February 2026

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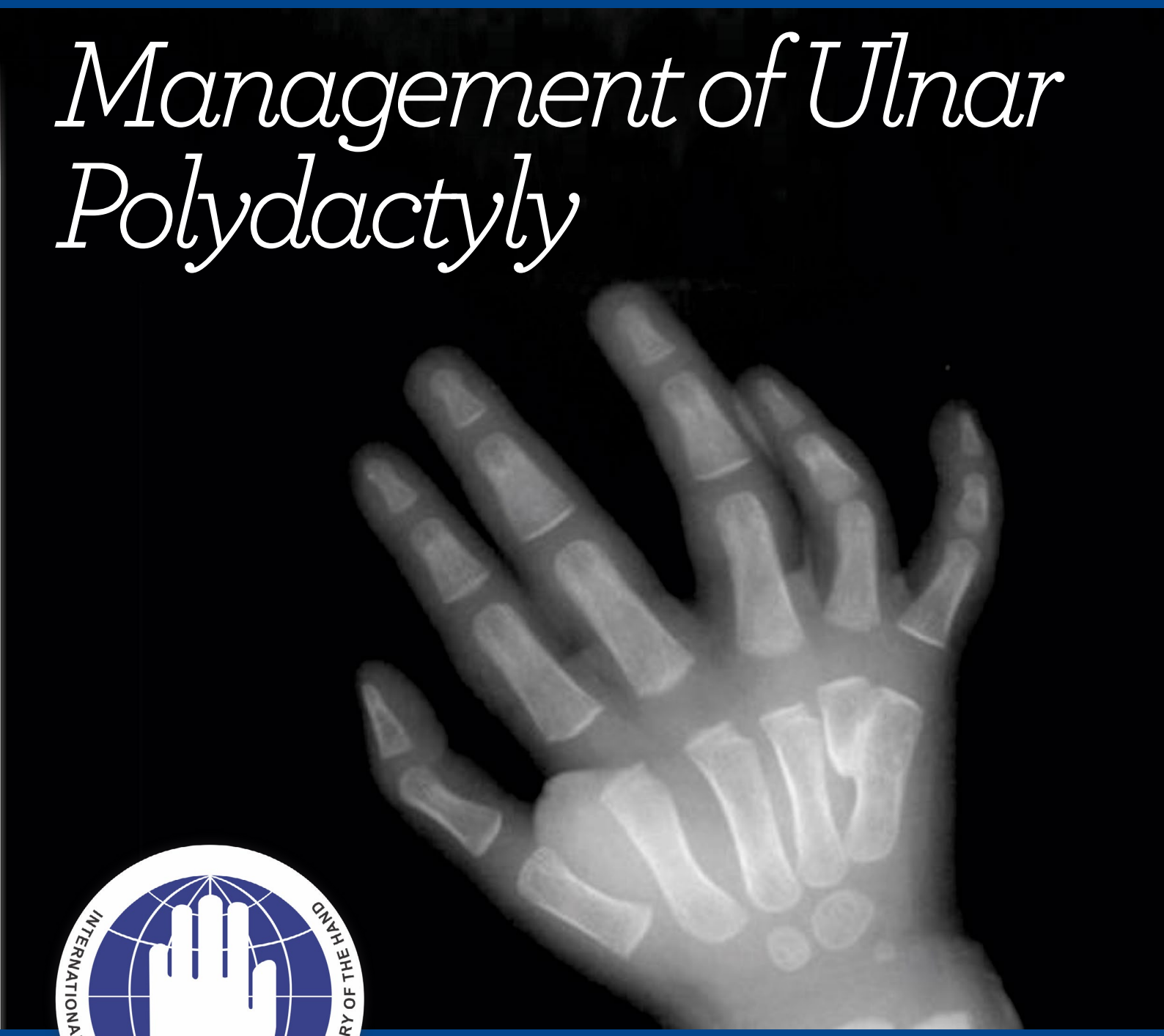
ezine ifssh

CONNECTING OUR GLOBAL HAND SURGERY FAMILY

SPECIAL FEATURE
ULNAR POLYDACTYLY: AN OVERVIEW OF CURRENT PRACTICE

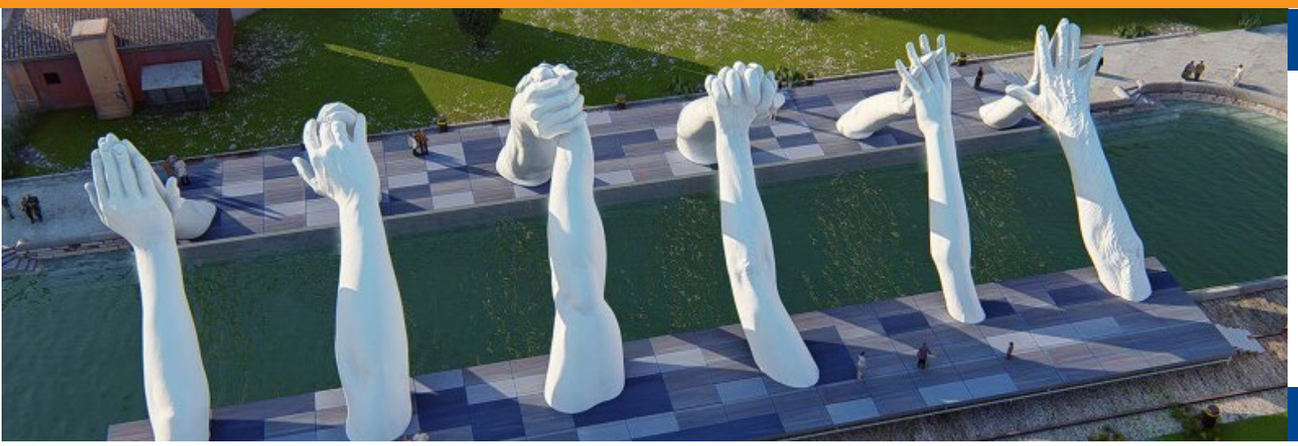
HAND THERAPY
A REMOTE WORKFLOW FOR CUSTOM ORTHOSIS DESIGN

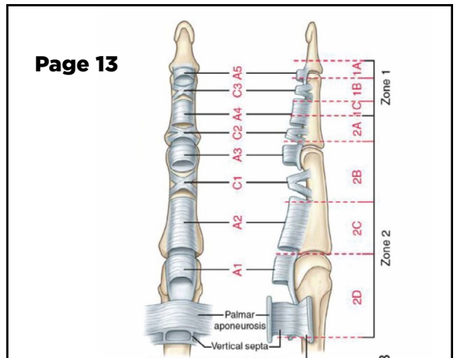
Management of Ulnar Polydactyly



EXTENSOR TENDON CLASSIFICATION: DISCUSSION
HAND SURGERY RESOURCE

www.ifssh.info VOLUME 16 | ISSUE 1 | NUMBER 61 | FEBRUARY 2026



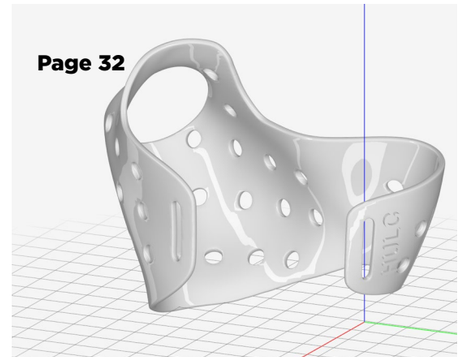


Page 13

contents

Page 18

Page 23



Page 32

Page 42

Page 46

With thanks for valued friendships and enriched collaborations

The International Federation of Societies for Surgery of the Hand (IFSSH) Executive Committee thanks all Delegates, member societies and colleagues for their shared commitment to improve hand surgery and education worldwide.

Through global friendships, many innovative and powerful partnerships continue to provide support and improve equity across all continents. In particular, we thank the AAHS, ASSH and ASHT for superbly hosting the 2025 IFSSH-IFSHHT Congress, and our IFSSH Patrons of Hand Surgery for generously investing in the future of hand surgery education.

We wish hand surgeons throughout the world all the very best for 2026.

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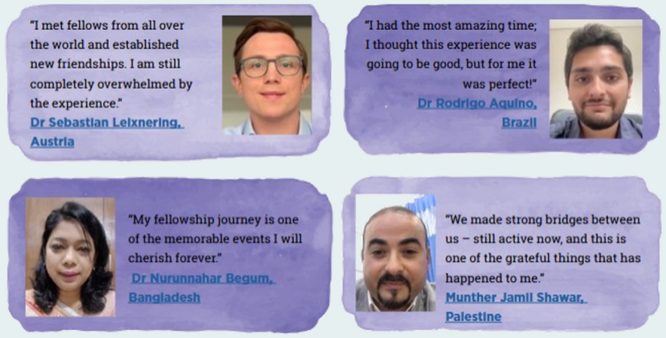

Simplicity can be profound

Simplicity, when done well, can indeed be profound.

When confronted with a complex problem, the old dictum states: seek the simplest solution - Occam's Razor[1]. Put another way, one should aim for the most straightforward and effective approach. True problem-solving focuses on what truly matters and eliminates unnecessary steps, gadgets, and embellishments that may introduce confusion, delays, or complications.

Reflecting on the technical developments in hand surgery over the past 50 years, one cannot help but marvel at the remarkable innovations in alloys, instruments, implants, biocompatible materials, and surgical techniques. These advances have undoubtedly expanded our capabilities.

However, in some instances, technique appears to triumph over reason; clever innovation may overshadow sound clinical judgement. When commercial interests and lucrative sponsorships become the primary drivers of innovation, it is clear that we have strayed from the correct path.

This is particularly evident in the management of osteoarthritis of the first carpometacarpal joint (base of the thumb). Over the years, innumerable devices and elaborate tendon reconstructions have been proposed to address this common condition. Many of these techniques have been promoted by small case series and only short- to, at best, medium-term follow-up. The outcomes have often resulted in failed implants, complications, unnecessary surgical revisions, and patient suffering, frequently without resolving the original complaint.

Revision surgery in such cases is often complex and leaves the surgeon with very limited options.

In contrast, the simplest solution - excision arthroplasty - remains highly effective. By removing the trapezium, clearing the space of foreign material, and allowing the formation of a mechanically stable ball-and-socket joint, has consistently demonstrated good to excellent long-term outcomes with minimal complications. It is simple, cost-effective, and reliable. Why, then, not perform this procedure from the outset?

The broader question is this: why complicate the management of a common condition by introducing unnecessary variables?

The ability to simplify and perform a procedure with skill and confidence is a sign of true professionalism.

ULRICH MENNEN
Editor

1. William of Ockham (Occam) c 1287-1347

President's Message

Greetings to you all for a very happy and healthy 2026 and a year of positive growth.

'You don't grow old, but if you stop growing you become old'

While this quote with a profound meaning is targeted to individuals it applies to institutions too. If institutions do not grow, they don't become old but lose their relevance to exist.

Meaningful growth first needs reflection of the year that went by. The first thing that causes us satisfaction is that our IFSSH family is poised for growth. We are at present a Federation of 65 societies and we have a further 7 societies under discussion and serving their establishment periods. We are guiding them in the processes for entry, and we will be happy when we have them all on board. Numbers and inclusivity matter. It is in the countries and regions where the new Societies are being nurtured, a lot of work needs to be done to provide quality hand surgery care to the masses. Addressing the inequity in healthcare delivery is a challenge that we will take on this year.

Reducing the inequity in healthcare can come through teaching and training. The IFSSH supports meaningful educational initiatives. A recent one was the WALANT workshop and teaching sessions convened by Don Lalonde and Pankaj Jani on the sidelines of the congress of the College of Surgeons of East, Central and Southern Africa (COSECSA) and the Surgical Society of Burundi in November 2025. It had great participation and we hope the IFSSH Sponsorship will go a long way to further surgical care in these regions. This is the type of growth that we cherish. The IFSSH is always ready to support such initiatives.

Our IFSSH Patron of Hand Surgery fund programme is gathering momentum and the cohort of donors is growing. I do hope this group will grow further in the coming year. We have a target of 5 million dollars. The number may appear daunting but if each one of the senior hand surgeons across the world contribute $1000 each, we will come near the midway mark. That push will help us to go through the next half. To those of you who read this, kindly consider making the contribution. As I wrote in the last President's message, anytime is a good time to do a good thing.

On the organisational front we are growing too. It always surprised me that such a big organisation like the IFSSH has had an administrative staff strength of one for a long time! We have expanded 100% by making it to two. In addition, we are streamlining the financial processes by recruiting GKM, a renowned auditing firm in India to help us. It is our belief that efficiency in the processes will ensure growth.

The IFSSH now provides many educational resources, and the Hand Surgery Resource is one such. It is the brainchild of Dr Larry Hurst. The IFSSH has taken ownership of it now and we are working on the processes that we need to take to maintain it as a leading source of information to a large part of the world. I would like the readers to click on Hand Surgery Resource and offer your suggestions.

Last weekend we had the biennial congress of the Indian Society for Peripheral Nerve Society. It is a group of Plastic Surgeons and Neurosurgeons interested in nerve surgery and we discuss anything from simple nerve repair to surgeries in the spinal cord to relieve intractable pain of brachial plexus injuries. I was privileged to receive the Lifetime Achievement award and that made me reflect on the work we do. From humble beginnings our unit does a little over 600 brachial plexus injury related surgeries a year, but the recognition was not for numbers. It was for providing a space to grow for all concerned and providing a space for all who wanted to get trained. That is where meaningful growth comes up. Each of us can do something and collectively it will help to change the world.

I will sign off with the quote of Mahatma Gandhi, 'The difference between what we do and what we are capable of doing would suffice to solve most of the world's problems'. In the new year I would urge you to do that little extra.

S. RAJA SABAPATHY
President: IFSSH

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Message from the Secretary-General

Dear Colleagues,

I wish everybody a very happy new year as we welcome 2026!

At the start of the new year, we are refreshed with updated views and pursuits.

I have spent some time advising the contents for the Central China Hand Surgeons' Conference 13-14 June 2026 in Anhui Province, China, an IFSSH sponsored educational event. The organising team, led by Dr Fang Jialiu, is planning this event in June to deliver education to geographical areas which have a large patient population, but where hand surgeons are too busy to travel far away to attend the educational courses. In these situations, we can bring the education to the surgeons by travelling to the area to give lectures, hold case discussions and participate in symposiums.

This event is another example of the IFSSH providing financial assistance paired with local resources to promote accessible and equitable education principles.

Please consider joining this event for a series of excellent lectures, symposiums, case discussion, workshops, and journal clubs with international experts from Europe, Asia, and America, headed by Prof David Warwick and Dr Koji Moriya, and with local colleagues. The two-day program and course will be followed as the social event by a one-day hiking in the famous Yellow Mountain.

Please consider applying for such IFSSH support in any areas where there is an obvious need. The IFSSH Committee for Educational Sponsorship, chaired by President-Elect David Warwick, is always willing to review applications to support events, especially when the educational and logistical ideas are paired with local hosts and the national Member Societies.

The 2026 IFSSH Delegates' Council Meeting will be in Basel, Switzerland in June 2026 (within the FESSH Congress).

The 2nd IFSSH Mid-Term Course in Hand Surgery will be held from 4-8 April 2027 in Venice, Italy.

2026 IFSSH Delegates' Council Meeting - save the date – 3-6 June 2026.
The 2026 IFSSH Delegates' Council Meeting will be held within the upcoming annual FESSH Congress in Basel, Switzerland. The FESSH Congress - https://fessh2026.com/ - runs from 3-6 June 2026.

The annual IFSSH business meetings are geographically rotated within each triennium to gain optimal attendance from all IFSSH Delegates.

We hope to see many IFSSH Delegates (or appointed proxies) in Basel to represent the 65 IFSSH Member Societies and plan the future priorities of our Federation. Full meeting information will be distributed by email to all IFSSH Delegates.

2nd Mid-Term Course in Hand Surgery – save the date – 4-8 April 2027

The 2nd Mid-Term Course will be held from 4-8 April 2027 at the Venice Convention Centre.

The Italian Society for Surgery of the Hand was selected to host the 2nd IFSSH Mid-Term Course in Hand Surgery. This occurred through a competitive bid process at the 2025 IFSSH Delegates' Council Meeting in Washington, D.C..

The inaugural Mid-Term Course was held in the South American region, hosted by the Ecuadorian Society, in 2024. The 2nd Mid-Term Course was opened to bids from Societies in the European/African region. The 3rd Mid-Term Course host will be chosen from the North and Central American IFSSH Member Societies; bids will be presented to the 2028 IFSSH Delegates' Council in Singapore. Societies from the Asian-Pacific region will be offered the opportunity to host the 4th Mid-Term Course.

1st

January 31 - February 3, 2024

Ecuadorian Society of Hand Surgery (ECUMANO)

Quito, Ecuador

www.ecumano.org

The Mid-Term Courses are a feast of lectures, workshops and masterclasses, held midway between the IFSSH Triennial Congresses, and are open to all surgeons worldwide. Keynote speakers are sponsored by the IFSSH. The program is planned to be practical and highly interactive.

2nd

4 - 8 April, 2027

2027 Mid-term Course

Venice, Italy

congressworks.com/venice2027

In late November 2025, with 500 days to do, the local organising committee commenced their countdown! The location of Venice and course dates have been meticulously chosen by the Italian Society to allow for a wonderful course in an iconic city with international accessibility. In April you will experience mild weather and if you plan extended travels, you might take advantage of the Easter holidays falling a week earlier.

The 2nd Mid-Term Course website is regularly updated with evolving information - https://congressworks.com/venice2027/. The preliminary schedule and topics are listed, and hotel and tourist suggestions will also attract your attention.

Get in early – register your interest for the 2nd Mid-Term Course so you don't miss the opportunity to learn from international experts, discuss clinical cases with renowned surgeons, network with colleagues from all continents, and explore the beautiful city of Venice!

The 'Art' page in this Ezine celebrates some of the art in Venice.

Calls for IFSSH Membership

The IFSSH is federation of societies whose members have a major interest in surgery of the hand. The IFSSH membership currently consists of 65 member societies from 63 countries (https://ifssh.info/member_societies.php).

The IFSSH always welcomes applications for membership. These are considered annually, requiring the recommendation of the IFSSH Executive Committee and the acceptance by the IFSSH Delegates' Council. Applications to join in 2026 should be submitted by April, for consideration at the annual Council meeting.

If your Society is interested in joining the IFSSH, please contact Prof. Ilse Degreef, Chair of the IFSSH Membership Committee. Ilse Degreef can be contacted via the IFSSH Secretariat – administration@ifssh.info.

Future Meetings

A detailed list of national and regional hand surgery meetings is available on the IFSSH website.

The IFSSH Courses and Congresses are as follows:

2nd IFSSH Mid-Term Course in Hand Surgery
4th-8th April, 2027
Venice, Italy
www.congressworks.com/venice2027

17th IFSSH – 14th IFSHT Congress
23rd – 27th October, 2028
Singapore
www.ifssh-ifsht2028.org

18th IFSSH – 15th IFSHT Congress
2031 (dates TBC) Rio de Janeiro, Brazil

HANDS'N'RIO
2031 IFSSH/IFSHT Triennial Congress

Wish all of you to embrace 2026 with happiness!

JIN BO TANG
Secretary-General: IFSSH
Email: administration@ifssh.info
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By becoming a Patron, you can help ensure that excellence in hand surgery transcends borders and impacts patients worldwide.

The International Federation of Societies for Surgery of the Hand (IFSSH) is proud to recognize the most recent donors to the IFSSH Patron of Hand Surgery program — an initiative dedicated to expanding global access to hand surgery education. Thanks to their generosity, the IFSSH continues to support and extend its educational offering. Young surgeons from resource-limited regions are gaining life-changing opportunities to attend international congresses, participate in hands-on workshops, and bring new skills back to their communities.

Past recipients hail from Nepal to Switzerland, from Ghana to Singapore, and from Mongolia to Brazil. Embedded workshops and outreach programs span from Hungary to India, and from Kenya to Cambodia. Reports detail transformative experiences that have led to new local training programs, clinics, and mentorship networks.

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We acknowledge the generous donations to date and thank the donors for their commitment to furthering the work of the IFSSH:

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Letter to the Editor

The Editor received a letter from Prof. Alexander Zolotov from the University Hospital of the Far Eastern Federal University (FEFU) in Vladivostok, Rusia.

A series of articles by a team of senior hand surgeons have discussed the classification of the zones of the extensor tendons in the Journal of Hand Surgery (European Volume).

You are invited to respond to this discussion by writing to the Editor at ezine@ifssh.info

"Dear Editor:

I would like to propose a topic for discussion.

A generation is a group of people born during a specific historical period (approximately 15–25 years) who are united by shared events and cultural experiences that shape similar values and behaviors.
For two generations, hand surgeons have used the tendon classification system proposed by Swiss surgeon Claude Edouard Verdan in their practice.

With a series of survey, discussion, and continuing publications over past 3 years, several leading surgeons are proposing an update to Verdan's scheme for extensor tendons. I wrote a letter to the Editor of the Journal of Hand Surgery (European Volume) with a reply from the lead authors of the most recent article in that journal. (see re-print).

I suggest a discussion of the following topics:

- What are your thoughts on the old and new zone classification?
- Do you use Verdan's classic scheme in your practice?
- Do you think it needs to be updated?
- If so, what should the updated classification be? What is your opinion?

Perhaps some of the Ezine readers would like to answer these questions and join the discussion.
Best regards,
Alex"

dalexpk@gmail.com | www.drzolotov.com

Acknowledgement: Permission to use and print the attachment was given by the Publisher (SAGE) and the Editor of the Journal of Hand Surgery (European Volume).

JHS(E)

Journal of Hand Surgery
(European Volume)
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Dear Editor,

Re: Tang JB, et al. Extensor tendon repairs: consensus, current guidelines and recommendations.

I read with great interest the publication by Tang et al. (2025a), dedicated to the treatment of finger extensor tendon injuries. One of the issues discussed by the authors concerns the classification of injuries by zones. The authors propose modifying the well-known Verdan system so that the extensor tendons have the same number of zones as the flexor tendons of the fingers. These publication by Tang et al. (2025a) seem like an invitation to discussion. In this regard, I would like to share my proposal. If the aim of revising the classical Verdan system is to unify the flexor and extensor tendon patterns, I suggest considering the following variant. The essence of the proposal is to create a completely mirror-image diagram of the extensor tendon zones, similar to the flexor tendon zones: 1, 2 (a, b, c, d), 3, 4, 5. Figure 1 shows Tang's diagram, Figure 2 shows the 'mirror diagram' and Figure 3 shows the flexor zone 2 with the generally accepted sub-zones a, b, c, d (Tang et al., 2025b). In fact, the 'mirror-image diagram' can be a second version of Tang's diagram, but, in my humble opinion, it is more understandable and justified.

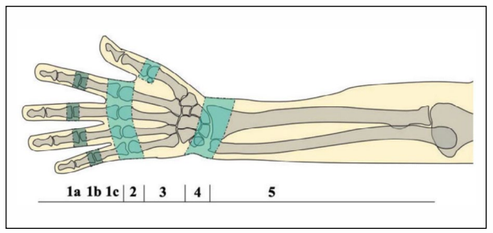

Figure 1. Tang's diagram of extensor tendon classification from Tang et al. (2025a).

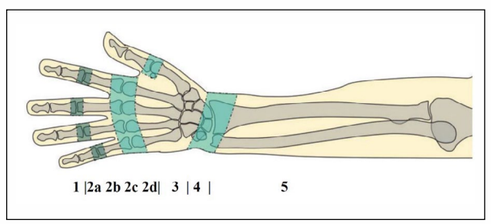

Figure 2. 'Mirror-image classification' that may be used.

Alexander Zolotov*
Medical Center, Far Eastern Federal University,
Vladivostok, Russia
*Corresponding author: dalexpk@gmail.com

Reply

Dear Editor,

We thank Dr Zolotov for the letter raising an excellent point of discussion. The subdivisions of zones 1 and 2 of flexor tendons have been used for a long while (Tang, 1994, 1995, 2005; Tang et al., 2025b). We agree that classification of extensor tendons mirroring *anatomical location* of flexor tendons is easy to remember, but this would purely be a mirror of location. A classification should also favour functional description, treatment selections and discussion of outcomes (Chen et al., 2025; Tang and Lalonde, 2025; Tang et al., 2025a).

With these factors in mind, grouping all structures in the finger distal to the metacarpophalangeal (MP) joint within one zone is better, as the extensor structures over the finger differ completely from those proximally and treatment is also different (Tang, 2024). The extensor tendon at the MP joint area is designated as zone 2 because the extensor in this part is the same as zone 2 flexors, being a round tendon, which can be treated with methods similar to those for zone 2 flexor tendons. Further proximally, extensor tendons in zones 3–5 can be treated with similar methods to those for flexor tendons in zones 3–5.

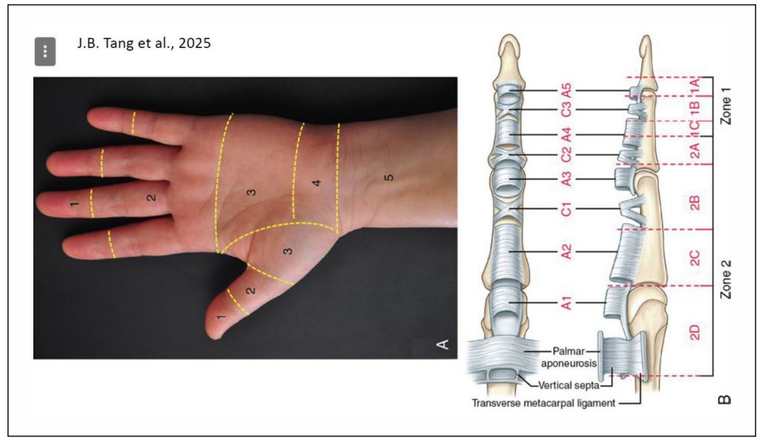

Figure 3. The generally accepted sub-zones a, b, c, d of zone 2 of the flexor tendon (Tang et al., 2025b). (a) Five zones of flexor tendons; (b) subdivisions of zone 1 and 2.

If we use direct mirror images of flexors for the extensors, we will not simplify discussion of the treatment. In making the new classification, it is our goal to serve selection and discussion of treatment and outcomes.

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Society and Federation Reports

NORWEGIAN SOCIETY FOR SURGERY OF THE HAND

This year's Norwegian Orthopaedic Annual Congress - Hand Symposium, was titled "Fractures and Soft Tissue Injuries of the Upper Extremity in Children". It was organised by the Oslo University Hospital and invited three guest speakers. The topic was chosen for its relevance to all orthopaedic surgeons. It was pleasing to see that the auditorium was so full that, unfortunately, there were not enough seats for everyone.

The Symposium was opened by Andrea Jester, a British hand surgeon. Since 2013, she has led The Hand and Upper Limb Service at Birmingham Women's and Children's Hospital. This hospital is one of Europe's leading centres for paediatrics and paediatric surgery and has one of the highest volumes of fractures and soft tissue injuries in children in the UK.

Andrea is a highly approved speaker due to her outstanding communication skills and impressive research activity. Andrea's lecture, "Hand trauma in children", mainly addressed hand fractures distal to the radiocarpal joint. She spent considerable time providing advice on how best to examine and manage paediatric patients and give advice for their caregivers. Every orthopaedic surgeon knows that hospitalised children are approached differently than adults. The examination can be quite challenging in children who are in pain, unable to cooperate, or too young to express themselves. She offered the tip of asking parents if they have taken a photo of the injured hand before it was bandaged, so that the child can avoid an unnecessary and painful bandage change before being taken to the operating theatre if the injury must be managed under anaesthesia. She also reminded the audience to look for a natural flexor cascade, with fingertips pointing towards the scaphoid bone at rest, and to check the tenodesis effect in children who are too young to follow instructions for movement. She emphasised the short treatment window for hand fractures due to very rapid healing, as well as children's ability to remodel even moderately displaced fractures. Most closed hand fractures in children can be managed conservatively, but Andrea highlighted Seymour's fracture in the distal phalanx and intra-articular condylar fractures in the middle and proximal phalanges as fractures that often require surgery.

The next speaker was May Tove Hestmo, who has been a consultant at the Orthopaedic Department at Oslo University Hospital since 2014, and has extensive experience in treating hand injuries in children. Her lecture, "Tendon injuries in children", dealt with flexor and extensor tendon injuries in children, including closed ruptures (such as Mallet finger) and ruptures of the extensor hood with dislocation of the extensor tendon over the knuckle. Like Andrea, May Tove gave tips on looking for flexor tension and checking the tenodesis effect in children who are too young to cooperate with a functional examination of the fingers. She recommended bringing the child back for a repeat examination after a few days in cases where pain and/or fear make it impossible to get a satisfactory examination at the first visit. She went on to explain that the actual surgical technique is not significantly different for tendon injuries in children compared to adults, except that thinner suture material and simpler core suture techniques are used. Postoperative management after flexor tendon injuries, however, is markedly different from treatment in adults, as children under about 10 years old cannot be expected to follow a hand therapist's instructions for careful exercises and to do these regularly enough. Younger children therefore have their hand casted for four weeks, followed by a tailored tie-down for the next four weeks (an orthosis preventing full extension).

Speaker May Tove Hestmo with the topic "Tendon injuries in children"

She emphasised that, due to the difficulty of the aftercare, it is rarely indicated to perform flexor tendon reconstruction in children before they are about 10 years old, but this must be assessed individually.

The final speaker was Andreas Lødrup, who is also a consultant at Oslo University Hospital. He is currently working on his PhD project, which concerns concomitant nerve injuries in elbow and forearm fractures in children. He gave advice on how to examine children with fractures to detect nerve injuries, which unfortunately are often missed in the first weeks after injury. Among other tips, he suggested asking the child to close their eyes and say which fingertip is being touched by the examiner, and to check skin moisture as the skin becomes dry in the innervation area of injured nerves. An important sign of accompanying nerve injury in children may be pronounced pain both locally and in the innervation area of nerves that are caught in or being pulled on by the fracture.

Speaker Andreas Lødrup had a talk on nerve injuries in elbow and forearm fractures in children

Andreas reminded the audience that one should suspect this in children who do not experience a significant reduction in pain within a few days after initial conservative or surgical management of fractures, and in children whose fingers hurt as much or more than the actual forearm or elbow fracture. He presented data from his retrospective studies of children who have undergone nerve exploration after supracondylar humerus fractures and forearm fractures, showing that in many cases there were signs of nerve traction or entrapment, and in some cases, there was structural damage to nerve tissue requiring nerve grafting/reconstruction. Andreas is very talented at drawing, and his presentation was full of beautiful anatomical and pathophysiological illustrations. He both started and finished his lecture with an interactive Mentimeter survey in which over 150 attendees participated. Fortunately, it seemed that most attendees had knowledge of the signs in nerve injuries in children and that such cases should be referred early for assessment when suspected.

The Symposium was educational and received excellent feedback. Knowledge from our field was shared with many orthopaedic surgeons from other subspecialties who attended.

Written by:
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GEORGIAN SOCIETY FOR SURGERY OF THE HAND

Hand surgery in Georgia has a long history and tradition. In 1977, a microsurgical group was founded by Iva Kuzanov at the 1st Hospital Tbilisi , under the leadership of Prof. G. Natsvlishvili. An experimental microsurgical laboratory was created, where the following operations were performed on laboratory rats: dissection, transection, and anastomosis of the aorta and inferior vena cava, kidney transplantation, pancreas transplantation, lower limb transplantation, prefabrication of a rat's dorsal skin flap by rotating the caudal vascular bundle, closure of the duodenal stump using a vascularized flap taken from a resected part of the stomach, etc.

In 1977, the first successful replantation of an amputated finger was performed in Georgia. In 1978, in Tbilisi, the first replantation of an amputated hand in the Soviet Union was performed on a 4-year-old child.

In 1984, for the first time in the world, a transplantation of the proximal joint of the second toe, along with its skin flap, was performed in Georgia to replace the damaged proximal interphalangeal joint of the middle finger of a pianist's hand. This operation was described in international medical journals. The article reached one of the founders of microsurgery, Bernard M. O'Brien from Australia, who was the originator the transplantation of the first web space flap of the foot. When he read the article that his flap had been modified to include a joint, he couldn't believe such an operation had been performed in Georgia!. He voluntarily visited Georgia and met the surgeons who performed the operation.

The Georgian Society for Surgery of the Hand was founded in 2018. Currently, the Society has 37 members, including orthopedic surgeons , plastic surgeons, and vascular surgeons. The current President of the Society is Teimuraz Gurjidze, a plastic and reconstructive surgeon. In Georgia, hand surgery is not a separate specialty or subspecialty. Negotiations are presently held to have Hand Surgery recognised as a separate subspecialty in our country.

In 2023 the Georgian Society for Surgery of the Hand became a Member Society of IFSSH. Dr. Sophiko Tsilosani, was a traveling fellow at the invitation of the American Society for Surgery of the Hand, where she gained great experience.

On 20 September 2025, a conference of the Society was held at the seaside city of Batumi, Georgia. Twelve speakers presented complex cases and their management, as well as modern approaches to Hand Surgery. This Conference will become an annual event and part of the international hand scene.

POLISH SOCIETY FOR HAND SURGERY

Introduction

The year 2025 was a period of exceptionally intensive scientific, educational, and organisational activity for the Polish Society for Hand Surgery (PSHS), confirming its leading role in the education of upper limb surgery in Poland and its strong international standing. Throughout the year, numerous meetings, conferences, and training courses were held, which not only strengthened professional relationships among our Society members but, above all, contributed to the continuous improvement of professional qualifications, and created valuable opportunities for the exchange of knowledge and experience.

The most important events of the past year are outlined below.

The 13th Congress of the Polish Society for Hand Surgery and the 3rd Congress of the Polish Society for Hand Therapy

Undoubtedly, the most significant event, traditionally organised every two years, was the 13th Congress of the Polish Society for Hand Surgery (PSHS) together with the 3rd Congress of the Polish Society for Hand Therapy (PSHT), held in Wrocław from 10-11 October 2025. The Congress welcomed 512 registered participants, which is a record attendance in the history of the joint PSHS and PSHT meetings.

The scientific program comprised 17 thematic sessions, numerous hands-on workshops, and educational events conducted prior to the Congress. A particularly noteworthy component of the program were two joint PSHS–PSHT sessions, held on the first day of the meeting and dedicated to:

- the principles of Evidence-Based Medicine in Hand Surgery,
- contemporary strategies for the treatment of degenerative disorders of the first carpometacarpal (CMC I) joint.

The Congress hosted 15 invited international speakers from leading clinical and academic centers across Europe and other regions of the world, significantly enhancing the scientific profile of the meeting and facilitating extensive international exchange of experience. In the days preceding the Congress, several highly rated educational events were held:

- 8 October 2025 – cadaver course "Elbow fracture-dislocations: from instability to degenerative changes";
- 9 October 2025 – cadaver course "Treatment of degenerative conditions of the hand joints";
- 9 October 2025 – AO Symposium dedicated to distal radius fractures.

Jonathan Hobby and Jin Bo Tang were awarded Honorary Membership of the Polish Society for Surgery of the Hand (PTChR) by the Society's President.

13th Congress of the Polish Society for Hand Surgery. Openig Ceremony

Jonathan Hobby and Jin Bo Tang were awarded Honorary Membership of the Polish Society for Hand Surgery by the Society's President prof. dr hab. n. med. Paweł Reichert

The recognition honors their significant contribution to global hand surgery and longstanding support for the Polish community through education and scientific collaboration.

Both the Congress and the accompanying courses received excellent evaluations from participants in terms of scientific content, organisation, and practical educational value, confirming the growing importance of events organised by PSHS and PSHT.

FESSH Academy Foundation Course in Hand Surgery - Poznań

From 25 February to 1 March 2025, the 8th edition of the FESSH Academy Foundation Course in Hand Surgery was held in Poznań, marking the first time this prestigious event was organised in Poland.

The Course was conducted under the auspices of FESSH and co-chaired by Piotr Czarnecki, Elisabeth Haas, and Jonathan Hobby.

The event attracted 114 participants from 30 countries, highlighting its strong international character and the considerable interest of the global hand surgery community. The faculty consisted of an international group of lecturers representing 10 FESSH Member Societies, including 10 new faculty members. The four-day program included lectures, plenary sessions, practical exercises, and intensive work in small discussion groups. Practical sessions, supported by industry partners, were particularly highly rated for their excellent technical and educational standards.

New features of this Course included hands-on sessions on ultrasound imaging, clinical wrist examination, and tendon and nerve repair techniques using the 'UpSurgeon' finger model. These innovations received enthusiastic feedback and will be incorporated into future FESSH Academy courses.

International Bone Research Association (IBRA) Course – Poznań

Another important educational event was the International IBRA course, held in Poznań on 25-26 April 2025, entitled:
"Trauma and Reconstruction of the Upper Limb – Advanced Concepts in Wrist and Elbow Treatment."

FESSH Academy Foundation Course in Hand Surgery - Poznań

SOCIETY AND FEDERATION REPORTS

FESSH Academy – Poznań. Lecturers and instructors

FESSH Academy – Poznań. Workshops

IBRA Course 2025

The Course was organised under the patronage of the International Bone Research Association (IBRA) with the active involvement of lecturers from the Polish Society for Hand Surgery. Invited international faculty from leading clinical and academic centers participated in the event. The program focused on advanced concepts in trauma management and reconstruction of the wrist and elbow. As in previous years, the Course represented a very high scientific and organisational standard and received excellent evaluations from participants.

National Cadaver Courses

In 2025, two additional national cadaver courses were held:

- in Wroclaw,
- in Poznań.

These Courses, organised by the PSHS faculty, were also very highly rated by participants.

National Cadaver Courses in Poznań and Wrocław

Summary

The year 2025 confirmed the dynamic development of the Polish Society for Hand Surgery and its growing role as a key educational and integrative platform for the hand surgery community in Poland. The high scientific quality of the events, record attendance at the Congress, and active international collaboration reflect a consistently implemented development strategy and openness to the latest advances in global upper limb surgery.

The activities undertaken by the PSHS not only contribute to improving the professional qualifications of its members but also strengthen the position of Polish hand surgery on the international stage, providing a solid foundation for the Society's continued growth in the years to come.

IRENEUSZ ADAM WALASZEK, MD PhD

AMERICAN SOCIETY FOR SURGERY OF THE HAND

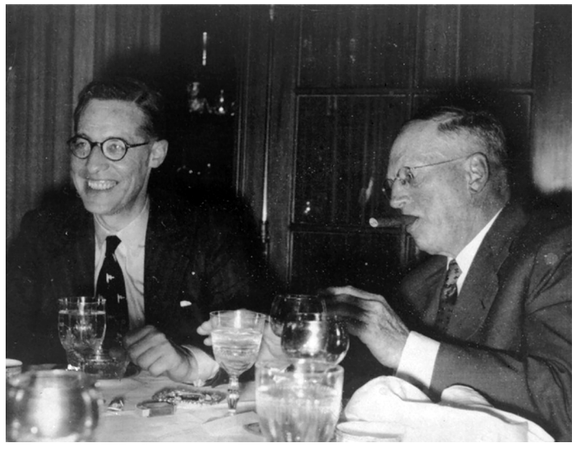
Sterling Bunnell and the Making of a Global Specialty

A review of **Dr. Sterling Bunnell: From Son of the Gold Rush to Founding Father of Hand Surgery**

Written by Anthony A. Smith, MD, and Steven J. McCabe, MD

Hand surgery, as we now practise it around the world, did not emerge fully formed from a single institution or nation. It evolved through necessity, collaboration, and the shared experience of surgeons confronting complex injuries of the upper extremity.
Few individuals embody this process more completely than Dr. Sterling Bunnell.

In October of 2025, the ASSH published a new biography of Dr. Bunnell entitles, Dr. Sterling Bunnell: From Son of the Gold Rush to Founding Father of Hand Surgery. In this work, authors Anthony Smith and Steven McCabe offer a deeply researched and engaging account of the man whose ideas helped shape hand surgery into a global surgical specialty.



Pulvertaft and Bunnell in San Franscico 1948. (image provided by Anthony Smith)

This biography succeeds not simply by recounting Bunnell's achievements, but by explaining why his efforts were so important in the development of hand surgery as a specialty. Smith and McCabe portray Bunnell as a surgeon whose thinking transcended traditional disciplinary boundaries and national borders—an outlook that aligns closely with the mission and spirit of the International Federation of Societies for Surgery of the Hand (IFSSH).

Foundations Beyond the Operating Room

One of the book's central insights is that Bunnell's surgical vision was shaped long before he entered medicine. As a young man, he was deeply immersed in ornithology, field observation, and drawing. These pursuits cultivated habits that would later define his surgical approach: meticulous observation, respect for anatomy, and an ability to translate three-dimensional structure into meaningful function.

Bunnell's lifelong commitment to drawing—something he later advocated explicitly for surgeons—reflected his belief that careful seeing precedes good surgery. Smith and McCabe show how this emphasis on visual understanding became integral to his teaching and writing, influencing how hand surgery was learned and practised across generations and continents.

War and the birth of a Composite Surgeon

Bunnell's experiences during World War I were transformative. Serving as both a combat neurosurgeon and chief of surgery, he encountered injuries that defied the compartmentalised structure of early 20th-century surgery. The combined bone, nerve, tendon, and soft tissue injuries seen in military hand trauma demanded a more integrated solutions.

From this environment, Bunnell emerged with a powerful idea: effective treatment of hand injuries required a surgeon fluent in multiple disciplines. This concept of the "composite surgeon" became foundational to hand surgery worldwide.

It resonated not because it was theoretical, but because it worked—particularly in settings where resources were limited and adaptability was essential.

A Textbook That Unified a Field

The publication of Surgery of the Hand marked a defining moment in hand surgery. More than a technical manual, the book articulated a philosophy of care that emphasised function, sensation, and return to meaningful activity. Its influence extended rapidly beyond the United States, aided by translations, visiting surgeons, and Bunnell's willingness to share knowledge freely.

Smith and McCabe document how this text became a catalyst for the formation of hand surgery societies across Europe, Scandinavia, Asia, and the Americas. In Austria, France, the United Kingdom, Japan, Brazil, and beyond, surgeons adapted Bunnell's principles to their own clinical environments, often citing his work as foundational.

Building institutions, encouraging independence

While Bunnell was the founding president of the American Society for Surgery of the Hand, the book makes clear that his hopes for the specialty extended beyond any single organisation.

Through visits, correspondence, and mentorship, he supported surgeons who would later establish national hand surgery societies—many of which are now IFSSH member societies.

Bunnell did not seek to impose a uniform model of practice. Instead, he promoted shared principles: respect for anatomy, commitment to function, and collaboration across disciplines. This approach allowed hand surgery to develop organically, shaped by local needs while remaining connected through a common intellectual framework.

A legacy that anticipated IFSSH

One of the most striking aspects of the biography is how closely Bunnell's outlook aligns with the goals of IFSSH. Long before international federations were commonplace, he predicted that hand surgery would flourish through global cooperation. He understood that no single country or training system held all the answers—and that progress depended on open exchange.

Smith and McCabe highlight how Bunnell's protégés and international colleagues carried this ethos forward, laying the groundwork for the international networks we now take for granted. In this sense, Bunnell's legacy is not only historical but ongoing, reflected in IFSSH congresses, educational initiatives, and collaborative research efforts worldwide.

Why Bunnell still matters

For today's hand surgeons, this book offers more than historical perspective. It reminds us that our specialty was born from necessity, shaped by collaboration, and sustained by generosity of knowledge. In an era of increasing subspecialisation and division, Bunnell's insistence on global inclusion, diverse viewpoints and shared learning feels especially relevant.

Dr. Sterling Bunnell is a fitting tribute to a surgeon whose ideas helped unite a global community. Smith and McCabe have written a biography that not only honours the past but also reinforces the values that continue to define hand surgery around the world.

Copies of the book may be purchased at the ASSH website: American Society for Surgery of the Hand (ASSH). Or : https://www.assh.org/store/product?title=Sterling-Bunnell-From-Son-of-the-Gold-Rush-to-Founding-Father-of-Hand-Surgery&id=a13Pb00000btqzyIAA

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MEXICAN SOCIETY FOR HAND SURGERY AND MICROSURGERY (SMCMYM)

This year our Society celebrated its 25th anniversary. We held our XXth International Congress on Hand Surgery from 21-23 May 2025 at the National Institute of Rehabilitation "Luis Guillermo Ibarra Ibarra", in Mexico City. Invited faculties included Jorge Boretto (Argentina), Juliana Rojas (Colombia), Francisco Soldado (Spain), Alejandro Badía (USA) and from Mexico, Alejandro Espinosa, Luis Sánchez, Gerado Zárate, René Barraza, Rafael Reynoso, Mario Mendoza, Cristhyan Baruch Cañedo, Susana Téllez Luna, Efraín Farías Cisneros, Diego Valencia Rodríguez, Ubaldo Ayala, and many others distinguished professors.

Mexico was the nation invited to the Annual Meeting of the ASSH, in Vancouver, BC, Canada from 9-11 October 2025. Our Mexican Society of Hand Surgery and Microsurgery was the 2025 International Guest Society. The meeting had 55 registrants from Mexico, 17 of whom where speakers in some of the Instructional Course Lectures, paper sessions, Evidence-to-Impact Sessions, Current Concepts and Controversies, and pre/post courses. Our speakers were Gerardo Zárate, Cristhyan Cañedo, Efraín Farías, Rafael Reynoso, Jorge Clifton and Miguel Ruiz. Our past-president Dr. Jorge Clifton was honoured to deliver the International Guest Lecture with the title "Brachial Plexus Birth Injury through the eyes of northern Renaissance Paintings".

Dr. Miguel Hernández Álvarez, a past-president won the Top Annual International Guest Society Poster with the paper "Pollicisation: functional results using the Buck-Gramcko technique in a 50-patient cohort". The other four top papers were from three active members of our Society, Diego Valencia, Luciano Torres and Efraín Farías, and a former Mexican Society member. Canadian Dr. Kevin Rumball, member of the International Relations Committee of the ASSH, hosted a welcome breakfast for the Mexican attendees.
He took us on a historic journey of José María Narváez, a Mexican Cartographer whose expeditions in the late 18th century reached British Columbia. We had the pleasure of attending the presidential dinner where Dr. Tamara Rozental hosted a beautiful evening, forming a 'hand surgery family'. Our Society was recognised by the ASSH.

A week later, our Society's International Delegate Dr. Luciano Torres Sánchez attended to the 20th Latin American Congress of Hand Surgery held in Buenos Aires, Argentina. He participated in a debate on 'Longitudinal Instability of the Forearm'.

In November 2025, our Society held a joint session with the Serbian Society for Hand Surgery. Dr. Tomislav Palibrk and Dr. Sladjana Andjelkovic, both from the Orthopaedic and Traumatology Clinic, Faculty of Medicine, University of Belgrade, Serbia, joined our members Diego Valencia and Efraín Farías, giving state-of-the-art presentations about distal radius fractures. We are looking forward to collaborating with other Societies from all over the world, sharing our knowledge and friendship!.

At our last meeting of 2025, six new members presented their works for admission as Full Members of our Society.

We thank the IFSSH for giving us the opportunity to share the activities of our Society.

We invite everyone to join us during the next year, including the XXIth Congress of our Society, which will be held in Mexico City, from 7-9 October 2026.

Ulnar polydactyly: an overview of current practice

PULPe (Paediatric Upper Limb Project Europe) has assembled an international faculty to discuss Ulnar Polydactyly in children, including aetiology and surgical treatment.

Introduction

Polydactyly represents one of the most common congenital anomalies of the hand. The condition can be categorised into preaxial, postaxial, and central polydactyly, which means that an extra finger or toe develops either along the first ray (radial or preaxial), the fifth ray (ulnar or postaxial), or in the middle (central). Supernumerary digits in ulnar polydactyly are classified as type A or type B, as described by Temtamy and McKusick [1].

Overall, the prevalence is estimated at 1-2 per 1,000 live births, with significant ethnic variation in frequency. Type B ulnar polydactyly is the most common anomaly and affects 1 in 1300 live births in the Eurasian population and up to 1 in 150 in African-Americans [2]. Most cases are of non-genetic, multifactorial origin. However, genetic causes of polydactyly, whether syndromal or non-syndromal, are increasingly being identified. For treatment, several methods are applicable including ligation, with a suture or vascular clips, or surgical excision under local or general anesthesia. However, the advantages and disadvantages per treatment option differ and there is still no convincing evidence regarding the most suitable treatment for simple ulnar polydactyly.

Etiology and epidemiology

Ulnar polydactyly is a condition that results from a developmental error in the radial-ulnar axis. This axis is regulated by the zone of polarizing activity (ZPA) via the sonic hedgehog (SHH) signaling pathway. SHH regulates the anterior-posterior differentiation through GLI transcription factors. Genetic variants affecting these pathways can cause ulnar polydactyly.

In patients of African descent, it is usually inherited in an autosomal dominant way. It is rarely associated with other hand anomalies, congenital syndromes, or non-syndromal systemic abnormalities. In these patients, it presents most commonly as type B and is often bilateral (70%). In addition, ulnar polydactyly is equally distributed in males and females with the left hand more commonly affected [3].

In patients of non-African descent, ulnar polydactyly usually occurs sporadically. Only 5% of non-Africans demonstrate a recognizable pattern of inheritance. Both Type A and Type B ulnar polydactyly are equally encountered in these patients, with only 20% of the cases being bilateral and being more common in males. These patients are more likely to have associated hand conditions, and foot involvement, such as lateral toe polydactyly, can also be present.

Furthermore, it may be associated with other congenital syndromes with either autosomal dominant or autosomal recessive patterns of inheritance [4].

Genetics

Most ulnar polydactylies are of non-genetic, multifactorial origin. However, a genetic cause always needs to be carefully considered, especially when the child is very young. At a young age, symptoms might be so mild that they are easily overlooked, or the patient might not have developed all symptoms of a disorder yet. Moreover, early genetic testing can help establish a diagnosis, which provides insights into giving adequate treatment, for other family members who might be at risk and future family planning.

Genetic ulnar polydactylies can be divided into two categories: isolated or syndromal.
Isolated, or non-syndromal, ulnar polydactylies are limited to the fingers and toes only. Currently, at least 7 genes are known to cause isolated ulnar polydactyly, including GLI1 (OMIM #165220), GLI3 (OMIM #165240), ZNF141 (OMIM #194648), IQCE (OMIM #617642), FAM92A (OMIM #617273), KIAA0825 (OMIM #617266) and DACH1 (OMIM #603803). Depending on the gene involved, these polydactylies can be inherited in an autosomal dominant or recessive manner. It is important to realize that reduced penetrance can be present, which means that an affected patient can have a non-affected parent with the same gene variant.

In syndromal ulnar polydactylies, multiple symptoms that can affect health are present. Syndromal ulnar polydactylies can be either of chromosomal origin, such as trisomy-13, or caused by smaller aberrations, such as gene variants. There are many syndromes that involve postaxial polydactyly. One of the most common ones is Greig syndrome, caused by pathogenic variants in the GLI3-gene. Features of Greig syndrome include frontal bossing with macrocephaly, hypertelorism, preaxial polydactyly of at least one limb, pre- and postaxial polydactyly of the other limbs and cutaneous syndactyly. This disorder is autosomal dominantly inherited.

Another relatively frequent group of syndromal postaxial polydactylies are the ciliopathies. The ciliopathies are a group of disorders caused by genetic variants encoding defective proteins which affect the ciliary structure or function. As cilia are present in numerous parts of the human body, these disorders can display problems in multiple organs, including the eyes, kidneys, heart, brain function and morphology, and skeleton. Some examples include Bardet Biedl syndrome, Joubert syndrome and Ellis-van Crefeld syndrome. These examples in their turn can be caused by numerous genes. As a result, the ciliopathies are very heterogeneous. Ciliopathies are inherited in an autosomal recessive manner. Additionally, many other genetic syndromes can cause ulnar polydactyly, such as ulnar mammary syndrome, Carpenter syndrome and acrocallosal syndrome. As in non-syndromal ulnar polydactyly, reduced penetrance can also be present in syndromal cases.

There are several methods for testing for a certain disorder, ranging from chromosomal microarray analysis, ie. searching for submicroscopic chromosomal aberrations, to whole genome sequencing, eg. searching for a specific gene variant. Depending on the clinical presentation, the right test can be chosen. Involvement of a clinical geneticist is key in this process. Referral to a clinical geneticist is indicated when multiple limbs are affected, the family history is positive for limb anomalies, and/or additional findings are present in the patient. In case of doubt, always consult a clinical geneticist.

Classification and treatment

Supernumerary digits in ulnar polydactyly are classified as type A or type B, as described by Temtamy and McKusick[1]. Type-A ulnar polydactyly represents well-developed digits located on the ulnar border of the small finger, whereas Type B describes a hypoplastic, pedunculated, or small finger nubbin.

Several additional classification schemes have been described [5,6].

Type A ulnar polydactyly involves a solid bony connection, and general anesthesia must be provided for excision and reconstruction.

For type A cases, the reconstructive procedure depends largely on the origin of the supernumerary digit. All reconstructions require exploration and division of the tendinous and neurovascular structures to the extra digit while preserving the function and sensation to the remaining digit. Incisions can be placed midlaterally or zig-zagged, and skin flaps might be required. Corrective osteotomy, ligament reconstruction, and/or articular contouring may be necessary. Principles known from radial polydactyly or thumb duplication might apply. For bilateral cases, approaching the easier side first may help in anticipating what is required on the more complicated one.

Type B ulnar polydactyly is the most prevalent type and often presents bilaterally. There is a poorly developed digit, ranging from a small lump to a whole non-functional finger attached only with soft tissue to the ulnar side of the pinky at the level of the proximal phalanx. This has been divided into type I and II depending on the pedicle width.

For type B cases, there are different opinions regarding the optimal age and method of treatment. Options for treatment include ligation, via suture or vascular clips, or formal excision, via local or general anesthesia.

Ligation can be performed when the base of the soft tissue attachment of the extra finger is small. This treatment is inexpensive and straightforward to fulfil. However, simple ligation by sutures can result in unsightly nubbins and painful neuroma. Clipping using vascular clips at the very base of the supernumerary digit could result in smaller and flatter nubbins than with sutures, which might result in lower revision rates [7]. Regarding timing of treatment, ligation can be performed at a young age shortly after birth.

Surgical excision could result in higher patient satisfaction and lower revision rates for persistent nubbins and painful neuromas [8]. Surgery can be conducted under local or general anesthesia. Regarding local excision, removal of the supernumerary digit can be executed with minimal distress in an operating room without need for general anesthesia under "milk sedation" [9], ie. the baby is fed just before or at the beginning of the procedure. This procedure is most suitable for babies less than 2-3 months old. Beyond 3 months of age, they are lively and it will be difficult to operate under local anesthetic. Therefore, formal surgical excision is usually delayed until the age of 12 months regarding safer general anesthesia [10,11].

The options for treatment can vary amongst surgeons and there is little literature comparing outcomes. To illustrate, a systematic review examining 900 articles could include only 10 and was not conclusive [12]. The authors mention a complication rate of 23.5% for ligation compared with 3% for excision. Efforts by the authors to conduct a multicenter randomized controlled trial (RCT) were unsuccessful due to a lack of consensus among surgeons regarding the optimal approach.

Tips and tricks for local surgery

For a local procedure, diathermy, a good light, and seating are needed. Ideally, there should be an experienced nurse to hold the baby, as some parents will find the process distressing.

The baby's clothes need to be removed, and it should be kept in a warm blanket, wrapped one arm inside it. For skin preparation, cover the baby's eyes with a swab, especially when alcohol-based disinfectant is used. Let the nurse swaddle the baby and sit on a static stool whilst holding the arm loosely encircling it, positioning it but not gripping it.

Once the baby falls asleep, local anesthetic will be applied at the base of the digit. EMLA anaesthetic cream is contraindicated in this age group, and pre-warmed local anaesthetic with adrenaline should be used instead. Insert the needle proximal to the extra digit, advance it, and inject as you withdraw it. Let the nurse cradle and comfort the baby while holding a gauze on the injection site. Pause and write a provisional operative note/discharge letter while the anesthetic takes effect and the child settles.

During the procedure, let them feed on a bottle of milk or sucrose water. Incise volarly first and then incise dorsally just through dermis ensuring sufficient tissue present for good contour. Do not apply traction to the extra digit. Use bipolar diathermy to cauterise the vessel and nerve. Close the wound with interrupted absorbable sutures, excising dog ears and covering with Steristrips™ and Mefix™ (providing spares to the parent). Advise parents to keep it dry for 48 hours and provide an emergency contact number for any queries.

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Ulnar polydactyly: an overview of current practice

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Advancing Hand Therapy:

A Remote Workflow for Custom Orthosis Design

Custom orthosis fabrication is a cornerstone of hand therapy, yet it remains challenging to deliver remotely.(Farzad et al., 2023) Traditional splinting involves in-person assessments, hands-on fitting, and skilled manual adjustments requirements that can be challenging for patients with mobility issues or those living far from specialised clinics.

To address these barriers, we developed a streamlined digital workflow that empowers therapists to evaluate, design, and deliver orthoses without in-person visits. Using a smartphone, patients complete a guided assessment of hand pain, sensory function, and range of motion. The phone's camera then scans the hand, creating a 3D digital model.(Farzad et al., 2025) Therapists can adjust the hand's positioning virtually and build a custom orthosis directly on the scan using an intuitive design interface—no computer-aided design (CAD) experience is required.

Once finalised, the orthosis is 3D printed using a "skin-safe" material and either delivered remotely or fitted in the clinic. This article outlines each step of the process and shares practical lessons from early clinical use, offering a new approach to accessible, personalised hand therapy in both urban and remote settings.

Step-by-Step Workflow: From Scan to Splint

The whole workflow follows a five-step process to help therapists assess, design, and deliver custom orthoses with minimal in-person interaction:

Step 1 – Remote Evaluation via App

Patients begin by using the Hand Scan mobile app to complete a structured self-assessment. The app guides them through short questionnaires and movement tasks to evaluate pain, sensory function, and range of motion (ROM). ROM is measured using the phone's camera, with clear on-screen instructions and visual guides that simulate a clinic-based goniometric exam.

> *"The 'Hand Scan' workflow now enables the delivery of precise, personalised orthoses without requiring in-person assessments or fittings"*

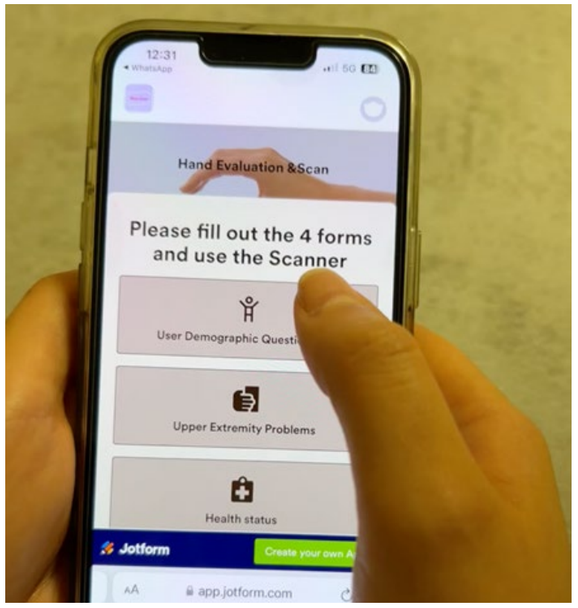


Fig. 1a: Remote evaluation interface in the Hand Scan app.

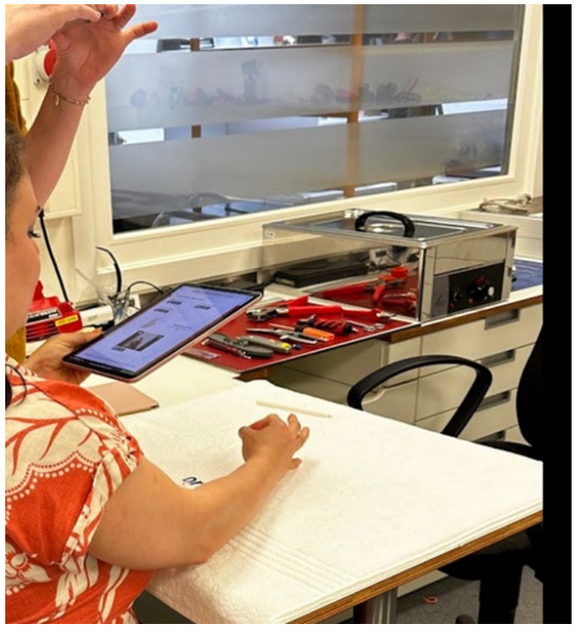


Fig. 1b: Remote measure of range of motion (ROM) using camera-guided positioning and simple tap-based interaction. ROM results closely align with clinical goniometry.

Once submitted, the data is uploaded to a secure therapist dashboard. These digital assessments have shown excellent clinical agreement with traditional methods, including a 2.1° average deviation for ROM and a strong correlation with VAS scores for pain. Therapists receive actionable insights—before any scan is taken.(Farzad et al., 2025) (Figure 1)

Step 2 – 3D Hand Scanning and Model Generation

Next, patients use the app to scan their hand with their smartphone camera. Multiple overlapping images are captured from different angles, then automatically filtered and processed into a high-resolution 3D model.

The system removes blurry or poorly lit images and generates a mesh model that captures hand shape, contours, and anatomical landmarks.

Scanning takes just a few minutes and can be completed at home with minimal support. The resulting model becomes the base for orthosis planning. (Figure 2)

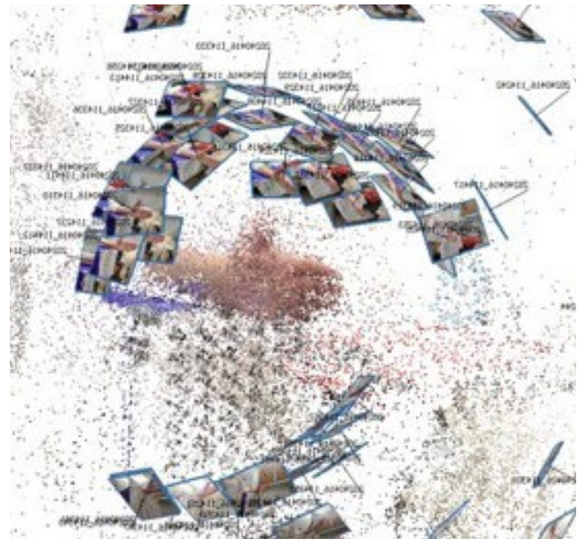


Fig. 2a: Photogrammetry-based 3D scan reconstruction process. The system captures and cleans overlapping hand images to generate a high-resolution mesh model used for orthosis design.

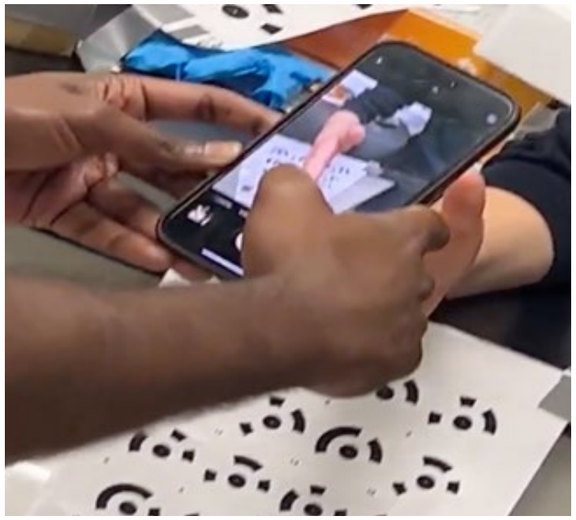


Fig. 2b: Photogrammetry-based 3D scan reconstruction process. Scanning is done using a standard smartphone camera.

Step 3 – Virtual Joint Repositioning Using Finite Element Analysis (FEA)
In many cases, patients cannot hold a corrective posture during the scan. To address this, the Hand Scan system includes a Finite Element Analysis (FEA)-based repositioning tool.

Therapists can digitally adjust joint positions, such as abducting the thumb or flexing the MCPS, using an interface that simulates how soft tissue moves and deforms.

This tool ensures the orthosis design is based on the hand's intended therapeutic position, not just the one captured during scanning. Deviations from ideal posture are automatically corrected, with an average adjustment accuracy of <1 mm when compared to ideal physical scans.(Farzad et al., 2025) (Figure 3)

Step 4 – Designing the Orthosis Using OpenSplint
Once the corrected hand model is prepared, it is imported into OpenSplint—a therapist-friendly design environment explicitly developed for upper limb orthosis. The platform enables step-by-step creation of custom orthoses without requiring CAD knowledge. The design process starts with outline definition: cutoff planes are placed at the wrist, thumb, and finger bases to isolate the target orthosis area. These can be positioned manually or automatically using sensitivity settings. Next, therapists set the orthosis thickness (commonly 2.0 mm) and offset (e.g., 0.8 mm) to control contact tolerance between the orthosis and skin.

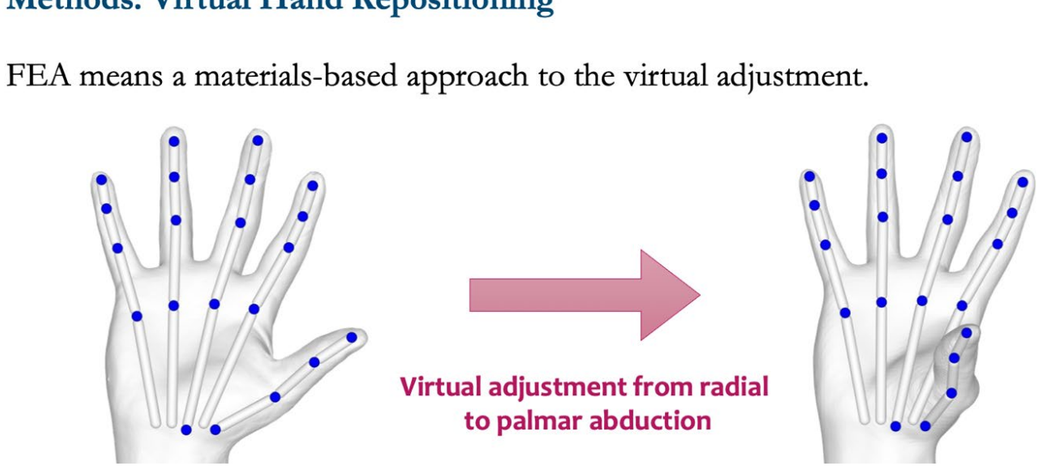


Fig. 3: FEA-based virtual joint repositioning interface. Therapists can digitally adjust the hand into a therapeutic posture using biomechanical constraints. Real vs. virtual overlay maps validate correction accuracy to within 0.87 mm.

Additional tools allow for:

- **Edge trimming** to define the exact borders and curvature of the orthosis
- **Ventilation hole customization**, including hole radius, number, and spacing
- **Text or symbol stamping** for personalisation (e.g., initials, clinic ID)

Throughout the process, therapists work directly with a live 3D preview of the orthosis. Once finalised, the design is exported as an STL file ready for 3D printing.

This intuitive workflow allows for rapid iteration and clinical tailoring, enabling personalised fabrication at scale. (Figure 4)

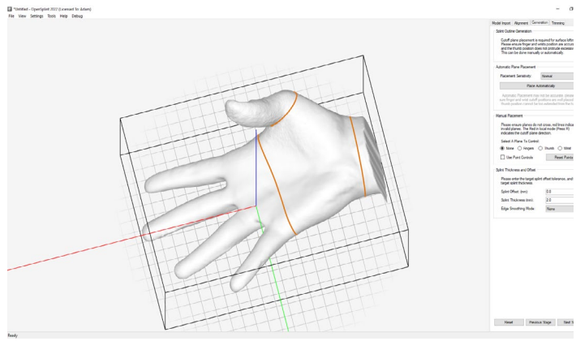


Fig. 4a: OpenSplint interface for orthosis design. Realignment of the scanned hand.

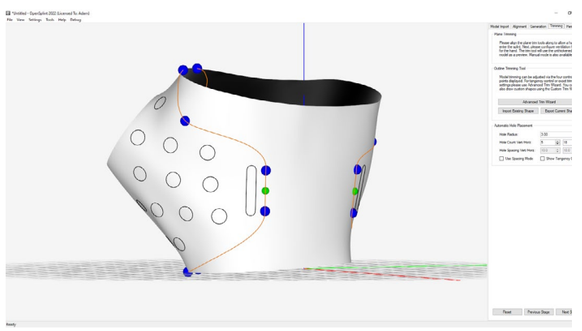


Fig. 4b: OpenSplint interface for orthosis design. Design the final orthosis on the scanned hand.

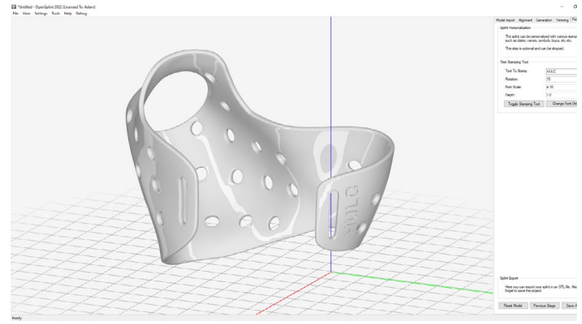


Fig. 4c: OpenSplint interface for orthosis design. The final orthosis form.

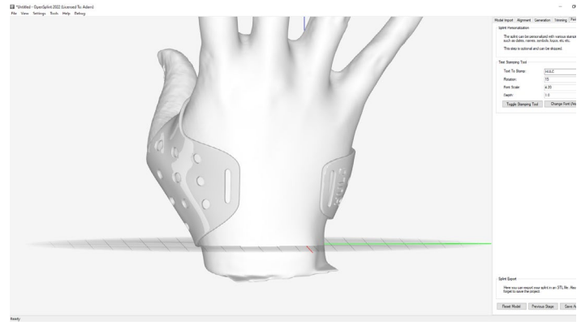


Fig. 4d: OpenSplint interface for orthosis design. Clinicians use a simple visual interface to adjust orthosis thickness, trim lines, perforation holes, and strap locations directly on the scanned hand model—no CAD skills required.

Step 5 – 3D Printing and Fitting with SHAPED™ Material
The final orthosis design is exported as an STL file and printed using SHAPED™ filament—a biocompatible, skin-safe, low-temperature thermoplastic developed by Orfit specifically for orthosis fabrication. This material is reformable in warm water, allowing therapists or patients to make final shape adjustments after printing.

SHAPED™ combines the comfort and safety of traditional thermoplastic orthosis materials with the durability and precision of 3D printing.

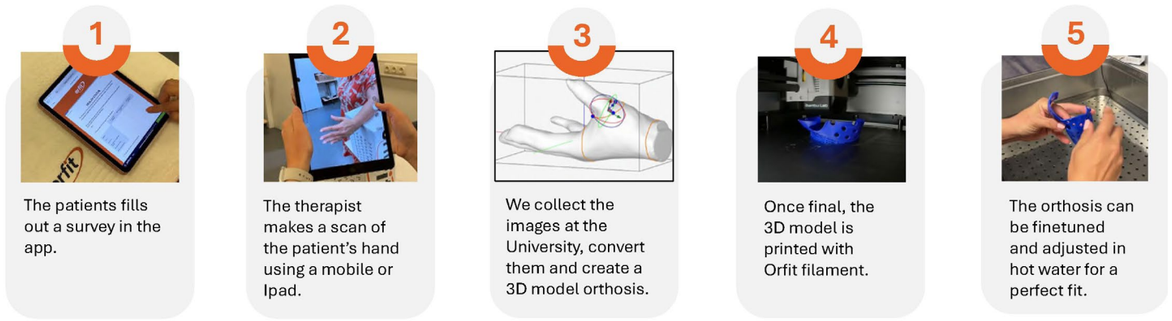


Fig. 5: Hand Scan system workflow overview. From mobile assessment to final fit: a visual summary of the five-step digital orthosis design and fabrication process.

It softens at around 65°C, ideal for in-clinic reheating or minor at-home adjustments. Once cooled, it retains its shape and provides stable, functional support.

Printing is typically done on a standard desktop FDM printer, such as the Bambu Lab P1 Carbon, using a 0.4 mm nozzle. The process takes approximately 60 minutes for a thumb-based orthosis, and 150 minutes for a wrist orthosis. For remote care, the printed orthosis can be shipped directly to the patient, pre-moulded to their scanned and virtually repositioned anatomy.

The ability to remould the material in a clinic makes the digital-to-physical transition seamless, reducing post-print modifications and preserving therapist flexibility.

Future Implications and Clinical Potential

This innovative system represents more than just a digital upgrade—it introduces a new care model for orthosis fabrication that can extend access, improve consistency, and modernise therapist workflows.
In early clinical use with patients diagnosed with CMC osteoarthritis, many therapists noted that the 3D-printed orthoses offered clear advantages over traditional thermoplastic orthoses. The fit was more precise, the edges were smoother and more comfortable, and the final product had a cleaner, more professional aesthetic.

These clinical impressions suggest that digital fabrication may be equivalent to conventional methods. As clinics adopt this technology, it opens the door for broader telehealth strategies, especially in rural or underserved regions, war zones, and in countries with poor healthcare, and where in-person hand therapy services are limited or unavailable.
Looking ahead, digital workflows like this could become part of routine care in hand therapy. With minimal training and a scalable setup, therapists can offer personalised orthoses without compromising quality, empowering both providers and patients to engage in more accessible, efficient, and modern treatment experiences.

Conclusion

Remote orthosis fabrication has long been a challenge in hand therapy. The Hand Scan workflow now enables the delivery of precise, personalised orthoses without requiring in-person assessments or fittings.
This system offers a modern, flexible approach to orthosis care by combining mobile evaluation, 3D scanning, and intuitive design software. Clinicians who have integrated this technology report improved fit, comfort, and aesthetics compared to traditional splints.
As healthcare continues to evolve, digital tools like Hand Scan will be essential in expanding access, enhancing patient experience, and supporting innovation in therapeutic practice.

Quick Guide:

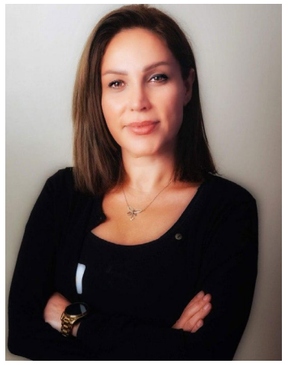
Remote Scanning and 3D Printing for Orthosis Fabrication

Essential tips for the successful use of the workflow
Scanning Tips

- Use a Plain Background: White or neutral-coloured surfaces improve scan clarity.
- Prioritize Good Lighting: Even lighting prevents shadows and enhances detail.
- Keep the Hand Still: Rest the hand flat; move the phone, not the hand.
- Capture All Angles: Scan the top, sides, and between fingers thoroughly.
- Avoid Reflections: Steer clear of shiny surfaces or direct sunlight.

3D Printing Parameters

- Material: Polycaprolactone (PCL) based – skin-safe and thermoformable.
- Printer Setup: FDM printer (e.g., Bambu Lab P1Carbon) with 0.4 mm nozzle
- Nozzle Temperature: 160°C
- Layer Height: 0.24 mm for the balance of detail and speed
- Print Speed: 160 mm/s
- Infill Density: 30%
- Cooling Fans: Both part and auxiliary fans are set to 100%
- Retraction: Off (prevents stringing)
- Post-Processing: Submerge in 65°C water briefly to smooth (20-30 seconds) and reshape (additional 20-30 seconds)



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IFSHT February 2026
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IFSHT NEWSLETTER – REACH

Issue 2 of volume 5 of the IFSHT newsletter is available on the IFSHT website. This issue is a special issue on the triennial congress which took place in Washington DC in March 25.
https://ifsht.org/publications/

The publication aims to collate Research, Education, Achievement and Clinicians in hand and upper limb therapy around the world.
We call on hand and upper limb therapy clinicians and researchers to submit any contributions for consideration to:
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UPCOMING EVENTS

The next joint IFSSH and IFSHT Triennial Congress will be in Singapore in 2028. The website is live for more information.

17TH IFSSH-IFSHT SINGAPORE 2028
TOWARDS SUSTAINABLE HAND SURGERY AND THERAPY

Further details can be found at: https://www.sshs.sg/ifssh2028

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Viktor E. Meyer

1937 – 2024

Viktor Emil Meyer was born in 1937. He studied medicine at the University of Bern in Switzerland, qualifying in 1966, and in 1972 obtained his degree as General Surgeon. He received a Fellowship at the Institute for Plastic and Reconstructive Surgery in New York, USA. He was introduced to microsurgery first in the laboratory of Robert A. Chase at Stanford Medical School, and then visited the Hand Institute in Louisville, Kentucky, USA observing finger replantations. Subsequently he learned peripheral nerve surgery from Hanno Millesi in Vienna, Austria.

Back in Switzerland, he performed the first successful replantation of a hand amputated through the metacarpals in June 1974. He then built up a microsurgical training and research laboratory at the University of Zürich. In 1975 the first free groin flap in a 4-year-old child was performed and shortly after a second toe transplant to the hand was done in a patient after total loss of all four fingers. In 1982 he was honoured by the Friedrich Goetz Award of the University of Zürich for having introduced reconstructive microsurgery in Hand and Plastic Surgery.

Meyer was promoted to Professor of Surgery and Director of Plastic, Hand and Reconstructive Surgery and the Centre for Severe Burn Injuries at the University Hospital Zürich (USZ) in 1987 until his retirement in 2005. From 1998 to 2000 Professor Meyer was also Medical Director and Vice Dean of the Clinical Department of the Faculty of Medicine at the University of Zürich. After his retirement he served as Dean of the Vetsuisse Faculty from 2007 to 2010.

Viktor Meyer research interests focused on reconstructive microsurgery, intra-operative electroneurography and peripheral nerve reconstruction. He published more than 179 scientific papers, four books and several book chapters. He was a member of numerous national and international scientific societies, many as Honorary Member.

He died at the age of 87 on 18 October 2024.

Viktor E. Meyer was honoured as a “Pioneer of Hand Surgery” by the IFSSH in 2010 at the 11th Triennial Congress in Seoul, Korea.

“From the first hand replantation to groundbreaking microsurgical techniques—his legacy endures”

Edward A. Nalebuff

1928 – 2018

Edward Nalebuff was born on 6 December 1928 in Newark, New Jersey, USA.. In 1953 he completed his medical degree from Tufts University School of Medicine in the USA. His further medical training was followed by a surgical internship at Yale University, New Haven, Connecticut, USA. (1953-1954). From 1954-1956 he served in the USA Military as Medical Officer at the US Air Force Hospital, Keesler Air Force Base, Biloxi, Mississippi. Nalebuff then became Chief Resident in Orthopaedic Surgery at the Boston Veteran’s Administration Hospital and the Peter Bent Brigham Hospital in Boston, Massachusetts, USA., followed as an Honorary Senior Registrar in Hand Surgery at the Derbyshire Royal Infirmary, Derby, England (1966-1967), and finally Assistant in Hand Surgery in Lausanne, Switzerland in 1967.

Nalebuff was on the Orthopaedic Staff at the Beth Israel Hospital (1960), the Veteran’s Administration Hospital (1968), the Children’s Hospital Medical Centre, (1971-1998), the New England Baptist Hospital (1971), New England Medical Centre (1976), the Newton-Wellesley Hospital, and the New England Deaconess Hospital, all in Boston, Massachusetts, USA. He was also on the Hand Surgery Staff of the Brigham and Women’s Hospital in Boston from 1980-1995. In 1982 he became Clinical Professor of Orthopaedic Surgery at Tufts University School of Medicine, Chief of Hand Service at the New England Baptist Hospital in 1982, Associate Clinical Professor in Orthopaedic Surgery at the Harvard Medical School in 1975, and Director of the Tufts Combined Hand Surgery Fellowship Programme.

“A lifetime devoted to healing, teaching, and elevating the standards of hand surgery”

Edward was a member of numerous Societies and Associations nationally and internationally. He was known for his expertise on rheumatoid arthritis and published 15 book chapters and 45 scientific journal articles.

Edward Nalebuff died on 8 July 2018 in Sarasota, Florida, USA. He was eighty-nine.

At the 11th Triennial IFSSH Congress held in 2010 in Seoul, Korea, Edward A. Nalebuff was honoured as “Pioneer of Hand Surgery”.

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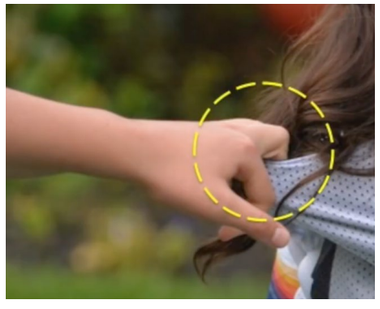

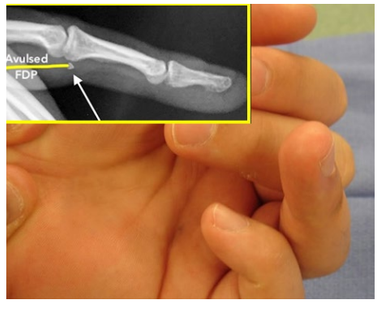

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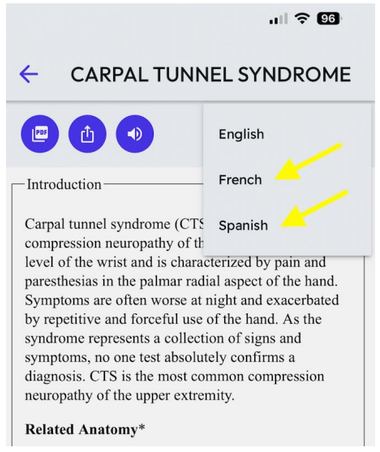

NEW PODCAST: CUBITAL TUNNEL SYNDROME

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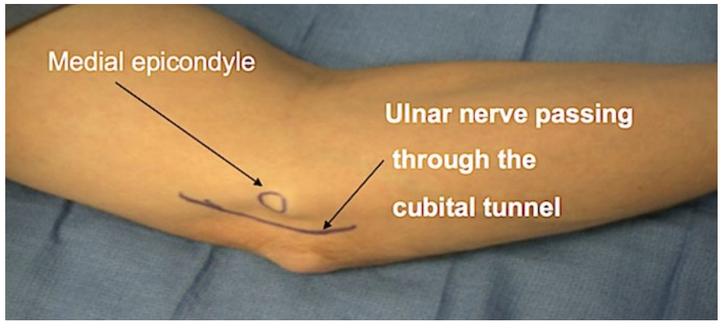

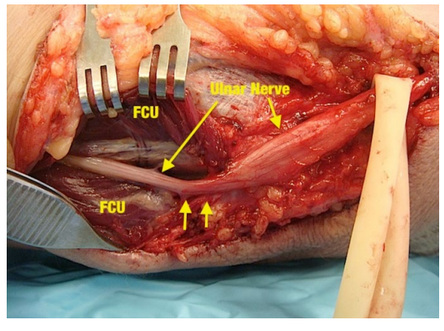

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Hand Surgery Resource is celebrating 10 years of providing invaluable educational resources to hand surgery students and professionals around the world. The nonprofit Hand Surgery Resource was started in 2016 to present the fundamental principles of injuries of the hand and upper extremity, diseases of the hand, hand therapy, and hand anatomy. Hand Surgery Resource is now an educational asset of the International Federation of Societies for Surgery of the Hand (IFSSH) where it provides free and open access educational materials worldwide.

We've had immense growth and reach over the years and want to thank you to everyone who's been with us along the way as we finish our first decade of hand educational service!

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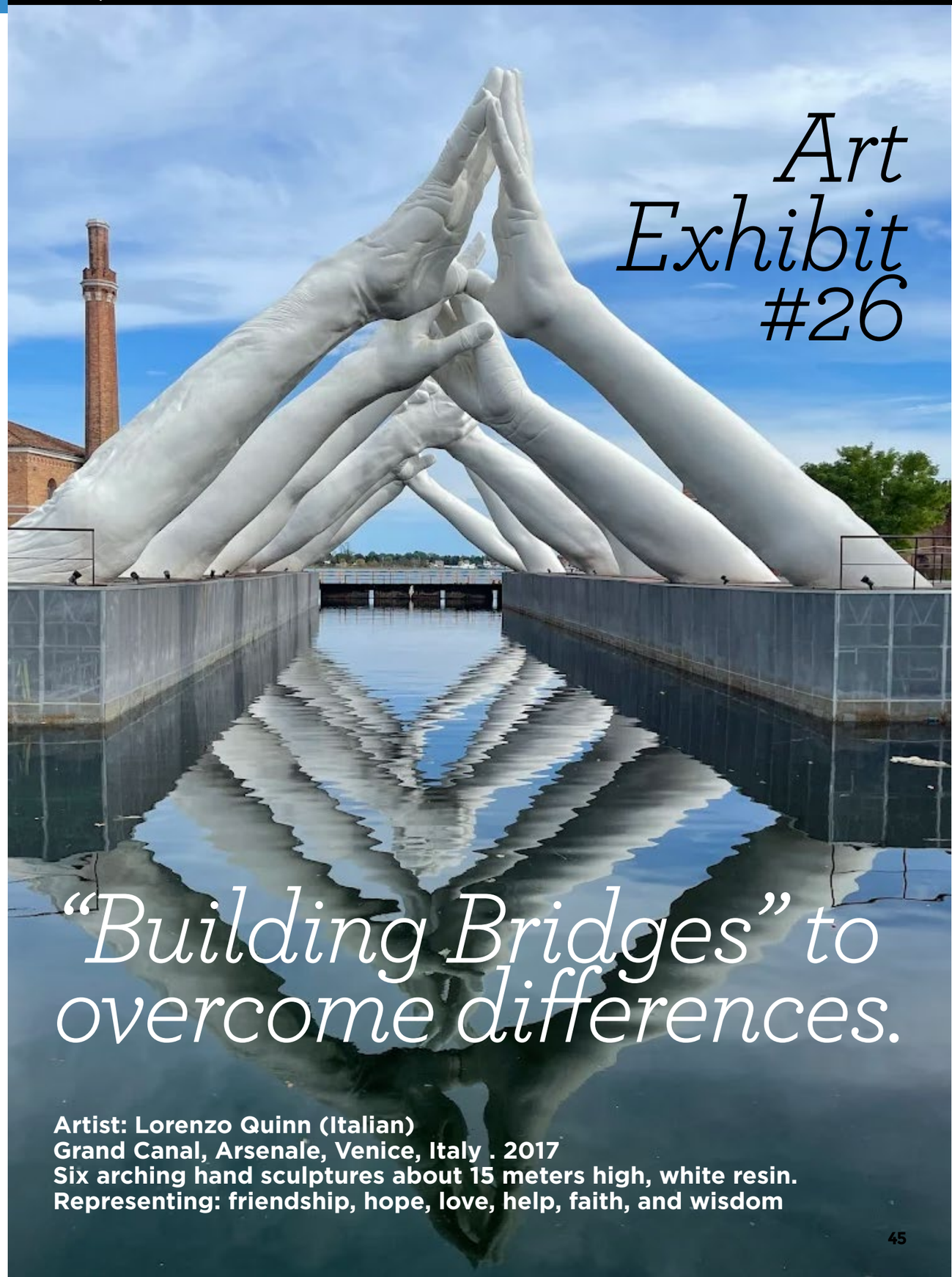
- 13,814 Anatomy at Risk app downloads
- 110+ countries reached
- 2.93K YouTube subscribers
- 48 YouTube videos
- 284,000+ video views
- 16 podcasts
- 6,068 podcast views
- 18,174 newsletter subscribers
- 22,065 LinkedIn followers

Hand Surgery Resource also contains Hand Surgery Source 8.0, a free educational app, and now, the Anatomy at Risk 1.0 app. The Hand Source site and app is available in English, Spanish, and French. View our nonprofit educational web site at www.handsurgeryresource.net

NEW DIAGNOSTIC GUIDE: TRIGGER THUMB

Check out the Hand Surgery Resource website and app for our updated diagnostic guide for Trigger Thumb. Trigger thumb, or stenosing tenosynovitis of the thumb, occurs when the flexor pollicis longus tendon cannot pass through the A-1 pulley smoothly. View our new guide to learn more about the anatomy, science and treatment options!

VIEW TRIGGER THUMB DIAGNOSTIC GUIDE



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CURRENT CONCEPTS

Signs of Systemic Illness in the Hand

Anna Green, MD,* Robert J. Goitz, MD*

CME Continuing Medical Education

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Disclosures for this Article

Editors

Dawn M. LaPorte, MD, has no relevant conflicts of interest to disclose.

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Planners

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Learning Objectives

Upon completion of this CME activity, the learner will understand:

- Nail discolorations that may be associated with systemic illness and when to refer the patient for further evaluation and treatment.
- Nail plate deformities and their potential association with systemic illness and when to refer the patient for further evaluation and treatment.
- Cutaneous manifestations of systemic illness in the hand and when to refer the patient for further evaluation and treatment.

Deadline: Each examination purchased in 2025 must be completed by December 31, 2025, to be eligible for CME. A certificate will be issued upon completion of the activity. Estimated time to complete each JHS CME activity is up to one hour.

Many systemic illnesses have characteristic signs that are apparent in the hand. Although these findings themselves may be subtle or benign, the potential underlying illnesses can have considerable and detrimental effects to the patient involved if left untreated. It is important for hand surgeons to be able recognize these signs, understand the associated conditions, and refer the patients to the appropriate specialty provider for work-up and treatment to manage the consequences of the systemic illness. The purpose of this review is to provide an update on notable clinical signs in the hand that could indicate an untreated systemic condition that all hand surgeons should be cognizant of to ensure early referral for treatment and improve the

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IT HAS LONG BEEN RECOGNIZED that systemic illnesses have visible signs in the hand.[1] Hand surgeons are often the first line of contact when patients notice hand differences or changes. Even when patients present for unrelated chief complaints, our daily practice involves detailed inspection of the hand that may unveil signs and symptoms of disorders that can systemically affect patients. It is therefore important for all hand surgeons to be aware of specific findings that could indicate greater untreated illnesses that impact patient health.

In the following sections, we review the signs that hand surgeons should be aware of that may indicate underlying systemic illness (Table 1).[2] Discovery of the findings discussed in this review should prompt hand surgeons to consider the potential systemic etiologies and ensure appropriate management has been or will be initiated. Some signs in the hand may be early findings in the disease process, which may allow for earlier detection and treatment. We break up these findings into three categories: nail discolorations (chromonychias), nail plate deformities, and cutaneous manifestations.

NAIL DISCOLORATIONS

Leukonychia

Leukonychia refers to the white discoloration of the nail and is often categorized by its etiology (true, apparent, and pseudoleukonychia) and pattern (total/subtotal, transverse, and punctate). True leukonychia is attributed to changes to the actual nail plate, whereas apparent leukonychia is because of the underlying nail bed. Pseudoleukonychia involves only the superficial nail plate and is often because of fungal infection.[3] With true leukonychia, the white discoloration remains when pressure is applied to the nail plate, as the etiology is based in the nail plate itself. Leukonychia can also be described by specific patterns or morphologies, the most prominent of which are total/subtotal, transverse, and punctate.

Total leukonychia, where the entire nail appears white, can be idiopathic or hereditary, but can also be because of severe anemia. The lack of circulating red blood cells can result in pale skin including the underlying nail beds, resulting in white appearing nails.

Subtotal leukonychias are often associated with considerable underlying disease. Half-and-half nails, also known as Lindsey's nails (Fig. 1) appropriately describe a subtotal leukonychia where the proximal half of the nail has whitish discoloration of the nail with reddish-brown discoloration at the distal half. This apparent leukonychia is commonly seen in patients with chronic kidney disease.[3]

Terry's nails, similar to half-and-half nails, involve proximal apparent leukonychia, but typically have a thinner, more defined transverse band of reddish-brown at the distal aspect of the nail (Fig.1). Terry's nails have been described in patients with liver cirrhosis, congestive heart failure, and diabetes.[4]

Transverse leukonychia describes the appearance of white bands, 1–2 mm wide, parallel to the lunula that may be true or apparent leukonychia. The two major forms of transverse leukonychias are Mees' and Muehrcke lines (Fig. 2). When these thin bands are inherent to the nail plate (true leukonychia), they are referred to as Mees' lines. Mees' lines were historically described in patients with arsenic poisoning, but have also been described in a variety of systemic insults causing disruption to the normal keratinization of the growing nail plate. This includes systemic infections, heart failure, lupus, chronic renal failure, lymphoma, and some chemotherapies.[3,4] The presence of Mees' lines indicates a severe disease process that has halted normal nail growth in the patient in which they are observed. In contrast to Mees' lines, Muehrcke lines are a form of apparent leukonychia and can be distinguished from Mees' lines as they disappear with pressure to the nail plate and do not appear to "grow out" with the nail plate since the underlying nailbed is the origin. Muehrcke lines are commonly seen in patients with severe hypoalbuminemia (<2 g/dL), which could indicate severe malnutrition, nephrotic syndrome, or cirrhosis.[5]

Punctate leukonychia is commonly seen in psoriasis and psoriatic arthritis, along with pitting (discussed later), red spots, subungual hyperkeratosis,

TABLE 1. Common Systemic Diseases with Associated Signs and Symptoms

Disease	Systemic Signs and Symptoms	Common Hand Findings
Rheumatoid arthritis	Pericarditis/myocarditis, heart failure, interstitial lung disease, pleurisy, metabolic syndrome, osteoporosis, Felty syndrome (splenomegaly)[2]	Boutonniere/swan neck deformities, ulnar drift, MCP subluxation, thumb Z deformity, rheumatoid nodules
Dermatomyositis	Proximal muscle weakness, heliotrope rash, periorbital edema, increased malignancy risk	Gottron papules, calcinosis cutis, Raynaud phenomenon, periungual telangiectasias
Systemic sclerosis/ Scleroderma	Gastrointestinal/esophageal dysmotility, heart failure, interstitial lung disease,	Raynaud phenomenon, dactylitis, sclerodactyly, joint contractures
Psoriatic arthritis	Uveitis, inflammatory bowel disease, joint stiffness, scaly skin patches, fatigue	Nail pitting/crumbling, dactylitis
Systemic lupus erythematosus	Malar rash, joint swelling/pain, fever, fatigue, pericarditis/ myocarditis, valvular disease, thrombosis, pleurisy, nephritis, oral ulcers, dry eyes, thyroid disease, cytopenia	Raynaud phenomenon, calcinosis cutis, splinter hemorrhage
Reactive arthritis	Arthritis, uveitis, urethritis	Dactylitis, nail pitting, onycholysis
Liver disease (Cirrhosis)	Ascites, jaundice, renal failure, spider angiomas, hepatic encephalopathy, cardiomyopathy	Terry nails (transverse leukonychia), Palmar erythema
Cardiovascular disease	Stroke, renal impairment, pulmonary edema	Digital clubbing, Osler nodes/Janeway lesions/ splinter hemorrhages (endocarditis)
Chronic kidney disease	Hypertension, electrolyte imbalances, anemia, bone metabolism disorders, immune suppression	Lindsey's nails (transverse leukonychia), edema
Diabetes	Neuropathy, nephropathy, retinopathy, peripheral vascular disease	Knuckle hyperpigmentation, digital ulcers

onycholysis (separation of the nail plate from the bed), and crumbling of the nail plate. Alopecia areata, an autoimmune disease that results in hair loss, can have similar findings of pitting and punctate leukonychia of the nails.[6]

Yellow nails

Another chromonychia that hand surgeons should be aware of is yellow nails. Although certain chemicals and fungal infections may cause yellowing of the nails, Yellow Nail Syndrome (YNS) is perhaps the most notable systemic condition to consider when yellow nails are present (Fig. 3). The yellowish discoloration in YNS is frequently seen in conjunction with onycholysis, or separation of the nail plate from the nail bed.[6] The YNS is associated with the clinical triad of yellow nails, lymphedema, and respiratory disease, commonly bronchiectasis, pleural effusions, or sinusitis. These symptoms do not always present simultaneously; therefore, diagnosis can be challenging. Patients with suspected YNS require specialty referral for evaluation of their pulmonary and lymphatic systems. Other systemic diseases associated with yellow chromonychia include alopecia areata, onychomycosis, psoriasis, and cirrhosis.[7]

FIGURE 1: Subtotal leukonychias. (Left) Lindsay's or half-and-half nails with proximal half leukonychia and distal half erythema associated with renal disease. (Right) Terry's nails with proximal leukonychia and a thin reddish distal band associated with liver disease.

Other chromonychias

Melanonychia describes the black or brownish discoloration of the nail because of melanin deposits. Although this can often be related to trauma, other causes include chemical exposures or skin disorders such as acanthosis nigricans, which is commonly associated with diabetes and obesity, and results in

FIGURE 2: Mees lines, a true leukonychia, exhibit a white band parallel to the lunula and can be distinguished from Muercke lines (apparent leukonychia).

FIGURE 3: Yellow nail syndrome.

hyperpigmentation and thickening of "velvet-like" skin.[8]

Erythronychia, or red nails, can be limited to the nail bed or involve the whole nail plate. Darier disease, a rare genetic skin disorder, has a classic nail plate discoloration whereby there is both longitudinal erythronychia and leukonychia streaks, forming a "candy cane" like appearance. These patients also present with numerous dark, hyperkeratotic papules throughout their bodies and oral lesions. Red lunulas can be observed in patients with psoriasis, lichen planus, systemic lupus erythematosus, chronic obstructive pulmonary disease, and cardiac failure.[9]

Lastly, blue nails are most commonly drug induced, but can be seen in Wilson's disease and severe autoimmune deficiency.[8]

FIGURE 4: Onychomadesis with proximal separation of the nail plate from the underlying matrix.

FIGURE 5: Koilonychia or spoon-shaped nails.

As noted throughout this previous section, chromonychias are often related to systemic illness and should prompt a referral to at least the patient's primary care physician for further investigation.

Splinter hemorrhages

Splinter hemorrhages appear as thin, reddish-brown, vertically oriented lines under the nail plate. The most common cause of this finding is direct trauma, isolated to the injured digits. Multiple digital involvement may warrant further investigation of underlying disease. The classic association of splinter hemorrhages is infective endocarditis, which should necessitate an infectious disease referral. However, connective tissue diseases and vasculitis can also present with multiple splinter hemorrhages.[10] Further examination revealing skin ulcerations, necrosis, thrombophlebitis, purpura, or rash may be cause for further work-up. Splinter hemorrhages should be differentiated from subungual melanoma, which can appear as dark black/brown streaks in the nail. In contrast to splinter hemorrhages, melanoma can span the entire vertical nail plate, are often wide, may affect the nail plate morphology, and persist despite nail growth. Biopsy is the definitive diagnostic test and should not be delayed if wide irregular longitudinal nail discoloration is noted.

NAIL PLATE DEFORMITIES

Beau's lines and onychomadesis

Onychomadesis is the proximal separation of the nail plate from the matrix because of prolonged growth arrest of the nail. This pathology usually begins as Beau's lines, which are small transverse ridges in the nail plate secondary to growth arrest. These findings may be nonspecific but signify severe illness that has compromised proper nail growth. When nail growth resumes, shedding of the nail plate often occurs as the new nail pushes the distal nail away (Fig. 4). A large array of diseases, both acute and chronic, have been associated with this finding. Chronic conditions include malnutrition, uncontrolled diabetes, and hyperparathyroidism.[11] Heart attacks and systemic infections like coronavirus disease (COVID)-19 have also been implicated. Onychomadesis and Beau's lines can also be seen in patients with severe blistering cutaneous disorders, such as pemphigus vulgaris, epidermolysis bullosa, and Steven Johnson Syndrome. The presence of onychomadesis denotes notable, sustained systemic insult and patients should be assessed by their primary care physician for potential etiologies.

Koilonychia

Koilonychia, or spoon-shaped nails, describes the concave deformity of the nail plate with everted lateral edges (Fig. 5). Some forms of koilonychia

FIGURE 6: Digital clubbing in a patient with severe cardiopulmonary disease.

FIGURE 7: Nail pitting associated with psoriasis.

may be congenital or genetic.[6] However, the most common cause of this nail deformity is iron deficiency anemia and can be the first sign of insufficiency in children. Therefore, conditions affecting iron stores such as Plummer-Vinson Syndrome and hemochromatosis may result in koilonychia. Endocrine abnormalities, such as diabetes, parathyroid and thyroid disorders, have also been implicated. Koilonychia is often a late clinical finding associated with these diseases and if observed, the patient should be referred to their primary care physician for further

FIGURE 8: Onychomycosis with nail discoloration, onycholysis, and hyperkeratosis.

FIGURE 9: Onychotillomania caused by severe underlying anxiety can result in notable deformity of the nail plate because of repetitive self-induced trauma.

evaluation, which may include basic blood work and iron studies.

Clubbing

Nail or digital clubbing is a deformity where the nails have a thickened and curved appearance (Fig. 6). The distal aspect of the digits may also be hypertrophied causing a bulbous appearance to the fingertips.[4] Although some cases of digital clubbing may be hereditary or idiopathic, severe cardiopulmonary illness such as lung cancer, congenital heart disease, and chronic obstructive pulmonary disease are commonly associated with clubbing. Gastrointestinal and liver disorders, though less common, have been associated with these findings as well.[6] When digital clubbing is observed, it is important to inquire about any known history of cardiopulmonary disease, as clubbing is often a late manifestation of such conditions. In the absence of a known underlying cause, prompt referral to cardiology or pulmonology is recommended for further evaluation. Notably, clubbing may be reversible if the underlying disease is effectively treated.[4]

Nail pitting

Small, punctate depressions in the nail describe nail pitting (Fig. 7). As mentioned previously, the most frequent cause of nail pitting is psoriasis, where it can be seen in up to 70% of patients with psoriatic nail changes. Psoriasis can be diagnosed by criteria based on nail pitting alone when more than 20 pits are seen on a single nail or greater than 60 pits in all nails combined. Nail pitting has also been described in Reiter syndrome, sarcoidosis, alopecia areata, rheumatoid arthritis, and syphilis.[4]

Onycholysis

Onycholysis refers to the distal separation of the nail plate from the bed. Trauma is a common cause of direct separation of the nail plate, but psoriasis, lichen planus, YNS are systemic diseases that have been implicated. Subungual squamous cell carcinoma, onychomycosis, as well as severe mucocutaneous illnesses can also lead to this separation.[6] When present in isolation, onycholysis may represent a benign finding. However, it can be clinically important when observed alongside other notable nail abnormalities.

Onychomycosis

Onychomycosis is a fungal infection of the nail and is one of the most common nail-related complaints hand surgeons come across. Fungal infections may have varying clinical appearances, but often includes subungual hyperkeratosis, nail discoloration, and onycholysis (Fig. 8). Onychomycosis may be isolated but can be seen in up to one-quarter of patients with pemphigus or bullous pemphigoid, particularly those treated with immunosuppressants.[12] Onychomycosis is common in immunocompromised patients, such as those with human immunodeficiency virus. In these patients, the infection often

FIGURE 10: (Left) Telangiectasias at the proximal nailfold appear as erythematous patches in a patient with systemic lupus erythematosus. (Right) Enhanced view under dermoscopy showing dilated and tortuous vessels.

presents as proximal subungual onychomycosis—a rare variant that progresses from the proximal nailfold toward the distal edge, in contrast to the more common distal lateral type, which spreads in the opposite direction.[6] The presence of widespread, proximally based onychomycosis should prompt evaluation for underlying immunodeficiency.

Onychotillomania and onychophagia

Onychotillomania describes the nail picking disorder whereby patients compulsively scratch or pick at their nails. Similarly, onychophagia refers to nail biting. These body focused repetitive behaviors are often indicative of underlying psychiatric illness, particularly anxiety, depression, and even psychosis. Multiple parallel transverse or longitudinal grooves down the middle of the nail plate because of the habitual tic is the characteristic deformity, and is most common in the thumb nails (Fig. 9).[13] Although this finding alone may not necessitate psychiatric referral, it can provide valuable context when evaluating treatment expectations and outcomes, as these may be influenced by underlying psychiatric conditions. Additionally, these nail findings may indicate a patient who would not be a good candidate for wide awake surgery.

FIGURE 11: Digital ulcer.

CUTANEOUS MANIFESTATIONS

Telangiectasias

Telangiectasias, or dilated superficial blood vessels, may appear in the nailfold as red spots or patches at the proximal aspect of the nail (Fig. 10). Closer inspection of the nailfold using dermatoscopy better reveals these enlarged, dilated, or twisted capillaries. These telangiectasias are commonly associated with systemic sclerosis, dermatomyositis and systemic lupus erythematosus.[1,14]

Raynaud phenomenon

Raynaud phenomenon describes the vascular condition where the fingers will periodically lose blood flow and become cyanotic. Episodes are typically caused by cold temperatures or stress but can be sporadic and quite painful for patients. Severe disease can result in digital ulcers or gangrene because of prolonged ischemia.[15] Raynaud phenomenon is currently classified as either primary Raynaud Disease (idiopathic), or secondary Raynaud Syndrome, which is associated with an underlying disease.

The most common underlying disease is systemic sclerosis (scleroderma), and Raynaud phenomenon is often the first presenting sign in afflicted patients. Up to 37% of patients who are initially thought to have primary Raynaud phenomenon are subsequently found to have an underlying connective tissue disorder. Patients who present at a younger age, have severe and frequent episodes, report involvement of the thumb, and have nailfold telangiectasias are more likely to have underlying scleroderma, which should prompt referral to a rheumatologist.[16] Scleroderma can have severe systemic consequences, including interstitial lung disease (the leading cause of mortality in scleroderma patients), pulmonary artery hypertension, renal impairment, cardiac disease, and esophageal dysfunction.[17]

Digital ulcers

Digital ulcers can be caused by a variety of conditions, all of which involve compromised blood flow to the fingers. As previously mentioned, systemic sclerosis is frequently associated with this finding, where up to 50% of patients with scleroderma report a history of digital ulcers.[18] However, peripheral artery disease, diabetes, and vasculitis are also known causes.[19] Digital ulcers are painful and can lead to considerable morbidity for patients. These wounds are slow to heal and when not treated appropriately can lead to infection, necrosis, gangrene, and even amputation (Fig. 11). Timely diagnosis and investigation of the underlying cause are essential to ensure optimal management. Treatment of digital ulcers focuses primarily on addressing the root cause, using vasodilator therapy to enhance blood flow, and providing appropriate local wound care. In cases of refractory ulcers or infection, surgical interventions such as botulinum toxin injections, debridement, or sympathectomy may be considered.[18] Counseling on smoking cessation is also a critical component of care.

Knuckle hyperpigmentation

Hyperpigmentation of the knuckles can be hereditary or drug-induced, but can also be caused by hormonal imbalances or vitamin deficiency. Vitamin B-12 deficiency has been associated with mucosal and interphalangeal joint hyperpigmentation. Additional symptoms of fatigue, paresthesias in the extremities, pallor, and cheilitis may suggest this deficiency.[20] Diabetes, polycystic ovarian syndrome, and Addison's disease result in hormonal imbalances that may also cause darkened skin at the knuckles.[21] When hyperpigmentation is observed alongside other signs

FIGURE 12: Gottron's Papules.

suggestive of a vitamin or hormonal imbalance, further evaluation by the patient's primary care physician may be beneficial.

Sclerodactyly

Sclerodactyly is a skin condition that causes tightening and hardening of the skin in the hand and fingers. As the name would suggest, it is commonly implicated in the connective tissue disorder, systemic scleroderma. This autoimmune condition may start with swelling of the fingers but ultimately leads to progressive loss of finger motion because of fibrotic tight and hardened skin.[22] Sclerodactyly is generally a later manifestation of scleroderma, whereas digital ulcers tend to occur earlier in the disease course as previously discussed.

Palmar erythema

Palmar erythema may be physiologic but can also be seen in several systemic pathologies. Normal palmar erythema can be seen in up to 30% of pregnant women, which is attributed to changes in the microvascularity of the skin. Nearly one-quarter of patients with liver cirrhosis will present with palmar erythema, which is attributed to the increase in circulating estrogens that are typically broken down in the liver.[23] Young children with palmar erythema should spark concern for congenital liver conditions such as Wilson disease or hemochromatosis. Palmar erythema can also be seen in patients with rheumatoid arthritis (over 60%) and systemic lupus erythematosus, though not associated with underlying liver dysfunction.[23] Palmar erythema on its own may be benign, but when accompanied by other systemic symptoms, it may indicate an underlying condition requiring further evaluation.

Calcinosis cutis

Calcinosis cutis refers to the deposition of calcium phosphate and hydroxyapatite into the soft tissues, which commonly occurs in the fingers and hands. These calcifications appear as whitish-yellow nodules or papules in the skin. These lesions can be painful or asymptomatic and incidentally seen on radiographs. Asymptomatic lesions can be left alone. Over time these calcifications can erode through the skin, leading to a chalky appearing discharge. Dystrophic calcinosis cutis, which occurs in damaged and inflamed tissues but normal calcium and phosphate serums levels, is a common finding in patients with connective tissue disorders, such as systemic sclerosis, dermatomyositis, and lupus.[24] Several pharmacotherapies exist to treat symptomatic lesions such as diltiazem, colchicine, and minocycline. Surgery is rarely indicated, but may be beneficial in large, localized lesions causing considerable symptoms.[24] Dystrophic calcinosis cutis should raise suspicion for an underlying autoimmune disease, and patients should be referred to a rheumatologist for further evaluation.

Dactylitis

Dactylitis refers to the swelling of the fingers, often into a "sausage-like" appearance. Other than infection, it is most commonly associated with psoriatic arthritis and is reported to occur in the majority of patients with inflammatory conditions. It can also be seen in sarcoidosis caused by granuloma invasion of the phalanges, or young children with sickle cell disease.[25] Patients with reactive arthritis, which is

FIGURE 13: Gout localized to the distal interphalangeal joint of a finger with associated tophi.

usually precipitated by a preceding infection, can also frequently present with dactylitis.[26] These patients also classically have symptoms of arthritis, uveitis, and urethritis. Dactylitis of unknown origin should be thoroughly investigated, as various disease processes can contribute to its development. Additional findings from the history and physical examination may assist in identifying the cause. Once infection is excluded, primary care physicians can play a key role in further evaluation of the underlying etiology.

Gottron papules and sign

Gottron papules are red- or purple-colored bumps that often appear on the dorsal aspect of the hand, typically around the knuckles (Fig. 12). Similarly, the Gottron sign refers to the flat, reddish rash on the dorsum of the metacarpophalangeal and interphalangeal joints, which can also appear on other bony prominences such as the olecranon or patella. These findings are hallmark findings associated with dermatomyositis, an inflammatory myopathy that causes muscle inflammation and weakness.[27] Inverse Gottron papules have also been described, which are

painful papules on the volar aspect of the hand that are usually whitish or atrophic in appearance. Patients with dermatomyositis may also present with other hand findings such as Raynaud phenomenon, calcinosis cutis, and periungual telangiectasias. Other typical physical examination findings include periorbital edema and erythematous patches over the shoulders, neck and upper back (shawl sign), with symptoms of muscle fatigue and weakness. Dermatomyositis is associated with several important systemic manifestations, most notably interstitial lung disease, cardiovascular dysfunction, dysphagia, vascular ulcerations, and even malignancy.[27] The presence of Gottron's papules or sign strongly suggests dermatomyositis, and the patient should be referred to a rheumatologist for further evaluation and management.

Rheumatoid nodules

Rheumatoid nodules are firm, lobular masses in the subcutaneous tissue of extensor surfaces, commonly the olecranon and dorsal hand. Rheumatoid nodules are generally considered a late manifestation of rheumatoid arthritis and are among the most common extra-articular features, occurring in up to 35% of patients with the condition.[28] They vary greatly in size, but are typically nontender and may be mobile within the soft tissues. Even with appropriate treatment, these nodules are unpredictable and may or may not resolve with disease modifying antirheumatic drugs. Although these nodules are typically asymptomatic on the extremities, they can be associated with nodules in the heart or lungs, which can have severe effects.[2] Nodules in the hands that interfere with function can be surgically removed. Patients with rheumatoid nodules should be referred to a rheumatologist if they are not already under their care.

Gouty tophi

Chronic and uncontrolled gout may lead to the formation of subcutaneous tophi. These tophi present as chalky, whitish-yellow nodules of varying size under the skin that can commonly be seen in the fingers and olecranon bursa (Fig. 13). These tophi can cause joint damage, disability, skin ulceration, and superimposed infection. Gout is caused by the deposition of monosodium urate crystals around tendons and joints and is characterized by recurrent flares of pain and inflammation. When left uncontrolled, elevated uric acid can also lead to gouty nephropathy, kidney stones, and kidney failure. Tophaceous gout typically indicates more severe disease and is associated with greater risk of cardiovascular disease and even mortality.[29] Tophi may gradually resolve with effective medical management of uric acid levels; however, this process can take months to years. Surgical removal can be beneficial in alleviating pain and functional impairment caused by the tophi.[30] Both primary care physicians and rheumatologists play important roles in managing patients with severe gout.

SUMMARY

Many systemic diseases present with signs that are visible in the hands. The findings discussed in this article should prompt further evaluation, including a thorough history and symptom review. When no underlying diagnosis is known, hand surgeons should maintain a low threshold for ordering basic laboratory tests and referring patients to their primary care physician or an appropriate specialist for a more comprehensive assessment and management. Aside from digital ulcers, the signs in the hand discussed in this review are rarely dangerous themselves unless causing severe skin and soft tissue compromise. However, the associated clinical diagnoses may have profound effects on other major organ systems. Additionally, the nail and skin changes often improve or resolve with appropriate medical management of the underlying condition. As such, addressing these hand findings should begin with identifying and treating the root cause.

As hand surgeons, our primary goal is to preserve hand function, but we must also remain mindful of our patients' overall health. As we may be the only providers to closely examine the hands, it is essential to recognize subtle findings that could indicate broader systemic conditions.

CONFLICTS OF INTEREST

No benefits in any form have been received or will be received related directly to this article.

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JOURNAL CME QUESTIONS

Signs of Systemic Illness in the Hand

1. Linday's nails, or half-and-half nails, are commonly associated with which of the following diseases?
   a. Congestive heart failure
   b. Renal failure
   c. Cirrhosis
   d. Lung disease

2. Koilonychia is most commonly associated with which underlying etiology?
   a. Lupus
   b. Scleroderma
   c. Iron deficiency anemia
   d. Cirrhosis

3. Nail fold telangiectasias can commonly be seen in all of the following systemic diseases, except which of the following?
   a. Systemic sclerosis
   b. Dermatomyositis
   c. Congestive heart failure
   d. Systemic lupus erythematosus

4. Gottron papules are pathognomonic for what systemic illness?
   a. Scleroderma
   b. Psoriasis
   c. Rheumatoid arthritis
   d. Dermatomyositis

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La mano de Dios
Eduardo Kingman, 1946
Cortesía Fundación Kingman
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2° Congreso Ecuatoriano de Terapia de mano ECUTEMA
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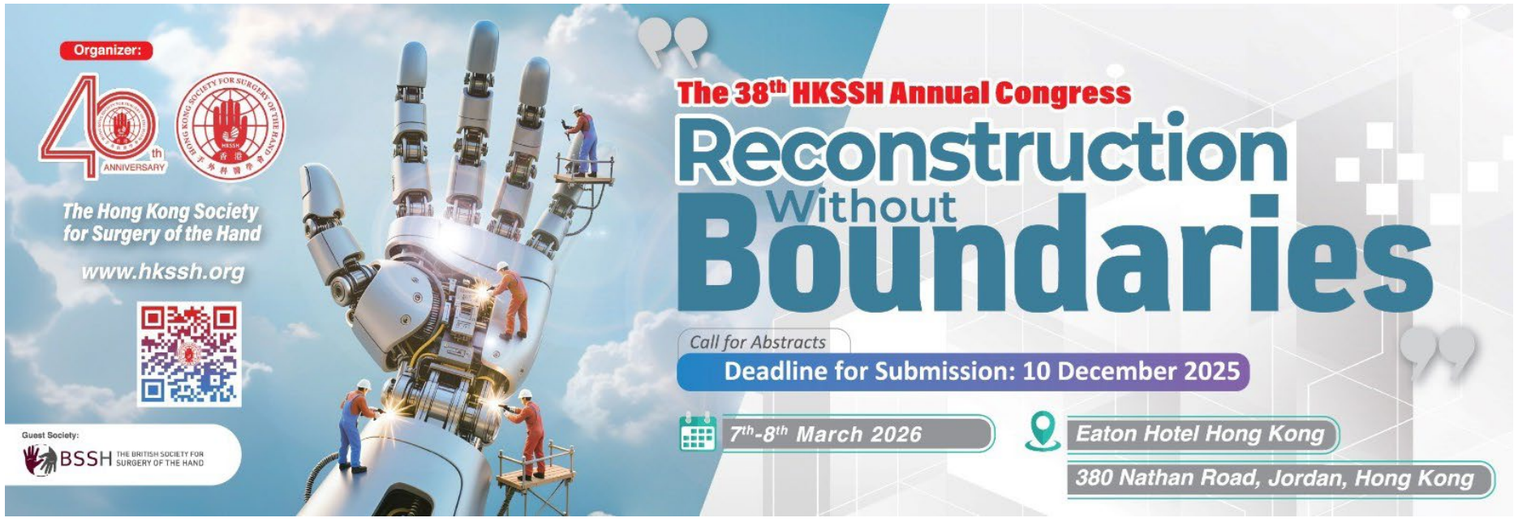
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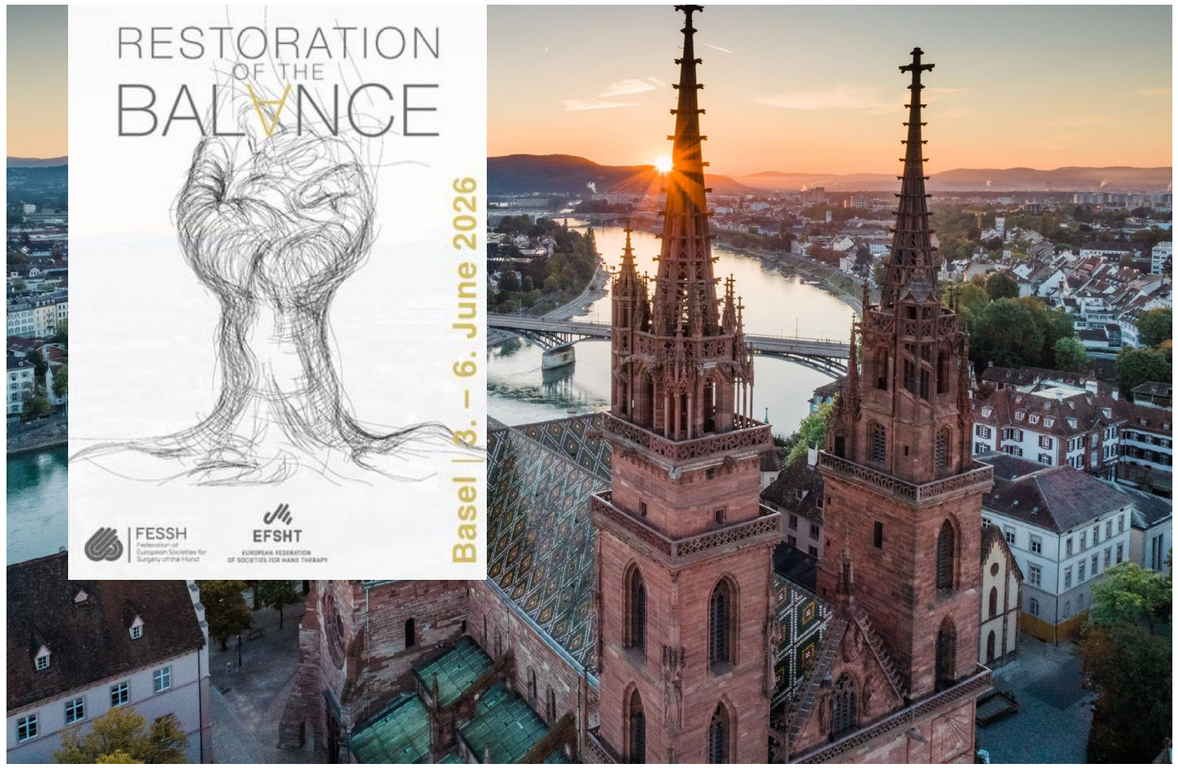

FESSH Federation of European Societies for Surgery of the Hand

Schweizerische Gesellschaft für Handchirurgie SGH
Société Suisse de Chirurgie de la Main SSCM
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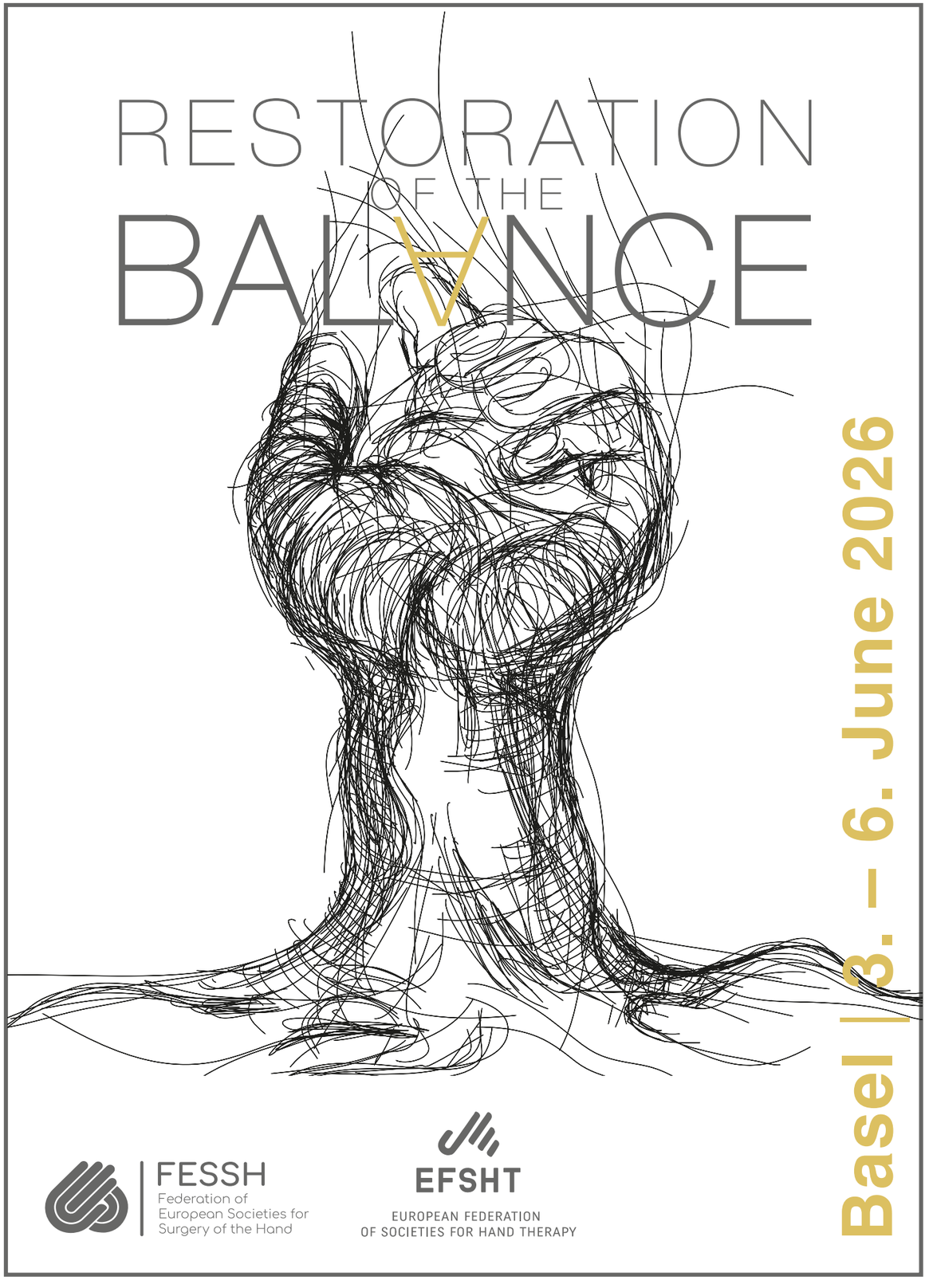


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Program: https://acu.handsurgery.cn/page/future-meetings
Program chair:
Dr Jialiu Fang
610292694@qq.com
Host:
Dr Hongxiang Zhou
Dr Jisen Zhang
Venue:
Hongrui Jinling Grand Hotel, Hefei City
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AHMDA
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June 20-21, 2026
Zhengzhou, China
Program chairs:
Dr Jing Chen
moshengren1013@163.com
Dr Rui Fu Yang
yrf153@126.com
Host:
Dr Jian Xi Hou
Meeting Venue: Zhengzhou Renji Hospital
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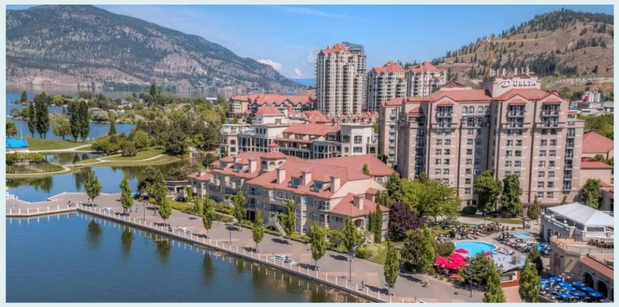

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