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ezine ifssh

CONNECTING OUR GLOBAL HAND SURGERY FAMILY

Journal Highlights

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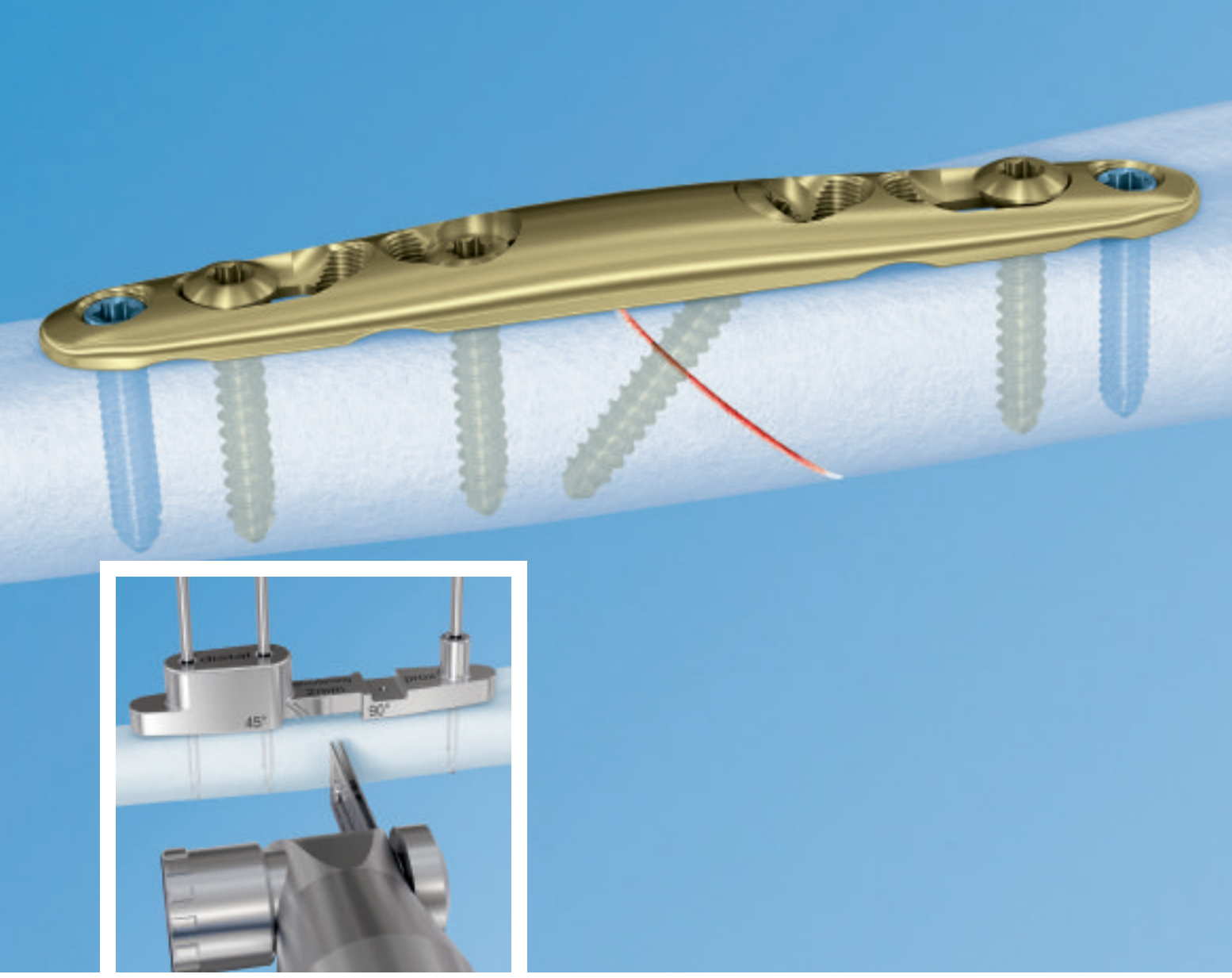
Upcoming Events

IFSSH Scientific Committee Report on the Anatomy of the Hand

THERAPEUTIC EXERCISE IN WRIST REHABILITATION PART 2

THE EPONYMOUS SWANSON LECTURE BY PROFESSOR WAYNE MORRISON



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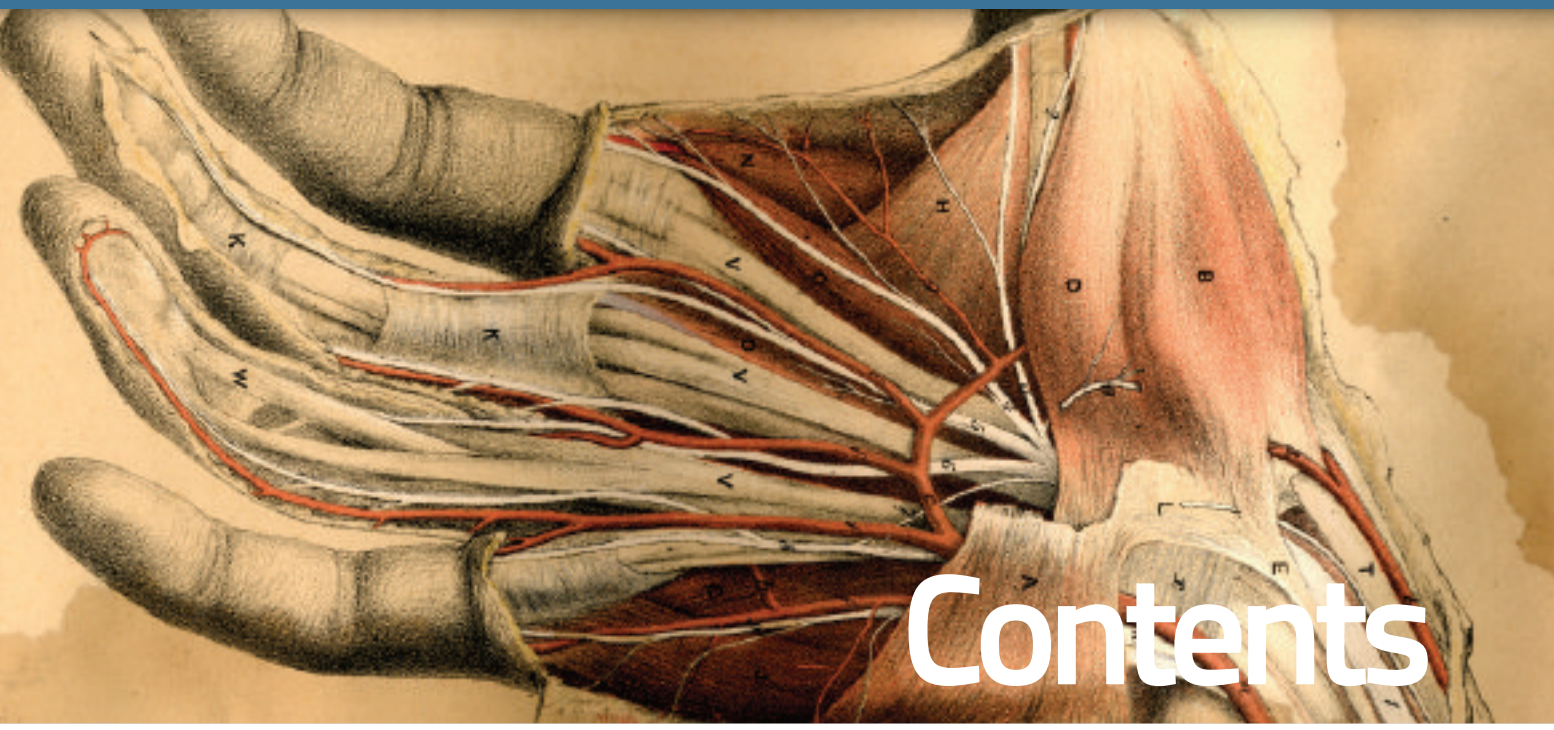


Contents

Editorial

The IFSSH ezine has become the official communication tool of the IFSSH. It also has become popular amongst our Members, judging from the constant flow of new subscriptions and the huge number of submissions.

To reiterate, the tagline of the Ezine is: for the Members, by the Members !

Therefore every Member is invited and encouraged to use this medium:

1. to share interesting and educational information
2. to advertise upcoming activities
3. to share humerus incidents (humorous!)
4. to give an opinion, controversial or debatable
5. to send photos which tell more than words
6. to get or give advice on difficult cases

This issue contains the following special features:

1. The **Eponymous Swanson Lecture** by Professor Wayne Morrison, presented at the 11th Congress of the IFSSH in India, March 2013.
2. The **Turner Institute in St. Petersburg**, Russia.
3. A new section for **Member society updates** and related Federations. Delegates are encouraged to use this platform to uniform colleagues worldwide about their activities.
   Be a communicator!

With sincere regards
Ulrich Mennen
Immediate Past-President:
International Federation of Societies for Surgery of the Hand
Editor: IFSSH ezine

IFSSH ezine editorial team:
Editor: Professor Ulrich Mennen (Immediate Past President of the IFSSH)
Deputy Editor: Professor Michael Tonkin (President of the IFSSH)
Publication coordinator: Marita Kritzinger (Apex ezines)
Graphic Designer: Andy Garside

Dear Member

I am trying to draw together a comprehensive archive. At the moment Belinda Smith (IFSSH Administrative Secretary) and I are concentrating on the Executive Committee Meetings over the years. I think the International Federation was set up in January of 1966 and have the inaugural Minutes. However, at present we have nothing from January of 1966 until some Minutes dated the 6 March 1971. After that we have no Minutes until the 24 February 1981. We have no Executive Committee Minutes from 1982 -1986 or 1997 - 2000 (inclusive). If you have a copy of any of the Executive Committee Minutes that are missing I would be grateful if you would scan them and send them to Belinda in the Secretariat (email: administration@ifssh.info). We would be extremely grateful. Minutes are very valuable data which trace the development of the International Federation and a comprehensive set would be a very valuable resource for archivists in years to come.

I think we should also start to develop the same process for the Delegates' Council Meetings. At this stage the only question I have relates to the date that Delegates Meetings started. We have all the Delegates Minutes from 2001 onwards and know that there was a Delegates Meeting in Barcelona of June 2000 (although we do not have those Minutes currently).

I do hope you will be able help us with the missing Executive Committee Minutes and/or information concerning the inaugural Delegates' Council Meeting and any Delegate Minutes from the outset to the year 2000 inclusive.

Frank Burke
IFSSH Historian

Living Textbook of Hand Surgery: an update

At the IFSSH Congress in Delhi, with the enthusiastic support from Ulrich Mennen and Raja Sabapathy, great interest and cooperation from the Hand Surgery family was shown for The Living Textbook of Hand Surgery. More authors, reviewers and members for the editorial board have come forward to participate. However, some chapters are still missing authors! The editorial team welcomes everybody who is interested to take part as an author. Do not hesitate to contact us if you are interested in participating in this very exciting venture.

The team has been working backstage to develop the software. The intended interactive web design for the book is completely different from standard ebooks and published PDF-documents, and therefore has to be generated as a new concept.

We are also in contact with Wikimedia and open access networks, to adapt the book, from the beginning, to defined concepts of open educational resources, like the UNESCO, who developed a system especially for higher education.

The Living Textbook of Hand Surgery will be introduced and discussed at the OER-Congress and Barcamp of Wikimedia in Berlin, in September 2013 to gain technical and conceptual ideas.

You are invited to follow the progress at the website: handbookhand.com. A timetable of further developments will be published soon.

Thank you all for your support and interest,

Richarda Boettcher
Handchirurgie Weltweit e.V.
richarda.boettcher@hand-ww.de

Newsletter from the Secretary-General

Dear Friends

It is only four months since I embarked on this magnificent cruise, called IFSSH, and yet I know that I will enjoy this trip. So far, membership cooperation has been superb; the crew (Belinda, Santosh), incredibly efficient; and the captain (Michael Tonkin), an expert sailor, one of the best, indeed! Yes, our ship is in good hands, and with the help of those who preceded me (Thank you, Zsolt and Ulrich) I have no concerns. If I ever thought that life as a secretary-general would be quiet, it is time to say that I was wrong. This is a ship where things happen constantly. Paraphrasing Rod Steward, I would say that "there is never a dull moment" in our Federation. Let me tell you what is going on.

For those who are still basking in the glow of that "incredible India" we had the chance of visiting, remember that thousands of photos were taken during the congress, and that they are available through our website (http://ifssh-ifsht2013.com/gallery1.php). The pictures are in web/screen resolution. To obtain high resolution copies for printing purposes, please send a message with the code number given below each photo to the webmaster at info@krithitechnologies.com, and he will mail them to you.

The IFSSH sponsored the registrations of 20 surgeons to attend

the triennial congress in Delhi, as well as recently providing funding for IFSHT projects and assisting the American Association for Hand Surgery with financial support to teach hand and microsurgery to a Mongolian delegation.

The Committee for Educational Sponsorship (CES), along with the Executive Committee, presented a new set of guidelines for educational bursaries and grants to the Assembly of National Delegates. They were approved, with four main categories of educational sponsorship support:

- Specific education projects with the oversight of a society/member of the IFSSH (e.g. fellowship programmes at underdeveloped institutions, educational DVDs and booklets, etc);
- Society congress/courses organised by societies, with support available for speakers, registrants and/or equipment;
- Regional courses, such as the Eastern European Hand Surgery course; and
- IFSSH congress registration (i.e. support to attend the congress for those from areas of need – IFSSH membership is not required for individuals to apply for this category).

The method of application and acceptance was simplified to make the process much faster and allow more projects to receive timely funding. Delegates are asked to read the guidelines on the website (www.ifssh.info) and encourage applications from their societies.

Excellent news comes from Buenos Aires about the possibility of having both the IFSSH and the IFSHT congresses in the same venue, a possibility that was initially discarded. Although not yet fully decided, the local organising committee is working full speed in this. The 2016 IFSSH Congress will be held on October 10-13, 2016 in one of most attractive areas of Buenos Aires, Puerto Madero.

Further information may be obtained at www.ifssh-ifsht2016.com. In this regard, new, more detailed guidelines on how to organise an IFSSH congress have been presented for discussion to the ExCo.

Aside from these initiatives, the administration keeps its routine: control of banking transactions, sending receipts to the membership who paid theirs annual dues, website updates, committee reports, and so on.

We have started preparations for the National IFSSH Delegates Council meeting which will be held in Paris during the meeting of FESSH, June 18-21, 2014 (www.fessh2014.com/en/welcome).

Frank Burke is doing a great job in reorganising and completing our archives, a badly needed task that finally appears to see an end.

A process of discussion has been started in order to update the IFSSH charter, a modification project that is needed to adapt our legal status to the 'changing times'.

I wish you the most relaxing summer vacation!

Marc Garcia-Elias
Secretary-General, IFSSH
Email: secretary@ifssh.info

Message from outgoing Secretary-General: Zsolt Szabo

As the Secretary-General during the last three years, I have realised how important it is to be a member of an international community. I have been always told, but now I know that we, the hand surgeons from all around the word, we are a little bit special. Our enthusiasm and friendship, our involvement in teaching and education activities, combined with high quality social activities makes hand surgery different to other specialties. The Executive Committee of the IFSSH led by its President did his best for the final goal of every hand surgeon: a better outcome for our patients. All our activities, projects and work are dedicated to this and for success we really need your contribution. The best leader is worth nothing without a devoted and enthusiastic army. Changing the leaders from time to time brings fresh ideas, new methods and different flavours, but the continuity, the real value is always represented by the active membership of a Society and a Federation. It was an honour and a great satisfaction to work with you during the last three years. We have achieved much.

A new Executive Committee has been elected. The personalities and the devotion of the new officers are a guarantee of continuity and the development of new ideas, activities

and projects. I would like to thank you for your involvement, for your support and your active participation in the life of our Federation and I would like to introduce the new Executive Committee:
President: Michael Tonkin
President Elect: Zsolt Szabo
Secretary-General: Marc Garcia-Elias
Secretary-General Elect: Daniel Nagle
Historian: Frank Burke
Immediate Past-President:
Ulrich Mennen

The new Nominating Committee is:
Chair: Ulrich Mennen
(Immediate Past-President)
Members: Jim Urbaniak,
Arlindo Pardini,
Moroe Beppu – Member-at-Large

Zsolt Szabo
President Elect, IFSSH

Member society updates

Australian Hand Surgery Society

The Australian Hand Surgery Society (AHSS) is a relatively small organisation of 150 members, the majority being from orthopaedic or plastic surgery backgrounds. Over the past four decades the Society has evolved from an informal interest group into a much more structured organisation with close links to The Royal Australasian College of Surgeons (RACS), and to the parent speciality bodies, namely The Australian Orthopaedic Association (AOA) and The Australian Society of Plastic Surgeons (ASPS). The Hand Society has always run a vibrant and comprehensive Annual Scientific Meeting which attracts the majority of the membership, and also organises a number of other workshops and training activities for both members and orthopaedic and plastic surgical trainees.

In recent years there has been strong support towards establishing hand surgery as an independent speciality in its own right, as present in a number of other countries.. For many reasons, some political, some organisational, this has been resisted by our College of Surgeons, who do not wish to expand the number of speciality groups beyond the current 9 established specialities. It has become clear over the years that extra training in hand surgery, outside the normal fellowship requirements of orthopaedic and plastic surgery training, is required to develop expertise in hand surgery. In past years, this has usually meant surgical graduates take up fellowship positions either overseas or within a handful of local fellowship jobs available in Australia. There has been no formal recognition of this extra training which has occurred in an ad hoc manner, although it has served our hand surgery community well. It is well recognized that there are considerable difficulties in finding overseas fellowship positions due to increasing political and bureaucratic obstructions to the free exchange of doctors and surgeons between overseas training centres.

The Australian Hand Surgery Society has been actively involved in promoting post fellowship training in hand surgery, and has pursued ways of improving training in a more formal and structured manner through The Royal Australasian College of Surgeons (RACS). In the past few years the RACS, with input from a couple of other sub-speciality groups, has developed a post fellowship education and training programme (PFET) in a number of super specialities. These currently include spinal, colorectal and hand surgery.

At the beginning of 2013 the AHSS appointed the first new post fellowship trainees into a structured PFET Programme. This has involved an enormous amount of work in establishing agreement between all the interested parties (RACS, AOA, ASPS), defining a curriculum, developing mechanisms for trainee selection and the accreditation of training centres, and all of the administrative processes to assist in management. Although it has just commenced, we are very enthusiastic that the PFET programme will expand quite rapidly as our orthopaedic and plastic surgical trainees with interests in this area seek more formal training within Australia.

There have already been a number of PFET Training Centre positions accredited to take on the expected increasing numbers of specialist trainees, and we look forward to fine tuning and improving our programme as it matures over the next few years.

Randall Sach
President AHSS
July 2013
www.ahssociety.org.au

Brazilian Society for Surgery of the Hand

Standing: *Hilton Gottshalk (USA), Randip Bindra (USA), José do Carmo (Brasil), Carlos Fernandes (Brasil), Peter Murray (USA), Mark Rekant (USA)*
Sitting: *Cherrie A. Heinrich (USA), Julie Adams (USA) Donald H Lalonde (President AAHS), Anderson Vieira Monteiro (President of 33o Congresso Brasileiro de Cirurgia da Mão), Alejandro Badia (USA)*

The 33rd Congresso Brasileiro de Cirurgia da Mão (Brazilian Meeting of Hand Surgery) and the 14th Congresso Sul Americano de Cirurgia da Mão (South American Meeting of Hand Surgery) were held between April 25th and 27th in Rio de Janeiro, also known as the Wonderful City.

On April 24th, a Pre-Meeting Course was held and organized by Dr Don Lalonde, President of the American Association of Hand Surgery. Many American hand surgeons came with Dr Lalonde, and they all paid for their own expenses.

The meeting had more than 700 participants, including Argentinean, Chilean, Ecuadorean, Peruvian and Venezuelan, German, Brazilian, Canadian and American Hand Surgeons. During those four days, we had an intense scientific schedule. Three rooms held courses, lectures, debates, presentations of thirty oral papers and eighteen e-posters.

Dr Monteiro, SBCM's President, and Dr. Sobania, SSCM's President, duly thank sthe involvement of all contributors.

Carlos Henrique Fernandes
SBCM's Treasurer

Bolivian Hand Society

The Bolivian Hand Society recently appointed its new council.

Dr Juan Carlos Suárez López (President), Dr Alfonso Soria Galvarro Bort (Vice President), Dr Julio César Irigoyen Suárez (Secretary General), Dr Kenyi Nitabara Koga (Secretario de Hacienda), Dr Jorge Arredondo Saucedo (Secretario de Actas), Dr Omar E. Lizarazu Jaldin (Vocal), Dr Juan Carlos Mendieta Rojas (Vocal).

Asian Pacific Federation Societies for Surgery of the Hand

The 9th Congress of the Asian Pacific Federation Societies for Surgery of The Hand (APFSSH) in conjunction with The 5th Congress of the Asian Pacific Federation of Societies for Hand Therapy (APFSHT) was held from October 10 – 13, 2012 at the Grand Hyatt Hotel in Bali, Indonesia. This was the annual scientific meeting for hand surgeons and hand therapists in Asia as well as other physicians that are interested in the management of hand injury, trauma, congenital and other disorders of the hand. The 9th APFSSH in conjunction with the 5th APFSHT included approximately 1,000 participants from all over the world. The scientific committee arranged a state of the art program including all the latest developments in the field consisting of 4 plenary lectures, 1 memorial lecture, 12 master classes, 6 panel discussions, 30 satellite symposia, 15 keynote lectures, post congress instructional courses and workshops, as well as free paper sessions consisting of both oral and poster presentations.

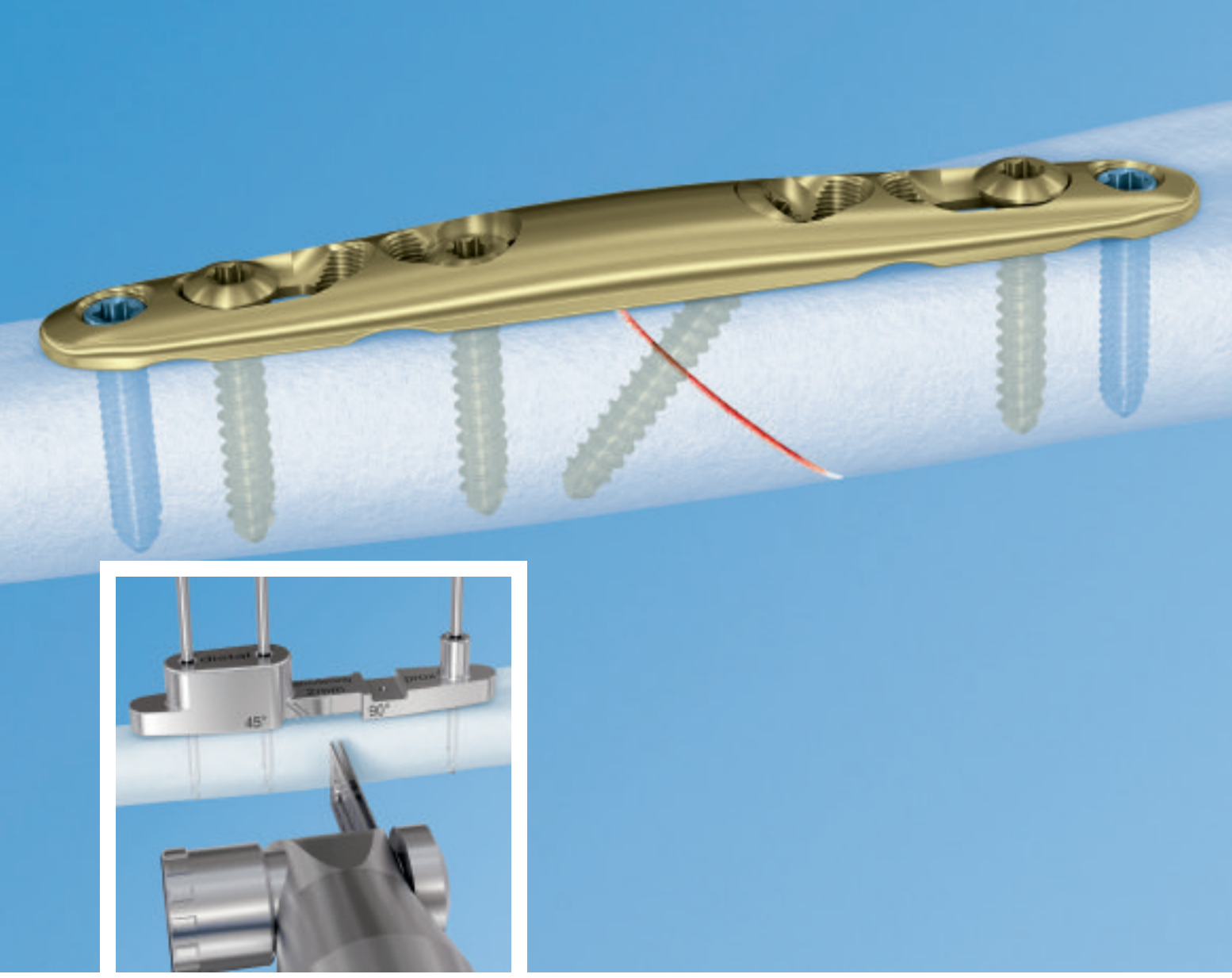
The 10th Congress of the Asian Pacific Federation Societies for Surgery of The Hand (APFSSH) in conjunction with The 6th Congress of the Asian Pacific Federation of Societies for Hand Therapy (APFSHT) will be held from October 2nd – 4th, 2014 at the Hilton Kuala Lumpur Hotel, – Le Meridien in Kuala Lumpur, Malaysia.

The Society President is Moroe Beppu,
The Congress President is S. Roohi Ahmad,
The Congress Vice-President is Ranjit Singh,
and the Congress Secretary is Shalimar Abdullah.

For further information, please check the homepage of the Congress at http://www.apfssh2014.org/index.html.

We look forward to seeing you all in Kuala Lumpur, Malaysia.

Moroe Beppu MD
President of APFSSH
www.apfssh.org



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Swanson Lecture

IFSSH Meeting, Delhi, 2013

Wayne Morrison
Professorial Fellow University Melbourne and Australian Catholic University
Director O'Brien Institute,
Plastic surgeon, St Vincent's Hospital, Melbourne.

Thank you for the honour of presenting the IFSSH Swanson lecture for 2013. I can only assume your choice was inspired by my former fellows and the charming Indian characteristic of politeness and deference to your elders. Many of these fellows are now illustrious alumni on the world stage of hand surgery. This parental relationship reminds me of Louis Vasconez an esteemed plastic surgeon when delivering a similar prestigious lecture told the story of how he was asked to give a talk at his son's school and his son pleaded with him "dad please don't make a fool of yourself in front of all my friends." Here's hoping!

Let me first say something of Al Swanson. This lecture is named in honour of Alfred Swanson. No name is more identifiable in hand surgery than Swanson as a result of his "Swanson silicone" joints that have proved their worth and popularity over almost 50 years. Given that each person has 10 fingers with the potential for 30 finger joint replacements, who in the history of surgery, would have had a greater influence on hand surgery. These were developed during the 1960's and marketed in 1969 during a period of hand surgery revival that could be described as the High Renaissance of hand surgery. Concurrent developments were occurring in tendon and nerve repair, congenital deformities, microsurgery and carpal mechanics. Swanson's other great contribution was in his role as chairman of the Nomenclature committee of the IFSSH where he introduced a classification for the congenital hand that allowed outcome studies of the various reconstructive procedures to be critically evaluated. He succeeded my mentor, Bernard O'Brien, as president of the IFSSH and O'Brien presented him the Federation medal which many do not know was a gift of the Australian Hand Club. It is somewhat ironic that our new president Michael Tonkin is now taking it back.

I started plastic and hand surgery training in 1972 at St Vincent's Hospital, Melbourne, with Bernard O'Brien when Al Swanson was at the height of his fame. The era of microsurgery had just begun and the excitement and expectations were palpable. Mutilating hand injuries were the norm before the current standards of health and safety were introduced and the opportunity for replantation and imaginative secondary reconstructions abounded. For me, this was the ideal hand surgery paradigm, a plastic-orthopaedic hybrid of aesthetic and functional challenges, and reconstruction of the mutilated hand became my major interest.

The groin flap was the graveyard of many a budding microsurgeon. The vessels were small, sometimes absent and recipient size match unfavourable. Failure was common. Anaesthetists and theatre staff were hostile and a thick hide and strong belief were prerequisites for self - survival. In 1972, Bernard O'Brien commenced an overseas fellowship training program and we were fortunate to always have them to blame.

In 1976, in the first article of the first issue of the American Journal of Hand Surgery, Bill Littler published "100 Years of Making a Thumb" charting the milestones and characters involved. This accurately paralleled the field of hand reconstruction as a whole during

this period. His centenary begins in 1874 with phalangisation by Hugier ; 1888 - staged cross finger transfer (Guermonprez); 1900 - toe transfer and osteoplastic thumb reconstruction (Nicoladani); 1946 - pollicisation based on the neurovascular pedicle (Gosset, Hilgenfeldt); 1957 - neurovascular island flap (Moberg, Littler and Tubiana); 1960 - microvascular anastomosis (Jacobson); 1965 – digital replantation (Tami); 1967 - free microvascular toe transfer (Buncke, Cobbett, O'Brien).

Not mentioned in Littler's pantheon, was the Australian, Arthur (Ben) Murray, from Tasmania who in his youth had lost a leg and sustained an ulnar nerve palsy but subsequently went on to train in orthopaedics. While in the UK at the outbreak of World War II, he was not selected for military service but was sent to Edinburgh where he established the first dedicated hand surgery service which has become the prototype model for hand surgery services around the world. In 1946, before Gosset, he described the true pollicisation technique on the neurovascular pedicle that is essentially employed today. He also performed cross ring finger transfers and long before Swanson, performed the first finger joint replacement which he designed from metal. This was reported in 1946.

Two plastic surgery pioneers of World War 1 laid the foundations of reconstructive surgery on which many of the subsequent hand surgery developments progressed. Harold Gillies, a New Zealander working in England introduced the tube pedicle for transfer of large amounts of tissue and Johannes Esser, a Dutch surgeon and Gillies' equivalent working in Berlin treating the German war injured, used "biological flaps" based on arterial pedicles.

In 1974 I had the good fortune of training at Canniesburn Hospital in Glasgow, then a hotbed of creativity and mecca for international visitors. McGregor had recently described the "groin flap" and rediscovered and articulated the concepts of arterial-based flaps practised by Esser. Tom Gibson with Medawar had pioneered the concepts of immunology for which Medawar won the Nobel Prize. Graham Lister and Bob Acland were at Canniesburn during this fertile period. From Glasgow, I went to Paris with Raoul Tubiana who taught me hand surgery with an orthopaedic focus under the one-on-one patron-apprentice format, a unique opportunity and a mentor to whom I owe a great debt. On

returning to Melbourne in 1976, I rejoined the team with Bernard O'Brien and Allan McLeod at St Vincent's which was a lively place with fellows attracted from all around the world. Many fascinating cases including a full face and scalp replant afforded us the experience to develop such techniques as microvascular cross ring finger transfer, vascularised tendon transfers, wrap-around toe flaps and major microvascular reconstructions. The Microsurgery Research Centre, subsequently to become the O'Brien Institute, was evolving and became a leading centre for microvascular, hand and reconstructive surgery research including transplantation.

Although many saw the opportunity for limb transplantation as the ultimate in hand and upper limb reconstruction, few believed that the current status of immunology, nor the results from animal research, justified the long term risks involved. Despite this in 1998, a single hand transplant was performed by Dubernard in Lyon, France, soon followed by Louisville's case pioneered by Warren Briedenbach. It was not however until 2000 in Innsbruck, a bilateral hand transplant was performed by Piza-Katzer and Ninkovic that many sceptics including myself were converted seeing the benefits versus risks ratio shift substantially in favour of the patient in the bilateral limb case. Although late starters, we performed our first hand transplant in 2011 on a patient who had lost both hands and both feet from pneumococcal septicaemia. This patient was aged 66, the oldest so far recorded transplant and the results 2 years later have been excellent.

"Although many saw the opportunity for limb transplantation as the ultimate in hand and upper limb reconstruction, few believed that the current status of immunology, nor the results from animal research, justified the long term risks involved"

Exciting progress is currently being made with robotic hands including mind-activated and no doubt this field will progress.

At the O'Brien Institute in Melbourne, our current research interest is in Tissue Engineering based on the concept of encouraging our own tissues to regenerate rather than heal by scar and avoid the necessity for donor tissue and its associated morbidity. The ultimate expression of this of course would be limb regeneration. There are examples in nature which make this concept tantalising feasible. Tadpole tails, salamander limbs and the human liver are examples. Children's fingertips and tendons sometimes are observed to apparently partially regenerate following injury. We have developed models of tissue engineering in small and large animals testing the capacity of cell therapies to survive and differentiate into specific tissues and have been able to generate pseudo skin flaps, muscle and bone tissues, and organ tissues such as beating heart and insulin-secreting pancreas. Fat injection is a form of cell therapy which no doubt incorporates fat cell precursor or stem cells which have the capacity to survive and differentiate or initiate self-repair through growth factor and cytokine release. This technique has been applied for revascularization of tissue and digits, reversal of radiation injury and in Dupuytren's contracture in the belief that recurrence will be diminished. Much of the science behind cell therapy remains to be elucidated but we are again entering an exciting era, perhaps a new renaissance akin to the period when Al Swanson and his contemporaries inspired us at the end of Bill Littler's centenary of ideas. It is now almost 150 years from the beginning of his cycle and it could be said that during this time we have seen surgery advance from Macro through Micro to the Molecular.

It has been a great honour to deliver the Swanson lecture and I sincerely thank our hosts and the scientific committee for giving me this unique privilege.

The Turner Scientific and Research Institute for Children's Orthopaedics

By **Dr Olga Agranovich**

The Turner Scientific and Research Institute for Children's Orthopaedics in Saint-Petersburg is a leading medical establishment in Russia dealing with orthopaedics, traumatology and the rehabilitation of children with bone and joint diseases and injuries.

In 1890 a shelter for children with orthopaedic diseases was established in St. Petersburg by the founder of Russian orthopedics, Professor Genrih Turner. In 1932 the shelter was transformed into the Turner Scientific and Research Institute for Children's Orthopaedics.

The aim of the Institute is to organise and improve the orthopaedic and trauma management of children and adolescents with congenital and acquired disorders of the locomotor system, as well as the development of scientifically based methods for the prevention, treatment and rehabilitation of disabled children.

The Institute consists of a complex of modern buildings, operating rooms and laboratories equipped with the latest technology, including modern microsurgical and neurosurgical facilities. The Institute has 500 beds, divided amongst the following 10 departments: general bone pathology, spine and neurosurgery, hip pathology, foot pathology and systemic diseases, cerebral palsy, hand pathology and microsurgery, rheumatology arthritis, arthrogryposis, maxillofacial surgery, as well as a rehabilitation and outpatient section. The Institute also has a school for the children.

The Arthrogryposis department was started in 2010, and is the first specialized department for children with arthrogryposis in Russia. It has 50 beds. There are several rehabilitation rooms in the department. From 2010 to 2011 , 120 patients with arthrogryposis were already treated. Being a specialized department, the focused treatment methods and improved overall management have a dramatic effect on the results. One of the goals of this Arthrogryposis Department is also to give assistance to patients and their families to adapt to home and social life. Patients are seen from the first month after birth up to 18 years of age. Surgery is performed from age 5-6 months. One of the research projects is spinal cord stimulation as a part of the rehabilitation of these patients. Locomotion therapy (Armeo, Locomat).is used extensively post-operation to restore function of the upper and lower limbs

IFSSH Scientific Committee Report on Anatomy Of The Hand

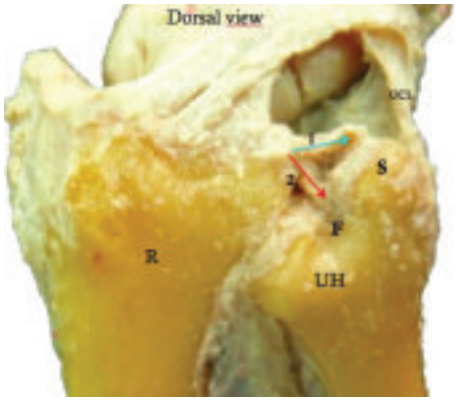
Chairman: Eduardo R. Zancolli III
Committee: Carlos Zaidenberg, Diego Piazza, Hernan Iriarte

Knowledge of anatomy of the hand is the basis for understanding pathology and for precise application of surgical techniques.

This committee has selected to write a report on the TFCC anatomy but believing also that it will be extremely useful for hand surgeons to have a brief actualization of the most significant new papers on hand anatomy.

Since the last IFSSH Committee Reports (November 2010), a lot of papers on hand anatomy have been published, many confirming what is already known but some adding new knowledge on the already known structures. This last group mainly refers to anatomical variations that need to be known in order to diminish surgical surprises and to imagine how to deal with them.

We are conscious that due to the huge amount of bibliographical sources we might have missed some important papers and we apologize for it.



C. Zaidenberg dissection

Figure 1. *R: radius, UH: ulnar head, S: styloid insertion, F: foveal insertion, UCL: ulnar collateral ligament. 1: Superficial aspect of TFCC (styloid), 2: deep insertion (foveal)*

Committee Report on Anatomy of the TFCC

The Triangular Fibrocartilage was initially described by Weitbrecht (1742) as intermedia triangularis cartilage. In modern literature Palmer and Werner (1981) introduced the term Triangular-Fibro Cartilage-Complex (TFCC) to describe these structures.

Anatomical description

The TFCC is a structure running from the medial border of the radius to the styloid area of the ulna and with a distal volar expansion to the carpus. This fibrocartilage-ligament complex stabilizes the distal radio-ulnar and ulno-carpal joints, distributing load between the carpus and ulna, and allowing smooth wrist flexion-extension, radial-ulnar deviation and forearm pronation-supination.

Other structures also intervene in stability: musculotendinous structures, the bony anatomy and the interosseous membrane.

The TFCC different components are:

- Articular disc
- Dorsal and palmar distal radio-ulnar ligaments
- Meniscus homologue
- Capsule
- Extensor carpi ulnaris subsheath

The articular disc is a cartilaginous avascular structure that has two wide insertions in the radius having as functions, load transmission (approximately 20% in normal conditions) and prevention of deformity during rotations of the radio-ulnar ligaments.

Dorsal and palmar radio-ulnar TFCC portions arise from the medial border of the distal radius and insert on the ulna at two separate and distinct sites: the fovea at the base of the ulnar styloid and to the ulna styloid itself.

The peripheral portion of the

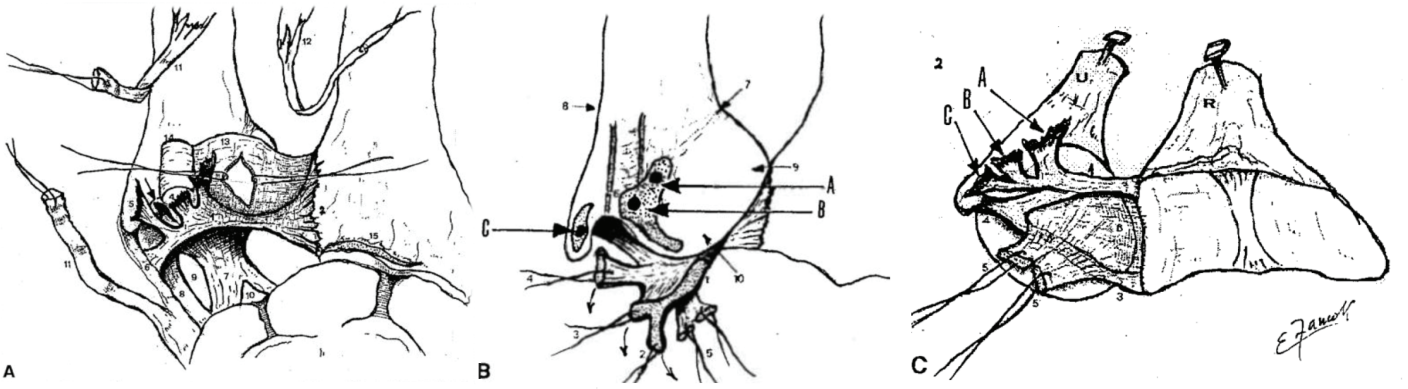


Figure 2. *Dorsal attachments of the superficial fascicle of the dorsal RU ligament. A: dorsal view. B: Oblique view. C: Volar view. From radial to ulnar, its 3 different ulnar insertions A,B,C. (from EA Zancolli´s paper)*

articular disc of the TFCC is thicker than the central part and has longitudinally oriented collagen fibres. This thickening has been described as the dorsal and palmar distal radio-ulnar ligaments. Both of them containing a superficial and a deep portion. Dorsal and palmar deep portions insert on the ulna's fovea (conjoined ligamentous insertion).

Superficial portion of dorsal RU ligament inserts proximally in three different sites, according to Zancolli EA descriptions (2008), A-radial border of ECU groove; B-deep in the ECU groove; C- dorsal aspect of the styloid process. Figures A, B, C. (Figure 2).

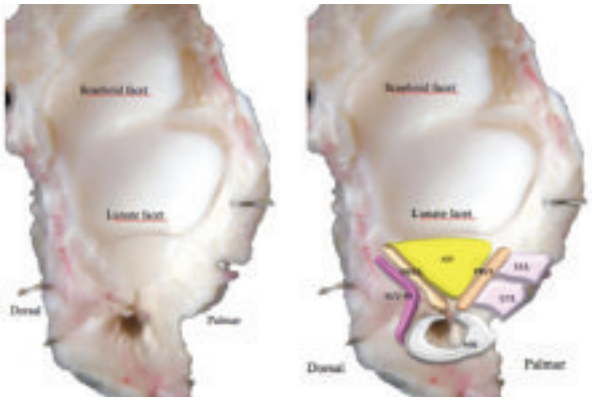
Superficial portion of palmar RU ligament inserts distally in the volar surface of lunate and triquetrum bones by two separate fascicles (ulno-lunate and ulno-triquetral ligaments). These ligaments are considered to connect the ulna to the carpus through the palmar foveal origin of the radioulnar ligament. (Figure 3)

Anatomical and histological studies have shown that only the proximal ligamentous component of the TFCC connects the radius directly to the ulna (Nakamura et al 1995, 1996, 2000).

The deep components of the TFCC have been referred by wrist investigators as the Ligamentum Subcruentum. In his landmark 1975 article on the "Articular disc of the hand", Kauer gives credit to Henle and Fick for describing a vascularized fissure between the superficial and deep components of the TFCC, which they called the "ligamentum subcruentum", technically not a ligament at all. Over the past 20 years, however, the term Ligamentum subcruentum has come to represent the deep fibers of the TFCC (inserting into the fovea) and is now used commonly by many investigators as interchangeable with the term "deep TFCC radioulna ligaments".

Nakamura & Makita (2000) suggested that the ligamentum subcruentum is merely the expression of a vascular intrusion into this defect between the superficial and deep laminae of the TFCC.

The meniscus homologue, a smooth synovium-like membranous structure which extends from the discoid section of the TFC to the triquetrum, was first described by Lewis (1970) as a distal-volar expansion that extends from the dorsal-ulnar aspect of the distal radius to the palmar-ulnar aspect of the triquetrum. It works like a hammock supporting the carpal ulnar border, highly vascularized with loose areolar tissue. There is a cavity adjacent to the ulnar



C. Zaidenberg dissection

Figure 3. *TFCC components: AD: articular disc; DRUL: dorsal radioulnar ligament; PRUL: palmar radioulnar ligament; ECU-SS: extensor carpi ulnaris subsheath; MH: meniscus homologue; UTL: ulnotriquetral ligament; ULL: ulnolunate ligament.*

styloid that communicates with the ulnocarpal space, called the prestyloid recess.

Garcia Elias, based on histological studies, considered the tissue which continued from the TFCC to the carpal bone as a meniscus homologue which is difficult to separate from the TFCC.

Others authors (Ishii, Palmer & Werner 1998) redefined three configurations of the meniscus homologue and the prestyloid recess, based on how the prestyloid recess communicates with the ulnocarpal space: 1- narrow opening type; 2- wide opening type; 3-no opening type.

Different studies have shown that there are variations in the attachment of the TFCC to the triquetrum. Hogikyan & Louis subdivided the patterns of its attachment to the triquetrum into four types: a small, thin structure and focal attachment (group 1: 28%); a small, thick structure and focal attachment (group 2: 39%); a thick structure and broad attachment to between one-third and one-quarter of the triquetrum (group 3: 28%); and a broad attachment covering the entire triquetrum (group 4: 5%).

Nishikawa et al. also performed a study for the meniscus homologue's attachment to the ulnar side of the triquetrum (79 joints) obtaining different results than those from previous studies. They found that the section attached to the triquetrum is smooth and that in almost all cases the site of attachment is on the ulnar articular side of the triquetrum (Figure 4). In about 10% of cases, the meniscal homologue was found attached to the ligament of the lunotriquetral ligament, obscuring the articular

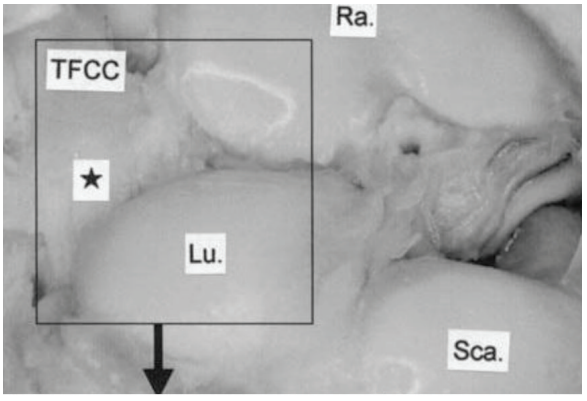
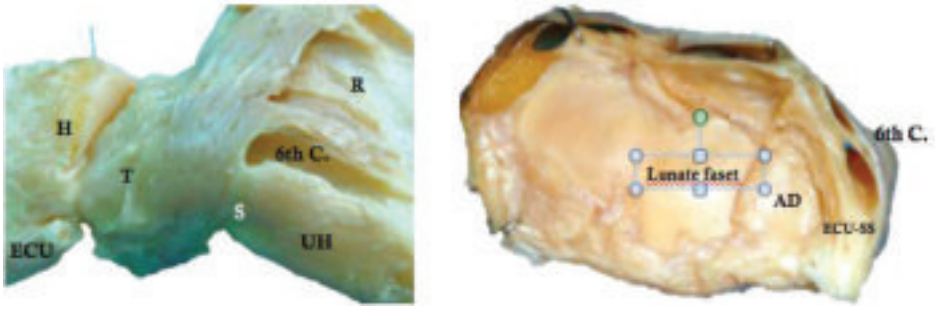


Figure 4: *Photograph showing the TFCC broadly attached to the triquetrum (group 4). The TFCC attached to the lunotriquetral ligament and the joint surface of the triquetrum was covered by the TFCC. (*TFCC broadly attached on the triquetrum). (from Nishikawa´s paper)*



C.Zaidenberg dissection

Figure 5: *Photograph showing cadaveric wrist dissection. R: radius; 6th Compartment; UH: ulnar head; S: Styloid; T: triquetrum; H: hamate; ECU: extensor carpi ulnaris. ECU-SS: subsheath; AD: articular disc.*

surface of the triquetrum.

The capsule attaches to the ulna along the anterior and posterior margins of the styloid process, and to the radius along the anterior and posterior borders of the sigmoid notch. Distally the DRUJ capsule is incorporated into the TFCC.

The thickened ulnar joint capsule originates from hyaline-like fibrocartilage on the tip and middle portion of the ulnar styloid, and coalesces with the meniscus homologue to constitute the ulnar wall of the TFCC. (Nakamura & Yabe, 2000). The ulnar collateral ligament is composed of the floor of the extensor carpi ulnaris sheath and the thickened joint capsule.

The Extensor Carpi Ulnaris (ECU) tendon courses through the sixth dorsal compartment of the wrist, passing dorsal on the lower end of the ulna through a small fibro-osseous tunnel. The tendon is held tightly in the ulnar groove by a thin subsheath, a proper relatively rigid retinaculum, attached on the margins of the ulnar groove and ensuring its stability during pronation-supination. It is a pulley described by Bourgery et al as "petit arcade fibrose" which prevents ECU tendon subluxation. The ECU retinaculum is separate from the dorsal or extensor retinaculum and covered by expansions of the extensor

retinaculum, which plays no stabilizing role with regard to the ECU tendon.

The extensor carpi ulnaris (ECU) subsheath has a firm connection to the dorsal edge of the ulnar fovea through Sharpey's fibers. Based on its histological composition, it is considered that the ECU subsheath is an important ulnocarpal stabilizer. (Figure 5)

Vascular supply of the TFCC

There are two clearly defined areas, 1) the central is avascular nourished by synovial fluid, 2) the periphery of the TFCC is supplied by branches of the ulnar artery and also from the anterior and posterior interosseous arteries. This has important implicance in the healing potential of future repairs. (Figure 6)

Innervation of the TFCC

Gupta et al (2001) studied the innervation of the TFCC. Central and radial aspects of the TFCC do not have any nerve fascicles or fibers present.

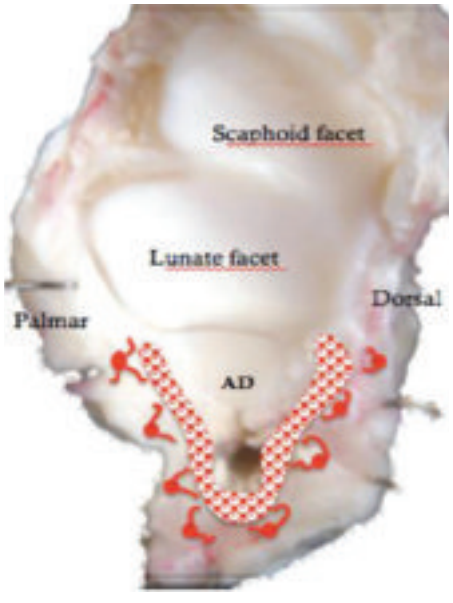
The volar portion of the TFCC is innervated by a branch of the ulnar nerve and the dorsal sensory branch of the ulnar nerve.

The ulnar and dorsal aspects of the TFCC are more variable in their patterns of innervation. Branches of the ulnar nerve and the dorsal sensory branch of the ulnar nerve innervate the ulnar aspect of the complex. Branches of the posterior interosseous nerve and the dorsal sensory branch of the ulnar nerve innervate the dorsal aspect of the TFCC. (Figure 7)

Cavalcante ML, Rodrigues CJ, R. Mattar Jr (2004) went futher and studied mechanoreceptors and nerve endings. The free nerve endings, (Figure 8) responsible for sensing pain, predominate in the ulnar and dorsal areas. The Vater-Pacini corpuscles predominate in the radial and dorsal area, promoting perception of the onset or cessation of movement and mechanical stress change. The Golgi-Mazzoni corpuscles were more frequent in the ulnar and ventral areas, linking these areas to function of slow adaptation and sensation of extreme movements. The propioceptive function receptors were found in all areas of TFCC because Ruffini corpuscles have homogeneous distribution in it´s fibrocartilaginous tissue.

Biomechanics in short

The distal radioulnar joint (DRUJ) has been defined as a diarthrodial trochoid articulation formed by the head of the ulna and the shallow sigmoid cavity of the lower end of the radius. The curvatures of the two articulating surfaces are not equal. The radius of the ulna is about two thirds the length of the sigmoid notch concavity. This results in a relatively unstable articulation with



C. Zaidenberg dissection

Figure 6. *Vascular supply patterns*

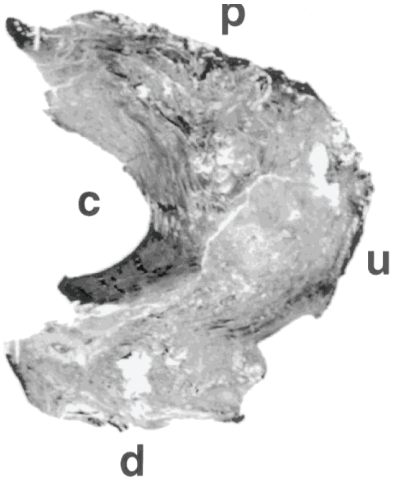


Figure 7. *Low-power view of preserved and sectioned TFCC showing sampled regions including central/radial (c), palmar (p), ulnar (u), and dorsal (d). (from Gupta´s paper).*

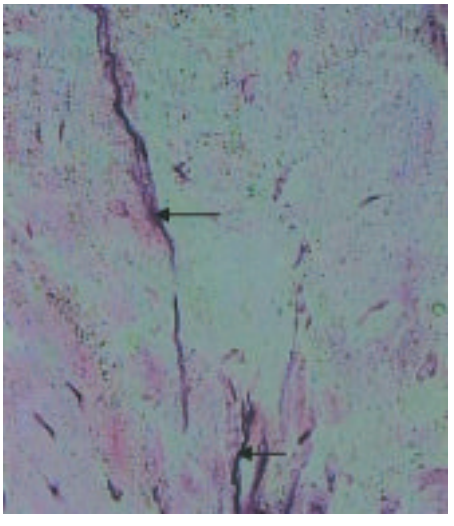


Figure 8. *Free nerve endings (arrows) in the fibrocartilaginous tissue at the peripheral area of the TFCC. (from R. Matta Jr´s paper)*

reduced area of contact between the two bones. To overcome this, different stabilizing structures exist: (a) the TFCC, composed of the discus articularis, the palmar and dorsal radioulnar ligaments, the ulnocarpal ligaments, and the ECU sheath; (b) the pronator quadratus muscle; and (c) the interosseous membrane.

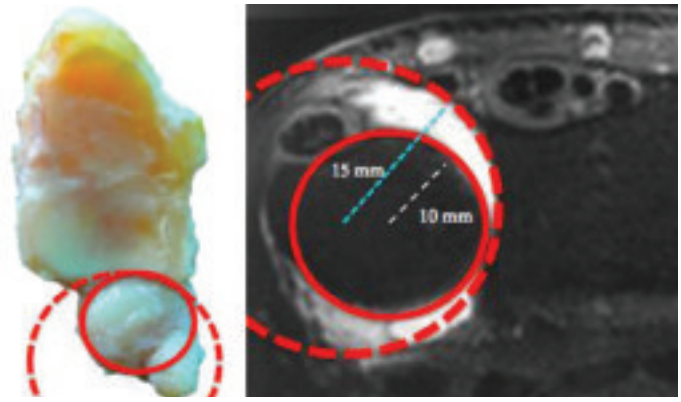
The concave radius-of-curvature of the sigmoid notch is greater than that of the ulna head (Figure 9).

Full congruity of two articulating surfaces is therefore not possible. This incongruity of articular surfaces creates a geometrically non-constrained articulation at the DRUJ, subject to translational dorsal and palmar instability.

In the extremes of forearm rotation, <10% of the ulnar head may be in contact with the sigmoid notch.

Thus for complete function in pronosupination, a longitudinal axis that passes through the center of the radial head proximally and through the foveal sulcus distally. (Figure 10)

The radioulnar ligaments arise from a broad area in the ulnar fovea and from a rather narrow area at the ulnar styloid. Considering the larger area of origin and the close relationship of the fovea to the rotation axis of the forearm, it is likely that the foveal origin is the more important. (Nakamura 2001)



C.Zaidenberg dissection
Figure 9. *Different radius-of-curvature between distal radius and ulna.*

DRUJ Stability

With inherently unstable, non-constrained articular surfaces, anatomic stability of the DRUJ is also achieved through extrinsic extracapsular structures.

Extrinsic stability is provided principally by dynamic tensioning of the ECU as its tendon crosses the distal head of the ulna, the semirigid sixth dorsal compartment itself, constraining the ECU tendon, dynamic support provided by the superficial and particularly the deep heads of the pronator quadratus and the interosseous membrane. These extrinsic DRUJ stabilizers are of relatively minor consequence to rotational forearm stability, compared with the more biomechanically effective intrinsic radioulnar components of the TFCC.

Classification of TFCC ruptures

Palmer (1989) divides TFCC lesions in two groups according to etiology (traumatic or degenerative) and location. He describes four main traumatic ruptures. (Figure 11)

A different rupture was also described by Zancolli EA (2008), who added a fifth injury: superficial dorsal avulsion, referring mainly to the two more radial insertions of the superficial fascicle of the dorsal radioulnar ligament, (Figure 12) which he consideres is the main cause of dorsal ulnar instability.

Based on clinical, radiographic, and arthroscopic findings, Atzei et al (2011) defined a comprehensive classification that refers to the different types of peripheral (Palmer class IB) TFCC lesions. With a guideline for specific treatment modalities. He defined six different classes. (Figure 13)

C. Zaidenberg dissection
Figure 10. *Longitudinal axis that passes through the center of the radial head proximally and through the foveal sulcus distally.*

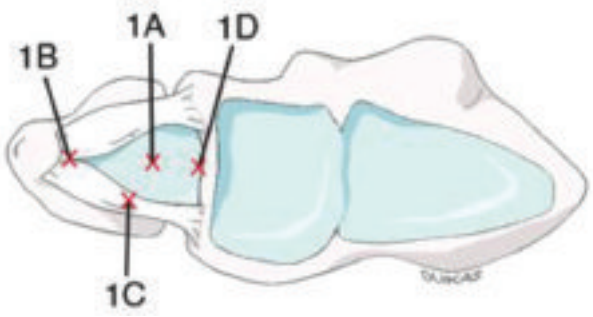


Figure 11: *Palmer Classification. I: Traumatic TFCC injuries. 1A: central tear. 1B: peripheral avulsion from ulnar styloid. 1C: volar ulnocarpal ligaments tear. 1D: radial attachment tears.*

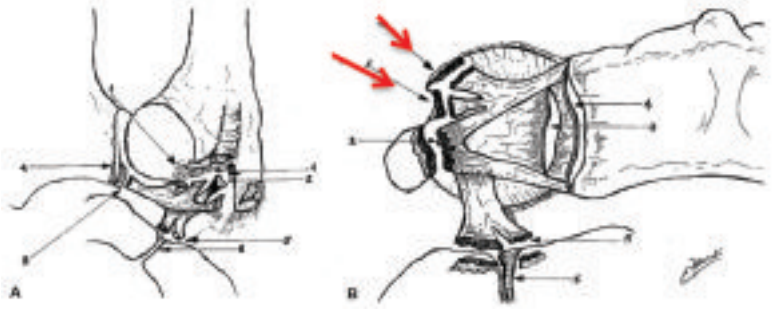


Figure 12: *A and B, traumatic injuries of the TFCC: 1.superficial dorsal avulsion (arrows); 2.deep ulnar avulsion (foveal); 3. Central perforation; 4. Radial avulsion; 5. distal avulsion: frequently associated with lunotriquetral interosseous ligament tear (6). (from EA Zancolli´s paper)*

Comprehensive Classification of TFCC Peripheral Tears
and associated Ulnar Styloid Fractures

		CLASS 0 Isolated styloid fracture without TFCC Tear	CLASS 1 Distal TFCC Tear	CLASS 2 Complete TFCC Tear	CLASS 3 Proximal TFCC Tear	CLASS 4 NON-repairable TFCC Tear	CLASS 5 DRUJ Arthritis
Clinical Findings	DRUJ Ballottement Test	Negative	Slight Laxity (Hard end-point)	Mild to Severe Laxity (Soft end-point)			Variable
Radiographic Findings	Intact Ulnar Styloid or Tip Fracture of the Ulnar Styloid					CLASS 4-A	CLASS 4-B
	Basilar Fracture of the Ulnar Styloid			(Floating styloid?)	CLASS 3-A Avulsion Fracture of TFCC Insertion		
Arthroscopic Findings	Appearance of the Distal TFCC (during RC Arthroscopy)	Normal Appearance (NO tear)	Peripheral Tear	Normal Appearance (NO tear)		Massive Tear Degenerated Edges	Frayed Edges Failes Suture
	Tension of the proximal TFCC (Hook Test)	Taut TFCC (Negative Hook Test)		Loose TFCC (Positive Hook Test)			Variable
	Cartilage status of DRUJ	well preserved Cartilage					Degenerative or Traumatic Cartilage Defect
Suggested treatment		Splinting for pain relief (Fragment removal in chronic painful cases)	TFCC Suture (Splinting of acute cases)	TFCC Foveal Reflixation	Styloid fixation	Tendon Graft Reconstruction	Arthroplasty

Figure 13: *Atzei Classification. He defined 6 different classes of peripheral TFCC tears.*

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Latest Papers on Hand Anatomy

I. LIGAMENTS

The insertion points of the thumb`s MP joint collateral ligaments has been described with some precision. The ulnar collateral ligament (UCL) has a metacarpal origin 4.2 mm from the dorsal surface and 5.3 mm from the articular surface. The center of the phalangeal insertion of the UCL was 2.8 mm from the volar surface and 3.4 mm from the articular surface. The volar aspect of the phalangeal insertion extended up to 0.7 mm from the volar edge of the phalanx.

The radial collateral ligament (RCL) inserts at the metacarpal, having its center at 3.5 mm from the dorsal surface and 3.3 mm from the articular surface, the dorsal aspect being 1.5 mm from the dorsal edge of the metacarpal. The RCL`s center at phalangeal insertion was 2.8 mm from the volar surface and 2.6 mm from the articular surface, being its volar aspect 0.5 mm from the volar edge of the phalanx. This data is relevant for successful repair and reconstruction.

- J Hand Surg Am. 2012 Oct; 37(10): 2021-6

Anatomy of the Thumb Metacarpophalangeal Ulnar and Radial Collateral Ligaments.
Carlson MG, Warner KK, Meyers KN, Hearns KA, Kok PL.

II. NERVES

The TMC joint has been described as innervated by the radial nerve (main innervation), the lateral antebrachial nerve innervation and the median nerve. Even though denervation's based on these structures not always lead to good results. A new study on 19 cadaveric specimens shows that 58% had superficial radial nerve, 47% had median nerve innervation from the motor branch and 47% had ulnar nerve innervation from the motor branch. This paper supposed to speak for the first time that ulnar innervation may also be present for the TMC joint. - Iowa Orthop J. 2011; 31:225-30.

Ulnar nerve component to innervation of thumb carpometacarpal joint. Miki RA, Kam CC, Gennis ER, Barkin JA, Riel RU, Robinson PG, Owens PW.

Deep palmar communications between the ulnar and median nerves have continued to be studied. (50 hands, 25 cadavers). In 16% of the hands communicating branches were found - Clin Anat. 2011 Mar; 24 (2): 197-201.

Deep palmar communications between the ulnar and median nerves. Marios Loukas, Sharath S Bellary, R Shane Tubbs, Mohammadali M Shoja, Aaron A Cohen Gadol

Another paper also describes that a connecting third common palmar digital branch of the median nerve with the fourth common palmar and proper palmar digital branches of the median nerve presented a plexiform nature. - Anat Sci Int. 2013 Jan 17.

A rare anatomical variation of the Berrettini anastomosis and third common palmar digital branch of the median nerve. Sirasanagandla SR, Patil J, Potu BK, Nayak BS, Shetty SD, Bhat KM.

The median nerve branches for the pronator teres have been studied in one paper. All specimens (20 upper limbs) showed to have a branch from the median nerve long enough to reach the radial nerve in the cubital fossa in potential for neurotization cases. - J Neurosurg. 2011 Jan; 114(1): 253-5.

Median nerve branches to the pronator teres: cadaveric study with potential use in neurotization procedures to the radial nerve at the elbow. Tubbs RS, Beckman JM, Loukas M, Shoja MM, Cohen-Gadol AA.

The sublime bridge is the tendinous arch connecting the radial and humeral heads of the flexorum digitorum superficialis muscle. Located at the mean distance of 8.1 mm from the medial epicondyle, it was found to be tendinous in 75% and muscular in 25% of the specimens. As known, it is a potential factor for median nerve compression at the proximal forearm. - J Neurosurg. 2010 Jul; 113(1): 110-2.

The sublime bridge: anatomy and implications in median nerve entrapment. Tubbs RS, Marshall T, Loukas M, Shoja MM, Cohen-Gadol AA.

III. MUSCLES

The flexor carpi radialis brevis muscle is a muscular variant that can be present as much as 3.95 % in cadaveric studies. On volar approaches for distal radius fractures it may be found as a separate tendon running between the FCR and the radial vessels (inserting distally at the FCR tunnel) and superficial to the pronator quadratus. - Hand Surg. 2011; 16(3): 245-9.

The flexor carpi radialis brevis muscle - an anomaly in forearm musculature: a review article. Ho SY, Yeo CJ, Sebastin SJ, Tan TC, Lim AY.

The Palmaris Profundus variant when present (incidence 1/530 limbs) may prohibit endoscopic carpal tunnel release. It was found inserting onto the undersurface of the transverse carpal ligament. - J Hand Surg Am. 2012 Apr; 37(4): 695-8.

Palmaris profundus tendon prohibiting endoscopic carpal tunnel release: case report. McClelland WB Jr, Means KR Jr.

IV. TENDONS

A new study of the flexor tendon sheaths shows high incidence of variations (33% in 12 cadavers), which have communication between the radial and ulnar bursae. This might explain variations to the classical presentation of spread of infection through the digital flexor sheaths. - J Hand Surg Eur Vol. 2009 Dec; 34(6): 762-5.

An anatomic study of flexor tendon sheaths: a cadaveric study. Fussey JM, Chin KF, Gogi N, Gella S, Deshmukh SC.

The extensor pollicis brevis (EPB) tendon has been determined to run through a separate sheath in the first dorsal compartment in 28% (50 wrists, 25 cadavers) - J Hand Surg Eur Vol. 2012 Feb; 37(2): 155-60.

Accuracy of intrasheath injection techniques for de Quervain's disease:

a cadaveric study. Mirzanli C, Ozturk K, Esenyel CZ, Ayanoglu S, Imren Y, Aliustaoglu S.

Accessory abductor pollicis longus tendons have been studied once more (78 cadaveric upper limbs) with a presence of 85%. This paper speaks of the potentiality of the tendons as a graft source for TMC osteoarthritis. - Clin Orthop Relat Res. 2010 May; 468(5): 1305-9.

Anatomic study of the abductor pollicis longus: a source for grafting material of the hand. Bravo E, Barco R, Bullón A.

The sheaths and tendons of the first dorsal compartment were also studied in 124 cadavers.

A unique compartment was found in 63.4%. In 32.1% two complete or partial separate compartments were observed, while 4.5% specimens showed no extensor pollicis brevis in the first dorsal compartment. - Anat Sci Int. 2010 Sep; 85(3): 145-51.

Anatomical variations in the tendon sheath of the first compartment. Motoura H, Shiozaki K, Kawasaki K.

The accessory tendon slip from the extensor carpi ulnaris (ECU) has also been studied in 54 specimens with an incidence of 5.6 %. Originating from the ECU, they ended in the extensor apparatus of the fifth finger, running ulnar side of extensor digiti minimi tendon.

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V. MYOTOMES

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VI. VASCULAR

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2013/Volume 2/4 issues p.a./ISSN 2163-3916

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Therapeutic Exercise in Wrist Rehabilitation

Part 2

By Jennifer Blenkinsop

This article is the second of two articles dealing with rehabilitation of the wrist after injury. The first section CLICK HERE TO READ PART 1 dealt with specific exercises using isometric and isotonic exercises. In this section, plyometric exercises, reactive muscle activation, mirror therapy and application of specific exercises in daily life are discussed.

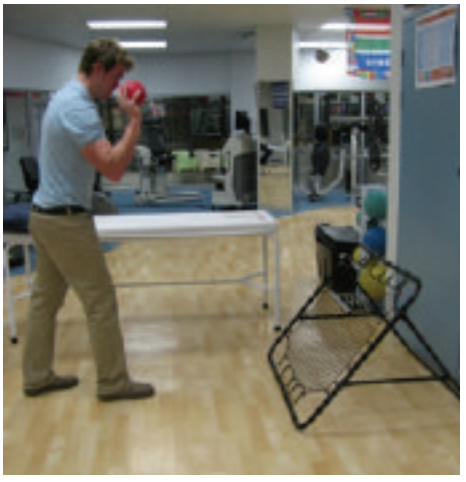
Plyometric exercises

Plyometric exercises cause a muscle to rapidly stretch (eccentric contraction) prior to contraction (concentric contraction). The pre-stretch eccentric contraction stores elastic recoil potential energy (much like a spring) which allows much greater force generation in the concentric contraction phase (1). This is used in many daily tasks like throwing an object, digging, hitting a ball, flipping a pancake, hammering, pushing something away (eg pushing a child on a swing) etc. The need for plyometric exercise as part of the rehab process is largely dependent on the functional needs of the patient, as they are an advanced form of exercise and require adequate strength and a reasonable degree of both conscious and unconscious neuromuscular control/ proprioception.

Plyometric wrist exercises may involve throwing and catching a ball against a mini-trampoline or to a therapist. The exercise may easily be graded. Initially the ball may begin as a medium to large, light ball and progress to a small medicine ball. The hand position for throwing may utilise the DTM or may use a number of different grips, which can be tailored to the patients' pathology and functional requirements. Initially the task may be bilateral and symmetrical, which is less demanding in terms of motor control, and may be graded to unilateral simple throwing and catching, to full arm throwing and catching using the entire upper quadrant and full body kinetic chain.

Reactive muscle activation

This focuses on reconstructing the unconscious activation of muscles to restore joint balance (2). It aims to restore the normal neuromuscular reflex patterns in the muscles around a joint, and the unconscious activation of agonist and antagonist muscles in response to changing/ unexpected requirements. This is critical to both high level function and injury prevention, and may be very important in ligament injuries as well as in hypermobility related wrist problems. By the time the client is engaged in plyometrics and reactive muscle activation exercise, the therapist must now consider involvement of the upper quadrant, rather than focusing on the wrist



joint only in order to normalise the wrist's role in global upper extremity movement and function.
Some examples of therapeutic exercises that may be used include:

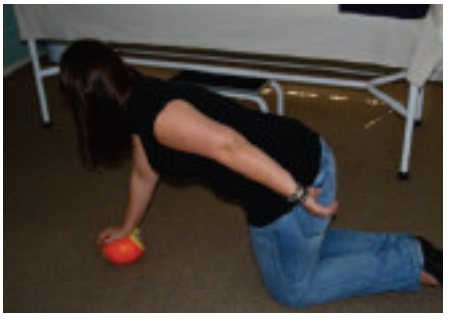
Powerball: The NSD Powerball, when spinning, produces multi-directional centrifugal forces. The patient is required to control the ball in a smooth, circular motion, against the multidirectional forces of the ball. The higher the speed of the inner spinning ball, the more control required by the patient. This exercise has been shown to significantly increase muscle endurance of the forearm (ie wrist) musculature (3). It requires a high degree of neuromuscular control. Initially larger circular motions are encouraged with slower ball speeds (less resistance but requires controlled, smooth motion), and graded to more controlled, smaller circles, but with a higher ball speed. Patients should begin with short periods (eg 3 X 30 sec) and slowly build their time. Overuse/ over exercising can produce pain at the common extensor tendon, and therefore careful monitoring of symptoms and speed of progress is required by the patient and therapist. Many patients have difficulty with the motion initially, and may need to try with the unaffected hand first before achieving the correct motion on the affected side. One of the benefits of the power ball is that only a small amount of wrist ROM is needed to successful master the technique.

Ball stability exercises: In this exercise a medium to large ball is stabilised by the patient (the amount of weight-bearing and position of the wrist is determined by the pathology), while the therapist tries to move the ball in different directions and degrees, at increasing speed. This is very similar to the ball exercise described in the section on Isometric exercise, except that the speed and amplitude of the disturbance in increased.

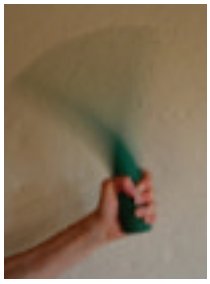
Wobble Board/ Balance Board: In this exercise the patient holds the opposite lateral sides of the balance board. The amount of wrist extension is dependent on the pathology and the goals of the exercise. The therapist holds the board anteriorly and posteriorly. The therapist then tries to move the board in different directions, while the patient tries to stabilise against the movement.

Another option is that the patient is in four-foot kneeling, holding the balance board on the floor in front him. He then 'walks' the wobble board forward a distance and then back.

The patient may also be in a four-foot kneeling position, while weight-bearing through the wrist which is on the centre of balance board. The unaffected wrist is not involved. The patient is required to maintain balance on the unstable surface of the balance board. A ball may also be used instead of the balance board, allowing greater flexibility in terms of wrist position.



"The hand is represented on both the motor and the sensory cortices. The brain is continuously remodelling itself in response to changes in sensory input."



Rubber Bar Exercise or similar: This involves holding the bar at the base and 'shaking' it in either an antero-posterior direction or in a circular motion. The Theraband bar is reasonably short and therefore the stabilisation requirement is reasonably low. There are exercise apparatus with longer and more flexible lever arms that make controlling the motion more challenging.

Mirror Therapy

"Surgical procedures of the hand are always accompanied by synaptic reorganisational changes in the brain cortex and the outcome of many hand surgical procedures is to a large extent dependent on brain plasticity" (4). The hand is represented on both the motor and the sensory cortices. The brain is continuously remodelling itself in response to changes in sensory input. Reorganisational changes may be activity dependent based on alterations in hand activity and tactile experience (4). Over-use, lack of use (ie diminished sensory and motor input) and minor injuries will also alter representation (5). Activation of 'mirror neurons' in the premotor cortex can occur by simply observing a movement (6), not only by movement of the injured part itself. Imagining a movement or viewing a picture of hand activity can stimulate neurons in the somatosensory cortex which may serve to limit the reorganisational changes, and thus it is thought to improve proprioception and motor control, as well as modulate pain responses particularly the location of pain stimulus has become more centralised.

Mirror therapy may therefore be helpful in improving co-ordination (7), motor control, proprioception awareness, kinaesthesia and reducing pain. It is also used as part of a sensory re-education programme where needed.

Altschuler (8) wrote an interesting article on their use of mirror therapy to assist a patient regain active wrist motion following distal radius fracture, where the patient had greater passive than active ROM. In this instance Electrical Stimulation was applied to the wrist extensors of the affected hand, which was obscured from vision, and when the stimulus was felt the patient was required to extend the unaffected wrist, while viewing this in the mirror. This was graded to active-assisted movement of the affected wrist at the same time as electrical stimulation, to concurrent active movement without the electrical stimulation. The result was a significant increase in active ROM than pre-treatment. Thus use of mirror therapy can be integrated during the application of other therapeutic modalities.

Other applications include observing the unaffected hand in the mirror in various hand positions and trying to reproduce this with the affected hand (joint position sense), and performing different movements which may include functional tasks, use of tools etc. Another option is performing a functional task with the unaffected hand while observing it in the mirror, while trying to reproduce the same functional task with the unaffected, obscured hand. Tactile stimulation may also be performed as part of a sensory re-education where appropriate.

According to Butler, 'smudging' of representations in the sensory and motor cortices and elsewhere are best avoided by return to normal activities. The brain is the ultimate 'use it or lose it' machine. It seems clear that functionally meaningful and goal

About the author

Jennifer Blenkinsop runs a Private Hand Therapy Practice in Johannesburg, South Africa. Her qualifications include BSc (OT), Certified Hand Therapist (CHT), Complex Lymphoedema Therapist (Casely-Smith), Guided Imagery and Music Fellow (FAMI- Bonny Method). Please direct all comments and enquiries to Jennifer at jblenkinsop@tiscali.co.za

directed inputs will be better accepted by the brain processing…clearly the more functional the movement and the more it links to desired activity and achievable goals, the better" (5).

Specific, targeted exercises are practical (including all those mentioned above), often measureable and cost effective in our current time, cost, and outcomes driven healthcare systems and lives. However, perhaps we need to consider how to incorporate more creative activities into our programme so that our therapy includes the whole person in a more bio-psycho-social approach. For example throwing actual darts for the dart throwing motion, or using computer games such as Nintendo Wii and X-box sporting games so that motion can be done without needing all the structure of a sporting activity, and without resistance and impact. Specific therapy-related computer programmes are commercially available, but not always easily accessible or affordable in some countries. An excellent option, if available is equipment such as the BTE or LIDO work simulators, which may simulate a number of work tasks and tools, while at the same time the therapist can adjust the resistance and time of the task.

Wrist extension may be achieved through woodwork and baking tasks. Reactive muscle activation for wrist motion within a short arc of motion can be achieved flying stunt kites, or the dart throwers motion may be progressed by fly-fishing. Wedging of clay for pottery is an excellent plyometric task, and working the clay on a wheel enhances bilateral co-ordination, mobility and proprioception, with tactile, visual and proprioceptive input. The list of activities is endless and of course culture specific. All this activities are not only important for motion, strengthening, proprioception and function, but also enhance a person's sense of accomplishment, self-esteem and confidence, while at the same time reducing fear of using their hand.

In this way more normal movement patterns will develop within the confines of the pathology/injury, and conscious and unconscious proprioception will improve. Better neuromuscular control will most likely result in more smooth, controlled and co-ordinated use of the upper quadrant, and cortical representation should be normalised more rapidly. Added to these are the emotional and psychological benefits of participation in meaningful activities at work, home and leisure. Not all of these aspects can be accurately measured, but without doubt the therapy will both maximise recovery in outcomes and time (meeting the needs of funders) while also being very client-centered (meeting the needs and goals of patients and therapists).

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Innovations in treating skin defects of the hand

USA

Dr Andrew Watt from the Department of Orthopaedic Surgery & Sports Medicine at the University of Washington, wrote an overview paper that investigated advances in treating skin defects of the hand, particularly skin substitutes and negative-pressure wound therapy.

"I became interested in the use of dermal substitutes and negative pressure wound therapy out of sheer necessity," Dr Watt explained about his interest in the subject. "I am a reconstructive microsurgeon and generally believe that native tissue reconstructions offer superior functional and aesthetic outcomes in the setting of complex hand injuries. With that bias in mind, however, there is a sub-set of patients who, by virtue of their injury, are not viable candidates for local tissue or free tissue reconstructions. These patients have generally sustained severe crush or blast injuries to the hand, have incomplete arterial arches or have tenuous vascular supply or underlying vascular disease," he continued, adding that for these patients, dermal substitutes offer the potential for reconstruction without relying on microvascular techniques or local tissue reconstruction. These techniques come with a cost, however. These alternative reconstructions often require longer healing times and as a consequence, often result in longer periods of immobility for the hand.

"Negative pressure wound therapy is a useful adjunct in the management of hand injuries as both a bridge to definitive reconstruction and as a highly effective bolster dressing which allows for contact with the anatomical irregularities inherent in the hand"

Watt believes the most important findings of this paper are that dermal substitutes provide a reliable and durable reconstructive option when local tissue and free tissue transfer techniques are not feasible. In addition, feasibility may be related to patient factors including the mechanism of injury and vascular status of the hand as well a health system factors including the availability of microsurgical techniques.

"Negative pressure wound therapy is a useful adjunct in the management of hand injuries as both a bridge to definitive reconstruction and as a highly effective bolster dressing which allows for contact with the anatomical irregularities inherent in the hand. Negative pressure therapy as a definitive management should be avoided given wound contracture and prolonged immobility limiting functional recovery," he continued.

For Watt, it is important that readers of the paper understand that while plausible and reliable reconstructive methods, the use of negative pressure wound therapy and dermal substitutes should not be regarded as a 'first line' reconstruction. "These techniques are useful adjuncts and act as definitive reconstructions only when local and free tissue transfer techniques are not feasible. Immobility is often prolonged while awaiting dermal substitute incorporation and granulation via negative pressure wound therapy resulting in increased stiffness," he explained. He continued that when embarking on this reconstructive path,

the surgeon and therapist should pay particular attention to splinting and should consider motion at all available joints that do not absolutely require immobilisation during the healing process.

In terms of the future, Watt said he will continue to employ dermal substitutes and negative pressure wound therapy in his clinical practice. "I have found negative pressure therapy as an almost indispensable adjunct to placement of dermal substitutes and as a bolster for skin grafts. Future endeavours are focused on minimising immobilisation while maintaining successful dermal substitute incorporation. I am also looking to compare functional outcomes in patients with comparable injuries treated with microsurgical reconstructions (free fascial and fasciocutaneous flaps) and with those treated with dermal substitutes," he concluded.

JOURNAL REFERENCE

Hand Clinics, Volume 28, Issue 4 , Pages 519-528, November 2012

Modern tendon repair techniques

USA

Dr Steve K. Lee, from the Hospital for Special Surgery at Weill Cornell Medical College in New York recently published a paper on the topic of modern tendon repair techniques in Hand Clinics. Digital tendon repair is one of the most common issues in hand surgery and also one of the most vexing. A repair must withstand the forces imparted on it during early motion. The article evaluates modern tendon repair techniques and early clinical experience using such methods have shown clinical success of improved motion and no known ruptures.

"My interest was sparked when I was faced clinically with treating patients with these problems. I did not feel that there was an adequate solution for hand tendon repairs. Either the repairs were too weak or too bulky. Early range of motion with a repair that glided well in the pulley system was a difficult goal to achieve. I therefore embarked on several studies to investigate this problem," Dr Lee explained.

For Lee, surgeons reading the article should understand that tendon repairs are technically demanding procedures where every single detail matters. Exactly what suture material is used, where the suture is started, how far of a suture span, the suture configuration, how many knots are used, etc. all play an important role in its biomechanical performance. "The modern repairs are extremely strong and have very limited gapping during active motion. For zone II repairs, they can also have a very low amount of friction imparted to the pulley system. These all lead to potentially improved surgical results," he added, concluding that his future research will be in the long term clinical evaluation of these patients who had such repairs.

"tendon repairs are technically demanding procedures where every single detail matters"

JOURNAL REFERENCE

Hand Clinics, Volume 28, Issue 4 , Pages 565-570, November 2012

Free vascularised medial femoral condyle autograft for challenging upper extremity nonunions

USA

Dr Alexander Shin, from the Division of Hand Surgery, Department of Orthopedic Surgery, Mayo Clinic, recently authored a paper on the topic of free vascularised medial femoral condyle autograft for challenging upper extremity nonunions, published in Hand Clinics.

"The inspiration for the use of the medial femoral condyle for scaphoid nonunions comes from our evaluation of the results of the 1,2 ICSRA vascularised bone graft for scaphoid nonunions," Dr Shin explained, adding that when his group initially described the dorsal distal radius vascularised bone grafts in 1995 and published the initial series in 2002, they had a 100% union rate of scaphoid nonunions. However, favourable outcomes were not universal and other authors were publishing significantly poorer results.

"In 2006, we critically evaluated the outcomes of the 1,2 ICSRA vascularised bone graft in 47 patients with 48 nonunions and found that we had a 71% union rate. Critical evaluation of this cohort, revealed that patient and fracture selection were imperative for optimising outcomes," he continued. "In particular, patients with carpal collapse (with humpback deformity) and proximal pole AVN, had a significantly high failure rate. To address this specific type of scaphoid nonunion, we recognised that we needed a large graft to restore the normal geometry of the scaphoid and also need a graft that was vascular. We had a good experience with the corticoperiosteal flap from the medial femoral condyle and took the experience with this and considered its use as a structural vascularized bone graft," he said.

"there are solutions for some very difficult and challenging upper extremity nonunions"

According to Shin, a cadaver study performed in our lab demonstrated that there were excellent vascular perforators to the distal inferior quadrant of the medial femoral condyle with consistent anatomy. "Dr Allen Bishop and I performed the index procedure in 2005, and we have had outstanding success with the graft in the patients with AVN, scaphoid waist nonunions with carpal collapse," he said.

For him, the most important outcome of this study is that they are able to achieve union in these very difficult scaphoid nonunions. Additionally, the results have been replicated across the hand surgery community. "Our original series reported in 2008 had 100% union rates. Anectdotally, since the original report, we have performed close to 55 surgeries and have only 3 failures to date," he said.

"The most important take away message is that there are solutions for some very difficult and challenging upper extremity nonunions. There is no simple panacea for some of these nonunions. The surgery is exacting and can be difficult. It is important for hand surgeons to know that there is a role of microvascular surgical procedures to address these nonunions. Critical evaluation and a discussion of outcomes, risks and benefits to the patient are necessary as well as having the technical ability for the surgeon to perform these surgeries. Currently we are critically evaluating the outcomes of our procedures with longer follow up and look forward to report these at the next international meeting," he concluded.

JOURNAL REFERENCE

Hand Clinics, Volume 28, Issue 4, Pages 493-501, November 2012

Pioneers in Hand Surgery

Robert E Carroll, MD

Dr Carroll was well known for his educational efforts in the teaching of hand surgery, not only in the United States, but throughout the world. He established one of the early formal training programs for hand surgery in the United States. During his career he has visited and taught in many countries throughout the world. Physicians from these countries, as well as many others, have experienced a formal training program with him in New York City as Visiting Fellows. Some 150 doctors from many countries that have an active Hand Society, have worked in his department.

Graduating in medicine from Yale University, New Haven, Connecticut, he received training in general surgery and orthopaedic surgery at the Massachusetts General Hospital in Boston where he came under the tutelage of Dr Henry C Marble. For a brief period of time he taught at the Harvard Medical School, Cambridge, Massachusetts. Following service in the Second World War in the Pacific theatre, he moved to New York City. A year was spent in studying with Dr Sterling Bunnell in San Francisco, California, and with Drs Sumner L. Koch, Michael L. Mason and Harvey S. Allen in Chicago, Illinois. Returning to the New York Orthopaedic Hospital, a division of the Columbia-Presbyterian Medical Center, he established the Division of Hand Surgery where he remained as Chief until 1986. During this tenure Dr Carroll had helped develop the use of silicone tendons for hand surgery reconstruction. The Hand Service has been known for its large experience in congenital hand deformities, as well as tumours and muscle transplantation.

Dr Carroll has been honoured by membership in the Hand Societies of 16 countries throughout the world. He was consultant to the United States Navy, United States Air Force, the Veterans Administration and the United States Public Health Service during his years of active practice. He has been President of the Association of Bone and Joint Surgeons. He was one of the founders and subsequently a President of the New York Society for Surgery of the Hand, as well as a Vice President of the American Society for Surgery of the Hand.

Professor Nils Carstam, MD

Dr Carstam, a native from Vaxjö, Sweden, graduated from the University of Lund Medical School. He trained in general surgery at the University of Lund, Sweden from 1942 to 1949. He was first introduced to hand surgery by Erik Moberg in 1949. He came to the United States in 1950 to study hand surgery under Sterling Bunnell in San Francisco, California, and Sumner Koch, Michael Mason and Harvey Allen in Chicago, Illinois. He continued his hand surgery studies with his many colleagues from the American Society for Surgery of the Hand and the British Hand Club. He worked with Graham Stack on a Hand Surgery Bibliography prior to the institution of Medline.

In 1951, he was a Founding Member and Secretary of the Scandinavian Club for Hand Surgery which was initiated by Erik Moberg. Dr Carstam later succeeded him as President. He became Head of the Section of Hand Surgery of the Department of General Surgery at the University Hospital, Malmö, Sweden in 1951. His graduation thesis, "The Effect of Cortisone on the Formation of Tendon Adhesions and Tendon Healing – an Experimental Investigation in the Rabbit," was presented in 1953.

Dr Carstam became Associate Professor in Hand Surgery at the University of Lund in 1954. In 1962, he became the Head of the first separate Department of Hand Surgery organised in Scandinavia at the University of Malmö.

Dr Carstam has been very involved in the organisation of hand surgery in Sweden, where it became a recognised specialty in 1969. He was the Scandinavian delegate to the constitutional meeting of the International Federation of Societies for Surgery of the Hand held in Chicago in 1966 and served on several of its committees.

Dr Carstam was appointed Honorary Professor by the Swedish Government (1980), Honorary Member of the American Society for Surgery of the Hand (1971) and of the British Society for Surgery of the Hand (1982).

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Journal Highlights

Below is a selection of contents pages from the latest issues of the following leading hand surgery journals. Hover your mouse over each article heading and click to go to the original abstract page of the article.

Journal of Wrist Surgery **Volume 03 · May 2013**

- The EWAS Classification of Scapholunate Tears: An Anatomical Arthroscopic Study
- Scapholunate Ligament Reconstruction
- Current Role of Open Reconstruction of the Scapholunate Ligament
- Arthroscopic Volar Capsuloligamentous Repair
- Arthroscopic Management of Scapholunate Instability
- Scapholunate Instability: Proprioception and Neuromuscular Control
- Arthroscopic Dorsal Capsulo-Ligamentous Repair in the Treatment of Chronic Scapho-Lunate Ligament Tears
- Anatomical Description of the Dorsal Capsulo-Scapholunate Septum (DCSS)—Arthroscopic Staging of Scapholunate Instability after DCSS Sectioning
- Radiographic Evaluation of Chronic Static Scapholunate Dissociation Post Soft Tissue Reconstruction
- Dorsal Wrist Capsular Tears in Association with Scapholunate Instability: Results of an Arthroscopic Dorsal Capsuloplasty
- Dorsal Capsuloplasty for Dorsal Instability of the Distal Ulna
- A Minimal Wrist Arthroplasty for Early Wrist Osteoarthritis
- Causes of a Block to Forearm Rotation after Distal Radius Fractures
- Anatomy and Clinical Relevance of the Ulnocarpal Ligament
- Management Distal Radius and Distal Ulnar Fractures with Fragment Specific Plate

Hand **Volume 8 – Issue 2, June 2013**

- Identification of three movement phases of the hand during lateral and pulp pinches using video motion capture
- Validity of the Patient Specific Functional Scale in patients following upper extremity nerve injury
- A systematic review of outcomes of revision amputation treatment for fingertip amputations
- Scapholunate ligament injuries: a review of current concepts
- Carpal coalition
- Resident selection of Hand Surgery Fellowships: a survey of the 2011, 2012, and 2013 Hand Fellowship graduates
- Tennessee emergency hand care distributions and disparities
- The range of movement of the thumb and pinch strength: a study in a Turkish pediatric population
- Resolution and recurrence rates of idiopathic trigger finger after corticosteroid injection
- A radiological sign in chronic collateral ligament injuries of the thumb metacarpophalangeal joint
- Suture button suspension following trapeziectomy in a cadaver model
- Anatomical evaluation of a cortical button for distal biceps tendon repairs
- Fluoroscopy-assisted stress testing of the thumb metacarpophalangeal joint to assess the ulnar collateral ligament
- The comparison of paper- and web-based questionnaires in patients with hand and upper extremity illness
- Prevalence of the palmaris longus muscle and its relationship with grip
- Partially ossified iliac crest graft for the reconstruction of the pediatric thumb proximal phalanx
- Acute closed dislocation of the second through fourth carpometacarpal joints: satisfactory treatment with closed reduction and immobilization
- Extension disturbance of the little finger in amateur piano players: two case reports
- Irreducible dorsal epiphyseal fracture dislocation of the distal phalanx: a case report
- Bilateral spontaneous flexor digitorum profundus tendon rupture of the fifth digit: case report and literature review

Hand Clinics **Latest issue is: Volume 29 ▪ Issue 2 May 2013**

- Gliding Resistance and Modifications of Gliding Surface of Tendon: Clinical Perspectives
- Tendon Healing, Edema, and Resistance to Flexor Tendon Gliding: Clinical Implications
- Current Practice of Primary Flexor Tendon Repair: A Global View
- Primary Flexor Tendon Surgery: The Search for a Perfect Result
- Wide-awake Flexor Tendon Repair and Early Tendon Mobilization in Zones 1 and 2
- Uncommon Methods of Flexor Tendon and Tendon-Bone Repairs and Grafting
- Two-stage Reconstruction with the Modified Paneva-Holevich Technique
- Flexor Pulley Reconstruction
- Tendon Reconstruction with Adjacent Finger Hand Tendon
- Outcomes and Evaluation of Flexor Tendon Repair
- Current Methods and Biomechanics of Extensor Tendon Repairs
- Diagnosis and Treatment of Finger Deformities Following Injuries to the Extensor Tendon Mechanism
- Complex Flexor and Extensor Tendon Injuries
- Current Flexor and Extensor Tendon Motion Regimens: A Summary
- Intrinsic Tendon Healing and Staged Tendon Reconstruction: Reflection of Legends

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- Complex regional pain syndrome: observations on diagnosis, treatment and definition of a new subgroup
- Commentary on complex regional pain syndrome: observations on diagnosis, treatment and definition of a new subgroup by Zyluk and Puchalski
- A comparison of the accuracy of two sets of diagnostic criteria in the early detection of complex regional pain syndrome following surgical treatment of distal radial fractures
- Complex Regional Pain Syndrome: a review
- Carpal tunnel syndrome diagnosed using ultrasound as a first-line exam by the surgeon
- Commentary on Lange. Carpal tunnel syndrome diagnosed using ultrasound as a first-line exam by the surgeon
- The long-term follow-up of treatment with corticosteroid injections in patients with carpal tunnel syndrome. When are multiple injections indicated?
- Commentary on Berger et al. The long-term follow-up of treatment with corticosteroid injections in patients with carpal tunnel syndrome. When are multiple injections indicated?
- Value of anatomic landmarks in carpal tunnel surgery
- Carpal tunnel release: a randomized comparison of three surgical methods
- The effects of 5-fluorouracil on flexor tendon healing by using a biodegradable gelatin, slow releasing system: experimental study in a hen model
- Assessment of volar angulation and shortening in 5th metacarpal neck fractures: an inter- and intra-observer validity and reliability study
- The effect of metacarpal shortening on digital flexion force
- Cost analysis and related factors in patients with traumatic hand injury
- Proximal interphalangeal joint replacement with an unconstrained pyrocarbon prosthesis (Ascension®): a long-term follow-up
- Iatrogenic injury to the ulnar nerve during primary repair of medial ulnar collateral ligament in complex elbow fracture dislocations
- Neurostenalgia as a cause of pain after tendon and nerve repair at the wrist
- Abnormal muscle of the distal anterior forearm presenting with compression on the median nerve

Journal of Hand Therapy

Volume 26, Issue 3, July - September 2013

- Effectiveness of cast immobilization in comparison to the gold-standard self-removal orthotic intervention for closed mallet fingers: A randomized clinical trial
- Clinical commentary in response to "Effectiveness of cast immobilization in comparison to the gold-standard self-removal orthotic intervention for closed mallet fingers: A randomized clinical trial"
- A descriptive study on wrist and hand sensori-motor impairment and function following distal radius fracture intervention
- Measurement properties of the Patient-Rated Wrist and Hand Evaluation: Rasch analysis of responses from a traumatic hand injury population
- A retrospective cohort investigation of active range of motion within one week of open reduction and internal fixation of distal radius fractures
- Hand impairment and activity limitations in four chronic diseases
- Evaluation of the Korean version of the patient-rated wrist evaluation
- Patterns of research utilization among Certified Hand Therapists
- A hand therapy protocol for the treatment of lunate overload or early Kienbock's disease
- Preference of lid design characteristics by older adults with limited hand function
- Involuntary contralateral upper extremity muscle activation pattern during unilateral pinch grip following stroke
- Design and construction of custom-made neoprene thumb carpo-metacarpal orthosis with thermoplastic stabilization for first carpo-metacarpal joint osteoarthritis
- A systems change: Leading the way to meeting health needs
- A simple distal radioulnar joint orthosis

Journal of Hand Surgery: American volume

Volume 38, Issue 7, Pages A1-A28, 1285-1468 (July 2013)

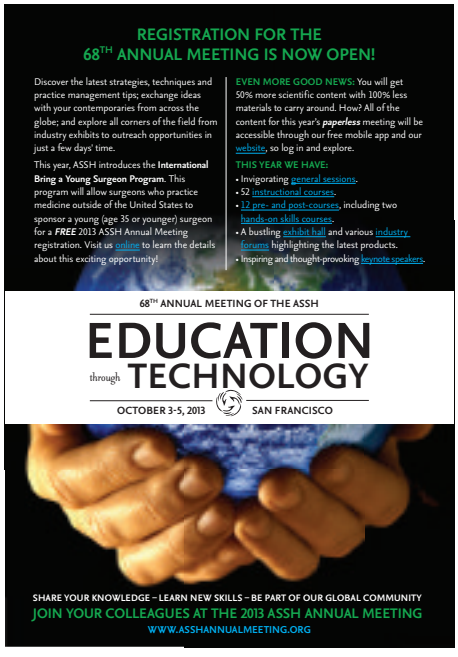
- The Effect of Night Extension Orthoses Following Surgical Release of Dupuytren Contracture: A Single-Center, Randomized, Controlled Trial
- The Thompson Procedure for Chronic Mallet Finger Deformity
- Distal Interphalangeal Joint Arthrodesis With the Reverse Fix Nail
- Fingertip Reconstruction With Simultaneous Flaps and Nail Bed Grafts Following Amputation
- Annular Ligament Reconstruction Using the Distal Tendon of the Superficial Head of the Brachialis Muscle: An Anatomical Feasibility Study
- Traumatic Proximal Interphalangeal Joint Reconstruction With an Autologous Hemi-Toe Osteochondral Graft: Case Report
- Comparison of In Vitro Motion and Stability Between Techniques for Index Metacarpophalangeal Joint Radial Collateral Ligament Reconstruction
- Histopathological Characteristics of Stenosing Flexor Tenosynovitis in Diabetic Patients and Possible Associations With Diabetes-Related Variables
- Effect of Capitate Morphology on Contact Biomechanics After Proximal Row Carpectomy
- In Vivo 3-Dimensional Analysis of Dorsal Intercalated Segment Instability Deformity Secondary to Scapholunate Dissociation: A Preliminary Report
- 3-Dimensional Deformity Analysis of Malunited Forearm Diaphyseal Fractures
- Single-Stage Surgery Combining Nerve and Tendon Transfers for Bilateral Upper Limb Reconstruction in a Tetraplegic Patient: Case Report
- Identifying the Location and Volume of Bony Impingement in Elbow Osteoarthritis by 3-Dimensional Computational Modeling
- Semiconstrained Total Elbow Arthroplasty for Posttraumatic Arthritis or Deformities of the Elbow: A Prospective Study
- Validation of Phone Administration of Short-Form Disability and Psychology Questionnaires

Upcoming events

68th Annual Meeting of the American Society for Surgery of the Hand

October 3-5, 2013
Moscone West Convention Center, San Francisco, CA, USA
www.ASSHAnnualMeeting.org

Annual Meeting program chairs Michael Hausman, MD and Fraser Leversedge, MD look forward to a robust program at the 68th Annual Meeting of the ASSH.



3rd Annual RAMSES Multispecialty Robotic Microsurgery Symposium

8-9 November 2013 | Strasbourg, France | www.roboticmicrosurgeons.org

The only multi-specialty microsurgical gathering of its kind—with microsurgeons from varying fields, including: hand, plastics, reconstructive, ENT, urology, gynecology, ophthalmology, vascular, orthopaedics, pediatrics and peripheral nerve.

4th Annual Congress of the Orthopaedic Department at Sohag University in collaboration with the Egyptian Society for Surgery of the Hand and Microsurgery & Pan Arab Hand & Microsurgeons

Hurghada, Egypt | 20-22 November 2013
www.handsurgery-sohag.org/

On behalf of Hand & Reconstructive Microsurgical Unit of Orthopaedic Department, Sohag University, Egypt, we have the pleasure to invite to participate and share your experiences in the 4th annual congress of the department in collaboration with the Egyptian Society for Surgery of the Hand and Microsurgery (E.S.S.H.M.) & Pan Arab Hand & Microsurgeons which will be held in Serenity Makadi Heights Hotel, Makadi Bay, Hurghada, Egypt from November 20-22, 2013.

The congress invited TOP figures of Hand & Reconstructive Microsurgical field in the world whom their presence will enhance the scientific program with latest & advanced techniques and procedures.

Hurghada is a coastal city located in the eastern coast of Egypt on the Red Sea and has a great and magnificent weather and nature. You will see the pure water and the magnificent creature in the sea from types of fishes to the coral reefs.

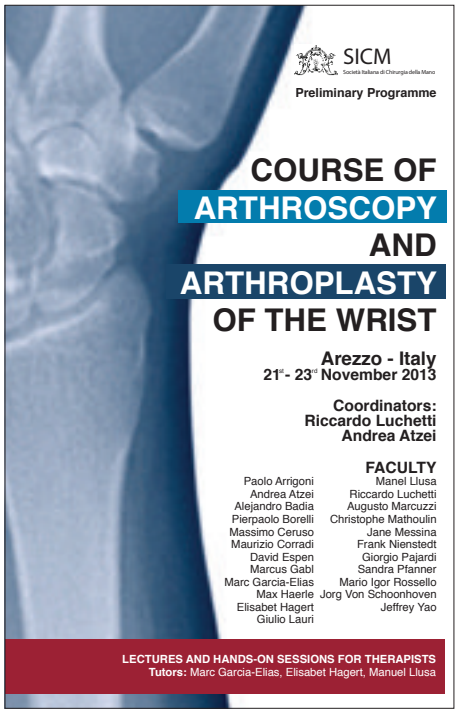
Serenity Makadi Heights Hotel is located in Makadi Bay, a 5-star hotel deluxe hotel built in the west bank of the Red Sea. It is easily reached from Hurghada International Airport (36 km) to the south. The resort surrounded by large gardens and located directly on the Red Sea offering spectacular views over the turquoise water and an amazing experience of a luxury life style combined with the warmth of true Egyptian hospitality and very possible features to make your stay enjoyable

We are looking forward to seeing you to share this wonderful scientific & social event.

Arthroscopy and arthroplasty of the wrist

22-23 November 2013
Arezzo, Italy
www.sicm.it/norme_editorialien.html

The course is designed for specialists in hand surgery, orthopaedics and plastic surgery who want to improve their technical skills in the diagnosis and treatment of wrist disease. Experts will take lectures and presentations followed by arthroscopic and open surgical techniques on anatomical specimens. Sessions will consider clinical diagnostics for each form of instability or other pathologies of the wrist. Open and arthroscopic techniques will be presented in details with their specific indications. Each participant will bring clinical cases to discuss with experts and will have at least one anatomical specimen.



3rd European Symposium on Paediatric Hand Surgery and Rehabilitation

13 - 14 January 2014
London, United Kingdom
http://www.bssh.ac.uk/education/courses/3rdeuropeansymposiumon

The British Society for Surgery of the Hand are delighted to host the 3rd European Symposium on Paediatric Hand Surgery and Rehabilitation which will be held at the Institute of Child Health in London on 13th - 14th January 2014.

Submission of abstracts is now open and will close on 31st August 2013. The full programme and further information will be published in September 2013.

Second International Symposium on Arthrogryposis

17-18 September 2014
St Petersburg, Russia
http://amc-2014.org/

We have pleasure in inviting you to join us to the SECOND INTERNATIONAL SYMPOSIUM ON ARTHROGRYPOSIS «UPDATES FROM AROUND THE WORLD» which will be held in Saint-Petersburg, Russia on 17th and 18th September 2014.

The faculty will consist of senior clinicians from all over the world with particular expertise in the management of all aspects of the care of children and adults with Arthrogryposis including, geneticists, neuromuscular pediatricians, surgeons and rehabilitation experts. This is a unique opportunity to discuss the difficulties of managing this complex condition.

One of the world's most beautiful cities, St Petersburg has all the ingredients for an unforgettable travel experience. The city offers an extraordinary history and rich cultural traditions, which have inspired and nurtured some of the modern world's greatest literature, music, and visual art. From the mysterious twilight of the White Nights to world-beating opera and ballet productions on magical winter evenings, St Petersburg charms and entices in every season.

We look forward to welcoming you to Saint-Petersburg.

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