7th Congress of Asian Pacific Federation of Societies for Surgery of the Hand 2008

21st HKSSH Annual Congress

3rd Congress of APFSHT

1st HKSHT Annual Congress

1st Conjoint Meeting of APFSSH and EWAS

Date: February 14-17 2008

Venue: The Hong Kong Convention and Exhibition Centre, Hong Kong, China

Macau Pre-Congress February 12-13 2008

Shenzhen Post-Congress February 18-20 2008

Congress Secretariat:

MV Destination Management Limited

Flat D, 8th Floor, Kim Tak Building, 328 Nathan Road,

Kowloon, Hong Kong, China

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http://www.apfssh2008.org

http://www.hksht.org

Programme & Abstracts

GUESTS OF HONOR

York Y N CHOW, SBS, JP
Secretary for Food and Health
Government of the Hong Kong Special Administrative Region

Shelley M. Chow
GradDipEd(EdAdmin),BAppSc(OT),HPCRegOT(UK),AccOT,OTR,SIPTCert
Registered Occupational Therapist (HK)
Adj Assoc Professor, Hong Kong Polytechnic University
Senior Consultant
Rehabilitation Consultants

It is with great anticipation and pleasure that we welcome delegates from around the world to Hong Kong for the 3rd Congress of the Asian Pacific Federation of Societies for Hand Therapists 2008.

With the committed support of local orthopaedic surgeons, occupational therapists and physiotherapists, hand rehabilitation has developed rapidly over the years since the late 1970's, such that Hong Kong's population is very well-served by extremely skilled and competent professionals.

The cross fertilization of ideas in hand rehabilitation techniques from the region and further afield has been achieved through meetings such as this congress, and your active participation is appreciated. Enjoy the networking opportunities, the presentations, exhibitions and stimulating discussions!

WELCOME MESSAGE

Shew-ping Chow
APFSSH President

The preparatory meeting of the APFSSH started in Hong Kong in the early 90s. Hong Kong now has an opportunity to host one of its congresses. During the intervening years, APFSSH has seen great strides in its development - its own official journal becoming indexed and its congresses getting more and more internationally recognized. I do hope that during this meeting, various ambassador programs can be formalized, thus adding the final pillar to our Federation. With your participation and support, this congress in Hong Kong will be remembered as another milestone in our development.

WELCOME MESSAGE

Josephine Wing-yuk. Ip
APFSSH Congress President

On behalf of the Organizing Committee, we would like to extend our warmest welcome to you for attending the 7th Congress of Asian Pacific Federation for Surgery of the Hand, the 3rd Meeting of Asian Pacific Federation of Societies of Hand Therapists and the 1st Conjoint Meeting of Asian Pacific Federation for Surgery of the Hand and the European Wrist Arthroscopy Society on February 14-17, 2008.

Hong Kong has been a meeting place between East and West and it is our greatest pleasure to host this Congress which is a conjoint event of various Societies. We have executed our utmost effort to make it a balance programme for the audience with wide variety of interests. Speakers from Asian Pacific region and worldwide are invited to enrich our scientific programme and to promote international interflow of knowledge.

This year we invite application for four junior traveling fellows. These awards are to recognize outstanding young surgeons with great potential to develop Hand Surgery in the coming generation.

Besides the main Congress, the pre-congress and the post-congress are in close by cities namely Macau and Shenzhen. We hope that you enjoy both the scientific programme and the three wonderful Chinese cities which have very different historical backgrounds.

Our Congress is held at the Chinese New Year month which is a time of great joy to all Chinese. I will take this opportunity to wish you to enjoy a year with good health, prosperity and fortune.

WELCOME MESSAGE

Josephine Man-wah Wong
Chairlady, HKSHT
APFSHT Congress President

The Hong Kong Society for Hand Therapy is really being cherished in 2008 when its First Annual Congress is held at the same time with the Third Congress of the Asian Pacific Federation of Societies for Hand Therapists. It is the enormous support from Dr Wing-yuk Ip, our congress president, Dr Cho-yee Lam, the president of the Hong Kong Society for Surgery of the Hand as well as our congress advisor, and all the members of the organizing committee that we can successfully realize, via the conference, a communication and meeting platform for our invited renowned speakers from USA, China, Sri Lanka and local regions, and all the hand therapists who participate. Apart from the invaluable knowledge that we can gain from our speakers, we can make new friends; enjoy delicious Chinese food and wonderful sceneries during our sight-seeing activities, and shopping in our low taxed shops all around. On behalf of the society, I do want to express our deepest thank to Dr Ip, our congress president and all the members of the organizing committee their support to our therapist congress. Moreover, I must thank all our council members, Dr Cecilia Li-tsang, Dr Grace Szeto, Ms Eva Ma, Ms June Wong and Mr Patrick So their effort in the organization work of that pioneer congress. Do support us by actively participating in our congress, now and in the future.

WELCOME MESSAGE

Tomoko Kondo, Ph.D., OTR/L
President of Asian Pacific Federation of Societies for Hand Therapists

It gives me great pleasure, as President, to welcome you to our third conference of Asian Pacific Federation of Societies for Hand Therapists (APFSHT) here in Hong Kong. We like to thank Professor Shew-Ping Chow, Congress Advisor, Dr. Wing-Yuk Ip, Congress President, and Organizing Committee of the 7th Asian Pacific Federation of Societies for Surgery of the Hand for their generous support to hold this conjoint conference. This exciting opportunity will enhance and further ensure the bond between therapists and surgeons.

This third conference is special for us, because it is a first three-day conference for our federation. It is also the conference that conjointly takes place with the first annual congress of the Hong Kong Society for Hand Therapy (HKSHT), celebrating its birth. Our conference program, enriched by the collaboration with these groups, includes four Therapists Symposia: Management of Hand Burns; Hand Therapy: From Education to Practice; Biomechanics and Splintage in Hand and Wrist; and Ergonomic Consideration, Pain Management and Work Rehabilitation, that will address the ideas, issues, concerns and goals of our everyday practice by the authorities of each area. The program also contains three free paper presentation sessions that will facilitate the unrestricted and complete exchange of knowledge among the participants.

The contribution of the local organizing committee of hand therapists, Dr. Grace Szeto, Dr. Cecilia Li-tsang, Ms. Eva Ma, Ms. June Wong, Mr. Patrick So, led by Ms. Josephine Wong, the secretariat of APFSHT and the first chairman of HKSHT, who made this event happen, was enormous. I would like to send special thanks to them. I also would like to thank my executive committee, Mr. Song Bo Kyung (Korea), Ms. Rosemary Prosser (Australia), and Mr. Kent Jui-Kun Chang (Taiwan), as well as executive committee members Dr. Cecilia Li-Tsang and Ms. Josephine Wong, for their effort to promote and prepare for the conference.

The Asian Pacific Federation of Societies for Hand Therapists welcomes you to this premier event. We thank you for support and we know that you will leave Hong Kong after having gained a wealth of new ideas, new perspectives, and new friends.

WELCOME MESSAGE

Cho-yee Lam
HKSSH President

Found in 1986, HKSSH is celebrating her 20th anniversary this year. 20 years is still trivial in the global development of hand surgery. However we had witnessed the establishment of Hong Kong Academy of Medicine in 1993 and her various Colleges progressively collaborated with International Bodies to set up local training programs and examinations. In the coming future they will serve as role models for our medical counterparts in PRC. This proves impossible without "1997".

In recognition of the immense contribution by my previous Councils, merits should be given to our past presidents, including SP Chow, PC Leung , J Cheng and others, too many to name. They are internationally renowned, not to say in the Asian pacific regions. Y Y Chow, our 9th President, was the man who sowed the seed for this enormous project of holding the 7th Congress of APFSSH in the Pearl of the Orient in 2008. W Y Ip, our present Congress President, was President Elect at that time.

Perhaps Dr. Ip will be telling you how she did it. As the 11th President, I would like to tell you some facts about our Society. HKSSH is a charitable body with 120 doctor members and 30 affiliated members running a small budget. Our primary missions are to promote the art and science of hand surgery and to provide academic activities to our members. Whilst our long term missions are to strengthen our bond with China, the Asian Pacific countries and world wide, and to hold the 7th Congress of APFSSH. Today, I am happy to accomplish this mission.

Within the various highlights, the 21st Annual Congress of the HKSSH and the 1st Annual Congress of our sister society, HKSHT will be impregnated into the main scientific program, sharing wisdom with every Congress delegate.

As the Congress advisor, I sincerely hope that you are happy staying with us. Your present trip, will be the most valuable and memorable one. Not only are you served by The Hand Societies of Hong Kong, Macau and Shenzhen, but also by the hearts of our professionals in accommodation, catering, tourism and entertainment. With that, I shall regard our mission is successfully fulfilled.

WELCOME MESSAGE

Hin-keung WONG

Secretary-General, 7th Congress of APFSSH

It is my great pleasure and deep honour to welcome you to attend the 7th Congress of the Asian Pacific Federation of Societies for Surgery of the Hand (APFSSH). This is the first time in the 20-year history of the Hong Kong Society for Surgery of the Hand (HKSSH) to host this important biennial Congress on 14 – 17 February 2008 at the Hong Kong Convention & Exhibition Centre. It is a combined meeting of the 7th Congress of APFSSH, the 3rd Congress of the Asian Pacific Federation of Societies for Hand Therapists (APFSHT), the 21st Annual Congress of HKSSH, the 1st Annual Congress of the Hong Kong Society for Hand Therapy (HKSHT) and the 1st Conjoint Meeting of the APFSSH and the European Wrist Arthroscopy Society (EWAS).

I must express my sincere thanks to all invited speakers and organizing committee members for their effort to make this Congress a success. The programme will be comprehensive, educational and stimulating. Distinguished and eminent international as well as regional speakers will speak on their areas of expertise through 11 plenary lectures, 11 symposia and 3 luncheon workshops. Prof Yu-dong Gu is the invited speaker of the Tajima Memorial Lecture. We have received over 400 free papers on clinical or laboratory research works related to hand surgery from various countries of the world for oral and poster presentations.

A Pre-Congress Meeting in Macau and a Post-Congress Meeting in Shenzhen are organized to enhance and encourage interaction among hand surgeons in Hong Kong, Macau and Shenzhen.

The ambassadorship exchange programme between HKSSH and Japanese Society for Surgery of the Hand (JSSH) runs smoothly since Year 2000. It aims at promoting fraternity and mutual exchange of knowledge, skill and experience between the two sister Hand Societies. This year, the Ambassador from Japan is Dr Koji Shigematsu. We also have set up the Junior Travelling Fellowship programme to encourage young and brilliant hand surgeons to participate in the Congress. Dr Shigematsu and the 4 Junior Travelling Fellows will present their papers on 15 February 2008 during a session dedicated for them..

Please meet your old friends, make new friends and enjoy the traditional Chinese musical performances during the Welcome Reception. It will be held at the Concord Room, 8/F, Renaissance Harbour View Hotel on 14 February 2008. We are very honoured to have Dr York Y.N. Chow, SBS, JP, Secretary for Food and Health of the Government of the Hong Kong Special Administrative Region and his wife, Shelley, as the guests of honour of the Opening Ceremony to be held on 15 February 2008. Interesting performances have been arranged for the Hong Kong Night Banquet which will be held at the Aberdeen Marina Club on 16 February 2008. This is an excellent opportunity for you to get together and strengthen the friendship.

Your attendance will be a valuable experience, not only in hand surgery but also in visiting Asia's World City, Hong Kong. Thank you very much for attending this important Congress.

SCHEDULE

Registration		
Hall 7A Foyer, Level 7, HKCEC	14 Feb 2008, Thursday	14:00 - 18:00
	15 Feb 2008, Friday	08:00 - 18:20
	16 Feb 2008, Saturday	08:00 - 17:20
	17 Feb 2008, Sunday	08:00 - 15:50
Business Meeting		
Room 603 and 604, Level 6, HKCEC	14 Feb 2008, Thursday	13:30 - 17:30
Welcome Reception		
Concord Room, 8/F, Renaissance Harbour View Hotel	14 Feb 2008, Thursday	18:00 - 21:00
Tajima Memorial Lecture		
Hall 7A Forum, Level 7, HKCEC	15 Feb 2008, Friday	10:30 - 11:30
Opening Ceremony		
Hall 7A Forum, Level 7, HKCEC	15 Feb 2008, Friday	11:30 - 12:00
JSSH Ambassador / Junior Travelling Fellow Session		
Hall 7A Forum, Level 7, HKCEC	15 Feb 2008, Friday	16:20 - 17:20
Lunchoen Seminar / Workshop		
Hall 7A Forum, Level 7, HKCEC	15 Feb 2008, Friday	12:00 - 13:00
Meeting Room 601, Level 6, HKCEC	16 Feb 2008, Saturday	12:30 - 14:00
	17 Feb 2008, Sunday	12:30 - 14:00
Scientific Sessions		
Various Meeting Rooms, HKCEC	15 Feb 2008, Friday	13:30 - 16:00
		16:20 - 18:20
	16 Feb 2008, Saturday	10:30 - 12:30
		15:30 - 17:20
	17 Feb 2008, Sunday	10:30 - 12:30
		15:20 - 17:20
Exhibition and Poster Session		
Hall 7A, Level 7, HKCEC	14 Feb 2008, Thursday	14:00 - 21:00
	15 Feb 2008, Friday	08:00 - 18:20
	16 Feb 2008, Saturday	08:00 - 17:20
	17 Feb 2008, Sunday	08:00 - 15:50
Hong Kong Night Banquet		
Aberdeen Marina Club	16 Feb 2008, Saturday	19:00 - 23:00

CONTENTS

CONFERENCE INFORMATION

Congress Venue
Hong Kong Convention and Exhibition Centre
1 Harbour Road, Wanchai, Hong Kong SAR, China
Tel No.: (852) 2582 8888

Congress Date
February 14-17, 2008

Lunch
February 15, 2008: Lunch boxes will be provided.
February 16 - 17, 2008: Luncheon Workshop
(* registration with sponsoring company is necessary)
or independent lunch

Conference Secretariat
MV Destination Management Ltd.
Flat D, 8/F, Kim Tak Building, 328 Nathan Road, Jordan, Kowloon, Hong Kong
Tel No.: (852) 2735 8118 Fax No.: (852) 2735 8282
Email: apfssh@mvdmc.com http://www.apfssh2008.org

Certificate of Attendance
A Certificate of attendance will be issued at the conference.

Official Language
The official language of the conference is English

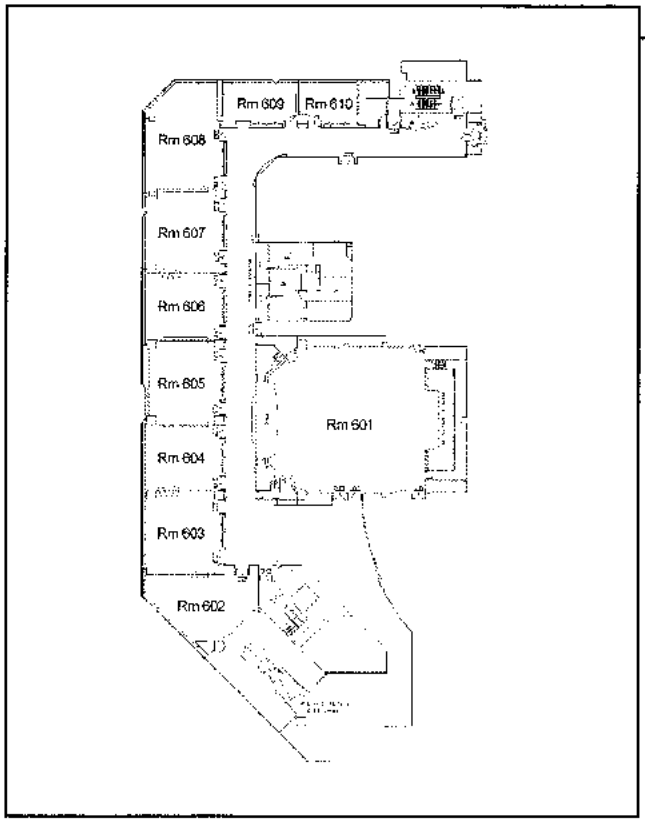
Registration
Registration counters are located at Hall 7A Foyer, Level 7, HKCEC. On-site registration can be made in cash (HK$ or US$) or by major credit cards.

CME Points
Continuing Medical Education (CME) credits have been applied from the respective medical institues in Hong Kong.

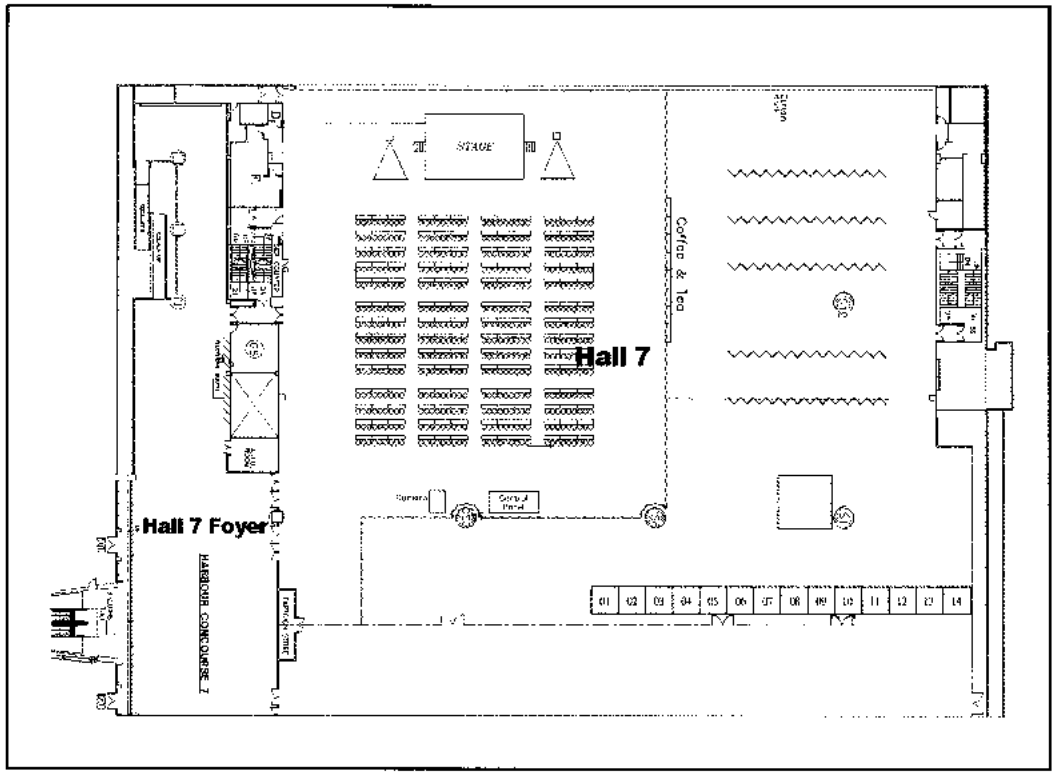
College / Programme	CME / CPD Points Awarded					
	Whole Function	15/2/2008	16/2/2008	17/2/008	CME/CPD Category	Other Condition
Anaesthesiologists	15	8.5	8.5	8.5	Non-anaes	
Emergency Medicine	10					
Family Physicians	Pending					
Orthopaedic Surgeons	15/10				Cat A/Rehab	Fellows Trainees
Pathologists	12	4	4	4	Passive	
Physicians		2	2	2		
Psychiatrists	18	6	6	6	List B	
Radiologists	25.5	8.5	8.5	8.5	Cat B	
Surgeons	18	6	6	6	Passive	
MCHK CME Programme	10 (max.)	5	5	5	Passive	Accredited by HKAM
HK Society of Certified Prosthetist-Orthotists	10 CEC					
Hong Kong Association of Orthopaedic Nurses	25.5 CNE	8.5	8.5	8.5		
Hong Kong Physiotherapy Association	15					
Hong Kong Occupational Therapists Board	22.5					

FLOOR PLAN

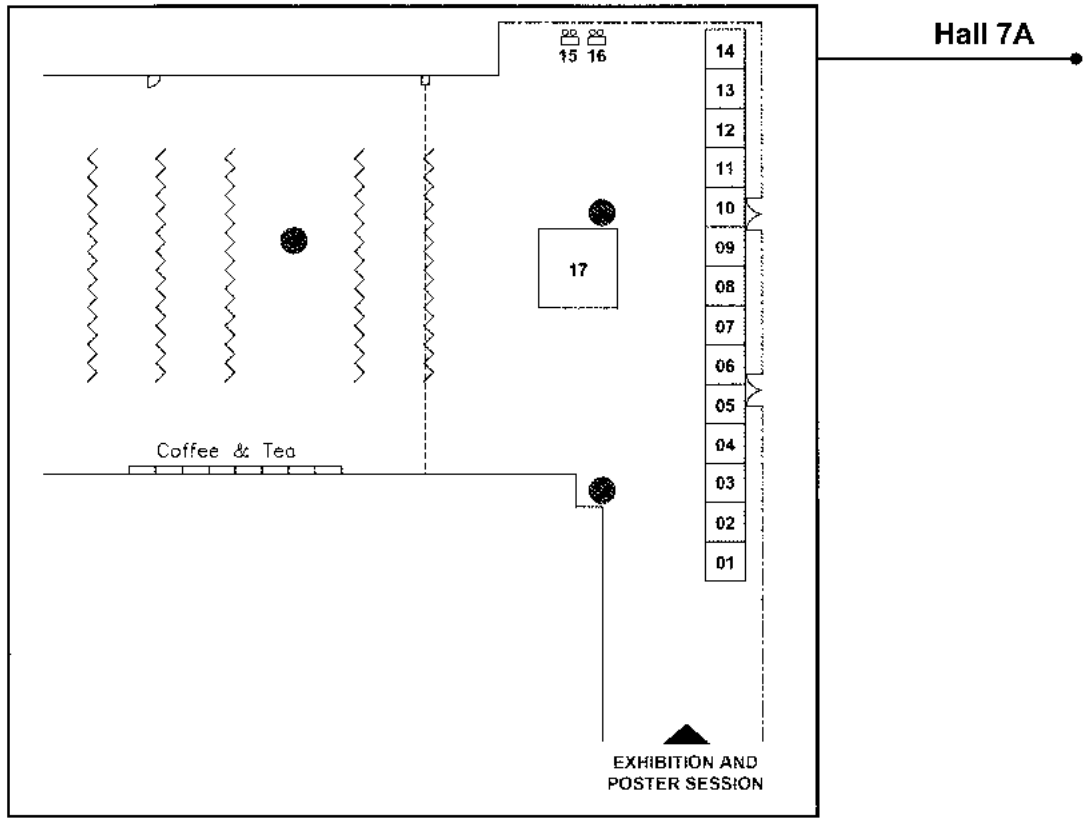
600 Series Meeting Rooms



Hall 7 and Hall 7 Foyer



EXHIBITION



EXHIBITORS	BOOTH NUMBER
Acumed	01
Shanghai Shending Industry Co., Ltd	02
Medartis AG	03
Karl Storz Endoscopy China Ltd	04
Biotech International	05
Klarity Medical & Equipment (GZ) Co., Ltd	06
Small Bone Innovations International	07
SAGE Publications Asia-Pacific Pte Ltd	08
MicroAire Surgical Instruments	09
Novartis Pharmaceuticals HK Ltd	10
Roche Hong Kong Ltd	11
Biometrics	12
APFSSH 2010	13
IFSSH 2010	14
Diamond Sponsor:	
Synthes Asia Pacific	17
Table Top:	
McBarron Book Co. Ltd.	15
World Scientific Publishing (HK) Co. Ltd	16

ORGANISING COMMITTEE

Congress Advisors

Shew-ping CHOW
Leung-kim HUNG
Ping-chung LEUNG
Cho-yee LAM

APFSSH Congress President

Josephine, Wing-yuk IP

Secretary-General

Hin-keung WONG

Financial Secretary

Yuen-fai LEUNG

Scientific Committee Chairmen

Robert, Yun-po CHANG
Fu-keung IP
Timothy, Yat-cheong SO
Pak-cheong HO
Stephen, Wing-cheung WU
Boris, Kwok-keung FUNG
Sheung-tung HO
Kan-hing MAK
Kai-yiu CHOI
Josephine, Wing-yuk IP

Workshop Co-ordinator

Chi-hung YEN
Ping-tak CHAN
Yan-kit LAU
Shun-chung LAU

Tajima Memorial Lecture Co-ordinator

Benjamin, Sin-tak FONG

Social Programme Committee

Yuk-yin CHOW

APFSHT / HKSHT Congress Organising Committee

Josephine, Man-wah WONG
Grace, Pui-yuk SZETO
Cecilia, Wai-ping LI-TSANG
Eva, Wai-ling MA
June, Yuen-ching WONG
Patrick, Tsz-wah SO

Pre-Congress Meeting Co-ordinator

Che-yuen LO
Hon-ming MAN

Post-congress Meeting Co-ordinator

Chi-wai CHAN
Yong-qing ZHUANG

Free paper Co-ordinator (oral presentation)

Yat-fai CHAN
Marianne, Man-yan LAM

Free paper Co-ordinator (posters)

Cham-on HO
Wing-leung CHAN

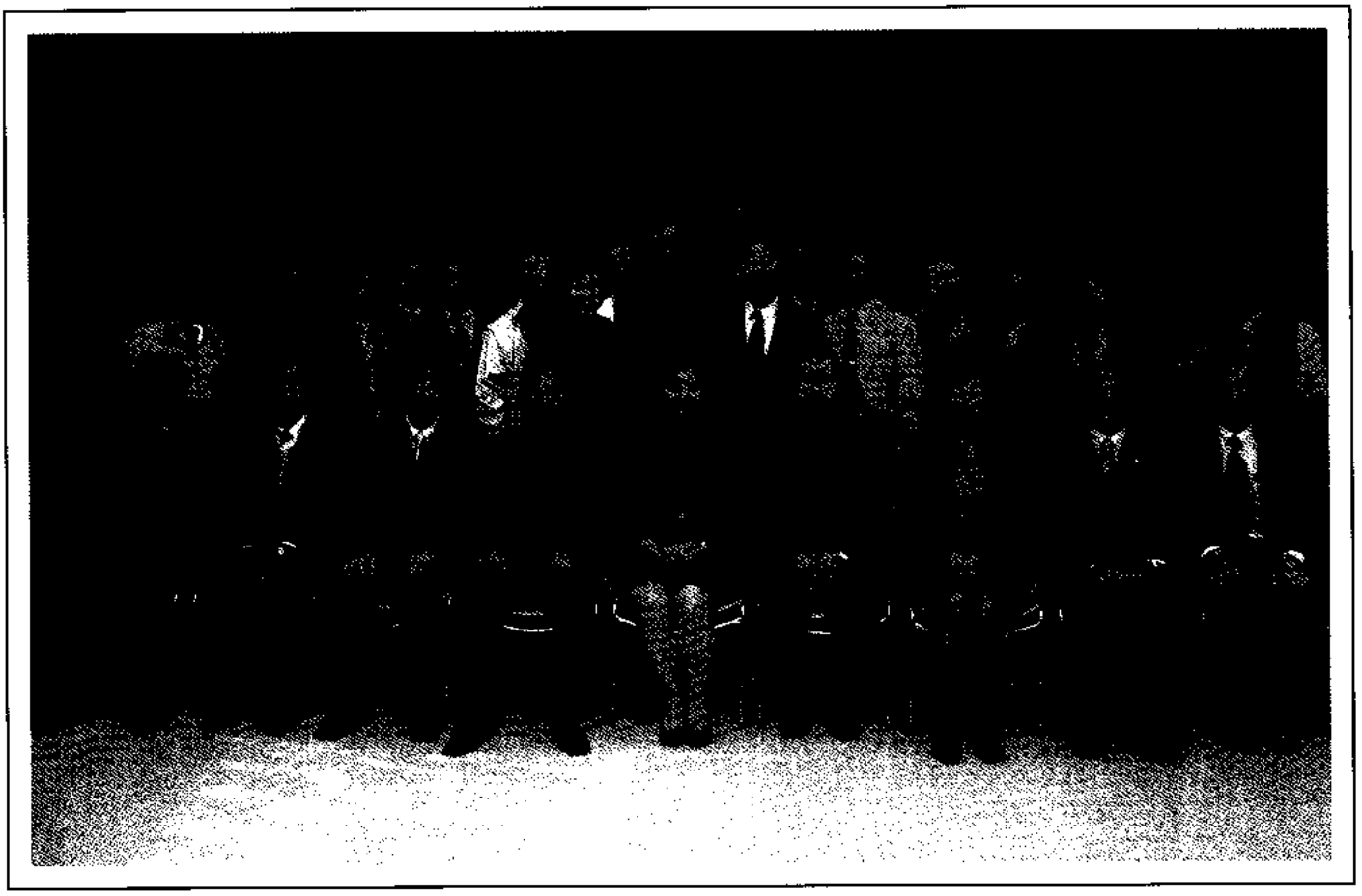
Venue Co-ordinator

Shun-fat WONG
Esther, Ching-san CHOW
Sally, Hi-shan CHENG

Other Organising Committee Member

Wing-lim TSE
Tak-hing YIP
Tak-chuen WONG
Ying-lee LAM
Kim-wai CHEUNG
Siu-cheong KOO

Organising Committee



(Back row from left) : YF Chan, LK Hung, WL Tse, KW Cheung, YY Chow, CH Yen, PT Chan, Marianne Lam, Boris Fung, KY Choi, YF Leung, KH Mak, CO Ho, TH Yip, YK Lau, CY Lo, WL Chan, TC Wong, SC Lau

(Front row from left) : PC Ho, Stephen Wu, ST Ho, CY Lam, Josephine Ip, Timothy So, Josephine Wong, HK Wong, Robert Chang

PROGRAM AT A GLANCE

		Hall 7A Foyer	Hall 7A	7A Forum	Meeting Room 601
Thursday 14 Feb 2008	13:30 - 14:00				
	14:00 - 17:30	Registration	Exhibition and Poster		
	17:30 - 18:00				
	18:00 - 21:00			Welcome Reception (Concord Rm, 8/F, Renaissance Harbour View Hotel)	
15 Feb 2008, Friday	08:00 - 09:00	Registration	Exhibition and Poster		Free Paper 1
	09:00 - 10:00			Plenary Lecture 1/2	
	10:00 - 10:30			TEA BREAK	
	10:30 - 11:30			Tajima Memorial Lecture	
	11:30 - 12:00			Opening Ceremony	
	12:00 - 13:00			SBI Luncheon Seminar	
	13:00 - 13:30			Plenary Lecture 11	
	13:30 - 16:00			SS1/ SS3 Basic Science/ Advanced Technology	T1 APFSHT/HKSHT 1
	16:00 - 16:20			TEA BREAK	
	16:20 - 17:20			JSSH Ambassador/ Junior Travelling Fellow Session	T2 APFSHT/HKSHT 2
	17:20 - 18:20			Upper Limb Reconstruction of Paralytic Conditions	
16 Feb 2008, Saturday	08:00 - 09:00	Registration	Exhibition and Poster		Free Paper 9
	09:00 - 10:00			Plenary Lecture 3/4	
	10:00 - 10:30			TEA BREAK	
	10:30 - 12:30			SS 5 Arthritis & Arthroplasty of Upper Limbs	T3 APFSHT/HKSHT 3
	12:30 - 14:00			AO Luncheon Workshop	Karl Storz Luncheon Workshop
	14:00 - 15:00			Plenary Lecture 5/6	
	15:00 - 15:20			TEA BREAK	
	15:20 - 17:20			SS 6 Hand Trauma (Tendon Surgery)	T4 APFSHT/HKSHT 4
	17:20 - 19:00				
	19:00 - 23:00	HONG KONG NIGHT BANQUET (Aberdeen Marina Club)			
17 Feb 2008, Sunday	08:00 - 09:00	Registration	Exhibition and Poster		Free Paper 17
	09:00 - 10:00			Plenary Lecture 7/8	
	10:00 - 10:30			TEA BREAK	
	10:30 - 12:30			SS 7 Hand and Wrist Injury I	T5 APFSHT/HKSHT 5
	12:30 - 14:00			AO Luncheon Workshop	
	14:00 - 15:00			Plenary Lecture 9/10	
	15:00 - 15:20			TEA BREAK	
	15:20 - 15:50			SS 9 Hand & Wrist Injury II	SS 10 Neurological Problems Including Brachial Plexus Injury
	15:50 - 17:20				
	17:20 - 17:50			Closing Ceremony	
	18:00 - 19:00				

Meeting Room 603	Meeting Room 604	Meeting Room 605		
Business Meeting			13:30 - 14:00	Thursday 14 Feb 2008
			14:00 - 16:00	
			16:00 - 16:30	
			18:00 - 21:00	
Free Paper 2	Free Paper 3	Free Paper 4	08:00 - 09:00	15 Feb 2008, Friday
			09:00 - 10:00	
TEA BREAK			10:00 - 10:30	
			10:30 - 11:30	
			11:30 - 12:00	
			12:00 - 13:00	
			13:00 - 13:30	
SS 2 *CULA*		Free Paper 5/6	13:30 - 16:00	
TEA BREAK			16:00 - 16:20	
SS 4 Elbow Surgery & Miscellaneous		Free Paper 7/8	16:20 - 17:20	
			17:20 - 18:20	
Free Paper 10	Free Paper 11	Free Paper 12	08:00 - 09:00	16 Feb 2008, Saturday
			09:00 - 10:00	
TEA BREAK			10:00 - 10:30	
W 1 1st Conjoint Meeting of APFSSH & European Wrist Arthroscopy Society		Free Paper 13/14	10:30 - 12:30	
			12:30 - 14:00	
			14:00 - 15:00	
TEA BREAK			15:00 - 15:20	
W 2 1st Conjoint Meeting of APFSSH & European Wrist Arthroscopy Society		Free Paper 15/16	15:20 - 17:20	
			17:20 - 19:00	
HONG KONG NIGHT BANQUET (Aberdeen Marina Club)			19:00 - 23:00	
Free Paper 18	Free Paper 19	Free Paper 20	08:00 - 09:00	17 Feb 2008, Sunday
			09:00 - 10:00	
TEA BREAK			10:00 - 10:30	
SS 8 Symposium on Minimal Invasive Surgery in Upper Limb		Free Paper 21/22	10:30 - 12:30	
			12:30 - 14:00	
			14:00 - 15:00	
TEA BREAK			15:00 - 15:20	
SS 11 Reconstructive Microsurgery & Tissue Engineering		Free Paper T 1/2	15:20 - 15:50	
			15:50 - 17:20	
			17:20 - 17:50	
		AO Lectures	18:00 - 19:00	

INVITED SPEAKERS

Tajima Memorial Lecture Speaker

Yu-dong Gu (China)

"Contralateral C7 Root Transfer over the last 20 years in China "

Plenary Lecture Speakers

Douglas Campbell (UK)
"Advances in the Management of Fracture of Distal Radius"

Alan Freeland (USA)
"The Operative Treatment of Phalangeal Fractures: Procedures to Do Routinely and Procedures to Avoid or Use Only with Discretion"

Marc Garcia-Elias (Spain)
"The Clunking Wrist: Pathomechanics and Treatment"

Alain Gilbert (France)
"Obstetrical Brachial Plexus Palsy"

Sylwester Gogolewski (Poland)
"Regenerative Medicine in Hand Surgery"

INVITED SPEAKERS

Daniel Herren (Switzerland)
"Rheumatoid Arthritis Surgery in the Hand: the European Perspective"

Michael Keith (USA)
"Reconstruction of the Hand and Upper Extremity after Paralysis, Surgery and Neuroprostheses"

Beng-hai Lim (Singapore)
"Flexor Tendon Injuries - Towards a Splint Free Repair "

Constantine Sotereanos (USA)
"Elbow Contracture: Evaluation and Management of the Stiff Elbow"

Simo Vilkki (Finland)
"Radial Club Hand"

Steven Viegas (USA)
"Demands on and Injuries to the Hand and Upper Extremity seen in the Astronauts in Space Program during Training and Space Flight"

JSSH AMBASSADOR / JUNIOR TRAVELLING FELLOW

JSSH-HKSSH Exchange Ambassador

Koji Shigematsu
MD, PhD
West Nara Central Hospital

Junior Travelling Fellows

Ahmed Syed Kamran
Honorary Clinical Associate.
Division of Hand and Foot.
Department of Orthopaedics and Traumatology
The University of Hong Kong

Ellen Yutan Lee
Philippine General Hospital

Ge Xiong
Department of Hand Surgery Beijing Jishuitan Hospital

Praveen Bhardwaj
Ganga Hospital, Coimbatore, India

SCIENTIFIC PROGRAMME

Friday February 15th 2008

7A Forum

Time	*Session*	
09:00-09:30	***PL1***	Reconstruction of the Hand and Upper Extremity after Paralysis, Surgery and Neuroprostheses **Michael Keith (USA)**
09:00-09:30	***PL2***	Radial Club Hand **Simo Vilkki (Finland)**
10:00-10:30		***TEA BREAK***
10:30-11:30		Tajima Memorial Lecture Contralateral C7 Root Transfer over the last 20 years in China **Yu-dong Gu (China)**
11:30-12:00		Opening Ceremony
12:00-13:00		SBI Luncheon Seminar
13:00-13:30	***PL11***	Obstetrical Brachial Plexus Palsy **Alain Gilbert (France)**
	SS1/SS3	**Basic Science & Advanced Technology Symposium** ***(moderator: H Moritomo & Zong-Ming Li)***
13:30-14:00		• Biomechanics of the Hand & Wrist ***(Steven Viegas)***
14:00-14:15		• Biomechanics of wrist dart-throwing motion ***(Moritomo)***
14:15-14:35		• Anatomic Variability of the Wrist ***(Steven Viegas)***
14:35-14:45		• Biomechanics of carpal tunnel syndrome ***(Zong-Ming Li)***
14:45-15:15		• Reconstruction of Paralysis using Implanted Neuroprosthetics ***(Michael Keith)***
15:15-15:45		• Carpal instabilities ***(Steven Viegas)***
15:45-16:00		• Telemedicine - Its use in the field of Hand Surgery ***(Steven Viegas)***
16:00-16:20		***TEA BREAK***
16:20-17:20		**JSSH Ambassador / Junior Travelling Fellow Session**
		Upper Limb Reconstruction of Paralytic Conditions ***(moderator: G Balkrishnan, KH Mak)***
17:20-17:35		• Post Hansen's Upper limb Paralysis: Some Concepts in Tendon transfers ***(K Sridhar)***
17:35-17:45		• Role of surgical reconstruction for upper limb function improvement in tetraplegic patients ***(Pak Cheong Ho)***
17:45-17:55		• Thumb surgery in cerebral palsy ***(Michael Tonkin)***
17:55-18:05		• Upper limb reconstruction in cerebral palsy ***(Kan Hing Mak)***
18:05-18:20		• Discussions

Meeting Room 601

Time	*Session*	
08:00-09:00	***FP1***	Free Paper 1
	T1	**APFSHT/HKSHT 1**
13:30-13:40		Opening Speech of 3rd APFSHT ***(SP CHOW)***
13:40-13:50		Opening Speech of 3rd APFSHT ***(Tomoko KONDO)***
	T2	**Therapist Symposium 1 - Hand Therapy: From Education to Practice** ***(moderators: Mr. Masao WATANABE, Dr. Grace SZETO)***
13:50-14:10		• Teaching Hand Therapy to Occupational Therapy and Physical Therapy Students ***(Kimiko SHINA)***
14:10-14:30		• Developing Hand Therapy in China ***(Jie LAO)***
14:30-14:50		• Hand Therapy: A Professional Specialty versus An Academic Research Niche ***(Cecilia LI-TSANG)***
14:50-15:10		• Discussion
15:10-16:00		• Free Paper Session
16:00-16:20		***TEA BREAK***
		APFSHT/HKSHT 2
		Therapist Symposium 2 - Management of Hand Burns ***(moderators: Kent CHANG, Cecilia LI-TSANG)***
16:20-16:50		• Micro-Surgery in the Management of Hand Burns ***(David Andrew Ross BURD)***
16:50-17:20		• Experience in Managing Burnt Hands in China ***(LK HUNG)***
17:20-17:40		• Pressure Therapy for Burnt Hands ***(Anna WU)***
17:40-18:00		• Rehabilitation of Full Thickness Burnt Hands ***(Asha KARUNATILAKE)***
18:00-18:20		• Discussion

Meeting Room 603, 604

Time	*Session*	
08:00-09:00	***FP2/3***	**Free Paper 2/3**
	SS2	**Congenital Upper Limb Anomalies Symposium** **Complex Congenital Anomalies and Pitfalls in Management** ***(moderators: Dr. Timothy So, Prof. Fuminori Kanaya)***
13:30-13:50		• Polydactyly - how to avoid complications in complex cases ***(Michael Tonkins)***
13:50-14:10		• Ulnar club hand (**Simo Vilkki**)
14:10-14:30		• Syndactyly with complex deformities (**Toshihiko Ogino**)
14:30-14:50		• The Role of Microsurgical Toe Transfers in Congenital Hand (**Simo Vilkki**)
14:50-15:05		• Pitfalls in surgery for Congenital Hand Anomalies (**LK Hung**)
15:05-15:15		• Discussion
15:15-16:00		**Ask the Experts (clinical case discussion)** ***(LK Hung, Toshihiko Ogino, Michael Tonkins, Simo Vilkki)***
16:00-16:20		***TEA BREAK***

Meeting Room 603, 604

Time	*Session*	
	SS4	**Elbow Surgery & Miscellaneous** ***(moderator: Dr. Y. Y. Chow, Dr. C Y Lo. Dr. W. C. Wu)***
16:20-16:50		• Elbow fracture dislocation---from common injuries to complex and rare patterns. ***(Dr. Sotereanos)***
16:50-17:10		• Heterotopic ossification of the elbow—How I do it. ***(Dr. Soereanos)***
17:10-17:30		• Biceps tendon rupture----Surgical management and how to prevent complications. ***(Dr. Sotereanos)***
17:30-17:50		• Elbow arthroplasty: how well are the patients doing? ***(Dr. Daniel Herren)***
17:50-18:00		• Chronic elbow joint instability reconstructed with bone-ligament-bone graft from the iliac crest. ***(Dr. W. C. Wu)***

Meeting Room 605

Time	*Session*	
08:00-09:00	***FP4***	Free Paper 4
13:30-16:00	***FP5/6***	Free Paper 5/6
16:00-16:20		***TEA BREAK***
16:20-18:20	***FP7/8***	Free Paper 7/8

SCIENTIFIC PROGRAMME

Saturday February 16th 2008

7A Forum

Time	*Session*	
09:00-09:30	***PL3***	Rheumatoid Arthritis Surgery in the Hand: the European Perspective **Daniel Herren (Switzerland)**
09:30-10:30	***PL4***	The Clunking Wrist: Pathomechanics and Treatment **Marc Garcia-Elias (Spain)**
10:00-10:30		***TEA BREAK***
	SS5	**Arthritis & Arthroplasty of Upper Limbs** **Symposium of Arthritis & Arthroplasty Part I - CMC arthritis** ***(Moderator: Lee Osterman, Alex Choi)***
10:30-11:00		• Current strategies for the surgical treatment of thumb carpometacarpal arthritis ***(Lee Osterman)***
11:00-11:10		• Suspension arthroplasty for thumb CM arthritis ***(Osamu Soejima)***
11:10-11:20		• Local experience of thumb CM arthritis reconstruction ***(Tak Chuen Wong)***
11:20-11:30		• Discussion
		Symposium of Arthritis & Arthroplasty Part II - Rheumatoid arthritis ***(Moderator: Daniel Herren, Cho Yee Lam)***
11:30-11:40		• Reconstruction of the PIP joint ***(Yoshitaka Minamikawa)***
11:40-11:50		• Novel Design and Development a new prosthetic device for proximal interphalangeal joint replacement ***(Josephine Ip)***
11:50-12:00		• Synovectomy around the wrist - rewarding alternative to preserve joint integrity in rheumatoid patients ***(Syed Kamran Ahmed)***
12:00-12:10		• Arthroscopic treatment for Rheumatoid wrist ***(Wing Lim Tse)***
12:10-12:20		• Metacarpophalangeal joint arthroplasty in rheumatoid arthritis: a long term assessment report ***(Cho Yee Lam)***
12:20-12:30		• Discussion
12:30-14:00		AO Luncheon Workshop
14:00-14:30	***PL5***	Regenerative Medicine in Hand Surgery **Sylwester Gogolewski (Poland)**
14:30-15:00	***PL6***	Flexor Tendon Injuries –Towards a Splint Free Repair **Beng-hai Lim (Singapore)**
15:00-15:20		***TEA BREAK***

7A Forum

Time	*Session*	
	SS6	**Hand Trauma (Tendon Surgery)**
		Tendon Injury Symposium ***(moderators: Osamu Soejima, Kan Hing Mak)***
15:20-15:35		• Basic science of tendon healing ***(Leung Kim Hung)***
15:40-15:50		• Flexor tendon injury in children ***(Alain Gilbert)***
15:55-16:00		• 4-strand flexor tendon repair ***(Chi Hung Yen)***
16:05-16:10		• Rehabilitation after tendon repair ***(Selina Wan)***
16:10-16:25		• Discussion
		Tendon Reconstruction Symposium
		(moderators: Moon Sang Chung, Chi Hung Yen)
16:25-16:40		• 2 stage flexor tendon reconstruction ***(Steven Viegas)***
16:40-16:50		• Loop tendon technique in tendon transfer ***(Hyun Sik Gong)***
16:50-17:00		• Subluxation of extensor digitorum communis tendon at metacarpophalangeal joint treated by Wheeldon's method (Il Jung Park)
17:00-17:10		• Extensor indicis proprius transfer for abducted small finger (Hyun Sik Gong)
17:10-17:20		• Discussion

Meeting Room 601

Time	*Session*	
08:00-09:00	***FP9***	Free Paper 9
	T3	**APFSHT/HKSHT 3**
		Therapist Symposium 3 - Biomechanics and Splintage in Hand and Wrist
		(moderators: Bo-Kyung SONG, Priscillia LAM)
10:30-11:00		• Biomechanical Interactions of the Hand ***(Zong-Ming LI)***
11:00-11:30		• Management of Stiff Hand: Splint or Cast ***(Judy COLDITZ)***
11:30-11:50		• Hand Brace for Colle' Fracture ***(Xia GUO)***
11:50-12:10		• Splinting for Wrist Injuries ***(Felicity Thorley)***
12:10-12:30		• Discussion
12:30-14:00		Karl Storz Luncheon Workshop
	T4	**APFSHT/HKSHT 4**
		Ergonomic Consideration, Pain Management and Work Rehabilitation
		(moderators: Felicity Thorley, Lay Lay TAN)
15:20-15:50		• Upper Extremity Disorders Related to Computer Use ***(Grace SZETO)***
15:50-16:20		• Physiotherapy Management for Upper Limb Work-Related Injuries ***(Edwin LEE)***
16:20-16:40		• Occupational Rehabilitation for Hand Injuries ***(Dan TANG)***
16:40-17:00		• Occupational Therapy Management for Upper Limb Disorders ***(Andy CHENG)***
17:00-17:20		• Discussion

Meeting Room 603, 604

Time	*Session*	
08:00-09:00	***FP10/11***	Free Paper 10/11
	W1	**1st Conjoint Meeting of APFSSH & European Wrist Arthroscopy Society** **Therapeutic wrist arthroscopy *(Moderator: Fujio Keiji, Riccardo Luchetti)*** • Arthroscopic repair of the TFC ***(Toshiyasu Nakamura)***
10:30-10:40		
10:40-10:50		• Classification and treatment algorithm of peripheral TFCC tears ***(Andrea Atzei)***
10:50-11:00		• Plate presetting arthroscopic reduction technique (PART) for distal radius fractures ***(Yukio Abe)***
11:00-11:10		• Arthroscopic management of post traumatic wrist sub-acute and chronic disorders ***(Michel Levadoux)***
11:10-11:25		• Discussion
11:25-11:35		**Special Lecture: Risks Arthroscopy: Importance of getting porper training *(Marc Garcia-Elias)***
11:35-12:30		**Innovation in wrist arthroscopy *(Moderator: KP Looi , Michel Levadoux)*** • Wrist Arthroscopy - New Technique ***(Gregory Bain)*** • Old Problems and New Tricks - Percutaneous and Arthroscopic Innovation of Hand & Wrist ***(Joseph Slade)*** • Arthroscopic assisted Sauvè Kapandji procedure ***(Riccardo Luchetti)*** • Complex reconstructive arthroscopic surgery of the wrist - How far it can go ***(PC Ho)*** • Discussion
	W2	**1st Conjoint Meeting of APFSSH & European Wrist Arthroscopy Society** **Small joint arthroscopy in the hand *(Moderator: Alex Choi, Loris Pegoli)***
15:20-15:30		• Role of CMCJ arthroscopy in advanced CMCJ arthritis ***(WL Tse)***
15:30-15:40		• Arthroscopic Artelon interposition in CMCJ arthritis ***(Alejandro Badia)***
15:40-16:50		• Arthroscopic Resection of Distal Pole of the Scaphoid for STT Joint Arthritis: Comparison between Simple Resection and Implant Interposition and analysis of Disi Evolution ***(Loris Pegoli)***
15:50-16:05		• Arthroscopy of the Metacarpophalangeal and Proximal Interphalangeal Joint in Rheumatoid Arthritis ***(Isato Sekiya)***
16:05-16:30		• Discussion
		Symposium on Wrist Instability (Carpal & DRUJ) ***(Moderator: LK Hung, Tunku Sara Ahmad)***
16:15-16:40		• Three-ligament tenodesis for the treatment of Scapholunate Dissociations. Indications, technique and results ***(Marc Garcia-Elias)***
16:40-16:50		• Chronic DRUJ Instability ***(Ben Hai Lim)***
16:50-17:00		• Lunotriquetral Dissociation, Diagnosis and Treatment ***(Ryogo Nakamura)***
17:00-17:10		• Palmar Mid-Carpal Instability (PMCI): A Relatively Neglected Form of Carpal Instabe ***(PC Ho)***
17:10-17:20		• Treatment of carpal instability associated with scaphoid nonunion and proximal pole AVN ***(Alexander Shin)***

Meeting Room 605

Time	*Session*	
08:00-09:00	***FP12***	Free Paper 12
10:30-12:30	***FP13/14***	Free Paper 13/14
15:20-17:20	***FP15/16***	Free Paper 15/16

SCIENTIFIC PROGRAMME

Sunday February 17th 2008

7A Forum

Time	*Session*	
09:00-09:30	***PL7***	The Operative Treatment of Phalangeal Fractures: Procedures to Do Routinely and Procedures to Avoid or Use Only with Discretion **Alan Freeland (USA)**
09:00-09:30	***PL8***	Advances in the Management of Fracture of Distal Radius **Douglas Campbell (UK)**
10:00-10:30		***TEA BREAK***
	SS7	**Hand & Wrist Injury I** **Wrist fractures** ***(moderators: Gregory Bain, Leung Kim Hung)***
10:30-10:45		• Bone substitute in hand and wrist fracture ***(Fuminori Kanaya)***
10:45-11:00		• Evolution of implants for fixation of fracture distal radius ***(Douglas Campbell)***
11:10-11:20		• Local experience of thumb CM arthritis reconstruction ***(Tak Chuen Wong)***
11:00-11:10		• Discussion
		Hand fractures ***(moderators: Sai-hung Yeung, Fuminori Kanaya)***
11:10-11:25		• Operative treatment of metacarpal fractures ***(Lao Jie)***
11:25-11:35		• Percutaneous fixation of phalangeal fracture ***(Gorvindasamy Balakrishnan)***
11:35-11:45		• Osteochondral graft in phalangeal fracture ***(Yuk Yin Chow)***
11:45-12:00		• Rehabilitation after intraarticular fracture of hand ***(Leung Kim Hung)***
12:00-12:15		• Malunion and nonunion of phalangeal fracture ***(Alan Freeland)***
12:15-12:30		• Discussion
12:30-14:00		AO Luncheon Workshop
14:00-14:30	***PL9***	Elbow Contracture: Evaluation and Management of the Stiff Elbow **Constantine Sotereanos (USA)**
14:30-15:00	***PL10***	Demands on and Injuries to the Hand and Upper Extremity seen in the Astronauts in space program during training and space flight **Steven Viegas (USA)**
15:00-15:20		***TEA BREAK***
	SS9	**Hand & Wrist Injury II** ***Liagmentous Injury of the Hand*** ***(moderators: Alan Freeland, Tak-chuen Wong)***
15:20-15:32		• Ligamentous anatomy and motion analysis of carpometacarpal joint ***(Steven Viegas)***
15:32-15:42		• Thumb carpometacarpal joint dislocation ***(Sheung Tung Ho)***
15:42-15:52		• Thumb metacrpophalangeal joint soft tissue injury ***(Takkaaki Shinohara)***
15:52-16:02		• Finger proximal interphalangeal joint collateral ligament injury ***(Beng Hai Lim)***
16:02-16:12		• Reconstruction of finger joint instability ***(Wing Cheung Wu)***
16:12-16:22		• Discussion
		Carpal Injury ***(moderators: Govindasamy Balakrishnan, Wing-cheung Wu)***
16:22-16:34		• Complex carpal injury ***(Gregory Bain)***
16:34-16:46		• Perilunate fracture dislocation ***(Constantine Sotereanos)***
16:46-16:58		• Minimal invasive treatment in transcaphoid perilunate dislocation ***(Tak Chuen Wong)***
16:58-17:10		• Limited wrist fusion ***(Gregory Bain)***
17:10-17:20		• Discussion

Meeting Room 601

Time	*Session*	
08:00-09:00	***FP17***	Free Paper 17
	T5	**APFSHT/HKSHT 5** **Therapist Free Paper Session 2** ***(moderators: Eva MA, Jimmy YUEN)***
10:30-11:30		• Free Paper Session
		Therapist Free Paper Session 3 ***(moderators: Polina YEUNG, June WONG)***
11:30-12:15		• Free Paper Session
12:15-12:30		• Closing Announcement ***(Tomoko KONDO)***
	SS10	**Neurological Problems Including Brachial Plexus Injuiry** ***(moderator: FK IP , TH YIP)***
15:20-15:50		• Obstetrical brachial plexus palsy (II) - secondary surgery /reconstruction ***(Alain Gilbert)***
15:50-16:10		• Peripheral nerve entrapment ***(Reimer Hoffmann)***
16:10-16:40		• Nerve transfer in adult brachial plexus injury ***(David Chwei-Chin Chuang)***
16:40-17:00		• Reconstruction in adult brachial plexus injury ***(Panupan Songchareon)***
17:00-17:20		• Basic science in C7 transfer in brachial plexus injury ***(Xui Jian-guang)***
		• Discussion

Meeting Room 603, 604

Time	*Session*	
08:00-09:00	***FP18/19***	Free Paper 18/19
10:30-11:35	***SS8***	**Symposium on Minimal Invasive Surgery** **Symposium I –MIS in upper limb *(Moderator : CH Wong)*** • Aesthetic aspects of minimally and endoscopic surgery of hand and forearm ***(Reimer Hoffmann)*** • Prospective Randomized Study Comparing Percutaneous and Open Trigger Finger Release ***(Wing-lim Tse)*** • Our Results in 232 Endoscopic Trigger Finger Release and Comparison with Open Procedure ***(Loris Pegoli)*** • Percutaneous Fasciotomy for Dupuytren Contracture in Chinese Patient ***(HS Cheng)***
11:35-12:30		**Symposium II – MIS in Tunnel Syndrome** ***(Moderator : Shigeharu Uchiyama, Yun-po CHAN)*** • Endoscopic Management in Thoracic Outlet Syndrome ***(Te-Sung Chen)*** • Okutsu one-portal endoscopic operative technique for carpal tunnel syn drome - 21years of clinical experience ***(Ichiro Okutsu)*** • Raynaud's Phenomon in Carpal Tunnel Syndrome ***(Goo-hynn Baek)*** • Endoscopic carpal tunnel release using modified Chow's extrabursal dual portal technique : Clinical results of 1100 patients ***(Poong-taek Kim)*** • Less Invasive ECTR Using Modified Chow's Technique and 5mm dia. Cannula ***(Shigeharu Uchiyama)***

Meeting Room 603, 604

Time	*Session*	
	SS11	**Symposium on Reconstructive Microsurgery & Tissue Engineering** ***(Moderator : Wing-yuk IP, S. Raja Sabapathy)***
15:20-15:30		• From Microsurgery to Regenerative Medicine ***(Wing-yuk IP)***
15:30-15:50		• Perspective of Microsurgery in the Hand ***(Soo-Bong Hahn)***
15:50-16:05		• Tissue Engineering of Bone and Skin ***(Sylwester Gogolewski)***
16:05-16:30		• Principles in choosing soft tissue cover of major injuries of the Hand ***(S. Raja Sabapathy)***
16:30-16:40		• Thumb Reconstruction ***(Chi-hung LIN)***
16:40-16:50		• Free Vascularized Fibula Grafts in Surgery of Upper Extremities ***(Hiroshi Yajima)***
16:50-17:00		• Application of Free-Style Perforator Flap from Proximal Lateral Leg For Hand Soft Tissue Transfer ***(Wei-choa Huang)***
17:00-17:07		• Neurosensory Free Flaps in the Hand ***(Jun-mo Lee)***
17:07-17:15		• Reconstruction of Hand Function by Various Types of Free Functional Muscle Transplantation ***(Sang-hyun Woo)***
17:15-17:20		• Discussion

Meeting Room 605

Time	*Session*	
08:00-09:00	***FP20***	Free Paper 20
10:30-12:30	***FP21/22***	Free Paper 21/22
15:20-17:20	***FP T 1/2***	Free Paper T 1/2
18:00-19:00		AO Lectures

PLENARY LECTURE

15 February, Friday
7A Forum
09:30 - 10:00

Radial Club Hand

Simo K. Vilkki M.D., Ph.D.
Tampere University Hospital
Finland.

Introduction and background

The optimum treatment for radial club hand is still controversial. Many different operative techniques have been used but are the results satisfactory in long term?

Centralization or radialization techniques have been the most frequently used conventional methods. The recommendation of the optimal age for surgery has been very low or below 1-year age. The ulna longitudinal growth, which is retarded considerably by the disease itself, can additionally be affected by early aggressive surgery. The normal ulna length at one year is 8-9 cm:s, while the ulna in radial club hand is only 5-6 cm:s at the same age. The final forearm or ulna length after growth period will remain always about 40 % shorter. This can be seen in non-treated cases.

What happens when the distal epiphyseal growth is disturbed at early life, when at least 2/3 from longitudinal forearm length should be still expected by growth process? Is the conventional surgery, which is directed to wrist area and very near to distal ulnar epiphysis, without adverse effects?

The reported forearm lengths in various studies have often been under 50 % of normal forearm lengths. [1,2,3] Recent developments in operative technique:

1)Preoperative soft tissue distraction is now widely used and considered to help in achieving a more safe centralization or radialization. 2) An adequate soft tissue release is considered also helpful in maintaining the correct wrist balance. 3) Physeal transplantation using fibula has been tried in several centers. 4) A bone distraction in order to correct marked forearm length discrepancies has become popular in some centers.

Experience from previous treatment options

The author has followed special groups of radial club hand patients: 1) A non-operative group

2) A centralization group 3) A radialization group 4) In addition, the author has extracted some data from modern bone lengthening series.[4,5], where the length-discrepancy has been tried to solve using external lengthening devices.

Observing the results in these different groups it is possible to see a variable tendency to growth retardation and recurrent deformation and evaluate the effects of surgery. In groups 2 and 3 there appears to be iatrogenically induced shorter than group 1 forearms. Despite of apparently adequate operative treatment the problems of long-term recurrences are also common [3].

If bone lengthening series are followed carefully, there seems to be a clear need for second time lengthening if the goal of treatment is set to equalizing the forearm length discrepancy. This is, however, most often faced with extremely long treatment times and the threat of many different complications. Also the bone-lengthening seems to become indicated partly because of additionally retarded iatrogenic growth disturbances from early surgery.

Author's present treatment method

The author has developed and used over 15 years a combined soft-tissue-distraction and epiphyseal growth-plate-transplantation method in order to treat radial club hand [6,7,8].

After continuous conservative splinting at early life, the deformity correction is done using unilateral external distractor. A slow soft tissue distraction, only half a millimeter a day, with the correction of the deformed and subluxed wrist area is carried out at the age of 2-3 years.

This procedure can be combined to a release operation of the tight radial structures in cases, when the patient is older and when the deformity is more fixed (type 3) with anlage type remnants of radius. After distraction period a microvascular bone and joint transfer from the foot is carried out using a second metatarsal bone with the proximal phalanx and the MTP II-joint. The joint transfer used includes two epiphyseal plates. With the aid of this vascularised and neurotized joint graft the radial club hand is stabilised in neutral or slightly overcorrected position.

Also the filleted skin of the second-toe is used to cover the transplant on the radial side of the wrist. After transplantation the wrist is held in the external fixator for about two additional months in order to allow the proper stabilisation and incorporation of the graft into the wrist area before any stress forces are allowed. Protective splinting is also continued until metatarsal graft hypertrophy.

Results:

A series of 23 patients (25 extremities) has been treated with this method. The follow-up time in in 19 cases followed over 4 years is 11 years in mean. With the aid of joint transplantation the extension-flexion mobility at wrist has been good (from 30 degree extension to 80 degree volar flexion). The alignment of the wrist has been acceptable even at long-term follow-up in the cases when the primary correction has been complete and when the graft has survived without compromise. The forearm longitudinal growth has apparently become slightly enhanced while relative ulna length (R.U.L.) has been slightly better than according to natural history of the radial club hand should appear (67 % in mean compared to healthy side or normal 50% percentile). The donor morbidity at the foot has remained minimal and has been equal to a normal toe-to-hand transfer in children.

Discussion

The author's preoperative soft tissue distraction combined with epiphyseal grafting using a whole metatarsal and MTP II-joint will help to maintain the ulna growth as "normal" as it will be in radial club hand. It also provides a wide wrist like movement from slight 20-30 degree extension to marked almost 90 degree palmar flexion. The growth rate in distal ulna and the transplanted second metatarsal will apparently not be in exact balance and there may appear a need for secondary surgery at adolescence, when partial recurrence of radial deviation is not acceptable. During the treatment in early life (at 2-3 years of age) the radial deviation is better to overcorrect into clear ulnar deviation so that this deviation balance will be acceptable as long as possible. The change from ulnar deviated balance back to radially deviated balance occurs rather slowly and the hand alignment may be acceptable at the end of growth. Because the growth of distal ulna will be very abnormal in every club hand, in average 63 % of normal ulna, the alignment of wrist can be maintained using these relatively small epiphyseal grafts and the patient can live without further treatment until adolescence

Conclusions:

1) The conventional operative treatment of radial club hand can induce additional or iatrogenic growth disturbance and the affected forearm may remain extremely short due to early aggressive surgery.

2) Bone lengthening becomes often indicated due to results mentioned in the first conclusion.

3) Presented new treatment method using vascularized joint as radial support seems to produce superior results compared to centralization or radialization in our hands [9]. It allows good wrist mobility and stability. The method will allow a more predictable forearm growth, at least equal to natural history of radial club hand..

The optimum age for the joint transplantation procedure seems to be at 2-3 years of age.

4) At present there is no single operation available to meet all the needs of the radial club hand patient throughout the growth period. Even if the alignment can be corrected in early life, without additional disturbance to ulna growth, there remains a considerable length discrepancy, which is difficult to treat. The recurrence of deformity needs also continuous attention and possible correction at or near the end of growth period.

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4) Kawabata H, Shibata T, Masatomi T, Yasui N (1998)
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8) Vilkki S K, Radial Club Hand: Distraction and joint transplantation
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PLENARY LECTURE

15 February, Friday
7A Forum
13:00 - 13:30

Obstetrical brachial plexus palsy (I)

Alain GILBERT

- Born 3/3/47
- Medical Studies : Faculté de Médécine Saint-Antoine, Paris

- Graduated : 1971
- Interne des Hôpitaux de Paris : 1971
- Chef de Clinique : 1977
- Associate Professor of Orthopedic Surgery : 1992
- Member Académie de Chirurgie

- Director University Diploma of Hand Surgery Saint-Antoine, Paris
- Director University Diploma of Microsurgery
- Surgeon in charge : University of Paris, Microsurgical Laboratories
- Secretary General G.A.M. (French Society of Microsurgery)
- Past-Secretary General F.E.S.S.H. (Federation of European Societies for Surgery of the Hand) 1989 - 1995
- President French Society for Hand Surgery, 1995
- President European Congress of Hand Surgery (Paris, April 96)
- President INSTITUT DE LA MAIN (Clinique Jouvenet, 6 Square Jouvenet, Paris)

Clinical experience in the Gulf :
Since several years , visiting surgeon in various countries of the Gulf ;

- Qatar : Hamad Hospital in the department of Plastic Surgery (Dr Habib Al Basti)
- Saudi Arabia : King Fahad and King Khaled National Guard Hospitals
  King Fayçal Hospital (Ryiadh)
  Saudi-German Hospital (Jeddah)
- Bahrain : Suleimanya Hospital (Dr Aradi)
- Oman : Khoula Hospital (Dr Kharussi)
- U.A.E. : Al Jazeera Hospital (Dr Safa Abaza)

I have a good knowledge in the medical problems and organization in the gulf area .

Sports Medecine

- Teaching in the diploma of Sports medicine
- Co-chairman of the symposium : Hand Injuries in Sports in 1992
- Editor of Sports Injuries of the Hand published in 1995
- Specialist in Hand problems for football players : several international Goal keepers operated (Al-Ain , Chelsea , Milan A.C. etc..)

Management
1985-1995 : owner and manager of a Hospital for Hand Surgery in Paris (Franklin) . Sold in 1995 ;
Since 1995 , successor of Professor Tubiana as Chairman of the Institut de la Main , European largest Hand surgery group (12 surgeons)

Rheumatoid Arthritis Surgery in the Hand: the European Perspective

Prof Daniel Herren

Rheumatoid arthritis as a life-long condition and basically incurable disease, has changed his face during the last 5 years tremendously. With the introduction of the new biologicals, mainly the TNF-Alpha blockers and the tendency to treat the patients earlier and more aggressive, the number of patients needing surgical treatment is decreasing. But it is not only the quantity of patients, which changed, it is also the type of deformity and therefore the procedures needed, which are different. Three distinguished groups of a new type of patients can be observed: 1. Patients who do not respond to the new medications and have ongoing, aggressive destruction in the hand; 2. Patients which respond well to the biologicals but have a remaining synovitis in one of the compartments; 3. Patients which have a good effect with the new medication, but have ongoing severe, but painless, destruction of their joints. So the surgeon is faced with a new type of patients, which require a different approach and collaboration with the rheumatologists. Classification systems, which try to anticipate the future development of the disease, may be very helpful in the determination of surgical interventions.

In the wrist the concept of partial fusion is well established and more aggressive indications give good long-term results and may avoid the need for total wrist fusion. Wrist arthroplasty on the other hand may be an interesting option especially in patients requiring bilateral wrist interventions. Newer implants allow a more precise implantation together with more physiological biomechanical concepts, hopefully better long-term results are to be expected.

In the finger joints the need for MP joint replacement is decreasing, whilst the reconstruction of the PIP joint with implants is increasing. So far the Silicone implants are still the golden standard, but with earlier indication, more complex implants might be considered. Similar to the concept of soft tissue balancing in other joints, complementary intervention of the ligaments and tendons in joint arthroplasty of the hand, might be the keystone in achieving better results.

Comprehensive assessment tools such as the SF-36, the DASH or the PREW, give more insight in the results of our interventions. These patient-related outcome measurements often show a discrepancy between the surgeon's perspective and the patient's criteria in judging the effect of certain interventions. Continuous improvement in the care of rheumatoid patients is only possible, when objective and subjective outcome criteria are taken into consideration.

PLENARY LECTURE

16 February, Saturday
7A Forum
09:30 - 10:00

The Clunking Wrist: Pathomechanics and Treatment

Marc Garcia-Elias, M.D., PhD.
Institut Kaplan, Barcelona, Spain

The wrist is a complex composite joint requiring very precise interaction between joint architecture, soft tissue constraints and the stabilizing function of the different wrist motor tendons. Failure of any one of these factors (bone, ligament or muscle) may induce different forms of wrist dysfunction (carpal instability) each presenting with abnormal motion (painful clunking: kinematic dysfunction) and/or incapacity to bear physiologic loads without yielding (kinetic dysfunction). Carpal clunking, therefore, is not a diagnosis to be used for specific pathology, but a syndrome which may result from a variety of conditions. The most common cause of the clunking wrist is the insufficiency of the palmar midcarpal crossing ligaments (distal V ligament) at either the radial portion (dysfunction of the scapho-trapezial-trapezoidal joint) or the ulnar portion (triquetral-hamate dysfunction). The instability is mild and do not exhibit substantial malalignment when there is only a tear or disruption of one of such ligaments. By contrast, when there is an associated insufficiency of the dorsal radiocarpal ligaments(stretched out or torn) a VISI pattern of carpal collapse appears, frequently involving a peculiar "catch-up" clunk while ulnardeviating the joint. Patients with painful clunking are initially to be treated with a period of conservative therapy, including some type of immobilization, typically splinting, antiinflammatory medication and, most importantly, activity modification. Failing this, surgery may be indicated. One of the most popular solutions for this type of painful midcarpal instability is to fuse the triquetrum-hamate joint. Once the fusion is achieved, however, the wrist no longer behaves normally. There is substantial radiocarpal rotation while minimum changes occur at the non-fused midcarpal joints. Furthermore, although effective in eliminating the clunking, midcarpal fusion implies a serious alteration of the so called "dart-throwing" motion, the most commonly used rotation of the wrist in activities of daily living. As a less morbid alternative, radiolunate fusion has been introduced for the treatment of this condition. The procedure appears to be very successful in eliminating the clunking, while preserving a good range of dart-throwing motion and excellent pain relief. The surgical technique and results of this approach will be discussed.

PLENARY LECTURE

16 February, Saturday
7A Forum
14:30 - 14:30

Regenerative Medicine in Hand Surgery

Regenerative Medicine in Hand Surgery
Sylwester Gogolewski
Biomedical Engineering, UZG University, Zielona Gora, Poland

Regenerative medicine is an emerging field aiming in *repair*, reconstruction and *regeneration* of damaged tissues and organs. It is derived from the fields of tissue engineering, cell biology, biochemistry, physics, chemistry, and reconstructive surgery, to mention but a few. The worldwide market for regenerative medicine is conservatively estimated to be $500 billion by 2010 [1]. *Tissue repair* restores the damaged area with a functional but different tissue. *Tissue regeneration* produces new tissue identical to that lost or injured. *Tissue engineering* applies cells, scaffolds, and morphogens to develop biological substitutes that promote tissue regeneration.

Hand bone fractures, bone loss, ligament and tendon injuries, ligament adhesions after tendon surgery, scaphoid nonunions, arthritis, nerve injuries, and tumours are just a few of the problems hand surgeons treat.

In all these situations the use of structural tissue scaffolds having biological properties approximating those of autogenous tissues might promote healing and facilitate surgical procedures. There is a general consensus that scaffolds for tissue engineering should be biocompatible, promote attachment, proliferation and activity of the specific cells which maintain phenotype and produce the extracellular matrix. All these in turn depend on the scaffold's chemical and physical characteristics. The chemical characteristics include the presence of chemical groups at the scaffold's surface controlling the surface free energy, hydrophilicity and the ability to form ionic bonds with cells. The physical characteristics comprise the texture of the surfaces contacting the cells, the presence of pores, the pore structure, size and distribution, and mechanical properties which, optimally, might match those of the tissue to be replaced. The scaffolds should be preferably bioresorbable or biodegradable and porous. The pores should be interconnected allowing for a flux of nutrients, ingrowth of cells, blood vessels and tissues. The size of pores having a significant impact on the scaffold's biological functionality will depend on the intended application, i.e. there is no one "universal" pore size which suits all types of tissues to be substituted. All these characteristics are strongly influenced by both the quality of the material and the technique used for scaffold preparation. Optimally, such scaffolds implanted in place of resected or defective tissues and organs should induce their healing and regeneration. As this is not yet the case for state-of-the art biomaterials technology, the scaffold's regenerative potential needs to be enhanced, for example, by seeding it with cells and/or by loading it with autogenous or synthetic growth factors (tissue-engineered implants).

Candidate materials for scaffolds are bioresorbable polymers of natural and/or synthetic origin. For a number of applications where mechanical properties, controllable degradation times and shaping are essential, synthetic bioresorbable polymers are preferred over the polymers of natural origin. In the group of synthetic polymers are polyhydroxyacids (polylactides, polyglycolide, copolymers of lactides with glycolide, with ?-caprolactone and trimethylene carbonate) and aliphatic segmented polyurethanes. Polyurethanes are of special interest as their versatile chemistry allows for synthesizing biomaterials with a broad range of chemical, physical and biological properties. Polyurethanes can be produced as biostable or as biodegradable and as rigid or elastomeric materials. The hydrophilicity, degradation rates and mechanical properties of biodegradable polyurethanes can be controlled by using specific monomers and varying synthesis conditions and can be adjusted according to the intended application. Hydrophilic polyurethane elastomers are preferred for tissue adhesion barriers. Polyurethanes with higher amounts of hydrophobic component may be required for cancellous bone graft substitutes. Incorporating upon synthesis of various biologically active molecules in the backbone chain of polyurethanes designed for tissue engineering, may promote interaction of scaffolds from such materials with cells and tissues. The form and structure of the scaffold may resemble the structure and form of the tissue or organ it is intended to substitute. In the early eighties experimental biodegradable polyurethanes were used for the preparation of small-caliber vascular prostheses, artificial skin, esophageal and tracheal prostheses, pericardial patches and porous membranes for the treatment of periodontitis. Vascular prostheses from these polyurethanes induced the growth of functional "neo-arteries" in animals. An "artificial skin" promoted healing of full-thickness skin wounds with no scaring. Tubular microporous prostheses facilitated regeneration of resected segments of trachea and esophagus in animals. The tubular polyurethane implants with uniaxial pore orientation that formed primary scaffolding for oriented migration of fibroblasts, Schwann cells and regenerating axons, facilitated healing of large defects in the sciatic nerve.

Thus, tissue-engineered constructs consisting of bioresorbable scaffolds seeded with Schwann cells might be an alternative to conventional nerve grafting. Hydrophilic nonporous membranes could be a means to protect against ligament adhesions after tendon surgery. The use of bioresorbable polymeric cancellous bone graft substitutes impregnated with bone marrow to treat bone defects in hand would reduce the morbidity of bone-grafting and improve healing. Bioresorbable microporous polymeric scaffolds in the shape of a finger in combination with chondrocytes could be used to tissue-engineer a small hand phalanx. Bioresorbable pins and screws might be used to fix bone graft. Ruptured or torn tendons could be repaired with bioresorbable cell-seeded tendon grafts. The cells under consideration include bone marrow-derived mesenchymal stem cells, adipoderived mesenchymal stem cells, tendon sheath fibroblasts or epitenon tenocytes. Loading such tissue-engineered tendon grafts with growth factors such as vascular insulin-like growth factor (IGF), endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), basic fibroblast growth factor (bFGF), and transforming growth factor beta (TGF-beta) might facilitate tendon healing. Coating of implants used for joint replacement with a bioresorbable porous layer containing growth factors might promote healing.

[1]. U.S. Department of Health and Human Services. 2020: A New Vision - A Future for Regenerative Medicine.

PLENARY LECTURE

16 February, Saturday
7A Forum
14:30 - 15:00

Flexor Tendon Injuries –Towards a Splint Free Repair

Beng-hai Lim (Singapore)

Centre for Hand and Reconstructive Microsurgery (CHARMS), Mount Elizabeth Medical Centre and Department of Orthopaedic Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Post-operative care following a successful flexor tendon repair is dependant on the quality of repair. A strong repair allows for a more aggressive post-operative rehabilitation.

The advantages of an immediate unprotected active mobilization of the hand include improve range of active motion; minimize risk of tendon adhesion, contractures and loss of grip strength. The risk however is tendon rupture.

Biomechanical studies have shown that an unrestricted mobilization of the tendon puts the strain on the site as high as 50N to 120N with flexion against resistance of 500g and 3.5kgf . There is also associate weakening of the tendon at 1 week and this can decrease the strength of the repair to as high as 50%.

The need for a strong repair of at least 200N will probably minimize the risk of rupture if an immediate unprotected mobilization of the hand is encouraged.

This requires a shift in paradigm in our repair techniques. Three specific anchoring points have been identified viz zone 1, 3 and 5. These sites are chosen because it allows for a slightly bulkier anchoring of tendons. The use of a double needle, 2 'o' fibrewire with a single button anchoring at points more than 3 cm away from the lacerated tendon site will allow us to achieve such tendon strength.

A proposed employment of mesenchymal stem cell at the site of repair may be another modality to minimize the weakening of the lacerated tendon ends and maintain the strength of the repair.

A major shift in our repair techniques may pave way for a more robust and sustainable repair. This will allow for a non-patient dependant and a splint free repair. This will further improve the results of tendon repair and allow an earlier functional use of the hand following a flexor tendon injury.

The Operative Treatment of Phalangeal Fractures: Procedures to Do Routinely and Procedures to Avoid or Use Only with Discretion

Alan Freeland, MD

Stiffness remains the most frequent and often the most serious consequence of proximal phalangeal fractures of the hand owing to adhesions that result from adjacent injured soft tissues and a dormant hand. Anatomic or near anatomic fracture reduction restores form, minimizes pain, and permits functional restoration. Percutaneous Kirschner wire fixation largely avoids extension of the soft tissue "zone of injury (ZOI)" and summation of the fibroblastic responses to injury. Hand surgeons have traditionally been at the forefront of "minimally invasive surgery (MIS)" by applying the doctrine of "primum non nocerum" ("at least do no harm") and favoring the use of Kirschner wire splinting for most closed isolated reducible two-part phalangeal fractures and those open fractures with skin wounding alone. Surgeons who are well versed in the technique may consider percutaneous mini screw fixation.

Open operative treatment may be judiciously selected for irreducible closed fractures, lost reductions, complex open fractures, fractures with comminution or bone loss, multiple hand fractures, fractures in unreliable patients, and in polyfractured or polytraumatized patients. In these instances, an expanded ZOI already exists or is justified by the nature of the fracture or the compelling needs of the patient. Soft tissue modulated hand therapy and therapeutic activities of daily living are instrumental in achieving functional recovery.

TAJIMA MEMORIAL LECTURE

15 February, Friday
7A Forum
10:30 - 11:30

Contralateral C7 root transfer over the last 20 years in China

GU Yu-dong
Department of Hand Surgery, Huashan Hospital, Fudan University, Shanghai 200040, China

The surgical procedure of C7 root transfer from the healthy side was first performed successfully on August 26, 1986. Since then, this procedure has proved one of the major treatments for brachial plexus root avulsions. Nowadays, attitudes of doctors towards this operation have changed from doubt and surprise to deep conviction and acceptance. The latest progresses in experimental and clinical studies on contralateral C7 root transfer are reviewed in this article.

Experimental study

After determination of the functional muscles innervated by brachial plexus nerve roots using intraoperative neurophysiological investigations during contralateral C7 root transfer, the distribution of nerve root innervation has been elucidated.5

Clinical study

Using selective or only hemi-contralateral C7 root transfer undoubtedly can minimize the risk of damage to the function of the donor limb, but unavoidably reduce the extent of functional recovery of the recipient limb.

Ipsilateral C7 root transfer is an optimal surgical procedure to treat the C5 and C6 root avulsion of the brachial plexus.

Contralateral C7 transfer to two major recipient nerves is practicable and efficient. The one-trunk method is suitable for reconstruction of the two nerves with congenerous functions such as the median and musculocutaneous nerves as well as the radial and axillary nerves.

ACKNOWLEDGEMENTS

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ABSTRACT

Session: Free paper 1

Date: 15 February 2008

Venue: Meeting room 601

Time: 08:00 - 09:00

Moderator : Y.P CHANG & K.L MAK

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	IMATANI	Junya	Japan	Free paper 1 - Elbow Problem	15. Feb. 2008	33	An Original Locking Plate System for the Transcondylar Fractures of the Distal Humerus in the Elderly
2	SHIMADA	Kozo	Japan	Free paper 1 - Elbow Problem	15. Feb. 2008	77	Costal osteochondral autograft for the treatment of full-thickness articular defect of the elbow
3	KIM	Byung-Sung	Korea	Free paper 1 - Elbow Problem	15. Feb. 2008	98	Effect of trochlear medial facet spur on elbow motion
4	GONG	Hyun Sik	Korea	Free paper 1 - Elbow Problem	15. Feb. 2008	113	Oblique Closing Wedge Osteotomy and Lateral Plate Fixation for Cubitus Varus Deformity in Adults
5	LEE	Young-Ho	Korea	Free paper 1 - Elbow Problem	15. Feb. 2008	179	Tension Band Pin System for Treatment of Olecranon Fracture and Distal Humerus Fracture with Olecranon Osteotomy
6	WATANABE	Ryuichi	Japan	Free paper 1 - Elbow Problem	15. Feb. 2008	244	Costal Osteochondral Graft for Steroid-Induced Osteonecrosis of the Distal Humerus: A Case Report
7	PHOON	Ee-San	Singapore	Free paper 1 - Elbow Problem	15. Feb. 2008	263	A Good Technique in Restoring Rotation in Proximal Radioulnar Synostosis - 2 Cases of Proximal Radial Resection
8	FAN	Cun-Yi	China	Free paper 1 - Elbow Problem	15. Feb. 2008	281	A comparative study of internal fixation and prosthesis replacement for radial head fractures of Mason type III
9	KANAYA	Fuminori	Japan	Free paper 1 - Elbow Problem	15. Feb. 2008	277	Mobilization of a Proximal Radioulnar Synostosis with use of a Free Vascularized Fascio-Fat Graft and a Radius Osteotomy
10	POH	Seng-Yew	Singapore	Free paper 1 - Elbow Problem	15. Feb. 2008	367	Extravasation Injuries In The Upper Limb: An Overview Of Our Experience With Inpatients In A Tertiary Hospital

Abstract #33

AN ORIGINAL LOCKING PLATE SYSTEM FOR THE TRANSCONDYLAR FRACTURES OF THE DISTAL HUMERUS IN THE ELDERLY
JUNYA IMATANI.[1], HIDENORI KONDOU.[1], YASUNORI SHIMAMURA.[2], HIROYUKI MIWA.[1]and MASAMICHI HAYASHI.[1]

(Purpose) The purpose of this preliminary study was to evaluate an original locking plate system for transcondylar fractures in elderly patients. (Methods)Thirty patients (mean age 77 years, range 70 to 94 years) with displaced transcondylar fractures in osteopenic bone and a small distal fragment were treated by our new fixation system. Seven patients were men and 23 were women. The plate conforms to the anatomical contour of the lateral column of the distal humerus and a locking mechanism between the plate portion and the transcondylar screw which passed from the lateral epicondyle to the medial wall of the trochlea across the humeral condyle. We used the ONI transcondylar plate at the lateral side of the fracture site, and either a cancellous screw (n=24) or an AO tubular plate (n=3) or an ONI medial Plate (n=3) which is an original anatomical plate at the medial column of distal humerus. (Results) In all of the 30 cases, complete union was seen on radiographs, and alignment was maintained postoperatively. The assessment of results according to the modified Cassebaum's rating score was excellent in 12 cases and good in 18 cases. (Conclusion) Our data showed that the ONI transcondylar plate system for treatment of transcondylar fractures in the elderly produced consistently good results even in cases with a small osteoporotic fragment of the distal humerus. With careful planning and familiarity with the special feature of the operative technique, the procedure should produce reliably good results in larger studies.

Abstract #77

OSTEOCHONDRAL AUTOGRAFT FOR THE TREATMENT OF FULL-THICKNESS ARTICULAR DEFECT OF THE ELBOW
KOZO SHIMADA, JUN-ICHI MIYAKE, EIJI SOGO
Dept of Orthopaedic Surgery, Osaka Kosei-nenkin Hospital, Osaka, Japan

Young athletes suffering from elbow pain due to a full-thickness articular defect were surgically treated by costal osteochondral autograft.
Materials and methods: Eight patients aged thirteen to forty-three with mean of nineteen years were treated. All of their lesions were progressive stage of osteochondritis dissecans (OCD) of the humeral capitellum or osteoarthritis as a result of OCD. The highly damaged articular lesion was debrieded and deepened to prepare for transplantation. 5th or 6th rib was harvested at the osteochondral junction and its bony end was shaped to a wedge. It was impacted into the lesion and its surface was shaved with a knife to fit the articular surface. In case the lesion was too large to be filled with an osteochondral graft, an additional bony wedge was impacted to stabilize the graft. After two weeks immobilization, motion exercise was started. They were followed more than six months with an average of nine months.
Results: All patients complained no pain after surgery. Mean range of motion was 121degrees of flexion and -16degrees of extension preoperatively, and improved to 124degrees of flexion and -12degrees of extension at follow-up. Bony union was obtained in three months in all cases. Three boys who were followed more than one year returned to their previous sports activity without degeneration.
Discussion: Costal osteochondral junction makes possible to resurface the articular cartilage with simultaneous subchondral bony support, although donor site morbidity is very low. This procedure could be a new surgical option for articular reconstruction of the elbow.

Abstract #98

Effect of trochlear medial facet spur on elbow motion

Byung-Sung Kim, M.D.
Department of Orthopaedic Surgery, Soonchunhyang Un iversity, College of Medicine, Bucheon, Korea

Purpose: The purpose of this study was to evaluate the effect of trochlear medial facet spur under medial collateral ligament on elbow range of motion limitation.
Materials and Methods:
We reviewed results of 28 patients underwent computed tomography of elbow. We treated arthroscopic loosebody removal and debridement in 11, arthroscopic anterior capsulectomy in 9, open capsulectomy in 4 and ulnar nerve anterior transposition in 4 cases. We checked spur or loosebody in coronoid side, olecranon side. Trochlear medial facet spur was measured with its depth, length and angle. The relation between elbow range of motion and spur or loosebody was analysed using SPSS.
Results:
Average elbow flexion contracture was 18.2°±13.4 and further flexion was 112.3°±14.5. There were 20 trochlear medial facet spur, 18 spur, 11 loosebodies at olecranon side and 14 spur, 7 loosebodies at coronoid side. Trochlear medial facet spur depth was 2.5mm±1.0, spur length was 4.9mm±3.6 and angle was 70.5°±28.1. The mean elow flexion contracture was 19.2°±11.6 with olecranon block(N=18) and 16.5°±14.9(p=0.629) without olecranon block(N=10). The mean elow further flexion was 105.4 °±12.1 with coronoid block(N=14) and 119.3 °±13.7(p=0.008) without coronoid block(N=14). The partial correlations coefficient adjusted by coronoid block between elbow further flexion and trochlear medial facet spur was -0.4523(p=0.018) in spur depth, 0.6917(p<0.000) in spur length and -0.6598(p<0.000) in angle.
Conclusion:
Relationship between coronoid spur or loosebody and elbow further flexion and one between trochlear medial facet spur length or angle and elbow further flexion is significant.
Key Words: trochlear medial facet, coronoid, spur, CT, elbow further flexion

Abstract #113

OBLIQUE CLOSING WEDGE OSTEOTOMY AND LATERAL PLATE FIXATION FOR CUBITUS VARUS DEFORMITY IN ADULTS

Hyun Sik Gong, Joo Han Oh, Young Ho Lee, Moon Sang Chung, Goo Hyun Baek
Department of Orthopaedic Surgery, Seoul National U niversity College of Medicine, Seoul, Korea

Background: Compared with children, healing of corrective osteotomy can be frequently delayed in adults, requiring a longer rehabilitation time. We reviewed the outcome of oblique closing wedge osteotomy and lateral plate fixation followed by early motion exercise for cubitus varus deformity in adult patients. Our hypothesis was that this technique, with larger contact area and stable fixation with a lag screw, would bring a reliable healing of the osteotomy with early motion exercise in adult patients.
Methods: We treated twelve consecutive patients with this procedure and allowed active motion exercise from one week postoperatively. The age at the operation averaged 39 (31 to 48) years and the follow-up averaged 20 months.
Results: The mean humerus-elbow-wrist angle improved by 30 degrees and the mean lateral prominence index did not increase postoperatively. All patients regained the preoperative arc of motion within 3 months of the operation. According to the Oppenheim's criteria, nine patients had excellent results, two had good results, and one had a poor result.
Conclusions: Oblique osteotomy and fixation with a lag screw and lateral plating can be a reasonable alternative technique for correction of cubitus varus deformity in adult patients, with satisfactory deformity correction and early recovery of elbow motion.

Abstract #179

TENSION BAND PIN SYSTEM FOR TREATMENT OF OLECRANON FRACTURE AND DISTAL HUMERUS FRACTURE WITH OLECRANON OSTEOTOMY

Moon Sang Chung, Young Ho Lee, Jin Young Kim*, Sang Lim Lee**, Sang Ki Lee***, Goo Hyun Baek, Hyun Sik Gong, Seung Hwan Rhee, Ji Yeong Kim

Departments of Orthopedic Surgery, Seoul National University College of Medicine, Seoul; Dongguk University College of Medicine, Seoul*; Inje University College of Medicine, Seoul**; Eulji University College of Medicine, Daejeon***, Korea

Introduction: The aim of our study is to evaluate the clinical and radiographic outcomes of tension band pin system for treatment of olecranon fractures and distal humerus fractures with olecranon osteotomies.
Materials and Methods: 44 olecranon fractures and 28 distal humerus fractures were treated operatively with tension band pin system between March 2003 and January 2007 and evaluated at a mean follow up of 22 (range 8-44) months. The olecranon osteotomies were done in all cases of distal humerus fractures required reduction of the articular surface.
Results: There was no or mild pain in 64 cases (41 cases in olecranon fractures, 23 cases in distal humerus fractures). Mean elbow flexion was 136 degrees in olecranon fractures, and 124 degrees in distal humerus fractures with olecranon osteotomies. Mean elbow extension was 2 degrees in olecranon fractures and 7 degrees in olecranon osteotomies. According to the Mayo Elbow Performance score, the results were graded as good or excellent in 41 cases (93.1%) in olecranon fractures and in 22 cases (85.7%) in distal humerus fracture. All the fractures and osteotomies had healed with adequate position at final follow up. There were no pin migration, skin infection, and loss of reduction during follow up period.
Conclusion: If properly used, tension band pin system is a simple and reliable method for the treatment of olecranon fracture and fixation of olecranon osteotomies to achieve adequate fracture healing with secure fixation and union of olecranon osteotomies without the complications of tension band wiring like backing out of K-wire leading to pain and skin breakdown.

Abstract #244

COSTAL OSTEOCHONDRAL GRAFT FOR STEROID-INDUCED OSTEONECROSIS OF THE DISTAL HUMERUS: A CASE REPORT

Watanabe R, M.D., Sato K, M.D., Nakamura T, M.D., Nakamichi N, M.D., Obara Y, M.D., Toyama Y, M.D., and Ikegami H, M.D.,
Department of Orthopaedic Surgery, School of Medici ne, Keio University, Tokyo, Japan

We report a case of steroid-induced osteonecrosis of the distal humerus treated with arthroplasty using costal osteochondral graft, and obtained significant pain relief and improvement of ROM.
Case A: A 43 year-old male was referred to our hospital with severe pain and limitation of ROM in his right elbow. He had a history of taking methyl prednisolone for 5 years under the diagnosis with SLE when he was 30 years old. Physical examination revealed swelling and tenderness around the humeroradial joint and range of elbow motion was restricted -20° of extensio n and 100° of flexion. Radiographs demonstrated destructive change at the capitulum and the trochlea of humerus and loss of joint congruity. MRI showed change of intensity (T1: low, T2: mixed) in the capitulum and the trochlea indicating osteonecrosis. Surgery was performed under general anesthesia to reconstruct the capitulum and the trochlea. When the free osteochondral pieces were removed, the defect was found to occupy about 2/3 of the articular surface of the capitulum and the trochlea, measuring 20×25mm. After dissection of the lesion and formation of the floor, two pieces of osteochondral graft were harvested from transitional area between the right 5^{th} and 6^{th} rib and associated cartilage. They were shaped and transplanted into the defect. After surgery, the elbow was immobilized with a plaster for 1 week, followed by ROM exercises. At the present time, 13 months after surgery, the ROM has been -12° o n extension and 128° on flexion. He no longer has pain at all. The latest radiographs demonstrated a satisfactory union of the implanted graft without osteoarthritis.

Abstract #263

A GOOD TECHNIQUE IN RESTORING ROTATION IN PROXIMAL RADIOULNAR SYNOSTOSIS - 2 CASES OF PROXIMAL RADIAL RESECTION.

DR E S PHOON, DR W Y C CHEW
Department of Orthopaedics, Tan Tock Seng Hospital, Singapore

Background: Synostosis of the proximal radioulnar joint occurs uncommonly following trauma about the elbow. This results in severe functional disability, particularly loss of forearm rotation. The usual treatment is surgical takedown of synostosis and soft tissue interposition. More recently, good results have been reported with excision of a segment of proximal radius to create a pseudoarthrosis.
Methods and Materials: Two cases of post-traumatic type 3 proximal radioulnar synostosis were managed by proximal radial resection. Both presented with severe elbow stiffness and ankylosis in 20 degrees pronation.
Case 1 : 40 year old male sustained a Monteggia fracture, complicated by heterotropic ossification a year after fixation. We performed surgery 15 months after initial trauma. Follow up of 24 months.
Case 2 : 54 year old female with radial head fracture, developed stiffness a year after fixation. Surgery was performed 5 years after initial trauma. Follow up of 6 months.
Surgery involved excision of heterotropic ossification and resection of 1cm of proximal radial shaft just distal to synostosis, and soft tissue interposition of the cut bone ends. Capsulotomy was also performed. Adjunctive course of indomethacin was prescribed. Intensive rehabilitation with supervised mobilization.
Results: Vast improvement of forearm rotation by 135 and 100 degrees in case 1 and 2 respectively. We also achieved a good flexion-extension arc of 135 and 110 degrees respectively. There was no pain, nor loss of stability. No recurrence of heteotropic ossification in both cases to date.
Conclusion: 1 cm thick resection of proximal radial shaft is a simple, safe and reliable technique in the operative management of post-traumatic synostosis of the proximal radioulnar joint.

Abstract #281

A comparative study of internal fixation and prosthesis
replacement for radial head fractures of Mason type III

Department of Orthopaedics, Shanghai sixth people's hospital, Shanghai Jiaotong university. Shanghai, P. R. China
Cun-Yi Fan, Hong-Jiang Ruan , Jun-Jian Liu, Bing-fang Zeng

Abstract Although several treatment options for radial head fractures are available, no clear solutions exist. In this study we therefore compare open reduction and internal fixation (ORIF) with bipolar radial head prosthesis replacement in treatment of radial head fractures of Mason type III. Cement stem and bipolar radial prosthesis were used to treat 12 fresh cases and two old cases of Mason type III radial head fracture. As a control group, another eight cases of radial head type III fracture were treated with ORIF with cannulated screws and Kirschner (K) wires. The 14 patients who received radial head prosthesis replacement were followed-up for 15.9 months (range 10–27 months). According to elbow functional evaluation criteria by Broberg and Morrey, we found excellent results in nine cases, good in four, and fair in one. Mean follow-up of the eight cases in the ORIF group was 14 months (range 10–21 months), with good results in one case, fair in four, and poor in three. The result was good or excellent in 92.9% of prosthesis replacement patients and in 12.5% of ORIF patients. This difference is statistically significant (P=0.0004; Fisher's exact test). We concluded that bipolar radial head prosthesis replacement is better than ORIF in treatment of Mason type III radial head fracture.

Abstract #277

Fuminori KANAYA

Mobilization of a Proximal Radiolnar Synostosis with use of a Fee Vascularized Fascio-Fat Graft and a Radius Osteotomy

Congenital proximal radioulnar synostosis is a rare congenital anomaly characterized by a fixed rotation of the forearm. Mobilization is still a challenging problem because of the high tendency toward re-ankylosis after separation. Our mobilization procedure consisted of a free vascularized fascio-fat graft to prevent re-ankylosis and a radius osteotomy to reduce the dislocated radius head. Results of our mobilization procedure were reported.
Patients and methods: We performed this procedure on 27 forearms of 26 patients. There were 22 boys and 4 girls. The average age at the surgery was 8 years (range, 5.3 years to 13.4 years). Preoperative forearm ankylosis was between neutral and 90 degrees of pronation except 1 patient showing 25 degrees supination ankylosis after failed previous mobilization. Radius head dislocation was seen in 24 forearms (posterior in 15, anterior in 9). Average follow-up duration was 51 months (range, 24 to 111 months).
Results: Neither re-ankylosis nor neurological complications occurred except the transient radial nerve palsy in 1 patient. The posterior subluxation of the radius head was seen in 9 patients by overgrowth of the radius. The mean range of active forearm rotation after surgery was 87 degrees (supination 22 degrees and pronation 65 degrees). All patients reported improvements in performing some activity, such as throwing or catching a ball, accepting objects such as coins, holding a bowl of soup and performing gymnastics.
Conclusions: This mobilization procedure prevented re-ankylosis after separation of the synostosis. Mobilization provided the ability to rotate the forearm that improved a child's daily activities.

Abstract #367

EXTRAVASATION INJURIES IN THE UPPER LIMB: AN OVERVIEW OF OUR EXPERIENCE WITH INPATIENTS IN A TERTIARY HOSPITAL

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DEPARTMENT OF HAND SURGERY, SINGAPORE GENERAL HOSPITAL

Introduction

Extravasation injuries arise from the administration of drugs for diagnostic or therapeutic purposes and can cause tissue destruction, culminating in the loss of limb. Our study aims to identify the factors associated with the need for surgery and development of complications in these injuries.

Methods

We conducted a retrospective review of 59 cases of inpatient extravasation injuries from January 2000 to June 2007. Case notes and incident reports were traced and clinical parameters recorded and analysed.

Results

The study group included 32 male and 27 female patients with a mean age of 60 years. The drugs extravasated include cytotoxics (63%), X-ray contrast (15%), antibiotics (12%), dextrose 50% (8%), and parenteral nutrition (2%). 12 patients (20%) developed acute complications of tissue loss, gangrene of the affected area, and/or secondary infection. 7 patients (12%) underwent primary surgery – 2 patients required Ray amputation, while 5 patients underwent excisional debridement. 3 patients required a secondary procedure for closure of the resultant defect. 6 patients (10%) developed long term complications of residual pain, joint stiffness, and/or poor cosmesis. Risk factors associated with need for surgery are co-morbidities of diabetes mellitus, chronic renal impairment and presentation with pain and inflammation. Infusion plug sited on the hand or wrist was an additional factor associated with the development of complications, while cytotoxic administration was negatively correlated with both these outcomes.

Conclusion

Extravasation injuries can largely be treated successfully with conservative measures, but patients with identifiable risk factors need closer vigilance for the development of complications, and may benefit from early surgery.

Session: Free paper 2

Date: 15 Feburary 2008

Venue: Meeting room 603

Time: 08:00 - 09:00

Moderator : T.C WONG & Goo-hyan BAEK

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	MORISAWA	Yasushi	Japan	Free paper 2 - CULA	15. Feb. 2008	32	Reconstruction of the Thumb in Congenital Flexion Contracture of Multiple Fingers.
2	NOVELLI	Chiara	Italy	Free paper 2 - CULA	15. Feb. 2008	72	Treatment of the Thumb in Arthogrtposis
3	MAJIMA	Masataka	Japan	Free paper 2 - CULA	15. Feb. 2008	139	Results of our surgical treatment for Thumb Polydactyly Type 3
4	KAWABATA	Hidehiko	Japan	Free paper 2 - CULA	15. Feb. 2008	150	Free non-vascularized toe phalanx transfers
5	HUNG	Leung-Kim	Hong Kong	Free paper 2 - CULA	15. Feb. 2008	347	Anterior Release of the Wrist for Congenital Radial Deficiency -- Early experience
6	TAKAYAMA	Shinichiro	Japan	Free paper 2 - CULA	15. Feb. 2008	366	Variation and treatment of extrinsic tendons in Blauth type III hypoplastic thumb
7	CHIANG	Yuan-Cheng	TAIWAN	Free paper 2 - CULA	15. Feb. 2008	372	Radial polydactyly---A series of 300 patients in southern Taiwan
8	CHIANG	Yuan-Cheng	TAIWAN	Free paper 2 - CULA	15. Feb. 2008	373	Bilhault-Cloquet Procedure for Radial Polydactyly—A review of 34 cases
9	CHOW	Esther Ching-San	Hong Kong	Free paper 2 - CULA	15. Feb. 2008	378	Neurovascular Pulp Island Flap For Pulp Augmentation In Extra Thumb Reconstruction
10	CHOW	Esther Ching-San	Hong Kong	Free paper 2 - CULA	15. Feb. 2008	379	Reconstruction of Hypoplastic thumb using hemi-metatarsal transfer
11	BAEK	Goo-Hyun	Korea	Free paper 2 - CULA	15. Feb. 2008	120	Solitary Osteochondroma of the Fingers Causing Deformity or Limitation of Motion

Abstract #32

RECONSTRUCTION OF THE THUMB IN CONGENITAL FLEXION CONTRACTURE OF MULTIPLE FINGERS.
Yasushi Morisawa, Shinichiro Takayama, Atsuhito Seki, Hiroshi Kusakabe, Keisuke Nakagawa, Hiroaki Matsumoto
Department of Orthopaedic Surgery, National Center for Child Health and Development, Tokyo, Japan.

Arthrogryposis multiplex congenita(AMC), Freeman-Sheldon syndrome(FSS), congenital contractural arachnodactly(CCA) and congenital windblown hand are the representative of diseases with congenital flexion contracture of multiple fingers. In this study, we examined the outcome of thumb reconstruction in recent 5 years. 11 patients with 15 thumbs in congenital flexion and adduction contracture of the thumb were treated surgically. They consisted of 8 males and 3 females, with an average age at the time of surgery being 8 years. The average follow-up period after surgery was 24 months. In these diseases, thumb is heavily flexed and adducted and at surgery there are three points which have to be improved i.e. first web space contracture, thumb MPJ flexion contracture and dysfunction of opposition and MPJ extension. Post operative results are evaluated by original point system which consists of three categories, first web contracture, thumb MPJ active extension and opposition. Almost good results were obtained. The average score of outcome is 6.8 point out of 9 point. The average score of satisfaction is 1.7 point out of 2 point. In the three categories, opposition is the lowest score. In the category of thumb MPJ active extension, the number of very improved is only 4. Although congenital contracture of multiple fingers is very difficult conditions, adequate surgical treatments could be effective. The opponensplasty by APB transfer is an effective procedure in particular of their improvement of thumb MPJ active extension.

Abstract #72

TREATMENT OF THE THUMB IN ARTHOGRYPOSIS
C. Novelli, C. Parolo, M. Seves, G. Pajardi

Abstract

Arthrogryposis multiplex congenita causes severe articular contraction since birth. Manipulation and splinting of the articulation starting after birth improves the range of motion, which, if surgery needs to be done, makes the operation less extensive. Thumb treatment, despite any early conservative treatment, usually requires a surgical treatment

The arthrogrypotic thumb is flexed adducted and "in-palm"; there's a severe 1°web contracture and a s ignificant loss of active extension. Surgical technique aim to correct any anatomical element which contribute in determining the deformity. So that skin requires an opening of the web; muscles need to be released when contracted, and to be improved when loose; bone sometimes need to be corrected, when soft tissue procedure are not sufficiently definitive. In our unit since 2000 up to 2007 12 patients with 17 hand has been treated, with an average age of 7,5. Surgery has been custom-made for each single case, caring about the different anatomical structures involved

In young patients with a severe deformity soft tissue treatment do not provide an adequate and satisfactory result, so that bon correction was performed in any cases. More adult patients normally presented a less severe contracture; moreover in these cases the correction of bony structures could modify an already established pattern of pinch. The tendency in these cases is to obtain improvement regulating only skin and muscle, maybe rerouting some tendon.
Arthrogryposis is a limiting but non progressive pathology. An aggressive and early approach combining splinting and surgery could improve function and increases patient independence

Abstract #139

Results of our surgical treatment for Thumb Polydactyly Type 3
Masataka MAJIMA

Radial polydactyly is a common congenital anomaly. Although several surgical reconstructions have been reported, secondary surgeries may be required due to deformity or joint instability. In order to increase the girth of the thumb and to obtain IP joint stability, we have modified surgical technique for reconstruction of type 3 radial polydactyly. We introduce our technique and report surgical outcomes.
M&M:
Ten patients (6 men and 4 women) with evenly developed Wassel type 3 polydactyly were operated on since 1996. Age at time of initial operation ranged from 8 months to one year and 5 months (mean, one year). In all cases, radial digits were partially excised, but the majority of the proximal phalanx or the radial digit was remained in order to stabilize IP joint and the girth of the thumb. A skin flap from the radial digit was used as supporting stability and alignment of the ulnar digit. Duration of follow-up observation ranged from 10 months to 12 years and 10 monthe (mean, 4 years 8 months). The patients were assessed by criteria of Japanese society for surgery of the hand.
Results:
All patients had no restriction in MPj motion, but had limitations in IP joint motion. Regarding joint instability, 9 patients except one had no instabilities. Bony alignments were evaluated as good in all patients.
Conclusions:
We introduced our surgical modification in reconstruction for evenly developed Wassel type 3 polydactyly. Restricted IP joint motion was problem, but overall functional and cosmetic outcomes were acceptable.

Abstract #150

FREE NON-VASCURALIZED TOE PHALANX TRANSFERS

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Department of Orthopaedic Surgery, Osaka Medical Center and Research Institute for Maternal and Child Health
Osaka, JAPAN

[Purpose] We have used non-vascuralized toe phalanx transfers for children with symbrachydactyly and congenital constriction band syndrome. We present results with our technique and also discuss the donor site morbidity.
[Method] Fifteen children with congenitally short fingers underwent 31 free non-vascuralized toe transfers at our center. Age at operation was 1.5 years on average. The proximal phalanx of the fourth toe was used most frequently. These phalanx were harvested according to the technique described by Buck-Gramco in 1990. The defect of the donor site was reconstructed using 2/3-width iliac-crest osteochondral bone graft. Fingers were explored using mid-dorsal longitudinal incisions. If remnant of the proximal phalanx was present, the toe phalanx was settled on the top of the remnant with tree or four non-absorbable sutures. If there was no remnant, preexisting extensor and flexor tendons were freed from the metacarpal and they were re-sutured with the toe phalanx after it was held on the top of the metacarpal with one Kirschner wire. Collateral ligaments were also reconstructed.
[Results] Excluding two cases (follow-up < 1 y), this procedure was useful to gain better hand function in 10 out of 13 cases. Donor-site outcome was excellent in 17 toes, good in five toes, fair in two toes, and poor in two toes. Deformity of the iliac crest was not apparent in all cases except for the first two cases in which full thickness apophysis was harvested.
[Conclusion] Our technique demonstrated excellent results with minimum donor morbidity.

Abstract #366

Variation and treatment of extrinsic tendons in Blauth type III hypoplastic thumb

National Center for Child Health and Development Tokyo JAPAN
Shinichiro Takayama
Atsuhito Seki
Yasushi Morisawa
Takehiko Takagi

Purpose
Blauth type III hypoplastic thumb is characterized by type II features plus hypoplastic metacarpals and abnormalities of extrinsic tendons. In order to clarify the variations of extrinsic tendons anomalies and necessity of its reconstruction, we examined our recent cases.
Materials and Methods
Since 2001, seventeen cases with twenty-one hands of type III were reconstructed. Sixteen hands were classified as type IIIA, and five hands were as type IIIB. For type IIIB, two-stage reconstruction procedure, non-vascularized metatarsal bone graft followed by abductor digiti minimi opponensplasty was indicated.
Results
The average ages at the surgery was 4.5 years old. FPL bifurcations were found in ten of sixteen type IIIA. Five of them also showed pollex abductus, interconnection between the FPL and the EPL passes on the radial side of the proximal phalanx. In the other six cases of type IIIA, three of them showed pollex abductus without FPL bifurcation, other three cases were neither of both. In all of five type IIIB, FPL and EPL tendons were discontinued proximal to metacarpophalangeal joint. For FPL bifurcation, releasing the bifurcated tendon insertion and pulley reconstruction were carried out as far as possible. For the proximal part of FPL or EPL deficiencies, FPS IV transfer was performed in seven and EIP transfer was performed in three cases. Active range of motion of interphalangeal joint was limited even after tendon transfer; thumb was stabilized well in pinching.
Conclusions
The extrinsic tendon anomaly in type III hypoplastic thumb is multifarious. Extrinsic tendon reconstruction is not frequently discussed, multiple directed reconstructions would be important for stabilizing thumb.

Abstract #372

Radial Polydactyly--A series of 300 patients in southern Taiwan

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Purpose:
Radial polydactyly (RP) has been reported to be the most common congenital limb anomaly (CLA) in oriental people. Its presentations are so variable that makes many classifications difficult to fit all of the cases. The goal of this study is to review the clinical presentations of this disease in Southern Taiwan, and compare the data with other regional reports.
Materials and Methods
Three hundred and two patients with 324 hands showing duplicated thumbs were collected between 1989 and 2006 in Chang Gung memorial hospital at Kaohsiung, Taiwan. A retrospective review of the charts, X-ray films and the photographs of the patients diagnosed as the radial polydactyly were performed. The patient's basic data, clinical presentations, associated anomaly, gestational history, family history and operative procedures were collected and analyzed.
Results
Among the 302 patients, 13 were secondary and 289 were primary cases. A higher incidence was noted in male (60%) and right hand (59%). About 10% of these patients had both hands involved with duplicated thumbs. About 20% of the patients had various associated anomalies noted at birth. About 20% of the patients had positive family history of hand anomalies. These primary cases were classified according to the modified Wassel classification. The most common one was type IV, followed by II, VII, floating, III, V, VI, and I. No predilection on season was noted, as well as the parental ages. The average operation number was 1.1 for each patient. Most of the patient underwent conventional surgery with mostly satisfactory results. About 10% of the patients underwent Bilhault-Cloquet procedure.
Conclusion
Presentation of the radial polydactyly is variable. Compared to the data of worldwide survey, the distribution of the Wassel types in this series is mostly similar. However, some differences were noted, which may be due to racial and geographical reasons. Surgical indication and treatment should be carefully evaluated and performed to obtain the best results

Abstract #373

Bilhault-Cloquet Procedure for Radial Polydactyly—A review of 34 cases
Yuan-Cheng Chiang

Purpose
Bilhault-Cloquet procedure has been one of the choices in the management of difficult radial polydactyly cases. Long term evaluation of the surgical results was rarely reported in the literature. The goal of this study is to review the results of a series of 34 cases.
Materials and Methods
A total of 302 patients with 324 hands showing duplicated thumbs were collected between 1989 and 2006 in Chang Gung memorial hospital at Kaohsiung Taiwan. Among these, 33 patients with 34 Bilhault procedures were performed by the author. Either the traditional two-nail bed combination method or the modified one-nail bed method was performed. Follow-up period ranged from 2 months to 136 months, with and average of 33 months. The chart, X-ray films, photographs were reviewed and the examined data including length, size, alignment, ROM, subjective symptom, cosmesis were analyzed.
Results
Twenty-five male and 8 female patients comprise this series. The age at surgery ranged from 6 months to 19 year-old with an average of 31 months. Traditional two-nail bed combination method was performed in 22 cases, while the modified one-nail bed method 12 cases. One patient underwent Bilhault procedure on both thumbs Most of the reconstructed thumbs had good alignment, bigger size, shorter length and acceptable ROM. The subjective symptoms are subtle and mostly tolerable. Most of the patients are satisfied with the results. Major morbidities include one partial pulp necrosis, one ectopic nail and one arthralgia.
Conclusion
With stringent selection of patients and meticulous surgical techniques, the Bilhault-Cloquet procedure can provide satisfactory functional results and acceptable cosmesis.

Abstract #378

Title: NEUROVASCULAR PULP ISLAND FLAP FOR PULP AUGMENTATION IN EXTRA THUMB RECONSTRUCTION
CHOW CS, HO PC, TSE WL, HUNG LK
Prince of Wales Hospital
Shatin, Hong Kong SAR

Introduction
Pulp and nail asymmetry is commonly seen in extra thumb condition, particularly in convergent type. Conventional or modified Bilhaut-Cloquet procedure can help to restore the symmetry but results in major dorsal scar with poor cosmesis. The author has designed a neurovascular pulp island flap together with nail bed transferred from the ablated digit, and when combined with the dorsally based skin flap approach, can effectively improve the pulp and nail symmetry with minimal dorsal scarring on the reconstructed thumb.
Materials & Methods
Five patients including 1 Wassel type III and 4 type IV extra thumbs, were being operated between Dec 2002 to June 2006. All patients had significant hypoplasia and asymmetry of the pulp and nail of the planned retained digit. The average age of operation was 12.2 months (range 8-15 months). A neurovascular pulp island flap including part of nail bed was raised from the planned ablated digit basing on its single neurovascular bundle. After standard reconstruction of the collateral ligament, abductor musculature with or without realignment osteotomy, the pulp flap was transferred to the proper digit for reconstruction. All patients were followed up at intervals to monitor the cosmetic, functional and radiological outcome.
Results
The average follow up was 22.2 months (range from 5 – 44 months). All flaps survived with no intra-operative complication. Transient hyperaemia of the transferred pulp was noted in 1 case due to transient ischemia. Pulp and nail symmetry was restored or improved in all cases. The nail width discrepancy reduced from 2.1mm to 0.4mm. Nail ridge was mild in 3 and minimal in 2 cases. Surgical scar was inconspicuous. Clinical and radiological alignment was satisfactory. All parents were satisfied with the treatment outcome.
Conclusion
In selected case of extra thumb with significant pulp and nail asymmetry, the neurovascular pulp island flap is a safe and effective mean to restore symmetry for cosmetic improvement.

Abstract #379

RECONSTRUCTION OF HYPOPLASTIC THUMB USING HEMI-METATARSAL TRANSFER

CHOW CS, HO PC, TSE WL, HUNG LK
Prince of Wales Hospital
Shatin, Hong Kong SAR

Introduction:
The treatment of hypoplastic thumb (Blauth's type IIIb and IV) by pollicization is culturally not acceptable in the Chinese population and digit preservation approach is preferred. The aim of this study is to evaluate the outcome of hemi-metatarsal transfer as an alternative reconstruction method.
Materials and Methods:
From January 1997 to February 2000, 5 patients (average age 17.5 months) with 6 hypoplastic thumbs (five Blauth's type IV; one Blauth's type IIIb) had received reconstruction using free hemi-metatarsal transfer. A 2nd stage surgery (Huber's opponenplasty and extensor tendon transfer) was performed in all cases. The functional outcomes were evaluated by range of motion, grip strength, pinch strength and the Jebsen Hand Function Test. Linear growth of the metatarsal graft was evaluated radiologically. Parent satisfaction was evaluated.
Results:
The average follow-up period was 87.7 months. The operated thumbs achieved good motion in abduction and opposition. The overall hand function was good as the Jebsen Hand function test time was not significantly different from the contralateral normal hand except in small objects manipulation ($p = 0.011$). The grip strength and pinch power were significantly weaker than the normal contralateral hand ($p = 0.032$; $p=0.011$). There was no neurovascular or wound complication. There was no donor site morbidity and all donor metatarsals regained normal growth potentials. Linear growth of the transferred metatarsals was evident radiologically. The parent satisfaction was excellent.
Conclusion:
Free hemi-metatarsal transfer is an innovative procedure for hypoplastic thumb reconstruction. It is feasible in the attainment of 5-digit hand in patients with type IIIb/IV hypoplastic thumb with good functional outcome.

Abstract #120

SOLITARY OSTEOCHONDROMA OF THE FINGERS CAUSING DEFORMITY OR LIMITATION OF MOTION

Goo Hyun Baek, Moon Sang Chung, Young Ho Lee, Hyun Sik Gong
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Seoul National University College of Medicine
Seoul, Korea

Although solitary osteochondroma is the most common benign bone tumor, they are rare in phalangeal bones.
We experienced 8 patients with solitary osteochondroma occurred in phalanges of the hand, who were treated surgically. There were 7 males and one female whose average age was 14.6 (range, 3 – 36) years. All the tumors were found at distal epiphyseal region of the phalangeal bones. Proximal phalanges were affected in six patients, and middle phalanges in two. Four of them occurred in third finger, and remaining four in fourth finger. Five patients complained of angular deformity in coronal plane. Three patients complained of limitation of extension or flexion, and one of them showed secondary buttonhole deformity. Mass excision was done in five patients. Mass excision and corrective osteotomy was done in two patients. In one patient with buttonhole deformity, extensor reconstruction was combined with mass excision. Average duration of follow-up was 34 months (range, 1 – 5 years).
Correction of the deformity and good restoration of motion was achieved by surgery. No complication was encountered, and there were no recurrence during follow-up.

Session: Free paper 3

Date: 15 February 2008

Venue: Meeting room 604

Time: 08:00 - 09:00

Moderator : T.H YIP & Duke-whan CHUNG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	ZYLUK	Andrzej	Poland	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	24	The results of corrective osteotomy in malunited fractures of the distal radius
2	ZYLUK	Andrzej	Poland	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	25	A comparison of the results of the conservative vs operative by percutaneous K-wiring treatment of fractures of the distal radius
3	LEE	Young-Keun	Korea	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	82	Early corrective osteotomy for a malunite Colle's fracture using volar T-plate and calcium sulfate grafting
4	GRUENERT	Joerg	Switzerland	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	95	Results of a randomised, prospective study comparing palmar angular stable with dorsal osteosynthesis in highly comminuted fractures of the distal radius.
5	CHANG	Chih-Hao	Taiwan	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	189	Unstable Distal Radius Fracture Treated with Leibinger Plating: 102 cases Report
6	LEE	Jae-Hoon	Korea	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	235	Treatments of unstable intraarticular distal radius fractures using either ORIF with volar locking plate or external fixation method
7	YIU	Hon-Wah	Hong Kong	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	394	Early result in the use of locking plate in management of painful distal radius malunion
8	LIM	Beng-Hai		Free paper 3 - Fracture distal radius 1	15. Feb. 2008	451	Chronic distal radial ulnar joint instability
9	FUKUTA	Makoto	Japan	Free paper 3 - Fracture distal radius 1	15. Feb. 2008	55	Minimally invasive plate osteosynthesis for distal radius fractures with the palmar locking plate

Abstract #24

Z. Niedzwiedz, A. Zyluk

The results of corrective osteotomy in malunited fractures of the distal radius

Patients and Methods. From 2002 to 2006, twenty-five patients, 19 women and 6 men who had a mean age of 50 years, with malunited fractures of the distal radius received corrective osteotomy. In all patients a bone graft was inserted in the gap following distal radius osteotomy. The operation was done at a mean of 8 months (range 6-19) after fracture and patients were followed-up over an average of 2 years. The assessment included Gartland-Werley scale and DASH score (in original version, range 30-150 points).
Results in Gartland-Werley complex scale, 20 patients (80%) had an excellent and good outcomes, 3 patients (12%) had moderate and 2 (8%) had poor results at final follow-up. Assessment with DASH questionnaire revealed statistically significant improvment form a pre-operative mean score of 115 points (range 76-132) to a mean of 47 points (range 30-100) at 2 years. All 11 patients who were employed before an accident, returned to their previous work. In two patients who had poor result in Gartland-Werley scale, a secondary displacement of the corrective osteotomy occurred, in both cases caused by a failure of the fixation with K-wires.
Conclusion. Correction of the symptomatic malunion of the distal radius is a safe and effective procedure in most cases.

Abstract #25

A. Zyluk, P. Janowski
A comparison of the results of the conservative vs operative by percutaneous K-wiring treatment of fractures of the distal radius
Summary

Patients nad Methods. The objective of this study was comparing the results of the conservative (close reduction and immobilisation in the plaster splint) vs operative (percutaneous K-wiring) treatment of fractures of the distal radius. Sixty patients, 49 women (82%) and 11 men (18%), who sustained an isolated, displaced fractures were randomly allocated to operative (30 patients) or conservative (30 patients) treatment. All patients were followed up at 1.5, 3 and finally at 6 months after fracture. The assessment included: rate of secondary displacement, wrist range of motion, fingers loss of flexion, total grip strength, dorsal/volar tilt, radial angulation and radial length on the X-ray. Function of the hand was assessed with DASH questionnaire, cold sensitivity with McCabe scale and final outcome in Gartland-Werley and Castaing complex scales. The rate of secondary displacement was considered a primary outcome measure.
Results. Secondary displacement was noted in 8 patients (27%) treated conservatively, of whom 7 required surgery and those were withdrawn from the trial. Three fractures (10%) treated operatively displaced secondarily, but none required additional operation and all completed the follow-up. The rate of secondary displacement was statistically significantly (chi^2 test, $p<0.05$) more frequent in conservatively treated group. With regard to other analysed parameters, the statistically significant differences was found in total grip strength at 3 and 6 months assessments, and in DASH score at 6 months assessment, both favouring operative method. The remaining variables did not differ significantly between the groups treated conservatively and operatively.
Conclusion. Our results have demonstrated, that percutaneous K-wiring of fractures of the distal radius is superior to the conservative treatment, because statistically significantly reduces the risk of secondary displacement and allows to obtain a stronger grip and better hand function within 6 months after fracture.
Key words: fracture of the distal radius - treatme

Abstract #82

Early Corrective Osteotomy for a Malunited Colles' Fracture using Volar T-plate and Calcium Sulfate Grafting
Young-Keun Lee, M.D., Yong-Jik Lee, M.D. Sang-Hyun Woo, M.D. Ph.D.
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Gangnam Hospital, Daegu, South Korea

Malunited fractures of the distal radius in active young patients are less tolerated, especially in those who are engaged in heavy manual work or who require a normal motion range of the wrist. Early surgical correction of the malunion of distal radius should be considered for those patients. We report a case of the malunion of distal radius treated with osteotomy using volar T-plate and calcium sulfate grafting for the metaphyseal bone defect 7 weeks after the injury. The patient showed good clinical results 20 months after surgery and the radiographs of the wrist showed the complete union of distal radius with the absorption of calcium sulfate.

Abstract #95

RESULTS OF A RANDOMISIZED PROSPECTIVE STUDY COMPARING PALMAR ANGULAR STABLE WITH DORSAL OSTEOSYNTHESIS IN HIGHLY COMMINUTED FRACTURES OF THE DISTAL RADIUS

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Background: The fracture of the distal part of the radius is the most common fracture in humans. Treatment has shifted to operative procedures as functional better results can be obtained markedly earlier. The dorsal approach has been widely used, but there has been a growing interest in the palmar approach with angular stable implants. In order to evaluate the pecularities of each procedure this study was performed in severe distal radius fractures.
Material and method: 42 patients elder than 50 years with a unilateral, intraarticular type c-radius fracture were either supplied with a palmar plate (APTUS) or a dorsal Pi-plate. Aftercare and follow-up were equal after 2 and 6 weeks, 3, 6 and 12 months. Range of motion, power, pain, satisfaction, X-ray evaluations were compared as well as the DASH and Gartland-scores one year postoperatively.
Results: Patients with a palmar angular stable implant regularly had a better range of motion; concerning the pain there was after one year no difference in both groups. Radiological and functional parameter were analysed and the DASH and Gartland-score compared.
Conclusion: Both approaches to the distal radius will provide good radiological results, but in high degree intraarticular fractures especially in the osteoporotic bone of the elder person the palmar approach is safer, faster and gives fewer complications (i.e. tendon problems). The peculiar complications and the functional results are discussed.

Abstract #189

Unstable Distal Radius Fracture Treated with Leibinger Plating: 102 cases Report

Chang Chih-Hao, Hou Sheng-Mou
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Abstract:
Unstable distal radius fracture is met very frequently in the clinical practice. There are many methods to treat this problem. Every method has its benefits and limitation. From 2004 to 2006, we treated the unstable distal radius fracture with Leibinger plate and screws consecutively. The plate and screws are unlocked type. In our series, unstable distal radius fracture was defined according to AO classification including A3, B2, B3 and C groups.
In our series, the follow-up period is from 6 months to 3 years averaging 16 months. There are total 102 cases. The average age is 46.2 years old. The postoperative results are satisfactory. The X-ray results are the average volar tilting angle 4.5 degrees and the average radial height 14.4 degrees. The results of range of motions are average flexion 70.6 degrees, average extension 75.2 degrees, average pronation 80.4 degrees and supination 71.3 degrees. The grasping force is 83% comparing to the contralateral hand. There are several cases with complications including one case of screw back-out resulting in scrubbing tenosynovitis, 3 cases with residual articular stepoff averaging 2 mm, 1 case with infection, and 2 cases with mild reflex sympathetic dystrophy. The further displacement after implanting can be seen in 4 cases. They all belonged to the group of further dorsal tilting and the average of displacement is 2.3 mm. There is not any case with screw broken. In general, the result is satisfactory and encouraging.

Abstract #235

Treatments of unstable intraarticular distal radius fractures using either ORIF with volar locking plate or external fixation method

Jae Hoon Lee, M.D., Duke Whan Chung, M.D., Boo Kyung Kwon, M.D.,
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Subject: Treatments of unstable intraarticular distal radius fractures using either ORIF with volar locking plate or external fixation method
purpose: To compare clinical and radiological results between open reduction and internal fixation with volar locking plate and external fixation with K-wire fixation for unstable intra-articular fractures in distal radius.
Material and method: From March 2003 to March 2007, 34 patients in 49 patients who had a fixative surgery for unstable intraarticular distal radius fractures could be followed at least 6 months. We analyzed results retrospectively. 22 patients were fixed by ORIF with volar locking plate. Another 12 patients were fixed with EF and K-wire. Average period of follow-up was 11 months (7-24months) in ORIF group and 12 months (6-30 months) in EF group. Two groups were compared with range of motion of wrist, strength and functional status using Mayo wrist scoring system. Radiologic parameters (radial inclination, ulna variance, and volar tilt) were compared between two groups.
Result: The flexion-extension arc of motion in ORIF group was average 98° and in EF group was average 86°. ORIF group had statistically significant better motion of flexion-extension. But there were no significant difference between two groups in pronation-supination arc of motion and strength. Mayo wrist scores were average 90.2 and there were excellent in 12 cases, good in 7 cases and fair in 3 cases in ORIF group. But it was average 82.4 and excellent in 6 cases, good in 4 cases and fair in 2 cases in EF group. In radiological analysis, all cases showed solid bony union. ORIF group averaged 7° volar tilt and 22 ° radial inclination with 1mm ulnar negative variance. EF group averaged 4° volar tilt and 18 ° radial inclination with 3mm ulnar negative variance. ORIF group resulted in a significant better result in radial inclination, volar tilt and radial length compared with EF group
Conclusion: Our retrospective analysis demonstrated that ORIF group with volar locking plate showed better results in range of motion of wrist, Mayo wrist score and radiological analysis than EF group, because ORIF enables early range of motion exercise and provide more stable fixation. But we think we must need long term follow-up study to know whether osteoarthritis develop.

Key words: distal radius fracture, open reduction and internal fixation, external fixation, volar approach

Abstract #394

Author: Dr. Yiu Hon Wah, Dr. Lam Hung Wai, Dr. Ngai Wai Kit
Department of O & T
North District hospital

Title: Early result in the use of locking plate in management of painful distal radius malunion

Abstract:
From January 2005 till December 2007, 6 patients(male to female ratio 1:2) suffered from malunited distal radius presented with painful deformity were managed with trapezoidal osteotomy fixed with 2.4mm AO volar locking plate and autologous bone grafting. The average operative time was 80 minutes (60-90 minutes), mean blood loss of 100ml (50-200ml), average length of scar of 4cm (3-5cm).
Immediate active mobilization was started in all the cases and resting wrist brace was given for 6 weeks.
The average time of radiological union was 8 weeks (6-12 weeks). Nearly full range of motion compared to the contralateral wrist was attained at 8 weeks after the operation. Average wrist score of 37/40 (35-38) was attained at 12 weeks after the osteotomy. All the patients managed to walk unaided on D2 and discharged within 3 days after the operation. (D1 to D3)
There was no complication reported.
In conclusion, trapezoidal osteotomy using 2.4mm volar locking plate provided a simple and reliable intraoperative measurement and the fixation was stable to allow immediate active mobilization.

Abstract #451

Chronic distal radial ulnar joint instability

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Centre for Hand and Reconstructive Microsurgery (CH ARMS), Mount Elizabeth Medical Centre and Departmen t of Orthopaedic Surgery, Yong Loo Lin School of Medicine , National University of Singapore, Singapore

Patients with chronic instability of the distal radial ulnar presents with ulnar sided wrist pain, weakness and sometimes loss of supination and pronation.

The primary stabilizers of the DRUJ are the radial ulnar ligaments that forms part of the TFCC. Tear of these ligament results in instability. Based on our biomechanical studies, the break strength of the radial ulnar ligaments are about 200 N in cadaver specimens.

Augmentation of the distal radial ulnar ligaments with the palmaris longus tendons by recreating the radial ulnar ligaments is important in reconstituting the complex interplay of these ligaments to stabilize the distal radial ulnar joint.

Cadaveric work on the 4 ligament augmentation reproduces the stability of the DRUJ.

All our first consecutive 9 patients with a follow up period of between 14 and 36 months had pain relief except for one patient who continues to have mild ulnar sided wrist pain. The range of supination and pronation were preserved and DRUJ stability was restored in all cases.

Our recent patients, we have proceeded with 4 weeks of immobilization with a wrist splint rather than rather than the conventional 6 weeks plaster cast. These patients again enjoyed full range of supination and pronation with pain relief and stable distal radial ulnar joint.

Abstract #55

Makoto FUKUTA
Minimally invasive plate osteosynthesis for distal radius fractures with the palmar locking plate
Objective
In our institution, minimally invasive plate osteosynthesis (MIPO) with the palmar locking plate has been used for displaced distal radius fractures. We make two palmar skin incisions and the plate is inserted under the ponator quadratus. This muscle can be protected and damage to the soft tissue can be minimized by using this technique. This procedure enables the patients to start early motion exercise. The purpose of this study is to evaluate
the clinical outcomes of 15 distal radius fractures treated with this technique.
Materials and Methods
Since August 2006, we have had 15 hands treated with palmar locking plate by MIPO technique. Their average age of them was 47.8 years old(range21-76). All fractures were classified according to the AO classification. The postoperative immobilization was not performed. We instructed the patients to start early motion exercise postoperatively.
The clinical outcomes at 6months postoperatively were rated according to a modification of the Green and O'Brien score.
Results
All fractures were successfully united. The average Green and O'Brien score was 78.5. Loss of reduction, implant failure and deep infection were not found postoperatively.
Conclusion
MIPO technique for distal radius fractures has three advantages.
First, it is not necessary to divide the pronator quadratus. Second, it can reduce soft tissue damage, which encourages bone healing. Third, this procedure allows small skin incision
that improve a cosmetic aspect. It is effective procedure because patient can quickly return to activities of daily living.The results from 6months of observation were satisfactory.

Abstract #448

Treatments of Advanced Kienböck's disease with tendon roll implantation and temporary partial wrist fixation.
-Its clinical results and future*s treatment using tissue engineered technique-

Koji SHIGEMATSU MD.
Nishinara Central Hospital

Various procedures have been performed for the treatment of advanced Kienböck's disease. We have treated it a tendon roll implantation after resection of the necrotic lunate with temporary internal fixation of the STT or SC joint. Twenty-one patients (8 males and 13 females) aged 24 to 72 years at the time of surgery. According to Lichtman*s classification, 12 patients were stage IIIb and 9 were stage IV. Postoperatively, wrist pain was completely disappeared in nine patients, and in remaining 12 patients, wrist pain was decreased compared with preoperatively. However collapse of the implanted tendon roll occurred in some cases. Thus, we considered that a new tendon roll with appropriate biomechanical properties is desirable for treatment of advanced Kienböck's disease.
In this presentation, I would like to show clinical results of the treatment of tendon roll implantation for advanced Kienböck's disease and a new tendon roll implantation combined with bone marrow-derived mesenchymal stem cells in collagen ceramic composite using tissue engineered technique experimentally.

Session: Free paper 4

Date: 15 February 2008

Venue: Meeting room 605

Time: 08:00 - 09:00

Moderator : S.F WONG & Alexander SHIN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	MURAMATSU	Keiichi	Japan	Free paper 4 - Basic Science 1	15. Feb. 2008	38	Chimerism Studies as an Approach for the Induction
2	RYUTARO	Kuriyma	Japan	Free paper 4 - Basic Science 1	15. Feb. 2008	51	Prolonged Survival of Rat Hind Limb Allografts Following Short-Course FK506 and Mycophenolate Mofetil Combination Therapy
3	TAKAMATSU	Kiyohito	Japan	Free paper 4 - Basic Science 1	15. Feb. 2008	67	The interaction among regenerating Nerve, Schwann Cell Migration and Angiogenesis in Biodegradable Nerve Conduit with Drug Delivery System (FGF-2)
4	SHIN	Alexander	USA	Free paper 4 - Basic Science 1	15. Feb. 2008	69	Motor Outcomes of Segmental Nerve Defect Repair in the Rat Using Bioabsorbable Synthetic Commercially Available Nerve Conduits
5	MURATA	Keiichi	Japan	Free paper 4 - Basic Science 1	15. Feb. 2008	79	Histo-anatomical study of relationship between the flexor retinaculum and the palmar apponeurosis: Entity and clinical importance of the distal extension of the flexor retinaculum and the pre-retinacular fat pad of the wrist
6	CHUANG	Celina	Taiwan	Free paper 4 - Basic Science 1	15. Feb. 2008	92	Comparing Composite Tissue Allotranspantation Tolerance Induction and its Chimerism Using Bone Marrow Transplanation or Vascularized Bone Marrow Transplanation with Non-Myeloablaitve conditioning
7	OH	Jin-Rok	Korea	Free paper 4 - Basic Science 1	15. Feb. 2008	133	The Expression of MMP-2, MMP-9 AND MMP-12 of Flexor Tendon Sheaths within Carpal Tunnel in Idiopathic Carpal Tunnel Syndrome
8	HAMADA	Yoshitaka	Japan	Free paper 4 - Basic Science 1	15. Feb. 2008	266	Exogenous bFGF Enhances Proliferation of Epitenon during the Synovial Tendon Healing and Callus Formation at the Repaired Tendon-Bone Interface.
9	CHEN	Lin	China	Free paper 4 - Basic Science 1	15. Feb. 2008	305	The role of ultrasonography in examination of the regeneration of sutured peripheral nerve
10	SHIN	Alexander	USA	Free paper 4 - Basic Science 1	15. Feb. 2008	99	Biomechanical Comparison of Three Fixation Techniques of Four Corner Arthrodesis: K-Wires Versus Circular Plate (Spider Plate) and Locked Circular Plate (Xpode Plate).
11	HINTRINGER	Wolfgang	Germany	Free paper 4 - Basic Science 1	15. Feb. 2008	447	Multidirectional fixed-angle plate fixation of unstable distal radial fractures based on a new locking principle
12	CAO	Yi		Free paper 4 - Basic Science 1	15. Feb. 2008	458	Remarkable Decreases In The Strength Of Repaired Tendons Gliding Over A2 Pulley: A Biomechanical Study In A Chicken Model

Abstract #38

CHIMERISM STUDIES AS AN APPROACH FOR THE INDUCTION
OF TOLERANCE TO EXTREMITY ALLOGRAFTS
KEIICHI MURAMATSU, RYUTARO KURIYAMA, TAKAHIRO HASHIMOTO AND TOSHIHIKO TAGUCHI
DEPARTMENT OF ORTHOPEDIC SURGERY, YAMAGUCHI UNIVERSITY SCHOOL OF MEDICINE, YAMAGUCHI, JAPAN

Recent advances in the field of transplant immunology and reconstructive surgery resulted in interest in extremity allograft. Until now, more than 20 hand transplants have been performed in human. Rejection is well controlled by currently available immunosuppressive drugs. The hand transplant, however, is not a life-supporting organ transplant and these drugs are unlikely to represent the final solution for hand transplantation due to serious adverse effects. The ultimate goal of extremity allograft is the induction of donor-specific immunotolerance. The major strategies for tolerance induction are: (1) T-cell co stimulation blockade, (2) induction of mixed chimerism (3), T-cell depletion, and (4) tolerance mediated by regulatory T-cells. Amongst these, the establishment of a high-level of chimerism may be the most stable strategy for donor-specific tolerance and our laboratory has been investigating the induction of macrochimerism following extremity allotransplantation. Recently, some studies demonstrated that macrochimerism induced immunotolerance for extremity allograft in the rodent model. We made a new protocol using cyclophosphamide (CYP) and granulocyte colony-stimulation factor (G-CSF) to induce high-level chimerism following rat whole-limb allotransplantation. Limb allografting could function as a vascularized carrier for bone marrow transplantation, provide a continuous source of donor cells and contribute to a high-level of chimerism in the recipient. Pre-transplant CYP followed by G-CSF and FK506 treatment significantly prolonged the survival of limb allografts but frequently caused chronic graft-versus-host disease in the recipients
In this presentation, recent experimental chimerism studies are reviewed for tolerance induction and we discuss the prospect of clinical applicability in extremity allograft.

Abstract #51

PROLONGED SURVIVAL OF RAT HIND LIMB ALLOGRAFTS FOLLOWING SHORT-COURSE FK506 AND MYCOPHENOLATE MOFETIL COMBINATION THERAPY
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Background: In clinical hand transplants, three drugs including FK506 (Astellas Pharma, Japan), steroids and Mycophenolate Mofetil (MMF; Syntex Corp., Palo Alto, CA) were used as immunosuppressive therapy. Among these, MMF appears to be a promising immunosuppressant because recent data indicates it is more effective and less toxic than cyclosporine (Novartis Pharma, Japan) in animal and human kidney, liver, and heart transplants. The purpose of this study was to determine whether short-course therapy with a combination of MMF and FK506 would prolong rat limb allograft survival and induce immunotolerance following the withdrawal of treatment.
Materials and methods: DA rat donor hind limbs were orthotopically transplanted into Lewis rat recipients. In total, 38 models of transplantation were performed and divided into 8 groups that were treated individually or in combination with FK506 and MMF therapy. Animals were immunosuppressed for 28 days and then observed for up to 140 days. Graft rejection was evaluated both macroscopically and histologically.
Results: Survival time for rat limb allotransplants receiving combination FK506 and MMF therapy were significantly longer than with FK506 or MMF monotherapy and this was achieved without serious side effects. Histopathological study demonstrated a significantly lower level of rejection with FK506 and MMF combination treatment compared to groups receiving FK506 or MMF monotherapy.
Conclusions: Recent experimental and clinical studies demonstrate a strong synergistic effect for FK506 and MMF but it is still relatively unknown for limb allografts. FK506 and MMF clearly have synergistic effects when administered in combination in the limb allotransplant model.

Abstract #67

Introduction: Recently, various biodegrable polymer tubes have been reported. However those results were not satisfying enough for clinical use.
We have already investigated that our biodegradable nerve conduit filled with gelatin incorporating FGF-2 is a reliable drug delivery system(DDS) and it could release FGF-2 for two weeks.
The purpose of this study is to introduce our novel biodegradable polymer tube filled with gelatin incorporating FGF-2 as DDS and to report its effect on peripheral nerve regeneration and angiogenesis.
Materials and Methods: Study #1; effects of DDS of FGF-2 on peripheral nerve regeneration, Schwann cell and angiogenesis :we implanted biodegradable polymer conduit filled gelatin with or without incorporating FGF-2 into 12 mm sciatic nerve gaps in Wistar rats. At 12 weeks after implantation, number of regenerating nerves and vessels in transverse sections at mid-conduit were observed histologically.
Study #2; enhancement of DDS FGF-2 on peripheral nerve regeneration, angiogenesis and Schwann cell migration:In the same series, at 5D, 10D, 15D, 20D post operation, relationship of regenerating nerves, Schwann cells and vessels from proximal stump in longitudinal sections were observed immuno-histologically.
Results: Study #1; Concerning FGF-2, the results of nerve regeneration at 12 weeks obviously showed the advantage of DDS with FGF-2. And the number of vessels and total area of vessels in conduit significantly increased with FGF-2, too.
Study #2; DDS of FGF-2 could enhance nerve regeneration at 15D and 20D, Schwann cell migration throughout 20 days, angiogenesis at 15D and 20D.
Among them, angiogenesis was obviously enhanced.

Abstract #69

MOTOR OUTCOMES OF SEGMENTAL NERVE DEFECT REPAIR IN THE RAT USING BIOABSORBABLE SYNTHETIC COMMERCIALLY AVAILABLE NERVE CONDUITS

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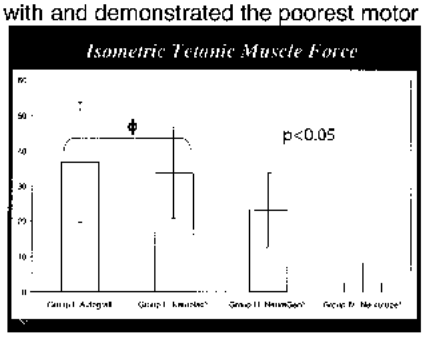
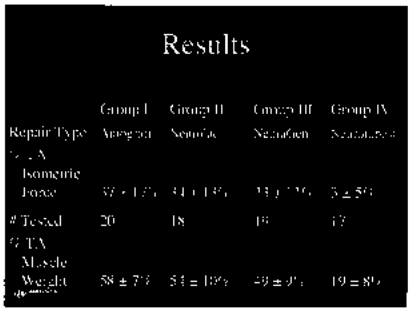
Purpose: The use of synthetic bioabsorbable nerve conduits for segmental nerve injury repair has been studied, but no studies have evaluated or compared their potential for motor recovery. The purpose of this study is to compare 3 commercially available nerve conduits with an autograft in a rat sciatic nerve injury model with respect to recovery of isometric tetanic force, nerve histomorphometry and electrodiagnostic measures.
Methods: A 10 mm segment of the sciatic nerve in 80 rats were excised and evenly divided into four repair groups: autograft nerve; poly lactide caprolactone tube (Neurolac, Ascension Orthopedics); collagen tube (NeuraGen, Integra Life Sciences); polyglycolic acid tube (GEM Neurotube, Synovis Micro Companies Alliance). Contralateral sides served as controls and all data was normalized to the control side and reported as a percentage of control side. At 12 weeks bilateral tibialis anterior (TA) isometric tetanic force testing was performed and muscle weights obtained. Nerve specimens were obtained for histomorphometric analysis.
Results: With respect to isometric motor recovery, autograft and the poly caprolactone tube were statistically similar and had the best isometric motor recover. The collagen tube was statistically inferior to the autograft and poly caprolactone tube, while the polyglycolic acid tube performed the worst. Tibialis anterior muscle weight paralleled the motor recovery findings as did the histologic analysis of the nerve segments.
Conclusion: Using our novel isometric motor testing of the tibialis anterior muscle in the rat sciatic nerve model, we have demonstrated that at 12 weeks after a segmental sciatic nerve injury that autograft and the poly caprolactone tube were statistically similar and demonstrated a statistical difference over collagen and polyglycolic acid tubes. Furthermore, we found that the polyglycolic acid tube collapsed with and demonstrated the poorest motor recovery.





Abstract #79

HISTO-ANATOMICAL STUDY OF RELATIONSHIP BETWEEN THE FLEXOR RETINACULUM AND PALMAR APPONEUROSIS: ENTITY AND CLINICAL IMPORTANCE OF THE DISTAL EXTENTION OF THE FLEXOR RETINACULUM AND THE PRE-RETINACULAR FAT PAD OF THE WRIST

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Purpose: To investigate a detailed histo-anatomy of the flexor retinaculum (FR) with relationship to the palmar apponeurosis (PA) for a reliable and less invasive procedure of the carpal tunnel release surgery.
Materials and methods: We performed an anatomical study on 8 hands from 4 embalmed adult bodies to clarify the detailed anatomical relationship between the FR and the PA. Combined structure of the FR, the AP and surrounding tissue from each hand was harvested for histological investigation. The hematoxyline-eosin staining was conducted to each specimen.
Results: In anatomical study, we found that fibrous structure of distal extension of the FR entered into the fibers of the PA in all hands. The length of this structure ranged from 13.7mm to 20.8mm (average: 16.1mm). We also found that a fat tissue was located between the FR and the PA in all hands. The histological findings showed that the fibers from the distal extension of the FR interdigitated into the fiber of the PA. In the fat tissue between the FR and the PA, considerable numbers of small arteries, venules and nerves existed.
Conclusion: Our study suggests that surgeons should pay attention to perform complete release of the distal extension of the FR to avoid symptom remaining or recurring. Injury to the fat tissue between the FR and the AP may play a part of tenderness after the carpal tunnel release surgery.

Abstract #92

THE UTILIZATION OF THE SYNTHETIC LIGAMENTS LARS FOR THE RECONSTRUCTION OF THE SCAPHO-LUNATE DISSOCIATION

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The treatment of scapho-lunate dissociation is a challenging problem.
The surgical strategy depending on chronologic and anatomical factors.
The trophic condition of the S-L ligament is strictly correlated to the time beetween the trauma and diagnosis. The wrist's condition (precence of arthrosis and anatomical congrence) and the characteristic of the instability (possible reduction of the DISI and the rotatory subluxation of the scaphoid) must be evaluated before performing any surgical procedures.
The aim of the Authors is to perform a new, simple, reproducible procedure with a mini-invasive incision so as to allow an "aggresive" rehabilitation and an early return to daily life activities utilizing the synthetic ligament LARS.
The experience of 30 years in the reconstruction of the LCA by Lars ligament is the basis for using it in hand surgery: as an internal brace in the acute lesion and as real ligament in the chronic lesion.
The A. present the results of this new procedure for the reconstruction of the S-L utilizing the synthetic ligament LARS.

Abstract #133

THE EXPRESSION OF MMP-2, MMP-9 AND MMP-12 OF FLEXOR TENDON SHEATHS WITHIN CARPAL TUNNEL IN IDIOPATHIC CARPAL TUNNEL SYNDROME

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The main histopathologic changes of tenosynovisum in idiopathic CTS are atherosclerotic changes of vessels and fibrosis of collagen fibers. These changes might be related with MMPs expressions. The purpose of this study is to investigate expression of the MMPs with regard to elastin degradation. The flexor tenosynovium was used as specimens obtained from 11 patients with idiopathic carpal tunnel syndrome and 12 fresh frozen cadavers. The section slides of slide were stained with van Gieson staining method for elastin stain and immunohistochemical staining method for MMP-2, 9 and 12 expressions. MMP-2, 9 is mainly stained at cytoplasm of fibroblasts and entire vessel walls while MMP-12 is stained widely in extracellular matrix and vessels. The staining intensity of MMP-12 is less than that of MMP-2 and MMP-9. The average amount of elastin was less in CTS group than in control group ($p<0.05$). The percentage of MMP-2 positive cells was higher in CTS group than in control group ($p<0.05$). The percentage of MMP-9 positive cells was higher in patient group than in control group ($p<0.05$). The expression rate of MMP-12 was higher in control group than in patient group ($p<0.05$). The results is suggesting that that the elevated expressions of MMP-2, MMP-9 and MMP-12 are related with atherosclerotic changes with regard to elastin degradation in idiopathic carpal tunnel syndrome and might be associated with fibrosis of collagen fibrils in tendon sheaths.

Abstract #266

Exogenous bFGF Enhances Proliferation of Epitenon during the Synovial Tendon Healing and Callus Formation at the Repaired Tendon-Bone Interface.

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Yoshitaka Hamada, Tatsuhiko Henmi, Naohito Hibino, Koichi Sairyo, Natsuo Yasui

investigate the effect of bFGF in healing of intrasynovial flexor tendon (Study-1) and tendon-bone interface (Study-2). METHODS: In Study-1, flexor tendons of rabbits were repaired by modified Kessler or inter-lacing suture. Bio-active nylon threads (JHS. 2006 31A:530-40) were used as a carrier of bFGF. In Study-2, the stump of the flexor digitorum fibularis tendons of rats were pulled out and sutured on drill-hole. We applied gelatin-hydrogels which released bFGF constantly over the course of 1 week on repaired tendon-bone interface. We compared bFGF-group and control-group without bFGF. We evaluated the integration by radiographs, histologically, Western blot test and biomechanically after surgery. RESULTS: These bFGF coated nylon suture and gelatin-hydrogels showed an excellent Drug Delivery System (DDS) to repaired site. (Study-1) B-FGF induced an increase of biomechanical strength as well as a thickening of the epitenon layer in vivo during 3 weeks, accelerating thereby cellular proliferation; initially peripherally and later centrally. (Study-2) The large cartilaginous callus seen on day 14 were remodeled gradually and decreased at 6 weeks after operation. In bFGF-group, the callus was larger which lead to increase the contact area between tendon stump and bone. In both groups, transitional fibrocartilagenous 4-zone structure could not be regenerated. CONCLUSIONS: The superficial epitenon layer is important during the early stage of tendon healing and activated by bFGF. The endotenon tenocyte in the center of the tendon is not accelerated by bFGF. Although bFGF did not recreate 4-zone structure between tendon stump and bone, it increased the reconstructed contact area.

Abstract #305

The role of ultrasonography in examination of the regeneration of sutured peripheral nerve

Lin CHEN

Objective Initially to discuss the role of US in determining the regeneration of sutured peripheral nerve. Material and method 8 patients, total 13 nerves with abnormal electromyography(EMG), accepted second surgery 3 months later averagely after first nerve suture. All nerves underwent US by the same sonographer. The specific image of suture was recorded, and accuracy was calculated correlated with intraoperative SEP Results 13 sutures were positioned correctly. The status of sutures divided into 2 grades according to the different characters of anastomosis. Correlating with intraoperative EMG, The accuracy of US was 92.3%. Conclusions In early period of nerve regeneration, US may evaluate the quality of nerve regeneration .

Key Word peripheral nerve suture ultrasonography electromyography

Abstract #99

BIOMECHANICAL COMPARISON OF THREE FIXATION TECHNIQUES OF FOUR CORNER ARTHRODESIS: K-WIRES VERSUS CIRCULAR PLATE (SPIDER PLATE) AND LOCKED CIRCULAR PLATE (XPODE PLATE).

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Introduction:

Four-corner arthrodesis is a common technique for salvage of degenerative wrist problems as well as carpal instability. Advocates of plate fixation state that rigid fixation allows early motion, which improves outcome of surgery. Despite this claim, there have been no comparative studies the effect of early motion on fixation type. The purpose of this study is to compare biomechanical profile of Kwires versus locked and unlocked dorsal circular plate in four-corner arthrodesis in physiologic condition mimicking early active range of motion.

Materials and Methods:

6 paired(12wrists) of fresh frozen cadaveric wrists underwent scaphoidectomy and four corner arthrodesis using K-wires (0.045" x 4) , unlocked stainless steel dorsal circular plates(Spider plate, Kinetikos Medical Inc.) or locked polyethlyethlyketone circular plate (Xpode, Trimed Inc.) An electromagnetic motion sensor was placed in the capitate and lunate. The specimens were placed in a cyclical flexion-extension wrist joint simulator(Figure 1). Repetitive cyclic wrist flexion and extension was applied using both displacement and force control. Hardware failure or motion > 2 mm was considered a failure of fixation.

Results:

The biomechanical profiles for 5000 cycles and the initial 100 cycles are shown below(Figure 2). 67% in the K wire group catastrophically failed, and 67% of the Spider plate group failed. There were no failures of the Xpode plate fixation group. Mode of failure in K-wire group were including pin breakage, bending, and loosening. For the spider group failure mechanism involved loosening screws.

Discussion:

This study determined the immediate stability of each fixation technique for cyclical loading mimicking early motion. Spider plate provide more rigid fixation in flexion and abruptly increase motion when more than 35 degree wrist extension occur. Xpode plate provided more stability in extension and was able to withstand cyclical loading in this experiment, and could tolerate simulated early range of motion without failure.

Figure 1

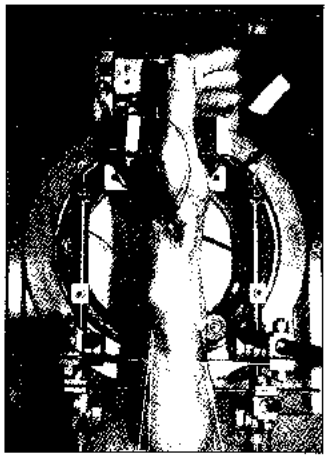
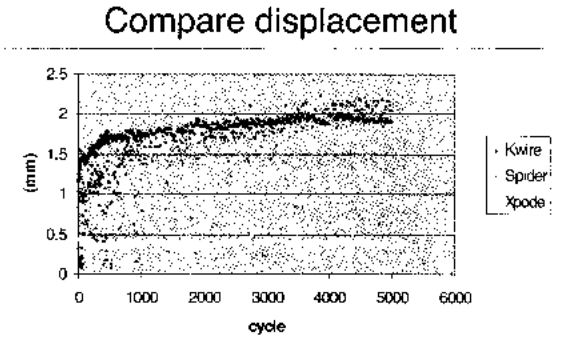


Figure 2



Abstract #447

Multidirectional fixed-angle plate fixation of unstable distal radial fractures based on a new locking principle

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Handcenter Korneuburg / Wien
Hermann Krimmer PHD
Handcenter Ravensburg
Germany

Introduction
The preferred treatment of unstable distal radius fractures nowadays has changed to palmar plating with fixed angle devices.
Methods
Based on a new locking principle (Trilock*) different plate devices were developed with screw placement by 15° of freedom in all directions (Medartis*). As the multidirectional angular stability is not realized by means of distortion of the plate hole (thread forming) but by means of force and friction, the material can be produced of high grade titanium in combination with a low profile design.
Material
55 patients with a mean age of 54years were treated using this device without bone graft. The majority demonstrated intraarticular patterns of the C-type according to the AO classification. Follow up examination showed no relevant secondary loss of reduction. X-rays revealed 8° of palmar inclination and an ulnar vari ance of +0,2mm. Wrist motion averaged 58° of extens ion, 61° of flexion, 36° of ulnar and 20° of radial deviation, 89° of pronation and 8 8° of supination. Patients regained good function r epresented in a mean DASH score of 14 and modified Cooney wrist score of 82 point

Medartis Basel Switzerland

Biomechanical considerations in different volar fixed angle stable plates in the treatment of radius fractures.

Wolfgang Hintringer Handcenter Korneuburg/Vienna/Austria

We will present various plate designs in the treatment of radius fractures and their volar position, and the problems and complications associated with these plates.
It has been clearly established that isolated application of volar stable-angle plate fixation has greatly simplified the decision – which was by no means simple in the past - as to which method should be used for what type of fracture.
Revisions performed in many cases because of problems encountered after stable-angle volar plate fixation showed that direct access over the median nerve was a frequent cause of the symptoms experienced by the patients.
The position of the plates has become a strongly debated subject in recent times The position of different plate designs according to the so called watershadeline from Orbay is discussed and shown in this paper.

Abstract #447

Multidirectional fixed-angle plate fixation of unstable distal radial fractures based on a new locking principle

Wolfgang Hintringer
Handcenter Korneuburg / Wien
Hermann Krimmer PHD
Handcenter Ravensburg
Germany

Introduction
The preferred treatment of unstable distal radius fractures nowadays has changed to palmar plating with fixed angle devices.
Methods
Based on a new locking principle (Trilock*) different plate devices were developed with screw placement by 15° of freedom in all directions (Medartis*). As the multidirectional angular stability is not realized by means of distortion of the plate hole (thread forming) but by means of force and friction, the material can be produced of high grade titanium in combination with a low profile design.
Material
55 patients with a mean age of 54years were treated using this device without bone graft. The majority demonstrated intraarticular patterns of the C-type according to the AO classification. Follow up examination showed no relevant secondary loss of reduction. X-rays revealed 8° of palmar inclination and an ulnar vari ance of +0,2mm. Wrist motion averaged 58° of extens ion, 61° of flexion, 36° of ulnar and 20° of radial deviation, 89° of pronation and 8 8° of supination. Patients regained good function r epresented in a mean DASH score of 14 and modified Cooney wrist score of 82 point

Medartis Basel Switzerland

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Abstract #458

REMARKABLE DECREASES IN THE STRENGTH OF REPAIRED TENDONS GLIDING OVER A2 PULLEY: A BIOMECHANICAL STUDY IN A CHICKEN MODEL

Yi Cao, Jin Bo Tang
Department of Hand Surgery, The Hand Surgery Research Center, Affiliated Hospital of Nantong University, Nantong, China

Purpose Pulleys play an important role in digital flexion but little is know about strength of repaired tendon caused by hindrance of a rigid pulley. We measured the strength of repaired flexor tendons over intact, incised A2 pulley or the sheath away from the pulley in a chicken model. **Methods** In 45 long toes of Leghorn chickens, the FDP and FDS tendons were completely lacerated and repaired: Group 1. tendon cut distal to the A2 pulley (zone 2B), pulley intact; Group 2. tendon cut within the pulley (zone 2C), pulley intact; and Group 3. tendon cut in zone 2C, pulley incision. The repaired FDP tendon was pulled to complete failure by an Instron machine, when the digits were fixed at 40 degrees of DIP joint flexion, or DIP and PIP flexion, respectively. **Results** Ultimate strength was significantly lower in the tendon repaired under intact A2 pulley (4.7 $\pm$ 0.8 N) than those distal to the pulley (6.4 $\pm$ 1.1 N) or when the pulley was incised (5.7 $\pm$ 0.7 N) ($p < 0.05$ or $p < 0.01$). The tendon gliding over an intact A2 pulley had strength of only about 80% of that after the pulley incision. **Discussion** The results indicate loading of the tendon against an intact major pulley decreases repair strength. The study suggests that the repaired tendon may rupture more easily when passing through the rigid pulley canal. This new model presents a method to test the strength at specific positions along entire finger motion arc.

Session: SS1/SS3 - Basic Science & Advanced Technology Symposium

Date: 15 February 2008

Venue: 7A Forum

Time: 13:30 - 16:00
Moderator : H. MORITOMO & Zong-ming LI

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	VIEGAS	Steven	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Biomechanics of the Hand & Wrist
2	MORITOMO	Hisao	Japan	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Biomechanics of wrist dart-throwing motion
3	VIEGAS	Steven	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Anatomic Variability of the Wrist
4	LI	Zong-ming	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Biomechanics of carpal tunnel syndrome
5	KEITH	Michael	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Reconstruction of Paralysis using Implanted Neuroprosthetics
6	VIEGAS	Steven	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Carpal Instabilities
7	VIEGAS	Steven	USA	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008		Telemedicine - Its use in the field of Hand Surgery
8	MORITOMO	Hisao	Japan	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008	103	In Vivo 3-Dimensional Kinematics of Scaphoid Nonunion
9	HORII	Emiko	Japan	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008	138	Load transmission through the wrist in extended position
10	CHEAH	Andre Eu Jin	Singapore	SS1/SS3 Basic Science/Advance Technology	15. Feb. 2008	146	The use of motion analysis in the study of the biomechanics of terminal pinch- early difficulties and preliminary data

Abstract #103

In Vivo **3-Dimensional Kinematics of Scaphoid Nonunion**

Hisao Moritomo, Tsuyoshi Murase, Hiroyuki Tanaka, Sayuri Arimitsu, Kunihiro Oka, Hideki Yoshikawa, and Kazuomi Sugamoto
Department of Orthopaedic Surgery, Osaka University, Osaka, JAPAN

Purpose: The purpose of this study was to obtain 3-dimensional and quantitative information regarding the pathological kinematics of the wrist with scaphoid nonunion using an in vivo and 3-dimensional motion analysis. We specifically tested the hypothesis that the fracture location is related to the kinematic pattern.
Methods: We studied wrist kinematics during wrist flexion-extension motion and radioulnar deviation in 13 patients with scaphoid nonunion using a markerless bone registration technique. Magnetic resonance images or computed tomography of the wrist were acquired with the wrist in the neutral and four extreme positions of flexion, extension, radial and ulnar deviation. 3-dimensional animations were created of the carpal motions and interfragmentary motions between the distal and proximal fragments of the scaphoid.
Results: There were 2 clear patterns of the interfragmentary motions of the scaphoid based on the fracture location. In the mobile type scaphoid nonunion (7 cases), the fracture was located distal to the apex of the scaphoid dorsal ridge (scaphoid apex), and the distal scaphoid was unstable relative to the proximal scaphoid. The distal fragment showed a "book-opening" motion during from wrist flexion to extension. In the stable type scaphoid nonunion (6 cases), the fracture was located proximal to the scaphoid apex, and the interfragmentary motion was significantly less than with the distal type.
Conclusion: Carpal instability following scaphoid nonunion appears to be related to whether the fracture line passes distal or proximal to the scaphoid apex, where the dorsal scapholunate interosseous ligament and the dorsal intercarpal ligament attach.

Abstract #138

Load transmission through the wrist in extended position

Purpose: The wrist is subjected to extremely high compressive loads in extended position, but pathoanatomy of this region remains unclear. The present study aimed to analyze force transmission in the maximum extended position, to clarify the pathomechanics of wrist injury.
Methods: Two sets of computed tomography of wrist joints were obtained on 7 normal subjects; one in neutral position; the other in maximum extension. A 3-dimensional rigid body spring model was used to analyze stress distributions through the wrist joint. Force transmissions through the carpus and ligament tension in extended position were compared to those in neutral position, and force distributions were compared in each position.
Results: Force transmission ratio on the scaphoid fossa increased from 52% in neutral to 62% in extension, whereas ratio through the lunate fossa decreased from 42% to 36%. In the midcarpal joint, force to the scaphoid increased from 60% to 69%. Force distributions of the radiocarpal joint in the extended position moved on the center of the lunate fossa and interfossal ridge of the scaphoid fossa. The dorsal ridge of the radial articular surface appeared as the new contact area. Tension in 3 palmar intrinsic ligaments increased in the extended position.
Conclusions: Force transmission in the extended position shifted radially, concentrating at the scaphoid. We could show how bending force causes scaphoid fracture and concentration of force on the radius surface might cause intra-articular fracture coinciding with the fracture pattern introduced by Melone. Our theoretical analysis could well explain several patterns of wrist injuries.

Abstract #146

THE USE OF MOTION ANALYSIS IN THE STUDY OF THE BIOMECHANICS OF TERMINAL PINCH- EARLY DIFFICULTIES AND PRELIMINARY DATA

Cheah AEJ[1], Buist ML[2], Nickerson D[2], Yeo JC[2], Peng ME[2], Ong FR[3], Schantz JT[2], Chong AKS[1]
[1]Department of Hand & Reconstructive Microsurgery, National University Hospital, Singapore
[2]Division of Bioengineering, Department of Engineering, National University of Singapore, Singapore
[3]School of Mechanical and Manufacturing Engineering, Singapore Polytechnic, Singapore

Introduction
Many different methods have been used to study the biomechanics of the hand ranging from cadaveric based mechanical studies to radiologically based studies in conjunction with mathematical modelling. While each of these methods has its merits, we chose to investigate the use of motion analysis as a non-invasive yet dynamic and robust method of capturing range of motion data of the hand joints involved in an important aspect of prehension, namely terminal pinch.

Materials and Methods
Terminal pinch was selected as the subject of study as it was felt that this aspect of prehension would be a good surrogate marker of the delicate tasks that a hand may need to perform. We recruited ten healthy volunteers and collected data from both hands using a computer aided motion capture system.

Passive markers placed over bony landmarks were used and range of motion data in all three axes was recorded from the interphalangeal and metacarpophalangeal joints of the thumb and index finger as the subjects performed ten repetitions of terminal pinch. Raw data collected was processed with computer scripts based on mathematical models allowing normative values on the range of sagittal motion, lateral deviation and rotation of the five joints studied to be obtained.

Discussion
In this preliminary study, the authors describe the multitude of difficulties faced in using a motion capture system in evaluating terminal pinch biomechanics and discuss how best to overcome them. A set of normative data is also presented and compared with existing literature.

Abstract #105

Title: Needs of hand therapist in a specialized rehabilitation centre in Bangladesh

Author: Syed Shakawat Hossain, Clinical Occupational Therapist; Bangladesh.

Presentation Duration: 10 minutes

Mode of Presentation: Multimedia Power point

Aim of the study:

- To explore needs of hand therapist in a specialized rehabilitation centre in Bangladesh

Objectives of the study:

- To find out common treatment used for hand conditions a specialized rehabilitation centre in Bangladesh
- To know the importance of hand therapist in rehabilitation of this centre
- To draw some recommendations to promote hand therapy as profession in this centre

Back ground and rationale of the study:

The Centre for the Rehabilitation of the Paralysed (CRP) is a non profit national organization which provides treatment, training and rehabilitation for people with disability in Bangladesh. This centre, the pioneer of Physiotherapy and occupational therapy profession is the only one which offers occupational therapy and Speech and Language therapy education in Bangladesh.

From July, 06 to June, 07 421 patient with Spinal Cord Injury in which nearly 169 (40%) with hand problems, 4015 (63%) with musculoskeletal problem having significant number of hand problems out of 6375 treated in physiotherapy out patient unit, 2272 (72%) having hand problem out of 3155 total patient treated in occupational therapy out patient unit got rehabilitation service from CRP (CRP, 2007). Dealing with such a significant number of hand problems and exemplary role of CRP in promotion of therapy profession in Bangladesh demand a study exploring the needs of hand therapy profession which will ultimately initiate promotion of this profession in Bangladesh.

Study Design:

Data from two doctors, two physiotherapists and two occupational therapists who deal with hand conditions will be collected following convenience sampling and qualitative Semi structure face to face interview

Result and Discussion:

Initial analysis shows burning needs along with some inevitable recommendations to make the first move for hand therapy profession in this centre as part of national promotion.

Abstract #324

SIGNIFICANCE OF EARLY PASSIVE MOBILIZATION FOLLOWING DOUBLE FREE MUSCLE TRANSFER

Masao Watanabe, OTR, Kazuteru Doi, M.D., Yasunori Hattori, M.D.
Ogori Daiichi General Hospital
Ogori, Yamaguchi-city, Japan

Purpose The tendinous portion of the transferred muscle following double free muscle transfer for reconstruction of prehensile function tends to adhere, and not to provide active finger motion in spite of powerful contraction of the muscle itself. The purpose of this study was to examine the effectiveness of early postoperative passive tendon excursion of the tendon to prevent its adhesion and the necessity of secondary tenolysis.

Methods Among 36 patients, who underwent double free muscle transfer technique, the initial 19 patients underwent the conventional postoperative management consisting of 4-weeks immobilization and the next 17 patients had early passive tendon gliding technique. Postoperative active range of motion of elbow and finger joints and the incidence of secondary tenolysis were reviewed.

Results Early passive tendon gliding technique decreased incidence of secondary tenolysis of the transferred muscle, although there were no significant statistical differences of final active range of motion of elbow and finger between both groups.

Conclusion Early passive mobilization consisting of tendon compression at the elbow and assisted resistance exercises of finger and wrist joints can prevent postoperative adhesion and motion of the free transferred muscle for considerable postoperative period.

Abstract #336

Title: Preliminary results of a prospective study of trauma-related depressive symptoms in the acute and chronic stage of upper limb injury.

Yau Carman, Josephine Wong man-wah, Vera Chan sui-mei, Frederick Au lap-yau, Jackey Cheung wei-hei
Occupational Therapy Department, Prince of Wales Hospital, Shatin, Hong Kong

Introduction

People who suffered from upper limb injuries including hand injuries will face physical difficulties and pain as well as possible psychological problems like depression, which highly affect a person's ability to return to work and general lifestyle.

Objective

A pilot study was conducted aiming at estimating the incidences of developing trauma-related depressive symptoms during the acute and chronic stages of patient with upper limbs injuries.

Methodology

28 patients who were categorized into 2 groups according to their stage of rehabilitation were assessed by the Chinese Beck's Depression Inventory (CBDI-1).

Data was analyzed by using SPSS. Significant difference in total depression score was shown between two groups of patients. Patients chronic stage were shown to have depressive symptoms more significantly ($p= 0.002$) than those in acute stage. Chronic upper limb injured group was found to have moderate depressive symptoms (total mean score=20.46) while the acute staged patient group having minimal to mild depressive symptoms.

Conclusion

The findings from this study substantiated the fact that restoring physical functioning was not the only remedy for patients with upper limb injuries. Being Occupational Therapists, we should concern more their psychological needs since their functional limitations, trauma-related distress and pain were important factors for them to resume work and life situation.

Abstract #343

Characteristics of Brachial Plexus Injuries: Understanding the Subjective Experience of Pain

Ukyo NAKAKI[1)] , Tanefumi NAKAGAWA[2)], Tetsuya HARA[2)] , Tomoko KONDO[3)], Kimiko SHIINA[3)]
1.Department of Occupational Therapy, Senpo Tokyo Takanawa Hospital
2.Department of Orthopedics, Senpo Tokyo Takanawa Hospital
3.Division of Occupational Therapy, Teikyo university of science & technology

Many patients with brachial plexus injuries (BPI) suffer from severe pain and have difficulty with self-care, leisure, and work activities. Our past study revealed the impact of pain on subjective abilities in daily activity regardless of physical functionality. This study proposes to explore the way in which patients with BPI experience pain. The ultimate purpose of this study is to help such patients acquire a higher quality of life.

The study focuses on 12 outpatients who received hand therapy for BPI from 1999 to 2007, and who suffered from intense pain. The average patient age is 31.4±11.5. The average period of time between BPI and Shultz Upper Extremity Pain Assessment (used to understand a patient's subjective experiences with pain) is 55 (6-155) months.

All outpatients suffered from continuous pain in their paralyzed limb. Nine had additional temporal or intermittent pain. At the time of the study the average current level of pain (on a 1-10 scale) was 4.25 ±2.29. Seven experienced unbearable discomfort when the pain became worse (9.62±0.88). Causes of increased pain included weather and exhaustion.

The area of pain did not match the level of injured nerve, but seemed similar to the phantom pain frequently experienced by people with amputated limbs. Fluctuation of pain was caused by multiple and interrelated factors. Despite severe discomfort, though, some participants successfully managed their daily activities. Further studies are necessary to examine the factors that relate to pain control and management of such activities.

Abstract #355

STRUCTURED PHYSIOTHERAPY PROGRAM FOR PATIENTS SUFFERING FROM CUMULATIVE TRAUMA DISORDERS

Wong E., Lee W., Lam R., Chan E.
Physiotherapy Department of United Christian Hospital, HKSAR

Introduction

Cumulative Trauma Disorders (CTD), or Repetitive Strain Injury (RSI) is the musculoskeletal disorders with cumulative damage to muscles, tendons, ligaments, nerves, or joints (as of the hand, wrist, arm, or shoulder) resulting from highly repetitive movements. The disorder is characterized chiefly by pain, weakness, and paraesthesia[1]. Tenosynovitis of hand or forearm (20%) and carpal tunnel syndrome (4%), are commonly encountered occupational diseases in Hong Kong[2]. Structured Physiotherapy Programs for patients suffering from upper quadrant and upper limb CTD have been set up in terms of RSI Exercise Classes in the Physiotherapy Department of United Christian Hospital since 1999.

Methodology

Patients with upper limb RSI problems were identified and grouped into Structured Upper Quarter, Elbow or Wrist RSI Class. Educational talk, ergonomic advice and grouped exercise therapy were the core programs. Collected data on Numeric Pain Rating Scale, Functional Score, Numeric Global Rating Change Scale and muscle power between 2005 and 2007, was analyzed by means of two-tailed paired-sampled t-test. Structured exercise program coupled with comprehensive patient education and instructional pamphlet did enhance peer support. This was found to be beneficial and effective in the management of CTD. Patients got improved knowledge and self awareness on working posture, ergonomics and work flow. The effect of group dynamics facilitated clients' holistic physical reconditioning as well.

Reference

1. http://www.nlm.nih.gov/medlineplus/mplusdictionary.html. Medline Plus Medical Dictionary
2. Statistics of Confirmed Occupational Diseases in Hong Kong in 2006. Labour Department of Hong Kong.

Session: T1

Date: 15 February 2008

Venue: Meeting room room 601

Time: 13:30 - 15:10

Moderator : Masao WATANABE & Grace SZETO

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract TItle
1	SHINA	Kimiko	Japan	T1	15. Feb. 2008		Teching Hand Therapy to Occupational Therapy and Physical Therapy Students
2	LAO	Jie	China	T1	15. Feb. 2008		Developing Hand Therapy in China
3	LI-TSANG	Cecilia	Hong Kong	T1	15. Feb. 2008		Hand Therapy: A Professional Specialty versus an Academic Research Niche

Session: T1 / Therapist FP 1

Date: 15 February 2008

Venue: Meeting room room 601

Time: 15:10 - 16:00

Moderator : Tomoko KONDO & Josephine WONG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	HOSSAIN	Syed Shakawat		T1	15. Feb. 2008	105	Needs of hand therapist in a specialized rehabilitation centre in Bangladesh
2	WATANABE	Masao	Japan	T1	15. Feb. 2008	324	Significance Of Early Passive Mobilization Following Double Free Muscle Transfer
3	YAU	Carman	HONG KONG	T1	15. Feb. 2008	336	Preliminary Results of a prospective study of trauma-related depressive symptoms in the acute and chronic stage of upper limb injury
4	NAKAKI	Ukyo	Japan	T1	15. Feb. 2008	343	Characteristics of Brachial Plexus Injuries: Understanding the Subjective Experience of Pain

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Abstract #336

Title: Preliminary results of a prospective study of trauma-related depressive symptoms in the acute and chronic stage of upper limb injury.

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1) Department of Occupational Therapy, Senpo Tokyo Takanawa Hospital
2) Department of Orthopedics, Senpo Tokyo Takanawa Hospital
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Session: SS2 CULA

Date: 15 February 2008

Venue: Meeting room room 603 -604

Time: 13:30 - 16:00

Moderator : Timothy SO & Fuminori KANAYA

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	TONKINS	Michael		SS2	15. Feb. 2008		Polydactyly - How to avoid complications in complex cases
2	VIKKI	Simo					Ulnar Club Hand
3	OGINO	Toshihiko					Syndactyly with complex deformities
4	VIKKI	Simo					The role of Microsurgical Toe Transfers in Congenital Hand
5	HUNG	LK					Pitfalls in Surgery for Congenital Hand Anomalies

Session: Free paper 5/6

Date: 15 February 2008

Venue: Meeting room room 605

Time: 13:30 - 16:00

Moderator : P.T CHAN & S.C LAU

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	WANG	Zeng-Tao	China	Free paper 5/6	15. Feb. 2008	400	2 cases report: replantation of cryopreserved amputated fingers
2	WU	Jian-Wei	China	Free paper 5/6	15. Feb. 2008	401	The Clinical application of perforating flap
3	CHEN	Aimin	China	Free paper 5/6	15. Feb. 2008	402	Treatment of comminuted fracture of proximal humerus with polyaxial locking plate
4	CHEN	Fu-Sheng	China	Free paper 5/6	15. Feb. 2008	403	Emergency reconstruction and repair of fingers with several segmental compound flaps of second toe
5	CHEN	Shanlin	China	Free paper 5/6	15. Feb. 2008	404	Using lengthening technique with external fixator for first web space contracture
6	CHEN	Xing-Long	China	Free paper 5/6	15. Feb. 2008	405	Closed reduction and percutaneous Kirschner pin fixation for treatment of peripheral fracture of metacarpophalangeal joint
7	CHEN	Xue-Song	China	Free paper 5/6	15. Feb. 2008	406	Immediate reconstruction of limb-threatening injuries by high energy : 55 patients
8	CHEN	Xue-Song	China	Free paper 5/6	15. Feb. 2008	407	Free posterior tibial vascular flap reconstruction in limb-threatening injuries in children
9	DING	Xiao-Heng	China	Free paper 5/6	15. Feb. 2008	408	Subchondral Osteotomy of Metatarsal Head to Modify Flexion Excursion of Metatarsophalangeal Joint in Toe-to-hand transfer
10	DONG	Le-Le	China	Free paper 5/6	15. Feb. 2008	409	The Pathological Study and Clinical Significance of Stenosing Tenosynovitis
11	FU	Xiao-Kuan	China	Free paper 5/6	15. Feb. 2008	410	Clinical Study on the U-I flaps for Distal Phalangeal Injury
12	GAO	Wei-Yang	China	Free paper 5/6	15. Feb. 2008	411	Free Dorso-Radial Forearm Perforator Flap In Soft Tissue Defect Of Finger
13	GAO	Yong-Bin	China	Free paper 5/6	15. Feb. 2008	412	The diagnosis, classification and treatment of injury of hamatometacarpal joint
14	HUANG	Qi-Shun	China	Free paper 5/6	15. Feb. 2008	413	Use of Homodigital Volar Adipofascial Turn over Flap for the Cover of Dorsal Soft Tissue Defect of the Finger
15	KANG	Hao	China	Free paper 5/6	15. Feb. 2008	414	Use of Reverse-Flow Vascularized Pedicled Fibular Graft for the Treatment of Congenital Pseudoarthrosis of Tibia
16	LI	Xue-Yuan	China	Free paper 5/6	15. Feb. 2008	415	The etiological study of atypical hand infections in littoral areas of China
17	LI	Xue-Yuan	China	Free paper 5/6	15. Feb. 2008	416	The free musclecutaneous perforator flap from personal artery to repair hand skin defects
18	LIAO	Jian-Wen	China	Free paper 5/6	15. Feb. 2008	417	Application of the second metatarpophalangeal joint by traction prolong transplant repair the defects in the metacarpophalangeal joint
19	JIU	Ming-Jiang	China	Free paper 5/6	15. Feb. 2008	418	Dumbbell-shaped latissimu Sdorsi Muscle-skin Flap for the Repair of Large Area Penetrating wound on Extremities
20	LIU	Ya-Ping	China	Free paper 5/6	15. Feb. 2008	419	Tibial digital flap from third toe combined second toe transplantation to improve the shape of the reconstructed finger
21	LU	Lai-Jin	China	Free paper 5/6	15. Feb. 2008	420	A Modified Approach of the Reverse Dorsal Metacarpal Island Flap : Anatomical Basis and Application in 24 cases
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Abstract #400

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Title：2 cases report: replantation of cryopreserved amputated fingers Abstract：

The preservation of amputated limb(finger) is one of the important research area of surgery. Currently accepted view is the amputated limb(finger) should be preserved above o℃.We successful replanted 2 fingers cryopreserved in the liquid nitrogen in Dec.14,2002 and Dec.14,2003. The cryopreservation time is 81days and 5 days. The fingers recover good feeling and movement. The significance of successful replantation of cryopreserved fingers: 1 Although the doctor have excellent replantating technique, there are still many cases with amputated limbs(fingers) in the clinic. Patients refused the replantation surgery is not because of the microsurgery technique ,but other reasons, such as: need emergency surgery to the more important organs to save lives, or the physiology reasons, the economic reasons, the social reasons. When the patients may accept the repalntation surgery, the limbs(fingers) already necrosis because the limb can not be preserved for long time. If the limb successful cryopreserved, it will save thousands patients'limb. 2 The allogeneic limb transplantation will be more popular with the development of transplantation immunology. The relative shortage of donor limbs will be more prominent. if the limb successful cryopreserved, we can set up limb bank to help the allogeneic limb transplantation. 3 Tissue such as: skin, vessel, nerve, tendon, bone, cartilage, joint, bonemarrow, etc. in a finger, the successful limb cryopreservation research will give more experience to the other organ cryopreservation. 4 The hope of cryotherapy.

Abstract #401

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Title：The clinical application of perforating flap

Abstract：
Object: To study and explore the method and clinical outcomes of repairing soft tissue defects in lower extrmeyies involving distal leg,ankle and foot with perforting flap from leg.
Methods: From June 2006 to September 2007,22 patients(15 males and 7 females ,aging from 18 to 53 years)were treated by using perforating flaps from legs, Injuries were caused by motorcycle accidents in 13 patients, by machine accidents in 9 patients. The damagelocation were distal leg and ankle(17cases),foot (5cases),and 15 cases complicated by bone fracture around the ankle, in 9 flaps,the blood supply were provied by perforating branches of peroneal vessel,10 by posterior tibial perforator,only 3 cases were selected anterior tibial perforating vessels as the pedicle.among all 22 cases, 10 cases were anastomose cutaneous nerve before suture the wound, and other 12 cases without anastomosing nerve.
Results: The distal skin necrosis occurred in two flaps, all the other flaps survived well and the wounds healed by first intention , The color and texture of the flaps were good,the pedicles show no any fat and clumsy,sensation recovery was obvious and the two –point diatance through detecting superficial sensation in skin flap was range from 7 mm to 10mm in those cutaneous anastomosis case while the contrast cases only recovery tactile sensation and algaesthesis,there exist no any discomfort on donor site. The appearance of flaps and the function of extremity were satisfactory as revealed by follow-up for 3 to 8 months.
Conclusion: The perforating flap has a good skin quality, abundance blood supply ,without any sarcrifice of the major blood vessel and easy to be dissected , it is proved to be a good alternative flap in repairing a large soft tissue defect in the distal leg, ankle and foot.
Key words: perforating flap, soft tissue defect, leg, ankle and foot

Abstract #402

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Title：Treatment of comminuted fracture of proximal humerus with polyaxial locking plate

Abstract： Objective: to evaluate the clinical results of polyaxial locking plate in treatment of comminuted fracture of proximal humerus · Methods: 21 patients (8 men and 13 women) with comminuted fracture of the proximal humerus were treated with polyaxial locking proximal humerus plate(Stryker, Numelock Ⅱ) in our hospital. The age of patients was 35 to 73 years old (average,63±7.4) · According to Neer classification · 14 cases were three-part fracture and 7 were four-part fracture · The mean follow-up period was 15.3 months (range 12 to 12 months). The result was evaluated by Neer standard. Results: All fractures are united at 10.8 Weeks(range 8 to 12 weeks). There was bone collapse or loosening of internal fixation. In the 12 month follow-up, the satisfactory and excellent ratio of Neer's score was 85.7%. Conclusions: Polyaxial locking proximal humerus plate could get good results in the treatment of comminuted proximal humerus fractures. It might provide more versatility in angulation without increasing loss of reduction or failure of fixation. Key words: fracture of proximal humerus, polyaxial locking plate, internal fixtion

Abstract #403

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Title：Emergency reconstruction and repair of fingers with several segmental compound flaps of second toe

Abstract：
Objective: TO research a new method to reconstruct and rapair compound tissue defect of fingers in emergency by dividing second toe into several segmental transplants. Method: According to condition of the skin, bone and joint,tendon and vessels of injured fingers, the second toe was divided into several segmental parts as bridging transplants to reconstruct and repair several sites of conpound tissue defect in fingers. Result: All of the eight cases were successful .Among them, one case underwent vascular management because of postoperatively vascular crisis. The follow-up period was form three months to five tears. The appearance and function were excellent after reconstruction of distal finer. The appearance of reconstructed finger was almost the same as original finger after the fibular skin flap was inserted into plantar side of second toe. Different degree of articular stiffness may be found in cases with destructive middle segment of finger or interphalangeal joint. Conclusion: In order to preserve the injured fingers, a second toe can be divided into several segments and applied to repair compound tissue defect according to the injury condition. It has merits of little damage to foot donor, repair several fingers with one second toe, reducing operation times, sparing expense of treatment, excellent recovery of hand function and providing a new method to reconstruct and repair several sites of tissue defect in fingers.
Key word: Second toe; Segmental transplantation; Reconstruction; Repair

Abstract #404

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Title：Using lengthening technique with external fixator for first web space contracture

Abstract：
Objective: To investigate the method and the result of using lengthening technique with Orthofix minifixator system to deal with the first web space contracture. Method: Fifty six cases of the first web space contracture were treated with the method of lengthening external fixation from August 2002 to October 2006. Forty patients were followed up in detail, among of them, twenty six cases occurred in right side, fourteen cases were left side. Thirty cases originated from trauma, ten cases insulted by burn. According to the classification method reported by Gu, twenty five of them were moderate contracture, fifteen of them were severe contracture. Anaesthesia at the local site or block at the brachial, the Orthofix minifixator (type B-46) was applied between the first and second metacarpal , at the level of nearby the first and second metacarpal neck. Lengthening was started first day after operation with a speed of 1mm/day, and continued until the maximal thumb abduction was obtained. The breadth of the thumb web was measured and recorded at the time of last follow up. Result: Forty cases of the patients were followed up for 3~6 months(average 4 months). The palmar abduction degree was increased 20 degrees generally. The distance between the radial side of the index metacarpalphanlangeal joint with the ulnar side of the thumb interphalangeal joint was enhanced 2.5 cm. Semi-dislocation of the first carpalmetacarpal joint was occurred in 4 patients. Ulnar inclination deformity of the proximal phalanx of the thumb was appeared in four patients. Conclusion: Lengthening technique with external fixator system is a simple , one stage method for the first web space contracture, the treatment result was satisfied.
Key words: contracture; first web space; external fixation; treatment result

Abstract #405

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单位：温州医学院附属第二医院/ The Second Affiliated Hospital of Wengzhou Medical College, Zhejiang, China
E-mail：drchenxinglong@126.com Title：Closed reduction and percutaneous Kirschner pin fixation for treatment of peripheral fracture of metacarpophalangeal joint

Abstract：
Objective: To assess the clinical effects of peripheral fracture of metacarpophalangeal joint with closed reduction and percutaneous Kirschner pin fixation. Methods: 17 cases of Metacarpal neck fractures and proximal phalanx base fractures were treated by closed reduction and percutaneous Kirschner pin fixation under C-arm since 2005. there were 11 simple fractures including 7 metacarpal head or neck fractures and 4 proximal phalanx base fractures. There were 6 cases of multiple fractures including 3 simple metacarpal neck fractures , 2 proximal phalanx base fractures and 1 metacarpal neck with proximal phalanx base fractures . All the fractures were close. 4 cases were operated by emergency operation. 12 cases were operated in 1 weeks. 1 case was operated after 11days. All the reduction were good as postop X-rays showed. Results: the plaster immobilization was removed 2-3 weeks postoperation for active functional exercise. Kirschner pins were removed after 4 weeks to enhance passive functional exercise . Follow-up were maintained 6~9 months. All the fracture were healed good. Hand function according to TAM system evaluation. There were 13 excellent,4 good . Conclusions: Close reduction and percutaneous pinning is mini-invasive, simple and effective for metacarpophalangeal joint fracture . It is an ideal way to treat metacarpophalangeal joint fracture.
key words: metacarpal fractures ; phalangeal fractures ; close reduction ; internal fixation

Abstract #406

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Title：Immediate reconstruction of limb-threatening injuries by high energy: 55 patients

Abstract：
Objective: To report the clinical results of immediate reconstruction in severely high-energy-injured limbs and put forward the discussion of superiorities of the method in this condition. Methods: Vascular flaps were applied in all patients, half of which were free flaps, meanwhile, vessels and nerves were repaired, broken bones and tendons were reconstructed. Results: All flaps were transplanted successfully. Follow-up ranged 12 to 50 months. Complications, including wound infection, bone nonunion, necrosis, and morbidity are significantly less likely to appear than conventional ways. Conclusions: The advantages of immediate reconstruction of seriously injured limbs by high energy are remarkable: in comparison with traditional methods, this technique enables controlling bone, soft tissue and other problems together through an emergency procedure with a relatively shortened in-hospital time and less fibrosis, thereby, favoring the functional outcome; definitive wound closure with vascularised tissue transfer, which favoring antibiotic diffusion and local blood supply, provides more choices of fixation and administers to bone healing.
Key words: limb; high-energy; trauma; surgical flap; immediate reconstruction

Abstract #407

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Title：Free posterior tibial vascular flap reconstruction in limb-threatening injuries in children

Abstract：
Objective: To report the clinical results of Free posterior tibial vascular flaps in Repairing of serious limb trauma in children and put forward the discussion of the flap's unique superiorities in this condition. Methods: Free posterior tibial vascular flaps were applied with each tourniquet around donor limb and recipient one in nine children suffered from serious limb and extremity injuries complicated by soft tissue defects, meanwhile, vessels and nerves were repaired with the flaps' corresponding tissues, moreover, broken bones and tendons were reconstructed . Results: All flaps were transplanted successfully with excellent results .Follow-up ranged 12 to 60 months. No blood supply problem or morbidity was discovered in donor limes. Conclusions: The advantages of the use of the flap are remarkable: It is easy to dissect and can be operated under tourniquets, therefore, operative time is relative short and without mass blood loss which especially benefit children; the flap is thin and has almost necessary corresponding tissues for all reconstructive needs, as · for example, to bridge vessel and nerve defects · and offer excellent results. It is an easy and reliable method.
Key words: children; posterior tibial vascular flap; reconstruction

Abstract #408

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Title：Subchondral Osteotomy of Metatarsal Head to Modify Flexion Excursion of Metatarsophalangeal Joint in Toe-to-hand Transfer

Reconstruction of thumb and finger by transplantation of second toe is one of the most characteristic operations of toe-to-hand transfer. As the metatarsophalangeal joint of toe ray has an anatomic characteristic of greater extension excursion and smaller flexion excursion than metacarpophalangeal joint of finger, the outward appearance and motion of the reconstructed digit naturally has an over extension tendency which compromises the functional result. Wedge osteotomy of metatarsal bone at a site proximal to metatarsal head advocated by Ding Zi-hai, Fang Guang-rong can increase flexion excursion of the MPJ and correct over extension of the joint though the procedure is rather complicated and has the potential risk of occurrence of avascular necrosis of metatarsal head. After anatomic observation of the MPJ of toe and finger, the authors revised the operation by placing the wedge osteotomy site at subchondral level of the metatarsal head. In a series of clinical cases, the author obtained excellent result by using this revised procedure. General data:
From 2003 – 2006, four cases of Degree V Thumb defect and two cases Degree VII finger defect were reconstructed clinically with author's revised procedure .Among them, 3 cases were male and the other 3 cases female. Their age ranged from 20 to 41 years with an average 28.2 years. Subchondral wedge osteotomy of metatarsal head was performed during second toe transplantation in all cases.
Result
All the reconstructed thumb and fingers survived uneventfully. Follow-up examinations made 12 to 24 months postoperatively show satisfactory outward appearance. Two point discrimination tests of all reconstructed digits are between 6 to 10mm. The range of motion of the reconstructed digits are 65°- 85°, average 6 5°. Postoperative X-ray films show sound bone healing with no degenerative joint change found.. The final functional result of all thumb and finger reconstruction cases of this series were evaluated with standard set by Hand Surgery Society of CMA. The whole group is graded as excellent.

Abstract #409

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Title：The Pathological Study And Clinical Significance Of Stenosing Tenosynovitis.

Abstract：
Objective: We well discuss the reason of the effect difference when choosing local steroid therapy from the pathological study of stenosing tenosynovitis, and provide a reference to selecting therapy methods of stenosing tenosynovitis. Methods: Full 23 pulleys from 22 patients with stenosing tenosynovitis were obtained during surgery, and full 23 pulleys were generally stained for light microscope observation. Each one portion of normal pulley, artilage, synovium and full portions of 23 stenosing tenosynovitis pulleys were prepared for s-100 protein polyclonal antibody immunohistochemical analysis. Results: The s-100 protein polyclonal antibody immunoreaction of full portions was negative. There was no infiltration by inflammatory cells. The stenosing tenosynovitis was divided into three types according to the pathologic characteristics of light microscope. Ⅰ Type(the slight pathological changes type), Ⅱ type(the tissue hyperplasis type), Ⅲ type(calcium salt sediment type). Conclusion: While extrapolating the effect difference of the local steroid therapy from the pathology, being suffering as Ⅰ Type(the slight pathological changes type), the symptom can be reduced completely according to local steroid therapy and restraining movement; being Ⅱ type(the tissue hyperplasis type), the local steroid therapy only make part of symptom to be reduced, and the condition appears easily again and again; being Ⅲ type(calcium salt sediment type), the conservative treatment is ineffective, surgical operation is the one and only method .
Key words: Stenosing tenosynovitis. Trigger finger. Pathobiology. S-100 protein. Clinic therapy

Abstract #410

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Title：Clinical Study on the U-I flaps for Distal Phalangeal Injury

Abstract：
The authors reported the application and techniques concerning the Second Dorsal Metacarpal Artery based U-I flap in repairing the soft tissue defects beyond the proximal interphangeal joint of index and middle finger. There were totally 11 patients received this surgical treatment，ten of which gained satisfied results，one failed because of poor venous return and infection. The authors discussed in details about the surgical techniques and anatomical backgrounds，and concluded that the U-I flap has long vascular pedicle and wide arc of rotation, is useful in repairing of soft tissue defect beyond the proximal interphalangeal joint of index and middle finger.
Key words: Surgical flap; Hand; Dorsal metacarpal artery; Island flap; Wound and injuries

Abstract #411

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Title：Free dorso-radial forearm perforator flap in soft tissue defect of finger

Abstract：
Objective To introduce clinical application of a new perforator flap. Methods on the base of anatomiac research, free flap with dors-radial forearm perforator as vascular pedicle was designed to reconstruct digital soft tissue defect. A total of 17 flaps were applied in 17 fingers in 15 case. Results All the flaps were survived. The flaps were thin. and the colour of flaps was closed to that of the recipient sites in dorsal finger defects. But there was a difference in finger pulp defects. 9 flaps were employed to reconstruct finger pulp in 8 cases with nerve anastomosis. 6 cases of them were followed 9 t0 12 months. Sensation recovered to S3. two point discrimination was 8mm - 12mm. all the donor site wound were closed primarily.Only linear line scar were found. Conclusions: Dorso-radial forearm perforator flap has a constant perforator, and the calibre of vasacular pedicle is big enough for anastomosis. The finger repaired with flap had a good shape and sensation by nerve anastomosis.

Abstract #412

姓名：郜永斌/Gao Yongbin
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Title：The diagnosis,classification and treatment of injury of hamatometacarpal joint

Abstract：
Objective: To study the diagnosis,classification,management and outcome of the injury of hamatometacarpal joint.Methods: Normal carpometacarpal （CMC） joint radiographic anatomy was established by review of normal wrist radiographs from 15 patients. The value of 4 projections of radiograph in the diagnosis of hamatometacarpal injury was gained by contrast . Retrospective analysis was carried out in 24 patients with injury of hamatometacarpal joint.There were 22 males and 2 females with an average age of 28.5 years. The injury of hamatometacarpal joint may be classified into 4 major groups based on the condition of the hamate,and subdivided into 2 types based on the isolated dislocation(subluxation) or fracture-dislocation of metacarpal base.There were 7 type Ⅰb,3 type Ⅱa,3 type Ⅱb,4 type Ⅲb,1 type Ⅱa,6 type Ⅱb in our group.We chose conservative or operative treatment according to the type of injury. Results: the average follow-up was 30 months(range 4~96 months).The patients had fracture union rate of 100%, and no traumatic osteoarthritis was occurred. There was no significant difference between bilateral hand in grip strength. Subjective evaluations of the patients are good or excellent. No complications was occurred. Conclusion: The PA view and 60° PA oblique view are the most valuable in the diagnosis of hamatometacarpal injury, and the lateral view is also valuable, while the 30°AP oblique view is more valuable in assessing the results of the post-operative patients. The stable injury of hamatometacarpal joint is ideally treated by closed reduction and immobilization in a well moulded cast or splint can lead to a satisfactory outcome if kept under strict surveillance.The unstable or intraarticular fracture should be treated by surgery,the outcome is also satisfactory and the rate of the compilcation of traumatic arthritis is low in short period.

Key words: hamatometacarpal joint,diagnosis,classification,treatment

Abstract #413

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Title：Use of Homodigital Volar Adipofascial Turn over Flap for the Cover of Dorsal Soft Tissue Defect of the Finger

Abstract：
Objective: Searching the method for the treatment of the dorsal skin and soft tissue defect of the finger and the result of treating such injuries with the homodigital adipofascial flap. Method: The adipofascial flap in homodigital volar side was designed according to the dorsal soft tissue defect in 12 patients. Incise the skin from the pedicle side of the of the adipofascial flap, turn over the skin to another side, expose the adipofascial tissue, then raise the adipofascial flap from the side of the pedicle of the skin, superficial layer of the flexor tendon sheath leaving intact. Turn over and tunnel the flap to the dorsal side through the subcutaneous tissue, then graft the defect with split thickness skin graft, suture the volar skin wound. Review the patients with their sensation, motor function and the shape of the finger. Result: The period of the follow up is 1 to 14 months, 8 months in average. The adipofascial flap and skin are alive. The DIP joint was fused in three patients, others have the range of movement of 10°-30°, 20° in average, the sensation of two-point discrimination in donor site is 2.5—4.0mm, 3.0mm in average, and the patients are satisfied with the results. Conclusion: the homodigital volar adipofascial turn over flap is a good method for the treatment of the distal dorsal skin and tissue defect of the finger.

Abstract #414

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Title：Use of Reverse-Flow Vascularized Pedicled Fibular Graft for the Treatment of Congenital Pseudoarthrosis of Tibia.

Abstract：
Objective: To explore a better reconstructive method for the treatment of congenital pseudoarthrosis of tibia: reverse-flow vascularized pedicled ipsilateral fibular graft. Method: 36 children with this abnormality were treated with reverse-flow vascularized pedicled ipsilateral fibular graft from 1980 to 2006. Result: 34 cases achieved excellent bony union. Conclusion: Compared with other methods, this method has many advantages, such as: 1) the graft has rich blood supply, 2) the pathologically invaded tibia can be removed completely as the graft can be harvested with adequate length, 3) bony healing can be achieved in a shorter duration, and 4) the procedure is simple and does not involve the contra-lateral healthy leg.

Key words: Congential Pesudoarthrosis of the Tibia; Reverse-flow fibular graft

Abstract #415

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Title：The etiological study of atypical hand infections in littoral areas of China

Abstract：
Purpose: As the pathogen of atypical hand infections in littoral area was unknown in a long time, and the most likely pathogens were mycobacterium, fungus, and nocardiae; our study is to explore the etiological factors of atypical hand infections and offer evidence for clinical diagnosis as well as treatments.
Method: Pathologic inspection, Acid-Fast Stain, routine culture, special culture including mycobacterium, fungus and nocardiae were performed in all 40 cases of hand atypical infections during 2002-2004. The isolated mycobacterium were identified by both phenotypic method and sequence analysis of the 16S rRNA gene.
Results: All cases showed chronic granulomatous lesions in pathological appearance except two, only 6 were positive in Acid-Fast Stain, 17 positive in special culture, 13 M. marinum, 1 M. tuberculosis, 1 M. fortuitous, 1 M. avium, and 1 M.nonchromogenicum； only 3 positive in common germ culture, 1 Nocardiosis, 1 Staphylococcus epidermis and 1 Alcaligenes xylosoxidans, while the last 2 were mixed-infections with mycobacterium；but no fungus were found in all clinical specimens.
Conclusion: Non-Tuberculo-Mycobacterium(NTM) especially M.mariunm were far more important as a pathogenic role than tuberculosis and other bacterial in atypical hand infections in littoral area of China. Germ culture should be routinely processed for all suspected cases.

Abstract #416

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Title：The free musclecutaneous perforator flap from peroneal artery to repair hand skin defects

Abstract：
Objective: To explore the surgical technique and clinical outcome of applying the free flap nourished by musclecutaneous branches of peroneal artery to repair skin defects of the hand. Method: 8 hand skin defects(2005-2007) with the size from 5.0×4.5cm ^{2} -16×10cm ^{2} were involved in our study. In 7 cases we choose the flatfish musclecutaneous branch as the anastomose vessles, and 1 with a T shape peroneal trunk. All the blood vessles were end to end anastomosed. Results: All the transferred free flaps survived uneventfully and followed up for 6-12 months. The outlooks as well as flexibility were satisfied. Conclusion: The flatfish musclecutaneous branche of peroneal artery had a relatively invariable anatomy, easier to dissecte than the peroneal flaps, thus it was a useful way to repair small and middle areas of skin defects in hands.
Key words: peroneal artery, perforator flap, soft tissue defect, repair

Abstract #417

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Title：Application of the second metatarpophalangeal joint by traction prolong transplant repair the defects in the metacarpophalangeal joint

Abstract：
Objective: Application of the second metatarpophalangeal joint by traction prolong transplant repair the defects in the metacarpophalangeal joint , reconstruct the function of it. Methods: By means of the apparatus to prolong finger in advance,then transplant the second metatarpophalangeal joint to reconstruct metacarpophalangeal joint for seven cases of obsolete defects in the metacarpophalangeal joint. Results: The average of finger prolong was 2.6cm, consultation from 1 to 4 years,average 2.5 years ,that the transplant joints have all survived and osteal concrescence. Through the criterion Chinese Medical Association, good rate was 85.7%. Conclusion: it's a good method to repair obsolete defects in the metacarpophalangeal joint by transplant traction prolong of the second metatarpophalangeal joint.

Abstract #418

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Title：DUMBBELL-SHAPED LATISSIMU SDORSI MUSCLE-SKIN FLAP FOR THE REPAIR OF LARGE AREA PENETRATING WOUND ON EXTREMITIES

Abstract：
Objective: To evaluate the clinical effectiveness of dumbbell-shaped latissimus dorsi muscle-skinflap for the repair of large area penetrating wound on extremities. Methods: The study analyzed 8 patients with dumbbell-shaped latissimus dorsi muscle-skinflap for the repair of large area penetrating wound on extremities. Results: All 8 flaps survived.Primary healing of the wound was achieved in both donor and recipient areas. Follow-up ranged from 6 months to 24 months.The function and appearance of the flaps was satisfactory. Conclusion: It has packed penetrating wound dead space of Dumbbell-shaped latissimus dorsi muscle-skinflap has good function and appearance.
Key words: Surgical Flaps; Fenetrating Wound;Soft Tissue Defect

Abstract #419

姓名：刘亚平/Liu Yaping
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Title：Tibial digital flap from third toe combined second toe transplantation to improve the shape of the reconstructed finger

Abstract：
Objective：To make up the outline defect due to toe-to-hand transfer and to cover the lateral defect remained in the side of finger after wraparound flap transplantation from second toe in finger avulsion injuries · Methods： In second toe transfer to reconstruct finger, a digital vascular flap from the medial side of the third toe was designed based on the size of the finger, to fix-into the palm of the second toe . In finger avulsion injuries, a similar flap based on the defect area was designed to cover the exposed area in adjacent side of second toe wraparound flap which was cut open to adapt the finger. And all of them were supplied by the same vessel—the first dorsal metatarsal artery · Results：In 10 patients with 11 fingers, shaped the outline of second toe in this way, the outcome was better both functionally and cosmetically. Conclusion：Its advantages are as follows：1.accomplishes function reconstruction and outline modify at a more simpler operation · 2. provides a sufficient blood supply through the constant vessels · Its disadvantage are as follows：1. bigger donor-site morbidity relatively · 2. Remained the toe faces especially the tip and nail.

Key words：Finger; Wraparound flap; Toe-to-hand transfer; Avulsed injury

Abstract #420

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Title：A Modified Approach of the Reverse Dorsal Metacarpal Island Flap: Anatomical Basis and Application in 24 Cases.

Abstract：
Introduction: The authors introduce a modified approach of the reverse dorsal metacarpal island flap (DMIF). Material: We observed and measured the parameters of the distal cutaneous branches arising from the 2-4 DMCAs in 34 specimens, and designed a new approach of the reverse DMIF. The axis of the flap is the midline between two adjacent metacarpals, from the leading edge of the web space to the metacarpal bases. Two points of pivot can be chosen, i.e. 2.5 cm or 1.5 cm proximal to the leading edge of the web space. The 2.5 cm point of pivot is the originating site of the cutaneous branch distal to the juncturae tendinum. The 2.5 cm point of pivot is chosen to cover the dorsum of the proximal phalanx. The 1.5 cm point of pivot is the site of anastomosis between DMCA and the common or proper palmar digital artery. The 1.5 cm point of pivot is used to cover volar or dorsal skin defect proximal to the DIP joint. The plane of dissection is along the extensor paratenon. From 2003 to 2006, we applied this approach in 24 patients. Results: The 2nd and 3rd DMCAs constantly gave off this cutaneous branch, but there was no cutaneous branch arising from the 4th DMCA in 4 among 34 specimens. All flaps survived completely except 2 cases of venous congestion, which were relieved through bleeding.
Conclusions: Based on the distal cutaneous branches arising from the 2-4 DMCA, the elevation of the reverse DMIF can be simplied.

Abstract #421

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Title：Vascularized Capitate Transposition for Advanced Kienböck's Disease: Application of 40 cases and its anatomy

Abstract：
Introduction: We introduce the design and experience of vascularized capitate transposition for advanced Kienböck's Disease. Material: Based on anatomic study, we designed a new method, i.e, vascularized capitate transposition, to replace excised necrotic lunate, which was applied in 40 cases. It includes excision of the necrotic lunate and proximal shift of the vascularized capitate. The blood supply of transposed capitate is provided by the dorsal branch of anterior interosseous artery. Results: Bone union occurred radiographically and no postoperative capitate necrosis occurred in all cases after 6 weeks. 23 cases were followed up for 1 year. No residual wrist pain existed in the range of motion, but limited residual wrist pain existed in labor work. The arc of motion ranged averagely from 35 degree flexion to 45 degree extension. The grip power of affected hand averagely reached 70% compared with the contralateral.
Conclusion: The authors conclude the vascularized capitate transposition is a reliable alternative for advanced Kienböck's disease.

Abstract #422

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Title：Soft tissue reconstruction in the hand using retrograde neurocutaneous flaps.

Abstract：
Objective: The aim of this study is to modify the flap dissection and to investigate its clinical results using neurocutaneous flap based on distal perforators of digital arteries and ulnar arteries to cover the soft tissue defects in the hand region. Methods: 32 cases were included in this group with an average age of 27 years old, in which the soft tissue defects were resulted from trauma. The finger pulp soft-tissue defects were reconstructed by the dorsal digital neurocutaneous flaps based on the distal dorsal perforator of the digital artery in 5 cases. The thumb pulp soft-tissue defects were reconstructed by the dorsoulnar thumb neurocutaneous flaps based on the dorsoulnar perforator of the thumb digital artery in 15 cases. The middle and proximal phalangeal soft-tissue defects were covered by dorsal neurocutaneous flaps based on the digital artery perforators in the hand web space in 7 cases. The soft-tissue defects in palm and dorsum of the hand were repaired by medial antebrachial neurocutaneous flaps based on the dorsoulnar perforators of the ulnar artery in 5 cases. The dimension of the flaps ranged from1.9x2cm~7x10cm. In 12 cases of hand injuries, a coaptation was performed between the cutaneous nerve of the flap and the recipient digital nerve. Results: All flaps survived except a distal venous crisis occurring in 1 case. The follow-up duration ranged from 3 months to 4 years. All patients were satisfied with the flap appearance. The two-point discrimination recovered in a range from 10mm to 12mm. Conclusions: It is a reliable approach for the soft-tissue coverage in the hand using neurocutaneous flaps based on distal perforators of digital artery or ulnar artery. The advantages include simply procedures, reliable blood supply without sacrificing main arteries and possibilities of sensibility reconstruction.

[Key words] Surgical flap; Cutaneous nerve; Hand; Treatment outcome

Abstract #423

姓名：唐举玉/Tang Juyu
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Title：The Free DIEP Flap for Dorsal Foot and Anterior Malleolus Reconstruction of Child: a Preliminary Report

Abstract：
Objective: To explore the clinical effect of the free DIEP flap for dorsal foot and anterior malleolus reconstruction of child. Methods: The authors present a series of 5 young patients with extensive defects in dorsal foot and anterior malleolus who were treated with the deep inferior epigastric perforator (DIEP) flap from January to November in 2007. The mean defect was 15.8×6.8 cm in size. Results: The flaps ranged in size from 12×7 cm to 18×7 cm. The maximum dimension of the flaps harvested was 18×7 cm. Mean follow-up was 4 months (range, 1 to 12 months), and all flaps survived with excellent contour and good function, no hematoma, abdominal bulging or hernia occurred. Primary donor-site closure was accomplished in all patients without the need for skin grafts.
Conclusion: The free DIEP flap represents a new flap that meets the requirements for dorsal foot and anterior malleolus reconstruction and has advantages over other methods of reconstruction for these defects. We believe that, the DIEP flap is a reliable technique and an ideal choice for young patients.

Abstract #424

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Title：TEMPORARY ECTOPIC IMPLANTATION OF THE DISTANT PART OF AMPUTATED LIMB WITH EXTENSIVE SKIN AND SOFT TISSUE DEFECTS

Abstract：
Objective: To approach an effective method of temporary ectopic implantation for the distantly part of amputated arm with extensive skin and soft tissue defects unreplantable at one-stage. Methods: One case of amputated avulsive left limb, which could not be implanted one-stage , was implanted in the abdominal wall temporarily.The amputated limb survived based on the anastomosis of the inferior epigastric artery and ulnar artery, cephalic vein and great saphenous vein which were severed up the knee, abdominal superficial vein and basilic vein.When the general condition and the distant condition of the amputated part were suitable, the ectopic implanted limb was transferred to its virgin anatomic position. Results: The left limb survived after the replantation.The injured limb recovered S_3^+ sensibility and ideal flexor function and partial hand intrinsic muscle function after 22 months. Conclusion: Temporary ectopic implantation is an ideal and new technique for the salvage of amputated limb with extensive skin and soft tissue loss in its distant part under special condition.

Abstract #425

姓名：王雷，蒋电明/Wang Lei, Jiang Dianming
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Title：Study of the early bioactivity of microencapsulated peripheral nerve tissue after transplantation with acellular nerve

Abstract：
Objective: To study of the early bioactivity of microencapsulated peripheral nerve tissue after transplantation with acellular nerve ， to analyze the seasoning of the former producing a marked effect in vivo. Methods: 30 Wistar rats were selected and divided randomly into three groups: group A, group B and group C, each containing 10 rats. The rats' sciatic nerves of group A were cut and chemically extracted to make acellular nerves. The rats of group B and C were transplanted by acellular nerves to bridge 10 mm sciatic nerve gaps, additionally in group C: 100μl serum-free medium of microencapsulated peripheral nerve(about 400 balls) was injected into the surrounding of stoma of nerve sutrure .About similar quantitative microencapsulated peripheral nerve were cultured in vitro under 10% fetal bovine serum 1640 medium , the medium were changed every 3 days. Venous blood, homogenate of transplanted nerve of each rats of group B and C and Supernatant of medium were adopted at 3 days, 1, 2, 3 and 4 weeks after the grafting , the serum concentration of NGF (nerve growth factor) was measured by ELISA(enzyme linked immunosorbent assay), and the difference between group B and C was analyzed. Results: All the rats of group B and C were involved in the results analysis without loss. fl NGF concentration level of group C were higher in serum and homogenate of transplanted nerve than group B, there were significant differences in the concentration of NGF among all phases between group B and C. fl NGF concentration level of group C decreased from 55.31±2.25pg/ml (3d) to 21.91±0.78 pg/ml (4w), the extent of degression was about 60%. NGF concentration level of group D decreased from 35.81±1.09 pg/ml (3d) to 23.29±1.22 pg/ml (4w), the extent of degression was about 35%.Conclusion: Microencapsulated peripheral nerve can remaining bioactivity at least 4 weeks in vivo, if acelluiar nerve was transplanted with it, the effect of nerve regeneration will be better than simple acellular nerve transplantation.

Key words: Microencapsulate ; Acellular nerve ; Transplantation

Abstract #426

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单位：广东省顺德和平创伤外科医院/ He-ping Traumatic Surgery Hospital, ShunDe, Guangdong, China
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Title：A minitype vascularized posterior interosseous artery's Singleness perforating branch flap transfer

Abstract：
Objective: To probe into a free minitype vascularized flap for repairing skin and softtissue defect accurately.
Methods: Based on the morphologic observation to the amount, distributing and passing through form of the perforating branch from the posterior interosseous artery. vascularized flaps of Singleness perforating branch from the posterior artery were performed, which repaired fingers skin defect in 11 cases and partial auricle defect in 1 case.
Results: 11 minitype flaps were successful , one was failed for fingers. One for auricle was successful. The appearance and function is excellence. Conclusion: A lesser skin and soft tissues defect can be repaired accurately by a minitype vascularized flap of Singleness perforating branch from the posterior interosseous artery.

Key words: Perforating branch; Posterior interosseous artery; Skin defect; Surgical flap

Session: JSSH Ambassador / Junior Travelling Fellow Session

Date: 15 February 2008

Venue: 7A Forum

Time: 16:20 - 17:20

Moderator :

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	SHIGEMATSU	Koji	Japan	JSSH Ambassador / Junior Travelling Fellow Session	15. Feb. 2008	456	Treatments of Advanced Kienböck's disease with tendon roll implantation and temporary partial wrist fixation.
2	AHMED	Syed Kamran	Hong Kong	JSSH Ambassador / Junior Travelling Fellow Session	15. Feb. 2008	332	Long Term Results Of 'Distal Radio Ulnar Joint Arthroplasty' In Rheumatoid Patients(for Junior Travelling fellowship).
3	BHARDWAJ	Praveen	India	JSSH Ambassador / Junior Travelling Fellow Session	15. Feb. 2008	353	Technical considerations and functional outcome of the management of complex injuries of the elbow
4	XIONG	Ge	China	JSSH Ambassador / Junior Travelling Fellow Session	15. Feb. 2008	110	Morphologic, Histological and Biomechanical Changes of Wrist Interosseous Ligaments After Radiofrequency Electrothermal Shrinkage
5	LEE	Ellen	Philippines	JSSH Ambassador / Junior Travelling Fellow Session	16. Feb. 2008	151	Anatomic Study of Musculocutaneous Nerve for Brachial Plexus Injury Reconstruction in Filipinos

Abstract #110

MORPHOLOGIC, HISTOLOGICAL AND BIOMECHANICAL CHANGES OF WRIST INTEROSSEOUS LIGAMENTS AFTER RADIOFREQUENCY ELECTROTHERMAL SHRINKAGE

Ge XIONG, Yankun SUN, Wei ZHENG, Chunlin Zhang,
Xinsheng GAO, Guoquan YU
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ABSTRACT Objective: To explore the morphologic, histological and biomechanical changes of the major wrist interosseous ligaments after radiofrequency electrothermal shrinkage. **Methods:** Fourteen frozen fresh male adult cadaver wrist were exploited for the research. It was observed and measured before and after the radiofrequency electrothermal shrinkage for the interosseous ligaments including SL-v, SL-d, LT, TC, CH and CMC-2. The bone-ligament-bone samples of the aboved ligaments were prepared for biomechanical measurements. Ligament extension testing was performed for each bone-ligament-bone sample on a material testing system. The broken load and length were measured and statistically analysed. Also the histological and ultrastructure changes were also studied. **Results:** The length of the ligaments were generally decreased after shrinkage, but the significance only occurred for CH. The thickness of the SL-v, SL-d, LT, CH and CMC-2 increased significantly. The broken load of the ligaments increased with only SL-d got the significant difference. The broken length of all the ligaments increased significantly. The histological changes included collagen shrinkage, collagen type changes and soft tissue damage. Electron microscope observation found that the collagen became more compact, and almost all the cells within the collagen fibers collapsed after shrinkage. **Conclusion:** Radiofrequency electrothermal treatment can lead to shrinkage of the wrist interosseous ligaments without significant impairment for the broken strength. It is more suitable to use for the ligaments abound with collagen. Temporary intercarpal fixation is recommended to maintain a long-term therapeutic effects after radiofrequency electrothermal shrinkage.

Keywords: wrist, interosseous ligament, radiofrequency, biomechanics, histological, ultrastructure

Abstract #332

TITLE

The Versatile Neurocutaneous Flaps

*SYED KAMRAN AHMED *, BORIS KWOK KEUNG FUNG*, WING YUK IP*, SHEW PING CHOW**
*DIVISION OF HAND AND FOOT SURGERY, DEPARTMENT OF ORTHOPAEDICS AND TRAUMATOLOGY, UNIVERSITY OF HONG KONG

Background
Reverse flow neurocutaneous flaps are being utilized more frequently during the past decade to cover vital structures around the foot and ankle area. Their potential advantages are their relatively constant blood supply, ease of elevation and preservation of major vascular trunks in the leg. Their potential disadvantages remain venous congestion, donor site morbidity and lack of sensation.
Methods
This descriptive case series was conducted at Queen Mary Hospital, University of Hong Kong, from 1997 to 2003. Fourteen cases of neurocutaneous flaps were identified through medical records. A detailed questionnaire was developed addressing variables of interest.
Results
Out of fourteen patients undergoing neurocutaneous flaps, there were ten reverse sural artery flaps, two saphenous artery retrograde and two saphenous artery antegrade flaps. There was no flap failure with minimum donor and recipient site morbidity.
Conclusions
Reverse sural artery flap remains to be the workhorse flap for the reconstructive micro surgeons. We highly recommend the flap to resurface soft tissue defects of the foot and ankle. Anastomosis of the sural nerve to the digital plantar nerve can potentially solve the issue of lack of sensation in the flap especially when used for weight bearing surfaces.

Abstract #353

ABSTRACT FOR FREE PAPER- ORAL PRESENTATION

TECHNICAL CONSIDERATIONS AND FUNCTIONAL OUTCOME OF THE MANAGEMENT OF COMPLEX INJURIES OF THE ELBOW

AUTHORS: Dr. Praveen Bhardwaj, S. Raja Sabapathy, Dr. S. Rajasekaran, Dr. Hari Venkatramani, Dr. Ravindra Bharathi, Ganga Hospital, Coimbatore, India.

Materials and Methods: Records of 34 complex elbow injury patients treated between
2000 – 2006 were studied. 21 patients could be contacted. Average MESS score was 6.7, with 14 having a score of 7 or above. 15 had fractures, one had pure dislocation and five had fracture dislocations. 10 had nerve injuries and 4 vascular injuries. 21 patients were evaluated clinically, radiologically, with DASH and Mayo Elbow Scores and employment status. Average follow up was 48 months. The data was analyzed for outcome determinants.
Treatment Details: After radical debridement skeletal stabilization was done (external fixation-5, supplementary external fixation with internal fixation-16).Primary nerve repair was done in 2. In 5 cases nerves were not repaired due to segmental loss/avulsion. Two underwent secondary tendon transfers. Vascular repair was done in 4. Primary wound closure was done in 6 and of them 2 needed secondary procedures. Three had local fasciocutaneous flaps, eight abdominal flaps and four pedicled latissimus dorsi. Average number of surgeries was 3.
Results: All elbows were salvaged. 16/21 were fully satisfied (visual analogue score >7). Dissatisfied patients had pain. Eleven returned to original jobs and six to less demanding jobs. Four were unemployed at 22 months (average) post injury. Average DASH score was 31 and Mayo elbow score was 78.
Conclusion: Complex Injuries of elbow with MESS of 7 or above are salvageable.Longer injury- debridement interval, serial fractures, associated hand injuries and nerve injuries/loss, delayed soft tissue cover and a longer period of immobilization were associated with poor outcome.

Abstract #151

ANATOMIC STUDY OF MUSCULOCUTANEOUS NERVE FOR BRACHIAL PLEXUS INJURY RECONSTRUCTION IN FILIPINOS

ELLEN Y. LEE AND EMMANUEL P. ESTRELLA

Introduction

The location of the musculocutaneous nerve branches to the biceps and brachialis is crucial in nerve transfers for brachial plexus injury.

Materials and methods

Surgical dissection of the brachial plexus was performed on 34 cadavers (65 upper extremities). The distance from the coracoid to the branching of the musculocutaneous nerve to the biceps and brachialis were noted, as well as the number of fascicles. Same measurements were made in 4 patients (4 arms) intra-operatively during reconstruction using the Oberlin procedure. The clinical outcome of the Oberlin procedure was also reported.

Results:

The branching of musculocutaneous nerve to biceps and brachialis in 65 cadaveric arms had a mean distance of 109mm (musculocutaneous nerve to biceps) and 151mm (musculocutaneous nerve to brachialis) from the coracoid. Fifteen percent (10/65) of the extremities had 2 fascicles of musculocutaneous nerve innervating the biceps while 9% (6/65) had 2 fascicles innervating the brachialis. Clinically, the musculocutaneous branch to the biceps was consistent at 100mm from the coracoid. Earliest recovery of elbow flexion after the Oberlin procedure was at 3 months with a motor grade of 4 at last follow-up.

Conclusion:

Identification of the location of the musculocutaneous nerve in Filipinos facilitates dissection in brachial plexus reconstruction. The Oberlin procedure performed for brachial plexus injuries is a viable option to restore function in said patients.

Abstract #456

Treatments of Advanced Kienböck's disease with tendon roll implantation and temporary partial wrist fixation.

-Its clinical results and future*s treatment using tissue engineered technique-

Koji SHIGEMATSU MD.

Nishinara Central Hospital

Various procedures have been performed for the treatment of advanced Kienböck's disease. We have treated it a tendon roll implantation after resection of the necrotic lunate with temporary internal fixation of the STT or SC joint. Twenty-one patients (8 males and 13 females) aged 24 to 72 years at the time of surgery. According to Lichtman*s classification, 12 patients were stage IIIb and 9 were stage IV. Postoperatively, wrist pain was completely disappeared in nine patients, and in remaining 12 patients, wrist pain was decreased compared with preoperatively. However collapse of the implanted tendon roll occurred in some cases. Thus, we considered that a new tendon roll with appropriate biomechanical properties is desirable for treatment of advanced Kienböck's disease.

In this presentation, I would like to show clinical results of the treatment of tendon roll implantation for advanced Kienböck's disease and a new tendon roll implantation combined with bone marrow-derived mesenchymal stem cells in collagen ceramic composite using tissue engineered technique experimentally.

Session: Upper Limb Reconstruction of Paralytic Conditions

Date: 15 February 2008

Venue: 7A Forum

Time: 17:20 - 18:20

Moderator : G. BALKRISHNAN & Kan-hing MAK

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	SRIDHAR	K	India	Upper Limb Reconstruction of Paralytic Conditions	15. Feb. 2008		Post Hansen's Upper limb Paralysis: Some Concepts in Tendon transfers
2	HO	Pak-cheong	Hong Kong	Upper Limb Reconstruction of Paralytic Conditions	15. Feb. 2008		Role of surgical reconstruction for upper limb function improvement in tetraplegic patients
3	TONKIN	Michael	Japan	Upper Limb Reconstruction of Paralytic Conditions	15. Feb. 2008		Thumb surgery in cerebral palsy
4	MAK	Kan-hing	Hong Kong	Upper Limb Reconstruction of Paralytic Conditions	15. Feb. 2008		Upper limb reconstruction in cerebral palsy

Session: T2

Date: 15 February 2008

Venue: Meeting room room 601

Time: 16:20 - 18:20

Moderator : Kent CHANG & Cecilia LI-TSANG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	RURD	David Andrew Ross	Hong Kong	T2	15. Feb. 2008		Micro-Surgery in the Management of Hand Burns
2	HUNG	LK	Hong Kong	T2	16. Feb. 2008		Experience in Managing Burnt Hands in China
3	WU	Anna	Hong Kong	T2	17. Feb. 2008		Pressure Therapy for Burnt Hands
4	KARUNATILAKE	Asha	Sri-Lanka	T2	18. Feb. 2008		Rehabilitation of Full Thickness Burnt Hands

REHABILITATION OF MAJOR BURN HAND INJURIES

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Hand burns are common among burn survivors. We receive nearly 200 major burn hand injuries per year as our unit is the only burn centre for the whole country.
Lack of resources, Long theater waiting lists, and poor pain management, high rate of scar formation, traveling difficulties and lack of knowledge among health staff and the community are the main challenges for us in rehabilitating these burns.

In order to achieve the best functional outcomes our main aim was to make a successful protocol for management of full thickness burn hand injuries.

Method: It starts from the time of admission to hospital. In detail assessment by burns unit on call doctor at the time of admission, proper dressing, proper bandaging, Plaster of Paris splinting, elevation, daily mobilization, encourage ADL , early excision and graft, pressure bandaging, scar massaging (indigenous oil massage), custom made pressure garments (double way stretch material which is used for undergarments), various methods of taping, and weekly and monthly review and follow up.

Results: We measured the out come by using Dash questionnaire with some alterations according to our cultural needs and our life pattern.
We received good results with our new protocol during last five years.

Conclusion: This protocol is very effective to treat to the patients with major burn hand injuries. We can make their hands totally functional. We would like to introduce this protocol as a successful protocol to the developing countries to get successful out comes.

Session: SS4 - Elbow Surgery & Miscellaneous

Date: 15 February 2008

Venue: Meeting room room 603 - 604

Time: 16:20 - 18:20

Moderator : Y.Y CHOW, C.Y LO & W.C.WU

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	SOTEREANOS	CONSTANTINE G		SS4	15. Feb. 2008		Elbow fracture dislocation - from common injuries to complex and rare patterns
2	SOTEREANOS	CONSTANTINE G		SS4	15. Feb. 2008		Heterotopic ossification of the elbow - How I do it.
3	SOTEREANOS	CONSTANTINE G		SS4	15. Feb. 2008		Biceps tendon rupture - Surgical management and how to prevent complications
4	HERREN	Daniel		SS4	15. Feb. 2008		Elbow arthroplasty: How well are the patients doing ?
5	WU	W.C		SS4	15. Feb. 2008		Chronic elbow joint instability reconstructed with bone-ligament-bone graft from the iliac crest

Session: FP7/8

Date: 15 February 2008

Venue: Meeting room room 605

Time: 16:20 - 18:20

Moderator : C.O HO & Soo Bong HAHN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	ORILLAZA	Nathaniel	Philippines	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	18	Ligament Reconstruction and Tendon Interposition of the First Carpo-metacarpal Joint after Excision of Giant Cell Tumor of the First Metacarpal : A Case Report
2	ZYLUK	Andrzej	Poland	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	29	An assessment of the results of upper limb replantation
3	HOLLEVOET	Nadine	Belgium	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	31	Treatment of chronic wounds at the olecranon with the antecubital fasciocutaneous island flap
4	MURAMATSU	Keiichi	Japan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	37	Sarcoma in the Forearm and Hand: Clinical Outcomes and Microsugical Reconstruction for Limb Salvage
5	ORILLAZA	Nathaniel	Philippines	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	41	Prognostic Factors of Functional Outcome after Limb-Salvage Surgery with Soft Tissue Reconstruction in Extremity Soft-Tissue Sarcoma
6	SANO	Kazufumi	Japan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	42	Delayed Extended _ Mid-Thenar_ Flap for Reconstruction of Fingertip Avulsion Injury
7	PARK	Jong-Woong	Korea	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	49	Inside-Out Vein Graft for the Sensory Nerve Segmental Defect
8	BANGLADESH	Mahfuzur Rahman	Bangladesh	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	76	Effectiveness of splinting on pain for people with having de Quatrain's tenosynovitis
9	LEE	Young-Keun	Korea	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	83	Reviersed osteocutaneous radial forearm flap for a thumb reconstruction
10	YOSHIDA	Atsushi	Japan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	88	Vascularized Bone Graft to the Persistent Non-Union of the Humerous
11	PAAVILAINEN	Pasi	Finland	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	90	Dorsolateral Forefoot Flap: A New Method for Coverage of Glabrous Skin Defects of the Hand
12	GOTANI	Hiroyuki	Japan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	122	Finger tip replantation -Technique and postoperative management, including children cases-
13	HASUO	Takaaki	Japan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	126	Fingertip Replantation
14	SEBASTIN	Sandeep	Singapore	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	128	Quaba Flap - Extending the Indications
15	LEE	Ellen	Philippines	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	152	The Distally Based Sural Artery Flap Lower Extremity Defects
16	HOU	Rui-Xing	China	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	160	Transplantation of Several Types of Nail Skin Flap From the Second Toe for Repair of Degloving Injury of the Fingers in Different Degrees
17	KIM	Jin-Sam	Korea	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	169	Reconstruction of the shoulder region using a pedicled latissimus dorsi flap following soft tissue sarcoma resection
18	KIM	Jin-Soo	Korea	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	172	Finger Reconstruction with Thenar Free Flap
19	GUO	Jing-Song	Taiwan	Free paper 7/8 - Microvascular & Reconstruction 1	15. Feb. 2008	175	Using Free Style Proximal Radial Forearm Free Flaps while Preserving Radial Artery for Reconstructions of Hand Defects in Burn Patients

Abstract #18

LIGAMENT RECONSTRUCTION AND TENDON INTERPOSITION OF THE FIRST CARPO-METACARPAL JOINT WITH FIBULAR AUTOGRAFT AFTER EXCISION OF GIANT CELL TUMOR OF THE FIRST METACARPAL : A CASE REPORT

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Manila, Philippines

We report the case of a 24-year old, female, diagnosed with Giant Cell Tumor of the first metacarpal who underwent wide excision removing the entire metacarpal, trapezium and surrounding muscles. Reconstruction was done using non-vascularized fibular autograft fused distally at the metacarpo-phalangeal (MP) joint and soft tissue arthroplasty using Ligament Reconstruction and Tendon Interposition (LRTI) using the Flexor Carpi Radialis (FCR) on the carpo-metacarpal (CMC) joint of the thumb to allow motion.
At 15 months post-surgery, patient did not present with any major complication. The metacarpo-phalangeal joint is already fused with pain free motion at the carpo-metacarpal joint and very functional hand.
We present another use of the LRTI combined with non-vascularized autograft as an innovative option in preserving motion after reconstruction of defects created with excision of the first metacarpal.

Abstract #29

A. Żyluk, I. Walaszek

An assessment of the results of upper limb replantation

Summary
Patients and Methods. During the period 1996-2005, 47 patients (45 men, 2 women) with a mean age of 42 years, with 34 total (72%) and 13 subtotal (28%) amputations proximal to the metacarpus underwent replantation or revascularization of the amputated part. Thirty five limbs (74%) survived, 10 (21%) were lost in the post-operative period and in 2 cases (5%) blood flow was not re-established during the operation. Of these 35 patients with successfully replanted or revascularized limb, 19 were followed up over an average of 2.5 years. The amputation level was metacarpus -5 cases, wrist - 9, forearm- 3, elbow- 1 and arm – 1 case. The assessment included: fingers active range of motion, grip strength, filament test and subjective assessment of hand function with DASH questionnaire.
Results. At the mean of 2.5 years assessment, the fingers active range of motion was a mean of 116 (range 26 -224 ..the total grip strength was a mean of 8.3 kG (range 2-12 kG) and the DASH score was a mean of 103 points, (range 72-148). Fingers range of motion was satisfactory in most of metacarpal and wrist replantations, but less pleasing in forearms and arm. Similarly, function of the replanted hand was better in metacarpal and wrist replantations (14 cases, mean DASH score 98), than forearm and arm replantations (5 cases, mean DASH score 117). The static monofilament testing revealed feeling of light touch good in 2 cases, satisfactory in 4 cases (median nerve) and in 2 cases (ulnar nerve). Only protective sensation in 8 cases (median nerve) and 10 cases (ulnar nerve). In Chen's classification 3 patients were scored I grade, 2 patients II grade and 9 patients III grade. The patients underwent a total of 78 corrective operations (mean 2.3 per patient, range 1-5) in order to improve function or cover skin defect.
Conclusion. The results support an opinion that these time consuming operations result in salvage of functionally acceptable extremity what advocates that in every case of major amputation, regardless the mechanism or extend of injury an attempt of replantation should be considered, when patient's general health condition is stable.
Keywords: upper limb, replantation

Abstract #31

TREATMENT OF CHRONIC WOUNDS AT THE OLECRANON WITH THE ANTECUBITAL FASCIOCUTANEOUS ISLAND FLAP

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Surgical resection of a bursa olecrani can be complicated by chronic infection, wound healing problems and skin defects. We treated four patients with these problems with an antecubital fasciocutaneous island flap. The flap is vascularised by the inferior cubital artery and the cephalic vein. In three patients a good result was obtained even though they had risk factors for wound healing like diabetes and smoking. In one elderly patient with diabetes and rheumatoid arthritis on corticosteroid therapy and ledertrexate, the flap failed. We conclude that the flap is a good solution if the risk for wound healing is not too high.

Abstract #37

SARCOMA IN THE FOREARM AND HAND:
CLINICAL OUTCOMES AND MICROSURGICAL RECONSTRUCTION FOR LIMB SALVAGE

KEIICHI MURAMATSU,[1] KOICHIRO IHARA,[2] TAKAHIRO HASHIMOTO[1] AND TOSHIHIKO TAGUCHI[1]

Purpose: Sarcomas in the forearm and hand are very rare and clinical outcomes after surgery and adjuvant therapies have been unclear. The aim of the current study was to examine oncological outcome, microvascular reconstruction and functional evaluation in patients who underwent wide resection for sarcoma.
Methods: A retrospective review was performed in 19 patients who were treated for soft tissue or osseous sarcoma. The most common pathologic subtype of soft tissue sarcoma was malignant fibrous histiocytoma, while chondrosarcoma was most common in the hand.
Results: All 12 patients with sarcoma in the forearm were treated with limb-salvage and needed microvascular reconstruction. Flap survival was excellent, although two patients had vascular complications. Local recurrence occurred in 4 patients, 3 of which had previously undergone inadequate resection in other hospitals. Three patients had distant recurrence and one died of disease at 38 months after surgery. The 3-year disease specific survival rate in 17 patients was 100% and 5-years in 9 patients was 88%. The mean Enneking functional score for the upper limb was 25 (83%) and ranged from 20 to 30 points at a mean follow-up period of 37 months.
Conclusion: Although sarcomas in the forearm and hand often metastasize, the overall survival rate is excellent. Wide marginal resection during initial surgery is the most predictive factor for tumor control. Careful pre-operative planning with anticipation of all resected structures can improve patient outcome. Microvascular flap reconstruction is essential for limb salvage and provides reliable, safe coverage with reasonable preservation of function.

Abstract #41

PROGNOSTIC FACTORS OF FUNCTIONAL OUTCOME AFTER LIMB-SALVAGE SURGERY WITH SOFT TISSUE RECONSTRUCTION IN EXTREMITY SOFT-TISSUE SARCOMA

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Background and Objectives: Soft-Tissue sarcoma patients requiring extensive soft-tissue reconstruction after limb salvage surgery are a unique subset of patients influenced by both the nature of the disease and the special procedures associated with wide tumor excision. No study has attempted to evaluate the possible prognostic factors of good outcome after reconstruction. The purpose of the current study was to evaluate the functional outcomes of this group of patients with extremity soft-tissue sarcoma using the Rating Scale of the Musculoskeletal Tumor Society (MSTS) and analyze factors possibly predictive of this outcome.
Methods: Thirty patients of the University of the Philippines Musculoskeletal Unit (UP-MuST) over the period of 1993-2004 with a minimum of nine months follow-up were evaluated using The Revised Musculoskeletal Tumor Society (MSTS) Rating Scale. Tumor and treatment-related variables (presenting disease status, anatomic site, tumor size, grade, radiation, margins of resection, irradiation) were collected retrospectively from patients charts and records. The variables were then subjected to stepwise multivariate regression analysis.
Results: All patients presented with good functional outcome, after an average of 37 months follow-up, with an average score of 27.9/30 or 93.1%. Large tumor size, margins of resection and tumor grade were significantly associated with the results of MSTS 1993 rating on the univariate model. Only tumor size remained significant on the multivariate analysis.
Conclusion:
The generally good functional outcomes support limb salvage surgery with soft-tissue reconstruction for extremity soft-tissue sarcoma patients. Tumor size is the single most important prognostic factor associated with significantly reduced functional outcome.

Abstract #42

DELAYED EXTENDED "MID-THENAR" FLAP FOR RECONSTRUCTION OF FINGERTIP AVULSION INJURY.

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Avulsion injury through the base of the distal phalanx of the ring finger with a large projecting tip of exposed bone was treated successfully with delayed extended mid-thenar flap in 2 cases. The mid-thenar flap adding delay procedure at the 1st stage of consecutive two-stage operation could provide extended flap length to wrap the large projecting tip of the exposed bone at the 2nd stage. When the mid-thenar flap is harvested with limited width which allows reasonable direct closure, scar of the mid-thenar area is as inconspicuous and soft as that usually seen after conventional carpal tunnel release. Although usage of the mid-thenar flap is limited to the middle and ring finger injuries, great advantage of this flap compared with the conventional thenar flap is that a patient can use the injured hand during immobilization period because motions of the thumb are not restricted. To reduce immobilized discomfort between two stages of the palmar flap operation, "relax flexion position" immobilization technique devised by the authors is also introduced.

Abstract #49

INSIDE-OUT VEIN GRAFT FOR THE SENSORY NERVE SEGMENTAL DEFECT

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The gold standard for the treatment of segmental nerve defect is an autogeneous nerve graft. However, donor site morbidity is an inevitable complication. We substituted the autogeneous nerve graft with the inside-out vein graft for the short segmental sensory nerve defect created by neuroma excision or trauma in the hand and foot. Nine patients of sensory nerve defects have undertaken inside-out vein graft for the recovery of sensation. The involved nerves were digital nerves in 2 cases, peroneal nerves in 2 cases, saphenous nerve in 1 case, superficial radial nerves in 4 cases. The average length of defects was 2.86cm(1.5cm~6cm). The donor vein was harvested 4mm longer than the nerve defect and everted with inside-out fashion to promote nerve regeneration. Both sides of nerves were inserted into the ends of vein and sutured. Patient's objective satisfaction, two-point discrimination, EMG were performed for the evaluation of results and the British Medical Council sensory functional score was evaluated. In all cases, the sensory functional score were recovered over S3. In the cases that the nerve defects were shorter than 2.5cm showed more improved recovery reaching to S3+. There were no donor site morbidity due to vein harvest and all patients showed satisfactory results with protective sensation at the involved sites. When the sensory nerve defect is short, the inside-out vein graft is a good surgical strategy substituting for the autogenous nerve graft without donor site morbidity.

Abstract #76

Title: Effectiveness of splinting on pain for people with having de Quatrain's tenosynovitis.
Author: Md. Mahfuzur Rahman, Bangladesh
Presentation Duration: 10 minutes
Mode of Presentation: Multimedia (power point)

This pre experimental quantitative study aimed to identify effectiveness of splinting on pain for people with having de Quatrain's tenosynovitis. The study was conducted in two steps. First the researcher provides the thumb spica splint having de Quatrain's tenosynovitis and advised to wear it for three weeks. In second step Visual Analogue Scale (VAS) was used to measure the pain intensity and also time taken to perform the four functional tasks were recorded (like power grip, dexterity test, fastening buttons, and jar opening). Five participants who were selected and convenience sampling was used to select subjects because de Quervain's tenosynovitis is not a very common condition in Bangladesh. Subjects were selected according to inclusion and exclusion criteria of out door unit of Occupational therapy department CRP. All participants were assessed by on the first day. The results of the study show that splinting is effective for reducing pain for the people with de Quervain's tenosynovitis. The difference between pretest and post test was statically significant (related t test) for both VAS and taken time perform functional tasks.

Abstract #83

Reversed Ostecutaneous Radial forearm flap for Thumb Reconstruction
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Department of Woo's Institute for Hand Surgery & Reconstructive Microsurgery, Gangnam Hospital, Daegu, South Korea

Purpose: To report the outcome of the reverse osteocutaneous radial forearm flap for thumb reconstruction
Method: We performed retrospective review of all (5) patients who had this procedure between 2001 and 2005. There were all men; their ages at the time of surgery ranged from 23 to 61 years (mean, 45 years). Types of defects and details of the level of lesion and alternative surgical procedures were reviewed. The size of flap, length of the radius harvested, time to union, the range of motion of thumb, grip and pinch strengths, complications, and patient outcome were determined.
Result: The size of the transferred radial forearm flap ranged from 8 x 4cm to 12 x 6cm (mean, 58.4cm^2). The length of the donated radius ranged from 3 to 6cm (mean, 4.4cm). All flaps survived completely. The interval required to obtain radiographic bone union was 2 to 3 months (mean, 2.8 months). The ROM of thumb ranged from 55°to 75°(mean, 65°). Postoperative gr ip strength ranged from 55 to 70lbs (mean, 55lbs) and pinch power ranged from 8 to 11lbs (mean, 9.2lbs). There were no any complications such as radius fracture, delayed bone resorption, vascular insufficiency, flexor tendon adhesion. All 5 patients were satisfied with the reconstructed site.
Conclusion: Reverse radial forearm flap provides thin skin of good texture together with bone for a one-stage reconstruction in hand injury without vascular anastomosis. Expecially, a radial forearm osteocutaneous flap is recommended for patients with combined defects of soft tissue and bone in thumb.

Abstract #88

VASCULARIZED BONE GRAFT TO THE PERSISTENT NON-UNION OF THE HUMEROUS
Atsushi Yoshida, Hiroshi Yajima, Yasunori Kobata, Keiichi Murata, Naoki Maegawa, Yoshihiro Dohi, Yoshinori Takakura
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【Purpose】
For patients with humeral non-unions, rigid fixation and bone grafting are performed. However, bone union cannot be obtained in some patients, especially those showing some infection or bone defects. For such patients, we have used vascularized bone grafting. Here, we report the use of vascularized bone grafts to the persistent non-union of the humerous.
【Materials and methods】
Eleven patients, 6 men and 5 women, with intractable post-traumatic non-unions in the humeri were treated using vascularized bone grafts. The initial state of injury showed that 9 fractures were closed, while two were open fractures. At the acute stage, 8 fractures were fixed using intramedullary nailing, 2 were fixed with plates, and 1 was treated conservatively. Donated bone grafts were fibula in 2 patients, medial condyle of the femur in 7, and scapula in 2.
【Results】
Follow-up periods ranged from 10 to 188 months (mean, 56 months). Primary bone union after vascularized bone grafting occurred in all patients, and the mean period required to obtain radiographic bone union was 4.1 months. There was one case with malunion occurred in 1. One patient complained of a sensory disturbance in saphenous nerve area, which finally disappeared.
【Conclusions】
Vascularized fibula graft is indicated in patients with large bone defects, the scapula is easy to transfer to the proximal humerus on its pedicle. Thin corticoperiosteal graft from the femur is indicated in patients with intractable nonunion of the humerus without significant bone defects.

Abstract #90

DORSOLATERAL FOREFOOT FLAP: A NEW METHOD FOR COVERAGE OF GLABROUS SKIN DEFECTS OF THE HAND
Pasi Paavilainen, Rowena Ng, Yrjana Nietosvaara, Beng Hai Lim, AymericY.T.Lim.

The specialized function of the volar glabrous skin of the hand requires that replacement following loss should as closely as possible approximate original skin.
The aim of this study was to develop a new free glabrous skin flap from lateral forefoot.
Twenty cadaver legs were used to evaluate specific anatomy of a free skin flap based on the lateral terminal branch of lateral tarsal artery of the forefoot. Twenty normal feet were studied by Doppler to determine the location of the pedicle.
The dorsolateral forefoot flap has a constant arterial pedicle of 4 cm with long veins and it can be raised with a sensory nerve if a sensate flap is desired. The pedicle runs through the centre of the flap and is relatively small in size (0.83 mm). This artery was found at a constant site by Doppler in 19 of 20 normal feet. Two thirds of this flap is glabrous or marginal interface type of skin and the donor site can be closed primary. The first clinical case in which a 25 x 75 mm large dorsolateral flap was successfully transferred to resurface a volar defect of the index finger is described.
The advantages in using this easily raised glabrous skin flap include minimal donor-site morbidity as well as good color and texture match for reconstruction of volar finger skin.

Abstract #122

Pre congress abstract
Restration of finger sensibility after inter costal nerve transfer
Osaka trauma and microsurgery center, Seikeikai hospital
Hiroyuki Gotani M.D., Hidetoshi Teraura M.D. and Yoshiki Yamano M.D.

We evaluate finger sensation of the patients with brachial plexus injury after intercostal nerve transfer by using Semmes-Weinstein Pressure Aesthesiometer and by recording of cortical somatosensory evoked potential (SEP) following stimulation of either reinnervated median or ulnar nerve at the wrist.

Intercostal sensory rami were transferred to either median or ulnar nerve in 15 cases, 21 nerves. Postoperative follow-up ranged from 15 to 168 months. S-W test showed allacesthesia in the axillary region ; Diminished protective sensation (n = 6), loss of protective sensation (n=10) and deep pressure sensation (n=5).

Then we analyzed relation between S-W test evaluation and amplitudes and latencies of SEP. There was no apparent correlation between marking number of S-W monofilaments and latencies of the first negative (N1), and the second positive (P2) deflections of SEP. The peak to peak amplitudes (N1-P2) was larger in group with diminished protective sensation than in other two groups.

The results suggest that the amplitude of cortical component of SEP reflects restoration of finger sensibility.

Abstract #126

Fingertip Replantation
Takaaki Hasuo, Genzaburo Nishi, Daiji Tuchiya
Aichiken Koseiren Kainan Hospital, Aichi, Japan

<Purpose> We retrospectively analyzed the influence of venous anastomosis, the range of motion and the sensory recovery in fingertip replantations.

<Subjects and Methods> From January 1980 to December 2005, 143 distal phalanges of completely amputated fingers in 127 cases were replanted. Patients ranged in age from 7 months to 69 years (mean, 38.1 years). In terms of Ishikawa's classification, there were 48 amputations in subzone II, 56 in subzone III, and 39 in subzone IV. Subjective sensation was evaluated using Semmes-Weinstein monofilament test (SW).

<Results> The overall survival rate was 78 percent. In 61 cases with no veins repaired, the survival rates were: 80 percent in subzone II, 83 percent in subzone III, and zero percent in subzone IV. The loss of the range of distal interphalangeal joint was 25 percent in subzone II, 39 percent in subzone III, and 76 percent in subzone IV. The average value of SW with nerve repair was 3.36±0.63, and 3.67±0.78 without nerve repair.

<Conclusion> The results from this series indicate that an amputated fingertip in subzone II and III can be replanted successfully without venous anastomosis. However, many digits in subzone II and III can require various venous drainage techniques. The loss of DIP function tends to increase, as it becomes almost a joint, and it's important that nerves be repaired if possible. Fingertip replantation is a valuable procedure which provides acceptable sensibility as well as good cosmetic results.

Abstract #128

THE QUABA FLAP - EXTENDING THE INDICATIONS

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The Quaba flap provides simple, reliable and single stage coverage of proximal digital defects. It is not commonly used for palmar or middle phalangeal defects as its distal reach is limited to the proximal phalanx. We used 40 Quaba flaps to cover 39 digital defects in 38 patients. Half of the flaps were used to cover defects beyond the proximal phalanx and we safely extended the flap till the distal interphalangeal joint. The technical maneuvers which enabled these expanded indications include harvesting the flap based on a fascial pedicle, oblique orientation of the skin island, semi-lunar design of the skin island and dividing the dorsal metacarpal artery proximal to the perforator. We describe these maneuvers, discuss our results and compare the Quaba flap with the alternative options namely, the reverse dorsal metacarpal artery flap, adipofascial turnover flaps and flaps from the adjoining digits. In conclusion, the Quaba flap provides reliable coverage of defects until the distal interphalangeal joint. It is easy to raise, provides thin pliable skin, has minimal donor site morbidity and allows early mobilisation.

Abstract #152

THE DISTALLY BASED SURAL ARTERY FLAP FOR LOWER EXTREMITY DEFECTS

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Introduction
The distal part of the leg, ankle and foot has been a problematic site for coverage because of the paucity of local tissues available, relatively poor skin circulation, and weight-bearing requirement. The reverse sural artery flap has been described as a reliable alternative to free tissue transfer for coverage of such areas.
Methodology
The reverse sural artery flap was performed on patients with small to midsized defects of the distal leg, ankle or foot with intact skin on the posterior leg. The patients were followed up until wound healing and return to ambulation.
Results
The procedure was performed in 14 patients with an average age of 30 years. The average size of the defect was 9 cm x 10 cm (range, 6 x 4 cm to 12 x 15 cm). The average operative time was three hours (range, 1-3.5 hrs). The average follow-up period was 11 months. All 14 flaps survived. Four flaps had tip necrosis of <1 cm at the distal portion and were treated conservatively. Mariginal necrosis of 10-30% was noted in 3 flaps. Two were treated conservatively and one was debrided and resutured with uneventful healing. Crutch ambulation was started at 1 month after the procedure and independent ambulation was achieved at an average of 4.75 months (range, 1.5-6 months).
Conclusion
The reverse sural artery flap was very useful in the coverage of a variety of soft tissue defects of the distal lower extremity.

Abstract #160

Transplantation of several types of nail skin flap from the second toe for repair of degloving injury of the fingers in different degrees

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【Objective】 To summarize the treatment outcome of using nail skin flap from the second toe to repair the degloving injury of the fingers. **【Methods】** Ninty-five degloved fingers in eighty-three cases were classified into the Class I (fifty-nine degloved fingers)and Class II (thirty-six degloved fingers)degloving injury of the fingers. Fifty-nine fingers with Class I degloving injury were repaired with fifty-nine pieces of single nail skin flap from the second toe , thirty-six fingers with Class II degloving injury were repaired with thirty-six pieces of nail skin flap from the second toe with flap from dorsum pedis. **【Results】** All the flaps survived. Sixty-two excellent repaired fingers and three good repaired fingers were obtained in sixty-five fellow-up fingers. **【Conclusions】** The nail skin flap from the second toe was one of the best way to repair the degloving injury of the fingers.

Abstract #169

Reconstruction of the shoulder region using a pedicled latissimus dorsi flap following soft tissue sarcoma resection

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Introduction
The latissimus dorsi flap is probably the most commonly used and reliable flap for reconstruction. The advantages of this flap include a constant vascular anatomy, long and high-caliber vessels, a high density of myocutaneous perforators to the overlying skin, minimal donor site morbidity and technical ease of flap raising. In particular, a pedicled latissimus dorsi flap can be used to repair defects around the shoulder region.
The present report details our experience using pedicled latissimus dorsi flaps for reconstruction after resection of soft tissue sarcomas of the shoulder.
Meterials and Methods
This study involved a retrospective review of the medical and physical examination records of six patients with soft tissue sarcomas of the shoulder region who underwent wide resection and pedicled latissimus dorsi flap reconstruction between 2004 and 2006. Three patients were men and three patients were women, with a mean age of 37 years (range, 19 - 49). Two patients had a dermatofibrosarcoma protuberance, one a synovial sarcoma, one a high-grade round cell sarcoma, one a myxofibrosarcoma, and one had a malignant peripheral nerve sheath tumor. Four patients were referred to our hospital after simple excision with an inadequate margin at other local hospitals. According to the American Joint Committee on Cancer (AJCC) system, there were two stage ⅡA, ⅡB, and Ⅲ patients. Three patients underwent postoperative radiation therapy, and one patient received postoperative chemotherapy. The study assessed the flap state, survival, postoperative complications and functional results using the scoring system of the Musculoskeletal Tumor Society for the upper extremity. The mean follow-up period was 27.3 months (range, 14 - 34).
Results
There were no major post surgery complications, and all flaps survived. There were no patient deaths during the study period. The mean flap surface area was 108 cm2 (range, 63 - 189). Only one flap exhibited partial skin necrosis, and this healed with conservative treatment. After wound healing, one patient underwent radiation therapy, resulting in severe color change at the flap site. Morbidity of the donor sites was minimal in all patients, and there were no incidences of seroma formation or wound dehiscence. All patients expressed satisfaction with the cosmetic and functional results. The mean functional score was 29.7(range, 28–30).
Conclusion
We believe that using a pedicled latissimus dorsi flap is safe and reliable, and that it may become the treatment of choice for repair of extensive defects of the shoulder region after oncological resection. This flap provides wide coverage, and the present study found that all patients were satisfied with the cosmetic and functional results, and no complications occurred.

Abstract #172

FINGER RECONSTRUCTION WITH THENAR FREE FLAP

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To preserve the function of hand, various flaps have been introduced to cover the defect of finger. When selecting a flap to cover the defect in finger, many factors should be considered including, defect size and location, skin texture and color, donor morbidity and pedicle diameter and length.
Because hand is always exposed to external environment like face, aesthetic aspect is very important in hand resurfacing. In this viewpoint, thenar area is very good donor site due to very similar color and texture with that of volar skin of finger.
Since January 2000, 35 thenar free flaps were performed for finger reconstruction. Flap was elevated based on palmar branch of radial artery and venae comitantes and subcutaneous vein. All flaps were successful.
Advantages of this flaps are 1) same operation field and regional anesthesia, 2) excellent skin texture 3) constant vascular anatomy 4) primary closure of donor site is possible and scar is minimal.
Disadvantages are 1) poor sensory recovery 2) absence of fingerprint.
Because of these reasons thenar free flap is one of the best options for finger resurfacing.

Abstract #175

Using Free Style Proximal Radial Forearm Free Flaps while Preserving Radial Artery for Reconstructions of Hand Defects in Burn Patients

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Purpose: Although radial forearm free flaps are commonly used for skin resurfacing of hand defects, the associated morbidity remains a concern. The most notable problems are related to the radial artery sacrifice and conspicuousness of a distal forearm skin graft. In this study, we describe harvesting a proximal radial forearm free flap while preserving radial artery and discuss its benefits and limitations for hand reconstruction in burn patients.
Materials and Method: From November 2002 through October 2006, 4 patients had burn related injuries of the hand that were reconstructed using proximal radial forearm free flaps (3 males, 1 female) in the free style fashion. The perforator pedicle of the flap was confirmed and chosen intraoperatively. The radial artery was preserved in all cases. Either the septocutaneous or myocutaneous perforator that nourished the flap was chosen for microsurgical anastomosis to the recipient vessels. The average dimension of the flap was 3.5 cm x 7 cm. All but one donor site was closed primarily.
Results: Four flaps survived with good functional and aesthetic outcomes. There were only minor complaints regarding the proximal forearm donor site.
Conclusion: Proximal radial forearm free flaps are suitable for small or medium sized hand defect reconstruction in burn patients who in doing so can benefit from radial artery preservation that may contribute to more secured circulation in an injured hand, primary donor site wound closure, and early rehabilitation.

Session: Free paper 9

Date: 16 February 2008

Venue: Meeting room 601

Time: 08:00 - 09:00

Moderator : S.T FONG & Reimer HOFFMANN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
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2	TERAURA	Hidetoshi	Japan	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	171	Arthroscopically Assisted Reduction and Percutaneous Pinning (ARPP) combined with Open Reduction and Internal Fixation (ORIF) for AO type C Intraarticular Distal Radius Fractures in Young and Middle-Aged Patients
3	FURUMACHI	Katsuro	Japan	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	186	The arched osteotomy of distal ulna for the TFCC injury
4	CHAKRABORTY	Narayan	Bangladesh	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	274	Effectiveness of splinting on pain for people with having de Quatrain's tenosynovitis.
5	HOFFMANN	Reimer	GERMANY	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	296	Endoscopic single incision extensor indicis transposition for EPL rupture
6	HOFFMANN	Reimer	GERMANY	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	297	Endoscopic Sural Nerve Graft Harvest with Soft Tissue Endoscope
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10	CHINDER	Pramod	Singapore	Free paper 9 – Miscellaneous condition in upper limb	16. Feb. 2008	60	Finger constriction by a Brass Threading Die - an unusual problem

Abstract #50

Intramuscular Hemangioma Of The Upper Extremity In Infants And Children
Kazuki CHAGAWA, Keiichi MURAMATSU, Koichiro IHARA, and Toshihiko TAGUCHI

Purpose: Intramuscular hemangiomas (IMH) are benign tumors comprising just 0.8% of all hemangiomas and are extremely rare in the upper limbs. These tumors can pose diagnostic as well as therapeutic challenges for orthopedic surgeons, especially in younger children. We reviewed cases of IMH of the upper extremity in infants and children from our institute.
Methods: Six consecutive patients underwent surgical treatment for IMH in our hospital. There were four girls and 2 boys. Long-standing pain and swelling were common symptoms except in a one-year-old boy. Tumors were evaluated by radiography, computed tomography, magnetic resonance imaging and angiography.
Results: After a mean follow-up of 42 months, all patients except one were free of pain and without tumor recurrence or functional impairment. Minimal symptoms remained in a six-year-old boy who underwent biopsy only.
Conclusion: Magnetic resonance imaging is the most useful evaluation for IMH because it not only delineates the extent of tumor but also reveals characteristic structures. For young children with IMH, wide excision is the treatment of choice to prevent local recurrence, but every patient should be treated individually after evaluating the patient's age, tumor location and invasion and cosmetic considerations.

Abstract #171

Arthroscopically Assisted Reduction and Percutaneous Pinning (ARPP) combined with Open Reduction and Internal Fixation (ORIF) for AO type C Intraarticular Distal Radius Fractures in Young and Middle-Aged Patients
Hidetoshi TERAURA, Yoshiki YAMANO, Hideki SAKANAKA, Hiroyuki GOTANI,
Takeshi KOMATSU, CHAE Young-Mi, Ryouhei MEGA, Takehiro KATAOKA, Kousuke SASAKI

Hypothesis: To improve the therapeutic results for AO type C intraarticular distal radius fractures in young and middle-aged patients, it is important to achieve and maintain anatomical reduction, and evaluate and treat soft-tissue injuries. We previously employed arthroscopically assisted reduction and percutaneous pinning (ARPP) combined with external fixation. Since 2003, we have employed ARPP combined with open reduction and internal fixation (ORIF) using volar locking plates.
Methods: The subjects were twenty-six patients under 60 years old. The patients comprised thirteen men and thirteen women aged from 16 to 57 (mean 43.5) years. The type of fracture according to the AO classification was C1 in six patients, C2 in ten, and C3 in ten. The follow-up period was 12-18 (mean 13.5) months. The radial inclination (RI), volar tilt (VT), and ulnar variance (UV) were measured radiographically at the time of injury, immediately after surgery, and at final evaluation. The Mayo wrist score was used for clinical evaluation.
Results: Union was achieved in all patients. The triangular-fibrocartilage complex injury was detected in nineteen patients, the scapholunate-interosseous ligament injury in twenty-three, and the lunotriquetral-interosseous ligament injury in nineteen. Radiographic evaluation showed that the mean RI, VT, and UV at presentation, immediately after surgery, and at final evaluation was 12.8, 21.0, and 20.9 degrees, -15.4, 9.7, and 9.6 degrees, and 3.10, 0.30, and 0.35 mm, respectively. The Mayo wrist score averaged 87.6 points.
Summary: Although treatment of AO type C intraarticular distal radius fractures is difficult, ARPP combined with ORIF achieved relatively good results.

Abstract #186

The Arched Osteotomy Of Distal Ulna For The TFCC Injury
Katsuro FURUMACHI, Katsumi TAJIMA, Jun NISHIDA, Tadashi SHIMAMURA

(Objectives) The arched osteotomy of distal ulna and the TFCC reattachment according to Sennwald was carried out on 10 wrists of manual workers. The outcome and surgical indications were investigated
(Patients and outcome) Patients sustaining persistent wrist pain due to TFCC injury underwent our ulnar shortening procedure. Eight male and two female manual workers with age ranged between 22 and 56 years were included. We performed arched osteotomy in ulnar head in order to level the articular surface, followed by a fixation with a cancellous screw. A simultaneous TFCC repair were performed in four wrists. Early motion exercise was encouraged following 3 weeks of splinting. The clinical outcome showed an excellent post-operative function and pain relief in the wrist score, and optimal change in the alignment of the distal radioulnar joint.
(Discussion) The advantages of the procedure are as follows: a good bony union after the osteotomy, a secure reattachment of TFCC to the radius or the ulna after osteotomy, and a visible adjustment of the alignment of the distal radioulnar joint.

Abstract #274

Effectiveness Of Splinting On Pain For People With Having De Quatrain's Tenosynovitis
Md. Mahfuzur RAHMAN
Bangladesh

A prospective randomised study, with the approval from the local Ethics Committee to compare the two-tunnel technique using two small incisions made at the palm and wrist , versus open carpal tunnel release in patients with bilateral carpal tunnel syndrome was carried out. All the operations were performed by the senior author. 25 adult patients (16 females, 9 males) with an average age of 55 years (range, 27-83) were included in the study. The average follow up was 7.7 months (1-12 months). The average operation time was 12 minutes for the 2 tunnel technique, and 6 minutes for open carpal tunnel release. There were no surgical complications in this study. 15 patients (60%) preferred the two tunnel technique. 9 patients (36%) preferred the open technique. 1 patient was indecisive. An average pain score at the wounds using the visual analog scale was 1.78 for the two tunnel technique, and 2.17 for the open technique two weeks after the operation. 52% of the patients with the two tunnel technique developed pillar pain and it was 40% for the other group. Only one patient at each group still had pillar pain six months after the operations. Objective assessment of the hand functions did not show any major difference in the two groups. In conclusion, two tunnel technique of carpal tunnel decompression had less early post-operative wound pain and more patients preferred this technique.
N.B. A multi-centre study on two-tunnel technique of carpal tunnel decompression has been submitted for presentation as well.

Abstract #296

Endoscopic Single Incision Extensor Indicis Transposition For EPL Rupture
Reimer HOFFMANN
Hand and Plastic Surgery, Oldenburg, Germany

Background: The standard operation for extensor indicis transposition to reconstruct a ruptured EPL tendon requires three incisions, over the 1st metacarpal, the MP II and the 4th tendon compartment at wrist level.
Aim: We describe a new endoscopic technique requiring only a single incision over the 1st metacarpal.
Method: A tunnel is made from the incision towards the MP II area and the 4th compartment at the wrist. A 4 mm face lift endoscope with a dissector at the tip is inserted. The whole dissection of the tendon and the transposition is done endoscopically. The Pulvertaft suture is made in the wound on the metacarpal.
The authors have used this technique in 10 cases of EPL rupture following radius fracture without significant synovitis. The results were very good.
Discussion/Conclusion: The advantage of the endoscopic procedure is in the reduction in external and internal scarring.
We consider this operation to be a reasonable step to introduce endoscopic techniques into reconstructive hand surgery.

Abstract #297

Endoscopic Sural Nerve Graft Harvest With Soft Tissue Endoscope
Reimer HOFFMANN
Hand and Plastic Surgery, Oldenburg, Germany

Background: Sural nerve grafts remain the gold standard for bridging larger nerve defects. There are different techniques for harveting including multiple incisions, stripping and endoscopic techniques. Many surgeons prefer a long incision along the course of the nerve to harvest the graft atraumatically.
Aim: We describe a new endoscopic technique using a 4mm standard face lift endoscope requiring 2 one-inch incisions for the harvest of up to 30 cms graft length.
Method: The patient is in prone position. A tunnel is made from the 12 mm incision in the retromalleolar region towards the mid calf area using blunt dissection with a tunneling forceps. A 4 mm soft tissue endoscope with a dissector at the tip is inserted. The whole dissection of the nerve is done endoscopically. Vision is excellent. If necessary a second similar incision is made in the mid calf area. The graft is transected proximal through a stab incision with a scalpel
Discussion/Conclusion: The advantage of the endoscopic procedure is the speed of the dissection, the minimal scarring and the atraumatic harvest of long grafts. Another aspect is cosmesis, especially in dark skinned patients, who tend to keloid formation.
The authors are using this technique routinely in sural nerve harvesting and the results are very good.

Abstract #73

Hand Treatment In Distrophic Epidermolisis Bullosa
C. NOVELLI, C. PAROLO, E. CAVALLI, P. ROSSI, V. FERRARIO, G. PAJARDI

Epidermolysis bullosa is a group of genetic disorders causing blistering and shearing of the skin from even the mildest trauma. It creates severe hand deformities such as pseudosyndactyly, obliteration of the first web, flexion contracture, with disabling functional limitations.
We present our experience on 38 patients and 48 operated hands. The patients were operated under general anaesthesia performed by an experienced anesthetichal equipe. The surgical plan was different mostly according to the age of the patient. In younger patients complete correction of the retraction is reached through the following schema: hand degloving, release of the contracted tissue and opening and grafting of the first web. In adolescents or aged patients, when retraction is present since long time, surgery is purely functional, to restore the pinch. Each procedure is followed by an acute and intensive rehabilitation protocol. Severe cases of early treatment are followed by intraoperative dynamic splinting. This custom made apparatus produce a constant traction on the finger, avoiding the risk of retraction, but permitting movements. In 26 patients with an 8 years follow up, 23 had had good or excellent results, and the remaining 3 patients show early recurrence. In our experience the intra-operative splinting has considerably changed the perspective.
Association of a correct surgical approach to an adequate intra and post-operative rehabilitation improve hand function and a slow down inevitable recurrence.

Abstract #201

Metatarsal Lengthening of First Brachymetatarsia by Callotasis in Adults
So-Min HWANG, Jennifer Kim SONG, Kyeong-Seok OH, Jin-Hyeong KIM, jun-Ho LEE

Brachymetatarsia is a rare congenital anomaly of foot defined as an insufficient growth of the metatarsus, most often found in the fourth metatarsus, where first brachymetatarsia is very rare.
Most of these patients seek medical care for aesthetic considerations rather than functional difficulties. By far, brachymetatarsia has been treated by means of osteotomy of the shortened metatarsus and extending it by bone graft, however, callotasis(callus distraction) has recently become popular. Metatarsal lengthening by callotasis carry an advantage of wide range of indications, no need for bone graft and possible early ambulation.
The first brachymetatarsia in adults haven't caught anyone's attention yet. In the present clinical reports, studies addressing the healing process and postoperative results after callotasis according to morphology, anatomic location and age of the patient are scarce.
We retrospectively reviewed and compared the outcomes of 9 cases of first brachymetatarsia in adult patients who underwent metatarsal lengthening by callotasis from March 1999 to February 2005. Lengthening was achieved by average 16.4mm and lengthening percentage was 43.7%. Healing index was measured 3.8 months/cm, higher than that of the 4th, brachymetatarsia. These results lead us to the conclusion that the period to achieve bony consolidation is longer in the first brachymetatarsia, that thorough discussion with the patient in terms of target length gain, period of healing and postoperative cosmetic outcome is needed. If bilateral, step-wise unilateral operation is recommended to maintain normal everyday life.

Abstract #109

Mycobaterium Chelonae And Mycobacterium Fortuitum Infection Following Open Fracture

Kenny KWAN, ST HO

Introduction: We report a case of nontuberculous mycobacterial infection complicating an open fracture.
Case Report: A 35-year-old man sustained fracture at multiple sites, including open distal radius and ulna, after a fall from height. The fracture was temporarily stabilized with K wires and external fixator after debridement and closed reduction. Definitive fixation was done by open reduction, plating and external fixator. There was persistent discharge from the wound. Debridement and removal of external fixator was done. The debrided tissue grew *Mycobacterium chelonae* and *Mycobacterium fortuitum*. Despite repeated debridement, revision plating and prolonged appropriate antibiotics, the patient developed left axillary abscess and forearm subcutaneous nodules which showed mycobacterial infection on fine needle aspiration. The infection was finally controlled with radical excision of distal third ulna and drainage of axilla abscess together with prolonged chemotherapy. The fracture healed. Follow up at 2 years showed a reasonable functional recovery free of disease and he returned to modified duty.
Discussion and Conclusion: *Mycobacterium chelonae* and *Mycobacterium fortuitum* are both rapidly growing acid-fast bacilli. They are opportunistic pathogens in human, and soft tissue lesions account for the majority of musculoskeletal infection. Osteomyelitis is rarely reported and the predilection site is sternum after open heart surgery. In the present case, the relative clinical significance of each of the dual nontuberculous infections was unknown. The chemotherapy was particularly complex since each showed some difference in susceptibility. In such circumstances, radical debridement (both soft tissue and bone) in combination with prolonged sensitive antibiotics were required to eradicate the infection.

Abstract #60

Finger Constriction By A Brass Threading Die - An Unusual Problem Solved By History Taking

Pramod CHINDER

Finger constriction caused by ring jewellery is a common problem. The two main approaches to the problem are to either cut the ring or to ease the ring out through various means. By the time the patient seeks medical attention, they would usually have tried and failed to some form of the latter, making ring cutting necessary. Other forms of strangulation devices are rare in the hand. We describe a case of finger strangulation involving an unusual device, a threading die, for which cutting the device was impractical and required a different approach. With the help of repeated questioning about the construct of the device by history, The device was easily removed by unscrewing action.

Abstract#446

Wrist Arthroscopy – New Techniques

Gregory BAIN

There have been significant advances in therapeutic wrist arthroscopy over the last ten years.
New techniques, which have added to therapeutic options will be discussed.

1. Arthroscopic capsular release.

For those patients who have marked restriction in the range of motion such that it limits their functional activities can be considered for arthroscopic capsular release of the radiocarpal joint. The ideal patient is the patient who has restricted range of motion; minimal pain, relatively normal x-rays with no evidence of arthritis, carpal instability or intra-articular fracture. In clinical practice this is patients who have had wrist injury or surgery with subsequent immobilisation.
By providing standard traction techniques and using cautery, the volar capsule is released. We recommend that at least part of the radioscaphocapitate ligament be left intact to minimise the chance of ulnar translocation of the carpus.

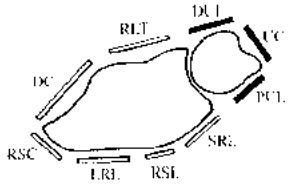

Figure 1 Drawing of the extent of the capsular release showing ligaments. Dorsal capsule (DC), radiolunotriquetral (RLT), dorsal ulnar (DUL), ulnar carpal (UC), palmar ulnar (PUL), short radiolunate (SRL), radioscapholunate (RSL), long radiolunate (LRL), radioscaphocapitate (RSC). Ligaments blackened (DUL, UC, PUL) are not sectioned.

2. Arthroscopic debridement of isolated STT joint arthritis.

In those patients in which isolated arthritis is present in the STT joint, we have performed an arthroscopic debridement. This is in part due to the restricted range of motion, postoperative radiostyloid arthritis and the affect on carpal motion provided by STT joint fusion. We have found that resection of the distal scaphoid is associated with further carpal instability and are therefore using arthroscopic debridement as the preferred technique.
Via localised incisions and blunt dissection the STT portals are established. A standard arthroscopic debridement is performed in this joint. It is common to find full thickness articular cartilage loss on both sides of the articulation.

3. Intraosseous ganglion of the lunate.

Ganglions within the substance of the lunate bone are relatively uncommon. It is our experience that they usually communicate the scapholunate ligament.
We have performed drilling of the intraosseous ganglion of the lunate to those patients who have localised pain with increased activity identified on a bone scan.
Preoperative CT scan is performed. This is used to identify the exact position of the lunate cyst. For those patients who have a cyst in the relatively volar aspect of the lunate a volar radiocarpal portal is utilised. Our preferred technique involves placing a Wissenger rod through the intra-ligamentous sulcus between the radioscaphocapitate and radiolunate ligaments. Over the Wissenger rod a drill guide can be inserted and then a drill advanced up into the lunate bone using the arthroscopic landmarks as a reference and using interoperative fluoroscopy.
Through the arthroscopic portal bone grafts harvested from the ipsilateral distal radius can be placed into the osseous canal in the lunate. Those patients in which the cyst is localised to the dorsal aspect of the lunate can have the drill placed through the ¾ portal with the scope in the 6R portal.

Figure 2
CT scan showing the extent of an intraosseous ganglion of the lunate.
(coronal section.)

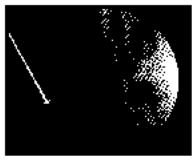

Figure 3
Fluoroscopic confirmation of drill placement (small arrow, drill in canular; large arrow, arthroscope).

4. Arthroscopic debridement of the long ulna styloid.

Ulnar styloid carpal impaction is a relatively uncommon condition. Patients will present with pain which is localised to the ulnar side of the carpus particularly in ulnar deviation and extension.
Because it is a rare diagnosis we use a 3D CT scan in the provocation position to ensure that the ulna styloid is abutting onto the carpus. The patient should obtain symptomatic improvement with a localised injection to the distal aspect of the ulna styloid as a diagnostic and possibly therapeutic modality.
I note that patients have persistent pain and arthroscopic assessment of wrists performed. Other localised pathology in the carpus is assessed. A burr is placed onto the prominence of the ulnar styloid and confirmed fluoroscopy. The ulnastyloid is shorten down to 3mm. Care is taken to ensure that the ulnar styloid does not abut on the carpus with arthroscopy and fluoroscopy.

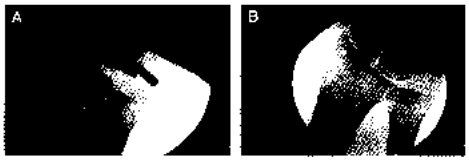

Figure 4 (A) Fluoroscopic confirmation of correct burr placement. (B) Image after resection of ulnar styloid.

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Session: Free paper 10

Date: 16 February 2008

Venue: Meeting room 603

Time: 08:00 - 09:00

Moderator : C.H YEN & Jing-yi MI

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	CHEZZI	Andrea	Italy	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	75	Our Experience and results after 795 Suspension Arthroplasty
2	TAKAHI	Koichiro	Japan	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	144	Finger Extensor Repair Without Separate Distal Stumps in Rheumatoid Hand
3	MI	Jing-Yi	China	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	329	Athrolysis to Treat Stiff Metacarpal Joint
4	LI	Teresa Wan-Man	Hong Kong	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	360	Role of occupational therapist in rehabilitation of rheumatoid wrist
5	MASSARELLA	Massimo	Italy	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	273	Nerve regeneration using inverted grafts: comparison of data between the use in man an experimental analysis of the animal model
6	PARK	Yong-Cheol	Korea	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	183	Dislocation of the extensor tendons at the metacarpophalangeal joint in non-rheumatoid patients
7	YEO	Andy	Singapore	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	206	The self-inflicted wrist slash and its characteristics: a study on hand dominance
8	CAO	Yi		Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	460	Biomechanical analysis of four-strand suture methods with three different configurations for tendon repair
9	CHOW	Esther Ching-San	Hong Kong	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	377	Functional absence of flexor digitorum superficialis to the little finger and its effects on functional status – a study in the Hong Kong Chinese population
10	WONG	Tak-Chuen	Hong Kong	Free paper 10 – Arhtritis and Tendon problem	16. Feb. 2008	449	Trapeziectomy with Ligament Reconstruction and Tendon Interposition Arthroplasty – Local Experience in treating Thumb CMCJ Arthritis

Abstract #75

Our Experience And Results After 795 Suspension Arthroplasty
A. Ghezzi, L. Pegoli, G. Pivato, P. Cortese, G. Pajardi

Arthritis of the first carpometacarpal joint is a wide spread disease in western countries. It affects predominantly women with marked impairment in daily life activities. Its aetiopathogenesis is well described, while its treatment still controversial. The authors report their experience about 795 consecutive patients with estabilished clinical and radiological findings of carpometacarpal joint arthritis treated by suspension arthroplasty with Ceruso's modified Weilby's technique. At 12 months follow up we were able to assess 703 patients using MAYO's score pre and post operatively, obtaining 232 excellent results, 342 good, 81 fair and 48 poor. As complications there were 7 infections, 68 persistent pain and 73 limited range of motion. According to our experience the treatment modality of suspension arthroplasty with Ceruso's modified Weilby's technique represents the procedure of choice in indicated cases of first carpometacarpal joint arthritis in advanced stages according to Eaton-Littler classification.

Abstract #144

Finger Extensor Repair Without Separate Distal Stumps In Rheumatoid Hand
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1 Osaka Koseinenkin Hospital , Osaka, Japan
2 Yukioka Hospital, Osaka, Japan
Fuji, Kozo Shimada[1]

Background and objective: Some patients with RA suffer extensor rapture of plural fingers, and these distal tendon stumps often had gathered together as one lump. In the operation, we did not separate these lumps, and sutured side to side using core suture from distal stump to graft tendon.
Patients and methods: Eight patients, 9 hands were operated for extensor rapture at least two fingers. EDC4-5 tendon stump sutured side to side to the EDC3 tendon or EDC2 transferred to EDC3-5 tendon stump. Average follow-up period was 20m after operation.
Results: Active ROM of MCP joints at the last follow-up were as follows: middle -21/81, ring -20/86, little -29/87(degrees). All patients without PIP and / or DIP joint disturbance could grip fully.
Discussion: Under the tendon rapture operation, it is important to maintain the flexion range, as well as to gain the extensional ability. Our method is relatively simple and showed good results.

Abstract #329

Arthrolysis To Treat Stiff Metacarpal Joint
JING YI. MI, MD, YONG JUN. RUI, MD

Objective: To discuss the classification and treatment of stiff metacarpal (MP) joint.
Methods: The classification was rested on pathology of stiff metacarpal joint. Four types of stiff MP joints were suggested: Ⅰ, contracture of collateral ligaments; Ⅱ, Ⅰ with adhesion of extensor tendon; Ⅲ, Ⅰ and Ⅱ with contracture of dorsal capsular; Ⅳ, Ⅰ, Ⅱ and Ⅲ with large area skin scar. According to the classification, arthrolysis was performed with multiple procedures involved as followed: release of collateral ligament, extensor tendon, dorsal capsular and replacement of skin scar. 15 patients with stiff MP joint were involved in this paper. All patients were treated with arthrolysis followed by application of splint and physical therapy.
Results: 12 patients were followed from 6~30 months (average 21 months). Three patients' MP joint recovered 75~90 active motion degree, seven recovered 60~74 degree, two recovered 45~59 degree. In spite of one patient complaining about mild abduction of little fingers' MP joint, there was no other complications occurred.
Conclusions: It is recommended that multiple procedures arthrolysis to release stiff MP joint according to pathological classification. With active splint and physical therapy, the majority of function of MP joint can get back.

Abstract #360

Role Of Occupational Therapist In Rehabilitation Of Rheumatoid Wrist
TERESA LI*, GLADYS LEUNG*, REBECCA CHAN*, NIGEL CHEUNG*, AHMED SYED KAMRAN**, BORIS KWOK KEUNG FUNG**, WING YUK IP**, SHEW PING CHOW**
*Occupational Therapy Department, David Trench Rehabilitation Center, Queen Mary Hospital
**Division Of Hand And Foot Surgery, Department Of Orthopaedics And Traumatology, University Of Hong Kong

Background: Rheumatoid arthritis (R.A.) disease can lead to severe disability in R.A. patients in different aspects such as self-care and psychosocial functioning. A comprehensive rehabilitation program is essential to attain an optimal functional recovery. The role of Occupational Therapist is prominent in the rehabilitation program.
Methods: A retrospective review of the R.A. patients with wrist operation in David Trench Rehabilitation Centre was conducted to reveal the long term clinical outcomes.
The 3 main features of the O.T. service include:
1. Immediate post operative rehabilitation with a clear care plan was implemented to address individual's need.
2. Implementation of therapeutic training to achieve maximum functional recovery. Patients were also empowered to cope with the chronic disability.
3. On-going evaluation to measure the hand function and to identify the risks of complication.
Post-operative assessment results at 1, 3 and 5 years was reviewed as preliminary outcome measures.
Results: 48 R.A. patients with wrist synovectomy and arthroplasty were reviewed. Majority of patients were satisfied with pain relief. Patient's hand function was maximized via a tailor-made treatment program, including splints and the joint protection techniques in activities of daily living. Further disease progression and risks of complication could be monitored by on-going evaluation and regular joint clinic follow-up.
Conclusion: With the integrated effort among occupational therapists, hand surgeons and rheumatologists leads to satisfactory long term outcome. R.A. patients could live with their disability in optimal function with quality professional support.

Abstract #273

Nerve Regeneration Using Inverted Grafts: Comparison Of Data Between The Use In Man An Experimental Analysis Of The Animal Model

M.Massarella D.S.Poggi, , A.Caraffa, G.Cerulli

Aim of the study: The classic method used to repair nerve injuries is to place the nerve autograft in the nerve gap maintaining the same direction it had had in the harvest area. As the axon flow within the nerve cell follows a set direction, this study aims to show the extend and quality of nerve regeneration in grafts where the tissue gap has been bridged using an autograft which has undergone a 180°rotation in respect to its original position at the donor site.
Material and method: As we believe that the inverted direction facilitates regeneration, we placed the graft in the nerve gap rotating it 180°in 2 different cases:1) isolated, primitive traumatic injury of the anterior interosseous nerve in the forearm: 2)inveterate injury of the median nerve of the forearm.
Following the results obtained in man we drew up an experimental protocol for the rabbit model in order to evaluate the quality and speed of nerve regeneration both in classic and inverted grafts by means of instrumental testing (electromyography- intraoperative electroneurography) and histologic sampling. The study was performed on a New Zealand male rabbit and lasted one year.
Results: The method we propose had already lead to outstanding results in man consisting of the complete and quick nerve regeneration and reinnervation in the areas presenting defects. Our animal model confirmed our hypothesis and instrumental and histologic result further confirmed the value of the procedure.
Conclusion: Nerve repair using inverted grafts is, in our opinion, the technique to be used for inveterate nerve injuries with a loss of substance. Further investigation is needed to uncover the biochemical, electrical and biological mechanisms involved in this phenomen. Important hypothesis are presented.
Key words: Nerve grafts, direction rotation, axon flow, nerve regeneration

Abstract #183

Dislocation of the Extensor Tendons at the Metacarpophalangeal Joint in Non-rheumatoid Patients

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Purpose: The EDC dislocation at metacarpophalangeal joint in non-rheumatoid patients is not common condition. We studied about treatment method according to the pathology.
Materials and methods: All 6 patients were followed for 5months in average (2-10moths). The causes are traumatic in 5 cases and congenital in one case. The location is 2 cases of long finger, 2 cases of little finger, 1 case of both index and long finger and 1 case of four lesser fingers. The direction of dislocation is ulnar side in all cases except one radial dislocation of index finger in case of both index and long finger. All cases are chronic dislocation which was delayed over 2 weeks and received surgery.
Results: In 4 cases of sagittal band tear, we performed primary repair, and in one case of capsular injury, we did reefing. In one case of all lesser finger extensor dislocation, we performed ulnar sagittal band release, radial sagittal bad repair and looping with radial hood. Following the reduction of index extensor, the three ulnar extensors were reduced spontaneously. We did not perform surgery for the three fingers. No case showed the recurrent dislocation and limitation of motion
Conclusion: The extensor dislocation at metacarpophalangeal joint can be expected good results by operative treatment. Exploration for the cause of dislocation should be preceded before surgical procedure
Key words: extensor dislocation, metacarpophalangeal joint, operative treatment

Abstract #206

The Self-Inflicted Wrist Slash And Its Characteristics:A Study On Hand Dominance

Andy K.S. YEO, LIM Y.T.A.
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INTRODUCTION: Wrist and forearm injuries, whether self-inflicted or as a result of assault, form a large proportion of injuries to the upper limb. Besides medical issues involved due to the cut structures as well as psychological issues of the patient, a commonly overlooked point is the legal aspect. It is not easy to differentiate between true self-inflicted wrist injuries and one from assault. Increasingly, medical opinions are being sought in cases with self-harm and it is not inconceivable that specialists may be called to the bar to identify likely causes of said injury.
MATERIALS & METHODS: From a retrospective review of cases admitted to our department between May 2003 and July 2007, a database of known self-inflicted wrist injuries was compiled.
RESULTS: We have identified a few characteristics of self inflicted injuries. Of note was that of hand dominance. Of the 43 patients, there were 14 males and 29 females ranging from 15 to 77 years with a mean of 34.4 years. Of 45 injuries, 40 were non-dominant, 1 dominant and 2 on both sides. Of the 3 non-dominant injuries, all penetrated only dermis with no tendon injuries. Tendons were the most commonly injured structures followed by nerves and vessels. The volar aspect was also more frequently involved.
CONCLUSION: Self-inflicted wrist injuries are almost always on the non-dominant hand. Bilateral wrist injuries or dominant hand injuries are usually shallow wounds, injuring skin only. Volar-ulnar wounds, due to their privileged location, were more common as compared to dorsal wounds as seen in classical defence injuries.

Abstract#460

Biomechanical Analysis Of Four-Strand Suture Methods With Three Different Configurations For Tendon Repair

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Purpose Clinically, early mobilization of repaired flexor tendons needs sufficient repair strength. U-shaped four-strand modified Tang method with a single looped nylon suture has been reported to have sufficient strength. We investigated the gap formation and ultimate strength of two other four-strand repair methods with different configurations using looped suture lines as compared to the U-shaped suture.
Materials and Methods Twenty-one fresh pig FDP tendons were randomly assigned to three groups. These tendons were repaired with the U-shaped modified Tang and two new configurations with looped nylon suture, one with 2 opposite knots on tendon surface, another with 2 separate knots between tendon cut. The tendons were subjected to a linear noncyclic load-to-failure test using an Instron machine. The initial gap force, 2-mm gap force, and ultimate strength were measured. The data were statistically analyzed.
Results The initial gap force, 2-mm gap force, and ultimate strength of the repair with the U-shaped configuration were significantly higher than those of the repairs with 2 rectangle configurations. No statistical difference was noted in gap formation and ultimate strength between the 2 new configurations.
Discussion Among three 4-strand repairs with different suture configurations, the repair with the U-shaped configuration has the greatest strength. The repairs with 2 tested rectangle configurations did not show strength equal to the U-shaped suture. Based on this study, we recommend the U-shaped modified Tang method rather than the rectangle configurations for clinical use because of its sufficient strength and simple manipulation.

Abstract #377

Functional Absence Of Flexor Digitorum Superficialis To The Little Finger And Its Effects On Functional Status – A Study In The Hong Kong Chinese Population

Chow, Esther Ching San

Introduction and Aim of study: Functional deficient of the little finger flexor digitorum superficialis (FDS-V) is known to be present in our population. The aim of this study is to evaluate the prevalence of the absence of FDS-V function in the Hong Kong Chinese population and the effects on functional status.
Materials and Methods :152 adult Chinese men and women from age 18 to 65 were recruited randomly. This study has 3 different parts: 1) Clinical survey to determine the prevalence of the absence of FDS-V function; 2) Cadaveric study to determine the anatomical variations of FDS-V tendon; 3) Correlate the clinical findings with MRI study.
Results: Total 152 subjects were recruited with 51 male and 101 female, average age 37.6. The prevalence of the absence of FDS-V function was 38.8% by the standard thest and 9.5% by the modified test. The absence of FDS-V function was found more common to be bilateral than unilateral. The absence of the FDS-V function had no significant effects on the grip power. Cadaveric study showed that the little finger FDS tendon was present in all cadaveric hands without any abnormal muscle or tendon interconnection. MRI study showed that there was hypoplastic tendon in subjects with absent FDS-V function.
Conclusion: The absence of little finger FDS function has no significant effects on the functional status as quantified by the grip power. We can postulate that patients with little finger FDS tendon injury can have normal range of motion and hand function if the FDP tendon is intact.

Abstract#449

Trapeziectomy with Ligament Reconstruction and Tendon Interposition Arthroplasty – Local Experience in treating Thumb CMCJ Arthritis

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Purpose: Osteoarthritis of the basal joint of the thumb develops relatively early in life because of frequent use of the thumb. Methods of surgical treatment of arthrosis of the basal joint of the thumb include arthrodesis, trapeziectomy, soft tissue arthroplasty, silicone arthroplasty and joint replacement. We reported our local experiences on surgical treatment in treating basal joint arthritis of the thumb.
Methods: From 1994 to 2006, twenty arthritis of basal joint of the thumb in twenty patients were treated operatively. Treatment consisted of partial excision of the trapezium and the anterior oblique ligament (beak ligament) was reconstructed with flexor carpi radialis and interpositional arthroplasties were done with free palmaris longus tendon ball. The thumb was immobilized in opposition and slightly distraction by a splintage for six weeks. No K-wires were used. The functional and radiological outcomes were assessed at final follow up. The nature and complications were reported
Results: Twelfth female and eight male with average age of 50 years old were treated. The mean follow up time was 36 months. 17 of 20 patients reported complete pain relief. 18 of 20 thumbs adducted fully into the plane of the palm, and 16 of 20 opposed to the small finger metacarpal head. An average of 20% increase in grip strength and 10% increase in key pinch strength after the surgery. The scaphoid-thumb metacarpal distance decreased but not reach statistic significant. One patient had complex regional pain syndrome which was resolved spontaneously.
Conclusions: Partial excision of the trapezium and beak ligament reconstruction with FCR and interpositional arthroplasty with free palmaris longus tendon ball is a safe and effective method in treating basal joint arthritis of the thumb. Longer follow up and prospective randomized controlled trial can further justify the results.

Session: Free paper 11

Date: 16 February 2008

Venue: Meeting room 604

Time: 08:00 - 09:00

Moderator : Alejandro BADIA & Min Jong PARK

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	LUCHETTI	Riccardo	Italy	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	223	Arthroscopic Resection for Dorsal Wrist Ganglia Recurrences After Open Surgery
2	FUJIO	Keiji	Japan	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	231	Arthroscopic treatment for DRUJ instability with TFCC detachment at Fovea
3	NAKAMURA	Toshiyasu	Japan	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	440	Arthroscopic repair of the ulnar disruption of the TFCC to the ulnar fovea
4	YAMAMOTO	Michiro	Japan	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	155	Distal radio-ulnar joint arthroscopy helps improving the diagnostic accuracy of triangular fibrocartilage complex injury
5	SAMSON	Virginia	Hong Kong	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	386	Arthroscopic Synovectomy In Inflammatory Arthritis: A Long-Term Outcome
6	LUCHETTI	Riccardo	Italy	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	224	Arthroscopic Wrist Arthrolysis After Wrist Fracture
7	MASSARELLA	Massimo	Italy	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	260	Arthroscopic treatment of the radioscphoid impingement
8	DREANT	Nicolas	Monaco	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	327	comparison of two arthroscopic classifications for scapholunate arthroscopy
9	TAN	Jacqueline Siau-Woon	SINGAPORE	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	344	Wrist Arthroscopy: Outcomes Of Debridement In A Single Institution
10	SAMSON	Virginia	Hong Kong	Free paper 11 – Wrist Arthroscopy	16. Feb. 2008	385	Rupture of flexor pollicis longus following arthroscopy and radiofrequency use in the metacarpophalangeal joint:

Abstract #223

Arthroscopic Resection For Dorsal Wrist Ganglia Recurrences After Open Surgery
Luchetti R, Atzei A (*), Papini Zorli I.
Rehabilitation Hand Center, Rimini (Italy)
(*) Dept of Hand Surgery, Policlinic GB Rossi, Verona (Italy)

Introduction Patients with dorsal ganglia recurrences after open surgery claim for discomfort, pain and wrist rigidity. Aim of the present study was to evaluate the outcomes of those patients treated by arthroscopy.
Material and Methods Eight consecutive patients (5 male and 3 female) with a mean age of 40 years (ranged from 24 to 52 years) were operated on by arthroscopic resection. Right wrist was affected in 7 cases. Hand dominance was right in 7 cases. Ganglia recurred after open surgery at a mean time of a year (ranged from 6 to 24 months) associated with pain and wrist rigidity. Patients were clinically evaluated before and after surgery by using the Mayo wrist score. DASH questionnarie was also included. All the patients were submitted to ultrasonographic evaluation or MRI before operation. Arthroscopic surgery considered ganglia resection including part of the dorsal capsule and adherences determinated by previous surgery.
Results With a mean follow-up of 35 months (ranged from 2 to 84 months) all the patients showed to be healed without complications. Pain completely disappeared passing from 4 to 0. Wrist range of motion remained unmodified. Grip strength passed from 30 to 33 Kg. All the patients returned to the previous activity. DASH questionnaire decreased from 51 to 34.
Conclusion Arthroscopic surgery demonstrated to be efficient and safe for the treatment of the dorsal wrist ganglia recurrences. Furthermore, it demonstrated to be also a valid procedure for the associated wrist rigidity that showed to be improved in all the patients.

Abstract #231

Arthroscoic Treatment for DRUJ Instability with TFCC Detachment at Fovea
Keiji FUJIO

Introduction The diagnosis and treatment of instability in distal radioulnar joint (DRUJ) due to TFCC injury was controversy. The aim of this current study was evaluate the result in the arthroscopic attachment of TFCC for DRUJ instability due to TFCC detachment at Fovea.
Material and Method 120 patients were surgically treated for DRUJ instability. Our own criteria of DRUJ indicated apprehension or painful click with forearm rotation, confirmation of detachment of TFCC at Fovea with MRI and arthrogram, and dorsal shift of ulnar head during manual stress test under fluoroscope. The 120patients include 74 men and 46 women (mean age 30.3; range, 14-68 years). Overall mean duration from injury to surgical repair was 85 days (range 33-184). All patients were operated under arthroscope with inside-out method. Two sutures were penetrated TFCC and Ulnar styroid, and stitched at ulnar cortex. Gyps fixation with the arm supinated was applied for 3weeks. All patients were evaluated with modified Green &O'Brien scoring system. Patients were evaluated at a mean follow up time of 642 days.
Result All cases except for one woman, who was carpenter were disappeared their wrist pain, and returned their previous work or sports. Grip strength averaged 89.9% of the contralateral side. Clinical score with modified Green and O'Brien scoring system averaged 93.9 points. There were no complications.
Discussion Recent reports suggested the TFCC at Fovea was great role on DRUJ stability. Current our results encourage the repair of the TFCC at Fovea arthroscopically. In spite of the good result, whether the factor of age (traumatic or degenerative), and duration from injury to surgical repair effect on the result was considered the future problem.

Abstract #440

Arthroscopic Repair of the Ulnar Disruption of the TFCC to the Ulnar Fovea
Toshiyasu Nakamura, Shinichiro Takayama, Kazuki Sato, Hiroyasu Ikegami, Yoshiaki Toyama
Department of Orthopaedic Surgery, School of Medicine, Keio University

Treatment of destabilizing DRUJ due to ulnar disruption of the TFCC is a challenging issue. Here an arthroscopic outside-in suturing (trans-ulnar suturing) of the ulnar disruption of the TFCC to the ulnar fovea is described.
Technique: When the disrupted TFCC from the fovea was diagnosed through the radiocarpal or DRUJ arthroscopy, the TFCC was tightly reattached to the fovea through two tunnels made from the outer cortex of the ulna to the center of the fovea using outside-in pullout technique with double 3-0 polyester sutures (Ticron or Etibond). Before suturing, the fovea area was refreshed by arthroscopic shaver via DRUJ portal.
Patients: We underwent the arthroscopic repair of the TFCC in 21 wrists. Age ranged 14-53 (average 27), 8 male and 13 female were included. There were 10 right and 11 left wrists. TFCC tears were ulnar peripheral + horizontal in 6, fovea avulsion in 14, and proximal slit in 1. Periods from initial injury to the surgery were 6-48 months (average 30). Pain, range of rotation and DRUJ instability were evaluated.
Results: All patients complained pain preoperatively. Pain disappeared in 14 wrists, remained in 3 and recurred in 4. There were no loss of forearm rotation pre- and postoperatively. Preoperative DRUJ instability was noted as ± in 2, + in 6, ++ in 13 and postoperatively, 16 wrists indicated no instability. We obtained excellent results in 13, good in 2, fair in 3 and poor in 3.
Conclusion: Arthroscopic trans-ulnar suturing technique is promising procedure in ulnar disruption of the TFCC with DRUJ instability.

Abstract #155

Distal Radio-Ulnar Joint Arthroscopy Helps Improving the Diagnostic Accuracy of Triangular Fibrocartilage Complex Injury
Michiro YAMAMOTO

Few reports have examined differences in findings for TFCC (triangular fibrocartilage complex) lesions between RCJ (radiocarpal joint) and DRUJ (distal radioulnar joint) portals. In this study, sixty-seven patients with wrist disorders were examined arthroscopically using both RCJ and DRUJ approaches. TFCC condition was classified into three (Normal, Wear and Tear). Findings were highly inconsistent between RCJ and DRUJ sides. Twenty-seven normal TFCCs were confirmed using the approach from both sides. Among the TFCCs rated as normal from the RCJ side, 16 surfaces were found to be worn and 1 surface was torn on the DRUJ side. In contrast, TFCCs with a normal surface from the DRUJ side were torn in 3 cases and worn in 1 case from the RCJ side. Among 13 patients with tears from the RCJ side, only 4 displayed confirmed tears from the DRUJ side. However, 2 cases with confirmed tears from the DRUJ side could not be detected from the RCJ side. RCJ arthroscopy was superior in detection of tear, while DRUJ arthroscopy was superior in detection of wear. It is also suggested that TFCC wear occurs from DRUJ side. Final diagnosis obtained from both portals differed from RCJ findings alone. Thorough TFCC evaluation should use both RCJ and DRUJ approaches.

Abstract #386

Arthroscopic Synovectomy In Inflammatory Arthritis: A Long-Term Outcome
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Objective: To evaluate the long-term clinical outcomes of arthroscopic synovectomy in patients with inflammatory arthritis of the wrist.
Materials and Methods: This is a retrospective study. A total of 64 wrists in 53 patients were operated on from 1997 to 2006. Of the 53 patients, 11 had bilateral wrist involvement and 4 had same side surgery. Patients who had prior surgery of the wrist other than arthroscopic synovectomy were excluded from the study. The procedure was performed under portal site local anesthesia (PSLA) or, occasionally, under regional or general. During follow-up, pain assessment, radiographic studies, and physical and occupational evaluations were performed.
Result: Of the 53 patients, 33 have rheumatoid arthritis, 9 with sero-negative arthritis, 5 with gouty arthritis, 4 with psoriatic arthritis, 1 with post-traumatic arthritis, and 1 with infectious arthritis. The age ranged from 19-74 years. There is a female predominance (n=38) compared to males. There was greater involvement of the radio-carpal joint in all diagnostic groups but was remarkable in the rheumatoid arthritis group (92.7%). The length of follow-up ranged from 6 to 102 months. Pain was rated by the patients from 0-3 on the visual analogue scale at rest and 0-7 upon exertion. The performance score averaged at 34.8 out of 40 (range 24-40.) Increase in grip and pinch strength was observed after surgery. With the exception of one patient, all were satisfied with the results of surgery.
Conclusion: Arthroscopic synovectomy of the wrist for various inflammatory disorders is a safe procedure and that it is a valid adjunct for adequate pain relief for patients who are no longer relieved by anti-inflammatory agents.

Abstract #224

Arthroscopic Wrist Arthrolysis After Wrist Fracture
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(**) Rehabilitation Hand Center, Bologna (Italy)

Purpose: Arthroscopic wrist arthrolysis is used for treating wrist stiffness after trauma or surgery. Our aim was to evaluate the results of this surgical procedure in patients affected by wrist stiffness after wrist fracture.
Methods: From 1988 to 2003, surgery was performed in 22 patients (16 men and 6 women) with a mean age of 37 years. Statistical evaluation was performed in all cases.
Results: At a mean follow-up of 28 months (range, 9 to 144 months), no complications were documented. One case that was operated on bilaterally successively required an additional right wrist arthroscopic arthrolysis to reach the same level of improvement as that of the contralateral side. Pain was almost absent in all cases (P _ .0001), and mean flexion/extension range of motion increased from 84° preoperatively to 99°postoperatively, mean pronati on/supination increased from 144°to 159°, and mean grip strength increased from 22 to 28 kg (P .0001). The mean modified Mayo wrist score improved from 28 to 79 postoperatively (P _ .0001), and the mean postoperative DASH questionnaire was 21.
Conclusions: Arthroscopic wrist arthrolysis is a suitable and promising surgical option for the treatment of wrist rigidity after trauma or surgery. In our series pain and wrist flexion-extension and grip strength significantly improved. The procedure is safe and required a minimal amount of invasive surgery while also permitting the surgeon to identify the precise cause of the intra-articular rigidity and pain.

Abstract #260

Arthroscopyc Treatment Of The Radioscaphoid Impingement
Azienda ospedaliera S.M.Misericordia
*University of Perugia Orthopaedic Department – Hand Surgery Unit

The radioscaphoid impingement is frequent in arthritic wrist,many open and invasive surgical procedure are already described, however , these procedure has been progressively abandoned.Today by the news arthroscopical tools the surgeons are able to treat and perform radial stiloidectomy under arthroscopic control.the Authors described personal thechnique, clinical and radiological outcome.
Key Words: Stiloidectomy,wrist arthroscopy.

Abstract#327

Comparison Of Two Arthroscopic Classifications For Scapholunate Arthroscopy

Nicolas DREANT

The goal of the study was to compare two arthroscopic classifications for the scapholunate instability : the Geissler well known classification and the Dreant/Dautel classification.
34 wrist arthroscopic examinations were realized by the members of the European Wrist Arthroscopy Society (EWAS) for scapholunate instability between september and november 2007. For each patient the two classifications were used and compared.
It appeared that every classification has its good and bad points. With these datas, the authors propose a new classification for the scapholunate instability, including the dynamic manoeuvers in the midcarpal space from the Dreant/Dautel classification and the different aspects of the scapholunate ligament tears in the radiocarpal space.

Abstract #344

Wrist Arthroscopy: Outcome Results Of Debridement In A Single Institution

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Introduction: Wrist arthroscopy has evolved since 1986 to become an essential diagnostic and therapeutic tool for the management of various wrist disorders. Our study aims to examine the outcomes of arthroscopic debridement of 68 consecutive patients at a single institution.
Methods: We carried out a retrospective of 68 consecutive wrist arthroscopies performed at our institution between January 2000 and July 2005. All the patients complained of wrist pain, which often interfered with their daily activities, work or sports. The mean duration of symptoms was 10.1 months. A standard arthroscopic technique was employed in all. Any triangular fibrocartilage (TFCC), scapholunate (SL) or lunotriquetral (LT) tears found were debrided.
Results: There were 41 patients with TFCC tears, 60 with SL tears and 49 with LT tears. At follow-up examination at an average of 16.3 months, 85.3% reported an improvement in symptoms and 29.4% had improved range of motion. Grip strength improved by 34.5%. On the average, the patients rested for 2.6 months before returning to work. Outcome following arthroscopic debridement was determined using the Mayo Modified Wrist Score. Based on the postoperative wrist scores of 47 patients, 24 patients (51%) were rated excellent, 17 (36%) good, 4 (9%) fair and 2 (4%) poor. By comparing preoperative and postoperative wrist scores of 34 patients, we were able to demonstrate significant improvement in patients who underwent wrist arthroscopies.
Conclusion: Our study has demonstrated that wrist arthroscopy is a valuable tool in the management of wrist pathology.

Abstract#385

Rupture Of Flexor Pollicis Longus Following Arthroscopy And Radiofrequency Use In The Metacarpophalangeal Joint: A Case Report

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While the clinical utility of radiofrequency energy in the arthroscopy of the knee and shoulder has been described in a good number of journal articles, little has been written about the use and, subsequently, complications of radiofrequency in the arthroscopy of the metacarpophalangeal joint. Some of the concerns that stem out from the use of radiofrequency include transfer of excessive thermal energy to target tissues, the response of target and adjacent tissues to heat, and the long-term effects of thermal shrinkage to treated tissues. These concerns have yet to generate extensive studies that would report on the use of radiofrequency to address capsular laxity in the metacarpophalangeal joint.
We present a case of a patient who, after undergoing thumb metacarpophalangeal arthroscopy and thermal shrinkage for posttraumatic instability, was diagnosed at three weeks post-surgery to have sustained rupture of the flexor pollicis longus.
Key Words: radiofrequency, thermal shrinkage, metacarpophalangeal arthroscopy

Session: Free paper 12

Date: 16 February 2008

Venue: Meeting room 605

Time: 08:00 - 09:00

Moderator : Y.K LAU & Woo-yung KIM

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	PENG	Yeong-Pin	Singapore	Free paper 12 – Basic Science 2	16. Feb. 2008	78	Image enhanced patient database (IMED) for the Musculoskeletal system
2	GONG	Hyun-Sik	Korea	Free paper 12 – Basic Science 2	16. Feb. 2008	111	The Effect of Muscle Length and Excursion on Muscle Contracture After Tendon Injury. A Study in Rabbit Soleus Muscles
3	BAEK	Goo-Hyun	Korea	Free paper 12 – Basic Science 2	16. Feb. 2008	121	Capitate View, A Simple Radiograph Which Clearly Show Peri-Capitate Joint Spaces
4	CHIKENJI	Takako	Japan	Free paper 12 – Basic Science 2	16. Feb. 2008	134	Distribution of Nerve Fiber and Mechanoreceptor in the Metacarpophalangeal and Proximal Interphalangeal Joints: A Preliminary Study
5	HONG	Jong-Won	Korea	Free paper 12 – Basic Science 2	16. Feb. 2008	228	Microvascular Surgery Training Using Non-Vital Pig Leg and Effectiveness Before Using Living Rat Femoral Artery & Vein
6	WANG	Huan	China	Free paper 12 – Basic Science 2	16. Feb. 2008	315	Motion Analysis For Evaluating Deficits And Recovery Of Forelimb Function Following Nerve Lesions
7	XU	Jian-Guang	China	Free paper 12 – Basic Science 2	16. Feb. 2008	322	An Anatomy and Histochemistry study of human C7 nerve root
8	HU	Shao-Nan	China	Free paper 12 – Basic Science 2	16. Feb. 2008	383	Origination of Brachialis Branch of the Musculocutaneous Nerve: An Electrophysiological Study and Case Report
9	SO	Billy	Hong Kong	Free paper 12 – Basic Science 2	16. Feb. 2008	392	Ergonomic Analysis Of Work-Related Musculoskeletal Disorders Among Aircraft Cabin Cleaners In Hong Kong: A Pilot Study
10	CAO	Yi		Free paper 12 – Basic Science 2	16. Feb. 2008	459	Changes In Resistance To Tendon Motion After Commencement Of Digital Mobilization At Different Days
11	ZYLUK	Andrzej	Poland	Free paper 12 – Basic Science 2	16. Feb. 2008	27	Prevention of Complex Regional Pain Syndrome Type 1 of the upper limb

Abstract #78

Image Enhanced Patient Database (IMED) For The Musculoskeletal System

YP PENG, J KOLENCHERY RAPPEL, MK TAN, YT LIM
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Aim. Our objective is to build a musculoskeletal clinical database capable of capturing and retrieving detailed and standardized textual and image clinical data during the course of surgical treatment.
Methods. The database is built along 3 major axes of exact anatomical location, pathological process and treatment procedures. Stage 1 involved a strictly controlled ontology design constantly revised with clinical usage before the final form was adopted. Stage 2 saw the development of a classic user interface model for data collection during surgery and its retrieval . Stage 3 focused on the development of a pictorial user interface to improve user interface and reduce data entry errors. The next phase of the study focuses on capturing outcome measures of this data with the incorporation of data from occupational therapy.
Result. Validation trials have documented accuracy of data entry to be consistent at 95%. Early compliance was low at 65% but improved to 85% as hardware problems were solved.
Conclusion. IMED has proven to be exhaustive, consensual , consistent and easy to use. We were able to systematically collect longitudinal data on clinical cases integrated with digital pictures. We use it for auditing, teaching and research. Modular research proformas have been integrated for specific studies. In a wider scope, we are currently developing the database for outcome data collation.

Abstract #111

The Effect Of Muscle Length And Excursion On Muscle Contracture After Tendon Injury. A Study In Rabbit Soleus Muscles

Hyun Sik Gong, Goo Hyun Baek, Young Ho Lee, Moon Sang Chung
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Background: If tendon repair after injury is delayed, intramuscular fibrosis occurs and finally results in an irreversible muscle contracture. The purpose of this study was to determine the effect of preserving muscle length and excursion on the progression of muscle contracture after tendon injury in a rabbit soleus tenotomy model.
Methods: Forty rabbits underwent tenotomy of the soleus muscles bilaterally and the tendons were managed according to the five experimental groups (N=40). In group A, the tendon was lengthened maintaining a half of the excursion. In group B, maximal muscle length was preserved and in group C, resting muscle length was maintained. In group D, the tendon was allowed to retract and undergo fibrosis. In group E, the tendon was partially transected and repaired. Four and eight weeks postoperatively, soleus muscles were harvested from each hindlimb and histomorphometric evaluations were performed to measure the connective tissue areas. Electrophysiologic studies were carried out to measure the compound muscle action potential to assess the number of functioning muscle fibers.
Results: Maximal muscle length preservation (group B) was the most protective in preventing muscle contracture within 4 weeks of tenotomy, but this effect was gradually offset by prolonged fixation of the muscle, and 8 weeks after tenotomy, maintenance of excursion (group A) was the most protective.
Conclusions: These observations may be helpful in the intraoperative evaluation of muscle contracture in neglected tendon ruptures, and be applied to the management of acute tendon injuries to prevent muscle contracture when immediate anatomical reconstruction is not possible.

Abstract #121

Capitate View, A Simple Radiograph Which Clearly Show Peri-Capitate Joint Spaces

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Introduction: The purpose of this study was to obtain a fine simple radiographic view which can show clear peri-capitate joint spaces, an important portion of the midcarpal joint.
With simple radiographs, it is not easy to see peri-capitate joint spaces clearly because of the overlapping shadows of carpal bones. Recent 3D studies has shown the anatomy and kinematics of the midcarpal joint that joint surface forms an ovoid shape whose major axis runs obliquely from radiopalmar to ulnodorsal. The authors made this oblique axis parallel to the ground by supinating the wrist to obtain a tangential plane of the midcarpal joint, especially peri-capitate joint spaces.
Methods: Simple x-rays of 30 healthy subjects were included in the study. Recent 3D studies has shown the anatomy and kinematics of the midcarpal joint that joint surface forms an ovoid shape whose major axis runs obliquely from radiopalmar to ulnodorsal. The authors made this oblique axis parallel to the ground by supinating the wrist to obtain a tangential plane of the midcarpal joint, especially peri-capitate joint spaces. Simple device to assure a reliable position of the wrist was used. The device had a handle which was inferiorly inclined 25 degrees from the horizontal plane. Simply holding the handle made the wrist to supinate 25 degrees, and this position will ensure the motional plane of the capitate parallel to the roentgenographic beam. Also wrist was dorsiflexed 15 degrees because dorsal arc of the head was longer than volar arc of the head of the capiate.
Results: A tangential plane of the midcarpal joint was visible in all radiographs. Compared to ordinary wrist PA X-rays, larger arc of head of the capitate was visible and scaphocapitate joint and lunocapitate joint was clearly seen with congruency. Concave scapholunate dome articulating with head of the capitate was smoothly seen in continuous manner. In lateral X-rays, scapholunate dome articulating with head of the capitate was also smoothly seen in continuous manner. Congruent joint line between head of capitate and scapholuante dome was clearly visible. Pisiotriquetral joint was also clearly seen with fine view of the surface of triquetrum and pisiform. Whole shape of scaphoid and hook of hamate was easily identified and trapezium was also easily seen in the radiographs.
Conclusion: 25°supination and 15°dorsiflexion of the wrist m akes the reliable view of the peri-capitate joint spaces. Healthy wrist will reveal congruent and clear view of the joint between head of the capitate and scapholunate dome. This radiographic view is very useful for evaluation of midcarpal joint, and shape of capitate.

Abstract #134

Distribution of Nerve Fiber and Mechanoreceptor in the Metacarpophalangeal and Proximal Interphalangeal Joints: A Preliminary Study

T. Chikenji, D. Suzuki, M. Aoki, S. Tsubota and H.Tatsumi
Sapporo Medical University, Sapporo, Japan

Purpose: To clarify the distribution of the nerve fibers and mechanoreceptors in human joint capsule of the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints. We also considered the clinical relevance of our results as compared with the recent biomechanical and physiological studies.
Materials And Methods: Whole MCP and PIP capsule-ligamentous structures were harvested from six human cadaveric hands. Those tissues were fixed with formalin, embedded in paraffin, sectioned 8 μm in thickness, and stained with luxol fast blue (LFB) - hematoxylin for identification of these nerve fibers and mechanoreceptors. These sections were observed under light microscope and taken digital images on computer to measure the area of the nerve fivers and mechanoreceptors using Image J soft ware.
Results: Regarding MCP joint, the mean area of the neural elements (nerve fibers and mechanoreceptors) was 2.21, 1.70, 2.05, 2.11$\mu m^2/10^4$ (in 107.94$\mu m^2/10^4$) in palmar, dorsal, radial, and ulnar side respectively. That of the PIP joint was 1.63, 1.17, 1.17, and 1.25$\mu m^2/10^4$ respectively. There was no statistical significance between the joint locations and the mean area of the neural elements, but the area of those elements tended to be clearly larger in the palmar side than the other sides of both MCP and PIP joints.
Conclusions: We showed the distribution of the nerve fiber and mechanoreceptor in both PIP and MCP joints. This anatomical and histological information might be indicated that a ligamento-muscular protective reflex exists in these small joints and the palmar region may play an important role of the joint stability.

Abstract #228

Microvascular Surgery Training Using Non-Vital Pig Leg and Effectiveness Before Using Living Rat Femoral Artery & Vein

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Seoul, Korea

Objective: Microsurgical techniques became increasingly important in virtually all surgical subspecialists. Some examples are replantation and transplantation, microvacular free tissue transfer in plastic surgery, orthopecids. And there are vessel and tubular anastomosis in urology, gynecology, cerebral revascularization in neurosurgery. In contrast to other surgical skills, microsurgical techniques have to be learned under special circumstances. Because of the complexity, microsurgery cannot be acquired by observation and performing it in infrequent clinical cases. These techniques are acquired during special courses or experimental projects in the laboratory. Typical microarterial anastomosis training programs include suturing of surgical glove, silicone tubes, foliage leaf, practice rat. But the nonbiological materials are quite different from human vessels, making the exercise far from actual surgical experience. In the majority of cases, living animals are used for acquiring the techniques of microvascular anastomosis. Of all laboratory animals, the femoral vessels of an anestheized rat is considered to be a standard live model. However, they are neither convenient nor practical for routine exercises or rehearsals.
The purpose of this study was to decide whether using a slaughtered pig leg before using a living rat was effective in microvascular anastomosis exercise, and how effective that method was in objective assessment.
Materials & Methods: Pig legs can be purchased at any nearby butcher's shop in Korea. A package usually contains 4 legs, and the price of each leg is 2~3 United States dollars. The vascular anatomy was nearly same between anterior and posterior legs. Cephalic vein and saphenous vein ran on the middle of the dorsal side. Antebrachial artery and anterior tibial artery ran on the middle of ventral side. The skin was lifted up and dissected from the dorsal to ventral side. The artery and vein were approximately 10 to 12 cm in length and 1 mm to 3 mm in diameter. For objective evaluation of the vessel anastomosis, 6 categories such as respect for tissue, time and motion, instrument handling, suture handling, flow of operation, quality of final product were assessed using the five-point global rating scale on performance of 4 trainee. For objective comparison, the experiment was localized into end to end anastomosis and a single anastomosis was defined as anastomosis of one artery and one vein without relation to the vessel. Also as for living rat, anastomosis of one femoral artery and one femoral vein was calculated as a single anastomosis. For evaluation of the time of anastomosis, the time was measured from preparation of the experiment to conclusion of the afterworks. Also, pure anastomosis time was separately measured. The anastomosis time was defined from the point of vessel preparation by cutting, including the dissection of the vessel adventitia to completion of the anastomosis. During the operation, breaking of suture, break knots, breaking or damaging needles including errors of management was assessed. Leakage of vessel anastomosis was also evaluated.
Result: 24 points out of total 30 points was evaluated as adequate level and on average of 4 trials, satisfactory results were achieved as beginners. On analysis of the categories, satisfactory results were noted with minimal practice rates on respect for tissue, time and motion, flow of operation, however, as for instrument handling, suture handling, quality of final product, more practice rates were needed for improved results. After completion of four practice trials, the first application on the living animal was difficult due to anesthesia and use of the laboratory, however, effective execution was noted on anastomosis of the second animal.
Conclusion: Practice of vessel anastomosis using the non-vital pig leg provided an effective practice on biologic material while saving time and acquiring techniques easily before application on rats. Also, application on various diameter of vessels allowed beginners to practice with vessels of minor diameter to larger diameter. Also, due to the long length of the vessel, multiple practice can be achieved with single dissection. Therefore, this can ce an effective and economic method of aquiring basic techniques of anastomosis before practice on rats.

Abstract #315

Motion Analysis For Evaluating Deficits And Recovery Of Forelimb Function Following Nerve Lesions

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3 Department of Neurology, Mayo Clinic, Rochester, Minnesota, USA

Introduction: The aim of the study is to develop an evaluation task for upper limb nerve injury models.
Methods: Median, ulnar, radial, and combined median and ulnar nerve transection and direct coaptation were done in 40 Sprague Dawley rats. Rats without surgery and with sham operation served as control. High speed video camera was used to record movement of rats walking in a transparent runway. A mirror mounted at 45° captured paw prints. Angles of flexion and extension of the wrist and metacarpophalangeal (MCP) joints were obtained from digitized images of the gait cycle. Distances between the 2nd and 5th digits (toe spread) and between the 3rd and 4th digits (intermediate toe spread) were computed from the paw prints. Recordings were carried out pre-operatively and at various postoperative intervals. Analysis of variance (ANOVA) was applied to compare the pre- and post-operative measurements.
Results: There was decrease in wrist and MP joint extension following radial nerve injury, decrease of wrist and MP joint flexion following combined median and ulnar nerve injury or median nerve injury. No obvious change of joint movement was seen in ulnar nerve injury. Obvious decrease of toe spread was observed in combined median and ulnar nerve injury and radial nerve injury. Median or ulnar nerve injury alone did not lead to significant change in toe spread.
Conclusion: Digital video motion analysis can quantify subtle movements of the rat forelimb. It is a valid method to evaluate functional deficit and recovery following peripheral nerve injury and repair.

Abstract #322

An Anatomy and Histochemistry Study of Human C7 Nerve Root

Xu Jianguang, Lu Wei, Xu wendong, Xu lei

Objective: To investigate the motor fiber counts of the human 7th cervical nerve root and its branches and avoid dysfunction of the latissimus dorsi muscle after contralaterl C7 nerve transfer.
Methods: 20 pieces of adult BP specimens and 3 fresh cadavers were dissected under microscopy, and the motor fiber counts of the fascicles were analyzed. The motor fiber counts (MFC) in the bundles, in C7 and thoracodorsal nerve were also observed.
Results: (1) There were about 9983 motor fibers in C7, 3010 and 5883 in anterior and posterior division respectively. In the anterior division, the were 589 motor fibers in the musculocutaneous nerve, and 1931 in the median nerve. In the posterior division, the motor fiber counts joining to axillary nerve, dorsal thoracic nerve and radial nerve were 611, 944 and 4036 respectively. (2) Over 52% of the motor fibers in thoracodorsal nerve were from C7. (3) The bundles originated from C7 to thoracodorsal nerve were mostly localized in posterior-internal part of C7 at trunk-division-boundary section.
Conclusions: (1) There are enough motor fibers both in anterior and posterior divisions of C7 nerve root. (2) Preservation of the posterior-internal part of C7 in the C7 transfer procedure (selective C7 transfer) can prevent the bundles of thoracodorsal nerve fascicles from damage, and reduce the postoperative dysfunction of the latissimus dorsi muscle.
Key Words: C7 nerve root , motor fiber counts, thoracodorsal nerve, brachial plexus injury, direction

Abstract#383

Origination of Brachialis Branch of the Musculocutaneous Nerve: An Electrophysiological Study and Case Report

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Objective: To test an innovative method to study the origination of a specific nerve or of the nerve fibers innervating a given muscle on the healthy upper limb of a live human and expand the indication for brachialis branch of musculocutaneous nerve (BBMCN) transfer.
Methods: An intraoperative electrophysiological study was carried out in 30 cases of contralateral C7 transfer to record compound muscle action potential (CMAP) of the brachialis muscle while various nerve roots of the brachial plexus was stimulated. BBMCN transfer to the anterior interosseous nerve was performed in a patient with spinal cord transverse injury at C7 level.
Results: Analysis of CMAP suggested that BBMCN is comprised of fibers from C5, C6 and C7 nerve roots. BBMCN transfer in the patient with spinal cord transverse injury at C7 level resulted in recovery of finger flexion.
Conclusion: The technique proposed here was a more direct and functional method to trace the origination of a specific nerve or of the nerve fibers innervating a given muscle on the healthy upper limb of a live human. And BBMCN transfer could restore finger flexion in patients with spinal cord transverse injury at C7 level.

Abstract #392

Ergonomic Analysis Of Work-Related Musculoskeletal Disorders Among Aircraft Cabin Cleaners In Hong Kong: A Pilot Study

So, CL.[1,2], Hung, LK.[1,2], Lui, PPY.[1,2], Chan., KM[1,2]
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[2] The Hong Kong Jockey Club Sports Medicine and Health Sciences Centre, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong SAR, China

Introduction: Work related musculoskeletal disorders (MSD) represent a significant cost to industry and to the productive capacity of local industries. Previous survey indicated the prevalence of shoulder, wrist and knee MSD were the highest among aircraft cabin cleaners[1]. The objective of this study is to identify, evaluate and quantify potential ergonomic posture risk factors of MSD. This study shall provide important first hand information for the subsequent intervention study for MSD prevention for workers in Hong Kong aircraft cabin cleaning industry.
Methods: Seat front floor cleaning and vacuuming work task was analyzed. To perform the task, one subject was asked to carry a special vacuum cleaner (~6 kg) on the back. Two shoulder straps and on waist strap were provided to secure the vacuum cleaner. Video recordings of the task were taken during the site visit by camera. Observations were made at the economy and business classes, on small size aircrafts (A330) and for transit and layover cleaning. Cleaners were observed for 20 minutes on a working day. The video recordings were subsequently digitized and sampled at two seconds intervals. The work postures were then decoded and analyzed using the Ovako Working Posture Analysis System (OWAS) to estimate the frequency and repetitiveness of various body postures when performing the cleaning tasks. Different observed postures were classified into action categories (AC) 1 to 4. AC 2 to 4 was regarded as stressful positions and risky for MSD.
Results: A total of 682 working postures were recorded and analyzed. For the OWAS method, Action C2 through AC4 grouped the harmful postures that would require remedial actions. 27.2% of the postures at action category 3 and 57.7% of postures at action category 2.
Discussion And Conclusion: The percentage of time spent in the stressful positions in seat front floor cleaning and vacuuming indicated remedial action to decrease the exposure of postures. From the analysis, the cleaners need to work in the limited area and need to secure the vacuum cleaner on one shoulder or other awkward postures. The findings supported the previous study on prevalence of MSD among aircraft cabin cleaners.
References:

1. So CL, Hung LK, Lui PPY, Chan KM. Perceived Physical Demands and Work-Related Musculoskeletal Disorders Among Aircraft Cabin Cleaners in Hong Kong. HKJOS. 11(Supp): 92; 2007.

Abstract#459

Changes In Resistance To Tendon Motion After Commencement Of Digital Mobilization At Different Days

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Purpose The optimum time to start postoperative mobilization is still controversial. We undertook a study to investigate the changes in resistance to tendon gliding as well as the extent of digital edema after commencement of mobilization at different days within the first postoperative week.
Materials and Methods Fifty long toes of Leghorn chickens were divided into 4 groups according to the days starting postoperative mobilization (1, 3, 5, and 7 days). The FDP tendon were partially cut and repaired. The toes were immobilized, and at different days after surgery, passive toe motion was started. Tendon gliding force and work of flexion were evaluated with an Instron machine after mobilization for two days. The digital edema was graded according to a scoring criteria created by our group. The force, work, and edema scores were statistically analyzed.
Results Little differences were found in the force and work of the toes with motion starting at 1, 3, 5, and 7 days. Digital edema peaked in the toes evaluated at postoperative day 3, and subsided at the toes evaluated at days 5, 7, and 9. Within each time-point, the edema scores correlated with an increase in the force and work. No correlation was found when edema scores were analyzed against the postoperative days.
Discussion The results indicate that resistance to tendon motion at tested time-points does not differ significantly. The findings suggest that early mobilization can start at any days within the early period, and may start as late as at 7 days.

Abstract#27

Prevention of Complex Regional Pain Syndrome Type 1 of the Upper Limb

Andrzej ZYLUK

Treatment of Complex Regional Pain Syndrome Type 1 is a challenge. Early recognition and immediate commencement of effective therapy gives a real chance of recovery, whereas progression into chronic phase is associated with poor prognosis and disability of the limb. Prevention of the condition is a reasonable approach, but little is known about it. Some authors have claimed that careful operative technique, anatomic dissection, avoidance of nerve traction, proper postoperative care and early mobilization of the limb after trauma or operation can reduce risk the frequency ofthe condition, but this has not been scientifically confirmed.
This paper presents current knowledge about prophylaxis of Complex Regional Pain Syndrome Type 1, based on literature and author's own experience. It was stated that, as yet, no specific, effective measures are known to prevent algodystrophy. Administration of 0.5 g vitamin C for 50 days after fracture of the distal radius reduces risk of the condition, but is was reported in only one study. Operation of unstable distal radial fractures, avoiding of tight, uncomfortable plaster casts and painful, forced physiotherapy is believed to reduce risk of CRPS Type 1, but it is based on observation rather than scientific evidence. Patients who recovered from the condition are not more susceptible to recurrence after further trauma or surgery. An early recognition of incipient CRPS Type 1 and immediate commencement of effective therapy was found to be the most important part of prophylaxis of the development of the florid condition.
Keywords: algodystrophy - treatment, algodystrophy - prevention

Session: SS5 - Arthritis & Arthroplasty of Upper Limbs - Part 1

Date: 16 February 2008

Venue: 7A Forum

Time: 10:30 - 11:30

Moderator : Lee OSTERMAN & Alex CHOI

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	OSTERMAN	Lee		SS5	16. Feb. 2008		Current strategies for the surgical treatment of thumb carpometacarpal arthritis
2	SOEJIMA	Osamu	Japan	SS5	16. Feb. 2008		Suspension Arthroplasty for thumb CM Arthritis
3	WONG	Tak Chuen	Hong Kong	SS5	16. Feb. 2008		Local Experience of thumb CM arthritis reconstruction

Session: SS5 - Arthritis & Arthroplasty of Upper Limbs - Part 2

Date: 16 February 2008

Venue: 7A Forum

Time: 11:30 - 12:30

Moderator : Daniel HERREN & Cho-yee LAM

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	MINAMIKAWA	Yoshitaka	Japan	SS5	16. Feb. 2008	352	Reconstruction of the PIP joint
2	IP	Josephine	Hong Kong	SS5	16. Feb. 2008		Novel Design and Development a new prosthetic device for proximal interphalangeal joint replacement
3	AHMED	Syed Kamran		SS5	16. Feb. 2008	335	Synovectomy around the wrist - rewarding alternative to preserve joint integrity in rheumatoid patients
4	TSE	Wing-lim		SS5	16. Feb. 2008		Arthroscopic treatment for Rheumatoid Wrist
5	LAM	Cho-yee		SS5	16. Feb. 2008		Metacarpophalangeal joint arthroplasty in rheumatoid arthritis: a long term assessment report

Abstract #353

ABSTRACT FOR FREE PAPER- ORAL PRESENTATION

TECHNICAL CONSIDERATIONS AND FUNCTIONAL OUTCOME OF THE MANAGEMENT OF COMPLEX INJURIES OF THE ELBOW

AUTHORS: Dr. Praveen Bhardwaj, S. Raja Sabapathy, Dr. S. Rajasekaran,
Dr. Hari Venkatramani, Dr. Ravindra Bharathi.
Ganga Hospital, Coimbatore, India.

Materials and Methods: Records of 34 complex elbow injury patients treated between 2000 – 2006 were studied. 21 patients could be contacted. Average MESS score was 6.7, with 14 having a score of 7 or above. 15 had fractures, one had pure dislocation and five had fracture dislocations. 10 had nerve injuries and 4 vascular injuries. 21 patients were evaluated clinically, radiologically, with DASH and Mayo Elbow Scores and employment status. Average follow up was 48 months. The data was analyzed for outcome determinants.

Treatment Details: After radical debridement skeletal stabilization was done (external fixation-5, supplementary external fixation with internal fixation-16).Primary nerve repair was done in 2. In 5 cases nerves were not repaired due to segmental loss/avulsion. Two underwent secondary tendon transfers. Vascular repair was done in 4. Primary wound closure was done in 6 and of them 2 needed secondary procedures. Three had local fasciocutaneous flaps, eight abdominal flaps and four pedicled latissimus dorsi. Average number of surgeries was 3.

Results: All elbows were salvaged. 16/21 were fully satisfied (visual analogue score >7). Dissatisfied patients had pain. Eleven returned to original jobs and six to less demanding jobs. Four were unemployed at 22 months (average) post injury. Average DASH score was 31 and Mayo elbow score was 78.

Conclusion: Complex Injuries of elbow with MESS of 7 or above are salvageable.
Longer injury- debridement interval, serial fractures, associated hand injuries and nerve injuries/loss, delayed soft tissue cover and a longer period of immobilization were associated with poor outcome.

Session: T3

Date: 16 February 2008

Venue: Meeting room 601

Time: 10:30 - 12:30

Moderator : Bo-kyung SONG & Priscillia LAM

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	LI	Zong-ming	USA	T3	16. Feb. 2008		Biomechanical Interactions of the Hand
2	COLDITZ	Judy	USA	T3	16. Feb. 2008		Management of Stiff Hand: Splint or Cast
3	GUO	Xia	Hong Kong	T3	16. Feb. 2008		Hand Brace for Colle's Fracture
4	THORLEY	Felicity	Australia	T3	16. Feb. 2008		Spliniting for Wrist Injuries

Session: W1

Date: 16 February 2008

Venue: Meeting room 603 - 604

Time: 10:30 - 12:30

Moderator : Fujio KEIJI & Riccardo LUCHETTI

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	NAKAMURA	Toshiyasu	Japan	W1	16. Feb. 2008		Arthroscopic repair of the TFC
2	ATZEI	Andrea	Italy	W1	16. Feb. 2008		Classification and treatment algorithm of peripheral TFCC tears
3	ABE	Yukio	Japan	W1	16. Feb. 2008	65	Plate Presetting artheroscopic Reduction for Distal Radius Fractures
4	LEVADOUX	Michel	France	W1	16. Feb. 2008	441	Arthroscopic Management of post Traumatic wrist sub-acute and chronic disorders
5	GARCIA-ELIAS	Marc	Spain	W1	16. Feb. 2008		Wrist Arthroscopy: Importance of getting proper training
6	BAIN	Gregory	Australia	W1	16. Feb. 2008		Wrist Arthroscopy - New Techniques
7	SLADE	Joseph	USA	W1	16. Feb. 2008		Old Problem & New Tricks - Percutanaeous & Arthroscopic Innovations of Hand and Wrist
8	LUCHETTI	Riccardo	Italy	W1	16. Feb. 2008	225	Arthroscopic Assisted Bilateral Sauv&kapandji Procedure: Case Report
9	HO	Pak Cheong	Hong Kong	W1	16. Feb. 2008		Complex Reconstructive Arthroscopic Surgery of the Wrist -How far it can go ?

Abstract #65

PLATE PRESETTING ARTHROSCOPIC REDUCTION FOR DISTAL RADIUS FRACTURES

Yukio Abe, Kenzo Fujii, Tetsu Tsubone, Yasuhiro Tominaga and Kazunari Tsue
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Introduction: Wrist arthroscopy for the distal radius fractures is the effective adjunct to evaluate the reduction of intraarticular fragments and soft tissue injuries. However, volar locking plate fixation has become popular, arthroscopic procedure becomes troublesome because vertical traction has to be on and off during the surgery. We developed plate presetting arthroscopic reduction technique, this technique simplify the combination of plating and arthroscopy. **Surgical Technique:** The fracture site was opened using Henry's approach. The fracture was reduced and anatomical alignment was regained under image intensifier, thereafter volar locking plate was preset. Wrist arthroscopy was introduced under vertical traction and intraarticular condition was assessed. Most of the cases, intraarticular fragments were already reduced though these processes, but step-off or separate over 2mm was sometimes residual. These dislocations were reduced by joy-stick maneuver, tenaculum cramp or pushing up the fragments from intramedullary canal and soft tissue injuries were treated simultaneously. Finally traction was removed and plate was securely fixed. **Patients and Methods:** Since May 2005, 54 cases consisted of 39 intraarticular and 15 extraarticular distal radius fractures were treated by plate presetting arthroscopic reduction technique. **Results:** Clinical results of 39 cases followed over 6 months after surgery, 26 cases resulted in excellent, 11 cases were in good, and 2 cases were in fair according to the Mayo wrist score. **Conclusion:** Plate presetting arthroscopic reduction technique that can simplify the combination of plating and arthroscopy was feasible procedure for distal radius fractures.

Abstract #441

Arthroscopic management of wrist sub acute and chronic disorders.

M. Levadoux, Ch Mathoulin

Wrist post traumatic after effects are very frequent and vary greatly. They can affect every kind of patient young , old, male, and female. Most of the time, the classic etiologic treatment is complex or difficult to manage. The arthroscopic procedure allows for a good functional outcome in the majority of the cases. Arthroscopy can help the surgeon to confirm the diagnosis of intra-articular post traumatic disorders with a high effectiveness but it also appears as a low morbidity method of treatment.
The indications of arthroscopic management of this kind of lesion will probably increase in the future.

Abstract #465

Wrist arthroscopy: Importance of getting proper training

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Since its introduction by Yung-Cheng Chen in 1979, wrist arthroscopy has gained widespread acceptance. From mostly a diagnostic tool in the 80's, it has evolved in our days into a proven means of safe, reliable treatment of a growing number of conditions. As a diagnostic tool, it is particularly useful for patients with a painful intracapsular problem whose evaluation with the available imaging techniques is uncertain. In this regards, arthroscopy has become the gold standard in the identification and severity assessment of a good number of wrist pathologies within the articular space, including ligament derangements, triangular fibrocartilage tears or cartilage defects. In the domain of therapeutic capabilities, the list of indications is steadily increasing. Arthroscopy is a useful adjunct in a wide variety of situations, including the reduction of intraarticular wrist fractures, percutaneous fixation of unstable carpal joints, or resection of damaged osteoarthritic joint surfaces. Arthroscopy, in expert hands, may also perform remarkably well in the release of joint contractures, in the excision of proliferating inflamed synovial tissue, or even in the resection of occult ganglia. The need for proper training, however, is of a paramount importance. Indeed, poorly trained surgeons should not attempt to perform unsupervised wrist arthroscopy: the consequences of malpraxis in these regards are often shattering in terms of joint stiffness and cartilage damage. Emphasis on proper hands-on workshops is mandatory to all who want to master these techniques

Abstract #225

ARTHROSCOPIC ASSISTED BILATERAL SAUVÈ-KAPANDJI PROCEDURE: CASE REPORT

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(*) Codivilla-Putti Institute, Cortina d'Ampezzo (Italy)
(**) Hand Surgery Center, Policlinic GB Rossi, Verona (Italy)
(***) I[st] Dept of Orthopedic and Traumatology, Spedali Civili of Brescia, Brescia (Italy)
(****) Institute de la Main, Paris (French)

Introduction We presented a case affected by primary arthritis of the distal radio ulnar joint (DRUJ) treated by Sauvè-Kapandji procedure arthroscopically assisted.
Material and Method Patient left wrist was operated in 2003. With double access (UC and DRUJ) cartilage was removed both by the ulnar head and sigmoid fossa by using motor power instruments and radiofrequency device. DRUJ was temporary fixed by using a K-wire and a cannulated screw was used as a definitive fixation of the joint. Arthrodesis of the DRUJ was performed maintaining the wrist in the vertical position and in 0° of pronosupinati on. An osteotomic resection of 1 cm of the ulna proximally to the neck of it was performed before to strongly fixing the DRUJ and a 2.0 mm K wire was used in addiction to the screw. Postoperative immobilization of the upper arm with the wrist at 0° of pronosupinati on and the elbow flexed at 90° was maintained for 3 0 days. Rehabilitation continued for two months. Patient was operated on at right wrist 2 years later by the same procedure.
Results At the follow up of 3 years patient was completely painless. He confirms us to get painfree after a month and to be returned to previous work after 2 months recovering progressive grip strength. X-ray demonstrated completely fusion of the DRUJ. Healing was achieved in both side by the same recovery time.
Conclusion This procedure seems to be safe, efficient and promising because do not open the DRUJ with mobilization of the ECU tendon.

Abstract #468

Complex Reconstructive Arthroscopic Surgery of the Wrist- how far it can go?

HO Pak-cheong
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Since 80's, wrist arthroscopy has been evolving from simple diagnostic tool to major therapeutic intervention. This presentation highlights some of the significant innovations in reconstructive arthroscopic wrist surgery and shreds light on the direction of possible future development.

1. **Osseous Reconstruction**
   - ***A. Arthroscopic Bone Grafting for Scaphoid Nonunion***

Standard procedure included take-down of non-union site a mid-carpal joint with motorized shaver and curettage till healthy bleeding cancellous bone encountered. Tourniquet was not inflated so that vascularity of both poles could be accurately appreciated. The fracture was reduced with DISI deformity corrected by close manipulation and fixation under fluoroscopic guidance. Cancellous chip graft was delivered to the fracture site through arthroscopic portals. Our series included 37 established symptomatic non-union and 6 delayed union cases treated from March 1997 to May 2005. The median duration of nonunion was 8 months (ranged 1- 192 months). The average follow up was 38.3 months (range 5-103 months). Overall union rate was 90.7% (39/43), including 4 cases of delayed union at 4-6 months. The average radiological union time was 12.2 weeks. Poor intra-operative vascularity predisposed to persistent non-union but did not preclude union entirely. Complications were few.

   - ***B. Partial Wrist Fusion***

Arthroscopic partial wrist fusion potentially can generate the best possible functional outcome by preserving maximum motion attributed to it's minimal trauma to the capsular-ligamentous structures. The author has performed 3 arthroscopic STT fusions, 4 scaphoidectomy and four-corners fusions, 1 LT fusion, 2 radio-scapho-lunate fusions and 1 radio-lunate fusion. Through the corresponding joint, the articular surfaces are denuded of cartilage using burr and curette. Fused bones are transfixed with K wires percutaneously after alignment corrected. Cancellous chip bone graft obtained is impacted to the fusion site through arthroscopic cannula. Final fixation is converted to cannulated screw system. Uneventful union was obtained in 8 cases, stable fibrous union in 2 cases and failure in 1 case.

2. **Soft Tissue Reconstruction**
   - ***A. Anatomical TFCC Reconstruction with Tendon Graft***

Anatomical reconstruction of the distal radio-ulnar ligaments is now regarded as the ultimate solution for painful chronic DRUJ instability. We have successfully performed this operation entirely under arthroscopic control in the 5 patients. Extra-articular drill holes were created on distal radius near sigmoid notch and fovea of ulnar head to simulate origin and insertion of the radio-ulnar ligament. The isometric point of fovea could be precisely located under direct arthroscopic view. Palmaris longus tendon graft was then introduced into the joint arthroscopically and brought back through drill hole on fovea to outside ulna where knot was secured after appropriate tensioning of the tendon graft to achieve DRUJ stability. Full range of prono-supination could be obtained without jeopardizing DRUJ stability. Follow up result showed superior range compared to open procedure.

   - B. ***Anatomical Scapholunate Ligament Reconstruction with Tendon Graft***

The dorsal and palmar portion of the scapholunate ligament can be restored anatomically and simultaneously through reconstruction with palmaris longus tendon in box-like structure. With the assistance of arthroscopy, a combined limited dorsal and volar incision can expose the scapholunate interval where bone tunnel can be made by drilling on the proximal scaphoid and lunate. Palmaris longus tendon graft is then used to connect the two bones in box-like fashion. Once diastasis reduced and DISI malrotation corrected, the tendon graft can be knotted on the dorsal surface in shoe-lacing manner. Scapholunate or scaphocapitate joint is then transfixes with 2-3 K wires. Initial results in 6 patients showed encouraging result.

3. **Cartilage Reconstruction**
   - ***Arthroscopic Osteo-chondral Grafting***

Arthroscopic assisted osteochondral bone graft has been performed in one patient with chronic symptomatic post-traumatic osteochondral lesion of the lunate fossa. Graft was being harvested over the lateral femoral condyle of the knee using a special osteochondral graft harvester. The graft was delivered to the defect through arthroscopic portal by stable impaction. Preliminary result is encouraging.

Session: Free paper 13/14

Date: 16 February 2008

Venue: Meeting room 605

Time: 10:30 - 12:30

Moderator : B. FUNG & Yu-te LIN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	KIM	Jae-Kwang	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	56	Locked metacarpophalangeal joint of an index finger: Usefulness of preoperative MRI in choosing
2	HAN	Soo-Hong	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	62	Percutaneous Retrograde Imtramedullay K-wire Fixation for Metacarpal Shaft Fractures
3	HAN	Soo-Hong	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	64	Extensor Mechanism Injury by Retrograde Intramedullary K-wire Fixation of Metacarpal Neck Fractures
4	HAMADA	Yoshitaka	Japan	Free paper 13/14 – Hand Trauma	16. Feb. 2008	87	Minimum invasive surgery with two different dynamic fixators for chronic fracture dislocations of the proximal interphalangeal joint
5	JUNICHI	Miyake	Japan	Free paper 13/14 – Hand Trauma	16. Feb. 2008	124	Treatment of chronic dorsal fracture dislocations of the proximal interphalangeal joint
6	LEE	Young-Ho	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	177	Modified Percutaneous Intramedullary K-Wire Fixation of Metacarpal Fractures
7	LEE	Young-Ho	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	178	Intramedullary Nail Fixation for the Diaphyseal Fractures of Forear in Adult
8	PARK	Yong-Cheol	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	182	The Results of Extension Block Technique for Mallet Fractures Delayed Over Two Weeks
10	FUJITANI	Ryotaro	Japan	Free paper 13/14 – Hand Trauma	16. Feb. 2008	187	Comparison between intramedullary nailings and low-profile platings for unstable metacarpal neck fractures
11	PARK	Il-Jung	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	210	Fracture-Dislocation of the Fourth and Fifth Carpometacarpal joint : Modified Classification and Treatment
12	CHOI	Soo-Joong	Korea	Free paper 13/14 – Hand Trauma	16. Feb. 2008	241	Closed reduction by towel clip and K-wire fixation technique for bony mallet finger.
13	MASSARELLA	Massimo	Italy	Free paper 13/14 – Hand Trauma	16. Feb. 2008	261	burst trauma in children:combined surgical and hyperbaric oxigen therapy.
14	STEFANESCU	Raluca-Laura	Romania	Free paper 13/14 – Hand Trauma	16. Feb. 2008	293	Hand trauma ?Etiology, treatment, evaluation ?A retrospective study
15	FUJIOKA	Hiroyuki	Japan	Free paper 13/14 – Hand Trauma	16. Feb. 2008	299	Nonunion Of The Triquetral Body Fracture
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Abstract #62

Percutaneous Retrograde Intramedullay K-Wire Fixation For Metacarpal Shaft Fractures

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Background: The vast majority of metacarpal bone fractures are stable and treated conservatively. Nevertheless, surgical treatment is justified in certain cases like unstable, displaced fractures. When surgical intervention is necessary, intramedullary fixation using small flexible rod or wire can be one of the best options that provide stable internal fixation while minimizing the extent of soft tissue trauma among many different operative procedures. The purpose of this study is to assess the anatomic and functional outcome of percutaneous retrograde intramedullay K-wire fixation for metacarpal shaft fractures.
Methods: Twenty one consecutive patients with 23 closed metacarpal shaft fractures who have been treated with closed reduction and percutaneous retrograde intramedullay K-wire fixation, were analyzed retrospectively. Fracture union and angulation were analyzed radiologically, and clinical evaluations were performed including range of motion and complications.
Results: Most of the patients were young of average age 26 years old and average follow up period was 1 year 9 months. Fracture union was achieved in all cases and callus formation was obvious at postoperative 49 days. Average angulation of fracture site was 1.9 degree at the last follow up and no measurable metacarpal shortening was obaserved. There was no range of motion limitation and no complication was recorded. All patients were cosmetically and functionally satisfied.
Conclusion: Intramedullary K-wire fixation is a minimally invasive method for stabilizing metacarpal fractures. Closed reduction with subsequent percutaneous retrograde fixation produced good radiological and functional results. With low rate of complication, the method can be recommended for the stabilization of such fractures.
Key Words: Metacarpal shaft fracture, K-wire, retrograde fixation

Abstract #64

Extensor Mechanism Injury By Retrograde Intramedullary K-Wire Fixation Of Metacarpal Neck Fractures

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Introduction: Metacarpal neck fracture is common fracture of the upper extremity and retrograde intramedullary pin fixation is one of commonly used fixation methods for treatment.
Study about extensor mechanism change after this fixation is rare even though pin penetrates extensor tendon during fixation procedure. Authors evaluated results of intramedullary K-wire fixation for metacarpal fractures and analyzed damage to the extensor mechanism.
Materials and Methods: A retrospective analysis of 60 patients who had retrograde intramedullary K-wire fixation for metacarpal neck fractures was performed. Mean age was 24.1 years old and average follow up period was 1 year 11 months. Open injury, severe comminution and multiple fractures are excluded in this study.
Radiographic fracture healing, size of K-wires, range of motion at the last follow up and complications were evaluated during follow up.
Results: **Forty three(72%) patients had fractures at the 5th metacarpal neck. Bone union, angulation correction were achieved in all cases and average union time was 5 weeks 4 days postoperatively.**
1.6 mm diameter K-wire was most commonly used in 46 cases(77%), but there was no statistical differences in results between K-wire sizes.
Only one patient showed ROM limitation of 20 degree extension lag at the last follow up due to insufficient rehabilitation and other complication was temporary superficial infection in 1 case.
Conclusion: Retrograde intramedullary K-wire fixation is a minimally invasive method for stabilizing metacarpal fractures and showed excellent results in our study. Damage to extensor mechanism was minimal and It is not necessary to restrict indication to avoid extensor mechanism injury.

Abstract#87

Minimum Invasive Surgery with Two Different Dynamic Fixators for Chronic Fracture Dislocations of the Proximal Interphalangeal Joint

Yoshitaka HAMADA

The treatment of neglected fracture-dislocations of the proximal interphalangeal (PIP) joint is difficult due to its displaced joint incongruency, osteoarthritic changes and contracture of the surrounding soft tissue. Although the PIP Compass hinge is a useful adjunct to surgical reconstruction of the injured PIP joint, it cannot distract the joint strongly nor provide stability during a long duration due to the small size of pins. We have developed a new surgical strategy with serial two external fixators, and applied the procedure for four cases. For the first step, Orthofix Mini or M-100 external fixator with bold screw pins is applied for 1 week to distract the PIP joint by a sufficient strength in order to stretch the dislocated joint components. As a second procedure, surgical release of PIP joint in all cases and open reduction with corrective osteotomy in two cases were done. PIP Compass hinge was applied using the same bold screw pins which were inserted at the first surgery. During comparatively long period (mean 11.5 weeks) after the surgery with the PIP Compass hinge, no complications such as pin loosening were observed except breakage of Compass hinge in one case. At the follow up time (mean: 9.3 months), the range of movement of PIP joints increased by 65 degrees and of DIP joints, 36 degrees. Instability to lateral directions was improved even in the case accompanying cartilage defect which covered joint surface. We recommend this technique for selected cases.

Abstract #124

Treatment Of Chronic Dorsal Fracture Dislocations Of The Proximal Interphalangeal Joint

Miyake JUNICHI

We report the outcome of treatment in 6 patients with chronic dorsal fracture dislocations of the proximal interphalangeal joint. 4 patients were neglected cases and the remaining 2 patients were underwent K-wire fixation in improper position at another hospital. 3 patients whose preoperative period was five weeks were treated by opnen reduction and Dynamic Distraction Apparatus(DDA). DDA maintained joint reduction position for average five weeks, encouraging range of motion exercise mean while. In remaining 3 patients whose preoperative period was average ten weeks, volar articular cartilage was severely degenerated and open reduction of the articular fragment was impossible. In those cases, volar plate advancement was performed in two patients and osteochondral autograft from the patient's capitate was performed in one. In 3 patients who underwent open reduction and DDA, the average extension was -8 degrees and the average flexion was 100 degrees. All of these three showed no pain and no degenerative change in X-ray. Redislocation and progressive degeneration occurred in 2 patients who were treated by volar plate advancement. They complained pain with work activity. The average extension was -23 degrees and the average flexion was 80 degrees in those patients. One patient who underwent osteochondral autograft achieved a stable pain-free joint with a range of motion from 0 degree to 85 degrees at two months after surgery. These data indicates that palmar osseous support is important for treatment of chronic dorsal fracture dislocations of the proximal interphalangeal joint.

Abstract #177

Modified Percutaneous Intramedullary K-Wire Fixation Of Metacarpal Fractures

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Introduction: The authors used closed reduction and percutaneous intramedullary two or three K-wires fixation to the metacarpal fractures which need internal fixation, with K-wire inserted from the metacarpal head, leaving it around the wrist level.
Materials and Methods: From May of 2002 to June of 2007, 105 patients were treated with modified percutaneous intramedullary K-wire insertion method. Of 121 metacarpal bones treated, 4 was 2nd metacarpal bone, 10 were 3rd, 29 were 4th, 78 were 5th. A K-wire was inserted at the metacarpal head, through the fracture site, pulled out at the wrist level with wrist flexed maximally, and then, retreated backward not to affect the MCP joint movement. In the final stage of the operation, the K-wire was bent dorsally and wrist extended maximally, so the wrist could be in the functional position of 30 degree-extension, to prevent K-wire sliding out postoperatively.
Results: The average duration of the bony union was 6 weeks. The average posterior angulation of the neck fractures was 48 degrees preoperatively, 7 degrees at the final follow-up stage. For shaft fractures it was 25 degrees preoperatively, 2 degrees at the final follow-up stage. No limitation of the active exercise and no distinguishable rotational deformity were found in all cases at the final follow up stage. In regarding to the complication, there were 14 cases of extensor irritation, which were gone during the follow up, with no rupture cases.
Conclusion: This method is easier to fixate the fracture site than the previous percutaneous method, gives more comfortable position of wrist postoperatively, and reduces the possibility of K-wire sliding out.

Abstract #178

Intramedullary Nail Fixation For The Diaphyseal Fractures Of Forear In Adult

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Introduction: The purpose of this study is to present the outcome of intramedullary rod system for the radius and ulna to stabilize displaced diaphyseal forearm fractures.
Materials and Methods: A prospective study was performed from January 2004 to June 2006 with 38 nail being inserted into 26 forearms. Seventeen radius rods and 21 ulna rods were used. In 14 forearm, fracture of only one forearm bone was seen (radius: 5, ulna: 9), in twelve patients both forearm bones were fractured. All patients were treated with the intramedullary rod system for the radius and ulna. The mean follow-up period was 15 months (range 12-37 months). Patient-rated outcome was assessed by completion of the DASH.
Results: The average time to fracture healing for 38 fractures of 26 patients was 12 (range 9-20) weeks. Twenty three of 26 forearms (88%) showed a nearly full range of motion (90% or more) compared with the contralateral arm, and only 3 forearms had 20, 22 and 25 degrees loss of pro- and supination. No deep or superficial infection occurred. And, postoperative radio-ulnar synostosis was not developed. Using the rating system of Grace and Evermann, 23 patients (88%) had an excellent results, 3 (12%) had a good result. DASH score averaged at 11.7.
Conclusion: The advantage of intramedullary rod system for the radius and ulna are high rate of bony consolidation, minimal surgical exposure and scar, less operation time. The intramedullary rod system for the radius and ulna may be considered an acceptable alternative to plate fixation of forearm fractures.

Abstract#182

The Results of Extension Block Technique for Mallet Fractures Delayed Over Two Weeks

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Purpose : We studied the results of extension block technique for mallet fracture delayed over 2weeks.
Materials and Methods : Fifteen cases were retrospectively evaluated. Mean delayed period was 4.4(2-10) weeks and mean follow-up duration was 30(4-66) months. In Wehbé-Schneider classification, they were grouped by 4 type IB, 9 type IIB, 1 type IIC and 1type IIIB. Nine cases were treated by closed reduction and 6 cases by open reduction through lazy-S incision. Six cases were composed of one case delayed for 10weeks, 2 cases delayed for 8weeks and 3 cases delayed for 4weeks which had large fragment (>50%) and subluxation. Results were measured by Crawford classification, bone union, subluxation and degenerative change.
Results : In Crawford classification, 13cases(66%) showed the result of 'Excellent' or 'Good'. None showed nonunion, persistent subluxation and degenerative changes. Complication rate was 40% including I infection, 2 osteolysis and 2 degenerative changes.
Conclusion : The treatment by extension block technique showed better results than conservative treatment. We could consider first this method to get early exercise and return to work because it was simpler and showed lower complication rate than other operative technique. Open reduction should be considered for cases delayed over 4weeks. Within 10weeks' delay, we could expect the good or fair results.
Key Words : mallet fracture, extension block technique

Abstract #187

Comparison Between Intramedullary Nallings And Low-Profile Platings For Unstable Metacarpal Neck Fractures

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Purpose: The majority of metacarpal neck fractures can be treated conservatively. Surgical treatment is indicated when a reduction of the fractures cannot be maintained by conservative methods. Previous biomechanical studies revealed that palmar dislocation of more than 20°and shortening of more than 2mm significant ly affect normal kinetics of the hand. The purpose of
this study was to investigate whether intramedullary nailings or low-profile platings allows for good clinical and radiological results for displaced metacarpal neck fractures.
Method: We prospectively reviewed 27 patients with a displaced metacarpal neck fracture who underwent surgery. 15 patients underwent intramedullary nail fixations (group I),and 12 patient had low-profile plate fixations(group P). Clinical and radiological results of these procedures were analyzed statistically.
Result: The follow up period averaged 10 months. There was no nonunion or malunion. One patient in group I had complication of a rupture of the extensor tendon.There were no significant differences regarding postoperative radiological parameters between the two groups. %Grip strength of group P was significantly higher than that of group I ($P<0.05$). We did not find any significant differences between %TAM of the two groups, although %TAM of group I (97%)was higher than that of group P(89%).
Conclusion: The current results indicate that both procedures of intramedullary nailings and plates are highly effective in maintaining restoration of unstable metacarpal neck fractures. Low profile plates system provides rigid fixations and may lead to early recovery of grip strength.

Abstract#241

Closed Reduction By Towel Clip And K-Wire Fixation Technique For Bony Mallet Finger

Soo-Joong CHOI

Purpose: There are many techniques to achieve closed reduction for bony mallet finger such as Ishiguro's extension block technique or Tetik's pin leverage method or Rocchi's umbrella handle technique. But all the above methods manipulate the fracture indirectly and not easy. We tried to reduce the facture directly with towel clip and report the results of this new technique.
Materials: From March 2002, authors performed this method in 9 patients(6 male, 3 female). The mean age of the patients was 36.8 years(range 17~71 years). The involved fingers were 5 long, 3 ring and one index finger. According to Wehbe classification, there were one type 1A, 7 type 1B, one type 2A fracture.
Methods: The fracture was reduced by percutaneous direct reduction with towel clip under fluoroscopic control. After achievement of reduction, it was fixed by 2 or 3 pins including DIP joint longitudinal transfixation. Pins were removed 4~6 weeks after operation.
Result: All the fractures were reduced easily and had good union, According to the Crawford rating system, there were 5 excellent, 3 good and 1 fair results.
Conclusions: We believe this technique is very easy and effective for closed reduction of mallet finger fractures.

Abstract#210

Fracture-Dislocation of the Fourth and Fifth Carpometacarpal Joint : Modified Classification and Treatment

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Background: Dislocation of the 4th and 5th CMC joint is frequently combined with the fracture of carpal bone or metacarpal base. Surgical treatment has been preferred rather than conservative treatment because of difficulty of maintenance of reduction. Cain et al. classified 4th and 5th CMC joint fracture-dislocation into four categories according to the pattern of hamate fracture. However there was no consensus about the fracture of 5th metacarpal base.
Objectives: We evaluated the patterns and the degrees of the fracture of the 4th and 5th CMC joint and analysed the effectiveness of the treatment according to the modified Cain's classification.
Patients and Methods: 24 patients who undergone surgical treatment were available. The fracture patterns were evaluated with X-rays and CT scans in all patients. Cain's classification was composed of IA, IB, II and III according to the pattern of hamate fracture. And each type was subdivided into 1 or 2 according to the presence of the fracture of 5th metacarpal base. The indications of open reduction were the failure of closed reduction, delayed diagnosis, multiple fracture-dislocation and over the Type IB-2 according to modified Cain's classifiction.
Results: 12 patients (50%) had the fracture of 5th metacarpal base which was no mention in Cain's classification. The fracture of hamate is 13 of 24 cases, which is the buttress against with the dorsal dislocation of the base of metacarpal. There are 10 cases of IA-2, 8 cases of III-1 according to modified Cain's classification. The results according to Kumar methods showed excellent and good in 92%. There was no recurrence of dislocation or arthritis.
Conclusion: Anatomical reduction of displaced hamate is key to good outcome. Usually type II and III are very unstable, so open reduction is required. But the treatment of type IB is controversy. A modified Cain's classification is helpful to determine the treatment of 4th and 5th CMC joint fracture-dislocation.

Abstract#261

Burst Trauma In Children: Combined Surgical And Hyperbaric Oxygen Therapy

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Massive burst trauma to a hand ,even in young children, may severely impair the function.A combination of open fracture with vascular,crush,and avulsion injury resulting in acute peripheral ischemia may place the hand at risk of necrosis and imminent amputation.We suggest a combined approach surgical and hyperbaric oxygen therapy.
Our series includes three children under 10years old, one bilateral, four hands treated in 6 mounths.
In conclusion the combined approach of these types of injury is a new procedure that reduce recovery time,improves the clinical outcome and reduce infections.
Key words: Burst hand trauma children,hyperbaric oxygen therapy

Abstract#293

Hand Trauma – Etiology, Treatment, Evaluation – A Retrospective Study

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Hand injuries count for 80% of Bucharest University Hospital surgery emergency room patients. Since the main goal of the surgeon is to preserve the almost complete of the hand our paper debates on etiology and topography of traumas from 2005 till 2007. Moreover we have considered all the operative steps and reconstructive results and further the psycho-social rehabilitation of the patients.

Abstract#299

Nonunion Of The Triquetral Body Fracture

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Introduction: We present a rare case of nonunion of the triquetral body fracture.
Report of a Case: A thirty-four-year-old man fell down onto an outstretched hand. He felt pain with limitation of range of motion in the right wrist and visited our hospital six months after injury. The radiographs revealed ununited fracture of the triquetrum with sclerotic changes. We diagnosed with nonunion of the triquetral body fracture treated surgically. Ununited fracture was observed at the middle of the triquetrum with incongruity of articulation to the hamate. Fibrous tissue and sclerotic bone at the nonunion site were removed and internal fixation with iliac bone graft was performed. One year after surgery, the patient was asymptomatic and union was confirmed on the radiographs.
Discussion: Fracture of the triquetrum generally yields good result with conservative treatment because the triquetrum is connected to the adjacent bones by multiple ligaments thus blood supply to the fracture is preserved. Therefore, very few cases of nonunion of the triquetrum have been reported. In the present case, it is speculated that the patient had not been treated adequately and fracture of the trequetrum resulted in nonunion. In the operative findings of the present case, fracture occurred at the middle of the trequeral body and caused incongruity of the articulation to the hamate, which might cause the degenerative changes of the midcarpal joint if untreated.
Conclusions: A rare case of nonunion of the triquetral body fracture was successfully treated with internal fixation and iliac bone graft.
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Abstract#368

Study Of Proximal Interphalangeal Fracture Dislocation Of Finger- A Follow Up Study

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Introduction: Proximal interphalangeal fracture dislocation is a relatively rare injury and often treated casually and flexion contracture are the major complications. Cases of fracture dislocation of PIP joint base of middle phalanx were studied in young people especially males. The incidence of this injury is percent. Sports injury is the major cause followed by fall at home or work place. Little fingers are common followed by index fingers.
Method And Material: Palmar lip fracture causing dorsal subluxation were mainly involved in this study. Intially treatment in the emergency department were mallete splint or POP slab. In case of displaced fractures, both conservative (extensor block splint) or operative treatment- open reduction and internal fixation with k wire or mini screw fixation. In comminuted fracture- Volar arthroplasty was carried out in eight cases.
Result: Follow up ranged from 10 weeks-60 weeks. The complication at the end of treatment were mainly swelling, stiffness and deformity.
Conclusion: It is observed that early reduction is extremely important and to be followed up by early mobilization to achieve better results.

Abstract#387

Hand Injuries And Safeguards From Doors In Children

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Objectives: To understand the epidemiology and outcome of hand injuries from doors in children, so as to suggest safety measures.
Between 2003 and 2005, 139 children aged 0 to 16 with hand injuries were admitted to our Hospital. 46 of them (33.1%) suffered from door crush injuries. Telephone interviews were conducted using a specifically designed questionnaire focusing on injury details and outcome.
Majority of the door crush injured patients were females (55.6%) and younger children (55.6%). Right middle finger and distal phalanx were most often injured. Types of injury included: nail bed lacerations skin laceration, contusion, amputation, fracture, subungal haematoma, digit tendon cut. 34 children (73.3%) required operations, including nail bed repairment 66.7%, replantation 12.1%, simple suture 12.1%, fracture fixation 9.1%. Average hospital stay was 3.4 days (range 1 to 21 days).
Door crush injuries usually occurred at the front door (18.6%) at home (67.4%), at the hinge side of the doors (62.8%). The doors were commonly wooden ones (74.4%) and were closed by another child (37.2%). Door crush injuries happened even with the presence of adults (60.5%).
Parents of 43 patients were successfully interviewed with an average follow up period was 24.8 months. Majority were satisfied with current appearance and daily functions of the injured hands.
Conclusions: Door crush injury is a common cause of severe domestic hand injuries that require hospital admission in younger children. Safety measures including new design of door and home precaution should be adopted to prevent such injury.

Abstract#395

Nonsurgical Treatment Of Closed Soft Tissue And Bony Mallet Finger Injury

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Objectives: This study reviewed the outcomes of closed mallet finger injuries with the treatment of custom made thermoplastic splintage
Patients and Methods: In the year of 2006, 42 patients suffering from either closed soft tissue or bony mallet finger injuries were available for a review at a mean of one year after the treatment. All of them were treated conservatively with custom made thermoplastic splintage following the same regime. The clinical and functional outcomes were analyzed.
Results: Twenty seven patients and 15 patients suffered from soft tissue and bony mallet finger injuries respectively. All patients had improvement in the terminal joint extensor lag with a mean of 14.7°. The average increase of post-operative flexion arc was 30°. The clinical and functional results in soft and bony mallet were equally good. The differences of the results in early and delay treatment groups (more than 3 weeks after injury) were statistically insignificant. Three patients (7%) with soft tissue mallet finger developed swan neck deformity. There was no skin breakdown or nail plate deformity. Our regime of mallet splintage is an acceptable treatment in both soft tissue and bony mallet injury, even in delayed diagnosis.
Conclusion: We recommend custom made thermoplastic splintage as the initial treatment in closed mallet finger injuries. Surgical treatment should be reserved for open injury or cases refractory to conservative management.

Abstract#396

Biomechanical Considerations in Different Volar Fixed Angle Stable Plates in the Treatment of Radius Fractures

Wolfgang HINTRINGER/ Vienna

We will present various plate designs in the treatment of radius fractures and their volar position, and the problems and complications associated with these plates.
It has been clearly established that isolated application of volar stable-angle plate fixation has greatly simplified the decision – which was by no means simple in the past - as to which method should be used for what type of fracture.
Revisions performed in many cases because of problems encountered after stable-angle volar plate fixation showed that direct access over the median nerve was a frequent cause of the symptoms experienced by the patients.
The position of the plates has become a strongly debated subject in recent times The position of different plate designs according to the so called watershadeline from Orbay is discussed and shown in this paper.

Abstract#129

Reliability And Accuracy Of A New Classification Of Thumb Injuries

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The critical anatomical elements of the thumb are respectively, the thumb pulp for sensation; the length of the thumb and the span of the first web for position; and, the thenar muscles and the first carpometacarpal joint for mobility. We have classified thumb injuries based on these elements. (Table 1) In order to assess the inter-observer reliability, repeatability and accuracy of this classification, the pre-operative photographs and radiographs of 30 patients with thumb injuries of differing severities were collected. Ten surgeons not familiar with the patients were given the set of cases and asked to suggest an appropriate management plan for each case. They were then asked to classify the injury as per the new classification and to indicate any change in their management plan. Two months later, the same set of cases, but in a different order were given to the observers and they were asked to classify it again and suggest a management plan. At the end of the study, all cases were sent to one of the authors of the new classification to obtain a reference, which was considered as the gold standard for the assessment of accuracy. Agreement between classifications was estimated by the Kappa coefficient separately for each element. A Kappa was considered to be moderate from 0.4-0.6, good from 0.6 to 0.8 and excellent above 0.8. Our results indicate that this new classification has good inter-observer reliability, repeatability and accuracy.

Table 1

Type of Details Thumb Injury	Anatomic Element	Subtype	Details
Type A	Skin	A0	No skin loss
		A1	Palmar skin loss
		A2	Dorsal skin loss
		A3	Combined (dorsal + palmar) skin loss
Type B	Length	B0	No loss of length
		B1	Length loss distal to neck of proximal phalanx
		B2	Length loss distal to neck of metacarpal
		B3	Length loss distal to base of metacarpal
Type C	Web span	C0	Normal web span
		C1	Web space skin loss or contracture limited to skin
		C2	Web contracture involving muscle
		C3	Web contracture involving joint
Type D	Thenar muscle	D0	Normal thenar muscle
		D1	Loss of insertion
		D2	Loss of muscle substance
		D3	Loss of innervation
Type E	1st carpometacarpal joint	E0	Normal CMC joint
		E1	Loss of ligament(tightness/ laxity) – articular surface is good
		E2	Loss of articular surface
		E3	Total loss of joint

Abstract#26

Conservative Vs Operative Treatment Of Isolated Metacarpal And Phalangeal Fractures: A Prospective, Randomized Study

Andrezej ŻYLUK, T. BUDZYŃSKI

Patients and Methods: Seventy patients with 73 isolated, displaced fractures of the metacarpal and phalangeal bones were randomly allocated to the conservative in plaster or thermoplastic cast, or operative with K-wires, mini-plate or screw fixation. Patients were followed up at 2 and 6 months after surgery or reduction, and the following measurements repeated on each occasion: active range of motion and loss of extension of affected fingers or fingers relative to affected metacarpal bone, the total grip strength and two-point pinch grip with the contribution of the affected finger, function of the hand with DASH questionnaire and radiological assessment of angular deformity and healing disturbances.

Results: At 2 and 6 months assessments the results of both treatments were equal with respect to range of motion of fingers, extension loss, power and function of the hand assessed with DASH questionnaire. Anatomical outcomes in terms of degree of angular deformity were statistically significantly better in operative group. Major secondary displacements, requiring surgery occurred in four patients treated conservatively. Patients with metacarpal fractures achieved statistically significantly greater active range of motion and better function of the hand, than those with phalangeal fractures.

Conclusion: The results of this study suggest that operative treatment of metacarpal and phalangeal fractures is not beneficial to conservative.

Keywords: Hand fractures - treatment, hand function

Session: SS6 Hand Trauma I (Tendon Surgery)

Date: 16 February 2008

Venue: 7A Forum

Time: 15:20 - 16:25

Moderator : Osamu SOEJIMA & Kan-han MAK

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	LEUNG	Kim-hung	Hong Kong	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		Basic Science of tendon healing
2	GILBERT	Alain	France	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		Flexor tedon injury in childen
3	YEN	Chi-hung	Hong Kong	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		4-strand flexor tendon repair
4	WAN	Selina	Hong Kong	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		Rehabilitation after tendon Repair

Session: SS6 Hand Trauma I (Tendon Surgery)

Date: 16 February 2008

Venue: 7A Forum

Time: 16:25 - 17:20

Moderator : Moon-sang CHUNG & Chi-hung YEN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	Steven	VIEGAS	USA	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		2 Stage flexor tendon reconstruction
2	GONG	Hyun-sik	Korea	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008		Loop tendon technique in tendon transfer
3	PARK	Il-jung	Korea	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008	215	Subluxation of the Extensor Digitorum Communis Tendon at the Metacarpophalangeal Joint Treated by Wheeldon's Method
4	GONG	Hyun-Sik	Korea	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008	112	Extensor Indicis Proprius Transfer for Abducted Small Finger
5	GOVINDASAMY	Balakrishnan	India	SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008	272	Percutaneous Fixation of Phalangeal Fractures
6	LIM	Beng-Hai		SS6 Hand Trauma 1 (Tendon Surgery)	16. Feb. 2008	452	Towards A Splint-Free Repair

Abstract #112

EXTENSOR INDICIS PROPRIUS TRANSFER FOR ABDUCTED SMALL FINGER

Hyun Sik Gong, Moon Sang Chung, Young Ho Lee, Goo Hyun Baek
Department of Orthopaedic Surgery, Seoul National University College of Medicine, Seoul, Korea

Background: Persistent abduction of the small finger has been usually treated by transfer of the extensor digiti minimi (EDM) muscle. However, there are concerns of postoperative limitation of extension or abduction of the small finger after transfer of the EDM because of the anatomic variations of the extensor system. We evaluated the outcome of extensor indicis proprius (EIP) transfer for the abducted small finger.
Methods: We performed EIP transfer in 8 patients with persistent abduction of the small finger. The primary cause of the deformity was, incomplete reinnervation after surgeries for ulnar neuropathy in 6, the 3rd palmar inteosseous muscle rupture in one, and intrinsic muscle scarring in one. The EIP was extended by splitting the tendinous portion and was transferred to the distal and radial part of the extensor hood. The outcome was assessed by comparing the perioperative active adduction and abduction angles between the two ulnar digits.
Results: At the mean follow-up of 23 months, the average adduction angle improved from 18.8 degrees to 0.6 degrees postoperatively ($p<0.05$). In terms of active finger motion, six patients showed excellent results, one good, and one fair, without loss of flexion and extension. No patient had an extension lag or complained of functional deficits of the donor index finger.
Conclusions: EIP transfer can be a reliable option for correction of abduction deformity of the small finger, maintaining active abduction and full flexion and extension.

Abstract #272

PERCUTANEOUS FIXATION OF PHALANGEAL FRACTURES

Balakrishnan GOVINDASAMY

Phalangeal fractures require anatomical reduction, stable fixation and early active mobilization to avoid complications. Malunion with shortening or rotation of phalangeal fractures lead to marked deformity and disability. Though open reduction with plate and screws is becoming increasingly popular, the amount of post operative edema and chances for adhesion formation and joint stiffness is more. Percutaneous fixation techniques include closed reduction and percutaneous pinning, percutaneous reduction and percutanous fixation and external fixator application. Manipulation and reduction of phalangeal fractures is technically easier because of their shorter length, subcutaneous nature and limited loading potential for stress. These are less invasive techniques with lesser complications. We present our experience of these techniques in 34 phalangeal fractures performed over the past 2 years.

Abstract #452

TOWARDS A SPLINT-FREE REPAIR

Adjunct Associate Professor Beng-Hai Lim
Centre for Hand and Reconstructive Microsurgery (CHARMS), Mount Elizabeth Medical Centre and Department of Orthopaedic Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Post-operative care following a successful flexor tendon repair is dependant on the quality of repair. A strong repair allows for a more aggressive post-operative rehabilitation.
The advantages of an immediate unprotected active mobilization of the hand include improve range of active motion; minimize risk of tendon adhesion, contractures and loss of grip strength. The risk however is tendon rupture.
Biomechanical studies have shown that an unrestricted mobilization of the tendon puts the strain on the site as high as 50N to 120N with flexion against resistance of 500g and 3.5kgf . There is also associate weakening of the tendon at 1 week and this can decrease the strength of the repair to as high as 50%.
The need for a strong repair of at least 200N will probably minimize the risk of rupture if an immediate unprotected mobilization of the hand is encouraged.
This requires a shift in paradigm in our repair techniques. Three specific anchoring points have been identified viz zone 1, 3 and 5. These sites are chosen because it allows for a slightly bulkier anchoring of tendons. The use of a double needle, 2 'o' fibrewire with a single button anchoring at points more than 3 cm away from the lacerated tendon site will allow us to achieve such tendon strength.
A proposed employment of mesenchymal stem cell at the site of repair may be another modality to minimize the weakening of the lacerated tendon ends and maintain the strength of the repair.
A major shift in our repair techniques may pave way for a more robust and sustainable repair. This will allow for a non-patient dependant and a splint free repair. This will further improve the results of tendon repair and allow an earlier functional use of the hand following a flexor tendon injury.

Abatract #215

Subluxation of the Extensor Digitorum Communis Tendon at the Metacarpophalangeal Joint Treated by Wheeldon's Method.

Department of Orthopedic Surgery, The Catholic University of Korea, Seoul Korea
Il-Jung Park, M.D., Yang-Kuk Chung, M.D., Hyoung-Min Kim, M.D., Seok-Whan Song, M.D., Seung-Koo Rhee, M.D., Yoo-Joon Suh, M.D., Bae Gyun Kim, M.D.

Introduction Subluxation of the extensor digitorum communis (EDC) tendon at the metacarpophalangeal (MP) joint can compromise the function of the extensor mechanism to the affected digit. It can be posttraumatic, congenital, or caused by arthritis of the metacarpophalangeal joint. Almost cases involve disruption of the radial sagittal band with ulnar subluxation of the extensor tendon. Several methods for sagittal band reconstruction and extensor tendon recentralization have been described. This report presents our experience using the Wheeldon's method for centralization of the extensor tendon and its long-term results.
Material & Methods Between 2004 and 2006, nine patients who were operated with Wheeldon's method for correction of the extensor tendon subluxation at the MP joint were selected. The patients who were treated by primary repair of the ruptured sagittal band or other reconstruction method were excluded. The commonest symptom was painful snapping of the affected finger during flexion. The surgical indication was if the symptoms were still present 3 weeks after the injury. Wheeldon described a sagittal band reconstruction that used a junctura tendinum. The ulnar junctura tendinum is released from adjacent tendon and sutured to the palmar radial sagittal band remnant of the deep intermetacarpal ligament. Some additional procedure including reefing of the dorsal extensor expansion, reefing of the dorsal capsule, synovectomy, trapdoor repair and augmentation with 4th EDC, were performed.
ResultsIn all patients centralization of the extensor tendons after surgery was maintained and no tendons subluxed through a full range of motion. For all patients, there was resolution of pain, and none required further surgery. There were no postoperative complications.
Conclusion Patients who have failed conservative management or have a more chronic or degenerative dislocation may require surgical correction. Wheeldon's method for centralization of the extensor tendon is safe and simple, and avoided the need to distort normal collateral ligament or lumbrical anatomy.

Fig. 1 Wheeldon's method for correction of the extensor tendon subluxation at the MP joint. The ulnar junctura tendinum (dotted line) is released from adjacent tendon and sutured to the palmar radial sagittal band remnant of the deep intermetacarpal ligament (pink arrow).

Table 1. Data of the patients

No	Sex/Age	Cause	Location	Direction of S/L	Sx. Duration (Months)	Treatment
1	F/33	Traumatic	Lt. little	Divergent	1	Wheeldon's Method + augmentation c 4th EDC free sling
2	M/20	Traumatic	Rt. middle	Ulnar	7	Wheeldon's Method + Dorsal expansion reefing
3	F/16	Spontaneous	Lt. middle	Ulnar	12	Wheeldon's Method + Dorsal expansion reefing
4	M/13	Traumatic	Lt. middle	Ulnar	6	Wheeldon's Method + Dorsal expansion reefing
5	M/24	Traumatic	Rt. ring	Ulnar	3	Wheeldon's Method
6	F/79	Rheumatoid Arthritis	Rt. middle	Ulnar	2	Wheeldon's Method + Synovectomy + Capsular reefing
7	M/23	Traumatic	Rt. middle	Ulnar	1	Wheeldon's Method + Trapdoor repair
8	M/48	Spontaneous	Rt. middle	Ulnar	1	Wheeldon's Method + Dorsal expansion reefing
9	M/30	Traumatic	Rt. middle	Ulnar	2	Wheeldon's Method + Repair of capsule + Dorsal expansion reefing

Session: T4

Date: 16 February 2008

Venue: Meeting room 601

Time: 15:20 - 17:20

Moderator : Felicity THORLEY & Lay-lay TAN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	SZETO	Grace	Hong Kong	T4	16. Feb. 2008		Upper Extremity Disorders Related to Computer Use
2	LEE	Edwin	Hong Kong	T4	16. Feb. 2008		Physiotherapy Management for Upper Limb Work-Related Injuries
3	TANG	Dan	China	T4	16. Feb. 2008		Occupational Rehabilitation for Hand Injuries
4	CHENG	Andy	Hong Kong	T4	16. Feb. 2008		Occupational Therapy Management for Upper Limb Disorders

Session: W2

Date: 16 February 2008

Venue: Meeting room 603 - 604

Time: 15:20 - 16:15

Moderator : Alex CHOI & Loris REGOLI

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	TSE	Wing Lim	Hong Kong	W2	16. Feb. 2008		Role of CMCJ Arthroscopy in Advanced CMCJ Osteoarthritis
2	BADIA	Alejandro	USA	W2	16. Feb. 2008		Arthroscopic Artelon Interposition in CMCJ arthritis
3	PEGOLI	Loris	Italy	W2	16. Feb. 2008	240	Arthroscopic Resection of Distal Pole of the Scaphoid for Stt Joint Arthritis: Comparison Between Simple Resection and Implant Interposition and analysis of Disi Evolution
4	SEKIYA	Isato	Japan	W2	16. Feb. 2008		Arthroscopy of the Metacarpophalangeal and Proximal Interphalangeal Joint in Rheumatoid Arthritis

Session: W2

Date: 16 February 2008

Venue: Meeting room 603 - 604

Time: 16:15 - 17:20

Moderator : LK HUNG & Tunku Sara AHMAD

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	GARCIA-ELIAS	Marc	Spain	W2	16. Feb. 2008		Three-ligament Tenodesis for the Treatment of Scapholunate Dissociations. Indications, technique and results.
2	LIM	Be-hai	Singapore	W2	16. Feb. 2008		Chronic DRUJ Instability
3	NAKAMURA	Ryogo	Japan	W2	16. Feb. 2008		Lunotriquetral Dissociation, Diagnosis and Treatment
4	HO	Pak Cheong	Hong Kong	W2	16. Feb. 2008	391	Palmar Midcarpal Instability- Clinical Outcomes And Surgical Results Of Local (Hong Kong) Experience
5	SHIN	Alexander	USA	W2	16. Feb. 2008		Treatment of Carpal Instability associated with scaphoid nonunion and proximal pole AVN

Abstract # 240

ARTHROSCOPIC RESECTION OF DISTAL POLE OF THE SCAPHOID FOR STT JOINT ARTHRITIS: COMPARISON BETWEEN SIMPLE RESECTION AND IMPLANT INTERPOSITION AND ANALYSIS OF DISI EVOLUTION.
L. Pegoli, R. Luchetti, A. Ghezzi, G. Berto, G. Pajardi

INTRODUCTION: Isolated STT arthritis is a rare condition to be found. After failure of conservative treatment few surgical procedure have been described. Among these arthrodesis is an option but decreases midcarpal mobility. Arthroscopi treatemtn trys to avoid this complication.
MATERIALS AND METHODS: The authors present a prospective study of arthroscopic resection of the distal pole of the scaphoid in 22 patients. In one group of 9 patients simple resection was performed while in the other 13 patients were treated with scaphoid resection and pyrocarbone implant interposition. The authors measured as well DISI deformity evolution, one of the main critical point.
RESULTS: MAYO score system and DASH questonierre are evaluated at 6.012 and 24 moths after operation. DISI deformity, main critic point according to some authors, was also measured after this procedure analyzing radiographical follow at 6, 12 and 24 months after operation.
CONCLUSION: according to authors opinion arthroscopic resection of the distal pole of the scaphoid both with or without implant interposition shows good results.

Abstract # 471

ARTHROSCOPY OF METACARPOPHALANGEAL AND PROXIMAL INTERPHALANGEAL JOINT IN RHEUMATOID ARTHRITIS

Isato Sekiya, Masaaki Kobayashi, Hideki Okamoto, Hirotaka Iguchi, Yuko Waguri-Nagaya, Hideyuki Gotoh, Sinji Hisazaki, Takanobu Otsuka
Nagoya City University, Nagoya, Japan

[Objective] Arthroscopy of finger joints was carried out at our hospital since 1989. The purpose of this study was to report our experiences and assess the value of arthroscopy of finger joints.
[Materials and Methods] 65 finger joints in 30 patients with rheumatoid arthritis were treated using arthroscope. Five were male and 25 were female. The mean age at surgery was 44.5 years (ranging from 26 to 60). Arthroscopy and joint irrigation was performed in 22 joints, synovial biopsy in one joint and arthroscopic synovectomy in 42 joints. There were 21 metacarpophalangeal joints and 44 interphalangeal joints. All procedures were performed on an outpatient basis under axillary block or local anesthesia. Mini-forceps and the mini-shaver system with 2.5 mm cutter were used for biopsy and synovectomy.
[Results] Intra-articular structures of finger joints were well visualized, and magnified observation of the articular cartilage and synovial membrane was possible. Arthroscopy revealed the condition of the articular surfaces and hypertrophic synovial membrane with polyp-like villus formation. Arthroscopic biopsy and synovectomy of the dorsal capsule under visual control were possible in the two-portal technique. There were no patients with complications.
[Conclusions] We conclude that arthroscopy of finger joints was useful not only for the assessment of articular cartilage and synovium, but also for biopsy and synovectomy of the dorsal capsule under visual guidance.

Abstract #482

Three-ligament tenodesis for the treatment of Scapholunate Dissociations. Indications, technique and results
Marc Garcia-Elias, M.D., PhD.
Institut Kaplan, Barcelona, Spain

The use of tendon grafts to reconstruct the SL ligaments has evolved considerably since first introduced in 1975 by Dobyns et al. In 1990 Brunelli advocated the use of a strip of the FCR tendon to address both the proximal and distal aspects of the instability that is present in the rotatory subluxation of the scaphoid. Two small transverse palmar incisions are made to identify and obtain a strip of FCR tendon which is left attached distally. Through a separate dorsal incision, all scar tissue formed between the two bones is removed, as well as that formed between the scaphoid, trapezium, and trapezoid. With this, the scaphoid subluxation should be easily reduced. The split tendon is then passed through a drill hole made across the distal scaphoid. According to the initial technique, the split tendon that emerges off the scaphoid hole is sutured to the remnants of the dorsal SL ligament before being pulled taut proximally and anchored to the dorsal-ulnar corner of the distal radius by transosseous sutures. This method was subsequently modified by Van den Abbeele et al who suggested not to cross the radiocarpal joint but to use the dorsal RTq ligament as a solid anchoring point to the tendon graft. The overall early results of this modified Brunelli's procedure (also known as "three-ligament tenodesis") are very encouraging, most patients having returned to their previous occupation with complete relief of pain, excellent grip strength, with an average 45 degrees loss of flexion as compared to the opposite hand.

Abstract #483

Chronic distal radial ulnar joint instability

Patients with chronic instability of the distal radial ulnar presents with ulnar sided wrist pain, weakness and sometimes loss of supination and pronation.
The primary stabilizers of the DRUJ are the radial ulnar ligaments that forms part of the TFCC. Tear of these ligament results in instability. Based on our biomechanical studies, the break strength of the radial ulnar ligaments are about 200 N in cadaver specimens. Augmentation of the distal radial ulnar ligaments with the palmaris longus tendons by recreating the radial ulnar ligaments is important in reconstituting the complex interplay of these ligaments to stabilize the distal radial ulnar joint.
Cadaveric work on the 4 ligament augmentation reproduces the stability of the DRUJ.
Our first consecutive 9 patients with a follow up period of between 14 and 36 months had pain relief. The range of supination and pronation were preserved and DRUJ stability was restored in all cases.
Our recent patients, we have proceeded with 4 weeks of immobilization with a wrist splint rather than rather than the conventional 6 weeks plaster cast. These patients again enjoyed full range of supination and pronation with pain relief and stable distal radial ulnar joint.

Abstract # 484

Clinical Features of Lunotriquetral Dissociations

Ryogo Nakamura, Etsuhiro Nakao, Shigeru Kurimoto
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Lunotoriquetral dissociation is one of the cause of ulnar wrist pain and is confusing with other ulnar sided wrist problems. Ulnar wrist pain with tenderness ulnar snuff box or distal to ulnar head is suggestive of lunotriquetral injuries but TFCC injuries, ulnocarpal impaction syndrome and ulnar wrist arthritis also develop same sign. Provocative tests for lunotriquetral injuries are helpful for suspected diagnosis. Lunotriquetral ballottement test, lunotriquetral compression test, shuck and shear are believed to be specific maneuver for diagnosis and lunotriquetral compression test is most reliable with higher sensitivity than other three tests.

Classical X-ray findings in lunotriquetral dissociation including separation or step-off of lunotriquetral joints and VISI deformity are rarely detected in isolated lunotriquetral injuries other than lunotriquetral dissociation with carpal dislocations (reduced lunate dislocation, ulnar axial carpal dislocation).

To establish a diagnosis, arthroscopy is essential for patients with isolated lunotriquetral injuries, and it enables to differentiate traumatic lunotriquetral injuries from degenerative tears (ulnocarpal inpaction syndrome) which require ulnar shortening for patients with persistent pain. Surgical results are more favorable than in scapholunate dissociation possibly because of less range of motion and less axial stress in lunotriquetral joint than scapholunate joint.

Abstract #391

PALMAR MIDCARPAL INSTABILITY- CLINICAL OUTCOMES AND SURGICAL RESULTS OF LOCAL (HONG KONG) EXPERIENCE

LAU Yan On Yvonne, HO, Pak Cheong, TSE, Wing Lim, HUNG Leung Kim
Department of Orthopaedics and Traumatology, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong

INTRODUCTIONPalmar midcarpal instability (PMCI) is a rare type of nondissociative carpal instability. We reported this condition that never been described in Chinese population. Pathomechanics and optimal treatment of PMCI are uncertain worldwide. We analyze the unique diagnostic results in Chinese for the proposed etiology and evaluate our management outcomes.

METHODSBetween 1996 and 2006, sixteen diagnosed PMCI were reviewed for their clinical, radiologic and arthroscopic features. Most patients were initially managed conservatively; refractory cases were treated by arthroscopic thermal shrinkage and soft tissue reconstruction using flexor carpi ulnaris (FCU) graft. Clinical outcomes were evaluated at an average of 3.7 years.

RESULTSSeven men and nine female of a mean age 32 were diagnosed PMCI. All presented ulnar wrist pain in dominant hand. Positive midcarpal clunk test is most sensitive and specific to diagnose PMCI. Most patients reported minor wrist injury before development of symptoms. More than half associated with generalized ligamentous laxity. Common arthoscopic findings were reactive synovitis over ulnar compartment. Most cases responded well to conservative treatments. Arthroscopic thermal shrinkage performed in three patients had recurred instability in one case. Two patients who received our invented soft tissue reconstruction using split (FCU) graft claimed satisfactory results and restored stability at a mean follow-up 24 months.

CONCLUSIONPMCI is not rare in Chinese population but often be missed. Better understanding of its etiologies and pathomechanics helps to predict prognosis and management outcomes. Longer follow up of a larger case number are prospected to develop optimal treatment in specific cases.

Abstract # 445

Treatment of Scaphoid Waist Nonunion with Associated Avascular Necrosis of the Proximal Pole with Carpal Collapse: A Comparison of Three Vascularized Bone Grafts

Alexander Y. Shin, MD;
David B. Jones, Jr, MD; Heinz Bürger, MD; Allen T. Bishop, MD

HYPOTHESIS (NULL): Treatment of scaphoid waist non-unions with an avascular proximal pole and carpal collapse requires correction of deformity as well as introduction of blood supply to the proximal pole. We hypothesis there are no differences between the three types of vascularized bone grafts (1,2-intercompartmental supraretinacular artery (1,2-ICSRA) pedicle distal radius graft; iliac crest wedge (ICW) graft with implanted arteriovenous bundle; free vascularized medial femoral condyle (MFC) graft) with respect to union rates, time to union and complications.

METHODS: A retrospective review was conducted to identify all patients treated at two institutions who had scaphoid waist nonunions associated with an avascular proximal pole and carpal collapse. Carpal angles, time to union, union rates, and complications were recorded. ANOVA and Kaplan-Meier analysis was performed.

RESULTS: Between January 1994 and February 2006, 24 patients(24nonunions) were treated: 10 with 1,2 ICRSA grafts, 3 with vascular bundle ICW grafts, and 11 with free vascularized MFC grafts. Patient characteristics were similar for the groups and follow-up averaged 12 months. Overall, 18 scaphoid non-unions united at an average of 19 weeks after surgery. The 1,2-ICSRA grafts achieved union in 4/10 fractures at a median time to healing of 6.9 months; the ICW grafts achieved union in 3/3 fractures at a median time to healing of 6.3 months; and the MFC grafts achieved union in 11/11 fractures at a median time to healing of 3.5 months. Median time to healing was significantly shorter for the MFC grafts compared to the 1,2 ICSRA ($p<0.001$) and ICW ($p=0.01$) grafts.

CONCLUSIONS: (1) Non-unions treated with vascularized wedge grafts from the iliac crest or femoral condyle achieve higher rates of union than 1,2-ICSRA grafts. (2) Free vascular MFC grafts achieve union more rapidly than vascular bundle ICW grafts. (3) MFC vascularized bone grafts demonstrated superiority in the treatment of scaphoid waist non-unions with proximal pole avascularity and carpal collapse.

Level of Evidence: Level II
Alpha Error: 0.05
Beta Error: 0.2
Effect Size:
Sample Size: n=24

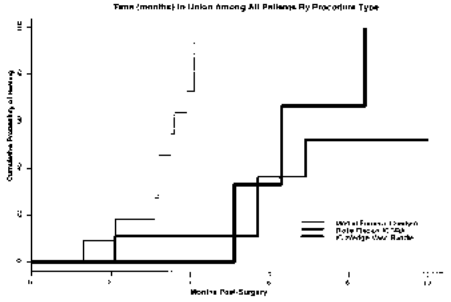

Figure 1: Kaplan-Meier Analysis

Session: Free Paper 15/16

Date: 16 February 2008

Venue: Meeting room 605

Time: 15:20 - 17:20

Moderator : CY LO & Raja SABAPATHY

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	CHUNG	Duke-Whan	Korea	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	207	Pollicization in Traumatic Amputation
2	LEE	Gi-Jun	Korea	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	218	Free pulp transfer of the toe for the reconstruction of the plus defects of the finger.
3	CHUNG	Duke-Whan	Korea	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	230	Segmented Bone Transpositional Graft in Forearm
4	LEE	Gi-Jun	Korea	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	234	Anterolateral Thigh Perforator Flap for the Coverage of Degloving Injury of the Hand
5	WOO	Sang-Hyun	Korea	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	249	The Fate of Neglected Vascular Injury of the Hand in Acute Hand Injuries
6	GOVINDASAMY	Balakrishnan	India	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	271	Role of Square Flap In Web Reconstruction
7	FAN	Cun-Yi	China	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	282	Gait Analysis after Microsurgical Repair of the Complex Injury in Children's Foot (1 Case report)
8	ZHANG	Gao-Meng	China	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	318	Anatomical study and clinical application of anatomic snuffbox flap
9	ZHOU	Wen-Jun	China	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	319	Application of tandem skin flaps with a common vascular pedicle in hand surgery
10	RUI	Yong-Jun	China	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	330	The Wrap-around Flap Combined with The Second semipulp flap for repair of total avulsion of digit
11	AHMED	Syed Kamran	Hong Kong	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	333	The versatile neurocutaneous flaps
12	RAJA SABAPATHY	S.	India	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	354	Functional outcome of one bone forearm done in salvage situations
13	CHEN	Chien-Chang	TAIWAN	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	380	Fingertip reconstruction using free thenar flap
14	GUO	Jing-Song		Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	381	Functional result assessment of nerve-sparing reverse digital artery flap for finger defect
15	XU	Germaine Gui-Qin		Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	384	Latissimus Dorsi - Serratus Anterior - Rib Composite Flap for Reconstruction of Bone and Soft Tissue Defects in the Lower Limb
16	TSE	Wing-Lim	hong Kong	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	388	Outcome of a new Cosmetic Dorsally Based Flap for Extra thumb Reconstruction
17	SUROTO	Heri	Indonesia	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	397	Replantation of hand ; clinical analysis and functional results of 60 cases
18	LAU	Yvonne Yan-On	Hong Kong	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	399	Intraosseous glomus tumor treated by toe-to-hand transfer after surgical excision
19	GU	Li-Qiang	China	Free paper 15/16 – Microvascular & Reconstruction	16. Feb. 2008	453	Treatment of total root avulsion of brachial plexus by contralateral C7 nerve transfer for directly repairing C8T1 through prespinal route combined with functioning gracilis transplantation

Abstract #207

Pollicization In Traumatic Amputation

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Purpose: The function of the thumb is critical to overall hand function. Thumb enables activities of pinch, grasp, and fine manipulation by circumduction and opposition. Amputation of the thumb secondary to trauma represents a much more significant loss than would result from loss of any other digit. Therefore, significant effort has been focused on thumb reconstruction. Various methods for thumb reconstruction were suggested as metacarpal lengthening, Z-plasty, phalangization, free osteocutaneous flap, pollicization, the toe-to-thumb transfer and wrap around flap according to amputation level. Pollicization, however, remains a useful method of thumb reconstruction if the amputation level was through the proximal third of the first ray. The purpose of this study was to report our clinical and functional result of undergoing pollicization in cases that traumatic amputation of thumb.
Material & Method: We have reviewed 9 cases operated at Kyung-Hee medical center from January 1986 to January 1999. We performed pollicization procedure for patients whose thumb had been amputated. It was pollicization of normal index finger in 2 cases, injured finger in 3 cases and little finger in one case. They were 33.7 years old on average and the average follow up period was 3.4 years. There were male in 5 cases and female in one case. We had followed up patients as checking bony union time, satisfaction about clinical results, opposition & pinch function, sensibility of thumb, and power by dynamometer as a evaluation of function.
Result: All pollicized thumb were survived. There was satisfaction about functional results in 4 cases(67%). Sensibility was excellent in 4 cases but 1 cases was 40% and another case was 70% as normal hand. We checked active range of motion to average 40° at mecarpophalangeal joint and average 20° at interpha langeal joint in 6 cases. Pinch power by dynamometer was average 36.8% of normal hand. In all cases, we have results improving pinch strength as the time going. Opposition by using pollicized digit was possible between new thumb and other 3 fingers in all cases.
Conclusion: With appropriate preoperative planning and attention to details of technique, pollicization is a safe procedure that the patients are highly satisfactory to function and aesthetic results. It is important that we must undergo pollicization to make proper position of new thumb.
Key words: thumb, amputation, reconstruction, pollicization

Abstract #218

Free Pulp Transfer of the Toe for the Reconstruction of the Pulp Defects of the Finger

Gi-Jun Lee MD, Seong-Han Ha MD, Sun-O Yu MD
MS Jaegeon Hospital, Daegu, Korea

Purpose: Pulp on the finger tip is very specific tissue that is glabrous, strong and highly sensory tissue, so reconstruction of defect of the pulp with most similar tissue is important for the functional recovery. Local flap, cross finger flap or thenar flap is good choice for the small defect, but free pulp transfer from the toe is most good for the large defect.
Materials and Methods: From Feb 2003 to Dec 2006, 44 cases of free pulp transfer from the toe were performed for the coverage of the defects of the finger. 32 cases were male and 12 were female. Mean age of the patients were 38 years old (21 to 50). It was composed with 20 cases of the thumb, 18 index finger and 6 long finger. 17 cases were right hand and 27 cases were left hand. Defects of the thumb (average area : 15.2 cm^2) were covered with free pulp from the great toe, and among the 24 cases of finger defect, larger defects (average area : 13.7 cm^2) were covered with free pulp from the great toe and smaller defects (average area : 8.95 cm^2) were covered with 2nd toe. Additional skin graft was performed at 19 cases of finger. Donor toes were closed primarily at 17 cases, skin graft was done at 27 cases.
Results: All cases were survived completely. One venous occlusion was occurred at next postoperative day and it was resolved with venous re-anastomosis. At 38 cases, vascular pedicle was dissected shortly (average 1.8cm) but at 6 cases which were artherosclerotic or spastic digital artery, long pedicle dissection was performed (average 9.3cm) for the overcome of the vasospasm. Cross toe flap was done at 1 case of grafted skin necrosis of the great toe. 4 cases of wound infection & 5 cases of partial necrosis of grafted skin were treated with conservative method. Debulking of the flap was done at 20 cases and z-plasty for release of scar contracture was performed at 9 cases. Two stage flexor tendon reconstruction was done at one case of delayed flexor tendon rupture. At 14th postoperative months, average static two point discrimination was 6.5mm, 83% of total ROM and 82% of grip strength was recovered. Patients were complaint about mild cold intolerance of the finger at 7 cases, mild finger pain at 5 cases and mild toe pain at 4 cases, but no gait disturbance was checked.
Conclusion: Free pulp transfer from the toe is good treatment of choice with functional and aesthetic aspect for the coverage of the large pulp defect of the finger which involved beyond the (distal) interphalangeal joint.

Abstract#230

Segmented Bone Transpositional Graft In Forearm

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Introduction: Ulna is nearly equal to radius in function and bony architecture and strength in forearm. But in lower extremity fibula is 1/5 of tibia in anatomic and functional point so we can find fibula transposition is commonly used in defect of tibia. We cannot find other article about segmental forearm bone transposition in man. The purpose of this study was to report our clinical and functional result of undergoing segmented transposition of ipsilateral ulna with its own vascular supply in defect of radius in 6 cases.
Material and Method: From 1994 to 2005, 6 segmented bone transpositional grafts in forearm were performed in Kyung Hee Medical Center. The distribution of age was from 20 years old to 73 years old. There was male in 5 cases and female in 1 case. The causes of operation were giant cell tumor in 1 case and traumatic origin in 5 cases; it was nonunion in 2 cases and fracture with severe comminution in 3 cases. Ipsilaterally segmented ulna keeping its own vascular supply was transported to defect of radius in severe traumatic patients and one patient whose tumor in radius had been excised. Transported ulna was fixed to proximal and distal radius remnants by plate and screw. In one case with giant cell tumor, transported ulna was connected to radius across wrist joint as wrist joint fusion. Joint preserving procedures were performed in 5 cases with crushing injury of radius.
Results: We could obtain solid bony union in all cases and good functional results. The disadvantage was relative shortening of forearm, but we could overcome this problem.
Conclusion: We think that ipsilateral segmented ulna transposition keeping its own vascular supply to radius can be perfomed with one of procedures in cases with wide defect in radius.

Abstract #234

Anterolateral Thigh Perforator Flap for the Coverage of Degloving Injury of the Hand

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Purpose: Degloving injury of the hand usually results in wide soft tissue defect so it's coverage and treatment is very difficult. We want to report the result of the treatment of the wide degolving injury of the hand using the ALT flap.
Materials and Methods: From Jan 2003 to Apr 2006, 20 cases of ALT flap were performed for the coverage of the degloved hand. Males were 14. Average age was 41 year old (5 – 55). Location of defects were composed by 11 cases of degloving of multiple digits, 3 of single digit, 2 of thumb and dorsum of the hand, 4 of digits & hand. Average area of flap 154cm^2(50-400cm^2) and donor site was closed primaryly only 6 cases. Neurorrhaphy for the recovery of the sensation was done at 1 case. Surgical syndactyly was divided at 14 cases and defatting of the flap was performed at 16 cases.
Results: Among the 20 cases, 19 cases were survived completely except one case of partial (40% of flap area) necrosis, so overall survival rate was 95%. One venous occlusion was occurred at next postoperative day and it was resolved with venous re-anastomosis. There was no complete flap loss or deep infection. Minor complications were 6 cases of mild wound infection and wound dehiscence of the flap and 5 cases of partial necrosis of grafted skin on the donor site. Despite of no nerve repair except one case, deep touch sensation was recovered with time caused by thin thickness from underlying bone.
Conclusion: For the preserving the maximal length of the hand and recovery of the function of remaining hand, ALT flap was good method for the coverage of the wide degloving injury of the hand.

Abstract #249

The Fate Of Neglected Vascular Injury Of The Hand In Acute Hand Injuries

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In acute hand injury, there are sometimes happened neglected or overlooked vascular injuries by primary operators. The authors evaluated the final results and prognosis after secondary revascularization. In eight cases, the authors performed secondary revascularization after prolonged warm ischemia. Five fingers in five cases among them were successfully survived and three cases finally necrosed. The mean warm ischemic time was 56.1 hours. In revascularization procedures, end-to-end artery anastomosis was possible in six cases. In two cases, vein graft was needed to anastomose digital artery, which resulted in complete survival of the fingers. In all three cases, revision amputation of the fingers was done. In acute complex hand injury, the importance of evaluation of the vascular injury can not be overemphasized. The necessity of the early secondary revascularization as well as serious consequence caused by misdiagnosis of vascular injury should be aware.

Abstract #271

Role Of Square Flap In Web Reconstruction

Balakrishnan GOVINDASAMY

Square flap had been first described by Prof. Hiko Hyakasoku of Japan for reconstruction of post burn contracture of the axilla. It consists of an advancing square and two transposisng triangles. The square flap is planned on one side of the contracture band and the triangular flaps planned on the other side. The square flap offers an lengthening of 225%. It is an extremely useful flap for web reconstruction also. We have used the flap for congenital hand differences, post traumatic and post burn web contractures. 48 Web reconstruction procedures using square flap were carried out in our Hospital for 30 patients over the last 2 years. Satisfactory release of web contracture was obtained in all the patients. We present our experience with the procedure including indications, technique and the results.

Abstract#282

Gait Analysis After Microsurgical Repair of the Complex Injury In Children's Foot (1 Case report)

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Objective To investigate the long results of microsurgical repair of the children's foot complex soft tissue and epiphysis defects, and to evaluate the walking and weight bearing of the foot by using the gait analysis.
Method We used two stage microsurgical methods to repair the soft tissue and metatarsal epiphysis, first to do thoroughly debridment, and use the free dorsi latissimus myocutaneous flap transplantation to cover the soft tissue defects. Secondly, to reconstruct the missing bone frame with epiphysisby by using vascularized proximal fibular head transplantation.
Result The transplanted dorsi latissimus myocutaneous flap survived after operation. When followed up for four year and three months, the transplanted fibula became longer and enlargement. The injured foot has an acceptable shape and the nearly normal gait function except weakness of anterior tibial muscle power and limitation of rotation of the ankle.
Conclusion For the complex injury of the foot in children, the vascularized free flap transfer can prevent the contracture caused by scar during growing, and vascularized fibular head transplantation can substitute the missing epiphysis to meet the continuous growth need of bone frame.

Abstract#318

Anatomical Study And Clinical Application Of Anatomic Snuffbox Flap

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Anatomic snuffbox flap is the flap supplied by a cutaneous branch of radial artery in the anatomic snuffbox. Our anatomic study showed radial artery gives off a constant cutaneous branch 4.63±0.42mm distal to radial styloid process. The diameter of the branch is about 0.5mm. The pedicle length is 4.18±0.25mm. The branch runs proximally and supplied distal and radial skin of the forearm. The branch has two small venae commitants. In the anatomic snuffbox, superficial branch of radial nerve is located deep to deep fascia of wrist, and runs distally and gives off 4-5 branches to radial dorsum of hand. When the flap is harvested, the superficial branch of radial nerve can be kept on its original position and not damaged. The midpoint of the anatomic snuffbox is origin of the cutaneous branch, also rotation point of the flap. The axis of the flap is junction line between radial styloid process and head of radius. The flap is raised under deep fascia. The harvestable area of the flap is about 10x5cm. The flap can be used to cover dorsal or volar skin defects of wrist, and skin defects of radial dorsum of hand or dorsum of proximal pharange of thumb. The operative procedure is also introduced. If the width of the flap is over 3 cm. the secondary skin defects of donor area need skin grafting. Since 1991, 39 anatomic snuffbox flaps have been completed. Except of 2 partial necroses, the others survived completely after operation.

Abstract #319

Application Of Tandem Skin Flaps With A Common Vascular Pedicle In Hand Surgery

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Objectives To explore applicative merit of tandem skin flaps with a common vascular pedicle in hand surgery.
Methods Anterior supramalleolar flap and dorsalis pedis flap based on anterior tibial-dorsal pedal artery and venae comitantes were used in 4 patients, and Medial flap of the leg and medial pedal flap based on posterior tibial-medial plantar vascular system were used in 5 cases in order to repair big skin defects in dorsum and palm of hand. The average areas of the flaps respectively were in turn 16x8cm、15x7cm、10x9cm、and 9x6cm.
Results All flaps survived completely in 9 patients, and the big skin defects in palm and dorsum of hand or forearm were covered better. The texture of the flap was good and thin without excessive fats.
Conclusions tandem skin flaps with a common vascular pedicle are effective method for repair of big skin defects in palm and dorsum or forearm, can reduce operative risk and increase operative achievement ratio. In order to decrease operative complication the pedal donor sites had better be covered using whole-thickness skin graft. Under special condition anterior supramalleolar flap and dorsalis pedis flap based on anterior tibial-dorsal pedal artery and venae comitantes can also be made as a big intact flap. However, this may result in bigger damage to foot, so its indication should be selected strictly.

Abstract#330

The Wrap-Around Flap Combined With The Second Semipulp Flap For Repair Of Total Avulsion Of Digit

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Objective : To discuss the method for repair of total avulsion of 2 to 4 fingers and to find the best procedure.
Methods: The wrap-round flap with part toenail combind with the dorsal pedical flap to repair soft tissue defect of the dorsal of digit and part of the palmar of digit, the second semipulp flap to repairs of tissue defect of the palmar of digit, transfer of two tissues with one pedicle to repair total avulsion of 2～4 fingers.
Results: 9 fingers were all survived in 6 cases. The wound of recipient area primarily healed up in 8 cases,There was 1case repaired by the bilateral wrap-around flaps and bilateral second semipulp flaps for index and middle finger, the distal phalanx of middle finger necrosis because of dislocation of DIP,3 months later, injury healed after the necrosis of phalanx excised, but the nail and the nail bed were necrosis. Except 1 case which the grafted skin necrotized in the donor area of the big toe, the rest cases all had primary healing. After 6～14 months following up in all cases, the range of motion was 60°~70°in MP joint and was 40°~50°in PIP joint. The pulp of repaired finger are full, the two point distinguish were 8~12mm. the appearance of the nail was fine, 1 digit's nail was atrophy and 1 digit's nail was defect. No complaint on walking without pain and edema of the donor foot, the grafted skin had deep color and the activity of joints were nomal.
Conclusion: The wrap-round flap with part toenail combined with the second semipulp flap is a good approach in treatment of digital skin avulsion injury.
Key Words: Digit; Avulsion injury; Toe nail flap; Transplantation; Microsurgery.

Abstract#333

The Versatile Neurocutaneous Flaps

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Background: Reverse flow neurocutaneous flaps are being utilized more frequently during the past decade to cover vital structures around the foot and ankle area. Their potential advantages are their relatively constant blood supply, ease of elevation and preservation of major vascular trunks in the leg. Their potential disadvantages remain venous congestion, donor site morbidity and lack of sensation.
Methods: This descriptive case series was conducted at Queen Mary Hospital, University of Hong Kong, from 1997 to 2003. Fourteen cases of neurocutaneous flaps were identified through medical records. A detailed questionnaire was developed addressing variables of interest.
Results: Out of fourteen patients undergoing neurocutaneous flaps, there were ten reverse sural artery flaps, two saphenous artery retrograde and two saphenous artery antegrade flaps. There was no flap failure with minimum donor and recipient site morbidity.
Conclusions: Reverse sural artery flap remains to be the workhorse flap for the reconstructive micro surgeons. We highly recommend the flap to resurface soft tissue defects of the foot and ankle. Anastomosis of the sural nerve to the digital plantar nerve can potentially solve the issue of lack of sensation in the flap especially when used for weight bearing surfaces.

Abstract#354

Functional Outcome Of One Bone Forearm Done In Salvage Situations

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Material and Methods: In salvage situations, long term assessment of one bone forearm done during four forearm replantation and in one long segment gap secondary to osteomyelitis was assessed. Average follow up was 3.5 years (range 1.5 to 8 years). Two patients had proximal ulna to distal radius and two had radius to radius fixation. The patient with post infective non-union with gap measuring 10 cm was reconstructed with vascularised free fibula graft attached proximally to the ulna and distally to radius. Four patients had fixation of the forearm bone done in mid-prone position and one in supinated position of the forearm. Two patients had secondary tendon procedures to improve function. Patients were evaluated with Chen's criteria and Peterson 10 point subjective scoring system.
Results: All the patients had primary bone union. Using the evaluation criteria three had excellent and two had good results. Average shortening was 7.5 cm. Range of movements- All had >90 degree flexion at elbow and >90 degree range at wrist joint. Patients with proximal ulna to distal radius fixation did not have any supination and pronation. One of the patients who had radius to radius fixation had 90 degree supination and 30 degree pronation and another had 90 degree pronation and 30 degree supination.
Conclusion: One bone forearm is a useful technique for salvage situations. Radius to radius fixation allows supination and pronation.

Abstract#380

Fingertip Reconstruction Using Free Thenar Flap

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Purpose: Finger injury resulting in loss of pulp or tip is not uncommon in emergency services. Various flaps have been designed for reconstruction of this defect. The free thenar flap, although rarely used, could provide some unique advantages such as glabrous skin, satisfactory sensation and same operation field. The goal of this study is to evaluate the surgical results of this flap in a series of seven cases.
Materials and Methods: From January2002 to December 2005, 7 patients with soft tissue defect over fingertip or pulp underwent free thenar flap reconstruction. Five patients had index defects, one involved the middle finger and one had thumb pulp defect. The flap size ranged from 1.5cm x2.5cm to 3cm x4.5cm. The average follow-up period was 6 months at least. Postoperative examinations included sensation, motion and pinch power. The hand span, scar condition, contours of the fingertips, as well as the patient's satisfactions were also evaluated.
Results: All the flaps survived and were sufficient to cover the defects. Vascular variation was noted in two patients. One overhanging flap tip needs a secondary revision procedure. The contour of the reconstructed fingertips or pulps was good in 5 patients and fair in 2 patients. The two-point discrimination was about 7mm in average. The results of slipping pinch test of thumb-index or thumb-middle finger were comparable to the other hands. The two-point discrimination at thenar area was slightly decreased, comparable to the other hand. Mild scar tenderness was complained in two patients. All the patients were satisfied with the results.
Conclusion: The free thenar flap provides a good alternative in the reconstruction of fingertip and pulp defect. The advantages of the free thenar flap include same operation field, one-stage operation, good skin texture and thickness, minimal donor site morbidity, and comparable vascular caliber to the digital vessels. All of these are favorable in reconstruction of the volar and tip defects of the fingers. However, the disadvantages of vascular variation and wrist scar problem should not be ignored.

Abstract#381

Functional Result Assessment Of Nerve-Sparing Reverse Digital Artery Flap For Finger Defect

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Background: The reverse digital artery flap has been applied for reconstruction of finger defect.The purpose of this study was to investigate functional results of nerve-sparing reverse digital artery flap comparing to standard one.
Methods: Between 2005.1 and 2006.1,5 patients received nerve-sparing reverse digital artery flap for finger defect were included in the study.Another 5 patients receiving standard reverse digital artery flap were included as comparing group.The recipient site and donor side of finger were examined.The healthy finger of the same patient on the other hand was used as control group. They were interviewed for evaluation of sensation to pain, thermal and two-point discrimination.The results were compared between the two groups and control group.
Results: Most patients had few subjective symptoms. The most common complaints were decreased sensation of pain and two-point disctimination . There were no significant differences of recipient site between the two groups but worse than the normal finger on the other hand.However,the sensation of donor side of finger was better in the nerve-sparing group.
Conclusion: Long-term follow-up revealed nerve sparing reverse digital artery flap could persever more sensation function of the donor side of finger with same function result of recipient site.

Abstract#384

Latissimus Dorsi - Serratus Anterior - Rib Composite Flap for Reconstruction of Bone and Soft Tissue Defects in the Lower Limb

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Introduction: The latissimus dorsi - serratus anterior - rib (LD-SA-rib) flap has been described in the literature for reconstruction of open fractures of the lower limb and for oral and mandibular reconstruction. It is especially useful for reconstruction of large concomitant soft tissue and bony defects, requiring microsurgical anastomosis of only one pedicle. We present six cases of complex lower limb injuries reconstructed using this flap.
Methods: From 2000 to 2007, six patients were treated in TTSH with the LA-SA-rib flap. All were due to road traffic accidents (four motorcyclist and two hit by on-coming vehicle). One had a crush foot with loss of the cuneiform bones and associated defect of the dorsum of the foot, initially covered with an adipose-fascial pedicled flap, with subsequent instability of the foot. Four had Grade IIIB tibia/fibula fractures which included one with incomplete amputation, and another with popliteal artery injury requiring grafting. The sixth had an infected supracondylar fracture of the left femur with subsequent bone and soft tissue defect. The first case was done electively to reconstruct the foot and to achieve good soft tissue coverage, all the rest were done. All the rest had initial skeletal stabilisation with external fixators and multiple debridements. The composite flap was done once a clean wound was achieved. Skeletal continuity was achieved using minimal screw fixation, and stabilisation with the external fixators. Vascular anastomosis was achieved using end to end to the sural artery in two, end to end anastomosis using the anterior tibial artery in three, and end to side with the popliteal artery in one. The average duration between injury to flap surgery was 4.45 months (range 11 days to 15.5 months). The average follow-up period was 12.83 months (range, 2 months to 3.33 years).
Results: All flaps survived. All wounds healed at an average of 6.5 weeks (range 6-7 weeks, excluding Kong and Alfred). Bony union was achieved between the proximal and distal graft-host junction at an average of 8 months for the first two patients (remaining 4 patients not healed completely). There were complications of deep infection in two patients (Alfred, Jasim) which required surgical drainage. Those with deep infection were on more than 6 weeks of antibiotics for treatment of infection. Those without deep infection were treated till there infection settled. At final review, the patient with foot reconstruction had hypertrophy of the rib and a stable foot allowing him to regain a normal gait at 9.5 months followup. One patient with open tibia fracture also showed hyptertrophy of the rib and a stable tibia allowing him to weight bear normally. However, the rest of the cases have a relatively short followup (range of 2 to 6 months), and the rib grafts have not hypertrophied to allow weight bearing.
Conclusion: The LD-SA-rib flap is a versatile flap which is suitable for a one-stage soft tissue coverage and bridging of bony defect in patients with open fractures of the lower limb. They can be performed as an early or late procedure.

Abstract#388

Outcome of a New Cosmetic Dorsally Based Flap for Extra Thumb Reconstruction

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Introduction : Extrathumb is the most common congenital upper limb anomalies in Orientals. The role of surgery in cosmetic and functional improvement are equally important. We proposed a new flap design to perform the reconstruction so that the scar just hide away from the usual socially presented hand surface
Materials & Method : We proposed a dorsally based gentle curvilinear flap with small proximal and distal zigzag extensions, closing the wound over the natural boundary between the dorsal and palmar skin. 26 thumbs of 12 boys and 13 girls were operated, functional and cosmetic outcome were assessed .
Results : The mean follow-up was 8 years, There was no flap failure or infection but one partial ischaemia. 7% with metacarpal head prominence .All were able to perform opposition and chuck pinch. There were 4% scar hypertrophy and 8% scar hyperpigmentation. 3.8% compliant of pulp pain
Functional satisfaction was 50% and scar satisfaction was 77%. The scar was noticed in 11.5% and 7.7% during writing and feeding and noticed by friends in 13%.
Conclusion : Our new flap design place the scar out of the social presenting surface without compromising function and major complication and may be recommended for most of the extrathumb surgery.

Abstract#397

Replantation Of Hand; Clinical Analysis And Functional Results Of 60 Cases

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Background: During the past 5 years periode January 1995 – June 2000 , we performed 60 cases replantation on digits and hand in Dr.Soetomo General Hospital . We didn't use special diagnostic system to determine indication of replantation. It is important to obtained successful replantation results. Post operative case is also important to achieve good functional results.
Method and material: Our design study is retrospective study. Sample are all patients that was pwerformed replantation on amputated hand injury by replantation team in Dr.Soetomo General Hospital in Surabaya during period January 1995-June 2000. The survival and functional results. We use chi square to analyze the datas.
Result: Our study reviews 60 cases of replantation on amputated hand injury between January 1995 and June 2000. All cases were operated by replantation team in Dr.Soetomo General Hospital. The overall survival rate was 52 %. Clean cut injury had higest survival rate (70 %). A higher survival rate and more satisfactory results correlated with length of ischemia time and followed rehabilitation. According SATT diagnostic system, the survival rate was 60 % from completely nonviable, isolated, single digit and clean cut injury . But more 52% of completely nonviable, extended, multi digits, and crush – avulsion injury had failure results.
Conclusion: To achieve successful of replantation , firstly we should determmine indication of replantation , and we sugesst to use SATT diagnostic system for determine indication of replantation on hand injury. Not merely survival results but also a satisfactory functional results must be obtained by replantation team.

Abstract#399

Intraosseous Glomus Tumor Treated By Toe-To-Hand Transfer After Surgical Excision

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Introduction: Glomus tumor has received its attention in clinical literature because of its rarity after it was firstly described by Masson in 1924. Primary intraosseous glomus tumor is even rare with 75% of them developed in hand. After Surgiura reviewed nine cases in 1976, there were only 5 cases of intraosseous glomus tumor that involving hand reported between 1981 and 2001.
Method: We reported a case of intraosseous glomus tumor in the distal phalanx of right ring finger of a 19-year old man and revealed the process of diagnosis, surgical decision and management by toe-to-finger transfer after en bloc excision of distal phalanx. Literature review of fourteen reported intraosseous glomus tumor cases in the past 60 years was performed.
Result: In our case, atypical presentation was established because of the extensive intraosseous tumor involvement. Radiological diagnosis was non specific. Incisional biopsy was performed and beneficial for histological diagnosis, tumor extent assessment and surgical decision. Microvascular reconstruction by left second toe-to-right ring finger transfer following en bloc excision of distal phalanx was performed in view of extensive soft tissue infiltration. Symptom relief, cosmetic and function results were satisfactory at 2 year follow-up.
Conclusion: To our knowledge, there was no previous attempt of toe-to-hand transfer after intraosseous glomus tumor excision. The operation has achieved successful symptom relief, cosmetic reconstruction and function preservation compared with the traditional curettage or amputation. With sufficient resources and confidence, we believe toe-to-hand transfer a feasible choice of management for benign phalanx tumors with extensive soft tissue involvement.

Abstract#453

Treatment Of Total Root Avulsion Of Brachial Plexus By Contralateral C_7 Nerve Transfer For Directly Repairing C8T1 Through Prespinal Route Combined With Functioning Gracilis Transplantation

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Objective: To explore the clinical design and therapeutic effect of total root avulsion of brachial plexus by contralateral C7 nerve transfer for directly repairing C8T1 through prespinal route combined with functioning gracilis transplantation.
Methods: 16 cases of total roots avulsion of brachial plexus were operated at one month to 3 months after injury. All of contralateral C_7 nerves were successfully transferred to directly repair avulsed C_8T_1 roots or lower trunk by prespinal route. At 2nd operation stage the functioning gracills transplantation was preformed to reconstruct the elbow flexion and fingers extension in 9 cases.
Results: The average lengths of contralateral C_7 from root to anterior or posterior divisions were (75.1±12.0)mm、(67.4±11.6)mm respectively in 16 cases at the 1st operation. The positive Tinel signs of ulnar or median nerves were located in the proximal arm at 3 months after operation in all 16 cases. Follow-ups were carried out in 9 cases who had been discharged for 6 to 18 months after the first operation. The positive Tinel signs of ulnar or median nerves were located in the elbow at 6 months and in the wrist or plam at 9 months. The contraction of sternocostal part of pectoralis major(M_3) was found at 9 months in 3 cases. There were the restoration of the taction-pain sensation in the palm ,finger , and medial side of forearm and the contraction of flexor carpi ulnaris and flexor digitorum(M_3) at 12 to 18 months after 1st operation. In 5 patients the flexion of elbow and extension of fingers and thumb restored at 9 to 12 months after the 2nd operation. Their elbow flexion was 90°～120°and M_3 (Highet's method) , and their finger and thumb extension M_3.
Conclusion: There is the possibility of the operative design and clinical application of total root avulsion of brachial plexus by contralateral C7 nerve transfer for directly repairing C8T1 through prespinal route combined with functioning gracilis transplantation. There are not only the restoration of sensation and flexion of wrist and fingers, but also the restoration of elbow flexion and fingers extension.

Session: Free paper 17

Date: 17 February 2008

Venue: Meeting room 601

TIme: 08:00 - 09:00

Moderator : CW CHAN & Ge XIONG

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382	YANG	Xiao-Dong	China	Free paper 17 – Free paper from Mainland China 2	17. Feb. 2008	429	Free toe with dorsum flap of foot transplantation for palm soft-tissue and thumb defect
383	YANG	Xiao-Dong	China	Free paper 17 – Free paper from Mainland China 2	17. Feb. 2008	430	The clinical experience of finger and thumb reconstruction
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Abstract # 428

The middle-term effects of proximal row carpectomy

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Objective: To evaluate the clincial effects of proximal row carpectomy after a minimum of 3 years follow-up.
Methods: The follow-up was made on 19 cases with proximal row carpectomy in our center from 1992 to 2004.
Results: The follow-up period was from 3 to 10 years, averaging 6.7 years. There was 16 cases with no pain at all, and 3 cases with mild pain. In the follow-up, 8 wrists had degenerative changes in the X-films. The flexo-extension motion range of the wrist was （72±17）° and radio-ulnar motion range was （39±11）°, which were 63% and 45% of the contralateral wrist respectively. The grip strength of 12 cases after the surgery were （20±11）kg which was 77% of the contralateral side.
Conclusions: Proximal row carpectomy has a steady clinical effects in the middle-term follow-up.
Key words: prxoximal row carpectomy ; middle-term ; follow-up

Abstract #429

Free toe with dorsum flap of foot transplantation for palm soft-tissue and thumb defect

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Objective: To explore the clinical outcome of free toe with dorsum flap of foot transplantation for palm soft-tissue and thumb defect.
Methods: According to the clinical feature of palm soft-tissue defect with thumb lost, we designed a combined tissue flap with free toe and dorsum flap of foot to repair the damaged hand. 3 patients received the operation from May 2006 to May 2007.
Results: All tissue-flaps survive and have good shape after 6-12 months follow up. Through the criterion of the Society of Hand Surgery CMA: Excellent: 1 finger, Good: 2 fingers.
Conclusion: Free toe with dorsum flap of foot transplantation for palm soft-tissue and thumb defect was a feasible operation method.
Key Words: Toe; dorsum flap of foot; thumb; transplantation

Abstract #430

The clinical experience of finger and thumb reconstruction

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Objective: To explore the clinical outcome of finger or thumb reconstruction with free toe.
Methods: 42 patients with 46 finger defects received different types of finger or thumb reconstruction with free toe tissue from September of 2000 to April of 2007.
Results: 45/46 fingers survive. Through the criterion of the Society of Hand Surgery CMA: good rate was 77.7%.
Conclusion: Proper operation time,skilled microsurgical technique, treatment of blood vessel variation or crisis and active rehabilitation training were the keys of the finger reconstruction.
Key words: Toe; finger and thumb; reconstruction

Abstract #431

A New Surgery Treatment for Thumb Reconstruction by One-stage plasty Free Second Toe Transfer

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Objective: To investigate a more perfect method for a nice outward appearance of the thumb(finger) reconstructed.
Methods: free one-stage plasty second toe transfer for thumb reconstruction by crossing-over the whole skin-nail flaps from the great toe and the second toe .
Results: The reconstructed thumb gets a nice looking and normal function while no blight to the great toe occurred .
Conclusion: It is an effective new procedure in ameliorating outward appearance of the reconstructed thumb by transferring the free moulded second toe.
Key words: Thumb; Reconstruction; Toe; Transfer; Skin-nail flap;
Crossing-over; Moulde; Microsurgery

Abstract #432

FK506 promoting proliferation of Schwann cells in vitro and NGF of Schwann cells secreted highly by itself

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Objective: Study on FK506 promoting proliferation of Schwann cells in vitro and NGF of Schwann cells secreted highly by itself.
Methods: To divide purified Schwann cells into six groups : A group(control) DMEM/F12 contained 10% calf bloodserum ; B group 0.1ng/mlFK506; C group 0.5ng/mlFK506; D group 1.0 ng/mlFK506; E group 5.0 ng/mlFK506; F group 10 ng/mlFK506。To observe morphology of Schwann cells by invert microscope and evaluated Schwann cells in immunocytochemistry staining with anti-S-100. To screen the best concentration of FK506 which promoted proliferation of Schwann cells by MTT. Cell cycle of Schwann cells were determined by flow cytometry. The level of NGF in the conditioned media was determined by an enzyme-linked immunoadsordent assay after 72h.
Results: 0.5ng/ml FK506 is the best concentration which promoting proliferation of Schwann cells among 5 groups. Both the rate of Schwann cells ´ S cycle and the secrete of proliferated Schwann cells ´ NGF are higher than group A significantly.
Conclusion: FK506 can promote proliferation of Schwann cells at early time in vitro and Schwann cells ´ good situation is highly kept to secrete NGF.

Abstract #433

Analysis of 203 cases of fingers and thumbs reconstruction with free tissue transplantation

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Objective: 203 cases with fingers and thumbs reconstruction with free tissue transplantation were evaluated.
Methods: From 1994, 203 cases were accepted free tissue transplantation to reconstruct fingers and thumbs. All surgery procedure included: second toe transplantation, wraparound free flap and free flap transplantation and so on.
Results: 202 cases were succeeded. According to the standard of China society for Surgery of the Hand, function of reconstructed fingers and thumbs were: excellent 98, good 69, fair 32, poor 3.
Conclusion: Free tissue transplantation was an effective therapy to reconstruct the function of the hand.
Key words: Second toe transplantation; Wraparound flap ; Hand injuries

Abstract #434

Clinical applications of the perforator flap of forearm for repairing skin defect of the finger

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Objective: To explore the clinical applications of perforator flap of forearm for repairing skin defect of the finger.
Methods: 13 cases with skin defects of the finger, the skin defects were from 1.8~2.6cm to 3.0~ 5.0cm, all cases were repaired with the perforator flap of forearm, and 7 cases with the cutaneous nerve anastomosis were done, the forearm wound were suture direct.
Results: All 13 cases flaps were survived, 4 cases of flaps were anaplasty after 3 months. Postoperative follow up ranged from two months to two years, with an average of seven months, the function and appearance were satisfactory. Two point discrimination recovered to 4~6mm with the cutaneous nerve anastomosis were done.
Conclusion: The perforator flap of forearm was a ideal method for repairing skin defect of the finger.

Abstract #435

Investiged the venous drainage of fingertip replantation

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Objective：To explore the venous drainage of fingertip replantation. Methods：43 cases(52 fingers) were replanted. 19 fingers anastomosis of the terminal digital artery, individual treatment with bloodletting、enlarging of medullary cavity and in situ suture.
Results：43 replanted fingertips survived, 9 fingers failure, the survival rate was up to 82.7%. Postoperative follow up ranged from six months to two years, with an average of fifteen months, Thickening and coiling of finger nails were seen in 2 digits and atrophy of the fingerpulp in 3 digits. Satisfactory appearance was obtained in 38 digits, the recovery of movement and sensation were excellent and 2-PD of 4~6mm.
Conclusion : A venous drainage of mechanism except the bloodletting and medullary cavity, but the venous sinus and artery tidal pulsation must be investiged.

Abstract #436

Replantation of severed finger tip in infant: 5 cases report

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Objective: To retrospectively analyze the characteristic and curative result of replantation of severed finger tip in infant(< 3 years old).
Methods: 7 severed finger tips of 5 infants (1.5-3 years old) were replanted between 2003 to 2005 in our department, which included 1 thumb, 2 index fingers,1 median finger,2 ring fingers and 1 little finger. Yamato classification: Zone II 2 fingers and Zone III 5 fingers, respectively. Anterograde replanting procedure was adopted.
Result: All replanted finger tips survived. Follow-up ranged from 6 to 12 months. The appearance of finger tips were satisfactory. Nail grew normal without deformity. Nerve function recovery was demonstrated by sweat test. Conclusion: Based on experience microsurgical technique, high survival rate and good result could be expected in infant finger tip replantation,
Key words: Infant ； Finger tip ； Severed finger ; Replantation

Abstract #437

Reversed sural neurovascular fasciocutaneous flap for reconstruction of soft-tissue defects in ankle and foot

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Reversed sural neurovascular fasciocutaneous flap for reconstruction of soft-tissue defects in ankle and foot

Objective: To evaluate clinical significance of the reversed sural neurovascular fasciocutaneous flap for reconstruction of soft-tissue defects in ankle and foot.
Method: From July 1994 to September 2002,52 cases with soft-tissue defects of the ankle and foot were reconstructed by the use of reversed sural neurovascular fasciocutaneous flap, including traumatic defects in 47 cases, chronic ulcer in 3 cases and tumor in 2 cases. The flap area ranged from 4×6cm to 10×21cm. Results: The flaps survived completely in 48 cases while 4 cases revealed distal partial necrosis and secondary free-skin graft were further conducted. All soft –tissue defects were repaired and their accompanied bone and tendon exposure healed. Forty-six cases were followed-up for 6 months to 48 months, the color and texture of the flaps were excellent and 2-PD demonstrated 11～17mm(averagely 14mm).The functions of ankle joints were good . Conclusions: The reversed sural neurovascular fasciocutaneous flap is convenient in design and dissection . The use of the reversed sural neurovascular fasciocutaneous flap demand no sacrifice to main arteries in leg. The reversed sural sural neurovascular fasciocutaneous flap can be used , therefore, to a certain degree ,to replace the use of vascular anostomosed flaps.
Key words: Surgical flap Soft-tissue defect sural nerve

Abstract # 427

The neurocutaneous flap of the dorsal branch of the lunar nerve for the reconstruction of the litter finger tip: the anatomy and clinical application

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Objective: To evaluate the clincial effects of proximal row carpectomy after a minimum of 3 years follow-up.
Methods: The follow-up was made on 19 cases with proximal row carpectomy in our center from 1992 to 2004.
Results: The follow-up period was from 3 to 10 years, averaging 6.7 years. There was 16 cases with no pain at all, and 3 cases with mild pain. In the follow-up, 8 wrists had degenerative changes in the X-films. The flexo-extension motion range of the wrist was （72 17） ° and radio-ulnar motion range was （39 11） ° , which were 63% and 45% of the contralateral wrist respectively. The grip strength of 12 cases after the surgery were （20 11） kg which was 77% of the contralateral side.
Conclusions: Proximal row carpectomy has a steady clinical effects in the middle-term follow-up.
Key words: prxoximal row carpectomy ; middle-term ; follow-up

Session: Free paper 18

Date: 17 February 2008

Venue: Meeting room 603

Time: 08:00 - 09:00

Moderator : W.L CHAN & Chinder PRAMOD

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39	KIM	Jae-Kwang	Korea	Free paper 18 – Fracture Distal Radius 2	17. Feb. 2008	58	Dorsally Unstable Distal Radius Fractures: Volar Locking Compression Plate Fixation Versus Percutaneous K-wire Fixation
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Abstract #30

Should we do conservation treatment for distal radius fractures with osteoporosis ?
Masahiro TOBE

【Purpose】As for the treatment of distal radius fractures with osteoporosis, the discussion has separated whether to do conservative or to do the surgical treatment. The comparative prospective study between the two groups is reported.
【Material and Methods】Between 2004 and 2006, 148 cases were treated. In order to analysis, all intra-articular fractures were excluded. In conservative treatment (group C), casting was continued during 5.2 weeks. In surgical treatment (group S), the operation was undergone on 7.2 days after the injury. Palmar angle-fixed plating without transecting the pronator quadratus muscle (PQ) was performed. Clinical evaluations included Mayo wrist score, X-ray measurements, the term to return to daily activities and complication.
【Results】In Mayo wrist score, there were 76.6 points in group C and 90.8 points in group S. In X-ray measurement, radial shortening was 2.5 mm in group C and 0.5 mm in group S. On the term to return to daily activities, there were 11.5 weeks in group C and 3 weeks in group S. In group C, the complications included bone atrophy in 41 cases, re-displacement in 39, contracture in 16 and CRPS in 2. In group S, the complications included bone atrophy in 6, contracture in 2 and irritation of the extensor in 2.
【Conclusions】Palmar angle-fixed plating without transecting the PQ was better than the conservative treatment. We believe that the distal radius fractures with osteoporosis should be operated to return daily activities earlier.

Abstract #39

Minimally invasive osteosynthesis (MIO) for distal radius fractures with small intramedullary nail
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Introduction
Since 2006 we have used MIO technique with a small intramedullary nail for distal radius fractures. The purpose of this study is to evaluate the clinical outcomes of 12 distal radius fractures treated with this method retrospectively.
Materials and methods
Twelve patients who had sustained distal radius fracture were treated with MIO technique using small intramedullary nail. Their average age at surgery was 60.9. According to the AO classification system, four patients were type A2, three A3, five C1. Two small skin incisions (1.5~2 cm) were used for this procedure. The small intramedullary nail was inserted from a cortical window between the 1st and 2nd dorsal extensor compartments. Three distal buttress screws were inserted into distal fragment and 2 locking screws were inserted into proximal fragment. No patient required post operative immobilization. The average follow-up period was 5.5 months. The range of motion of the wrist, Green and O'Brien score at the final follow-up, radiographic findings and post operative complications were assessed.
Results
The average range of flexion and extension were 65 and 60 degrees. The average Green and O'Brien score was 89 points. Palmar tilt, ulnar variance and radial inclination at the final follow-up X-ray were 7.2 degrees, 0 mm, 13 degrees respectively. Loss of reduction, implant failure, deep infection and tendon or nerve problems were not found postoperatively.
Conclusions
The clinical outcome was good and there was no postoperative complication in this study. Small skin incisions are advantageous to cosmetic effect. Using this MIO technique, pain and swelling can be little and patients can quickly return to activities of daily living. The small intramedullary nail was found to be very useful for the treatment of distal radius fractures, although a long-term follow-up is necessary.

Abstract #58

Dorsally Unstable Distal Radius Fractures: Volar Locking Compression Plate Fixation Versus Percutaneous K-wire Fixation
Purpose : Many papers which indicate excellent results of volar fixed-angle plates in unstable distal radius fracture were published. However, few of comparative studies between volar fixed-angle plate and other fixation methods were reported. The purpose of this paper is to compare functional and radiologic outcomes between ORIF with a volar 3.5mm locking compression plate (LCP, Synthes) versus percutaenous K-wire fixation in dorsally unstable distal radius fracture.
Materials and Methods : We reviewed retrospectively patients treated for dorsally unstable distal radius fracture using a volar LCP or percutaneous K-wire. Fourty-four patients who were treated with percutaneous K-wire had been followed up for an average of 28 months (range, 16-40 months) and 50 patients who were treated with volar LCP had been followed up for an average of 20 months (range, 12-32months). These groups were subdivided according to AO classification. The 2 groups were compared for range of motion (ROM), pain scale, and the Disability of the arm, shoulder, and Hand Questionnaire (DASH). Fracture reduction was evaluated from the radiographic measurement taken at the last follow-up visit and compared between groups.
Results : In AO type A dorsally unstable distal radius fracture, the radiological outcomes, e.g., radial tilt, volar tilt, ulnar variance and functional outcomes, e.g., wrist ROM, pain scale, and DASG were not statistically significantly different between both groups. However, In AO type C dorsally unstable distal radius fracture, ulnar variance, pain scale, and DASH score among were statistically significantly low in LCP fixation group.
Conclusion : We believe that volar LCP fixation is more effective treatment method than percutaneous pin fixation in dorsally comminuted intra-articular distal radius fracture.

Abstract #158

Volar Fixation of Unstable Dorsally Displaced Distal Radius Fractures Using Locking Plates with SmartLock Locking Screws
Tak-chuen WONG

Introduction: The purpose of this prospective cohort study was to determine the functional and radiological outcomes of patients treated with new volar locking plates and special designed locking screws for dorsally displaced, unstable distal radius fracture
Method: By using the Stryker volar locking compression plating system a consecutive series of 25 unstable dorsally displaced distal radius fractures in 25 patients were treated surgically. Fractures were classified using the AO classification. There were 12 men and 13 women with a mean age of 44 years (range, 17 - 75). All patients had internal fixation using trans-flexor carpi radialis tendon approach. Radiographic parameters on preoperative, postoperative and post fracture union radiographs were compared. The functional outcomes using the modified Mayo clinic wrist score together with complications were reported
Results: All fractures united in a mean union time of 7 weeks (range, 4 – 10). The average follow up period was 8 months (range, 3 -12). There were no statistic differences in the radiological parameters for the initial postoperative period and after the fracture united. The average wrist score was 90 (range, 55 – 100) after the fracture united. One patient had early loss of the fracture reduction and one patient had complex regional pain syndrome with wrist score of 55
Discussion and Conclusion: Volar plate fixation using Smart Lock locking screws was effective and safe in stabilizing unstable dorsally displaced distal radius fracture with good radiological and functional outcomes

Abstract #262

Clinical outcome of wrist fracture in elderlypatients treated with DVR volar plate.
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Key words:wrist fracture elderly.
Authors .M.Massarella ,A.Caraffa, M.Chionchio.
The fracture of wrist in the elderly are very common, the treatment continue to evolve, many plate are already used .
This study reviews the results of 30 patients with fracture of distal radius that were treated with DVR multidirectional plate.
Material: 30 patients with closed fractures of the distal radius were treated with DVR Hand Innovations volar plate ,into 12 hour after trauma under regional anestesia using FRC approach,no plaster o splint used post operatively,wrist and hand motions started soon as possible,x ray performed intra operatively and after one mounth.
Results: <the average of ROM was 85 % of the controlateral ,grip strength,and pain was valuated by Dash score.
Conclusions: The wrist fractute treatment with DVR volar plate in our data showes good early and radiological results

Abstract #341

The position and direction of screw for locking plate in distal radius fracture by using the Finite Element Analysis method.
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Ko Izumiyama, Hiroyuki Shimizu, Takeshi Arai, Yoshiaki Satomi, Moroe Beppu

Locking plate has many advantages over non-locking plate for unstable intra-articular fracture of distal radius. But, in case of accompany with the small fragment, it is difficult for locking screw to support the subchondral bone and connecting the lateral and medial column.
The purpose of this study was to determine the directions and positions of locking screws for getting good stability of fragment in the distal radius fracture.
(Method)The 3-dimensional image reflected bone density and CT values reconstruction of the radius was performed by multi-slice CT. Two layer structure model as a distal radius of osteoporotic case and three layer structure model as a non-osteoporotic case were made. The axial compression force on the articular surface of the distal radius was made. These model's stress distribution and displacement were analyzed and visualized with finite element method(FEA).
(Result) There was no difference to two layer structure model and three layer structure model in maximal stress concentration., In cortical bone the stress was concentrated the scaphoid and lunate fossa, and volar medial diaphysis. In high density cancellous bone, maximal stress concentration was 9.49 MPa, in low density cancellouse bone was 1.58MPa, stress distribution and displacement was recognized and stress shielding occurred.
(Discussion)It was effective for fixation of fragment to insert the screws high density cancellous bone area in medial distal radius and the screws supported the subchondral bone under the dorsal scaphoid fossa and volar lunate fossa. Receiving the force before distributed the stress will make the effective and rigid fixation in osteoporotic cases.

Abstract #375

SURGICAL CAUSES OF THE RESIDUAL SYMPTOMS IN PATIENT WITH HEALED FRACTURE DISTAL RADIUS – A TREATMENT ALGORITHM AND THE OUTCOMES

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Healed distal radial fractures are frequently complicated by chronic wrist pain which is multifactorial and can be debilitating. An accurate delineation of the pathoanatomy is the key for successful treatment.
This study reviewed 22 patients with a mean age of 40.9 who had surgical treatment between 1997 and 2001 for chronic wrist pain after distal radial fracture. All were symptomatic cases that failed conservative treatment with adequate analgesics and physiotherapy (ranged from 3 months to 7years, average 16 months). The mean follow up was 4 years (4-96 months). Four patterns of pathoanatomy were identified: 1) ulnar impaction caused by radial malunion and shortening; 2) ulnar styloid nonunion; 3) Triangular Fibrocartilage Complex (TFCC) tears with or without distal radio-ulnar joint (DRUJ) instability; and 4) Intercarpal ligament injuries and chrondral lesions. In some cases, no specific pathoanatomy could be identified except some synovitis and arthrofibrosis.
Surgical treatment directed towards identified abnormalities gave satisfactory outcome. For the ulnar impaction syndrome with malunited distal radius but without intra-articular pathology, ulnar shortening or radial lengthening osteotomy was performed in 4 cases. For the painful ulnar non-union with instability or impingement problem, open reduction and internal fixation of ulnar styloid fragment or excision of the non-healing ulnar bone fragment and capsular placation were preformed (3 and 1 case respectively).
At 6 months after surgery the mean functional score improved 36%, mean pain score decreased 50%, mean grip strength improved 25% and 64% of patients returned to work.

Abstract #199

Median Nerve Neuropathy after Volar Plating of Distal Radius Fracture

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Introduction
We report the incidence of median neuropathy after volar plating of distal radius fracture.
Method
A retrospective study on the incidence of median nerve neuropathy after volar plating for distal radius fracture done during 2002 to 2006 was done.
Results
During the 5-year period, 314 volar plating was done for acute distal radius fracture. Two patients had carpal tunnel release as part of fasciotomy for compartment syndrome. Three patients had carpal tunnel release during volar plating for acute carpal tunnel syndrome. Late median nerve neuropathy occurred in 7 patients (5 carpal tunnel syndrome with carpal tunnel release done and 2 median nerve neuropathy at distal forearm treated by neurolysis). All had clinical improvement except one patient with late carpal tunnel syndrome. Thus, the incidence of acute median nerve neuropathy and late median nerve neuropathy was 1.6% (5/314) and 2.2% (7/314) respectively.
Discussion and Conclusion
The incidence of CTS after volar plating of distal radius in the present series is quite comparable with that in other series of distal radius fracture, regardless of the treatment method by conservative treatment, volar buttress plating or dorsal plating. The incidence is also similar to that of symptomatic CTS in the general population. A narrow carpal tunnel, increased pressure inside carpal tunnel from injury during the fall and surgical intervention and scar adhesion around the median nerve may all contribute to median nerve neuropathy after distal radius fracture. The outcome after surgical intervention is generally favourable.

Abstract #303

Experiment and clinical effective report of contralateral C7 transfer to two recipient nerves at the same time

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Objective the goal of this study is to investigate how to make better use of the abundant nerve fibers of C7 to neurotize more recipient nerves and restore more function .
Methods Based on the traditional procedure, we design a new surgical procudure to improve the functional results after contralateral C7 transfer. one procedures the ulnar nerve is splited and sutured to median nerve and radial nerve by the end to end neurorraphy. the other procedure of C7 transfer via ulnar and sural nerve graft to neurotize two recipient nerves is also devised.
Results There were 4 patients with a follow- up period range from 9 months to 16 months.the results of median nerve: 2 of the 4 patients obtained M3 recovery of the wrist and finger flexors,and 2 patients had M2 recovery and 3 patients obtained S2 and 1 had S0 recovery in the median nerve area. The results of radial nerve: 2 of the 4 patients obtained M2 and 1 patient had M1 recovery of the wrist and finger extensors and 1 patient had M1 recovery of the elbow extensors . 1 patients obtained S2 and 1 patient had S1 and 2 patients had S0 recovery in the radial nerve area. No remarkable impairment was found in all patients.
Conclusion It is an efficient method for treatment of root avulsion of brachial plexus by using nerves spliting transfer when the donor nerve is limited.
[Key words] total brachial plexus avulsion; contralateral C7 transfer; median nerve; radial nerve; follow- up

Abstract #190

Corrective Osteotomy of Distal Radius for Post-Traumatic Pronation Contracture of Wrist

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Pronation contracture of the wrist can be met in the cases of cerebral palsy patients. Except that, trauma-associated, post-traumatic pronation contracture of the wrist can be seen in the forearm injury especially in the fracture of distal third of radius. There are many reasons that will contribute to post-traumatic pronation contracture of the wrist. The possible reasons included mal-reduction of the distal radius/ulna fracture, the problem of proximal radio-ulnar joint, the problem of distal radio-ulnar joint and soft tissue contracture of forearm and wrist.

In this report, we presented 10 cases of post-traumatic pronation contracture of wrist treated by corrective osteotomy of distal radius successfully. In these 10 cases, there is one case receiving double osteotomy of radius and ulna. The other 9 cases received corrective osteotomy of radius only. The result is satisfactory. The angle of supination improved from negative 10 degrees pre-operatively to positive 65 degrees post-operatively.

Good reduction is very important in the treatment of distal third radius/ulna fracture. Alignment, length and rotation orientation are 3 major points for the reduction of the fracture site. If you did wrong with anyone factor, the complication will happen expectedly. There are many surgical options to treat pronation contracture of the wrist. It is because the underlying reasons are multifactorial. Careful patient selection and adequate surgical method are the crucial factors to treat these patients.

Abstract # 238

Symptomatic intra-articular malunion of the distal radius fractures after treatment with volar fixation.

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Purpose: We retrospectively analyzed symptomatic intra-articular malunion of the distal radius fractures after treatment with open reduction and volar fixation plate.

Methods: There were six cases of symptomatic intra-articular malunion of the distal radius fractures after treatment with volar fixation. There were AO type C3 fractures in five cases, type C1 in one. We measured radiographic parameters throughout the period of fracture healing, and we examined the location and direction of displaced intra-articular fragments and additional secondary procedure. Clinical outcome were evaluated according to scoring system by Cooney.

Results: Follow up periods ranged from 3 to 20 months (mean, 10.7months). All cases had a poor result and five cases had intra articular incongruity of >3mm gap and step off at immediately post operation. According to fragment specific classification described by Medoff, there were three intra articular fragments displaced to depression, one ulnal corner fragment displaced to dorsal, and two combinations of ulnar corner and volar wall displaced to depression. As secondary additional procedure, partial intra-articular osteotomy was performed later in one case, radio-lunate partial fusion in one case, and manipulation in one case. Those three cases showed a fair result after the salvage procedure.

Conclusion : In this series, most of symptomatic intra-articular malunion of the distal radius fractures had insufficiency reduction at operation, and the clinical result is poor. Those salvage procedures were able to improve the clinical result. Sometime, it is difficult to confirm intra-articular incongruity at a intraoperative period with volar plate fixation.

Abstract #457

Surgical treatment of thoracic outlet syndrome assisted by endoscope:
report 16 cases

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【abstract】 objective To report and investigate anew treatment method of thoracic outlet snydrome (TOS) assisted by endoscope. Methods After local anaesthesia, an incision 1.5cm in length was made at the lateral neck. The tendon-like origin fiber of anterior and middle scalene muscles was cut partially under the endoscope.

Result 16 cases of TOS were involved in the study from11March,2002 to 16 December 2003. The symptoms and signs were disappeared completely immediately after operation. After 4months to 1year follow-up (mean: 6 months) the symptoms and signs were disappeared in 9 cases, The muscle power restored to normal, with prickling sensation decreased a little along the forearm and small finger in 6 cases. In 1 cases occasional uncomfortable feeling occurred at the neck. There was numbness, pain and over-sensitivity to prickling around the clavicle in this patient. After 4-5 years follow-up (mean: 53 months) the symptoms and signs were disappeared in 12 cases, the muscle power restored to normal, with pricking sensation decreased a little along the forearm and small fingen in 3 3cases

Conclusion Patial resection of theorigin parts of anterior and middle scalene muscle with minor incision at the neck sssisted by endoscope is a new way with minimal trauma for treatment of TOS, which can relieve the compression of the brachial plexus by the scalene muscles

Session: Free paper 19

Date: 17 February 2008

Venue: Meeting room 604

Time: 08:00 - 09:00

Moderator : C.H YEN & Osama SOEJIMA

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240	TU	Yuan-Kun	Taiwan	Free paper 19 – Wrist Disorder	17. Feb. 2008	284	Vascularized Bone Graft for Kienböck Disease
202	CHUNG	Yang-Guk	Korea	Free paper 19 – Wrist Disorder	17. Feb. 2008	236	Treatment of Stage III Kienbock's Disease using the 4, 5th extensor Compartment Artery Pedicled Vascularized Bone Graft
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320	NAKAMURA	Toshiyasu	Japan	Free paper 19 – Wrist Disorder	17. Feb. 2008	365	Reconstruction of the interosseous membrane using patellar bone-tendon-bone substitute in Essex-Lopresti fracture-dislocation

Abstract #80

Modified Graner Procedure for Advanced Kienbock Disease - Short Term Follow up
Soo Bong Hahn, MD, Young Suck Shin, MD, Ho Jung Kang, MD, Yun Rak Choi, MD
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Purpose : To review the short term follow up of Modified Graner procedure in advanced Kienbock's disease.
Materials and Methods : Four patients, who had undergone a Modified Graner procedure between September 2004 and June 2007, were followed up for more than 9 months (mean 17.6 months) and evaluated retrospectively. In all cases, diagnosis was Kienbock disease (Lichtman stage IIIb). The average age at the time of surgery was 39.8 years. The Radiologically, preoperative and postoperative evaluations were done by calculating carpal height index, radioscaphoid angle. The Grip strength was calculated through hand dynamometer. Therapeutic results were evaluated according to the scoring system of Evans et al.
Results : Pain disappeared after surgery in 3 patients. The last one had a reduction in the intensity of the pain to a mild level. The radiographically, preoperative and postoperative carpal height index were mean 0.89 and 0.96. The preoperative and postoperative radioscaphoid angles were mean 49.8 and 49.5. The preoperative and postoperative wrist range of motions(flexion/extension) were mean 67.5°65°and 47.5°33.8°. The mean grip streng th on the affected side had recovered to about 83% of that on the unaffected side. The short-term results were graded as good in one of the patients and fair in three with Evans scoring system. There was no complication with the operation. All patients returned to their daily living and occupation.
Conclusion : Clinically satisfied results were obtained with modified Graner procedure in advanced Kienbock disease with short term follow up. However, we still need to observe for long period of time to decide the end results.
Key Words : Kienbock disease, Lunate, capitate, Modified Graner procedure

Abstract #284

Vascularized Bone Graft for Kienböck Disease
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Introduction
Kienböck disease is mostly common seen in young active adults in their 20s and 30s. Etiology of Kienböck disease including: impaired vascular supply, trauma, ischemia, increased interosseous pressure, impairment of venous drainage, and ulnar variance. The classification of Kienböck disease (stage 1-4) was proposed by Lichtman and Weiss in 1991. Treatment for Kienböck disease varies widely, but it is generally correlated to the stage of disease. Surgeons have advocated immobilization, ulnar lengthening, radial shortening, limited carpal fusion, lunate resection with or without soft tissue interposition, revascularization with or without external fixation, radiocarpal fusion, and total wrist arthrodesis. Recently, vascularized bone graft, capitate shortening, radial wedge osteotomy, and proximal row carpectomy have also been reported.
Materials and Methods
We demonstrate our VBG and joint leveling procedures for the treatment of Kienböck disease. From 1997 to 2004, we performed a consecutive series of 40 patients with Kienböck disease who received VBG / or combined VBG and joint leveling procedures for their osteonecrosis. Joint leveling procedures were indicated when negative ulnar varience presented. Average age was 27 years old. The stage of Kienböck disease included stage 2 (10), stage 3A (25) and stage 3B (5). We used either 2,3 ICSRA (16), or 4th ECA (24) for the pedicle of VBG. Outcomes assessments were based on pain, functional recovery, and progression of the Kienböck disease. The average follow up was 5 years (2 to 8 years).
Results
Surgical techniques, including lunate decompression, VBG harvesting, VBG transfer, as well as leveling procedures will be demonstrated during the presentation. Our results demonstrate that VBG w/ wt leveling procedures are quite effective for stage 2 Kienböck disease (9/10 excellent), moderate effective for stage 3A Kienböck disease (14/25 excellent, 7/25 good, 4/25 fair & poor), but working poorly for stage 3B Kienböck disease (1/5 good, 4/5 fair & poor).
Conclusions
According to our clinical study, VBG / VBG combined joint leveling procedures are acceptable procedures for the treatment for stage 2 and stage 3A Kienböck disease. The functional recoveries are satisfactory, and diseases progression are prevented. However, the VBG treatment model is not suitable for stage 3B Kienböck disease.

Abstract #236

TREATMENT OF STAGE III KIENBOCK'S DISEASE USING THE 4, 5TH EXTENSOR COMPARTMENT ARTERY PEDICLED VASCULARIZED BONE GRAFT
YANGGUK CHUNG, BAEGYUN KIM, JOOYUP LEE, SEOKWHAN SONG, SEUNGKOO RHEE
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Purpose: To determine the effectiveness of the 4, 5th extensor compartmental artery pedicled vascularized bone graft for the treatment of type III Kienbock's disease.
Materials and Methods: A retrospective study was carried out on 5 patients with stage IIIA and early stage IIB Kienbock's disease who had revasculization procedures using the 4, 5th ECA pedicled vascularized bone graft between Jan. 2004 to Dec. 2006. Temporary scaphocapitate fixations with 2 K-wires were performed for the prevention of early postoperative collapse of curettaged lunate. Evaluations included range of motion, pain and grip strength. Radiologic evaluation for lunate remodeling, radioscaphoid angle, Stahl's index and carpal height ratio were taken from preoperative and final follow up radiographs. The mean follow up period was 11.2 months.
Result: At last follow up, wrist motions were improved upto 73% of the unaffected sides. 80% of patients had significant improvement in their pain. Four of five(80%) of patients showed no further collapse on final follow-up radiographs. One postoperative collapse of lunate was developed in case of insufficient curettage and bone graft into anterior portion of avascular lunate.
Conclusion: The 4+5th ECA pedicled vascularized bone graft provides a reliable alterative for the treatment of stage IIIA and early stage IIB Kienbock's disease. To obtain good clinical outcomes, A proper surgical technique is mandatory.

Abstract #317

Closing Radial Wedge Osteotomy for Preiser's Disease

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Purpose: Preiser's disease involves ischemic necrosis of the scaphoid, and several surgical procedures have been reported. Optimal treatment, however, has not been established. We performed closing radial wedge osteotomy for Preiser's disease. The purpose of this study is to introduce our surgical technique and to report the treatment results and the problems we encountered.
Materials and Method: The patients consist of four female with the age from forty-seven to seventy-one years. All patients had swelling and tenderness just distal to Lister's tubercle and noted severe pain on wrist extension. The active range of motion was moderately restricted due to pain. A simple closing osteotomy from a palmar incision was performed and fixed with a plate and screws. After surgery a short-arm cast was applied for 6 weeks.
Results: Radiographical bone union was obtained and the MRI one year after the surgery indicated increasingly high density of the scaphoid on the T1 weighted image in all patients. Severe pain disappeared completely in two patients. Mild pain remained in one and moderate in one.
Discussion: Whether this procedure acts as decompression between the radius and the proximal row carpus remains unknown. We believe, however, that attenuation of axial pressure on the wrist joint by osteotomy was the basic factor that improve pain in our cases. There are two advantages to this surgical method: (1) less surgical invasion compared with other procedures such as proximal row carpectomy and wrist arthrodesis and (2) the simplicity of the surgical procedure compared with vascularized bone graft.

Abstract #351

ULTRASOUND IN THE DIAGNOSIS OF DYNAMIC SCAPHOID INSTABILITY

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Queensland Diagnostic Imaging, Brisbane Private Hospital

Introduction Establishing the diagnosis of dynamic scapholunate instability in patients with chronic wrist pain while avoiding the invasive procedure of arthroscopy has long been problematic. Cadaver SLL cutting studies have demonstrated altered load patterns between the scaphoid and the radius without significant diastasis of the scapholunate interval occurring. Imaging techniques such as stress radiography, triple phase arthrography and MRI all have reported low sensitivity for the diagnosis of partial scapholunate ligament tears, particularly when compared with arthroscopy.
Methods Ultrasound has previously had documented low sensitivity when examining the scapholunate ligament and widening of the scapholunate interval, however advancing ultrasound technology is providing improved resolution and the opportunity to scan the wrist in different planes, including the sagittal plane. The proximal pole of the scaphoid and its relationship to the scaphoid fossa of the radius can be seen, and hence subtle instability of the scaphoid can be documented.
Discussion A study is presented comparing plain xray, dynamic ultrasound and MRI in the diagnosis of dynamic scapholunate instability. Small dorsal osteophytes adjacent to the SLL, 'buckling" of the SLL in radial-ulnar deviation and an effusion are ultrasound signs suggesting subtle scaphoid instability.

Abstract #91

THE UTILIZATION OF THE SYNTHETIC LIGAMENTS LARS FOR THE RECONSTRUCTION OF THE SCAPHO-LUNATE DISSOCIATION

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The treatment of scapho-lunate dissociation is a challenging problem.
The surgical strategy depending on chronologic and anatomical factors.
The trophic condition of the S-L ligament is strictly correlated to the time beetween the trauma and diagnosis. The wrist's condition (precence of arthrosis and anatomical congrence) and the characteristic of the instability (possible reduction of the DISI and the rotatory subluxation of the scaphoid) must be evaluated before performing any surgical procedures.
The aim of the Authors is to perform a new, simple, reproducible procedure with a mini-invasive incision so as to allow an "aggresive" rehabilitation and an early return to daily life activities utilizing the synthetic ligament LARS.
The experience of 30 years in the reconstruction of the LCA by Lars ligament is the basis for using it in hand surgery: as an internal brace in the acute lesion and as real ligament in the chronic lesion.
The A. present the results of this new procedure for the reconstruction of the S-L utilizing the synthetic ligament LARS.

Abstract #214

FUNCTIONAL RESULTS OF FOUR-CORNER ARTHRODESIS USING MULTIPLE HEADLESS SCREWS

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Introduction Although more rigid fixation devices such as circular wrist fusion plate were introduced to decrease the complications of four-corner arthrodesis, there are still some problems reported. We present the functional results of four-corner arthrodesis using multiple headless screws for treatment of scaphoid nonunion advanced collapse (SNAC) wrists.
Materials and Methods From Sep 2004 to December 2006, 7 patients who had SNAC wrist were treated with four-corner arthrodesis using three headless screws (Acutrak STD: Acumed, Orlando, USA). There were 6 men and 1 woman. The mean age of the patients was 43.7 years (range, 32-59). The mean follow-up was 13 months. Through the dorsal incision, scaphoid fragments were excised and capito-lunate, luno-triquetral, capito-hamato-triquetral joints were fixed with three Acutrak screws after decortication. Postoperative results were assessed using range of motion, grip strength, and Korean DASH disability score.
Results Bony union was achieved in all patients, and dorsal impingement of the lunate or implant was not found. Mean flexion/extension motions were 54 degrees, which was 46% of opposite side. Grip strength was 65% of opposite side. Mean DASH disability score was 32 (range 21 – 47).
Conclusion Our findings show that multiple headless screw fixation for four-corner arthrodesis can effectively prevent nonunion and dorsal impingement of the implant, which are frequently reported in circular plate fixation method.

Abstract #188

A new joint stabilization procedure for chronic lunotriquetral injury

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Eleven patients with chronic lunotriquetral (LT) ligamentous injury underwent dorsal capsuloligamentous plasty to restore stability of the LT joint. There were 8 males and 3 females with an average age of 36 years. Patients who had ulnocarpal abutment syndrome, perilunate dislocation and associated fractures of the wrist were excluded from this study. Duration between injuries to surgery averaged 7 months. Preoperative radiograph showed no abnormal carpal malalignment, but stress x-ray with grip action indicated malalignment of the proximal carpal row in 3 patients. Arthrography was undertaken in 6 patients, and extravasation of contrast medium from the LT joint was observed in 3 and abnormal pooling in 3 patients. Preoperative physical examination positive in all patients included local tenderness over the LT joint, ballotment test, and ulnar compression (shuck) test. Arthroscopic debridement of torn ligament and capusuloligamentous plasty using dorsal radiocarpal ligament was performed to augment the dorsal LT interosseous ligament. Temporary pinning through the LT joint was placed for 8 weeks. Postoperative hand therapy of range of motion exercise was begun at 6 weeks, and protective splinting was continued for an average of 12 weeks. Postoperative analysis of visual analogue pain score and wrist function revealed that pain score was decreased 5 to 1.2, average range of flexion and extension was increased by 10 degrees and average grip strength was increased by 12 kg. Although small size of patients and short-term follow up, dorsal capsuloligamentous plasty may be a feasible alternative for chronic ligamentous injury of the LT joint.

Abstract #211

FUNCTIONAL RESULTS OF COMBINED DISTAL RADIOULNAR LIGAMENT RECONSTRUCTION AND ULNAR SHORTENING PROCEDURE

Joo-Yup Lee, Sung-Chul Yang, Yang-Guk Chung, Seok-Whan Song, Hyoung-Min Kim, Seung-Koo Rhee
Department of Orthopaedic Surgery, College of Medicine, The Catholic University of Korea, Seoul, Korea

Purpose
To retrospectively review clinical outcome of combined distal radioulnar ligament reconstruction and ulnar shortening procedure in chronic distal radioulnar joint (DRUJ) instability with positive ulnar variance.
Materials and Methods
From May 2003 to December 2006, 11 patients who had chronic DRUJ instability with positive ulnar variance were treated with combined distal radioulnar ligament reconstruction and ulnar shortening. There were 2 men and 9 women. The mean age of the patients was 35.4 years (range, 19-64). DRUJ stress test and ulnar grind test were positive in all patients. Anatomic DRUJ reconstruction with free palmaris longus tendon graft and ulnar shortening were done using the same dorsal incision. Postoperative results were assessed using range of motion, modified Mayo wrist score, and Korean DASH disability score.
Results
Mean lengths of ulnar shortening were 3.4 ± 0.5 mm, and bony union was achieved in all patients. Mean flexion/extension motions were 134 degrees and pronation/supination were 153 degrees, which are not different from preoperative range of motions. Eight of the 11 patients rated their wrists "excellent", 2 rated "good", and 1 rated "fair" according to the modified Mayo wrist score. Mean DASH disability score was 18 (range 9 – 34).
Conclusion
Our findings show that distal radioulnar ligament reconstruction combined with ulnar shortening procedure is an effective treatment method for post-traumatic DRUJ instability with positive ulnar variance.

Abstract #157

RELIABILITY AND NORMAL VALUES OF VARIOUS COMPUTED TOMOGRAPHY METHODS FOR QUANTIFYING DISTAL RADIOULNAR JOINT TRANSLATION

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Purpose: To evaluate the reliability of the current computed tomography methods for measuring distal radioulnar joint translation and to determine the normal population values of these methods.
Methods: CT scans of forty-five wrists were obtained in supination, neutral, and pronation. Four methods for diagnosing DRUJ subluxation were used; the radioulnar line method, the epicenter method, the radioulnar ratio, and the subluxation ratio, which is a modified method of radioulnar line using a perpendicular line to the sigmoid notch. Three observers measured all the scans independently and repeated three months later.
Results: The interobserver reliability was the best with the subluxation ratio, which was substantial to almost perfect. The intraclass correlation coefficients showed substantial to almost perfect in the radioulnar line method, substantial in the radioulnar ratio, and moderate to substantial in the epicenter method. The intraobserver reliability was almost perfect in all methods. Based on the radioulnar line and subluxation ratio, the ulnar head was always located outside of the dorsal line in pronation and outside of the volar line in supination. The normal epicenter values indicated that the center of the distal radioulnar joint fell in the middle half of the sigmoid notch in all positions. For the radioulnar ratio, the normal ranges demonstrated larger variation than originally reported.
Conclusions: This study suggests that the subluxation ratio is the most useful method with regard to its reliability and simplicity. Substantial normal variations in the current methods should be considered in CT evaluation of the DRUJ in symptomatic patients.

Abstract #365

Reconstruction of the Interosseous membrane using patellar bone-tendon-bone substitute in Essex-Lopresti fracture-dislocation

Toshiyasu NAKAMURA

Introduction: Essex-Lopresti (EL) fracture includes comminuted fracture of the radial head and rupture of the TFCC and the interosseous membrane (IOM), which subsequently induces proximal migration of the radius (longitudinal radioulnar dissociation: LRUD). We report reconstruction of the interosseous membrane (IOM) using patellar bone-tendon-bone substitute in EL fracture.
Technique: The middle portion of the radius and distal 1/4 of the ulna are explored. The bony part of the patellar bone-tendon-bone substitute is anchored either to the radius or ulna with two 2.5 mm cortical screws along with direction of the tendinous part of the IOM. The radial head is repaired whenever possible, or the artificial radial head replacement is done. The TFCC is also repaired or reconstructed.
Patients: We underwent the procedure in 25 year and 32 year-old males. The first case was a fresh case with comminuted radial head fracture and rupture of the TFCC. The second case was a chronic case, which needed the artificial radial head replacement and reconstruction of the TFCC. Final clinical results (2-3 years follow) were evaluates.
Results: There was no pain on the elbow, forearm or wrist. There was no LRUD. The first case indicated full range of rotation, +2 mm of ulnar variance and can push-up his body. The second case indicated +2 mm ulnar variance with good results, which only demonstrated 30 degrees loss of supination.
[Discussion] Reconstruction of the IOM using the patellar bone-tendon-bone promises excellent clinical results in EL fracture of the forearm.

Session: Free paper 20

Date: 17 February 2008

Venue: Meeting room 605

Time: 08:00 - 09:00

Moderator : K.Y CHOI & Poong-taek KIM

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16	LAI	Chao-Yi	Taiwan	Free paper 20 – Peripheral nerve Entrapment	17. Feb. 2008	35	Secondary Review of Technique of "subfascial anterior transportation" for Cubital tunnel syndrome
117	SON	Young-Hon	Korea	Free paper 20 – Peripheral nerve Entrapment	17. Feb. 2008	140	Simple Decompression of The Ulnar Nerve in the Cubital Tunnel Syndrome with Minimal Skin Incision.
119	Sara Ahmad	Tunku	Malaysia	Free paper 20 – Peripheral nerve Entrapment	17. Feb. 2008	142	The Role of Wrist Anthropometric Measurement in Idiopathic Carpal Tunnel Syndrome
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329	TSO	Chi-Yin	Hong Kong	Free paper 20 – Peripheral nerve Entrapment	17. Feb. 2008	376	A Modified Camitz Approach To Reconstruct Opposition In Patients With Severe Carpal Tunnel Syndrome
346	FOK	Margaret Woo Man	Hong Kong	Free paper 20 – Peripheral nerve Entrapment	17. Feb. 2008	393	Evaluation of a Hong Kong Chinese Version of a self - administered questionaire for assessing symptom severity and functional status of carpal tunnel syndrome: cross - cultural adaptation and reliability

Abstract #23

Transverse carpal muscle and carpal tunnel syndrome
Nadine HOLLEVOET

The purpose of the study was to determine the prevalence of transverse carpal muscles and their association with carpal tunnel syndrome. We looked for transverse muscle fibres on the palmar surface of the transverse carpal ligament between thenar and hypothenar on the place where the ligament is cut during surgery for carpal tunnel syndrome. We observed 143 hands of patients operated on for carpal tunnel syndrome and dissected 103 cadaver hands. In 50% of the operated hands no transverse carpal muscle fibres were found, in 39% transverse muscles between 2 and 10 mm wide were present and in 11% a transverse carpal muscle of more than 10 mm wide was seen. In cadaver hands similar percentages were found: in 50.5% there were no transverse muscle fibres, in 35% there were small transverse muscle fibres and in 14.5% there was a wide transverse carpal muscle. The transverse muscles originated from thenar or hypothenar muscles. It can be concluded that transverse carpal muscle fibres are frequently encountered during surgery for carpal tunnel syndrome and probably there is no association with carpal tunnel syndrome.

Abstract #35

SECONDARY REVIEW OF TECHNIQUE OF "SUBFACIAL ANTERIOR TRANSPOSITION" FOR CUBITAL TUNNEL SYNDROME
Chao-Yi Lai, David, C.C. Chuang,
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Introduction:
Cubital tunnel syndrome (CuTS) was the second most common nerve entrapment syndrome of the upper extremity. The pathogenesis was due to repeated traction on the nerve with flexion and increased intraneural pressure. There are many methods for the treatment of CuTS and each has its own advantage and disadvantage.
Subfascial anterior transposition was first published as a series study in 1998 by Dr.David Chuang. Here we r collected 50 cases from January 1997 to December 2005 with Cubital tunnel syndrome in Chang Gung Memorial Hospital. All the 50 cases received subfascial anterior transposition method. We compared the pre-OP clinical findings and post-OP result, and intra-operative findings in this study.
Materials and Methods
We included the patients with cubital tunnel syndrome from January 1997 to December 2005. All the diagnosis were proved by clinical symptoms and signs and electrodiagnosis (mNCV, EMG data). All the patients received the operation "subfascial anterior transposition of ulnar nerve ". We evaluated our patient and classified the pre-op and post-op condition by traditional McGowan grading. We also recorded the clinical findings and operative findings in all 50 cases. All the cases had been follow-up in our clinics at least 6 months. All of them were managed by same Surgeon (D.C.C.Chuang).
Result:
We included 50 cases (male/female:39/11) of cubital tunnel syndrome with or without trauma history. The average age was 43.8 years old (6-81y/o). According to McGowan grading system, we had no case of Grade I , 16 (32%) cases of grade II (moderate) and 34 (68%) cases of Grade III(severe). The follow –up period was 12.52m (6 -68 months). Finally, there were 45 cases(90%) got improved from our treatment. There were no recurrent cases or any major complication in our study.
Conclusion:
Subfascial anterior Transposition was an effective method for cubital tunnel syndrome especially in moderate to severe cases.

Abstract #140

Simple Decompression of The Ulnar Nerve in the Cubital Tunnel Syndrome with Minimal Skin Incision
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Purpose: Cubital tunnel syndrome is the most frequently occurring compression neuropathy in the upper limb next to carpal tunnel syndrome. Operative management includes simple decompression; medial epicondylectomy; and anterior transposition. Recent minimal invasive technique has prompted us to gain clinical experience with simple in situ decompression with minimal skin incision. Early surgical outcome has been evaluated with surgical technique.

Materials and methods: 96 consecutive cubital tunnel syndrome were treated using minimal skin incision technique. The mean age of the patients was 50.9 years and average symptom duration was 14months(range, 6-72 months). The cause of cubital tunnel syndrome was idiopathic in 59 patients and osteoarthritis(n=20), ganglion(n=30) and deformity(n=7), etc. Clinically, 20 elbows were classified as having McGowan Grade Ⅰ, 69 as Grade Ⅱ and 7 as Grade Ⅲ compression. Preoperative nerve conduction study by inching method revealed conduction delay distal to the medial epicondyle.

Results: All operations were carried out in day surgery unit under local anesthetics. Seven patients had combined median neuropathy at the wrist and three had cervical radiculopathy. All patients returned to their previous work level in average 2 weeks time. Seven patients had aberrant anconeus epitrochlearis muscle. After a mean follow up of 25 months, results were excellent in 35(36%), good in 43(45%), fair in 16(17%), and poor in two patients(2%). Overall satisfactory results were noted over 81% of the patients, which included 83% excellent or good in McGowan stage Ⅰ&Ⅱ. However, there were 2 fair results and one poor result in McGowan stage Ⅲ. Complications such as wound infection, reflex sympathetic dystrophy did not occur.

Conclusion: This procedure is comparably effective alternative which involves less trauma, morbidity and rehabilitation time with good surgical outcomes. The results show that in situ decompression of the ulnar nerve through minimal skin incision is a safe and effective method to treat patients with cubital tunnel syndrome.

Abstract #142

THE ROLE OF WRIST ANTHROPOMETRIC MEASUREMENT IN IDIOPATHIC CARPAL TUNNEL SYNDROME

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* ORTHOPAEDIC SURGERY DEPARTMENT, UNIVERSITY OF MALAYA, KUALA LUMPUR, MALAYSIA.
** DEPA ORTHOPAEDIC SURGERY DEPARTMENT, HOSPITAL SEBERANG JAYA, MALAYSIA.

Anthropometric wrist measurement ratios were examined for an association with idiopathic carpal tunnel syndrome. Wrist measurements were recorded in 67 patients (111 hands) with carpal tunnel syndrome as well as in a matched control group of 101 healthy volunteers. The Wrist Ratio (wrist anterior-posterior dimension/ wrist medial-lateral dimension) and the Wrist Palm Ratio (wrist anterior-posterior dimension/palm length) were calculated for each case. We found that a Wrist Ratio of ≥ 0.70 and Wrist Palm Ratio of > 0.342 were significantly associated with idiopathic carpal tunnel syndrome.

Abstract #173

PICK UP TEST- AN INDICATION FOR OPPONENSPLASTY IN ADVANCED CARPAL TUNNEL SYNDROME

Siu-Leung Yip, Chi-Hung Yen, Wai-Lam Chan, Sze-Chung Cheng, Wing-Cheung Wong, Kan-Hing Mak.
Department of Orthopaedics and Traumatology, Kwong Wah Hospital, Hong Kong

Purpose:
No clinical test has ever been advocated to assess functional disability of advanced carpal tunnel syndrome. Nor is there clinical indicator for opponensplasty at the same setting of nerve decompression and assessment of post-operative result of such functional reconstruction. We propose a Pick up test which serves all these purposes.
Methods:
Pick up test is a test in which the patient is asked to pick up a Hong Kong 1 dollar coin from a table with his thumb and index finger only. Failure to pick up the coin is a positive test. Eight patients (eight hands) with advanced idiopathic carpal tunnel syndrome with severe thenar atrophy were evaluated. All patients were asked to perform Pick up test pre-operatively. All patients underwent open carpal tunnel release and Camitz opponensplasty. Result of functional reconstruction was also assessed by Pick up test post-operatively.
Results:
All patients showed positive Pick up test before surgery. All patients with Camitz opponensplasty showed negative test at 6 weeks post-operatively, which was sustained at latest follow up. Follow up was 15 (2-38) months.
Conclusions:
Pick up test is a simple and reliable test to identify those in need of additional procedure of opponensplasty in advanced carpal tunnel syndrome with severe thenar atrophy. It serves as an invaluable and valid clinical indicator for patient selection, patient education and assessment of post-operative result of functional reconstructive surgery. Authors propose the Pick up test as a must-do test for all CTS patients for assessment of functional disability, indication for opponensplasty and post-operative outcome measure.

Abstract #226

PRELIMINARY EXPERIENCE WITH THE SPLIT FLEXOR CARPI ULNARIS OPPONENSPLASTY

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INTRODUCTION
Several well established opponensplasty techniques are known. Many motors have been described for use, which include the Abductor digiti minimi, Palmaris longus, Extensor indicis proprius and the Flexor digitorum superficialis. A review of existing literature shows that none of these transfers are able to produce both opposition and abduction of the thumb consistently. In addition, the former two are weak motors and the latter two are associated with some donor morbidity. We present our preliminary experience in 10 patients with a new technique of opponensplasty using the split FCU.
METHODS
10 patients with severe carpal tunnel syndrome with thenar muscle atrophy underwent the split FCU opponensplasty in a four year period between 2004-2007. An open carpal tunnel release is performed, followed by harvest of the Palmaris longus as a free tendon graft. The graft is attached proximally to the FCU and distally to the APB under appropriate tension. The patients were splinted for three weeks and started on mobilization thereafter. They were followed up at three monthly intervals for up to 2 years.
RESULTS
Follow up duration ranged from 3 months to 2 years. All patients had good to excellent opposition and abduction of the thumb. All patients obtained high satisfaction and functional scores and excellent DASH scores. The FCU function was preserved. The technique was easily performed and dissection was simple. The morbidity was minimal.

Abstract #270

DOUBLE CRUSH NERVE ENTRAPMENT SYNDROME

Govindasamy BALAKRISHNAN

Double crush phenomenon in compression neuropathy is a well established event. Local damage to a nerve at one place impairs the overall functioning of the nerve cells due to disturbance in the axonal flow. This renders the nerve more susceptible to compression trauma at any other secondary site. Double crush phenomenon in nerve entrapment syndromes is first described by Upton AR & McComas AJ in Lancet, 1973. They postulated that nonsymptomatic impairment of axoplasmic flow at more than one site along a nerve might summate to cause a symptomatic neuropathy. Decompression of the nerve at both the sites has to be performed to relieve the patient of the symptoms. We present an unusual case of symptomatic ulnar nerve compression at two sites within same anatomic region. Exploration of the nerve revealed compressive neuropathy at both cubital tunnel and Guyon's canal. Decompression was carried out at both sites and the recovery of function was full.

Abstract #364

Review of benign peripheral nerve sheath tumours in upper limbs

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Background: This is a retrospective review of 73 benign peripheral nerve sheath tumours (PNST) which were managed between 1995 and 2005 in Pamela Youde Nethersole Eastern Hospital. The clinical presentation, surgical technique and clinical outcome are presented.
Methods: 73 patients' medical records and pathology reports were retrospectively reviewed. The tumours were classified according to their nature and site of presentation. The clinical presentation and outcome were also studied.
Result: The mean age of the group was 52.3 year old. Male to female ratio was 56% to 44%. Among these 73 tumours, 62.5% of tumours were neurilemoma. Finger and hand are the two most common sites for presentation (27% and 23% respectively). The most common symptom was history of long standing mass and numbness. Forty-six percent of tumours were originated from 3 major nerves of upper limb. Although the most common surgical morbidity was residual numbness with the highest occurrence rate in digital nerve, most of the patients remained asymptomatic after operation.
Conclusion: Neurilemoma and neurofibroma are the 2 most common peripheral nerve sheath tumours in upper extremities. Excision of benign PNSTs in digital nerve resulted in greater proportion of residual nerve dysfunction. Overall the surgical outcome of benign PNST is usually satisfactory in the majority of patients.

Abstract #369

CARPAL TUNNEL SYNDROME: CAN WE DO BETTER

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India.

Carpal tunnel syndrome is a common condition of the compression of distal median nerve at the wrist. It is still misdiagnosed as a cervical root syndrome and thus incorrectly treated.
Women are commonly affected more than men (approx 8:1). The syndrome most often occur bilateral. It is also seen among professionals e.g computer worker with strenuous use of their hands in their daily works.
MATERIAL AND METHODS: Thorough clinical and electrophysiological examination were done in 46 patients in the prospective study and followed up to two years. Operative release were carried out after diagnosis and conservative treatment. Histopathological studies were also carried out in few cases of doubtful pathology.
Despite success and easy to perform surgery, complication and treatment failure occur in about 20% of cases which are difficult to treat.
CONCLUSION: It is concluded that carpal tunnel operation should not he underestimated. Technical errors could be avoided during surgery. Patients must be properly informed about the prognostic outcome.

Abstract #376

A MODIFIED CAMITZ APPROACH TO RECONSTRUCT OPPOSITION IN PATIENTS WITH SEVERE CARPAL TUNNEL SYNDROME

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Department of Orthopaedics and Traumatology, Prince of Wales Hospital

The classical Camitz transfer, using a radially-placed vector at the insertion of abductor pollicis brevis, achieved good thumb abduction but failed to correct thumb opposition. We devised a modified Camitz transfer to provide better thumb pronation using an additional vector from the dorsal ulnar aspect of the thumb, and therefore improved thumb opposition.
Explicitly, we employed the extensor pollicis brevis tendon, which is split longitudinally in half and the ulnar distal slip of this tendon is detached and looped around the ulnar saggital band of the extensor pollicis longus tendon. The proximal end of this tendon slip is finally attached to the abductor pollicis brevis insertion where it is joined to the tendon pull of the transferred palmaris longus tendon aponeurosis, constructed in the Camitz manner. From 2002 to 2006, this method of transfer together with open carpal tunnel release was performed on 13 patients. We evaluated the degree of thumb pronation, dexterity and patient satisfaction in the post-operative period.
The average thumb pronation achieved was 21 degrees (ranged 8 to 40 degrees). Eighty-eight percent of patients showed satisfied to excellent results. Average dexterity, in terms of nine-peg test, was similar to the non-operated hand. No complication including extensor rupture was noted
Preliminary results showed this method of reconstruction can achieve satisfactory thumb opposition and dexterity in patients with severe carpal tunnel syndrome.

ORIGINAL ARTICLE

Evaluation of a Hong Kong Chinese version of a self-administered questionnaire for assessing symptom severity and functional status of carpal tunnel syndrome: cross-cultural adaptation and reliability

Margaret WM Fok 霍美雯
HB Leung 梁漢邦
WM Lee 李惠敏

Objectives To evaluate the application of a translated version of an established self-administrated questionnaire for carpal tunnel syndrome on Chinese patients in Hong Kong.

Design Evaluation of an instrument tool.

Setting Department of Orthopaedics and Traumatology, Queen Mary Hospital, Hong Kong; Holistic Medical Centre, Aberdeen, Hong Kong.

Participants Patients with carpal tunnel syndrome, translators.

Main outcome measures The adaptation was based on forward-backward translation from English to Chinese (Hong Kong) and vice versa. Meetings with translators, investigators, and patients were organised to generate an acceptable version of the questionnaire. A pilot study was carried out on 20 patients and subsequently minor adjustments were added. Fifty patients were recruited to validate the reliability and internal consistency of the questionnaire.

Results The ordinality of response agreed with the original instrument. Test-retest reproducibility showed no significant difference between tests. The Pearson correlation coefficient ranged from 0.83 to 0.93. Internal consistency was good, at 0.85.

Conclusion Through the validation of the Hong Kong Chinese version of the questionnaire, we are able to produce an assessment tool for the local patients. Furthermore, we are able to create a platform for: (i) a cross-national and cross-cultural epidemiological comparison as well as a means of (ii) evaluating different types of treatments.

Session: SS7 - Hand and Wrist Injury I

Date: 17 February 2008

Venue: 7A Forum

Time: 10:30 - 11:10

Moderator : Gregory BAIN & Kim-hung LEUNG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	KANAYA	Fuminori	Japan	SS7	17. Feb. 2008		Bone Substitute in Hand and Wrist Fracture
	CAMPBELL	Douglas	UK	SS7	17. Feb. 2008		Evolution of implants for fixation of fracture distal radius
	WONG	Tak-chuen	Hong Kong	SS7	17. Feb. 2008		Local Experience of thumb CM arthritis reconstruction

Session: SS7 - Hand and Wrist Injury I

Date: 17 February 2008

Venue: 7A Forum

Time: 11:10 - 12:30

Moderator : Sai-hung YEUNG & Fuminori KANAYA

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	LAO	Jie		SS7	17. Feb. 2008		Operative treatment of metacarpal fractures
	BALAKRISHNAN	Gorvinfasamy		SS7	17. Feb. 2008		Percutaneous fixation of phalangeal fracture
	CHOW	Yuk-yin	Hong Kong	SS7	17. Feb. 2008		Osteochondral graft in phalangeal fracture
	LEUNG	Kim-hung	Hong Kong	SS7	17. Feb. 2008		Rehabilitation after intraticular fracture of hand
	FREELAND	Alan	USA	SS7	17. Feb. 2008		Malunion and nonunion of phalangeal fracture

Session: T5

Date: 17 February 2008

Venue: Meeting room 601

Time: 10:30 - 11:30

Moderator : Eva MA & Jimmy YUEN

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
221	CHAN	Sui-Mei	Hong Kong	T5	17. Feb. 2008	265	Hand function in Modified Camitz procedure : Construct Validity & Reliability of Nine-hole Peg Test
128	CHAN	Pui-Sze	Hong Kong	T5	17. Feb. 2008	154	Effectiveness of Immediate Controlled Active Motion (ICAM) Program following Zone 4-7 Extensor Tendon Repair
301	PESCO	Mary S.	USA	T5	17. Feb. 2008	346	A Comparison Of Palmar Static Digit Extension Splinting And Dorsal Block Dynamicdigit Extension Splinting With Post Operative Dupuytren''S Contracture Release
254	LAU	Lewis Chan-Fai	Hong Kong	T5	17. Feb. 2008	298	Forearm Rotational Contracture Splint
144	CHANG	Jui-Kun	Taiwan	T5	17. Feb. 2008	170	Traction Splint for Digital Intra-Articular Fracture- Case Reports

Session: T5

Date: 17 February 2008

Venue: Meeting room 601

Time: 11:30 - 12:15

Moderator : Polina YEUNG & June WONG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
173	LIN	Joseph King-Mo	Hong Kong	T5	17. Feb. 2008	204	A Study Of Biomechanical Factors Associated With Computer Mouse Use In Symptomatic And Asymptomatic Computer Users
304	HUNG	Leung-Kim	Hong Kong	T5	17. Feb. 2008	349	Work-related injuries and pain syndromes of the upper limb -- a proposal of a management algorithm
256	MONDAL	Debashis	Bangladesh	T5	17. Feb. 2008	300	Occupation related hand injuries at selected garment industries in Dhaka city, Bangladesh
245	CHAN	Leo Hoi-Hung	Hong Kong	T5	17. Feb. 2008	289	Case report: a dynamic shoulder splint to improve patient function for return to work.

Abstract #265

Title : Hand function in Modified Camitz procedure : Construct Validity & Reliability of Nine-hole Peg Test

Vera Chan sui-mei, Josephine Wong man-wah, Carman Yau, Jackey Cheung wei hei, Frederick Au lap-yan
Occupational Therapy Department, Prince of Wales Hopsital

The Nine-Hole Peg Test is one of the most commonly used hand function assessments for assessing hand dexterity by occupational therapists especially for those stroke patients. To our knowledge, however, there are only few studies in assessing the validity and reliability of the nine-hole peg test in assessing hand functions for people with hand dysfunctions.

Objective To evaluate the construct validity and reliability of nine-hole peg test for people receiving modified Camitz procedures in Prince of Wales Hospital.

Methodology Jebsen hand function test was used to explore the construct validity of the Nine-hole Peg Test. Measurements of physical dimensions including grip & pinch strength, 1st web space, moving 2-point discrimination of thumb & index fingers were also conducted. Data were analyzed by using SPSS. Intra-class correlation coefficient was used to assess the test-retest reliability. The individual subjects' difference between the mean of Test I & II and normative data was calculated for both affected and non-affected hands.

ResultsA total of 10 subjects were assessed according to standardized protocol and retests were performed at the same time of the day and one week later on each subject. The dominant hands of the two males and eight females were affected. The reliability coefficient of the nine-hole peg test was good (*r=0.86*) and the intra-class correlation coefficient was high (ICC =0.75) for the affected hands. There were positive correlation between results of both Test I & II in nine-hole peg test and sub-test of Jebsen hand function test (pick up small objects) for affected hands (Test I : *r=0.78 p=0.007;* Test II: *r=0.88 p=0.001*). Also, significant correlations of sub-test for affected hands (large light objects, *r=0.83*; *p=0.003*; large heavy objects, *r=0.82*; *p=0.004*) & non-affected hands (large light objects, *r=0.83*; *p=0.003*; large heavy objects, *r=0.83*; *p=0.032*) in all Test II were found.

ConclusionThe Nine-hole Peg Test was a quick, easy-administered and reliable tool to measure hand dexterity for patients receiving modified Camitiz procedure. Further research is worth while to generalize its application on patients with hand problems.

Abstract #154

Effectiveness of Immediate Controlled Active Motion (ICAM) Program following Zone 4-7 Extensor Tendon Repair

Casie, P.S.Chan, Josephine, M.W. Wong, Carman Yau, Vera, S.M. Chan
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Introduction:
To promote better recovery of patients with Zone 4-7 extensor tendon repair, an Immediate Controlled Active Motion (ICAM) protocol, reported in Howell's study, was compared with the existing rehabilitation protocol in Prince of Wales Hospital.

Method:
All patients who had undergone tendon repair to at least one extensor in Zone4-7 were recruited. A low profile 2-part splint was applied, according to the ICAM protocol, with immediate and guided active extension and flexion suggested by an occupational therapist. Within seven-week treatment period, active range of the injured finger(s), wrist motion and grip strength were collected and result were compared with a retrospective group of patients treated with our original controlled passive approach.

Results:
Eleven subjects were completed ICAM program meanwhile. There were 7 men and 4 women, aged from 28 to 62 years old. The majority was injury at zone 5. All patients showed less than 20 degrees of flexion loss and without extension lag at the day of discharge. The average treatment sessions attended was 8.3. Significantly fewer treatment sessions and shorted rehabilitation program were demonstrated, compared with our original approach.Moreover, better acceptance of this splinting design and shorter wearing time were also noted.

Conclusion:
ICAM program could provide good to excellent recovery for patients with Zone 4-7 extensor injury.

Abstract #346

A COMPARISON OF PALMAR STATIC DIGIT EXTENSION SPLINTING AND DORSAL BLOCK DYNAMICDIGIT EXTENSION SPLINTING WITH POST OPERATIVE DUPUYTREN'S CONTRACTURE RELEASE

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Key Words: Dupuytren's disease, Prevention of flexion contracture of MP, PIP joints, Palmar static digit extension splinting, Dorsal block dynamic digit extension splinting, Open palm total fasciectomy, comprehensive hand therapy

Objective: This study compares the effectiveness of palmar static digit extension splinting with dorsal block dynamic digit extension splinting on preventing postoperative secondary joint flexion contracture of metacarpophalangeal joints and proximal interphalangeal joints.

Methods: Six patients with Dupuytren's Disease were randomly selected for this study and divided equally into two groups. Group A was fitted with the palmar splint and Group B with the dorsal splint. Both groups were fitted with the experimental splints at the end of their first initial evaluation session.

All patients received six months of comprehensive hand therapy. Patients were also assigned a program of independent daily home exercise.

Results: Objective measurements were taken at initial evaluation and during the 12th and 24th weeks of hand therapy. This study found significantly greater improvement of ROM from use of the dorsal block dynamic digit extension splint than with the palmar static digit extension splint when combined with comprehensive hand therapy.

Discussion: Massive surgical scars resulting from Dupuytren's release surgery need specific long-term care in terms of scar reduction and rehabilitation in order for patients to regain and maintain hand mobility. Appropriate splinting is just one aspect of care, but if dorsal block dynamic digit extension splints can reduce flexion contracture and improve mobility, therapists should examine their usefulness within a comprehensive treatment program[11]

Abstract #298

FOREARM ROTATIONAL COTRACTURE SPLINT

Lau Chan Fai Lewis, Chan Hoi Hung Leo, Ma Wai Ling Eva
Institution: Occupational Therapy Department, Queen Elizabeth Hospital, Hong Kong

Introduction

Early mobilization and splinting are effective in improving the range of motion while established stiffness or contracture may require passive mobilization and stretching splints. There were several splinting designs in correcting rotational deformity. Experiences have been gathered from patients and therapists for modification. The feedbacks included bulky size, difficulty in application and time consuming in fabrication. A modified rotational stretching splint, The Planet Rotational Splint, has been modified and used in the past two years.

Splinting Design

The Planet Rotational Splint utilized the biomechanical advantage to correct rotation contracture. It consists of an elbow and a forearm piece connected by metal bar. The overlapping of the two pieces maximized the movement arm of the rotation axis. The rigid metal bar and the screw locking system minimized the lost of stretching force due to plastic deformation. This design also allows the patient to adjust the stretching force according to their tolerance and thus maximized compliance.

Results

Five patients with rotation contracture were reviewed. The pre treatment rotation arcs were 93°in aver age, range from 70° to 130°. Maximum gain in rotation can be achieved in one to three months. The rotation arcs further improved to 125°, range from 100° to full rotation after splinting treatment. The average change in percentage gain was 165%, range from 15% to 450%.

Conclusion

The Planet Rotation Splint is effective to improve both supination and pronation contracture. There were an average of 15% to 200% gain in pronation and 15% to 450% gain in supination.

Abstract #170

TRACTION SPLINT FOR DIGITAL INTRA-ARTICULAR FRACTURE - CASE REPORTS

Jui-Kun CHANG, OT
Department of Rehabilitation, Chang Gung Memorial Hospital at Kaohsiung, Taiwan

Purpose

Case reports about using some kinds of dynamic traction splints for the treatment of digital intra-articular fracture.

Method

1. The patients with comminuted intra-articular fractures of the PIP and MCP joints were treated by dynamic traction splinting and early active mobilization.
2. Surgery involved the placement of a pin for dynamic traction. The dynamic splints were fabricated by occupational therapists after or before pinning.
3. The splint consists of U-shape (modified from ring-shape loop) aluminum wire, elastic band, and W-shape hook. Distal traction was provided by 2 rubber bands connecting the transosseous pin to the W-hook around the forefront of U-wire.
4. Under exact alignment of digital traction, active ROM exercise of fracture site was carried out on a timed schedule.
5. The splints and transosseous pins were removed after 6-8 weeks. The follow-up evaluation of hand function was arranged.

Results

At follow-up examination, most of cases had good results in ROM and hand function after 8-10weeks. X-ray films revealed good results of fracture union, joint remodeling, and joint space.

Discussion

1. Distal traction obviates the tendency to longitudinal compression of fracture fragments (termed "ligamentotaxis").
2. Both distal traction and active movement are of value in maintaining collateral ligment length and preventing contracture of the periarticular tissues.

Conclusion

1. Adequate alignment, traction and active ROM exercise can be effective treatment for digital intra-articular fracture.
2. The un-bulky U-shape wire dynamic traction splints design should be considered

Abstract #204

A STUDY OF BIOMECHANICAL FACTORS ASSOCIATED WITH COMPUTER MOUSE USE IN SYMPTOMATIC AND ASYMPTOMATIC COMPUTER USERS

Authors: Lin King Mo, Joseph; Szeto Pui Yuk Grace
Institution: The Hong Kong Polytechnic University
City: Hong Kong
Country: People's Republic of China

Introduction: With widespread use of computers, the "mouse" is become an essential input device in daily office work. Intensive mouse operation is reported to be associated with disorders such as forearm tenosynovitis and carpal tunnel syndrome. Present study aimed to examine biomechanical differences associated with mouse use between persons with and without such disorders.

Method: 8 subjects with computer-related hand/wrist disorders (Case Group) and 10 symptom-free controls (Control Group) participated in this study. Each subject performed 4 multidirectional mouse clicking tasks with: (1) high and low precision demand, (2) fastest possible and constant speed. Surface electromyography (sEMG) of right flexor carpi ulnaris (FCU), flexor carpi radialis (FCR), extensor carpi radialis (ECR) and extensor carpi ulnaris (ECU) were measured and compared for median activities. Wrist radial/ulnar deviation angles were measured by electrogoniometer.

Results: Case Group exhibited higher median muscle activities in 4 muscles among 4 tasks compared to Control Group. There was significant differences in FCR (p=0.028) and ECR (p=0.003) between Case and Control Groups, but not in ECU and FCU. These differences were obvious between fastest possible and constant speed condition for both groups. For the wrist deviation angles, mean postural angles and extent of movements were smaller in Control group compared to Case group.

Conclusion: Present results showed consistent differences in muscle activities and wrist postural angles between symptomatic and asymptomatic computer users. These results would support the important role of motor control in contributing to the development of work-related musculoskeletal disorders in the forearm and wrist region.

Abstract #349

Work-related injuries and pain syndromes of the upper limb – a proposal of a management algorithm

Hung LK, So CL Billy
Institution: Department of Orthopaedics & Traumatology, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong

Work-related close and overuse injuries or soft tissue pain syndromes are increasing in significance in a society with changing socioeconomic environments. Classical orthopaedic textbooks do not describe these conditions fully because of 2 reasons: frequently changing work-related activity patterns and a lack of pathological confirmations because these conditions seldom come to surgery or the lesions exceed the sensitivity of available diagnostic means. The conventional diagnostic approach relying heavily on the "logistics" of a demonstrable pathological lesion fails here. An alternative approach requires an understanding of the work-related activity patterns, mechanisms of injury, pre-morbid physical capacity and psychological status of the patient, and an appreciation that no two individuals are alike. Psychological over-reactions to any injuries resulting in loss of earning capacity are tangible consequences after any injuries and should be treated per se. Return-to-work programs must be individualized. The authors present their experiences with the management of work-related upper limb injury patients with case illustrations and propose a management algorithm.

Abstract #300

Occupation related hand injuries at selected garment industries in Dhaka city, Bangladesh

Debashis Mondal

Textile industries are the largest manufacturing sector in Bangladesh. It became the main export sector and a major source of foreign exchange since 1980. It exports about $950 billion worth of product last year. According to Begum, the industries employ 3 million workers in 4000 industries in Bangladesh, of whom 90% are women. The working conditions in textile, garments industries around the world increasingly demand special attention and effort to the international trade union market. Every year, some two million men and women lose their lives through accident and disease related to their work. In addition workers suffer 270 million occupational accidents and 160 million occupational diseases each year. Out of that, a significant number of hand injury cases are there.
Objectives: To identify the common hand injuries that occurred in this industry and to identify any factors that were associated in order to recommend preventive steps.
Methods: After studying the activities undertaken in the garment manufacturing
Industry accidents reporting to the first aid room of the factories were recorded. The workers suffering these accidents were interviewed. Additionally participatory methods of evaluation were used with some of the personnel to gain further insight into the problem.
Results: Recognizing the injuries to the distal phalanx is the commonest accidental occurrence in the garment industries in Bangladesh. Burn, Carpal tunnel syndrome, repetitive strain injuries, tenosynovities, metacarpal and phalanx facture, Shoulder pain are also found.
Conclusion:
Hand injuries are a common occurrence in the apparel manufacturing industry. Both workers and the managements should be made aware of the problems associated with accidents and on the correct and continuous use of personal protective equipments that are recommended for each task in the industry.

Abstract #289

CASE REPORT: A DYNAMIC SHOULDER SPLINT TO IMPROVE PATIENT FUNCTION FOR RETURN TO WORK.

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OCCUPATIONAL THERAPY DEPARTMENT, QUEEN ELIZABETH HOSPITAL, HONG KONG

Introduction:
The report describes the rehabilitation of patient suffer from malignant tumor in humerus after one and half year surgical management with right partial shoulder replacement. The splint program was discussed.
Case description:
A 35-year-old woman with malignant bone tumor one and a half year follow partial shoulder replacement was referred for occupational therapy to prescribe a splint. Patient mainly complained of difficulty to perform her duties as laboratory technician with limited motion of shoulder and poor tolerance. After the job analysis, problem is identified that she can not lift up and reaches out the right upper limb for even a short period of time in order to operate the laboratory apparatus above the waist level. The limitations severely affect her job performance and her chance to sustain her job.
Splint design:
A new invention splint was prescribed. The design was inspired by the photographer using the single leg stand attached to the waist to support the camera. The splint involved a stand with one end stabilized by a pocket on a custom made waist belt. The other end attached to a splint fitted on patient forearm level with a dynamic joint.
Result
The result was successful that patient shoulder function was improved together with her job performance by using the splint. The splinting design and job analysis are discussed.

Session: SS8 - Symposium on Minimal Invasive Surgery

Date: 17 February 2008

Venue: Meeting room 603 - 604

Time: 10:30 - 11:25

Moderator : Chin-hong WONG & Alphonsus CHUNG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
251	HOFFMANN	Reimer	GERMANY	SS8	17. Feb. 2008	295	Aesthetic aspects of minimally and endoscopic surgery of hand and forearm
342	TSE	Wing-Lim	hong Kong	SS8	17. Feb. 2008	389	Prospective randomized study comparing percutaneous and open trigger finger release
52	PEGOLI	Loris	Italy	SS8	17. Feb. 2008	71	Our Results in 232 Endoscopic Trigger Finger Release and Comparison with Open Procedure
	CHEN	Hi-shan	hong Kong	SS8	17. Feb. 2008		Percutaneous Fasciotomy for Dupuytren Contracture in Chinese Patient

Session: SS8 - Symposium on Minimal Invasive Surgery

Date: 17 February 2008

Venue: Meeting room 603 - 604

Time: 10:30 - 12:30

Moderator : Shigeharu UCHIYAMA & Yun-po CHANG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	CHEN	Te-sung	China	SS8	17. Feb. 2008		Endoscopic Management in Thoracic Outlet Syndrome
318	OKUTSU	Ichiro	Japan	SS8	17. Feb. 2008	363	Okutsu One-Portal Endoscopic Operative Technique For Carpal Tunnel Syndrome - 21 Years Of Clinical Experience
	BAEK	Goo-hyun	Korea	SS8	17. Feb. 2008		
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Abstract # 295

AESTHETIC ASPECTS OF MINIMALLY AND ENDOSCOPIC SURGERY OF HAND AND FOREARM
Reimer Hoffmann, Hand and Plastic Surgery, Oldenburg, Germany

Hand Surgery is generally believed to be a column of Plastic Surgery. Yet aesthetic aspects often are neglected in this field. While in cosmetic surgery it is natural and obligatory to think carefully about the line of incision, in hand surgery surgeons mostly follow traditional thinking.

Minimally invasive and endoscopic techniques have found their way into hand surgery and therefore small incisions and less obvious incisions are possible both in elective and traumatic cases.
We have found that using new and different incisions the positive effect is not only aesthetic but functional as well.
In this paper we present our philosophy and practice with regard to minimizing scars and applying soft tissue endoscopic methods to hand and forearm with regard to: cubital tunnel syndrome, pronator syndrome, Dupuytren's contracture, base of thumb arthritis, tennis elbow, metacarpal fractures, flexor tendon surgery, tendon transfer and compartment syndrome.

Abstract #389

Prospective randomized study comparing percutaneous and open trigger finger release
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Introduction:

Percutaneous release is a minimally invasive procedure for treating trigger fingers. The efficancy, safety of the procedure and application to thumb were questioned. This prospective randomized study was conducted to compare the outcome of percutaneous and open release.

Materials and Methods:

49 females and 9 males with recurrence of trigger fingers (including 14 thumbs, 4 index, 31 middle, 9 ring) graded 2 or above after steroid injection were randomized into two groups : 30 patients recieved percutaneous release (PTFR) and 28 revieved open release (OTFR) under local anaesthesia. Average followup period was 8.6 weeks.

Results:

Average operative time was 7.15 minutes for successful PTFR and 15 minutes for OTFR. Less intraoperative lignocine requirement, better total active motion range (TAM) in first week significant earlier return to ADL were demonstrated in PTFR group. No significant difference in time return to work. Two (6.7%) patients failed PTFR and was converted to open release successfully. One OTFR case was complicated with local wound infection and was treated successfully with antibiotics without drainage. No neurovascular or tendon cut was reported.

Discussion and conclusion:

PTFR is a safe and efficient procedure even for the thumb. Less operative time, early return in ROM and ADL activities were reported in this study.

Abstract #71

OUR RESULTS IN 232 ENDOSCOPIC TRIGGER FINGER RELEASE AND COMPARISON WITH OPEN PROCEDURE
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Multimedica Holding
Plastic Surgery Department
University of Milan, Italy
L. Pegoli, E. Cavalli, G. Pivato, C. Parolo, G. Pajardi

Trigger finger is not a challenging pathology to be evaluated and treated. The main complain of patients after an open approach is disconfort at the level of the incision site and in a minor number of cases retraction at the level of the incision site. In this prospective study the authors compare two consecutive groups for a total of 420 patients one treated by an open approach and one treated by endoscopic release of the A1 pulley. The authors describe the technique and indications. Preoperative and postoperative evaluation at seven, 30 and 90 days was performed showing a faster recovery of disconfort with a faster return to daily and working activities using the endoscopic procedure.

Abstract #461

Percutaneous Fasciotomy in the Management of Dupuytren's contracture

Hi-shan CHEN

Percutaneous fasciotomy is commonly performed as an out-patient procedure in many European countries nowadays, by both rheumatologists and orthopaedic surgeons. The result of this procedure in Chinese population had not been studied in the past and no relevant information could be found in the literatures. Therefore, we have performed a retrospective study to review the effectiveness of the percutaneous fasciotomy in the management of the Dupuytren's contracture in local Chinese population.

We have reviewed the records of 8 patients (7 males and 1 female) who received percutaneous fasciotomy between 2002 and 2005. Four patients were bilaterally affected. For unilateral problem, dominant to non-dominant hand affected was 3 to 2. Total 13 digits affected included 3 middle fingers, 3 ring fingers and 7 little fingers, total 41 points of release were performed under local anaesthesia. Operations were all performed under LA without tourniquet, 19G needle was used as the cutting tip. The average release point was four (ranged from 3-5). The mean operation time was 20 minutes. All the patients could be discharged on the same day and none of them required regular analgesics. All patients received slab immobilization immediate after the operation, they were changed to nocturnal splint 1 week after the operation.

The average corrections in MCPJ and PIPJ contracture were from pre-operatively 50 and 46 degrees, to immediate post-operatively 0 and 11 degrees, respectively. After an average 22 months follow up, the amount of MCPJ and PIPJ contracture were 12 and 27 degrees correspondingly, with an average gain of 76% and 41% compared with the pre-operative condition. None had wound complication or neurovascular injury. They all have full DASH functional score and good satisfactory grading after the procedure.

Therefore, percutaneous fasciotomy is a simple, safe and effective procedure in Dupuytren's Contracture especially in the correction of MCPJ contracture.

Abstract # 363

Okutsu one-portal Endoscopic Operative Technique for Carpal Tunnel Syndrome – 21 years of Clinical Experience

Ichiro OKUTSU

[INTRODUCTION] In 1986, I developed the Universal Subcutaneous Endoscope (USE) system for extra-articular endoscopic surgery, and applied it to the operation for carpal tunnel syndrome (CTS). In order to prove the effectiveness of the world's first endoscopic management procedure as evidence-based medicine, we measured carpal canal pressure and median nerve pressure pre- and postoperatively. We also measured the size of the carpal canal cross sectional area pre- and postoperatively using MRI. We then analyzed the clinical results.
[MATERIALS AND METHODS] Over the past two decades, we have operated on 7,300 hands. For this procedure I use one 1-centimeter forearm portal with local anesthesia, without a pneumatic tourniquet, and it is performed on an outpatient basis. My operative technique does not rely on any blind procedures. The USE system is inserted into the carpal canal and both the flexor retinaculum (transverse carpal ligament) and distal holdfast fibers of the flexor retinaculum (DHFFR) are released using a hook knife.
[RESULTS] Seventy-five percent of all of our cases recovered from clinical sensory symptoms at 8 weeks, postoperatively. Muscle power recovery of the abductor pollicis brevis depended on preoperative muscle condition. Our complication rate was 0.3%. No tendon or nerve injuries occurred.
[CONCLUSIONS] In endoscopic surgery for CTS, complete decompression of the carpal canal is only achieved by release of the both flexor retinaculum and the DHFFR. Based on our more than 20 years of clinical experience, we are confident that our endoscopic technique for carpal tunnel syndrome is an evidence-based surgical procedure.

Abstract #463

Raynaud Phenomenon in Carpal Tunnel Syndrome

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The median nerve contains sympathetic nerve fibers as well as motor and sensory fibers.
Although sensory and motor symptoms in patients with carpal tunnel syndrome, such as pain and sensory impairment of median nerve territory, and weakness of thenar muscles, are well known, symptoms from alteration of sympathetic nerve fibers such as Raynaud phenomenon, are not familiar even to hand surgeons.
There have been many controversies about the coexistence of idiopathic carpal tunnel syndrome (ICTS) and Raynaud phenomenon (RP). Most authors have used questionnaire, history and physical examination for their diagnoses of RP. In this study, quantitative cold provocation test with plethysmography was used to diagnose RP, and perioperative prevalence of RP was investigated in patients with ICTS. Negative conversion rate of RP, in patients with both ICTS and RP after open carpal tunnel release, was also evaluated.
Thirty patients who were diagnosed clinically and electromyographically as ICTS were examined for the simultaneous presence of RP, using cold provocation test with plethysmography. The presence of RP was assessed when the patient showed positive cold provocation test, and had episodes of vasospastic signs and symptoms. Cold provocation tests were repeated at postoperative six weeks, three months, six months, and one year.
Eighteen patients (60%) were found to have RP. Sensory nerve conduction velocity was more significantly delayed in the patients with ICTS and RP, than in patients with ICTS only ($p=0.04$). The symptom duration of ICTS was longer in patients with RP than in patient without RP, but this was not significant statistically ($p=0.13$). Fourteen out of 16 patients (89%) showed improvement of RP at average 4.3 months (range: 6 weeks - one year).
This study found that the prevalence of RP in patients with ICTS was far higher than in the general population. This finding suggested that RP should be considered carefully when treating the patients with ICTS, because of the similarity of the symptoms and the possibility of the coexistence of these two conditions. However, RP was disappeared in most patients after open carpal tunnel release.

Abstract #325

Less invasive ECTR using modified Chow's technique and 5mm dia. cannula.

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Two portal ECTR using 5.5 mm dia. cannula to decompress the median nerve of the patients with idiopathic carpal tunnel syndrome (CTS) has resulted in a transient increase in carpal tunnel pressure but there was no relationship to clinical outcomes.
However, as pressure threshold of damaging the chronically entrapped median nerve has been unknown, attempt should be made to minimize an increase in carpal tunnel pressure during ECTR. In this paper, we introduce our technique of 2-portal ECTR using 5mm dia. cannula and show preliminary results.

Materials and Methods

We enrolled 7 patients of idiopathic carpal tunnel syndrome. Average age was 68 years old. Our modified 2-portal ECTR using 5 mm dia. cannula was performed using a pressure transducer catheter (2-Fr Mikro-Tip Pressure Transducer Catheter, Millar Instruments) inside the carpal tunnel. Continuous pressure measurement was performed during the procedure.

Results

The postoperative examinations at 1 day and 9 days after surgery did not demonstrate any worsening of the preoperative numbness or newly acquired numbness. All the patients experienced decrease or disappearance of preoperative numbness. At 1 month after surgery, motor distal latency significantly improved. Intraoperative measurement of carpal tunnel pressure was as follows: Max. pressure during insertion of the cannula: 582mmHg(148-1447). Average pressure of insertion of the cannula: 89.4mmHg(35-256).
Conclusion: Our modified 2-portal technique using 5 mm dia. cannula could be less invasive surgery to decompress the carpal tunnel in terms of transient increase of carpal tunnel pressure than the original ECTRA system, which increased pressure more than 2000mmHg for 37% of the patients.

Abstract #439

Endoscopic carpal tunnel release using modified Chow's extrabursal dual portal technique : Clinical results of 1100 patients

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Introduction : The purpose of this study is to evaluate the clinical results of endoscopic carpal tunnel release using modified Chow's extrabursal dual portal technique in 1280 wrists in a single center.
Material and Method : A total of 1280 wrists in 1100 patients were collected during 11-years period. All operations were performed under local anaesthesia. A 1-cm incision was marked 1 – 2 cm proximal to the distal wrist crease, in the midline, ulnar to the palmaris longus. A distal portal was established along a line bisection an angle created by the intersection of the ulnar border of the abducted thumb and the third web space. An obturator and cannula assembly was inserted under the, and three blades were used to cut the under endoscopic vision.
Results : Subjective results showed that 1172 hands (90%) had a reduction in the severity of pain after carpal tunnel release, 1172 hands (90%) had a reduction in the severity of paraesthesia and 1190 hands (93%) had a reduction in the severity of numbness. Nocturnal pain and paresthesia was relieved in 1216 cases (95%).
Discussion : Conventional open carpal tunnel release, limited open carpal tunnel release, and endoscopic carpal tunnel release (single or dual portals) are available. Less postoperative pain and faster recovery has been reported following endoscopic carpal tunnel release when compared top conventional open carpal tunnel release.
Conclusions : This study suggests extrabursal dual portal technique is a safe and reliable treatment option for carpal tunnel syndrome with high success rate.

Session: Free paper 21/22

Date: 17 February 2008

Venue: Meeting room 605

Time: 10:30 - 12:30

Moderator : F.K IP & Fok-chuan YONG

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Abstract #68

Relationship between Choline Acetyltransferase (CAT) Activity and Return of Motor Function in Peripheral Nerve Injuries

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The level of Choline Acetyltransferase (CAT) activity is considered to reliably and accurately reflect the number of motor nerves in any given peripheral nerve and has been used extensively as an indicator of viable motor nerve axons in a proximal nerve stump. However, the relationship between CAT levels and ultimate return of motor function has been inadequately evaluated. The purpose of our study was to investigate the relationship between CAT activity and ultimate return of isometric motor strength in a rat model.
Materials and Methods:60 female Lewis rats were divided into three groups: Group I – removal of a 10 mm segment of sciatic nerve, Group II – removal and repair, Group III – removal, crush injury of the segment and repair.
The right side was used as the experimental side and the left as a control. After 3 months survival time, the animals underwent a non-survival surgery. Isometric force measurements of the tibialis anterior muscle were obtained. Wet muscle weights were obtained. CAT assays were performed on the segments of spinal ventral and dorsal roots, as well as bilateral peroneal and sciatic nerves distal to the repair. CAT activity was compared to muscle strength and wet muscle weight to determine if a relationship existed.
Results: Considerable variability of CAT activity was demonstrated in the normal spinal roots as well as normal peroneal and sciatic nerves. There were no statistical differences between Groups II and III with respect to CAT levels or return of isometric motor function.
Conclusions:

1. CAT activity in normal uninjured nerves is highly variable.
2. When applied to injured nerves, CAT levels were also highly variable and were unable to correlate with return of isometric motor strength.
3. Degree of injury correlated inversely to isometric motor strength and wet muscle weight, but did not correlate with CAT levels

CAT levels are a poor, highly variable method to predict recovery motor recovery and are not appropriate to use in determination of viable nerve roots.

Abstract #96

Brachial plexus lesion in Spinal Cord Injuries: a multicentric study
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The brachial plexus lesion in a patient with spinal cord injury is a rare event.
For this reason the diagnosis and the treatment is very difficult.
The unit of Hand Surgery of "Policlinico" Hospital of Modena with the "Bichat" Hospital of Paris have studied this rare event.
In the unified casuistry we have treated 10 patients affected by brachial plexus lesion and spinal cord injury.
As regards the level of brachial plexus lesion two had an upper lesion, six patients had a lower lesion and two had a total lesion.
The level of spinal cord injury was cervical in one patient and in the others was thoracic one.
The average time for understanding the double lesion was 11,6 months.
The average time between trauma and first surgery is 18,6 months.
In all cases we performed tendon transfer and in 3 patients we operated the brachial plexus too.
The purpose of this multicenter study is to realize a early diagnosis and to tailor the surgery for the needs of the patient.
We present our preliminary study based on specific tests with the aim to design a multicetric prospective study on this issue.

Abstract #100

LONG-TERM OUTCOME OF CONTRALATERAL C7 NERVE TRANSFER
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Contralateral C7 root transfer was one of several treatment procedures for total brachial plexus root avulsion in our department. Here twenty-nine patients treated with contralateral C7 transfer were followed up for over three years (average 5.76 years) for the purpose of evaluating the long-term functional recovery of contralateral C7 transfer and evaluating the factors that affect the result of the operation.
The operations of contralateral C7 transfer were performed by a one-stage procedure in four cases or a two-stage procedure in twenty-five cases. The C7 were transferred to median nerve in twenty cases; radial nerve in two cases; musculocataneous nerve in two cases; the anterior division of upper trunk in one case; to median and radial nerve in two cases; and to median nerve and musculocataneous nerve in two cases.
The effective rate (motor recovery M3, sensory recovery S3) of one-stage procedure is 20%, while that of two-stage procedure is 64.29%. And there was no lasting impairment in healthy limb function. Only seven patients in the series could move their affected limbs independently.
Conclusions: Contralateral C7 transfer is an ideal procedure for the treatment of total brachial plexus roots avulsion injuries; the operation should be carried out through 2 stages and the optimal interval is 4 to 8 months; and function of affected limb will get improved with time after operation.

Abstract #106

EPIDEMIOLOGY OF ADULT TRAUMATIC BRACHIAL PLEXUS INJURY IN MALAYSIA: A MULTICENTRE STUDY

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Adult traumatic brachial plexus injury (ABPI) in Malaysia is commonly seen mainly following road traffic accidents, but the incidence is not known. The objective of this study is to identify incidence, causative factors, injury types and associated injury patterns of adult traumatic brachial plexus injury presenting in Accident and Emergency Units in Malaysia.
All trauma patients were screened for traumatic brachial plexus injury at the Accident and Emergency Unit (A&E) in six participating major hospitals. A simple questionnaire served as a screening tool at the triage counter to identify ABPI among trauma patients. Positive patients were examined in detail.
Total of 42 407 trauma patients were screened and eleven patients with traumatic brachial plexus injury were detected during the study period. The average percentage of trauma admissions out of total admissions to A&E ranged from 12% to 34%. The incidence of ABPI calculated in this study was **0.27 per 1000 trauma cases** of whatever origin and severity. Demographic data, causative factors, injury types and associated injury patterns were identified. Our results showed strong correlation of ABPI with road traffic accident involving young male motorcyclists who survived the initial high velocity impact.

Keywords: Brachial plexus injury, epidemiology, traumatic

Abstract #131

END TO SIDE BYPASS NERVE GRAFTING: EVIDENCE FROM INTRAOPERATIVE NERVE CONDUCTION STUDY

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Neuroma-in – continuity following nerve repair is a difficult problem. Surgical treatment is difficult and requires repair or bypass of non functioning nerve fascicles with preservation of functioning fascicles. One of the solutions is to use an end to side nerve graft to completely bypass the neuroma without interfering with the existing nerve function. This method has been reported by several authors but is not gained widespread acceptance for lack of evidence consistent functional recovery
We have used this method in 4 patients with neuroma of the ulnar nerve in the forearm and 1 patient with neuroma of the median nerve in the forearm.
We were able to document motor conduction through an end to side bypass graft in an intra-operative nerve conduction study and clinical evidence of improvement in sensory or motor function in 4 patients.
We have also suggested some modifications in the technique to improve the functional outcome in this procedure.

Abstract # 229

RESULTS OF SHOULDER ABDUCTION RECONSTRUCTION WITH DOUBLE NEUROTISATION FROM SPINAL ACCESSORY NERVE IN BPI

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Introduction: In C5-7 roots avulsion BPI, both Suprascapular and Axillary Nerves (SSN + AxN) should be neurotised to achieve good results for shoulder abduction reconstruction. However, there may be circumstances where there is a lack of donor nerves. A double neurotisation from a single donor nerve may be done to overcome this. We report the results of this method using the Spinal Accessory Nerve (SAN).
Materials & Methods: 10 male patients aged 19-33 years presented with C5-7 roots avulsion injuries. The SAN was dissected to expose the terminal segment of bifurcation or trifurcation of the nerve. One larger branch is connected to the SSN directly and the other one or two branches to the AxN via a Sural Nerve (6-10 cm) graft. They also had ICN3-5 to Musculocutaneous Nerve or Ulnar Nerve to the Nerve to Biceps nerve transfers for reinnervation of the Biceps.
Results: A review at 2 years post-surgery showed that 7 patients had achieved M3 shoulder abduction to 80^0 and above. They achieve this at 14-24 months. The other 3 patients achieved 30^0, 70^0 and 70^0 of shoulder abduction respectively. 3 of those who had good results also had good external rotation movements.
Discussion: Good results of shoulder abduction reconstruction require reinnervation of both the SSN and AxN. In circumstances of paucity of donor nerves, one donor nerve maybe used to neurotise two nerves. The SAN is able to provide double target neurotisation with good results as shown above.

Abstract #233

Respiration and elbow flexion were not completely independent even long after intercostal nerve cross suture to the musculocutaneous nerve

Tanefumi NAKAGAWA

Intercostal nerve cross suture to the musculocutaneous nerve (ICN transfer) is performend to the patient of the brachial plexus injury with cervical nerve root avulsions by suturing the intercostal nerve which controls respiration to the musclocutaneous nerve which is the control nerve of the elbow flexion. According to previous researches, contraction of the biceps was seen with respiration to some period after this operation, but with time the contraction of the biceps and respiration became dependent.
Physiological study after ICN transfer with a different view point compared to previous reports was done to know more about the problem of functional conversion after ICN transfers.
Eleven patients of brachial plexus injuries who had ICN transfer were examined. Post operation periods were 3 to 11 years. They were ten males and one female and their ages were 21 to 37. Muscle strengths were M3 in 8 patients, M4 in 3 patients. Muscle activity of the biceps with the surface electrodes and movement of the chest with the sensor were recorded simultaneously.
Synchronized contractions of the biceps with ordinary respirations were seen in three and synchronized contractions of the biceps with vigorous respirations in eight. Moreover, synchronized movements with the contractions of the biceps were seen in ten patients, When chest movement waves were averaged with the trigger of every contraction .of the biceps this finding was apparent. The result implies that the respiration and the contraction of the biceps were not fully independent even long after the operation.

Abstract #239

BRACHIAL PLEXUS SURGERY IN THE PHILIPPINES:Preliminary Results of Treatment

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Introduction: Brachial Plexus surgery in the Philippines is a relatively new field of expertise that has gained recognition only in the last decade. The increasing incidence of brachial plexus injuries led us to review our result of treatment in the past years.
Patients and Methods: From 2004 -2007, we reviewed our cases of brachial plexus surgeries done at the Philippine General Hospital, Department of Orthopedics, Section of Hand and Microsurgery. We had a total of 20 patients who underwent brachial plexus surgeries. Of these 20 patients, 12 patients had a follow-up of more than six months that were included in this study. Three patients underwent multiple nerve transfers for upper type injuries, four patients underwent functioning free muscle transfers for late, complete injuries and five patients had local muscle transfers. For the patients with multiple nerve transfers for shoulder abduction, the average range was 0-123 degrees, and external rotation was 0-90 degrees. For elbow flexion using the method of Oberlin, the average elbow flexion was 0-115 degrees. For those patients who underwent free muscle transfers for elbow flexion, the average elbow flexion was 0-106 degrees. For those patients who underwent a local muscle transfer for elbow flexion, the average range was 110 degrees.
Conclusion: The preliminary results of brachial plexus surgery in the Philippines were encouraging. The most common presentations were late cases of almost 12 months after injury. In such cases, local and free muscle transfers can restore some function of the upper extremity.

Abstract #285

3mbGracilis-adductor longus muscle transfers for patients with brachial plexus injuries

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[Anatomical study]
Fifty thighs from fresh human cadavers were studied to evaluate the feasibility of a double functioning free muscle transfer (DFFMT) of the gracilis and adductor longus with single common vascular pedicle anastomosis. Methylene blue intra-arterial injection and loupe-magnified dissection were used to demonstrate three groups of vascular patterns in these two muscles. The common vascular pedicles of 88% of our specimen muscles were long enough for possible anastomosis. Ten percent (type B2) were quite short, making microsurgical procedure quite difficult. Two percent (type A3) of our specimens were not suitable for single anastomosis. Four percent of our gracilis muscles had two major arterial pedicles that branched from the common pedicle in a Y-shaped configuration. If only one pedicle of this type is harvested during a free gracilis muscle transfer, it may cause inadequate flap perfusion. Four specimens were studied using contrast media angiography to confirm both are Mathes and Nahai type II muscle flaps. In summary, this study typed the common vascular pedicle of our sample of gracilis and adductor longus muscles, and confirmed the feasibility of double functioning free muscle transfer of the gracilis and adductor longus with single vascular anastomosis.
[Clinical results]
From 2001 to 2003, 32 patients received free gracilis-adductor FFMT for complete total avulsion BPI. The FFMT reconstructive procedures were performed in an average 13 months after trauma. The gracilis-adductor muscle flap was serving as elbow flexor and wrist extensor, while the second gracilis muscle flap was serving as finger flexor in the 2nd stage surgery. The average follow up was 3 years. The primary flap successful rate was 96.9% (31/32), with 1 case required a reopen surgery due to venous thrombosis. 84.4% (27/32) achieved M3 elbow flexion / M3 wrist extension, and 65.6% (21/32) obtained M3 hand grip in 1 year follow up. In 2 years follow up, 87.5 % (28/32) could have M4 elbow function, and only 71.8% (23/32) had M4 hand grip. We concluded that gracilis-adductor FFMT for reconstruction of total avulsion type BPI is a worthwhile technique.

Abstract #288

EARLY EXPLORATION FOR ROOT AVULSION INJURIES OF BRACHIAL PLEXUS

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Purpose
The purpose of this study is to clarify the advantages of early exploration for the diagnosis of pre- or post-ganglionic lesion in each root using simple electrical stimulation.
Materials and Methods
Six cases of brachial plexus injury operated within 10 days of injury were examined Electronic stimulation of the nerve was performed percutaneously and directly befor and during operation.
Results
2 cases were operated within 2 days and good muscle reaction was obtained during operation. In one case, reaction was obtained before operation by Erb point stimulation.
In one case operated at 5 days, the reaction was weak though it was obvious by percutaneous stimulation at the next day of injury.
In 3 cases operated at 6 days or more after injury, no reaction was obtained during operation. In one of them, reaction was positive at 2 days by percutaneous stimulation at Erb point.
In all cases, the plexus was easily explored without any scar formation.
Discussion
The reactivity of the nerve persisted surely within 2 days, and partly within 5 days after injury. Reactions could also be obtained percutaneously within 2 days. So if the muscle reaction is positive by Erb stimulation in a patient of brachial plexus injury, the level of injury is supposed to be preganglionic.
Conclusion
Early exploration has the advantage of making the diagnosis of the level of injury easily. Muscular reaction by electrical stimulation is preserved for at least 2 days after injury and may be helpful for the diagnosis of root avulsion.

Abstract #304

An Anatomic Study of the anterior brachial cutaneous nerve as transplanter for contrallateral C7 nerve root transfer

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Objective To observe the branches and course of the anterior brachial cutaneous nerve and the ulnar nerve, and to provide reliable anatomical basis for more effective and reasonable use of the anterior brachial cutaneous nerve as the graft for healthy side C7 transfer.
Materials and Methods The study was done in 8 fixed and 3 fresh adult cadavers. The anterior brachial cutaneous nerve and the branch and the blood supply vessels was carefully dissected in the upper limb. And the course of the ulnar nerve was also dissected and followed.
Results There were 4-6 fascicles in anterior brachial cutaneous ,which contain nearly 3010 motor fibers in human, the anterior brachial cutaneous nerve originates from lower trunk of the brachial plexus and travels 20.31±5.49cm long to the elbow joint. The anterior brachial cutaneous nerve and ulnar nerve are relatively stable and close each other and can be removed easily.
Conclusions The anterior brachial cutaneous nerve, which indicates that it is feasible to resect. anterior brachial cutaneous nerve and ulnar nerve can be as transplanter for contrallateral C7 nerve root transfer to treat brachial plexus injury.

【Key words】 brachial plexus injury; anterior brachial cutaneous nerve; anatomic study

Abstract # 308

The clinical application of artificial blood vessel in brachial plexus injury patients combined with blood vessel injury

Feng PENG

Objects: To investigate the possibility and advantage of application artificial blood vessel in brachial plexus injury patients combined with vascular injury.
Methods: 6 patients with brachial plexus injuries who were combined with vascular injury accepted the ePTFE artificial vessels to repair the affected blood vessels, when they were underwent brachial plexus repairing. The average lengths of artificial vessels were 12.3cm.
Results: After follow-up 18 to 24 months, the patency rate of the artificial blood vessels was 66.7%.good and excellent function outcomes were achieved in these patients with good blood supplying for upper extremities.
Conclusions: It is possible to repair brachial plexus and vessels simultaneously by using artificial blood vessels in brachial plexus injury patients combined with vascular injury. The blood supply and curative effect of affected extremities were improved.
Key words: brachial plexus vascular injury blood vessel prosthesis

Abstract # 313

C7 NERVE DOUBLE NEUROTIZATION IN THE TREATMENT OF TOTAL BRACHIAL PLEXUS AVULSION INJURY: AN EXPERIMENTAL STUDY

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PURPOSE
To test the feasibility of rescuing 2 impaired nerves by C7 nerve transfer (C7 nerve double neurotization)
METHODS
Using adult male Sprague-Dawley rats (200-250g), a C7 nerve double neurotization model is established. At postoperative 2, 4, 6, 8, 12th weeks the recovery underwent electrophysiological, muscle-nerve morphological, histological examinations and is compared with conventional C7 single neurotization.
RESULTS
Maximum amplitude and nerve-muscle latency of evoked motor action potential of reinnervated biceps and flexor digit profundus M, twitch and maximum tetanic muscle contractile tension, muscle weight, numbers of myelinated nerve fibers distal to the nerve coaptation site, cross-sectional area of muscular fiber show that: In the early postoperative period (2, 4 , 6 weeks), nerve regeneration in double neurotization group is not as good as single neurotization. As the postoperative interval prolongs, most of the parameters of nerve regeneration in group A approximate to those in the single neurotization groups and normal control group, ie, the result of double neurotization is close to that of the single neurotization. This indicates C7 nerve contains enough nerve fibers to provide sufficient regeneration for 2 recipient nerves.
CONCLUSION
Compared to single neurotization, C7 nerve double neurotization has the advantage of restoring 2 nerve function at same time. This implicates its future clinical application in treatment of severe brachial plexus avulsion injuries.

Abstract #316

Hand prehension recovery after brachial plexus avulsion by means of full-length phrenic nerve transfer via endoscopic thoracic surgery

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Object. The functional recovery of hand prehension after complete brachial plexus avulsion injury (BPAI) still remains an unsolved problem nowadays. The authors conducted a prospective study to provide a new method to solve it.
Methods. In the present study 3 BPAI patients underwent a new procedure, during which the full-length phrenic nerve was transferred to the medial root of median nerve by the technique of endoscopic thoracic surgery. All three Patients were followed up for a postoperative period more than 3 years and resulted well (The power of the palmaris longus, the flexor pollicis longus and the flexor digitorum of all four fingers reached Grade 3-4 of 5 and no symptoms of respiratory insufficiency occurred.).
Conclusions. It is proved that the neurotization of phrenic nerve to the medial root of median nerve via endoscopic thoracic surgery is a feasible way for early hand prehension recovery after complete BPAI.

Abstract #323

The Contralateral C7 transfer via prespinal route to repair the upper & middle trunks avulsion of the brachial plexus

Xu LEI

Objective To investigate a shorter and safe route for contralateral C7 transfer to repair the upper & middle trunks avulsion. **Methods** Eight male patients were treated from Dec 2005 to May 2007. The bilateral scalenus anterior muscles were transected before a prespinal & retropharyngeal tunnel was made. We transected C7 at division-cord junction level retroclavicularly to obtain more length and then C7 nerve root was dissected proximally close to
the intervertebral foramen. The contralateral C7 nerve root was used to repair the residual nerve C5 and C6 nerve roots or the anterior & posterior divisions of the upper trunk of injured side via this route, using direct neurorrhaphy or nerve grafting. **Results** All patients complained of tingling in the contralateral fingers when coughing or eating, which gradually subsided in 2-3 weeks. At 3 month follow-ups, ipsilateral SSEP could be recorded. At 7 months follow ups, CMAP could be recorded in biceps, deltoids and infraspinatus. At 12 months follow ups, we could observe motor and sensory function recovery of those patients. **Conclusion** Transection of bilateral scalenus muscles could reduce the length of nerve graft and make C7 nerve transferred more smoothly and safely through prespinal & retropharyngeal route and also favors nerve regeneration and functional recovery. Direct neurorrhaphy or short bridging by 3~4cm nerve graft greatly shortens the distance needed for nerve regeneration and should facilitate recovery of function of shoulder and elbow. Postsurgical fasting for 4 days included foods and liquids will benefit healing of neurorrhaphy nerves, and avoid complications.

【Key words】 Brachial plexus; injury; nerve graft; microsurgery

Abstract # 356

RECONSTRUCTION OF LONG SEGMENT FLEXOR AND NERVE LOSS AT WRIST LEVEL FOLLOWING ELECTRICAL BURNS

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The effect of high voltage electrical injury to the wrist is frequently a flail, insensate and non-functioning hand. There is paucity in the literature regarding the practical aspects of reconstructing such injuries. The authors' experience of managing such cases is presented with emphasis on the following technical details: Adequate soft tissue cover is of paramount importance prior to subsequent reconstruction. These patients have severe scarring around the wrist and radical debridement and flap cover is required; the lower abdomen is our preferred donor site. The flap skin and inset scars must be supple before tendon reconstruction proceeds. Tendon grafts are routed along anatomical pathways, but the nerves are routed separately, so they are away from any revision tendon surgery. Four illustrative clinical cases are presented in which multiple tendon gaps of up to 20cm are reconstructed with between two and eight fascia lata grafts and nerve gaps of up to 20 cm are bridged with sural nerve cables. A useful functional result can be obtained if opposition of the thumb to digits (preferably the index when present) is possible. For this metacarpophalangeal joint flexion is of greater importance than interphalangeal joint flexion, and reconstruction may proceed in the absence of the latter. All four patients achieved a useful thumb to finger pinch grip. These devastating injuries are difficult to manage and improved outcomes may be achieved by following an ordered sequence of surgery.

Abstract #34

TREATMENT OF ACQUIRED POSTERIOR SHOULDER DISLOCATION IN BRACHIAL PLEXUS BIRTH PALSY

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Introduction
Posterior glenohumeral dislocation is not infrequent in brachial plexus birth palsy (BPBP). An unreduced glenohumeral joint may become dysplastic with consequent deterioration of function. We report on the outcome of our treatment of children with Narakas I BPBP and posterior shoulder dislocation.
Method
Ten (4 males, 6 females) children with acquired posterior glenohumeral dislocation and upper trunk BPBP were treated at our institution with closed or open reduction, transfer of the Latissimus Dorsi-Teres Major to the Infraspinatus insertion, and release of the Subscapularis and Pectoralis Major. Postoperative immobilization was done with a full-time shoulder spica or brace for 6 weeks followed by 6 more weeks of nighttime bracing.
Results
Average age at time of surgery was 39.9 months (Range: 9-97 mos). After a mean follow up of 38.4 months (Range: 10-62 mos), all shoulders remained reduced. On final follow-up, passive external rotation averaged 58^0 with a mean improvement of 51^0 (Range: 30^0-80^0). Mean active elevation was 144^0 (Range: 90^0-170^0) with average improvement of 35^0.
Summary
Posterior glenohumeral dislocations in BPBP can be reliably reduced by closed or open technique. Transfer of the Latissimus Dorsi-Teres Major to the Infraspinatus insertion with Subscapularis and Pectoralis Major release aids in maintaining the reduction of the glenohumeral joint. This allows the functional hand to be used in an improved arc brought about by improved external rotation and elevation of the shoulder. In some patients, abduction contractures persist, internal rotation may deteriorate, and radiographic changes do not revert to normal.

Session: SS9 - Hand & Wrist Injury

Date: 17 February 2008

Venue: 7A Forum

Time: 15:20 - 16:22

Moderator : Alan FREELAND & Tak-chuen WONG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	VIEGAS	Steven	USA	SS9	17. Feb. 2008		Ligamentous anatomy and motion analysis of carpometacarpal joint
	HO	Sheung-tung	Hong Kong	SS9	17. Feb. 2008		Thumb carpometacarpal joint dislocation
	SHINOHARA	Takkaaki	Japan	SS9	17. Feb. 2008		Thumb metacrpophalangeal joint soft tissue injury
	LIM	Beng-hai	Singapore	SS9	17. Feb. 2008		Finger proximal interphalangeal joint collateral ligament injury
	WU	Wing-cheung	Hong Kong	SS9	17. Feb. 2008		Reconstruction of finger joint instability

Session: SS9 - Hand & Wrist Injury

Date: 17 February 2008

Venue: 7A Forum

Time: 16:22 - 17:20

Moderator : Govindasamy BALAKRISHNAN & Wing-cheung WU

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	BAIN	Gregory		SS9	17. Feb. 2008		Xomplex carpal injury
	SOTEREANOS	Constantine	USA	SS9	17. Feb. 2008		Perilunate fracture dislocation
	WONG	Tak-chuen	Hong Kong	SS9	17. Feb. 2008		Minimal invasive treatment in transcaphoid perilunate dislocation
	BAIN	Gregory		SS9	17. Feb. 2008		Limited wrist fusion

Session: SS10 - Neurological Problems Including Brachial Plexus Injury

Date: 17 February 2008

Venue: Meeting room 601

Time: 15:20 - 17:20

Moderator : F.K IP & T.H YIP

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
	GILBERT	Alain		SS10	17. Feb. 2008		Obstetrical brachial plexus palsy (II) - secondary surgery / reconstruction
	HOFFMANN	Reimer		SS10	17. Feb. 2008		Peripheral nerve entrapment
	CHUANG	David Chwei-chin		SS10	17. Feb. 2008		Nerve transfer in adult brachial plexus injury
	SONGCHAREON	Panupan		SS10	17. Feb. 2008		Reconstruction in adult brachial plexus injury
	XUI	Jian-guang		SS10	17. Feb. 2008		Basic Science in C7 transfer in brachial plexus injury

Session: SS11 - Reconstructive Microsurgery & Tissue Engineering

Date: 17 February 2008

Venue: Meeting room 603 - 604

Time: 15:20 - 17:20

Moderator : Wing-yuk IP & S. Raja SABAPATHY

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	IP	Wing-yuk	Hong Kong		17. Feb. 2008		From Microsurgery to Regenerative Medicine
2	HAHN	Soo-bong			17. Feb. 2008		Perspective of Microsurgery in the Hand
3	GOGOLEWSKI	Sylwester	Poland		17. Feb. 2008		Tissue Engineering of Bone and Skin
4	SABAPATHY	S. Raja			17. Feb. 2008		Principles in Choosing soft tissue cover of major injuries of the Hand
5	LIN	Chi-hung			17. Feb. 2008		Thumb Reconstruction
6	YAJIMA	Hiroshi	Japan		17. Feb. 2008		Free Vascularized Fibila Grafts in Surgery of Upper Extremities
7	HUANG	Wei-choa			17. Feb. 2008		Application of Free-style perforator flap from proximal lateral leg for hand soft tissue transfer
8	LEE	Jun-mo			17. Feb. 2008		Neurosensory Free Flaps in the Hand
9	WOO	Sang-hyun			17. Feb. 2008		Reconstruction of Hand Function by Various types of Free Functional Muscle Transplantation

Abstract #57

Perspective of Microsurgery in the Hand

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The term of microsurgery was coined in a paper on experimental anastomosis of 1- to 2-mm vessels at the American College of Surgeons meeting in 1960 by Jacobson and Suarez. Malt and McKhann performed the first case of arm replantation in 1962 in Boston; they reported two clinical cases in 1964 (JAMA). However, The first clinical report of a arm replantation was by Chen et al in the Chinese Medical Journal. In 1965, Komatsu and Tamai successfully replanted the thumb. And then, Cobbett detailed the first successful toe-to-hand transfer in 1969. In 1982, Manktelow gave his paper on "Functioning Free Muscle Transfer" at the American Society for Surgery of the Hand meeting.

Over the past 40 years there has been a shift in focus from refining technical aspects and improving success rates to assessing functional outcomes and better defining the indications for microsurgery in the hand. The advances in microsurgery have revolutionized the way surgeons restore form and function to the body, and have laid the groundwork for new advances. In the field of the hand, the microsurgical techniques and instruments have been used widely from replantation and reconstruction to composite tissue allotransplantation. Now, we will discuss current issues and future trends for microsurgery in the hand in an orderly manner.

1. Replantation

During recent 20 years, microsurgical centers around the world reported impressive series of successful replantation with viability rates greater than 80%. Successful replantation of digits and hands has been made possible by the development of an operating microscope with improved magnification, focus, and lighting; ultrafine nonreactive suture material; precision microcaliber needles; and a variety of microsurgical instruments. The dicision to replant an amputated part is not always easy. Factors that must be considered include the predicted morbidity to the patient, the expected chance of survival and functional outcome of the replanted part, and the total cost incurred. Good candidates for replantation are those with the following amputations: thumb, multiple digits, partial hand, almost any upper extremity part of child, wrist or forearm, elbow and above elbow, and individual digit distal to the FDS insertion.

2. Thumb Reconstruction

In 1966 Buncke et al. reported successful great toe-to-thumb transfers in rhesus monkeys. This breakthrough was quickly followed by successful application to a human, as reported by Cobbett in 1969. Microsurgery also enhanced primary thumb replantation. However, it is important for the surgeon and the patient to have realistic expectations with regard to the outcome of replantation. Survival rates from 46 to 91 percent have been quoted, with the highest viability in laceration injuries and the lowest in avulsion injuries. Most patients report satisfaction with the results of successful replantation. In unsalvageable cases or in the event of a replantation failure, various methods for thumb reconstruction are given that can be quite functional. There are nonmicrosurgical and microsurgical methods of thumb reconstruction. Results of all procedures vary according to the level of amputation and concomitant injuries. Distal amputations treated with revision of amputation have been shown to provide results comparable to those of replantation. For more proximal amputations, it has been demonstrated that the great toe transfer provides excellent mobility and strength of grip, whereas pollicization results in improved pinch accuracy. Comparison of great toe transfer with second toe transfer has demonstrated better cosmetic results and stronger grasp with great toe transfer, but with a more significant donor defect. The donor defect can be diminished in selected cases by use of the great toe wraparound flap in cases of malignant tumor of the thumb like melanoma rather than amputation. It should be noted the decision-making process should be directed by the patient's need rather than the surgeon's ability to perform certain operations.

3. Toe-to-Hand Transplantation

The absence of fingers is still a clinical problem that limits hand function and causes psychological suffering despite the possibility of functional compensation in the hand after finger amputation. When properly indicated, reconstruction with like tissue transferred from the feet is undoubtedly a good alternative to restore function and appearance after finger amputations. Since the first successful microvascular toe transfer for replacing a thumb was performed by Cobbett more than 30 years ago, toe-to-hand transfers have been undertaken with increasing frequency, not only for post-traumatic defects, but also, increasingly, for congenital absence of digits or defects after tumour ablation. The thumb and fingers can be reconstructed with success using various combinations of great toe, second toe, third toe, bilateral second toe, combined second and third toe and combined third and fourth toe transfers

4. Reconstruction of Composite Skin and Extensor Tendon Defects

The dorsum of the hand is covered by a thin skin envelope with little subcutaneous tissue, underneath which lies the extensor tendons and bony structures. Traumatic soft tissue injuries in this area are often associated with concurrent extensor tendon defects. Ideally, surgical management of these injuries should include reconstruction of both defects in a single surgical procedure. Conventionally, these injuries are managed with primary soft tissue coverage followed by a later secondary tendon reconstruction. Local tissues are often the preferred choice for soft tissue replacement; however, limited availability frequently makes free flap reconstructions, such as the venous flap, necessary. Non-vascularized tendon grafts, even if used in the primary reconstruction, also have limited functional outcome as they are prone to adhesions. When choosing a method to salvage a complex wound of the fingers, the surgeon must consider factors such as the location, size, thickness, and special requirements of the defect, as well as the donor site morbidity. One-stage composite tissue transplantation with desired components should be attempted whenever possible. However, this procedure has more donor site morbidity than non-vascularized tendon grafts; therefore surgeons should decide which operation is more suitable to each patient.

5. Resection Replantation for Malignant Tumor of the Arm

Resection-replantation of the upper limb was reported first by Windhager et al. They described 12 patients with upper extremity Stage IIB or IIIB tumors in whom forequarter amputation was the only alternative that would allow wide excision of the primary tumor. The procedure described may be considered analogous to rotationplasty of the leg. The tumor-bearing region is resected as a cylindrical segment, including prior biopsy sites and all contaminated structures. Uninvolved vessels or major nerves are dissected from the tumor-bearing segment through longitudinal incisions provided this can be done with wide margins. Reconstruction is accomplished by limb shortening, osteosynthesis, vascular, nerve, and soft tissue repair. In most patients reported by Windhager et al, vascular reconstruction was unnecessary, although nerve repair was common. Useful limbs were achieved with resultant hand function correlating with the number of nerves repaired. Patients accepted the appearance of the limb when this reconstruction was offered as an alternative to amputation.

6. Free Functioning Muscle Transfers

Free muscle transfers have been found to be useful both for soft tissue coverage and as functioning contracting muscles for reconstruction of the extremities. Functioning muscle transfer is a procedure that involves microneurovascular transfer of a muscle from one location to another. This procedure is applicable to patients who have sustained a major loss of skeletal musculature in the upper extremity resulting in a significant functional deficit that cannot be adequately reconstructed by a simple procedure. For a muscle transfer to provide useful grip function, a number of conditions must be satisfied. Good range of passive joint movement and adequate hand sensibility and prerequisites. There must be a mechanism for finger and thumb extension to enable the grasp mechanism to be useful. Intrinsic muscle function should be present. In addition, the recipient of a muscle transfer must have the patience to wait for reinnervation and the persistence to pursue a postoperative muscle-strengthening program.

7. Vascularized Bone Graft

Clinical reports of vascularized bone grafting following with use of rib, fibula, and iliac crest. The first vascularized fibula transfer was done by Ueba and Fujikawa in 1974. Together with the iliac crest it remains the mainstay for extremity reconstruction today. Many variations have been described that allow tailoring of the graft to meet specific needs, including reconstruction of combined bone and soft tissue loss in one setting. It would seem that vascularized autografts would be ideal for grafting under most circumstances. Their use as free tissue transfers is technically demanding, however, and pedicle grafts are often more limited in dimension, pedicle length, and hence indications. Prolonged operative times and extensive dissection increase the risk of complications, and dornor site morbidity may be significant. Vascularized transfer is indicated in segmental bone defects lager than 6 to 8 cm owing to tumor resection, traumatic bone loss, osteomyelitis, or infected nonunion. Their use in smaller defects is reasonable in cases in which biologic failure of bone healing is likely or has already occurred. Examples include persistent nonunion after conventional treatment, poorly vascularized bone and/or its soft tissue bed due to scarring, infection or irradiation, and congenital pseudoarthrosis.

8. Intra-Uterine Microsurgery

Now-a-days, foetal surgery may allow early treatment of certain congenital anomalies that can be easily diagnosed with high-resolution ultrasound. Unfortunately, foetal morbidity and mortality rates remain excessively high after such interventions, due to (a) direct operative trauma to the myometrium, foetal membranes and foetus, and (b) effects of postoperative premature membrane rupture, uterine flow decrease and the increase of uterine contractions. Syndactyly is one of the most common aberrations of limb development. Current protocols initiate surgical repair at about 6 months of age or later and occasionally require several operations to complete digital separation. Furthermore, these operations are complicated by scar formation, particularly at the reconstructed interdigital web, where contracture bands can form web creep and limit abduction and digital mobility. Some reports demonstrated virtually no scar formation with intra-uterine wound healing. Thus, intra-uterine syndactyly repair may potentially provide optimal cosmetic and functional results. An endoscopic approach is currently being investigated in an attempt to reduce the risks associated with foetal surgery and make intra-uterine intervention for morbid malformations a more acceptable approach.

9. Transfer of Fascicles from Ulnar or Median Nerve in Upper Brachial Plexus Palsy

In cases of upper brachial plexus palsy involving mainly the loss of shoulder function and elbow flexion, the C5, C6, and, often, C7 nerve roots are avulsed from the spinal cord, a condition that precludes nerve-grafting. As a result, many authors prefer nerve transfers. The primary aim of surgery in patients with upper brachial plexus palsy is the restoration of elbow flexion. In 1994, Oberlin C et al described an alternative approach involving the transfer of one or more fascicles from the intact ulnar nerve to the nerve to the biceps. After this report, this procedure is supported by several factors: the reinnervation and recovery of the biceps provides better results than do other palliative treatments. Usually, the patient complains of some tingling or paresthesias in the little finger for a few days or weeks after the nerve transfer. The higher rate of satisfactory results was showed in patients with the shorter preoperative delay no more than eight and twelve months, respectively. However, some authors have reported that median nerve fascicle transfer can be alternative to ulnar nerve fascicle transfer, especially when the recovered ulnar nerve is smaller than usual and cannot be clearly separated as a single fascicle for transferring to a motor branch of the biceps muscle. The median and ulnar nerves are nerves of passage in the arm, but in the forearm and hand each contributes: the median nerve more heavily in the foream, and the ulnar nerve more heavily in the hand. Therefore, they insist that transfer of one or two fascicles of the median nerve to motor branch of the triceps muscle appears to be reliable, without further impairment of the donor site at final flow-up examination, particularly in the patient who has a small ulnar nerve that cannot be separated as a fascicle to transfer to the motor branch of the biceps muscle.

10. Hand and Composite Tissue Allo-transplantation

The report by Lanzetta M et al in 2007 said that total eighteen male patients underwent 24 hand/forearm/digit transplantations from September 1998 to February 2006 around the world. Immunosuppressive therapy included tacrolimus, mycophenolate mofetil, rapamycin and steroids; polyclonal or monoclonal antibodies were used for induction. Topical immunosuppression was administered in some patients. Follow-up period ranged from 34 to 85 months. Patient and graft survival were 100% at 1 and 2 years. Finally, total 8 cases of graft failure or loss were showed only non-compliant patients. Acute rejection episodes occurred in 12 patients within the first year. Rejection was completely reversible in all compliant patients. No life-threatening complications or malignancies were reported. All patients had achieved protective sensation and in 17 of them also discriminative sensation. Extrinsic and intrinsic muscle recovery enabled patients to perform most daily activities and 90% of the recipients returned to work, and improved manual skills allowed them not only to resume their previous jobs but also, in some cases, to find more suitable employment. The first 8 years of clinical experience confirm that hand transplantation is technically feasible and that results are very encouraging as major adverse effects due to surgery and immunosuppressive regimen did not occur.

11. Robot-Assisted Microsurgery (RAMS)

In the early 1990's, NASA's jet propulsion laboratory (JPL) began a project in telerobotics as part of its emergency response robotic program. The subsequent evolution of the robotic surgical system culminated in the development of a different skill and advanced instrumentation. In the mid 90's there was a sudden surge in the development of robotic surgical technology. Dr. Alan Richards became the first surgeon to operate using the robotic system by performing a laparoscopic cholecystectomy. In the mid nineties, Steve Charles originated the concept of a telerobotic system as a tool to assist the microsurgical procedures. Subsequently, in 1994-95 JPL engineers developed RAMS based on surgical requirements provided by Steve Charles using previously developed NASA telerobotics technology. It was a six-degrees-of-freedom surgical robot slave made up of a torso-shoulder-elbow body with a three-axis wrist. The robot manipulator was about 10 inches long and 1 inch in diameter. In 1998, a study by Stephenson first pointed out to the fact that coronary artery anastomoses are technically feasible with the use of robotic instruments. An additional study done by the same group reported the successful use of this approach in a large animal trial. On July 11, 2000, FDA approved the first completely robotic surgery device,

the da Vinci surgical system from Intuitive Surgical to perform general surgical procedures while seated at a computer console and 3-D video imaging system across the room from the patient. There are some limitations also: the initial capital cost, the time taken for the surgery, the presently available instruments which are not yet small and fine enough, and no haptic feedback.

12. Gene Therapy In Flap Survival

Tissue repair begins with an increased release of numerous cells such as leukocytes and plasma proteins such as fibrinogen from the circulation, and growth factors such as VEGF, PDGF, and FGF from the tissue. Activation and attraction of these cells and factors augment the complex cascade of repair and remodeling at the wound site. Particular attention is given to the role of growth factors, which are polypeptide regulatory molecules that play both specific and nonspecific roles in angiogenesis and tissue repair through effects on cell growth, differentiation, and metabolism. The use of exogenous growth factors in enhancing skin flap viability has indeed been studied and provides promising results, demonstrating the importance of growth factors in aiding tissue repair and development. Considerable improvement in flap survival was noted in studies that administered growth factors through various routes such as topical, systemic, and subcutaneous, intramuscular, and intradermal injections. Utilizing techniques such as gene therapy that lengthen the active life of the factors could increase the effectiveness of growth factors. By placing growth factor coding strands into host cells, gene therapy can provide a greater flow of growth factors to damaged tissue, which the body can use to reduce flap ischemia.

13. Conclusion

Microsurgical field in the hand will be expanded with the dazzling development of computer-assisted robotic system, microsurgical equipments, and its instruments along with study for new medicine or surgical techniques. Also, the end results of microsurgery will be enhanced with new technologies like gene therapy and RAMS and early intervention like intra-uterine surgery in the future. Hand surgeons should be used to microsurgical techniques and new technologies.

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Abstract #102

Free Vascularized Fibula Grafts in Surgery of Upper Extremities

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PURPOSE I report the operative procedure, therapeutic outcome, representative cases, and indications for vascularized fibula (fibular head) grafts in the upper limb.

MATERIALS Between 1979 and 2005 in our clinic, free vascularized fibular grafts were applied in reconstructing bone and joint structures of the upper extremity in 28 patients. There were 18 men and 10 women. Their ages at operation ranged from 3 to 67 years, with an average of 36 years. Four patients had traumatic bone defects, 4 had post-traumatic nonunions, 8 had osteomyelitis, 2 had congenital pseudoarthroses, 9 had defects after tumor resection, and 1 had congenital club hand. Reconstructed sites were the humerus in 4 patients, the radius in 18, the ulna in 4, both radius and ulna in 1, and the metacarpal bone in 1. In 6 of the 28 cases, a fibular head involving an articular fibular-head graft was used for reconstruction of the wrist joint. The length of the bone defect ranged from 3 to 18 cm (mean, 8.2). The mean follow-up period was 58 months.

RESULTS Postoperative circulatory disturbance necessitated revision surgery in 3 patients, who were all salvaged finally. No patients required additional bone grafts. The mean period required to obtain radiographic bone union was 4.5 months. Fractures of the grafted bone encountered in one patient. The mean total range of wrist flexion-extension was 110 degree in patients with fibular head grafting. In 2 patients with growth plate transplantation, lengthening of the fibula was noted in both patients, but the radial deformity of the hand recurred.

CONCLUSION Vascularized fibula graft is indicated in patients with large bone defects or intractable nonunions in the humerus, radius, and/or ulna. Vascularized fibula head graft is indicated for functional reconstruction of the wrist joint after tumor resection of the distal radius.

Abstract #125

Neurosensory Free Flaps in the Hand

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Introduction: Microsurgical reconstruction of the hand demands recovery of the sensation of the reconstructed free flap as well as exact anastomosis of the injured nerves and vessels so as to be complete successful. Even with adequate soft tissue coverage and skeletal mobility, an insensate hand is prone to be further damageable and unuseful in the activities of daily livings.
Materials and methods: Author have performed 16 cases of neurosensory free flaps in the hand, 8 cases of wrap around, 6 dorsalis pedis and 2 lateral arm flaps, from July 1992 through June 2006. Followed up period was average 4years and 6 months. Wrap around flap was performed for reconstruction of the thumb, repairing deep peroneal nerve with superficial radial nerve by epineurial neurorrhaphy with 10.0 Ethilon suture material under the microscopy. Dorsalis pedis flap was transplanted for reconstruction of the ray amputation, extensor tendon exposure and wrist exposure cases. Deep peroneal nerve and branch of the ulnar nerve was repaired with superficial radial nerve by epineurial neurorrhaphy with the same suture material and equipment. Lateral arm flap was performed for reconstruction of the exposed metacarpal areas and repaired posterior cutaneous nerve of the arm with the superficial radial nerve by epineurial neurorrhaphy with the same circumstances.
Results: Wrap around flap was 9 mm, dorsalis pedis flap, 18mm and Lateral arm flap was 20mm in the static two point discrimination test.
Conclusion: Some of the neurosensory free flaps performed in the hand have not satisfactory to the patients because of limited regeneration of the sensory nerves.

Abstract #250

RECONSTRUCTION OF HAND FUNCTION BY VARIOUS TYPES OF FREE FUNCTIONAL MUSCLE TRANSPLANTATION

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Introduction: Free muscle transplantation with motor innervation represents the only way to restore hand function in case of extensive loss of musculature due to direct trauma or untreated compartment syndrome (Volkmann´s contracture).
Material and methods: 27 patients were treated by 31 muscle transplantations. Although considerably weaker than the finger flexors the gracilis muscle was the preferred donor muscle for reconstruction of finger flexion in 22 cases . The latissimus dorsi muscle was used in four cases with extensive loss of soft tissue at the forearm. Three patients, where additionally the extensor compartment was destroyed, were reconstructed by an additional gracilis muscle in two cases and by tensor fasciae latae muscle transplantation in one case after failure of the gracilis. For reconstruction of thumb opposition and resurfacing of the thenar defect an abductor hallucis muscle with medial plantar flap was transferred in one case. Mean age of the patients was 26 years. Sequelae of Volkmanns contracture were seen in 13 patients, loss of musculature by direct rauma in 11 patients and burn injuries in 3 patients. For motor innervation the interosseus anterior nerve was present in 22 cases, motor part of the proximal ulnaris in one case, interosseus posterior nerve in three cases and motor branch of the medina nerve in one case.
Results: Mean follow-up was 7,5 years (1-18 years). Reinnervated functioning muscle was obtained in 24 patients, 3 patients got no function despite the muscle survival and 2 muscles failed caused by arterial in one and venous thrombosis in the other. Both patients showed extensive scarring by longstanding ischemia in avulsion injuries. All 24 patients regained useful function and were satisfied with the final result. Additional procedures were necessary by wrist fusion in 5 patients and tenolysis in 6 patients. On average total active motion showed 110 degrees and grip strength reached 28% to the opposite side.
Conclusion: Free functional muscle transplantation represents a reliable procedure for reconstruction of finger flexion or extension. In case of extensive loss of soft tissue coverage the latissimus dorsi proved to be preferable to the gracilis. Complete excision of all necrosed and fibrosed musculature and neurolysis are prerequisites for good functional outcome. The abductor hallucis muscle with medial plantar flap can be used for covering wide thenar defects and restoring thumb opposition.

Perspective of Microsurgery in the Hand

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The term of microsurgery was coined in a paper on experimental anastomosis of 1- to 2-mm vessels at the American College of Surgeons meeting in 1960 by Jacobson and Suarez. Malt and McKhann performed the first case of arm replantation in 1962 in Boston; they reported two clinical cases in 1964 (JAMA). However, The first clinical report of a arm replantation was by Chen et al in the Chinese Medical Journal. In 1965, Komatsu and Tamai successfully replanted the thumb. And then, Cobbett detailed the first successful toe-to-hand transfer in 1969. In 1982, Manktelow gave his paper on "Functioning Free Muscle Transfer" at the American Society for Surgery of the Hand meeting.

Over the past 40 years there has been a shift in focus from refining technical aspects and improving success rates to assessing functional outcomes and better defining the indications for microsurgery in the hand. The advances in microsurgery have revolutionized the way surgeons restore form and function to the body, and have laid the groundwork for new advances. In the field of the hand, the microsurgical techniques and instruments have been used widely from replantation and reconstruction to composite tissue allotransplantation. Now, we will discuss current issues and future trends for microsurgery in the hand in an orderly manner.

14. Replantation

During recent 20 years, microsurgical centers around the world reported impressive series of successful replantation with viability rates greater than 80%. Successful replantation of digits and hands has been made possible by the development of an operating microscope with improved magnification, focus, and lighting; ultrafine nonreactive suture material; precision microcaliber needles; and a variety of microsurgical instruments. The dicision to replant an amputated part is not always easy. Factors that must be considered include the predicted morbidity to the patient, the expected chance of survival and functional outcome of the replanted part, and the total cost incurred. Good candidates for replantation are those with the following amputations: thumb, multiple digits, partial hand, almost any upper extremity part of child, wrist or forearm, elbow and above elbow, and individual digit distal to the FDS insertion.

15. Thumb Reconstruction

In 1966 Buncke et al. reported successful great toe-to-thumb transfers in rhesus monkeys. This breakthrough was quickly followed by successful application to a human, as reported by Cobbett in 1969. Microsurgery also enhanced primary thumb replantation. However, it is important for the surgeon and the patient to have realistic expectations with regard to the outcome of replantation. Survival rates from 46 to 91 percent have been quoted, with the highest viability in laceration injuries and the lowest in avulsion injuries. Most patients report satisfaction with the results of successful replantation. In unsalvageable cases or in the event of a replantation failure, various methods for thumb reconstruction are given that can be quite functional. There are nonmicrosurgical and microsurgical methods of thumb reconstruction. Results of all procedures vary according to the level of amputation and concomitant injuries. Distal amputations treated with revision of amputation have been shown to provide results comparable to those of replantation. For more proximal amputations, it has been demonstrated that the great toe transfer provides excellent mobility and strength of grip, whereas pollicization results in improved pinch accuracy. Comparison of great toe transfer with second toe transfer has demonstrated better cosmetic results and stronger grasp with great toe transfer, but with a more significant donor defect. The donor defect can be diminished in selected cases by use of the great toe wraparound flap in cases of malignant tumor of the thumb like melanoma rather than amputation. It should be noted the decision-making process should be directed by the patient's need rather than the surgeon's ability to perform certain operations.

16. Toe-to-Hand Transplantation

The absence of fingers is still a clinical problem that limits hand function and causes psychological suffering despite the possibility of functional compensation in the hand after finger amputation. When properly indicated, reconstruction with like tissue transferred from the feet is undoubtedly a good alternative to restore function and appearance after finger amputations. Since the first successful microvascular toe transfer for replacing a thumb was performed by Cobbett more than 30 years ago, toe-to-hand transfers have been undertaken with increasing frequency, not only for post-traumatic defects, but also, increasingly, for congenital absence of digits or defects after tumour ablation. The thumb and fingers can be reconstructed with success using various combinations of great toe, second toe, third toe, bilateral second toe, combined second and third toe and combined third and fourth toe transfers

17. Reconstruction of Composite Skin and Extensor Tendon Defects

The dorsum of the hand is covered by a thin skin envelope with little subcutaneous tissue, underneath which lies the extensor tendons and bony structures. Traumatic soft tissue injuries in this area are often associated with concurrent extensor tendon defects. Ideally, surgical management of these injuries should include reconstruction of both defects in a single surgical procedure. Conventionally, these injuries are managed with primary soft tissue coverage followed by a later secondary tendon reconstruction. Local tissues are often the preferred choice for soft tissue replacement; however, limited availability frequently makes free flap reconstructions, such as the venous flap, necessary. Non-vascularized tendon grafts, even if used in the primary reconstruction, also have limited functional outcome as they are prone to adhesions. When choosing a method to salvage a complex wound of the fingers, the surgeon must consider factors such as the location, size, thickness, and special requirements of the defect, as well as the donor site morbidity. One-stage composite tissue transplantation with desired components should be attempted whenever possible. However, this procedure has more donor site morbidity than non-vascularized tendon grafts; therefore surgeons should decide which operation is more suitable to each patient.

18. Resection Replantation for Malignant Tumor of the Arm

Resection-replantation of the upper limb was reported first by Windhager et al. They described 12 patients with upper extremity Stage IIB or IIIB tumors in whom forequarter amputation was the only alternative that would allow wide excision of the primary tumor. The procedure described may be considered analogous to rotationplasty of the leg. The tumor-bearing region is resected as a cylindrical segment, including prior biopsy sites and all contaminated structures. Uninvolved vessels or major nerves are dissected from the tumor-bearing segment through longitudinal incisions provided this can be done with wide margins. Reconstruction is accomplished by limb shortening, osteosynthesis, vascular, nerve, and soft tissue repair. In most patients reported by Windhager et al, vascular reconstruction was unnecessary, although nerve repair was common. Useful limbs were achieved with resultant hand function correlating with the number of nerves repaired. Patients accepted the appearance of the limb when this reconstruction was offered as an alternative to amputation.

19. Free Functioning Muscle Transfers

Free muscle transfers have been found to be useful both for soft tissue coverage and as functioning contracting muscles for reconstruction of the extremities. Functioning muscle transfer is a procedure that involves microneurovascular transfer of a muscle from

one location to another. This procedure is applicable to patients who have sustained a major loss of skeletal musculature in the upper extremity resulting in a significant functional deficit that cannot be adequately reconstructed by a simple procedure. For a muscle transfer to provide useful grip function, a number of conditions must be satisfied. Good range of passive joint movement and adequate hand sensibility and prerequisites. There must be a mechanism for finger and thumb extension to enable the grasp mechanism to be useful. Intrinsic muscle function should be present. In addition, the recipient of a muscle transfer must have the patience to wait for reinnervation and the persistence to pursue a postoperative muscle-strengthening program.

20. Vascularized Bone Graft

Clinical reports of vascularized bone grafting following with use of rib, fibula, and iliac crest. The first vascularized fibula transfer was done by Ueba and Fujikawa in 1974. Together with the iliac crest it remains the mainstay for extremity reconstruction today. Many variations have been described that allow tailoring of the graft to meet specific needs, including reconstruction of combined bone and soft tissue loss in one setting. It would seem that vascularized autografts would be ideal for grafting under most circumstances. Their use as free tissue transfers is technically demanding, however, and pedicle grafts are often more limited in dimension, pedicle length, and hence indications. Prolonged operative times and extensive dissection increase the risk of complications, and dornor site morbidity may be significant. Vascularized transfer is indicated in segmental bone defects lager than 6 to 8 cm owing to tumor resection, traumatic bone loss, osteomyelitis, or infected nonunion. Their use in smaller defects is reasonable in cases in which biologic failure of bone healing is likely or has already occurred. Examples include persistent nonunion after conventional treatment, poorly vascularized bone and/or its soft tissue bed due to scarring, infection or irradiation, and congenital pseudoarthrosis.

21. Intra-Uterine Microsurgery

Now-a-days, foetal surgery may allow early treatment of certain congenital anomalies that can be easily diagnosed with high-resolution ultrasound. Unfortunately, foetal morbidity and mortality rates remain excessively high after such interventions, due to (a) direct operative trauma to the myometrium, foetal membranes and foetus, and (b) effects of postoperative premature membrane rupture, uterine flow decrease and the increase of uterine contractions. Syndactyly is one of the most common aberrations of limb development. Current protocols initiate surgical repair at about 6 months of age or later and occasionally require several operations to complete digital separation. Furthermore, these operations are complicated by scar formation, particularly at the reconstructed interdigital web, where contracture bands can form web creep and limit abduction and digital mobility. Some reports demonstrated virtually no scar formation with intra-uterine wound healing. Thus, intra-uterine syndactyly repair may potentially provide optimal cosmetic and functional results. An endoscopic approach is currently being investigated in an attempt to reduce the risks associated with foetal surgery and make intra-uterine intervention for morbid malformations a more acceptable approach.

22. Transfer of Fascicles from Ulnar or Median Nerve in Upper Brachial Plexus Palsy

In cases of upper brachial plexus palsy involving mainly the loss of shoulder function and elbow flexion, the C5, C6, and, often, C7 nerve roots are avulsed from the spinal cord, a condition that precludes nerve-grafting. As a result, many authors prefer nerve transfers. The primary aim of surgery in patients with upper brachial plexus palsy is the restoration of elbow flexion. In 1994, Oberlin C et al described an alternative approach involving the transfer of one or more fascicles from the intact ulnar nerve to the nerve to the biceps. After this report, this procedure is supported by several factors: the reinnervation and recovery of the biceps provides better results than do other palliative treatments. Usually, the patient complains of some tingling or paresthesias in the little finger for a few days or weeks after the nerve transfer. The higher rate of satisfactory results was showed in patients with the shorter preoperative delay no more than eight and twelve months, respectively. However, some authors have reported that median nerve fascicle transfer can be alternative to ulnar nerve fascicle transfer, especially when the recovered ulnar nerve is smaller than usual and cannot be clearly separated as a single fascicle for transferring to a motor branch of the biceps muscle. The median and ulnar nerves are nerves of passage in the arm, but in the forearm and hand each contributes: the median nerve more heavily in the foream, and the ulnar nerve more heavily in the hand. Therefore, they insist that transfer of one or two fascicles of the median nerve to motor branch of the triceps muscle appears to be reliable, without further impairment of the donor site at final flow-up examination, particularly in the patient who has a small ulnar nerve that cannot be separated as a fascicle to transfer to the motor branch of the biceps muscle.

23. Hand and Composite Tissue Allo-transplantation

The report by Lanzetta M et al in 2007 said that total eighteen male patients underwent 24 hand/forearm/digit transplantations from September 1998 to February 2006 around the world. Immunosuppressive therapy included tacrolimus, mycophenolate mofetil, rapamycin and steroids; polyclonal or monoclonal antibodies were used for induction. Topical immunosuppression was administered in some patients. Follow-up period ranged from 34 to 85 months. Patient and graft survival were 100% at 1 and 2 years. Finally, total 8 cases of graft failure or loss were showed only non-compliant patients. Acute rejection episodes occurred in 12 patients within the first year. Rejection was completely reversible in all compliant patients. No life-threatening complications or malignancies were reported. All patients had achieved protective sensation and in 17 of them also discriminative sensation. Extrinsic and intrinsic muscle recovery enabled patients to perform most daily activities and 90% of the recipients returned to work, and improved manual skills allowed them not only to resume their previous jobs but also, in some cases, to find more suitable employment. The first 8 years of clinical experience confirm that hand transplantation is technically feasible and that results are very encouraging as major adverse effects due to surgery and immunosuppressive regimen did not occur.

24. Robot-Assisted Microsurgery (RAMS)

In the early 1990's, NASA's jet propulsion laboratory (JPL) began a project in telerobotics as part of its emergency response robotic program. The subsequent evolution of the robotic surgical system culminated in the development of a different skill and advanced instrumentation. In the mid 90's there was a sudden surge in the development of robotic surgical technology. Dr. Alan Richards became the first surgeon to operate using the robotic system by performing a laparoscopic cholecystectomy. In the mid nineties, Steve Charles originated the concept of a telerobotic system as a tool to assist the microsurgical procedures. Subsequently, in 1994-95 JPL engineers developed RAMS based on surgical requirements provided by Steve Charles using previously developed NASA telerobotics technology. It was a six-degrees-of-freedom surgical robot slave made up of a torso-shoulder-elbow body with a three-axis wrist. The robot manipulator was about 10 inches long and 1 inch in diameter. In 1998, a study by Stephenson first pointed out to the fact that coronary artery anastomoses are technically feasible with the use of robotic instruments. An additional study done by the same group reported the successful use of this approach in a large animal trial. On July 11, 2000, FDA approved the first completely robotic surgery device, the da Vinci surgical system from Intuitive Surgical to perform general surgical procedures while seated at a computer console and 3-D video imaging system across the room from the patient. There are some limitations also: the initial capital cost, the time taken for the surgery, the presently available instruments which are not yet small and fine enough, and no haptic feedback.

25. Gene Therapy in Flap Survival

Tissue repair begins with an increased release of numerous cells such as leukocytes and plasma proteins such as fibrinogen from the circulation, and growth factors such as VEGF, PDGF, and FGF from the tissue. Activation and attraction of these cells and factors augment the complex cascade of repair and remodeling at the wound site. Particular attention is given to the role of growth factors, which are polypeptide regulatory molecules that play both specific and nonspecific roles in angiogenesis and tissue repair through effects on cell growth, differentiation, and metabolism. The use of exogenous growth factors in enhancing skin flap viability has indeed been studied and provides promising results, demonstrating the importance of growth factors in aiding tissue repair and development. Considerable improvement in flap survival was noted in studies that administered growth factors through various routes such as topical, systemic, and subcutaneous, intramuscular, and intradermal injections. Utilizing techniques such as gene therapy that lengthen the active life of the factors could increase the effectiveness of growth factors. By placing growth factor coding strands into host cells, gene therapy can provide a greater flow of growth factors to damaged tissue, which the body can use to reduce flap ischemia.

26. Conclusion

Microsurgical field in the hand will be expanded with the dazzling development of computer-assisted robotic system, microsurgical equipments, and its instruments along with study for new medicine or surgical techniques. Also, the end results of microsurgery will be enhanced with new technologies like gene therapy and RAMS and early intervention like intra-uterine surgery in the future. Hand surgeons should be used to microsurgical techniques and new technologies.

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Session: Free paper T1/2
Date: 17 February 2008
Venue: Meeting room 605
Time: 15:20 - 17:30
Moderator : Poong-taek KIM & Eng-seng NG

	Surname	Firstname	Country	Session	Date	Abstract No.	Abstract Title
1	PUN	Wai-Ki	Australia	Free paper T1 - MIS	17. Feb. 2008	54	Two-Tunnel Versus Open Carpal Tunnel Release in Bilateral Carpal Tunnel Syndrome
2	CHUENG	Ian	Australia	Free paper T1 - MIS	17. Feb. 2008	153	The Two Tunnel Technique - An Alternative Technique for Carpal Tunnel Release, A Multi-Centre Study of 214 Cases
3	IKEDA	Kazuo	Japan	Free paper T1 - MIS	17. Feb. 2008	17	a New Tequnique of Open Carpal Tunnel Release with a Palmar Short Incision
4	UCHIYAMA	Shigeharu	Japan	Free paper T1 - MIS	17. Feb. 2008	254	Surge of Intracarpal Contact Pressure during 2-portal ECTR
5	KIM	Jong-Pil	Korea	Free paper T1 - MIS	17. Feb. 2008	40	The Effect of Steroid Injection in Percutaneous Release of Trigger Fingers
6	ZYLUK	Andrzej	Poland	Free paper T1 - MIS	17. Feb. 2008	28	The results of simple decompression of the ulnar nerve for cubital tunnel syndrome
7	WAN	Siu-Ho	China	Free paper T1 - MIS	17. Feb. 2008	145	Review of limited fasciectomy for Dupuytren's disease in Chinese population.
8	CHEZZI	Andrea	Italy	Free paper T1 - MIS	17. Feb. 2008	74	Arthrosocopic Treatment of CMC Joint Arthritis
9	KANG	Ho-Jung	Korea	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	47	Horse shoe bone graft and two screws fixation for scaphoid nonunion
10	WONG	T.M.	Hong Kong	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	104	Clinical Results of Vascularized Distal Radius Bone Graft for Scaphoid Non-Union
11	KIM	Joon-Woo	Korea	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	141	Dorsal Percutaneous Fixation of Scaphoid Fracture.
12	ARIMITSU	Sayuri	Japan	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	161	3-dimensional Kinematic evaluation of the rheumatoid wrists before and after partial arthrodesis
13	CHUNG	Duke-Whan	Korea	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	180	Scaphoid nonunion
14	CHUNG	Duke-Whan	Korea	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	208	Surgical Treatment of Scaphoid Nonunion - Factors of Influencing Outcome
15	CHUNG	Yang-Guk	Korea	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	237	Treatment of Scaphoid Nonunion with Avascular Necrosis Using the 1, 2nd Intercompartmental Supraretinacular Artery Pedicled Vascularized Bone Graft
16	TSE	Wing-Lim	hong Kong	Free paper T2 – Scaphoid Nonunion	17. Feb. 2008	390	Computer-guided percutaneous screw fixation: a new insight into operative treatment of scaphoid fracture

Abstract #54

Two-Tunnel Versus Open Carpal Tunnel Release in Bilateral Carpal Tunnel Syndrome. A Perspective Randomised Study

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A prospective randomised study, with the approval from the local Ethics Committee to compare the two-tunnel technique using two small incisions made at the palm and wrist , versus open carpal tunnel release in patients with bilateral carpal tunnel syndrome was carried out. All the operations were performed by the senior author. 25 adult patients (16 females, 9 males) with an average age of 55 years (range, 27-83) were included in the study. The average follow up was 7.7 months (1-12 months). The average operation time was 12 minutes for the 2 tunnel technique, and 6 minutes for open carpal tunnel release. There were no surgical complications in this study. 15 patients (60%) preferred the two tunnel technique. 9 patients (36%) preferred the open technique. 1 patient was indecisive. An average pain score at the wounds using the visual analog scale was 1.78 for the two tunnel technique, and 2.17 for the open technique two weeks after the operation. 52% of the patients with the two tunnel technique developed pillar pain and it was 40% for the other group. Only one patient at each group still had pillar pain six months after the operations. Objective assessment of the hand functions did not show any major difference in the two groups. In conclusion, two tunnel technique of carpal tunnel decompression had less early post-operative wound pain and more patients preferred this technique.
N.B. A multi-centre study on two-tunnel technique of carpal tunnel decompression has been submitted for presentation as well.

Abhstract#153

THE TWO TUNNEL TECHNIQUE- AN ALTERNATIVE TECHNIQUE FOR CARPAL TUNNEL RELEASE, A MULTI-CENTRE STUDY OF 214 CASES.

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Tze Ki Ho, Maroochydore, Queensland, Australia
Wai Ki Pun, Toowoomba Hospital, Toowoomba, Australia

The two tunnel technique involves the use of two mini-incisions and specially designed re-usable instruments. The design rationale of the surgical approach and instrumentation, the surgical technique, and our clinical findings are detailed. This is a prospective study reporting our experience using this technique on 177 consecutive patients undergoing 214 carpal tunnel releases at two centres. The study especially looks at the efficacy and safety of this technique. The mean follow-up period was 24 weeks. The symptomatic and functional improvements were documented as well as time to return to activities of daily living and work. The complications were recorded. Our clinical study supports this technique as an effective alternative method of carpal tunnel release. In our opinion, it allows excellent exposure and provides a safe approach. It has proven itself with good post-operative outcome and a low complication rate.

Abstract #17

A NEW TEQUNIQUE OF OPEN CARPAL TUNNEL RELEASE WITH A PALMAR SHORT INCISION

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Purpose: One of the severe complications of an open carpal tunnel release (OCTR) is a pillar pain. The purpose of this study is to show our new technique of OCTR with a palmar short incision, which decreases pillar pain.
Methods: The palmar longitudinal incision was started at 2 cm distal to the distal wrist crease and continued 2 cm distally. A developed retractor was introduced between palmar fascia and flexor retinaculum to protect branches of palmar cutaneous nerve. A developed elevator was introduced into the carpal tunnel from the distal end of carpal tunnel. Since a flexor retinaculum was hold between the retractor and the elevator, it was safely cut using scissors. The retinaculum should be cut 2 cm proximal to the distal wrist crease. A developed thin elevator with 1.cm width was introduced to the most proximal part, so the most proximal retinaculum was able to cut safely. The pillar pain of 30 patients was estimated by the threshold of tenderness using pressure meter. The highest pressure was 30 Newton (N). 14 Common OCTR patients were used to be a control group.
Results: The threshold of the control group was 12±5.9 N (10 days), 16±6.9 N (1 month), 21±8.1 N (2 months), and 27±5.8 N (3 months). The threshold of a new technique group was 30 N since 10 days after the surgery.
Discussion: Since our study showed that the new technique with a palmar short incision decreased the pillar pain, this technique is a useful method of OCTR.

Abstract# 254

Surge of Intracarpal Contact Pressure during 2-portal ECTR

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Purpose

We hypothesized that 2-portal ECTR procedure significantly increased intracarpal tunnel contact pressure but had fewer adverse effects on the improvement of symptoms postoperatively.

Methods

Thirty hands of 30 patients with idiopathic carpal tunnel syndrome were prospectively analyzed. Each patient was evaluated by physical examinations, wrist MRI, nerve conduction studies, and DASH score preoperatively. Our modified 2-portal ECTR was performed using a pressure transducer catheter inside the carpal tunnel. Continuous pressure measurement was performed during the procedure. The physical and electrophysiological examinations that were the same as those conducted preoperatively were repeated at 1, 3, and 6 months after surgery.

Results

Subjective symptoms and nerve conduction study findings improved uneventfully. Maximum pressure was always observed when the cannula assembly was about to be pulled out of the exit portal, and a pressure of more than 2000 mmHg was recorded in 11 patients. Resistance experienced during the introduction of the cannula assembly was greater when the cross-sectional area of the carpal tunnel at the hook of the hamate level on MRI was small. The average cross-sectional area of the patients whose maximum pressure exceeded more than 2000 mmHg was less than that of the patients who had measurable maximum pressure.

Conclusion

A surge of intracarpal tunnel contact pressure of more than 2000 mmHg during ECTR did not worsen clinical findings and nerve conduction study findings. However, to minimize the risk of median nerve damage, the cross-sectional area of the carpal tunnel at the hook of the hamate level should be evaluated if ECTR is indicated.

Abstract #40

The effect of Steroid Injection in Percutaneous Release of Trigger Fingers

Jong-Pil Kim

Purpose: To analyze the clinical patterns of trigger fingers and assess the effect of the steroid injection in percutaneous release.
Materials and Methods: Fifty-six patients with 68 trigger fingers that did not respond to nonoperative treatments were randomized to either percutaneous release alone (n=37) or percutaneous release with steroid injection (n=31) for surgical treatment of the A1 pulley. Grades of triggering according to severity and clinical type (nodular or diffuse) were assessed preoperatively. Duration of postoperative pain, graded results of surgical release, complications, and recurrence were assessed at 2-week, 4-week, 3-month, and 6-month follow-up examinations.
Results: Trigger fingers were successfully treated in 97% (30/31) of the cases using the percutaneous release with steroid injection and in 92% (34/37) of the cases using the percutaneous release alone. Mean duration of postoperative pain was significantly shorter in the percutaneous release with steroid injection group (p=0.002). For the cases of diffuse-type trigger finger, those treated by percutaneous release alone exhibited significantly longer duration of postoperative pain than those by the percutaneous release with steroid injection (p=0.003). No serious complications were observed in either group.
Conclusion: Percutaneous release of trigger fingers is a simple and usually successful procedure. In cases of diffuse-type trigger finger, percutaneous release with steroid injection provides better results than that of percutaneous release alone.

Kew words: Trigger finger, Steroid injection, Percutaneous release

Abstract #28

Conservative vs operative treatment of isolated metacarpal and phalangeal fractures: a prospective, randomized study

A. Żyluk, T. Budzyński

Patients and Methods. Seventy patients with 73 isolated, displaced fractures of the metacarpal and phalangeal bones were randomly allocated to the conservative in plaster or thermoplastic cast, or operative with K-wires, mini-plate or screw fixation. Patients were followed up at 2 and 6 months after surgery or reduction, and the following measurements repeated on each occasion: active range of motion and loss of extension of affected fingers or fingers relative to affected metacarpal bone, the total grip strength and two-point pinch grip with the contribution of the affected finger , function of the hand with DASH questionnaire and radiological assessment of angular deformity and healing disturbances.
Results. At 2 and 6 months assessments the results of both treatments were equal with respect to range of motion of fingers, extension loss, power and function of the hand assessed with DASH questionnaire. Anatomical outcomes in terms of degree of angular deformity were statistically significantly better in operative group. Major secondary displacements, requiring surgery occurred in four patients treated conservatively. Patients with metacarpal fractures achieved statistically significantly greater active range of motion and better function of the hand, than those with phalangeal fractures.
Conclusion. The results of this study suggest that operative treatment of metacarpal and phalangeal fractures is not beneficial to conservative.

Keywords: Hand fractures - treatment, hand function

Abstract#145

Review of limited fasciectomy for Dupuytren's disease in Chinese population

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Co-author :Dr. Chan Wai Chung

Introduction

The aim of this 7-year, single institution, and single technique study is to evaluate the surgical outcomes, complication and recurrence of Dupuytren's disease.

Material and methods

The result of 28 consecutive operations in 19 patients was reviewed retrospectively. There were 13 men and 6 women with a mean age of 68 years (range 44-94). All the patients received limited fasciectomy. For the skin incision, Bruner's zig-zag incision was adopted in 26 operations, while Z-plasty was used in 2 operations. The postoperative gain of the range of the metacarpophalangeal joint (MCPJ) and proximal interphalangeal joint (PIPJ) was evaluated. The recurrence rate, complication and risk factors were also reviewed.

Results

Among the study group, the mean postoperative gain of range of MCPJ and PIPJ was 90.5% and 71.1 % respectively. The mean follow up time was 32 months (range 10 to 60). The most common involved finger is the ring finger (43%), followed by little finger and middle finger (25%). There was no neurovascular complication. One patient got persistent contracture of the PIPJ after operation. Another patient got recurrence of the contracture. 21% of the patients were diabetic. 16% of patients were alcoholic. There was no significant difference in the postoperative improvement in these groups of patients compared to the other patients.

Abstract#74

ARTHROSOCOPIC TREATMENT OF CMC JOINT ARTHRITIS

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Basal joint arthritis of the thumb, is usually seen in female beginning from the fourth and fifth decade. In the the last two decades arthroscopic techniques has brought new chances of diagnosis and treatment for this condition. In this paper the authors describe the indications and their experience concerning the arthroscopic hemitrapezectomy and tendon interposition using the palmaris longus tendon. A series of 16 patients with a maximum follow up of 24 months is analized. Grasp strength, pinch strength, DASH and MAYO evaluation score both pre and post operatively at 12 months follow up were evaluated. According to MAYO score there were 6 excellent results, 6 good, 3 fair and 1 poor. No complications occured. According to our results, this procedure with the proper indications gives a valid option for the treatment of the thumb carpometacarpal joint arthritis in stage I and II according to Eaton's classification.

Conclusion

By using the technique of the limited fasciectomy and Bruner's zig-zag incision, satisfactory results were obtained. The improvement in the MCPJ was more significant than the one in PIPJ.

Abstract #47

Horse shoe bone graft and two screws fixation for scaphoid nonunion
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OBJECTIVES Three dimentional anatomical reconstruction of old scaphoid nonunion with humpback deformity is not an easy procedure. We report the effect of cortical interpositional horse-shoe graft using two screws and volar cancellous chip bone graft for the treatment of scaphoid nonunion with humpback deformity or miss-match fracture surface in scaphoid nonunion.
METHODS Nineteen patients treated for scaphoid nonunion using cancellous chip bone and cortical interpositional horse-shoe graft with 2 screws(Herbert's screw and miniscrew) were reviewed retrospectively. The mean follow up period was 24(14-36) months. The mean age was 30.5(17-52) years and 18 patients were male and 1 patient was woman. The nonunion sites were located in the waist in 15 wrists and in the distal third in 4 wrists. Volar approach used in 18 cases and dorsal approach used in 1 case. To assess the result of the operations, intrascaphoid angles were measured with peri-operative computed tomographs and radiographs.
RESULTS Bony union was obtained in 18(95%) cases. The average time for union was 13 weeks. There were improvements in the scapholunate angle (from 65.2 degrees to 49.5 degrees) and intrascaphoid angle (from 43.5 degrees to 29.6 degrees). There are 3 in execellent, 10 in good, 6 in fair. There was one complication. In 1 case, nonunion gap was seen at 7 months after operation, but there are no clinical symptoms.
CONCLUSIONS Cortical interpositional horse-shoe graft using two screws and cancellous chip bone for the treatment of scaphoid nonunion with humpback deformity or miss-match fracture surface in scaphoid nonunion seems to be encouraging in regaining the normal anatomy of scaphoid.

Abstract #104

CLINICAL RESULTS OF VASCULARIZED DISTAL RADIUS BONE GRAFT FOR SCAPHOID NON-UNION
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INTRODUCTION
Scaphoid non-union is a clinically difficult condition to treat. This study is to review clinical results of vascularized distal radius bone graft for scaphoid non-union.
METHODS
All scaphoid non-unions were close reduced by traction and transfixed percuatenously with 3mm cannulated screw or K-wire through volar approach. 1,2 or 3,4 inter-compartmental supra-retinaculum artery bone graft was harvested. Thumb spica was put on for 3-6 months. Clinical examination and fluorographs were criteria for bone union.
RESULTS
6 patients of mean age of 22 (18-28) years old were included. 5 were male. 4 affected right hand. Mechanism of injury includes fall and soccer game. Mean duration of non-union was 18 (9-24) months. Five 1,2 and one 3,4 inter-compartmental supra-retinaculum artery bone graft were performed. Mean follow-up was 28 (12-48) months. All non-union was healed, at 4 months. Grip strength was 90% of normal side. ROM was 97% of normal side. Mean scapho-lunate angle was 43 (36-50) degrees. There was no donor site morbidity.
DISCUSSION AND CONCLUSION
Vascularized distal radius bone graft provides a technically easy and practicable alternative for treating difficult scaphoid non-union based upon consistent vascular anatomy.

Abstract #141

Dorsal Percutaneous Fixation of Scaphoid Fracture
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Introduction:
The evolution in percutaneous scaphoid repairs shifted from volar repair to novel dorsal percutaneous repair. From March 2005 to date, we have treated 22 cases of scaphoid fracture by dorsal percutaneous fixation.
Materials:
There were 20 males and 2 females. The ages of the patients ranged from 15 to 45 years. There were 8 cases of acute stable, 2 of acute displaced fracture which was reducible, and 12 of delayed union on CT scan in the longitudinal axial plane of the scaphoid. All delayed union fractures were so-called late fractures, with the patients presenting 1 month or more after injury. Twenty cases had fractures at scaphoid waist and 2 cases at proximal pole.
Surgical Technique:
A small transverse skin incision on about 1 cm length is made at the dorsal scapho-lunate area. The wrist is pronated and flexed until the scaphoid is seen as a circle, the ring sign. The center of the circle is the target point for insertion of the guide wire into the proximal pole of the scaphoid using fluoroscopy. The Herbert screw was inserted with a free hand in all cases.
Results:
The length of follow-up time ranged from 4 months to 36 months. All scaphoid fractures had healed by CT scan. The average time to union was 8 weeks. Union failure, loosening of the screws and re-displacement were not found.
Discussion: The advantages of the dorsal percutaneous approach to scaphoid fixation are: (1) the proximal-to-distal placement of the guide pin and screw allow for more precise placement along the central axis of the scaphoid, which decreases healing time and reduces risk of screw thread exposure. (2) The dorsal approach avoids injuring the vulnerable volar ligament anatomy.
Conclusion:
It provides faster rehabilitation, earlier return to work, and quicker bony union in all patients.

Abstract #161

3-dimensional Kinematic evaluation of the rheumatoid wrists before and after partial arthrodesis

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Purpose: Radiolunate (RL) and radioscapholunate (RSL) arthrodesis are well-established treatments for rheumatoid wrists. The postoperative kinematics of rheumatoid wrists, however, has not been described. The purposes of our study are to evaluate the wrist kinematics after partial arthrodesis three-dimensionally and to compare the wrist behaviors between before and after the procedures.
Materials and Methods: We acquired in vivo kinematic data of 30 rheumatoid wrists before arthrodesis by three-dimensional computed topographies. We evaluated the range and direction of the midcarpal motion precisely by a markerless bone registration technique. The 10 cases were selected for the partial arthrodesis whose midcarpal motion was more than 30°. RL arthro desis was performed in 6 cases and RSL arthrodesis in 4. We compared them with the postoperative data of the 10 wrists.
Results: The average range of midcarpal motion after RL arthrodesis was 48±23°, which was almost same as the preoperative 46±8°. That after RSL arthrodesis was 49±18°, which slightly decreased from the preoperative midcarpal motion, 59±22°. The postoperative direction of flexion-extension motion was oblique from radiodorsal to ulnopalmar with respective to the wrist sagittal plane, which inclination was 29±5°after RL arthrodesis and 26±1 2°after RSL arthrodesis.
Conclusion: We found that both RL and RSL arthrodesis well preserved the midcarpal motion specifically in a wrist oblique plane, the so-called dart-throwing motion plane, which is utilized the most in daily activities. Our results may identify the value of the partial arthrodesis for the rheumatoid wrists which have significant amount of midcarpal motion preoperatively.

Abstract #208

Surgical Treatment of Scaphoid Nonunion- Factors of Influencing Outcome-

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Purpose : This study attempted to investigate the factors that influence the clinical and radiological results for patients who underwent bone graft and internal fixation for treatment of scaphoid nonunion.
Materials and Methods : The subject of this study were 45 patients who had been diagnosed with scaphoid nonunion and had undergone internal fixation and bone graft using a Herbert screw or Acutrak screw between March 1997 and March 2006. The average follow-up period was 20.5 months (ranging from 1 year to 8 years and 4 months). The average period from the injury to the surgery was 27.6 months (ranging from 6 months to 10 years). The scaphoid union was determined by a simple radiologic examination. The wrist function was evaluated using the modified Mayo wrist scoring system for patients who achieved union. This study examined the period from injury to surgery, the postoperative immobilization period and the influences of accompanying radioscaphoid arthritis, avascular necrosis and DISI on the clinical results. The Fisher's exact test was used for analysis.
Results : The union rate was 97.8% (44 cases) and the modified Mayo wrist score was 86. The ratio of excellent or good results was 81.8% (36 cases). All patients in the group whose period from injury to surgery was less than 5 years achieved union ; but only 85.7% of patients in the group whose period from injury to surgery was over 5 years achieved union. The average union rate of the 12 cases with concomitant avascular necrosis was 91.7% (11 cases), and the group without avascular necrosis attained a union rate of 100% (33 cases). The immobilization period, accompanying radioscaphoid arthritis, operation method and DISI did not influence the union rate. The average modified Mayo wrist score of the 26 cases whose immobilization period was longer than 6 weeks was 83.4, lower than that of the 18 cases whose immobilization period was 6 weeks or shorter than 6 weeks, which was 91.3 ($p<0.05$). The average modified Mayo wrist score of the seven cases whose period from injury to surgery was 5 years or longer was 81.6, whereas that of the 37 cases whose period from injury to surgery was shorter than 5 years was 87.4 ($p<0.05$). The average modified Mayo wrist score of the eight cases with concomitant radioscaphoid arthritis was 79.7, lower than that of the 36 cases without radioscaphoid arthritis which was 88.5 ($p<0.05$). Regarding the operation method, the average modified Mayo wrist score of the nine cases who did not undergo bone graft due to lack of fracture gap was 95.4, statistically significantly different from that of the 35 cases who underwent bone graft, which was 84.8.
Conclusion : As a treatment for scaphoid nonunion, internal fixation using a Herbert screw or Acutrack screw achieved a high union rate. The factors that influenced the union rate were the period from injury to surgery and avascular necrosis. The factors that influenced wrist function after union were the postoperative immobilization period, the period from injury to surgery, radioscaphoid arthritis, and the fracture gap in the nonunion area.
Key words: scaphoid, nonunion, internal fixation, bone graft

Abstract #237

TREATMENT OF SCAPHOID NONUNION WITH AVASCULAR NECROSIS USING THE 1, 2ND INTERCOMPARTMENTAL SUPRARETINACULAR ARTERY PEDICLED VASCULARIZED BONE GRAFT

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Purpose:
To evaluate the effectiveness of the 1, 2 intercompartmental supraretinacular artery pedicled vascularized bone graft for the treatment of scaphoid nonunion at waist or proximal pole with avascular necrosis
Materials and Methods:
A retrospective study was carried out on 10 patients with scaphoid nonunion at waist or proximal pole with avascular necrosis. Osteosynthesis with Acutrak screw fixation and vacularized bone graft using the the 1, 2 intercompartmental supraretinacular artery pedicle were performed between Jan. 2005 to Mar. 2006. For the correction of humpback deformity, anterior autogenous iliac wedge bone grafts were combined in two cases. Radiologic bone union was observed and the functional outcome was evaluated with Modified Green and O'brien's criteria. The mean follow up period was 11.2 months.
Result:
Bone unions were obtained in all patients at average10.4 weeks. At last follow up, the functional outcome were better than fair in all cases. As complications, there were two transient superficial radial nerve palsies and one screw loosening at proximal fragments, even in which the bone union was occurred at 12 weeks.
Conclusion:
The 1, 2 intercompartmental supraretinacular artery pedicled vascularized bone graft for the treatment of scaphoid nonunion at waist or proximal pole was a reliable method with high rate of bone union and good functional outcome even in case of avascular necrosis.

Abstract #390

Computer-guided percutaneous screw fixation: a new insight into operative treatment of scaphoid fracture

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Introduction
Percutaneous screw fixation has gained acceptance as the first line treatment in most scaphoid fractures. However the procedure is technically demanding. The introduction of computer-guided surgery may help to reduce the difficulties and improve the safety margin.
Methods
Twelve embalmed adult cadaveric forelimbs (6 right and 6 left) were randomly allocated to conventional fluoroscopy-guided percutaneous scaphoid screw insertion (FG) or computed-guided navigation placement (NG), carried out by one surgeon (TWL). The procedures were timed and radiological exposure recorded. The screw position was assessed in 4 different X-ray views by 2 independent observers. The scaphoids were dissected out and assessed for the entry and exit points and any breach of bone cortices.
Results
Radiographical satisfactory screw placement was achieved in all FG cases. It was only 50% in the NG group. On dissection, no screw protruded out in the FG group but none fulfilled all criteria for an optimal screw placement, and variations were up to 4mm in the entry point and 2.8mm in the exit point. In the NG group 50% of screw tips protruded out. All had good entry points, but deviation from the ideal axis averaged 2mm. The FG technique required an average of 20 fluoroscopy films and 10 minutes to complete. The NG group required 7 films and on average 28 minutes (both $p<0.05$).
Discussion and Conclusion
Computer-guided screw placement has the potential to provide more accurate screw placement with reduced x-ray exposure. The learning curve is steep, and current instrumentations need significant improvement to ensure reliability.

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Abstract #44

Congenital Anonychia with Ectrodactyly of 5th Finger
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Purpose:
Despite a high frequency of acquired nail disease, congenital absence of the nail, also called as anonychia, is a rare anomaly. It may be seen as an isolated of phalangeal bone(ectrodactyly), nail-patella syndrome, birth trauma, impaired peripheral circulation, alopecia areata, and pemphigus, idiopathic atrophy of the nail, bullous drug eruptions, periodic shedding, lichen planus, Stevens-Johnson syndrome and so forth.
Methods:
We have experienced a rare case of 40-day-old neonate, suffering from intrauterine growth retardation, but without familial history, chromosomal anomalies or any other diseases.
Results:
There was no nail on left 5th finger and distal phalangeal bone of same finger. So, we diagnosed as congenital anonychia with ectrodactyly of 5th finger.
Conclusion:
We report this case as congenital anonychia of 5th finger which have developed from underlying distal phalangeal ectrodactyly. We also review other reported cases in the literatures.

Abstract #53
Takaaki SHINOHARA
Successful treatment of macrodactyly requires complete resection of the growth plate

Purpose. Epiphysiodesis has long been listed as a recommended treatment for growth control in macrodactyly. However, the effect of the procedure appears to be unpredictable and often requires repeat surgery. In this study, we addressed the question whether method of epiphysiodesis affect the growth rate of the bone.
Patients and methods. Patients with bilateral macrodactyly and those who had surgeries for bone growth correction other than epiphysiodesis were excluded form the study. The study group consisted of 8 patients (4 boys and 4 girls) who were underwent epiphysiodesis for macrodactyly. Age at the time of surgery averaged 3.7 years. The mean follow-up was 4.8 years. In group A (9 phalanges and 2 metacarpus), growth plate was destructed with Kirschner wire. In group B (3 phalanges and 1 metacarpus), it was completely resected and fused with Kirschner wires. Yearly growth rate was calculated bilaterally using x-rays taken immediately after surgery and at the latest follow-up.
Results. Progressive type accounted for 64 % in group A and 75 % in group B. In group A, mean yearly growth rate was 11.2 % on the affected side and 10.1 % on the unaffected side. In contrast, in group B that was 5.8% on the affected side and 10.5% on the unaffected side.
Discussion and conclusion. In our hand, only bones in group B showed appreciable growth suppression. we conclude that simple destruction of the growth plate is inadequate and complete resection is required to achieve effective growth retardation.

Abstract #181

Macrodystrophia lipomatosa in the Pediatric Hand
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Macrodystrophia lipomatosa is a congenital macrodactyly characterized by proliferation of all mesenchymal components, particularly fibroadipose tissues. Especially, macrodactyly is a rare congenital anomaly of the hand that is difficult to treat.
A 6-year old girl presented with enlarged index, middle and ring finger, particularly pronounced hypertrophy of middle finger and cerebriform hypertrophy of her right palm. And her DIP & PIP joints of marked enlarged 3rd finger didn't function. MR imaging demonstrated proliferation of fatty tissue in the territory of the median nerve in the hand.
We corrected the macrodctyly through staged operations: on the first stage, we performed en bloc resection of radial side of marked enlarged 3rd finger as soft tissue debulking procedure. In order to limit growth, we did epiphygeal ablation, stripping of the digital nerve. Also tip plasty was done. Second stage, we did debulking procedure to ular side with preservation of digital artery & nerve in this side.
The degree of reduction was marked, however, the finger is still a little bit bigger than the normal one of the opposite hand. Although the pediatric patient may require additional surgeries because the deformity will continue to grow, early treatment can allow this child the benefit of a cosmetically appearance and provide psychological effects. Furthermore, follow up of this case is needed continuously. We consider decompression of median nerve also.
We report a case of macrodystrophia lipomatosa of the hand with a review of the literatures.

Abstract #213

THE NATURAL HISTORY OF CONGENITAL METACARPAL SYNOSTOSIS

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ABSTRACT

Metacarpal synostosis is a rare congenital deformity most commonly affecting the fourth and fifth metacarpals. There are few reports of this condition in literature and most discuss the technical aspects of surgical correction of the deformity. There is a lack of understanding regarding the natural history of the disease. We present a pair of siblings with metacarpal synostosis between the third and fourth metacarpals of increasing severity and its resultant complications, and our intraoperative findings and management for one of them.

Abstract #216

ANGIOLEIOMYOMA IN THE DIGIT

-TWO CASES REPORT-

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Angioleiomyoma, first described by Virchow in 1854, is a benign solitary smooth muscle cell tumor that occurs mainly in the lower extremity. It originates from the tunica media layer of arterial or venous walls and is uncommon in the hand, especially in the digit. The differential diagnosis of angioleiomyoma is very difficult. Diagnosis is usually made by a histopathologic study of the tumor. If resection is complete, the chance of recurrence is minimal and the prognosis is excellent.

We report 2 cases of angioleiomyoma of the digit. One of them destructed the cortical bone and invaded into the medullary marrow, which have not been reported previously.

Abstract #290

An Experimental Study on Congenital Limb Anomaly

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(Purpose) Experimental studies on abnormal developments in mammalian embryos have been limited by inaccessibility for surgical manipulations. We have developed the exo utero survival method proposed by Muneoka et al. in 1986 to produce the models of various congenital anomalies by cauterizing a portion of the limb bud of the mouse embryo.

(Subjects) A total of 500 mouths were used. Cauterization was performed on time-pregnant JCL/ICR mice at 10.5 to 12.5 days of gestation (plug day = day 0) by bipolar microcoagurator.

(Results) Polydactyly occurred in pre-axial cauterization at 10.5 to 11.0 days of gestation, and oligodactyly at 10.5 to 12.5 days of gestation. A same insult resulted in different deformities depending on the time of cauterization. Immediately after the cauterization, there was a cloudy area in the limb bud, but at 15 minutes to one hour later, it developed into a necrotic focus surrounded by hemorrhaging and hematoma. The hematoma occurred just beneath the mesenchymal tissue in the peripheral venous sinus and moved proximally at 24 to 48 hours after the cauterization, in the group treated after 11.5 days of gestation (not seen in the 12.5 days group).

(Conclusions) This fact was considered to support the progress zone and positional value theory proposed by Summerbell et al. in 1973. According to this study, we concluded that the occurrence of limb deformities would have been determined by the site, severity and time of the local insult as well as by the recoverability of the mesenchymal tissue.

Abstract #279

THUMB MP JOINT VOLAR PLATE RECONSTRUCTION WITH TENDON SLING

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Instability of the MP joint of the thumb impairs hand function significantly. Several techniques have been described to treat chronic volar instability of the thumb MP joint. Kessler described a volar sling technique using the EPB tendon to restore volar stability of the MP joint. We describe our modification of Kessler's technique to improve outcome.

9 patients with traumatic chronic volar instability of the MP joint of the thumb underwent reconstruction using our tendon sling technique. Outcome of surgery was assessed based on wound healing, recurrence, restoration of pinch strength and range of motion.

Patients were followed up for an average of 1.4 years (range 5 weeks - 4 years). All 9 patients had restoration of MP joint stability and were pain-free. Primary wound healing was achieved in all cases. There were no cases of skin ischaemia or necrosis. Thumb pulp sensation was intact in all cases. Pinch strength was restored and MP joint motion was 38.9 degrees (range 25-55 degrees).

The tendon sling technique effectively prevents hyperextension, restores stability and improves pinch strength; it preserves range of motion, and is a simple and safe procedure to perform.

Abstract #275

Pyogenic arthritis after steroid injection & percutaneous release of A1 pulley for trigger 3rd finger: a case report

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Subject: Pyogenic arthritis after steroid injection & percutaneous release of A1 pulley for trigger 3rd finger: a case report

Introduction: Trigger finger is a common hand disorder, and middle aged women are the most commonly affected age group. Treatment methods consist of conservative management like as splint immobilization, medication, steroid injection and operative methods by direct open or percutaneous release of A1 pulley. After subcutaneous injection or intratendinous injection, fat necrosis, skin depigmentation and tendon rupture are potential complications. We want to report a rare case with pyogenic arthritis after steroid injection & percutaneous release of A1 pulley for trigger 3rd finger.

Case report: A 59-years-old woman had visited our clinic for severe pain and limitation of motion on volar side of metacarpophalangeal joint of right 3rd finger.

5 months ago, she had been treated by steroid injection for triggering of 3rd finger, but symptom had not been improved. So 4 month ago she had been treated by percutaneous release of A1 pulley by needle. Symptom was subsided, but it was recurred 2 months after. On physical examination, she had heating, swelling, severe tenderness on volar side of metacarpophalangeal joint of right 3rd finger. She

had been taking oral medication for diabetes the last 15 years. Simple radiography of hand showed erosion on 3rd metacarpal head and base of proximal phalanx of 3rd finger and soft tissue swelling around joint. Ultrasonography of hand showed increased exudation, synovial hypertrophy, bony erosion on metacarpophalangeal joint of right 3rd finger as pyogenic arthritis. She was treated by operative method as incision and drainage. Infected granulation tissue was removed and pus was drained. Pain was decreased and range of motion of joint was improved on follow-up examination.

Discussion: Long acting corticosteroid injection is the mainstay of initial management treatment of symptomatic trigger digit. But patients should be warned complications which are fat necrosis, skin depigmentation and tendon rupture by collagen degeneration. Percutaneous release of A-1 pulley has gained popularity recently due to safety and simplicity of procedure. But complications as incomplete release of pulley or digital nerve injury or tenosynovitis were sometimes reported. Among various complications, we must keep in mind that pyogenic arthritis as complication after steroid injection and percutatneous release of A1 pulley in diabetes can be developed.

Abstract #294

UPPER LIMB TUBERCULOSIS – A CHALLENGING DIAGNOSIS

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Tuberculosis is the most frequent specific infection of the thoracic limb. We present two cases – a 56 years old woman with a brachial tumor who had undergone three recurrent surgical procedures and a 57 years old male with a carpal tunnel syndrome presumed to be a sarcoma. The symptoms were of very little diagnostic value - sarcoma, parasitic infection, TB?. Our conclusion is that the TB infection might prove to be a real masquerader and so the diagnosis is often delayed with serious clinical consequences.

Abstract #46

Compression of the Ulnar Nerve in Guyon's Canal Caused by an Anomalous Pulsatile S-shaped Ulnar Artery

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Purpose:
Compression of the ulnar nerve in Guyon's canal is a relatively uncommon condition. Many authors have described several etiologies of ulnar nerve compression at the wrist and Guyon's canal. The compression are frequently caused by situations such as occult tumorous condition, repeated occupational trauma, ulnar arterial disease, fractured carpal bone, rheumatoid arthritis and anomalous anatomy of ulnar tunnel. Preoperative physical examination, electromyography and radiological study are helpful in finding the cause and location of the compression.

Methods:
A 51 year-old man was referred with numbness, burning and tingling sensation along the volar side of the ring and little fingers of his dominant right hand for 6 months. Exploration of the ulnar tunnel was completed through an incision just ulnar to the third metacarpal. The ulnar artery was pulsatile, S-shaped and impinging on the ulnar nerve. Within the Guyon's canal, the ulnar nerve bifurcated into a superficial sensory and a deep motor trunk at 7mm distal to the proximal edge of the pisiform bone. To decompress the ulnar nerve, the pulsatile ulnar artery was mobilized and translocated radially onto the adjacent fibrous tissue and was fixed in place by nylon 8-0 suturing.

Results:
After decompression, the paroxysmal tingling sensation decreased to less than 1 minute per episode, occuring 1-2 times a day. After 4 months, he had no more episodes of tingling, numbness and burning sensation. Examination demonstrated good sensation to pinprick and touch on the ulnar aspect of the hand.

Conclusion:
Conservative treatment is applied to neuropathies caused by repetitive trauma in case for which a discrete abnormality cannot be found. We describe a pulsatile S-shaped ulnar artery that caused symptomatic compression of the ulnar nerve in the Guyon's canal. Immediate surgical decompression with transposition of ulnar artery is necessary to restore the ulnar nerve function. The prompt relief of compressive neuropathic symptoms following the translocation of the impinging ulnar artery from the affected ulnar nerve onto adjacent tissue proved that the the ulnar nerve compression is due to the anomalous vessel.

Abstract #63

Trady Posterior Interosseous Nerve in Guyon's Canal Caused by an Anomalous Pulsatile S-shaped Ulnar Artery

Chul-Hyun CHO

Acute posterior interosseous nerve (PIN) palsy after a Monteggia fracture has been reported fairly frequently. However, tardy PIN palsy as resulting from residual dislocation of the radial head in these fractures is extremely rare. Lichter and Jacobsen first reported a case of tardy PIN palsy with a Monteggia fracture. Since then, 4 cases have been reported in the English literature. We report a extremely rare case of tardy PIN palsy that developed 40 years after unreduced anterior dislocation of the radial head in Monteggia fracture. We excised the radial head and performed neurolysis. The function of the right hand was normal at a follow-up examination 8 months after surgery. We believe that excessive repeated motion with loss of elasticity of around tissues because of long-term dislocation of the radial head may cause delayed PIN palsy. It is necessary to make an accurate diagnosis and render proper treatment when a Monteggia fracture occurs, making sure that the radial head does not remain dislocated, to avoid PIN palsy due to excessive pronation and supination even several decades later.

Abstract #127

Surgical Treatment of the Posterior Interosseous Nerve Syndrome

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Introduction

The posterior interosseous nerve can be entrapped in the proximal forearm in the five potential compression sites from proximal to distal are fibrous bands, recurrent leash of vessels(leash of Henry), extensor carpi radialis brevis, Arcade of Frohse(proximal edge of superficial head of supinator) and distal margin of supinator muscle.
Purpose To evaluate the clinical and objective(EMG+NCV) results of the surgical release of the compressed posterior interosseous nerve in the forearm.
Materials and Methods: From September 2001 through July 2006, 12 cases(male 9, female 3:18 years ~ 66 years of age) were diagnosed by clinical symptoms and EMG and nerve conduction velocity test and released causative components through the anterolateral approach. Followed up period was at least 1 year after surgical release(1 year ~ 3 years and 5 months).
Results: 10 cases were recovered from wrist drop and/or fingers extension lag with satisfactory function, but 2 cases were in incomplete recovery with full extension lag of the wrist and finger joints.
Conclusion: Immediate surgical decompression of the confirmed posterior interosseous nerve syndrome of the under the age of 60 years of age shows excellent results in subjective and objective evaluations.

Abstract #168
Treatment of sensory nerve neuroma with modified end-to-side nerve repair method: A report of two cases
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Introduction
Because there is a limitation in sacrificing other sensory nerve as a donor, selecting proper treatment of sensory nerve neuroma is always difficult. To overcome this limitation, we performed modified end-to-side repair method without sacrificing other sensory nerve according to the Al-Qattan's method and present the surgical technique and the result.
Surgical technique: After resection of the neuroma, proximal and distal ends of the nerve were split longitudinally. Half of the split nerve end, as a donor nerve, was connected at the defect area and half of another nerve end was also divided to adjust nerve diameter. The both remaining nerve ends were connected to the original nerve with modified end-to-side technique.
Case 1. 29-year-old male, who had sustained deep laceration 5 years ago, presented to the clinic with paresthesia, pain at superficial radial nerve area. We performed modified end-to-side repair method. At follow-up 1 year later, he had no previous symptom such as paresthesia, pain and local tenderness at injured area. VAS (Visual Analogue Score) for pain has been improved from ten to one after surgery.
Case 2. 50-year-old male with painful neuroma at sural nerve area presented our clinic. Surgical exploration revealed a neuroma of the sural nerve with 2.2cm gap and same surgical treatment was used. At follow-up 17 months later, there was no evidence of any neuroma or tenderness. VAS has been improved from six to two.
Discussion
Although several techniques have been used for the treatment of painful sensory nerve neuroma such as nerve transplantation, ligation, implantation into muscle and bone, every procedure has its own disadvantage and shortage. Especially, choosing a proper donor nerve is always a dilemma in nerve transplantation. To solve this problem, Al-Qattan reported the modified end to side nerve repair without sacrificing other sensory nerve. We used this technique and achieved good surgical results.
The modified end to side nerve repair without sacrificing other sensory nerve could be one of the good options to treat the sensory nerve neuroma.

Abstract #193
Medical problems of PRMDs among string players in Symphony Orchestra
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Background: Musicians tend to suffer from various types of playing related musculoskeletal disorders (PRMD). It was reported that some string players had experienced pain in the upper limbs and fingers. In Japan, there has been little investigation into the PRMDs of string players in symphony orchestra, so this study was conducted to look at this matter.
Material and method: An anonymous questionnaire was performed with the 67 subjects, who were string players belonging to "A" symphony orchestra. There were 7 men and 60 women. There ages ranged from between twenties to fifties. The questionnaire consisted of three sections: demographics, musical background and practice habits, and medical problems and their care. There were 30 questions in all. The purpose of the study was explained to the subjects before hand and protection of their privacy was guaranteed in writing. All statistical analyses were done using SPSS for windows. We analyzed the correlation between physical symptoms and objective factors such as number of years performing and hours of daily practice.
Results: 89% of the players had some kind of physical problems involving the shoulders, wrist, head, back, neck and fingers. There were no significant correlations between their symptoms and such factors as their years of playing experience and their hours of practicing the instruments per day.
Discussion: The results suggested that high percentage of string players have the PRMDs. Not only upper extremities of the players but their entire bodies have to be considered in order to keep them from suffering from the PRMDs

Abstract #200
IATROGENIC SPINAL ACCESSORY NERVE INJURY – CASE REPORT
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Purpose: Iatrogenic spinal accessory nerve injury usually follows a simple posterior triangle lymph node biopsy. We present 4 cases with the painful shoulder and atrophy of the trapezius.
Materials and Methods: Four cases from September 2006 to September 2007 were selected. Mean age was 22 years old. There were 3 men and 1 woman, 2 right, 2 left. Mean follow-up period was 5 months. The approach was zig-zag incision included previous biopsy incision. The operative procedure were neurolysis 1, nerve graft 2, neurorrhaphy 1.

Results: The subjective result of treatment were judged as follows: excellent, good, fair, and poor. The objective result were evaluated with mearsurement of the thickness of the trapezius by ultrasound and active range of motion of the shoulder. All patients were recovered from the pain and atrophy of the trapezius.
Results: The knowledge of posterior neck anatomy prevent iatrogenic spinal accessory nerve injury. Early operative intervention only has the best functional results.

Abstract #221

Malignant Peripheral Nerve Sheath Tumor [MPNST] on a Toddler
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We report a rare case , one year boy old with a lump on the left arm that later known as Malignant Peripheral Nerve Sheath Tumor [MPNST]. The tumor was excised and the nerve keep intact during operation . Two months after operation , it was recurrent ; the parent refused amputation procedure but they ask excise the tumor only at 6 months after first operation . Later , 3 months after second operation , the tumor recurrent ; growing faster and bigger with distance metastases on the left chest . The third operation was done by amputation of the left arm closed to the left shoulder . 12 months post operation the patient was die before he admitted to the hospital

Abstract #243

GANGLIONS AS A CAUSE OF ULNAR NERVE COMPRESSION IN THE CUBITAL TUNNEL
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ABSTRACT
Ulnar nerve compression in the elbow region by ganglions is an uncommon occurrence. Most ganglions in the cubital tunnel arise from the elbow joint. In cases where the site of compression by the ganglion is not visualized while performing a formal cubital tunnel decompression, it may be missed. However the use of an "inching" nerve conduction study across the elbow region can aid in the localization of the exact site of compression. We report a case of a patient with cubital tunnel syndrome caused by compression of the ulnar nerve by a ganglion. The ganglion was outside the usual extent of cubital tunnel release and would have been missed if a conventional cubital tunnel decompression was performed. The location of the ganglion was determined preoperatively with an "inching" nerve conduction study which aided the surgery producing symptom relief for the patient.

Abstract #287

FIEXOR PLASTIES OF THE ELBOW AFTER BRACHIAL PLEXUS INJURY
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We reviewed the results of elbow flexor plasties after brachial plexus injury. There were 23 patients with average age of 25 years. Total palsy was noted in 11 patients, and upper palsy in 12 patients. Eleven patients were treated by intercostal nerve transfer, 3 by Steindler procedure, 1 by pectoralis major transfer, 1 by latissimus dorsi transfer, and 4 by Oberlin procedure. Free muscle transfer following Doi's method was performed in 4 total palsy cases to reconstruct elbow and finger function simultaneously, and in 2 cases of upper palsy to reconstruct elbow flexion alone. Four cases undergoing free muscle transfer had previously received surgeries such as intercostal nerve transfer etc., but the results were poor. Results were assessed more than 1 year after operation. After intercostals nerve transfer, grade 4 on MMT was achieved in 3 patients, 3 in 2 patients, 2 in 6 patients, and 1 in 1 patient. After Steindler's procedure, grade 3 was achieved in all 3 patients. After Oberlin procedure, grade 5 was achieved in 1 patient, 4 in 2 patients, 2 in 1 patient whose age was 68. Grade 5 was achieved after latissimus dorsi transfer while grade 1 persisted after pectoralis transfer. After free muscle transfer, M5 and M4 were achieved in each 3 patients. Free muscle transfer appears to be a reliable procedure for reconstruct elbow flexion as well as being useful for salvaging previous reconstruction. Oberlin method is considered most suitable for the upper root avulsion case except advanced age.

Abstract #328

Malignant Peripheral Nerve Sheath Tumor [MPNST] on a Toddler
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Jakarta – Indonesia

We report a rare case , one year boy old with a lump on the left arm that later known as Malignant Peripheral Nerve Sheath Tumor [MPNST]. The tumor was excised and the nerve keep intact during operation . Two months after operation , it was recurrent ; the parent refused amputation procedure but they ask excise the tumor only at 6 months after first operation . Later , 3 months after second operation , the tumor recurrent ; growing faster and bigger with distance metastases on the left chest . The third operation was done by amputation of the left arm closed to the left shoulder . 12 months post operation the patient was die before he admitted to the hospital

Abstract #371

Optimal time of spinal cord-derived neural stem cells transplantation for preventing the skeletal muscles from denervated atrophy: A pilot study

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[Abstract] Objective To determine which is the optimal time of spinal cord-derived neural stem cells transplanted for preventing the skeletal muscles from denervated atrophy. **Methods** The spinal cord-derived neural stem cells of 14-day SD fetal rats were isolated and cultivated in serum-free media, then were identified by cellular immunocytochemistry. The 90 SD rats were divided into 9 groups (10/group), the spinal cord-derived neural stem cells were transplanted into the epineurium of tibial nerves which were transected 0,1,2,3,4,6,8,12 and 16 week(s). After 4 weeks of the transplantation, the tibial nerves were harvested. The neuron were counted with frozen section and cellular immunocytochemistry, at the same time, the images were analyzed by Leica Q-win software. **Results** There are the most neurons in the group that the spinal cord-derived neural stem cells were transplanted into the epineurium of tibial nerves which were transected 1 week, the second is the group which they were transplanted 6 weeks after the tibial nerves transected. There are no surviving neurons in the group which they were transplanted 16 weeks after the tibial nerves transected. **Conclusion** The optimal time that spinal cord-derived neural stem cells were transplanted for preventing the skeletal muscles from denervated atrophy is 1 week after the peripheral nerves injured.

[Key words] Spinal cord-derived neural stem cell : neurons : transplantation; denervated atrophy

Abstract #164

TOE PULP TRANSFER DONOR MORBIDITY

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Introduction
Nowhere else in the limbs is like for like reconstruction more important than in the thumb pulp. The two available options are from the adjacent finger or the toe. Toe pulp transfer is a great option as the donor site is less obvious. However donor site morbidity can be significant enough to delay patient's return to work.
Methods and Material
A retrospective, observational, consecutive study on toe pulp transfers to finger pulp injuries was done in the Hand and Reconstructive Microsurgery Department, National University Hospital Singapore, from 1st January 2001 to 31st December 2004, looking at the following:

1) Size of flap
2) Type of closure on the donor site
3) Type of morbidity
4) Length of medical leave granted

Results
2 of the 17 cases were problem free, 3 had recipient site related problems, and 13 had donor site problems. 11 cases responded to conservative treatment for their donor site problems; while 2 went on to have secondary procedures. No correlation was found between donor site problems, with either flap size or closure method. Patient's time of return to work was mainly due to the rehabilitation period for their recipient digit, though 2 patients' return to work were delayed by their donor site.
Conclusion
There are strict indications for toe pulp transfers. Although donor site may present problems, these usually resolve with conservative treatment before rehabilitation is completed. Donor site morbidity should not be under-estimated as it can be the primary cause for delay in returning to work.

Abstract #176

Second-Toe Transfer for Thumb and Finger Reconstruction

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Purpose: The purpose is to investigate the clinical results of second-toe transfer for thumb and finger reconstruction.
Material and Method: Since 1980, 25 second-toe transfers were performed for thumb and finger reconstruction, for 23 patients. There were 22 males and one female patients, with an average of 36 years (range 15 to 60 years). In 25 cases of second-toe transfer, 23 fingers was indicated for amputation in trauma, and one each for severe burn and congenital constriction band syndrome; 6 thumbs, 3 index fingers, 10 middle fingers, 3 ring fingers, 3 little fingers were reconstructed. Two patients with index and middle finger amputation received simultaneous double second-toe transfer. Overall results were evaluated in term of success rate, number and type of secondary operation, range of motion, pinch strength (in thumb reconstruction), moving two-point discrimination, donor side morbidity, and subjective satisfaction.
Results: All transfers completely survived. Tenolysis was performed in 6 cases and Z-plasty of operative scar in one. The average range of motion compared with contralateral side was 33% in thumb reconstruction cases and 30% in finger reconstruction cases. The averaged pinch strength was 2.1kg (range 0.3 to 5.8kg). Moving two-point discrimination of the transferred toe averaged 10.5mm (range 6 to 20mm). Three patients had hallux valgus deformity and cross third-toe at the final follow-up. The majority of the patients were satisfied with final outcome.
Conclusion: Second-toe transfer is a useful method for finger reconstruction not only for functional purpose but also for aesthetic reason.

Abstract #202

Communicated Multiple Epidermal cyst on Palm

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The epidermal cyst is found in various regions, such as the face, neck, scalp, thorax and abdomen. Yet, there have been few reports of a case of epidermal cyst originating from hands. We have experienced an atypical case of communicated multiple large epidermal cyst on palm with severe adhesion with the digital artery and nerve.

A 55-year-old male patient, a carpenter, visited our clinic for surgical excision of the tumor in his Lt. Palm. He had first noticed a 5mm-sized lump located on the distal end of the fourth metacarpal area about 5 years ago, and this had gradually grown to its present size. Under thorough physical examination, we were able to define 3 or possibly more, fixed, non-tender mass, that interferes with the flexion of the Lt. ring finger. MRI finding revealed a well-defined 9x5cm multi-loculated lesion, suspicious of chronic ganglion, with no involvement with the adjacent bone or tendon.

Intraoperative finding showed well capsulated multiple mass encircling the ulnar digital artery and nerve of the Lt. index finger. Adhesion with the ulnar & radial digital artery and nerve on Lt. long finger and radial digital artery and nerve of the Lt. ring finger was also observed. Another unique character noted is the ductal communication between the tumors. While preserving the involved digital artery and nerve, mass was excised under microscopic field. Pathologic diagnosis was epidermal cyst, presenting white cheeze-like creamy substance within the cystic mass. Patient had an intact digital sensory and motor function, no recurrance nor any complications at postoperative 10th months.

Abstract #209

Microsurgical Treatment of Giant Cell Tumor of Distal Radius

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Subject: Microsurgical Treatment of Giant Cell Tumor of Distal Radius

Treatment of giant cell tumor of distal radius can be treated in several ways according to the aggressiveness of the tumor. But the management of giant cell tumor involving juxta-articular portion has always been a difficult problem. In some giant cell tumors with bony destruction, a wide segmental resection may be needed for preventing to recur. But a main problem is preserving of bony continuity in bony defect as well as preservation of joint function. We have attempted to overcome these problems by using a microvascular technique to transfer the fibula with peroneal vascular pedicle or anterior tibial vessel as living bone graft . From April 1984 to July 2005, we performed the reconstruction of wide bone defect after segmental resection of giant cell tumor in 14 cases, using Vascularized Fibular Graft, which occur at the distal radius. VFG with peroneal vascular pedicle was in 8 cases and anterior tibial vessel was 6 cases. Recipient artery was radial artery in all cases. Method of connection was end to end anastomosis in 11 cases, and end to side in 3 cases. An average follow-up was 6 years 6 months, average bone defect after wide segmental resection of lesion was 6.8cm. All cases revealed good bony union in average 6.5

Abstract #307

Title: Two cases of deep burns of the hands managed by Moist Exposed Burn Ointment (MEBO) bags with good hand function

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Introduction: Two patients with deep dermal and full thickness bilateral hand burns treated with the herbal ointment MEBO are reported.

Materials:

Patient A sustained 65% total body surface area (TBSA) mixed burns and bilateral deep dermal burns of his hands.

Patient B sustained 36% TBSA, bilateral deep dermal dorsal hand burns and full thickness burns of the fingertips.

Method:

Patient A: Both hands were treated initially with flamazine bags for slough separation and later changed to MEBO bags. Early mobilization was started. No surgery was performed on the hands.

Patient B: Immediate burns excision with non-meshed skin grafting was done on the second post burn day. When the grafts were stablised on the fifth post operative day, the hands were mobilized in MEBO bags.

Result:

Patient A: Deep dermal burns healed without skin grafting by eight weeks.

Patient B: The dorsal deep dermal burns on the dorsum healed in 2 weeks but the full thickness fingertip burns healed in 60 days. There were residual nailbed deformities and pulp reduction. Good hand function and range of motion were achieved for both patients.

Conclusion: Hand burns treated using MEBO bags have several advantages.

1. Easily available
2. Economical
3. Rapid wound epithelisation
4. Little scarring
5. Easy wound inspection
6. Facilitates easy mobilisation

Deep dermal burns are usually grafted early. As an alternative, MEBO bags are used for rapid epithelisation when surgery is not performed.

Full thickness fingertip burns are normally terminalised. Preservation of bony length of salvaged digits offer reconstructive options such as nail transfer and microsurgical pulp transfer.

Key Words:
Deep dermal and full thickness burns, Hand burns, Burns Ointment, Closed therapy, MEBO bags, Hand occupational therapy

Abstract #331

UNICOMPARTMENTAL KNEE HEMIARTHROPLASTY USING VASCULARIZED FIBULA TRANSFER- 25 YEARS FOLLOW UP

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Background

Stage III giant cell tumours requiring wide margin resection of the articular surface present a challenge for the reconstructive micro surgeon. Despite the vast literature on the use of free fibula transfers for reconstruction of bone defects following tumour resection in lower limbs, there is no case report of replacement of tibial condyle with a vascularized fibular head.

Case report

We present a case of 22 years lady with stage III giant cell tumour of the proximal tibia, who underwent wide margin resection of the lateral tibial condyle and replacement with vascularized fibula transfer using fibular head for joint surface replacement. Long term follow up at twenty five years is presented.

Results

The patient has a tumour free status at twenty five years. Despite the early onset of osteoarthritic changes in the knee, the joint motion is preserved and compatible with an active life style.

Conclusions

In selected cases, this method can save the knee joint, avoiding the use of allografts, prosthetic replacement or arthrodesis.

Abstract #334

PAIRED ABDOMINAL FLAP- A RELIABLE HAND SANDWICH FOR DEGLOVING INJURIES

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Background

Despite the sophistication in microsurgical techniques, wound coverage for an entirely degloved hand remains a substantial challenge. The paired abdominal flap described by Miura and Nakamura provides simultaneous and adequate coverage for the dorsal and volar surfaces of a degloved hand especially upto three digits. It has been largely under utilized despite its extreme usefulness.

Case report

We present a case report of twenty years gentleman who suffered degloving injury to his right hand requiring coverage with a paired lower abdominal flap. The surgery was performed at the Department of Orthopaedic, Reconstructive and Hand Surgery, Jinnah Medical College Hospital, Karachi. Overall hand function was evaluated through Quick DASH questionnaire.

Results

There was excellent cosmesis of the donor and recipient sites. Two point discrimination on the flap tip was 8 mm. There was no development of pressure sores on light manual work at six months from injury. Outcome assessment through Quick DASH revealed functional recovery.

Conclusions

We recommend this flap for mutilating hand injuries. The technique can be easily learnt by a well trained orthopaedic surgeon for salvage of mutilated hand in centres with limited microsurgery facilities.

Abstract #350

Title: A classification system for severe post-burn contractures of the hand

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Abstract:

Severe burn injuries of the hand are still very common among developing countries, people in mountain dwelling and rural countries in cold climatic regions. The lack of proper wound care and surgery cause many of these injuries to develop into sever contractures. It is necessary to analyze these conditions carefully, especially with an understanding of the possible cause for their formation, so that surgical treatment can be planned with the minimal disruption of salvageable normal structures, in particular any remaining skin, and also achieving the most with the least number of procedures. With our experience of treating these patients in rural China, we recognized several recurrent patterns of hand contractures and propose to classify them into 4 categories : Clawed, Crutched, Cocooned, and Contorted. The underlying deformities with these different categories are presented and the management approaches are presented with illustrations.

Abstract #359

ABSTRACT FOR FREE PAPER- POSTER

TECHNIQUES OF RESTORING THE NAIL
IN TOTAL AVULSION INJURIES OF THE DIGITS

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Ganga Hospital, Coimbatore, India.

In avulsion injuries of the digits, two types of degloving can happen, one in which the nail bed is intact and another with nail bed loss. In patients with non replantable injury or for patients unwilling to accept loss of great toe, a thin tubed groin flap is a good option. We have increased the final satisfaction in this group using two techniques to restore the nail. In patients who have intact nail bed, it is retained in its original position and covered with a groin flap. The nail is exteriorised at a later date when the groin flap has settled well. The other technique is used when the nail bed along with distal phalanx is avulsed and the amputated part is not replantable. In this case a groin flap cover is given for the digit and the site of future nail is marked. The nail bed along with the germinal matrix is harvested and grafted at that site. It incorporates well and nail growth provides a good aesthetic result and greatly increases the acceptance of the reconstructive effort.

Abstract #43

Clinical Experience of Extravasation Injury in Amental Stated Patient with Spastic Hand

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Purpose:

Necrosis of skin and underlying soft tissue is an uncommon complication of peripheral intravenous infusions. Skin slough has been previously associated with peripheral noradrenalin infusions and with cytotoxic drugs. If injected or extravasated sucutaneously, this causes a painful tissue slough. Severe soft tissue extravasation injuries result in wounds that are sufficiently large to require debridement and coverage with skin graft, flap, or eventual amputation.

Methods:

A 49-years old male patient recieved a solution 5% dextrose and vancomycin through a vein on the anterior left forearm. The solution infiltrated and within a few hours the swollen hand had cyanotic area involving most of palm and dorsum. On the 5weeks after injury amputation provided good coverage. This is a retrospective study of amental stated patient with spastic hand having major intravenous extravasation injury analyzed in terms of causing agents, natural history, treatment, mechanism of necrosis, and prevention.

Result:

Follow-up length was about 6 months. The injuried hand was left spastic and nondominant hand, the long finger. Patient treated by amputation long finger in middle portion of middle phalanx after 5weeks.

Conclusion:

The clinical treatment of severe extravasation injuries consists of prolonged watchful waiting for healing or eventual demarcation, followed by multiple debridements and wound closure. Patients with these iatrogenic injuries have considerably longer hospital stays and increased morbidity.

Abstract #45

Subacute Osteomyelitis on Phalangeal Bone Resulting from Mutiple Kirschner Pin Fixation: Case Report

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Purpose:

Percutaneous Kirschner wire fixation is common method for hand fracture. It is simple but has risk of ascending infection through the pin and bony injury by multiple drilling. Ascending infection through pin tract is almostly superficial and can be treated with antibiotics and aseptic dressing. This is a case review of subacute osteomyelitis on phalangeal bones after Kirschner wire fixation with literature review.

Methods:

A 40-years-old man with distal phalangeal fracture on right second finger is presented. He went to a local clinic and had a percutaneous Kirschner wire fixation under local anesthesia. He was transferred to our hospital for ulcerative wound on DIP joint at 4 weeks after operation. Radiography showed osteolytic change around medulla of middle and distal phalanges, leading to diagnosis of a subacute osteomyelitis. We treated it with amputation at the level of shaft of middle phalanx.

Results:

The postoperative course was uneventful. We thought several possible reasons for osteomyelits in our case. First, it could resulted from ascending infection through the wire. Second, it could be resulted from a bony burn by repeated drilling. And bony necrosis could be a consequence of arterial insufficiency caused by 2 pin insertion.

Conclusion:

We suggest that a precise pinning based on accurate anatomical understanding is required for a percutaneous Kirschner wire fixation. T he frequency of drilling should be minimized. Careful observation and patient education for pin site care are essential.

Abstract #48

Closed Intramedullary Fixation for Metacarpal Fractures using J-Shaped Nail

Eichi ITADERA

Purpose: To present the results of a new intramedullary fixation technique for metacarpal fractures using a J-shaped nail made by bending and cutting a Kirschner wire (K-wire).

Methods: A J-shaped nail, which is a 2.0-mm diameter K-wire sharply bent at the proximal end, was inserted from the dorsal aspect of the metacarpal base. Nineteen hands (12 dominant and 7 non-dominant) of eighteen consecutive patients (16 men and 2 women) with metacarpal fractures were operated with this technique. Five transverse shaft fractures and sixteen neck fractures (three of them involving comminution of the metacarpal head) were identified. The mean age of the patients was 31 years (range, 15?81 years). Two hands had extensor tendon lacerations and/or severe soft tissue damage, and two others had neighboring carpometacarpal joint fracture-dislocations. Outcomes were assessed by clinical and radiographic findings.

Results: All nineteen hands had successful fracture unions. Clinical and radiographic results were excellent for all ten hands that do not involve concomitant injuries. Radiographic findings showed angular deformities over 10 ‹ in two neck fractures concomitant with multiple injuries or neighboring carpometacarpal joint fracture-dislocations. Motion was restricted in two hands with severe soft tissue damage and in three hands with comminution of the metacarpal head. In one hand, the tip of the nail perforated the metacarpophalangeal joint. Although two hands had temporary cutaneous nerve damage, there was no mechanical irritation of the skin or extensor tendons in any patient.

Conclusions: This intramedullary fixation technique is very useful for neck or transverse shaft fractures of the metacarpals without concomitant injuries such as severe soft tissue damage. Currently, small diameter intramedullary nails are commonly used for the treatment of metacarpal fractures; however, it is possible that large diameter devices will replace them.

Abstract #86

A simple dynamic fixator for a complex intra articular fracture at the proximal interphalangeal joints

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Introduction

Fracture dislocation at the proximal interphalangeal joint (PIP) is an uncommon injury seen at our center. These injuries can be debilitating if not managed properly at the first instance and can lead to persistent stiffness and pain.

Method

We reviewed ten cases of this complex fracture at PIP joint seen at our center which was managed by the senior author, KMK. All these cases were offered the simple dynamic fixator when seen at the casualty or clinic setting at the onset of injury. All of these cases were done under local anaesthesia with the assistance of the Image Intensifier. The materials used for this fixator is easily available within the department except for the rubber bands which was obtained from the Dental department. Early passive mobilization was started for the patient once the pain subsided and this was continued over the next 6 weeks. Active motion was stated aggressively after the fixator was taken of for the next 2 weeks.

Results

All the patients were followed up for a minimum duration of about 6 months. The active and passive range of motion of the proximal and distal interphalangeal joints were used as objective assessment. The most common complications among these patients were superficial infection at the pin sites.

Conclusion.

This pin & rubber traction system (PRTS) is another simple method present in our armamentarium in managing complex PIP joint injuries. It is cheap, light and an effective way to treat such problems since the results obtained are acceptable with decent functional outcomes.

Abstract #136

SIMULTANEOUS FRACTURES OF THE SCAPHOID, PROXIMAL AND DISTAL END OF THE RADIUS

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Fractures of the scaphoid are the most common of the carpal bones, but are rarely associated with an injury to proximal or distal end of the radius. We report a case of simultaneous fractures of the scaphoid and both proximal and distal end of the radius. A twenty-seven-year-old man fell from a ladder and on the outstretched right hand. Roentgenograms showed fractures of the radial head, distal end of the radius and the scaphoid. He underwent a perctaneous pinning of the distal end of the radius and the scaphoid. At 8 months after the injury, he had no pain in the elbow and wrist and returned to normal activities. Roentogenograms showed that the fractures had healed. The previous reports mentioned that the mechanism of a scaphoid fracture is a fall and an impact between the carpal bones and the radius with the elbow and wrist in extension. When these compression forces are larger, they act proximally along the longitudinal axis of the radius, and cause more severe injuries, such as simultaneous fractures of the scaphoid and radial head may occur. Therefore the scaphoid fracture is sometimes missed, and inappropriate treatment may be prescribed. For this reason, it is important to recognize this fracture mechanism, and the careful examinations are needed.

Abstract #159

Our experience of Ilizarov mini fixator for finger.

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【purpose】 We report our experience of the treatment using Ilizarov mini fixator for fingers for fresh bone fractures, malunion, adduction contracture of the thumb..

【object】 Total of 21 cases consisted of 16 males and 5 females were treated with Ilizarov mini fixator. The age at surgery was an average of 53.3 years. The sites of fractures were middle phalanx in 2, proximal phalanx in 11, metacarpal in 7 cases respectively. The device was applied for the treatment of malunion of the fifth metacarpal in one, lengthening of distal phalanx in one and adduction contracture of the thumb in one case respectively. In case of adduction contracture of the thumb, interosseus tendon was partially cut to facilitate widening of the first web and two external fixators were attached to the first and second metacarpals. After two connection plates were secured to the external fixators, gradual widening of the first web was started at the time of operation and continued for 3 weeks followed by 3 weeks of consolidation period. In cases of intra-articular comminuted fracture of the PIP joint, the joint was immobilized for approximately 4 weeks and then mobilization of the joint was started.

<Result > Complete bone fusion was obtained in all cases. Distal phalanx bone was lengthened 10mm by distraction osteogenesis. Malunion was found in two cases of fifth metacarpal neck fractures. In case of adduction contracture of the thumb, grip and pinch functions were improved.

< Discussion >

Ilizarov mini fixator system has many advantages, the pins in 1.2-1.5mm thin diameter are easy to be bent, secured to the fixator at the dorsal aspect of the finger without interference of adjacent fingers, no need for considering the strict angle of wire insertion, as well as facilitating the alignment of fracture. Furthermore, it has not only compression but distraction function, it has a great advantage in treating fractures and bone lengthening. However, pins inserted through skin caused skin irritation in one case and thus the joint exercise was delayed and external fixator was changed at the time of joint movement. Based on result the malunion of the fracture segment was observed in cases of 5th metacarpal neck fracture, temporary fixation of MP joint should always be considered. Ilizarov fixator was useful in lengthening of bone and releasing of joint contracture.

In conclusion, in some cases of intra-articular fracture and comminuted fracture, temporary fixion of the fractured segment should be considered for the stability of the fracture.

Abstract #174

Treatment of Mallet finger deformity with Hook plate

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Purpose: The bony mallet finger injury is generally performed by conservative treatments, but operative treatments are needed especially when the fractures involve above 30 percent of articular surface, or distal phalanx is accompanied by subluxation in the volar side. This is because they often result in chronic instability, articular subluxation, articular surface defect, and unsatisfactory cosmetic. In order to avoid such negative results, various methods have been tried including K-wire fixation, Ishiguro extension block technique, and screw fixation. In this report, new method using the hook Plate as an operative treatment to Mallet finger deformity will be described.
Method: Among 11 patients with Mallet finger deformity who came from February 2006 to August 2007. five were observed. Four of them were male and one was female. Their ages ranged from 26 to 57 and the average was 41. Under local anesthesia, H type incision was made at the DIP joint area. After the DIP joint extension with 1.0 mm K-wire fixation, the hook plate was put on the fracture line, and one self tapping screw was used for fixation. The screw was 1.5 mm in diameter and 5 mm long. One of the holes in 1.5mm 2hole plate was cut in almost half and 100 degrees bended down
Result: In all five cases which applied the Hook Plate, complications such as postoperation infection or naildeformity was not seen. The K-wire was removed after the postoperative one weeks, and from the second week, active rehabilitation was performed. The result of this was satisfactory not only cosmetically but also functionally . At postoperative 6 weeks, the DIP joint ROM was average 67 degrees
Conclusion: The purpose of the operative treatment for mallet finger deformity using the hook plate is to provide anatomical reduction with fixation to prevent constractures at the DIP joint. While other operations take 6 weeks for DIP joint fixation, the operation using the hook plate let the K-wire eliminated in one weeks and begins an active rehabilitation. No complications were found and the method is rather simple. Thus, the operation using the hook plate is recommended as a good alternative to the mallet finger deformity treatment.

Abstract #219

Volar locking plate fixation for intra-articular fractures of the distal radius: a biomechanical study using cadaver models

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Purpose: We conducted a biomechanical study on five types of volar locking plates using intra-articular fractures of the distal radius models of cadavers, and the following is our report. Method: Using the region from the proximal forearm to the metacarpophalangeal joint of thirty limbs of formalin-fixed cadavers, wrist joint models classified as AO-C3.2 intra-articular fractures of the distal radius were created. The specimens were classified into five groups, and the plates were fixed for six specimens in each group: Group I: DRV Locking Plate; Group II: Stellar Plate; Group III: Acu-Loc Plate; Group IV: DRP Plate; Group V: Matrix Plate. The specimens were set in a testing machine, and 250 N of axial pressure was repeatedly applied 3,000 times. The rigidity after the first, second, third, thousandth, two-thousandth, and three-thousandth application of axial pressure was measured, and the presence of subsidiary fractures of the articular surface of the radius was observed. Results: The average values of rigidity (N/mm): Group I: 229.7; Group II: 240.5; Group III: 216.7; Group IV: 172.4; and Group V: 173.6. Groups I and II had higher rigidity than that of Groups III, IV, and V. Moreover, no models incurred subsidiary fractures of the articular surface after being subjected to pressure up to 3,000 times. Conclusion: The plates of Groups I and II were stronger than those of the other groups. In the AO-C3.2 intra-articular fracture models in this study, all plates acquired a sufficient fixation ability for the post-operative digits flexion and extension movement.

Abstract #269

VOLAR PLATING OF PROXIMAL INTERPHALANGEAL JOINT FRACTURE-DISLOCATION

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Fracture-dislocations of the proximal interphalangeal joint (PIPJ) are unstable when associated with a big volar fragment and often difficult to treat. The key to treatment is thus to obtain a stable reduction with articular congruity to facilitate rehabilitation and minimise risk of post-traumatic arthritis. Various closed and open treatments have been described but there is still no consensus on its treatment. We report our technique and result of volar plating that has not been previously described,which permitted immediate mobilisation with good functional outcome

Abstract #311

Dislocation of the second and third carpometacarpal joints: A case report

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Risa Ikeda[1], Narikazu Toyokawa[1], Masahiro Kurosaka[1]
Takeshi Makino[2]

Introduction: Dislocation of the second and third carpometacarpal joints are uncommon. We report a case of fracture dislocation of the second and third carpometacarpal joints.
Report of a Case: A 22-year-old man sustained a traumatic injury of the right wrist while driving his car. At first medical examination, his wrist was nothing abnormal detected on radiographs, and his wrist was not placed in cast immobilization. At 3 months after injury, his wrist remained painful, then he referred to our hospital. On physical examination, the active range of finger and wrist was normal. But interdigital area between middle and ring finger widened when fingers were in full flexion. Radiographs and CT scan showed fracture dislocation of the base of the second and third carpometacarpal joints. The patient underwent surgery of an open reduction and fusion of the second and third carpometacarpal joints with Kirschner wires. The arthrodesis was augmented with iliac bone graft. Postoperatively, he was managed in a short arm cast for 4 weeks. Radiographs at 1 year after surgery showed a solid fusion and he had no pain and returned to his original work.
Discussion: The second and third carpometacarpal joints and the distal carpal row form the stable keystone of the transverse and longitudinal arches of the hand and the interlocking osseous architecture, which is supported by thick ligaments, makes the joints an extremely stable complex. In the present case, anatomical reduction of the second and third carpometacarpal joints and arthrodesis of the joints is effective.
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Abstract #342

Neglected Ulna fracture with resorbtion and atrophy of the bone

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Proximal fracture of the ulna is unstable fracture . We found a boy 14 years old , who treated conservatively by medical doctor . The ulna was not only non union but also fragmented and atrophy . The patient came to our clinic with atrophy of the right hand and the angulation was clear . The function of the elbow was poor , because he felt moderate pain and was not able to extend his right forearm . The right hand and the fingers had a good motion , nerve function also good . Range of motion of the elbow was good ; when we checked on general anesthesia. Exploration of the ulna ; the size was around 1/3 of the radius and there was a gap between the fragment . We fixed the bone with double long miniplate on both side (volar and dorsal) after refreshed the fracture fragment ; local life cancellous bone graft from proximal ulna was placed on the gap of the fracture . Four months post operation , the callus was appeared . The function of the right extremity being fine . .....

Abstract #358

VOLAR PLATE FIXATION FOR ARTICULAR FRACTURE OF DISTAL RADIUS IN ELDERLY PATIENTS

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Surgical results of articular fracture of distal radius (AO classification: C3) in elderly patients treated with volar plate were reported.
Materials and Methods: Between 2003 and 2007, we treated 25 elderly patients (2 men and 23 women) suffered from distal radius fractures (C3). Their mean age was 75 year-old (65 to 89). All fractures were treated with volar locking plate. Articular fragments were reduced volarly or intramedurally under fluoroscopic control. Bioactive cement was grafted into the fracture void in 16 cases. A Kirschner-wire or a screw was added for 1 each. Radiological parameters, such as volar tilt, ulnar variance, and radial inclination were measured in all cases before and immediate after surgery, and at final follow-up. Functional evaluation was performed in 12 cases using Saito's demerit point system at final follow-up. The mean follow-up period was 7.6 month.
Results: The mean volar tilt was -14.9 degrees before surgery, 6.0 degrees immediate after surgery and 6.1 degrees at final follow-up. The mean ulnar variance was 1.9mm, -1.6 mm and -0.5 mm respectively. The mean radial inclination was 12.8 degrees, 20.9 degrees and 21.2 degrees respectively. All radiological parameters improved after surgery and were maintained at final follow-up. There were 7 Excellent, 5 Good and no Fair or Poor in Saito's demerit point system. Mild contracture of digits of the operated hand was seen in 1 case and no severe complication was found.
Conclusion: C3 distal radius fractures in the elderly patients were successfully treated with volar plates.

Abstract #66

Comparative Study of Clinical Results Between Non-bridging External Fixation and Locking Palting for Unstable Fractures of The Distal Radius

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INTRODUCTION: Non-bridging external fixation is quite minimum invasive surgery for fractures of the distal radius. In this study, comparison of radiological and clinical results between non-bridging external fixation and locking plating was performed for unstable fractures of the distal radius. METHODS: Fifty patients were randamizedly chosened among 150 patients with the distal radius fractures that were treated non-bridging external fixation and locking plating. Fifty patients were mached in age and fracture type. 25 patients were treated by non-bridging external fixation (Group EF). And 25 patients were treated by locking plating (Group LP). Their average age at surgery was 61 years (range, 21 to 79). The average follow-up period was 10 months. At follow-up examinations, radial inclination (RI), palmar tilt (PT) and ulnar variance (UV) were measured at the point of injured and at just after surgery, and at follow-up to evaluate acquirement and maintenance of reduction. Clinical assessment was achieved through the use of Mayo wrist scoring chart (Mayo score). RESULTS: PT was -12.8ºat injured and 10.6º at just after surgery($p<0.001$) ,9.3ºat follow up in group EF. -23º , 9.4º ($p<0.001$) ,9.3º in group LP. UV was 4.8mm and 1.4mm($p<0.001$), 2.4mm($p<0.001$) in group EF. And 6.0±5.2mm and 0.7mm($p<0.001$), 1.3mm($p<0.001$) in group EF . Average Mayo score at follow-up was 87.2 points in group EF and 85.6 points in group LP. There was no difference between in two groups. CONCLUSION: Non-bridging external fixation and locking plating can acquire good stability to resist dorsal tilt and axial shortening by using subchondral support, and satisfactory clinical results were gained.

Abstract #101

Temporary scaphotrapezoidal joint fixation for the treatment of adolescent Kienböck's disease.

Kenichi Kazuki[1)], Masataka Yasuda[2)], Yoshiyuki Ando[2)], Masahiro Yoneda[1)], Takuya Uemura[1)], Noriaki Hidaka[3)]

Purpose: Although Kienböck's disease typically is found in patient ranging from 20 to 40 years of age, relatively few cases occurring in individuals in skeletally immature patients have been reported. They respond better to treatment than do adults. We have been treated adolescent Kienböck's disease by temporary scaphotrapezoidal (ST) joint fixation, although radial shortening is the most frequently reported operative procedure for Kienböck's disease. The purpose of this study is to investigate clinical outcome of temporary ST joint fixation for adolescent Kienböck's disease.
Materials and methods: Six patients with Kienböck's disease were treated by temporary ST joint fixation using K-wires. Four were girls and two were boys. Their mean age was 13.8 years-old (range, 9 to 17 years-old). Preoperative Lichtman's stage was 3A in three wrists and 3B in three wrists. K-wires inserted from the trapezium to the scaphoid in maximum ulnar deviation of the wrist. Then the scaphoid can be fixed in extended position with supporting the lunate from the radial side. K-wires were removed 3 to 6 months postoperatively. Clinical and MRI evaluation were performed postoperatively. Their mean follow-up period was 20 months (range, 7 to 39 months).
Results: All 6 patients had no pain at rest or with activity. The average postoperative wrist extension and flexion were 70˚ and 78˚. These improvements comparing with preoperative wrist extension and flexion were statistically significant. The average grip strength increased from 12.2 to 20.7 kg significantly. Sclerosis and cystic shadow in the lunate were disappeared in all wrists. MRI demonstrated normal intensity in the whole lunate on both T1 and T2 weighted images of all wrists.

Conclusion: Both clinical and radiographic outcomes of temporary ST fixation for adolescent Kienböck's disease were excellent results. We recommend this procedure for adolescent Kienböck's disease instead of the radial shortening which operation is more invasive.

Abstract #116

Comparative Study of Clinical Results Between Non-bridging External Fixation and Locking Palting for Unstable Fractures of The Distal Radius

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INTRODUCTION: Non-bridging external fixation is quite minimum invasive surgery for fractures of the distal radius. In this study, comparison of radiological and clinical results between non-bridging external fixation and locking plating was performed for unstable fractures of the distal radius. METHODS: Fifty patients were randamizedly chosened among 150 patients with the distal radius fractures that were treated non-bridging external fixation and locking plating. Fifty patients were mached in age and fracture type. 25 patients were treated by non-bridging external fixation (Group EF). And 25 patients were treated by locking plating (Group LP). Their average age at surgery was 61 years (range, 21 to 79). The average follow-up period was 10 months. At follow-up examinations, radial inclination (RI), palmar tilt (PT) and ulnar variance (UV) were measured at the point of injured and at just after surgery, and at follow-up to evaluate acquirement and maintenance of reduction. Clinical assessment was achieved through the use of Mayo wrist scoring chart (Mayo score). RESULTS: PT was -12.8ºat injured and 10.6º at just after surgery($p<0.001$) ,9.3ºat follow up in group EF. -23º , 9.4º ($p<0.001$) ,9.3º in group LP. UV was 4.8mm and 1.4mm($p<0.001$), 2.4mm($p<0.001$) in group EF. And 6.0±5.2mm and 0.7mm($p<0.001$), 1.3mm($p<0.001$) in group EF . Average Mayo score at follow-up was 87.2 points in group EF and 85.6 points in group LP. There was no difference between in two groups. CONCLUSION: Non-bridging external fixation and locking plating can acquire good stability to resist dorsal tilt and axial shortening by using subchondral support, and satisfactory clinical results were gained.

Abstract #118

4+5 Extensor Compartmental Vascularized Bone Graft for the treatment of Kienböck's disease

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Purpose : The use of vascularized bone grafts for the treatment of Kienböck disease may prevent ongoing lunate collapse and provide relief of wrist symptomatology. The aim of this study was to evaluate the use of the 4+5 Extensor Compartmental Vascularized Bone Graft for the treatment of stage III Kienböck's disease.
Materials and Methods : A retrospective study was carried out on 5 patients who had undergone 4+5 extensor compartmental vascularized bone graft for stage III Kienböck's disease between Jan. 2005 and Aug. 2006. All patients were in stage IIIA in 2cases and stage IIIB in 3 cases of Lichtman's staging classification. The radiographic findings were evaluated by carpal height ratio, Ståhl's index, ulnar variance, radiolunate angle and radioscaphoid angle. Clinical outcome was evaluated by Mayo wrist score.
Results : The mean age of 43.4 years(range, 21-61) and the mean follow up of 23 months(range, 12-31) were presented. All patients were satisfied and The mean Mayo wrist score was 77. Four patients had no pain in the activity of daily living. Other one patient had the radiographic progression from stage IIIA to stage IIIB with mild occasional pain.
Conclusion : The 4+5 Extensor Compartmental Vascularized Bone Braft for the surgical treatment of Kienböck's disease is considered the useful treatments because all patients have satisfactory results despite of no improvement in radiographs.
Key word : Kienböck's disease, vascularized bone graf

Abstract #132

SYMPOTMATIC LUNOTRIQUETRAL CARPAL COALITION- A CASE REPORT AND COMMENT ON ITS PATHOMECHANICS

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Carpal coalition is a seldom discussed entity which is has a variable incidence ranging from 0.1% in certain populations of European descent to almost 61.5% in some African populations. Of these carpal coalitions, the lunotriquetral variant is the most common.
Interestingly, most of these lunotriquetral carpal coalitions are asymptomatic radiological oddities which are found incidentally which have been classified by Minaar in 1952. We present a case report of a labourer who was found to have persistent ulnar sided wrist after a fall on his outstretched hand which was attributed to triquetral hamate arthrosis secondary to the Minaar type III carpal coalition that was present.
We also reviewed the literature on symptomatic lunotriquetral carpal coalitions and discuss the pathomechanics of the symptoms in the different types of lunotriquetral carpal coalitions.

Abstract #162

Koichiro MASUZAKI

Effect of Radius and Capitate Shortening on Lunate Decompression: A Three-Dimensional Finite Element Analysis

Kienbock's disease can be treated using various surgical procedures. Among these, radius shortening (RS) and capitate shortening (CS) are generally performed to reduce the compressive force on the lunate. By performing a three-dimensional finite element analysis (3DFEM), we attempted to clarify how different surgical procedures modify the stress distribution in the lunate.
(Methods)
We constructed a three-dimensional wrist joint model based on the computed tomogram of a healthy adult man whose ulnar variance was 0 mm. Further, 6 RS models were created by moving the radius proximally (RS: 0.5-mm, 1.0-mm, 1.5-mm, 2.0-mm, 2.5-mm, and 3.0-mm). Moreover, 3 CS models were created by shortening the capitate (1.0-mm, 2.0-mm, and 3.0-mm). Using a 3DFEM software (ANSYS-STRUCTURAL), a compressive force of 100 N was applied on the metacarpal bones along the long axis of the radius, and the surface and internal stress distributions in the lunate were then calculated.
(Results)

In the RS and CS models, as the shortening increased, the mean stress of the lunate decreased. However, the mean stress decreased by 34% in RS 2.0-mm model; 37%, in RS 2.5-mm model; and 38%, in RS 3.0-mm model. More than 2.0 mm, there were few effects of reducing mechanical stresses. As the shortening increased, the stress on the lunate was distributed on the ulnar side.
(Discussion)
The result of the analysis using RS models suggests that TFC would bear larger mechanical stresses after surgery. The result of the analysis using CS models suggests that mechanical stresses circumvented on the scaphoid side.

Abstract #166

Giant cell tumor of the distal radius: experience of Japanese Musculoskeletal Oncology Group

(Introduction)
The distal radius is the third most frequent site of giant cell tumor of bone. Optimal treatment for this tumor remains controversial. We have performed a cooperative study to clarify this particular problem.
(Materials and methods)
We have sent questionnaires to Japanese Musculoskeletal Oncology Group. Clinical data were retrospectively collected through surgeons of ten institutes. Patient age, treatment methods, and oncological results were examined.
(Results)
Twenty patients were included in this study. The mean age was 33 years. The mean follow-up period was 68 months.
En bloc resection was performed in 12 patients, whereas curettage was indicated in 8. Reconstructive methods after tumor excision were vascularized fibular grafts in 9, conventional bone grafts in four, bone substitutes in three, PMMA in three, allograft in one. Local recurrence occurred in six. In these patients, en bloc resection and curettage were performed in two and four, respectively.
(Discussion)
In the current study, a rate of local recurrence was 29%. The rate was relatively high, especially in patients who received curettage (56%), and it was 13% in patients who received en bloc resection. Some surgical adjuvant is recommended to achieve local control of the tumor in this particular region.
Concerning the grafting materials, there were no differences in a rate of local recurrence among patients with curettage. En bloc resection could achieve good control of giant cell tumor of bone. Extensive bony defects are left after resection, and vascularized fibular transfer offers definite solution for reconstruction.

Abstract #167

TITLE: ATTRITION RUPTURE OF THE EXTENSOR POLLICIS LONGUS TENDON AFTER REPAIR OF EXTENSOR CARPI RADIALIS BREVIS TENDON

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Singapore

A patient sustained a wrist laceration with cut extensor carpi radialis brevis (ECRB) tendon, which was repaired using a modified Becker repair technique. The patient developed sudden inability to extend the thumb 7 weeks into rehabilitation. Reexploration was done, and an attrition rupture of the extensor pollicis longus (EPL) was found. An extensor indicis proprius (EIP) to EPL transfer was subsequently done. The patient regained full range of motion to the thumb and independent extension of the index finger after rehabilitation. We postulate that the cause of the EPL rupture was that of increase friction between the modified Becker repair site with the EPL which crossed the ECRB at the wrist. We recommend that core suture repair techniques should be used when repair of tendon in tight compartments and areas where tendons crosses each other. Alternatively, the repair site should be covered with protective tissues such as a slip of retinaculum. In EPL rupture, EIP to EPL tendon transfer is a well described technique and produced consistent and excellent results.

Abstract #195

Computer-assisted Corrective Osteotomy with Prefabricated Three-Dimensionally-Cut artificial Bone for Malunited Fracture of the Distal Radius

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Purpose: This paper presents the results of our recent evaluation of the usefulness and outcome of corrective osteotomy with prefabricated three-dimensionally-cut artificial bone in cases of malunited fracture of the distal radius.
Methods: Seven subjects with traumatic malunited fracture of the distal radius, 4 males and 3 females, with a mean age of 54 years (range, 31to70 years).
Preoperatively, computerized simulation of three-dimensional corrective osteotomy was performed for each case from the patient's CT data. During the simulation, an artificial bone, fitting the defect created by corrective osteotomy, was prepared with a three-dimensional bone cutter. The artificial bone was inserted into the defect created by osteotomy. The accuracy of surgery was evaluated by comparing the X-ray taken immediately after surgery with that on the unaffected side. Clinical outcomes were examined. The postoperative follow-up period was a mean of 14 months (range, 7 to 24 months).
Results: The mean differences in X-ray parameters between the affected and unaffected sides were as follows: palmar tilt 4.7 degree, radial inclination 1.5 degree, radial length 1.8 mm, and ulnar variance 0.7 mm. No patient complained of wrist pain at the final follow-up. Mean ROM of flexion / extension of the wrist improved from 75 to 99 degree. Mean ROM of pronation/supination increased from 126 to 169 degree. Mean grip strength improved from 16.6 kg to 29.8 kg.
Conclusion: These findings indicate that computer-assisted corrective osteotomy with prefabricated, three-dimensionally-cut artificial bone enables accurate correction of angle in corrective osteotomy for malunited fracture of the distal radius.

Abstract #335

SYNOVECTOMY AROUND THE WRIST - REWARDING ALTERNATE TO PRESERVE JOINT INTEGRITY IN RHEUMATOID PATIENTS

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Background

Proliferative synovitis in rheumatoid patients produces the spectrum of hand and wrist deformities. The wrist and distal radioulnar joint synovectomy and soft tissue balancing provides disease control and pain relief in patients with persistent and painful synovitis. It has been shown to prevent or delay the need of a wrist fusion even in cases of minimal to moderate radiographic involvement.

Methods

The study was carried out the Division of Hand and Foot Surgery, University of Hong Kong. 65 wrist and DRUJ synvovectomies in 48 patients, from 1989 to 2007, were identified through medical records. A detailed Performa was developed.

Results

The male: female ratio was 8:57. At a mean follow up of four years, the average dorsiflexion and volar flexion was 34.2 and 34.1 degrees respectively. The average grip strength was 12.18 kgf. Extensor tendon ruptures were found in approximately one third of patients on presentation. Despite decrease in grip strength on long term, patients preferred a relatively stiff and painless wrist over wrist fusion.

Conclusions

Wrist synovectomy is a rewarding procedure even for late presenters of rheumatoid arthritis, if post operative rehabilitation and medical support are well integrated.

Abstract #339

A comparative study of arthroscopic findings and high resolution MRIs with microscopy coil for TFCC disorder

[Purpose] Trianglar fibrocartilage complex (TFCC) is a very small disc, and there are limitations in visualization in MRIs. We compared and analysed high-resolution MRI finding using a 47mm microscopy coil and arthroscopic findings.

[Materials and methods] Sixteen patients with cases of ulnar wrist pain, who had radiocarpal joint arthroscopy and MRIs. Evaluation of the imaging divided the injured site into 1) radius attachment, 2) disc proper, 3) triangular ligament (upper lamina), 4) triangular ligament (lower lamina), 5) articular surface of the lunate bone and 6) articular surface of the trequet bone. In addition, we reviewed the association with decrease of tension of TFCC under the arthroscope.

[Result] Verification of evaluation area was possible in all patients with high-resolution MRI using microscopy coil. Sensibility/specificity in MRI findings were 1) radius attachment 100%/100%, 2) disc proper 75%/91.7%, 5) articular surface of the lunate bone 50%/100%, 6) articular surface of the trequet bone nothing/100%. 8 patients out of 16 patients had depression of TFCC tone, and sensibility/specificity of decrease of tension of TFCC under the arthroscope was upper lamina with 75%/87.5%, lower lamina with 50%/87.5%.

[Conclusion] The high-resolution MRI with microscopy coil was useful in detailed diagnosis of TFCC injury. The injury of the upper lamina in MRI was associated with decrease of tension of TFCC under the arthroscope.

Abstract #70

POLARIZED LIGHT EMITTING DIODE (LED) IRRADIATION INCREASES FIBROBLAST PROLIFERATION AND ACCELERATES WOUND HEALING.

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We examined the effect of polarized LED irradiation on fibroblast proliferation and wound healing with a high intensity LED irradiation device set at 627nm.

(METHODS) Five groups were classified as control (C), non-polarized (N), linear (L), right-hand circular (RC), and left-hand circular (LC). *In vitro* study, fibroblast cell cultures were irradiated with a range of 1 to 10J/cm^2, and cellular proliferation was evaluated with a WST-8 assay. *In vivo* study, two round, full-thickness wounds 2cm in diameter were produced on the dorsal side of rats. On day 7 and 14, the ratio of the residual wound area expressed as a percentage to the control group was measured and expression of type1 procollagen mRNA in scar tissue was determined by RT-PCR.

(RESULTS) Irradiation with 4J/cm^2 increased cellular proliferation significantly when measured 48 hours after subculture. In particular, the proliferation rates of RC and L groups were 116% and 113%, respectively. In addition, wound healing was accelerated significantly. On day 7, the ratio of the residual wound areas of RC and L groups were 72% and 69%, respectively. Expression of type1 procollagen mRNA in the RC group was significantly increased about 1.5-fold in comparison to the control group.

(DISCUSSION) These experiments demonstrate that right-hand circular and linear polarized light from LED is more effective than non-polarized light. The differences observed in the results between right and left circular polarized lights suggest that some optical active material which has a circular dichroic spectrum takes part in a biochemical reaction caused by irradiation.

Abstract #107

INDUCTION OF INTERLEUKIN-6 mRNA AT THE DORSAL ROOT GANGLION BY HYALURONIC ACID

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Hyaluronic acid (HA) has the effect of reducing postoperative adhesion of peripheral nerves. The purpose of this study was to clarify the nerve protecting function of HA by investigating expression of interleukin-6 (IL-6) mRNA. Sciatic nerves of Wister rats were compressed for either 0, 1, 5 or 10minutes using mini-clips (172gs). In addition, a group of rats underwent an axonotomy. Total RNA was extracted from ipsilateral L4-6 dorsal root ganglia 1day after compression or axonotomy. The expression levels of IL-6 mRNA were determined by the reverse transcription-polymerase chain reaction method. We also measured the value of glyceraldehyde 3-phosphate dehydrogenase (GAPDH) and determined the expression level of IL-6 mRNA semiquantitatively by finding rate of IL-6 for GAPDH. The levels of IL-6 mRNA increased gradually in proportion to the time of compression. We selected a 10 minute compression group as the control group. In another group, HA was administered to the compression area after 10minutes of compression. We compared the levels of IL-6 mRNA in the HA and control groups using Mann-Whitney's U tests. The levels of IL-6 mRNA in the HA group (12.486±5.823) were significantly higher than in the control group without HA (2.742±0.835) ($p=0.028$). Our study therefore showed that the level of IL-6 with HA was higher than that without HA. It is known that IL 6 has a major role in neurotization and neuronal survival. Our results suggest that the use of HA assists nerve regeneration as well as reducing postoperative adhesion in peripheral nerves.

Abstract #114

A new trial of open palm technique for Dupuytren contractures

Open palm technique for Dupuytren contractures is popular, however management of the wound was troublesome because of frequent gauze exchange and balneum medication. Early finger motion exercise is difficult to perform due to exposing thick gauze for more discharge. We report a new open palm technique using alginate, polyurethanes and film dressing.
Materials and methods:
Ten patients suffering from Dupuytren contracture were treated with the following method. Basically we performed aponeurectomy in transverse skin incision along palm and finger creases. After the surgery, we affied an alginate covering material on open transverse wounds and performed dressing. Postoperative finger motion exercise was started early as possible. We washed the wound with tap water postoperative day-one, day-four and day-seven, and exchanged the alginate. Afterward we washed the wound once or twice a week, and protected open wounds with polyurethane foam and film dressing. Motion exercise was encouraged through the time.
Results:
Wound healing was obtained four to six weeks with good epithelization except for one case of superficial infection that needed prolonged time for a complete cure. Average TAM of the involved fingers was 137degrees (100-215) before operation and improved to 167degrees (120-230) at postoperative six weeks.
Summary:
Good skin healing was achieved with this method. This was not only easy to do but also effective for early finger motion exercise.

Abstract #119

Experimental Study of Vascularized Tissue Engineered Bone Grafts

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Purpose: Vascularized bone grafting has become a useful method for treatment of large bone defects and infected non-unions lacking adequate blood supply. However, this method has disadvantages such as donor site complications. To overcome these disadvantages, we developed a new method for creating vascularized tissue engineered bone grafts in an experimental model.
Materials and methods: Fisher rat bone marrow mesenchymal stem cells (MSCs) were cultured for 2 weeks in fully opened interconnected porous hydroxyapatite (HA) ceramic. The composites of MSCs and HA were implanted in the medial calf region together with the saphenous vascular bundle in syngeneic rats. Two weeks after implantation, the vascular pedicle with the implants was exposed and covered with silicon rubber to prevent vascular invasion through surrounding tissues (vascularized MSCs/HA implants). In addition, non-vascularized MSCs/HA implants were created with a ligated vascular pedicle. Vascularized HA alone implants were prepared as a control. All implants were retrieved 4 weeks after surgery.
Results: Histologically, *de novo* bone formations were observed in the vascularized MSCs/HA implants. This was in contrast with only necrotic tissue observed in the non-vascularized MSCs/HA implants. Bone formation was not observed entirely in the vascularized HA alone implants. For biochemical analysis, alkaline phosphatase activity and osteocalcin content of the vascularized MSCs/HA implants were significantly higher than those of the non-vascularized MSCs/HA and vascularized HA alone implants.
Conclusions: The results of this study indicated that the vascularized tissue engineered bone grafts could be transferred as free vascularized grafts to lesions lacking adequate blood supply.

Abstract #135

REPAIR OF OSTEOCHONDRAL LESION WITH A POROUS PLG SCAFFOLD IN AN ANIMAL MODEL

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Objective: We have investigated the possibility of repair of the osteochondral defect using a new porous scaffold which was made with poly (DL-lactide-co-glycolide) (PLG).
Methods: The osteochondral defects, made on the femoral condyle of rabbits were treated with transplantation of the PLG scaffold. At postoperative week 1, 3, 6 and 12, the specimens were evaluated histologically, compared with the untreated defect.
Results: At postoperative week 1, fibrous tissue was organized in an arcade array on the articular surface of the PLG scaffold. Thereafter, this fibrous tissue gradually regenerated to cartilage tissue at the articular surface and new bone formed at the subchondral zone. The histological scores were significantly higher in the defect treated with PLG than in the untreated defect at postoperative week 6 and 12 ($p<0.05$).
Discussion: When the defect was treated with the PLG scaffold, cartilage tissue formed on the articular surface and bone formed at the subchondral zone while the scaffold was absorbed. The PLG scaffold has pores in which the erupted bone marrow cells attach and might have the potential to build a microenvironment to regenerate bone and cartilage in the osteochondral defect.

Conclusion: The porous PLG scaffold is effective for repairing the osteochondral defect without cultured cells and growth factors in an animal model. The new porous PLG might be able to use in treating the focal osteochondral defect in the elbow and the wrist joints due to trauma.

Abstract #259

Flexor Tendon Tissue Engineering: The Biomechanical Properties of Rabbit Flexor Tendons after Acellularization

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James Chang, Plastic and Hand Surgery, Stanford University Medical Center, Stanford, CA, USA

INTRODUCTION:
Tissue engineering of flexor tendons requires scaffold material with adequate biomechanical strength. We hypothesized that treatments for acellularization and reseeding of flexor tendons would not significantly decrease the tensile stress and elastic modulus compared to normal tendons.
METHODS:
Rabbit forepaw and rearpaw flexor tendons were acellularized using an optimized protocol. Reseeded constructs were obtained by incubating acellularized tendons in a tenocyte cell suspension. Tensile testing was performed to compare the ultimate tensile stress and elastic modulus of acellularized tendons (n=24), reseeded tendon constructs (n=24), and fresh flexor tendons (n=32). Statistical analysis was performed using ANOVA and the Student's t-test.
RESULTS
Acellularized tendons were successfully reseeded with tenocytes. Acellularized tendon had the same ultimate stress and elastic modulus as normal tendons. Reseeded constructs had the same elastic modulus as normal tendons but rearpaw tendon constructs showed a decrease in ultimate stress compared to normal tendons (50.09 MPa vs 66.01 MPa, $p = 0.026$). Forepaw tendons had similar ultimate stress compared to normal tendons. The study has 90% power to detect a difference of 18N in ultimate tensile strength between groups.
SUMMARY:
1. Acellularized tendons retain the biomechanical properties of normal tendons.
2. Acellularized tendons can be successfully reseeded to form tendon constructs.
3. Reseeded constructs retain the elastic modulus of normal tendons, but show a decrease in ultimate stress in the case of rearpaw tendons.
4. Acellularized flexor tendons are potential high strength scaffolds for flexor tendon tissue engineering.

Abstract #357

ABSTRACT FOR FREE PAPER- POSTER

CONCEPT OF "ON ARRIVAL BLOCK"
IN THE MANAGEMENT OF MAJOR INJURIES OF UPPER LIMB

AUTHORS: Dr. S. Raja Sabapathy, Dr. Ravindra Bhat
Ganga Hospital, Coimbatore, India.

Purpose:
In the management of major mutilating injuries, rapid assessment, early decision making and prompt surgical intervention is essential. The concept of giving brachial plexus block on arrival for a major mutilating upper limb injury even before removing dressings has been practiced and has been found to be useful.
Method:
Patients with mutilating injuries are received in the ante room of the operating theatre. Brachial Plexus Block is given using the subclavian perivascular approach. Dressings are opened only after pain relief has been obtained. Radiographs are done. A plan of treatment is made and explained to the patient and relatives.
Result:
This concept of on arrival block has been used in 210 patients over the past 10 years. We have not had any complications attributable to the brachial plexus block. The pain relief boosts the morale and the confidence of the patient. Taking Radiographs after the block helps to obtain better pictures without overlapping of the bones which occurs when the limb is bandaged in the presence of multiple fractures.
Conclusion:
Examination of the injuries after pain relief allows better assessment and more meaningful explanation of treatment options. The anesthesia obtained is used to carry on with definitive surgery. The only requirement is availability of a dedicated operating room, skilled anesthesiologist and surgical team for taking care of hand injuries.

Abstract #59

ARTHROSCOPIC FINDINGS AND CLINICAL RESULTS OF RADIAL OSTEOTOMY FOR KIENBÖCK'S DISEASE

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Purpose: Kienböck's disease affects the lunate and once the disease advances, osteoarthritic (OA) changes progress. Some studies have examined arthroscopic findings of Kienböck's disease, but whether arthroscopic findings affect surgical outcome remains unclear. The purpose of this study was to determine whether OA changes affect surgical outcomes.
Methods: Between 1975 and 2005, we performed 36 radial osteotomies for Kienbock's disease. Mean follow-up time was 21 months. Data from patient charts, radiography and video images of arthroscopy were retrospectively reviewed. Mean age was 29 years. OA changes were defined by arthroscopy as fibrillation, erosion or defects of the joint cartilage.
Results: Wrist function was improved in terms of range of motion and grip strength. OA changes of the proximal lunate cartilage were documented in all cases. On first-look arthroscopy, patients with OA changes in lunate fossa of radius displayed decreased arc of flexion/extension and patients with OA changes in distal lunate cartilage displayed decreased grip strength on follow-up. First-look

arthroscopy revealed lunate surface fracture at the midcarpal joint in 18 wrists and second-look arthroscopy revealed healing of lunate fracture in 9 wrists.
Conclusions: This study showed arthroscopic OA changes affect clinical outcomes and some lunate fracture would unite after radial osteotomy. Arthroscopic OA changes affect clinical outcomes. Wrist arthroscopy supplies helpful information about intraarticular pathoanatomy.

Abstract #130
A CADAVERIC STUDY OF SAFETY AND EFFECTIVENESS OF MINI OPEN CARPAL TUNNEL RELEASE USING Knifelight® WITH A SINGLR WRIST INCISION
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Carpal Tunnel Syndrome is the commonest entrapment neuropathy of the upper limb. Surgical treatments include the classical open release, endoscopic release and mini open release using specialized knives or instruments. The incision of mini open release using a specialized knife is either through a palm or a wrist incision. A palm incision is commonly use as the superficial palmar arch san be identified and preserved. However this may lead to a painful scar over the palm and pillar pain. In this study, we evaluate the safety and effectiveness of carpal tunnel release using Knifelight® (Stryker Instruments) through a single 1 cm wrist incision. Carpal tunnel releases using this method were performed on 32 cadaver wrists by a single surgeon. The wrist is then open to assess the completeness of the release and injuries to the superficial palmar arch, palmar cutaneous branch and recurrent branch of the Median Nerve. The proximity of these structures in relation to the cut on the transverse carpal ligament is measured. All the wrists had complete releases and no injury to the median nerve and other structures were observed in this method. The mean distance of the recurrent motor branch to the ligamentous division was 5.7 +/- 2.4 mm. The mean distance of the superficial palmar arch to distal end of the retinaculum was 8.7 +/- 3.1 mm and the mean distance of the palmar cutaneous branch to the ligamentous division was 7.2 +/- 2.4 mm. The mean length of the transverse carpal ligament was 29.3 +/- 3.7 mm. There was no invasion into the guyon canal. This study showed that this technique of Carpal Tunnel Release using a 1cm wrist incision is safe and effective.

Abstract #36
AUTOLOGUS BLOOD INJECTION FOR RECURRENT LATERAL EPICONDYLITIS
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Background: Tennis elbow is a common complaint. Several treatment strategies, such as corticosteroid injections and physical terapy and braces have been describe with no predictable efficacy. The purpose of this study was to evaluate prospectively the result of refractory lateral epicondylitis with autologus blood injections.
Methods: Twenty two patients with lateral epicondylitis were injected with 2 mL of autologous blood under the extensor carpi radialis brevis. All patients had failed two previous non surgical treatment including all or combination of physical thrapy, splintinge, non steroidal anti-inflammatory medication and prior steroid injection. The patients were evaluated with Patient-rated Tennis Elbow Evaluation (PRTEE).
Results: The average fallow-up period was 7.3 months (range, 4-10mo).
After autologus blood injection the average pain score decreased from 43.7 to 9.1 (P-value < 0.001). The average functional score decreased from 42.4 to 10.1 (P-value <0.001).
Conclusions: On the basis of this study this minimally invasive treatment advocate for refractory Tennis elbow.

Abstract #52
Ultrasonographic Examination of the Synovial Fold of the Radiohumeral Joint
Shukuki KOH
The purpose of this study is to describe the anatomy and incidence of the synovial folds of the radiohumeral joint (RHJ) and to assess its visibility by ultrasonography.
Forty-nine fresh frozen cadaver were used. The RHJs were examined by ultrasonography from the anterior, lateral, and posterior aspects before and after intra-articular injection of 5 mL saline. The joint was then dissected and the shape, location, and size of the synovial fold were recorded. The location was recorded as clockwise, setting the joint so that the proximal radioulnar joint was perpendicular. After excising the humerus, digital photos were taken from the proximal side of the joint before and after excising the RHJ capsule. The relative coverage of the radial head by the synovial fold was calculated.
Synovial folds were observed in all 49 specimens. Forty-three specimens had anterior and posterior lobes and 6 specimens had a circular-type fold. Ten specimens had a lateral lobe in addition to the anterior and the posterior lobes. The synovial fold covered an average of 28% of the RHJ surface of the radial head. The sensitivity of the ultrasonography was 81%, 46%, and 85% from the anterior, lateral, and posterior aspects of the RHJ, respectively. After injection of 5 mL saline, the sensitivity improved to 96%, 67%, and 94%.
Synovial folds of the RHJ are consistent and distinct anatomic structures. Ultrasonography was found to be a sensitive imaging modality to identify synovial folds of the RHJ.

Abstract #108
ISOLATED ELBOW TROCHLEAR FRACTURE: A CASE REPORT
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INTRODUCTION: Isolated fractures of the humeral trochlea are very rare, and are normally associated with other injuries to the elbow. Little has been published on its treatment, and there is no standard method for its management.
METHODS AND RESULTS: We report a 56 year old lady who presented 5 days after a mechanical fall and sustained an isolated left trochlea fracture. This was treated with open reduction and internal fixation with a 4.0mm AO cancellous screw supported by a 2.0mm 5 hole buttress plate. A stable fixation was obtained and the patient was placed in a hinged elbow brace, allowing full range of movement within it. By 14 weeks, she had a pain-free active range of movement of 0-140°, full pronation and supination. She has returned to her job as a manual worker.
DISCUSSION AND CONCLUSION: This is a rare case of isolated trochlear fracture. An excellent functional outcome can be achieved with internal fixation and early mobilization.

Isolated Elbow trochlear fracture
A fifty six year old lady complained of left elbow pain after a mechanical fall. She presented to the Emergency Department 5 days after her initial injury. Physical examination revealed a limited range of motion at the elbow joint with no sign of skin changes nor swelling. There was no distal neurovascular deficit and the shoulder and wrist joints were normal. Radiolgraph revealed an isolated left trochlear fracture.
She underwent open reduction and fixation. Intra-operatively, small coronoid process fracture fragment and loose articular fragments were removed. Trochlea was reduced and fixed with a cancellous screw supplemented by a buttress plate. Post-operative she was placed in a hinged elbow brace, allowing full range of movement within it. The brace was removed 10 days post-operatively. She achieved full supination and pronation, and an active range of movement 10-120° at 7 weeks, which improved to 0-140° at 14 weeks.

Abstract #137
Reconstruction of ignored capitellar fracture
Purpose: The isolated humeral capitellar fracture is rare injury and sometimes ignored at the initial diagnosis. We have experienced five cases of old capitellar fractures which had been ignored more than three months. The aim of this study was to report surgical outcomes of this type of injury.
Materials and Methods: Since 2000, 5 patients with old capitellar fractures were treated. Two patients were male and three patients were female with an average age of 55.2 (range 37 to 67 years). The duration from injury to first operation was 3 months to 12months (mean 8.6 months). The preoperative arc of motion was averaged 56 degrees. A lateral approach (modified Kocher approach) was used in all patients. Open reduction of malunited fragment and internal fixation with Herbert screw was performed in three patients. Resection of the capitellar fragment was performed in two patients because of poor quality of the fragment. The follow-up period ranged from 4 to 35 months (mean, 16 months). **Results:** The postoperative arc of motion was averaged 87 degrees. All patients had no instability and two patients had slight pain after strenuous activities. The results were evaluated good in two patients, fair in two and poor in one according to the criteria of Grantham et al. There was no evidence of avascular necrosis. **Conclusion:** There was no significant difference between two treatment method in short follow-up periods. The arc of motion was not significantly improved because of soft tissue contracture for long time. Although the surgical outcomes were not as good as osteosynthesis for fresh fracture, we still recommend open reduction and internal fixation for the old humeral capitellar fracture.

Abstract #163
Three dimensional analysis of cubitus varus deformity following supracondylar fractures of humerus
Y.Takeyasu, S.Arimitsu, K.Oka, H.Moritomo, H. Yoshikawa, K.Sugamoto, T.Murase.

【Purpose】Cubitus varus deformity following supracondylar fractures of humerus has been described as varus, internal rotation and hyperextension of distal fragment. However the three-dimensional (3-D) quantification of deformity has not been reported. The purpose of our study was to find the 3-D patterns of cubitus varus deformity following supracondylar fractures of humerus using 3-D computed tomography (CT) data.
【Materials and Methods】The materials were 13 humerus of 13 patients with cubitus varus deformity after supracondylar fractures of humerus
(on anterior-posterior view of X-ray). The average age was 13 years old. 3-D bone surface models of bilateral humeri were created from 3D-CT data. The proximal site of affected humerus was superimposed to the corresponding part of the mirror image of the contralateral normal one. The 3-D cubitus varus deformity was quantified in three directions of varus-valgus, flexional-extensional and rotational deformity using Euler angles method.
【Results】The average angle of varus deformity and extensional deformity were 21.4°in 13 cases and was 9.3°in 12 cases, respectively. One case had slightly flexional deformity. 9 cases had 14.5°of internal rotation on average, while th e other 4 cases had 9.1°of external rotation.
【Conclusion】We could evaluate cubitus varus deformity following supracondylar fractures of humerus with 3D-CT. We found not only internal rotation but also external rotation of the distal humerus that was existed in 30% of the cases.

Abstract #258
MOBILIZATION OF A PROXIMAL RADIOULNAR SYNOSTOSIS WITH USE OF A POSTERIOR INTEROSSEOUS ARTERY ADIPOFASCIAL FLAP
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Proximal radioulnar synostoses are congenital or occur after injury. Surgical release alone usually results in recurrence in the majority of cases. Treatment is divided roughly into two methods. One is rotation osteotomy, and the other is prevention of recurrence with use of interposition. In 1998, Kanaya reported free lateral arm fat-flap interposition with good results. However vascular anastomosis is needed for this technique. We have used posterior interosseous artery adipofascial flaps since 1996, which doesn't require vascular anastomosis. We report here our surgical results in 8 cases (10 elbows).

Eight patients (10 elbows) with proximal radioulnar synostosis. There were 5 boys and 3 girls. Average age at surgery was 8.8 years old (3-15). At the surgery, we elevated the posterior interosseous artery adipofascial flap, and then did correction osteotomy of the proximal radius. The anconeus muscle and posterior interosseous artery adipofascial flap were inserted.

Average follow-up period was 3.3 years (9 months - 10 years). At the final follow-up, average pronation angle was 54.2 degrees, 38.3 degrees of supination, -5.8 degrees of elbow extension, and 136.7 degrees of elbow flexion. The average forearm rotation angle by this method was 92.5 degrees (85.0 degrees in congenital cases). This result is similar to the report by Kanaya.

The prevention of recurrence is considered to be good with this technique. In congenital cases, it was difficult to obtain the centric position of the radial head for the capitulum in both pronation and supination because of bowing of the radius.

Abstract #340
Dr Surname:ARAI
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Department orthopedic surgery,
Abstract Title:Treatment of lateral of lateral epicondylitis by arthroscopic surgery.

Purpose: Generally, the cause of lateral epicondylitis has been considered inflammation to origin of the extensor carpi radialis brevis(ECRB) and partial tear of the ECRB. We believe the synovial fringe to the radio-humeral joint is one their cause. The purpose of this study was to evaluate the results of lateral epicondylitis treated with arthroscopic surgery.
Materials and Methods: Eleven patients and 12 elbows were treated by arthroscopic surgery. All patients had non surgical treatments including physical therapy, splinting, nonsteroidal anti-inflamatory medication, and steroid injections several times more than six months previous to surgical treatment. All patients had resected synovial fringe and debridement of ECRB origin. We evaluated pain on a rating scale of 1 to 10 after surgery.
Results: The average follow-up period was 10months(range, 6 to 22 mos). After arthroscopic surgery, the average pain score decreased by 2.4 points. One patient experienced ulnar nerve palsy after surgery but recovered with conservative treatment.
Conclusion: We expect that synovial fringe
in the radio-humeral joint is important as a cause of chronic lateral elbow pain syndrome. The lesion of synovial fringe correlated with resected in arthroscopic surgical treatment of all patients with lateral epicondylitis with good results.

Abstract #22

Clinical Experience of Intratendinous Ganglion in the Extensor Tendon of Hand

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Purpose : Ganglion is the most common soft tissue tumor of the hand, and most of them usually arise from scapholunate ligament, scaphotraezial ligament, radiocarpal joint or flexor tendon sheath. However, intratendinous ganglion is very rare with unknown etiology and pathogenesis that originates within tendon.
Methods : We have experienced three clinical cases of intratendinous ganglion in extensor tendons of the hand. The average age of patients at operation was 36 years. All patients were treated by excision of the ganglion in conjunction with tenosynovectomy followed by repair of the tendon.
Results : The length of mean follow up time was 6.7months and all of them showed no evidence of recurrence.
Conclusion : We report 3 cases of intratendinous ganglions in extensor tendon, which are very rare cases, but can treated without recurrence by excision or excision with tenosynovectomy.

Abstract #117

Tendon transfer or tendon graft for ruptured extensor tendons in rheumatoid hands

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Introduction: The purpose of study is to evaluate the clinical outcome of tendon reconstruction using tendon graft or tendon transfer and to investigate parameters related with the clinical outcome.
Materials & Method: From 1995 to 2006, ruptured extensor tendons in rheumatoid hands were treated in 51 wrists of 46 patients. These tendon ruptures were managed with reconstructive procedures(mostly tendon transfer or tendon graft) combined with synovectomy, posterior interosseous neurectomy and hemiresectional arthroplasty. The clinical outcome was assessed with Geldmacher's criteria and the patient satisfaction was measured with a visual analog scale.
Results: The mean follow up period was 5.6 years. At final follow-up, the Mean MP joint extension lag was 7.73 degree, the mean visual analog satisfaction scale was 74. Reoperation was in 1 case and 5 cases had a failure of extension. No difference of clinical outcome between tendon grafting and tendon transfer was found. The MP joint extension lag, Geldmacher score and patient satisfaction scale was related to the number of affected finger($p<0.05$). The MP joint extension lag correlated with patient satisfaction scale. The duration of untreated rupture was longer, the MP joint extension lag was larger.
Conclusion: For satisfactory result, the restoration of extension should be done. Both tendon graft and tendon transfer are reliable reconstruction methods for ruptured extensor tendons in rheumatoid hands. The longer duration of untreated rupture, three or more affected fingers have relation with poor clinical outcome.
Key word : Rheumatoid hand, extensor tendon rupture, tendon graft, tendon transfer

Abstract #191

Modified Dorsal Cock-up Splint For CP Hand- A New Design

Yee-Hwa WU, Jui-Kun CHANG, OT

Abnormal grasp pattern may be presented in CP children especially in spastic type of CP that was often due to the disorganized of their neurological mechanisms in their central nervous system which activate and control the muscle.
Disturbances of active wrist and hand function in children with cerebral palsy occur as a result of some problems:
1. *Muscle spasticity* commonly pulls the hand & wrist into a posture of flexion during the performance of occupational tasks. Some spastic hand that lack of finger flexion in grasp, may accompany associated with palm (wrist) flexion and splaying of the finger i.e. hyperabduction with hyperextended metacarpalphalangeal and interphalangeal joint.
2. To a lesser extent in children with active wrist motion, *myostaticcontracture* occur. They are able to use grasp pattern that rely on the use of the long finger flexor and extensor (e.g. a palmar grasp or hook grasp), but are unable to effectively use the intrinsic muscles of the hand to allow for more variety and function in grasp.
3. Many children lack adequate thumb stability for opposition and substitute with thumb adduction, whereas others are pulled into thumb adduction by an overactive adductor pollicis.
The child's functional needs should be considered in determining the type of grasp pattern to be emphasized. Therefore use of orthosis to keep in functional position and to facilitate a normal movement pattern during functional activity performance was required. In the past, a dorsal cock-up splint may be incorporated if wrist flexion is excessive. Another figure of eight thumb strapping may be adequate to get an adduction thumb out of fist or hand. But, in fact, they still lack of finger flexion in grasp at the same time, difficulty to pick up a small or tinny objects in a functional manner was noted.

A new design of modified dorsal cock-up splint consisted of a firm surface in volar side which extend from anterior border of dorsal cock-up splint that maintained metacarpalphalangeal joint in extension position to allow proximal and distal phalange joint flexion when grasp. A extended c-bar from the radial side of splint to keep thumb in abducted and opponent position, which allowed the hand to grasp release in a functional manner. The new design of this splint can inhibit the abnormal grasp pattern that caused by abnormal muscle tone and involuntary motion, and let the child grasp-release & manipulate an object more efficiency.

Abstract #197
Extracorporeal Shockwave Therapy for Calcific Tendinitis of Extensor Carpi Ulnaris
- A Case Report -
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Calcific tendinitis on hand area is very rare. Calcific tendinitis of the hand is reported to have relatively high incidence in perimenopausal women. Clinical symptoms like erythema, swelling, and pain were confused with local inflammation. Most radiographs show periarticular calcification. Many treatment modalities have been introduced. However the treatment of choice has not been established. ESWT is known as effective treatment for calcific tendinitis of shoulder, chronic pain of elbow and foot, and nonunion of long bone.
We experienced the satisfactory pain relief and diminution of calcific material by serial use of extracorporeal shock wave therapy (ESWT) for calcifying tendinopathy of the extensor carpi ulnaris unresponsive to conservative treatments. So we report this case with a review of the relevant literature.

Abstract #205
IS PATIENT'S KNOWLEDGE TO THE TYPE I MALLET FINGER INJURY A MATTER TO THE OUTCOME OF THERAPY? A SURVEY STUDY.
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Background: Early intervention and compliance with therapy for mallet finger are essential to regain full active finger extension. Good understandings about the injury determine ones' readiness for promptly intervention and compliance with therapy. The objective of this survey was to describe whether patients' knowledge do affect their compliance and hence the outcome of therapy. ***Method:*** Patients referred to occupational therapy for mallet finger program by A&E were interviewed on their knowledge about the etiology and treatment. Patient's timeliness in visiting A&E; modes of injury; active extension range; readiness to work; default rate and satisfaction on therapy were evaluated. ***Results:*** 7 out of 33 cases had shown considerable knowledge. They attended A&E immediately and had regained full finger extension at 6^{th} week. 26 cases without knowledge, with average 4.7 days (ranged 0– 17) delay on treatment had regained full extension after 6^{th} (n=14) and 8^{th} (n=8) week with four default cases. Modes of injury and readiness to work among those cases with and without knowledge were diversifying. Work injury and sports injury were the common causes (n=13, 10). All appreciated therapist's effort on education about the anatomy and rationale of therapy. ***Conclusion:*** This study revealed knowledge on mallet finger might not affect the treatment outcome of therapy. Patients with knowledge, however, tend to attain earlier appropriate treatment and be more compliant. It also indicated people in Hong Kong might lack on knowledge about mallet finger management. Public education on proper mallet finger management might be helpful for a successful therapy.

Abstract #309
Mycobacterial tuberculous tenosynovitis of the extensor tendon occurring after liver transplantation A Case Report
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Introduction: We present a rare case of mycobacterial tuberculous tenosynovitis of the extensor tendon occurring after liver transplantation.
Report of a Case: A 52-year-old man presented with swelling and local heat in his right middle finger. There were no traumatic episodes and no suspicion of any other antecedent infections. However he had received a liver transplantation 8 years previously. He had been receiving antibiotic treatment for two weeks, however his symptoms were gradually worsening. Roentgenograms showed no sclerosis or osteolysis. MRI showed the inflammatory change in the subcutaneous area of the dorsal side of the PIP joint. Bacterial examination with drainage from an incision in the dorsum of the PIP joint revealed mycobacterium tuberculosis, and we administered anti-tuberculous drugs. After one week of anti-tuberculous treatment his inflammatory symptoms had gradually reduced, thus surgical treatment was cancelled. Ten months after starting the drug therapy, he had regained full range of motion in the middle finger. At the 3-year follow-up examination, there was no recurrence.
Discussion: In our case, it is possible that he had a minor infection of asymptomatic
pulmonary tuberculosis which caused the tuberculous tenosynovitis because of receiving immunosuppresants. We hypothesized the tenosynovitis was localized in the extensor tendon sheath, because the space where the bacterium can proliferate is more limited in the extensor tendon compared with the flexor tendon. This suggests some cases of tuberculous tenosynovitis of the extensor tendon can be treated conservatively.

Abstract #348
Title: A modified axial incision for anterior surgery on the finger
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Abstract:
Conventional incisions for anterior exposure of the finger include the mid-axial lateral exposure (Bunnell) or the criss-cross direct palmar exposure of Brunner. These incisions are used on different occasions depending on the pathology. Both have their advantages and disadvantages. The modified axial incision combines the advantages of both: the incision is placed more anteriorly on the palmar-lateral surface of the finger, so that the skin flap is raised palmar to the neurovascular bundle. At the level of the joint, the incision is turned obliquely dorsally towards the mid-lateral axis to avoid scar contracture. If further extension across the joint is needed, the incision is turned back and continued as a longitudinal incision distal to the joint crease. This creates a small triangular flap over the joint crease, with an apex angle of between 60 to 90 degrees, and the apex located around the mid-axis of the joint.

The steps for this modified incision are illustrated and compared with the conventional incisions. The precautions and the critical points when using the incision are discussed.

Abstract #312

SUCCESSIVE SPLINTING FOR A PATIENT WITH WRITER'S CRAMP : A CASE STUDY

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Writer's Cramp is most commonly marked by involuntary muscle contractions while a person writes. The symptoms not only include difficulty in writing, but also difficulty in conducting routine daily activities. Although various approaches have been tried to improve this affliction, no clear remedies have been found. The purpose of this presentation is to introduce an approach that satisfactorily treats symptoms of Writer's Cramp after successive splinting. Using medical and occupational therapy charts, an in depth analysis was conducted to examine and clarify the factors that contribute to recovery.
The case was a man in his 40s, a computer engineer who lived with his wife. Among his physical problems, he especially had difficulty writing in front of other people, using a computer mouse, and driving a car. He received occupational therapy once a week for six weeks. His treatment was conducted in five phases, consisting of: 1) immobilization, 2) increase of motivation, 3) expansion of activities within limitation, 4) behavior modification, and 5) self-management. In each phase a particular type of splint -- a resting splint or a buddy splint, or a combination of the two -- was utilized. After successive splinting, the case regained the ability to engage in those functions that had previously caused him great physical difficulty.
The results suggest that the successive splinting approach was effective in reducing focal fingers dystopia. In order to appropriately and effectively utilize the splints, it is necessary to consider the occupational, temporal, physical, and psychological factors involved.

Abstract #85

Finite Element Analysis of Flexor Tendon Repaired in Dynamic Flexion-Assist Splint

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Rehabilitation of tendon rupture after surgery is an impact factor to affect the hand function. The dynamic splint is effectively able to prevent from tendon adhesion, abnormal scar formation and joint contracture. However, the appropriate traction force of dynamic splint is undetermined from previous literatures. Currently, the traction force of dynamic splint was depended on the therapist's experience. Therefore the purpose of this study was to investigate the biomechanical behavior of repaired tendon (1) elongation at suture position, (2) the tendon excursion, and (3) the force of repaired tendon during dynamic splint treatment.
A 3D finger finite element (FE) model was constructed to compare the motion analysis for validation. This FE model comprised cortical bone, cancellous bone, cartilage, volar plates, soft tissue, flexor tendons, and the pulley system. The single rubber band stiffness of 0.0167 N/mm and double rubber band stiffness of 0.0334 N/mm were chosen for this study. This study indicated that the single rubber band stiffness of 0.0167 N/mm was sufficient to generate a traction force to achieve 3 mm tendon excursion while avoiding greater than 1 mm tendon elongation.

Abstract #115

Simple Dressing Method for the Fingertip Composite Graft
using Hydrogel and Surgical Rubber Glove

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Purpose:
There have been reports of the concept of moist wound healing to enhance fingertip composite graft survival. In this study, a technique to enhance nonmicrosurgical replantation of amputated fingertips as composite grafts is presented.
Methods:
In this retrospective study, we assessed the success of fingertip composite graft with moist-exposed hydrogel(Duoderm gel®), which has been shown to maintain adequate moisture for optimal healing by hydrogel application with surgical rubber glove dressing.
Results:
Ten fingertips had survived completely .All patients were achieved, with acceptable sensibility, minimal shortening, and satisfactory esthetic outcome using this technique.
Conclusions:
The article offers information about the simple and easy method in using hydrogel and surgical rubber glove dressing material over composite grafting.

Abstract #156

Medical problems of PRMDs among piano students

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Musicians tend to suffer from various types of playing related musculoskeletal disorders (PRMD). It was reported that some pianists had experienced pain in the upper limbs and fingers. In Japan, there has been little investigation into the PRMDs of piano students, so this study was performed to look at this matter.

An anonymous questionnaire was performed with the 73 subjects, who were students belonging to the department of music in collage. All the students were majoring in piano. There were 9 men and 64 women. Their ages ranged from between teens to twenties. The questionnaire consisted of three sections: demographics, musical background and practice habits, and medical problems and there care. There were 30 questions in all. The purpose of the study was explained to the subjects before hand and protection of their privacy was guaranteed in writing. All statistical analyses were done using SPSS for windows. We analyzed the correlation between physical symptoms and objective factors such as number of years performing and hours of daily practice.

58% of the students had some kind of physical problems involving the shoulders, head, neck and thumbs. The symptoms of subjects who had had more than 10 years of the piano playing experience were statistically significantly worse than the symptoms in those with less than 10 years experience($p<0.05$).

The results suggested that overuse of the hands in piano playing leads to PRMDs. Although several of the students had PRMDs they have little knowledge of the changes or kinetics of this disease.

Abstract #257

Examination of grip strength on maximal effort and duration of grip using the force-time curve

Kayoko Watanabe[1], Sadako Tsubota[2], Naoki Oikawa[3], Masaki Takahashi[1], Kiyokazu Hara[1]

INTRODUCTION: Some studies on grip strength of healthy adults have previously been conducted. Grip strength test is only objective and reliable when an individual is exerting a maximal effort. Sustained maximal effort in grip test can result in fatigue and pain. In order to understand better the changes in grip duration produced by maximal effort, a superior method of grip testing is required. The purpose of this study is to examine the maximal grip strength of healthy adults using the force-time curve.

MATERIALS AND METHODS: 18 healthy subjects (8 males, 10 females, aged 24.2±1.9years) performed three maximal grip strength trials with their dominate hand. For force measurements, we used the hand and finger dynamometer "Hand Biofeedback System" EG-200 (Sakai Iryo). The averages of slope were calculated from peak force to three seconds, six seconds and nine seconds. Also average of normalized integration every three seconds from peak force was calculated. All statistical analyses were done using SPSS for windows.

RESULTS: Average of maximal force was 35.7±10.2kgf. Significant gender differences were not found for the each slope or for normalized integration every three seconds. No significant difference was found between items of slope. The normalized integration was significantly different between items by one-way ANOVA($p<0.01$).

DISCUSSION: The slope of the grip strength was not an effective tool for differentiation. However, the normalized integration was decreased according to time. Future research is required comparing the maximal grip strength of people with hand injury and healthy people, using the force-time curve.

Abstract #264

Comparison of the Result of 'Modified-Kleinert' and 'Early Active Motion' After Flexor Tendon Repair In zone1 and zone2

Shuya Okumura[1], Sayoko Kawabata[1], Yasue Harada[1], Kanae Furuhashi[1],
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Early Active Motion (EAM) has been recognized as allowing longer tendon excursion than Modified-Kleinert (M-K). However, M-K is still used depending on the extent of and type of damaged tendon, as well as the ability of patients to manage precise movements. The purpose of this study is to look at the effectiveness of the two differing approaches.

41 patients (34 male, 7 female) were examined for this study, all of who received hand therapy in our institute between 1992 and 2007. The average patient age was 34.2 years old. Among the 47 total fingers treated, M-K was used on 11 (6 in Zone1 and 5 in Zone2) and EAM was used on 36 (16 in Zone1 and 20 in Zone2). The range of motion (ROM) and the average %TAM were compared according to both the zones and the therapeutic approaches.

While there was a significant difference in the %TAM of zone1 injuries between the two approaches ($P<0.05$), there was no significant difference in zone2 injuries between the two approaches, and no significant difference in ROM in any zone using the two approaches.

The patients received better %TAM in zone 1 when they were treated using EAM. It is indicated that EAM allows for longer tendon excursion than M-K, particularly in the distal portion of the tendon. It is important that therapists clarify the appropriate conditions of the subject hands and guide patients toward achieving the best results.

Abstract #283

Complete decongestive lymphatic physiotherapy reduces the edema and improves QOL in patients with breast cancer.

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Background: Much research and clinical attention after surgical interventions for breast carcinoma has been focused on the reduction of lymphedema. The association between function and Quality of Life (QOL) has not been well studies. Thus, the purposes of this study are to examine various evaluations before and after complete decongestive lymphatic physiotherapy (CDPT).

Methods: Ten outpatients with lymphedema after surgical interventions for breast carcinoma were provided CDPT, 40 minutes, 1 day per week for 8 weeks. Total perimeter measurement, range of motion (ROM), Disabilities of the Arm, Shoulder and Hand (DASH), EuroQOL and original questions were compared before and after therapy.

Results: The average score of total perimeter measurement was 93.6 ± 12.3 before CDPT and 89.7 ± 12.4 after CDPT. [ROM: 160.4±25.5 → 179.5 ± 1.4] [EuroQOL: 0.7 ± 0.3 → 0.9 ± 0.3] [DASH: 23.0 ± 16.6 → 13.1 ± 16.9] All score significantly improved. The result of original question using visual analog scale also significantly improved.

Conclusions: CDPT can reduce the volume of edema in patients with lymphedema. And also improvement was recognized on ADL, QOL score.

Abstract #338

STIFF HAND DUE TO FLEXOR TENOSYNOVITIS

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Complex regional pain syndrome (CRPS) is the group of painful diseases, the etiology of which is almost unknown. The treatment of CRPS is challenging and hand therapy should be performed in a very gentle manner. In our hospital, in some cases of CRPS, tenosynovitis and carpal tunnel syndrome has been considered as its etiology. We report seven hands of six patients (two male and four female) who appeared to present CRPS, but hand therapy was performed successfully.

The mean age of these patients was 62 (43-79) year. Four cases presented symptoms after trauma or surgery, but other two cases did not have any antecedent trauma and surgery. With the careful examination, tenderness on the annular 1 pulley, swollen tendon sheath, local heat over tendon sheath, aberrant tendon excursion associated with restricted metacarpophalangeal joint extension were seen. Thus, patients were diagnosed as tenosynovitis. After diagnosis was made, tenosynovitis was focused in hand therapy. For their swollen stiff hands, the patients were instructed to elevate the hands, mobilize the joints passively, and avoid forceful repeated grasp and heat to the hands. These treatment improved % total active motion from 50.3% to 75.1%. Edema, swollen tendon sheath, and pain were also relieved.

In treating cases with CRPS symptoms (edema, pain, limited range of motion), it is important to examine tenosynovitis. Once the diagnosis of tenosynovitis is made, hand therapy should be started as early as possible before stiff joint is established.

Abstract #361

COMPARISON BETWEEN POSTOPERATIVE DYNAMIC SPLINTING AND ALTERNATIVE SPLINTING ON A RHEUMATOID ARTHRITIC HAND AFTER ARTHROPLASTY ON METACARPOPHALANGEAL JOINTS

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An extension dynamic splint is typically used after an arthroplasty on Metacarpophalangeal (MCP) joints. However, Burr N. noted effectiveness in alternate use of flexion and extension static splints. In this study the efficacy of these types of splinting was explored through a patient who used both methods in the same area of the hand.

The patient was a 62-year-old woman diagnosed with Rheumatoid Arthritis fourteen years earlier. At the initial MCP arthroplasty in her right hand she used a dynamic splint for eight weeks. The following year she had another athroplasty in the same hand area -- only this time MCP flexion and extension static splints were used for eight weeks.

Ranges of motions (ROM) in the patient's MCP joint after dynamic splinting were 34 (-26/60) degrees in the index finger, 36 (-20/56) degrees in the middle finger, 30 (-16/46) degrees in the ring finger, and 26 (-26/50) degrees in the little finger. ROM after alternative splinting were 24 (-40/64) degrees in the index finger, 46 (-20/66) degrees in the middle finger, 48 (-16/64) degrees in the ring finger, and 34 (-36/70) degrees in the little finger.

Alternative splinting resulted in the patient acquiring more flexion in the MCP joints in every finger, and increased ROM in the middle, ring and little fingers. Also, because the patient acquired increased grip function, she could more effectively use her hand in her activities of daily living (ADL). Thus, alternative splinting in this case produced better results in both ROM and ADL functions.

Abstract #362

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【BACKGROUND】
Before, we reported on extension and flexion ROM of metacarpophalangeal(MP) joints to perform daily activities by using 19 activities included in DASH. In the study, our results indicated that flexion of ulnar fingers(UF) MP joints to at least 30 degrees, extension of radial fingers(RF) MP joints to at least-30 degrees, are associated with little difficulty in performing daily activities. This time, we measured the motor function of fingers in limit of metacarpophalangeal joints ROM by using STEF, which is an objective evaluation. STEF is the test which can evaluate objectively performance of upper extremity by measuring the time required for move objects.

【METHODS】
A total of 10 people volunteered for this study. Orthosis were attached to each subject to limit motion of MP joints artificially. For UF MP joints flexion, orthosis were used to limit ROM to 0 degree, 30 degrees, 60 degrees. For RF MP joints extension, orthosis were used to limit ROM to - 90 degrees, - 60 degrees, - 30 degrees. The subjects carried out STEF. Activities in limited ROM were compared with the activity in no limit of ROM.

【Result】
In STEF, a significant difference in performance of UF MP joints flexion was not noted. A significant difference in performance of RF MP joints extension was noted only between "was no limit" condition and "-90 degree extension".

【CONCLUSION】
As for STEF which was an objective evaluation, there was little influence in limit of MP joint ROM in comparison with DASH which was a subjective evaluation.

Abstract #382

FINGER PERCUSSION BRACE: A NEW INSTRUMENT USED TO PROMOTE FRACTURE HEALING

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[Abstract] Objective: To develop a finger percussion brace and investigate its effect on fracture healing after finger replantation or reconsturction. **Methods:** Eighteen patients who had underwent finger replantation or reconstruction were assigned to control group and study group randomly and equally. In all eighteen cases with phalanx fractures, flat fracture ends were constructed with rongeur, and reduction and internal fixation with Kirschner wire in length wise were applied. Other operation procedures were done according to routine. One week after operation, when the blood supply of the replanted or reconstructed finger was stabilized, finger percussion brace were applied to patients in study group, who were instructed to wear the brace and knock on the table with finger tip for thirty minutes twice a day for forty days. All the other treatments were the same in both groups. Fracture healing was assessed with X-rays per ten days postoperation. **Results:** The bone union of roentgenographic evidence could be observed between 20 to 30 days postoperation (average 26.4±3.8 days) in study group, and 20 to 40 days postoperation (average 34.2±6.3 days) in control group. **Conclusion:** Finger percussion brace is easy to made and convenient to be used, as well as effective function on promote phalanx fracture healing among patients after finger replantation or reconstruction. By this way, internal fixation can be pulled out earlier, and passive or active joint movement can be done earlier as well.

Key words: phalanx fracture; brace; percussion;