www.ifssh.info VOLUME 4 ISSUE 3 AUGUST 2014

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PROPHYLAXIS GUIDELINES FOR VTE FOLLOWING UPPER LIMB SURGERY

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2014/Volume 3/4 issues p.a./ISSN 2163-3916

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About the front cover

This historical photo was taken at the founding meeting of the IFSSH in Chicago, USA, 21 January 1966.

The original eight founding Societies of the IFSSH were represented by the following Delegates (from left to right): A Bonola (Italy); T Morotomi (Japan); A Barsky (USA); G Stack (UK); N Carstam (Scandinavia-Sweden); D Buck-Gramcko (Germany); A Pernet (Brazil); R Tubiana (France)

Photo courtesy of Dr Sergio Gama (Brazil)

IFSSH Pioneers of Hand Surgery

Traditionally during the Congresses of the International Federation of Societies for Surgery of the Hand, a number of "Pioneers of Hand Surgery" are acknowledged. This is a long standing custom which dates back to the 3rd Congress in Tokyo held in 1986.

To date, 142 physicians have been granted the honour of becoming a "Pioneer of Hand Surgery".

The enormous contribution of the Pioneers to Hand Surgery will influence many generations of Hand Surgeons to come. Ultimately of course, their accomplishments will benefit countless patients far into the future.

The words of Alfred Swanson, at his acknowledgement of the Pioneers of Hand Surgery announced at the 5th international congress in Paris in 1992, elegantly describe the purposes of this award:

"The knowledge of this specialty is relatively new in the world and has reached development and dissemination through the work and contributions of many great individuals. Appropriate recognition of these persons is difficult. Recognising those living persons who have spent their lives to further our specialty is the purpose of this presentation.

The Council of the International Federation of Societies for Surgery of the Hand has reviewed and discussed a list of these important persons, and takes great pleasure in presenting them to you at this time. To recognise a Pioneer for his great contributions is enriching to all of us.

The Federation considers it most appropriate that official praise and commendation be extended to our Pioneers in grateful recognition of their truly exemplary record of contributions to the field of Hand Surgery and to people everywhere. This occasion provides us an opportunity to recognise those who have come before us, and particularly, these gentlemen who by their wealth of discoveries and advances in Hand Surgery have so vastly improved the lives of thousands of persons the world over."

Alfred Swanson's words in 1992 reflect the timing of development of Hand Surgery as a sub-specialty. The American Society for Surgery of the Hand (ASSH) was established in 1946 following the efforts of Sterling Bunnell and colleagues to provide services for those injured in the Second World War.

In its early years, the IFSSH recognised "Giants of Hand Surgery", those who have been drawn from past literature. Subsequently, Pioneers have been honoured for their contributions, largely from the time of the mid-1940s. However, Sterling Bunnell is not an IFSSH Pioneer but is listed as a Giant of Hand Surgery, which he certainly was. Many of our national societies are born of more recent times. A continuation of awarding the title of "Pioneer" of Hand Surgery has raised some comment. Some suggest that the terminology of our Pioneers award should now be changed to a term which reflects significant contributions to a field of surgery which is well-established rather than in its pioneering days. However, after consideration, the IFSSH Executive Committee has decided that the term "Pioneer" remains appropriate, given both the disparate degree of the sophistication of hand surgery in different countries throughout the world and because more recent advances in hand surgery may continue to be appropriately considered as of a pioneering nature.

Another important question is how to decide whether the contributions

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

of any particular person are worthy of the award of IFSSH Pioneer of Hand Surgery. I am sure that all would agree that if the criteria are too loose and the award given too freely, then the worth of the award is diminished. Currently, to be nominated as a Pioneer the person must be at least 70 years of age or deceased, must be a recognised leader in hand surgery and have contributed significantly to the development of Hand Surgery nationally and/or internationally.

The nomination must come from a society, not from an individual. The IFSSH Nominating Committee, chaired by the Immediate Past-President of the Federation, is responsible for assessing the nominations and making a recommendation as to whether the nominee is to receive a Pioneer award at the next IFSSH Congress.

Perhaps the guidelines provided to our constituent societies are lacking in the detail necessary to assist the societies in determining if a particular person has excelled to an exceptional level, beyond that which is normally expected, and therefore is deserving of the award of IFSSH Pioneer of Hand Surgery. As such, the Executive Committee has suggested that the following criteria should be assessed when considering a possible Pioneer nomination:

1. Exceptional ability to teach and train hand surgeons at registrar and fellowship level.
2. Significant contributions to basic hand surgery research.
3. Significant contributions to clinical hand surgery research.
4. Publications in peer reviewed journals which substantially add to our understanding of hand surgery.

"The continued recognition of those who have excelled in hand surgery is an important role of the IFSSH"

5. Publication of chapters and/or books which made major contributions.
6. Involvement in outreach programs of significant importance.
7. Specific international contributions to promote hand surgery, such as involvement in Federation activities; and involvement in regional activities.
8. Specific contributions to promote hand surgery nationally, such as Society activities.
9. Visiting Professorships and invitations to lecture internationally.
10. Paper and poster presentations at International Meetings.
11. Preparation of video programs for teaching purposes.
12. Development of equipment and processes for clinical use or academic programmes.

Of course, this list is not exhaustive, nor must each nominee have excelled in all criteria. However, for the Committee to recommend the award of "Pioneer of Hand Surgery", the nominee must have made outstanding contributions in many of the above categories.

The Secretary-General will call for nominations from member societies at least nine months before the date of the triennial Congress. Nominations should be received in writing and include:

- a summary of the reasons for recommendation from the national society (one page maximum);
- the nominee's curriculum vitae (abbreviated - three pages maximum); and
- the nominee's photograph.

Nominations must be received by the secretariat at least six months before the Congress date. A nomination should be supported by a vote at the individual society annual meeting and not be a proposal from an individual or an Executive Committee. It is recommended that each society give careful consideration to its responsibility when putting forward the nomination for consideration. The IFSSH Nominating Committee will assess the recommendations and advise the IFSSH Executive Committee of its decision.

I believe that the continued recognition of those who have excelled in hand surgery is an important role of the IFSSH. In understanding, respecting and acknowledging our history, we create the circumstances to establish our future.

Michael Tonkin
President, IFSSH

Professor Nils Carstam

1913-2014

Professor Nils Carstam, Malmö, Sweden, passed away May 28 2014 at the age of 100 years.

The founder of Department of Hand Surgery in Malmö, and one of the internationally recognised pioneers in Hand Surgery, Nils Carstam was a true pioneer in the field of Hand Surgery. He had the vision to initiate the organisation of Hand Surgery in Malmö more than 60 years ago. A large number of patients in the southern part of Malmö have been successfully treated by Professor Carstam and by the colleagues who were trained by him.

Nils Carstam was born in Växjö, Sweden September 13 1913 and got his medical degree and residency in Surgery in Lund, Sweden. During his early career as a general surgeon, his interest in Hand Surgery was sparked by having to treat a large number of patients with injured hands caused by their work in the glassware and furniture industries in that region. Nils Carstam was aware of the growing and extensive experience among the colleagues in USA of Hand Surgery due to the large amount of hand injuries from the Second World War. Therefore, in 1950 he visited, together with his mentor Professor Erik Moberg, the American Society for Surgery of the Hand and attended a specific course in Hand Surgery, which was followed by an extended visit to the "father of Hand Surgery", Sterling Bunnel, in San Francisco. These events were fruitful and crucial for the development of Hand Surgery in Sweden.

After the return from the USA 1951, Nils Carstam was provided a number of beds reserved for patients with hand injuries at the General Hospital in Malmö by the inventiveness of the head of Department of Surgery, Helge Wullf. By 1962 the first independent Department of Hand Surgery in Sweden was founded in Malmö with Nils Carstam as the head. He was granted an associate professorship in Hand Surgery in 1954. At his retirement 1979 he was given a professorship in Hand Surgery and he was awarded the title "pioneer of hand surgery" at the annual meeting of International Federation of Societies for Surgery of the Hand (IFSSH) in Paris 1992.

Due to two important initiatives by Nils Carstam the speciality Hand Surgery was strengthened – Hand Surgery as its own speciality in 1969 and the founding of the Swedish Society for Surgery of the Hand in 1973. In 1973 Nils Carstam was also the president of the Scandinavian Society for Surgery of the Hand (initially called The "Nordic Club for Hand Surgery"). Nils Carstam had a rich and extended international network in Hand Surgery and he was an honourary member of both the British (BSSH) as well as the American Societies for Surgery of the Hand (ASSH). In the field of Hand Surgery Nils Carstam was particularly interested in repair and reconstruction of injured hands, but he also put a large effort into the treatment of Dupuytren´s contracture and congenital malformations of the hand. Exchange programmes with several international departments of Hand Surgery, e.g. with the Hand Center in Louisville headed by Professor Harold Kleinert, was also an initiative by Nils Carstam.

During his leisure time Nils Carstam showed, above his great interest and knowledge in art, which was clearly revealed during his lecture at retirement, also a very high skill in playing bridge, tennis and golf – activities that he continued in his later years. Colleagues and the entire society for Hand Surgery in Sweden are grateful to Nils Carstam for all the work that he did for development of our speciality. We remember him with honour!

Göran Lundborg
Professor emeritus

Lars B. Dahlin
Professor and President for the Swedish Society for Surgery of the Hand

Judy Bell-Krotoski

1945 – 2013

It is with sadness that the international hand rehabilitation community heard of the passing away of one of the pioneers in hand therapy, Judy Bell-Krotoski. Judy was passionate about her job and made many valuable contributions to the body of knowledge of hand therapy, both in the USA as well as internationally. She will always be remembered for her contribution in the field of nerve injuries and sensory loss, especially the validation of Semmes-Weinstein Monofilaments as objective test instruments to measure sensibility.

She was one of six founder members of the American Society of Hand Therapists (ASHT) and served as President of this Society in 1998. She played an important role in laying the foundations for the publication of the Journal of Hand Therapy and served on the Editorial Board for 11 years.

Judy published more than 100 scientific articles and chapters in books and was one of the co-editors of the first edition of Rehabilitation of the Hand and Upper Extremity. She was the author of one or more chapters in all six editions of this prestigious publication.

However, Judy was so much more than a good researcher and clinician. She was a true friend and supportive colleague, as is illustrated by the words of one of her life-long hand therapy colleagues and close friend, Donna Breger-Stanton:

My memories of Judy Bell-Krotoski

I knew Judy Bell-Krotoski since about 1979, soon after I joined the US Public Health Service (USPHS). Judy was working at the US Public Health Service in Carville, Louisiana and I was working at the US Public Health Service Hospital in San Francisco, California. Because I was working with patients diagnosed with Hansen's disease, I began talking with Judy, by phone, about topics such as hand therapy, nerve compression, leprosy, and sensory testing using the Semmes-Weinstein Monofilaments. Judy was very helpful as our talks became more frequent. I was sent by USPHS to travel to Carville to visit and learn on site, how to treat and care for my patients with Hansen's disease.

Judy was a champion of people she believed in, and of causes she believed in. She became well known for her work with sensibility testing of hands and upper extremities using the Semmes-Weinstein Monofilaments. She felt that testing sensibility with monofilaments would give the healthcare professional an accurate sensibility map which would coincide with effects of medications used to allow for improvements to individuals' neuropathies. This would enable a healthcare professional to follow a patient's progress as he/she showed either improvement or decline in nerve status.

Judy will always be remembered for her steadfast devotion to reach as many of the health professionals working with Hansen's disease as possible. She endeavoured to make them understand and appreciate how a simple evaluation tool as the Semmes-Weinstein Monofilaments can give information otherwise potentially overlooked.

Everything Judy did was done with her total commitment and devotion to the task. Whether it was her work or one of her many hobbies, she gave it her full attention and results were near perfection. Judy had so many interests, and would easily surprise me and others with another ability that few would know of her. Judy sang at her own wedding. She loved and grew orchids, while at the same time maintaining her own horse 'ranch' which provided her with some horse race winners, especially one who won a race just a few weeks before she passed away. Judy would search for rocks of semi-precious stones wherever she went with plans to eventually polish them and make jewellery. Judy was a devoted wife and mother, in addition to being an excellent clinician and researcher.

It was an honour to know Judy as well as I did. It was a total pleasure, as well as an honour to be among Judy's close friends. She was a mentor and friend to me and I will never forget her for all so many reasons. I miss her.

Corrianne van Velze

Donna Breger-Stanton

Share Section

The Exco of the IFSSH receives occasional requests by individuals or Hand Surgery Units for donations or financial support to purchase instruments, books, and various equipment needed to practise their trade as fellow Hand Surgeons and Therapists.

Many of our members have surplus instruments and other such items which could be of use to those in less fortunate circumstances. The IFSSH ezine would like to dedicate a 'Share Section' in every issue to facilitate contact between those seeking support and those looking for recipients of their surplus.

If you have anything which another Surgeon or Therapist may use in her/his practice, please offer it by sending a short description of the item(s) to the Editor(ezine@ifssh.info), as well as a contact email address.

If you are in need of a specific item, you are also welcome to send a short email to the Editor with your request and a contact email address.

NB: The IFSSH ezine acts solely as contact agent, and does not take any responsibility for any exchanged goods. The actual exchange and arrangements are the full responsibility of the two parties involved.

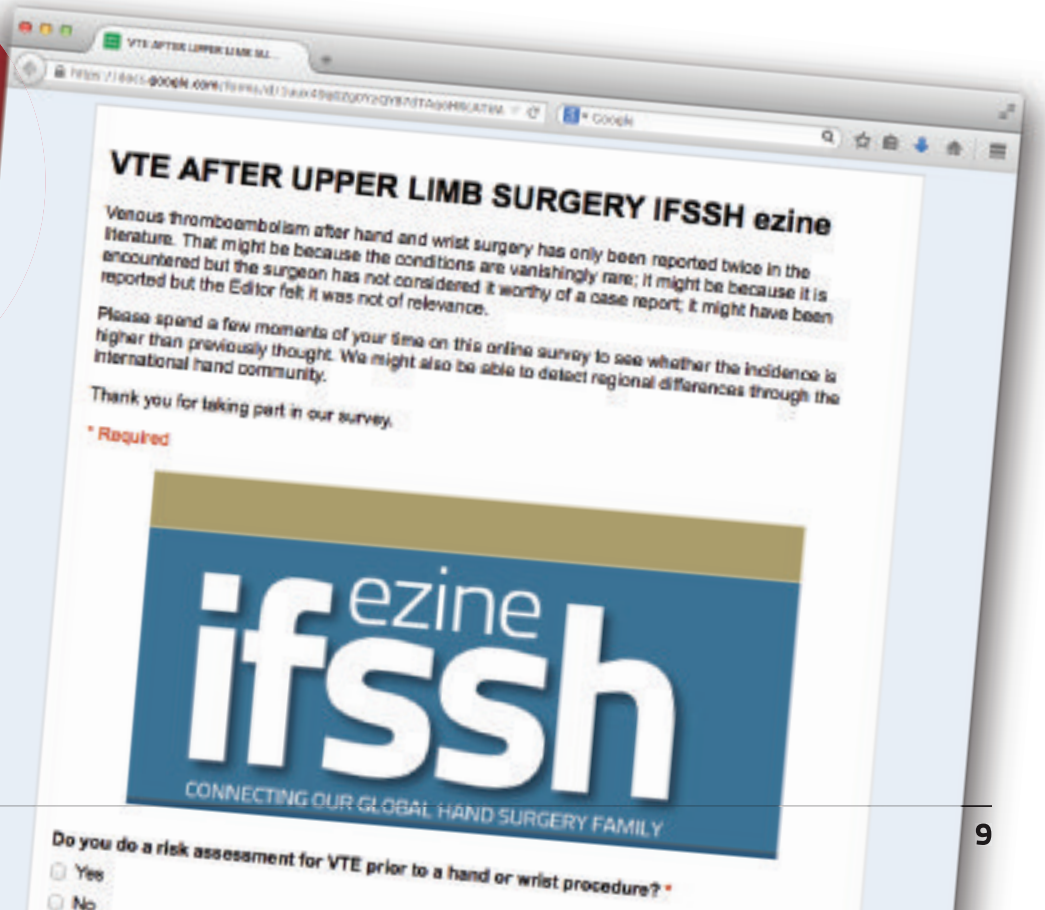
Tell us: How do you treat VTE?

Venous thromboembolism (VTE) after hand and wrist surgery has only been reported twice in the literature. That might be because the conditions are rare; it might be because it is encountered but the surgeon has not considered it worthy of a case report; it might have been reported but the Editor felt it was not of relevance.

Please spend a few moments of your time on this anonymous online survey to see whether the incidence is higher than previously thought. We might also be able to detect regional differences through the international hand community.

Thank you for taking part in our survey!

CLICK HERE



Member society updates

Brazilian Society of Hand Surgery

The Brazilian Society of Hand Surgery was founded in Rio de Janeiro on June 17 1959 and in 1985, SBCM moved its headquarters to São Paulo. In 1966, in Chicago, the SBCM, represented by Alipio Pernet, participated in the foundation of the International Federation of Societies for Surgery of the Hand.

The first Brazilian Meeting for Hand Surgery was held in 1967, in São Paulo. For several years, world experts in Hand Surgery participated in the Brazilian Meeting, such as Moberg, Starck, O'Brien, Vainio, Pulvertaft, Boyes, Wakefield, Tubiana, Kleinert, Bora, Swanson, Barton, Omer, Burkhalter, Gilbert, Steichen, Taleisnik, McFarlane, Manske and Green.

On November 22, 1992, SBCM participated in the founding of the South American Federation for Hand Surgery. In 1999, MANUS was launched. This informative newspaper is still published today in 2002, the medical residency in Hand Surgery in Brazil became a 2-year residency.

From 2004 to 2007, Dr Pardini chaired IFSSH. In 2005, the 'Club of the Hand Online' programme of continuing education was started.

SBCM
Sociedade Brasileira de Cirurgia da Mão

It is held until today. The webinar is presented in Portuguese and access is free for surgeons.

In 2013, the Journal HAND becomes a scientific publishing partner of SBCM. In 2014, the SBCM completes 55 years of existence. We are currently just over 500 members, distributed throughout Brazil. The 34th Meeting of Brazilian Society for Hand Surgery was realised in March 27-29, in the city of Maceio. 570 attendants took part with intense participation in the Scientific Programme.

The following photo shows a debate by participants during a session in 34th Meeting of Brazilian Society for Hand Surgery.

Thank You

Carlos Henrique Fernandes
General Secretary of Brazilian Society for Hand Surgery
Brazilian Society for Hand Surgery
atendimento@cirurgiadamao.org.br
www.cirurgiadamao.org.br

Asociación Boliviana de Cirugía de la Mano

The Asociación Boliviana de Cirugía de la Mano (ABOCIMA) was founded in 1997. In 2013, ABOCIMA was admitted to membership of the International Federation of Societies for Surgery of the Hand (IFSSH), with the support of IFSSH member nations such as Argentina. The scientific activities of ABOCIMA include:

- **1st PRACTICAL COURSE IN MICROSURGERY**
  15-20 November, 1993; Santa Cruz de la Sierra, Bolivia.
- **2nd PRACTICAL COURSE IN MICROSURGERY**
  24-26 March, 1994; Santa Cruz de la Sierra, Bolivia.
- **1st INTERNATIONAL SYMPOSIUM OF HAND AND UPPER LIMB SURGERY**
  6-8 March, 1996; Santa Cruz de la Sierra, Bolivia.

- **1st INTERNATIONAL COURSE OF SURGERY OF THE HAND AND UPPER LIMB**
  20-22 March, 1997; Santa Cruz de la Sierra, Bolivia.
- **INTERNATIONAL SYMPOSIUM AND MEETING OF EXPERTS IN HAND AND UPPER LIMB SURGERY**
  23-25 March, 2011; Santa Cruz de la Sierra, Bolivia.
- **1st ZANCOLLI COURSE and 1st BOLIVIAN-SPANISH INTERNATIONAL SYMPOSIUM ON ORTHOPAEDICS AND TRAUMATOLOGY**
  28-30 March, 2012; Santa Cruz de la Sierra, Bolivia.

ABOCIMA DIRECTORS: 2012-2014

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SECRETARY: MINUTES
Dr. Eduardo Omar Lizarazu Jaldin *VOCAL*
Dr. Juan Carlos Mendieta Rojas *VOCAL*

The Australian Hand Surgery Society

Every even year, the AHSS contributes to the Royal Australasian College of surgeons meeting, and every odd year the AHSS contributes to the Australian Orthopaedic Association Annual Scientific meeting. This year therefore the AHSS contributed to the RACS meeting.

The RACS Annual Scientific Congress was held in Singapore at the Marina Bay Sands Convention Centre form Monday May 5th to Friday May 9th 2014. The Hand Surgery Section was conducted over the Thursday and Friday of the congress.

The visiting speaker for the Hand Surgery Section was Professor Jagdeep Nanchahal, who was Professor of Hand, Plastic, and Reconstructive Surgery, at the Kennedy Institute of Rheumatology, at Oxford University in the United Kingdom.

This year the congress was run concurrently with the Australian and New Zealand College of Anaesthetists Annual Scientific Meeting. This offered opportunities for numerous combined academic sessions across the various specialty groups.

There were combined sessions with the Burns Surgery, Trauma Surgery, and Military Surgery Sections. There were combined sessions with Pain Medicine of the RACS, and the Chronic Pain Group from the College of Anaesthetists.

The Burn Surgery Department at Singapore General Hospital was represented by Dr Bien Keen Tan, and the other guest speaker was Dr Filip Stilleart from Ghent in Belgium, who was the visiting Professor in the Plastic Surgery Section.

There was a key note presentation from Professor Michael Tonkin, who is an AHSS member and currently President of the IFSSH.

Our guest Professor, Jagdeep Nanchahal, gave excellent presentations on the science behind fracture healing, and a master class on hand trauma reconstruction. He also presented a fascinating insight in to his research relating to the aetiology of Dupuytren's Disease. Over all there were 8 sessions or key note lectures, with over 20 papers presented.

The formal Hand Surgery Sections dinner was held in combination with the Plastic Surgery and Burns Surgery Department at the Fullerton Hotel on the Wednesday evening. The entire meeting was well attended by AHSS members.

Dr D Stabler
President
The Australian Hand Surgery Society

IFSSH Scientific Committee on Degenerative Arthritis – Distal Radioulnar Joint

Chair: Luis R. Scheker (USA), Committee: Chris Milner (United Kingdom), Ilse Degreef (Belgium), Gregory I. Bain (Australia), Eduardo R. Zancolli III (Argentina), Richard A. Berger (USA)

Report submitted April 2014

Part 1: Overview of Degenerative Arthritis – Distal Radioulnar Joint

Introduction

Disease of the distal radioulnar joint (DRUJ) has challenged the medical profession for centuries and has been approached through a diverse spectrum of medical and operative strategies. Where for decades, the mainstay of treatment for advanced DRUJ pathology has taken the form of distal ulna ablation, the modern era of advanced biomaterials has now coupled with new insights into the structure and function of the DRUJ to culminate in a complete repertoire of techniques to effectively address DRUJ pathology in all its forms, without sacrificing its essential role in hand function.

This review has been compiled by an international panel of hand surgeons, all with extensive expertise in treating DRUJ pathology even though collectively they have a broad range of opinion on the subject. Part 1 begins by summarising the latest ideas regarding osteoarthritic joint degeneration and its medical management, before looking at the structure and function of the DRUJ. This is followed by an evaluation of how OA impacts the DRUJ. Part 2 includes a history of how DRUJ OA has been surgically addressed and details current techniques including how these can help in the salvage situation following DRUJ ablation.

Articular Cartilage and Degenerative Joint Disease

Structure, Function and the Pathobiology of Osteoarthritis

Articular (hyaline) cartilage is a 2-4mm thick white layer of highly specialised tissue that forms the interfacing surface between bones that articulate within diarthrodial synovial joints[1]. The functional requirement of articular cartilage is to withstand and efficiently transmit load across the joint under both static conditions and during movement of the joint surfaces during articulation. Successful dynamic load transfer requires the articular cartilage to maintain a very low frictional coefficient even where local pressures reach high levels and this role must be maintained throughout the lifespan of the individual. Therefore, the health and function of the joint is dependent upon its correct initial formation during embryogenesis, maintenance during use and repair after injury. The structure of articular cartilage reflects these requirements and consists of highly specialised articular chondrocytes embedded within a tightly regulated extracellular matrix (ECM) scaffold of collagen and ground substance. Through the careful arrangement of structural collagen types II and IX around the extremely hygroscopic aggrecan-containing ground substance, articular cartilage is able to maintain a very smooth surface at the joint line in conjunction with structural resilience to applied loads. The synovial fluid contains lubricin and hyaluronan (HA) that both minimise frictional resistance and also deliver oxygen and nutrients to the isolated but metabolically active synoviocytes locked within the cartilage matrix. Finally, the highly vascular synovium controls synovial fluid composition and plays an essential role in cartilage homeostasis and repair

following injury [2].

Traditional descriptions of OA classify the disease into either primary or secondary types. Primary OA develops in previously intact joints with no obvious cause, whilst secondary OA follows a defined pre-disposition such as trauma, septic arthritis, joint instability or other identified syndromes with recognised joint involvement. However, these distinctions have increasingly lost their simplicity as evidence now demonstrates an inextricable interdependence between cause and effect in what is considered to be a multifactorial disorder involving interplay between genetic and environmental components [3-5].

Regardless of what initiates the cartilage damage in OA, a pathophysiological vicious circle of progressive cartilage damage and ineffective repair is triggered that ultimately leads to the typical signs and symptoms of OA. There is now no doubt that inflammation has a central role in driving this destructive process6. This evidence comes from numerous angles of investigation that demonstrate a physiological inter-dependence of all joint tissues including the synovium, subchondral bone, support ligaments, muscle and the articular cartilage itself [2,4,6-8]. Inflammatory joint synovitis in early-stage OA demonstrates hyperplasia, cellular infiltration, vasculogenesis and fibrosis [2,7]. The associated endothelial activation allows both the loss of lubricating HA and lubricin molecules and ingress of inflammatory cells and complement in the joint space, bathing the articular surface in hostile factors instead of the nutritive properties of normal synovial fluid [9]. This, together

"The DRUJ forms the distal half of the bicondylar articulation between the forearm bones that, in association with the proximal component, provides for up to 150 degrees of pronosupination of the forearm"

with possible direct injury to the cartilage itself, produces a phenotypic switch in the resident chondrocytes from their quiescent state to that of hypertrophic calcifying chondrocytes, normally only seen during embryogenesis of bone [10]. These changes are induced in response to circulating cytokines including IL-1β and TNF and are central to the pathological destruction of the articular matrix through their expression of bone-related MMPs [3,9] and especially [13 3]. Despite the ECM destruction, articular chondrocytes attempt repair by synthesising new ECM components, but these fail to distribute and assemble correctly [11]. At a macroscopic level, the accelerated and disorganised ECM remodelling process results in swelling and microscopic surface roughening of the cartilage surface known as fibrillation that is associated with a reduction in gliding properties [11]. Clinically, this is reflected in the loss of sheen of healthy articular cartilage when viewed through an arthroscope or by the naked eye. Fibrillation renders the joint susceptible to further friction-induced surface wear every time the joint is moved that exacerbates the damage and potentiates the inflammatory stimulus. In addition to ineffective remodelling of the ECM, articular chondrocytes also calcify the remaining cartilage in keeping with their hypertrophic phenotype, and this thins the overall depth of articular surface covering the subchondral bone. The subchondral bone also alters, undergoing sclerosis, with peri-articular osteophyte formation and reduced overall mineralisation. This results in a weakened foundation for the overlying articular cartilage that unfortunately occurs right below areas of greatest applied joint surface load [4]. These osseous changes reflect the typical bone oedema seen on MRI scanning of subchondral bone in joints affected by OA.

Epidemiology and the worldwide burden of OA

Osteoarthritis (OA) is the most common form of arthritis and ranks amongst the top three causes of disability in the USA [12,13]. OA is increasingly prevalent in older age, with a female preponderance that is typically more severe, with hand and knee involvement seen more frequently when compared to disease in male patients. OA is a heritable condition, varying by site and with an inherited component of between 50 and 65% [14,15]. Familial studies have revealed higher rates of OA in monozygotic versus dizygotic twins and it is more common in first degree relatives and siblings of affected individuals than in the general population [16]. Racial patterns of susceptibility also exist with high rates of hand and hip OA in Caucasian populations as compared to people

of Asian descent, whereas the reverse holds true for knee arthritis.

At the population level, 12.1% of the US population were shown to have clinically apparent OA in at least one joint, giving a figure of 26.9 million from population census figures for 2005 [12]. If this figure is extrapolated forward to indicate the proportion of the US population with OA in 2013 it rises to 28.8 million (data from US Census Bureau). Assuming similar prevalence rates throughout the world, this gives a worldwide figure of 648.8 million people with OA, and given the high immigrant representation within the US population, this estimate of world OA burden may not be an entirely unreasonable one. Despite increasing incidence by age, there is still a significant proportion of individuals affected by OA who are of working age and several studies have examined the socio-economic impact associated with loss of productivity secondary to symptomatic OA [13,17,18]. Using the 2009 National Health and Wellness Survey, DiBonaventura found that workers with symptomatic OA were more likely to be older, female and with a higher BMI, and there was also a significantly higher usage of healthcare resources, including medical costs 1.5 times higher than those associated in workers without OA. OA has also been shown to develop in younger age groups who are involved in heavy manual labour, with other studies estimating up to 12% of symptomatic OA following trauma when considering disease of the hip, knee or ankle. This is associated with a potential healthcare bill of 0.15% of the total health care cost per annum [18,19].

"More advanced joint destruction can mirror some features characteristic of rheumatoid arthritis at the DRUJ, with volar subluxation of the radius."

For OA specific to the hand, the prevalence was found to be 27.2% overall in the Framingham study of 2400 participants of age 26 or greater, rising to over 80% in older individuals (with values considerably lower than this found in another study which identified symptomatic OA in patients over 60 years of age to be only 8%) [12,20]. Extrapolating these values for hand OA to a national level, Lawrence et al estimated the prevalence of symptomatic OA to be in excess of 13 million people in the USA based on population statistics for 2005. OA figures specific to the DRUJ are harder to evaluate, as there are few studies that provide epidemiological data that includes disease in this joint. Nevertheless, in a cross-sectional study of ulnar sided wrist pain, Katayama et al found 12.3% of 1128 patients had radiographic evidence of primary OA of the DRUJ 21. Due to the selective nature of subjects included in this study, it is impossible to relate DRUJ OA to overall rates of hand or total OA at a population level.

Current Approaches to Medical Treatment of Osteoarthritis

Unlike the revolutionary development of disease modifying drugs available for rheumatoid arthritis (RA), OA remains frustratingly elusive to similar attempts at arresting the pathological disease process. Therefore, whilst there are tried and tested techniques of pain management, the inexorable progression of joint damage in OA is often addressed through surgical joint reconstruction and the expansion in the arthroplasty industry reflects this. The current paradigm for non-surgical management in OA in general is therefore to address pain and optimise joint function such that the morbidity of the disease can be reduced to a minimum for the longest period of time possible before surgery becomes unavoidable.

In general terms, preservation of joint function is achieved through a combination of physical therapy, patient education, and pain control [22]. For pharmacological pain management in mild to moderate OA, there is a major reliance on simple drugs such as acetaminophen and NSAIDS. Opioid drugs are useful in moderate to severe OA pain but again bring their own side effects including constipation and possible dependence. In patients who eventually fail to obtain durable pain control from these analgesics, temporary joint splintage and intra-articular or oral steroid therapy can bring effective symptom control. Such patients frequently undergo serial steroid administration in an attempt to stave off surgery for as long as possible. Other attempts to improve joint function and pain control have seen some success through the intra-articular injection of HA, especially in its highly cross-linked form. Nevertheless, HA is expensive and has not been shown to arrest disease progression or attain a clear advantage for symptom control

over NSAIDS. Likewise, Glucosamine and Chondroitin sulphate have been purported to have a beneficial effect on symptomatic OA but their beneficial effect has yet to be conclusively demonstrated in clinical trials.

The use of biological disease modifying drugs (DMDs) that have been so effective in RA have so far shown mixed results in OA despite the core inflammatory process at the heart of both disease processes [6]. The mixed results seen with anti-TNF and anti-Il-1 drugs may due to the small number of existing human studies, compounded by the diverse modes of drug administration used. Ongoing trials in this area may hopefully replicate the positive results and definitive inhibition of joint deterioration conclusively seen in animal studies.

Finally, there is increasing interest in the use of mesenchymal stem cells (MSC) to treat OA. It is postulated that the pluripotent nature of MSC make them well placed to counteract the OA phenotype through down-regulation of the inflammatory process, and restitution of the correct articular cartilage framework both through modulation of the behaviour of resident chondrocytes and direct ECM generation [23]. Certainly, there is now clear in-vitro evidence for chondrocyte behaviour control by MSC, and initial reports of its therapeutic use in animals are encouraging. To date, the very limited reports of MSC use in human OA have not demonstrated successful reconstitution of lost articular cartilage, but have reported symptomatic improvement [24]. Concerns with MSC therapy include unwanted cell migration distant from the site of joint administration and secondary expression of unwanted phenotypic behaviour such as bone formation. There are also concerns over the generation and /or potentiation of neoplastic cell growth and disease transmission during the in-vitro cell processing stages prior to clinical use.

Osteoarthritis and the Distal Radioulnar Joint

Basic Anatomy and Function of the DRUJ

The DRUJ forms the distal half of the bicondylar articulation between the forearm bones that, in association with the proximal component, provides for up to 150 degrees of pronosupination of the forearm [25]. This motion makes up a great proportion of hand functionality and is essential for activities of daily living. The difference between the DRUJ and other bicondylar joints such as the knee and the digital interphalangeal joints is that in the forearm, each bone has a condyle at one end. The proximal condyle (radial head) of the radius articulates with the lesser sigmoid notch or radial notch of the ulna. Distally, the ulnar condyle (ulnar head) articulates with the radius at the sigmoid notch. The two areas of contact between the radius and ulna form the radioulnar joint, with the proximal half known as the proximal radioulnar joint (PRUJ) while the distal half is the DRUJ. Both halves move together, and pathologies affecting one part will affect the other. The radius and ulna have different functions and their anatomy reflects this. The ulna is relatively straight in shape and, through its articulation with the humerus, provides flexion and extension of the elbow by virtue of the insertion of the brachialis distal to the coronoid process of the ulna and the triceps insertion into the olecranon. In contrast to the ulna, the radius has a curved "S" profile, with a broad funnel-shaped distal end composed mainly of cancellous bone that is responsible for accepting axial load and transferring it through its shaft towards the radial head and capitellum. The radius is attached to the ulna by the annular ligament proximally and the triangular fibrocartilage complex (TFCC) distally. At the DRUJ, the radius and ulna have differential radii of curvature, making this hemi-joint incongruent with only a thin line of direct cartilage contact, akin to the contact point of a car tyre to the road surface. This discrepancy permits slight translation of the radius in the antero-posterior plane during pronation and supination as it rotates around the head of the ulna. If the TFCC were tight enough to prevent translation in neutral rotation, there would be no pronosupination possible. Indeed, much work has been performed to understand the exact role of the deep and superficial fibres of the distal radioulnar ligaments (DRUL) that regulate the tightly controlled transition from full pronation to full supination [25-27]. As the sigmoid notch moves from full supination to full pronation, its contact area with the seat of the ulna reduces to as little as 10% of the available joint surface in full pronation [28,29].

In considering the part played by the interosseous membrane (IOM) in DRUJ stability, it is erroneously ascribed

the function of axial load transfer between the radius and ulna. As shown by Skahen et al, the tension in the central band of the IOM during axial loading of the forearm is actually very little unless the radial head is excised, indicating a major load transfer directly to the humerus via the capitellum of the radius [30,31]. Rather, the two most important functions of the IOM are firstly to unify the radius and ulna into a single unit during full supination for the purposes of lifting; a situation where the IOM is under tension and thereby converts the radius and ulna biomechanically into a single structure that the biceps and brachialis can act in concert upon as pure elbow flexors. The other function of the IOM is that of preventing excessive bowing of the curved radius as seen in boxers like Frank Bruno, who could generate 1420lb or 53g of acceleration to the head of their opponent [32]. Whilst there are additional stabilizing roles ascribed to the ECU tendon and subsheath, ulnocarpal ligaments and pronator quadratus, the principal stabilising structures at the DRUJ are the dorsal and volar distal radioulnar ligaments of the TFCC complex.

Functionally, the forearm has the important task of placing the hand in the positions necessary for its work and, in so doing, has to handle two discreet sets of forces acting upon it. Firstly, the forearm must handle axial loads that pass principally through the radiocarpal interface such as in hand grip or pushing against resistance such as in opening a door. Secondly, the hand and any associated carried load must be supported against the force of gravity and this is the function of the ulna [28,33,34]. Whilst the biceps and brachioradialis have been described as having roles in forearm flexion, biophysical studies have demonstrated that elbow flexion is principally the action of the brachialis muscle where it inserts into the coronoid process of the ulna. The biceps is primarily a supinator until full supination is reached (see above) whilst brachioradialis cannot voluntarily be activated without simultaneous triceps activation and therefore acts principally as a modulator of elbow movement [35]. If this is appreciated, then the importance of the joint reaction force provided by the head of the ulna in supporting the hand and radius can be realised [36]. It was with the dynamic radiographic studies performed by Lees and Scheker that the loss of the supporting function of the ulnar head was emphatically demonstrated in patients who had previously undergone ulnar head removal during the Darrach or Sauve-Kapandji procedures [37]. In these experiments, painful impingement of the ulnar stump against the radius was easily reproduced when the patient was asked to bear weight in the ipsilateral hand (Figure 1). Therefore, in evaluating any existing or proposed new DRUJ reconstructive procedure, it is essential to evaluate the lifting capacity of the forearm before passing judgement on its success or otherwise. Finally, if the supporting role of the ulna is appreciated, then the manner of current reference to DRUJ instability can become misleading. For example, instability, subluxation and dislocation of the DRUJ are typically defined on the basis of the ulnar head placement relative to the radius and radiocarpal joint. For example, if the ulnar head is prominent dorsally, it has traditionally been referred to as "dorsal dislocation of the ulna". In reality, these positions of joint instability are brought into being through gravitational forces acting on the unsupported radiocarpal unit and it is in fact, the ulna that is in the correct position. It is therefore the radius that has subluxed or dislocated.

In order for the forearm to perform its functions correctly, all of

Figure 1: Dynamic lateral forearm radiograph demonstrating ulnar impingement upon the radius as it supports the carpus and hand against the force of gravity. Upper X-ray – conventionally acquired A-P view, lower X-ray – dynamic film taken with the patient holding a weight against gravity. Note the wear pattern on the contact surface of the ulna from regular such impingement during activities of daily living.

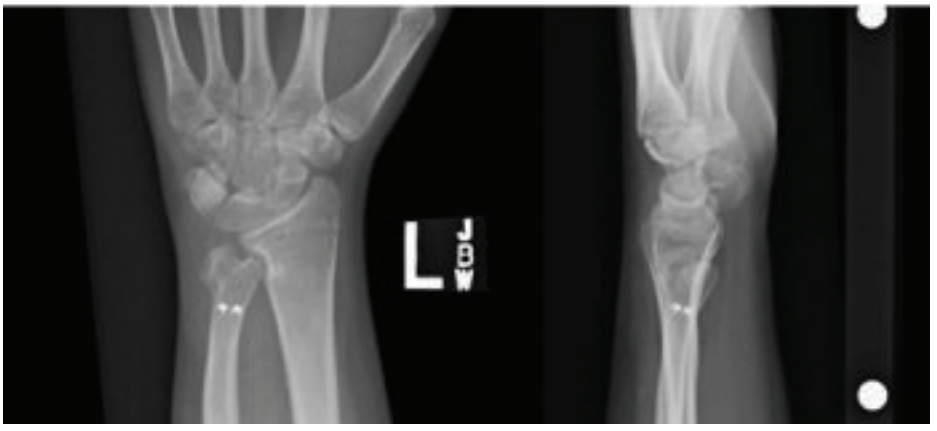

Figure 2: Demonstration of the 'scallop sign' in the sigmoid notch of the radius as seen in advanced osteoarthritis of the DRUJ. This X-ray was taken of a 16 year old patient with advanced DRUJ arthrosis following previous forearm fracture and multiple corrective surgeries.

its anatomical components must be maintained, and therefore it is essential to address and restore normal anatomy following fracture or ligamentous injury.

Osteoarthritis at the DRUJ

Osteoarthritis can affect any synovial joint and the DRUJ is no exception. As in other areas of the body, DRUJ OA develops from both primary and secondary causes. In addition to the acquired abnormalities of ECM component structure and function discussed above, primary OA specific to the DRUJ is more common in females, and is associated with positive ulnar variance [21,38]. Secondary causes of DRUJ OA are extensive but generally result from either pathological incongruence or instability at the DRUJ, and follow either direct or indirect trauma from fracture or injury to the soft tissue stabilising structures, namely the distal radioulnar ligaments. Instability describes the abnormal path of articular contact that occurs either during or at the end of the range of motion and may follow an alteration in joint surface congruence, as well as deficiencies in the controlling distal radioulnar ligaments that permit excessive movement and shear force across the joint. Incongruence at the DRUJ describes an alteration to the precise point of contact between the joint surfaces that can produce unnatural joint loading and accelerated wear, as seen in congenital DRUJ abnormalities such as the Madelung deformity, following direct articular damage from distal radial fractures, or after acute or longstanding loss of normal joint biomechanics through instability (For the purposes of the rest of this document, incongruence is used in reference to pathological joint mechanics and not the physiological incongruence of the curvatures of the normal radioulnar interface at the DRUJ). Specific causes of instability include direct TFCC component damage (including Galeazzi fracture dislocations), distal radial malunion, and instability following radial head excision in the Essex Lopresti injury. Other causes of DRUJ dysfunction include arthrosis following infection and the instability associated with rheumatoid arthritis that fall outside the remit of this review.

"Establishing the nature of DRUJ dysfunction in symptomatic patients is an essential task to perform before embarking upon treatment and this must include an appreciation of the load-bearing role of the ulna, be it a problem of incongruence, instability or both."

If early, treatable joint pathologies are not appropriately addressed, DRUJ arthrosis can develop and manifests clinically with pain on pronosupination of the forearm, especially under load. Assessing the functionality of the DRUJ under such loadbearing conditions is easy and can be achieved by examiner-placed pressure on the patient's wrist whilst the patient is asked to pronosupinate the forearm. This motion loads the DRUJ and will elicit pain if articular wear has developed [39]. More advanced OA of the DRUJ is associated with all of the radiographic hallmark features of OA including osteophyte formation, joint space narrowing and sclerosis as well as the so-called scallop sign of sigmoid notch erosion originally described in rheumatoid arthritis (Figure 2) [40]. More advanced joint destruction can mirror some features characteristic of rheumatoid arthritis at the DRUJ, with volar subluxation of the radius. When joint degeneration reaches this stage, the extensor tendons frequently suffer attrition-rupture over the prominent ulnar head akin to that seen in Vaughan-Jackson syndrome [41-44]. The functional

significance of DRUJ loadbearing and the development of OA are of relevance for two reasons. Firstly, as described above, there is a only a small point of direct bony contact across the DRUJ leading to locally high pressures exerted on the articular cartilage. In addition, the movement of this bone contact through pronosupination generates high shear forces across the joint as the radius moves progressively into pronation or supination from neutral at which shear force is zero. With so little direct contact at an incongruent joint interface, the health and integrity of the DRUJ articular cartilage is heavily reliant upon the maintenance of correct joint alignment afforded principally by the distal radio-ulnar ligaments of the TFCC complex, and to a lesser extent, the secondary DRUJ stabilisers including the interosseous membrane, ECU and subsheath and pronator quadratus fibres [26,29,38].

Clinical Aspects of DRUJ Degeneration

Establishing the nature of DRUJ dysfunction in symptomatic patients is an essential task to perform before embarking upon treatment and this must include an appreciation of the load-bearing role of the ulna, be it a problem of incongruence, instability or both. In our experience, the treatment plan should be tailored after assessing the presence, direction and degree of instability, the congruency of the DRUJ, and the ulnar variance. Pathology affecting any of these areas can result in pain, decreased strength, limited range of motion, and loss of forearm function. The following discussion will concentrate on the pathology associated with DRUJ dysfunction that can lead to OA.

Clinical DRUJ instability progresses from dynamic to static in four stages. In stage 1 (dynamic instability), the patient complains of a "giving away" sensation with no obvious clinical or radiographic sign [36]. In stage 2 (secondary dynamic instability), the symptoms are the same as in stage 1, but the joint can be subluxed or dislocated. In stage 3 (static instability), limited motion and pain become prominent features. The joint rests in an unstable position, but can be reduced and plain radiographs demonstrate subluxation and malalignment. In stage 4 (advanced static instability), limited motion is the predominant feature, and a fixed deformity is established at the DRUJ, with an increased risk of osteoarthritis. From a pathological standpoint, Bowers has identified four types of instability based on abnormalities within the different structures that make up the DRUJ [45]. Group 1 includes ligamentous defects, group 2 has loss of ligamentous tension due to deficiencies in intra-articular joint conformation, group 3 comprises a combination of ligamentous and articular surface problems whilst group 4 demonstrates ligamentous deficiency with extra-articular problems, such as distal radius metaphyseal malunion. Although the Bowers classification system is useful for identifying DRUJ pathology, appropriate management is usually based on the stage of the disease, not the initial pathology. Scheker, Ozer and Babb [46] have classified the instability of the DRUJ as:

Stage 1: TFC attenuation.
Stage 2: TFC disruption (no DRUJ dislocation or distal radius fracture).
Stage 3: TFC disruption, DRUJ dislocation (no distal radius fracture).
Stage 4: TFC disruption, DRUJ dislocation, fracture (distal radius fracture, malunion)
Stage 5: Radial instability following ulnar head resection.

References

1. Sophia Fox AJ, Bedi A, Rodeo SA. The basic science of articular cartilage: structure, composition, and function. Sports Health. 2009;1(6):461-468.
2. Scanzello CR, Goldring SR. The role of synovitis in osteoarthritis pathogenesis. Bone. 2012;51(2):249-257.
3. Li Y, Xu L, Olsen BR. Lessons from genetic forms of osteoarthritis for the pathogenesis of the disease. Osteoarthritis Cartilage. 2007;15(10):1101-1105.
4. Lories RJ, Luyten FP. The bone-cartilage unit in osteoarthritis. Nat Rev Rheumatol. 2011;7(1):43-49.
5. Pitsillides AA, Beier F. Cartilage biology in osteoarthritis--lessons from developmental biology. Nat Rev Rheumatol. 2011;7(11):654-663.
6. Kapoor M, Martel-Pelletier J, Lajeunesse D, Pelletier JP, Fahmi H. Role of proinflammatory cytokines in the pathophysiology of osteoarthritis. Nat Rev Rheumatol. 2011;7(1):33-42.
7. Oehler S, Neureiter D, Meyer-Scholten C, Aigner T. Subtyping of osteoarthritic synoviopathy. Clin Exp Rheumatol. 2002;20(5):633-640.
8. So A, Busso N. Osteoarthritis: Crystal-gazing into the pathogenesis of osteoarthritis. Nat Rev Rheumatol.

2011;7(12):688-689.
9. Lotz MK, Kraus VB. New developments in osteoarthritis. Posttraumatic osteoarthritis: pathogenesis and pharmacological treatment options. Arthritis Res Ther. 2010;12(3):211.
10. Drissi H, Zuscik M, Rosier R, O'Keefe R. Transcriptional regulation of chondrocyte maturation: potential involvement of transcription factors in OA pathogenesis. Mol Aspects Med. 2005;26(3):169-179.
11. Heinegard D, Saxne T. The role of the cartilage matrix in osteoarthritis. Nat Rev Rheumatol. 2011;7(1):50-56.
12. Lawrence RC, Felson DT, Helmick CG, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. Arthritis Rheum. 2008;58(1):26-35.
13. Dibonaventura M, Gupta S, McDonald M, Sadosky A. Evaluating the health and economic impact of osteoarthritis pain in the workforce: results from the National Health and Wellness Survey. BMC Musculoskelet Disord. 2011;12:83.
14. Michou L. Genetics of digital osteoarthritis. Joint Bone Spine. 2011;78(4):347-351.
15. Zhang Y, Jordan JM. Epidemiology of osteoarthritis. Clin Geriatr Med. 2010;26(3):355-369.
16. Simonet WS. Genetics of primary generalised osteoarthritis. Mol Genet Metab. 2002;77(1-2):31-34.
17. Maetzel A. The economic burden associated with osteoarthritis, rheumatoid arthritis, and hypertension: a comparative study. Annals of the Rheumatic Diseases. 2004;63(4):395-401.
18. Rossignol M, Leclerc A, Allaert FA, et al. Primary osteoarthritis of hip, knee, and hand in relation to occupational exposure. Occup Environ Med. 2005;62(11):772-777.
19. Brown TD, Johnston RC, Saltzman CL, Marsh JL, Buckwalter JA. Posttraumatic osteoarthritis: a first estimate of incidence, prevalence, and burden of disease. J Orthop Trauma. 2006;20(10):739-744.
20. Dillon CF, Hirsch R, Rasch EK, Gu Q. Symptomatic Hand Osteoarthritis in the United States. American Journal of Physical Medicine & Rehabilitation. 2007;86(1):12-21.
21. Katayama T, Ono H, Suzuki D, Akahane M, Omokawa S, Tanaka Y. Distribution of primary osteoarthritis in the ulnar aspect of the wrist and the factors that are correlated with ulnar wrist osteoarthritis: a cross-sectional study. Skeletal Radiol. 2013;42(9):1253-1258.
22. Brandt KD. Non-surgical treatment of osteoarthritis: a half century of "advances". Ann Rheum Dis. 2004;63(2):117-122.
23. van der Kraan PM. Stem cell therapy in osteoarthritis: a step too far? BioDrugs. 2013;27(3):175-180.
24. Pastides P, Chimutengwende-Gordon M, Maffulli N, Khan W. Stem cell therapy for human cartilage defects: a systematic review. Osteoarthritis Cartilage. 2013;21(5):646-654.
25. Hagert E, Hagert CG. Understanding stability of the distal radioulnar joint through an understanding of its anatomy. Hand Clin. 2010;26(4):459-466.
26. Acosta R, Hnat W, Scheker LR. Distal radio-ulnar ligament motion during supination and pronation. J Hand Surg Br. 1993;18(4):502-505.
27. Schuind F, An KN, Berglund L, et al. The distal radioulnar ligaments: a biomechanical study. J Hand Surg Am. 1991;16(6):1106-1114.
28. Bell MJ, Hill RJ, McMurtry RY. Ulnar impingement syndrome. J Bone Joint Surg Br. 1985;67(1):126-129.
29. Huang JI, Hanel DP. Anatomy and biomechanics of the distal radioulnar joint. Hand Clin. 2012;28(2):157-163.
30. Skahen JR, 3rd, Palmer AK, Werner FW, Fortino MD. Reconstruction of the interosseous membrane of the forearm in cadavers. J Hand Surg Am. 1997;22(6):986-994.
31. Skahen JR, 3rd, Palmer AK, Werner FW, Fortino MD. The interosseous membrane of the forearm: anatomy and function. J Hand Surg Am. 1997;22(6):981-985.
32. Atha J, Yeadon MR, Sandover J, Parsons KC. The damaging punch. Br Med J (Clin Res Ed). 1985;291(6511):1756-1757.
33. Hagert CG. The distal radioulnar joint in relation to the whole forearm. Clin Orthop Relat Res. 1992(275):56-64.
34. Kleinman WB. Stability of the Distal Radioulnar Joint: Biomechanics, Pathophysiology, Physical Diagnosis and Restoration of Function. In: Slutsky D, ed. Principles and Practice of Wrist Surgery. First ed. Philadelphia: Saunders Elsevier; 2010:41-55.
35. Boland MR, Spigelman T, Uhl TL. The function of brachioradialis. J Hand Surg Am. 2008;33(10):1853-1859.
36. Kleinman WB. Stability of the distal radioulna joint: biomechanics, pathophysiology, physical diagnosis, and restoration of function what we have learned in 25 years. J Hand Surg Am. 2007;32(7):1086-1106.
37. Lees V, Scheker, LR. The Radiological Demonstration of Dynamic Ulnar Impingement Journal of Hand Surgery European Volume. 1997;22B:448-450.
38. Zimmerman RM, Kim JM, Jupiter JB. Arthritis of the distal radioulnar joint: from Darrach to total joint arthroplasty. J Am Acad Orthop Surg. 2012;20(10):623-632.
39. Scheker LR, Ozer K. A simple method of physical examination for the diagnosis of distal radioulnar joint incongruity. European Journal of Plastic Surgery. 2004;27(1):42-43.
40. Freiberg RA, Weinstein A. The scallop sign and spontaneous rupture of finger extensor tendons in rheumatoid arthritics. Clin Orthop Relat Res. 1972;83:128-130.
41. Couturier CA, Alnot JY. [Non-traumatic osteoarthritis of the distal radio-ulnar joint: a consecutive series of 11 wrists with 42 months follow-up]. Rev Chir Orthop Reparatrice Appar Mot. 2002;88(6):573-581.
42. Tanaka T, Kamada H, Ochiai N. Extensor tendon rupture in ring and little fingers with DRUJ osteoarthritis without perforating the DRUJ capsule. J Orthop Sci. 2006;11(2):221-223.
43. Yamazaki H, Uchiyama S, Hata Y, Murakami N, Kato H. Extensor tendon rupture associated with osteoarthritis of the distal radioulnar joint. J Hand Surg Eur Vol. 2008;33(4):469-474.
44. Cho CH, Lee SW. Extensor tendon rupture caused by instability of the ulnar head with an osteoarthritic distal radioulnar joint: a case report. J Med Case Rep. 2013;7(1):281.
45. Bowers WH. Instability of the distal radioulnar articulation. Hand Clin. 1991;7(2):311-327.
46. Scheker LR, Ozer K, Babb BA. Distal Radioulnar Joint Problems and Solutions. Surgery of the Injured Hand - Towards Functional Restoration. New Delhi: Jaypee Brothers Medical Publishers ☒ Ltd.; 2009:458-474.

IFSSH Scientific Committee on Musician's Hand

Chair: Naotaka Sakai (Japan)
Committee: Peter C. Amadio (USA), Ian Winspur (UK), Steve Leibovic (USA), Peter Bentivegna (USA)
Report submitted September 2013

Report of the IFSSH Musician's Hand Committee, 2013

As musicians require quite specific hand movements for performance, hand afflictions are a serious problem for their professional career. Some physicians noticed the problems in 19th century, and Poore reported the hand pain of professional pianists in 1887[1].

However, there have been few medical reports concerning the musician's health until the 1980s [2-6]. In addition, medical conferences focusing on musicians were organised, such as the Performing Arts Medicine Association (PAMA) symposium, and the European Congress for Musician's Medicine (ECMM). However, as there were few hand surgeons participating, the discussions on the musician's hand could not include causes and management in detail.

As the hand surgeon is a specialist of hand clinical matters, the discussion by the IFSSH members allows more specific and more relevant discussion to be focused on the musician's hand.

The musician's hand committee is composed of five IFSSH members and three advisers: Dr Kai-Nan An as an adviser for the biomechanics; Dr. Richard C. Lederman and Dr. Eckart Altenmuellar as advisers for the focal dystonia.

Background of the musician's hand

1. New criteria for musician's hand

As the musician's hand has so many aspects, it brings many new concepts to the world of general hand surgery. Certainly, there are not so many professional musicians, but understandably the treatment of the musician's hand may be a key to open the door to alternative methods of assessment and treatment of other conditions by hand surgeons.

For example, most criteria for the clinical results include only static evaluation such as range of motion, i.e. maximum and minimum flexion angle, grip or pinch strength. Radiological parameters also show only static positions. DASH tries to evaluate some hand activities, but is not detailed enough to evaluate the musician's hand activity. Many musicians require a quick speedy movement of their fingers which cannot be evaluated with any criteria so far published. Although the hand surgeon may be satisfied with the clinical result of a good score, some musician patients are not satisfied because they cannot do their performance quickly enough. This suggests that new criteria need to be established and these would be applicable not only to musicians, but for any other patients who needs a quick occupational hand motion such as the typist, cook, sculptor, or others.

2. Re-evaluation of conservative treatment

Another aspect of management of the musician's hand is a re-evaluation of non-surgical treatment to avoid surgical complications. Tenosynovial release is a simple, very easy surgical procedure and the result is usually good. However, some musicians complain of subluxation of tendons following this surgery, e.g. tendon bowing, as it brings a poor effect to their music performance. The 1st compartment release for de Quervain's disease may result in tendon subluxation when playing on the piano keyboard. Even small, minor surgery changes the physical structure and some of these could result in poor effect for the patient's hand activity. Similarly, carpal tunnel release may result in bowing of flexor tendons and a similar complaint may be found among string players. It also affects other occupational hand functions. Corticosteroid injection using triamsinolone gives an excellent result for any kind of tenosynovitis, and the

Figure 1 (left): One of the violinists had difficulty in holding the string with Dupuytren's contracture. Figure 2 (right): But he was satisfied with the result of conservative treatment. Even though the ring finger also showed a limited range of motion, he never wanted more improvement.

injection technique has been proposed as providing a better result. However, corticosteroid has serious potential side effects including tendon rupture, and better injection material is expected. Amadio and colleagues have studied the excursion inside the tenosynovium, and clarified its structural mechanism [7].

Concerning non-surgical treatment, conditions such as carpal and cubital tunnel syndrome, osteoarthritis including the Hebereden's node and 1st CMC joint arthrosis, and Dupuytren's contracture should be additionally discussed.

3. Practice for music performance

The third point is that musicians do not want to stop their practice for music performance. They complain that most physicians would firstly recommend a rest from practice. However, they need to consume several hours for music instrumental practice to maintain their performance technique. Otherwise they cannot complete the performance to the high, professional level which the audience expects. In order to maintain their performance technique level, to continue to practise, hand surgeons should consider what they can and what they cannot do. We may have to re-evaluate the after-treatment for an early return to stage. Minimally invasive or endoscopic surgery cannot resolve the problem. Discussion of problems of the musician's hand should be more directly related to kinematics of the human hand, and this would be appropriate not only for musicians, but for any other patients with hand problems.

4. Interface between the instrument and hand

The fourth point is that we hand surgeons should remember that the hand is always directly related to the object. Therefore, the man-machine interface between the hand and the object should be more closely considered with any hand problems. Music instruments often require musicians to adopt an unreasonable hand position or motion. Consider the unnatural hand position of the violinist or flautist. If instruments were tools of daily use, they would have been totally changed in design from an ergonomic point of view. However, most music instruments cannot be changed and retain their unique tone. For example, string instruments have been unchanged for 300 years. Therefore, the musician's hand must adapt itself to the type of music instrument. The hand surgeon should consider not only the hand condition, but the interface between the hand and the music instrument. This is also so for general hand patients.

5. Psychosomatic factor of musicians

The fifth point is the psychosomatic factor of the musician's hand. Usually, musicians are nervous about their hand condition, because even small changes could create a serious problem or disability for their specific, music performance. This feature may often be related to a psychosomatic factor. Hand surgeons cannot avoid or underestimate the importance of a psychosomatic factor, because the hand is a mirror of brain activity.

6. Focal hand dystonia

Focal dystonia should also be discussed when assessing the problems confronting the musician's hand. This is a most difficult musician's disease to treat, and so serious for them as to cause them to give up their professional carrier. Dystonia should be discussed not only by hand surgeons, but by neurologists. I have asked two neurologists who are well known for

musician's dystonia to contribute their thoughts.

Surgical indications for musicians

Among the discussion points on the musician's hand, surgical indication was thought to be one of the most important ones, because musicians sometimes have a specific need, in order to improve or maintain their performance activities, rather than simply undertake their daily living activities.

For example, with Dupuytren's contracture, some musicians with a small contracture need surgery, but in the others, especially some violinists, digital flexion contractures can exist with no functional loss even when joints are contracted to a degree where surgery is normally indicated. One violinist with a Dupuytren's contracture had difficulty in holding the string (Figure 1, Dr. Sakai's patient), but he was satisfied with the result of conservative treatment, even though the ring finger showed a limited range of motion (Figure 2).

Concerning the surgical indication for musicians, Dr. Winspur offered a general comment as follows:

"Surgical indications, the analysis of the risks of surgery versus the benefits, differ in musicians from those in the general public. In some circumstances the indications are looser and in others much stricter and they may vary from instrument to instrument."

Trauma

In the repair/reconstruction of an injury in a musician one must strive for 100% return of function and balance. This may mean a complex anatomical repair or reconstruction when a simpler compromise may be available. Simple examples would be the repair of very distal digital nerve lacerations or digital or cutaneous nerves on the less important aspects of digits. A further example would be the repair of an extensor tendon when the function of that tendon is reduplicated or of minor importance generally; or the secondary reconstruction of divided tendons by tendon grafting when the simpler option of tendon transfer or arthrodesis may be available and is known to work well in the general population. The indications therefore for anatomical repair are much greater in a musician than in the general population.

"As the musician's hand has so many aspects, it brings many new concepts to the world of general hand surgery."

Non-trauma

In the simplest terms, if the medical condition is interfering with a musician playing at their own high level and all options of conservative care, adjustment of technique and adjustment of the instrument have been exhausted or are not applicable, surgery is indicated. This may be at a later point than in the general population or earlier. An example would be Dupuytren's contracture which in the left hand in string players causes little interference with playing even with a contracture well past the point one would normally have recommended treatment. In these circumstances surgery should be withheld until playing is compromised. Conversely musicians requiring wide span – pianists and bassoon players are two examples – are compromised by very early disease in the palm without digital contracture and surgery or collagenase injection is indicated at this early point when not in the general population.

Nerve compression syndromes

The commonest operations performed on musicians electively are release of entrapped nerves particularly release of the carpal tunnel. However not all musicians suffering tingling in the fingers, even in the median distribution, have compression of the median nerve and this group fare very badly with inappropriate surgical release. The indication for surgical release of the carpal tunnel in a musician is interference with playing AND positive nerve conduction testing and this also applies to all other nerve compression syndromes amenable to nerve conduction testing.

Summary

Indications vary from musician to musician, from instrument to instrument and from medical condition to medical condition and are different from those in the general population. When a musician has injured structures from open or closed trauma anatomical reconstruction should be the goal even when not indicated in a non-musician. When a musician is suffering a non-traumatic condition, surgery is only indicated when all other modalities of treatment or adjustment have been

exhausted and the condition prevents the musician from playing.

EPL rupture - Transfer or graft?

As the first topic of detailed committee discussion, we chose the extensor pollicis longs (EPL) rupture, which usually needs a reconstruction because of degenerative changes in the end of ruptured tendon. Either extensor indicis proprius (EIP) transposition or a free autologous tendon graft using the palmaris longus tendon may be usually used. Especially, our question is whether the EIP transfer would bring poor effect on the index finger's independent movement or not. If its extension would be limited, it would be a serious problem for musicians, just as for string players.

One committee member has a case of professional violinist with an EPL rupture, who sustained the injury 3 years ago but did not have a surgical treatment of EIP transfer. She complained that no surgeon could explain the residual effect of loss of the EIP, and that the right index finger is most important for any violinist's performance. She also did not accept alternative surgery with a free tendon graft, because of the risk of avascular necrosis of graft and long time immobilisation. Fortunately, she could hold the bow to complete the music performance, without full extension of the thumb IP joint, but had some difficulty in her daily activities.

Schaller et al. compared the clinical results between the EIP transposition and the tendon graft, and concluded that there were no differences in thumb function [8]. They stated that the risk of avascular necrosis of the graft may be limiting factors for the tendon graft, while the limited function of the index finger may be a disadvantage of EIP transfer. DeSmet et al. and Noorda et al. investigated clinical results after EIP transposition, and they noticed limited function of the index finger [9, 10]. However, they did not describe this in detail, because there were no complaints on the subjective assessment in patients.

On the other hand, Browne et al. reported that index finger extension lag after EIP transfer was not caused by removal of the force of tendon, but by factors that caused either disruption of normal hood function or tethering of its normal excursion [11]. They recommend a repair of the hood at the EIP transfer procedure, to prevent this extension lag. Moore et al. claimed that independent extension of the index finger was retained by sectioning immediately proximal to the dorsal hood while the other fingers were held fully flexed [12]. However, 26% of their EIP transfer cases showed an extension lag of the index finger. Kitano et al. stated that the juncturae tendinum between the index and the middle finger mainly caused a loss of extension of the index finger [13]. According to von Schroeder et al., the juncturae tendinum between the index and the middle finger is classified into two groups, fascia alone type and filamentous bands type, while EIP had no junction with the other extensor tendons. Kitano et al. described that the index finger extension lag after EIP transfer would be caused by the filamentous band type juncturae tendinum, and they recommended its excision at the time of EIP transfer to retain the extension of the index finger.

"Discussion of problems of the musician's hand should be more directly related to kinematics of the human hand, and this would be appropriate not only for musicians, but for any other patients with hand problems."

Tubiana stated that the EIP transfer might be contraindicated in patients whose occupation requires independent movements of the index finger, such as typists and musicians [14]. The suggestion was that there was a disadvantage for the index finger extension after harvesting the EIP for transfer.

One committee member recommended the EIP transfer using the "wide awake" approach described by Don Lalonde [15]. That method allows setting of the tension with the patient's help, and also allows the surgeon to verify independent EDC index function intraoperatively. Usually, the EDC to the index finger can independently extend the digit, so there is no loss of independent index motion after EIP transfer.

Another committee member reported that one violinist who had an EIP transfer for his EPL rupture had to give up his professional career as the extension function was so unbalanced in his left index finger. He recommends the palmaris tendon graft to reconstruct more anatomically.

In conclusion, both the EIP transfer and the tendon graft are alternatives available, even for the musician's hand. However, hand surgeons should respect the extension function after harvesting the EIP tendon for transfer. A "wide awake" approach would be recommended in order to confirm independent EDC function of the index finger, and if needed, repair of hood or separation of the juncturae tendinum should be considered. A palmaris tendon graft would make possible an anatomical reconstruction, but surgeons should consider that there would be the risk of avascular necrosis of the graft, and that a long immobilisation time may bring another disadvantage for musicians, interrupting their practice for performance.

However, it is questionable whether simply the full extension of the index finger is enough for musicians, who need an independent quick movement of each finger. As stated in the background, we need new criteria for the musician's hand which evaluate not only the static position but the dynamic movement. As such, we need to continue the discussion on optimal management following the trauma to the musician's hand.

In the future, we will expand the discussion to tenosynovitis, hypermobile joints, entrapment neuritis, and focal hand dystonia of musicians.

References

1. Poore, G.V.: Clinical lecture on certain conditions of the hands and arm which interfere with the performance of professional acts, especially piano-playing. British Medical Journal, 1887;1:441-444, 1887.
2. Hochberg F.H., Hand difficulties among musicians, JAMA, 1983;249:1869-1872.
3. Fry, H.J., Overuse syndrome in musicians – 100 years ago, Medical Journal of Australia, 1986;145: 620-625.
4. Brandfonbrener, A.G.: Myasthenia gravis in wind players: two cases study. Med Probl Perform Art, 1988;3:155-157.
5. Lederman R. J., Calabrese, L. H., Overuse syndromes in instrumentalists, Med Probl Perform Art, 1986;1:17-11.
6. Dawson, W.J.: Hand and upper extremity problems in musicians. Epidemiology and diagnosis. Med Probl Perfom Art, 1988;3:19-22.
7. Zhao C, Sun YL, Jay GD, et al.: Surface modification counteracts adverse effects associated with immobilization after flexor tendon repair. J Orthop Res, 2012;30:1940-1944.
8. Schaller P, Baer W, Carl HD: Extensor indicis-transfer compared with palmaris longus transplantation in reconstruction of extensor pollicis longus tendon: A retrospective study. Scand J Plast Reconstr Surg Hand Surg, 2007;41:33-55.
9. DeSmet L, Loon JV, Fabry G: Extensor indicis proprius to extensor pollicis longus transfer: results and complications. Acta Orthop Belg, 1997;63:178-81.
10. Noorda RJP, Hage JJ, deGroot PJM, et al.: Index finger extension and strength after extensor indicis proprius transfer. Hand Clin, 1995;11:411-412.
11. Browne EZ, Teague MA, Snyder CC: Prevention of extensor lag after indicis tendon transfer. J Hand Surg, 1979;4A:168-172.
12. Moore JR, Weiland AJ, Valdata L: Independent index extension after extensor indicis proprius transfer. J Hand Surg, 1987;12A:232-236.
13. Schroeder HPV, Jolla L, Botte MJ: Anatomy of the extensor tendons of the fingers: variations and multiplicity. J Hand Surg, 1995;20A:27-34.
14. Tubiana R: Lesions of the extensors of the thumb. In: Tubiana R, ed. The Hand, Vol. III, Philadelphia: WB Saunders, 1988;pp155-156.
15. Bezuhli M, Sparkes GL, Higgins A, et al.: Immediate thumb extension following extensor indicis propirus-to-extensor pollicis longus tendon transfer using the wide-awake approach. Plast Reconstr Surg, 2007;119:1507-1512.

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Mallet Fingers Around the Globe: Does One Best Method for Immobilisation and Mobilisation Exist?

Part II: Mobilisation

This article is the second in a series of two articles on the treatment of the mallet finger. The first article covered immobilisation of mallet fingers (see the May 2014 issue #14 of the IFSSH ezine). This article was also compiled by Julianne Howell of Oregon, USA and was first published in the February 2014 edition of the ASHT Times.

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Non-surgical management is the first line of intervention to restore tendon continuity or bony union following type 1 a-b mallet finger injury. This is truly a unique situation for the therapist to be able to manage a tendon injury without the aid of suture or fracture reduction. It is the therapist's responsibility to fabricate an orthotic/cast that precisely positions the tendon/bone for gapless healing, to impress the patient about the importance of maintaining the immobilised position, and determine when healing is sufficient for safe transition into the phase of mobilisation.

The purpose of Part 2 in this series is to summarise the literature about when and how type 1 a-b mallet finger injuries are mobilised and review tools to measure outcomes. The co-authors offer tips and tricks which they feel lend to successful transition into the phase of mobilisation and define their criteria for successful outcomes.

Table 1 shows there is no consensus in the literature about when to end immobilisation and commence mobilisation, immobilisation ranges from 4-9 weeks and is often prolonged another 1-12 weeks by the continuation of night splinting[1-15]. In Table 2 each co-author was asked, "How do you decide length of time to immobilise". Their answers suggested that immobilisation times served only as a guideline from which to evaluate healing status, all authors used DIPJ extensor lag as the guide, and defined their criteria to begin motion. Hirth, van Strien and Devan start their countdown from the week immobilisation began; Bassini and Howell do not start the 6-8 week countdown until after active extension of DIPJ is 0 to -5 degrees. Not cited in the table, the co-authors also gave consideration to the type of mallet; bony or tendinous and zone of injury; 1or 2, and unanimously felt tendinous mallets require more time to heal, while no consensus was achieved regarding the zone of injury requirements. In stark contrast to the protocol-driven literature, the co-

Table 1: Week when mobilization is commenced

Week when mobilization is commenced	Source
4-5 plus 2-4 wks night splint	Lester et al, 2000
6 minimum	EFSHT Delphi study mallet finger, 2008
6 unless >20°lag or patient dissatisfaction; add 4wks	Pike et al, 2010
6 plus 2wks night splint	Warren et al, 1988;
6 plus 3wks night splint	Maitra & Dorani, 1993
6-8	Moss & Steingold, 1983; Hovgaarg & Klareskov, 1988
6-8 plus night splint until wk 12	Tocco et al; 2013
6-9	Shankar & Goring, 1992;
7wks 2d (mean) plus 2 wk night splint	Groth & Wilder, 1994
8 plus 2wks night splint	Crawford, 1984; Patel, Desai & Bassini-Lipson, 1988
8 review, if no lag, graduated splint withdrawal	O'Brien & Bailey; 2011
8-12 Type 1a; 6 Type 1b	Katsoulis et al, 2005
8-16 plus 2 wk night splint chronic mallet fingers 4-18wks old	Patel, Desai, Bassini-Lipson, 1986

authors make decisions based on their clinical observations, and treatment is tailored to each patient's biological response. Clearly the literature does not truly reflect what is actually being done in clinical practice.

For the most part, in the literature, should an extensor lag develop or increase during mobilisation there are no stated contingency plans, except in studies by Groth and O'Brien[10,13]. Groth added 2 weeks of full time immobilisation if at any time DIP lag increased 5° or more10. O'Brien added

"there is no consensus in the literature about when to end immobilisation and commence mobilisation, immobilisation ranges from 4-9 weeks and is often prolonged another 1-12 weeks by the continuation of night splinting"

Table 3: Literature Details for Mallet Finger Mobilization

Mobilization Details		Source
Week 6:	Composite fist & extension 6x/day 10 reps, return to orthotic	Groth & Wilder, 1994
Week 8:	Isolated DIP flexion/extension	
Week 9:	Heavy use	
Week 8:	Loose fist & full extension 5x/day 10 reps, return to orthotic	O'Brien & Bailey, 2011
Week 9-10:	Light activity, orthotic off	
Week 10-11:	Wear orthotic for heavy activity	
Week 6-8:	Passive MP flexion & active IP extension, hold 5seconds, 6-8x/day	Tocco et al, 2013
	10 reps, orthotic continued	
Week 7-9:	Active fisting added with above exercises,	
Week 8:	Orthotic only at night	
Week 2-14:	Use hand normally	

Table 2: Therapist's response to questions regarding mobilization of mallet finger Type 1a-b injuries

Question	Bassini (New York, USA)	Hirth (Australia)
How do you decide length of time to immobilise?	8 weeks after DIP extension lag has been at 0º	6 weeks bony, 8 weeks tendinous if no lag. If lag develops, reapply orthotic for 2 weeks further full time.
How long will you wait to achieve your criteria before progressing to the phase of mobilisation?	<5º full extension or when patient is satisfied, needs to understand chance of recurrence	Varies with the patient and their willingness to continue immobilisation. Most will wait until 12 weeks. Beyond this, dependent on current lag, age, work and functional impact. The decision is made with the patient.
How do you introduce DIP joint motion?	Protected AROM exercises for 2 more weeks, and a removable cast.	AROM exercises and light functional use. Orthotic on for heavy activities and overnight.
Please clearly define the terms you used above when describing how you introduce DIP joint motion.	Protected AROM exercise: Limited ROM based on the limits demonstrated by the therapist.	AROM exercises: Actively closing the fingers into a comfortable composite fist. Light functional use: Use of the hand for activities ≤ 500 grams (1 lb) in weight, e.g. brushing teeth, using cutlery or getting dressed. Heavy use: Avoiding use of the hand for activities >500gm (1lb) such as lifting 2 litre (4.4lb) milk cartons or returning to the gym.
When do you commence passive DIP flexion exercises?	I discourage this until as late as 6 months	Not prior to 10 weeks post commencement of splinting, and depends on how stiff the DIPJ and the degree of lag/strength of extensor tendon.
When do you commence resisted extension and/or flexion exercises as part of the standard therapy program?	Never resisted extension. Flexion if needed, rarely.	Not a standard component. Main aims of therapy are to maintain extension, then regain flexion. Strength comes later with functional hand use.
What criteria do you use to continue weaning from the device?	If no lag develops after 2 weeks or recovery of motion, and no pain and return to function	If no lag after 2 weeks of light functional use and AROM exercises.
Define a successful outcome?	<5º lag, minimal edema, no pain, functional fist (1cm to DPC), no forced tight fist.	<5º lag or neutral (for those with pre-injury hyperextension), minimal oedema, no pain, functional fist, + satisfied patient.
What type of goniometer do you use?	Flat metal finger.	15cm plastic.
Where do you place the goniometer to measure?	Dorsal and lateral	Dorsal.
What are the 3 most common concerns you hear from patients regarding the outcome?	How long will I have to wear this orthotic? Will it happen again?	The existence of a lag. Presence of a lump on the dorsum of the finger.Finger stiffness into flexion and loss of full DIPJ flexion.

Howell (Oregon, USA)	Van Strien (the Netherlands)	Devan (South Africa)
6-8 weeks after DIP extension lag has been at 0-5º.	8 weeks if no lag. If lag develops, reapply cast for another 2-4 weeks full time.	4 weeks is standard if no lag. If there is a lag, the splint is continued 2 weeks further
Will go as long as 16 weeks with patient consent.	Will wait until 12 weeks. Then, together with the therapist, surgeon and patient decide what to do.	6-8 weeks.
Protected AROM exercises 2 weeks further, plus full time orthotic.	Limited protected AROM for 2 more weeks, plus a removable cast with a removable orthotic.	Discontinue daytime splint, continue elastic tape, protected AROM for 2 weeks. If full extension is not achieved by then, continue for 2 weeks further and consider splint application, light ADL.
Protected AROM exercises: For DIPJ mobilisation – flexion angles of MP>PIP>DIP for a soft active fist around a cone, without cone, and active DIP extension. See Tips and Tricks.	Limited protected AROM: Full DIPJ extension. Flexion is limited to 20º OR only active DIPJ extension, no flexion.	Protected AROM: Active ROM with elastic tape. Light ADL: Self care and other activities that do not involve resistance and heavy lifting.
Slow recovery is ideal. Can add exercises if, after 3 months, no lag is present and the patient requests.	Not part of standard therapy program. Only when needed for function. Not added until 6-12 months or sooner if certain lag won't increase.	After week 8 where no extensor lag exists.
Not part of program. Both challenge tendon's tensile strength. Goal: no change in lag for 3 months.	Strengthening not part of therapy program, recovery by functional use is preferred. Consider only after healing is stable and no lag.	Week 12.
After 2 weeks protected AROM and no lag or increase in lag has occurred.	After 2 weeks protected motion and no lag or increase in lag.	Active DIPJ extension to 0º.
≤5º lag, minimal edema, no pain, functional fist + patient satisfied.	<5º lag, no pain, and functional fist (full fist may take a year to achieve).	0º extensor lag.
Flat metal finger.	Gloria Devore.	Jamar metal.
Dorsal and lateral.	Dorsal.	Dorsal.
Persistent lag. Appearance, i.e. dorsal DIPJ bump and/or pseudo-swan neck posture. How can such a small injury be so finicky, take so long to heal and then not be normal?	Residual lag. Limited DIPJ flexion after 3 months. Amount of time and effort invested for a relatively minor trauma.	Residual swelling. Sensitivity of the fingertip.

the 2 weeks of full time immobilisation if DIP lag increased >10°[13]. Table 2 outlines the criteria used by the co-authors to adjust mobilisation times as well as how long each was willing to continue immobilisation to achieve their benchmark. It is interesting to observe that whenever an extended period of immobilisation was required, Hirth, Howell and van Strien brought in patient-centered care via shared-decision to guide treatment.

The literature is sparse on the details of the how's & when's to introduce motion (Table 3). In Figures 1-5 each co-author has shared tips and tricks they find useful to begin motion. Each co-author was also asked to define the terminology they use in their descriptions, such as protected motion, light functional activity, extensor lag, it's clear to see that even our terminology is not standardised, an important requirement for replication.

Table 4 summarises the rating criteria used to assess treatment outcome. Note that the wide variability by the authors, making comparison among studies quite difficult. Since DIPJ extension lag is the gold standard let's take a look at this one variable to understand what each author considered an excellent result. Warren and Norris' criteria was a 0-5° lag; Abouna and Brown a <5°lag, Crawford's scale is < 10° extension lag; Garberman, Diao, and Peimer's criteria and Tocco et al's modification of Garberman's criteria rated a < 10° extension lag [4,8,16,11,17] Notice that other variables are often combined with extensor lag, adding further

Table 4: Outcome measurement tools after mallet finger (Type 1a-b) injury

Abouna and Brown Categories 1968

	Cured	Improved	Unchanged
Lag	<5°	5-15°	>15°
Stiffness	None	None	Stiffness or
DIPJ motion	Normal flexion/extension	Normal flexion	Impaired flexion

Crawford's Categories 1984

	Excellent	Good	Fair	Poor	
Lag	<10°	10-25°	>25°	>25°	
Flexion	Full	Full	Any loss		Any loss
Pain	None	None	None	Persistent	

Warren and Norris' Categories 1988

	Success	Improved	Failure
Lag	0-5°	6-15°	>15°

Garberman, Diao, and Peimer Categories 1994

Treatment Success	Treatment Failure
Extensor lag <10°	Extensor lag >10°
No DIPJ stiffness or loss of flexion	Associated DIPJ stiffness or loss of flexion
Cosmetically acceptable to patient	Cosmetically unacceptable to patient
Patient satisfaction	Patient dissatisfaction

Tocco et al's Modifications of Gaberman's Categories 2013

Treatment Success	Treatment Failure
Extensor lag <10°	Extensor lag >15°
No DIPJ stiffness or loss of flexion (<25°)	No DIPJ stiffness or loss of flexion (> 30°)

complexity when attempting to compare each variable directly.

Table 2 defines what each co-author accepted as a successful outcome. Interestingly all co-authors accepted an extension lag as successful, even if the contralateral DIPJ hyperextended. Various authors included extra variables in some combination in their definition of success such as limited oedema, no pain, functional fist or a satisfied patient. Only one of the authors used a formal outcome measurement tool, all used different types of goniometers, methods varied in placement (dorsally or laterally), and making note of the week measurements were taken may make a difference. These variations once again challenge the ability to compare studies.

Pike et al questioned the validity of goniometric measure of lag and developed a formula called radiologic lag. When radiologic lag was compared to dorsal goniometric measurement between weeks [7-12], goniometry overestimated the lag, whereas by week 24 both measures were not significantly different[3]. They postulated the early discrepancy was due to acute dorsal digit oedema[3].

The most common patient concerns after mallet finger injury was extensor lag (Table 2). Also making the list were appearance such as dorsal lump or swelling, pseudo-swan neck posture, functional stiffness or sensitivity, and frustration with the investment of time and energy in treatment without guaranteed success. For methods that could be used to measure these common patient concerns, Kalainov et al included visual analogue scales to assess difficulties with specified functional activities, residual finger pain, satisfaction with finger function, and satisfaction with treatment outcome18. This same group also classified the size of dorsal DIPJ prominence as minimal, moderate and large18. Tocco and colleagues measured residual swelling by using Oval 8 ring sizers™ around the middle of the middle phalanx and comparing to the contralateral digit 8. Kalainov defined the persistence of a pseudo-swan neck deformity in combination with DIPJ lag to be significant if PIP joint hyperextension was >10 degrees [18].

Perhaps measuring the initial DIPJ lag and comparing this to the final DIPJ extension measure would be a method to quantify the degree of change with treatment. This may help the patient see improvement, rather than only comparing the injured digit to the non- injured digit and sensing lack of success if they are not equal. While most patients expect treatment to restore normalcy, as we have observed, most authors do not set the outcome bar that high.

Review of the literature and querying the co-authors clearly shows that there is no single best method to immobilise and mobilise a mallet finger. As Merritt states, "We need to resist the pressures to make the patient fit the protocol. We must do whatever means are at our disposal"[19]. We believe that treatment tailored to the individual's healing response, and tapping the knowledge and clinical skills of the hand therapist are the means to take us to the best outcomes after mallet finger injury.

"For methods that could be used to measure these common patient concerns, Kalainov et al included visual analogue scales to assess difficulties with specified functional activities, residual finger pain, satisfaction with finger function, and satisfaction with treatment outcome"

Tips and Tricks for Treatment of Mallet Injury

Van Strien

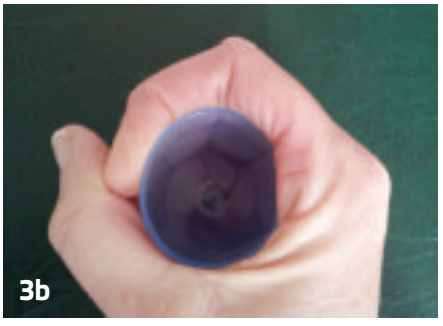


Figure 1: Extend DIPJ with PIPJ held in slight flexion to (1) make DIPJ extension easier and (2) prevent PIPJ hyperextension. No active flexion of DIPJ allowed at this time, just let the joint to "drop" into flexion when finger is relaxed after extension. If no lag develops in the first two weeks of mobilization, active flexion can be started to 20 degrees and slowly increased to more flexion as long as no extension lag develops.

Figure 2: Find a cylinder shape that is easily obtained around the house. Make sure the flexion around the shape only allows up to 20° of flexion at the DIPJ for the first two weeks. Use the shape to also actively extend DIPJ away from the cylinder.

Figure 3: When there is no increase in DIPJ extension lag, progress to smaller diameters for greater DIPJ flexion.

Figure 4: Eventually use objects to "block" and increase the DIPJ flexion angle.

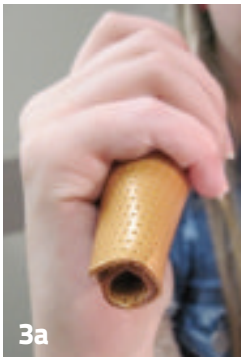
Tips and Tricks for Treatment of Mallet Injury
Hirth

Figure 1. At 6 weeks (bony) or 8 weeks (tendinous) AROM is measured with a goniometer pre and post a 5 minute warm water bath whereby the patient actively closes the fingers into a comfortable composite fist. If a lag develops during this period of time, the splint is reapplied full time and the patient reviewed the following week.
Figure 2. Light functional hand use such as holding a mobile phone is encouraged.
Figure 3. Actively closing the hand into a comfortable composite fist is given as an exercise for the patient to complete regularly at home.
Figure 4. Passive flexion is generally not commenced prior to 10 weeks post orthosis commencement, and instituted only in patients who have good extension but remain very stiff into flexion.

Tips and Tricks for Treatment of Mallet Injury
Howell

Figure 1. The patient wears the tape in the orthotic and for exercise during the first 2 weeks of protective AROM to provide proprioceptive feedback so not to force flexion. (Note: the tape is not shown in the figures that follow)
Figure 2a. The patient blocks the MP joint in flexion and actively extends the PIP & DIP joints for a 3-5 seconds.

Howell (continued)



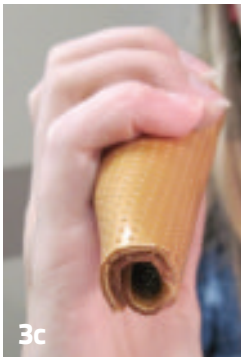


Figure 2b. (b) Relax active extension. Protected AROM extension exercises are done at twice the repetition rate as the flexion exercises. **Figure 3.** A thermoplastic cone is used to guide protected AROM flexion exercise. A) Week 1: a soft active fist (MPJ flexion > PIPJ flexion and PIPJ flexion > DIPJ flexion) is desired. In this example, the small finger is in the desired position. Week 2: if no change in lag, move toward the smaller end of the cone. B) If no change in lag, progress to a soft active fist without the cone. If after 2 weeks of mobilization and there is no increase in lag, add C) soft active fist at the larger end of the cone (DIPJ flexion > PIPJ flexion). If no increase in lag, add D) soft active hook fisting commencing at the larger end progressing to smaller end. Key Point: C and D place maximum stress on the terminal tendon.

References

1. Lester B, Jeong G, Perry D, Spero L: A simple effective splinting technique for the mallet finger. The American Journal of Orthopaedics 2002; 29: (3)202-06.
2. Cederlund R, Kul F, Rouzaud JC, Wendling U, Aasheim T, Schreuders T; Results of Delphi round in mallet finger EFHSTconsensus. 2008.
3. Pike J, Mulpuri K, Metzger M, Gordon Ng, Wells N, Goetz T: Blinded, prospective, randomized clinical trial comparing volar, dorsal and custom thermoplastic splinting in treatment of acute mallet finger. J Hand Surg 2010; 35A:580-88.
4. Warren RA, Norris SH, Ferguson DG: Mallet finger: a trial of two splints. J Hand Surg 1988; 13B: (2)151-53.
5. Maitra A, Dorani B: The conservative treatment of mallet finger with a simple splint: a case report. Archives of Emergency Med 1993; 10:244-48.
6. Moss JG, Steingold RF: The long-term results of mallet finger injury: a retrospective study of one hundred cases. The Hand 1983; 15: (2)151-54.
7. Hovgaarg C, Klareskov B. Alternative conservative treatment of mallet-finger injuries by elastic double-finger bandage. J Hand Surg 1988; 13B: (2)154-55.
8. Tocco S, Boccolari P, Landi A, Leonelli C, et al: Effectiveness of cast immobilization in comparison to the gold-standard self-removal orthotic intervention for closed mallet fingers: a randomized clinical trial. 2013; 26: (3) 191-201.
9. Shankar N, Goring C. Mallet finger: a long-term review of 100 cases. J of Royal College of Surgeons 1992:37:196-98.
10. Groth G, Wilder D: The impact of compliance on the rehabilitation of patients with mallet finger injuries. J Hand Ther 1994; 7:21-24.
11. Crawford G: The moulded polythene splint for mallet finger deformities. J Hand Surg 1984; 9A:231-37.
12. Patel MR, Desai SS, Bassini-Lipson L: Conservative management of mallet finger. J Hand Surg 1988; 13:329-34.
13. O'Brien L, Bailey M: Single blind, prospective, randomized controlled trial comparing dorsal aluminum and custom thermoplastic splints to stack splint for the acute mallet finger. Arch Phys Med Rehabil 2011; 92:191-8.
14. Katsoulis E, Rees K, Warwick D: Hand therapist-led management of mallet finger. Br J Hand Ther 2005; 10:17-20.
15. Patel M, Desai S, Bassini-Lipson L: Conservative management of chronic mallet finger. J Hand Surg 1986; 11A:570-73.
16. Abouna J, Brown H: The treatment of mallet finger: the results in a series of 148 consecutive cases and review of the literature. British J Surg; 1968 55: (9)653-67.
17. Garberman S, Diao E, Peimer C: Mallet finger: results of early versus delayed closed treatment. J Hand Surg 1994; 15A: 850-52.
18. Kalainov DM, Hoepfner PE, Hartigan BJ, Carroll C et al: Nonsurgical treatment of closed mallet finger fractures. J Hand Surg 2005; 30A:580-86.
19. Merritt WH: Written on behalf of the stiff finger. J Hand Therapy 1998; 11: (2)74-79.

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A review of prophylaxis guidelines for venous thromboembolism following upper limb surgery

United Kingdom

David Warwick from the Hand Surgery Unit at the Department of Trauma and Orthopaedics, University Hospital Southampton recently co-wrote a review article in the Journal of Hand Surgery about the prophylaxis guidelines for venous thromboembolism (VTE) following elbow, wrist and hand surgery. We asked him a few questions about the article:

What sparked your interest to conduct this literature review on this particular topic?

David Warwick: I have been interested in venous thromboembolism (VTE) in orthopaedics for over 20 years. My doctoral thesis and much of my published research has been on this topic. The very great majority of the world literature in orthopaedic VTE relates to hip and knee replacement; there has been very little written about the risk in upper limb surgery.

In the United Kingdom Health System, there is a stringent mandatory VTE risk assessment of all hospital patients. Whilst this is sensible, it takes time for each and every patient to be assessed. Health service resource is being spent routinely giving prophylaxis by default to upper limb patients who perhaps did not need it.

"There have been no studies examining which prophylaxis should be given after upper limb surgery in those at risk"

As s Hand Surgeon who has been researching lower limb VTE for so long, I thought it was time to review the literature on upper limb VTE to see whether there really is a risk and if so who should be considered for prophylaxis.

What were the most interesting results that this review yielded?

David Warwick: The occurrence of VTE after hand or wrist surgery is, at least as far as the published literature is concerned, vanishingly rare. There is a material risk of lower leg thrombosis after shoulder surgery (so the aetiology must be due to systemic hyper-coagulability rather than immobility of the legs). Death after complex elbow surgery has been reported, so the problem cannot be denied.

What are the most important points for any hand surgeon to know about prophylaxis for VTE following upper limb surgery?

David Warwick: There is a risk of fatal PE after major elbow surgery. Each of these patients should have a risk assessment and prophylaxis is given for those at high risk. For patients undergoing short duration hand and wrist surgery under regional or local anaesthesia the risk is vanishingly rare and so prophylaxis is not required. For longer duration procedures, when there is concomitant pelvic or lower limb surgery, or risk factors such a infection, prior VTE or or a family history, then prophylaxis should be considered.

Will you be conducting any further research into this area in the future?

David Warwick: There is so much we need to know. Although the literature suggests that VTE after hand and wrist surgery is exceedingly unusual,

perhaps that is because events have occurred sporadically but the treating surgeon has never bothered to write a case report, or the journals have never seen fit to publish submitted case reports. We must find out more. One option is a survey of surgeons to see if they have encountered VTE after upper limb surgery. Another option is a registry organised by a national society which would either reassure us that the risk is too low to give prophylaxis or that the risk is higher than previously thought.

As it happens, we have just come across a case of a man who developed a significant lower limb DVT after a recurrent thumb infection for which he had three operations and a prolonged hospital stay. We are writing this up, highlighting how risk factors (infection, repeated surgery) should prompt a consideration of prophylaxis.

There have been no studies examining which prophylaxis should be given after upper limb surgery in those at risk. One would have to extrapolate from the vast hip and knee arthroplasty literature. Mechanical methods in theatre and then an oral chemical agent until the risk has diminished would be a reasonable approach. To prove this would require a randomised trial that would be exceedingly expensive and which would still leave most questions unanswered - which chemical, for how long, which outcome measure? So the most sensible thing until we have more knowledge is to avoid unnecessary prophylaxis (which costs money and can carry side effects) but make sure that we do a proper risk assessment and cover those with risk.

JOURNAL REFERENCE

Venous thromboembolism following elbow, wrist and hand surgery: a review of the literature and prophylaxis guidelines
J Hand Surg Eur Vol March 2014 39: 306-312

http://jhs.sagepub.com/content/39/3/306.abstract

The application of DASH and the QuickDASH instruments in Norway

Norway

Vilhjalmur Finsen from the Department of Orthopaedic Surgery at St. Olav's University Hospital in Trondheim, recently co-wrote a paper in the Journal of Hand Surgery about DASH and QuickDash instruments.

The team collected population-based normative data for the DASH (disabilities of the arm, shoulder and hand) and QuickDASH questionnaires in order to determine the co-morbidity to be expected in a group of patients and then studied the correlation between the two scores.

"I translated the DASH questionnaire and later the QuickDASH questionnaire it into Norwegian soon after it started to be reported in the literature. I have used it in a number of studies, but as I gained more experience with it, I began to wonder if it was quite as robustly objective as I had initially taken for granted," Professor Finsen explained about the reason for undertaking the study. He continued: "A DASH score in an 80 year old patient, is it a measure of whatever disease on is studying in that patient, or also of something else? If one were able to cure the patient of whatever disease one is studying, would the 80 year old patient end up with a DASH score of zero? It seemed unlikely. So we collected the DASH scores in a large sample of the general population to determine the age-adjusted co-morbidity to be expected, a kind of 'background DASH' in the normal population."

"If the age composition among the patients is not the same, the scores can not be compared"

Their main finding was that mean DASH scores rise in both sexes with age and are surprisingly high in the elderly. Mean DASH scores for women rose with age from 5 among those aged 20-29 to 22 among those aged 70-79 and 36 for those over 80. The corresponding mean values for men were 5, 13 and 22.

"We can see no obvious reason why this should not be the case, in general terms, in all countries where the DASH questionnaire is used. It also seems likely to apply to other regional questionnaires used in orthopaedics," he added.

According to Finsen, one of the consequences of this is that one must be very careful when comparing DASH scores from different studies. "If the age composition among the patients is not the same, the scores can not be compared. We suggest that it may be possible to compare scores in different populations when the scores have been corrected for the expected 'background DASH' for the patients' sex and age-group. This remains to be evaluated. The DASH questionnaire should mainly be used to compare scores before and after intervention in the same patient," he said.

The team plans to continue doing further research into this area and has recently submitted another paper showing that the patients' socio-economic status, their income and number of years at school, is of importance for the DASH score.

JOURNAL REFERENCE

The DASH and the QuickDASH instruments. Normative values in the general population in Norway
J Hand Surg Eur Vol February 2014 39: 140-144
http://jhs.sagepub.com/content/39/2/140.abstract

Pioneers in Hand Surgery

Jenó Manninger

Following his graduation from the Medical University of Pèes, Hungary (1942), Professor Manninger specialised in pathology, general surgery and traumatology. He studied hand surgery with Jorg Bohler in Linz, Austria (1959) and with Marc Iselin in Paris (1965). He earned a World Health Organisation Scholarship to further his hand surgery studies in the United Kingdom under the direction of H. Graham Stack, R. Guy Pulvertaft and A.R. Parkes (1967).

Professor Manninger dedicated his career to the development of hand surgery in Hungary. He worked at the National Institute of Traumatology in Budapest from 1948 to 1989 where he was appointed Professor of Traumatology Surgery (1972), and later Chairman of the Traumatology Surgery Department and Director of the Institute (1978-1989). He established the first Department for Surgery of the Hand in Hungary (1959) which was one of the first to evolve in the old Eastern Block. In 1962, he organised a series of three-week Hand Surgery courses which he directed yearly at the institute for 25 years. These courses offer simultaneous translation and to this day are heavily attended by surgeons from neighbouring European countries.

Professor Manninger was President of the Section for Surgery of the Hand of the Hungarian Society for Traumatology (1978-1986) and President of the Society (1986-1991). He has published 160 articles in scientific journals and chapters in four textbooks. He was a member of Hungarian Societies for Surgery, Traumatology Surgery and Hand Surgery, of the German and French Societies for Surgery of the Hand and of the Austrian Society for Traumatology Surgery.

Kenya Tsuge

Born in Okayama, Japan, Professor Tsuge graduated from the Okayama Medical School in 1945, where he became Lecturer (1953) and then Associate Professor (1954). He worked as Dr. Joseph Posch's Hand Fellow at Wayne State University in Detroit in 1958 and 1959. In 1964, he was elected Professor and Chairman of the Department of Orthopaedic Surgery of the Hiroshima University School of Medicine. Professor Tsuge served as President of the Japanese Society of Surgery of the Hand in 1969. He delivered the Founder Lecture, "Treatment of the Established Volkmann's Contracture", at the 28th Meeting of the American Society for Surgery of the Hand held in Las Vegas, Nevada in 1973 and became Honorary Member of the Society. He has been Honourary Member of the South African Society for Surgery of the Hand since 1981.

In 1985, Professor Tsuge was nominated Chairman of the Hiroshima Prefectural Rehabilitation Center, Professor Emeritus of the Hiroshima University, Honorary Member of the Japanese Society for Surgery of the Hand and of the Japanese Orthopaedic Association.

Professor Tsuge authored a Japanese textbook, "Principles and Practices of Hand Surgery" (1965) which is in its 5th edition and has been read by most Japanese hand surgeons. His "Comprehensive Atlas of Hand Surgery" was first published in 1984. The second edition of this textbook was released in 1986 and was translated in English, Italian, German and Chinese. After his retirement, Emeritus Professor Kenya Tsuge remained Chairman of the Rehabilitation Centre.

Professor Tsuge has devoted his career to hand surgery for more than 30 years, treating nearly 10 000 patients and teaching his hand fellows and orthopaedic residents. He has been actively involved in clinical and basic science research covering topics such as congenital malformations, tendon repair and transfers, nerve repair and rheumatoid arthritis.

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 **Issue 02 Volume 03 · May 2014**

- An Italian Experience Delving Inside the Wrist
- Ulnar Shortening Osteotomy for Ulnar Impaction Syndrome
- The AO Ulnar Shortening Osteotomy System Indications and Surgical Technique
- Ulnar Impaction Syndrome: Ulnar Shortening vs. Arthroscopic Wafer Procedure
- Periprosthetic Osteolysis after Total Wrist Arthroplasty
- Biomechanical Test of Three Methods to Treat Thumb CMC Arthritis
- Arthroscopic Resection Arthroplasty of the Radial Column for SLAC Wrist
- The Clinical Outcome after Extra-Articular Colles Fractures with Simultaneous Moderate Scapholunate Dissociation
- How to Avoid Ulnar Nerve Injury When Setting the 6U Wrist Arthroscopy Portal
- The Use of Navigation Forces for Assessment of Wrist Arthroscopy Skills Level
- Isolated Lunocapitate Osteoarthritis—An Alternative Pattern of Osteoarthritis
- Spontaneous Flexor Tendon Rupture Due to Atraumatic Chronic Carpal Instability
- Rupture of the Flexor Digitorum Superficialis at the Musculotendinous Junction Due to a Forearm Fracture: A Case Report
- A New Total Wrist Fusion Locking Plate for Patients with Small Hands or with Failed Partial Wrist Fusion: Preliminary Experience

Hand Clinics **Latest issue is: Volume 30 ▪ Number 3 August 2014**

- Evidence-based Medicine in Hand Surgery
- Health Services Research: Evolution and Applications
- Evidence-Based Medicine in Hand Surgery: Clinical Applications and Future Direction
- Measuring and Understanding Treatment Effectiveness in Hand Surgery
- Patient-Reported Outcomes: State-of-the-Art Hand Surgery and Future Applications
- Bench to Bedside: Integrating Advances in Basic Science into Daily Clinical Practice
- Comparative Effectiveness Research in Hand Surgery
- Quality Assessment in Hand Surgery
- Collaborative Quality Improvement in Surgery
- The Patient Protection and Affordable Care Act: A Primer for Hand Surgeons
- Patient-Centered Care in Medicine and Surgery: Guidelines for Achieving Patient-Centered Subspecialty Care
- Clinical Practice Guidelines: What Are They and How Should They Be Disseminated?
- Funding Research in the Twenty-First Century: Current Opinions and Future Directions
- Future Education and Practice Initiatives in Hand Surgery: Improving Fulfillment of Patient Needs

Hand **Volume 9 – Issue 2, June 2014**

- Overcoming short gaps in peripheral nerve repair: conduits and human acellular nerve allograft
- Current concepts: mallet finger
- A prospective randomized controlled trial comparing night splinting with no splinting after treatment of mallet finger
- Arm ache
- Psychometric properties of health-related quality of life instruments in patients undergoing palmar fasciectomy for dupuytren's disease: a prospective study
- Adherence to therapy after flexor tendon surgery at a level 1 trauma center
- Surgical rehabilitation of a tetraplegic hand: comparison of various methods of reconstructing an absent pinch and hook
- An early shoulder repositioning program in birth-related brachial plexus injury: a pilot study of the Sup-ER protocol
- Concomitant upper extremity soft tissue sarcoma limb-sparing resection and functional reconstruction: assessment of outcomes and costs of surgery
- Arthroscopic dorsal wrist ganglion excision with color-aided visualization of the stalk: minimum 1-year follow-up
- MCP arthrodesis using an intramedullary interlocking device
- Microsurgical principles related to excision of intraneural ganglion at the elbow
- Platelet-rich plasma for zone II flexor tendon repair
- The influence of mindfulness on upper extremity illness
- Distal radius fractures and the volar lunate facet fragment: Kirschner wire fixation in addition to volar-locked plating
- A cohort study of one-year functional and radiographic outcomes following intra-articular distal radius fractures
- Digit replantation in children: a nationwide analysis of outcomes and trends of 455 pediatric patients
- Targeted muscle reinnervation in the initial management of traumatic upper extremity amputation injury
- Cubitus valgus and tardy ulnar nerve palsy due to an intracapsular ulnar nerve

Journal of Hand Surgery (European Volume) **July 2014 J Hand Surg Eur Vol 39, Issue 6**

- Pyrocarbon metacarpophalangeal joint replacement in primary osteoarthritis
- Ten year follow-up of pyrocarbon implants for proximal interphalangeal joint replacement
- Ten years' experience with a pyrocarbon prosthesis replacing the proximal interphalangeal joint. A prospective clinical and radiographic follow-up
- Morphology of the proximal and middle phalanx of fingers with regard to the Ascension PyroCarbon PIP total joint
- Partial trapeziectomy and pyrocarbon interpositional arthroplasty for trapeziometacarpal joint osteoarthritis: results after minimum 2 years of follow-up
- The use of a pyrocarbon capitate resurfacing implant in chronic wrist disorders
- Cubital tunnel syndrome: a comparison of an endoscopic technique with a minimal invasive open technique
- A comparison of the functional difficulties in staged and simultaneous open carpal tunnel decompression
- Simultaneous modified Camitz opponensplasty using a pulley at the radial side of the flexor retinaculum in severe carpal tunnel syndrome
- Variability in local pressures under digital tourniquets
- The management of viper bites on the hand
- Intercostal and pectoral nerve transfers to re-innervate the biceps muscle in obstetric brachial plexus lesions
- Distal radio-ulnar joint instability in children and adolescents after wrist trauma
- Scaphoid nonunions in skeletally immature adolescents

Hand Surgery: Asia Pacific **Volume 19, Number 2**

- Posterolateral Rotatory Instability Of The Elbow After Corrective Osteotomy For Previously Asymptomatic Cubitus Varus Deformity
- Anatomy Of The Extensor Pollicis Brevis Associated With An Extension Mechanism Of The Thumb Metacarpophalangeal Joint
- Posterior Interosseous Artery Flap: Our Experience And Review Of Modifications Done
- Flexor Pollicis Longus Reconstruction Using The Palmaris Longus In Anterior Interosseus Nerve Syndrome
- Structural Changes Of The Carpal Tunnel, Median Nerve And Flexor Tendons In Mri Before And After Endoscopic Carpal Tunnel Release
- Thumb Opposition In Severe Carpal Tunnel Syndrome With Undetectable Apb-Cmap
- Resource Utilisation Associated With Single Digit Dupuytren's Contracture Treated With Either Surgery Or Injection Of Collagenase Clostridium Histolyticum
- A 20-Year Analysis Of Hand And Wrist Research Productivity In Asia
- Treatment Of Extra-Articular Distal Radial Malunion With Percutaneous Osteotomy And An Intramedullary Implant
- Intraosseous Xanthoma Of The Distal Radius — A Case Report
- Sauvé-Kapandji Procedure In A Patient With Wrist Disarticulation: Case Report
- Two Cases Of Proximal Pole Scaphoid Fracture Accompanied By Lunate Fracture
- A Case Report Of Trigger Wrist Associated With Carpal Tunnel Syndrome Caused By An Intramuscular Lipoma
- Spontaneous Rupture Of Epl And Ecrb Tendons In A Washerwoman: An Unusual Phenomenon
- A Case Of Recurring Multifocal Giant Cell Tumour Of The Tendon Sheath In A Child
- Mycobacterium Kanasii Flexor Tenosynovitis Of The Finger
- Congenital Defects Of The Flexor Digitorum Profundus Tendon Of The Little Finger
- Atypical Subcutaneous Granuloma Annulare On The Digit: A Case Report
- Sea Urchin Spine Arthritis Of The Proximal Interphalangeal Joint Of The Hand: Radiological, Intraoperative And Histopathological Findings
- Intraosseous Epidermoid Cyst Discovered In The Distal Phalanx Of A Thumb: A Case Report
- A New Building Block: Costo-Osteochondral Graft For Intra-Articular Incongruity After Distal Radius Fracture
- Wrist Arthrodesis In Children — A New Technique: Case Presentation
- Arthroscopic Assisted Percutaneous Screw Fixation Of Bennett's Fracture
- Usefulness Of Braided Polyblend Polyethylene Suture Material For Flexor Tendon Repair In Zone Ii By The Side-Locking Loop Technique
- Surgical Tips To Optimize Digital Flexor Sheath Washout
- Management Of Flexor Tendon Injuries — Part 1: Australian Contributions
- Management Of Flexor Tendon Injuries — Part 2: Current Practice In Australia And Guidelines For Training Young Surgeons
- Wrist Arthroplasty: Where Do We Stand Today? A Review Of Historic And Contemporary Designs

Journal of Hand Therapy **Volume 27, Issue 3, July-September 2014**

- Therapist supervised clinic-based therapy versus instruction in a home program following distal radius fracture: A systematic review
- Clinical Commentary: Therapist supervised clinic-based therapy versus instruction in a home program following distal radius fracture: A systematic review
- Patient-centered care and distal radius fracture outcomes: A prospective cohort study analysis
- The push-off test: Development of a simple, reliable test of upper extremity weight-bearing capability
- Outcomes following the conservative management of patients with non-radicular peripheral neuropathic pain
- Stronger relation between impairment and manual capacity in the non-dominant hand than the dominant hand in congenital hand differences; implications for surgical and therapeutic interventions

Journal of Hand Surgery: American volume **Volume 39, Issue 8, (August 2014)**

- Factors Delaying Recovery After Volar Plate Fixation of Distal Radius Fractures
- Radiographic Scoring System to Evaluate Union of Distal Radius Fractures
- Malpractice in Distal Radius Fracture Management: An Analysis of Closed Claims
- Headless Bone Screw Fixation for Combined Volar Lunate Facet Distal Radius Fracture and Capitate Fracture: Case Report
- Suture Anchor Fixation for Scaphoid Nonunions With Small Proximal Fragments: Report of 11 Cases
- Graft Choice in the Management of Unstable Scaphoid Nonunion: A Systematic Review
- Volarly Displaced Transscaphoid, Translunate, Transtriquetrum Fracture of the Carpus: Case Report
- Scapholunate Ligament Reconstruction Using a Flexor Carpi Radialis Tendon Graft
- Antegrade Joint-Sparing Intramedullary Wiring for Middle Phalanx Shaft Fractures
- Outcomes of Closed Reduction and Periarticular Pinning of Base and Shaft Fractures of the Proximal Phalanx
- Nonunion Without Avascular Necrosis of Finger Phalangeal Neck Fractures in Children: Report of 4 Cases
- Radial Collateral Ligament Injury of the Little Finger Proximal Interphalangeal Joint in Young Pianists
- Simultaneous Proximal Interphalangeal Joint Arthroplasty and Extensor Tendon Reconstruction in Adjacent Fingers: Case Report
- Estimation of Base of Middle Phalanx Size Using Anatomical Landmarks
- Long-Term Outcomes Following Radial Polydactyly Reconstruction
- Single Osteotomy at the Radial Diaphysis for Congenital Radioulnar Synostosis
- Comparison of Compression Screw and Perpendicular Clamp in Ulnar Shortening Osteotomy
- Radiocapitellar Joint Contact Pressures Following Radial Head Arthroplasty
- Anatomic Findings and Complications After Surgical Treatment of Chronic, Partial Distal Biceps Tendon Tears: A Case Cohort Comparison Study
- The Impact of Obesity on Complications of Elbow, Forearm, and Hand Surgeries
- Discrepancies Between Meeting Abstracts and Subsequent Full Text Publications in Hand Surgery
- The Influence of Patients' Participation in Research on Their Satisfaction

- Manual mobilization of the wrist: A pilot study in rehabilitation of patients with a chronic hemiplegic hand post-stroke
- Rehabilitation of a patient following hand replantation after near-complete distal forearm amputation
- An introductory study of common grasps used by adults during performance of activities of daily living
- A scoping review of the use of elastic therapeutic tape for neck or upper extremity conditions
- A cross-cultural adaptation of the Upper Limb Functional Index in French Canadian
- Using smartphone applications as hand therapy interventions
- A custom bicycle handlebar adaptation for children with below elbow amputations

Upcoming events

Congress of the European Society for Surgery of the Shoulder and the Elbow

17-20 September 2014
Istanbul, Turkey
http://secec2014.com

The 25th "SECEC-ESSSE European Society for Surgery of the Shoulder and Elbow" Congress, which is the biggest Congress in Europe in the field of Surgery of the Shoulder and Elbow, will be held on Sept. 17-20, 2014 at Lütfi Kırdar Convention and Exhibition Center in Istanbul.

10th Congress of the Asian Pacific Federation of Societies for Surgery of the Hand

2-4 October 2014
Kuala Lumpur, Malaysia
www.apfssh2014.org

The Malaysian Society for Surgery of the Hand (MSSH) is pleased to invite you to the 10th Congress of the Asia Paci¬fic Federation of Societies for Surgery of the Hand (10th APFSSH) and 6th Congress of the Asia Paci¬fic Federation of Societies for Hand Therapists (APFSHT) which will be held from 2nd - 4th October 2014 at Hilton Kuala Lumpur Hotel, Kuala Lumpur, Malaysia. To make it more exciting and well worth your while, ISSPORTH and IBRA are also joining in the academic activities! The conference programme includes:

- Cadaveric Pre-Congress Workshops
- 18 Industry Forms
- Five concurrent sessions with 99 symposia and 12 plenaries
- ISSPORTH - International Society for Sport Traumatology of the Hand Meeting
- Exhibition booth showcase
- Digital interface showcase
- International Bone Research Association (IBRA) meeting

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 paediatricians, 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

One-Day International Shoulder and Elbow Symposium

18 October 2014
London, Euston
www.welbeing-cpd.co.uk/Page.aspx?P_ID=15

The European Society for Shoulder & Elbow Rehabilitation is the only Europe wide society that connects healthcare professionals with an interest in shoulder and elbow dysfunction. The objective of the society is to provide the highest standard of information and education to enhance patient care. This conference is a unique opportunity to hear international expert speakers on the topic of instability in the upper limb. The conference aims to explore both surgical and conservative perspectives on how to manage dysfunction in the shoulder and elbow. Clinical cases will be discussed amongst the faculty to generate debate as well as nuggets of advice. This conference is targeted to surgeons, therapists and physicians.

Rome Symposium: Upper limb arthroscopic techniques

7-8 November 2014
Rome, Italy
www.studioprogress.it

Surgery in general, but especially upper limb surgery, has evolved towards a mini-invasive type of surgery. That is aiming to achieve increasingly precise gestures using increasingly small incisions. During the last 15 years arthroscopy has become a safe and reproducible technique. It has given us the opportunity to better understand pathologies, it has changed indications and it has allowed technical gestures that were unthinkable 10 years ago. During this symposium we have put together the best surgeons in the field and we will review the essential technical improvements and the up-to-date surgical choices by means of presentations, debates, face-to-face and surgical videos.

Hong Kong International Wrist Arthroscopy Workshop and Seminar

8-10 November 2014
Hong Kong
www.olc-cuhk.org

Program includes symposium on carpal instability, clinical workshop on wrist examination and wrist pain management, Hands-on wrist arthroscopy workshop on anatomical specimens. Organised by the Orthopaedic Learning Centre, Department of Orthopaedics and Traumatology, The Chinese university of Hong Kong.

Elbow: diseases and clinical experiences: hands-on Cad Lab

13-15 November 2014
Arezzo, Italy
www.sicm.it

Topics on Anatomical approaches, Arthroscopy, Arthroplasty and Prosthesis, Tendon repair and reconstruction. President, Bruno Battiston. Scientific Committee: Andrea Atzei, Riccardo Luchetti.

CUHK-OLC Surgeon Education Program: The 17th Microsurgery Workshop

24-28 November 2014
Hong Kong
www.olc-cuhk.org

Workshop covers advances microvascular techniques, intensive laboratory practice, end-to-side anastomosis. The guest speaker is Dr Ping tak Chan, the program director is Dr Wing-lim Tse and program instructors are Drs Edmund Cheung and Clara Wong.

Surgical techniques in hand surgery: Ligaments, tendons, fractures and arthroplasty

11-13 December 2014
Arezzo, Italy
President, Roberto Adani. Scientific Committee: Massimo Ceruso, Pierluigi Tos
www.sicm.it

The 6th Combined Meeting of ASSH and JSSH: Unsolved Problems in Hand Surgery

Maui, Hawaii, USA
March 29 - April 1, 2015
http://www.assh.org/Courses/ASSH-Courses/2015-ASSH-and-JSSH-Combined-Meeting

The American Society for Surgery of the Hand (ASSH) and the Japanese Society for Surgery of the Hand (JSSH) invite you to submit an abstract for consideration at our 2015 Combined Meeting in! The 6th Combined Meeting will bring hand care professionals from around the world together to share, discuss and learn about breakthrough techniques and procedures advancing the care and treatment of the hand and upper extremity.
Mark your calendar for and join us in beautiful Hawaii!

10th World Symposium on Congenital Malformations of the Hand and Upper Limb

7-9 May 2015
Rotterdam, The Netherlands
www.worldcongenitalhand2015.com

The 10th World Symposium on Congenital Malformations of the Hand and Upper Limb will be held on the 7th-9th May 2015, in Rotterdam, The Netherlands. A broad variation of congenital hand anomalies, genetics, embryology and classification will be presented, discussed and shared. Invited lectures, discussion, free paper sessions and panel sessions will inform you of the latest on congenital hand anomalies. Some of the keynote speakers are Michael Tonkin, Caroline Leclercq and Ann van Heest. The symposium will be preceded by a cerebral palsy pre course on Wednesday the 6th of May. For more information on the program and registration go to: www.worldcongenitalhand2015.com

NEXT IFSSH & IFSHT

NEW DATES
24-28 October
2016

October 09-13, 2016
Argentina
Buenos Aires

Make your plan for attending to the first Congress in South America!

Hilton Buenos Aires
& Convention Center

Scientific Program: Symposia on the most controversial topics, updates by world reknown experts and best selected free papers.

Special Social Events and Tango Shows.
High quality meat and exquisite Malbec Wines.

High ranked Tourism: Patagonia and it´s glaciers, Iguazú Falls, Mendoza´s Wine Routes and the incredible views of Purmamarca (Salta and Jujuy).

www.ifssh-ifsht2016.com

Buenos Aires 2016
IFSSH & IFSHT
Congress

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INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND