HAND SURGERY WORLDWIDE

International Reconstruction of a "Beautiful and Ready Instrument of the Mind"

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The editors dedicate this book to ***Fran Perkins***
who has faithfully served the members of the International
Federation of Societies for Surgery of the Hand
as the administrative secretary for nine years
and as a superb editorial assistant in collating the material
and communicating with the contributors of this book.

Preface

Improvements in the diagnosis and management in hand surgery have evolved in part from basic and clinical research, but mostly from the experience of surgeons and their teachings. A vast amount of knowledge and surgical skills in hand surgery exist around the globe. Although most students of hand surgery have some appreciation of the teaching, training, and practice of hand surgery in several countries by way of personal interchange or international travels, these encounters are limited. To our knowledge there is no publication describing hand surgery around the world The production of this book was prompted by our desire to make a printed source of world-wide hand surgery available not only to our hand surgery colleagues but for others who are interested in this specialty.

This book is unique, for to our knowledge, not only is it the sole publication that describes hand surgery in the 50 member societies of the International Federation of Societies for Surgery of the Hand, but no other medical or surgical specialty has produced a similar publication on their specialty. The book is primarily comprised of two sections: one on the history, training and practice of hand surgery in each member country and the second on specific clinical topics in hand surgery. A collection of leading and respected hand surgeons from the 50 different countries have contributed to the history chapters. Twenty different countries are represented by international experts in their specific areas of hand surgery in the concise clinical chapters. The readers will note that chapters in both sections vary in length and description because we have chosen to retain the individual styles of the author and cultures of the country to add a variation of flavors to the text.

Sir Charles Bell (1774-1842)

Sir Charles Bell, a Scottish anatomist, published the treatise "The Hand: Its Mechanism and Vital Endowments as Evincing Design"in 1833. In a fitting passage he writes "The human hand is so beautifully formed, it has so fine a sensibility, that sensibility governs its motions so correctly, every effort of the will is answered so instantly, as if the hand itself were the seat of that will, its actions are powerful, so free, and yet so delicate, that it seems to possess a quality instinct in itself and there is no thought of its complexity as an instrument, or of the relations which make it subservient to the mind. We use it as we draw our breath, unconsciously."

From this eloquent description of the hand by Bell we chose the subtitle for this book. This text affirms that surgeons from around the world have played a huge role in helping to restore this "beautiful, ready instrument of the mind" that Bell described. It has been a genuine pleasure for us to gather this global information on hand surgery and we do hope that individuals interested in hand surgery at any level will appreciate its unique and informative contents.

James R. Urbaniak
L. Scott Levin
Goo Hyun Baek
Panayotis N. Soucacos

1966

James R. Urbaniak

History OF THE INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND (IFSSH)

In the middle of the 20th century societies were being developed around the world by the new specialists with a common interest in hand surgery. The oldest and most active society at the time was The American Society for Surgery of the Hand which was formed in 1946. The impetus for this national society was the gathering of mostly military surgeons who had been trained during World War II by Sterling Bunnell, the father of hand surgery in the United States. As noted in this book, the need to care for the large number of hand injuries sustained in World War II provided a stimulus for surgeons in several countries to form national hand societies. *(Fig. 1)*

Surgeons with an interest in hand surgery as a specialty began holding international meetings in the 1960s, for example Martin Entin's International Conference in Montreal and Ramsey Straub's international conference in New York City in 1964. The interchange of experiences and cross fertilization of ideas among these international colleagues prompted the many friends with a common bond to plan an international organization of hand surgeons. Several discussions among international friends led to a meeting in Chicago in January of 1966 at the Annual Meeting of the American Society for Surgery of the Hand to implement an international organization of hand surgeons.

The founding meeting of the IFSSH was led by Arthur Barsky who was president of the American Society for Surgery of the Hand at that time. The international attendees included:

Argentina	Dr. Zancolli
Austria	Dr. Millesi
Brazil	Dr. Pernet
Canada	Dr. Entin
Britain	Mr. Capner
	Mr. Harrison
	Mr. Patterson
	Mr. Stack
France	Dr. Mallek
	Dr. Michon
	Dr.Tubiana
	Dr. Saito
Italy	Dr. Bonala
	Dr. Mancini
	Dr. Morelli
	Dr. Opert
Japan	Dr. Morotomi
	Dr.Saito
Sweden	Dr. Carstam
	Dr. Isaakson
	Dr. Skoog
Switzerland	Dr. Verdan
United States	Dr. Barsky
	Dr. Boyes
	Dr. Curtis
	Dr. Kaplan
	Dr. Riordan
	Dr. Swanson
West Germany	Dr. Buck-Gramcko

History OF THE INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND (IFSSH)

The Federation with a charter was formulated at this meeting. The founding societies and delegates were designated as follows: *(Fig. 2 – Charter IFSSH)*

Society	Delegate
American Society for Surgery of the Hand	Arthur Barsky
Brazilian Society for Surgery of the Hand	Alipio Pernet
British Club for Surgery of the Hand	H. Graham Stack
French Society for Surgery of the Hand	Raoul Tubiana
German Speaking Hand Club	Dieter Buck-Gramcko
Italian Hand Society	Augusto Bonola
Japanese Hand Society	Takefumi Morotomi
Scandinavian Hand Club	Nils Carstam

It is interesting to note that the attendees at this founding meeting were not self-serving and adhered to the charter and by-laws governing membership. That is to say of the founding fathers who were there, the Canadians did not become members until 1972, the Argentineans until 1979, and the Austrian membership was delayed until 1990, apparently because of the later activation of their respective national hand societies.

FIG. 1 J. William Littler – 1946 – Military Hospital

Purpose

The organization was formed for the purpose of coordinating activities of the various hand societies throughout the world and thus increase and spread the knowledge of surgery of the hand.

An organization must be more meaningful than just to have a meeting to decide where the next meeting will be held. Our founding members were, indeed, visionaries, for although

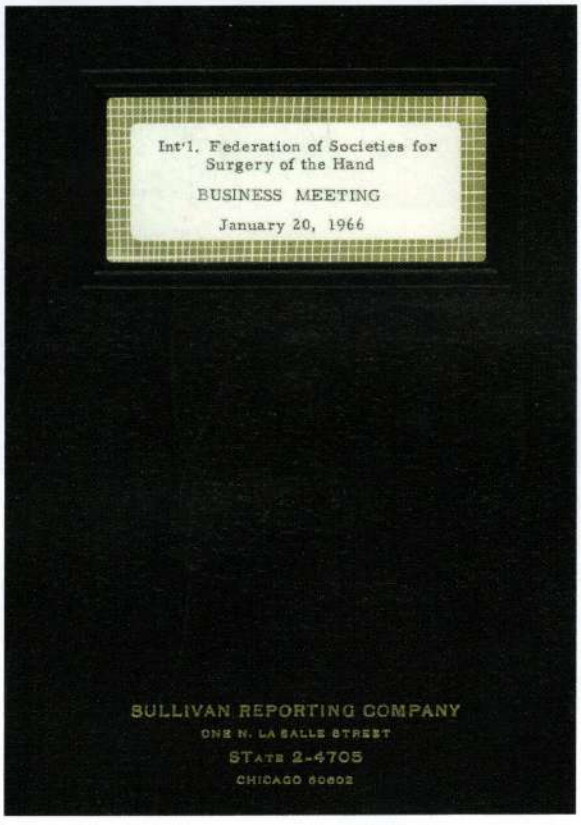


FIG. 2 IFSSH – Charter from Inaugural Meeting 1966 in Chicago, Illinois, USA

the charter was founded in 1966 and revised in 1966, 1972, 1986, 1989, 1992, 1996 and 1998, the fundamental mission for the IFSSH has remained the same. The mission or objective has been to increase and spread the knowledge of surgery of the hand throughout the world. Eleven chief purposes were clearly defined but may be summarized as activities that promote free exchange of ideas and cooperative liaison among the various specialties while providing opportunities to learn by joint publications and meetings and to develop international standards of nomenclature and classification. Other major objectives were to study the socio-economic impact on disorders of the hand and further the availability of hand surgery throughout the world while cooperating with other related professions. Initially six committees were established to accomplish these objectives:

Initial Committees 1966
Bibliography
Disability Evaluation
Prevention of Accidents
Functional Results
Congenital Malformations
Standard Nomenclature

All of the founding attendees were represented on these initial committees. Because of various modifications in the by-laws and Presidential discretion through the years, the number of scientific committees has varied but has usually been around 30 as indicated below.

Anatomy
Arthrogyposis
Arthroscopy
Cerebral Palsy
Complex Trauma
Congenital Hand
Distal Radial Fracture
Distal Radial Ulnar Joint
Dupuytren's Disease

History OF THE INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND (IFSSH)

Entrapment Syndrome
Exchange Scholar Programs
First Carpo-Metacarpal Joint
Flaps in Reconstructive Hand Surgery
Flexor and Extensor Tendon Injuries
Hand Transplantation
Impairment Evaluation
Kienbock's Disease
Microsurgery
Mini-Invasive Hand Surgery
Musician's Hand
Obstetrical Palsy
Occupational Disorders
Sports Injuries of the Hand
Rheumatoid Arthritis
Tendon Transfers
Tetraplegia
Tumors
Vascularized Bone Grafts
Web Sites in Hand Surgery
Wrist Biomechanics and Instability

The outcome of the committees has varied from minimal productivity to significant and meaningful work including publications such as the text "Terminology for Hand Surgery" and the electronic version of "Making a Thumb".

Membership

Membership is restricted to bona fide societies of a country or region, not individuals. The founding group of eight societies has grown to 50 members. Although the Federation was formed in 1966, the first congress was not held until 1980 in Rotterdam, The Netherlands and was organized by Jacques van der Meullen and Al Swanson. Bernie O'Brien from Melbourne was President. *(Fig. 3)* Over 500 hand surgeons from 51 countries attended this inaugural congress. The new seal of the Federation designed by Dutch artist Kees DeVries was displayed at this meeting *Fig. 4.*

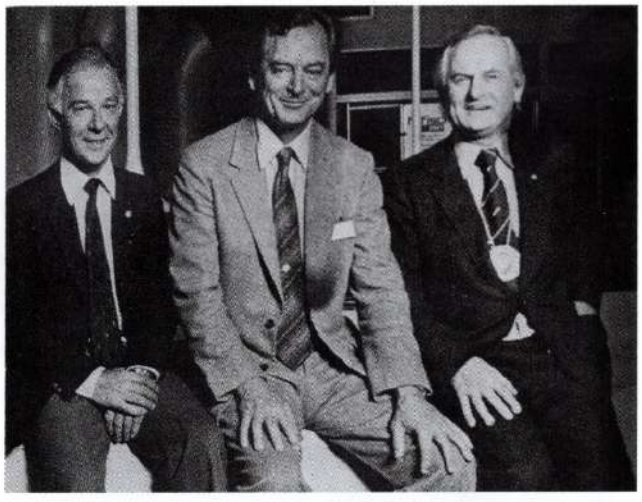


FIG. 3 Organizers of Inaugural Congress of IFSSH in Rotterdam, The Netherlands, 1980. Jacques van der Meullen, The Netherlands, Host Chairman, Al Swanson, USA, Secretary General, and Bernie O'Brien, Melbourne, Australia, President.

FIG. 4 IFSSH seal designed by Dutch artist, Kees De Vries

Subsequent successful congresses have been held every three years with the attendance often over 1,000 hand surgeons at the following sites:

1980	Rotterdam, Netherlands	June 16-20, 1980
1983	Boston, Massachusetts, USA	October 16-21, 1986
1986	Tokyo, Japan	November 2-8, 1986
1989	Jerusalem, Israel	April 9-14-1989
1992	Paris, France	May 25-28, 1992
1995	Helsinki, Finland	July 3-7, 1995
1998	Vancouver, Canada **	May 24-28, 1998
2001	Istanbul, Turkey **	June 9-13, 2001
2004	Budapest, Hungary **	June 13-17, 2004
2007	Sydney, Australia	March 11-15, 2007
2010	Seoul, Korea	October 31, November 4, 2010

***These three meetings made a profit for the IFSSH ranging from $20,000 to $55,000.*

- Three of these congresses generated a profit for the Federation, notably the Vancouver, Istanbul, and Budapest Congresses.
- Nearly a quarter of a century transpired after the creation of the Federation before the Articles of Incorporation were established in 1990 in San Juan, Puerto Rico and were signed by Miguel Vargas, the Secretary General at that time (See chapter 35).

Treasury

The treasury for the Federation started in 1968 and dues for constituent societies were initiated at a cost of $5 per individual surgeon. For more than 20 years the dues have been $10 per individual member; therefore the amount of dues for a society depends on the number of members per society. In the past decade, the treasury has quadrupled through dues, profit from congresses and investments to nearly $700,000. *(Fig. 5)*

Projects

Major projects of the Federation were initially limited by lack of funding. However in recent years with the growth of the treasury, the Federation has been able to financially sponsor worthwhile educational and research endeavors through the Educational Bursary.

Earlier projects of the Federation include *(Fig. 6)*:

1. A contingency of 30 members of the Federation visiting Eastern Europe to study needs in

History OF THE INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND (IFSSH)

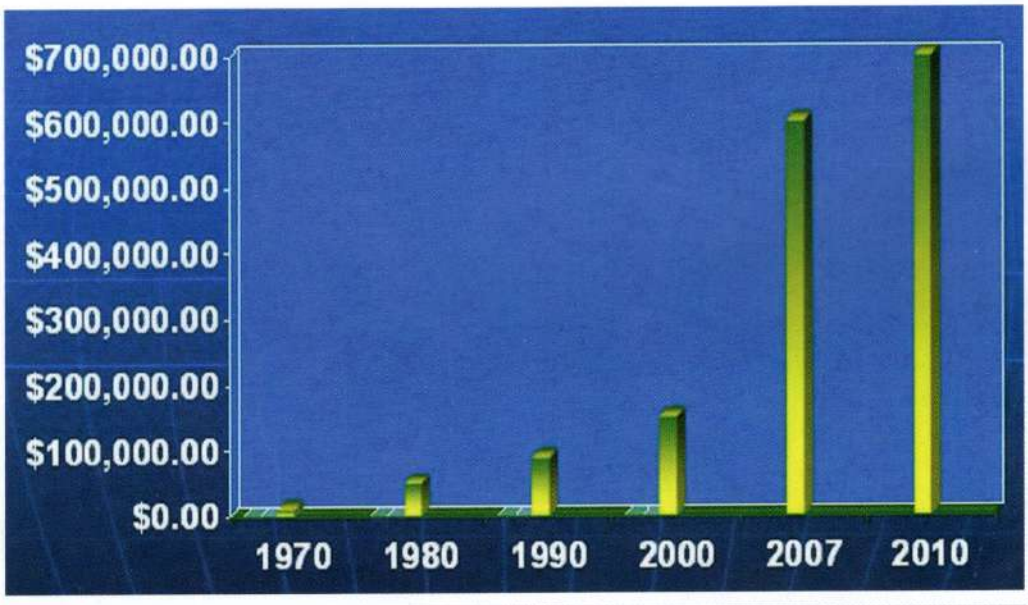


FIG. 5 Treasury of IFSSH.

hand care in these areas in 1993.

2. Committee activities which included Textbook on Hand Surgery Nomenclature.
3. Report on education in hand surgery in various countries.
4. Three supplements in the "Journal of Hand Surgery", American edition
5. Pioneers in Hand Surgery.

The recognition of the Pioneers in Hand Surgery was initiated at the Third International Congress in Tokyo in 1986. *(Fig. 7)* This selection of recognized leaders in international hand surgery continues at each congress with the Pioneers proposed by the national societies and selected by the Nominating Committee and approved by the Executive Committee.

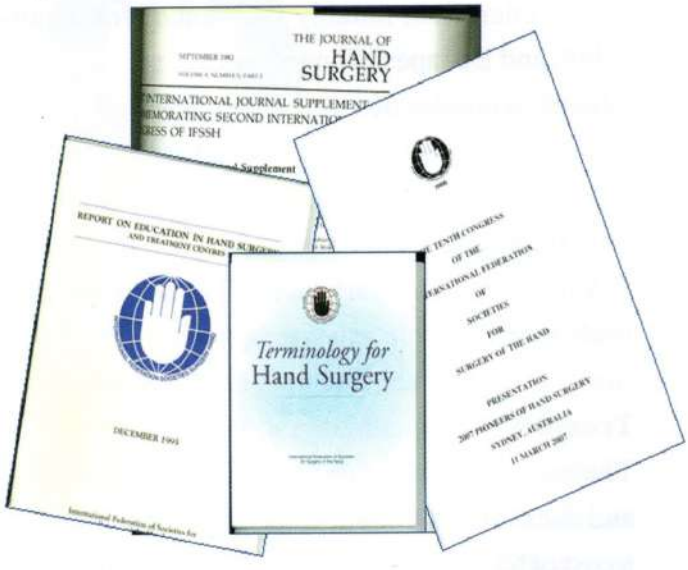


FIG. 6 Early Projects of IFSSH.

FIG. 7 Initial recognition of Pioneers in Hand surgery at Third International Congress in Tokyo, 1986. **Back Row, left to right:** Paul Brand, Tamikazu Amako, Claude Verdan, William Littler, Eric Moberg and Martin Entin. **Front Row, left to right:** Johan Landsmeer and Raoul Tubiana.

The International Hand Library was established in Louisville, Kentucky, USA in 1996 to serve as a repository and resource for hand surgery information. Expansion and utilization of an International Library has waned though recently there has been some enthusiasm to rejuvenate it, perhaps in Lausanne, Switzerland at the Claude Verdan Museum or in San Francisco at the American Society for Surgery of the Hand Museum.

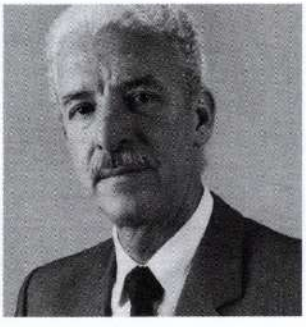
With the creation of Educational Bursary in 2005, the Federation has supported training programs for hand surgeons in underdeveloped areas in Africa, CDs for "Making a Thumb" from the Shrine Hospital in Dallas, Texas and financial support for hand surgeons to attend the triennial IFSSH Congress. Members of the Federation are encouraged to apply to the Federation for financial assistance for educational projects.

Officers

- There have been 16 presidents of the Federation with Erik Moberg serving as the initial one. Al Swanson is the only one to serve two 3-year terms *(Table 1)*.
- There have been nine Secretary Generals with Arthur Barsky from the United States serving in this inaugural role *(Table 2)*.

History OF THE INTERNATIONAL FEDERATION OF SOCIETIES FOR SURGERY OF THE HAND (IFSSH)

Giorgio Brunelli



Arlindo G. Pardini

Eric Moberg

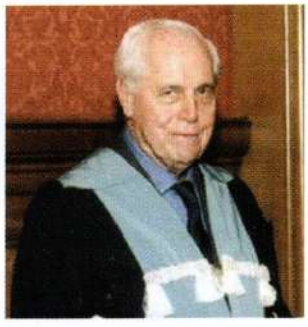
R. Guy Pulvertaft

Douglas W. Lamb

Alfred B. Swanson

TABLE. 1 Presidents of the IFSSH

Erik Moberg 1968-69
R. Guy Pulvertaft 1970-71
Raoul Tubiana 1972-1973
Dieter Buck-Gramcko 1973-1975
Tatsuya Tajima 1975-1977
H. Graham Stack 1977-1979
Bernard McC. O'Brien 1977-1983
Alfred B. Swanson 1983-1989
Douglas W. Lamb 1989-1992
Robert M McFarlane 1992-1995
Giorgio Brunelli 1995-1998
Yasuo Yamauchi 1998-2001
Guy Foucher 2001-2004
Arlindo G. Pardini 2004-2007
James R. Urbaniak 2007- 2010
Ulrich Mennen 2010 – 2013



Raoul Tubiana

Tatsuya Tajima

This title was appropriately changed to Secretary by the by-laws in 1998, although the Secretary has unquestionably remained "the work horse" of the Federation.

For more than 30 years the council met in conjunction with the American Society for Surgery of the Hand in the United States. In 1999 the council meeting was moved to the site of the FESSH annu-

Robert M. McFarlane

Guy Foucher

TABLE. 2 Secretary Generals of IFSSH

Arthur J. Barsky 1966-1972
H. Graham Stack 1972-1977
Alfred B. Swanson 1977-1983
Robert M McFarlane 1983-1989
Miguel Vargas 1989-1993
Guy Foucher 1993-1998
James R. Urbaniak 1998-2004
Ulrich Mennen 2004-2007
Michael Tonkin 2007 – 2010

Michael Tonkin

H. Graham Stack

al meeting to accommodate a large number of European members and have more countries attend and participate.

The Federation, however, is not about officers and delegates; it is about learning from each other around the world. Hand surgeons of the Federation have learned much from each other around the globe. Some examples of international contributors to the international fund of knowledge area as follows:

1. Arthritis – Argentina, England, Israel, Spain, Netherlands, South Africa, Belgium
2. Brachial plexus – Britain, France, Switzerland, Taiwan, Thailand, South Africa, Turkey
3. Complex microsurgical reconstruction – China, Greece, Taiwan, Germany, Czech Republic, Japan
4. Compartment Syndrome – Japan, Turkey, USA
5. Congenital – Austria, Australia, France, Germany, Japan, Denmark, South Korea, Mexico, India, Poland
6. Dupuytren's Disease – Iran, Australia, Canada, UK, New Zealand, Belgium, Scandinavia
7. Limb Lengthening – Bulgaria, Italy, Russia, USA
8. Flexor Tendons – Britain, Bulgaria, France, Hong Kong, USA, Japan, Poland, Bulgaria
9. Infections – Hong Kong, Romania, Malaysia
10. Microsurgery –Australia, Brazil, Canada, China, Russia, Germany, Serbia, Singapore, Scandinavia, Italy, Israel, Romania, , Iran, Lithuania
11. Nerves – Australia, Austria, Britain, Sweden, Switzerland, Italy, Scandinavia, Egypt, Turkey, Singapore, Poland, Hungary
12. Tendon Transfers – Argentina, France, India, Sweden, New Zealand

13.Trauma – Greece, Iran, Hungary, South Africa, India, Romania, Thailand, Turkey Hong Kong
14.Tumors – Hong Kong, Italy, Japan, USA
15.Wrist – Belgium, Russia, Britain, Spain, Switzerland, Brazil, Argentina, Netherlands, Belgium, Bulgaria

As St. Augustine said "The world is a book, and those that do not travel read only a page."

In a world shaped and colored by political and religious leaders,our differences are difficult to settle. Similar interests or goals do not tie nations together and may even separate them because of competition and rights of possession. The situation is not so in hand surgery for similar interests of hand surgeons and even their disagreements unite them. If surgeons are not disagreeing to some extent, they are not learning. They really don't learn from each other if they all agree. They may as well be living alone, if they always agree. It's unfortunate that our national politicians don't share this educational attitude. Having a preference for one's country is admirable, but does not require one having a prejudice against others. With the explosion of information technology (IT), gathering knowledge from around the world is definitely easier. However, direct personal interaction fosters more productive and rewarding creativity and is also more enjoyable. It is important to read the whole book not just the one page. For this reason the members of the 50 societies of the Federation gather to exchange ideas, skills and knowledge every three years.

The Federation with a rich history of pioneers has inspired and educated hand surgeons not only at the triennial congresses but with continuous international exchange. The more diverse the group the broader the vision.

The Federation is now in a position to improve the care of hand problems throughout the world. Sustained by the core ideology of establishing and maintaining global friendships, the Federation will be successful and continue to work and study together to improve the care of the hands of our patients.

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Hand Surgery Worldwide

International Reconstruction of a "Beautiful and Ready Instrument of the Mind"

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1 CHAPTER

Argentina

Founded 1974

Eduardo R. Zancolli III

After the end of World War III an increasing interest in Hand Surgery began in Argentina. Two important hand surgeons visited Buenos Aires in the early 50's. Pulvertaft visited in 1952, to demonstrate a flexor tendon graft surgical procedure, and in 1954 Sterling Bunnell visited to obtain information about the state of the art of hand surgery in Argentina.

As early as 1953 the Argentine Society for Orthopedics and Traumatology created a Chapter for Hand Surgery. Surgeons practicing hand surgery were from different specialties (orthopedic surgery, plastic surgery and general surgery). That was the reason for increasing wishes to create an independent society. As the Argentine Society for Orthopedics and Traumatology did not approve it's creation, and similar situations were occurring in other South American countries, a group of surgeons decided to form the South

American Society for Surgery of the Hand (it included only Spanish speaking language countries). It was formed on December 2, 1965 in Lima, Perú (one year before the creation of the IFSSH). The first President elect was Eduardo A. Zancolli. *(Fig. 1)*

The society worked well but only for a couple of years. It was quite difficult at that time, particularly in South America with its political and economic problems, to maintain efficient communication between members and to continue with the organization of meetings on a regular basis. For that reason the dreams of an independent Argentinean Hand Society were returning to life, and the objections of the Orthopaedic Society were waning.

FIG. 1 Eduardo A. Zancolli (orthopedic surgeon), Jack Davis (plastic surgeon) and Chouy Aguirre (orthopedic surgeon): among the first to practice Hand Surgery in Argentina (decades of the 50's and 60's).

Foundation of the Argentine Society

On November 24, 1974, a course on hand surgery was organized in Patagonia, in Comodoro Rivadavia, a city 1700 km from Buenos Aires. There, an enthusiastic group of surgeons, dedicated nearly exclusively to the hand, decided to found the Argentine Society for Surgery of the Hand (Sociedad Argentina de Cirugía de la Mano). The first elected President was once again Eduardo A. Zancolli. Vice-President: Carlos N. Firpo; Secretary: Héctor J. Mitre; Treasurer: Guillermo Loda; Director for Publications: Bartolomé Allende; Vocal: Manuel Sanguinetti. The rest of the Founding Members were: Nestor Maquieira,, Guillermo Dabbah, Roque Blanco, Fredy Aponte Arrazola and Aldo Ilarramendi.

Meetings and Courses and Other Activities

The Argentine Society has been organizing an annual Meeting since 1974. Every year distinguished guests from all over the world have been invited. Some of them included: Raoul Tubiana, Alfred Swanson, Herbert Stark, Harold Kleinert, Algimantas Narakas, Goran Lundborg, Tom Watson, Ronald Linscheid, James Strickland, Edward Nalebuff, Julio Taleisnik, Graham Lister, David Green, James Urbaniak, Jesse Jupiter, Andrew Palmer, Hano Millesi, Ezio Morelli, Bill Cooney, Alain Gilbert, Philippe Saffar, Michel Merle, Guy Foucher, Richard Gelberman, Mark García Elías, Robert Beckenbaugh, Hill Hastings, William Kleinman, Luis Shecker, and many other well known surgeons who have made major contributions to the developement of hand surgery.

Since the beginning of the Society a very important event for continuing medical education has also been taking place. Designed mainly for young doctors and residents, a Hand Course has been organized in June for the purpose of studying the basics of hand pathology.

During the last few years a Seminar is held every month in order to discuss difficult cases.

Members of The Argentine Association are also traveling to distant provinces in order to dis-

FIG. 2 Some Argentine Hand Surgeons during a Meeting in 1995 at National Academy of Medicine (invited guest: Ronald Lischeid).

seminate hand surgery knowledge. Since 2009, the Society has been sending different topics to the media in order to promote public understanding of hand problems. It has already informed the Argentine community about repetitive use pathology, and also the common upper extremity problems in tennis players, musicians, and polo players. It is believed that this is a way to introduce specialized health care into the culture.

Presidents

After the first President, Eduardo A. Zancolli, the following 35 Presidents were: 1976, Carlos Firpo; 1977, Héctor Mitre; 1978, Guillermo Dabbah; 1979, Aldo Ilarramendi; 1980, Guillermo Loda; 1981, Roque Blanco; 1982, Néstor Maquiera; 1983, Manuel Sanguinetti; 1984, Fredy Aponte Arrazola; 1985, Enrique Penner; 1986, Alberto Sanguinetti; 1987, Bartolomé Allende; 1988, Hugo Caloia; 1989, Luciano Poitevin; 1990, Roberto Lima; 1991, Juan Carlos Miller; 1992, Eduardo R. Zancolli III; 1993, Alberto Garay; 1994, Mario Rodríguez Sammartino; 1995, José María Rotella; 1996, Alberto Gamarnik; 1997, Rodolfo Cosentino; 1998, Santiago Fazzini; 1999, Miguel Slullitel; 2000, Roque Nigro; 2001, Juan Carlos Torrano; 2002, Gustavo Archain; 2003, Carlos Zaidenberg; 2004, Heraldo Rosini; 2005, Alejandro Ramos Veriz; 2006, Juan Carlos Cagnone; 2007, Miguel Capomassi ; 2008, Pablo De Carli; 2009, Adriana Pemoff; and 2010, Sergio Daroda.

MEMBERS

Members are selected from orthopedic surgery, plastic surgery or general surgery. *(Fig. 2)*
The Argentine Association has different membership status.
Honorary: 1 (Eduardo A. Zancolli).
Active Members: 98
Board Certified Members: 60
Adherent Members: 127
Total Members: 286

Specialists in Hand Surgery

Since 2000 the Argentine Association for Hand Surgery has an official course for specialization in hand surgery after which a certificate of Specialist in Hand Surgery is given. It is a two year course with theory taught once a week by professors. Applicants have to participate in hands-on workshops in osteosynthesis and microsurgical training. They also have to assist in surgical procedures with different professors. Following periodical evaluations they have to pass a final examination at the end of the course in order to be certified.

National Personalities and Major Contributions

Since the first quarter of the XXth century, Argentina has contributed to the knowledge of Hand Surgery. In 1920 Ricardo Finochietto described ischemic intrinsic contracture with tests for diagnosis and a surgical technique that still

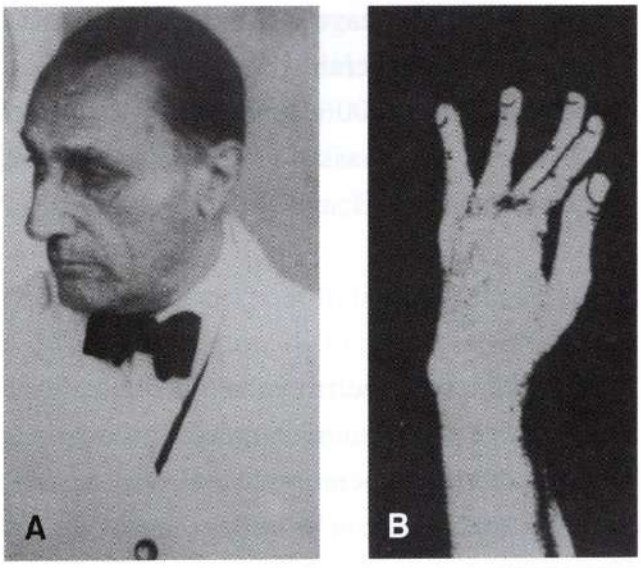


FIG. 3 Finocheitto's medical records of an ischemic intrinsic retraction.

is utilized. Nearly simultaneously in our neighboring country, Uruguay, Navarro was developing the Columnar Theory of the Carpus (1918 and 1921). *(Fig. 3)*

The 1950s was probably the decade of major development of knowledge in our speciality.

Two important papers were published by authors from Argentina. In 1956 Chouy Aguirre and Kaplan published the technique still used today for reconstructing opposition in median-ulnar paralysis. This transfer of the exensor indicis proprius (EIP) around the ulnar side of the wrist has passed the test of time. One year later, in 1957, Eduardo A. Zancolli presented metacarpophalangeal (MP) capsulodesis in a paper describing the correction of clawhand. *(Fig. 4)*

One of the most significant features in Argentinean hand surgery has been the study of anatomy. Many distinguished anatomists have published important papers on hand anatomy: Elbio Cozzi, Eduardo A. Zancolli, Carlos Zaidenberg, Luciano Poitevin, Homero Bianchi, Roque Nigro, Carlos Nemirosky and José María Rotella are some of them. *(Fig. 5)*

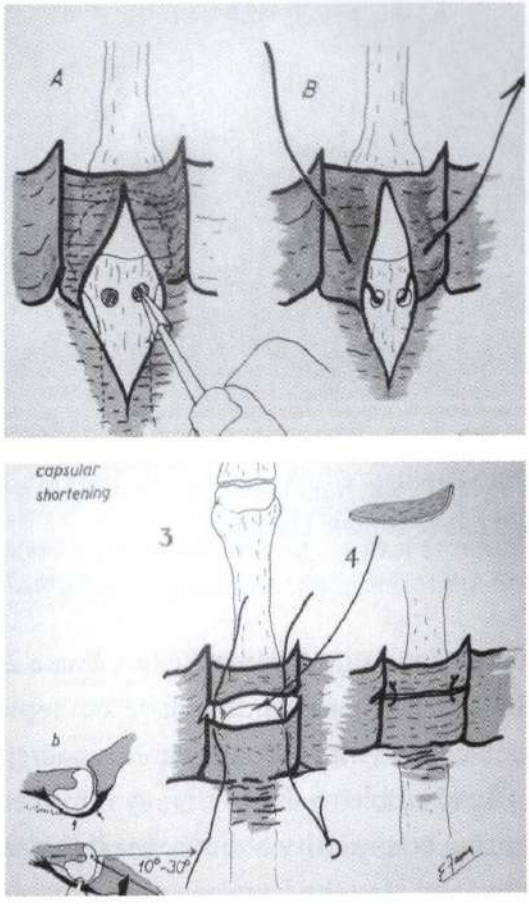


FIG. 4 Zancolli's technique for MP capsulodesis (1957.

FIG. 5 Elbio Cozzi during an anatomical dissection.

Perhaps the more known papers and books of Argentinean surgeons are those of Eduardo A. Zancolli. These works include papers on: latissimus dorsi transfer, biceps to pronation for paralytic supination, the "lasso" operation for

clawfingers, the posterior interosseous flap, the "asa" dynamic transfer for swan-neck deformity, obstetrical palsy, spastic hand, quadriplegia, malformations of the retinaculum cutis and biomechanics of the carpometacarpal (CMC) joint of the thumb. Héctor Mitre, Fredy Aponte Arrazola, Claudio Angrigiani, Juan Carlos Cagnone and Eduardo R. Zancolli III have been coauthors of one or many of these subjects. Zancolli has also published the books: Structural and Dynamic Basis of Hand Surgery (1st and 2nd editions), and Atlas of Surgical Anatomy of the Hand, co-authored with Elbio Cozzi.

Other Argentineans have authored books on surgery of the hand: Rodolfo Lima (nerve compressions), Guillermo Loda (thumb and finger reconstruction), and Rodolfo Cosentino (hand and upper limb pathology).

Some others have contributed to some significant aspects of current knowledge: Nestor Maquieira with an innervated full thickness skin graft to restore sensibility for fingertips, Ignacio Uriburu described his technique for thumb metacarpal (TMC osteoarthritis, Carlos Zaidenberg and Jose Maria Rotella described the distal radius vascularized bone grafts for scaphoid pseudoarthrosis, Luciano Poitevin described with compression sites of brachial plexus, and Aldo Illarramendi described the distal radius metaphyseal core decompression for Kienbock's disease and Eduardo R. Zancolli III described the triquetro-hamata medial instability.

South American Federation

Since the end of the 60's the South American Society for Surgery of the Hand had minimal presence or scientific activity. In 1991 the IFSSH General Secretary came to Argentina in order to determine how the Society should proceed. He recommended dissolution of the Society. As the South American Society was in someway representing countries without national hand societies, or with societies not yet officially in the IFSSH, the local decision was to transform it into a South American Federation. To accomplish such a goal it was necessary to incorporate the other big South American country, Brazil, which also had well developed hand surgery. Since 1992, the Federation has organized a biannual meeting in different countries. 1992 in Argentina; President Guillermo Loda. 1994, Brazil; President Arlindo Pardini. 1995, Venezuela; President Contreras Gamboa. 1997, Argentina; President Eduardo Zancolli III. 1999, Brazil; President Walter Albertoni. 2001, Chile; President Alberto Perez. 2003, Argentina; President José María Rotella. 2005, Brazil; President Rames Mattar. 2007, Uruguay; President Jorge De Vecchi. And 2009, Colombia; President Francisco Camacho.

In the alternate years without Annual Meetings, the Federation has been organizing a Course in South American countries that did not have national hand societies. Uruguay, Chile, Bolivia, Ecador, and Peru (2010) have benefited from this activity. Subsequently some countries have established a national society (Chile and Uruguay). To organize such a Course, the Federation usually provides around 20 speakers who pay their own airline tickets and hotel accommodations. The local country has only to provide an auditorium. *(Fig. 6)*

Argentine Society for Hand Therapy

In 1997 the Argentine Society for Hand Therapy was founded. Since then, it has held it's annual Meeting together with the Hand Society. With a total of 68 members, 30 are active and 38 associate.

FIG. 6 South American Federation (from left to right). Juan Carlos Cagnone (Secretary General, 2002-2003) with four of the Past Presidents: José Maria Rotella (2002-2003), Eduardo R. Zancolli III (1996-1997), Arlindo Pardini (1993-1994) and Walter Albertoni (1998-1999).

FIG. 7 Hill hastings and Jaiyoung Ryu during their visit to Buenos Aires.

Bunnell Travelling Fellowships Visiting Argentina

Three Bunnel Travelling Fellows have chosen Argentina among their visits. Hill Hastings (1989-1990), Jaiyoung Ryu (1994-1995) and Scott Levin (1999-2000). *(Fig. 7)*

2 CHAPTER

Australia

Founded 1972

Richard Honner,
Michael Tonkin

Australian hand surgery does not begin with Andrew "Ben" Murray but his story is illustrative.

Born in Tasmania, educated in Medicine in Melbourne, he lost his leg to a shooting accident and ulnar nerve function to another mishap. Like many Australians, a part of his formative surgery training was gained overseas. When rejected for military service because of his physical disabilities, he was instrumental in setting up a hand clinic at the Leith Hospital in Edinburgh in 1942. In 1946 he published perhaps the first article describing pollicization of the index finger by transfer on its neurovascular pedicle, before Gosset in 1949. He inserted artificial hinge joints and described interosseous wiring as a reliable method of internal fixation many years before the publication of articles which received recognition for the introduction of these techniques.

Ben Murray returned to Australia in 1948. In

Brisbane in 1955, a flourishing career was cut short when he and a senior colleague were shot dead by a disgruntled patient, dissatisfied at his failure to obtain a medical certificate for a back injury.

Murray's hand surgery experience developed parallel with and perhaps because of the necessity for hand surgery services created by limb injuries sustained in the Second World War. Prior to this, the focus of hand surgery was on the management of hand infections, In the United States, Sterling Bunnell developed concepts for reconstruction of the injured hand. In Australia, Sir Benjamin Rank, though mostly involved in secondary reparative surgery during and immediately after the war years, established the place of primary repair for hand injuries which became rife with the mushrooming of light industry. Rank and Alan Wakefield published the "Surgery of Repair as Applied to Hand Injuries" in 1953, being joined for the last two of five editions by John Hueston. These Melbourne plastic surgeons developed a rich breeding ground for hand surgery training and development in Australia.

In the more northern states of New South Wales and Queensland, orthopaedic surgeons played a major role in Australian hand surgery history. In Sydney, interested surgeons had formed an association to discuss hand surgery clinical cases, with regular meetings from 1961. Crawford McKellar was an enthusiastic and active person whose endeavours led to the formation of the New South Wales Hand Surgery Association in 1963. This group included interstate members, such as John Hueston from Melbourne and Peter Millroy from Brisbane.

In 1970, and again in 1971, John Hueston invited members of the NSW Hand Surgery Association to Melbourne, for informal discussion of hand surgery cases and demonstrations of his surgical expertise. At this time the concept of a nationwide hand surgery society was discussed and the members of the NSW Hand Surgery Association prepared a draft constitution and a mechanism for setting up an inaugural meeting. In March 1972 Sir Benjamin Rank came to Sydney and was met by the office bearers of the NSW Hand Surgery Association. This was at a time of much political debate and activity in the medical world concerning the differential recognition of specialists, which continues to this day. After discussion, the Australian Hand Club was established. The foundation meeting was held on 1 July 1972 in the hall of the British Medical Association building in Macquarie Street, Sydney, with 47 surgeons from around the country in attendance. The elected Office Bearers were:
President - Sir Benjamin Rank,
President Elect - Alan McJannet
Secretary - Frank Harvey
Treasurer - Richard Honner
Committee Members - Peter Millroy, Don Robinson, Bernard O'Brien

The Australian Hand Club held a Scientific Meeting each year, rotating through each State, and eventually decided to change its name to the Australian Hand Surgery Society in 1990. *(Fig. 1)* This society is now the platform for the continued development of hand surgery in Aus-

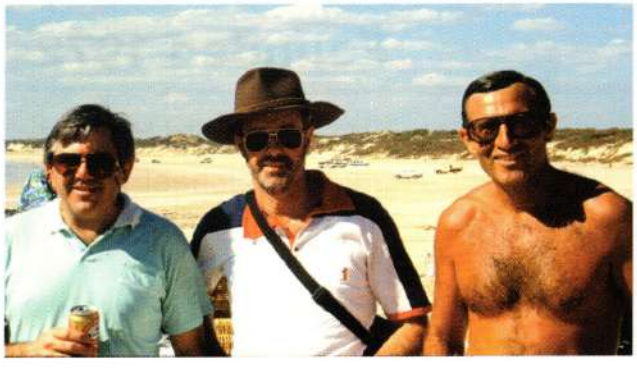


FIG. 1 Guest Professor Guy Foucher with previous AHSS Presidents, Peter Hales and David Vickers, in typical Australian style at the 1990 AHSS Annual Scientific Meeting.

tralia, advocating training programmes and certification which incorporate those aspects of hand surgery previously within the domains of plastic surgery and orthopaedic surgery.

The current membership of the Australian Hand Surgery Society numbers 163, including 19 overseas New Zealand members. An additional 33 surgeons, national and international, have been invited to honorary membership. An Annual Scientific Meeting with overseas Guest Professors is conducted each year. This meeting is often associated with a separate two day program in hand surgery for Registrars on surgical training schemes in Australia and New Zealand. The AHSS also convenes hand surgery programmes for the Annual Scientific Meetings of the Australian Orthopaedic Association and the Royal Australasian College of Surgeons.

The visit of Dieter Buck-Gramcko from Germany in 1983 as Guest Professor at our Annual Scientific Meeting, will be remembered for a frightening excursion to a coral reef, on which members of the Australian Hand Club were stranded during a fierce storm and a rising tide *(Fig. 2)*. Access to the reef and the prevention of a developing disaster was not possible from the boat chartered for the excursion, but horrific consequences were averted by the timely arrival of a small rescue boat sent to the reef by a large tourist vessel nearby. Members of the Australian Hand Surgery Society continue to take delight in scaring future international guest professors with this story of the possible consequences of acceptance of an invitation.

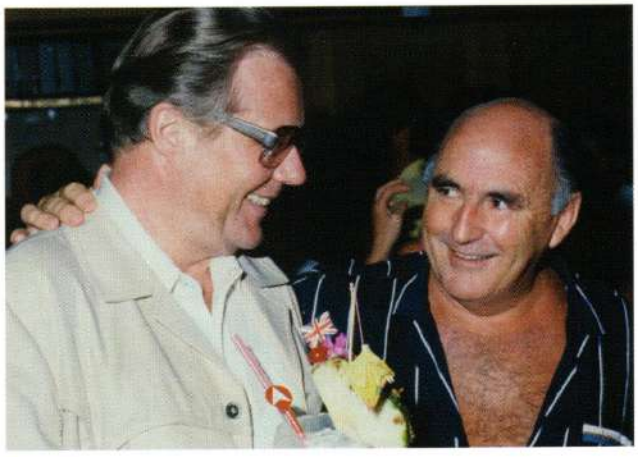


FIG. 2 Guest Professor Dieter Buck-Gramcko and John Hueston at the 1983 AHSS Annual Scientific Meeting, prior to the reef incident.

Australian hand surgeons have benefited from the training available in overseas centres, such as Canniesburn in Glasgow, the Pulvertaft Hand Centre in Derby, Louisville Hand Surgery and Duke University in the United States. We are also indebted to teachers such as Guy Pulvertaft, Ian McGregor, Harold Kleinert, Graham Lister and James Urbaniak, amongst many others. In turn, Australian centres provide sophisticated hand surgery training for Australian and overseas trainees, led in Melbourne by Bernard O'Brien and subsequently Wayne Morrison. They, along with their Sydney counterparts have embraced the concept of hand surgery units which combine the expertise of orthopaedic and plastic surgeons.

The Australian Hand Surgery Society joined the International Federation of Societies for Surgery of the Hand (IFSSH) in 1977. In 1979, the Australian Hand Club hosted an international hand surgery congress held in Melbourne under the chairmanship of Bernard O'Brien, with smaller satellite meetings in Sydney, Brisbane, Adelaide and Perth. Over 300 surgeons from around the world attended. This was followed by the very successful Sydney 2007 IFSSH Congress hosted by the Australian Hand Surgery Society, with an attendance of 1200 surgeons and trainees. Bernard O'Brien was honoured with the IFSSH Presidency (1979 to 1983) *(Fig. 3)*. Michael Tonkin is the current Secretary-General of the IFSSH.

The Australian Hand Surgery Society was a founding member of the Asia-Pacific Federation of Societies for Surgery of the Hand (APFSSH), hosting the inaugural APFSSH Congress in Perth

in 1997. Wayne Morrison, Michael Tonkin and Bruce Conolly have been appointed to Presidency of the APFSSH.

A number of Australian hand surgeons have been recognised as IFSSH Pioneers in Hand Surgery – Sir Benjamin Rank, Sir Sidney Sunderland, Bernard O'Brien, John Hueston and Bruce Conolly. These, and others, including Wayne Morrison, David Vickers, Timothy Herbert and Michael Sandow, to name a few of many, have contributed to Australia's status in the international world of hand surgery. It has been a profitable journey, from the outstanding anatomical descriptions of the hand by C. Gordon Shaw and F. Wood Jones in the 1920s to the current time.

FIG. 3 Bernard O'Brien, AHSS President 1978-80, IFSSH President 1979-83.

FIG. 4 The koala is a native marsupial of Australia. It is of interest to hand surgeons as it has two opposable thumbs for better gripping.

Austria

3 CHAPTER

Founded 1990

Hildegunde Piza

History of Hand Surgery

The **Austrian Society for Surgery of the Hand (OEGH)** is an association of specialists representing different medical professional groups who are acting within the area of hand surgery or who are involved with this topic in a scientific or practical way.

The Austrian Society for Surgery of the Hand (www. handchirurgen. at) was founded in 1990. The first President was Prof. H. Millesi from Vienna, followed by Prof. S. Pechlaner from Innsbruck and Prof. Meissl from Vienna. Currently Prof. H. Piza-Katzer is the President of this well established society, which holds an annual scientific meeting attended by 200-250 participants in Hand Surgery centers all over Austria. The society is well respected by colleagues and its 216 members. In 2009, the society had its first annual meeting together with hand therapists. Both

were glad to intensify the co-operation between surgeons and therapists specialized in the field of the Hand. The Austrian Society for Surgery of the Hand is proud to announce that these joint meetings will continue in the future.

The society is managed by an association management company, vereint Ltd. , which takes care of the daily business including the organization of the meetings.

Hand Surgery is a very important and topical subject in Austria, which is daily growing due to several factors such as:

- Austria is a haven for sports-lovers, where we are seeing a rapid increase of hand injuries due to "fashion sports" such as rollerblading, mountain biking and snowboarding, just to name a few.
- Between 2000 and 2006, the department of plastic and reconstructive surgery of the University Innsbruck successfully implemented double-sided hand transplantations in 3 men who previously sustained bilateral hand amputations.
- Austria is highly committed to helping children with hand malformations with an integrative concept of offering operations and therapies at an optimal time. In cases with double-sided malformations, there is a trend to operate on both hands at the same time.
- As early as 1976, the first Centre of Replantation was established in Austria.

Hand Training

As mentioned above, the Austrian Society for Surgery of the Hand organizes an annual meeting - the "ÖGH Frühjahrsklausurtagung" – offering sessions with cutting-edge presentations.

The "Wiener Handkurse", founded by Prof. Dr. Jörg Böhler *(Fig. 1)* in 1958, have been continued by his two "trainees and companions",

FIG. 1 Prof. Dr. Jörg Böhler.

Dr. Martin Leixnering and Dr. Wolfgang Hintringer. Many colleagues from near and far in the art of Hand Surgery continues to extend their knowledge and training in these courses. Furthermore, more than 4. 000 participants have already visited the courses since the inception. The 125th basic course took place in September 2009.

In Innsbruck, Handkurse are offered by the University Hospital Innsbruck – under the guidance of Dr. Markus Gabl.

The Austrian Microsurgery Courses are held in Vienna and in Linz. In Vienna, Dr. Friedrich Russe, Dr. Helmut Matuschka, Dr. Alexander Meznik at the AUVA hospital are the scientific course directors. At AKH Linz MAZ, these Microsurgery Courses are under the scientific leadership of Dr. Oskar Kwasny, Dr. Dietmar Hager and Dr. Georg Huemer.

FIG. 2 Dr. Hanno Millesi.

In Austria, Hand Surgeons come from backgrounds of Trauma Surgery, Plastic Surgery, General Surgery and Orthopaedics.

Certification

As a result of negotiations with-in the "Österreichische Ärztekammer" (Austrian Federation of Doctors), Hand Surgery became a recognized specialty in autumn 2009.

Hand Surgery has a long tradition in Austria: world recognized pioneers were/are:

- Prof. Dr. Jörg Böhler (1917-2005)
- Prof. Dr. Hanno Millesi (President of the OEGH 1991 – 1996 – Millesi Center for Surgery of Peripheral Nerves, the Plexus Brachialis and for Reconstructive Surgery) *(Fig. 2)*
- Prof. Dr. Sigurd Pechlaner (President of the OEGH 1997 – 2002)
- Prof. Dr. Günter Meissl (President of the OEGH 2003 – 2005)
- Prof. Dr. Hildegunde Piza-Katzer (President of the OEGH 2006 till now)
- OA Dr. Martin Leixnering (long-standing Secretary of the OEGH)
- Univ. -Doz. Dr. Werner Girsch (Treasurer of the OEGH)
- Dr. Gabriele Kriegs-Au (Board-Member oft he OEGH)
- Univ. -Doz. Dr. Markus Gabl (Board-Member of the OEGH)
- Prim. Dr. Andreas Pachucki (Board-Member of the OEGH)

4 CHAPTER

Bangladesh

Founded 2005

A. S. M. Monirul Alam

Brief History

Bangladesh, a land of 6000 years old history and heritage,is situated in South Asia. Once a part of Undivided British India, it became Independent in the year 1971. Now it has 150 million people , 88% of them are Muslim and others are Hindu, Buddhist and Christian. The longest sea beach in the world- Cox'sbazar and the largest mangrove forest Sundarban are situated in Bangladesh.

Dhaka is the capital of Bangladesh with 9 million inhabitants. Fifty thousand graduate doctors are serving the nation in the health sector. There are 38 medical colleges,64 District Hospitals, one medical university and 11 specialized Institutes. Four hundred and twenty-five rural hospitals form the skeleton of the Health Service. There is one 500 bed specialized Trauma & Orthopaedic hospital in Dhaka. There are

only 400 Orthopaedic and Trauma surgeons and less than 50 Plastic surgeons. There are no separate Hand Surgery units.

Hand surgery is a very new speciality in Bangladesh. A few interested Orthopaedic and Plastic surgeons are performing Hand Surgery. More than 25% of the injured patients who are attended in the emergency departments have hand injuries. These cases are managed by inexperienced surgeons and doctors who have no training in the management of hand injuries. So most of the time management is insufficient. In addition, other problems like congenital anomalies, hand infection, deformity, and arthritis go unmanaged due to lack of facilities.

In 2005 a few orthopaedic surgeons and plastic surgeons sat together to organize a separate Hand Society. Prof. R. R. Kairy and Dr. A. S. M. Monirul Alam became the convener and secretary of the Society. Twenty-seven surgeons became Life members and nine became general members. The convening committee wrote a constitution with the help of the Indian Hand society. The Society was established with the following objectives:

1. To promote and direct the development of the Hand surgery,
2. To foster and coordinate Hand education.
3. To arrange Hand courses and Instructional lectures for surgeons.
4. To establish an independent specialty in the future.

We are grateful to Dr. S. Raja Sabapathy, India, for helping us form this Society and to Prof. Ulrich Mennen, South Africa, who gave us the opportunity to attend World Hand Congress in Sydney in 2007.

Training & Activities

In last three years the Society organized three National Conferences and 11 Instructional Courses in different cities of Bangladesh. The membership increased to 55.

A weekly out patient department and day case surgery unit for patients with hand problems have been established in the National Trauma Hospital (NITOR). This Unit has also become a training center for junior surgeons. The Hand Team organized a Basic Hand course conducted by a foreign (Indian) Hand faculty in October 2009. Training on Hand and Micro surgery (one year duration) for junior Ortho- Plastic surgeons is available, in India at Ganga Hospital.

Prof. R. R. Kairy who was trained in Singapore (N. U. H.) is the pioneer hand surgeon in Bangladesh. More than 50 Hand surgeons are practicing in the country since the formation of the Society.

The members are well informed about the updates of hand management and are encouraged to participate in conferences abroad.

* *At the 2008 delegate meeting of the IFSSH in Switzerland, the Society became the 50th Member nation of the IFSSH. We appreciate Prof. Michael Tonkin for his help. We also express gratitude to Hand societies of India, Australia, U. K. ,USA, Spain, Switzerland, Korea for sponsoring us to become an IFSSH member.*

5 CHAPTER

Belgium

belgian handgroup

Founded 1972

P Wylock, A Lejeune, F Van Innis, A Carlier, Y Baeten, J Goubau and O Barbier

Belgium is a constitutional monarchy in northwestern Europe, independent since 1830 with Brussels as the capital and headquarters of the European Union and of the North Atlantic Treaty Organization (NATO). With a population of 10,414,336 inhabitants (2009 estimate), Belgium has its own hand surgery society, The Belgian Hand Group (BHG), established on May 30, in 1972 by six founding members: A.de Coninck (president), G. Calberg (vice-president), J.J. Rombouts (secretary), P. Van Wetter (treasurer), G. Matton (consultant) and E. Vander Elst (consultant).

Between 1972 and 1975, the BHG included 12 members and 20 associated members. The group has progressively grown to a total of 127 members in 2009 , with 59 full members, 3 honorary members, and 12 foreign members. These members are mainly orthopaedic and

FIG. 1 Meeting of ancient presidents and founding members of the society at the occasion of the 30th anniversary of the Belgian Hand Group, in 2002. Back row (left to right): P.Wylock, G.Lejeune, H.De Frenne, J.P.Moermans, L.Kinnen, L.De Smet, F.Schuind. Front row : J.J.Rombouts, G.Matton, M.Lejour, P.Van Wetter.

plastic surgeons, with a few general surgeons. The BHG holds two meetings per year, occasionally with sister or related societies. More information on the group and its activities can be found on the website created on June 18 2001: www.belgianhandgroup.be and regularly updated. *(Fig. 1)*

FIG. 2 Albert de Coninck

FIG. 3 George Calberg

The BHG Through its Successive Presidents

Albert de Coninck (1972 to 1975), a plastic surgeon organized the first meeting of the BHG in Brussels on December 9, 1972. He was a microsurgery pioneer in Belgium, like Pr W.Boeckx. He performed the first free flap in Belgium in1971 and directed the department of plastic surgery at the Université Catholique de Louvain *(Fig. 2)*.

Georges Calberg (1976-7) was the editor of the Acta Orthopaedica Belgica. He had a great vast knowledge of orthopaedics and authored many publications. He was the first in Belgium to orient all of his practice to hand surgery *(Fig. 3)*.

Guido Matton (1978-9), a trainee of J.W. Littler was the head of the department of plastic surgery at the University Hospital in Ghent. He was the only Dutch speaking founding member of the BHG and the father of plastic surgery in Flanders.

Henry Evrard (1980-1) from Charleroi organized a major combined meeting of the Belgian

Hand Group and the Société Française de Chirurgie de la Main in Lille from 29 to 31 May 1981.

Madeleine Lejour (1982-3) was the head of the department of plastic surgery at the Université Libre de Bruxelles from 78 till 93. She organized the 10th Anniversary of the Belgian Hand Group in Brussels and invited many European authorities in hand surgery. The guest of honour was John Hueston from Melbourne.

Georges Lejeune (1984-5), past president of the Royal Belgian Society of Surgery performed the first replantation in Belgium of a complete avulsion of an arm above the elbow, the 4th of March 1971, in Liège. Among the replantations, we note also the first thumb replantation in Belgium by Dr. Depoorter, the 20th of January 1975, in Bruges.

Hervé De Frenne (1986-7) organized on June 14, 1986 in Waregem a BHG Day on "The Rheumatoid Hand" with professor R.Tubiana from Paris as Guest of honour.

Pierre Van Wetter (1988-9) is one of the most famous hand surgeons in Belgium. He founded the first unit in Belgium exclusively dedicated to hand surgery and hand rehabilitation.He has also a great expertise in the evaluation of corporeal damage *(Fig. 4)*.

Paul Wylock (1990-1) is the head of the department of plastic surgery at the University Hospital of the Free University Brussels. He organized with W.Elias in 93 the exhibition of sculptures and paintings called "Praise of the Hand" in Brussels on the occasion of the first congress of the FESSH. He is the historian of the Belgian Hand Group.

Alain Carlier (1992-3) from Liège is well known for his extensive experience in microsurgery and replantation surgery and as professor of anatomy.

Louis Kinnen (1994-5) is the head of the hand surgery department at the Clinique du Parc Leopold in Brussels. He has a very large experience in trapezo-metacarpal implants.

FIG. 4 Pierre Van Wetter.

FIG. 5 Frederic Schuind.

Jean-Pierre Moermans (1996-7) is well known for his thesis about Dupuytren's disease.

Luc De Smet (1998-9) of the Katholieke Universiteit te Leuven is an authority in wrist pathology and congenital hand anomalies and author of many publications.

Frederic Schuind (2000-1) organises every year an international congress on hand and upper limb surgery, in Genval, Belgium. He performed the first hand allotransplantation in Belgium at the Academic Hospital Erasme in Brussels the 15th of June 2002. He is chairman of the European Accreditation of Hand Surgery *(Fig. 5)*.

Danny Vandenberghe (2002-3) is a hand surgeon in Antwerp with a special interest in implants for the hand and wrist.

Fernand Van Innis (2004-5) is also President of the Société Royale Belge d'Orthopédie et de Traumatologie (2008-2009) with Yo Baeten directs the discussions regarding the hand surgery at the social security and government levels.

Raphaël Van Damme (2007-2008) from Aalst (B) is a pupil of the school of Ghent (B) and Nancy (Fr).

Olivier Barbier (2008-9) is involved in clinical and teaching activities at the Cliniques Universitaires St-Luc in Brussels. He organizes the

sessions on complex hand injuries and congenital pathology for the interuniversity training in hand surgery.

Jean Goubau (2010-11) from Bruge is a trainee of Professor Yves Allieu (Montpellier – France) and Jean-Luc Roux (Montpellier – France). He started the activity of SOS Hand (emergencies) in 2006. His main interests are pathology of the basis of the thumb and wrist arthroscopy *(Fig. 6)*.

FIG. 6 Jean Goubau.

FIG. 7

Hand Emergency Organizations

In 1972, in Paris, Vilain organized a facility for the treatment of acute hand injuries « SOS Main ». After Paris, Strasboug and Nancy in France, Liège in Belgium developped a « SOS Main ». In 1979, nine french surgeons (Vilain, Merle, Allieu, Foucher, Alnot, Magalon, Saffar, Michon, Lemerle, Bureau) and one belgian (Lejeune), created the European Confederation for Hand Emergencies that was renamed as FESUM (Federation Européenne des Services d'Urgence de la Main) in 1989, and later integrated the Hand Trauma Committee (HTC) of the FESSH *(Fig. 7)*. In 2009, Belgium counts 4 centers SOS Main FESUM (Bruxelles, Bruges, Courtrai, Liège) and 2 centers accredited by the FESSH (Bruges, Nivelles).

The Belgian Federation of Hand Therapists (www.bht.be) is a society member of EFSHT and the IFSHT (European and International Federation of Societies of Hand Therapists) and works in close collaboration with the BHG *(Fig. 8a)*.

FIG. 8 **A.** BHT, **B.** FESSH, **C.** IFSSH.

BHG as Member of the FESSH and IFSSH

The BHG is an active member of the FESSH since its foundation and is also a member of the IFSSH *(Fig. 8 b&c)*. An important event in 1993 was the organization of the First. European Congress of the Federation of the European Societies for Surgery of the Hand (FESSH) in Brussels from May 26 to May 29 1993. The members of the organizing committee were G. Lejeune, F. Schuind, J.P. Moermans, W. Boeckx, A. Carlier, H. De Frenne, S. Monstrey, J. Otthiers, J.J. Rombouts and P. Wylock.

Again, Belgium will organize the Congress of the European Federation of the Societies for Surgery of the Hand from the 20th to the 23rd of June 2012 *(Fig. 9)*. The congress will be hosted by the city of Antwerp which due to an ancient legend has a hand as symbol. Antwerp filled with the monuments of a wealthy medieval and Renaissance period is also the world's fifth-largest port and the leading diamond-cutting center in the world. The organisation of the congress is directed by two co-presidents: Yo Baeten and Jorg Bahm. Yo is certainly one of the pillars of the BHG, acting as secretary since the year 2000.

Training and Diplomas

In Belgium, hand surgery is not considered as a speciality by itself and there is no specific training for it. Therefore the surgeon interested in hand surgery, has to complete his training either in orthopaedic, plastic, or even general surgery (usually in 6 years) before considering post graduate training in a Belgian or foreign hand unit. There are two main ways to obtain certification in hand surgery:

1. Via the European Federation of Society for Surgery of the Hand's diploma (entry criteria: www.fessh.com)
2. Via the interuniversity hand and peripheral nerves surgery diploma organized by the universities of Louvain-Woluwe (UCL), Brussels (ULB), Liège (Ulg) and Lille (France). It is a two-year course with four periods of lessons held two days each year. At the end of the course, an examination and a dissertation can lead to the diploma (secretary: olivier. barbier@uclouvain.be).

FIG. 9

FIG. 10 Anatomy textbook, "De Humani Corporis Fabrica" by Andreas Vesalius, 1543.

FIG. 11 Logo of Technological Exposition in Gent.

An Old Story in a Young Country Oriented to the Future

Belgium is a young country (1830) but people of this region have a long tradition of innovation and quality in medicine. Andreas Vesalius Bruxellensis (or Andre Van Wesel native of Brussels) performed dissections of the hand and the upper limb and reported his observations in the founding book of modern anatomy "De Humani Corporis Fabrica" (1543) richly illustrated by Titian's pupils *(Fig. 10)*.

Belgium remembers its past but is also oriented to the future as demonstrated by the logo of the technological exposition organized with a great success on a two year basis in Gent, between 1983 and 1999 *(Fig. 11)*.

In the same way, the Belgian Hand Group has been so far a very dynamic group, rich of the experience of its predecessors and giving the opportunity to the new generation to take over.

6 CHAPTER

Brazil

Founded 1959

Arlindo G. Pardini, Jr.

After the creation of the Brazilian Society for Surgery of the Hand in 1959, the specialty of hand surgery rapidly developed in this country. Before this, hand surgery was practiced by plastic surgeons or general surgeons who managed mainly congenital deformities and soft tissue injuries and their sequelae, or by orthopaedic surgeons who managed mainly osteoarticular lesions. In this early period most of the influence in the education of these surgeons came from Europe, mainly France and England.

In the first half of the last century, several surgeons played a decisive role in the evolution of hand surgery in Brazil. They were the pillars who were responsible for the development and success of the Brazilian Society for Surgery of the Hand.

In São Paulo, at Fernandinho Simonsen Pavillion of Santa Casa, in the Orthopaedic Department under the leadership of Professor

Domingos Define, the first service of Hand Surgery in Brazil was opened in 1945. This service was organized and directed by Orlando Graner for 23 years and he trained many hand surgeons. Later on, Graner helped to organize two other services: one at Hospital dos Servidores Públicos do Estado and another at Escola Paulista de Medicina (Paulista Medical School), where, in 1972, Walter Albertoni, his disciple, organized the service of Hand Surgery. Thanks to Albertoni, the Paulista Medical School was the first Brazilian university to include the discipline of Hand Surgery in its curriculum. Graner was always a hard, serious and productive worker, and published several papers in Brazil and abroad. Endowed with bright intelligence and scientific curiosity, he was a self-taught person who did not receive any direct influence from other centers. He was succeeded at Santa Casa Hospital by Edmur I. Lopes and Heitor Ulson, and recently by Ivan Chakkur.

In **1952**, professor Godoy Moreira, chief of the Department of Orthopaedics at Faculdade de Medicina da Universidade de São Paulo (São Paulo University Medical School) created the second specialized centre of Hand Surgery in Brazil, which was organized and directed by Lauro Barros Abreu until 1979. After his retirement, he was succeeded by Ronaldo Azze who, with Marcos C. Ferreira in 1974, created the first organized Service of Microsurgery in South America. It was in the University Hospital in São Paulo that the first replantation was performed in 1965.

Abreu, an orthopaedic surgeon, wishing for more training in cutaneous injuries of the hand applied and was awarded a fellowship in England, via the British Council. In 1944, he left the country through Buenos Aires, Argentina, because Brazil was participating in the II World War, with the allies. After 28 days traveling in a mixed ship (a ship made up of both freight and passengers) he arrived in Liverpool. His first contact was with Harold Gillies who helped him and encouraged him to learn corrections of ear deformities. After 3 months with Gillies, Abreu visited Watson Jones for another 3 months. He also visited Robert Jones at Agnes Hunt Hospital in Oswestry, Seddon's peripheral nerves service in Oxford and later the R. A. F. Rehabilitation Center. After his return to Brazil he organized more than 20 post graduate courses in Hand Surgery and published more than 40 scientific papers about Hand Surgery.

In San Paulo, another physician who played an important role in hand surgery in Brazil was Allipio Pernet. He was a surgeon in the Brazillian Air Force. Initially as a General Surgeon he ran a surgical clinic at Hospital da Aeronautica (Air Force Hospital) in Recife. From 1944 to 1952 he worked as a plastic surgeon. He was sent to the United States to be trained in Hand Surgery, under Mason, Koch and Allen in Chicago and later on he visited William Littler in New York. After returning to Brazil he worked hard to make Hand Surgery known in the country, and in 1953 he helped to organize the Hand Surgery Service at Hospital dos Servidores Públicos in São Paulo. Pernet published three books and 49 papers on Hand Surgery.

The one who greatly stimulated more the creation of the Brazilian Hand Society was Danilo C. Gonçalves from Rio de Janeiro. Gonçalves, an Orthopaedic Surgeon trained in England, dissatisfied with his results in flexor tendon repairs, decided to have extra-training under Guy Pulvertaft, in England, in 1951. Married to an English lady he set up an excellent relationship with his master. From 1967 to 1977 he was the Director of the Orthopaedic Department at Hospital Souza Aguiar in Rio de Janei-

ro, an Emergency Hospital, where he had the opportunity to treat a great amount of traumatized hands. Gonçalves created the Hand Surgery Service of Hospital da Lagoa in Rio de Janeiro, where problems of Rheumatoid Arthritis were frequent. Besides Derby he visited several Hand Surgery Services in England such as The Royal National Orthopaedic Hospital (London), Accident Hospital (Birmingham), Royal Infirmary (Manchester) and Royal Infirmary (Edinburgh). His disciple and collaborator was José Raul Chiconelli, who continued his work, mainly in the training and formation of new specialists until his retirement when Anderson Monteiro assumed his position.

Due to Danilo Goncalves' efforts - the Brazilian Society for Surgery of the Hand was founded in 17 June 1959 in Rio de Janeiro. There were initially 44 founders from Orthopaedics and Plastic Surgery. Gonçalves was elected the first president.

In **1965** under the Presidency of Henrique Bulcao de Moraes from Rio de Janeiro the first International Meeting of Hand Surgery was organized in Brazil. This was a remarkable event in the history of the Brazilian Hand Surgery and stimulated many surgeons to devote themselves to this new speciality. Several famous guests attended this meeting like Erik Moberg, Kauko Vainio, B. O'Brien, J. Boyes, G. Stack, Conway, G. Loda, Firpo, Luiz G. Correa and other well known hand surgeons. Bulcao de Moraes, who was a general surgeon in Rio de Janeiro, noticed that most abdominal surgeries were mainly extractive, and this was contrary to his reconstructive personality. In 1951 he went to the United States as a fellow in General Surgery. He trained for 6 months at Massachusetts General Hospital and then transferred to the Baltimore City Hospital where he was trained in Orthopaedics. During this period he became a "volunteer", collaborating with Raymond Curtis on the emergency care of hand injuries. An out-patient clinic and all the emergencies were Bulcão's responsibility. Curtis required Bulcão to complete two years training in Plastic Surgery before he was accepted as a "volunteer fellow" in Hand Surgery. He returned to Brazil in 1957 and worked at Hospital das Forças Armadas and at Santa Casa Hospital in Rio de Janeiro. In 1972 he opened his Hand Surgery Service at Infirmary 11 at Santa Casa Hospital, where he stayed until 1996. He was followed by is dedicated collaborator Jacy C. Alvarenga.

Recent History of Hand Surgery in Brazil

Following the experience of São Paulo and Rio de Janeiro new centers of Hand Surgery began to appear in other states of Brazil. In Curitiba, Paraná, Luiz Carlos Sobania under the influence of professor Heinz Rücker from the Orthopaedic Department of the Hospital das Clínicas instituted a Hand Surgery Service. By training specialists in Hand Surgery he played a major role in spreading the specialty in the south of the country. In Belo Horizonte, Minas Gerais, in the central area of Brazil, Arlindo Pardini after being trained by Adrian Flatt in Iowa City, Alfred Swanson in Grand Rapids, Michigan and Campbell-Reid in Sheffield, England, created a Training Center in Hand Surgery in 1972. This service has trained more than 80 hand specialists for the Centre, North and Northeast of Brazil, and some countries from Latin America. As the Pressident of the Brazilian Society for Surgery of the Hand, Pardini organized the Teaching and Training Committee of the Society and managed to obtain the approval of Hand Surgery as a speci-

ality by the Federal Medical Council in Brazil. Pardini published two books in collaboration with all Hand Surgery Services of Brazil: one of the books on Traumatic Injuries, now in the 4th edition and the other on Non-Traumatic Lesions of the Hand, now in the 2nd edition. He produced more than 100 scientific papers on the specialty. Pardini was President of the Brazilian Hand Society 1982-1983; of the South America Society for Surgery of the Hand (1992-1993) and of the International Federation of Societies for Surgery of the Hand (2003-2006).

Training and Certification

For a Hand Surgery Service in Brazil to be approved to train specialists it must be inspected by the Training Committee of the Brazilian Hand Society. Once approved, the service is accredited as a Training Center, for a two year residency program. One of the criteria for a candidate to be accepted as a resident in surgery of the hand is that he/she shall have at least three years of residency in Orthopaedics or Plastic Surgery. After two years of residency in an accredited service by the Society, the surgeon can take the National Board Examination and get the title of Specialist in Hand Surgery, recognized by the Brasilian Medical Association and Federal Council of Medicine.

As Brazil is a vast country, the Brazilian Hand Society divided local societies in five regions: Center-East-West, North-Northeast; Rio de Janeiro; São Paulo, and South.

There are 18 Training Centers in Brazil approved by the Brazilian Society for Surgery of the Hand.

The Brazilian Society for Surgery of the Hand has the 460 Members. Until 1996 the National meetings were held every two years, but since 1997, the meetings are annual. From the inauguration in 1959 until 1967 the National meetings were held in Rio de Janeiro or in São Paulo. After 1967 the congresses have rotated through other regions.

The Brazilian Society for Surgery of the Hand and the South American Society for Surgery of the Hand

The Brazilian Society for Surgery of the Hand has greatly contributed to the development of the specialty in South America. In 1992 the Brazilian Society had an important role in the reorganization of the South American Society for Surgery of the Hand. Arlindo Pardini was elected president of this society at that time. He, along with Walter Albertoni, Eduardo Zancolli and Guillermo Loda wrote new by-laws, which permitted the Society to develop faster. In 1993 Pardini organized the IV South American Meeting combined with the meeting of the Brazilian Society for Hand Therapy in Bel Horizonte. Several international guests attended the meeting including Robert Mc Farlane, the President of the International Federation of Societies for Surgery of the Hand, Ronald Linscheid, Philippe Saffar, Tatsuya Tajima, Eduardo Zancolli, G. Allende, Brunicardi, Camarillo, Contreras, Loda and more than 400 Brazilian and South-American Hand Surgeons and Hand Therapists.

After the 1993 meeting, the South American Society transformed into South America Federation of Societies for Surgery of the Hand, and a congress is held every two year in the various countries (1993 Brazil, 1995 Venezuela, 1997 Argentina, 1999 Brazil, 2001 Chile, 2003 Argentina, 2005 Brazil, 2007 Uruguay, 2009 Venezuela).

The Brazilian Society for Surgery of the Hand was one of the first Hand Societies formed in the world. It was a founding member of the International Federation of Societies for Surgery of the Hand. Sterling Bunnell, Guy Pulvertaft and Marc Iselin, fathers of Hand Surgery, exerted a great influence on the history of the society.

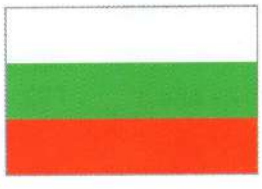
In Brazil, Surgery of the Hand as a Specialty has made extraordinary progress in the last decades. Based on its structure of teaching, training and continued education one can predict a brilliant future for the Brazilian Society for Surgery of the Hand.

7 CHAPTER

Bulgaria

Founded 1984

Dimitar Raikov,
Dimitar Kamburov



Hand surgery in Bulgaria has a long history. In 1984 prof. Ivan Matev established the section of Hand surgery as a part of the Bulgarian Orthopedic and Trauma Association (BOTA). Later on in 1986 Bulgaria was accepted as a member of the International Federation of the Societies for Surgery of the Hand (IFSSH) and in 2003 as a member of the European Federation of Societies for Surgery of the Hand (FESSH) *(Fig. 1)*.

On October 8, 1994, the national hand section was transformed into the Bulgarian Society of Surgery of the Hand (BSSH). Earlier in 1956 the first ward for hand surgery was founded in Bulgaria and Europe. Later, while establishing the National Institute of Orthopedics and Traumatology (Gorna Banja - Sofia), this ward was transformed into a hand surgery clinic. In 1973 the first operating microscope was obtained in Bulgaria.

Janaki Holevich is recognized as the father of

FIG. 1 FESSH meeting 2003.

the Hand surgery in Bulgaria. He was an excellent leader, general surgeon, orthopaedist and traumatologist with the skills and knowledge of a complete reconstructive and plastic hand surgeon. Under his leadership several famous hand surgeons developed. *(Fig. 2)*

"Dr. Holevich's praiseworthy disciple is Prof. Ivan Matev, a surgeon and scientists, who raised Bulgarian hand surgery to a higher level *(Fig. 3)*. He is recognized for his skills in surgery of the thumb, tendons, and spastic hand. He is the founder of the first hand surgery clinic in Gorna Banja, National Orthopaedic institute and is a teacher of more than 30 Bulgarian and world famous hand surgeons. In 1998 during the 8th congress of IFSSH Prof. Matev was elected as one of the 10 "Pioneers of hand surgery" in the world.

Prof. Dimitar Kamburov *(Fig. 4)* became the next leader of the Bulgarian Hand surgery society and was elected during the 12th conference in 2003. He was the former rector of Medical University in Varna and is recognized for his profound studies in aseptic necrosis of the carpal bones (Kienböck disease) and reconstructive surgery of the thumb.

In 2007 during the annual conference of Bulgarian Hand Surgery Society Prof. Pavka Trichkova was elected as the President. She is well known for the treatment of traumatic nerve and tendon injuries of the hand. Other outstanding Bulgarian Hand surgeons are Prof. Janka Paneva - Holevich (double stage flexor tendon repair and transposition) and Prof. Doncho Popov.

Bulgaria, one of the first countries of Hand surgery in Europe, has hosted more than 20 in-

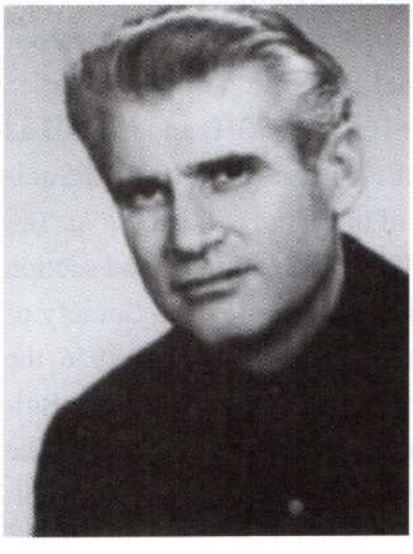


FIG. 2 Prof. Janaki Holevich – the first hand surgeon in Bulgaria.

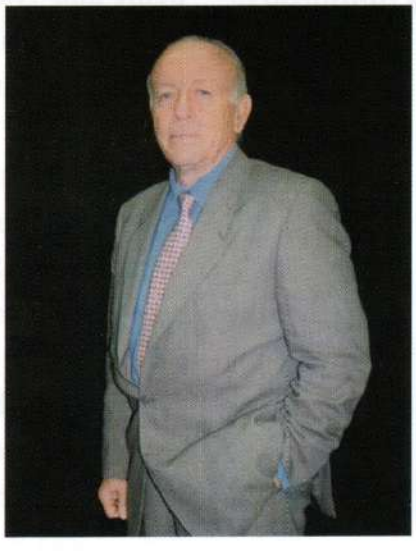


FIG. 3 Prof. Ivan Matev – one of the "10 pioneers of the world hand surgery".

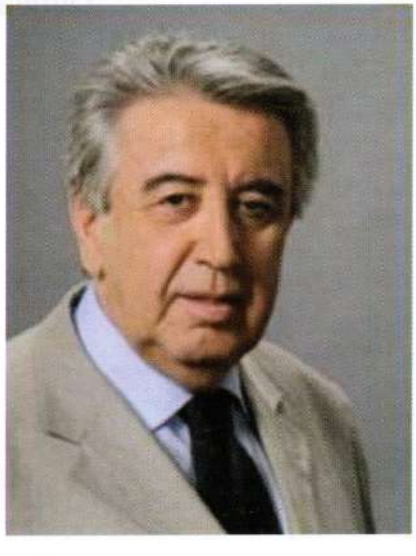


FIG. 4 Prof. Kamburov – leader of BSSH in 2003-2007.

ternational scientific meetings *(Fig. 5)*, that have included leading hand surgeons from around the globe. One of the first and best was the Combined Bulgarian – American Conference, held in 1988 in Albena resort on the Black sea coast. It was praised as one of the best Hand Surgery meetings of the decade. During this scientific meeting leading international hand surgeons, e. g. – Kessler, Brunelli, Millesi, Breidenbach, Boom, Swanson, Posner – lectured and interacted with the attendees.

FIG. 5 Prof. Brunelli and Prof. Kamburov during the Hand Surgery Conference in Varna, 1998.

8 CHAPTER

Canada

Founded 1972

Vaughan Bowen,
Don Lalonde,
Robert S Richards

Manus-Creation of the Seed

The early discussions took place between 1966 and 1968 at the instigation of Robert W Harris. The founders, aware of the French Groupe d'Etude de la Main where only one subject was dealt with in depth at a given meeting, and, anticipating that membership would not be large, felt that a 'study group' format was desirable which would allow a more thorough discussion of topics than would be possible at a large open meeting. Secondly, the founders realised that Canada was one of the few nations that did not have its own hand association and they wanted to have a Canadian society that could reflect our own national character. By January, 1969, MANUS was under way. Robert W Harris was the chief motivator but he had strong support from W R N (Bill) Lindsay and from Jacques G Dansereau. Robert W Harris developed the

name of the society and designed the original logo. He thought the name MANUS would provide easy identification for both anglophone and francophone members. The original logo was updated in 1998 when MANUS hosted the International Federation of Societies for Surgery of the Hand 7th Congress in Vancouver BC, Canada in May 1998.

The first meeting of MANUS took place at St. Mary's Hospital in Montreal on 15 January 1969 in the form of a symposium entitled 'Surgery of the Digital Flexor Tendons'. The program stated that 'the Canadian Hand Surgery Group was organized in 1968 for the purpose of sharing knowledge and experience relating to reparative and reconstructive surgery of the hand. The annual meeting provides an effective forum for teaching and discussion of recent advances in the investigation and treatment of hand surgery conditions. Two more meetings were held under the auspices of the Hand Surgery Group until "the Letters Patent incorporating the 'Canadian Society for Surgery of the Hand' under the Canadian Corporation Act were given on the 14th day of February 1972". The official name of the society thus became The Canadian Society for Surgery of the Hand, although MANUS CANADA was retained to facilitate communication between the two official language groups. Harris, Lindsay and Dansereau were the founding members who drew up the by-laws which were unanimously adopted, officially completing the incorporation of the Society at a meeting of the provisional directors in Victoria on 24 May 1972. Later that day, at the first assembly of members of the Canadian Society for Surgery of the Hand, Jacques G Dansereau was elected President and six applicants became active members of the Society. A symposium on 'Thermal Injuries of the Hand and Upper Limb' followed.

An application was made to join the International Federation of Societies for Surgery of the Hand because it was felt that this would improve the credibility of the Society. R G Pulvertaft from Derby, England, and Raoul Tubiana from Paris, France, acted as sponsors and MANUS was officially accepted into the federation in the autumn of 1972.

Broad-mindedness was stressed from the outset. Robert Harris published all transactions in both English and French and actively solicited memberships from both cultural communities. In addition, both orthopaedic and plastic surgeons were encouraged to join the society. During the early 1970s the Royal College was trying to bring specialty societies under its wing, partly to make the annual meetings more appealing to surgeons across the country. In April, 1973, MANUS became one of ten specialty groups to come under the program structure of the Royal College and the members rejoiced because this solved the problem of which annual meeting should have the honour of MANUS's presence! More importantly, this afforded a common meeting ground for both orthopaedic and plastic surgeons and it was hoped that this would avoid the problem in the United States where two separate organizations had been formed, initially one attached to the Orthopaedic Academy and the other to the Plastic Surgery Society. Although each of these societies, the ASSH and AAHS, eventually met independently from these organizations.

MANUS actively participated in the annual Royal College (RCPS) meeting for many years during the 1970s but, despite the feeling that the association with the Royal College was mutually beneficial, many felt that a more direct affiliation with the Canadian Orthopaedic Association (COA) and the Canadian Society of Plastic Surgeons (CSPS) should be considered. At the January, 1975, business meeting David Hastings proposed a system of alternation of

MANUS's annual meeting between these two associations, an idea that became increasingly attractive after a very successful half-day program during the COA meeting in Ottawa later that year. In January, 1978, it was agreed that the annual general meeting would, in future, take place in June at the time of the COA or CSPS meeting of MANUS.

The scientific meetings have varied greatly in their format. There have been highly focused symposia, widely varied free paper sessions, open discussions of problem cases, film presentations and 'How I do it' panels. MANUS has also been responsible for putting on formal courses and for sending delegates to other national and international societies.

The Canadian Journal of Plastic Surgery publishes the abstracts from papers presented at the MANUS meeting each year.

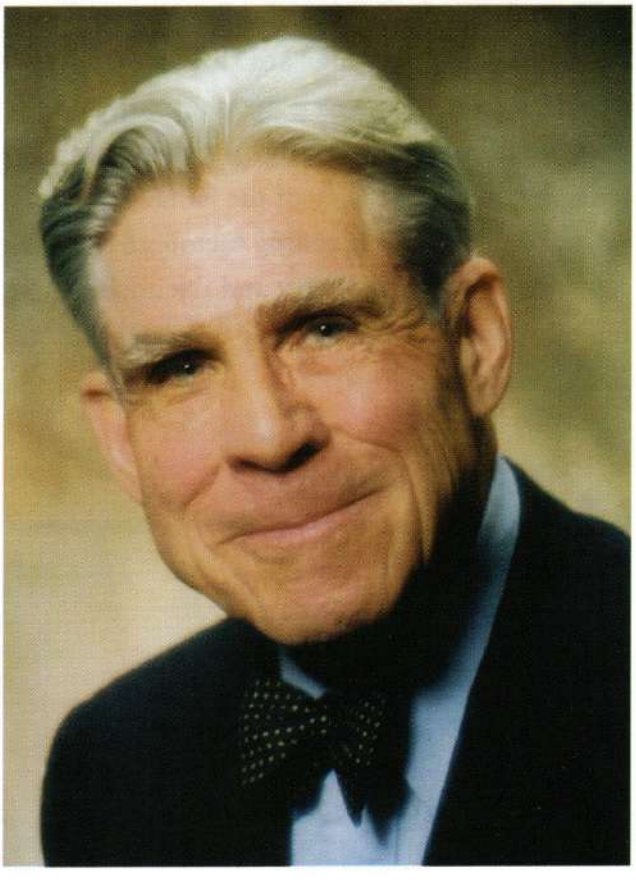


FIG. 1 Dr Robert Malcolm McFarlane: May 28, 1927 – February 27, 2006.

In the early years a new executive was elected each year at the Royal College meeting. During Arnis Freiberg's presidency it was decided to change the time of the election. Subsequent elections were to be held at the time of one of the main orthopaedic or plastic surgery meetings. In addition, because of the relatively small size of the society, it was decided that each executive should remain in office for two years. These decisions produced a system whereby elections take place at the time of the CSPS meeting, where attendance is greatest, and the new executive stays in office through both an orthopaedic and a plastic surgery year. This system allows for continuity during the alternating programs and is working well for the Society at the present time.

Although there is no official ruling in the by-laws, since 1980 the presidency of MANUS has alternated between a plastic and an orthopaedic specialties.

In 1977 Robert McFarlane became President of the American Society for Surgery of the Hand (ASSH) *(Fig. 1)*. In celebration of the honour he invited all members of MANUS to attend the February, 1978, ASSH meeting in Dallas as his guest. One other member to have achieved this honour is James F. Murray.

Five years later, in 1982, Al Swanson, Grand Rapids, Michigan called Robert McGraw and informed him that Robert McFarlane had been chosen to succeed him as Secretary General of the International Federation of Societies for Surgery of the Hand. Technically, Robert McFarlane could not be nominated unless he was a delegate; McGraw stepped down from that position so that McFarlane could take his place as the MANUS delegate for the 1983 meeting and occupy the prestigious Secretary General position.

FIG. 2 Sculpture by Sorel Etrog Toronto, Canada.

In May 1998 Manus hosted the the International Federation of Societies for Surgery of the Hand 7th Congress in Vancouver BC, Canada under the leadership of James Roth. It was widely attended and one of the most successful IFSSH congresses.

With the passing of former members, Dr Bob McFarlane, and Dr John Fielding and the retirement of Dr Pat Shoemaker, we have lost three of the worlds pioneers of safe epinephrine use in the finger. Their work has spawned the field of wide awake hand surgery, which is now practiced routinely by large numbers of Canadian hand surgeons who are leading the world in this area. This involves the use of locally injected lidocaine and epinephrine into the hand and fingers for anesthesia and hemostasis. No tourniquet or sedation is required. The inconveniences of general or Bier block anesthesia are eliminated. Surgeons are able to watch the patient actively move repaired structures and make adjustments before closing the skin. We owe these three Canadian pioneers a great debt.

There is no doubt that the Society is flourishing. Annual meetings are still small enough to be fun, yet increasing membership and the popularity of the meetings attests to the intense interest in surgery of the hand. The broad -mindedness of the founding members has been rewarded by the cordiality and friendships that have grown between members from different backgrounds.

9 CHAPTER

Chile

Founded 2002

Daniel K Hinzpeter

The population of Chile is 17 million inhabitants. In the 1950s, Chile had a few orthopedists, and there was no thought of subspecialties such as hand surgery. Being an orthopaedic surgeon was considered a specialty in itself and they performed all types of surgery involving fracture care and muscuoskeletal reconstruction.

At this time Dr. Walter Ihl, was a pioneer interested in hand lesions. He followed the indications and management concepts of Bunnell, and he began the diagnosis and treatment of hand problems in patients.

Later, a younger physician, Dr. Victor Mouat from the beginning of his career became interested in hand surgery, as he was encouraged by the experience and enthusiasm of Dr. Ihl.

Throughout the 1960s there were only three doctors in Chile with a strong interest in hand surgery: Drs Ihl, Mouat and Jenkin. They

worked individually, but discussed hand cases at conferences or informal meetings. At this time there was no formal group or society of hand surgery.

On December 2, 1965 in Lima, Peru, during the congress of the SLAOT, the South American Society for Surgery of the Hand (SASSH) was founded. This act later would be of great relevance in the Chilean development of hand surgery. Dr. Enrique Jenkin from Chile, was actively involved in this growing foundation (SASSH) which began to function effectively in 1967.

The developments and progression of hand surgery in Argentina and Brazil, had a positive influence on the Chilean group. The Chilean doctors attended their conferences and exchanged views and appreciated the value of these organizations.

The Chilean Orthopedic Society organized congresses and courses, which presented papers and lectures on some topics of hand surgery. Also some case presentations and conferences about hand topics were held in several hospitals.

In 1965 Dr. Joseph Boyes visited Chile. He attended several conferences and meetings in Santiago and stimulated an interest in hand surgery.

The high frequency of hand injuries in workers played a significant role in the development of the subspecialty. Initially these were managed in general hospitals.

In the 70's, special hospitals (Chile Mutual) were established to treat traumatic injuries of workers. The work inside these hospitals were designed exclusively to treat traumatic injuries of workers. The work inside them defined subspecialty teams, which was a great impetus to the development of hand surgery.

Some of the first specialized hand surgery courses in Chile were in the 1970s and 1980s, Dr. Enrique Jenkin, from Hospital El Salvador, Santiago and Dr. Miguel Gasic were organizers of these courses.

In the 1980s and 1990s a consolidated group of physicians with experience in hand surgery included Drs Oscar Lobo, Luis Rossel, Robinson González, Genaro González, Alberto Pérez, Jorge Vergara, Paul Duclos and Juan Carlos Uribe. They were responsible for the organization of many conferences and courses on the management of hand problems.

In the 1990s a formally organized group held monthly meetings on hand surgery. About 10-15 surgeons attended these meetings to discuss clinical cases and present lectures.

In October 2002 the congress of the South American Federation of Hand Surgery was held in Santiago. Dr. Alberto Perez was the President of this meeting which had a great impetus for the development of hand surgery in Chile. A new generation of doctors to were stimulated to become dedicated to this subspecialty.

This same year, 2002, the Chilean Society of Hand Surgery was founded in association with the Chilean Society of Orthopedics and Traumatology, but with relative autonomy. This situation of dependency, which remains until today, involves mainly administrative matters such as secretary of finance and management and postal addresses,. This relationship has not affected the academic development of the Chilean Society for Surgery of the Hand.

Training

It is noteworthy that since 2000 there has been a growing number of young specialists in orthopedics and traumatology that have chosen the subspecialty of Hand Surgery. A surgeon becomes a subspecialist in Chile by joining a service where a specialized team is already working. This is complemented with a stay at a lead-

ing hand center in South America, mainly Brazil or Argentina, or the United States or Europe.

This training is chosen by the doctor"s own initiative. There is not currently in Chile a law regulating the work as sub-specialist in hand surgery. There is no actual formal training program in hand surgery in Chile.

In October 2007 the first Argentine-Chilean Congress of Hand Surgery, chaired by the Chilean Society of Hand Surgery, was held in Buenos Aires. Dr Alejandro Bifani hosted in November 2008 in Viña del Mar, Chile the First Chilean Congress of Hand Surgery, and Second Chilean-Argentine congress, chaired by-Dr. Daniel Hinzxpeter of the Chilean Society of Hand Surgery. Both events were of great significance in the development of the Chilean group.

Today, the Chilean Society for Surgery of the Hand has a stable and formal group and announces its monthly meetings. There are between 40 - 50 members, the majority of the members are orthopedic surgeons, with minimal involvement of plastic surgeons. Specialty courses are organized by the society whose members maintain an active participation in national and international meetings, with symposia and free papers.

10 CHAPTER

Colombia

Founded 1966

Roberto Melendez

The Colombian Society for Surgery of the Hand was established on 1966. Currently there are 20 Honorary Members, 55 Corresponding Members, and 40 Titular Members, (26 orthopaedic and 14 plastic surgeons).

In 1992 the Society obtained the Official Recognition of Hand Surgery as a Specialty, and today two Academic University Programs are recognized for training of specialists, with the requirement of being previously certified in Orthopedics or Plastic Surgery. Official Diplomas are obtained as **SPECIALIST IN HAND SURGERY**.

History and Pioneers

Before the foundation of the Colombian Society for Surgery of the Hand in 1966, some surgeons promoted Hand Surgery as an integral discipline:

Dr. Julio Calonje, *(Fig. 1)* specialized in Orthopedics in Chile in 1945, and later trained in Hand Surgery with Dr. Sterling Bunnell in the United States. He returned to Cali and developed the first academic orthopaedic residency and established the Clinic of Hand Surgery.

Dr. Guillermo Nieto Cano, *(Fig. 2)* a Plastic Surgeon who trained with Dr. Harold Gillies, returned from England in 1947, and founded several services of Plastic Surgery in Bogota. He was a Founding Member of the Colombian Society for Surgery of The Hand.

Dr. Miguel Orticochea, *(Fig. 3)* was born on 1928 in Uruguay, where he was trained as a plastic surgeon. He moved to Bogotá and became a professor at the Javeriana and National Universities. He published techniques for the treatment of the metacarpal hand, the transference of the deep head of the short flexor of the thumb for opposition, the reconstruction of the thumb by local flaps, and the anatomy and physiology of muscular and musculocutaneous flaps.

The Colombian Society for Surgery of the Hand was founded in Bogotá on the July 1, 1966, by 29 surgeons under the Honorary Presidency of Professor Dr. Paul W. Brand.

Some the Founding Members were as follows:

Dr. Roberto Laignelet, *(Fig. 4)* the Society's first President was trained in Hand Surgery with Dr. Guy Pulvertaft in England. He returned to Bogota and in 1970 created the Service of Hand Surgery at the Children's Hospital.

Dr. Abraham Cuperman, *(Fig. 5)* the Society's first Secretary, studied Hand Surgery with Dr. Marc Iselin in France, and returned to Colombia in 1963 to begin an exclusive Hand Surgery Clinic. In 1965 he became a faculty member at the National University in Bogota.

Dr. Eduardo Bustillo, *(Fig. 6)* Trained in Surgery of the Hand with Dr. Joseph Boyes in the United States and returned to Bogota in 1962 to practice at the Hospital San Juan de Dios of the National University.

FIG. 1 Dr. Julio Calonje.

FIG. 2 Dr. Guillermo Nieto Cano.

FIG. 3 Dr. Miguel Orticochea.

FIG. 4 Dr. Roberto Laignelet.

FIG. 5 Dr. Abraham Cuperman.

FIG. 6 Dr. Eduardo Bustillo.

FIG. 7 Dr. Felipe Coiffman.

FIG. 8 Dr. TitoTulio Roa.

FIG. 9 Dr. Bernardo Montes.

FIG. 10 Dr. Benjamin Rivera.

FIG. 11 Dr. Jochen Gerstner.

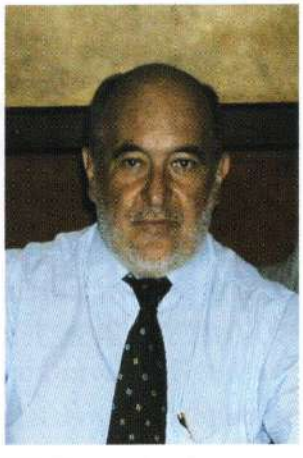


FIG. 12 Dr. Jaime Restrepo.

Dr. Felipe Coiffman, *(Fig. 7)* trained in Plastic Surgery and Hand Surgery with the Dr. A. J. Barsky in New York and returned to Bogota in 1955 to the Hospital San Juan de Dios of the National University. In 1986 he published the first edition of his book "Reconstructive and Aesthetics Plastic Surgery"; the third edition was published on 2008 in 6 volumes, one of them focused on Hand Surgery.

Dr. Tito Tulio Roa, *(Fig. 8)* trained in Hand Surgery with Dr. William Littler in New York, then he returned to Bogota in 1965 to join the Hospital San José.

Dr. Bernardo Montes, *(Fig. 9)* Was an enthusiastic professor of semiology, anatomy and handling of the peripheral nerves injuries, the principles for tendon transfers, and the treatment of carpal fractures.

In the following years, new members joined the Society to consolidate its growth process, such as:

Dr. Benjamin Rivera, *(Fig. 10)* trained in Hand Surgery with Dr. Robert Carroll in New York and he joined the Society in 1968. He created the Hand Surgery Service at the Hospital San Ignacio of the Javeriana University in Bogota. In 1984, he became the first Delegate of the Colombian Society for the International Federation of Societies for Surgery of the Hand.

Dr. Jochen Gerstner who became a member in 1968. *(Fig. 11)* trained in Hand Surgery with Dr. William Burkhalter in Miami, and joined the Universitary Hospital in Cali on 1976.

Dr. Jaime Restrepo who became a member in 1981. *(Fig. 12)* trained in Hand Surgery and microsurgery with Drs. Raoul Tubiana and Alain Gilbert in France. When he returned to the country, he joined the Hospital San Vicente de Paul in Medellin.

Dr. Roberto Meléndez who became a member in 1982, *(Fig. 13)* trained as a Hand Surgeon in Brazil with Drs. Edmur Isidoro Lopes and Hei-

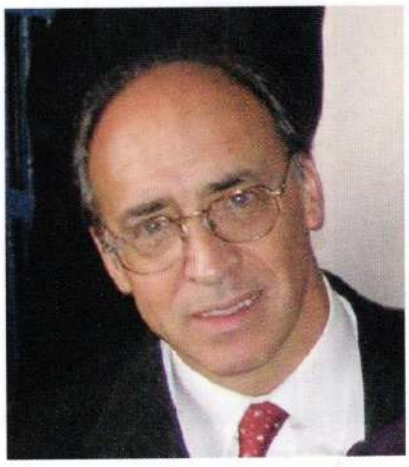


FIG. 13 Dr. Roberto Meléndez.

FIG. 14 Dr. Félix Borrero.

FIG. 15 Dr. Julio Bermidez.

tor Ulson. He returned to the country in 1980 to practice exclusively in Hand Surgery at the La Samaritana Universitary Hospital in Bogota, and created the Hand Surgery Section at the Orthopaedic Department.

Dr. Felix Borrero who became a member in 1987, *(Fig. 14)* studied Hand Surgery at the Dr. Walter Blauth School in Germany and joined the Universitary Hospital La Samaritana in Bogota in 1984 as the chief of the Hand Surgery section.

As pioneers in microsurgery, Dr. Fernando Gomez Rivas performed the first extremity replantation at the Hospital San Juan de Dios in Bogota in 1963, and Dr. Marcos Ramirez performed one in Medellin on 1968. The formal development of microsurgery began in 1975, when Drs. Luis Fernando Robledo and Tito Tulio Roa accomplished their first replantation at the Hospital San José in Bogota. In 1985, Dr. Julio Bermudez *(Fig. 15)* described the techniques for finger replantation and hand and upper limb free flaps. In 1985 Dr. Raul Sastre organized the first microsurgery laboratory at the Hospital San Juan de Dios in Bogota. Leaders in microsurgical peripheral nerve repair and research were Dr. Yolanda Restrepo, Dr. Raul Sastre, and Dr. Enrique Vergara.

The Logo

The Colombian Society for Surgery of The Hand was founded in 1966 and adopted as a logo derived from the Miguel Angel Buonarroti work "The Creation of Adam". In 1986 it was modified, and again on 1997 when the statutes were adjusted to new law requirements that changed the term SOCIETY to ASSOCIATION. *(Fig. 16)*

The International Federation of Societies for Surgery of the Hand

The Colombian Society for surgery of The Hand became a Member of the International Federation of Societies for Surgery of The Hand in 1984. Dr. Benjamin Rivera Pico *(Fig. 11)* was its first Delegate.

Training in Hand Surgery

On July 1988, Dr. Roberto Melendez initiated the process to officially recognize hand surgery as a subspecialty based upon his work **"Studies for Education on Hand Surgery in Colombia"**, *(Fig. 17)* Published on 1987, this document demonstrated the magnitude of the problems that affected the hand, based on statistics of accidental rates at the Social Security

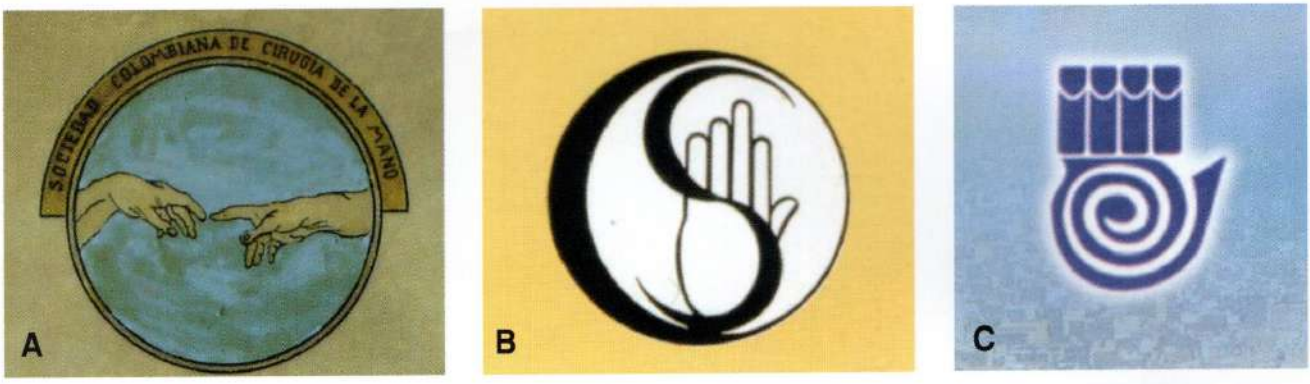


FIG. 16 **A.** 1966-1986 **B.** 1986-1996 **C.** 1997.

Hospital. Thirteen hospital centers were identified in which hand surgery was practiced. He subsequently authored a "Program of training for the formation of Specialists in Hand Surgery", with 14 items of anatomical dissections in cadaver, 43 basic subjects of laboratory microsurgery training, and 113 essential theoretical subjects.

In **1992** Dr. Melendez was mainly responsible for obtaining the official approval of Hand Surgery as a Subspecialty, based on Orthopaedic, Plastic or General Surgery training. A historic event for the Society occurred March 1, 1993 when a group of 31 surgeons became officially certified as **"Specialist in Hand Surgery"**.

Based on new legal and academic orders, on May 7,1993 the first **Hand Surgery Specialization Progam** was approved at the Military Medicine University in Bogota. This is a one year program for specialists graduated in Orthopaedic or Plastic Surgery. Currently, 15 specialists have graduated from this program. On February 1,2000, the University El Bosque obtained the approval of a second program which has graduated 12 specialists.

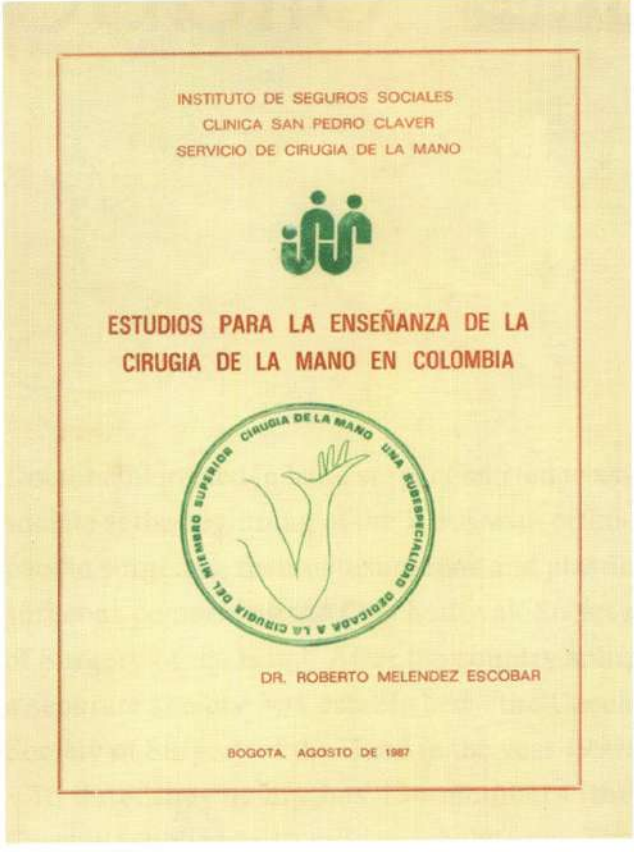


FIG. 17 "Studies for Education on Hand Surgery in Colombia".

11 CHAPTER

Czech Republic

Founded 1997

Alena Schmoranzova

Doctors interested in hand surgery started to associate at the beginning of the 1980s with orthopaedic surgeons, rheumatosurgeons and plastic surgeons comprising the Czechoslovak Society of Surgery of the Hand. After the country split, a separate society was established - the Czech Society of Surgery of the Hand in the year 1997.

To date, the society has 134 members (the Czech Republic has 10 million inhabitants). The members include about an equal number of orthopaedic surgeons, plastic surgeons and general surgeons. Other specialities included in the membership are neurosurgeons, trauma surgeons, paediatric surgeons and physiotherapists.

The goals of the society are :

1. Improvement of education and research in hand surgery
2. Cooperation with related specialities, publication of scientific articles and organization

FIG. 1 Prague, capital of the Czech Republic. View of Prague Castle and Charles Bridge.

of congresses on hand surgery.

Part of the Society includes the European Club, members of FESSH, who are interested in the development of cooperation of hand surgery abroad.

The society entered the IFSSH in 1992 and FESSH in 2007. The Czech Society of Surgery of the Hand has no permanent secretariat. The office of the society changes according to the site, where the elected chairman of the society works. The address can be found on the web pages and it is registered with the bureau of FESSH and IFSSH. The web pages of the society are as follows www. handsurgery. cz.

FIG. 2 South Moravia is one of the most beautiful areas in the Czech Republic and grape vines thrive here.

Hand Training in Country

The doctors who want to be educated in hand surgery have several options. Compulsory rotations in hand surgery of several weeks duration are included in the training of surgeons, orthopaedic surgeons and plastic surgeons. Those, who are interested in more extensive understanding of hand surgery, must seek a workplace with appropriate extensive hand training.

Diploma in Hand Surgery

There is no separate examination in hand surgery organised by the Czech Society of Hand Surgery. Questions regarding hand surgery are included in the qualification exams for surgeons, orthopaedic surgeons and plastic surgeons.

FIG. 3 Alfons Mucha, (24 July 1860 – 14 July 1939), was a Czech Art Nouveau painter and decorative artist, best known for his distinct style and his images of women. Mucha produced a flurry of paintings, posters, advertisements, and book illustrations, as well as designs for jewelry, carpets, wallpaper, and theatre sets in what was initially called the Mucha Style but became known as Art Nouveau. In contrast with contemporary poster makers he used pale pastel colors.

FIG. 4 Czech glass. Popular Czech Bohemian lead crystal dates back to the Renaissance, when abundant natural crystal was discovered throughout the Czech Republic. Hand-cut glassware—from delicate champagne flutes to intricate Christmas bowls—can be found in elegant Prague shops.

FIG. 5 The glassmakers' hands at work.

The possibility to pass a qualification test from hand surgery exists within the membership in FESSH. FESSH always offers Diploma examination prior to the annual congress. The entry criteria are provided on the internet and in the European Journal of Hand Surgery.

In the Czech Republic, the only surgeon who passed this exam prior to 2010 was Dr Radek Kebrle in Poznan in 2009 when he was awarded the best examination score.

Pioneers and Major Contributions

The interest in hand surgery in the country dates back to the mid 1900th century. Mr Maydl was recognized for his work on synovial sheaths and Mr Kukula for management of infections in fingers. Other important personalities include Prof. Burian, a plastic surgeon who devised a tubular flap for replacement of a finger in 1913 and Mr Dlabal for innovative methods for reconstruction in median nerve palsy to restore motor function.

In the 1975, the first, and so far, the only specialised work place for hand surgery, was established by Vejvalka and Jizerou in the city of Vysoke.

Czech hand surgery quickly adapted the development of microsurgical skills. Some of the leaders include the following: Vesely, Tvrdek,

Valka, Sukop, Nejedly, Kempny, and Marik.

There are currently four replant centres in the Czech Republic (Prague, Brno, Ostrava, České Budejovic.

In 1989 great developments in all fields of medicine, including hand surgery, occurred in the regions. The doctors were provided the opportunity to work with the most up to date equipment and materials. The opportunity to travel abroad for training in hand surgery has led to great developments also in the specialty.

FIG. 5 Pottery has been made by hand for hundreds of years.

12 CHAPTER

Dominican Republic

Founded 1996

Marcos Nunez,
Hector Herrand

The Society was formed in March 1996. The Hand Club predating it was established 1995. The merger took place in 1995 with the name changed to The Dominican Society for Surgery of the Hand in 1996. Membership (2008) includes nine full members, one overseas member and four associates. The population of the Dominican Republic is 9 million (2006 statistics). The majority of full members are plastic surgeons, with a minority being orthopaedic surgeons. One member is in an exclusive hand surgery practice.

The Society Secretariat is based at Centro de Cirugía Plástica de Santo Domingo. (CECIP), and the actual secretary is Héctor Herrand MD. h. herrand@codetel. net. do

Training

Surgeons aspiring to a hand surgery career

in the Dominican Republic join an orthopaedic, plastic surgery or general surgery training programme (having already done two or three years in general surgical training). Basic training in orthopaedics and plastic surgery includes rotation in hand surgery to provide the opportunity to acquire basic hand surgery skills. An additional one year of training at the end of the residency allows for a higher level of hand surgery training and facilitates an opportunity for a fellowship abroad in the United States, Europe, Latin America or elsewhere.

FIG. 1 First cathedral in America here in Santo Domingo was built 1514-1520 and is believed to contain the remains of Christopher Columbus.

The Development of Hand Surgery and National Personalities

In the decades of the 1940's and 1950's the only hand care in the country was provided by plastic surgeons and orthopedic surgeons who came from the USA to operate at the military hospitals. They came for short periods of time and were invited by the government of the dictator Trujillo. They provided general plastic and orthopedic care to the population including treatment of congenital abnormalities, burns and reconstruction of injuries.

In the 1950's Antonio Dohse MD, who trained in Canada at the Queen Mary Hospital, and was probably the first Dominican plastic surgeon in the country, provided regular plastic reconstructive surgery at the military hospital. The "La Nación" newspaper in August 1952 describes his work on tendon graft for hand reconstruction as well as syndactyly releases. He couldn't continue his practice in the Dominican Republic because of the dictatorial government of Trujillo and returned to Chicago, Illinois where he practiced, not as a surgeon, but as a General Practitioner.

Years later Dr Sony Moreta arrived in the country. He had been trained by Dr. Luis

FIG. 2 A sugar cane cutter, a source of digital and hand amputations.

Gomez Correa, who is considered the father of hand surgery in Mexico. Dr. Moreta worked at the Dr. Salvador B Gautier Hospital performing hand surgery procedures for a couple of years, and then he migrated to Puerto Rico.

At that time, orthopedic surgeons who were doing hand surgery included the following: Santo Domingo, Dr Eliseo Rondón, Dr Eros Cruz Sanchez (with the CARE Group) and Dr Mejia Feliú (the founder of Orthopaedic Sur-

gery, Department at the Dr. Salvador B. Gautier Hospital), in Santiago (Second largest city in Dominican Republic), Dr. Perez Simo practiced hand surgery

In 1969 Ivanhoe Baez Comme MD, a plastic surgeon who trained at Temple University in Philadelphia, PA with Dr. Cramer arrived in Santo Domingo. At the beginning he was integrated in the General Surgery staff at Dr. Salvador B Gautier Hospital because of his General Surgery background. International surgeons visited the country to offer plastic and hand care. In 1972 Dr. Baez founded the Plastic Surgery Service as part of the Surgery Department. This service covered general plastic surgery and a vast area of upper extremity care on trauma, burns, congenital and degenerative conditions. Dr. Baez also started the first and only Plastic Surgery Residency Program in the country in 1972. This service treated open fractures of the hand and orthopedics treated the closed fractures, which is still the policy. The Department of Plastic Surgery at Dr. Salvador B Gautier Hospital trained two groups of plastic surgeons, one group from 1980 to 1992 and another group from 1995 until now. Both groups have developed a special training in hand surgery, but the second group has incorporated hand surgery and microsurgery training together.

FIG. 3 Painting from Mr. Vela Zanetti, who settled in the Dominican Republic in exile from Spain during Spanish Divil War. He was famous for his paintings of farm workers and rural scenes. Notice the large hands.

In the 1970's Dr Luis R. Scheker, a young doctor left the country to obtain plastic surgery training in Scotland. In 1982 he was selected for a hand fellowship in Louisville, Kentucky with Dr. Harold Kleinert. He remained on the staff at the C. M. Kleinert Institute for Hand and Microsurgery where he was instrumental in training Dr. Marcos Núñez (1990), Dr. Hector Herrand (1995), and Dr. Otoniel Diaz (2005). These threesurgeons have been responsible for the replantation of more than 53 hands, including one bilateral hand with a 70% success rate. They provide care for more than 75% of all the major cases in Hand surgery and Microsurgery nationwide. They are the core of hand surgery in Dominican Republic and have trained the new generation of surgeons performing Hand Surgery and Microsurgery in the country. Other plastic surgeons and orthopedic surgeons have dedicated part of their practice to hand surgery following training in Germany, Cuba and Brazil; e.g. Dr Marcos A. Mártire Borrell, Dr Máximo Periche and Dr Ricardo Gutierrez.

The Hand Club was formed in 1995 by a limited number of young surgeons with an interest in hand surgery which led to the formation of the Dominican Hand Society. The stimulus to the development of hand surgery in the Dominican Republic is principally related to the creation of the Dominican Hand Society, composed of young staff men and senior residents. The Society was formed in March 1996.

The Society sponsored the 1st Iberoamerican Hand Surgery meeting celebrated in Bávaro, Dominican Republic, in April 1998 with participation of more than 100 Hand Surgeons from North America, South America, the Caribbean, Spain and Portugal.

13 CHAPTER

Egypt

Founded 2007

Nash Naam

Hand and upper extremity surgery in Egypt is as old as the ancient Egyptian civilization. Ancient Egyptians practiced hand and upper extremity surgery several millenniums ago. In the Edwin Smith Surgical Papyrus, two cases of fractures of the humerus are reported; case #36 describes a closed humeral fracture and case # 37 describes an open humeral fracture. The Papyrus details the difference in treatment between open and closed fractures *(Fig. 1 & 2)*.

The engineer who built the tomb of Ramses II employed a sculptor named Ipuy to paint his own tomb. Among those paintings is a picture on the right upper corner that looks like a Kocher's reduction of a dislocated shoulder.

The logo that has been adopted by the Egyptian Society for Surgery of the Hand is from an engraving on one of the walls of Edfu temple depicting two embracing hands.

Recent history of hand surgery in Egypt is relatively short. Several Orthopedic and Plastic surgeons showed an early interest in hand surgery such as Professor Ahmad Abdel Razzak Saad in Alexandria, Professor Hassan El Zaher at Ain Shams University in Cairo, and Professor Wael Farag at Cairo University.

Professor Saad, who is regarded as the father of Hand Surgery in Alexandria, traveled to England and France in the 1960s for training in Hand Surgery. Back home he started the Hand Clinic at Hadra University Hospital in Alexandria. As a gifted surgeon he mastered many aspects of Hand Surgery including flexor tendon grafting, surgery of the paralytic and cerebral palsied hand, surgery of congenital hand anomalies and finger joint arthroplasty *(Fig. 3)*.

But the main credit for pioneering hand surgery in Egypt goes to Professor Wael Mansour Fahmy. He was a military surgeon who was trained with Guy Pulvretaft in the UK. He became very intrigued by the complexity and beauty of the hand. After returning from England he started practicing and teaching hand surgery. The clinical material was plentiful in the military with 3 consecutive wars in 1956, 1967 and 1973. He was especially interested in peripheral nerve surgery. He studied and sketched the internal topography of the injured nerves that he was treating. He was the first in Egypt to explore and treat brachial plexus injuries. He also was the first to use denuded muscle as a conduit for nerve repair. He established a replantation laboratory at the Maadi Military Academy in 1970 and was the first in Egypt to establish a Microsurgery Laboratory at the same institution in 1979 *(Fig. 4)*.

Dr. Fahmy founded the Eastern Mediterranean Hand Society in 1997 which became a member of the IFSSH. Many of the international pioneers of hand surgery were members of that society.

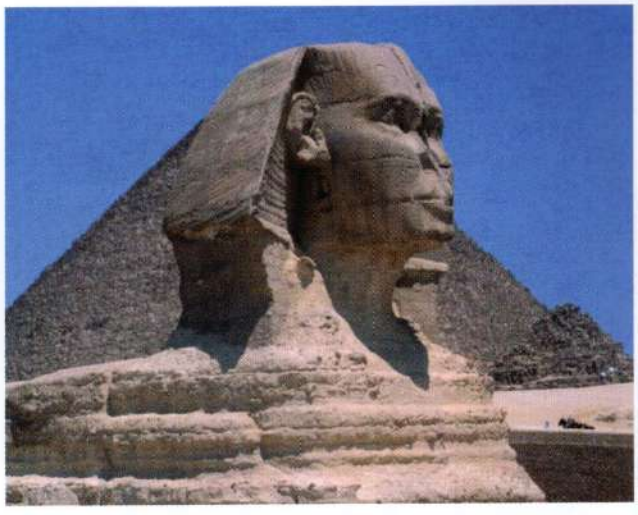


FIG. 1 The ancient Egyptian civilization.

FIG. 2 Papyrus details.

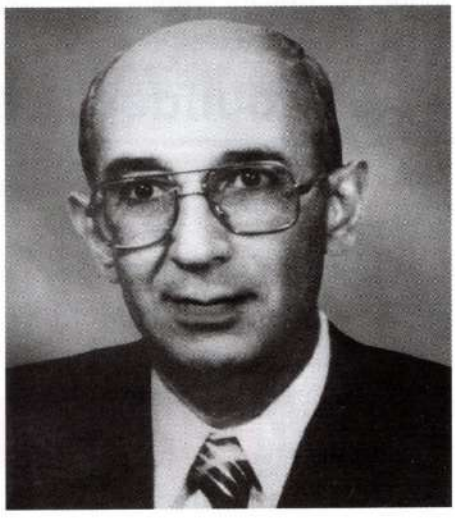


FIG. 3 Professor A. Abdel Razzak Saad.

FIG. 4 Professor Wael Mansour Fahmy.

FIG. 5 Founding members of the Egyptian Society for Surgery of the Hand and Microsurgery.

He also published a yearly journal "The Hand" in which some of the most eminent international hand surgeons contributed scientific articles.

The current Egyptian Society for Surgery of the Hand and Microsurgery was a dream of a small group of surgeons who were dedicated to that goal. Since most of hand surgery in Egypt is usually performed by general, orthopedic and plastic surgeons who lack fundamental hand surgery training, it became essential to establish hand surgery as a surgical subspecialty and to form an organization responsible for teaching and promoting hand surgery education in Egypt. Finally the Egyptian Society for Surgery of the Hand and Microsurgery was founded in 2007 and is now a member of the IFSSH. Its first president was Professor Abdel Hakim A. Massoud.

The society now has approximately 50 members and is growing rapidly. Most of the members are orthopedic surgeons but the number of plastic surgeons is increasing. The society desires to attract all the surgeons who have an interest in hand surgery regardless of their original training. It has the vision to be a source of education both to physicians and the public about hand surgery not only in Egypt but in the whole Middle East region *(Fig. 5)*.

Currently there is only one category of membership; active. Other categories such as associate, corresponding and international memberships are being developed to attract new surgeons who are in training and hand surgeons from other countries as well as hand therapists.

Training

There is no specific training at the present time for hand surgery in Egypt. It is still a part of the curriculum included in orthopedic and plastic surgery training. Most of the training is now in the form of apprenticeship between a professor and a student. An effort is being made to design specific curriculum for hand surgery teaching and training.

Certification

As of now, no specific certification in hand surgery has been established. Hopefully a diploma in hand surgery will soon be developed. Most of the surgeons interested in hand sur-

FIG. 6 Professor Fahmy with other Honorees at the IFSSH meeting in 1998.

gery have their Master's or MD's thesis in the field of hand surgery.

Pioneers

Dr. Wael Mansour Fahmy has been honored as Pioneer by the IFSSH in 1998 *(Fig. 6)*.

Journal

An Egyptian Journal of Hand Surgery is being developed. It will be co edited by Nash Naam, MD and Tarek El Gammal, MD.

Meetings

The Egyptian Society for Surgery of the Hand and Microsurgery holds two main meetings a year; the largest is its Annual International Congress in late March or Early April in which many international guest speakers are invited. The other is in the fall and is staffed mainly by local hand surgeons. Many other regional meetings in different parts of the country are held through the year.

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Email: drnaam@handdocs. com

Finland

14 CHAPTER

Founded 1976

S K Vilkki

History of the Finnish Society for the Surgery of the Hand

A global need for improvement in the field of hand surgery was the outcome of poor results during the Second World War. This fact was also observed by the Finnish surgical community, including K. E. Kallio, who, in 1950, was appointed professor of surgery at the University of Helsinki. Kallio began to systematically improve and modernize the treatment of hand injuries. He also encouraged and supported his colleague Kauko Solonen to become acquainted with the challenges facing hand surgery.

In 1960, hand surgical operations were transferred from the Helsinki Surgical Hospital to the Töölö Hospital, where hand-specific surgery began in 1963 under the leadership of Solonen. The operations decreased in 1967, when Solonen was transferred to Kotka, but re-emerged in 1969,

FIG. 1 The photo from the founding event of the Finnish Society for the Surgery of the Hand on 7th January 1976, from left to right Dr. Martti Vastamäki, Prof. Kauko Solonen, Dr. Georg Bakalim, Dr. Henry Brummer and Dr. Simo Vilkki.

when he was assigned to the Invalid Foundation Hospital in Helsinki. During the same year, the first department of hand surgery was founded at the hospital, lead by Solonen. The first formal hand surgical training position was given to Simo Vilkki in 1973 while he was serving as a resident in orthopaedic surgery.

Once hand surgery had been established, and as the number of orthopaedists practicing hand surgery had began to increase in the 1970's, the establishment of a community responsible for knowledge, skill, and improvement in working conditions became inevitable. The Finnish Society for Surgery of Hand was officially established on the 7th of January 1976. The original members included Kauko Solonen (chairman), Henry Brummer, Georg Bakalim, Martti Vastamäki, and Simo Vilkki (secretary) *(Fig. 1)*. The founding members continued to run the society for the following decade, after which the number of members increased vastly to a point, where the governing body was able to recruit younger members to the board and decide on the length of terms.

Until 1985, the Invalid Foundation Hospital was the sole location for education in the field of hand surgery. Further locations of training were introduced to the Tampere University Hospital by Simo Vilkki in 1986, to Kuopio University Hospital by Heikki Jaroma in 1989, and to Oulu University Hospital by Timo Raatikainen in 1995. Hand surgery was re-introduced to the University of Helsinki in 1995, when a new department of hand surgery was established by Simo Vilkki at the Töölö Hospital.

During the 1970's, the development in both knowledge and skill of hand surgical techniques, especially microsurgery, added pressure to form a special field for hand surgery. Constant efforts and endless requests by hand surgeons resulted in the recognition of hand surgery as a specialist field on the 6th of July 1981. After the reforms of specialized doctor's training in 1993, hand surgery maintained its status as an independent branch, which required an additional two years of training succeeding the six years of surgical training.

After Finland became a member of the European Union, the number of specialty training fields in medicine was subdued because of adaptations according to EU regulations. Hand surgery as a specialty field was extremely close to losing its independent status, but, thanks to the efforts of active members of the Society for Surgery of Hand, hand surgery maintained its independence from other specialized branch-

FIG. 2 Gigantic fingers - a sculpture by Kimmo Kaivanto - inside the entrance hall of Helsinki City Hall.

FIG. 3 Hands at work in Finland. Masses of forest work are done annually in Finland and this may be the reason that Tampere University Hospital has been the leading replantation centre in Finland and probably in whole Scandinavia since 1977. The head of the Tampere Hand Clinic is Professor Simo K. Vilkki MD, PhD.

FIG. 4 A medieval castle "Olavinlinna" in the beautiful Eastern Finland lake area at Savonlinna. The famous Savonlinna Opera-Festivals are held in this special castle annually in July.

FIG. 5 A group of Finnish Hand Surgeons at the educational planning workshop. From left to right: Arvi Harju, Jarkko Vasenius, Timo Raatikainen, Pasi Paavilainen, Jouni Havulinna, Jorma Ryhänen, Niina Ruopsa, Simo Vilkki, Yrjänä Nietosvaara.

es. Since 1999, Finland is the only EU member country where hand surgery is recognised as a specialty field and where the responsibility of training has been transferred to the universities.

The activity of the governing body and members (currently 88 members, of whom 43 are specialized hand surgeons) has been internationally acknowledged e. g. Finland held the Nordic (1988 and 2000) and International (IFSSH 1995) Hand Surgery conferences. In addition, our members have numerous confidential posts – both national and international - in surgical societies, and the society has also published in year 2000 the first Finnish contextual book on hand surgery *(Fig. 6)*. The society has throughout its existence aimed at spreading information on hand surgery to the Finnish Medical Association. It has done this by actively organizing its own program for the annual medical and surgical conventions. It participates in conferences organized by the Finnish Orthopaedic Association, as well as by giving concise specialist training courses to hand surgeons *(Fig. 5)*.

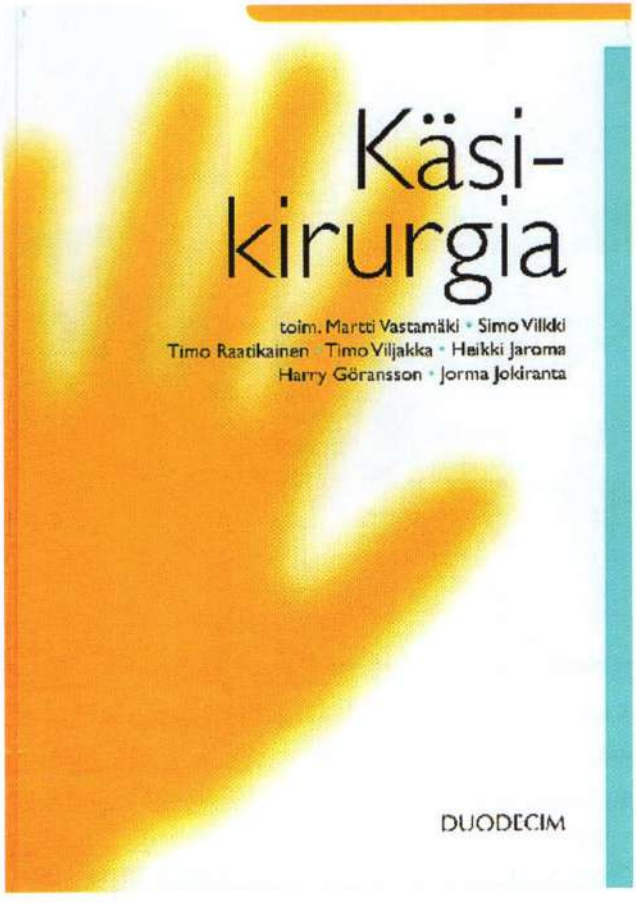


FIG. 6 The text book with 648 pages in Finnish Language was published in 2000.

Hand Surgical Training in Finland

1. Graduation from medical university program (normally six years after high school).
2. Basic Surgical education including a minimum of 3-years surgical training including 1-2 years service in orthopaedics and traumatology.
3. A practical course in microsurgery is necessary before starting the specialization for Hand Surgery.
4. The specific Hand Surgery Training occurs as a 3-years training period serving as a resident at Hand Surgical department of a university hospital with 24-hour acute hand trauma and microsurgical service. (The qualified teacher must be a Ph. D and at least an Associate Professor level person).

There is also a requirement for a theoretical workshop or lecture-type education. The extent of this must be 30 hours annually (altogether 90 hours minimum). This may be in the form of seminars, special workshops or weekly morning lectures. During the last year of residency a board examination in Hand Surgery is taken. The questions for the written examination must be developed and graded by professors other than the candidate's personal tutor.

Certification as a Specialized Hand Surgeon

In Finland, there is a national board examination in hand surgery. The examination can be taken during the last year of specialization. It

is coordinated by the University of Helsinki Medical Faculty together with all Professors of Hand Surgery.

Hand Surgery Practice

The special level hand surgery is practiced by hand specialist units in five university hospitals. Most complex hand surgery is performed by hand surgery specialists. Moreover basic level hand surgery is performed by orthopaedic surgeons. The rheumatoid hand surgery is practiced by specially trained rheumatoid orthopaedic surgeons.

"Giants" (or pioneers) of Hand Surgery in Finland and Major Contributions

The pioneers of Hand surgery were Professor Kauko Solonen MD and Dr Henry Brummer. Both of them were recognized as "Pioneers in Hand Surgery" by IFSSH. They initiated the systemic teaching of new hand surgical specialists in the 1970s. However, due to Professor Kauko Vainio's activity, the rheumatoid Hand Surgery was concentrated in Heinola at Rheumatoid Foundation Hospital in 1960's. The second generation pioneers have been Professor Simo Vilkki MD and Associate Professor Martti Vastamäki MD. Their continuous enthusiasm and that of other society members resulted in the IFSSH meeting being held in Helsinki in 1995 whe held in Helsinki, where Martti Vastamäki acted as the President and Simo Vilkki as the Scientific Chairman. This enthusiasm has also produced a high quality textbook of Hand Surgery including 648 pages, written in the Finnish language and published in year 2000. An important contribution has been the acceptance of Hand Surgery as an equal specialty among surgical specialties in Finland in 1981.

Finnish Society for the Surgery of the Hand

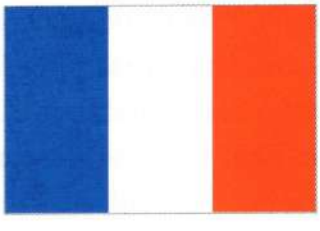
Suomen Käsikirurgiyhdistys ry. (in Finnish). Finnish Society for the Surgery of the Hand. It was founded on 7th January 1976. The Finnish Society is represented in IFSSH via Scandinavian society for Surgery of the Hand and has been a member in the latter from the beginning.

France

15 CHAPTER

Founded 1963

Philippe Saffar



Hand surgery was individualized as a surgical specialty in 1960. Articles and a book on the specific techniques of hand surgery were published at that time. In 1963, five surgeons created a group investigating hand surgery. This group was called "Groupe d'Etude de la Main" or GEM (Group for Study of the Hand) and was composed of five individuals: three plastic surgeons Raoul Tubiana, Raymond Vilain and Jacques Michon; one orthopaedist, Jacques Duparc and one professor of anatomy and of biomechanics Pr Pierre Rabischong. *(Figs. 1-5)* They had regular but informal meetings until an association with statutes was created.

The first formal meeting was organized in 1963 under the leadership of Robert Merle d'Aubigné, a leading French Orthopaedist who was the first President of the GEM. He was the head of an Orthopaedic department which was

FIG. 1 Jacques Duparc.

FIG. 2 Jacques Michon.

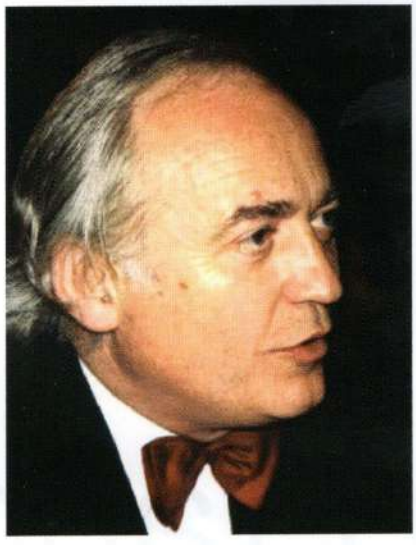


FIG. 3 Pierre Rabischong.

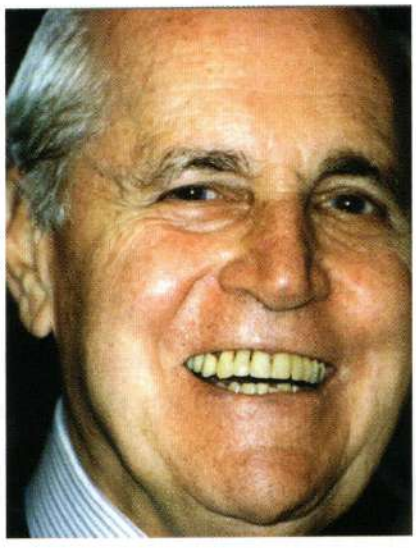


FIG. 4 Raoul Tubiana.

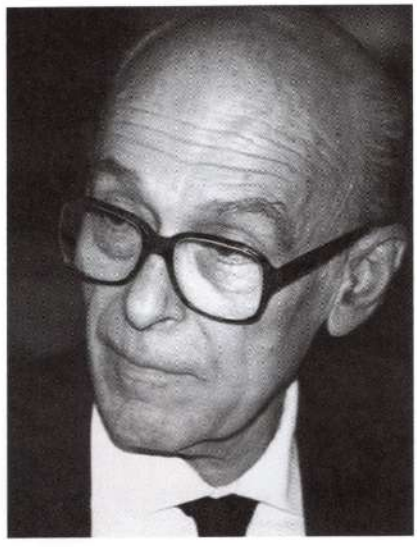


FIG. 5 Raymond Vilain.

composed of several units and Raoul Tubiana was in charge of the Hand Unit. In 1966, there were 24 members.

Subsequent meetings were held on an annual basis and the presidents succeeding Robert Merle d'Aubigné, Jean Gosset, and Marc Iselin, have all been involved in hand surgery.

The attendance of these meetings continued to grow and the society was comprised of approximately 50 members in 1968.

The papers presented were published in the Journal of Surgery. Beginning in 1974, one issue a year was dedicated to the Hand in the journal "Annales de Chirurgie". In 1982, the journal of the Hand Society: "Annales de chirurgie de la main" was created and published four issues a year. The Journal title changed to "La Main" and now "Chirurgie de la main" publishes six issues per year. This journal is also the journal of the French-speaking Swiss

and Belgium societies.

The Society has grown in number of members and attendees. The name of the Society was changed to the "Société Française de Chirurgie de la Main (French Society for Surgery of the Hand)" with new statutes. A board was created and is now composed of a President, two vice-Presidents, a General Secretary and an assistant General Secretary, a Treasurer and three members at-large. They are all elected during the annual general Assembly.

Over the years, the Society has steadily grown and now has 158 full members, 24 foreign full members, 233 associate members and 47 associate foreign members.

There is a three day annual meeting in December in Paris which is a joint meeting with the Hand Therapists. A spring meeting takes place in a city chosen by the President. Attendance at the December meeting has grown to more than 1000 attendants each year with about twenty-five percent being international.

Actually, the French Society for Surgery of the Hand (SFCM-GEM) played the role of an European Society until the creation of the FESSH (European Federation of societies for surgery of the hand).

Training

A diploma is obtained after two years of study and passing an examination. It is provided by two faculties in Paris and three others in France. The programme is the same in all of the faculties. The first year is devoted to generalities in anatomy, biomechanics and emergency surgery. The second year concentrates on pathology and treatment of diseases of the hand and upper limb. The theoretical teaching is 150 hours over two years. There are also upper limb dissections. There are two examinations: one after the first year, which is necessary to pass to be admitted to the second year, and a final examination at the end of the second year combined with a study on a special subject which is a part of the final evaluation.

There are numerous hand units in France, both public and private. A group of hand emergency units has been created, the first in 1970 called "SOS Hand" created by R. Vilain. Now, there are 47 centers in France (27 private and 20 public). In these units, elective hand surgery is performed as well as emergencies. The European Federation of Hand Emergency Units (FESUM) was created in France and now there are also seven centers in Belgium, five in Switzerland and one in Luxembourg.

In these units, residents begin to operate under the supervision of a confirmed hand surgeon. Every year, about 20 courses or meetings are organized in different French cities, sponsored by the Society.

Every year, the "French Society for Surgery of the Hand" grants several scholarships to French surgeons who would like to train abroad for a period of months, and to young international surgeons who wish to study in France.

Certification

A certification of "competence in Hand Surgery" is presented to surgeons who specialize in orthopaedics or in plastic surgery and have completed two years of hand surgery. To obtain the title of "Hand Surgeon", the diploma of hand surgery must be combined with a diploma of microsurgery and two years in hand units as a resident. Associated with the Society, there is a "collège Français des enseignants de Chirurgie de la Main", which includes all the teachers for Hand anatomy, biomechanics, pathology and treatments.

Hand Surgeons

Most hand surgeons performing exclusively hand and upper limb surgery come mainly from orthopedic surgery or less frequently from plastic surgery. Very few come from general surgery. Hand surgery is also performed by surgeons who are not specialists in hand surgery.

Pioneers

Besides the founders of the GEM, other pioneers during the same period were Marc Iselin who wrote the first French book on hand surgery and A. Kapandji, an outstanding teacher on hand biomechanics and thumb arthritis.

A major contribution was made by Raoul Tubiana and his book of more than a thousand pages on Hand Surgery which was translated into several different languages. A series of monographs (more than 20) dealing with hand topics were edited by the Society.

Among the "second generation", numerous contributions have been added. The main contributors have been : Yves Allieu on wrist, rheumatoid arthritis and elbow, Jean-Yves Alnot on rheumatoid arthritis, nerves and brachial plexus, Jacques Baudet on hand plastic surgery, Jean-Yves de la Caffinière for his thumb prosthesis. Jean-Jacques Comtet on Dupuytren and wrist, Guy Foucher on microsurgery and congenital deformities, Alain Gilbert on microsurgery and congenital deformities, Julien Glicenstein on hand tumours, Dominique LeViet on sequellae of traumatology and entrapment neuropathies, Michel Mansat on elbow and shoulder, Michel Merle on microsurgery and trauma, Jean Pillet on hand prostheses, Philippe Saffar on wrist and thumb arthritis, and François Schernberg on scaphoid and wrist.

FIG. 6 Sculpture by Auguste RODIN.

FIG. 7 Sculpture by CESAR.

The society

The name of the Society is "Société Française de Chirurgie de la Main" founded in 1963. The Society has been a member of the IFSSH since the beginning in 1966. The society hosted the IFSSH in Paris in 1992. The Society is also affiliated to EFSSH.

Germany

16 CHAPTER

DGH DEUTSCHE GESELLSCHAFT FÜR HANDCHIRURGIE

Founded 1965

Dieter Buck-Gramcko

The Deutschsprachige Arbeitsgemeinschaft fur Handchirurgie (German-Speaking Study Group for Surgery of the Hand; DAH) was founded in 1965. The members were general or traumatology surgeons and worked in the three German-speaking countries Germany, Austria, and Switzerland. They were participants of the Handchirurgische Literaturzirkel (journal club) which was organized in 1959 by Dieter BUCK-GRAMCKO, *(Fig. 1)* who acted also as Honorary Secretary of the DAH for the following 34 years. The first annual meeting (symposium) was held in Hamburg in 1960 and represented the three countries with only three speakers: Gottlieb ZRUBECKY, Hanno MILLESI, Henry NIGST. The style, which became traditional for these symposia in the next decades was a contrast to the style of most congresses. Rather than short papers and very limited time for dis-

FIG. 1 The Honorary President of DAH and DGH, Dieter BUCK-GRAMCKO.

FIG. 2 The executive board of the DGH at the symposium 2008 in Hamburg. From left to right: Peter BRUSER, Hans-Eberhard SCHALLER, Andreas EISENSCHENK, a member of the Town Council, Dieter BUCK-GRAMCKO, Bernd PARTECKE, Hermann KRIMMER.

cussions, it consisted of the presentation of only three papers as a review of a subject for 45 to 60 minutes, followed by (almost) unlimited discussion. With the increasing participants it became necessary to change this style, but it was resurrected in the "Basler Arbeitstaungen", which were held from 1976 until 1996 in conjunction with the annual symposia. They were organized by Henry NIGST and Dieter BUCK-GRAMCKO and limited to 25 participants who were experts in the field of the specific topic.

As early as 1969 the DAH published the journal, "HANDCHIRURGIE", as one of the first journals of this specialty. The inclusion of microsurgery and some parts of plastic surgery was the reason for changing the name in 1982 to "HANDCHIRURGIE-MIKROCHIRURGIE-PLASTISCHE CHIRURGIE".

The different principles of medical training in the three countries were the main reason for form national societies. In 1990 the Deutsche Gesellschaft fur Handchirurgie (German Society for Surgery of the Hand; DGH) was founded and administered, now with an executive board instead of only an Honorary Secretary. At that time the West Germans were happy to include their East German colleagues after the release of the "iron curtain" in Germany.

The German Society for Surgery of the Hand holds twice a year seminars to train younger colleagues. The annual meeting is called "symposium" and includes, besides the scientific programme, the general assembly.

Training

In order to achieve the official title "hand Surgeon", a full training program as general surgeon, orthopedic and traumatologic surgeon or plastic surgeon is required. This is followed by an additional training in a recognized unit for hand surgery for another three years. The diploma for a hand surgeon is given only after a special examination is passed.

Personalities and their Contributions

This first internationally recognized German hand surgeon was Otto HILGENFELD (1900 – 1983), the pioneer of thumb reconstruction. He published his book, "Operativer Daumenersatz" in 1950, although he performed his first pollicization with transposition of the middle finger in 1943.

Another early hand surgeon and book author was Wilhelm SCHINK (1918 – 2004). The third German book on hand surgery was published in two volumes in 1981 and 1983 and represented the three German-speaking countries not only in its content but also by the three editors Henry NIGST, Dieter BUCK-GRAMCKO, and Hanno MILLESI. Important contributions of DAH-members were made by Henry NIGST (1919-2008) on peripheral nerves, by Claude VERDAN (1909 – 2008) on flexor tendon repair, by Jorg BOHLER (1917 – 2005) on hand injuries and as the translator of Sterling BUNNELL's book, "Surgery of the Hand," and by Hanno MILLESI (born 1927) on Dupuytren's disease and on the repair of peripheral nerves and brachial plexus. In Germany, Wolfgang PIEPER (1908 -1987) and Wilhelm SCHINK (1916 – 2004) were important pioneers of hand surgery, while Gerhard STELLBRINK (1922 – 1974) has introduced the surgical treatment of polyarthritis in Germany. Albrecht WILHELM (born 1929) became internationally known by his work on denervation of joints and nerve compression syndromes. Walter BLAUTH (born 1924) was not only the originator of the journal "Operative Orthopadie und Traumatologie", but has worked extensively on congenital malformations. This special field, in addition to thumb reconstruction and skin coverage is also the main interest of Dieter BUCK_GRAMCKO (born 1927). He especially refined the pollicization technique and the treatment of radius aplasia. He has edited the book, "Congenital Malformations of the Hand and Forearm", was inaugural president of the DGH, and president of the IFSSH in 1974/75. Since 1994 he has served as honorary president of both the DAH and the DGH. He worked for 33 years as editor of the journal, "HANDCHIRURGIE-MIKROCHIRURGIE-PLASTISCHE CHIRURGIE". The last-mentioned position was passed onto Ulrich LANZ (born 1940), who was also the co-author of two books on anatomy and radiology of the hand. Peter BRUSER (born 1940) was one of the first microsurgeons in Germany and hosted in 1999 the sixth congress of the Federation of European Societies for Surgery of the Hand. Since 2004, he together with Andreas EISENSCHENK (born 1957), the secretary of the DGH, directed the postgraduate seminars of the DGH. Peter HAUSSMANN (born 1949) was president of the DGH in 1995 and is renowned for his work on nerve compression syndromes and on the pathology of the wrist joint.

FIG. 3 Three leading members of the DGH: Andreas EISENSCHENK, Peter BRUSER, Hans-Eberhard SCHALLER.

IFSSH Connection

The Deutschsprachige Arbeitsgemeinschaft fur Handchirurgie (DAH) as one of the first socie-

ties for surgery of the hand in the world, is one of the eight founding members societies. At the foundation meeting in January 1966 in Chicago, Dieter BUCK-GRAMCKO was the delegate. He became president in 1974/75. Many German hand surgeons were members of different committees of the IFSSH. The Deutsche Gesellschaft fur Handchirurgie (DGH) has applied for the privilege of hosting the IFSSH Congress in the German capital of Berlin in 2016.

Greece

17 CHAPTER

Founded 1984

Panayotis N. Soucacos

Introduction

Over the last century, around the world there has been a progressive fragmentation of the field of Surgery into various specialties and subspecialties. For the most part, surgery of the hand as an area of regional specialization in orthopaedic surgery and plastic surgery, began after the second World War. Although this holds true for Greece, as well, it appears that in Greece the first seeds of hand surgery were planted as early as the 6th century BC, during the time of Homer.

Ancient Greece

The epic poems of Homer, the Iliad and the Odyssey, provide a rich source of information regarding therapeutics in Ancient Greece. Although these and other works indicate that magic and mysticism often played a role in early

Greek Medicine, a closer look reveals the beginnings of a rational medical art which even included the beginnings of surgery of the hand. In one passage of the Iliad, Helenos, a Trojan hero, was wounded in the hand by a spear. To avoid death he withdrew into the company of his companions where the *". . the great-hearted Agenor drew from his hand the spear and bound up his hand with a careful twist of wool fleece in a sling"* (Homer, Iliad, Book XIII, lines 595-600) A similar scene is depicted on a shield from 500 BC where Achilles is shown binding the arm of his friend, Patroklos, after removing the spear from the wound. *(Fig. 1)*

FIG. 1

Written passages and art such as these clearly indicate that in the time of Homer, a system of treating open wounds of the hand and upper extremity existed and was recognized. Arrows were quickly, but carefully removed, in order to avoid hemorrhage, the *"black blood"* was sucked away, the wound was cleansed with warm water, medicines including healing salves, preparations from bitter roots were applied, as well as bandages and slings. Phrases such as the "wound dried and the flow of blood stopped" (Homer, Iliad, Book XI, lines 845-846) suggest that some medicines used were conducive to promoting rapid coagulation and healing. Scenes from various artifacts show that the Ancient Greeks had also developed means of treating injuries of the digits, such as in the scene depicting Sthenelos binding the right index finger of his friend and warrior companion, Diomedes. *(Fig. 2)*

FIG. 2

The Pioneers

In modern Greece, surgery of the hand branched mainly from orthopaedic surgery. After World War II, orthopaedic surgeons performed most of the hand surgery. Routine cases, including skin lacerations, metacarpal phalangeal fractures and dislocations and distal radial fractures, however, were treated by a number of general surgeons who had acquired some experience in surgery of the upper extremity.

Never-the-less, the real beginning of the era of

hand surgery in Greece was marked in the early 1960s when two pioneers, Anastasios Giannikas and Vassilios Petropoulos, established the first hand surgery units in Greece. Giannikas undertook his training in England from 1959 through 1962 under Sir H. J. Seddon, Sir J. Burrows and P. H. Neuman. He received a solid background in hand surgery at the Derbyshire Royal Infirmary for over 2 years under the supervision of R. G. Pulvertaft, one of the most renowned hand surgeons in Europe at that time. Upon his return to Greece in 1963, Giannikas founded the first hand unit in the Department of Orthopaedics of the University of Athens at Laiko University Hospital under the auspices of Professor Theodore Garofalidis, a giant in Greek Orthopaedics. Later, he established the first Hand Surgery Unit at the KAT Accident Hospital with the support of George Hartofilakidis. Petropoulos was also trained in England (1957-1960) at the royal National Orthopaedic Hospital under Sir H. J. Seddon and Sir J. Burrows. He was schooled in hand surgery under R. G. Pulvertaft in 1958-1959 at the Derbyshire Royal Infirmary and in 1959-1960 at Harlowood Hospital. In 1961, Petropoulos returned to Greece and established a Hand Unit at one of the major orthopaedic hospitals in Greece, the Asclepeio Hospital in Voula, Athens.

With the return of these two pioneers, Giannikas and Petropoulos, modern hand surgery began to flourish in Greece. Other young initiators of the discipline, such as Nicholaos Papavassiliou and Emmanuel Fragiadakis, began to contribute to the early progress and evolution shortly after these two units of Hand Surgery were founded. Fragiadakis was trained in England (1967—1970) at the Princess Margret Rose Orthopaedic Hospital in Edinburgh under Douglas Lamb, while Papavassiliou studied at the Hammersmith Hospital in London under James Cainan.

FIG.3 The beginning of the era of hand surgery in Greece was marked by the two pioneers, Anastasios Giannikas (left) and Bassilios Petropoulos (right). Both had extensive training in high caliber centers in England and upon their return to Greece established the first Hand Units in KAT Accident Hospital in Athens, and Asclepeio Hospital in Voula.

The era of Hand Surgery was also fostered and advanced by Greek surgeons abroad, such as Harilaos Sakellarides in the United States, who supported and nurtured efforts made in Greece. Sakellarides became renowned for his outstanding work and continuous contribution to the international literature in Hand Surgery, as a member of both the Greek Orthopaedic Society and the American Society for Surgery of the Hand.

The Microvascular Era

Up until the early 1970s, traditional hand surgery progressed in Greece with the influence of these early pioneers. In 1975, upon the return of Panayotis N. Soucacos, microvascular surgery was introduced to Greece and to the then flourishing discipline of Hand Surgery. Microsurgery in Greece has its roots at Duke University Medical Center in Durham, North Carolina where between 1970 and 1975, Soucacos was trained in microvascular and hand surgery in

FIG. 4 Microsurgery in Greece has its roots with James Urbaniak at Duke University Medical Center in Durham, North Carolina. Numerous fellows from Greece were trained in Hand Surgery and Microsurgery under his auspices during his tenure as Chief of the Hand Unit, and later as Chief of the Division of Orthopaedic Surgery.

FIG. 5 Dr. Dean Soteranos, Professor at Drexel University and Vice Chairman of the Orthopaedic Network Development in Pennsylvania has supported the efforts and training of fellows from Greece, maintaining close ties with Hellenic Society of Hand Surgery and its endeavors.

FIG. 6 Dr. Andrew Koman has also trained fellows from Greece, and was recognized by the University of Athens with an Honorary Doctorate for his efforts. He is seen here at the awards ceremony from left to right with Dr. Aris Zoubos, Dr. Christo Kittas (Chancellor of the University), Dr. Koman, Dr. George Kreastas (Dean of the Medical School), Dr. John Bramis (Chief of the Section of Surgery), and Dr. Panayotis Soucacos (Chairman of the Department of Orthopaedic Surgery).

the Department of Surgery, Division of Orthopaedic Surgery under J Leonard Goldner and James R. Urbaniak. In 1975, Soucacos established the first microsurgery/replantation team at "KAT" Accident Hospital under the auspices of Professor George Hartofilakidis, one of the visionaries in Greek Orthopaedics, and began to organize round tables and lectures to introduce the new discipline to the Greek Orthopaedic, Plastic and Hand surgeons.

Even before the introduction of microvascular surgery in Greece, the first successful replantation of a completely amputated arm was done on February 18, 1967 at Laiko Hospital by Giannikas and Panayotis Balas, a vascular surgeon. Not only was this the first successful replantation in Greece and one of the first replantations in Europe, but also it was among the very few successful replantation around the world. One year after the introduction of microsurgery in Greece, Soucacos and his team succeeded in replanting an incomplete nonviable amputation of the thumb and an incomplete nonviable amputation of the distal third of the forearm using suture material and instruments that were donated by Urbaniak from Duke University.

By the early 1980s, in addition to the two Hand Units in Athens, two microsurgical Units had also been founded; one at "KAT" Accident Hospital in Athens, and the other at the University of Ioannina with the appointment of Soucacos as the Professor and Chairman of the newly founded Department of Orthopaedic Surgery. In the later two Units, microsurgery was applied and pushed forward the frontiers in the management of hand injuries. Shortly afterwards, both centers also established separate,

modern Hand Surgery Units which always collaborated closely with the existing Microsurgery Units.

The Hellenic Society for Surgery of the Hand

In the early 1980s, Hand Surgeons in Greece were active participants of the National Orthopaedic Society (the Hellenic Association of Orthopaedic Surgery and Traumatology (HAOST)), as well as of the major hand societies in the United States, Europe and International Hand Federations. The Hellenic Society for Surgery of the Hand (HSSH) was founded in 1984. Its first steps were taken as a Section of HAOST which was founded in 1947 after World War II. Ten years after it's beginning, HSSH decided to separate from the HOAST and become its own independent entity. Thus, the HSSH with its own constitution as known today, was formed in 1994 with approximately 100 members.

The founding president of the HSSH was Giannikas, who along with Petropoulos were the fathers of Hand Surgery in Greece. He presided from 1984 to 1987. In addition to the annual meetings, he hosted a workshop in Hand Surgery with Pulvertaft as an invited instructor. In order to plant solid seeds in Hand Surgery in Greece, the members of the Surg-Hand Club which at that time included giants such as Urbaniak, Strickland, Taleisnik, Hunter, Watson, Ferlic, among others were invited to Greece. The Surg-Hand Club spent two weeks giving talks, special seminars and workshops throughout the major centers in Greece on state-of-the-art topics in surgery of the hand. Petropoulos followed as President of the HSSH from 1988 to 1989 and organized the first Combined Meeting with HAOST. This example was followed by the next Presidents, Papavasilliou, Fragiadakis and Daoutis in 1990, 1991 and 1992, respectively. The HSSH organized its first International Scientific Combined Meeting under the leadership of Soucacos in 1993 with the Cypriot Orthopaedic Society and with the Hellenic Society for Reconstructive Microsurgery (HSRM). In 1994, during the Presidency of Zoubos, the HSSH Meeting was combined with the prestigious American Society for Surgery of the Hand. The remaining three Presidents of HSSH, have all combined the annual meeting of HSSH with the HSRM.

Today, the HSSH shares a central office with the HSRM in affiliation with the HAOST. HSSH was a founding member of the Federation of European Societies for Surgery of the Hand (FESSH) and has been an active member of the International Federation of Societies for Surgery of the Hand (IFSSH) since 1991. A significant number of the Greek Hand Surgeons are also active members of the American and British Hand Societies, as well as other international hand groups. Today, about 75 percent of the members are othropaedic surgeons, while the remaining are plastic surgeons.

The HSSH sponsors one annual meeting which traditionally, is combined with the HSRM and/or an international hand group or society. These meetings always host a large number of internationally renowned invited speakers, who have over the years developed close ties and friendships with the Greek hand surgeons. These guests have included names such as Pulvertaft, Urbaniak, Goldner, Strickland, Taleisnik, Nunley, Burke, Adelaar, Koman, Stanley, Gilbert, Foucher, Millesi, Brunelli, Weiland, Steichen, Terzis, Nachemson, Herdon, Sotereanos, Levin and Stevanovic, among many others. The hand society in Greece also sponsors two instructional

FIG. 7 International hand surgeons have maintained close ties with Greece. Among these giants is Dr. Julia Terzis who has played a pivotal role in training young orthopaedic and plastic surgeons in peripheral nerve and brachial plexus surgery.

FIG. 8 Dr. L. Scott Levin, board certified both in Orthopaedic and Plastic Surgery, maintained the Duke tradition initiated by Urbaniak to bring Greek fellows for additional training to Duke University where he chaired the Section of Plastic Surgery, and now to the University of Pennsylvania where he is Chairman of the Department of Orthopaedic Surgery and Professor of Plastic Surgery.

FIG. 9 Dr Alain Gilbert, an undisputable pioneer in the field, was one of the early supporters of the development of Hand Surgery and Microsurgery in Greece from the European continent. In addition to supporting the education of several fellows from Greece, he has been pivotal to maintaining surgical excellence in congenital anomalies and brachial plexus surgery for young Greek surgeons.

courses per year aimed at providing state-of-the-art information on new techniques for young and experienced hand surgesons, alike.

Hand Surgery Today

The hand surgery subspecialty, as in many European countries and in the United States, is acknowledged by a training fellowship in Hand Surgery at recognized expert centers. The majority of Greek hand surgeons have subspecialized in Hand Surgery with extensive training in renowned units throughout Europe and the United States, as well as in Greek Orthopaedic Departments that have internationally recognized Hand Units.

Hand Units exist in all major Orthopaedic Department in Greece, including the University of Athens, Thessaloniki, Patras, Thessalia, Ioannina, Crete and Alexandroupolis. Other Clinics with Hand Units include Asclepeio Hospital, "KAT" Accident Hospital, Red Cross Hospital, Argos Hospital, Laiko Hospital, Evagelsimos Hospital, General State Hospital, and Karditsa General Hospital. In addition, to these there are a number of Hand Surgeons who have established impressive units in the private sector.

Achievements in Hand Surgery and Contribution to the Literature

It is difficult to provide a critical review of the outstanding achievements made in Hand Surgery in Greece and the contributions made to the international medical literature. Various names have appeared repeatedly in the literature and many surgeons have served in a plethora of postgraduate programs focused on Surgery of the

Hand. Many of these surgeons are internationally recognized not only for their particular skills and interests, but also for their academic contribution ot the evolution of the discipline.

Since the introduction of modern Hand Surgery, several noteworthy achievements have marked the history of the discipline of Hand Surgery in Greece. The first successful replantation of a completely amputated arm was done in 1967 at Laiko Hospital by Giannikas and Balas. Following the introduction of microsurgery in Greece, Soucacos, Anastasiou and Beris performed the first successful digit replantation in Greece in 1979, followed by the first successful replantation of a completely amputated thumb.

State-of-the-art procedures, too numerous to expand on individually, include the full range of techniques such as wrist arthroscopy and management of wrist injuries, primary and secondary flexor tendon repair, toe-to-hand transfer, free tissue transfer, peripheral nerve repair, brachial plexus surgery and management of congenital hand anomalies. These procedures have been advanced in virtually all of the Hand Units in Greece.

The achievements made over the years in the field of hand surgery in Greece have been underscored by several special editions in international journals dedicated to the Greek surgeons and the advances they have made. Significant contributions towards research and development in Hand Surgery have marked several areas of Hand Surgery as highlighted by high caliber publications on replantation and reconstruction of the hand and upper limb, free tissue transfers, nerve repair, brachial plexus surgery, flexor tendon repair, reflex sympathetic dystrophy, open injuries of the hand, bony and ligamentous injuries, wrist arthroscopy and instability, among many others. Today, HSSH remains devoted to the goal of educating more young surgeons and to the expansion of Hand Surgery, with the formation of new centers for the better care of patients with injuries of the upper extremities.

In addition to the scientific literature, Greece has made significant contributions to educational efforts in the field. In 2007, Athens hosted the 12th Congress of the Federation of European Societies for Surgery of the Hand in an effort to present hand & upper extremity surgeons with the latest and most noteworthy developments. Current issues in clinical practice and surgery, as well as landmarks in research were discussed in a rich program consisting of a plethora of clinical and scientific symposia. The interest of the Hellenic Society in educational programs is also underscored by the plethora of educational and training programs that have developed throughout Greece aimed at presenting a diverse collection of current topics and innovative techniques. Among these are the Annual Microsurgery Seminars, Microsurgery Weeks that take place three times a year, as well as the Annual Seminar on Surgical Anatomy of the Hand organized by the University of Ioannina by Professor A. Beris. In addition, Dr. C. Dimitriou of the Aristotellion University of Thessaloniki organizes a biannual seminar on Wrist Problems. Applied Hand and Upper Extremity Seminars with live surgery and cadaveric workshops are organized annually by Drs. P. Giannakopoulos, S. Anagnostou, D. Misitzis and N. Souras of the Athens Medical Center. Dr. K. Vlastou organizes an annual seminar and workshop on Flap Dissection on Living Tissue. Finally, the Department of Hand and Upper Extremity Surgery of the Athens KAT Accident Hospital under the auspices of Drs. N. Gerostathopoulos and J. Ignatiadis, along with the Research Center of the ELPEN Pharmaceutical Company host International Courses of Vascu-

larized Flap Dissection in Living Tissue with Clinical Applications in Limb Reconstruction. The later is in collaboration with the Romanian Society of Reconstructive Microsurgery, (including the Cluj Napoca Medicine & Pharmacy University and the Plus Brinzens Timisoara Experimental Surgery Center), as well as the CTO Center for Trauma and Orthopaedics in Torino, Italy. All of these programs attempt to bring outstanding faculty to share the insights and practical skills necessary for young hand surgeons to practice in the formidable realm of surgery of the hand. These educational programs bring together a broad range of practical experience, expertise and basic research to foster the scientific knowledge and practical skills of hand surgeons in Greece. In light of the above, the Hellenic Society has adopted the European Diploma in Hand Surgery, with the first recipient in 2009 being Dr. E. Papadogeorgou. Finally, in 2010 the Center for Orthopaedic Research & Education (CORE) was inaugurated on the grounds of the ATTIKON University Hospital of the University of Athens, School of Medicine. In addition to supporting a broad range of research areas, CORE is a multi-functional research and educational facility dedicated to the advancement of microsurgical techniques and hand and upper extremity surgery, as well as continuous educational programs in the field.

Hong Kong

18 CHAPTER

Founded 1986

S P CHOW

Hand surgery in Hong Kong after the Second World War was performed mainly by Orthopaedic Surgeons and occasionally by general surgeons. In 1965, DR. Y S Tsao from the University of Hong Kong was sent for special training under DR. Joseph Boyes for one year. He practiced for a couple of years after returning to Hong Kong, but had to resign because of health reasons.

The real impetus came when DR. P C Leung from the government hospital and DR. S P Chow from the University were sent abroad for hand surgery training in the 70s *(Fig. 6)*. Upon their return, they separately set up an integrated team of surgeons, trainees, physiotherapists, occupational therapists, prosthetists, nurses and research fellows. With this platform, all aspects of hand problems were managed. In particular, hand trauma including microsurgical replantation and

FIG. 1 Goddess "Guan Yin" with many Hands to relieve many sufferings.

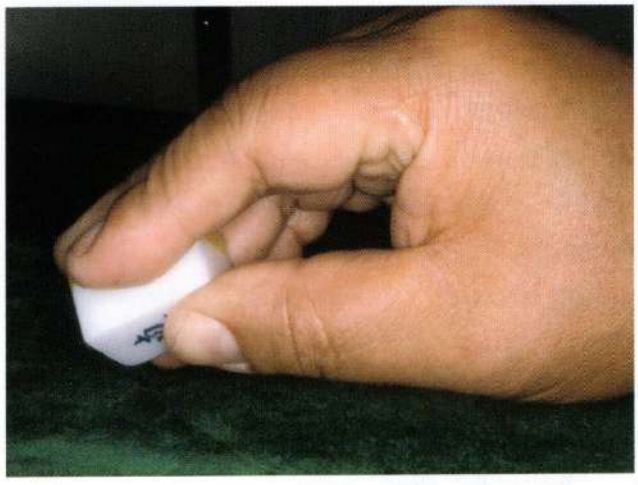


FIG. 2 The "Mahjong" game block can be recognized by stereognosis without looking with the eyes.

FIG. 3 Tenosynovitis caused by Mycobacterium marinum, common in Hong Kong.

FIG. 4 The first successful microsurgical replant in Hong Kong in 1977.

microsurgical reconstruction were performed. Research at clinical, basic, and social levels were productive. They soon became regional leaders instrumental in the development of hand surgery in South East Asia. They also trained the second and third generations of hand surgeons such as Dr. L K Hung, Dr. Y C So, and Dr. P C Ho.

Hand surgery training in Hong Kong is undertaken for a three to six months period during Orthopaedic residency, and again as post-residency training for six months to one year. Many will also take a period of time for overseas training. Hand surgery fellowships are also offered

FIG. 5 DR. Joseph Boyes performing an intrinsic reconstruction for a leprosy patient in Hong Kong during the 60s.

FIG. 6 Two pioneers of Hand Surgery in Hong Kong: Prof. P C Leung (left) and Prof S P Chow (right).

to surgeons all over the world. At the moment, a very intense debate is ongoing on the issue of added Certification for Hand Surgery.

The Hong Kong Society for Surgery of the Hand (HKSSH) was set-up in 1986, and it became a member of the International Federation of Societies for Surgery of the Hand (IFSSH) also in 1986. It was one of the Founding Members of the Asian Pacific Federation of Societies for Surgery of the Hand (APFSSH) when it was founded in 1995.

19 CHAPTER

Hungary

Founded 1991

Antal Renner & Zsolt Szabo

Modern hand surgery resembles a tree with leaves, the flowering of which is due to the experience of previous decades. Its roots are the medical activity of earlier centuries. There are frequent descriptions of diseases of the hand and their treatment in the Hungarian medical literature of earlier centuries. Ferentz Miskoltzy's book (1742) describes fractures and dislocations of the hand and their management and Jozsef Csapo (1771) wrote about syndactyly and the treatment of supernumerary digits.

The first steps of modern hand surgery in Hungary were made after the Second World War. Professor Rudolf Kós wrote the first Hungarian book on hand surgery, "Surgery of the hand" (1961), which was the Bible in hand surgery for trainees during decades.

The National Institute of Traumatology was founded in 1956, and it was a milestone in the

history of hand surgery in our country. The Institute organized independent trauma surgery in Hungary, separate from general surgery, and arranged teaching and training in this speciality. Jeno Manninger set up the first Department of Hand Surgery in Hungary in 1959 at the Institute.

In the early 1970s, the political isolation of the previous 15 years was easing and it became possible to study hand surgery abroad and for several professionals to make scientific contacts. The resultant inflow of new information produced a surge in expertise and our young trauma surgeons were sent to study modern hand surgery in the best institutes of Europe. On their return they immediately introduced their experiences into our practice, giving teams of hand surgeons new ambitions and enthusiasm to achieve better results.

Manninger and his staff introduced many surgical techniques, and developed new methods for the management of hand conditions at the Department of Hand Surgery of the National Institute of Traumatology. In addition to the treatment of the injured hand, they obtained excellent results with reconstructive operations. They devised techniques for thumb reconstruction, restoration of sensibility and replacement of the carpal and finger joints with endoprostheses. Furthermore, this Department became the centre for treatment of congenital anomalies and it was among the first to perform replantation of amputated fingers and extremities. The development of hand surgery in the country was accelerated by greater professional expectations, study trips abroad and the courses of the National Institute. Its position in the National Institute of Traumatology allowed it to be developed and organized in combination with the trauma surgery network in Hungary; teams of hand surgeons were initially developed in the trauma surgery departments of our university departments and county trauma centres.

Professor Mihály Forgon was among the first pioneers of well-organized hand surgery in Hungary. He established an excellent school of hand surgery at the University Department of Traumatology in Pécs, and with his pupils he carried out experimental research in important fields of hand surgery while providing a high quality clinical service. Vilmos Bíró introduced ideas regarding tendon sheath reconstruction, József Nyárády was one of the pioneers of vascularised tissue transfers in Hungary, and Ákos Kovács provided a valuable contribution to the treatment of peripheral nerve injuries. In the 1970s János Endrődy introduced hand surgery to the Department of Traumatology of the II. Surgical Clinic in Szeged. His talented young colleagues, Aurél János Simonka, Gábor Dósa and Gyula Kiss, have since been leaders of hand surgery in our country.

Excellent hand surgery units were also organized in the major county trauma centres. Professor Antal Salamon in Szombathely continued the research work he had started in Pécs, while in Eger, the late István Kovalkovits organised the nursing of hand surgery patients in the countryside. Gabor Dósa in Szolnok, and then Gyula, Sándor Rácz in Miskolc, Géza Király in Győr, and Miklós Noviczky in Nyíregyháza and Gábor Kertész in Kecskemét have also made great contributions to hand surgery.

In Budapest József Farkas worked in the Central Military Hospital. His successor was the highly talented Endre Cziffer, who tragically died early after designing many instruments for hand surgery. He developed a simple and cheap mini external fixator, which is still in general use in Hungary and abroad, and his writings have been of lasting value as well.

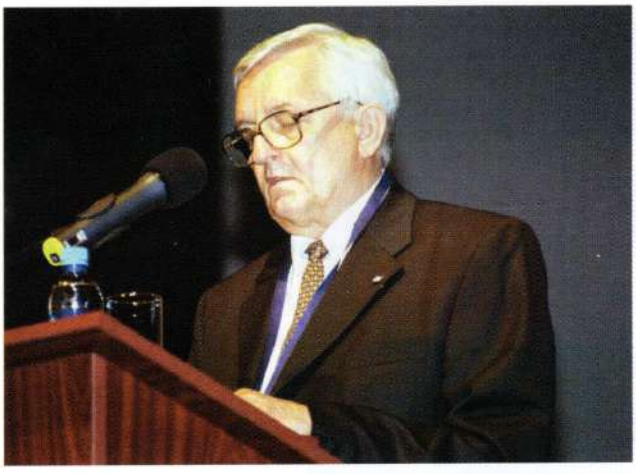


FIG. 1 Prof. Antal Renner, first President of Hungarian Society for Surgery of the Hand.

FIG. 2 Ninth IFSSH Congress in Budapest 2004. Zsolt Szabo, chairman of Scientific Committee, and wife Melinda. Muff with her husband James R. Urbaniak, the then Secretary General of the IFSSH.

National Network

By the early 1980s units or departments of hand surgery were identified within 14 departments of Traumatology.

Nowadays the reorganization of the Hungarian Health Care System necessitates the establishment of Hand Surgery Centres. The first hand Surgery Centre was established in 2007 in Miskolc by Zsolt Szabo. Such Hand Surgery Centres' are planned in Budapest, Gyula, Szeged, Győr, Nyíregyháza, Pécs. and other county centres in order to form a national network.

Society

The Section of Hand Surgery was established within the Hungarian Society for Traumatology in 1977, under the leadership of Professor Manninger.

In 1991 the independent Hungarian Society for Surgery of the Hand was established, and Antal Renner was its first president *(Fig. 1)*, followed by Professor János Aurél Simonka, Professor József Nyárády and Sándor Rácz. The first secretary general was János Rupnik. followed by István Zimmermann, Zsolt Szabó and János Rupnik jr.

Ivan Matev from Bulgaria assisted our application to the International Federation of Societies for Surgery of the Hand. In 1976 A. B. Swanson, President of the IFFSH visited the National Institute of Traumatology, and subsequently the Section for Surgery of the Hand became a member of the IFSSH.

The Vienna-Budapest Post-Congress Meeting, which we organized with the Austrian Hand Surgeons, was held in Budapest in 1992 after the Paris IFSSH Congress. At this Congress Professor Manninger was honoured with the Diploma of "Pioneer of Hand Surgery", which was presented by Secretary General Mr. Miguel Vargas. At the same time a Joint Meeting of American and Hungarian Hand Surgeons was held in Budapest.

The Hungarian Section of Hand Surgery participated in the historic European Congress in Taranto in 1989, which was organized by Professor Alessandro Carole and the Federation of European Societies for Surgery of the Hand was founded.

As a coronation of our achievements, the IFSSH decided at its 1998 Vancouver Congress that the Hungarian Society for Surgery of the

FIG. 3 Hands photo by József Szarvas.

Hand should host the 9th IFSSH Congress in 2004 in Budapest.

A very successful high level scientific and social event was organized in Budapest with the participation of about 1700 hand surgeons and medical industrial representatives. The Congress was directed by Antal Renner as chairman, Zsolt Szabo *(Fig. 2)* as scientific committee chairman and Aurél János Simonka as the president of HSSH. A valuable and continuous help and support was received from Guy Foucher, the president and James Urbaniak the secretary of the IFSSH. During this congress Antal Renner was attributed the Diploma of Pioneer in Hand Surgery.

As recognition of the Hungarian hand surgery and the high level of the 2004 IFSSH Congress, in 2007 in Sydney Zsolt Szabo, the secretary general of the Hungarian Society was elected secretary general elect of the IFSSH.

Training and Education

In Hungary hand surgery is a well-organised speciality. Thus, contrary to the situation in other countries, high quality hand surgery was first provided by departments of traumatology. A great variety of hand conditions are treated in these departments.

The University of Health Sciences was established in 1962, with its Chair of Traumatology in the National Institute of Traumatology. Since then it has held annual courses for the two specialties, trauma and hand surgery, at various levels for young surgeons, candidates for board examinations, and specialists. Manninger organized the first 3-week basic course on hand surgery in 1962. There was huge interest in these courses and the number of participants have have increased year by year. Learning anatomy on cadaver hands, participation in operations, case demonstrations, and consultations have proven to be especially attractive.

A board examination in hand surgery was introduced as a subspecialty in Hungary in 1992; this was among the first in Europe. This possibility to become a board certified hand surgeon is open to all general surgeons, traumatology surgeons and orthopaedic surgeons. A minimum of two years training in specified hand

surgery units and attendance at a basic and advanced hand surgery course and a microsurgery course are required. More than 120 hand surgeons have passed the speciality board examination and are certified.

In 1995, Professor Antal Renner organized in Budapest the first FESSH course with the attendance of more than 20 European leading hand surgeons. In 2001 at Lillafüred, Zsolt Szabo organized the first international course of hand surgery with the support of the IFSSH. Eighteen international professors in hand surgery participated in the course. In 2006 at Budapest, in 2007 and 2009 at Hajdúszoboszló Zsolt Szabo organized three international advanced hand surgery courses for Eastern European countries with the support of FESSH.

Professor Antal Renner has participated as examiner for the European Diploma in Hand Surgery. He was followed by Zsolt Szabo and János Rupnik Jr. Since 2006 Zsolt Szabo has served as the Chairman of the Examination Committee of FESSH for the European Diploma in Hand Surgery.

The recognition of the Hungarian hand surgery is a well deserved reward to all those who have done their best during the past five decades to establish and practice hand surgery in Hungary. The seed, sowed half a century ago, fell into fertile soil and will bear fruit, giving rise to long lasting honour and recognition for the future generation of hand surgeons.

20 CHAPTER

India

Founded 1973

S Raja Sabapathy

In the foreword to David Bornstein's book, 'How to Change the World', the famous entrepreneur in the world of Indian Information Technology, Narayanamurthy has defined the word, 'entrepreneur'. He writes the word 'entrepreneur' comes from the French word meaning "one who takes into hand'. Social entrepreneurs are people who take into hand major social issues and relentlessly toil to produce a change in the lives of people. Only few doctors in the history of medicine have been great social entrepreneurs. The pioneers of Hand surgery in India were such people who by their work influenced the lives of millions.

Development of Hand Surgery in India

Hand surgery in India evolved with the management of deformities of Leprosy patients. In

the process a new life and hope was given to these people. The pioneer in this field was Paul Brand who could be termed as the Greatest Social Entrepreneur of Hand Surgery *(Fig 1)*. Born of Christian missionaries in India, he had his early education in India and gained his qualifications at the Royal College of England, London. He came back to India in 1948 and did his major work at the Christian Medical College, Vellore in South India

In the times of Paul Brand, great social stigma was attached to Leprosy patients. Ostracized by family and abandoned by the society they were forced to live away from the villages due to their deformities and 'rotting flesh'. Brand used to meet his physician friend Robert G. Cochrane, who was in charge of Leprosy Sanatorium and became interested in these patients. Brand was the first to realize that the lepra bacillus preferentially affected the nerves near the surface of the body and all the deformities were not directly due to the disease but due to the nerve paralysis and the trauma suffered by the insensate hands and feet. Brand proved to the world that surgical incisions in these patients heal as well as they do in uninfected people and correction of deformities by tendon transfers could give them a new lease on life.

To dispel the fear that these people needed to be isolated he admitted the patients in the same ward as other patients and started the 'New Life Centre', a treatment and rehabilitation centre for Leprosy patients among the residential complex of the medical staff. The message of his work spread and surgeons from all over the world especially from the developing countries visited the centre. Ernest Fritschi and Selvapandiyan continued the mission which Brand started. The unit is presently headed by George Anderson. Hariharan Srinivasan and Dinakar Palande who continue to analyze the mechanics of tendon transfer procedures for paralytic deformity correction in Leprosy patients introduced by Brand.

FIG. 1 Paul W. Brand.

In Mumbai and Pune, a plastic surgeon Noshir Antia did pioneering work for these patients. Apart from tendon transfers, as a plastic surgeon his team also did a great deal of work on the correction of facial deformities of these patients. He remained passionate in his work and rural camps until his death and he was ably assisted by Dr Swaran Arora. The workload was so much that specialized centers evolved to cater to these patients. A good centre in Agra was started and headed by Malaviya. Fortunately with the control of the disease these centers are being disbanded and no more are surgeons only treating this disease. Presently in the practice of surgeons like Sridhar and Santhosh Rath who specialize in tendon transfers, leprosy patients form only a very small percentage of their practice.

Surgery for Hand Injuries

Brij Bhushan Joshi and Venkataswami were the two surgeons who established Hand surgery as a specialty by their work on Hand trauma. They

could be called the 'Social entrepreneurs in the field of Hand injuries'. Joshi, the first surgeon to qualify in Orthopaedics from Bombay concentrated on Hand surgery and worked all of his professional life time in a Government hospital in Mumbai. Working in circumstances of poor infrastructure but armed with tremendous zeal and commitment, he developed many ingenious surgical techniques and splints. The external fixation system which he developed was later refined and is now well known as the Joshi's External Fixation System. (JESS). He was a self taught hand surgeon and his brilliance was recognized by Guy Pulvertaft who visited his unit in 1974 and invited him to lecture in the UK. Working alone he realized the value of books and had one of the best personal collection of hand surgery literature in the country which he donated to the Ganga Hospital Library at Coimbatore in 2008 *(Fig 2)*.

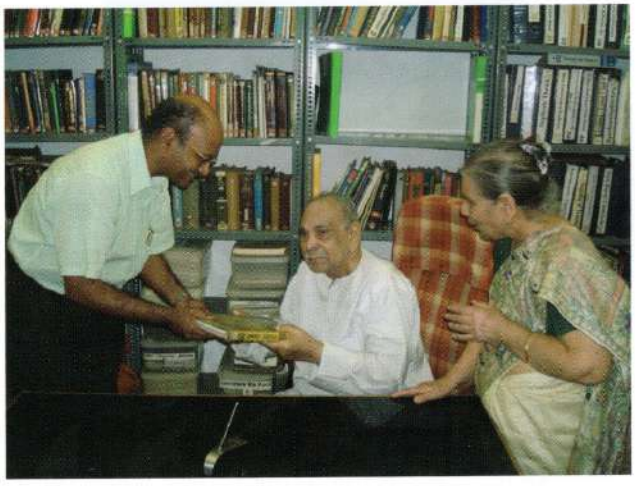


FIG. 2 Dr BB Joshi with his wife handing over a book to symbolize the handing over of his lifetime collection of books to Dr Raja Sabapathy who received it on behalf of Ganga Hospital.

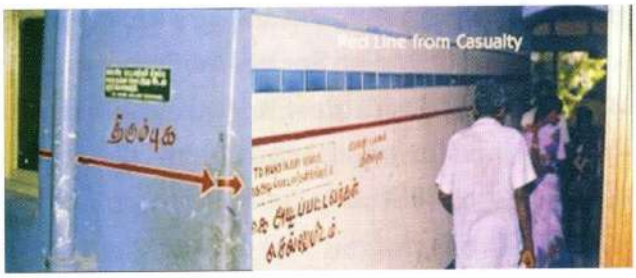


FIG. 3 The 'Red line' in the corridors of Stanley Hospital, leading the hand injury patients from the gate to the department.

Developing a health care delivery model for the masses in a country like India required a person who could think outside the box. Government Stanley Hospital, Madras where Venkataswami worked was situated in a crowded industrial belt and the institution received many hand injuries. Realizing the importance of good primary care, he hit upon a great idea to draw the patients directly to the department. He painted a line with the message 'All Hand injury patients please follow the red line', from the gates of the Hospital along the corridors and stairs to the Hand surgery department *(Fig 3)*. Patients thus bypassed the emergency room and the inevitable delays that could occur. It was such a simple idea and soon the unit was treating about 35 hand injuries a day. With this system all hand injuries were primarily seen by a qualified hand surgeon, a remarkable feat which he achieved as early as the late seventies. Balakrishnan, who succeeded him built a new building which exclusively houses the Plastic surgery and the Hand Surgery unit.

Venkataswami also established Stanley Hospital as the first organized microsurgery facility in the country. In North India, Abraham Thomas, who was trained by Marko Godina founded the centre at the Christian Medical College, Ludhiana and made replantation a routine procedure.

Until the early nineties Hand surgery was predominantly being performed in the Government sector. However the Indian economy was opening up and it created social changes. Quality private medical care at affordable prices was being

preferred by people and many young surgeons started Hand surgery units in the private sector. The author after his training in the UK and Louisville, started the centre at Ganga Hospital, Coimbatore in 1991 and now it is presently the largest Hand and Trauma Reconstructive Microsurgery unit in the private sector in the country. Dr Raja Sabapathy had the distinction of being invited to deliver the Douglas Lamb lecture of the British Society for Surgery of the Hand in the year 2005. In the year 2000, a microsurgery training laboratory modeled on the Acland Lab at Louisville was set up and trainees from 31 countries and 60 cities of India have been trained here. Because of the organized and well equipped micro laboratory it is popular with trainees and about 100 surgeons visit the centre every year.

Hand Surgery Practice and Training

For a country of a more than one billion people the current number of well trained Hand surgeons is insufficient. The way hand injuries are treated depends upon the availability of the type of surgeon in the location. Specialized work is done by few. The influence of Dr Joshi and Dr Venkataswami was so profound that in North India most Hand surgeons are Orthopaedic surgeons and in South India most of them are Plastic Surgeons. Reconstructive Microsurgery is almost exclusively performed by Plastic surgeons throughout the country. The National Board of Examinations runs a 2 year post doctoral training programme in Hand surgery with an exit exam at the end of the training period.. Presently three centers in the country offer the course. India is emerging as a destination of advanced training in Hand surgery and reconstructive microsurgery due to the large volumes of patients combined with high quality training.

FIG. 4 The ISSH logo

Indian Society for Surgery of the Hand

The Indian Society for Surgery of the Hand (ISSH) was formed on Aug 15th 1973 and the first meeting was held in Jan 1974. Guy Pulvertaft was the guest at this meeting. It's logo has a hand outline with the medical symbol - the staff of Aesculapius with snakes curled around it in the centre *(Fig 4)*. Since the Vancouver IFSSH meeting in 1998,. India is regularly represented in the International body and is proudly looking forward to hosting the 2013 Triennial Congress of the IFSSH and IFSHT. The ISSH meets once a year and has two orations in the name of BB Joshi and R Venkataswami. ISSH offers two inland fellowships and one overseas fellowship. The overseas fellowship (Robert Acland – S & T Fellowship) was set up in 2009 from the sale proceeds of the book, Acland's "Practice Manual of Microsurgery" whose copyright Acland was kind enough to transfer to the Indian Society for Surgery of the Hand. Prof BB Joshi, Prof R Venkataswami and Prof H Srinivasan have been recognized as the pioneers by the IFSSH *(Fig 5)*.

The Hand in Indian Culture

While modern hand surgery has a recent history, glorification of the hand in Hindu mythology

FIG. 5 Prof R Venkataswami and Prof H Srinivasan.

FIG. 6 The hand of a girl during a wedding ceremony.

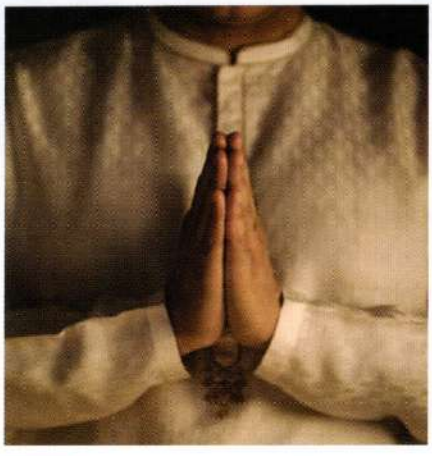


FIG. 7 Folded Hands, 'Namaste' – the traditional welcome sign of India.

is as old as mankind. Hand gestures were used as forms of communication even before man began to speak and the habit of using the hand in regular communication persists. In emotional situations or arguments the hand is as much used as the voice and it might surprise a western visitor. In ceremonial occasions the hand is as often used as the face for body art. The paste derived from the Henna leaves is decoratively applied to the hands and the red orange pigment, lawsone stains the skin *(Fig 6)*. In large weddings, hundreds of guests will be hennaed as well as the bride and the groom.

The folded hands (Namaste) are the standard form of welcome gesture in India *(Fig 7)* and it is more common than handshake. Normally ladies do not shake hands, though it is becoming increasingly common. Handedness has a special place in Indian culture. While left handedness in writing or operating does not attract special attention, Indians are very mindful of using the right hand for all things important and good. Giving or receiving things with the left hand or serving food with the left hand may be considered impolite in traditional homes.

Hand gestures, called 'mudras' are seen in classical dances and in Indian Mythology, where Gods and Goddesses are depicted with different mudras of various symbolic meaning. To illustrate I have provided the figure of a God form. Hindus worship various God forms and Sri Dakshinamurthy is worshipped as the God for wisdom. In an idol dating back to 12th Century AD, the right hand of Sri Dakshinamurthy is showing Chin Mudra *(Fig 8)*. In this gesture the thumb and the index finger are joined. The index finger touches the thumb in a semicircular fashion. The other three fingers which represent body, mind and intellect stand aloof. The index finger rep-

resents ego (Ahamkara) while the thumb represents Atma (inner self). Chin mudra denotes that the person who renounces attachment to body, mind and intellect and merges his individual ego with 'Atma' (which is God itself) achieves supreme wisdom. Many profound truths are exemplified by hand postures in the statues found in temples and during the classical Indian dances.

Indian mythology, literature, and dances extensively reference and use the hand to enrich their content. Hand surgery in India has also come of age. India is said to be a 'Land of Contrasts'. Cutting edge technology co exists with very traditional ways of practice. The challenge facing the hand surgeons of India is in raising the average level of care and providing quality care to the masses. It is a challenge they will live up to and all of them are looking forward to welcome the world for the triennial congress of the International Federations of Hand Surgeons and Hand Therapists in 2013.

FIG. 8 The right hand of the God Sri Dakshinamurthy showing 'Chin Mudra'.

Indonesia

21 CHAPTER

Founded 1979

Theddeus O H Prasetyono

The Development of Hand Surgery

Orthopedic and plastic surgeons were the pioneers in the formation of the Society. However the Society consists of experts from other disciplines with the intent of working together to support the increasing knowledge of hand surgery. Surgeons who deal with hand surgery have long sought for supporting teams to improve functional results especially for the patients suffering from traumatic injury and leprosy. The expert teams, mainly hand therapy, have contributed much to the rehabilitation programs. It was also the rule imposed by the Indonesian Medical Association that any professional group wanting to form a new society or association must include similar "working groups" if they have not established a curriculum of study for a particular specialization. Thus, the society which was formed in 1979 was named

HIPITA (Himpunan Indonesia untuk Pengembangan Ilmu Bedah Tangan) which literally means "Indonesian Society of Experts to Develop the Science of Hand Surgery." However, the name did not refer to the particular specialty of hand surgery. Besides orthopedic and plastic surgeons, leprosy surgeons are amongst the surgical practitioners who are eligible for membership as well as other specialties such as specialized doctors in medical rehabilitation. The Official Bearers made a decision later on to name it as The Indonesian Society for Surgery of The Hand in order to better communicate with international colleagues and societies, and to be eligible for membership into the IFSSH.

FIG. 1 Djoko Roeshadi, most prominent pioneer of hand surgery in Indonesia. Picture courtesy of Teddy O.H.Prasetyono.

The Pioneers

The HIPITA started with a few members comprised of mostly orthopedic and plastic surgeons and some other doctors specializing in medical rehabilitation, microbiology, and leprosy, etc. The Society was headed by Djoko Roeshadi, an orthopedic surgeon noted as one of the prominent pioneers of hand surgery in Indonesia. He worked together in the development of hand surgery with other pioneers i.e. Robbana Bisono and Sidik Setiamihardja, (leading plastic surgeons) and Chehab R. Hilmy and Ahmad Djojosugito (leading orthopaedic surgeons). Djoko Roeshadi devoted his works mostly on hand surgery and kindly introduced the meticulous techniques to his colleagues and trainees in orthopedic surgery. *(Fig. 1)* He was the first one to perform replantation of finger and hand amputations as well as toe to finger transplantation in the country. Apparently he was the first one to organize a workshop on microsurgery in the country and invitited plastic surgeons to participate. By this action he showed the generous intention to bring all experts interested in hand surgery to work together to develop delicate surgical skills. He has served as the President of the Society since the establishment to the year of 2005 when he handed over the position in a National Congress to his successor Erwin Ramawan who learned the surgery from him. During his tenure he struggled to fund himself to represent his country in the international congresses of the APFSSH and IFSSH amid the "long dormant period" when the Society did not have any active scientific meetings. Satrio, Burhanuddin Rambe, Agung Sutiyoso, and Syaifulah Hadi are some members to mention a few, who acted as national delegates in the APFSSH national delegate meetings during his tenure.

The late Chehab Hilmy was the individual who strongly suggested the science of hand surgery to be mastered by those working on hand cases. He was also the man behind the establishment of Sports Medicine in the country especially at the University of Indonesia in Jakarta. Accordingly, he elegantly represented the

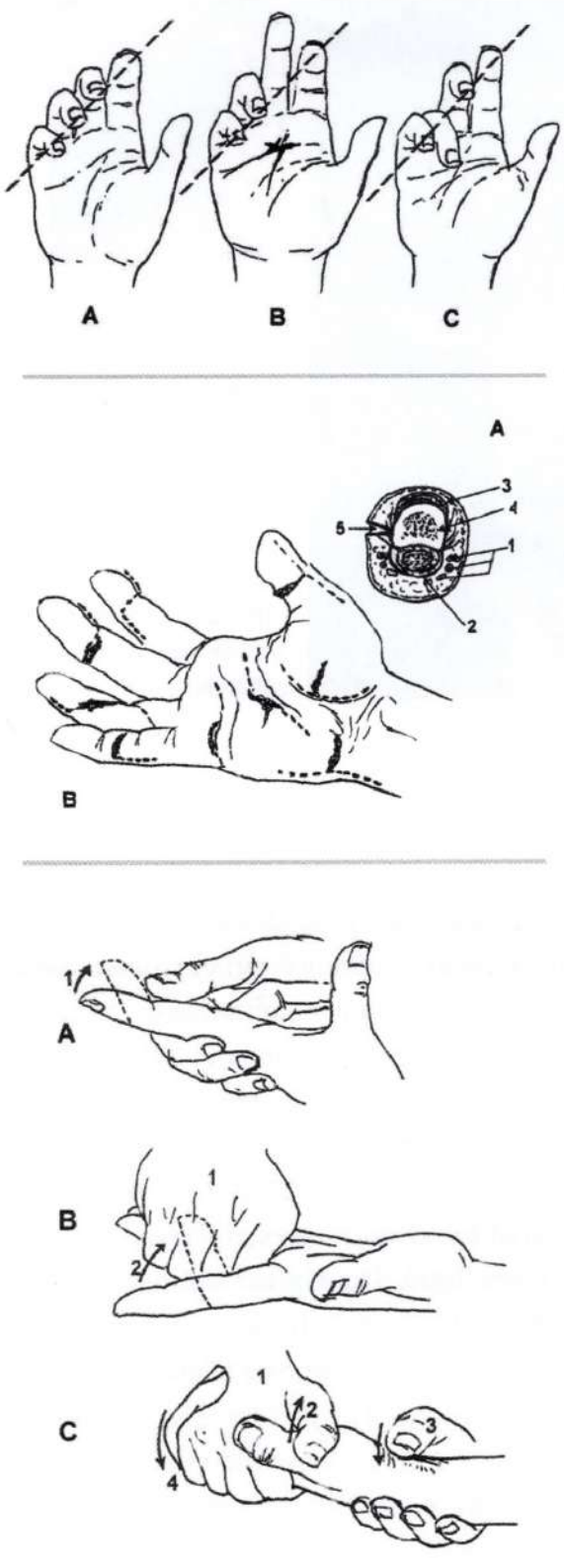


FIG. 2 Some hand illustrations depicted from "Wim de Jong – Sjamsuhidajat Textbook of Surgery" where Robbana Bisono is the solo illustrator of 718 figures of the 954 pages book. Pictures courtesy of Robana Bisono; with permission from medical publisher EGC, Jakarta.

country by relationships with international orthopedic surgeons.

Bisono, who was trained in Australia, was recognized as the premier referral surgeon whenever plastic surgeons in the country had difficult hand cases. He introduced the importance of hand anatomy, function, and clinical examination to obtain a better understanding and achieve better results in hand surgery. He pioneered the application of tendon transfers as well as finger sensate flap transfer to reconstruct an insensate thumb. Moreover, he is remarkably noted as an illustrator of beautifully schematic diagrams of human anatomy and function which he illustrated in the prestigious textbook of surgery, "Wim de Jong – Sjamsuhidajat Textbook of Surgery."1 *(Fig. 2)* Amazed by his work, one of his trainees in plastic surgery, Teddy O.H. Prasetyono ,became very interested in hand surgery and organized prestigious events such as the International Symposium on Hand Surgery and the Advances of Hand Therapy from 2004-2006 to stimulate the scientific activities in the country. The three year annual symposium drew interest from Asia Pacific distinguished hand surgeons and therapists and was endorsed by some Societies from Asia Pacific countries. Cadaver dissection enriched workshops on flaps, tendon transfers, and microsurgery,and hands-on courses on hand splinting and therapeutic programs were among the comprehensive programs included. Together with Erwin Ramawan and Heri Suroto, Prasetyono won the bidding to host the coming APFSSH Congress of 2012.

The Training and Certification

The basic training of hand surgery is included in the training of orthopedic and plastic surgery. Practitioners from both specialties who are

FIG. 3 Hand of Javanese woman wearing batik clothes is holding a canting carrying hot wax in her endeavor to create batik tulis delicately. (Picture courtesy of Teddy O.H.Prasetyono and Astuti Pitarini).

interested in hand surgery add their training experiences by taking further study abroad. A full year hand fellowship program in the country, including with a few months studying in Singapore, is currently conducted by the College of Orthopedic and Traumatology. It commenced in the year 2003 under the directorship of Djoko Roeshadi. Since then, it has produced some hand surgeons whose certifications are given by the College of Orthopedic and Traumatology.

Artworks and Cultural Heritages Elaborating Hands

Batik

One of the most famous artworks from Indonesia is batik attire in which Indonesians use it during formal and non-formal occasions. Silk made clothing decorated with beautiful batik patterns is most interesting. Batik is a wax-resistant dyeing technique used on textiles. The original batik from Indonesia is called batik tulis, literally means the written batik. The designs are painstakingly created by hand using a canting, a pen-like applicator which is used to apply the hot wax on a wide white cloth to create intricate designs. Designs are usually inspired by everyday living, customs, and day-to-day activity. It is regarded as a cultural icon which contains symbols and a deep philosophy of the human life cycle. After the hot wax drawing is finished, the wide cloth then dyed using one color only. Multicolor batik cloth is created by several times of dyeing process. In October 2009, The United Nations Educational, Scientific and Cultural Organization (UNESCO) named Indonesia's handmade batik a world heritage. The picture *(Fig. 3)* shows a local Indonesia woman in the middle of creating batik tulis, using hot wax delicately, which carried inside a canting.

Traditional Dance

Man, woman, and dancing are a blend that maintains cultural existence in the Hinduized Balinese population amid around thousand of dances across the archipelago of Indonesia.

FIG. 4 A woman is performing as Rama, a very handsome, gentle, and kindhearted king of Ayodya kingdom taken from Ramayana epic poems. (a,b) On different occasion of dancing performance depicted from the same story, the same dancer is performing as Shinta, the beautiful wife of Rama.

Balinese traditional dancing has been known worldwide for its exoticism which emphasizes the strong movement of the upper body and flexibility and rigorous gesture of the hands. The speed of fingers movement as well as the gazing of the eyeballs can be extraordinarily fast is some particular dances. The picture in figure 4 shows Tari Ramayana, Ramayana Dance, one of the most popular Bali dancing, performed by native Balinese woman at a sacred temple before the sunset in order to celebrate God's goodwill to human being.

Weaving

As one big archipelago consists of 17,508 islands, Indonesia has countless elaborate culture and heritage. Indonesia traditional weaving, or best known as songket, is locally handmade cloth existing variably across the archipelago. The process of songket weaving exclusively uses golden and silver thread following an intricate pattern, which usually is pictured as Indonesia floras and faunas. The stunning cloth

FIG. 5 A young girl in the family's showroom is weaving a particular pattern of songket from Lombok, an island just east to Bali island. Some patterns of the songket were displayed at the background. Picture courtesy of 2121studio.com [cited 2009 December 9]. Available from http://www.tokgajah.com/viewtopic.php?f=23&t=4496&start=75.

is typically worn on special occasions. The picture shows colorful songket Lombok, a traditional weaving cloth originally made from an island located just east to Bali island. *(Fig. 5)*

Reference

1. Sjamsuhidajat R, de Jong W, editors. Buku Ajar Ilmu Bedah (Textbook of Surgery). 2nd ed. Jakarta: EGC; 2004.

22 CHAPTER

Iran

Founded 1984

F A Lahiji,
M G Massoumi

Society was Formed by 2 Groups

1. In 1971 Dr. Shojaedine Sheikholeslamzadeh, who is an American-trained Iranian orthopedic surgeon, started the Rehabilitation Hospital "Shafa Yahyaian" and invited many Iranian surgeons who were trained in the United States and Europe, to join as members of the teaching staff.

Among them were two orthopedic surgeons with a history of fellowship training in surgery of the hand: Dr. Korush Sajadi and Dr. Feraydun Ghobadi; and three plastic surgeons: Dr. Mohamed Reza Samiian, Dr. Reza Shaysteh and Dr. Manuchehr Fayz. These five surgeons introduced hand surgery to the Iranian Medical Community.

In 1979 the fellowship training for surgery of the hand and upper extremity was started by

Dr. Feraydum Ghobadi and Dr. Aziz Ahmadi at the "Shafa Yahyaian" Hospital. The first fel-

lowship training for surgery of the hand was offered to board certified orthopedic surgeons, and included a year of fellowship training.

Subsequently the curriculum for this fellowship training adopted the American guidelines of the American Board of Medical Specialties to award these surgeons the Added Qualifications in Surgery of the Hand.This Fellowship process was presented to the University of Medical Sciences to be introduced to the Ministry of Health and Science to confirm and recognize the qualifications as fellowship-trained hand surgeons, which is now 18 months of training following orthopedic training.

2. The second group is The Iranian Plastic, Reconstructive and Aesthetic Surgery Organization, under the direction of Professor Jamal Goosheh, who is a French-trained Iranian plastic surgeon in association with Dr. Ahmad Maghari, an Australian-trained Iranian plastic surgeon, Dr. Sayed Kamal Forutan, Dr. Mohamed Ali Hosseinian and Dr. Raheem Matloobi. In 1981 they started training plastic surgeons to concentrate on surgery of the upper extremities, peripheral nerve surgery,and especially brachial plexus injuries and reconstruction,as well as burn injuries, which unfortunately there were many due to eight years of the Iran/Iraq war. This fellowship program is offered at the Beheshti University Medical Science.

The Development of Hand Surgery and National Personalities

Historically a Persian (IRANIAN) scientist named ABU ALI SINA (980-1037 A.D.) whose medical textbook, The Laws of Well Being or The Books of Law, was used by many Europeans and Middle Eastern scholars. At the time he was the first one who differentiated between anatomical structures of the UP-

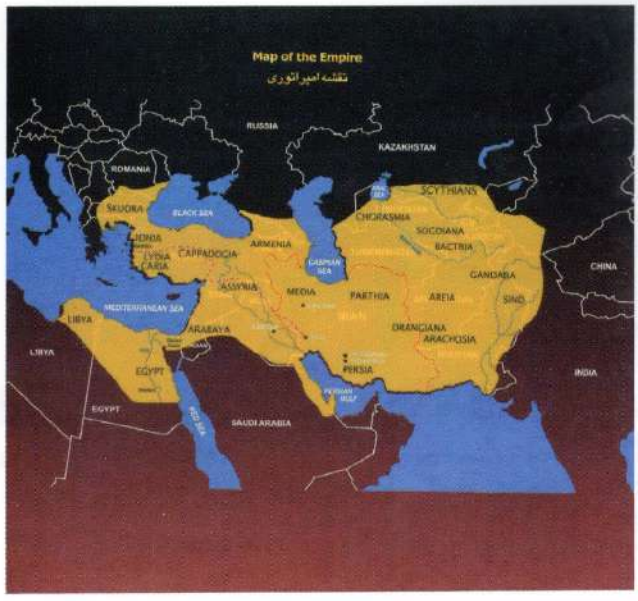


FIG. 1 Ancient Persian Empire.

Dr. Shekholeslamzade, 2nd Pioneer Hand Surgeon.

Dr.Ahmadi, Immediate Past President I.S.S.H.

Dr.Goosheh, First Iranian Pioneer Hand Surgeon.

Dr.Lahiji, Current President, I.S.S.H.

FIG. 2

FIG. 3 Persepolis Palace Ruins.

PER EXTREMITY. He explained in his book that there was a difference between the TENDONS, which could have been repaired, and the NERVES, which were extremely painful to touch, and must be left alone.

Currently Iran has a population of 71 million (2008 Statistics), with 45 medical schools, 18 general surgery residency programs, 11 orthopedic residency programs, and 4 plastic and reconstructive surgery residency programs, with 2 recognized hand fellowship programs.

In 1979 after the Iranian revolution, no organization, whether political or scientific, was allowed to be registered by the government. In the meantime while general, plastic and orthopedic surgeons were having various meetings in their teaching or community hospitals, providing conferences and educating their fellows and residents, they could not be officially organized to join the International Federation of Societies for Surgery of the Hand (I.F.S.S.H.).

During this period, without the knowledge of Iranian physicians or participation of any Iranian physician, the name of Iran was registered among the Eastern Mediterranean Hand Societies, by one of the Egyptian hand surgeons!

In 1983 during the second I.F.S.S.H. meeting in Boston, Massachusetts, Dr. Jamal Goosheh was a guest speaker for brachial plexus injury, sharing his experience with this prestigious Society *(Fig. 2)*.

Dr. Massoud (Mas) Massoumi, Iranian-born and Iranian-trained physician, who did his post graduate training in orthopedic and hand surgery in the U.K. and the United States, and is currently practicing in the United States, met Dr. Goosheh for the first time at this meeting in Boston,. They were encouraged by Dr. Alfred Swanson, who was the President of the I.F.S.S.H., that the Iranian Society must be formed independently and apply for membership in the I.F.S.S.H.

Since Dr. Goosheh could not register such a society in Iran at that time, Dr. Massoumi encouraged him to gather a minimum of 25 surgeons, whether general, plastic or orthopedic surgeons, whose practice was at least more than one-third upper extremity surgery to develop a

format to meet the requirements according to I.F.S.S.H. to be able to apply for membership. After Dr. Goosheh complied with that, membership application was sent to the I.F.S.S.H.

In 1986 during the Congress of I.F.S.S.H. in Tokyo, Japan, the Iranian Society for Surgery of the Hand (I.S.S.H.) was nominated by India's delegate, and seconded by the Italian's, as well as the Australian's delegates, and Iran, for the first time, was unanimously approved to be an active member of the I.F.S.S.H.

In 2001 the I.S.S.H. endorsed Professor Goosheh to be recognized as one of the pioneer hand surgeons, and the International Federation recognized him in 2001 in Istanbul, Turkey, as the first Iranian to become a pioneer hand surgeon.

In 2003 Dr. Aziz Ahmadi *(Fig. 2)* was voted by the Iranian Society for Surgery of the Hand to replace the Founding President, Dr. Goosheh, as the new President. During Dr. Ahmadi's first year as the President, since the laws were changed and the Iranian government allowed organized medical societies to be registered and recognized by the government, the Board of Directors, which included Dr. Javad Vazirzadeh Ebraheemi, Dr. Mehdi Shokuhzanganeh,

Dr. Hamid Taheri, Dr. Ali Dianat, and Dr. Farivar A. Lahiji *(Fig. 4)*, registered the Iranian Society for Surgery of the Hand. For the first time this organization was officially recognized by the Iranian government as a scientific organization.

During this period several hospitals were designated by the Ministry of Health for treatment and education primarily limited to surgery of the hand and upper extremity. Prior to this designation these hospitals were mainly giving treatment under the direction of primarily plastic and reconstructive surgeons for management of soft tissue injuries affecting upper extremities.

In 2007 the I.S.S.H. awarded Dr. Shojaedine

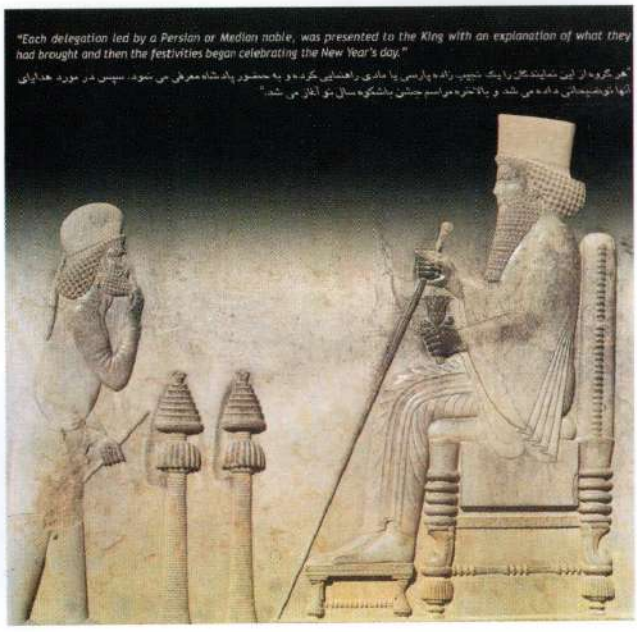


FIG. 4 Cyrus The Great Receiving Dignitary.

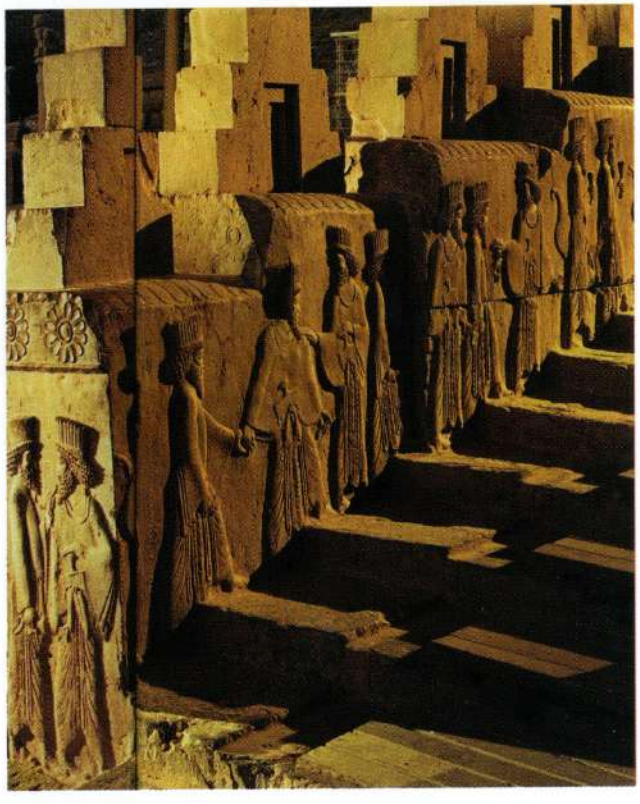


FIG. 5 Persepolis Palace Stairs.

Sheikholeslamzadeh *(Fig. 2)*, who was the founding father of the orthopedic residency program and rehabilitation education,as the second Irani-

an pioneer hand surgeon, during the World Congress of Hand Surgeons in Sydney, Australia.

During the Annual Iranian Orthopedic Association (I.O.A.) Educational Meeting, which not only covers upper extremity and hand surgery, but also has a Specialty Day wherein each specialty group, such as spinal surgeons, hand surgeons, sports medicine, etc., has one day of their own meeting.Many non-orthopedic surgeons such as plastic, general surgeons or hand therapists who do not belong to the I.O.A, participate on the scientific program.

The Society Secretariat is based in The I.O.A. office, 94, 1st floor, Keshavarz Blvd., Tehran-14166-Iran, Tel: (+9821) 88966583, Fax: (+9821) 88983610; Email: anjomanedast@yahoo.com; website: www.ISSH.org.ir

Persian (Iranian) History

The word **"HAND"** in Farsi (Iranian) language has been conjugated as different parts of speech, such as noun, verb, adverb, adjective, pronoun, etc., and has been used in more than 176 various expressions, which shows how important the word **"HAND"** is in this ancient country with more than 5,000 years of civilization.

Please see the Ancient Persian Empire map in the first photograph, which extended during the reign of Dariush (A.K.A. Darius or Cyrus The Great), from The Ural Mountains in Siberia to The Black Sea and The Mediterranean Sea in Eastern Europe, and to Egypt and Libya in Northern Africa; and the current Iranian map which covers the area from The Caspian Sea, in the north to The Persian Gulf, in the south *(Fig. 1)*.

The third photograph is of the Persepolis Palace *(Fig. 3)*, which is a testament to Persian power established by Cyrus the Great (522 to 486 B.C.). The Persepolis awed distinguished visitors who came from the far ends of the largest empire of the age to present gifts *(Fig. 4)*. This historic palace, which Iranians call "Takhteh Jamsheed", is just north of the city of Shiraz.

In the fifth photograph, Persian nobles are ascending stairs HAND IN HAND to the Tripylon Hall, which signaled a fraternity among the Empire's elites *(Fig. 5)*. Four hundred years ago Isfahan was larger than London and more cosmopolitan than Paris. The City's most famous bridge is Si-O Seh Pol (Bridge of 33 Arches) over the River of Zayandeh, which is nearly 1,000 feet long and 45 feet wide. At the time Isfahan used to be called "Half of the World". Elegant bridges crossed its modest river. Lavishly outfitted polo players dashed across the world's largest square and hundreds of domes and minarets punctuated the skyline. Europeans, Turks, Indians and Chinese flocked to the glittering Persian Court, the center of a vast empire stretching from the Euphrates River in what is today Iraq, to the Oxus River in Afghanistan.

23 CHAPTER

Israel

Israeli Society for Surgery of the Hand

Founded 1969

Joel Engel

Past

In the early sixties some of the members of the Israeli orthopedic society and plastic surgery society developed a special interest in hand surgery. Isidor Kessler was the first one to convert his activity from orthopedic surgery to a full time hand surgeon. He trained as a fellow with the Boyes group in California where he was active amongst others in the developing of the Niebauer silicone metacarpophalangeal prosthesis. After returning to Israel he established the first hand surgery service in the Kaplan hospital.

In 1967 following the 6-day war there were many upper extremity injuries that had to be treated. The following wars in which the state of Israel was engaged with its neighbors caused this number to rise to about 10,000, out of which more of a third were upper extremity injuries. In order to provide optimal care to this large num-

ber of patients five hand surgery units were established by a decree of the ministry of health, (much like the five hand surgery units that were created in the USA during world war II).

Currently in Israel there is one department for hand surgery in the Sheba Medical Center in Tel Hashomer and seven hand surgery units in the hospitals: Hadasa –Jerusalem; ziv-Sefad; Ichilov- Tel Aviv; Wolfson-Jaffa; Rambam-Haifa; Hacarmel-Haifa; Kaplan-Rechovot; and Soroka-Ber Sheva. At least two board certified hand surgeons serve in each of these units.

From the beginning, academic activity paralelled clinical service in hand surgery. Hundreds of papers were published in local and international journals. In 1975 the first international symposia was conducted in collaboration with tutors from the US in Israel. A joint meeting of the Israeli Hand Society and the American Society for Surgery of the Hand followed in 1979. In April 1989 the Israeli Hand Society hosted the IV IFSSH congress. Joint meetings with the Greek, Italian and French Societies of surgery of the Hand were held in the following years.

Instructional courses at Tel-Aviv University are given during the post graduate training of orthopedic surgery. Special courses by the hand surgery community members are given to the school of nursing, physiotherapy, occupational therapy, sports medicine and military medicine. Every fall the Hand Society holds it's annual meeting and once every summer the members hold for a meeting covering one specific subject in hand surgery.

Training & Diplomas in Hand Surgery

There are board certifications in hand surgery in Israel. To become a Hand surgeon in Israel one has to have a board certification in Orthopedic or Plastic surgery prior to his hand surgery residency. Than he/she has to pursue a two and a half years residency in hand surgery, which he/she can do in the hand surgery department in Tel Hashomer or partially in the other units mentioned above. There is a list of surgical procedures he/she has to perform during this residency besides participating in symposia, journal clubs etc. After having accomplished these requirements he/she will have to pass a written and oral examination to be certified.

The Development of Hand Surgery and National Personalities

The most outstanding personality in the history of hand surgery of Israel is Isidor Kessler. His work in limb and finger elongation are certainly landmarks in the development of hand surgery. His contributions on flexor tendon suture techniques are also known world wide. Joel Engel established the hand surgery service in Tel Hashomer, Israel's largest center for hand surgery after training with Prof. Tubiana in Paris and fellowships in the USA with E .Naelebuff, R. Carroll and J, Tupper. Numerous publications, on clinical and basic science in hand surgery originated in this center, e.g. basic science in nerve surgery.

Israel is a melting pot for Jews from all over the world. The microcosmos of hand surgery in this country is similar. Along with Israeli born members of our hand surgery society such as M. Wexler J. Engel and H. Weinberg, many others joined our small community from all over the world. This includes E. Spira from Czechoslovakia, C. Pidhortz from France, M. Russo from Uruguay and many others from all over the world.

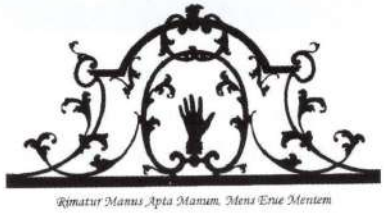
Batya Yaffe followed Joel Engel in directing of the hand surgery department in Tel Hashomer in

the year 2001. She did so after a fellowship with B. Strauch in N.Y.C. She brought hand surgery in Israel a big step forward by establishing a Microsurgical unit and introducing this exciting subject into our country. She still is the senior and leading micro surgeon in hand surgery in Israel besides being an outstanding hand surgeon. Prof. Reiss who practiced prior to his retirement in the Sefad hand unit trained in England where he was part of the team that worked on the Callan-Nicoll-Reiss finger prosthesis.

In the Israeli hand society are 48 active members out of which eight have a plastic surgery diploma and 40 have a hand surgery diploma. For 15 members of our society hand surgery is their main or only occupation.

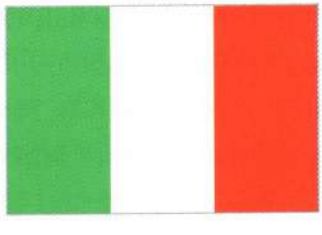
Italy

24 CHAPTER



Founded 1963

Roberto Adani,
Thomas Giesen



The Origin

The first Italian Department for the care of the lesions of the hand was opened at the Centro Traumatologico Ortopedico INAIL in Milan and was directed by Aldo De Negri (1910-1996). De Negri played an important role in the development of hand surgery in Italy.

In 1959 on the 24th of October the Annual Meeting of the Italian Orthopedic Society convened in Rome. During the meeting Augusto Bonola and Oscar Scaglietti *(Fig. 1)* proposed dedicating a branch of the Orthopedic Society to the Hand Surgery.

Augusto Bonola (1906-1976) was at that time one of the first Italian Pioneers in Hand Surgery. His first clinical and surgical experience was in Bologna at the Rizzoli Institute, under the guidance of Vittorio Putti and Francesco Delitala. During the Second World War, his

experience rapidly grew even more and he realized one of the main principles in Hand Surgery: the importance of the skin coverage in difficult open wounds in order to avoid macro amputations. After the war Augusto Bonola became Professor in Orthopedic Surgery at the University of Modena where he created a centre for Hand Surgery along with the first Hand Surgery training program in Europe.

In 1962 for the first time in Italy, a National Meeting entirely dedicated to the Hand was organized in Florence. During the meeting the constitution for the Italian Society for the Surgery of the Hand was written (SICM: Società Italiana di Chirurgia della Mano). The Founding Members were: Augusto Bonola, Giorgio Brunelli, Aldo de Negri, Leonardo Gui, Germano Mancini, Umberto Mangini, Ezio Morelli and Filippo Perricone *(Fig. 2)*.

The following year a new meeting in Florence was organized on thumb reconstruction. The opening lecture was given by Augusto Bonola and after this lecture the Italian Society was considered officially established.

The SICM was the third national Hand Society in the world, following the American and the Scandinavian Societies that were founded 12 years earlier. In January 1964 the first edition of the Italian Journal of Hand Surgery was published.

The IFSSH was founded in Chicago in 1966. The Italian Society was a founding member. The first IFSSH delegate was Augusto Bonola who served as the coordinator of the research committee on work related injuries.

The Present

The Italian Society for the Surgery of the Hand includes 11 Honorary Members, 306 full registered members, and 541 associates members.

FIG. 1 Oscar Scaglietti (1906-1993) on the right side of the picture awarded by Augusto Bonola (on the left) for his research on Volkmann Contractures.

FIG. 2 One of the first council meeting of the Italian Society for the Surgery of the Hand. In the center, Augusto Bonola.

The majority of the Italian members are Orthopedic Surgeons while Plastic Surgeons are a substantial minority. In Italy in 2008 the population was 58.1 million (2008 statistics).

The Society Secretariat is based at:

ITALIAN SOCIETY FOR SURGERY OF THE HAND

Clinica Ortopedica dell'Università,
Largo P. Palagi, 1-50139 Firenze, Italy,
Tel: (+39) 055 430 673, Fax: (+39) 055 430 673
segreteria@sicm.it http://www.sicm.it

The Society Journal is the "Rivista Italiana

di Chirurgia della Mano" (http://www.mattioli1885.com).

Italy is present in the international scenario in the person of Massimo Ceruso (Chief of the Hand Surgery Department in Florence, known for his interest and expertise in hand tumors). He is General Secretary of the FESSH.

Training

In Italy surgeons aspiring to become Hand Surgeons should first complete a full training program in Orthopedic Surgery or Plastic Surgery (5 years). After the registration in the Specialist Register, several fellowships, masters and courses are approved by the SICM.

Hand Surgery Masters of one year are available in Rome, Milan and Modena. Two Hand and Microsurgery fellowships of one year are available in recognized Hand Surgery Centers.

The SICM and Italian Society for Microsurgery (SIM) organize a practical Microsurgery course in Napoli (three sessions in one academic year). All information and entry criteria are available online: http://www.sicm.it.

Diplomas in Hand Surgery

There is one Diploma available in Italy for trainees. The European Federation of Societies for Surgery of the Hand holds a Diploma examination at the time of their annual congress. For entry criteria see the official website (www.fessh.com)

National Personalities

Ezio Morelli (1923-2009) was president of the SICM from 1972 to 1973 and he worked all his life in the Department of Plastic Surgery in Legnano. He was a world-wide known expert on brachial plexus injuries in children and in adults. In 1995 he was awarded as a "Pioneer in Hand Surgery" at the 6th IFSSH meeting in Helsinki-Finland. Paolo Bedeschi and Alessandro Caroli were fellows under Augusto Bonola.

FIG. 3 Alessandro Caroli opening the 23th Hand Surgery Course in Modena in 1988.

Paolo Bedeschi was president of the SICM in 1978 and was Clinical Director of the Orthopedic Department in Modena after Augusto Bonola. He published extensive research papers on Dupuytren's contractures and innovative surgical techniques for the radial club hand deformity. In 2001 he was awarded a "Pioneer in Hand Surgery" at the 8th IFSSH meeting in Istanbul-Turkey.

Alessandro Caroli *(Fig. 3)* was elected president of the SICM in 1986. He became Professor in Hand Surgery at the University of Modena and Director of the Modena Hand Surgery Unit from 1986 to 1997. One of his major credits is the Organization of a historical Hand Surgery Meeting in Taranto in July 1989.He spent several months organizing this event and inviting all the international European Hand Surgery scholars. At the time of the meeting in Taranto, 20 different European Countries were represented.

Alessandro Caroli's idea was to create an European Society for the Surgery of the Hand.

Based on the Taranto meeting this idea became reality the following year in Paris when the FESSH was officially founded.

Renzo Mantero became president of the SICM in 1980. As the Director of the General Surgery Department at the San Paolo Hospital in Savona, he opened a new Division for Hand Surgery in 1972. His massive clinical and research work on flexor tendon repair, with probably the longest series ever published on this topic, and his commitment to congenital hand malformations are internationally recognized. He has served as Editor of the Italian Journal of Hand Surgery since 1979.

Giorgio Brunelli *(Fig. 4)* is one of the Founders of the SICM. He was Director of the Orthopedic Department in Brescia for many years and in 1980 founded the Research Centre for Spinal Cord Injuries. He was President of the IFSSH from 1995 to 1998 and in 1998 he was awarded as a "Hand Surgery Pioneer" at the 7th IFSSH meeting in Vancouver-Canada. For many years, he enlightened the Italian and International Hand Surgery scenario with revolutionary ideas and innovative techniques that today are considered as routine procedures in many Hand Surgery practices (nerve repair, flexor tendon repair, scapho-lunate dissociation, microsurgical techniques).

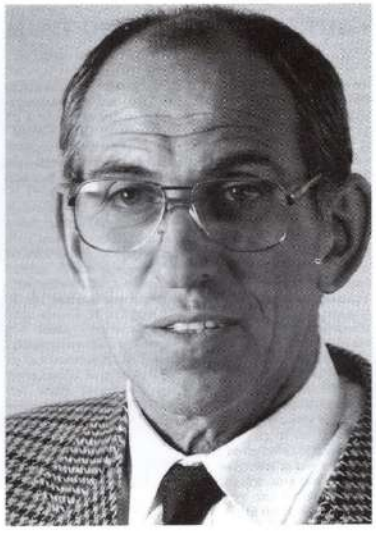


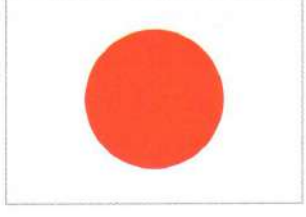
FIG. 4 Giorgio Brunelli.

Japan

25 CHAPTER

Founded 1957

Hiroyasu Ikegami,
Moroe Beppu,
Emiko Horii



In 1956, Dr. Harry Miller from Pennsylvania visited Japan. He brought the film of "Tendon Repair" edited by Dr Mason, and the letter from Dr. Bunnell which encouraged the launching of the Hand Society in Japan. In 1957, the Japanese Society for Surgery of the Hand (JSSH) was founded, and the secretariat was established at Kyushu University. The 1st Annual Meeting was held on July 7, 1957 in Kobe (President Prof. Amako). There were only fifty participants *(Fig. 1a)*, who discussed 'Hand Contracture' and 'Tendon Repair'. The proceedings were published and entitled 'Basics of Hand Surgery'.

Development of JSSH

With the effort of many senior hand pioneers *(Fig. 1b)*, the JSSH has now grown to 3,386 regular members, approximately 18% of whom are

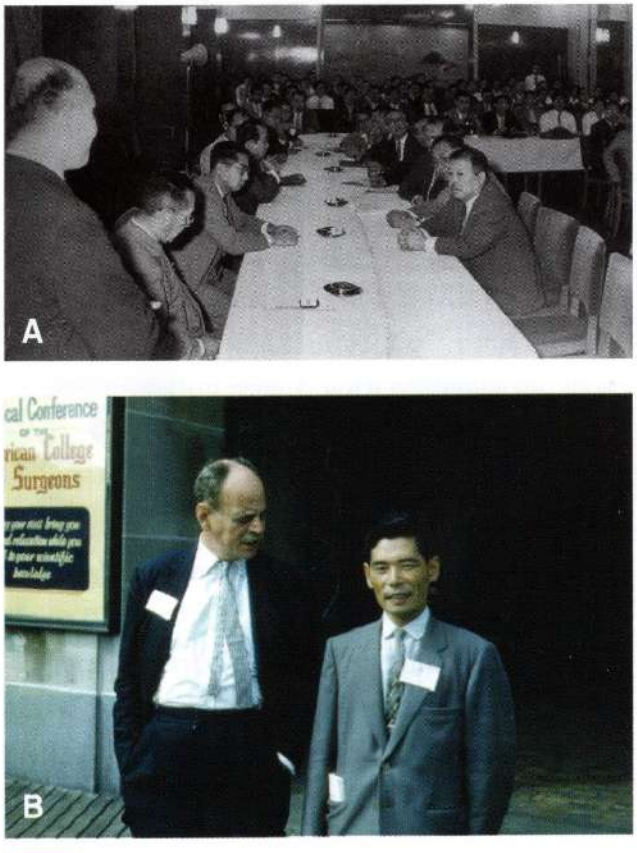


FIG. 1 **A**. The 1st JSSH meeting in Kobe.
B. Dr. Johnston and Dr. Tsuge in 1959.

FIG. 2 The 50th JSSH meeting in Yamagata.

FIG. 3 Dr. Tamai & Dr. Iwamoto.

plastic surgeons. The annual meeting is held regularly every year. The 50th Anniversary Meeting was held in Yamagata (Congress President Prof. Ogino) in April 2007. There were approximately 1,200 participants and 430 papers including poster presentations *(Fig. 2)*. The last Anniversary Meeting (52nd) was held in Tokyo (Congress President Dr. Horiuchi) in April 2009. Nearly 1,600 participants and 480 papers including poster presentations were involved *(Fig. 3)*.

As the Society grew, a stronger system was needed to manage it. In 1999, the Society presidency system began, and the central office of the JSSH was removed from Kyushu Univ. to His Brain Inc. in Nagoya. Prof. Tamai was elected the 1st President of JSSH in 2000 *(Fig. 4)*. Now the central office of the JSSH has moved from His Brain Inc. to Congress Corporation in Tokyo and Prof Minami is the 4th President of JSSH. The JSSH organization has one vice president, 12 directors, and 200 councilors. The congress president, who is elected every year, is engaged in the management of the annual meeting. In 2006, the Qualified Hand Surgeon(QHS) system was started, and 450 surgeons were registered as QHS.

JSSH activities include not only the annual meeting, but also the publication of journals, continuous education of hand surgeons, and the promotion of the importance of hand surgery among the general public.

The journal of JSSH was first published in 1983,

FIG. 4 Dr. Tamai, 1st President of JSSH, and dr. Twanoto.

FIG. 5 Journal of the JSSH.

FIG. 6 **A.** President Prof. Tajima, 3rd IFSSH, Tokyo, 2005, **B.** Japanese hand surgery leaders at 3rd IFSSH Congress, 2005.

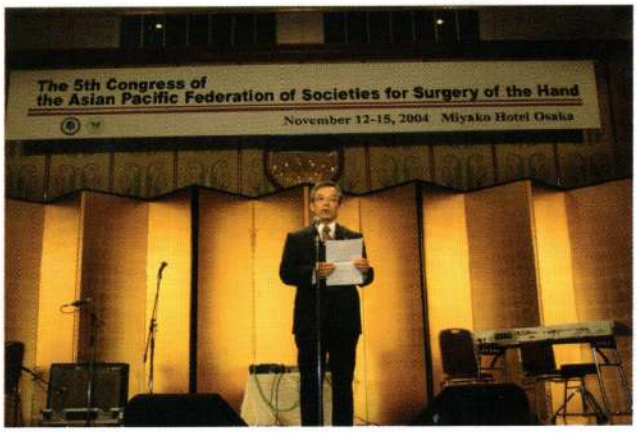


FIG. 7 Dr. Ikuta as President of 5th Congress of APFSSH, 2004.

and it is now published 6 times a year *(Fig. 4)*.

A newsletter is also published two or three times a year, while an instructional course in hand surgery has been held twice a year. Dr. Ikuta is now working as chief editor of JHS Asian volume along with several councilors.

Organizing international meetings is also an important task for the JSSH. The 3rd International Federation of Societies for Surgery of the Hand (IFSSH) Congress in 1986 was the first big international meeting hosted by the JSSH (President Prof. Tajima) *(Fig. 6)*. Since then, the JSSH has been active in the 2nd International Symposium on the Wrist in 1991 (President Prof. Miura), the 5th International Symposium on Congenital Differences of the Upper Limb in 2000 (President Prof. Ogino), and the 5th

Asian Pacific Federation of Societies for Surgery of the Hand (APFSSH) in 2004 (President Prof. Ikuta) *(Fig. 7)*. Dr. Yamauchi was elected as President of the IFSSH in 1998. Dr. Tamai was also elected as President of APFSSH in 2000. Many senior Japanese Hand Surgeons have been elected as the "Pioneer of Hand Surgery" by IFSSH *(Fig. 8)*.

We congratulate the development of hand societies, and hope for even stronger relationships between IFSSH and JSSH.

FIG. 8 Dr. Yamauchi and Dr. Miura were elected as Pioneers of Hand Surgery in Istanbul, 2001.

Korea

26 CHAPTER

Founded 1982

Goo Hyun Baek

History of Hand Surgery in Korea

Although Korea has a 1500-year-old history of oriental medicine, the modern concept of western medicine and surgery were not introduced until the late 19th century. In the early half of the 20th century, medical schools and affiliated hospitals were established one after another, and orthopedic or plastic surgery departments began to be separated from surgery departments. After the Korean War in 1953, Korea has made a rapid political and economic progress from a country impoverished by war. At that time, many new factories were built and many patients suffered from hand injuries but could not get proper care. In the late 1960s and early 1970s, orthopedic and plastic surgeons in several university hospitals were beginning to perform technically demanding hand surgeries, including replantation and mi-

crosurgery. They mostly had studied abroad or trained themselves with animals. In Seoul in 1982 some of these surgeons who were interested in hand surgery held an inter-hospital friendship meeting called "Scandinavian club", which had been named in commemoration of the Scandinavian nations that had donated in the post-war era a large amount of new medical equipment to the National Medical Center. These 19 surgeons established the Korean Society for Surgery of the Hand (KSSH) on October 29, 1982 *(Fig. 1)*. Subsequently the KSSH became one of the sub-societies under the Korean Medical Association (KMA) in December 1982. The KSSH had its first scientific meeting in 1983 and continued to have congresses twice a year, once in the spring and once in the autumn. In 1987, a separate hand surgery society with mostly plastic surgeons was formed. This society, named the Korean Reconstructive Hand Surgery Society (KRHSS), also held annual congresses until 2003, when the two societies, the KSSH and the KRHSS, merged into one, the KSSH. In 2007, the KSSH had the 25th anniversary of its foundation and published its history book.

As of 2010, there are about 1,735 members in the KSSH, of which 240 are hand specialists with a board certificate. About 100 hand surgeons are mainly or solely treating patients with hand conditions and the rest of them perform hand surgeries part time.

The KSSH publishes "The Journal of Korean Society of Surgery of the Hand" four times a year. In 2002, the KSSH successfully held the 4th biennial congress of the Asian Pacific Federation of Societies for Surgery of the Hand (APFSSH) in Seoul. In 2010 the KSSH hosted the 11th triennial congress of the International Federation of Societies for Surgery of the Hand (IFSSH) in Seoul.

FIG. 1 The KSSH entered the IFSSH is 1989.

Hand Training in Korea

One who wants to be an orthopedic or plastic surgeon enters a one-year intern program and then a 4-year orthopedic or plastic residency program after graduating from a medical school. Basic hand surgery skills can be learned during these residency programs. These residency programs are controlled by the Kore-

FIG. 2 Hands that prepare kimchi. A taste of Korean food comes from a flavor of mother's hand.

FIG. 3 A Korean traditional dance with a fan.

FIG. 4 A Gayageum, a twelve-stringed Korean harp requires delicate motion of hands.

an Hospital Association and the Ministry for Health Welfare and Family Affairs, which is responsible for quality control of all hospitals in Korea. After finishing the residency program and passing the board examination, one can practice hand surgery as a general, orthopaedic, or plastic surgeon either at a private clinic or at a hospital. If one wants to be a hand surgery specialist, one should join a hand surgery fellowship program of one or two years in the hospitals that are accredited for the fellowship training. After finishing the fellowship, one can apply for the hand surgery board examination and after passing the test, one can work as a hand surgery specialist with a board certificate. Hospitals that are permitted to have a hand surgery fellowship program are controlled by the KSSH, and have to submit hand-related patient records and educational programs to the KSSH every 5 years to maintain the accreditation.

Certification of Hand Surgery in Korea

In 2003, the Korean Orthopaedic Society (chairman, Moon Sang Chung) and the Korean Society of Plastic and Reconstructive Surgeons (chairman, Yoon Ho Lee) approved hand surgery as a subspecialty. Subsequently the Korean Society for Surgery of the Hand (KSSH) and the Korean Reconstructive Hand Surgery Society (KRHSS) merged into one the KSSH. Certification of hand surgery was closely related with this merger of the two Korean hand surgery societies in 2003.

In order to control the quality of hand surgeons and education, the unified KSSH began to work with a hand surgery specialist system in 2004. The KSSH specified qualifications for a hand surgery specialist and offered its first examination in 2005. The qualifications are such that an applicant should have practiced at least 4 years as a board-certified orthopedic or plastic surgeon, should be a member of the KSSH, should have finished at least one-year hand fellowship program that is approved by the KSSH, and authored papers regarding hand surgery and attended domestic or international hand surgery meetings. At the first examination, 195 young and old surgeons applied and 160 passed and became a hand surgery specialist. The examination is offered once a year and about 10 new surgeons are certified. As of 2009, there are about 240 certified hand surgery specialists in Korea.

Specialties that Perform Hand Surgery in Korea

Basically any doctor who has passed the test for medical doctor after graduating from a medical school can do any kind of surgery and claim the same fee as board certified surgeons for a given procedure. However, surgeries are performed usually by board-certified surgeons because patients tend to seek physicians with a specialty. Any orthopedic, plastic, or even neuro- or general surgeon can perform hand surgery. In recent years, most hospitals hire hand surgeons with more than a fellowship education and thus more and more patients with hand conditions are being treated by certified hand surgeons.

FIG. 5 The Gilt-Bronze Half-seated Contemplative Maitreya (national treasure No. 83) is comparable to The Thinker (French; Le Penseur) by Auguste Rodin.

Pioneers of Hand Surgery in Korea and their Contributions

The late Byung Hoon Ahn, studied hand sur-

FIG. 6 Hands raising a cheer to a victory in the 2002 Korea-Japan World Cup soccer games, which made all the Korean people patriotic.

FIG. 7 A calligraphy, a hand-write with brush gives us a peace of mind and strengthens a mental power.

gery at Oslo University in 1965, and was the Congress chairman of the 19th SICOT Meeting which was held in Seoul, Korea in 1993.

Ik Dong Kim who was a former president of the Kyungpook National University, was recognized for for the reconstruction of hands in lepers.

Young Ho Lee was one of the founding member of the KSSH and the first inaugural chairman of the KRHSS.

Hand surgery as one of the subspecialties of orthopedic surgery, was first introduced in Korea by Eung Shick Kang.

Kwang Suk Lee, was dedicated to microsurgery, especially the vascularized fibular graft.

Se Min Baek, a recognized microsurgeon, has been credited for designing the pectoralis major flap and lateral thigh flap.

Moon Sang Chung published the first Korean textbook on hand surgery, two volumes with 1,725 pages in 2005, and is currently the Congress president of the 11th IFSSH meeting.

Poong Taek Kim contributed to the cordial relationship between the KSSH and the Japa-

FIG. 8 A fist in Taekwondo. Taekwondo is a Korean art of self defense and is helpful in training one's body and sprits.

FIG. 9 A sewing with a hand wearing a thimble that is a protector against a needle like a helmet.

nese Hand Society, and he has been a strong proponent of endoscopic carpal tunnel release technique. Kwan Chul Tark was the Congress chairman of the 4th APFSSH meeting in Seoul in 2002, and is internationally recognized for finger replantation.

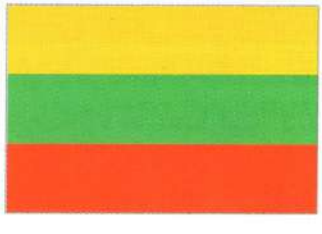
Lithuania

27 CHAPTER

MANUS LITHUANICA

Founded 1992

Darius Radzevičius,
Saulius Špokevičius



The Lithuanian Society for Surgery of the Hand "Manus Lithuanica" was established in 1992 and joined IFSSH the same year. At present Manus Lithuanica has eleven full members, two honorary members and five associates. The population of Lithuanis is 3.3 million (data 2009). All but one of the of full members are plastic surgeons. All surgeons in hand practice are members of Lithuanian Societies of Plastic Surgery or Orthopedic Surgery, thus the greatest number of Manus Lithuanica meetings are held in cooperation with either one or the other of the above mentioned Societies. The Office of the Society is based in Vilnius University Hospital Santariškių Klinikos, Žygimantų St. 3, 01102 Vilnius, Lithuania, Department of Plastic and Reconstructive Surgery, email jauniskis@gmail.com.

Medical doctors willing to practice hand surgery in Lithuania after one year of primary res-

FIG. 1 Živilė Jasutytė „The Hands", 2001. 1000x98cm. Oil on wood.

FIG. 2 Anatomical hand dissection, by Adomas Bielkevičius (Bielkiewicz), (1797-1840). Property of Faculty of Medicine, Vilnius University.

FIG. 3 Old Town of Vilnius.

FIG. 4 Cathedral and Belfry, Vilnius.

idency are expected to finish a five year plastic surgery or orthopedic surgery secondary residency at Vilnius University Medical Faculty or Kaunas University of Medicine. An eight month training period in hand surgery includes, basic hand surgery skills and microsurgery. The vast majority of medical doctors practicing hand surgery in Lithuania are orthopedic surgeons. Most plastic surgeons also have experience in microsurgery and are concentrated in the two biggest cities of Lithuania,Vilnius and Kaunas.

A diploma examination of the Federation of European Societies for Surgery of the Hand (FESSH) is available for Lithuanian hand surgeons at the time of the annual Congress.

Contemporary or classical (Bunnell's) hand surgery developed in Lithuania in the 1980s. Previously surgery of the hand was practiced mainly by general trauma surgeons, although some hand disorders, such as rheumatoid deformities, were treated by rheumatologists and general rehabilitation physicians. Composite hand trauma cases were treated usually by the general trauma specialists and vascular surgeons and/or neurosurgeons.

Historically the first description of the treatment of the congenital syndactyly was mentioned by Jokūbas Šimkevičius (Szimkiewicz), a Vilnius University graduate and a local physician at the Hospital of St. Jacob. He wrote the first trauma manuscript in Lithuania in early 1810s.

Another very talented surgeon and anatomist was Adomas Bielkevičius (Bielkiewicz), who performed careful and detailed anatomical dissections; his elaborate hand dissections depicts the highest understanding of the hand anatomy and appreciation of the finest hand structures *(Fig. 2)*.

During the Soviet period, all of medicine in Lithuania was formulated according to the Soviet rules implemented by the leading hospitals

in Moscow. A greater impact on the development of hand surgery became possible only after the introduction of microsurgery as a branch of the general/vascular surgery in the Soviet Union in 1970s. The first successful microsurgical thumb replant was performed in Moscow in 1976. Encouraged by the new and dramatic techniques, microsurgery became rapidly mastered and implimented into the clinical practice in Vilnius, Lithuania, by Kęstutis Vitkus, who was guided and trained by his father Mečislovas Vitkus. They achieved the first successful replantation of a composite of two fingers block amputated through the metacarpals in 1980.

The success was a major stimulus for starting broader studies in the intricacies of the hand anatomy and hand surgery. Soon Vilnius Microsurgical Centre became the leader in the entire Soviet Union, and is also recognized as an outstanding microsurgical center by the Europeans.

FIG. 5 View from the Church of St. Francis of Assisi, Vilnius.

28 CHAPTER

Malaysia

Founded 1993

Tunku Sara Ahmad

Malaysia is a multicultural, multi religious country and gained an amicable independence from Britain in 1957. In our history we have Indian, Chinese, Arabic, Portuguese and Dutch influences and many others as we were on the main route for ships looking to buy spices; our medical administration system was inherited from the British administration.

Hand surgery in Malaysia began as management for leprosy. A leprosarium was set up in Sungai Buloh (Bamboo River in English), a small town which is a 15 minutes drive from Kuala Lumpur *(Fig. 1)*. The set up included outpatient and inpatient facilities and residences for patients requiring long term management. Many patients decided to reside around the hospital to escape social stigma and also to group together economically to grow and sell flowers and potted plants. The area became known for

selling plants and flowers, which admittedly is not an ideal occupation for those with insensate hands, but nevertheless helped them to make a good living and in some cases, to prosper.

Dr K. Thambyrajah worked in Sungei Buloh Hospital in the 1960s. He remembers Dr Dakshiamoorthy and himself performing 20 to 30 procedures a month on hands and feet. The main problem they encountered was high ulnar nerve lesions. Today, Leprosy is still the world's main cause of high ulnar nerve palsies. They performed Brand's many tailed transfer, grafting from extensor carpi radialis longus (ECRL) to the dorsal hood using a palmaris longus for a graft. They also performed opponensplasties for median nerve lesions at the wrist. Sadly, they were not able to restore the debilitating loss of sensation. We are little better at that even today.

Doctors in Malaysia then were either trained overseas or moved to Malaysia from abroad. The first medical school, the University of Malaya, was set up in Singapore (then part of Malaysia) in 1949. The two countries separated and the branch in Kuala Lumpur was officially renamed the University of Malaya in1969.

There was also help available from overseas. The legendary leprosy surgeon Dr. Grace Warren and a Dr John Hargrave visited from time to time, from Australia. They examined and operated on patients and guided young surgeons. "The Leprosy Mission of England" also helped by sending physiotherapists such as Miss Jean Watson to rehabilitate these unfortunate patients. Dr Thambyrajah did two fellowships with Mr Pulvertaft at the Derbyshire Royal Infirmary and on return joined the Orthopaedic Department of the University of Malaya. With encouragement from Prof. P. Balasubramaniam the head of the Orthopaedic Department and advice from Professor Pesi Chacha, a visiting examiner from Singapore, a microsurgical practice laboratory was set up using the rat

FIG. 1 Sungei Buloh Leprosarium Ward.

FIG. 2 Malaysian Orthopaedic Surgery Association/ College of Surgeons of Malaysia National Course on Hand Surgery – left to right SPCHow, Venkataswami, PCLeung, Campbell Semple, Chehab Helmi, RWHPho, Khaw Joo Hwa, A. Hamid.

FIG. 3 Logo reflecting different cultures and disciplines interwoven and working towards excellence in hand surgery.

carotid artery model. Today, the Department of Orthopaedic Surgery runs a yearly Basic Microsurgical Course, which has been successfully continued for the past 8 years.

Another young Orthopaedic Surgeon, Dr. Abdul Hamid bin Kadir also became interested in hand and microsurgery and did a fellowship with Mr Campbell- Semple in UK. He joined the second medical school in Malaysia ,the Universiti Kebangsaan Malaysia (National University of Malaysia) and also set up a microsurgery practice laboratory there. In 1983, he became the Secretary of the Malaysian Orthopaedic Association (MOA) and organized a hand Course under the banner of the MOA and the College of Surgeons of Malaysia *(Fig. 2)*.

The distinguished faculty included S.P.Chow and P.C. Leung from Hong Kong, Venkataswami from India, Campbell Semple from UK, Chehab Helmi from Indonesia and Robert W.H. Pho from Singapore. Abdul Hamid and Khaw Joo Hwa represented Malaysia. Over the years, there has been much cooperation and transfer of skills from nearby and distant countries. Prof P.C. Leung performed the first two toe-to-thumb transfers (one in each of the two medical faculties) in 1985.

Over the years, many more young surgeons developed an interest in Hand and Microsurgery and several did training abroad. Dr V. Pathmanathan and Dr R. A. Vaikunthan were the first to do fellowships at the "Christine Kleinert Instituite of Hand Surgery", Louisville, Kentucky, USA. After their return, enthusiasm was all and the Malaysian Society for Surgery of the Hand (MSSH) was formed *(Fig. 3)*. It was registered on the 3rd of March 1993. Dr. Abdul Hamid became the protem President and Dr V. Pathmanathan was secretary. The motto of our society is "Excellence through Hand Surgery".

The surgeons worked closely with therapists and decided to make therapists full members of the society, a unique cooperation. Several therapists, especially Mr Nathan Vytialingam, were active in the committees in the early days. However, later on it was decided to revert to an association membership similar to those overseas, with surgeons as full members and

FIG. 4 Ist Malaysian Conference on Surgery and Rehabilitation of the Hand – 1993.

therapists as associate members. We ran joint "Roadshows" with therapists, in most of the 14 states in Malaysia where the surgeons would talk about various topics covering hand trauma and the therapists would hold splinting and therapy workshops.

In 1993 the Malaysian Society for Surgery of the hand (MSSH) held a course entitled "The 1st Malaysian Conference on Surgery and Rehabilitation of the Hand" *(Fig. 4)*. This was a successful international course with guest speakers including Judy Colditz, Robert WH Pho, Tsu Min Tsai, David Green, Teoh Lam Chuan and James Hunter. The next conference was entitled "The 2nd Malaysian Conference on Surgery and Rehabilitation of the Hand" but quickly became known as the "2nd Hand meeting". We invited in addition to the previous regional guests, Jean Pillet, the famous prosthetist, from France, and other famous hand surgeons such as Venkataswami and B.B.Joshi from India. It was again very successful, although on a visit to the Tropical Jungle Learning centre in the University of Malaya, a thunderstorm broke out and a bolt of lightning struck a few feet from Prof Robert Pho!

Since those two big international conferences, the specialty of hand surgery has been slowly and quietly gaining strength. There have been circle meetings at least three times a year. These meetings are loosely based on the circle meetings held in Liverpool, UK and the concept was brought back by MCh. Orth (Liverpool) candidates. The meetings are held traditionally in homes of surgeons, not institutions, and are casual meetings where exchanges of ideas occur and discussions on difficult problems are held. These casual and warm meetings are in line with our Malaysian culture and have been readily accepted and proved to be an invaluable source of learning and camaraderie. Yearly annual scientific meetings are held in conjunction with the MSSH annual general meeting and have been well attended. In addtion, other courses that have been held are: the Universiti Malaya (UM) cadaveric flap course 2007, the Universiti Putra comprehensive course 2008, the yearly UM basic Microsurgery course for the past

8 years and the Kuantan National Course on Hand Trauma for the past 4 years.

The MSSH designed a logo which was adopted in 2007 and reflects many different cultures and disciplines that are interwoven and working towards excellence in hand surgery *(Fig. 3)*.

The only Department of Hand Surgery in the Ministry of Health was set up in the Kuala Lumpur Hospital in 1986. It moved to Selayang Hospital (on the outskirts of Kuala Lumpur) in 1999. It was headed by Dr V. Pathmanathan, a pioneer who has been involved tirelessly in the training of Hand Surgeons since the department was established.

FIG. 5 FESSH congress 2008, Sharifah Roohi Ahmad (on the left) after winning the prize for the hand surgery examination.

On the 18th of May 2000, a team led by Dr V. Pathmanathan at the Department of Hand Surgery, Selayang, performed the world's first arm and hand transplant on a one-month-old baby girl. This was a unique opportunity. Chong Lih Ying was born without a left arm and had an identical twin with a brain abnormality, incompatible with life. Their team rose to the occasion. The second twin was kept alive until the limb was harvested and transplanted to her sister. This was very delicate surgery as vessel spasm was a continuous threat during the proximal dissection of the recipient nerves and vessels that were unusually small, due to the failure of formation. Since the twins were identical, there was no need for anti rejection drugs. It was the worlds 9th successful hand transplant and the world's first arm and hand transplant.

Recently the Ministry of Health began four year subspecialty courses for post graduate doctors. The four years include a one year fellowship abroad. The two pioneer doctors to be accepted for hand surgery are Dr Chua Chee –Kheng and Dr Rashdeen Fazwi bin Muhammad Nawawi. They are undergoing their training now and it is hoped they will be followed by many others. Although Hand and Microsurgery is not one of the most popular subspecialties of either Plastic Surgery or Orthopaedic Surgery, there is no doubt that these surgeons are very needed. With industry and construction carrying on at a rapid rate, the number of hand injuries is staggering. The popularity of the motorbike as a mode of transport also leads to many injuries and especially brachial plexus injuries. Numbers are not available, but the fact is that the hospitals able to perform the appropriate surgery are finding it difficult to cope.

The trauma seen in our country has attracted

fellows from abroad such as:

Dr Tracey Horton (U.K. 2006)

Dr. Simon Tan (U.K. 2007)

Dr. Fuat Malkok (2008 Turkey)

Dr AlAmeen Salim Mohammed (Sudan 2009)

This exchange of ideas and also cultures is excellent for our local surgeons. We need to benchmark our standards with international standards. When FESSH (Federation of European Societies for Surgery of the Hand) opened their hand surgery examination to foreigners, Dr Sharifah Roohi sat for the examination in 2008 in Lausanne, Switzerland and topped the class *(Fig. 5)*. Dr. Tunka Sara Ahmad passed it in Poznan, Poland 2009 and Malaysian hand surgeons will continue to seek international benchmarking.

We are looking forward to hosting another international meeting, the congress of the Asia Pacific Society for Surgery of the Hand in the next few years *(Fig. 6)*. With this in mind, we have encouraged our therapy colleagues to form a 'Hand Therapy Interest Group'. The group has been formed and developed several ambitious plans for the future.

What the MSSH aim for in the future is

- to have a uniformly high standard of care for hand conditions and injuries throughout the country
- to have a high standard of local postgraduate training in hand and microsurgery
- to aid, catalyze and foster formation of a hand therapists group for training and learning
- to form and maintain closer international links
- to carry out more research
- to look into prevention and treatment of hand injuries in the local context
- to be a presence at all international conferences
- to publish in all major hand surgery journals

With a dynamic group, a critical mass of members and god's grace, we hope these goals can be achieved.

FIG. 6 Malaysian Hand surgeons and friends at the APFSSH Hong Kong (2008) posing at the hand print of Jackie Chan.

29 CHAPTER

Mexico

Founded 1980

Alejandro Espinosa Gutierrez
Fernando Padilla Becerra
with the collaboration of:
Francisco Garcia Lira
Jorge Diaz Gutierrez

Just like in the United States of America and Europe, here in México, the orthopedic surgeons started managing the surgery of the hand by having an additional training. In the year 1970, Dr. Juan Manuel Fernández Vázquez, an orthopedic surgeon, had the honor of being the first fellow in hand surgery at the Mayo Clinic in Rochester, Minnesota. Right after that, a group of plastic surgeons created a group for the development of such specialty. In 1948 Dr. Sterling Bunnell visited Mexico for a two-week trip. He gave many lectures and performed several surgeries which took place mostly at the Traumatology clinic number 4 of the "Instituto Mexicano del Seguro Social" (Mexican institute of social security [IMSS]).

In 1950, Dr Mario González Ulloa, a Plastic Surgeon, started the Dalinde Seminars of hand surgery. After that, there was a period of wait-

ing until 1953 when Dr Adán Velarde y Oaxaca, Surgeon of the IMSS, and head of the medical services of "Ferrocarriles Nacionales de México" (National Railroads of México), together with Dr Alejandro Velazco Zimbrón, Orthopedic surgeon, organized several academic events. They brought professor Lorenz Bohler from Vienna who gave a complete course about traumatology at the colonial hospital in Mexico City. Among other topics, the advances of the treatment of the fractures of the carpal and metacarpal bones were taught.

Within the field of institutional medicine, Dr Enrique Arreguin Vélez from IMSS organized the first one-week course about professional hand trauma.. In 1958, Dr. Mario Gonzales Ulloa, a plastic surgeon organized seminars where during five consecutive years doctors from U.S.A. attended to give lectures. Most of the lectures were give by Dr Michael L. Mason, Dr William J. Littler, Dr Robert A. Chase, Dr Hugh S. Crawford, Dr William L. White, Dr Erle E Peacock, Dr Eugene S. Kilgore and Dr Sylvester J. Carter. They shared their knowledge with about 120 Mexican surgeons and some from Central and South America.

By that time, the First Course of Hand Surgery took place within the Second International Course of Traumatology and Orthopedics given by Dr. Jorge González Rentería *(Fig. 1)*, Dr. Eduardo Stevens Pérez Garcia, Dr. Armando L. Bejarano, Dr. Alberto Pérez Garcia, Dr. Alfonso Tohen Zamudio and Dr. Luis Gomez Correa *(Fig. 2)*.

The most important advance of the surgery of the hand in the 1950's was the reconstruction of an amputated thumb by performing a pollicization. While two great surgeons of the time Bunnell in 1952 and Littler in 1953 published their first techniques about it, so did Doctors Ortiz Monasterio and Serrano in 1955 and 1957 respectively.

Dr Fernando Ortiz Monasterio and Dr. Alfonso Serrano Rebeil published the first book about hand surgery edited by the "Academia Mexicana de Cirugia" (Mexican Surgery academy) and entitled "Hand Surgery" in the year 1963.

FIG. 1 Dr Jorge Gonzalez Renteria.

In 1964 and 1965, there were given several courses of hand surgery around the country organized by Dr. Correa and Dr. Renteria and later international congresses of the specialty in Caracas, Venezuela, Rio de Janeiro, Brazil and Lima, Peru. In 1968 Latin American surgeons founded in Chicago the "Sociedad de Cirugia de la Mano del Caribe" (Caribbean Society of Hand Surgery), which began with 150 surgeons from 15 countries. They celebrated their first congress in México City in 1969.

In 1970, Dr. Luis Gomez Correa and Dr Alfonso Vega Rodriguez, a plastic surgeon, performed the first arm replantation, at La Raza hospital, IMMS in México City. In 1971, Dr. Joaquin Araico, who was one of the first doctors of the first generation of hand surgeons from the General Hospital of Mexico, wrote the article "Internal fixation with a nail for adduction contracture of the thumb". After that he worked as the head of the hand surgery department at the "Centro Médico Nacional Siglo XXI" (XXI Century National Medical Center) from IMMS.

FIG. 2 Dr. Luis Gomez Correa.

FIG. 3 Dr. Fernando Ortiz Monasterio.

FIG. 4 Dr Alfonso Vega Rodriguez.

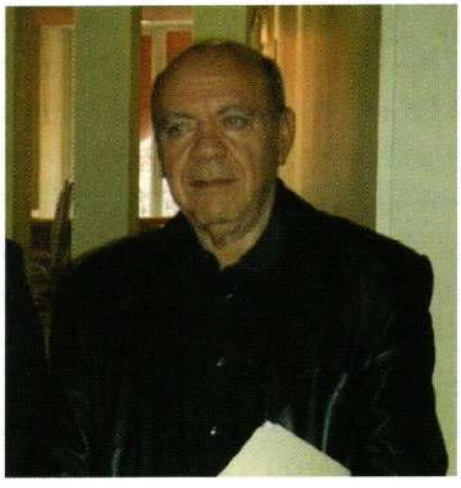


FIG. 5 Dr. Juan Manuel Fernandez Vazquez.

In 1979, the only course of hand surgery as a subspecialty with university recognition was established and taught by Dr. Luis Gomez Correa. It was taken by Mexican, Central and South American surgeons. It was held at "20 de Noviembre" hospital and endorsed by the "Universidad Nacional Autonoma de México"(National Autonomous University of Mexico [UNAM]). The last course was held in 1990.

In the year 1979 Dr. Juan Manuel Fernandez Vázquez *(Fig. 5)*, Orthopedic and hand surgeon founded the hand committee of the "Sociedad Mexicana de Ortopedia" (Mexican Society of orthopedics) with him as its coordinator until 1991.

In 1980, the "Asociacion Mexicana de Cirugía de la Mano"(Mexican association of hand surgery [AMCM]), elected Dr Luis Gomez Correa as its first president and Dr Juan Manuel Fernandez Vazquez as his successor.

Dr. Luis Gomez Correa made many contributions to hand surgery, such as the first hand revascularization in 1967 and his book "Cirugia de la mano"(hand surgery), edited by IMMS in 1971. In 1986 the first transplant toe to hand was performed by him. In that same year, Dr Gómez Correa together along with Ramón Cuenca Guerra and Dr. Alfonso Vega published another book named "Cirugía de mano" by Salvat Mexicana Ediciones.

It is thanks to Dr. Gomez Correa that a chair for hand surgery was established inside the board of "Academia Mexicana de Cirugia" (Mexican Academy of Surgery). When the flexor tendon zones were created designating zone II as "No man's land", Dr. Gomez Correa named it "Zona de Zapata" (Zapata's Zone). Zapata was a revolutionary whose motto was "land and freedom". He named it after Zapata because he used to say that the land should be owned by the ones who work on it. In 1987, the second Pan-American congress of hand surgery was held in Cocoyoc, Morelos in honor of Dr William Littler's teachings in our country. Guest professors from around the world included Dr Alfred B. Swanson, Dr Harry J. Buncke, Dr Hanno Millesi, Dr J. Michon and Dr. M.M. Joshi *(Fig. 6)*.

Unfortunately Dr. Luis Gomez Correa passed away on January the 14th 2010, one day short of his 89th birthday. It was a huge loss for hand surgery in Mexico but his legacy will stay for future generations.

Dr. Jorge Gonzalez Renteria, who is 89 years old, is still working actively at Ruben Leñero hospital in México City. He took his training with surgeons of great prestige such as Dr Mason, Dr Littler, Dr W.L. White and Dr Chase. He has written multiple articles and books on Hand Surgery.

There are in our country multiple courses and fellows about hand surgery but the only ones that have a university recognition are the ones held at "Lomas Verdes" hospital directed by Dr. Manuel Briesno; "Dr. Manuel Gea Gonzalez" hospital directed by Dr. Carlos Gargollo and "Instituto Nacional de Rehabilitación"(National Rehabilitation Institute[INR]) directed by Dr Alejandro Espinosa.

Dr Luis Guillermo Ibarra, Director of INR, formed in 1985 the Hand and Microvascular Surgery department at INR, having Dr Moises

FIG. 6 Drs. William Littler, Luis Gomez Correa, Harry J. Buncke, Hanno Millesi and colleagues at 1987 Pan-American Congress in Cocoyoc, Morelos.

FIG. 7 Sociedad Mexicana De Cirugia De La Mano Y Microcirugia A.C.

López Ramos and Dr. Octaviano Cruz Matadamas as its surgeons until 1992 when Dr. Alejandro Espinosa Gutierrez become chairman. He gathered a team of hand surgeons with orthopedic and plastic surgery backgrounds that included: Doctors Mario Mendoza Muñoz, Rafael Reynoso Campos and José Antonio Rivas Montero. Under Dr Espinosa's gesture, INR got the authorization to open the post-grad and the diploma course of hand surgery certified

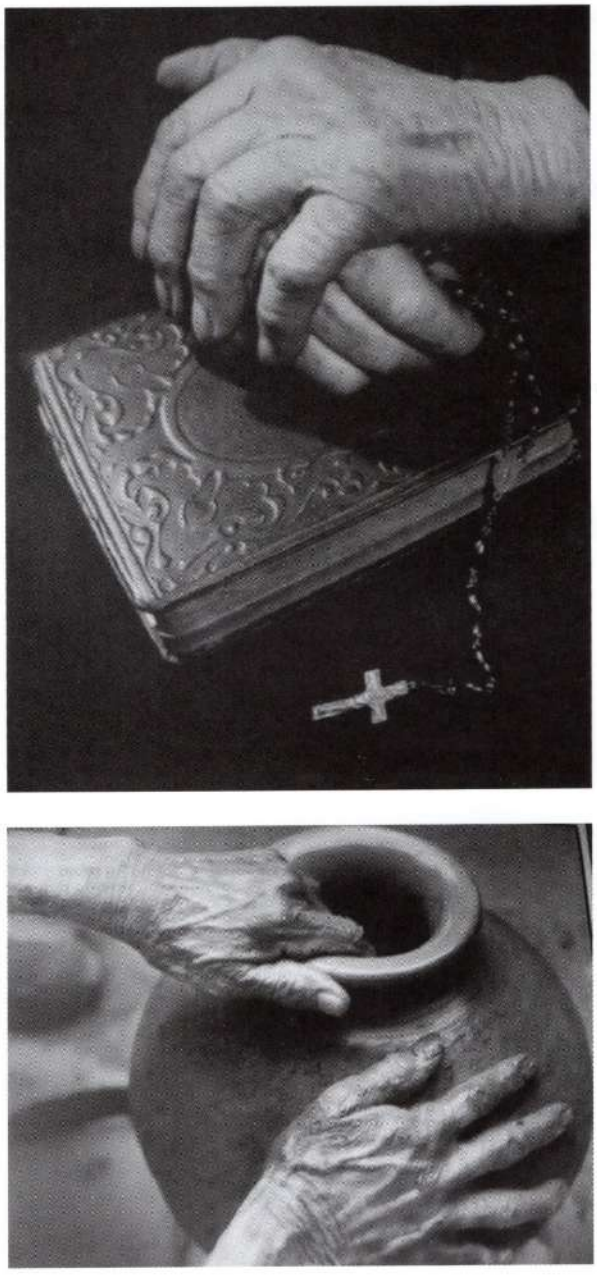


FIG. 8 **A.** De Rosario (From Rosario) Catedral De Puebla. **8B** Doña Rosa Trabajando Barro Negro En Oaxaca (Mrs. Rosa Working On Black Clay In Oaxaca). Mexico 1969.

by UNAM. So far, the department has trained 18 generations totaling 76 graduated surgeons and has 8 surgeons in current training from all around the country and some from Central and South America. This course is the only one that has had university recognition for more than 15 years and is endorsed by UNAM which is the maximum house of studies in Mexico.

The Hand and Microvascular Surgery Department of INR, offers emergency attention and programmed surgeries from different clinics of the specialty. It also supports teaching by organizing several courses and conferences. It has held 12 international courses of hand surgery and 6 more courses endorsed by AO with the current concepts in wrist and hand osteosynthesis. International professors from all around the world with a high academic level have influenced directly in the development of the hand surgeon in Mexico. For more than a decade this service has organized multiple campaigns of outdoors surgery starting in the state of Guerrero and continuing in the states of Jalisco, Durango, Chiapas and Campeche to support the communities of the country where there are no hand surgeons.

In our country, there are many hand surgeons who had their training outside the country. The very first one was the aforementioned Dr Juan Manuel Fernandez Vazquez. He was followed by other surgeons who were trained at the C. Kleinert Institute in Kentucky including: Dr Jorge Clifton Correa, Dr. Alfredo Neira, Dr. Fernando Padilla, Dr. Oscar Orozco, Dr. Rafael Reynoso Campo, Dr. Ricardo Pacheco and Dr. Alejandro Espinosa. All of them are nowadays teachers of this specialty in different institutions of the country.

Conclusion

Despite being relatively young, the Surgery of the Hand in Mexico has reached advances which are comparable with the ones from countries from all around the world. We believe that these results are the product of the unique effort and dedication of the community of surgeons from our country. We have named most of them in this article and we apologize in advance be-

cause it is hard to mention all of them.

The challenge for the new generations in Mexico is big because the mentors have set the standards to a very high level, but we are sure that they will be up to it.

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New Zealand

30 CHAPTER

Founded 1976

Alastair Rothwell

The New Zealand Society for Surgery of the Hand was formed on 13th November 1976 at a meeting in Auckland of 36 orthopaedic and plastic surgeons interested in hand surgery. The meeting had been convened by Mr Alan McKenzie who was elected the first President. Mr. Earle Brown was the first secretary and the other elected committee members were Messrs G Blake, J Lester, O Mehrotra and A Rothwell. Initially it was called the New Zealand Hand Club but about ten years later was changed to The New Zealand Society for Surgery of the Hand. In the early years meetings of the Society were normally "piggybacked" onto that of another group such as the New Zealand Orthopaedic Association when it had an eminent hand specialist guest lecturer.

As time passed, independent meetings of the society were held, but, increasingly, full time hand

FIG. 1 The New Zealand "All Blacks" Rugby Team performing the haka, the traditional dance of the Maori of New Zealand.

surgeons recognized the need for a larger peer group, particularly for continuous medical education (CME) and became increasingly involved with the Australian Hand Surgery Society. After a very successful combined meeting in Queenstown in 2005, it was agreed to formalize a greater association of the two societies and in 2006 many NZ hand surgeons became corresponding members of the Australian Hand Surgery society. They regularly attend the Australian society's meetings and the expectation is that New Zealand will host regular combined conferences in rotation with the Australian state Hand societies

FIG. 2 The hands of Richie McCaw, captain of New Zealand All Blacks rugby team and International Player of the Year 2009.

Training

The New Zealand Society for Surgery of the Hand does not undertake or sponsor any formal training programmes. However, since 2005 two Hand Fellowships with the Regional Hand Service, in Auckland, (one for a plastic surgically trained and one for an orthopaedically trained surgeon) have been available. In addition there has always been a steady flow of New Zealanders receiving Hand Fellowship training in Australia. In 2010 the first Australian surgeon was selected for one of the Hand Fellowships available in NZ.

Research

Throughout the 1960's through to the 1980's Mr. M Flint an academic plastic surgeon published extensively on the changes to proteoglycans, glycosaminoglycans and collagen in flexor tendons, ligaments, dermis and Dupuytren's disorder placed under varying conditions of physical stress and culture. Another area of his interest was Langer's lines which led to his "circle technique" for determining the optimal line of skin tumour excision.

In the late 1980's the Spinal Cord Injury Upper Limb Research Group was set up by Prof A Rothwell in Christchurch. It has produced a number of publications on a diverse range of topics including reconstructive arm and hand surgery, psychometric analyses of upper limb function in relation to impairment and participation before and after surgery, patterns of manual wheelchair propulsion for different spinal cord injury levels including the changes following upper limb surgery and defining the optimum working space for an individual confined to a wheelchair.

As the Fellowship program has developed in Auckland, increasing emphasis is being placed on research and audit. The Fellows are expected to be actively involved in the development and management of appropriate clinical trials.

The Development of Hand Surgery and National Personalities

Although hand surgery did not become recognised as an independent specialty in New Zealand until the early 1990's many surgeons, both Orthopaedic and Plastic, prior to that time undertook acute and elective hand surgery as a major sub speciality interest. Most of them had no formal Fellowship training but attended appropriate courses and visited overseas Hand units during their careers. In the Auckland region the early surgeons included Messrs W Pike, W Manchester, O Nicholson and J Williams; in the Wellington region Messrs F Hutter, C Bossley, and M Lovie; in the Canterbury region, Messrs J Lester and G Blake; and in the Otago region, Prof.N Nisbet and Mr A McKenzie.

Over the last 15 years the numbers of full or near fulltime hand surgeons have steadily increased in the major metropolitan regions as well as in some of the more provincial regions. It is noteworthy that Dr Karen Smith, a Hand surgeon in Auckland, was the first female Orthopaedic surgeon admitted to the Royal Australasian College of Surgeons.

Independent hand units for the management of acute hand injuires by orthopaedic and plastic surgeons were formed in Christchurch in the early 1980's and in Auckland in the mid 1990's. These units also function as major tertiary referral centers. The 1980s also saw the development of Hand Therapy groups encouraged by hand surgeons who recognised the vital role of therapists in hand rehabilitation.

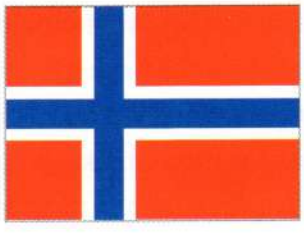
Norway

31 CHAPTER

Norsk forening for håndkirurgi

Founded 1979

Leiv M. Hove & Jan-Ragnar Haugstvedt



History of the Society

The Norwegian Society for Surgery of the Hand was established in 1979. During the fall and winter of 1978-79 the Drs Arne Reigstad (1922) and Cato Hellum (1928-) from the Crown Princess Märtha's Institute (KMI) in Oslo arranged meetings to prepare the founding of a Norwegian Society for Surgery of the Hand. Dr Jens Teigland (1929-) was the secretary and referent at these meetings. At this time a Scandinavian Society was already established.

Erik Moberg (1905-1993) from Gothenburg, Sweden published in 1947 his book "Akut Handkirurgi" after having visited Sterling Bunnell. This book defined the standards of modern hand surgery in Scandinavia. During a meeting of the Nordic Surgical Society in Copenhagen in 1951, the main topic of the first day was hand surgery. During the weeks before the

meeting, Erik Moberg invited Nordic (from the Scandinavian countries) colleagues with interest in the field of hand surgery to participate in a meeting in order to form a new society. At a lunch-meeting at the restaurant in the National Museum in Copenhagen 30 Nordic surgeons founded the Nordic Hand Club (1951). Erik Moberg was the first president. Thus the Scandinavian Society became the second established society for hand surgeons in the world next to the American Society. The British Hand Club (later BSSH) was established in 1952. From Norway Halfdan Schjelderup *(Fig. 1)*, Henrich Nissen-Lie, Vilh Loennecken, and M. Foss-Hauge were among the "founding fathers". The following years The Nordic Hand Club had separate sessions at the Nordic Surgical Meetings, while in 1956 the first meeting for hand surgeons only was arranged at Moberg's department in Gothenburg. At the first Scandinavian congress in Sandefjord, Norway in 1977, the name of the hand club was changed to the Scandinavian Society for Surgery of the Hand (SSSH). At present, Jan-Ragnar Haugstvedt (1954-), senior hand surgeon at the National Hospital in Oslo, is president of the SSSH (2010-). The Society is part-owner of the Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery. The SSSH is a founding member of the International Federation of Societies for Surgery of the Hand (IFSSH), established in 1966, with Erik Moberg as the first president (1968-69).

For many years the Nordic Hand Club was the only society for Norwegian hand surgeons. However on March 24, 1979, nine Norwegian hand surgeons met at KMI in Oslo to establish the Norwegian Society for Surgery of the Hand (NSSH). A few weeks later the society had 22 members, while today (2009) the society counts 70 members and four honorary members. Dr

FIG. 1 Dr Halfdan Schjelderup.

Arne Rugtveit was elected the first chairman in 1979[1]. The Norwegian society (represented by Kjell Bye) was among the founders of the European Federation of Societies for Surgery of the Hand (FESSH) during the first European Congress in Hand Surgery in Paris 1990.

Training

In Norway, hand surgery is not a speciality of its own. Several Norwegian surgeons have received their speciality in hand surgery after clinical training in Sweden or from the Icelandic's authorities based on the EU/EØS-agreements. The Federation of European Societies for Surgery of the Hand (FESSH) has established a European Diploma in Hand Surgery. Based on this, a similar Norwegian Diploma in Hand Surgery has been formed. To achieve this diploma the surgeon needs to be a specialists in orthopaedic surgery or plastic surgery, and needs at least two more years of training at a centre for hand sur-

gery. The candidate also needs to verify a wide experience within hand and microsurgery.

Hand surgery in Norway is organised as a regional sub-speciality. All Norwegian university hospitals have separate divisions for hand surgery within their departments of either orthopaedic or plastic surgery. At the academic scene two Norwegian hand surgeons have been appointed professors; Bill Finsen (1946-) at the University of Trondheim (1996) and Leiv Hove (1948-) at the University of Bergen (1998). Several attempts have been made to establish an academic chair in Oslo as well, but without success. The Norwegian Society for Surgery of the Hand and the Norwegian Orthopaedic Society run annual Instructional Courses in Hand Surgery in Oslo, Bergen, and Trondheim, respectively. At the 50-years anniversary for the instructional courses in 2009 the first Norwegian textbook in hand surgery was published[3].

Norwegian Pioneers in Hand Surgery

Halfdan Schjelderup (1911-91) *(Fig. 1)* had been trained as a plastic surgeon by Sir Harold Gillies at Basingstoke near London, UK. The head of the hand surgery service in Basingstoke was Mr James Cuthbet, a former trainee of Mr Guy Pulvertaft. In 1948 Schjelderup visited Sterling Bunnell and other hand centres in the US. After returning to Norway he established the first Norwegian department of plastic and hand surgery at the Red Cross Clinic in Bergen in the fall of 1948. In 1958 the department moved to the Betanien Hospital and expanded to 45 beds. In 1967 the department was included as part of the University Hospital in Bergen with Schjelderup as the head. From 1958 he gave lectures in plastic and hand surgery at the University of Bergen. He established the first annual postgraduate instructional course in hand surgery in Norway in 1959[2]. Schjelderup was awarded with the Knights Cross of St. Olav for his achievements in plastic and hand surgery in Norway.

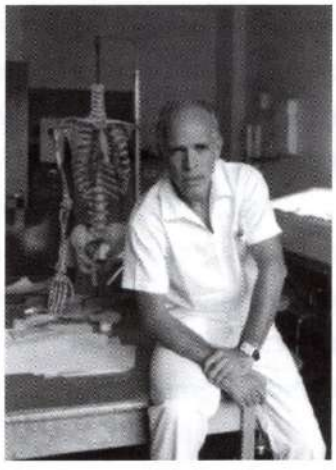


FIG. 2 Dr Astor Reigstad.

In Oslo hand surgery evolved from the orthopaedic tradition. In 1956 the national hospital, KMI, was established as an orthopaedic hospital for treatment of sequelae after polio. As the number of patients suffering from polio decreased, it soon became a hospital for treating patients with rheumatoid arthritis or other orthopaedic conditions especially those in the upper extremity. Henrich Nissen-Lie (1903-78) was the first head of the department. He came from a position as consultant in orthopaedic surgery and associate professor at Ullevål Hospital. He was a skilled orthopaedic surgeon and had studied at different hand surgical centres abroad. Nissen-Lie was a close friend and collaborator of the Swedish pioneer in hand surgery, Erik Moberg. When Nissen-Lie retired in 1973 he was awarded with the Knights Cross of St. Olav for his achievements in orthopaedics and hand surgery in Norway. As the head of KMI he was succeeded by Arne Rugtveit (1922) and later by Astor Reigstad (1937-) *(Fig. 2)*.

The latter established microvascular surgery as a regular practice in Norway in 1983[1].

In Trondheim, Inger Schulstad who had been

trained in general, plastic-, and orthopaedic surgery, was the first consultant in hand surgery (1963-77) at the department of Orthopaedic Surgery. She was followed by Knut Skoglund (1977-80) and Harald Russwurm (1980-2005). During these years the hospital transformed from a central hospital to a regional and university hospital, and became a part of the University in Trondheim. The hand unit became a division under the Department of orthopaedic surgery.

In Tromsø hand surgery was organized as a department of Plastic and Hand Surgery. The general surgeon, Jan Sæbøe-Larsen (1931-2003) was the first head of hand surgery at this University Hospital. In 1999, he was followed by the orthopaedic surgeon, Harry Johanen as head of the hand surgery service in the Department of Plastic and Hand Surgery.

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32 CHAPTER

Philippines

Founded 1985

Ida S. Tacata,
Emmanuel P. Estrella

Hand surgery in the Philippines began with two premier orthopedic institutions: The National Orthopedic Hospital (now the Philippine Orthopedic Center) and the University of the Philippines - Philippine General Hospital, Department of Orthopedics. The National Orthopedic Hospital evolved during the aftermath of World War II in 1945 as an Emergency Hospital-The Civilian Aid Unit I, organized by a Filipino Surgeon-Colonel under the USAFFE Medical Corps. After the post-war emergency period, the emergency hospital was renamed in 1947 as the "National Orthopedic Hospital" under the Bureau of Health with Dr. JV delos Santos as the first Chief of Hospital. In 1956, the Hand and Peripheral Nerve Surgery Unit was established at the National Orthopedic Hospital with Dr. Buenaventura Canto as head and Dr. Eugenio Inocentes as the senior resident. Three years later, through the efforts

of Dr. Canto and Dr. Benjamin Tamesis, Dr. Inocentes was sent to the United Kingdom and India from 1959 to 1960 under the British Colombo Plan Fellowship Grant. Dr. Inocentes rotated under Dr. RG Pulvertaft, Prof. HJ Seddon and Dr. D Brooks in England, Prof. JP James in Scotland, and Prof. PW Brand in India. After his return to the Philippines in 1960, Dr. Inocentes headed the Hand and Peripheral Surgery Unit and continued as a lecturer in Hand Surgery until 1999. At present, the Philippine Orthopedic Center has four consultant hand surgeons working in the Section of Hand Surgery. The Philippine Orthopedic Center is presently the largest center dedicated to orthopedics and is accredited by the Philippine Board of Orthopedics as an orthopedic training institution.

The University of the Philippines College of Medicine-Philippine General Hospital (PGH) was established in 1908. In 1952, the Section of Orthopedics under Dr. Ambrosio Tangco was established under the Department of Surgery. A promising surgeon Dr. Jose V. Silao, Jr. was sent by Dr. Tangco for hand surgery training in the USA under Dr. R Carroll and under Dr. W Green from 1970-71. In June 1971, the Section of Orthopedics became a separate Department, with Dr. Jose V. Silao, Jr. as first Department Chairman. Dr. Silao saw the need for advanced training in the different areas of orthopedics. Graduates of the department were sent overseas for advanced training in the orthopaedic subspecialties of adult, trauma, spine, pediatric, and hand. From the late 1970's to the early 1980's, the different sections of orthopedics were formed. This included the Section of Hand Surgery. In 2002, the Section of Hand Surgery established the Microsurgery Service and in 2005, the Microsurgery Service was renamed the Microsurgery Unit-a multidisciplinary unit dedicated to microsurgical reconstruction needs of patients.

Hand Training in the Philippines

Training in hand surgery in the Philippines is part of the comprehensive residency training program in Orthopedic surgery, certified by the Philippine Board of Orthopedics (PBO). All accredited orthopedic training institutions are required to have their resident or trainee accomplish at least 3 months of clinical training in hand surgery. Orthopedics residency training programs in the Philippines follow a general curriculum issued by the PBO that involves clinical rotations in orthopedic trauma, adult reconstruction, spine, pediatrics, and hand surgery in one accredited hospital during a four year period. Specific learning objectives, length and order of rotation are individualized by each training institution /hospital. At the end of residency training, surgeons are expected to be proficient in managing common hand conditions. Certification of each training program is granted based on the number of Orthopedic cases seen by each institution and the available facilities for managing Orthopedic patients – number of dedicated beds, clinic hours, operating theater equipment, presence of support services such as rehabilitation, prosthetics/orthotics and pathology services. Presently, the Section of Hand and Microsurgery of the PGH has six consultant faculty members supervising resident training and management of service cases.

The Section of Hand Surgery of the Department of Orthopedics, Philippine General Hospital is the only institution in the country that offers a clinical fellowship program in hand surgery which was instituted in1995. This one-year fellowship program is recognized by the Philippine Society for Surgery of the Hand (PSSH) and the umbrella organization in orthopedics-the Philippine Orthopedic Association. Fellows are exposed to the management of all hand patients for the year and are responsible for taking care of

hand patients of the section. All fellows are required to do basic microvascular anastomosis in a rat model as part of their training. They are also required to complete at least one research paper prior to graduation. Aside from managing hand trauma, fellows are also exposed to a variety of microsurgical procedures such as replantation surgery, free tissue flaps for soft tissue coverage, vascularized long bone reconstruction for post traumatic injuries and post-oncologic resections, vascularized joint reconstruction for avascular necrosis of the femoral head and the microsurgical management of obstetric and traumatic brachial plexus injuries. Fellows are also encouraged to take advantage of using the animal laboratory of the Microsurgery Unit to do nerve and vascular repairs in animal models. At present, the fellowship program has graduated five hand specialists. There are no local certifying bodies for Hand Fellowship training in the Philippines as of this writing. Hand surgery in the Philippines is mainly done by orthopedic surgeons with a minority being done by general and plastic surgeons with additional training in hand surgery.

Philippine Society for Surgery of the Hand

The Philippine Society for Surgery of the Hand was conceptualized to address the needs of the Filipino people for specialized care of the hand. The group was initially formed in 1984 through the initiatives two prominent hand surgeons: Dr. Vicente Pido and Dr. Eugenio Innocentes, Jr. The society had seven founding members with Dr. Vicente Pido as president and Dr. Eugenio Innocentes, Jr. as vice-president. A year later, the society constitution and by-laws were drafted and approved by its members.

Today, the society has expanded its membership to 28 hand surgeons from Orthopedic, General and Plastic Surgery. Since then, the society has conducted various workshops and lectures around the country. Hand surgeons from around the world have helped the society achieve this. Among them were Dr. Tan Ser Kiat (Singapore), Dr. Bruce Conolly (Australia), Dr. John Wyrick and Dr. John Capo (USA), Dr. Yoshikazu Ikuta (Japan), Dr. Teoh Lam Chuan (Singapore), Dr. Looi Kok Poh (Singapore), Dr. PC Ho and SP Chow (Hong Kong).

Among the projects of the PSSH aside from holding regular meetings are quarterly round table discussions of hand cases among the different institutions across the country. In this way, we are able to promote the specialty and the local hand surgeons in the area. One of the goals of the society is to spread hand surgery across the nation so that more Filipinos will have access to specialized hand care. Past presidents of the society include: Dr. Vicente Pido, Dr. Eugenio Inocentes, Jr., Dr. Leo Daniel Caro, Dr. Ida Tacata, Dr. Ferdinand Autea, and the current president of the society, Dr. Angel Gozum.

Pioneers of Hand Surgery in the Philippines

In any great feat or achievement, there will always be people behind the action that is responsible for initiating, achieving or sustaining those achievements. Hand surgery in the Philippines today would not be possible if not for certain key personalities that have dedicated their lives in developing and promoting the specialty of hand surgery. Among the early proponents of the specialty, Dr. Eugenio Inocentes, Jr. would probably stand out as the "Father of Hand Surgery" in the Philippines. In the 1950's and 1960's, hand surgery as a specialty was not well recognized, and most surgeries of the hand were being done by general orthopedists and general surgeons. Dr. Inocentes went out

FIG. 1 Here, devout Catholics are lined up and flagellate themselves during Good Friday.

of his way to acquire specialized training in hand surgery and subsequently established and headed the Hand and Peripheral Nerve Unit of the Philippine Orthopedic Center (then called the National Orthopedic Hospital). His interest in tendon transfers for the paralytic hand placed him in the forefront of reconstructive hand surgery in the Philippines. His published articles on tendon transfers were the first in the Philippines. The contributions of Dr. Inocentes on hand surgery has blossomed today where four hand specialists from the Philippine Orthopedic Center, the institution where he first started, are continuing his work on specialized care and reconstruction for the hand.

At University of the Philippines-Philippine General Hospital, Dr. Ambrosio Tangco saw the need for specialized hand surgery training and initiated the training of Dr. Jose V. Silao, Jr. to study hand surgery overseas in 1970. Upon his return, Dr. Jose V. Silao became the founding chairman of the Department of Orthopedics of the University-based hospital. Following the vision of Dr. Ambrosio Tangco for specialized training in the hand and with the other subspecialties as well, Dr. Silao initiated the overseas training of the graduates of the Department of Orthopedics.

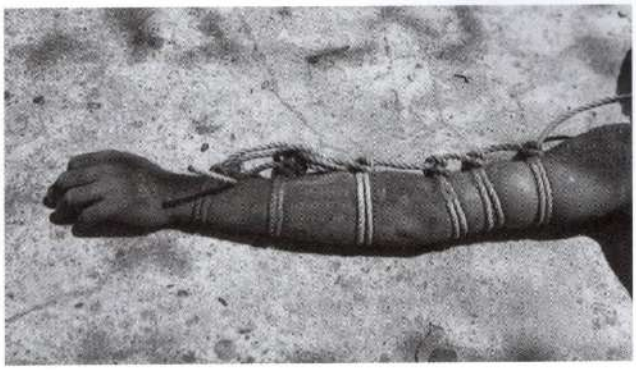


FIG. 2 The hands of the devout Catholic is usually tied during the cenaculo, the most revered religious celebration in The Philippines.

FIG. 3 The hands of the devout in prayer.

FIG. 4 The hand of a devout Catholic nailed to the cross.

Among the early recipients of specialized training in the hand at that time were Dr. Ida Tacata (San Francisco, USA under Dr. Eugene Kilgore) and Dr. Severino Tanbonliong (University of Tokyo, Japan under Dr. Yamauchi). Dr. Silao's influence on atraumatic handling of hand injuries has

FIG. 5 The logo of the Philippine Society for Surgery of the Hand. The colors of the Philippine flag are behind the healing hand of the society symbolizing the devotion of the society members to management of various hand problems of the Filipino people.

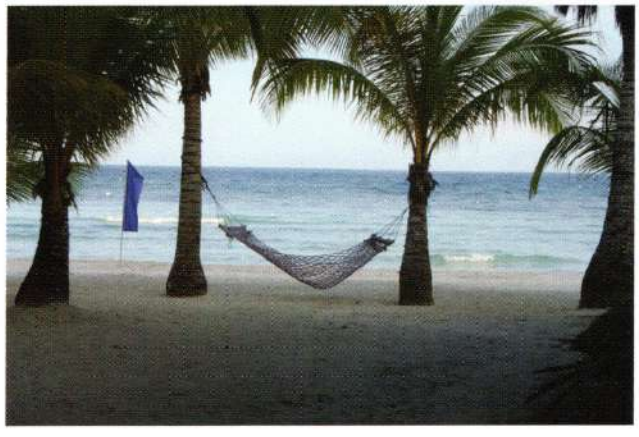


FIG. 6 & 7 The Philippines is known for its wonderful beach resorts, like this one in Bohol, Philippines.

been continued since he became the head of the Department of Orthopedics three decades ago. His devotion to hand surgery as a specialty gave birth to the Microsurgery Unit in 2005. The multi-disciplinary unit is the only one of its kind in the Philippines (alongside with the Brachial Plexus Clinic). As a tertiary hospital and a University-based hospital, the Microsurgery Unit has been the referral center for various microsurgical reconstructive surgeries. The Brachial Plexus Clinic under the Microsurgery Unit has been in the forefront in the management of obstetric and traumatic brachial plexus injuries in the Philippines. At present, the Microsurgery Unit is being headed by Dr. Emmanuel P. Estrella.

Another leader in hand surgery, especially with the "Philippine Society for Surgery of the Hand" is Dr. Vicente Pido. Dr. Pido was very instrumental in the creation of the present hand society in 1984 and served as its founding president. Together with Dr. Inocentes as its founding vice-president and distinguished members such as Dr., Luisito Maano, Rimando Saguin, Felix Vicuna, and Conrado de Gracia, the Philippine Society for Surgery for the Hand created its by-laws and constitution in 1985.

Figures and Legends

The Cenáculo (Spanish, pronounced: [thay-nah'-coo-lo]) is actually the dining hall according to Christian doctrines where Jesus Christ celebrated the Last Supper. In the Philippines, cenaculo is synonymous to the "Passion Play" and is celebrated during the Holy Week-the most revered religious celebration in the country. In the "Cenaculo", the devout Catholic usually flagellates himself as sign of gratitude for answered prayers or as penance for their sins *(Figs. 1-3)*. This is a form of reenactment of the

sufferings of Jesus Christ. Some devout Catholics go as far as having themselves nailed to the cross *(Fig. 4)*.

Acknowledgments

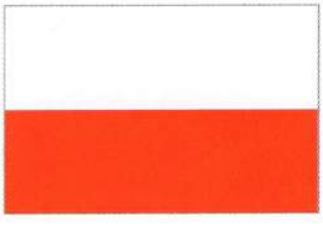
The authors want to thank Dr. Copernico Villaruel, Jr. for the Cenaculo pictures.

Poland

33 CHAPTER

Founded 1998

Leszek Romanowski,
Piotr Czarnecki



The father of Polish Hand Surgery was Hieronim Strzyżewski, who started his work in Poznan Orthopaedics Department after getting experience in Great Britain and USA. He organized the first Hand Surgery Department at Poznan University of Medical Sciences in 1970 which was the start of a rapid hand surgery development in Poznan and Poland. This led to the first national and one of the first European replantation procedures which was performed in Trzebnica in 1971 and is continued in replantation centers. Main hand surgery units are in Poznań, Wroclaw, Szczecin, Trzebnica, Białystok, Gdańsk, and Warszawa where both clinical and scientific works are active.

The highlight of cooperation and work of Polish hand surgeons was XIV FESSH Congress in Poznan *(Fig. 1)*. It was held on 3rd to 6th June 2009 and gathered over 1300 hand surgeons and physiotherapists from over than 64 countries. It was a great success for POLISH hand surgery with exceptional events such

as Instructional Courses and combined SECEC/ FESSH meeting, all highly evaluated by participants.

FIG. 1

Hand training in Poland

Hand training is based on the fellowships in official Hand Surgery Departments, including Polish and foreign units. Specialty training hand courses are organized for orthopaedics.

Certification

At this time there is no national certification of the hand surgery skills. Our national society is developing the training and examining procedure for a hand surgery specialty, which will give hand surgeons the opportunity to achieve appropriate certification. Polish hand surgeons can obtain the FESSH Hand Diploma after passing the exam.

Hand surgery in Poland

Mainly hand surgery is performed by orthopaedics surgeons. Also plastic and general surgeons are involved but they are in a much smaller number and they cover mainly soft tissue problems and reconstructions in the upper extremity.

Polish hand surgeons of the orthopaedic specialty often deal with the whole upper extremity problems including major joint replacement, arthroscopy and trauma. They have to comprehend the complex treatment of all of the pathology in the upper extremity in adults and children. Such wide coverage is necessary because of the small number of hand surgery departments in Poland. Because of the limited access to highly skilled doctors, the hand surgeon must be skilled in many areas of the upper extremity to provide help for suffering patients.

FIG. 2 Cast of left hand of Frederic Chopin, famous Polish composer and virtuoso pianist (1810-1849).

Pioneers in Hand Surgery

The following Polish Hand Surgeons have been recognized as Pioneers in Hand Surgery by the IFSSH: **1. Władysław Manikowski - 2007**- innovative work in primary and secondary tendon and nerve reconstruction, congenital malformations, and rheumatoid arthritis surgery. **2. Jan Haftek – 2007** – significant improvement in peripheral nerve surgery after trauma and secondary reconstruction. **3. Boleslaw Nagay – 1998** – multiple studies on Dupuytrens Disease,and treatment of hand injuries and infections

Member society

The first hand surgery society was a Hand Surgery Division of the Polish Orthopaedics Society and was established in 1965. Since then 35 scientific symposia have been organized during national orthopaedic congresses.

The main hand surgery organization is the Polish Society for Surgery of the Hand which was founded in 1998 in Poznan and has entered IFSSH as a continuity of the previous orthopedic hand section. This led to the first Polish Hand Surgery Congress in 1999 which is held every two years. According to recent information it has over a hundred active members and supports publishing scientific papers in Polish Hand Surgery.

34 CHAPTER

Portugal

Founded 1968

Ana Pinto

On September 23, 1967, the first steps of formation for the Portuguese Hand Surgery Society where taken, by gathering an Organizing Committee. The intention was the formation of a scientific entity meant to facilitate the accumulation of knowledge about the diagnosis and treatment of pathologic and traumatic hand lesions.

The founding partners were plastic surgeons and orthopedists: Prof. Batista Fernandes, Prof Gentil Martins, Dr. Guimarães e Sousa, Dr. Elias da Costa, Prof. Fernando Paredes, Dr. Prata da Lima, Dr. João Sacadura, Prof. Paiva Chaves, Prof. José Oliveira, and Dr. Serra e Costa.

The Portuguese Hand Surgery Society is a section of The Lisbon Medical Sciences Society and it was made official in 12 March 1968. In 29 April 1968 the first Board of Directors was elected as follows: President - Dr Serra e Costa, Secretary - Prof. José Oliveira, and as Adjunct

Secretary - Prof. Fernando Paredes.

At the inaugural meeting on 28 February 1969, Prof. Paredes presented the first Hand Society communications entitled "Impressions of Meeting of the American Hand Society" and "Actualization of the work of the International Federation of Societies for the Surgery of the Hand". By that time the Portuguese Hand Surgery Society was a member of the International Federation of Societies for the Surgery of the Hand. Under this direction two Hand Meetings were organized in Sant`Ana Hospital, which were the first international meetings about Hand Surgery in Portugal. The conferences included presentations by Guy Pulvertaft, Graham Stack, and Eric Möberg, among others.

The first Board of Directors was re - elected in July 1971. That same year the first consultation in Hand Surgery was created in Sant`Ana Hospital by Dr. Serra e Costa *(Fig. 1)*, with the assistance of Dr. Buceta Martins *(Fig. 2)*, and the aid of Guy Pulvertaft in Derby, Athol Parks in Glasgow and Douglas Lamb in Edimburg.

In 1981 Prof. Batista Fernandes was elected President of the Portugese Hand Surgery Society (PHSS) and the scientific meeting was held in Vimeiro.

In 1986 a new regulation of the PHSS was proposed with the presidency alternating between Orthopedists and Plastic Surgeons every two years. The new President elected was Dr. Buceta Martins. During this presidency the society became known as Sociedade Portugesa da Cirurgia da Mao (SPOCMA) and significantly increased the number of associates, mainly young specialists.

FIG. 1 Dr. Manuel Serra e Costa.

FIG. 2 Dr. Buceta Martins.

The Portuguese Hand Surgery Society entered a period of remarkable activity that continues with Portuguese meetings every year.

In June 2003 it hosted the IX FESSH Congress in Lisbon, and in April 2008 the IX Ibero-Latin American Meeting in Oporto.

In 2008 an agreement was made with the Spanish Hand Surgery Society with the intent of narrowing the borders and working together.

There has been a constant work of the Portuguese Hand Society with our international partners, namely FEESH and IFSSH that we hope to maintain for many, many years.

35 CHAPTER

Puerto Rico

Founded 1982

Manuel Medina

The Hand Surgery Society of Puerto Rico, the Sociedad de Cirugía de Mano de Puerto Rico,was started by a group of surgeons from different specialties who were interested in surgery of the hand in the late 1950's and early 60's.

Some of the original members of the society were Drs. Ramon Isales Davis, Julio Simmons, Lawrence Snyder, Eugenio M. de Hostos, Blas Ferraiouli, and José Bernal Rosa.

At that time Puerto Rico was an agricultural oriented society and most of the hand injuries were associated with the sugarcane field and agricultural labors. These surgeons belonging to different specialties and most of them working for Workman's Compensation Corporation organized the hand group to discuss and learn from each other about surgery of the hand.

With time Puerto Rico changed from an agricultural to an industrial society and the types of

injuries were different, but the Society continued to meet every month and kept up with the advances in Hand Surgery,and was officially founded in 1982. Later on other surgeons such as Drs. Miguel Vargas Busquets, Miguel Quetglas, Angela Ramirez Irizarry and Hector Ortíz Sambolín joined the Society and continued to promote the knowledge and advancements in Surgery of the hand.

At the beginning there was no formal training in Hand Surgery in Puerto Rico, but some of the members spent traing time with Hand Surgeons on the mainland of the United States. More recently the Medical Regulating Authorities in Puerto Rico defined who could proclaim themselves Hand Surgeons and required full training in General, Plastic or Orthopedic Surgery followed by one year of Hand Surgery Fellowship.

Surgery of the Hand continues to be practiced by many surgeons who feel competent in different degrees and limited by the surgical privileges given to them by their hospital faculties, similar to the way Orthopedic Surgery and Gynecological surgery was practiced by general surgeons on the mainland in the past.

The Medical Licensing Board of Puerto Rico at the present time requires a full year of Hand Surgery training which is obtained on the mainland of the USA, for although many different specialty training centers exist in Puerto Rico there are none for Hand surgery. At the present time most of our Hand Surgeons also have obtained their main specialty training in the United States.

The Puerto Rican Hand Society is currently not active. Its function has been substituted by a Chapter of Hand Surgery in the"Colegio de Médicos-Cirujanos de Puerto Rico" (PR College of Physicians)which was created by legislation. However the hand surgeons currently are in the process of reactivating the Society.

The care of injured laborers in Puerto Rico is provided by a public Workman's Compensation

FIG. 1 Miquel Vargas Busquets, Secretary-General of IFSSH (1989-1993) signed the Articles of Incorporation of the IFSSH in 1990 in Puerto Rico.

FIG. 2 Some members of the Sociedad de Cirugia Mano de Puerto Rico with Dr. Douglas Lamb on visit to Puerto Rico in early 1990. First row from left to right: Drs. Jan Pierre Zegarra, Douglas Lamb, Miguel Vargas Busquets, and Manuel Medina, Second row: Drs. Natalio Debs, Miguel Quetglas, Julio Simmons, Julio Simmons, Jr. and Clara Rivera.

Corporation called Corporación del Fondo del Seguro del Estado de P.R. A group of 10 Hand Surgeons provides services through out the island and treat over 16,000 patients a year in the clinics, making this a very important service to the Workman's Compensation program.

It is of great historical interest to note that the IFSSH (International Federation Society Surgery of the Hand) was officially incorporated in Puerto Rico in 1990 when Miquel Vargas Busquets served as Secretary-General of the IFSSH *(Fig. 1)*.

36 CHAPTER

Romania

Founded 1995

Alexandru Georgescu

The Romanian Society for Surgery of the Hand was established in Romania, one of the East European countries, where the challenges enforced upon the professional development were often difficult to bear.

From a chronological point of view, there are some important aspects that need to be mentioned. Until 1958 there was not a well defined organization formula for hand surgery. It was performed arbitrarily by different surgical disciplines, following the dominant lesion: orthopedics – for bone, tendons and joint traumas; general surgery – for infections and soft tissue lesions, and neurosurgery -- for peripheral nerve lesions. In 1958 the Plastic Surgery and Burns Clinic was formed in the University of Medicine and Pharmacy in Bucharest, under Professor Agrippa Ionescu's leadership. From that moment on hand surgery became official-

ly part of the interest area of this discipline, and the Hand Surgery became more specialized.

A great opportunity occurred by the year 1989 when Romania listed 23 County Plastic Surgery Departments, in which hand surgery represented about 50% of the admitted cases. Nowadays, there are 6 University Centers (Bucharest, Cluj Napoca, Iasi, Timisoara, Constanta, Craiova) integrated in the continuous formation and development of young specialists in this field.

In this general framework of Plastic Surgery leading hand surgery, the First National Congress of Hand Surgery was held in September 1995, under the tutelage of the Brasov County Plastic Surgery Department. At this meeting, in agreement with all the plastic surgeons, the foundation of the Romanian Society for Surgery of the Hand (RSSH, in Romanian language SRCM) was formed.

Hand Surgery Training

Romania is a country with about 20 million inhabitants and the RSSH has 63 members. Since in Romania there is no independent Hand Surgery Discipline, all the members are plastic surgeons. Until about 5 years ago, in the Plastic Surgery module about 80% of the pathology was related to trauma and burns, but lately a great interest has been elicited by new knowledge and techniques of reconstruction for the tissue losses and the degenerative hand pathology.

The experience of" to read "Plastic surgeons who perform hand surgery in Romania address a multitude of hand conditions, such as peripheral nerve reconstruction, oncology surgery, covering of simple and complete tissue defects, congenital malformations, replantation 'revascularization, and free tissue transfers.

The residency in Plastic Surgery and Reconstructive Microsurgery (the official name of the discipline) is completed over 6 years. During this training program there are many different modules of study in surgical and complementary disciplines, such as general surgery, plastic surgery, orthopedics and traumatology, ENT, ophthalmology, urology and one year of microsurgery. When finishing every module the resident has to pass an examination for that surgical discipline. After completing all the required modules, the official certification can be acquired by submitting to a harsh 3 steps general examination by committees appointed by the Ministry of Health and Family and the Ministry of Education and Science. The examination starts with a 2 hours written exam. If passed, the candidate proceeds to the clinical examination, which upon successful completion allows the trainee to take the practical examination (where fresh cadaver and/or live surgical procedures are performed in the surgical theater).

The certification is in Plastic Surgery and Reconstructive Microsurgery, and there is no additional credentialing for Hand Surgery.

RSSH Activity

The Society's activity matured during its 14 years of existence through the organization of 7 National Congresses, with a large international participation.

The RSSH organized, in cooperation with AAHS (American Association for Hand Surgery), in June 18-21st 2004 the Post-IFSSH Congress in Bucharest, Romania. Many notable international hand surgeons participated in the scientific program which was highy successful.

Also the RSSH organized in Cluj Napoca 4 International Courses of Hand Surgery and Hand Therapy. During these courses Romanian and international scientific papers pertaining to hand surgery discipline were presented. The

faculty demonstrated reconstructive techniques on fresh cadavers and subsequently the participants performed them, under guidance and supervision of the faculty.

The RSSH hosted the XVth FESSH Congress 2010, in Bucharest, Romania. The international acknowledgement was put in a concrete form by our society's affiliation to IFSSH – Vancouver 1998 and FESSH – Barcelona 2000. This endeavor couldn't be accomplished without the help and support of some international personalities as Robert Mc Farlane, Guy Foucher, Jean Philippe Nicolai, Peter Bruser, Steven Hovius, Alberto Lluch, Alex Beris, and Panayotis Soucacos. The first President and organizer of the First Congress of the RSSH was Irina Visa; today the President is Theodor Stamate and the offices are in Iasi.

The Romanian Delegate for IFSSH and FESSH is Alexandru Georgescu. Also, he is the delegate for Romania to the Hand Trauma Committee and Chairman of the Commission of Cooperation of National Health Administration towards specialized Hand Trauma Centers.

RSSH Contact: www.rssh.ro

E-mail addresses: tstamate@iasi.rdsmail.ro, geordv@hotmail.com

Pioneers of Hand Surgery in Romania

Agrippa Ionescu was a great international personality around whom the Plastic Surgery discipline was created in Romania and who set the pillars of university teaching in hand surgery. He introduced the delayed emergency principle in traumatology in Romania.

Valentin Aburel promoted in our country some of the new methods, at that time, of hand surgery reconstruction.

Doina Ionescu Dumitrescu is one of the pioneers in reconstructive microsurgery. He performed in Romania the first limb replantation (1982); the first interfascicular nerve graft (1981) and the first anastomosis of median nerve artery (1982) – the first reported case in the world..

FIG. 1 Potter's wheel.

Nicolae Ionescu performed the first free tissue transfer in Romania, which was a great omentum transfer for a scalp defect.

In 1987 Constantin Ciuce was successful in performing the first free digital transfer in reconstructing a long finger of the hand. Alexandru Georgescu performed the first successful free transfer of a composite of two fingers in 1991.

The major promoters of microsurgical techniques in modern hand surgery in Romania are Theodor Stamate, Alexandru Georgescu, Ioan Lascar, Stefan Luchian, and Irina Visa.

Hands in Romanian Life and Culture

Romanian people have a long tradition in creating original, expressive, and profoundly social art filled with sensitivity. From the beginning of time, the hands have always been indispensable in spinning the potter wheal, in creating and embroidering the attires, and in every day's work *(Fig. 1)*.

FIG. 2 STEFAN LUCHIAN - Self-portrait.

FIG. 3 Dinu Lipatti.

FIG. 4 George Enescu.

The public life is mediated by a hand shake and the sleep is guarded by a prayer. Romanians embellish life by surrounding themselves with special things, sounds and tastes.

Romanian art is optimistic, powerful and filled with fantasy, but also deeply anchored in reality. From the traditional to the modern, it is imposible to imagine the life without hands.

Hand surgery is determined to preserve and reconstruct this amazing instrument.

Stefan Luchian (1868-1916) was a great Romanian impressionist painter, admirer of the Romanian landscape, which he presented all through life with simplicity and delicacy in bright and fluid colors. His life was unfortunately shortened by an invalidating disease, which made it impossible to hold the brush between his fingers. At the end, he he had the brush tied to his wrist, because the flame that burned inside him did not accept surrendering *(Fig. 2)*.

Dinu Lipatti (1917-1950) was a famous piano player, composer and teacher, whose records are living proofs of his exquisite style, warmth and spirituality *(Fig. 3)*.

George Enescu (1881-1955) was a prominent Romanian composer, violinist, piano player, conductor and teacher, one of the most charismatic performers of his time. His music was greatly influenced by the Romanian folk music. His hands performed miracles of perfection in creating and taming the vibrations of sound *(Fig. 4)*.

37 CHAPTER

Singapore

SINGAPORE SOCIETY FOR HAND SURGERY

Founded 1982

Robert WH Pho

Early Development of Hand Surgery in Singapore from 1952 to 1975

The Hand Surgery service had always been an integral part of orthopaedic surgery (established in 1952) in Singapore General Hospital at Outram Road. The program manages emergency hand trauma from firecrackers, injuries from home and cottage industries, leprosy and paralysis from poliomyelitis, etc. Drs Yeoh Khean Hong, N. Balachandran, Pesi B. Chacha, and Kanwaljit Soin were among surgeons who demonstrated early interest in the specialty. As Singapore become industrialized, high incidences from severe hand injuries required more specialized care. Dedicated Hand clinics were first established in 1974 in University Department of Orthopaedic Surgery at Singapore General Hospital.

Hand Surgery in Singapore 1975 to 1985

A strong foundation in hand surgery was established during this period through many developments and advancements in this field in Singapore:

1. Wide interest and application of microsurgery in Singapore.
2. Successful organization of first and second advanced hand Surgery courses in 1981 and 1982 supported by NUS postgraduate medical school and Academy of Medicine.
3. Formation of Singapore Society for Hand Surgery in 1982.
4. Establishment of Experimental Surgical Unit at Singapore General Hospital in 1984.
5. Establishment of HMDP Visiting Experts in Hand Surgery by Ministry of Health in 1984.
6. Establishment of Hand Surgery Unit by Ministry of Health at Singapore General Hospital in January 1985.
7. Establishment of Department of Hand and Reconstructive Microsurgery at National University Hospital in 1990.
8. Establishment of Advanced Hand Surgery Training Programme which is dedicated to train young surgeons in the specialty of Hand Surgery and local trainees to be trained overseas.

Singapore Society for Surgery of the Hand Surgery

The Society was formed in 1982 by an interested group of orthopaedic surgeons and plastic surgeons. The elected office bearers were: President: Robert WH Pho; Vice-President: Lee Soon Teik; Secretary; Tan Ser Kiat; Treasurer: Tay Chong Kam. The Society was able to establish a common focus of exchanging ideas and experiences with emphasis on training, education, research and development of the specialty with the international communities and leading institutes. Among members include associate members of Hand therapists. At its early development the society was able to attract the brightest and very capable leaders in orthopaedic and plastic surgeons to lead the society: Tan Ser Kiat, Kanwaljit Soin, Tan Kok Chai, Low Yin Peng, Low Cheng Ooi, Rexon Ngim, Fong Poh Him, Foo Chee Liam., Yeap Choong Lien, VP Kumar, and Winston Chew.

As the specialty evolves, we have committed groups of very outstanding leaders who dedicate themselves totally to the specialty of Hand Surgery, and hold high offices in the Society. Their unfailing contributions and total commitment have made a great impact in the advancement of Hand Surgery in Singapore and internationally. Among these are Teoh Lam Chuan, Kour Anam Kueh, Lim Beng Hai, Yong Fok Chuan, Tan Soo Heong, Aymeric Lim, Looi Kok Poh, Agnes Tan, Peng Yeong Pin, and Andrew Chin.

The Society organizes an annual Hand Review Course which is an integral part of the Hand Surgery training programmes. The Society works closely with the two main training institutes of Department of Hand Surgery at Singapore General Hospital and Department of Hand and Reconstructive Microsurgery at National University Hospital in providing a national advanced Hand Surgery training programme and an international Hand Fellowship in Hand Surgery.

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Slovakia

38 CHAPTER

Founded 1998

Teodor Kluka,
Jaroslav Ciganak,
Drahomir Palencar

History of Hand Surgery

The history of hand surgery in Slovakia reflects historical developments in Slovakia itself. The Slovak Republic was founded on 1 January 1993 and became a successor state following the dissolution of Czechoslovakia. Hand surgery has a similar history with the initial establishment of the Czech and Slovak Hand Surgery Society, which was transformed into an independent association after the country's division in 1993. The first Hand Surgery Congress in Slovakia took place in 1996 at the High Tatra Mountains *(Fig. 1)*. In consideration of these facts, the Slovak Hand Surgery Society (SHSS) was founded on 1 January 1998 after elections for important positions were held. Most of the credit for creating the Slovak Hand Surgery Society has to be given to the founding members and members of the Steering Committee: assist professor Jozef

FIG. 1 1st Slovak Hand Surgery Congress: T. Kluka, PhD, Congress President, 1996.

FIG. 2 1st President of the Slovak Hand Surgery Society: Ass. Prof. Jozef Janovic, MD, PhD.

Janovic, MD, PhD; Teodor Kluka, MD, PhD and Jaroslav Ciganak, MD, PhD. These three doctors also served on the first Slovak Hand Surgery Society Committee, whose members were assist prof. Jozef Janovic, MD, PhD *(Fig. 2)*, Chairman; Teodor Kluka, MD, PhD, Secretary; Jaroslav Ciganak, MD, PhD; Ladislav Kostal, MD and Drahomir Palencar, MD, PhD. Members; and Peter Kovar, MD, Auditor. Over several years, the Slovak Hand Surgery Society has organized seven hand surgery congresses, presenting successes in microsurgery (Kluka, Palencar), distraction and external fixation (Guzanin, Ciganak, Kluka), and reconstructive plastic surgery (Palencar, Kluka). Among technical literature, we cannot fail to mention the historical Hand Surgery Atlas (Simun, 1980) and newer titles such as External Minifixation in Hand Injuries (Ciganak, 1998) and Flexor Apparatus Surgery (Bansky, 2006)

FIG. 3 Pioneers of hand surgery in Slovakia at the 5th Slovak Hand Surgery Congress, held at Bojnice Castle: ass. prof. S. Guzanin, MD, PhD, ass. prof. J. Fedeles, MD, PhD, accompanied by ass. prof. K. Dlabal, a venerated hero of hand surgery in the Czech Republic.

Teaching Hand Surgery in Slovakia

Hand surgery training is currently being handled by the Slovak Medical University (SMU) in pre-attestation preparation for plastic surgery, where participants take courses in hand surgery.

Hand Surgery Certificate

No certification currently exists but a certified program is in the draft stage with its own head physician for hand surgery.

FIG. 4 5th Slovak Hand Surgery Society Congress in Bojnice, held 21-22 October 2004 at Bojnice Castle: Congress President: Jaroslav Ciganak, MD, PhD. Knighted for his service as member of the hand surgery community in Slovakia: ass. prof. Juraj Strmen, MD, PhD.

FIG. 5 Current President of the Slovak Hand Surgery Society: Prof. Silvia Vajczikova, MD, PhD, middle.

Fields Impacting Hand Surgery

Plastic surgery clearly has the biggest impact, together with trauma, orthopedics and general surgery.

Hand Surgery "Pioneers" in Slovakia

Pioneers include ass. prof. Jozef Janovic, MD, PhD, Asst prof. Jozef Fedeles, MD, PhD, as.prof. Stefan Guzanin, MD, PhD *(Fig. 3)*.

Society Name and Year Established

The Slovak Hand Surgery Society was established in 1998 and entered the International Federation of Societies of Surgery of the Hand (IFSSH) in 1993 when the joint Czech and Slovak Society for Hand Surgery still existed.

39 CHAPTER

South Africa

Founded 1969

Ulrich Mennen

The South African Society for Surgery of the Hand (SASSH) was established in 1969, in one of the then few countries to recognize the need to have an organization to promote hand surgery.

Dr Andries C Boonzaier proposed the idea of forming a South African Hand Society at the Annual Orthopaedic Congress in Johannesburg in 1963. The first annual general meeting which marks the official establishment of SASSH was on 11 July 1969 during the 47th Congress of the Medical Association of South African in Pretoria. At that meeting 29 founding members were present. The first executives were Dr Isidore Kaplan (Johannesburg, President), Dr A. J. Wienand (Pretoria, Secretary/Treasurer) and members Dr Martin Singer (Cape Town), Dr John Youngleson (Durban), Professor G. T. du Toit (Pretoria) and Dr A. C. Boonzaier (Johannesburg).

One of the reasons for the delay in officially

FIG. 1 The Executive of the South African Society for Surgery of the Hand with the Drakensberg Mountains in the background. 29 August 2009. 40th Congress of SASSH (left to right): Dr. Martin Wells(President) ; Prof. Theo le Roux(Treasurer/ Secretary and Immediate Past-President) ; Dr. Michael Carides(Exco Member and Past-President) ; Dr. Michael Solomons(President-Elect) ; Prof. Ulrich Mennen(Historian and Past-President) ; Dr. Johan van der Westhuizen (Exco Member) ; Prof. John Fleming(Past-President).

establishing SASSH was that emphasis was put on the activities of regional hand clubs, which eventually merged to form the national society.

Many hand surgeons were invited to South Africa to visit the local Hand Clubs before the establishment of SASSH, including Guy Pulvertaft from the UK (1960), Daniel Riordan (1967) and Willy White from the USA (1969). In 1970 at the Annual Congress in Cape Town, Dr Robert E Carroll from New York, USA was the first official invited guest of SASSH. For his outstanding contribution he was elected the first honorary member of SASSH. He was followed by many distinguished hand surgeons. The list of surgeons represents an almost "Who's Who in Hand Surgery"

In the South African scene, hand trauma was of prime importance, and was therefore the main topic at meetings and discussion groups in the early years. During the 1960s, Hand Clinics were established at various centres by Dr A. C. Boonzaier (Baragwanath Hospital, Soweto), Professor D. H. Walker (Johannesburg), Professor G. T. du Toit (Pretoria), Dr M. Singer (Cape Town) , Professor T. Sarkin, Dr F. Hedden, Dr. J.H.Youngleson and others in Durban, and in Pretoria by Dr.A J Wienand.

In 1972, Dr A. C. Boonzaier wrote to all the Directors of Hospital Services and Heads of some Orthopaedic and Plastic Surgery Departments to establish specific posts to deal exclusively with hand surgery. Professor Peet Joubert, Head of the Department of Orthopaedic Surgery at Tygerberg Hospital and University of Stellenbosch, initiated the first Hand Surgery Unit with a full-time hand surgeon, Dr L. K. Pretorius.in 1974.

In 1985 a fully fledged Department of Hand

and Microsurgery was established, separate from the Department of Orthopaedic Surgery, at the Medical University of Southern Africa (MEDUNSA) with Professor Ulrich Mennen as the first head until 2007.

A stand-alone Hand Surgery Unit was established in 2006 at the Chris Hani-Baragwanath Hospital (Soweto, Johannesburg) with efforts by Dr Walter Stewart and funds from private donations.

Dr Syd Biddulph (Johannesburg) established the first private practice devoted exclusively to hand surgery in 1973. He was also in charge of the Hand Surgery Service at the Johannesburg General Hospital for many years. His example encouraged many more Hand Surgeons to follow private hand surgery practices, although most maintained a very active commitment as part-time consultants at the teaching institutions.

Dr John Flemming (Johannesburg) was one of the pioneers in South Africa to train surgeons from other parts of Africa, an initiative which was followed and developed into fellowships by some other units in South Africa. Apart from private practice, he also headed the Baragwanath Hospital Hand Surgery Unit.

It would be a great mistake to promote Hand Surgery without Hand Therapy. In 1988 the South African Society of Hand Therapists was established in Pretoria, and SASHT soon joined the International Federation of Societies of Hand Therapists (IFSHT) which is closely affiliated with the IFSSH. Ms. Corrianne van Velze (Pretoria) was the the first Secretary-General of the IFSHT and was subsequently elected President.

SASSH offers a two-day Refresher Course annually which, on a 5 year rotation basis, covers the entire field of Hand Surgery and Therapy. Additionally Instructional Courses and a Congress, which always has invited speakers of international standing, are organised annually.

FIG. 2 Springbok the National Symbol of South Africa.

Training in Hand Surgery is mainly done by the Orthopaedic Departments at the Medical Schools. At some Universities input from the Departments of Plastic and Reconstructive Surgery complements the training of surgeons in the art of hand surgery.

The SASSH became one of the early members of the IFSSH joining in 1972. Two SASSH members have achieved the highest international honour viz. "Pioneer of Hand Surgery" by the IFSSH: Martin Singer (2004), and Andries C. Boonzaier (2007).

In 1998 Ulrich Mennen was elected to serve on the Executive Council of the IFSSH. He became Secretary-General of the IFSSH in 2004, and and President in 2010.

The Past-Presidents of SASSH were: I Kaplan(1969-1971), AC Boonzaier(1971-1973), M Singer(1973-1975), JH Youngleson(1975-1977), TL Sarkin(1977-1979), CE Bloch(1979-1981), SL Biddulph(1981-1983), WMM Morris(1983-1985), LK Pretorius(1985-1987), KS Naidoo(1987-1989), SL Biddulph(1989-1991), BJvanR Zeeman(1991-1992), SL Biddulph(1992-1993), JH Fleming(1993-1995), U Mennen(1995-1997), EJ Bowen-Jones(1997-1999), LT de Jager(1999-2001), JJ van Wing-

erden(2001-2003), M Carides(2003-2005), TLB le Roux(2005-2007), MC Wells(2007-2009), M Solomons(2009-2011).

Many members of SASSH have made outstanding contributions in various ways to improve Hand Surgery in South Africa and elsewhere by outreach programmes, writings, research findings, novel operations, implant development, and as visiting lecturers and professorships.

More information about SASSH, i.e. office bearers, updated detailed history, meetings, members etc. can be found on the internet at http://www.sassh.co.za/ www.sassh.co.za. Enquiries can be directed to sassh@iafrica.com

40 CHAPTER

Spain

SECMA

Founded 1969

Marc Garcia-Elias

Up until the second half of the twentieth century all hand surgical procedures were done by general surgeons, consisting mainly of the debridement of infected tissues and the basic care of wounds and fractures. Tendon, nerve and vascular injuries were seldom treated. During the Spanish Civil War (1936-1939) closed treatment for open fractures was developed by Josep Trueta from Barcelona. This method was also used during the II World War. Trueta was later awarded a Professorship at Oxford University. In the mid 1940's surgeons, such as Angel Santos Palazzi Duarte and Jaime Planas from Barcelona were already performing tendon repairs, tendon grafts and tendon transfers, and Senti Montagut from Madrid was surgically correcting rheumatoid hand deformities.

The first two books related to Hand Surgery written in Spanish were published in 1948:

"Traumatismos e incapacidades de la mano" by Mario Oliveras from Carabanchel, and "Lesiones Osteoarticulares Traumáticas de la Muñeca" by Eugenio López-Trigo Torres from Valencia. Two years later, E. Velilla Mateo from Madrid published another book entitled "Traumatología y Cirugía Reparadora de la Mano". These early books are considered to be the cradle of Spanish Hand Surgery, as doctors had a limited access to foreign publications. Poor understanding of other languages, other than French and German, was an added issue. In the 1960's, hand surgery was strongly influenced by the French surgeons such as Iselin, Michon, Souquet and Vilain. Sterling Bunnell's book "Surgery of the Hand", published in the USA in 1944, was not translated into Spanish until 1951 by Jaime Planas (Editor:José Janés).

In February of 1969, Alfredo Quintana Montero, an Orthopaedic Surgeon from Zaragoza organized the first National Symposium on Hand Surgery in the Hospital San Juan de Dios of Zaragoza. Invited lecturers were, Souquet, Pulvertaft, Tubiana and Vainio. This meeting, which was very successful and well attended, was the seed that evolved into the foundation of the "Sociedad Española de Cirugía de la Mano" (SECMA) on 11 May 1969. The 13 founding members were Fernando Enríquez de Salamanca (first President), Tomás Antona, José Antonio Bañuelos, Antonio Bengoa, José Maria Cañadell, Ricardo de Manuel, Manuel Masoliver, Ramón Moreno, Angel-Santos Palazzi Duarte, Jaime Planas, Alfredo Quintana, Ignacio Sampera and Vicente Seguí. The Society initially had 29 members. Forty years later, SECMA has 205 full members, 104 associated, 22 foreign, 14 emeritus and 6 honorary members. During the last four decades, the Society has held 18 biannual National Congresses, 10 Meetings with Ibero-American hand societies, and numerous symposia, courses and videoconferences.

In 1973, Alfredo Quintana founded the Revista Española de Cirugía de la Mano which has been the official Journal of the Society. This biannual publication changed its name to Revista Iberoamericana de Cirugía de la Mano in 2000 to become the official Journal of the Hand Surgery Societies from Spain, Portugal, Brazil, Argentina, and Uruguay.

Since 1969, SECMA has been a Member of the International Federation of Societies for Surgery of the Hand (IFSSH), and since 1991 a founding and active Member of the Federation of European Societies for Surgery of the Hand (FESSH). The Secretariat of the Spanish Society is in Madrid: calle Caceres, 6, 5º D. 28045 Madrid, Spain. E-mail: secretario@secma.info. Website: www.secma.info

Training

Although hand surgery is not a recognized speciality in Spain, there is a project to accept Hand Surgery as a "Certified Added Qualification" in the near future. Currently, surgeons wishing to become hand surgery specialists are required to complete a five year residency training in Orthopaedic Surgery or Plastic and Reconstructive Surgery. During the last year of their training they are offered the opportunity to join a Hand Surgery unit, in Spain or abroad, for a variable number of months. Since 2006, the University of Barcelona offers a one year Fellowship in Hand Surgery which involves a rotation to four different hand units, each emphasizing six major areas: general hand surgery, wrist surgery, rheumatoid surgery, microsurgery, congenital and brachial plexus surgery. Applications for this Fellowship should be addressed to abayo@clinic.ub.es.

FIG. 1 Alfredo Quintana Montero (1926 -2000).

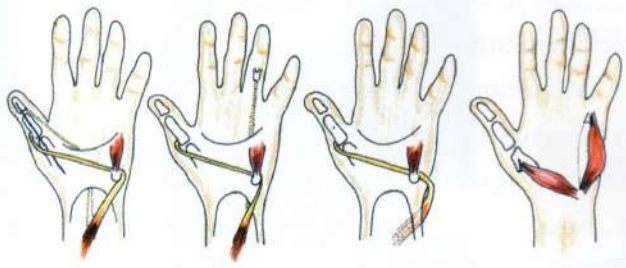


FIG. 2 Front cover of first volume of Revista Española de Cirugía de la Mano. 1973.

FIG. 3 Angel Santos Palazzi Duarte (1909 –1993).

Diplomas in Hand Surgery

Aside from the University of Barcelona Hand Surgery Fellowship described above, a Diploma in Hand Surgery is available to Spanish trainees. The Federation of European Societies for Surgery of the Hand (FESSH) holds a yearly Diploma Examination, during the FESSH annual congress, consisting of one multiple choice questionnaire and two oral examinations. Further information at: www.fessh.com.

Hand Surgery in Spain

Occasionally, Hand Surgery has an official recognition as an independent Unit in Spanish public hospitals. This is the case of the Hand Unit in the General Hospital of Elche, Alicante, under the direction of Enrique Mackenney. In some of the major public hospitals, the care of hand pathology is mostly done by doctors within an Orthopaedic or Plastic Surgery Department. Approximately 80% of SECMA members are Orthopaedic Surgeons.

In private practice, a growing number of FESSH certified hand surgeons are establishing their offices within the premises of private hospitals and clinics. The first independently run group private practice solely dedicated to Surgery of the Hand and Upper Extremity was founded in 1994 in Barcelona by Alberto Lluch and Marc Garcia-Elias (www.institutkaplan.com). Other Hand Surgery Centres, also involved in clinical practice, educational activities and research, have been established in Santander by Francisco Piñal (www.drpinal.com)

Pioneers

Out of the 13 founding Members of the Spanish Society for Surgery of the Hand, four of them deserve special recognition for their exceptional contribution to the development of Hand Surgery in Spain.

Alfredo Quintana Montero (1926-2000) *(Fig. 1)*, was an Orthopaedic Surgeon from Zaragoza, who organized many Courses and Symposia and was the founder and director of the Revista Española de Cirugía de la Mano *(Fig. 2)*, official Journal of the Society from June 1973 until 2000, when it changed its name into Revista Iberoamericana de Cirugía de la Mano.

Angel Santos Palazzi Duarte (1909 –1993) *(Fig. 3)*, was an Orthopaedic Surgeon from Barcelona, who also organized many Courses on Surgery of the Hand and published his experience on the reconstruction of thumb opposition

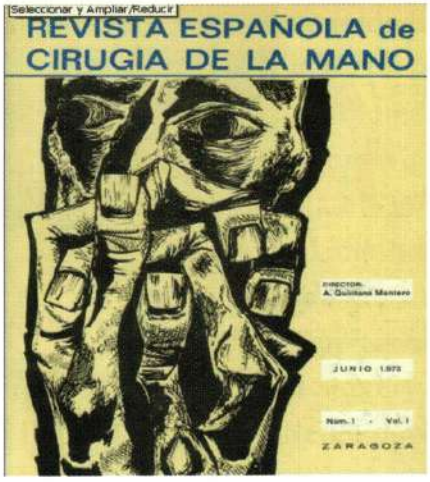


FIG. 4 On the treatment of the loss of opposition. Palazzi AS. Acta Orthop Scand. Separatum. 1962.

FIG. 5 Jaime Planas Guasch (1915-2004).

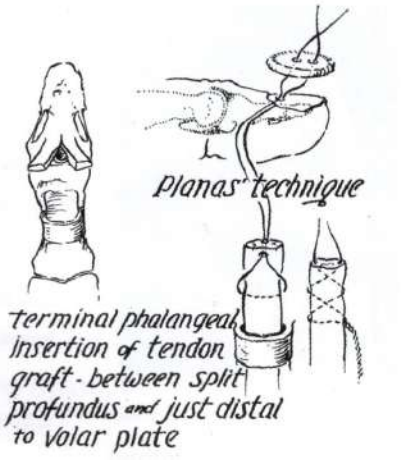


FIG. 6 Littler's drawing of Plana's technique for distal phalangeal insertion of a tendon graft. 1964.

in the Acta Ortop Scand in 1962 *(Fig. 4)*.

Jaime Planas (1915-2004) *(Fig. 5)*, was a Plastic Surgeon from Barcelona, who translated Bunnell's book Surgery of the Hand into Spanish in 1951. His technique for distal tendon graft suture was drawn by J. William Littler in his chapter on Principles of Reconstructive Surgery of the Hand (In: Reconstructive Plastic Surgery. Converse JM, editor, Philadelphia: W.B. Saunders Co. 1964: 1664) *(Fig. 6)*.

Fernando Enríquez de Salamanca (1921 – 2005) *(Fig. 7)*, was a General Surgeon from Madrid, who trained in the 40's in New York, and spent some time with Drs. Boyes and Bunnell in California, was elected as the first President of SECMA.

FIG. 7 Fernando Enríquez de Salamanca Lorente (1921 – 2005).

Throughout his professional life he maintained special leadership in the dissemination of Hand Surgery in Spain through courses and seminars which became very popular.

Hand artwork in Spain

Spain has worldwide recognition for having many artists, such as Velazquez, El Greco, Goya, Picasso, Zurbarán, Ribera, Miró, Dalí and many others, all of whom showed their skills in drawing hands, one of the most difficult body parts to represent. Initial interest in painting hands can be observed in the prehistoric caves of Northern Spain, where we can admire positive and negative hands painted more than 20.000 years ago.

The right hand with an eye in the palm was giv-

FIG. 8 Coat of arms of the Royal College of Surgeons of Barcelona. Art work by Giorgio Brunelli.

en as a coat of arms to the Royal College of Surgeons of Barcelona by King Carlos II (1716-1788), King of Napoli, Sicily and Spain *(Fig. 8)*. It signifies that the surgeon can see inside the patient's body through his hands. The word chirurgeon (Archaic: a surgeon), as well as chiropractor and chiromancy, are derived from the Greek word Kyros, meaning hand. The Royal College of Surgeons of Edinburgh has the same coat of arms on one of its stained-glass windows.

41 CHAPTER

Sweden

SHF Svensk Handkirurgisk Förening

Founded 1973

Lars B. Dahlin

The human hand is a central part of our body in spite of its peripheral position. The hand is a working tool, a sensory organ and a communicating instrument. Due to its unique construction we can perform a wide variety of tasks in the activity of daily life. The hand of children and adults is exposed to a variety of situations with a potential threat of injury. The child explores the environment with their hands; an important task for development of skills and cerebral plasticity. Adults are dependent on an adequate hand function in their professional life and also in activities during leisure time. A hand injury may cause sequelae in spite of the development of new treatment strategies. Thus, the injury may interfere with the patients' future life, both professionally and during leisure time.

Clinical observations of hand injuries and their treatment were already described 2800

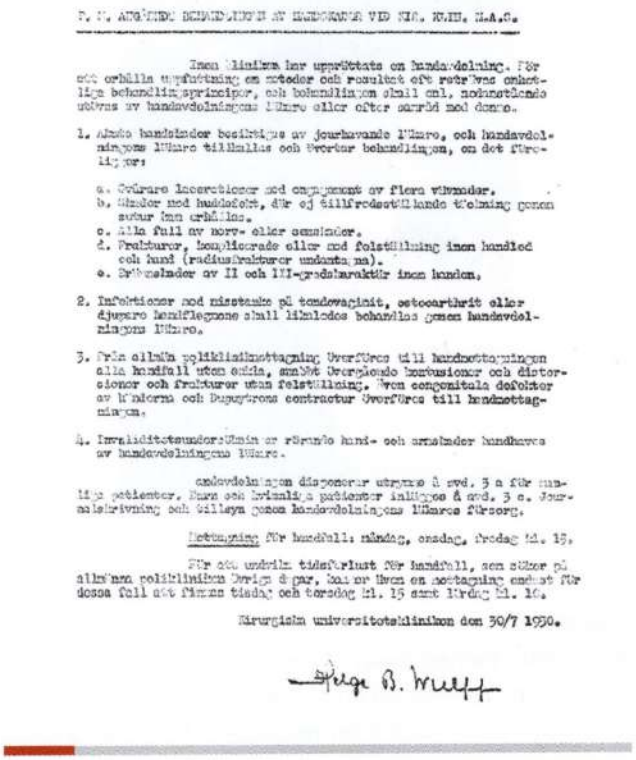
B.C. Descriptions of reduction and stabilisation of wrist-, hand- and finger fractures and dislocations were provided by Hippocrates (460-356 B.C.). In the Iliad, written by Homeros, about 42 injuries to the hand, arm and shoulder are described. More recently, one of the Swedish authors, Fritiof Nilsson the Pirate, described in a very humoristic book the consequences for the hand of a flexor tendon injury. It was stated in that book by one of the victim's friends that "it is as easy to heal a tendon as putting on the head of a decapitated". The progress of Medicine and Surgery has inspired other authors, like John Irwing in "The fourth hand", to write about hand transplantations; a procedure presently performed on more than 20 patients in the world.

The economic decree of treatment of extremity injuries was commenced as early as2000 B.C. in the paragraphs of the code of Hammurabi, Babylonian ruler, where it was stressed that "if a doctor has healed a free man's broken bone or has restored deceased flesh, the patient shall give the doctor five shekels of silver". Presently, there is a growing interest in medical literature to study the economic consequences of hand injuries since the costs from the health care system may take a substantial part of the gross domestic products in different countries.

Hand surgery in Sweden can be dated back to the 1800s when Lennander, late professor of surgery, described the use of free skin grafts in syndactyly. This early publication was followed by several articles by others, describing suppurative infection in the tendon sheaths, polydactyly, surgical technique for use in tenosynovitis and the correlation between ulna minus variance and Kienböck's disease. However, hand surgery in Sweden was initiated by Erik Moberg *(Fig. 2)*, "the father of hand surgery in Sweden", who was inspired by the principles to treat hand injuries described in Sterling Bunnell's "Surgery of the hand" from 1944. Erik Moberg spent time in US 1947 together with Bunnell and Howard in San Francisco and with Koch, Mason and Allen in Chicago. When he returned to Gothenburg Moberg wrote his book "Acute hand surgery" (1948). The first hand surgery ward in Scandinavia was established at Sahlgren´s Hospital in Gothenburg a year later. Moberg trained a large number of hand surgeons who later established hand surgery units in different parts of Sweden (for example Nils Carstam, Malmö 1950, Lars Önne, Stockholm 1952, Lennart Mannerfelt, Lund 1964 and Göran Lindström, Umeå 1975). Several other important pioneers in Swedish hand surgery are mentioned in an excellent previous review and should be remembered [1].

Nils Carstam *(Fig. 2)* was trained by Erik Moberg and also spent time in San Francisco and Chicago. Carsatam opened up a ward in Malmö with the support of the general surgeon Helge Wulff. An important document was created at that time which clearly advises the general surgeon on call which types of hand injuries should be transferred directly to Nils Carstam for treatment *(Fig. 1)*. In addition, policy was established on which elective cases cases ,including post traumatic reconstruction should be referred. This document formed a base for the present agreement with the orthopaedic surgeons for how and where injuries and diseases of the hand should be treated – a guide for level for treatment of specific hand injuries.

Hand surgery has been an independent speciality since 1969, accredited by the National Board of Health and Welfare. Thus Sweden was the first country in the world to have achieved an independent speciality. This work created an important base for development of hand surgery in Sweden. It was initiated by Carstam and Odvar Eiken, and formed a strong platform for



1. Akuta handskador beslutsjas av jourhavande l:läkare, och handavdelningens l:läkare tillkallas och överbar behandlingen, om det föreligger:

a. Grövre lacerationer med engagement av flera vävnader.
b. Skador med huddefekt, där ej tillfredsställande tillslutning genom sutur kan erhållas.
c. Alla fall av nerv- eller senskador.
d. Frakturer, komplicerade eller med felställning inom handled och hand (radiusfrakturer undantagna).
e. Frånvaro av II och III-gradslaraktär inom handen.

2. Infektioner med misstanke på tendovaginit, osteoarthrit eller djupare lokalisationer skall likaledes behandlas genom handavdelningens l:läkare.

3. Från allmän poliklinikmottagning överföres till handmottagningen alla handfall utom enkla, ännu ej övergående kontusioner och distorsioner och frakturer utan felställning. Även congenitala defekter av händerna och Dupuytrens contractur överföres till handmottagningen.

4. Invaliditetsundersökning av rörelse hand- och armskador handhavas av handavdelningens l:läkare.

Handavdelningen disponerar utrymme å avd. 3 a för ambulanta patienter. Även sådana patienter inlägges å avd. 3 a. Journalskrivning och tillsyn genom handavdelningens l:läkare försorg.

Mottagning för handfall: måndag, onsdag, fredag kl. 15.

För akut undersökning tidsförlust för handfall, som söker på allmänna poliklinikens övriga dagar, kan av läkare en mottagning anordnas för dessa fall att äga rum tisdag och torsdag kl. 15 samt lördag kl. 10.

Kirurgiska universitetsklinikum den 30/7 1950.

Börje B. Wulff

FIG. 1 The document, signed by the head of department of Surgery in Malmö, Sweden 1950, defined hand injuries that should be treated by the hand surgeon. A similar agreement with the Society for Orthopedic Surgery in Sweden is presently used regarding which hand injuries and diseases should be referred to a hand surgery clinic.

the hand surgery specialty for respect and recognition. The development of hand surgery has continued and the speciality now works, often in collaboration with orthopaedic, plastic, neurosurgeons and even thoracic surgeons, on problems in the whole upper extremity. The reorganization of the residency of these specialities in Sweden has, however, created a severe threat to the development and research in hand surgery (see below).

Hand Societies

The Scandinavian Society for Surgery of the Hand (initially named Nordic Hand Club) was founded 1951 as the first European hand society. It was formed on the initiative by Erik Moberg who actually received a telegram from Sterling Bunnell, who started the American Society for Surgery of the Hand 1946[1]. Meetings in the society are held at different places in Scandinavia, with the Moberg lecture given by an invited prominent hand surgeon. In Sweden, the Swedish Society for Surgery of the Hand was founded in 1973 as a section of the Swedish Society of Medicine.This served as an important indication that hand surgery has achieved accreditation as an independent speciality. Annual meetings are held in Stockholm or Gothenburg, and a guest lecturer is invited with generous support by the Gabrielsson Foundation. Financial support for hand surgeons in Sweden to travel abroad for the purpose to improve their knowledge in hand surgery is also kindly provided by the Foundation, which was founded by the hand surgeon Göran Gabrielsson in memory of his father Börje Gabrielsson, who was CEO of the international pharmacological company ASTRA.

Hand surgery in Sweden has had several academic positions. Erik Moberg was initially professor in extremity surgery and later in hand surgery. Nils Carstam was appointed by the Swedish government on his retirement as professor of hand surgery honoris causa. In 1987, Goran Lundborg was appointed the first independent professor of hand surgery in Sweden. At present four professorships are held in Gothenburg, Umeå and Malmö (Fridén and Sollerman, Wiberg and Dahlin, respectively).

Hand training

After medical school (5.5 years)and an internship (21 months) a residency in hand may be obtained(generally around 5-6 years). Previously, hand surgeons were recruited from orthopaedic, plastic and general surgery, but since 1969

hand surgery is its own speciality. To train in hand surgery, young residents can also be recruited from orthopaedic surgery after they have received their speciality qualification in that speciality. The current plan is now that training in hand surgery should be around two years after the residency in orthopaedic surgery. Training in orthopaedic and hand surgery may include general surgery, plastic surgery, anaesthesiology, neurosurgery, vascular surgery, or neurophysiology in various proportions. Specific descriptions of aims for the residency have been created for each speciality in collaboration with the national Board of Health and Welfare.

During the training the residents must participate in a specific number of postgraduate courses with focus on its speciality. For hand surgery a post graduate course in microsurgery is also mandatory. After fulfilment of residency the National Board of Health and Welfare gives the residence accreditation as a hand surgeon ("speciality qualification"). In collaboration with the Federation of European Surgery for Society of the Hand, a diploma examination is provided annually. New specialists are encouraged to enter the FESSH diploma examination.

Thus, at present hand surgery is performed by hand surgeons, where some where initially trained in general surgery, plastic surgery and orthopaedic surgery (presently around 2/3), while the remaining (1/3) are directly trained in hand surgery. A large number of hand surgeons have defended their dissertations at different universities in Sweden on subjects related to hand surgery or in otherwise basic science[1]. This has been an essential issue for development of hand surgery in our country.

Pioneers

A large number of persons have been important for the development of hand surgery in Sweden, as outlined in Hagert's review[1], making it impossible to select specific hand surgeons as pioneers. National personalities would include Erik Moberg, the father of hand surgery in Sweden, for his initiative and decisive development of hand surgery even after retirement (surgery of the tetraplegic hand; *(Fig. 2)*). Nils Carstam's work for accreditation of hand surgery as an independent speciality should be highly appreciated. Göran Lundborg, the first professor of hand surgery, has made extensive contributions to our international reputation of research in hand surgery, including the authorship of comprehensive books in hand surgery and nerve injuries.

FIG. 2 Two of several pioneers of hand surgery in Sweden. Erik Moberg (right), the father of hand surgery in Sweden, trained many of the residents in hand surgery and developed principles for surgery of the tetraplegic hand even after retirement. Nils Carstam's (left) work created an important base for development of hand surgery in Sweden leading to achievement of hand surgery as an independent speciality.

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Switzerland

42 CHAPTER

Schweizerische Gesellschaft für Handchirurgie **SGH**
Société Suisse de Chirurgie de la Main **SSCM**
Società Svizzera di Chirurgia della Mano **SSCM**

Founded 1966

Esther Voegelin

History

The Swiss Society of Surgery of the Hand was founded on 12th of November in 1966 by Claude E. Verdan and 50 General Surgeons in Lausanne (Schweizerische Arbeitsgemeinschaft für Handchirurgie, Groupe Suisse dÈtude de Chirurgie de la Main, Gruppo Svizzero di Studio per la Chirugia della Mano).

In 1988 Hand Surgery was acknowledged as a sub-specialization and in 2007 Hand Surgery was acknowledeged as a speciality in Switzerland. The Swiss Society of Surgery of the Hand became member of FESSH in 1990 .

The society of Swiss Hand Surgeons consists of 150 members. Presidents of the Swiss Society of Hand Surgery:

2008-	Dr. Daniel Herren, Zürich
2006-2007	Dr. Urs von Wartburg, Luzern
2004-2005	Dr. Walter Künzi, Zürich

2002-2003	Dr. Michael Sturzenegger, Lausanne
2000-2001	Dr. Chantal Bonnard, Lausanne
1998-1999	PD Beat René Simmen, Zürich
1996-1997	PD Dominique R. Della Santa, Genf
1994-1995	Professor Ueli Büchler, Bern
1991-1993	Professor Algimantas O. Narakas, Lausanne
1989-1991	PD Daniel V. Egloff, Lausanne
1988-1989	Professor Viktor E. Meyer, Zürich
1986-1987	PD Andre Chamay, Genf
1983-1986	Professor Karl Pfeiffer, Basel
1977-1982	Professor Algimantas O. Narakas, Lausanne
1973-1976	Professor Henry Nigst, Basel
1966-1972	Professor Claude E. Verdan, Lausanne

Hand Training in Switzerland

It is possible to start a specialized Hand Surgery training after two years of General Surgery before acquiring the Swiss Hand Diploma after 6 years of training. However, this diploma is only acknowledged in Switzerland. Most trainees interested in Hand Surgery accomplish first a full training of 6 years in General Surgery, Plastic Surgery, Pediatric Surgery or Orthopaedic Surgery before subspecializing in Hand Surgery during another 4 years. The achievement of this rather long education consists of two diplomas acknowledged in Europe.

Certification

After 4 years training in 2 specialized centers including a defined logbook and a passing an oral and written exam in Switzerland, the candidate receives a diploma. With this diploma the candidate is a board certified Hand Surgeon in Switzerland. The training and the specialization ,but not the Swiss diploma, is acknowledged in most countries of Europe.

Specialities Performing Hand Surgery

General Surgeons, Plastic Surgeons, Orthopaedic Surgeons and Pediatric Surgeons include very basic Hand Surgery in their training program. However, candidateswho desire to specialize in Hand Surgery have to accomplish the specialized Hand training program.

Giants and Major Contributions

Henry Nigst (1919-2008)

During his training as a general surgeon in the fifties he managed to train one year in London at the Royal National Orthopaedic Hospital. The personal contact with Sir Herbert Seddon and J.I.P. James influenced his understanding in peripheral nerve surgery and the rehabilitation potential of injured and paralyzed patients. After a visit in Paris with Marc Iselin he returned to Basel and founded the first hand therapy centre in 1954. As a trauma surgeon he became an academic teacher in Hand Surgery and Surgery of the Peripheral Nerves at the University of Basel in 1971. In 1967 he left this post to become the chief of the first division of Hand Surgery and Surgery of Peripheral Nerves in Basel. After retiring in 1985 he continued to be a consultant surgeon in various hospitals around Basel. He influenced the development of hand surgery,especially in the treatment of nerve injuries, in Middle Europe *(Fig. 1)*.

Viktor E. Meyer (1937-)

After his board qualification in general surgery in 1972 he received a fellowship at the Institute for Plastic and Reconstructive Surgery of J.M. Converse MD at NYU in New York under the guidance of R.W. Beasley. He was introduced into microsurgical techniques in the laboratory of Robert A. Chase at Stanford University, Medical School, and then clinically while observing

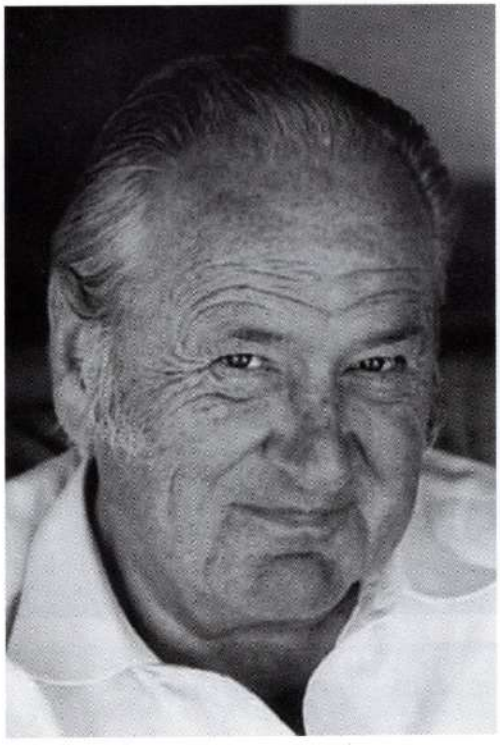

FIG. 1 Henry Nigst (1919-2008).

FIG. 3 Ulrich Büchler.

finger replantations in Louisville. He finished his educational travels in Vienna, learning modern principles of peripheral nerve surgery with Hanno Millesi. After returning to Switzerland in

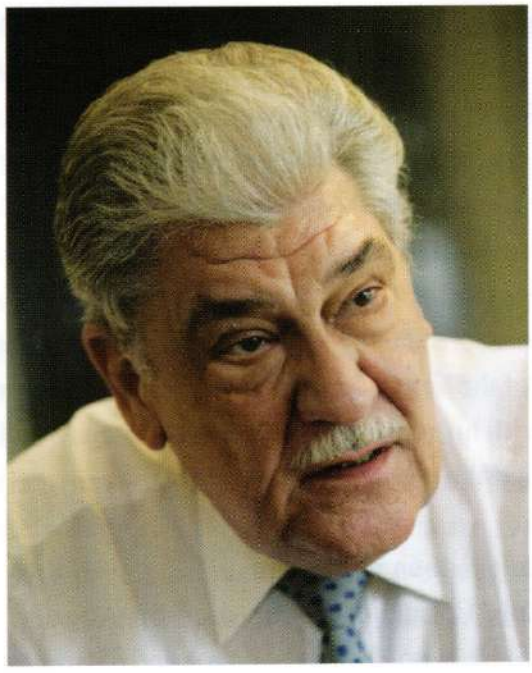

FIG. 2 Viktor E. Meyer.

1974 he performed the first successful replantation of a hand amputated at the level of the metacarpus in June 1974. He then built up a microsurgical training and research laboratory at the University of Zürich. In 1975 the first free successful groin flap in a 4 years old child was performed. Shortly after that he performed a second toe transplantation to the index position on a patient with total loss of all four fingers. In 1982 he was honored by the Georg Friedrich Goetz Award of the University of Zürich for having introduced reconstructive microsurgery in Hand and Plastic Surgery into Switzerland *(Fig. 2)*.

Ulrich Büchler (born in 1944)

After Medical schools in Bern, Geneva and Paris he obtained his board certification in General Surgery. He then trained in United States with John Boswick in Denver, Harry Buncke in San Francisco, Lee Milford in Memphis and Harold Kleinert in Louisville. After returning to Switzerland he became the chief of Surgery of the Hand and Peripheral Nerves at the University of

Bern in 1977 and developed a treatment, training and research center of international reputation. He fathered the concepts of simultaneous double free tissue transfer, free contralateral index pollicization, condylar blade plating, phalangeal osteotomies, the dorsal middle phalangeal flap and others. Ueli Büchler investigated the functional interactions during the healing of combined injuries of the hand. After retiring in 2006 he carried on with his many private interests such as sailing around the world *(Fig. 3)*.

Claude Edouard Verdan

Claude Edouard Verdan died on August 7th, 2006. He would have been a hundred years old on September 26th 2009. He was a man of action – all his life is reflected in one of his last sayings : « In fact, whatever the manual, intellectual, cultural or spiritual activity to which each of us has devoted his life, at the time of death, the individual is nothing; what he has achieved, however, is everything» *(Fig. 4)*

His vocation for a medical career was strengthened through a peritonitis incurred when he was 15 years old. In those days antibiotics did not exist. He swore that if he survived, he would devote his life to sick people. Another event was going to lead him towards hand surgery. This was before the last world war at a time when hand surgery did not exist. While working as a regional practicioner in the 1940s he had to deal with many patients who had suffered from an accident and showed sequellae from hand traumas in particular. The seriousness of those cases shocked him ; they were so utterly disabling that he decided their treatment had to be improved. One should remember that at that time either a phlegmon or a lesion of the flexor tendons meant an amputation.

Moved by this ambition he founded in 1946 the Longeraie Surgical and 24 hour Emergency Clinic, opened, according to its name ,permanently for 24 hours. For many years he personally dealt with the emergency cases. while he was the head of the University out-patients' clinic in Lausanne.It was during this period that he was drawn to consider the repair and treatment of tendons and nerves. In 1950 he shook the surgical world in proposing the primary repair of the flexor tendons in the digital canal. For

FIG. 4 Claude Edouard Verdan.

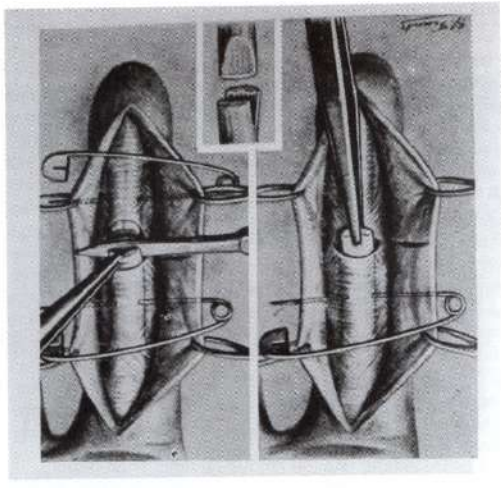

FIG. 5 Verdan's primary repair of flexor tendon in Zone II of the digital sheath.

the Americans this represented a heresy : this area had been a no-man's land ever since one could remember and the repair was undertaken as a secondary operation with a graft. Steadily and progressively, this dogma disintegrated and Verdan's treatment was accepted *(Fig. 5)*.

In 1951 he submited his accreditation thesis : Repair and functional surgery of hand tendons. It was published the following year by the French Scientific Expansion

In addition, Professor Verdan was Dean of the Lausanne Medical Faculty for two consecutive mandates (1972 and 1973).

Algimantas Otonas Narakas (1927-1993)

Jonas, his father, was Commander in Chief of the Lituanian Air Force, future Deputy Minister and Minister of Home Affairs. Algimantas Narakas was sent to Switzerland in 1938 to be treated medically for an osteitis affecting his left tibia and an osteomyelitis of his right hip, which kept him bedridden until penicillin freed him in 1947. He used this forced inactivity to devour all the German and French literature that he could find. This sparked his wide interest in culture and his curiosity in all things. When Switzerland established diplomatic relations with the Soviet Union in 1946, Lithuania having become a Soviet republic, he lost his nationality. Only in 1962 did he acquire Swiss citizenship.

In 1957, Dr Narakas received his degree as M.D., but he was still a foreigner. The Swiss M.D. degree was awarded to him only in 1963, after he had become a Swiss citizen and had again passed his final medical examinations, as required by Swiss Law. He gained an international reputation for his expertise in nerve repair especially of the brachial plexus.

His greatest gift, however, was compassion and also vigor. All his operations were reported with precision, accompanied by appropriate drawings. Perioperative discoveries were compared to preoperative status. Thanks to the charts which he had also meticulously made, he could establish rules for classifying lesions : the routes, first, primary, then secondary repairs, and palliative operations. He also wanted to share his new knowledge, and for this he organized symposia.

Apart from his skill as a surgeon, he was also gifted with two other talents: 1) He loved teaching, and taught with gusto, thrilling his audience. 2) Narakas could draw. Any scientific demonstration that Narakas presented was supported by his drawings. Those that he included in his operation reports attest to his artistic proficiency.

Taiwan

43 CHAPTER

Founded 1990

David Chwei-chin Chuang,
Alvin Chao-Yu Chen

History

The Taiwan Hand Association was established in 1990 with support of local orthopaedic and plastic surgeons. The number of registered members was initially 323. The President is elected alternatively from orthopaedists and plastic surgeons. Each President serves two years with a personal general secretary and 12 elected executive committee members. The first President was Prof. TK Liu, and the first general secretary was Prof. SM Hou who later became the chief of Taiwan National Health Care Administration (Fig. 1). Both are orthopaedists. The President in 2010 is Prof. David Chwei-Chin Chuang, the 10th President. The secretary is Prof. Chih Hung Lin. Both are plastic surgeons. For the period 2011-2012 Prof. Alvin Chao-Yu Chen will serve as the 11th President. During this same period, the secretary

FIG. 1

FIG. 2 First Combined Meeting of Taiwan hand surgeons and therapists. Distinguished guests: A) Richard Berger 2nd from left and B) Rosemary Prosser 3rd from left.

will be Dr. Ying-Chao Chou. Both are orthopaedists. Our future is full of challenges. We plan to have monthly CME (Continuing Medical Education) in cooperation with local hospitals and doctors for intellectual exchange and experience sharing, to set up scholarships, to encourage and facilitate the active participation of young hand surgeons, and to set up ambassador exchange programmes with other countries. In 2008, we invited hand therapists to join in our society. The first combined meeting of hand surgeons and hand therapists was held on May 23, 2009. Two international guests were invited: Dr. Richard Berger from Mayo Clinic, Rochester, MN (an orthopaedist) and Miss Rosemary Prosser (Hand therapist from Australia).*(Fig. 2A-B)*. We also had attractive lectures from our senior consultants (12 people) for so called "Experience Talks). The meeting was quite successful. The number of active members of hand surgeons is 235 and 20 hand therapists.

Hand Training in Taiwan

All hand surgeons must complete either orthopaedic or plastic surgery residency training prior to a qualifying examination (oral and written tests). After passing the quality examination he/she will become a certified hand surgeon. Most hand surgeons are either orthopaedic or plastic surgeons.

Giants (or pioneers) and Major Contributions

Many of our pioneers had overseas training (USA and Japan are the most common). Dr. TK Liu is recognized for his work in infection and peripheral nerve disorders; Dr. SM Hou in bone fractures and allotransplantation; Dr. FC Wei in toe transplantation and allotransplantation; Dr. HC Chen in lymphedema and flap surgery; Dr.

MT Chen in anatomy and AV malformations; Dr. TY Wu in rheumatoid arthritis; Dr. YK Tu in fractures and brachial plexus injury; Dr. David Chwei-Chin Chuang in brachial plexus injury and peripheral nerve disorders; Dr. IM Jou in minimal invasive surgery; Dr. YC Ching in congenital hand; Dr. CH Lin in traumatic hand.

Hand Society

The name of the association name has been changed. The old name was " Society of Surgery of the Hand, ROC" . The new name now is "Taiwan Society for Surgery of the Hand, TSSH) which was renamed in 2009 and a new logo was made.

44 CHAPTER

Thailand

Founded 1973

Panupan Songcharoen

The Thai Society for Surgery of the Hand was first established in 1973 by a group of orthopedics, plastic and general surgeons who had training in hand surgery from abroad (U.S.A., U.K, Germany, etc.) and practiced most of the time in the field of hand surgery. Due to the limited number of hand surgeons, the regular annual academic meeting of the society in the first few years was held in collaboration with the Thai Orthopedic Association, the Thai Society of Rehabilitation Medicine,and the Society against Rheumatism of Thailand. Beginning in 1984, the Thai Society for Surgery of the Hand held its own separate annual academic meeting. At present the Thai Society for Surgery of Hand has 10 full time members exclusive in hand surgery practice and 128 associate members. The vast majority of members are orthopedic surgeons with plastic and general surgeons as a

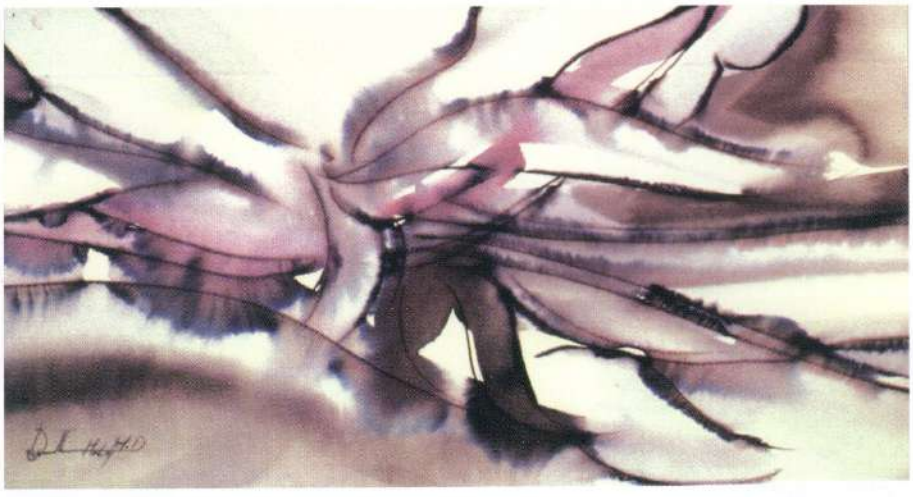

FIG. 1 Intrinsic augmentation by Dr. Dumronk Thanachanant.

FIG. 2 Thailand Greeting - "wai".

minority. In 1989, the Thai Society for Reconstructive Microsurgery (the sister society of the Thai Society for Surgery of the Hand) was established with great support from Professor T. Tamai (Nara University, Japan) who is a pioneer in the field of hand and microsurgery. Since then, the annual academic meetings of the two societies have been combined together.

The Thai Society for Surgery of the Hand hosted two international meetings. In 1991, the 4th Congress of Hand Section of the Western Pacific Orthopaedic Association, in Bangkok (Congress Chairman – Dr.Charoen Chotigavanich) and in 2006 the 6th Congress of the Asian Pacific Federation of Societies for Surgery of the Hand in Bangkok (Congress Chairman – Dr.Panupan Songcharoen).

FIG. 3 Thailand dancers emphasize supple and graceful hand movements.

Training

A formal hand surgery training program was first established in Thailand in 1997 at the Hand and Microsurgery Unit, the Department of Orthopedic Surgery, Faculty of Medicine Siriraj Hospital Mahidol University. The surgeons applying for a one year clinical fellowship program in hand surgery and microsurgery have to be a board certified orthopedic, plastic or general surgeon (4-5 years training). A second clinical fellowship program in hand surgery was started in 2004 at the Institute of Orthopedics, Lerdsin Hospital with similar basic requirements. At the end of each training program the candidate has to submit a research project and pass an oral and written examination. The training program is monitored by the university, the Royal College

of Orthopedics, the Royal College of Surgeon and the General Medical Council.

Pioneers and National Personalities in Hand Surgery

The pioneers of Hand Surgery of Thailand include: Dr.Natee Rakspolmuang, Dr.Thamrongrat Kaewkarn, Dr.Charoen Chotigavanich, Dr. Pongsak Vathana, Dr.Vivat Visuthikosol who are past presidents of the Thai Society for Surgery of the Hand. Also included are: Dr.Ek Tardthong in hand surgery in Leprosy. Dr.Dumronk Thanachanant *(Fig 1)* who designed the Thai Society for Surgery of the Hand logo, Dr.Surasak Muangsombut and Dr.Adisorn Patradul in microsurgery and replantation, Dr.Panupan Songcharoen, Dr.Preecha Chalidapong and Dr.Somsak Leechavengwong in brachial plexus surgery and hand surgery training in Thailand.

45 CHAPTER

The Netherlands

Founded 1968

Jacques van der Meulen,
Geneviève de Groot Swanson,
Steven Hovius

When or why is a concept, movement or society born? Never on a single day because a group of people suddenly feels creatively urged. Honestly, this would make a historian's task too simple. The answer, as we know, is far more complex and subject to individual interpretation.

Wars occur at the interface of chaos and order where newly formed lives replace old destroyed ones. As a rare benefit, the large number of wartime casualties stimulates the evolution of reconstructive surgery. The facts that The Netherlands remained neutral in World War I, only briefly served as a battlefield during World War II and suffered from Academic repression under the Nazi regime, play an intricate role in the slow development of hand surgery in the Netherlands.

During and after World War I, working in Brunn, Vienna, Budapest and Berlin, the Dutch

surgeon Jan F.S. Esser developed arterial flaps and epithelial inlay techniques, the bases for modern reconstructive surgery.[1] In particular, his case report on "Reconstruction of a hand and four fingers by transplantation of the middle part of the foot and four toes" received worldwide attention.[2]

Before World War II, frequently referred to as "petite chirurgie" or minor surgery, hand surgery was considered part of general surgery and served as ideal training material for the junior surgeon in the catacombs of a major hospital. As an exception to this trend, G. Crietee became interested in the repair of tendons while training under Prof. Dr P.R. Michael at the "Zuidwal" Hospital in The Hague. Unfortunately, in 1946, he died in an accident before having the opportunity to defend his doctoral thesis on this topic.

Occasionally after the War, an intrepid surgeon with keen interest in the intrinsic mysteries of the hand would attempt elevating the treatment standards in his hospital by seeking further training under Prof. Marc Iselin in Paris. However, his efforts remained usually in vain as for years many colleagues continued selecting finger amputation as the preferred treatment. Understandably, while the wartime lapse in international communication hampered the advancement of surgery in The Netherlands, the years of post-war poverty favored the development of important new specialties such as thoracic and peripheral vascular surgery at the expense of others such as orthopaedic surgery and urology.

In the late forties and early fifties, interest in hand surgery surged as small groups of surgeons who trained in plastic surgery in the United Kingdom returned to the Netherlands armed with new methods for treating hand lesions. Arriving first, C.F. Koch, J.C. Raadsveld and C.A. Honig founded the plastic surgery specialty in Holland in 1950. Returning later, J. Hage, A.J.C. Huffstadt, S. Woudstra and E. Frederiks pioneered the development of hand surgery through their surgery, lectures and publications. Huffstadt wrote his doctoral thesis on tendon grafting and Hage, on pollicization. While organization of hand surgery as a specialty in the Netherlands remained in an incubation stage until the mid-sixties, a number of surgeons made important individual contributions. Becoming aware of the social impact of hand lesions while training under Sir Archibald Mc Indoe, Raadsveld was the driving force in coordinating the care of hand patients in The Netherlands. Back in Rotterdam, he organised the first multidisciplinary hand team that included representatives of the surgical and rehabilitation departments, as well as socio-economic services (insurance companies and labor board).

In 1966, two events served as catalysts for stimulating the formation of Dutch hand surgery organisations. First, the foundation of the International Federation of Societies for Surgery of the Hand (IFSSH) in Chicago, January 20, 1966, encouraged worldwide dissemination of knowledge, specialized training and organisation of regional societies. Second, The Netherlands' first formal hand surgery meeting, International Conference on Surgery of the Hand, was held on May 20 and 21, 1966, at the Dijkzigt Hospital in Rotterdam. Jointly organized by the Dutch and Belgian Associations for Plastic Surgery, the meeting featured world-renowned authorities who impressed the audience with the quality of their presentations *(Fig. 1)*. Sharing his moving experiences with the rehabilitation of severe hand injuries in the pilots of the Battle of Britain, Christopher (Kit) Wynn Parry represented the birth of hand rehabilitation services.

Organisation: Dutch and Belgian Associations for Plastic Surgery
Date: May 20 and 21, 1966
Place: Auditorium, Dijkzigt Hospital, Rotterdam (Holland)
Chairman: W.L. White (USA)

PROGRAM

FRIDAY, MAY 20
2.00 p.m. Scientific Session

J.C. RAADSVELD (Holland)	– Introduction
J.M.F. LANDSMEER (Holland)	– Functional anatomy of the hand
J.D. MULDER (Holland)	– Contractures of the fingers caused by muscular imbalance
M. BÄCKDAHL (Sweden)	– Rheumatoid arthritis and surgery of the hand

SATURDAY, MAY 21
9.30 a.m. Scientific Session

J. POLUS (Belgium)	– The use of broken incisions in the treatment of Dupuytren's contractures
R.P. HERMANS (Holland)	– Primary treatment of the burnt hand
G. MATTON (Belgium)	– Reconstruction of the burnt hand
S. HARRISON (England)	– Flexor tendon grafting
G. STACK (England)	– Restoration of prehension in severely injured hands,
S. WOUDSTRA (Holland)	– Reconstruction of the thumb

2.00 p.m. Scientific Session

W.L. WHITE (USA)	– Practical considerations concerning dynamic function of the human hand
A. PARKES (Scotland)	– Ischemic contractures of the hand
C.B. WYNN-PARRY (England)	– Rehabilitation of the severely injured hand

FIG. 1 Program: International Conference on Surgery of The Hand, Dijkzigt Hospital, Rotterdam, May 20 and 21, 1966.

Following this conference, Jacques van der Meulen received invitations to attend the 1967 meetings of the British Hand Club and the G.E.M. (Groupe d'Etude de la Main). In November 1968, he presented his work on tendon healing at their London and Paris meetings and became a member of both prestigious societies. The opportunity to meet and share information with many foreign colleagues, including a number of illustrious peioneers, gave van der Muellen the idea of developing a Dutch hand surgery organisation. After the spring 1968 Joint European Meeting of the American, British and French Societies in London, Oxford and Paris, Jacques van der Meulen, supported by Johan Landsmeer, took the initiative of founding The Dutch Club for Surgery of the Hand. Held on June 14, 1968, at the Dijkzigt Hospital in Rotterdam, the first meeting was attended by the Founding Members including A.W. Bom, E. Frederiks, J. Hage, Herschel, C.A. Honig, A.J.C. Huffstadt, J.D. Mulder, H.S.M. Raat, J.C. Raadsveld and S. Woudstra. The Club membership represented various disciplines including anatomy, orthopaedic surgery, plastic surgery and rehabilitation. The agenda of the first meeting addressed two proposals:

1. Schedule yearly informal meetings to discuss topics of mutual interest and determine the viability of the Club. The set schedule included Rotterdam, March 3, 1969; Utrecht, September 9, 1969; Utrecht, November 27, 1970; and Rotterdam, December 11, 1971.
2. Invite the American Society for Surgery of the Hand (ASSH) to include The Netherlands in the agenda for its spring 1970 Joint Euro-

pean Meeting with the Scandinavian Society for Surgery of the Hand.

Dr. Vinton Siler, ASSH President, whom van der Meulen met in Oxford at the joint European Meeting in 1968, accepted the invitation. In order to coordinate the scientific program, van der Meulen visited Erik Moberg in Göteborg. He recalls, "We first met in his clinic, where much to my surprise an open stairway directly connected the operating room to the outpatient department below. Moberg said it was extremely efficient because he had never seen a microbe crawling upwards. Later Moberg took me to his small cottage on the edge of a seaside bay. The icy surface of the frozen water seemed to touch the foggy horizon. Moberg almost had to bend in two to enter his little cabin, but to me it was crystal clear... the tall man was in his element."

On May 3, 1970, following their meeting with the Scandinavian Society in Copenhagen, Malmö, Göteborg and Heinola, our colleagues from the ASSH arrived in Holland for a memorable joint meeting with the Dutch Club for Surgery of the Hand. The program included two days of scientific sessions separated by a free day of sightseeing.

On May 4, the group met in Leiden, home of the oldest university in the Netherlands and birthplace of the immortal Rembrandt. Held in Prof. Landsmeer's Department of Anatomy and Embryology at the University of Leiden, the outstanding session "The Anatomical Exploration of the Human Hand" included visits of the exhibition, presentations by department members and Landsmeer's anatomical demonstrations. Incidentally, surrounded by "cream of the crop" physicians, the Great Anatomist received the best and well-deserved care for his acute low back pain.

In his delivery of the 1965 ASSH Founders Lecture, Landsmeer clarified the pathomechanics of the boutonnière and swan neck deformities by explaining the role of Weitbrecht's ligament in coordinating finger movements and its effect on the bi-articular intercalated bone system following lesions of the extensor aponeurosis.[3] He became the icon and anatomical guru for the hand-surgeons of those days. His Atlas of Anatomy of the Hand, published in 1976, only added to his fame.[4] For his many contributions, Landsmeer received honorary memberships in the American, British, French and Dutch societies for surgery of the hand. In 1986, he received the honour of recognition as Pioneer in Hand Surgery at the Third International Congress of the IFSSH, held in Tokyo, Japan.

On May 6, the meeting convened in Rotterdam, the "Phoenix City" arisen from ashes of WW II bombardments to become Holland's second largest city and the world's largest seaport. Held in the new De Doelen concert hall and chaired by the illustrious Prof. Joseph H. Boyes, "The Symposium on Surgery of the Hand" featured an internationally acclaimed faculty that discussed new advancements in primary treatment of hand injuries and hand reconstructive procedures.

The outstanding success of the Dutch-American meeting provided an important stimulus for the development of hand surgery in The Netherlands. In 1972, The Dutch Club for Surgery of the Hand decided to become a formal society and outlined the charter of the Netherlands Society for Surgery of the Hand. Members of the board included Johan Landsmeer, President; B. van Linge, First Secretary; A.J.C. Huffstadt, Treasurer; and J.C. van der Meulen, Assistant Secretary. Honoured by the presence of acting Godfathers Raoul Tubiana and Graham Stack, the Society held its first meeting in Rotterdam, on December 2, 1972.

On June 6, "D-Day" 1973, in Utrecht, having

satisfied the entrance requirement of national society status, the Netherlands Society for Surgery of the Hand applied for membership to the International Federation of Societies for Surgery. The IFSSH welcomed the Dutch Society in its mondial fraternity of hand surgeons on August 24, 1975, at its Paris Council meeting and appointed van der Meulen as Dutch delegate on December 12, 1975. The new status not only gave the Society needed political power, but also made its members, although still small in number, aware of their academic responsibilities. In 1974, van der Meulen became the first lecturer in hand surgery at the Erasmus University speaking on "Man and his Hand".[4] In 1979, J. Bloem became full Professor in Surgery of the Hand at the Free University of Amsterdam. The specialty reached its growing phase.

At its 1977 Council meeting, the IFSSH suggested the possibility of organising an International Congress to further promote the quality of hand surgery world wide. Taking the leadership, Alfred B. Swanson, the new Secretary-General who could be very persuasive, felt that Rotterdam with its excellent University facilities would be an ideal site and worked on the idea with van der Meulen. In 1978, the Federation Council approved the proposal of The Netherlands Society for Surgery of the Hand to act as hosts and assist organizing the meeting. It took great faith, confidence and personal efforts on the part of those involved to overcome the enormous difficulties in coordinating the First International Congress.[5] The Secretary-General and van der Meulen held multiple conferences in the United States, Norway, Britain and France, before securing the organisation. Van der Meulen was able to obtain financial guarantees with a Dutch congress organizing firm and travel agency. Bob Huffstad accepted to become chairman of the Scientific Committee and other members followed. The Erasmus University of Rotterdam offered its facilities.

FIG. 2 Conference leaders of the First IFSSH Congress: Raoul Tubiana, France; Erik Moberg, Sweden; Alfred B. Swanson, United States; Bernard McC. O'Brien, Australia; Graham Stack, England R. Guy Pulvertaft, England; Dieter Buck-Gramcko, West Germany; and Tatsuya Tajima, Japan.

The First IFSSH International Congress was convened in June 1980, in Rotterdam, under the patronage and presence of His Royal Highness Prince Bernhard of The Netherlands.[6] Representing 51 countries, 526 registrants and 140 accompanying persons attended the outstanding scientific and social program *(Fig. 2)*. The Federation released its new logo designed by Dutch artist Kees DeVries from Erasmus University and representing a hand on the face of the world globe.

At the invitation of Former Secretary-General Graham Stack and acceptance by Evelyn Mackin, President of the American Society of Hand Therapists, more than 200 therapists attended the Rotterdam Congress, marking their first worldwide meeting. Evelyn's dream of a World Confederation of Hand Therapists would be born in Rotterdam in 1980.

At a time when hand therapy as a specialty was virtually non-existent in the Netherlands, van der Meulen realised its important role in the treatment of hand patients during a visit to

John Madden's hand unit in Tucson, Arizona. A few years later, while attending the 1986 IFSSH International Congress with S. Hovius in Tokyo, Japan, he met a young Dutch therapist trained by Evelyn Mackin in the U.S.A. Gwendolyn van Strien accepted the invitation to work in Rotterdam. She eventually played a prominent role in the evolution of hand therapy in the Netherlands and the formation of The Dutch Society for Hand Therapy, which is now part of the World Confederation.

In retrospect, it is probably fair to say that the 1980 IFSSH International Congress marked the transition between two periods. The years following WWII, knew a steadily increasing number of dedicated individual surgeons who were constantly trying to improve the quality of hand surgery, usually by trial and error. The formation of national societies allowed disseminating and exchanging knowledge, which ultimately led to the organisation of the first world congress under the aegis of the International Federation of Societies for Surgery of the Hand. After the Congress, hand surgery continued to flourish with national societies firmly in charge and a new generation of ambitious young surgeons pursuing further perfection. The incorporation of microvascular surgery in the hand surgeon's armamentarium drastically expanded the spectrum of techniques, leading to improved results and increasing respect for the specialty. Hand Surgery finally earned its place as an important surgical specialty.

Activities of the Society

Following the intriguing start as described afore the Netherlands Society moved on and established itself. Concerning the activities two one-day scientific meetings are organised per year.

It is a good custom to invite key note speakers mostly from abroad on varying subjects. Meetings are quite often organised together with the Netherlands Society for Hand Therapy (Nederlands Genootschap voor Handtherapie) and sometimes with the Belgian Hand group. There is a very good relation with the hand therapists.

The Netherlands Society for Hand Surgery has currently 140 active members. Members are plastic surgeons, orthopaedic surgeons, and a couple of general surgeons, rehabilitation physicians and hand therapists. A potential new member has to be supported by two members at the general assembly; the new member should also present a paper.

The society supports PhD theses and protocols. A website is up and running. The European hand examination is encouraged.

In the past years a number of activities have been exerted by members. For instance a booklet was issued on hand trauma for all emergency departments in the Dutch hospitals under the guidance of Peter Houpt. Also the wrist group 'Amici Carpi' was founded by Richard Koch holds many meetings with wrist surgeons from the UK. Furthermore a congenital hand group 'Sin Dactly' was founded by Dirk van Egmond and Steven Hovius. The congenital hand group has also developed many patient information brochures on the common congenial hand malformations.

In addition many theoretical courses, dissection courses and master classes on the hand and wrist are organised throughout the country by members of the society.

A number of well known surgeons from abroad have been invited to demonstrate their skills in hand surgery. These visitors include: Joe Upton, Paul Smith, Dieter Buck-Gramcko, Guy Foucher, Roger Khouri, Ralf Habenicht, Jan Friden and many others.

The Dutch were among the founder coun-

FIG. 3 Logo of the 8th FESSH meeting in Amsterdam.

tries of the Federation of European Societies for Surgery of the Hand (FESSH) in Taranto, Italy. Following the initiative of Caroli from Italy to bring the societies together, Alain Gilbert of France took over and made the society what it is today.[7] As secretary general for the FESSH from 1999-2002 Steven Hovius offered to host the FESSH meeting in the Netherlands with support of the society. As a consequence one of the major events for the Netherlands Society after the IFSSH meeting in 1980 was the organization of the 8th FESSH meeting in Amsterdam in 2002 together with the Netherlands Society for Hand Therapy. The phrase for the congress was 'Lend a hand to science improvement'; the instructional course and book concerned the pedriatic hand. Nearly a thousand participants attended the meeting *(Fig. 3)*.

Another activity which was set up by members is the National Hand and Wrist Fellowship. This fellowship is for the duration of one year and open to board certified specialists (plastic surgery, orthopedics and traumatology). The fellow visits in the first half year hospitals in Rotterdam and The Hague and in the second half year hospitals in Amsterdam and Zeist. In this way the fellow has a broad exposure to hand and wrist surgery. During this year the fellow will follow teaching modules and will have to pass the FESSH hand examination at the end of the fellowship. Furthermore an article in a peer reviewed journal should be submitted.

In the future emphasis should be placed more on standards and protocols, and being able to prove which technique or therapy is best in the different areas of hand and wrist surgery. Hand and wrist specialised surgery has its place in the Netherlands, although there is still enough to do to gain more recognition.

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Turkey

46 CHAPTER

Founded 1977

Ayan Gulgonen

The Modern era of hand surgery in Turkey started with Prof Rıdvan Ege. Prof Merih Eroğlu was the first hand surgeon who integrated the education of hand surgery in the field of Orthopedic Surgery and Traumatology. Prof Ayan Gülgönen, who is also the pioneer of microsurgery in Turkey, performed the first replantation of a completely amputated finger in 1978.

Prof Rıdvan Ege, after completing his education in Orthopaedic Surgery and Traumatology, studied hand surgery at the Columbia University with Prof Robert Carroll in 1963, and visited Dr William Littler at the Roosevelt Hospital and Dr Lee Ramsey Straub at the Cornell University. He also visited Dr Boyes at University of Southern California, and Dr Flatt at Iowa University in 1966. Following these intensive studies in the USA he retuned to Turkey and started to work on hand surgery.

Prof Merih Eroğlu, who was a member of the Aegean University Medical School Department of Orthopaedic Surgery and Traumatology, went to Columbia University, New York to visit Prof Carroll. She established the Department of Hand Surgery at the Aegean University and become the first surgeon who started a structured education of hand surgery.

Prof Ayan Gülgönen studied in the field of hand surgery with Prof Carroll in 1970, and with Dr Michon at Nancy Hospital Jeanne D'Arcin Paris. He established a dynamic team of hand surgery, comprised of several surgeons and physiotherapists in 1980 at Pasteur Hospital, İstanbul. Many surgeons from several hospitals interested in hand surgery have visited Prof Gülgönen and his team. The experienced surgeons of this team moved to other health care facilities following the closure of the Pasteur Hospital. The number of surgeons interested in hand and microsurgery increased significantly after the early nineties and new teams were established in other cities. One of the important milestones of hand surgery in Turkey was "The Hospital of Hand and Microsurgery", which was founded in the industrial heart of the city of İzmir in 1991. Health care related to hand injuries are largely covered by private hospitals in Turkey.

Entering the new millenium, academic hand surgeons in University Hospitals set up more than 15 divisions in the bodies of the Departments of Orthopaedic Surgery/Traumatology and Plastic/Reconstructive Surgery. In 2009, hand surgery was accepted as a subspecialty under orthopaedic surgery or plastic surgery.

FIG. 1 "Hands" in Abdi Ipekci Park, Ankara by sculptor Metin Yurdanur.

Prof Rıdvan Ege founded Turkish Society of Hand and Upper Extremity Surgery in 1977. He led the society for 27 years. Prof Ege published a major textbook of hand surgery in 1991. Following heads of the executive committee were Prof Ayan Gülgönen (2004-2006), Prof Oğuz Polatkan (2006-2008), and Prof Hüseyin Bayram (2008-2010). Currently the society has 217 active members. National Congresses are held every two years. A comprehensive review course is organized every year. The Turkish Society of Hand and Microsurgery has hosted the VIIIth IFSSH congress in Istanbul in 2004 and will be hosting 2013 FESSH Congress in Antalya.

United Kingdom

47 CHAPTER

Founded 1968

Frank Burke

The Society was formed from two groups: The Hand Club (established 1952) and the second Hand Club |(established in 1956). The merger took place in 1964 with the name adjusted to The British Society for Surgery of the Hand in 1968. Membership (2008) includes 283 full members, 65 overseas members and 252 associates. The population of the United Kingdom is 60.9 million (2008 statistics). The majority of full members are orthopaedic surgeons, with a substantial minority being plastic surgeons and with an additional 50 full-time members in exclusive hand surgery practice.

The Society Secretariat is based in The Royal College of Surgeons of England, 35-43 Lincoln's Inn Fields, London WC2A 3PE, email secretariat@bssh.ac.uk The Society Journal is the European Journal of Hand Surgery (http://jhs.sagepub.com).

Training

Surgeons aspiring to a hand surgery career in the United Kingdom join an orthopaedic or plastic surgery training programme (having already done two or three years in more general surgical training). Basic training in orthopaedics and plastic surgery occurs in the first four years with the opportunity for acquiring basic hand surgery skills. An additional two years at the end of training allows for a higher level of hand surgery training on secondments to fellowship posts in the United Kingdom or elsewhere. Training is monitored by the Royal College of Surgeons leading to certification on the General Medical Register on satisfactory completion of studies.

The British Society for Surgery of the Hand runs Instructional Courses in hand surgery in Manchester twice yearly – a three year programme allows instruction in all areas considered to be relevant to hand surgeons in training.

Diplomas in Hand Surgery

There are two Diplomas in hand surgery available to British trainees. The European Federation of Societies for Surgery of the Hand holds a Diploma examination (multiple choice and clinical vivas) at the time of their annual congress. Entry criteria can be obtained from the FESSH website (www.fessh.com).

More recently the British Society for Surgery of the Hand has collaborated with the University of Manchester to create a Diploma in Hand Surgery recognized and validated by the University. There are eight modules; the first seven include four tutorials (per module), with the 28 tutorials covering the entire hand surgery syllabus. Candidates are also required to submit a demonstration operation on DVD and present at clinical meetings. The first seven modules

FIG. 1 Healing Hands. Albert Pountney, Leicester, UK.

are usually taken on a 12-month clinical fellowship in hand surgery. The programme is highly structured and labour intensive for trainees and the tutors. The eighth module is the examination, a multiple choice on day one and, if successful, a series of vivas on day two.

The Development of Hand Surgery and National Personalities

The Hand Club was composed of a limited number of senior surgeons with an interest in hand surgery. The stimulus to the development of hand surgery in the United Kingdom principally related to the creation of the Second Hand Club, composed of young staff men and senior residents. The two clubs fused in 1964 with the more youthful club driving hand surgery development.

Comparisons are odious, but national personalities would include Guy Pulvertaft, pioneer in flexor tendon repair and reconstruction and inaugural president of The British Society

for Surgery of the Hand in 1968 and the International Federation in 1970/1. Geoffrey Fisk, who initiated the debate on the complex area of biomechanics of the wrist. Graham Stack, who created and developed the societies journals (The Hand and subsequently the British Journal of Hand Surgery). Douglas Lamb, inaugural secretary of the Society and president of the International Federation 1988-1992. Ian McGregor who devised the groin flap. John Cobbett, who performed the first micro vascular toe to hand transfer in 1968. Simon Kay for pioneering the development of the Manchester British Society for Surgery of the Hand Instructional Courses in hand surgery. Simon Kay and Vivien Lees for leading the development of the British Society for Surgery of the Hand Diploma in hand surgery.

United States

48 CHAPTER

ASSH founded 1946

Paul R. Manske

Hand surgery, as an organized surgical specialty in the United States, began in the throes of World War II. In 1944, Surgeon General of the United States Norman Kirk asked Sterling Bunnell to serve as a "special civilian consultant" for the U.S. Army to establish hand centers at ten military hospitals to deal with the devastating hand and upper extremity injuries sustained during that war. Prior to that time, only a few surgeons in the United States had a specialized interest in the hand.

In Chicago, Allen Kanavel noted the poor results of patients with hand infections, which lead to his important anatomical studies of the tendon sheath and fascial spaces. His 1912 publication Infections of the Hand had a substantial impact on the treatment of hand injuries; it was the only textbook of hand surgery available during World War I. Kanavel was subsequent-

ly joined by younger colleagues, Sumner Koch, Michael Mason, and Harvey Allen, thus forming the Chicago School of Hand Surgery.

In New York City, Condict Cutler's interest in the hand related to his experience as a medical officer during World War I. His text, The Hand: Its Diseases and Disabilities, published in 1942, advocated a systematic approach to treating hand problems. Other surgeons with a similar interest included Leo Mayer and Hugh Auchinclos of New York, Henry Marble of Boston, and Daryl Hart of Durham.

Finally, Sterling Bunnell *(Fig. 1)*, a San Francisco general surgeon with a broad array of surgical interests developed a special interest in surgery of the hand in the early 1900's. His first paper, "Repair of Tendons in the Fingers and Description of Two New Instruments", was published in 1918. In that same year, he became a military surgeon in France during World War I; he was appalled at the poor care and outcome of hand injuries and the indiscriminant use of amputation. On return to civilian life, he focused his practice on reconstructive surgery of the hand. Bunnell considered the hand as a single region composed of several different tissues (i.e. bone and joint, tendon, nerve, vessels, skin and soft tissue), and felt that hand surgeons should be proficient in operating on all of them. He was joined in his practice by younger colleagues, LD Howard, Donald Pratt, and Joseph Boyes (who subsequently left San Francisco in 1938 to establish his own practice in Los Angeles). In 1944, Bunnell published Surgery of the Hand, a publication which covered the entire spectrum of reconstructive hand surgery; along with the four subsequent editions, it served as the basic textbook for most hand surgeons for many years. In that same year, Kirk called upon him to become the civilian consultant to the U.S. military.

FIG. 1 Sterling Bunnell (drawing by J. William Littler, MD, published with the permission of the ASSH).

Kirk developed a friendship with Bunnell in the 1930's when he was the Chief of Surgery at Letterman General Hospital in San Francisco. In 1943, Kirk was promoted to Surgeon General of the United States, the first orthopaedic surgeon to hold that position. He was a skilled administrator; more important, his area of orthopaedic expertise was rehabilitation, an interest which prepared him well for his responsibility as Surgeon General in the care and treatment of nearly 600,000 injured soldiers. While reviewing patients at Valley Forge General Hospital in Pennsylvania, he was struck by the many "crippled hand" cases and immediately thought of his San Francisco colleague, Sterling Bunnell, and his expertise in the reconstruction and rehabilitation of the injured hand.

Bunnell was 62 years old at the time of his appointment and had chronic hip pain from a non-united femoral neck fracture. Nevertheless, he approached his new assignment with

vigor; he closed his thriving hand surgery practice in San Francisco and devoted himself entirely to setting up the ten hand surgery centers across the United States. The surgeons he identified to staff these centers were young (some had not yet completed their residencies) and had an interest in orthopaedics, plastic surgery, or neurosurgery. They possessed the technical skills to operate the small structures of the hand, shared Bunnell's understanding of this "regional" specialty, and were effective teachers. Between 1944 and 1947, Bunnell made frequent trips to each of the hospitals: a typical visit included 3-4 days of intensive lectures, examination of patients, and performing surgery. At war's end, Bunnell suggested that this group of "hand" surgeons from the ten hospitals continue to meet on a regular basis to exchange ideas. The first meeting was held in January, 1946 at the Blackstone Hotel in Chicago, where they formed the American Society for the Surgery of the Hand (ASSH), the first established national hand surgery organization *(Fig. 2)*. Twenty-nine of the 35 original members were from the 10 hand centers; 6 were civilian surgeons with a strong interest in surgery of the hand. Most of the military surgeons were still on active duty, because there were no other trained surgeons to replace them. Bunnell, as the "father" of this special group was chosen as the first president. However, it is generally agreed that Joseph Boyes *(Fig. 3)* was the driving force behind the first meeting and organizing the Society. He was named secretary-treasurer, a position he held for seven years until he became president-elect in 1953.

During the first 25 years, the ASSH effectively established hand surgery as a surgical discipline. However, the Society was rather insular. The early meetings were limited to members only, and membership in the organization was highly selective. New members averaged only 6 per year. In response to this exclusivity, a second hand organization, The American Association for Hand Surgery (AAHS) was formed in 1970.

FIG. 2 Founding members of the ASSH, January 1946 (published with the permission of the ASSH).

FIG. 3 Joseph H. Boyes (drawing by William R. Loscher, MD, published with the permission of the Journal of Hand Surgery).

The 1970's marked a turning point for the ASSH. Forty new members were elected in

1971, and the number of new initiates has averaged 57 per year thereafter. Education and research became a central focus as noted by the introduction of numerous post-graduate courses on a variety of hand and upper extremity topics. Research grants were instituted in 1975 and funding progressively increased; currently, basic and clinical research is supported primarily by the American Foundation for Surgery of the Hand, which was founded in 1990. Perhaps the most significant educational undertaking was the publication of the Journal of Hand Surgery in 1976, naming Joseph Boyes as the founding editor, who at 71 years old had retired from the clinical practice of hand surgery. Finally, under the guidance and direction of Alfred Swanson *(Fig. 4)*, the ASSH became one of 8 founding members of the International Federation of Societies for Surgery of the Hand in 1966; Swanson was Secretary-General of the organization at the time of the First International Congress held in Rotterdam in 1980.

The education and training of young hand surgeons has long been a focus of the hand surgery community. The first formal 12-month hand surgery fellowship was established in 1958 by Robert Carroll in New York City. This was followed in 1960 by a similar fellowship at Walter Reed Hospital under the tutelage of Raymond Curtis of Baltimore. By 1961, 10 hand surgery fellowships had been established. Currently, 63 hand surgery fellowships, including 136 positions, are available to surgeons who have completed an accredited residency in general, orthopaedic, or plastic surgery. Hand surgery fellowships must meet accreditation standards established by the American College of Graduate Medical Education. Hand surgeons who have completed an accredited fellowship are eligible to receive a Certificate of Added Qualifications in Hand Surgery upon passing a written examination.

FIG. 4 Alfred Swanson (published with the permission of the ASSH).

Most surgeons in the United States who have an interest in surgery of the hand are members of either the ASSH or AAHS; a number of hand surgeons hold membership in both. The two organizations maintain a harmonious relationship and work jointly to achieve common goals. Of the 2,315 members of the ASSH, 77% are orthopaedic surgeons, 18% plastic surgeons and 5% general surgeons. The AAHS membership includes 626 surgeons, a majority of whom are plastic surgeons. Members of both societies are primarily from the United States and Canada; qualified surgeons from other countries are also represented as international members.

The original ASSH logo *(Fig. 5)*, designed just prior to the inaugural meeting in 1946, depicted a hand holding a caduceus, a recognized symbol of the practice of medicine. A more contemporary logo *(Fig. 6)* was adopted in September 2006.

Thus, the establishment of hand surgery as a distinct surgical specialty in the United States can be traced back to World War II. This military conflict concentrated hand and upper extremity injuries in such overwhelming numbers that creative minds were challenged to find unique organizational and therapeutic solutions to seemingly unsolvable problems. It is ironic that war, arguably the most destructive societal force in the cause of suffering and physical de-

FIG. 5 Official logo of the American Society for Surgery of the Hand, 1946-2006 (published with the permission of the ASSH).

FIG. 6 Official logo of the American Society for Surgery of the Hand, 2006 to present (published with the permission of the ASSH).

formities, was a most effective agent in the organization and advancement of hand surgery, a medical discipline dedicated to relieving pain and restoring function. It is unlikely that those young surgeons who gathered in Chicago nearly 65 years ago were fully aware of the importance of their meeting.

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AASH founded 1970
Scott H. Kozin, MD

The American Association for Hand Surgery (AAHS) was born in 1970 fulfilling the vision of alumni of the training program directed by Joseph L. Posch at the Grace Hospital in Detroit. The organizational meeting of the American Association for Hand Surgery was only the second official meeting of the Joseph L. Posch hand society. Fourteen members in attendance decided to form a national hand society and disbanded the Joseph L. Posch hand society. The idea to form this new national hand organization grew from the stringent requirements for membership

in the American Society for Surgery of the Hand (ASSH). Many qualified hand surgeons were unable to gain membership due to the strict requirements, and annual quota of ten new members. The alumni saw a need for a second national organization for those interested in hand surgery that would foster the exchange of surgical knowledge and provide a forum for any and all interested in surgery of the hand. The association would include plastic surgeons, orthopaedic surgeons and general surgeons.

The inaugural officers were elected for two year terms to insure continuity in the infancies of the organization. The first president was Joseph Danyo and he launched a successful membership drive. Dr. Danyo and colleagues emphasized that the American Association for Hand Surgery was an organization for surgeons who practice hand surgery, to foster the exchange of knowledge, and to allow its members to stay current on new developments.

Shortly after its birth, the association encouraged affiliate membership for hand therapists and has provided an environment for them to share their experience with surgeons. The active affiliate membership works closely within the organization and enhances the entire meeting. In fact, three affiliate members are part of the board structure and have an active voice in the decisions of the association.

The first annual meeting was a one day affair in October of 1971 that preceded the meeting of the American Society of Plastic and Reconstructive Surgeons in Montreal, Canada. The early years consisted of formation of the constitutional by-laws, registration as a non-profit organization, and active recruitment of members. Approximately 100 members were invited to join the new organization and 65 members were initiated at the first meeting. An honorary membership was conferred upon Joseph L. Posch, M.D. for instituting the ideas behind the American Association for Hand Surgery. Since that time the American Association for Hand Surgery has grown in strength and numbers. After the first 3 years, the association doubled its membership.

The association's third president, Ray A. Elliott, Jr., established a liaison with the American Society for Surgery of the Hand, which has promoted a cordial and constructive relationship between the two groups. This relationship is ongoing and both organizations work together on common goals, such as education and patient advocacy. The presidential lines from each organization meet on an annual basis to promote synergism and to discuss common goals and interests. A substantial number of members belong to both groups today.

George L. Lucas was the president in 1982 and presided over the 12th Annual Meeting in Maui, Hawaii. This meeting boasted the largest registration to date at that time of over 500 members. This meeting in Hawaii followed the American Society for Plastic and Reconstructive Surgeons meeting in Honolulu. This was the first separation between these two organizations.

The 13th president of the American Association for Hand Surgery, Dr. James G. Hoehn addressed the 40th Annual Meeting of the American Society for Surgery of the Hand via invitation from ASSH president James Dobyns, M.D. This historic event was significant as it laid the foundation for interaction and collaboration between the hand societies of North America.

The initial seal or logo of the American Association for Hand Surgery was proposed at the first annual meeting in 1971. The fresco, by Michelangelo depicts God touching the hand of Adam *(Fig. 1)*. This fresco entitled creation of man and woman was accepted as the symbol of the American Association for Hand Surgery. The original seal was replaced in 1992 by

FIG. 1 Initial logo of the American Association for Hand Surgery inspired by the fresco by Michelangelo depicts God touching the hand of Adam this Sistine chapel.

FIG. 2 New logo unveiled and adopted at the 2010 Annual Meeting in Boca Raton, Florida.

FIG. 3 Board picture from the 2010 Annual Meeting in Boca Raton, Florida. **Back row** (Left to right): Gretchen Kaiser-Bodell OTR/L , Jaiyoung Ryu MD, Susan Michlovitz, PT , Thomas B. Hughes, MD, Brian Adams, MD, Donald H. Lalonde, MD, Kyle Bickel, MD, Steven L. Moran, MD, Georgette Fogg, OTR/L, Michael Neumeister, MD. **Front row** (Left to right): Jesse Jupiter MD, Nicholas Vedder, MD, A. Lee Osterman, MD, Steven McCabe, MD, Scott H. Kozin, MD.

a more detailed and finer rendition of the original fresco. In 2010, the American Association for Hand Surgery adopted a new logo after careful review of multiple designs *(Fig. 2)*. This new logo updates the seal of the American Association for Hand Surgery. The logo is designed to be more representative of the association. The logo was recently unveiled at the 2010 Annual Meeting in Boca Raton, Florida *(Fig. 3)*.

Wallace H.J. Chang, M.D., president of the American Association for Hand Surgery from 1985-1986 stated that "AAHS needs to main-

tain high standards, but it must never become exclusive so as to destroy the spirit and freedom of expression upon which this organization was originally formed". This statement from 1985 resonates with the organization today. The AAHS is designed to be inclusive to all surgeons and therapists that participate in the care of patients with hand injuries. The association has encouraged young members to join during their residency and streamline their transition to active membership. Over the last five years, the membership committee has increased the number of young members and increased the membership of the American Association for Hand Surgery.

Beginning in 1995, the American Association for Hand Surgery and American Society for Reconstructive microsurgery began meeting jointly. In 1996, American Society of Peripheral Nerve joined the annual meeting. This relationship has been fruitful for all 3 organizations with a combined day that highlights the best papers from each organization and promotes interaction and collegiality amongst the members.

The certificate of added qualification (CAQ) became a reality in 1989 in hand surgery after years of impassionate debate. This credential was administered by American Board of Orthopaedic Surgery and supported by the American Board of Plastic Surgery and General Surgery. Ultimately, the American Association for Hand Surgery supported the certificate of added qualification in hand surgery but decided not to include this examination as requisite for admission into the association. To this day, the American Association for Hand Surgery does not require a certificate of added qualification for membership admission.

Today, the Association's membership of over 1100 represents a diverse but cohesive mixture of highly respected professionals who work in all disciplines related to hand surgery. The members include orthopedic surgeons, plastic surgeons, general surgeons, microsurgeons, hand therapists, nurses, and basic scientists from the United States and Canada, as well as many other countries around the world. The diversity of AAHS membership fosters improved communication and sharing of ideas between health care professionals.

Recent Events

The AAHS was affiliated with the Illinois' State Medical Society since 1994. In 2009, the association sought out alternative society management. After numerous board discussions and with collaboration from the American Society for Peripheral Nerve, the association changed management companies. The American Society for Plastic Surgery was selected with a goal to optimize management and promote the American Association for Hand Surgery. This commitment has provided sound management for the American Association for Hand Surgery. The association has grown exponentially, appointed its own executive director, and become fiduciary responsible to its members.

Susan MacKinnon, MD was president in 2005 and instituted a journal for the American Association for Hand Surgery published by Springer. The journal is entitled HAND and its first editor was Elvin Zook, M.D. In 2010, the editorship changed to Michael Neumeister, M.D. The journal is listed under PubMed and the number of articles has increased exponentially. This journal represents and brands the American Association for Hand Surgery as a reputable organization devoted to education, research, and care of hand problems. The editorial board has been expanded and the future is exceptionally promising.

The membership in AAHS continues to grow

including physician and affiliate therapy members. The goal of the organization is essentially unchanged with a focus to be inclusive with an emphasis on education, research and patient care.

For any individuals, physicians, therapists, or patients interested in the American Association for Hand Surgery, please visit us at our website www.handsurgery.org.

49 CHAPTER

Uruguay

Founded 1987

Jorge de Vecchi

History

The history of hand surgery as a specialty developed together with that of plastic surgery, since those who originally were interested in soft tissue and cosmetic reconstruction also included the treatment of hand surgical pathologies within their field of study.

Before that it was general surgeons who performed the hand procedures, though in a more limited way.

The first doctors who started working on hand procedures were general surgeons, two brothers, Ruben and Hector Ardao. Hector Ardao, a general surgery professor, never accepted the idea of specialization within the general surgery practice, nor did he accept plastic surgery, and even less hand surgery. He studied in England during World War II with Sir Harold Gillies.

Enrique Apolo, a traumatologist, and Vic-

tor Pedemonte, an otolaryngologist, also joined this pioneering group and focused their interest on hand procedures within the plastic surgery practice.

The first general surgeon that devoted himself completely to plastic and hand surgery was Professor Jorge de Vecchi, who was also the first Professor of Plastic Surgery.

Younger doctors Guillermo Fossati, Eugenio Bonavita, German Moller and Juan Hornblas (who later succeeded him as professor) studied with Jorge de Vecchi. Initially these surgeons individually trained students. After the speciality was accepted by the Postgraduate School in 1973, they trained a whole group of surgeons in general plastic surgery and hand surgery.

Training in Hand Surgery in Uruguay

In Uruguay, medical specializations are under the official control of the Postgraduate School of the Faculty of Medicine of Montevideo, which belongs to the University of the Republic, Uruguay's state university. It is the official body in charge of authorizing the creation of new specializations, updating and approving the syllabi and contents of the existing specialities, supervising teaching units and endorsing tests and issuing degrees .

Currently there is no speciality in hand surgery as such.

Hand surgery is part of the training program in plastic, cosmetic and reconstructive surgery. All aspects of hand surgery are included in the training, including the topics of vascular and nerve surgery of the upper limbs.

Fractures in all parts of the upper limb, including the hand, are studied in the specialties of orthopaedics and traumatology. Plastic surgeons study and treat only fractures distal to the carpal area.

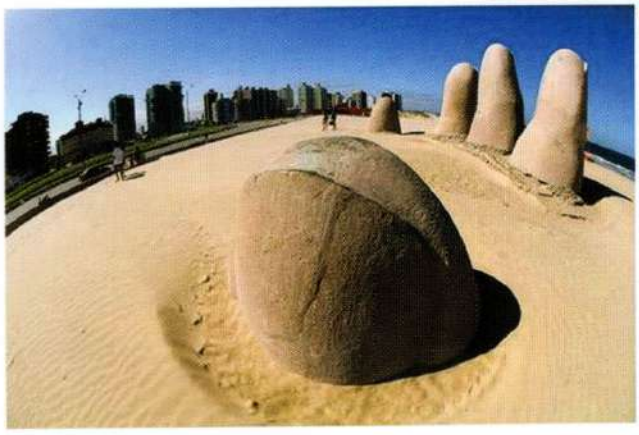

FIG. 1 Sculpture by Mario Irrazabal, Uruguay.

Consequently, training is divided into two specialities, but the one specifically referred to hand issues (traumatic, tumor and degenerative) is plastic surgery. Plastic surgeons are also responsible for providing services in this area in the different public and private health care centers. The course can be attended as a resident after an examination of clinical testing.

The learning is assessed through tests that residents must pass upon finishing their training in order to be awarded the degree as a specialist.

Certification

The only degree that includes the hand is that of plastic surgeon. There is no specific training in hand surgical procedures that leads to specialization.

There are two plastic surgery teaching centers in Uruguay, located in public hospitals; one is in Hospital de Clínicas (university hospital) and the other in Hospital Maciel, which is under the jurisdiction of the Ministry of Public Health. Both centers are supervised by the Postgraduate School of the Faculty of Medicine, University of the Republic.

Hand Surgery Specialists

Plastic surgeons are the professionals that carry out 90% of the work on the hand, including hand microsurgery, nerve and vascular surgery. Traumatologists deal with general fractures and include most of the carpal area, the distal end of the radius and all proximal osteo-articular pathologies and injuries.

Pioneers

As mentioned above, the first doctor to completely devote himself to plastic and hand surgery was Professor Jorge De Vecchi Larralde. At a local level, he published works about the carpal tunnel, Dupuytren disease, and congenital malformations. His most notable contribution was probably the opposition plasty, which transposes the thumb's adductor pollicis, and is a popular elective surgery performed in our country for median paralysis without ulnar nerve injury. It is a simple, rapid and effective transposition.

Doctor V. Pedemonte contributed to the Annals of Orthopaedics and Traumatology in December 1959 with a study about phalange homotransplant (which was later presented in the International Congress of Plastic Surgery in Sweden, 1955). It was a 5 year study on 28 cases with this technique, with excellent results.

Doctor Alberto Irigaray performed the first microsurgical transplants and replants in the year 1977 and also initiated peripheral nerve microsurgery at that time.

Hand Associations

Before the creation of the Hand Association, all scientific activity related to the hand was dealt with by the Uruguayan Association of Plastic Surgery.

In response to the development of hand surgical procedures, the Hand Surgery Association of Uruguay was created and was first known as the Hand Medicine and Surgery Association in 1987 and then as the Uruguayan Association of Hand Surgery in the year 1996. Its first chairman was doctor Martin Palacio del Val. It then joined the South American Federation of Hand Surgery with the support and guidance of Eduardo Zancolli II from Argentina. The Association submitted its application of entry before the IFSSH and was accepted in June 1999.

50 CHAPTER

Venezuela

Founded 1974

Antonio De Santolo

History

The history of the hand surgery in Venezuela began in 1950, when a few Venezuelan orthopaedic and plastic surgeons returned after training in these specialties from other developed countries, and tried to resolve traumatic and congenital hand cases. These "Pioneers" who were highly respected doctors were the "Precursors" of hand surgery in this country. Later the "Pioneers", generally chiefs of Orthopedic and Plastic Services in important hospitals of the country, tried to resolve the difficult hand problems and stimulate the young doctors to receive training in hand surgery outside the country.

In 1970 , the first Hand Surgery Service was founded in Caracas at the Hospital Miguel Perez Carreño. The founder and Director was Dr Ricardo Sanchez Beaujon. Orthopaedic-hand surgeons trained in Duke University

before 1960, and later with Dr Paul Brand in India. This service with 30 beds was very important for the development of the hand surgery in Venezuela, and the majority of hand surgeons worked there after returning from training in other countries.

In 1974, January 11, the SOCIEDAD VENEZOLANA DE CIRUGIA DE LA MANO was founded. Nine hand surgeons founded the Society: Ricardo Sanchez B., Antonio De Santolo, Rodolfo Contreras, Luis Capriles, Edgar Kamel, Cesar Sanches, Rafael Marante, Gonzalo Marquez and Josue Garcia M. The presence of the hand society and the work developed by its members was critical in the development and growth in hand surgery for the next generations

FIG. 1 Logo Venezuela Society for Surgery of the Hand.

FIG. 2 Dr Ricardo Sanchez Beaujon. Pioneer of Hand Surgery in Venezuela. Founder-Chief of the first Hand Surgery Service in Venezuela. Founder and first President of the Venezuela Society for Surgery of the Hand.

Hand Training

The Precursors and the Pioneers always included some hand training in their Orthopedic and Plastic Services, but regular training began with the hand service at Perez Carreño Hospital, as previously noted, and at the University Hospital of Caracas where a Hand Surgery Unit was created on 1971. Later, other hand services were created at the University Hospitals of Maracaibo and Valencia, important cities of Venezuela. All of these Training Services were directed by the later nominated "Professors" of Hand Surgery.

The Venezuela Hand Surgery Society soon after its founding organized a national plan of hand lectures over five years, 2 week-ends a month, for a duration of 6 or 8 hours, in big hospitals in the most important cities of the 23 states in the country. The objective was to teach the management of acute and common hand conditions. At the same time the Society held two annual meetings which included lectures from visiting leading international hand surgeons.

In 1983 the Caracas UCV Medical School officially initiated a complete course for hand surgeons of 3 years of duration after the doctors completed Orthopedic, Plastic or General Surgery training. These courses for Hand Residencies were approved in Miguel Perez Carreño Hospital and in the University Hospital of Caracas. Later the training and courses for Orthopedic-Hand residency were approved at the University Hospitals of Maracaibo city and Valencia city by the local Medical Schools.

FIG. 3 Dr. Pablo Izaguirre. Pioneer in Hand Surgery in Venezuela. Former Chief and Postgraduate Director, Cathedta-Service of Orthopedic Surgery Department, University Hospital of Caracas.

Certification

Since 1981 the Federacion Medica Venezolana (Medical Federation of Venezuela) have certified the hand surgeons that complete the training in the Services at the University Hospitals. This Institution, by law, approves and oversees the Medical Specialization and Medical Training in Venezuela.

Specialty Performing Hand Surgery

To be specialist in hand surgery the Doctor must be approved by local State Medical School and by the Medical Federation of Venezuela. The majority of Hand Surgeons have been trained in Orthopedic Surgery and they manage the majority of hand cases in the Hospitals where Hand Surgery Services exist.

FIG. 4 A combined meeting of the Venezuelan American and Caribbean Hand Societies was held in Caracas in 1987. It was organized by Drs De Santolo and Fiesky Nunez.

Giants

The major contributions to hand surgery in Venezuela since 1960 may be attributed to the Pioneers, such as Dr. Ricardo Sanches Beaujon *(Fig. 2)*, who was chief and founder of the first Hand Surgery Service with 30 bed in Caracas. Dr Pablo Izaguirre *(Fig. 3)*, an academician and also Pioneer in this specialty, was the Chief of Cathedra-Service of Orthopedic Department in the University Hospital of Caracas. Dr Jose Ochoa Rodriguez was Chief of Plastic and Reconstructive Surgery Service in the University Hospital of Caracas. Dr Rafael Soto Matos, a plastic surgeon of Maracaibo city played an important role in the development of Hand Surgery and management of burn patients in Maracaibo city.

Before the foundation of the Venezuelan Hand Surgery Society, several Venezuela doctors received training in Hand Surgery outside the country and returned to practice and teaching hand surgery in this country, e.g.: Dr Edgar Kamel trained with Dr M Iselin in France,Dr Jose Ettegui and Dr Nicolas Tata trained with Dr R Carroll in New York.Dr Rafael Marante trained with Dr E Nalebuff in Boston.Dr Antonio De Santolo *(Fig. 5)* trained with Dr Richard

Smith and Dr John Boswick in NY and Chicago, Dr Rodolfo Contreras trained with Dr Raul Tubiana in France. Dr Fieky Nunez and Dr Rafael Brunicardy trained with Dr James House in USA. Dr Rafael Camarillo trained in Brazil, Dr J Acevedo trained with Drs. Swanson and A. Flatt in the U.S. Dr Mata Benitez trained with Dr Zancolli in Argentina.

After the Foundation of the Society some other hand surgeons trained abroad, and returned to Venezuela. Some of these were: Dr Nelson Socorro, Dr Paul Mondolfi, Dr Argenis Brito, Dr Hermilo Avila. Some others after they had training in the Venezuela studied elsewhere for a year of Fellowship such as Dr. Jose G Mora, Dr Jose Guerrero, and Dr Miguel Guedez, but the majority of Hand Surgeons in the country are currently trained in Venezuela.

FIG. 5 Three generations of Hand Surgeons of The Venezuelan Society with Dr and Mrs James Dobyns in ASSH Meeting in Phoenix in 1972. Dr. Antonio De Santolo first generation Founder and Past President. Dr. Jose Guerrero second generation Past President and Dr. Ricardo Tobio third generation and President at that time.

Name of Member Society

The name of our Society is SOCIEDAD VENEZOLANA DE CIRUGIA DE LA MANO. It was founded on January 11, 1974 and was accepted in the IFSSH in 1983 The Society LOGO is shown in *Fig.1*.

Hand Surgery Worldwide

International Reconstruction of a "Beautiful and Ready Instrument of the Mind"

PART TWO

CLINICAL

I. Arthritis
1. Carpometacarpal Arthritis
2. Rheumatoid Arthritis

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3. Wrist Arthroscopy and Clinical Problems
4. Advances in Arthroscopic Management of the Triangular Fibrocartilage Complex

III. Bones and Joints
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31. Malignant Conditions of the Hand
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SECTION i Arthritis

Carpometacarpal Arthritis

1 CHAPTER

Philippe Saffar

The Problem

Introduction

Degenerative arthritis of the trapeziometacarpal joint is the cause of significant disability and painful discomfort that affect a considerable proportion of the middle-aged population, especially post-menopausal females. Surgical treatment started over 50 years ago, using two different techniques which were published at the same time in the Journal of Bone and Joint: the trapeziectomy and the arthrodesis.

Throughout our lives, we have witnessed the evolution of the treatment, which was discussed in the speech we were invited to give in the 2007 Sydney Congress. From a conceptual point of view, such evolution can be summarized as having gone from the simplest procedure, the arthrodesis or simple resection, to more complex procedures, such as the LRTI or more complex prosthesis, and finally to the current and progressive reintroduction of simpler techniques.

History

This story starts with Gervis and Muller in 1949, who simultaneously published articles in Journal Bone Joint (Br), the former about trapeziectomy and the latter about arthrodesis, both of them trying to address the issues of pain and functional deficit.

Throughout this chapter we will focus on grade II injuries and higher.

Some patients who were subjected to trapeziectomy procedures, suffered from instability and loss of strength due to collapse of the thumb column, a complication described by many authors: Murley 1960, Iyers 1981, Carrol 1990. This last

author solves the problem through a fascia interposition procedure in order to restrict such collapse and preserve mobility (1952); Froimson later used tendons. Since 1970 , multiple tendons and fascias have been used for such purposes with a good rate of success. Swanson developed a silicone prosthesis to replace the trapezium, a technique that delivered very good results. This procedure, which was widely used, was eventually dropped because of the occurrence of silicone synovitis, an infrequent though difficult to treat condition. This was the procedure we used for several years.

Currently several modes of sophisticated joint prostheses exist. The procedure's main advantage is the quick recovery; however, the costs are high and there might be subsequent instability problems and heterotopic bone formation.

Eaton and Littler created the ligament reconstruction procedure in 1976, which they used to treat grade 1 injuries. In that same year, Uriburu added the procedures of trapeziectomy and capsuloplasty, which gave origin to one of the most successful and widely used techniques in the history of the disease, called trapeziectomy with ligament reconstruction (LRTI), a procedure whose multiple variables have been thoroughly described by several authors, including the aforementioned surgeons and Burton and Pellegrini.

This technique was later simplified by replacing the ligament reconstruction with a tendon suspension. Weilby, Sigfusson & Lundborg were pioneers in the field. We developed our variation in 2001. Tomaino published a very similar procedure in 2006. The latest simplification was the return to simple trapeziectomy procedures with refilling the void with haematoma, and maintaining the space using Kirshner wires for six weeks. Several publications report excellent results.

The Solution

Primary conclusion

What have we learned?

1. The procedure of trapezium resection is useful to alleviate pain.
2. It is advisable to insert something to preserve the thumb length, strength and stability, avoiding collapses and keeping the relation between both 1st and 2nd metacarpal bases.
3. It is not necessary that such insertion be anything complex; it can be just a haematoma.
4. The question of whether a ligament reconstruction procedure is necessary is controversial.
5. The arthrodesis procedure delivers excellent results in relation with stability and pain alleviation, but the degree of stiffness makes it uncomfortable for daily activities.

Our proposal

When we started our training in hand surgery procedures, the technique we used was the trapeziectomy and arthoplasty with Swanson silicone prosthesis. We had very good results applying such technique. We stopped using it because we could not use the prosthesis anymore.

We then continued using the technique of trapeziectomy and the Littler/Uriburu ligament reconstruction procedure. We also had very good results, but we always needed to use a general anaesthetic, immobilization for 6 weeks and 2 months of rehabilitation.

In order to simplify the procedure and accelerate the recovery period, since 2001 we have been using the following technique:

1. Total trapeziectomy
2. Ligament reconstruction (suspension), with accessories of thumb's long abductor
3. Cavity obliteration with tendon excess
4. Immobilization in plaster for one month
5. Immediate mobility exercises, opposition/reposition

FIG. 1 Incision and APL accessory tendon proximally sectioned.

FIG. 2 Tendon maintaining its distal insertion and sutured in depth to FCR tendon. The excess shall refill the cavity.

FIG. 3 Sutured incision with reabsorbable monofilament.

The main advantages are:

1. It can be performed by using a local anaesthetic with vasoconstrictors with or without sedation, depending on the patient,
2. The use of accessory tendons for the long abductor reduces the subluxation strength of that tendon, whose role in the pathology was demonstrated by E. Zancolli,
3. The brief immobilization followed by immediate mobilization exercises allows for a rapid return to activities of daily living *(Fig. 1, 2, 3)*

The incision, performed only in the hand for the purposes of not transversing the wrist skin creases, allows subcutaneous access to the first compartment so as to use accessory tendons. Only the most dorsal one is left in intact; the most volar ones, which we proximally sectioned after the first compartment has been opened, are then reintroduced into the cavity and sutured with one stitch to the FCR distal tendon, using the excess to fill out the cavity.

Plaster is used to immobilize the area and keep the thumb in 45° position of abduction, flexion and rotation. Fingers are free at the metacarpophalangeal joint and active mobility is encouraged from the beginning. Such regular finger mobility allows for the simultaneous performance, if necessary, of carpal tunnel release and flexor tendon release in trigger fingers, pathologies which are frequently associated with CMC arthritis. The immobilization is discarded within a period of 3 to 4 weeks, and opposition/reposition exercises are immediately prescribed; the movement should be performed at the new joint level.

Results

So far, from 2001 to 2008, 40 patients have been

operated, 38 females and 2 males. Average age was 54 years old. In 8 cases the procedure was associated with release of median nerve in carpal tunnel and two trigger fingers. Results were excellent for pain disappearance, good mobility levels and strength recovery within 6 months. The average reduction in length was 5mm.

The main complication in some cases was the compromise suffered by some branches of the superficial radial nerve with sensitivity in the area of the incision. This is an annoying complication but recedes spontaneously over time. The patient must be supported during this time.

Conclusions

There are several ways to treat the pain and the functional deficit derived from the trapeziometacarpal arthrosis. Many authors have published series that demonstrate very good results with all the techniques currently in use. The aim is that the joint maintains a painless range of motion and provides sufficient stability for normal activities.

It is worth mentioning that virtually all the techniques described are still in use. Clinical series report very good results in most cases. With that in mind, the technique described applies proven concepts, common to all techniques, in the simplest and least invasive manner, to minimize risks and complications related to the thumb's function. The technique proposed is also advantageous from the point of view of the costs; an increasingly important factor. In view of the procedure's simplicity and speed, it can be performed using local anaesthetic as an out-patient surgery. The resumption of the patient's normal activities is rapid, generally 2 months.

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SECTION i Arthritis

Rheumatoid Arthritis

CHAPTER 2

Donald C Ferlic

Rheumatoid arthritis occurs worldwide and involves all races, ethnic and income groups. It occurs in temperate climates as well as in the tropics and sub-polar regions[1].

It is a major crippling disease often affecting the hands, represented by tendon rupture, joint instability and deformity. The cure of the disease has been elusive, but a remarkable breakthrough with the newer disease modifying anti-rheumatic drugs has considerably reduced the severity and incidence of the deformities that are seen in the hand surgeon's office.

Another factor influencing the referral of a patient for hand surgery is the difference in the rheumatologist's opinion of the results of hand surgery compared with the surgeon's opinion of what can be accomplished. When I first entered practice, my senior partner who did general orthopedics gave me his "Bunnell's" Surgery of the Hand 1st edition, 1944. [2] Although there were discussions of stiff joints as well as arthritic joints there was no mention of inflammatory arthritis except for infections and tuberculosis. Ways to treat the stiff or unstable joints with capsulotomy, fascial arthroplasty or arthrodesis were included in the text.

Thinking that more up to date information would be useful I obtained "Bunnell's" 4th edition (1964)[3] where there was a significant amount of new material dealing with arthritis. This included synovitis, tenosynovitis, tendon ruptures, ulnar drift of the hand, swan neck and boutonniere deformities. Arthrodesis, synovectomy and tenosynovectomy were the mainstays of treatment. New arthroplasties to maintain motion with prostheses were discussed, includ-

ing those developed by Flatt, Brannon and Klein *(Fig. 1)*. These metal prostheses had good short term results particularly in the PIP joints, but generally failed via loosening mid-term. This gave impetus to further prosthetic development.

Silicone hinges for finger joints were developed in the mid-1960's by Swanson, who did not want fixation to the bone, where as Niebauer felt fixation was important. There have been several modifications of the silicone prostheses and a tougher type of silicone material was developed than what was originally used. Pyrocarbon finger implants were introduced in the late 1990's.

The wrist is the key joint to the upper extremity and it must be stable, balanced and pain free for proper hand function. Tenosynovitis of the wrist can cause rupture of the extensor tendons although other factors may contribute. These include erosion caused by bone irregularity of the distal radius and ulna, compressive effect of the dorsal carpal ligament and direct rheumatoid invasion of the tendons.

The differential diagnosis of tendon ruptures at the wrist includes subluxation of the extensor tendons off the metacarpal heads and posterior interosseous nerve palsy[4] *(Fig. 2)*. Besides tenosynovectomy and synovectomy of the wrist, the distal ulnar needs to be stabilized or excised. The ruptured tendons are reconstructed and the results are proportional to the number of ruptured tendons. Individual transfers work better than transfer of one tendon to all the ruptured ones, but in a wrist with multiple ruptures, this may not be possible.

The most common tendons to rupture in order of frequency are: extensor digitorum minimi (EDM), extensor digitorum communis (EDC) V, EDC IV, extensor pollicis longus (EPL) and EDC III. These ruptures occurring at the wrist are usually not painful but are simply expressed by the inability of the digit to function. One needs however to determine the site of malfunction.Repair of these ruptured tendons requires reflection of the dorsal retinacular ligament, synovectomy, tenosynovectomy, excision of sharp bony prominences from the distal radius and usually resection of the distal ulna. The tendons are inspected. Any partial ruptures may need a tendon graft to support the attenuated areas.

For a single finger extensor rupture, sewing the distal segment into the adjacent common finger extensor is usually successful. If the ex-

FIG. 1 Flatt finger prosthesis as an arthroplasty for the thumb metacarpophangeal joint and internal fixation for internal fixation for fusion of the interphangeal joint.

FIG. 2 Rupture of the extensor tendons to the long, ring and little finger. This mimics a posterior interosseous nerve palsy as well as ulnar subluxation of the extensor tendons off the metacarpal heads.

FIG. 3 Preoperative x-ray of a patient o be treated with a wrist fusion and silicone metacarpophalangeal arthroplasties of the fingers and thumb fusion.

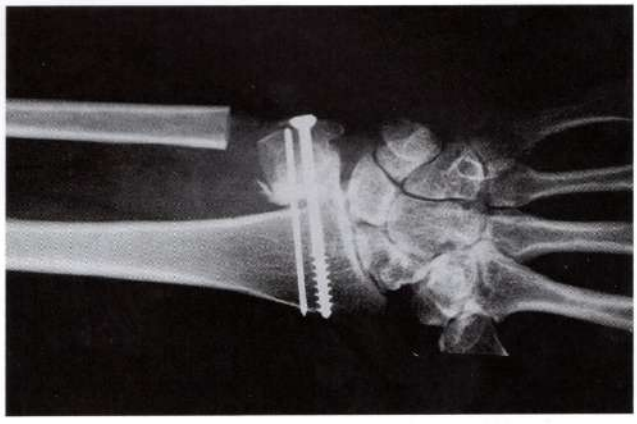

FIG. 4 Post operative x-ray of a Suave-Kapandji procedure in a rheumatoid wrist.

tensors to both the ring and little fingers are ruptured, the extensor indicis propius (EIP) is transferred to the EDC V and the EDM. The EDC IV is transferred to the intact III. The same concept is applied if III, IV, V and EDM are ruptured. The ruptured III is sewn to II and the EIP goes into IV, V and EDM.

In the case where there is an EPL rupture the EIP is used as a transfer if available. The extensor pollicis brevis (EPB) or a graft are the other options. If the wrist extensors are ruptured, most often the wrist should be fused *(Fig. 3)*.

In treating the distil radio ulna joint (DRUJ) in the rheumatoid wrist a synovectomy is performed.The TFCC is usually found to be severely torn. The distal ulna is resected and the ulnar stump is stabilized using a retinacular flap, capsule or tenodesis using the flexor carpi ulnaris (FCU), extensor carpi ulnaris (ECU) or pronator quadratus.

The Sauve-Kapandji procedure allows preservation of the ulnar head to prevent ulnar subluxation of the carpus while eliminating a structure harmful to the tendons as well as eliminating DRUJ pain.[4] This procedure consists of removing a 10-12 mm section of the ulna just proximal to the ulnar head. The ulnar head is arthrodesed to the sigmoid notch ofthe radius[5] *(Fig. 4)*

Ulnar silicone head implants have been used in the past after distal ulnar resection in order to eliminate DRUJ pain, preserve length and attempt to stabilize the DRUJ. These have been abandoned due to poor results. Metallic implants and even a total DRUJ have had some success but their use in rheumatoid arthritis has yet to be determined.

Ulnar drift has been studied extensively. It begins with a proliferative synovitis of the metacarpophalangeal joint (MPJ) s causing loss of dorsal, radial and volar support. This causes drift to the ulnar side owing to the dynamic influence within the hand, the normal anatomy of the hand and external forces acting on the hand such as radial rotation of the wrist. We have found that if a wrist is radially deviated and has the inability to ulnar deviate, the extensor carpi radialis longus (ECRL) should be transferred to the ECU at the same time as the ulnar drift of the fingers is corrected [6] *(Fig. 5)*

Flexor tenosynovitis in rheumatoid arthritis often presents as carpal tunnel syndrome. In such cases the floor of the canal needs to be in-

spected as there may be herniated synovium from the wrist joint, sharp bony spicules from carpal bones, radius or ulna just waiting to destroy the tendons.

Ruptured flexor tendons need to be repaired. A common pattern of rupture is the flexor pollicis longus(FPL) and flexor digitorum profundus (FDP) II caused by eroded carpal bones. Ruptured flexor tendons usually can be repaired with tendon transfers utilizing transfer to an intact adjacent tendon, flexor digitorum superficialis (FDS) transfer or even fusing the interphalangeal joint of the thumb[6]. For a badly deformed wrist, arthrodesis in a functional position is compatible with useful hand function. Rotation is maintained. A supplemental bone graft other than the resected distal ulna or carpal bones is rarely needed unless the fusion is performed for a failed total wrist arthroplasty (TWA) where the prosthesis is removed leaving a big gap. Usually a dorsal plate is used for fixation. Occasionally the skin on the hand of a rheumatoid patient is quite thin with no subcutaneous tissue. In these cases a Steinman pin is placed retrograde through the 3rd metacarpal into the radius. Supplementary crossed Kirchner wires are used.

Non implant wrist arthroplasty such as proximal row carpectomy, has not been successful long term in the rheumatoid patient.

Implant arthroplasty of the wrist began with Swanson's silicone flexible hinge. Our experience with this method resulted in implant breakage, particulate synovitis and loss of motion. This procedure has been abandoned.

Total wrist replacement has been evolving and is being used with success as an alternative to wrist arthrodesis. Many types of total wrists have come and gone but as more experience has been gained with both design and technique they have been found to be useful for maintaining motion and relieving pain *(Fig. 6)* We have found however, that maintaining a satisfactory result in a wrist that is not balanced is quite challenging. In such cases we would prefer to do an arthrodesis of the wrist.

FIG. 5 Radial rotation of the wrist and ulnar deviation of the fingers to be treated with transfer of the extensor carpi radialis longus to the extensor carpi ulnaris.

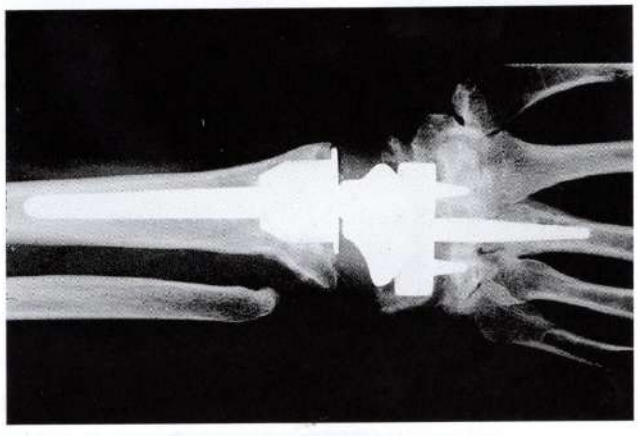

FIG. 6 Fifty three months post operative CFV total wrist arthroplasty.

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SECTION ii Arthroscopy

Wrist Arthroscopy: Clinical Problem

3 CHAPTER

Michael Hayes

History

Having completed my orthopaedic training at Duke University in 1976, I returned to Adelaide and followed the late Dr Goldner's model of maintaining a wide interest in orthopaedic surgery, including spinal surgery, and I also set up outlying clinics visiting country centres for up to 150 miles from the city. Initally, I was unable to gain a public hospital position which made practice of microsurgery difficult.

With the development of " Super Specialists"- specialties such as spine, knee, hand etc I opted to concentrate on the upper limb and in 1987 with a colleague, Malcolm Wicks, attended courses run by Terry Whipple, a former fellow Resident, and also visited and operated with Terry in his clinic in Virginia *(Fig. 1)*.

On returning to Adelaide carrying heavy cases loaded with a complete set of arthroscopic instrumentation allowing us to carry out arthroscopic surgery of the shoulder, elbow and wrist, we set up a private clinic and also a clinic at the Royal Adelaide Hospital for hand and upper limb conditions. We operated together and the clinics developed with reinforcements from fellow Duke graduates, Michael Sandow and Andrew Saies.

As well as demonstrating and lecturing in Australia, I visited Hong Kong, Singapore, Taiwan (with former Duke Fellow, Professor Mou Hou) and New Zealand.

Clinical Problem

One of the clinical problems I identified with wrist arthroscopy was crystal synovitis and in particular, chondrocalcinosis, a condition that

is common not only in the wrist, but also in other joints of the upper extremity, including the carpometacarpal joint of the thumb and the shoulder. Ulnar sided wrist pain remains one of the challenges of hand surgery and a clue to the underlying problem of chondrocalcinosis is revealed in plain x-rays where there may be calcification in the triangular fibrocartilage. However, this is not the only area that can be involved by crystalline deposition disease as it may also damage the scapholunate ligament leading to a radiolunate instability problem and consequent radioscaphoid degeneration[1-2] *(Fig. 2)*.

Gout, with a deposition of urate crystals, may also cause similar problems in the wrist but without the calcific changes noted on plain x-ray[3]. In this recent article, involvement of the scapholunate and lunotriquetral ligaments was identified but there was no crystal deposition in the TFCC.

Arthroscopic management of crystal synovitis in the wrist is indicated to assess the degree of damage to the triangular fibrocartilage and articular cartilage itself, and also allows biopsy and confirmation of the diagnosis. It allows mapping of the areas of degenerative change, both in the radiocarpal and midcarpal joints and can help in framing further management options.

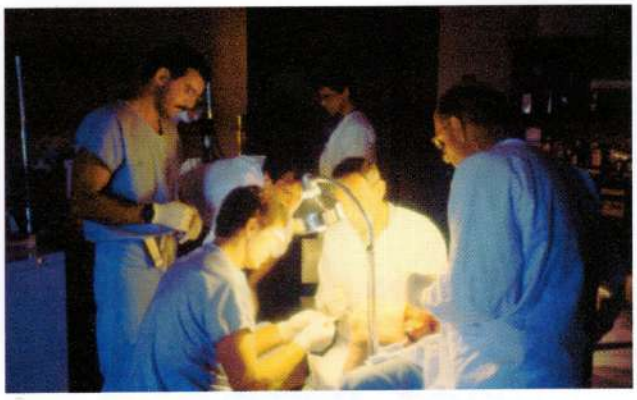

FIG. 1 Dr Terry Whipple preparing for a demonstration of wrist arthroscopy.

FIG. 2 Calcium deposit in the TFCC.

Chondrocalcinosis- Calcium Pyrophosphate Dihydrate Disease

Chondrocalcinosis has other important implications for the hand surgeon as it frequently occurs in the carpometacarpal joint of the thumb and there is a strong association with other medical conditions.

Calcium Pyrophosphate Dihydrate Disease (C.P.D.D) was first identified in 1962 by McCarty et al- who recognised calcium pyrophosphate crystals under polarised microscopy and

FIG. 3 Calcium Pyrophosphate Crystals.

defined their crystalline detail *(Fig. 3)*.

Calcium Pyrophosphate Dehydrate Disease (CPDD)

- Prevalence 0.9/1000
- Female> Male
- Incidence increases with age.
  - 20% aged >60.
  - 50% aged >90.
- Familial incidence documented.

The condition can cause widespread destruction of joints- this patient underwent arthroplasties of the wrist, shoulder, knees and hip *(Fig. 4)*.

Conditions associated with CPDD:

1. Definite
- Hyperparathyroidism
- Haemochromatosis
- Hypophosphatasia
- Hypomagnesemia
- Wilson's Disease

2. Possible
- Gout
- Ochronosis

Triggering Mechanisms

- Direct Trauma
- Intercurrent medical illness
- Chest Infection
- Myocardial infarction

Surgery

- Parathyroidectomy.
- Transfusion

Classification

- Acute synovitis- (pseudogout)
- Chronic pyrophosphate arthropathy
- Incidental (Lanthanic)

Management

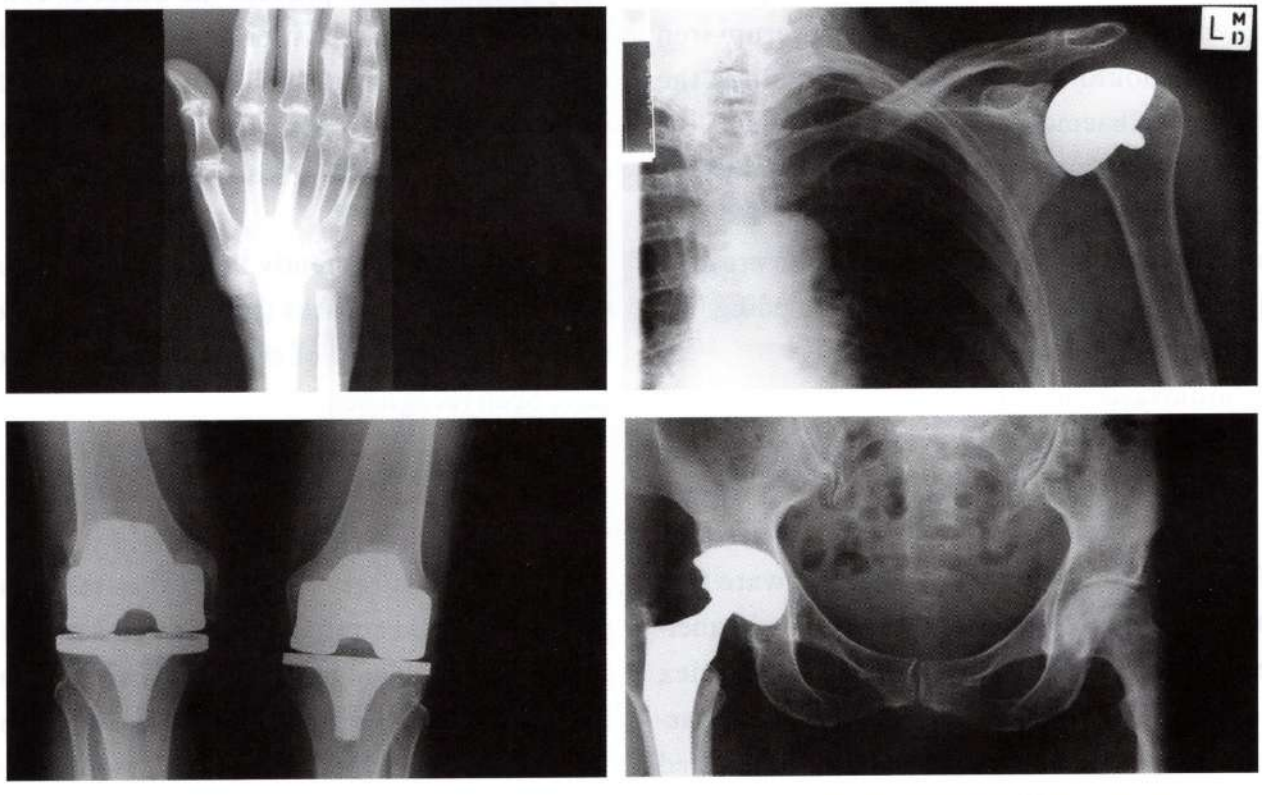

FIG. 4 Photo 4. Widespread joint involvement in CPDD.

Acute Synovitis (Pseudogout) Acute episodes of pseudogout can occur in the knee, wrist, shoulder, ankle and elbow, especially in the elderly *(Fig. 4)*. The symptoms are similar to those in acute gout:

- Severe pain
- Signs of inflammation
- Pyrexia
- Effusion

Provoking causes include both illness and surgery, and if an acute attack follows surgery such as a wrist or hand procedure, the differential diagnosis includes infection. If the correct diagnosis is not made, the acute inflammatory response can lead to excessive swelling, especially if a cast or restricted bandage is present. This may lead to a dystrophy syndrome.

FIG. 5 Metacarpophalangeal joint involvement in CPDD.

Associated Conditions

The association of haemochromatosis with chondrocalcinosis is recognised. In patients presenting with chondrocalcinosis, serum iron studies should be carried out to exclude the presence of haemochromatosis.

The implications for patients with haemochromatosis are extremely important. The condition can be treated with regular venesection preventing possible serious complications including:

- Severe liver disease
- Cardiovascular disease
- Degenerative arthritis
- Death from liver failure

The hand surgeon should also be aware that haemochromatosis is often associated with metacarpophalangeal joint arthritis in the index finger, in particular, although other metacarpophalangeal joints in the hand can be affected *(Fig. 5)*. When patients present with osteoarthritis of the metacarpophalangeal joints in the hand, investigations to exclude haemochromatosis should be considered.

Identification of haemochromatosis also allows genetic mapping of family members and early treatment can prevent the onset of complications associated with iron overload. It also allows for genetic counselling which may help prevent the disease occurring in future generations. The importance of early diagnosis cannot be overemphasised.[4]

Patients have frequently undergone previous orthopaedic procedures (hip, knee and ankle) and the significance of the diagnosis may not have been recognised.

Summary

Arthroscopic surgery in South Australia and perhaps even Australia, has its origins to work initially performed by Dr Terry Whipple, and his generous dissemination of knowledge and technique has helped the development of arthroscopic surgery in the upper limb in Australia and Asia.

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SECTION ii Arthroscopy

Advances in Arthroscopic Management of TFCC Peripheral Tears

4 CHAPTER

Andrea Atzei, Riccardo Luchetti

The problem

Post-traumatic triangular fibrocartilage complex (TFCC) peripheral tear, also known as TFCC ulnar avulsion or Palmer's Type 1-B TFCC tear, represents a common cause of ulnar wrist pain and impaired hand function after wrist sprain or distal radius fracture (DRF). It affects the ulnar side of the TFCC, which consists of a distal part -comprising the hammock structure and the ulnar collateral ligament- and of the proximal triangular ligament -the strong structure formed by the distal radio-ulnar joint (DRUJ) ligaments. When the proximal component of the ulnar TFCC is interrupted, following either midsubstance ligamentous tear or osseous avulsion, then the DRUJ becomes unstable.

Since early 90's, wrist arthroscopy has been considered the golden standard for the diagnosis of TFCC peripheral tears and proved to be beneficial by suture repair of tear's edges to the dorso-ulnar wrist capsule or EUC tendon sheath, by many techniques.

However, it is generally agreed that arthroscopic repair is of limited help when the TFCC peripheral tear is associated to DRUJ instability[1] and/or when TFCC injury is severe. These conditions are usually treated by open surgery with either TFCC refixation to the fovea ulnaris or ligamentous reconstruction by tendon graft Refinements in arthroscopic diagnosis and surgical technique have allowed the surgeon to overcome these limitations and perform an "all-arthroscopic" treatment of the TFCC peripheral tear even when associated with DRUJ instability.

The solution

Recent improvement of diagnostic ability and technical proficiency of wrist arthroscopy benefitted from the widespread use and acceptance of the following:

Arthroscopic Dry Technique (ADT): On a standard arthroscopic set-up, traction through the fingers is sufficient to create an intra-articular working cavity. Thus, arthroscopic exploration of the whole wrist can be performed in a way similar to the classic technique but without infusing water[2], with the main advantage that soft tissue extravasation is eliminated and the peri-articular tissues maintain their original features, facilitating any combined open surgery. The technique was systematized by del Piñal[3], who arranged a set of technical tips to overcome difficulties related to impaired vision and promoted ADT as the technique of choice for complex wrist reconstruction[4].

DRUJ Arthroscopy: Even with the many limitations due to the reduced intra-articular space and the lack of working portals, DRUJ Arthroscopy is the only method to visualize the proximal TFCC, i.e. the DRUJ ligaments, and its foveal attachment. The distal-DRUJ portal is used to introduce the scope and visualize the proximal TFCC down to the fovea. Stress on the TFCC is applied using a percutaneous needle or introducing a probe through the so-called Direct Foveal portal[5]. Likewise, DRUJ Arthroscopy is recommended when the ballottement test is positive for DRUJ instability, but radiocarpal arthroscopy shows an apparently intact distal TFCC. However, use of the Hook test is decreasing the actual need for DRUJ Arthroscopy to confirm the foveal rupture.

Hook Test (or TFCC pulling test): This is an arthroscopic method to assess foveal disruption of the TFCC. It consists of using the probe to pull the ulnar-most border of the TFCC towards the center of the radio-carpal joint. Using the dry technique, the Hook test is more sensible in assessing the integrity of the TFCC than the popular trampoline test. It is probably due to the reduced joint distension that decreases the resilience effect[4]. Furthermore, the Hook test shows strong correlation with clinical DRUJ instability assessed through the ballottement test as well as with DRUJ arthroscopic findings of either laceration of the proximal TFCC or avulsion from the foveal attachment[5]. Thus in case of a positive hook test, DRUJ arthroscopy is no longer necessary to confirm proximal TFCC rupture or avulsion.

Direct Foveal (DF) portal: A dedicated working portal is devised to provide access to the fovea ulnaris[5]. The DF portal is located about 1 cm proximal to the 6-U portal and is created with the forearm in full supination, so that the fovea become subcutaneous and may be reached easily *(Fig. 1)*. The DF portal is less technically demand-

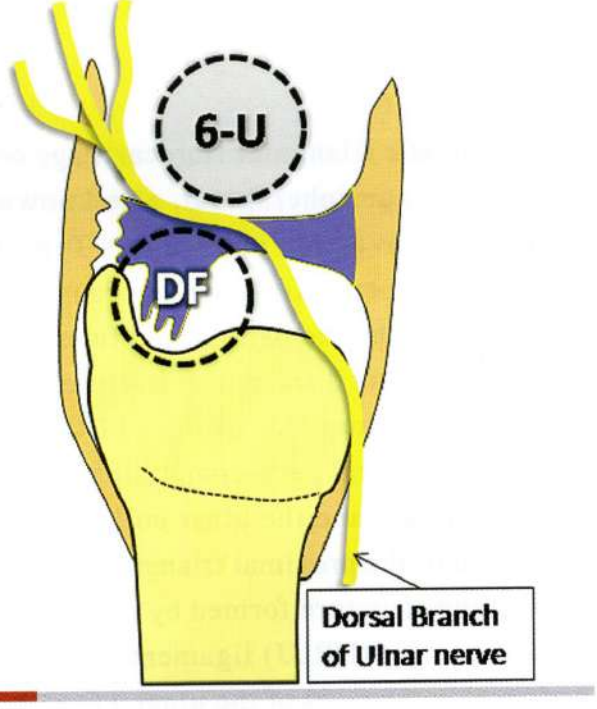

FIG. 1 Direct Foveal Portal: Schematic drawing showing the 6-U and Direct Foveal (DF) portals and their relationship with the ulnar head and TFCC. During portal preparation care must be taken to protect the dorsal branch of the ulnar nerve.

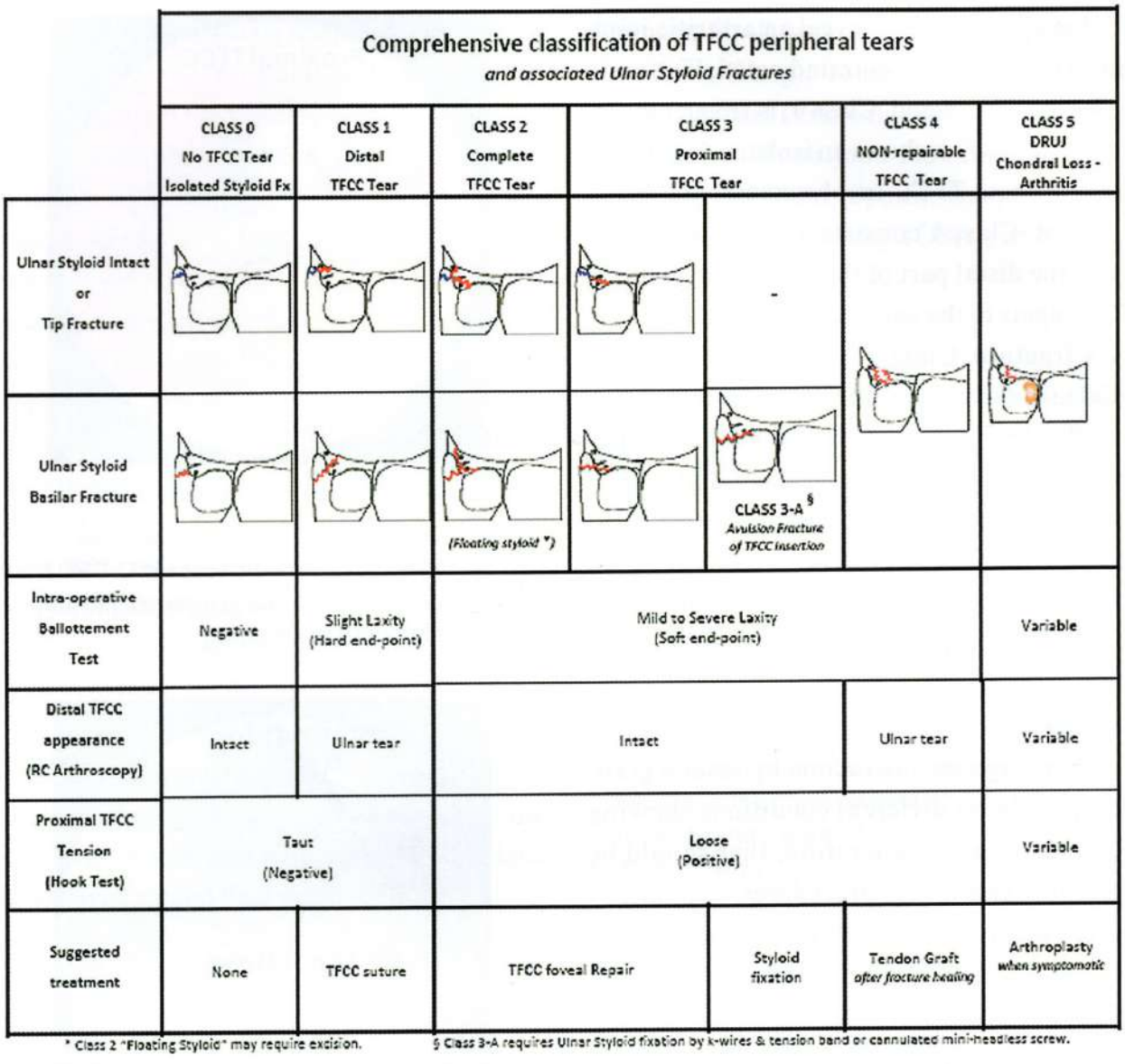

FIG. 2 Comprehensive Classification of Peripheral TFCC tear (modified from Atzei[6]).

ing compared with the Volar-Ulnar portal, but its use is limited to the introduction of working instruments, or suture screw/anchor drilling and insertion, eventually as a mini-open procedure.

Treatment-oriented Classification of Peripheral Tears: A novel classification of TFCC peripheral tears[6] is based upon radiographic findings, clinical evaluation of DRUJ laxity and arthroscopic findings and provides guidelines for treatment *(Fig. 2)*. Radiographic findings consist of two basic conditions: 1) when the ulnar styloid (US) is intact or fractured at the tip and 2) when there is a basilar fracture of the ulnar styloid. DRUJ laxity is evaluated by the ballottement test and graded as None; Slight; Mild or Severe and by the finding of a "soft" or "firm" end-point resistance. Arthroscopic findings consist of the evidence of a TFCC tear during radiocarpal exploration (suggesting rupture of the distal component of the TFCC), and the positivity of the Hook test (suggesting avulsion of the proximal component of the TFCC). Arthroscopic evaluation of the features of tear's edges suggests the likelihood of good healing of the repair or the need for a reconstruction by tendon graft. In doubtful cases

DRUJ exploration may reveal an arthritic joint, then TFCC repair is contraindicated. Five main classes are considered. Class 0, is frequently associated to DRF: it shows an isolated fracture of the US without TFCC involvement, requires no treatment. Class 1 consists of an isolated rupture of the distal part of the TFCC and requires TFCC repair to the capsule, regardless the type of US fracture. Class 2 represents a complete TFCC tear and requires foveal refixation. Since Class 2 "floating styloid" retains only a few ligamentous fibers, US excision may be advisable. Class 3 consists of the proximal rupture without tears visible during radio-carpal exploration: generally it requires foveal refixation, but if the TFCC is avulsed with a large US fragment (Class 3-A), then US fixation is recommended. Class 4 tears are non-repairable lesions that should undergo reconstruction by tendon graft. Class 5 includes different conditions showing DRUJ cartilage degeneration, that should be treated by joint salvage procedures.

Arthroscopic Foveal Repair: Through the DF (direct fovea) portal, eventually enlarged to a limited open approach, it is possible to debride the torn or avulsed proximal TFCC with a small shaver or curette, prepare the fovea ulnaris and introduce an anchor/screw pre-mounted with a pair of sutures *(Fig. 3)*. Under arthroscopic guidance, sutures are passed outside-in from the DF portal, retrieved from the 6-U portal and tied using a small knot-pusher. One suture is for the palmar DRUJ ligament and the other suture for the dorsal DRUJ ligament. A series of 18 patients showing Class 2 and 3 TFCC peripheral tear were treated with arthroscopic foveal repair and evaluated after a minimum 1 year: DASH score showed 94.4% excellent and good results and 83.3% return to previous work and recreational activities[5].

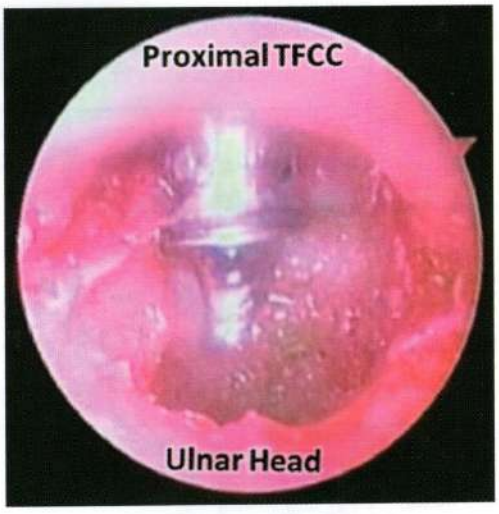

FIG. 3 Foveal Refixation of the avulsed proximal TFCC. With the scope in D-DRUJ portal, the suture screw is inserted into the fovea through the DF portal.

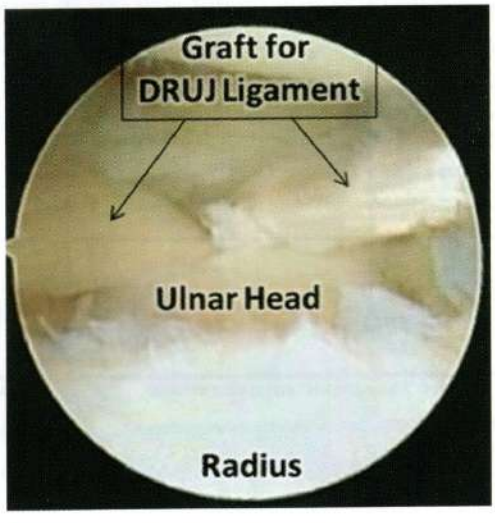

FIG. 4 Arthroscopic Reconstruction of DRUJ Ligaments. At the end of the procedure the palmar and dorsal limbs of the graft are visualized entering the ulnar tunnel through the fovea.

Arthroscopic Reconstruction of DRUJ Ligaments: The arthroscopic technique[6] is a modification of the open procedure using the palmaris longus (PL) or similar graft, originally described by Michel Mansat (France) and popularized by Bryan D Adams (USA). Two 3-cm longitudinal skin incision are located above the ulnar cor-

ner of the distal radius on the palmar and dorsal aspect of the wrist, for a safe preparation of the sagital tunnel on the distal radius. Another skin incision is required for the preparation of the ulnar tunnel with the aid of a small joint compass, aimed to the fovea through the 6-U portal. Under arthroscopic guidance (3-4 portal), the graft is passed through the radial tunnel and is mounted on a shuttle wire to be introduced into the joint through the 4-5 portal and through a small opening between the ulnocarpal ligaments. Then both ends are passed inside the ulnar tunnel *(Fig. 4)* and fixed with an absorbable interference screw. Since 2005, this technique was used in 11 patients with DRUJ instability due to a non-repairable TFCC peripheral tear (Class 4) and showed excellent to good results according to DASH and Modified Mayo Wrist Score in all patients. Only one case had a recurrence of DRUJ instability due to a fall one month after the treatment, the patient was re-operated with the same technique and achieved a good final result.

Authors acknowledge as Experts and Pioneers on this Topic

Gregory I Bain (Australia); Alejandro Badia (USA); Richard A Berger (USA); Didier Fontes (France); Jan-Ragnar Haugsvedt (Norway); PC Ho (Hong Kong); Tommy Lindau (Sweden); Michel Mansat (France); Christophe Mathoulin (France); Toshijasu Nakamura (Japan); Francisco del Piñal (Spain); Gary G Poheling (USA); David J Slutsky (USA); and Terry L Whipple (USA).

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SECTION iii Bones and Joints

5 CHAPTER

Amputations

Ulrich Mennen

The concept of "amputation" in the general population often evokes feelings of finality, permanent loss, mutilation and deformity, which may lead to depression and an altered or "spoiled" body image. These negative feelings are mainly based on myths, misconceptions or simply lack of information. If sound reason and objectivity is maintained when discussing the various management options as well as the functional and cosmetic outcome, then these negative feelings and images may turn into a co-operative patient, and acceptable results.

Etiology

Amputations may be performed for the following therapeutic, practical or even cosmetic reasons:

1. Congenital malformations e.g. polydactyly.
2. Arterio-venous malformations.
3. Trauma, e.g. crush injury.
4. Infection, e.g. uncontrollable in diabetes mellitus.
5. Neoplasia, especially malignant tumours.
6. Fixed deformities, e.g. stiff deformed finger.
7. Gangrene, e.g. vascular compromise.
8. Revision amputation, e.g. psychological self-mutilation.

Principles

The following principles must be considered when contemplating an amputation:

1. Length – preservation of functional length in the fingers is less important than in the thumb.

2. Skin cover – digital stumps should be covered with good, sensate, volar skin. This is more important than preserving a few extra millimeters of length.
3. Scar – incision should be designed in such a way that scars do not end up in areas that are subjected to pressure *(fig 1)*.
4. Web space – if possible, incisions should be designed to produce pliable and expandable webs without restrictive scars, or cause web space narrowing *(fig 2)*.
5. Digital nerves – meticulous dissection of nerves proximally by about 1-2cm and a clean neurotomy with cauterisation of the ends, may prevent annoying neuromas.
6. Type of amputation – age, occupation, patient requirements and cosmetic expectations will influence the type of amputation. E.g. a mechanic may need the width of the palm to exert torque on his tool which would make a simple digital amputation more appropriate than a ray-amputation.
7. Function – an index finger stump may handicap the function of the hand, necessitating a ray-amputation.
8. Timing – initial surgery after a traumatic injury should aim to preserve all viable tissue. Reconstructive surgery is done on an elective basis when useless, but viable tissue may be used to augment or enhance remaining fingers. Thorough planning, taking into account the needs of the patient will make for a more optimal result.
9. "Robbing Peter to pay Paul" – care should be taken not to cause damage or compromise function of other parts of the hand to obtain skin cover. Fancy skin flaps often cause more morbidity than the advantage they are supposed to provide.
10. "Keep it simple" – many traumatic amputations can be treated very successfully by conservative measures, e.g. semi-occlusive dressings (ref.) *(fig 3 A,B,C)*, or closure by secondary intention. Shortening of the bone to achieve primary closure without the use of elaborate flaps is a simple way of achieving good results. Skin flaps and skin grafting may be a cause of hypersensitivity, cold intolerance and other annoying sensory symptoms. Conservative management has fewer of these complications.
11. Amputation vs. re-implantation. Micro vas-

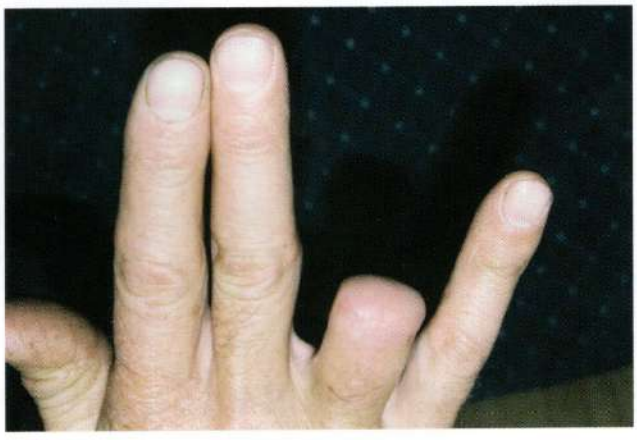

FIG. 1 Flaps should be designed in such a way as to place the scar outside of pressure/working areas. Also note the amputation stump is covered with normal, full thickness, volar skin.

FIG. 2 The webs should be free of scars and the flaps designed to transfer an entire normal web when performing a ray-amputation.

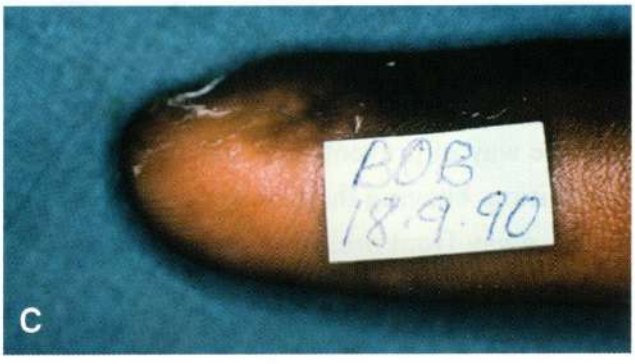

FIG. 3 **A.** Finger tip injuries can be treated with semi-occlusive dressings, applied directly to the wound, and changed only once weekly. This type of dressing acts as a "second skin" and allows regeneration of soft-tissue including the skin. **B.** Finger tip injury treated once weekly with semi-occlusive dressing only. **C.** Same finger tip injury after less than eight weeks treatment with semi-occlusive dressing.

cular surgical techniques have become common practice. Traumatic amputations are replanted on an almost routine basis at many centres. The fact that an amputated part can be replanted does not necessary mean that it should. Reasonable judgment is imperative. A primary revision and suture of a non-dominant finger rather than a laborious, expensive and rehabilitation intensive re-attachment may be the more prudent option.

Specific Amputations

Children

Finger tip amputations or avulsions The severed finger tip can be replaced as "skin cap" after defatting and will act as a full thickness skin graft or a good biological dressing. Alternatively, semi-occlusive moist-wound management results in a near normal fingertip.

Nail injuries Beware of a physeal injury (i.e. mallet injury in children) of the distal phalanx, which may not be too apparent. After reduction of the physeal injury and fixation with a K-wire, the nail is replaced and the skin folds resutured.

Finger tip amputations

Soft-tissues only.

These soft-tissue injuries can be treated conservatively. The effect of wound contracture "draws" good pulp skin in, and usually leaves a minimal scar with no morbidity.

Distal phalanx involvement.

A host of ingenious flaps have been described for this type of injury. These are well described in the major Hand and Plastic Surgery Textbooks. However in most cases conservative management with semi-occlusive dressing, or wound healing by secondary intention, gives good results.

If a more definitive management is demanded, shortening of the phalanx by a few millim-

eters allows primary suture of the skin. The downside of this method is inadequate nail support which may result in a "parrot-beak" of the nail. This complication may also occur with any of the described flaps.

Proximal phalanx

Amputation proximal to the middle of the proximal phalanx causes a "gap" in the hand. This may be annoying when holding small objects in the palm. However, the width of the hand is maintained which is an important factor in many cases such as in manual workers.

A ray-amputation may offer a cosmetically more acceptable hand. An additional advantage of ray-amputation is that cold-intolerance is much less of a problem. The following principles apply when performing a ray-amputation:

Creation of the web – a racquet type incision results in the scar being in the middle of the web. Transfer of the web as shown in fig. 2 results in a "normal" web both functionally and cosmetically.

Deep transverse ligament – it is imperative to suture this ligament very carefully to maintain a normal inter-metacarpal distance. This is achieved by overlapping the adjacent ligaments. However, this may result in rotation of the finger. By reversing the overlap, normal alignment can be restored.

If **normal rotation of the fingers**, especially in finger flexion, cannot be achieved, transposition of the adjacent metacarpal is indicated.

The base of the amputated finger metacarpal should not be removed, since it is part of the carpo-metacarpal complex.

Ray-amputations of the index and small fingers need not reach all the way down to the metacarpal base. Only one half of the metacarpal is taken. The osteotomy is oblique. This will ensure a more natural shape of the hand and retain some width *(fig 4)*.

Complications

Scar – sensitive scars are due to:

- inadequate management of the digital nerves.
- foreign bodies in the wound.
- non-dissolved sutures.
- too tight flaps – always make flaps large enough to allow for a loose suture line.
- ill placed suture lines, i.e. on pressure areas or not allowing webs to expand freely.

Neuroma –these are very annoying complications which are sometimes almost impossible to address. Cutting back and cauterising the ends of the severed digital nerves appears to be a reasonable way of preventing neuroma formation. In addition, burying the nerve ends deep in soft tissue, away from pressure areas, may need to be done. However, even this may not be enough and more proximal neurotomy may be indicated. Partial digital amputation may have to be revised to a ray-amputation. Many methods are described to deal with neuromas, which is an indication that there is not one method that gives consistently good results.

FIG. 4 Index finger (and small finger) ray-amputations need only to be done partially i.e. leaving about two thirds of the metacarpal. This leaves a more natural looking hand and preserves the width. Note: (1) the scar is away from the web, (2) the metacarpal osteotomy has to be oblique to follow the skin slope.

Hypersensitivity – this may not necessarily be due to a neuroma. Desensitisation and sensory rehabilitation by a Hand Therapist is indicated.

Cold intolerance – in colder climates this could pose a serious incapacitating problem. Keeping the hand permanently warm may not be very practical. Desensitisation may help. Drugs are mostly disappointing. A more radical revision amputation may be the only solution.

Complex Regional Pain Syndrome (CRPS) – reflex sympathetic dystrophy with peripheral nerve injury is currently classified as CRPS type 2. This is a very complex, and disabling condition, which should be identified early and prevented by intensive therapy, rather than treating the established syndrome. The management of this complication falls outside the scope of this chapter (see chapter 24).

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SECTION iii Bones and Joints

Carpal Fracture and Instability

6 CHAPTER

Goo Hyun Baek, Bong Cheol Kwon

Acute Perilunate Dislocation or Fracture-Dislocation

Acute perilunate dislocation (PLD) or perilunate fracture - dislocation (PLFD) are one of the most severe injuries to the carpus. Their prevalence is relatively low, contributing approximately 10% of all carpal injuries. These injuries usually occur in young males in their 3rd or 4th decades, and are the result of high energy injury such as motor vehicle collision, fall from a height, or sports activity.

The injury mechanism is the force of extension, ulnar deviation, and intercarpal supination propagating from radial to ulnar side of the wrist through ligaments (lesser arc injury) or bones (greater arc injury) to generate a staged disruption of intercarpal and radiocarpal ligaments, and carpal bones stage as follows: Stage I, scapholunate dissociation. Stage II, scapholunate and capitolunate dissociation. stage III, dorsal perilunate dislocation. Stage IV, volar lunate dislocation.[1]

The diagnosis of perilunate injury is frequently missed, in up to 25% of cases. Standard wrist PA view shows loss of carpal height, disruption of Gilula's three carpal arcs, and associated fractures *(Fig. 1-a)*. Lateral wrist view shows direction of carpal bone dislocation *(Fig 1-b)*. Traction wrist radiographs make it easier to identify intercarpal ligament injuries by exaggerating step off deformity between carpal bones. CT scan is of help in detecting the injuries missed by radiographs.

Immediate reduction is crucial. If left unreduced, most of the patients undergo arthritic changes of the wrist that cause pain and func-

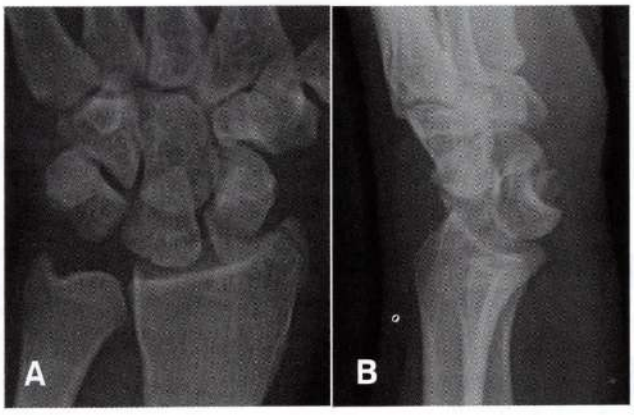

FIG. 1 A 22 year old male sustained a wrist injury in motor vehicle collision. Wrist PA view showed disrupted Gilula's carpal arc I and II, scaphoid fracture, and radial styloid fracture **(A)**. Lateral view showed dorsal dislocation of capitate relative to lunate while radio-lunate joint was spared **(B)**, indicating stage 3 trans-styloid, trans-scaphoid perilunate fracture dislocation.

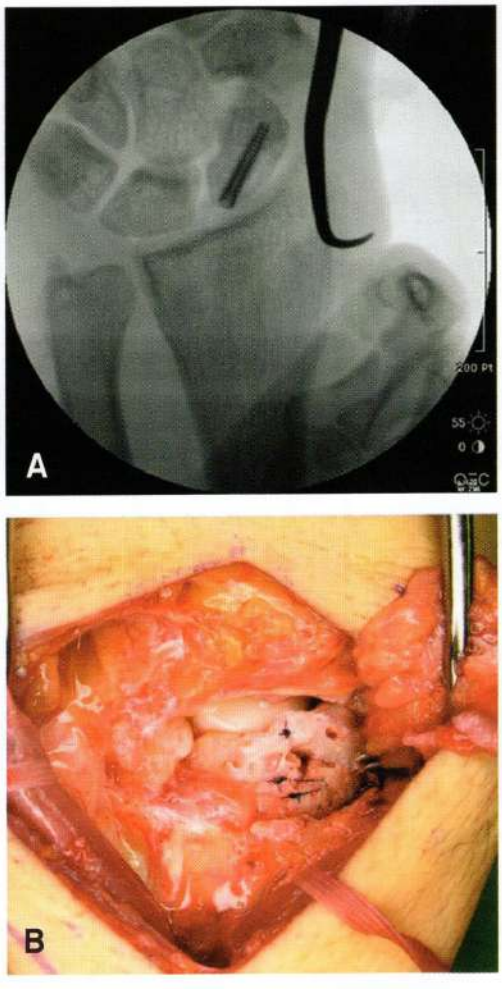

FIG. 2 Reduction and fixation of the scaphoid fracture with a headless compression screw **(A)**, and repair of SLIL avulsion with micro suture anchor augment with trans-osseous suture was performed **(B)**.

tional decrease, and complications such as median nerve compression and the attritional rupture of flexor tendons.[2]

It is better to perform surgery within one week after injury.[2] Salvage procedures are frequently required after two months. The aim of surgery is to obtain accurate reduction of intercarpal and midcarpal joints, to repair of all repairable ligaments, especially SLIL which usually has a sufficient ligamentous flap for reattachment, and to obtain firm fracture fixation *(Fig. 2)*. Controversy exists as to whether combined volar-dorsal approach is better than dorsal approach alone. Additional volar approach enables repair of volar capsule and ligaments, however the extended dissection may lead to increased swelling and stiffness. The authors prefer dorsal approach alone except for the cases with acute median nerve injury or irreducible volar lunate dislocation, because evidence does not indicate that additional volar ligamentous repair by combined volar-dorsal approach translates into a better functional improvement.

Arthroscopic reduction and pinning has been recently described for the treatment of acute PLDs.[3] This method is likely to contribute a better healing of the ligaments by being minimally invasive while assisting in accurate reduction and pinning.

Good to excellent results have been obtained in 68~77% of patients, with grip strength averaging 71~77% and wrist flexion-extension arc averaging 77~ 80% of the uninjured wrist. Ra-

diographic midcarpal joint arthritis can develop in up to 87 % of wrists , but most of them remain asymptomatic. A complete dislocation of the lunate or a fracture of the proximal fragment of the scaphoid frequently demonstrates transient avascular changes in radiographs but rarely result in avascular necrosis if accurately reduced and firmly fixed.

Scapholunate Instability

Scapholunate instability occurs as the first stage of perilunate instability. The concept of a spectrum of instability is important and useful in the management of patients with scapholunate instability. This instability is classified as follows: predynamic, dynamic, and static instability depending on radiographic findings. Static scapholunate instability is an instability that shows typical radiographic changes, representing complete SLIL tear along with significant injuries of secondary stabilizers. Dynamic instability is an instability that shows typical radiographic changes only under a loaded condition, representing complete SLIL tear only. Predynamic instability is an instability that shows no radiographic changes even under a loaded condition, representing partial SLIL tear.

Patients with scapholunate instability may have a tender point on the scapholunate interval on the dorsum of the wrist. Positive scaphoid shift test is a useful but not specific finding as it is positive in normal population with midcarpal joint laxity as well. Standard PA wrist X-rays should be taken with the X-ray tube angulated 10° radialward to obtain a profile view of the scapholunate joint and exactly measure the scapholunate gap. A scapholunate gap more than 2 mm as measured at the mid-joint level indicates scapholunate instability *(Fig. 3)*.[4] In the lateral wrist X rays, a scapholunate angle

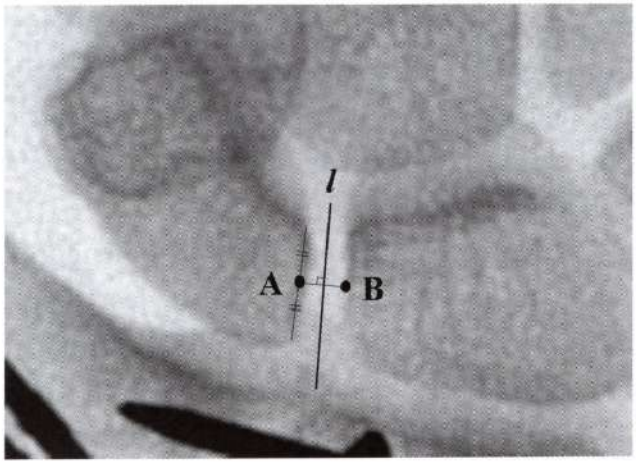

FIG. 3 From the middle of the flat surface of the ulnar cortex of the scaphoid (point A), a line was drawn, vertical to the scapholunate joint bisecting line (l), to the radial cortex of the lunate (point B). The length of this line is the scapholunate gap.

more than 70° is highly suggestive of scapholunate instability. Stress radiographs such as clenched fist view or PA distraction view (so called carpal stretch test) may be helpful in the diagnosis of dynamic scapholunate instability. All radiographic images should be compared with those of the contralateral uninjured wrist. Fluoroscopic examination may be more useful for both dynamic and static evaluation, in that a surgeon can directly observe asynchronous scaphoid motion generating a a "catch up" clunk during radioulnar deviation and more easily obtain profile view of scapholunate joint. CT arthrography and MR arthrography are relatively accurate and can be used to confirm a suspected diagnosis of scapholunate instability. Arthroscopy has been considered as the most accurate diagnostic method. Arthroscopy allows for direct visualization of all the three parts of the SLIL, a part of extrinsic ligaments, and articular cartilages, via various dorsal and volar portals.However, the interpretation of arthroscopic findings requires experience.

Untreated scapholunate instability tends to

progress towards more severe forms of instability and wrist arthritis in the end. The arthritic changes are postulated to occur in a specific pattern, termed as scaphoid lunate advanced collapse (SLAC).

Five aspects of instability to be considered for an optimal treatment have been described:[5] 1. Rupture of dorsal SLIL. 2. Reparability of dorsal SLIL. 3. Flexion deformity of scaphoid. 4. DISI deformity of lunate. 5. Cartilage degeneration at radiocarpal or midcarpal joints. Treatment options for each stage are summarized in *Table 1*. Briefly, strong SLIL repair or reconstruction should be attempted when the DISI deformity is correctable and cartilage degeneration is absent.

Scaphoid Fractures

The scaphoid fracture is the most common carpal bone fracture, comprising approximately 60% of all carpal fractures. It occurs as a result of a wrist extension injury, or flexion injury on rare occasion, most frequently in males in their 3rd or 4th decades. About 70 to 80% of scaphoid fractures occur at the middle third, and 10 to 20% occur at the proximal third.

The dorsal ridge of the scaphoid is an important anatomical landmark in the pathogenesis of avascular necrosis and hump back deformity in scaphoid fractures *(Table 2)*. The dorsal ridge at the waist of the scaphoid is entered by dorsal braches of radial artery that almost exclusively supply proximal 2/3 of the scaphoid.[6] This explains why scaphoid fractures that occur proximal to dorsal ridge have a higher possibility of delayed union, nonunion, and avascular necrosis.The dorsal ridge is inserted by the dorsal intercarpal ligament, which acts as an important antagonist against a flexion momentum on the scaphoid. Scaphoid fractures occurring distal to the dorsal ridge are more likely to develop hump back deformity and subsequent DISI deformity due to the unresisted flexion momen-

Instability	Stages	Partial rupture of dorsal SLIL	Complete rupture of dorsal SLIL	Scaphoid flexion deformity	DISI deformity	Cartilage degeneration	Treatment options
Predynamic	Stage 1	O	X	X	X	X	Casting, pinning, or arthroscopic debriment
Dynamic	Stage 2	X	O(repairable)	X	X	X	Repair with or without capsulodesis
	Stage 3	X	O(irreparable)	X	X	X	Tri-ligament tenodesis
Static	Stage 4	X	O(irreparable)	O	X	X	Tri-ligament tenodesis
	Stage 5	X	O(irreparable)	O	O	X	Reducible: tri-ligament tenodesis Fixed: limited carpal fusion
SLAC	Stage 6	X	O(irreparable)	O	O	O	Limited carpal fusion or Proximal row carpectomy

TABLE 1 Classification and treatment options for scapholunate instability.

Nonunion location	Complications	Preferred bone grafting
Distal to DR*	Hump back deformity and DISI†	Wedge graft
Proximal to DR	AVN‡	Vascularized bone graft

TABLE 2 Location of nonunion, associated complications, and bone grafting.
*DR, dorsal ridge; †DISI, dorsal intercalated segment instability; ‡AVN, avascular necrosis.

tum on the distal fragment.

Patients with a scaphoid fracture usually have anatomical snuff box tenderness. A full set of radiographs, including standard wrist PA, lateral, both oblique views, and a PA view with ulnar deviation has approximately 70% of sensitivity. Patients with clinically suspected scaphoid fractures are often recommended to be re-examined after 1~3wks of immobilization. But there is a recent trend toward early decision regarding the presence of an occult scaphoid fracture with aid of MRI or bone scan to avoid unnecessary immobilization and subsequent loss of work time.

An acute displaced scaphoid fracture is an indication for surgery to prevent complications such as nonunion or malunion. Open reduction and internal fixation with a cannulated headless compression screw via a dorsal approach is preferred for the waist or proximal fracture of the scaphoid because this approach allows for an accurate placement of a screw along the longitudinal axis of the scaphoid. This technique allows for rigid fixation while minimizing the injury to dorsal blood supply of the scaphoid. Controversy as to the optimal treatment for acute non-displaced scaphoid fracture has not been resolved yet. Benefits from surgery include faster fracture union, earlier gain of function, earlier return to work or sports activity, and a reduced rate of nonunion, all of which have controversial cost-effectiveness.

Scaphoid nonunions occur when acute scaphoid fractures are not properly diagnosed and treated. If untreated, many of them follow a specific pattern of progressive arthritis, termed as scaphoid nonunion advanced collapse (SNAC). Bony consolidation should be attempted before the development of advanced arthritis. Prior to surgery, scaphoid nonunion should be evaluated for hump back deformity, DISI deformity, and AVN of the proximal fragment using imaging studies such as CT and MRI with enhancement. A volar approach and wedge intercalated bone grafting is preferred when hump back deformity is present *(Fig. 4)*.A dorsal approach and vascularized bone grafting is preferred when avascular necrosis of the proximal fragment is present. Delay to surgery, proximal nonunion, AVN, DISI deformity, and fixation with K-wire may negatively affect the outcome. If advanced arthritis already exists, salvage procedures such as proximal row carpectomy, limited intercarpal fusion, or total wrist arthrodesis should be considered after failure with conservative treatment.

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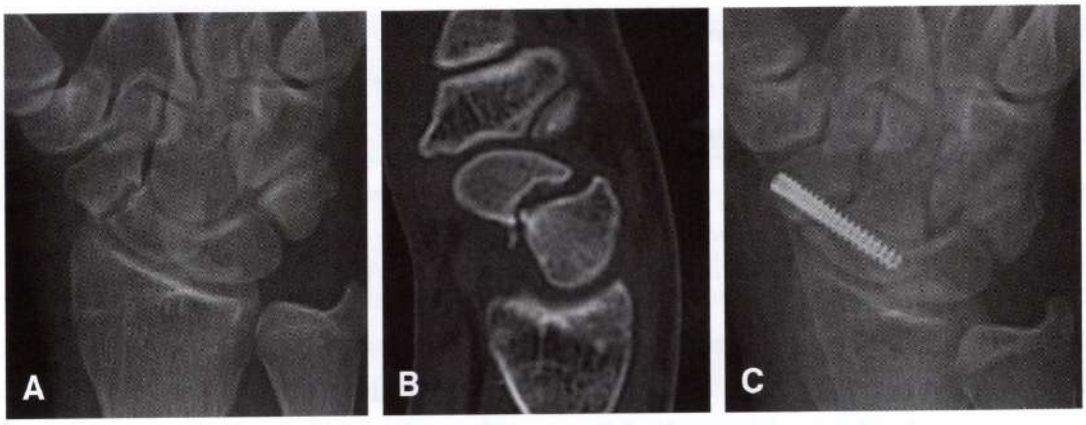

FIG. 4 Treatment of scaphoid nonunion. A semipronated wrist view showed scaphoid nonunion at distal 1/3 **(A)**. CT scan showed flexion deformity of the distal fragment, so called hump back deformity **(B)**. Wedge intercalated bone grafting from iliac crest and fixation with a headless compression screw was performed via volar approach **(C)**.

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SECTION iii Bones and Joints

Scaphoid Reconstruction with Pedicled Bone Grafts and Periosteal Flaps

7 CHAPTER

K.N. Malizos, Z.H. Dailiana, S.E. Varitimidis

The problem

The majority of the fractures of the carpal scaphoid heal after early diagnosis and adequate immobilization. However those with severe initial displacement, as well as the undiagnosed ones and in cases with inadequate immobilization fail to unite and lead to nonunions. Delays in the management of nonunions may cause bone resorption, cystic changes and less commonly avascular necrosis of the proximal pole. The reconstruction of the carpal scaphoid requires fibrocartilagenous tissue excision down to bleeding surfaces, thus resulting in a considerable bone defect, which presents a challenging problem.

Management with non-vascularized bone grafts and casting or combined with internal fixation demonstrated healing rates ranging from 53% to 100% and an overall union rate of 84%. Adverse prognostic factors for healing of the nonunion with nonvascularized grafts include avascular necrosis of the proximal segment, chronicity of the non-union with wrist deformity, and proximal fracture location. The aim of the treatment is to accomplish healing of the scaphoid with reconstruction of its length and alignment.

The Treatment Proposed

In the case of a scaphoid nonunion with a considerable bone defect, the required bone graft should be of adequate size for interposition and able to enhance the vascular supply so as to ensure healing in due time. Vascularized bone grafts and periosteal flaps from adjacent loca-

tions have the biological potential to enhance callus formation due to their intrinsic blood supply, maintained through a vascular pedicle[1-6]. Union rates ranging from 85-100% have been reported after treatment of nonunions with vascularised bone grafts from the dorsal or the palmar aspect of the distal radius, except one study with only 27% union[7].

The vasularized bone grafts used for scaphoid reconstruction may be classified in 3 categories

A. Bone grafts based on a specific pedicle1[2,4,6]

- On the dorsal radius, flaps based on pedicles running on the longitudinal axis of the radius, between (inter-compartmental) or inside (compartmental) the respective extensor compartments[1-2]. These pedicles are the 1,2 intercompartmental artery, the 2,3 intercompartmental artery, and the 4th extensor compartment artery[3]. The former graft, initially described by Zaidemberg et al. in 1991[2] is the most commonly used for the treatment of scaphoid nonunions.
- On the volar aspect of the distal radius the palmar carpal arch and the palmar metaphyseal arch allow the elevation of a cortico-cancellous bone graft on a vascular pedicle (transverse to the longitudinal axis of the forearm) long enough to reach the wrist area and especially the waist of the scaphoid. These pedicles run at the distal edge of the pronator quadratus muscle between the radial, anterior interosseous and ulnar arteries[4].
- Vascularized grafts from the 1st or 2nd metacarpals, based on the dorsal metacarpal arteries may also be applied as alternatives.
- Bone grafts based on the ulnar artery have been proposed for the treatment of scaphoid nonunions by Guimberteau and Panconi.

B. Bone grafts based on capsule[5] or muscle

- The capsular-based vascularized bone graft is a cortico-cancellous bone graft from the dorsal distal radius, attached to distally based strip of the dorsal wrist capsule[5]. This may be applied in the treatment of nonunions of the proximal pole of the scaphoid.
- The tubercle of the scaphoid, attached on the abductor pollicis brevis, was proposed for the treatment of scaphoid nonunions by Judet at al. (1972).

C. Periosteal flaps[3]

The pedicled periosteal flaps from the distal radius and the dorsal metacarpals are based on the aforementioned pedicles and may be used as onlay flaps in case of a recent scaphoid nonunion, without bone loss or hump-back deformity[3].

The location of the nonunion is critical for the selection of the most appropriate donor site of the bone graft[6]. For nonunions at the waist of the scaphoid, grafts from the palmar-ulnar aspect of the radial metaphysis (based on the palmar carpal arch of the radius running on the distal edge of the pronator quadratus) are suitable, whereas for nonunions of the proximal segment of the scaphoid, bone grafts from the dorsal-radial side of the distal radius, based on the 1,2 or the 2,3 intercompartmental arteries are preferable and easier to apply *(Fig. 1-4)*.

Also the size of the defect after the curettage will dictate the use of a pedicled cortico-cancellous bone graft with adequate size (interposition graft) to restore the length and the alignment of the scaphoid. In the case of a nascent nonunion without bone loss a pedicled periosteal flap may cover the site of the nonunion combined with plain fixation.

The commonly established "humpback" deformity may be challenging and always needs correction. . This can be addressed through harvesting a larger graft that is then trimmed with the wider base opposite to the pedicle or in the case of dorsal approach with a cuboid shape graft inserted into an open-wedge shaped defect. In

FIG. 1 Nonunion of a proximal scaphoid fracture. The fracture remained undiagnosed for eight months.

FIG. 3 The necrotic bone and fibrocartilagenous tissue have been excised and replaced by the vascularized bone graft. The bone graft is secured by two K/wires. One K/wire is passed to the lunate bone and further stabilizes the proximal fragment, as the scapholunate ligament is intact.

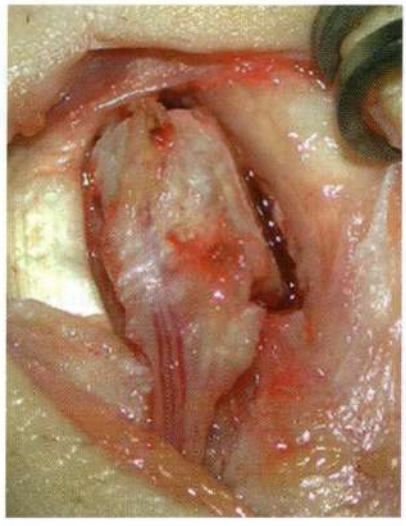

FIG. 2 A bone graft perfused by the dorsal 1,2 dorsal intercompartmental artery is harvested from the distal radius. The vascular pedicle is protected in 4-5 mm wide strip of fascia and periosteum throughout its length.

FIG. 4 Radiographic result one year after the procedure. The nonunion healed with normal scaphoid length and axis.

addition, the use of K-wires as joysticks in each scaphoid segment facilitates graft insertion. The graft is always interposed in full width between the two scaphoid segments, so as to enhance the healing process between the bleeding surface of the graft and the curetted surface of the adjacent, viable or necrotic, scaphoid segment[1,4,6].

Patients who are candidates for vascular-

ized bone grafting may anticipate that pain will be dramatically decreased and that the grip strength will reach approximately 80% of the normal hand. However, they may not experience equal improvement of the preoperative range of motion. This proposed management of the nonunited scaphoid gives a more predictable and better functional outcome, depending on the patient's compliance, smoking cessation and the rehabilitation program[4,6].

Experts and/or Pioneers on this Topic

In Greece and Cyprus apart from the authors of this chapter (K.N.M., Z.D., S.V.) who have also published reports of the procedures described above, the following surgeons (in alphabetical order): A. Beris, N. Darlis, H. Dinopoulos, P. Kinnas, A. Korompilias, V. Psychoyios, I. Sarris, G. Shiamishis, P.N. Soucacos, V. Vragalas, have applied the pedicled grafts for wrist reconstruction.

Internationally, Zaidemberg's report pioneered in the field in 1991. Other experts include (in alphabetical order): A.T. Bishop, R.A. Berger, F. Brunelli, M. Innocenti, R. Judet, C. Mathoulin, R. Mattar Jr, M. Sauerbier, D.G. Sotereanos, A.Y. Shin and S.P. Steinmann.

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SECTION iii Bones and Joints

The Distal Radioulnar Joint

8 CHAPTER

Jonathan A. Donigan, Brian D. Adams

Introduction

The distal radioulnar joint (DRUJ) provides the distal link between the radius and ulna and a pivot for pronation-supination *(Fig. 1)*. During forearm motion, the DRUJ moves synchronously with the proximal radioulnar joint. Any injury or deformity involving the radius or ulna can alter the function of both joints.

The distal radioulnar and ulnocarpal joints are also anatomically and functionally integrated, so that both are affected by traumatic and arthritic conditions. Because of these anatomic relationships, evaluation and treatment of the DRUJ is challenging.

Relevant Anatomy and Biomechanics

The DRUJ is a trochoid, diarthrodial articulation that allows both rotation and translation during normal forearm motion. Its dorsal bony rim is typically acutely angled while the volar rim is more rounded but frequently augmented by a cartilaginous lip. The ulnar styloid is a continuation of the subcutaneous ridge of the ulna, projecting 2-6 mm distally. At the base of the styloid lies a shallow concavity termed the fovea that is replete with vascular foramina and is an attachment site for ligaments.

The TFCC is generally accepted to be the major static, soft tissue stabilizer, and the palmar and dorsal radioulnar ligaments are the prime components of the TFCC. The two radioulnar ligaments are the major restraints to dorsal or palmar joint displacement, and they act in concert with the rims of the sigmoid notch to constrain the joint. The secondary structures that

contribute to DRUJ stability are the pronator quadratus, extensor carpi ulnaris (ECU), interosseous membrane (IOM), DRUJ capsule and components of the triangular fibrocartilage complex (TFCC). The interosseous membrane is important in maintaining the radius and ulna as a single functioning forearm unit.

During forearm rotation, DRUJ translation occurs because the sigmoid notch is shallow, subtending a sector of only 47° to 80°, and its radius of curvature is 50% greater than that of the ulnar head. At the extremes of pronation and supination, the ulnar head slides palmarly and dorsally in the sigmoid notch, resulting in only 2 to 3 mm of articular contact area at the rims.

Triangular Fibrocartilage Complex Lesions

Palmer's classification is the most recognized scheme for classifying TFCC lesions. It divides them into two broad categories: traumatic and degenerative *(Fig. 2)*. Traumatic TFCC injuries are further classified according to location of the tear. Most traumatic tears result from an acute rotational injury to the forearm, a combined axial load and distraction injury to the ulnar border of the forearm, or a fall on the pronated outstretched hand. Most acute, isolated TFCC tears do not require urgent treatment. The necessity of treatment for TFCC tears depends on the presence of persistent joint pain

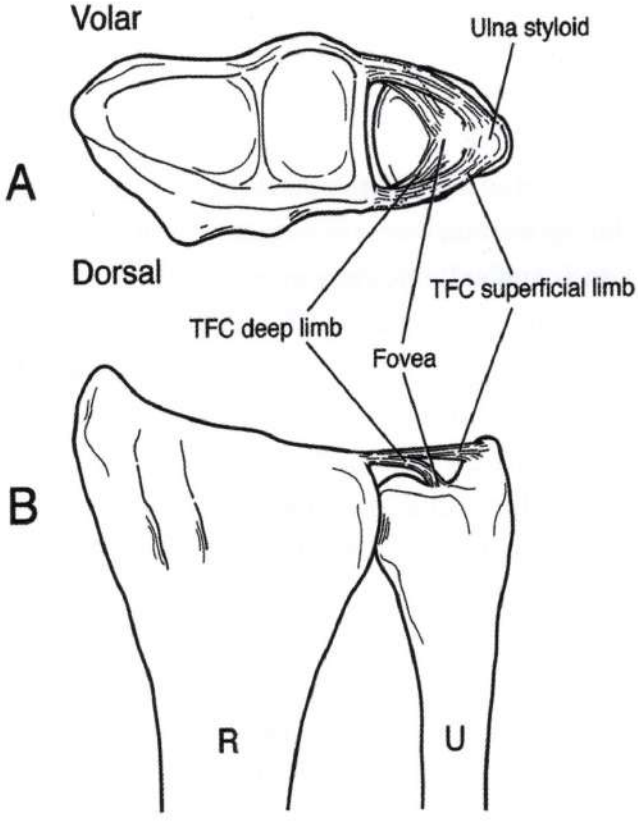

FIG. 1 Distal radioulnar joint with triangular fibrocartilage (TFC).

Class 1: Traumatic
- A. Central perforation
- B. Ulnar avulsion
  - With styloid fracture
  - Without styloid fracture
- C. Distal avulsion (from carpus)
- D. Radial avulsion
  - With sigmoid notch fracture
  - Without sigmoid notch fracture

Class 2: Degenerative (Ulnar Impaction Syndrome)
- A. TFCC wear
- B. TFCC wear
  - + lunate and/or ulnar head chondromalacia
- C. TFCC perforation
  - + lunate and/or ulnar head chondromalacia
- D. TFCC perforation
  - + lunate and/or ulnar head chondromalacia
  - + lunotriquetral ligament perforation
- E. TFCC perforation
  - + lunate and/or ulnar head chondromalacia
  - + lunotriquetral ligament perforation
  - + Ulnocarpal arthritis

FIG. 2 Palmer's Classifications of TFCC Lesions.

from mechanical irritation or synovitis caused by the tear, associated fractures or malunions, and whether there is instability of the DRUJ.

Degenerative TFCC tears can result from chronic, excessive loading through the ulnocarpal joint and are a component of ulnar impaction syndrome. It is important to recognize, however, that natural degeneration of the ulnocarpal joint structures is very common. Palmer classified degenerative lesions by the location and severity of degeneration involving the TFCC, ulnar head, lunotriquetral interosseous ligament and carpus. Treatment of degenerative TFCC lesions is directed toward debridement of the joint and reduction of load across the ulnocarpal joint. Options depend on associated degeneration in the DRUJ and carpus and whether developmental or acquired skeletal deformities coexist.

Arthroscopic TFCC Repairs

Several arthroscopic techniques are available for repair of ulnar-sided TFCC tears (Palmer type IB) including inside-out and outside-in techniques, and good results have been reported for each *(Fig. 3)*. Repair of isolated incomplete radial-sided tears (Palmer 1 D) is also possible using either open or arthroscopic techniques. Instability secondary to complete detachment of the disk and both radioulnar ligaments from the radius without a fracture is rare, while an equivalent injury due to a lunate fossa or sigmoid notch fracture as part of a distal radius fracture is common. Some authors have advocated repairing 1A tears by resecting the remaining portion of the disk along the radius' margin and advancing the TFCC to bone using transosseous sutures. Whether these technically challenging repairs produce better results than simple debridement is unknown. To reduce TFCC loading, ulnar shortening by either shaft osteotomy or partial resection of the ulnar head (wafer procedure) may be combined with TFCC repair when positive ulnar variance is present. Arthroscopic debridement of traumatic, central and incomplete radial tears (Palmer types 1A and ID) is effective treatment, but coexisting chondral lesions are common and may also require debridement.

DRUJ Instability

DRUJ instability can be caused by bony de-

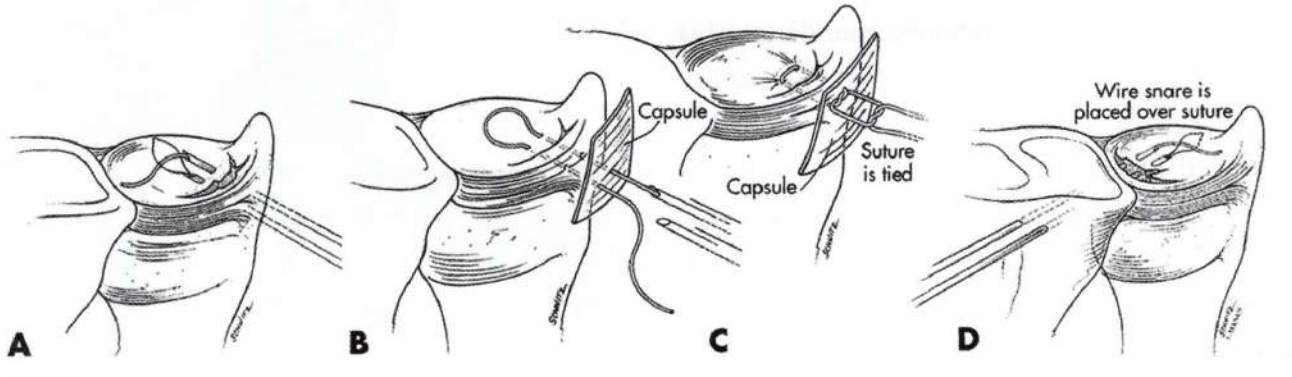

FIG. 3 Arthroscopic technique used for TFC tears. The technique incorporates cannulated needles and instruments that facilitate tying of mattress sutures to anchor the tear. A, Two parallel cannulated needles are passed through the tear. The snare passed through one cannulated needled extracts one limb of the suture, forming a mattress configuration (B). C, The suture can then be tied over the joint capsule. D, A similar technique can be used for radial-sided tears, passing the cannulated needles through the dorsal distal radius.

formity, ligament injury or a combination. Although the TFCC typically ruptures from the ulna in traumatic DRUJ instability, an important exception is radial-sided disruption due to sigmoid notch fractures. Ulnar styloid base fractures are more likely associated with complete TFCC disruption from the ulna than a styloid tip fracture.

Chronic instability rarely improves spontaneously but symptoms may lessen and become tolerable in mild cases. The role of arthroscopy in the treatment of chronic DRUJ instability is evolving. An ulnar styloid nonunion can be treated either by skeletal repair or styloid fragment excision with repair of the TFCC to the styloid base.

If the radioulnar ligaments are irreparable and there is no bony deformity, a soft tissue reconstruction is indicated. Numerous techniques have been described, which can be categorized as a direct radioulnar tether extrinsic to the joint, an indirect radioulnar link via an ulnocarpal sling or a tenodesis, or reconstruction of the distal radioulnar ligaments. The techniques in the first two categories do not restore normal joint stability or mechanics but can improve symptoms and are indicated as an adjunct to a partial or complete distal ulna resection, for an unstable previously resected distal ulna, or as an alternative to radioulnar ligament reconstruction. Reconstruction of the distal radioulnar ligaments is more anatomic and can potentially restore stability without substantial loss of motion or strength; however arthritis and substantial joint incongruity are contraindications.

Sigmoid notch-plasty for the treatment of DRUJ instability in patients with a deficient notch has been described. The procedure increases the prominence of the rim to create a better bony buttress *(Figure 4)*.

Ulnar Impaction

Repetitive ulnocarpal joint overloading can lead to wear of the ulnar head, lunate, triquetrum, lunotriquetral interosseous ligament (LTIOL) and TFCC producing the ulnar impaction syndrome. It is usually associated with positive ulnar variance, which can be developmental or acquired. Common causes of acquired positive variance include radius shortening from distal radius fracture, Essex-Lopresti injury, and traumatic physeal arrest. Some patients are susceptible to impaction due to physiologic or dynamic positive ulnar variance which is particularly increased during power grip with the forearm pronated.

In a patient with neutral ulnar variance, arthroscopic debridement of the articular disk, chondral surfaces, and lunato-triquetral interosseous ligament (LTIOL) is often effective. When ulnar positive variance is present, ulnar shortening via a shaft osteotomy or distal ulna resection is used to reduce ulnocarpal loads. Because arthroscopic distal ulna resection is feasible at the time of TFCC debridement, it is

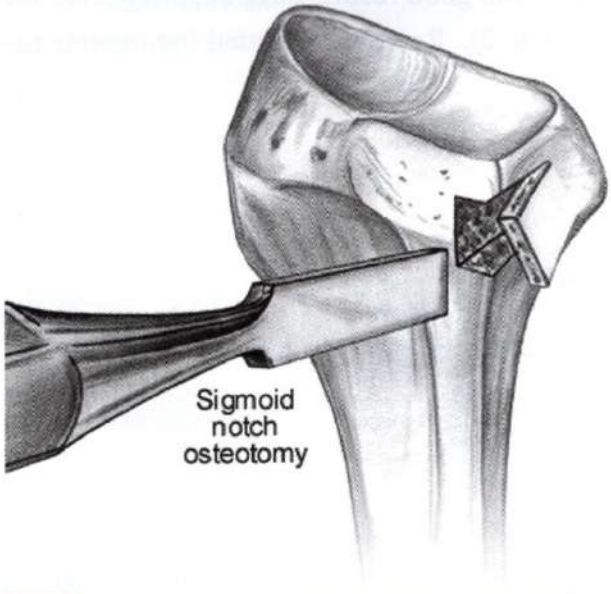

FIG. 4 Sigmoid notch osteoplasty for chronic DRUJ instability. A bone graft is inserted behind the osteochondral flap.

often preferred over shaft osteotomy due to possible hardware irritation and risk of nonunion, and produces good results. With ulnar impaction a variable portion of the TFCC is torn, and ulnar shortening can increase the ultrastructural stiffness and tension in the TFCC and LTIOL.

Arthritis

DRUJ arthritis can be caused by osteoarthritis, long-standing instability, intra-articular fractures or inflammatory disease. Mild arthritis of the DRUJ has been managed by surgical procedures that retain the ulnar head. One method is ulnar shortening shaft osteotomy which alters the contact surfaces of the DRUJ. Procedures for failed DRUJ surgery or the initial treatment of arthritis have historically involved distal ulna resections or radioulnar fusions. Options include the Darrach resection, hemi-resection arthroplasty Suave-Kapanji procedure, one-bone forearm, wide distal ulna resection, and implant arthroplasty. Because these procedures do not restore the normal anatomy, some compromise of function and incomplete pain relief often occur. Darrach resection is typically limited to the rheumatoid or low-demand patient because of the risk of instability and weakness. In the Sauvé-Kapandji procedure, the ulnar neck should be excised with its periosteum to reduce the risk of bony regrowth, and a tenodesis can be added to reduce ulnar stump instability. Avoiding excessive head resection, interposing adequate soft-tissue, preserving some TFCC attachments and avoiding stylocarpal impingement are technical factors that improve outcome with a hemi-resection arthroplasty. Creating a one bone forearm is often considered the most debilitating salvage because forearm rotation is sacrificed; however these already debilitated patients usually accommodate to the loss. The satisfactory results with wide distal ulna resection in tumor surgery have led some to use it for the salvage of failed distal ulna resections due to radioulnar impingement. The optimum level of resection is unclear, but near the mid-ulna appears to be a reasonable compromise between maintaining forearm stability and minimizing the risk of recurrent impingement.

Distal Ulna Implant Arthroplasty

Because normal stability and mechanical function of the DRUJ requires an ulnar head, implant arthroplasty is an attractive concept for the treatment of posttraumatic or osteoarthritis and especially for the challenging unstable resected distal ulna with radioulnar impingement. A functional ulnar head implant could alleviate radioulnar impingement and restore load transmission.

Swanson introduced a silicone implant to cover the end of the resected ulna. Despite good early results of this silicone implant combined with soft tissue reconstruction, inevitable failure of the implant led to recurrence of symptoms and frequent silicone synovitis. Silicone ulnar head implants have since been abandoned.

A group of hand surgeons from both Europe and the United States, under the leadership of Timothy Herbert, developed the Herbert ulnar head prosthesis. It consists of a titanium stem and a modular spherical ceramic head. Van Schoonhoven and associates reported on its use with good clinical results.

A metallic ulnar head implant with a modular head and stem, and including an extended collar for ulnar neck deficiencies, has been popularized by the Mayo clinic. The head has a site for reattachment of the TFCC, ECU sheath, and ulnocarpal ligaments to help stabilize the DRUJ. Several other total ulnar head replacements with design variations have subsequent-

ly been introduced. Preliminary clinical results have been encouraging using these implants.

Louis Scheker from Louisville designed a linked implant that replaces both the ulnar head and the sigmoid notch, which he considers a total replacement of the DRUJ. It is a ball-and-socket concept that allows some axial displacement of the radial component on the ulnar component to accommodate changes in ulnar variance during forearm rotation, but does not allow translation. At an average follow up of 15 months, all 23 patients reported on were said to have complete pain relief and good function.

Marc Garcia-Elias recently reported on a pyrocarbon spacer supported by a titanium stem. This implant aims to substitute the articular portion of the ulnar head while maintaining some of the native DRUJ stabilizers. The implant allows joint rotation and proximodistal translation.

An anatomic partial ulnar head replacement was introduced that replaces all articular surfaces of the head while allowing retention of the ulnar neck, ulnar styloid, ECU groove and sheath, ulnocarpal ligament attachments, and the TFCC attachments to the ulnar styloid *(Fig. 5)*. Longer follow up is needed to fully determine the outcomes of all of these implants.

Conclusion

Management of DRUJ problems poses many challenges related to the unique bony and soft tissue anatomy. Diagnosis requires consideration of many potential sources of dysfunction and may require the use of advanced imaging techniques. Recent, less invasive methods and greater emphasis on restoring or reconstructing the normal anatomy and function, including the use of newer implants, are showing improved results from surgical treatment.

FIG. 5 Ulnar head hemiarthroplasty.

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SECTION iii Bones and Joints

Distal Radius Fractures

9 CHAPTER

Jaiyoung Ryu, Barry Davis

Introduction

In 1814, without the aid of x-rays, Sir Abraham Colles first identified distal radius fractures (DRFxs), which were previously thought to be wrist dislocations. He described the classic "dinner fork" deformity as one of the features of the fracture and stated "they all do well" regardless of treatment. Since then, the treatment of DRFxs has evolved, particularly over the last decade with open reduction using a volar approach and a locking plate system.

DRFxs account for nearly 20% of all fractures seen in emergency rooms. Even with our current understanding of anatomy and biomechanics, and the implementation of new technologies *(Fig. 1)*, the optimal treatment of DRFxs remains controversial, mainly because radiographic alignment does not correlate well with the extent of post treatment symptoms.

DRFxs are difficult to classify, as evidenced by the fact that there are more than 20 different such classification systems present, including the more commonly used schema of Frykman, Melone, Fernandez, and AO.

In this chapter, we divide DRFxs into stable versus unstable, and extraarticular versus intraarticular. We also discuss our preferred treatment options and tips for each category of DRFx.

Stable Extraarticular Distal Radius Fractures

Closed reduction and cast immobilization remains the treatment of choice for anatomically reduced stable extraarticular DRFxs.

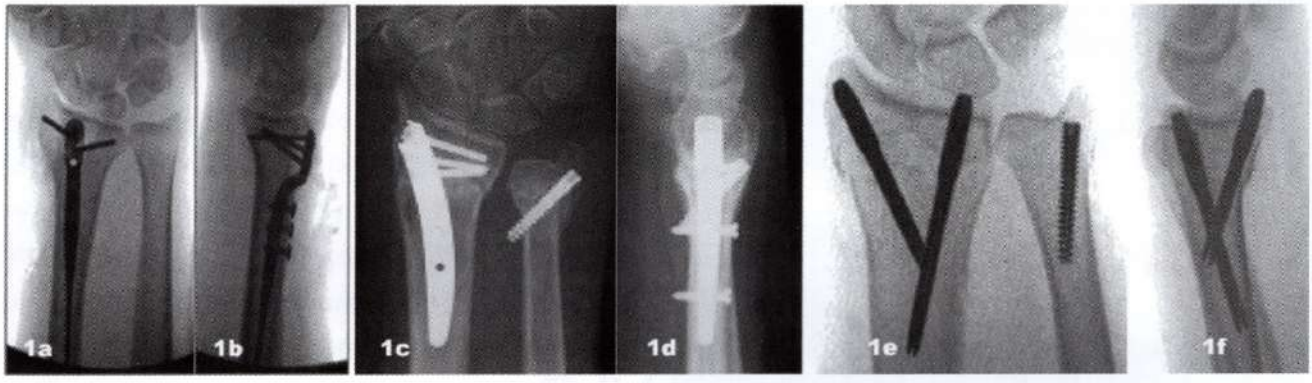

FIG. 1 Examples of usage of intramedullary devices for ORIF. (1 A.B., 1 C.D., 1 E.F.)

Authors' tips for closed reduction and cast immobilization:

- Three point molding needs to be emphasized. A crooked cast makes a straight bone.
- A short arm cast may be used unless distal radioulnar joint (DRUJ) instability is observed. If DRUJ instability is present, use a long arm or Muenster cast with the forearm in supination.
- Extreme wrist flexion is avoided to prevent median nerve compression.
- Weekly follow up for the first three weeks is necessary to verify maintenance of reduction. The evaluation of any interval changes since the prior follow up remains more important than the acceptability of the current position of bony fragments.

Unstable Extraarticular and Intraarticular Distal Radius Fractures

A DRFx is considered unstable when its dorsal comminution extends volar to the midaxial plane of the radius, dorsal angulation is > 25o, and/or intraarticular displacement is > 2 mm.

As documented by LaFontaine in 1995, an unstable fracture will tend to return to its position of inherent stability even in a cast, making it necessary to have better fixation than a simple cast.

While K-wire fixation (percutaneous or Kapandji's intrafocal pinning) is minimally invasive, its disadvantages are that it requires other immobilization methods such as a cast or an external fixator, the pins often migrate in either direction,pin tract infection is common, and it often requires pin removal.

Authors' surgical tips for percutaneous pinning:

- Make a small (≈ 5 mm) skin incision followed by blunt (spreading) dissection to the bone instead of introducing K-wires directly to intact skin. This will prevent injury to the superficial sensory nerves and tendons.
- Make sure the K-wires penetrate the intact cortex of the radial shaft proximally instead of ending in the medullary canal as it can give a spring effect and displace the fragment later.
- Utilize the K-wires as joy sticks to reduce the fracture before passing them through the fracture lines.
- Reserve Kapandji's intrafocal pinning technique for young patients with good bone quality and for noncomminuted extraarticular fractures.

When bone quality is sub-optimal, an open reduction internal fixation (ORIF) might be the appropriate choice for an unstable extra-articu-

lar DRFx. Useful devices for the condition include a variety of locking volar plates *(Fig. 2)*.

In their recent study, Koenig et.al.[2] concluded that ORIF with a volar plate for potentially unstable distal radial fractures provided a higher probability of painless union. The long-term gain in quality-adjusted life years outweighed the short-term risks of surgical complications making early internal fixation the preferred treatment in most cases.

Radial styloid (Chauffeur's) fractures are intraarticular in nature and require internal fixation unless the fracture is non-displaced, in which case, cast immobilization may suffice. K-wires, regular or headless screws, T-Pins, or a fragment specific device can be used. A locking volar plate system can also be used, and a variable angle device allows the surgeon to place additional screws in the radial styloid *(Fig. 2)*.

There are many different ways to fix intraarticular DRFxs, including K-wires, external fixators (static, dynamic, or non-bridging), dorsal plates, fragment specific systems, volar plates, or a combination of them.

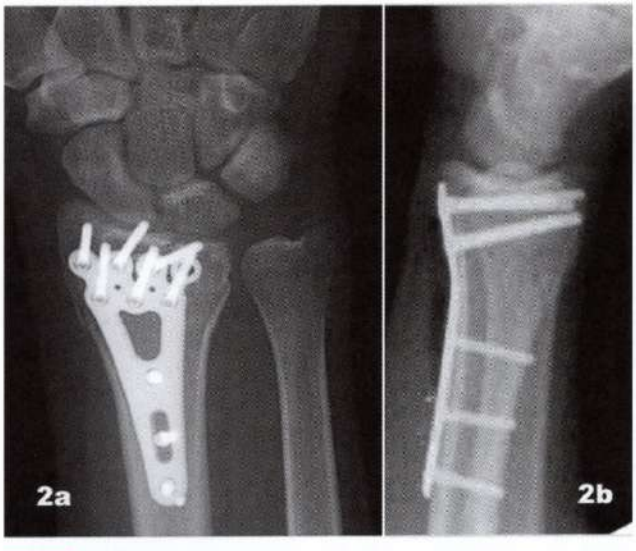

FIG. 2 An example of a variable angle locking plate system. Note the slope view (2b) with good visualization of radiolunate joint congruency.

Orbay popularized the locking volar plate in 2000. The current trend has shifted towards using one of the more than forty different locking plate systems that have since been developed for virtually all intraarticular DRFxs. Recently, Koval, et.al.[3] confirmed this striking shift in fixation strategy. They discovered that 81% of all operative DRFxs underwent open treatment with the rest (19%) treated by percutaneous pinning in 2007, compared to 42% open and 58% percutaneous in 1999.

The authors agree with this consensus and use a variable angle locking volar plate system for most intraarticular and unstable extraarticular DRFxs. Closed reduction should be performed in displaced fractures at the time of initial presentation, even if operative intervention is expected. This allows for pain relief, decreased swelling, and decreased pressure on the median nerve while waiting for the surgery.

Several papers suggest that in comparison to various other treatments, volar plating improves short term (up to 3 or 6 months) wrist range of motion (ROM), function, and DASH scores. Long term results were shown to be comparable with other treatments.

The authors have found that use of volar locking plates increases final forearm pronosupination and leads to far fewer hand therapy visits. These benefits likely lead to increased productivity during the first 6 months after fracture.

Knirk and Jupiter[4] stated that all patients with > 2 mm residual step off in the distal radius articular surface showed signs of post-traumatic arthritis later. The authors attempt to have no or minimal articular step offs.

Authors' surgical tips for ORIF with volar approach:

- A variable angle locking volar plate system is preferred as the screws can be placed where

FIG. 3 [Courtesy of Dr. Jorge Orbay] The plate can and should be used as a reduction template. In other words, one can mold the comminuted fragments against the plate.

they need them most.

- It is helpful to release the brachioradialis tendon insertion
- Obtain the maximal anatomic reduction possible.
- Reduce & fix the radial column first, followed by the volar piece, followed by the other pieces.
- If there is residual radial translation of the distal piece, use a gelpi or a lamina spreader to place distraction between the radial and ulnar shafts to reduce it.
- Use the plate as a reduction template. *(Fig. 3)* Once the optimal reduction is obtained, do not remove your finger pressure from the dorsal comminuted pieces until at least two distal locking screws are placed.
- Arthroscopy may be helpful in visualizing fracture reduction.
- Place screws in correct direction and length.
- When checking the reduction/fixation with a fluoroscan, use a slope view instead of a straight lateral view to see the articular surfaces better.

Authors' tips in treating DRFxs with high energy comminution

- A CT scan with 3D reconstruction might help if orientation of bony fragments is in question.
- If the fracture is too comminuted for adequate reduction and/or fixation, consider using a bridge plate or an external fixator. An external fixator can be used with a volar plate if necessary. *(Fig. 4)*
- Make sure there is no undue distraction at the radiocarpal and intercarpal joints when using an external fixator. In other words, ligamentotaxis can be used as an initial reduction method, but other methods such as K-wires or a plate need to be added. The amount of distraction needs to be reduced to none.

Distal Radius Fractures with Concomitant Injuries

About 50% of DRFxs have involvement of the radiocarpal and/or distal radioulnar joint (DRUJ). One needs to look not only at the fractured bone, but also at the other carpal bones, intercarpal ligaments, radiocarpal joints, and DRUJ, and treat accordingly.

Distal Radius Fractures With Ulnar Styloid Fracture and/or DRUJ Instability

The benefit of fixing the ulnar styloid during open treatment of DRFxs is controversial. There are reports showing no significant difference between patients with an unrepaired fracture of the ulnar styloid base and patients without ulnar fracture. Other reports describe cases that later develop DRUJ instability and ulnar sided wrist pain if the ulnar styloid was not repaired, even in some cases where no instability was present at the time of surgery.

The authors check for the presence of DRUJ instability after DRFx fixation by shucking the

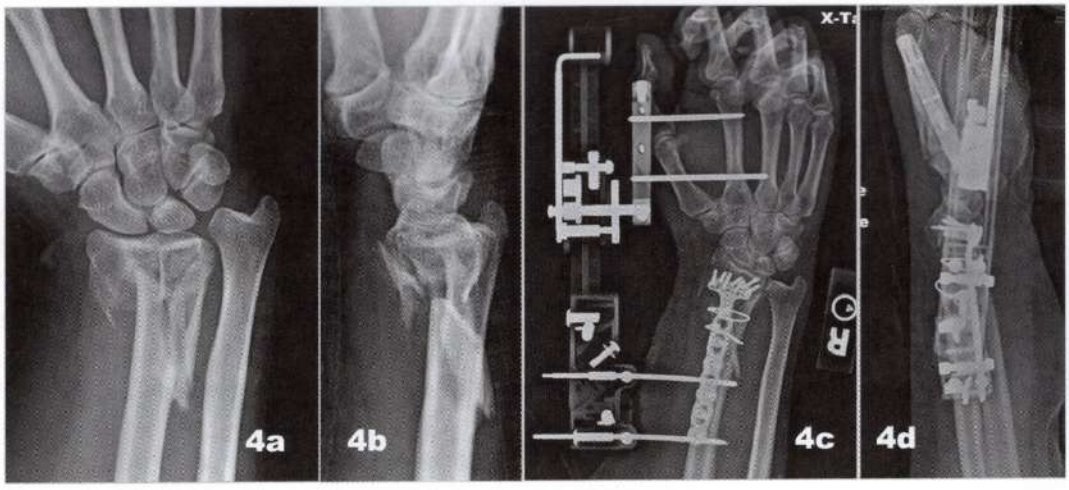

FIG. 4 An example of a high energy comminuted fracture and utilization of different techniques – in this case, a locking volar plate, circlage wires, and an external fixator - to obtain enough rigid fixation to facilitate early finger motions and forearm pronosupination.

DRUJ in different pronosupinated forearm positions and with the DRUJ pivot shift test. We internally fix (usually with a headless screw) *(Fig. 5)* – ulnar styloid fractures or repair the triangular fibrocartilage complex (TFCC) at its ulnar insertion site. In rare cases where DRUJ instability persists despite these treatments, we transfix the ulnar shaft to that of the radius with two 2.0 mm Steinman pins with the forearm in supination.

Post Locking Volar Plate Rehabilitation

Lozano-Calderón et.al.[5] recently concluded that the initiation of wrist exercises six weeks after volar plate fixation of a DRFx does not lead to decreased wrist motion compared with the initiation of wrist motion within two weeks after surgery.

Authors' tips on rehabilitation after an ORIF with a locking volar plate

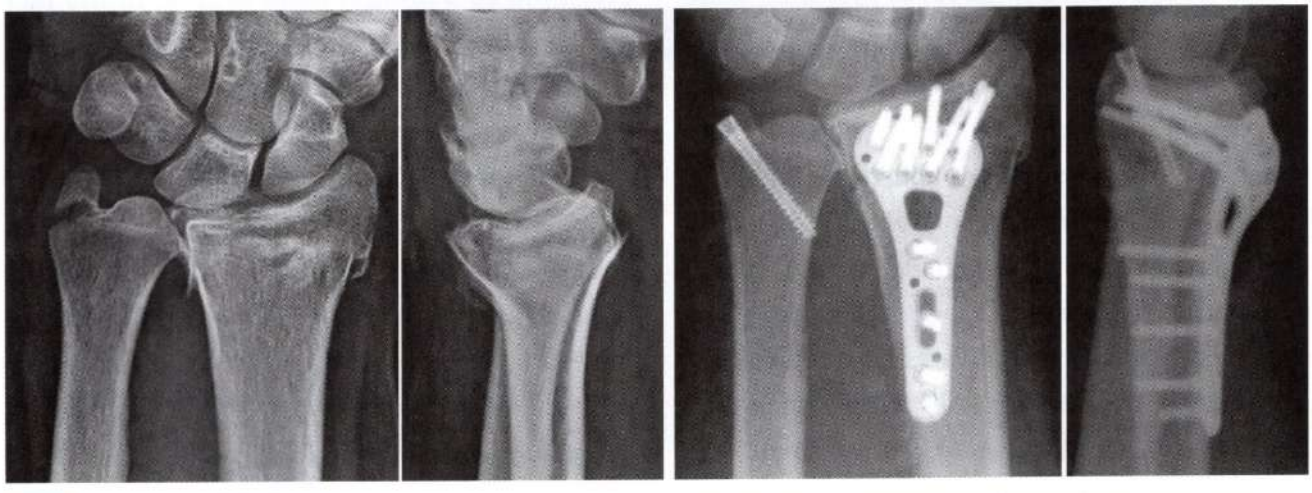

FIG. 5 If the DRUJ remains unstable after ORIF of the distal radius fracture, the ulnar styloid fracture should be fixed (here with a headless screw) or the TFC complex should be repaired at its ulnar insertion site.

- Immobilize the wrist in a plaster volar splint at the end of surgery.
- Convert to a prefabricated, removable cock-up splint after suture removal at 2 weeks.
- Gentle motion at the wrist and forearm out of the splint is encouraged.
- Teach how to begin aggressive active and passive motion exercises of all finger and thumb joints from the first post-op day.

More tips by the author

- Do not miss the opportunity to treat possible causes of the DRFxs. For elderly patients, communicate with their primary physician for proper evaluation and management of osteoporosis.

Please note that complications of different treatments are not discussed because of space limitation.

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SECTION iv Congenital, Dupuytren's Contracture, Infection

Congenital Limb Anomalies

10 CHAPTER

Scott N Oishi, Marybeth Ezaki

The problem

The child born with a noticeable anomaly has been the focus of enormous natural curiosity throughout recorded history.[1] These special children have been regarded as monsters in many societies, and as gods or goddesses in others. Cultural and religious views determine whether these children are accepted or reviled.

Whereas in the past these children were hidden away from the public, today children with special needs are included in schools, and supported with reasonable adaptations and focused therapy services mandated by the laws of many countries. Happily, today the birth of a child with a limb anomaly in the United States and developed nations is seen not as a curse, but as a condition that has a natural explanation. Most children with congenital upper limb anomalies have normal cognitive function, and therefore, have the potential to both understand and overcome their differences and to be productive members of our communities. Our society has come to accept these children, to recognize their needs, and to celebrate their successes. *(Fig. 1).*

Congenital anomalies of the upper limb present enormous challenges for the child, the parents, the family and the professionals caring for the child. In addition to the clinical findings that define and characterize the abnormal morphology of the upper limb, important aspects of evaluation and treatment must be directed to the identification of associated syndromes and anomalies, and the emotional and educational support of the parents and family. Later issues that must be addressed include all the adaptations that contribute to functional independ-

FIG. 1 Young man with a unilateral brachydactyly/oligodactyly participating at the highest level of team sports. As a pitcher, he modified his mitt and catching technique. Recognizing and supporting the talents of all young people benefits us all. (with permission Texas Scottish Rite Hospital for Children, Dallas, TX).

ence, an intact self-esteem, and psychological health for the child herself.

The problem that we, as hand surgeons, are faced with is how to best use our skills and knowledge to enhance the ability of any given patient to function in society. How can we know and do what is the best for the child.

The solution

Establishing an accurate and complete diagnosis is a team effort. Most of these small patients are treated at referral centers where expert care is available for the whole child. A network of dedicated pediatric orthopaedic hospitals was established by numerous benevolent organizations in the United States, initially to provide free care to the children crippled by poliomyelitis in the last century. Today, the Shriners Hospitals, the Scottish Rite Hospital for Children, and others with the same mission, continue to provide this care for children with orthopaedic needs. The upper limb surgeons from these hospitals have organized meetings for the collegial exchange of information as well as informal networking and referral of complex patients. Numerous publications have come from these collaborations.[2].

The Hand Surgeon must be aware of the potential for associated anomalies and may be the one to initiate the appropriate referrals. With the hand surgeon should reside the knowledge to know what to look for, especially as education in the primary care specialties devotes little or no time to most of these obscure conditions.

Help must also be made available to educate and support the parents in the critical bonding with their infant, especially if the diagnosis of the congenital anomaly was not made before birth. Divorce is a very common response to the birth of a child with a congenital limb anomaly because of the added stress on the marriage. The child herself will experience a normal grieving process when she is old enough to understand the full impact of having a limb anomaly. Family and caregiver support systems must be robust to nurture a child through these transition periods with a valued sense of self.

Care of the child with a congenital anomaly is complex and rewarding, and must be long term and ongoing. Enabling a child to interface with the environment and become more independent must be the goal of any treatment. The guiding principle of "To-For" in deciding whether an operation is indicated, recognizes that there are many things that we can do "To" the child, but we must make sure that what we do is truly

FIG. 2 Radiograph of a forearm showing vascular clips from a free gracilis transfer for finger flexion, despite the lack of wrist stability and passive motion of the fingers. A technically demanding and expensive procedure done "to" this patient resulted in worsening of her deformity and no improvement of function. This result is disappointment, depression, and mistrust of physicians extending beyond those who did the procedure (with permission Texas Scottish Rite Hospital for Children, Dallas, TX).

"For" the child. *(Fig.2)*

Amazing advances in surgical technique have added immensely to our ability to reconstruct and improve the lives of our patients. The judgment to know which child will benefit from microsurgical free toe transfers, or from the application of limb lengthening techniques is more difficult to learn.[3] Where is the evidence? Primum non nocere

Children with congenital anomalies of all sorts will continue to be born as the result of genetic mutation, or genomic variation, epigenic effects, and teratogenic causes. Advances are being made, at an ever increasing rate, that define the basic science of the causes of congenital anomalies. The understanding of molecular mechanisms of causation may someday lead to the ability to prevent or alter final outcomes for children – but in the distant future. Not all of these anomalies will be predicted or prevented. We must continue to ask questions and ensure that our communities support research in the areas of congenital anomalies. We must, likewise, work toward ensuring a clean and healthy environment for the children of our children.

We must also recognize and fight the discrimination that comes from ignorance and ill-focused blame and guilt. Innocent curiosity that changes into schoolyard teasing, can easily change into deeply wounding harassment if we do not address current societal values about limb malformations. Because of our unique role in the lives of these children, we are able to ask the questions that will uncover these problems. "Does your hand ever make you sad?" "Who is your best friend?" "Draw a picture of yourself." Early intervention with psychological support and peer groups is more critical than any surgical procedure we can do. Social networking is an important aspect of support for our patients. In the United States camps, retreats, websites, handouts, and peer support offer enormous benefits for the children and the families, with equal feedback and immense per-

sonal reward for the surgeon who chooses to become involved in these efforts. *(Fig. 3)*

As hand surgeons, we must perform a critical analysis of our own results and honestly report them so that we can move the science and care of the children forward. Congenital hand anomalies are unusual and our natural curiosity makes us eager to try a procedure that has appeared in the textbook. Long term follow-up and outcomes assessment of how we impact Quality of Life are much more important than short term measures of pinch and grip, and must become an integral part of what we do.

Many hand surgeons – too many to name - have contributed to the knowledge we have about congenital anomalies. National and international meetings provide opportunities to exchange information and updates. At these meetings, the name of the nation is "Science," a land with no borders, and our anthem must be "For the Children." Translational research that brings clinicians and basic scientists together will greatly expand our knowledge in this century. Rapid exchange of information and electronic consultation benefit us as well as our patients.

The future is bright for the field of congenital hand surgery. We must constantly remember to put the best interest of our patients first, and to follow and support them to the other side of their childhood.

FIG. 3 Girl attending a social camp organized by a parent support group. Note her "self-portrait" showing her perception of her hand, and the smile on her face. Social Networking is an important part of the continuum of care we can provide for our patients. It requires emotional and financial support, but the results can be transforming for the child and the family, and the rewards immense (with permission Texas Scottish Rite Hospital for Children, Dallas, TX).

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SECTION iv Congenital, Dupuytren's Contracture, Infection

Congenital hand differences in Japan

11 CHAPTER

Toshihiko Ogino

Classification of Congenital Hand Differences

In 1968, Swanson AB reported a new classification system, which was partially based on the embryology and it was adapted by the IFSSH and is now widely used in the world. On the other hand, a common clinical feature between osseous syndactyly and cleft hand was pointed out in Japan by Marumo, E et al: Jikei University (1974), Miura T et al: Nagoya University (1975), and Egawa, T et al: Osaka University (1975). The common clinical feature between central polydactyly and cleft hand was pointed out by Ogino T et al: Hokkaido University (1977) and Watari, S et al: Hiroshima University (1977).

In 1937, Műller W suggested a teratogenic spectrum of symbrachydactyly ranging from a hand with brachymesophalangy to a hand with no digital rays. In 1971, Blauth and Gekeler reported a process in which deficiency of the middle phalanges in the central finger rays developed to form a symbrachydactyly. Ietsune, T: Jikei University (1974), Yamauchi, Y et al: Juntendo University (1975), and Ogino et al: Hokkaido University (1978) analyzed clinical features of symbrachydactyly and reported that as hypoplasia of the bone developed gradually to the proximal part in the same mechanism of formation of symbrachydactyly, it eventually formed atypical cleft hand or transverse deficiency and supported the concept of symbrachydactyly proposed by Műller, W (1937).

Based on these results, several investigators pointed out the problems of this classification system. One was classification of symbrachy-

dactyly and another one was that of cleft hand that is called central deficiency in that classification (Ogino, T et al: 1978). The congenital hand committee of the Japanese Society for Surgery of the Hand (JSSH), chaired by Tsuge, K: Hiroshima University, discussed about these problems for 3 years and in 1980 it reported that cleft hand should be classified into Category 2: Failure of differentiation of parts, and symbrachydactyly should be classified into Category 5: Undergrowth. The suggestion seemed reasonable and unique, but it was not widely used, because the committee did not modify the classification. In 1986, based on the clinical and experimental studies using animal models, Ogino, T et al reported a modified IFSSH classification, in which cleft hand, syndactyly and central polydactyly are classified into new category 4: Abnormal induction of finger rays, and symbrachydactyly including typical short webbed finger to transverse deficiency is classified as transverse deficiency in Category 1: Failure of formation of parts. In 1996, this modified classification was adapted as the JSSH modification of the IFSSH classification.

Treatment: Description of surgical improvement in common anomalies

Thumb polydactyly: Iwasawa et al: Shinshu University (1989) reported preoperative correction of the deviation of the thumb polydactyly by using splint and taping. They did not need to correct the deviation surgically and obtained good results after surgery. Tada, K et al: Osaka University (1983) reported shaving of the articular cartilage to correct the deviation of the interphalangeal or metacarpophalangeal joint of a preserved digit in thumb polydactyly and obtained satisfactory results. They assessed the results of surgical treatment by a scoring system that they devised to enable them to assign points for the range of motion and stability of the joint and alignment of the affected thumb, as well as to determine an over-all score for each thumb. This scoring system was widely used for evaluating the results of thumb polydactyly surgery.

Hypoplastic thumb: Treatment of hypoplastic thumb is different in each grade of Blauth's classification. For grade 3-hypoplastic thumb, pollicization is usually indicated, but several attempts have been made to preserve five digit hands. Yabe, Y: Keio University (1973) reported the reconstruction of the floating thumb by using abdominal flap and free metatarsal head transfer for creating a new carpometacarpal joint combined with muscle and tendon transfer. Free vascularized second toe joint autograft was used for reconstruction of the carpometacarpal joint of Blauth grade 3 hypoplastic thumb by Yamauchi, Y (1979). These procedures have been modified by Nishijima, N et al: Kyoto University (1995) and Shibata et al: Niigata University (1998) and satisfactory results have been reported.

Congenital radioulnar synostosis: A characteristic clinical feature in congenital radioulnar synostosis is ankylosis of the forearm in pronated position. Custom and culture influence the best position of the forearm for the patient. In Europe and America, people use knives and forks for eating, and do not need full supination of the forearm to do thus. However, in Japan, people use chopsticks with the dominant hand, and it is good manner to hold the rice bowl with the non-dominant hand: for this, the palm of the non-dominant hand must be fully supinated (Fig 1). There are two different methods for treatment of this condition. One is corrective rotation osteotomy of the forearm bones and the other is arthroplasty or mobilization procedure of the proximal radioulnar joint. Hikino, K et al (1987) reported corrective osteotomy

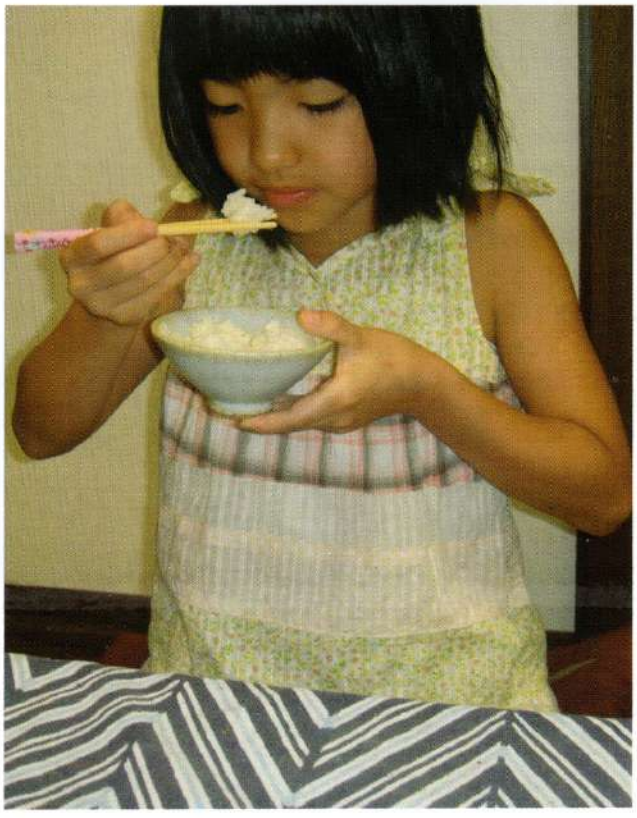

FIG. 1 People use chopsticks with the dominant hand. It is good manner to hold the rice bowl with the non-dominant hand: for this, the palm of the non-dominant hand must be fully supinated as shown in this figure.

at the fusion mass between the ulna and radius. Kanauchi, Y et al: Yamagata University (2004) and Fujimoto, M et al: Hokkaido University (2005) reported corrective osteotomy of the radius at the insertion of the pronator teres. They reported satisfactory results without postoperative complications. On the other hand, Yabe, Y (1971) developed an arthroplasty of this joint by using anconeus muscle flap, but reunion of the radius and the ulna often occurred. Kanaya, F et al: Ryukyus University (1998) developed the same kind of procedures by using a free vascularized fascio-fat graft instead of the muscle. They performed osteotomy of the radius in order to reduce the dislocated radial head and reported good results after surgery. Osteotomy of the radius is essential to prevent dislocation of the radial head and to achieve forearm rotation. They used the profunda humeri vessels serving as the donor vessels as for a lateral arm flap and they anastomosed them with the recurrent radial (recipient) vessels. The procedure has been modified to use a vascularized pedicle fat graft instead of free fat graft.

Macrodactyly: As for treatment of macrodactyly, Barsky's two-staged procedure is well known. In his procedure, the redundant palmar skin is removed at a second stage surgery. Tsuge, K (1967) modified his procedure and made the redundant skin dorsally and removed it at a second stage surgery. Hoshi et al: Niigata University (1973) reported a single stage digital reduction procedure. He removed the convex side and distal end of the excessive skin, nail and subcutaneous tissue. He removed the distal interphalangeal joint and fused the joint. The enlarged digital nerve was removed in a modified Hoshi's procedure.

Brachydactyly: Brachydactyly is caused by brachytelephalangy, brachymesophalangy, brachybasophalangy and/or brachymetacarpia. Various digital lengthening procedures have been attempted, such as callotasis, lengthening with external fixator combined with bone graft and single stage lengthening with bone graft. Mostly these procedures have been performed though a dorsal approach which results in a dorsal operative scar of the hand. Since surgery is indicated mainly because of esthetic reasons, the dorsal scar of the hand should be avoided. In order to prevent a dorsal operative scar, Saito, H: Niigata University (1983) developed a palmar approach for single stage lengthening of the metacarpal bone using iliac bone graft. The cosmetic results after palmar approach were better than the dorsal approach.

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SECTION iv Congenital, Dupuytren's Contracture, Infection

Dupuytren's Contracture

12 CHAPTER

James R Urbaniak, Richard D Goldner

Introduction

Although the condition had been previously described by others (Cline 1777 and Cooper 1822), the Baron Guillaume Dupuytren of France was the first to present a thorough description of the anatomy, etiology and treatment of the diseased palmar aponeurosis.[1] Dupuytren's Disease is currently a more acceptable term than Dupuytren's Contracture as the entity often involves connective tissues other than those that cause digital contractures.

Dupuytren's disease is a progressive connective tissue disorder in which the palmar and/or digital fascia undergo fibroplasia which leads to slowly developing contractures of the digits. It is primarily a disease of the fascia with the palm almost always being involved, and it is more common in the ring and little fingers *(Fig. 1)*. It is bilateral in 65% of patients and if the disease is unilateral it is more often involves the right hand.

The occurrence of the disease is higher in males than females (10 to 1) and is more common in Scandinavia, northern Europe, Great Britain, Ireland, Scotland, Australia, Canada and the United States. There is a strong genetic component for the disease which appears to be autosomal dominant. It usually appears between the ages of 40 to 60 years. A higher incidence is associated with alcoholism, epilepsy, diabetes and vascular disorders. The role of trauma remains controversial.

A clear etiology of the disease remains controversial. Various growth or stimulating factors probably initiate proliferation of the fibroblasts in the palmar fascia. The myofibroblasts (spe-

cialized contractile fibroblasts thought to be perivascular in origin) can actively contract and contribute to the development of pathologic cords which have an increased deposition of type III collagen.[2] The process may be initiated by hypoxia. The progression of the contractures is slow and most commonly involves earlier contractures of the MCP joint, followed by the PIP joint.

Since the disease is not life-threatening, there are no absolute indications for invasive therapy. Treatment is indicated when the deformities cause impairment of normal dexterity for activities of daily life or an awkward appearance for the patient. Surgical treatment is generally considered when the MCP joints develop a contracture of 30° and the PIP a progressive contracture of 15°. The prognosis for release of the MCP joints is better than for the PIP joints. Of most importance is to carefully manage the patient's expectations. The patient must understand that the reoccurrence rate may be as high as 50% by any method of treatment and there is no cure.

Choices of Treatment

The treatment of the disease must consider the age of the patient, severity and progression of the disease, state of the skin and patient's activities at work and play. There is no strong reproducible scientific evidence of the value of splinting, stretching, oral medications such as allopurinal, Vitamin E, steroid injections or radiation therapy are of any significant benefit although steroid injections may soften the nodules.

A variety of surgical options are available: limited or complete fasciectomy, percutaneous fasciotomy with scalpel or needle, enzymatic fasciotomy with collagenase, dermatofasciectomy, and the McCash open partial fasciectomy.

FIG. 1 Typical Dupuytren's contracture of digit.

The severe contracture may be partially corrected by a Digit Widget©[3] prior to one of the selected procedures *(Fig. 2 and Chapter 13)*.

Total fasciectomy was essentially abandoned in the 1950's as the complication rate was too high. Limited or partial fasciectomy is the most universal type of surgery. The skin incisions may be zigzag (Bruner), straight midline with "z"plasty closure, multiple transverse incisions or any combination of these. Only diseased tissue is removed and healthy fascia is left intact. The decision must be made on correcting the PIP contracture by releasing the checkrein ligaments, accessory and proper collateral ligaments and volar capsule in that order. Some surgeons argue that the least releases performed the better the outcome and active range of motion.

The recurrence rates for limited fasciectomy range from 46% to 71% with follow-up of 5 to 10 years.[4,5] The complications are low with digital nerve and vessel transaction being less than three percent and wound healing may be occasionally delayed.

The open palm technique of McCash *(Fig. 3)* has no risk of hematoma and affords complete relaxation of the palm while the MCP joints are held in extension.[6] Repeated dressing changes

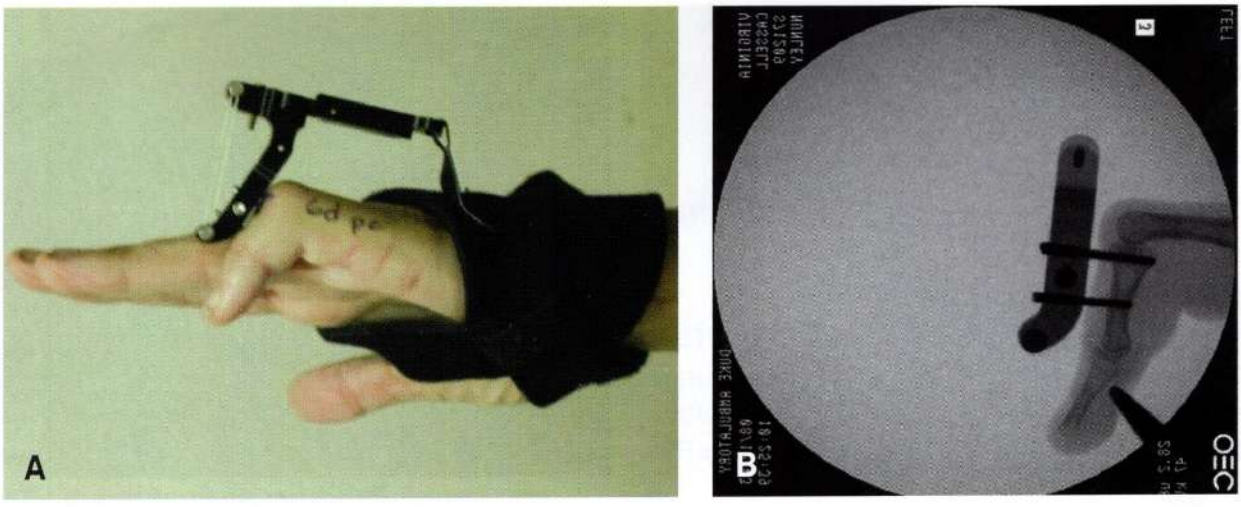

FIG. 2 **A.** Agee Digit Widgit© applied to correct some of the severe digital contracture in preparation for open partial fasciectomy. **B.** Two small screws in middle phalanx to secure extender.

are necessary and the wounds take four to six weeks to heal, but the recurrence rate is low.

Dermatofasciotomy as advocated by Hueston[7] involves removal of the diseased fascia and overlying skin with coverage by full thickness skin grafts. This procedure has a low rate of recurrence, but is probably best reserved for recurrences and severe contractures in the young patient (Dupuytren's diasthesis).

In the past decade percutaneous fasciotomies have become universally popular. Luck introduced subcutaneous fasciotomy for release of contracted narrow cords in 1959.[8] There has been a resurgence of this limited technique with modifications by using a hypodermic needle or collagenase.

Lermusieux and Badois, French rheumatologists in Paris, introduced needle aponeurot-

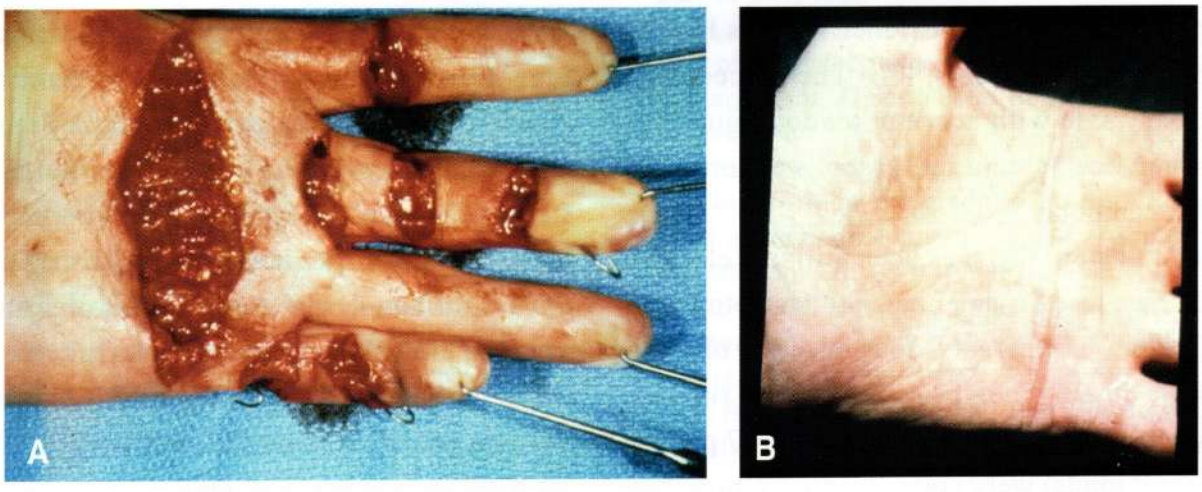

FIG. 3 **A.** The open palm technique of McCash. The digital incisions are closed with interrupted skin sutures, and the palm would is allowed to heal secondarily. **B.** The healed wound after six weeks of dressing changes.

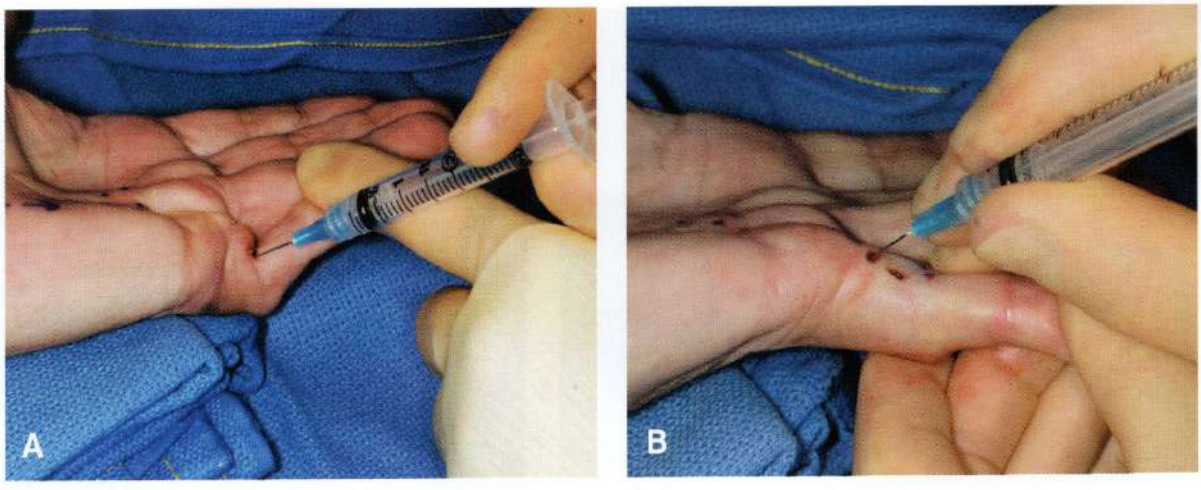

FIG. 4 Percutaneous needle fasciotomy of PIP joint. **A.** Local anesthetic injected. (RDG). **B.** Digit passively extended after needle fasciotomy. (RDG)

omy (NA) in 1993.[9] The procedure has gained popularity in the United States via the teaching of Charles Eaton of Jupiter, Florida. The procedure includes preoperative planning with Doppler scanning of the vessels, local skin injection, and percutaneous fasciotomy with a 25 gauge hyperdermic needle. *(Fig. 4)* The fingers are passively extended to complete the release.

Percutaneous needle aponeuroromy provides the best results in correction of the MCP joints and lesser in the PIP joints. The correction of the digital contractures are reported as high as 70 percent but with recurrence rates as high as 65 percent at five years.[9,10,11] The procedure is relatively safe with nerve or tendon injuries in less than one percent by surgeons experienced in the technique.

Hurst in New York has been utilizing clostridial collagenase for an enzymatic fasciotomy for ten years.[12] The percutaneous injection of collagenease directly into the cord lyses and ruptures collagen. Hurst's latest report reveals 87 percent (54 of 62 joints) were corrected to a contracture of 5 degrees or less. Recurrence occurred in only five joints at two years follow-up. The most frequently adverse effect is a transient mild inflammatory reaction to the injection. Tendon ruptures are rare.

Both of these percutaneous methods have a potential for a high complication rate in the hands of untrained and inexperienced physicians. However their popularity is increasing and may eventually become the procedure of choice. In the severe recurrent cases, rarely are arthrodesis, implant arthroplasty or amputation indicated.

Author's Preferred Treatment (JRU)

For four decades I have preferred limited fasciectomy through an open technique with multiple zigzag incisions in the palm and digit. Preoperatively I determined the vascular and sensibility state of the involved digits and perform most of the dissection on the side of the diminished nerve of vascular supply – if it exists. This precautionary plan protects the normal side. Only the diseased fascia is excised with the excision initiated in the proximal palm. This step usually allows for some extension of the digits to make the digital approaches easier. The vessels and nerves are clearly identified and protected. *(Fig. 5)*

If the PIP joints cannot be fully extended after

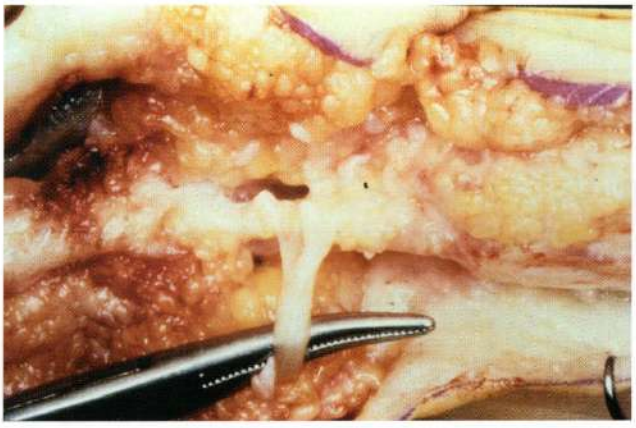

FIG. 5 The digital nerve may be displaced by the diseased fascial cord. The hemostat is beneath the fascial cord which is looped over the digital nerve.

fasciectomy, I proceed with checkrein, accessory collateral ligaments, proper collateral ligaments, and volar capsular release in that order, until the digit can be fully extended.

Total hemostasis is obtained, the wounds are closed, sometimes with a V-Y plasty, over a suction drain which is removed before the patient is discharged from the out-patient surgical unit. The MCPs are splinted in 20 degrees of flexion and the PIPs fully extended. An extension splint is worn at night for two months.

I explain to the patient that some recurrence is expected but I have reoperated on less than two percent of my patients.

Summary

Dupuytren's disease is a condition characterized by diseased fascia which results in contractures of the digits, especially the ring and small fingers. It is far more common in males than females. There is no cure for the disease. There are no established nonoperative methods of treatment. Surgical intervention can correct the contractures and improve hand function. The recurrence rate is high by any method, which ranges from percutaneous methods, small incisions to large open methods of limited fasciectomy. The outcomes are often related to the skill and experience of the surgeon more than the particular technique.

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SECTION iv Congenital, Dupuytren's Contracture, Infection

Biological Corrrection of Severe Dupuytren's Contracture of the Proximal Interphalangeal Joint by an External Fixator system

13 CHAPTER

Duncan Angus McGrouther, John White

Introduction

The severely contracted PIP joint in Dupuytren's Disease remains a technical challenge[1], and it is difficult to predict the outcome of fascial release or excision alone. The joint, may be held by several cords, contracted checkrein ligaments and scar contracture. In recurrent disease there may also be shortening of the nerve and arteries due to fibrosis, making surgical release by fasciectomy difficult.

Messina employed an innovative technique of skeletal traction with an external fixation device to correct PIP joint contracture and followed this by surgical fascial excision[2]. The mechanism of this phenomenon has been demonstrated by traction experiments[3] on Dupuytren's tissue in vitro where constant tension switched on MMP2 and 9 expression thus achieving biological remodelling of the fascia, rather than just a physical stretch.

The main drawback of traction techniques has been the cumbersome nature of the external fixation apparatus when applying traction across MP and PIP joints. Techniques applied to the PIP joint alone may use devices which protrude laterally from the digits making application to central digits difficult. The S Quattro system[4] attaches to each phalanx with a single pin and requires ratchet tightening of the fixator in stages thus applying different tension at different time points. The ideal requirements for an external fixator system would be to

1. Attach firmly to proximal and middle phalanges- we have employed a 2 pin system to correct only the PIP joint.
2. Apply traction in the axis of flexion without

angulation or torque and avoid impingement on adjacent digits. We have placed pins in the dorsal midline.

3. Apply constant traction while allowing joint motion to preserve cartilage health- we have used rubber band traction.

The fixator allows the treated digit to move throughout the possible range of PIP motion while applying a continuous extension force, Because of its size and position on the dorsum of the digit *(Fig.1)* it can be employed on any digit.

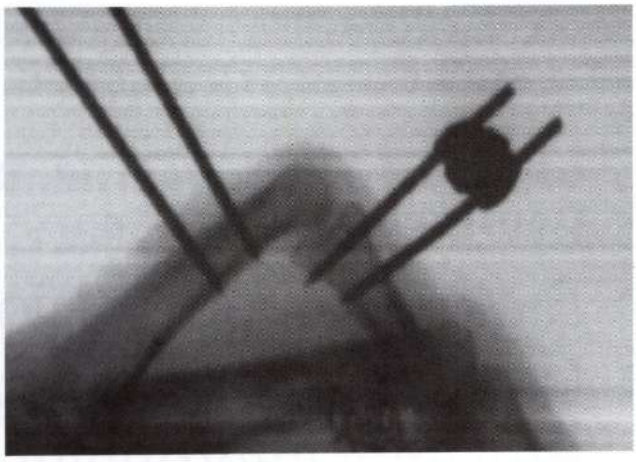

FIG. 1 Pin insertion under fluoroscopy guidance.

Patients

We have used this technique over several years on recurrent PIP contractures and primary cases of severe contracture where we predict that surgical correction will be difficult. We present here a cohort of patients with documented follow up. Thirty-eight fingers in twenty-seven patients (three females) with severe Dupuytren's PIPJ contractures (>70°) were operated on(between December 1999 and October 2004) in two different centres (Royal Free and Oldchurch Hospitals, London). The mean patient age was 60.7 years (range, 29 -79 years), and all fingers were grade III/IV of Tubiana's classification. Digits affected were little 20, ring12, middle 5 and index 1. Five of the cases had multiple fingers that underwent the 2-stage procedure. Three patients had had previous surgery on the affected finger(s).

Technique

The first stage involved applying a mini external fixator under local anaesthesia and intraoperative image guidance *(Fig 1)*. Two 1.6mm diameter pins were placed in line in the midline of the dorsum of the proximal phalanx. A short midline split in the extensor apparatus allows gliding and preserves motion. The distal pins were placed in the triangular area of the middle phalanx between the lateral slips approximately 2mm from the articular surface. Elastic bands were used to adjust the tension across the joint such that the patient was just able to flex against the band resistance For the first three patients the tension was set to the maximum comfortable tension as determined by the patient. This was found not to allow active motion and correction of the deformity occurred rapidly, within two weeks. After these three patients an adjustment to the protocol was made. For the remaining patients tension was set to the maximum level at which active flexion of the joint remained possible. Twice weekly, the tension of the elastic bands was adjusted so that full active flexion of the PIPJ against the elastic bands could be achieved. This allowed for continuous correction over 3- 6 weeks as well as regular hand therapy to maintain joint mobility.

The second stage, four weeks after the external fixator was applied, involved limited palmar fasciectomy if required for the contracted bands restricting MCPJ movement and dermofasciectomy with full thickness skin grafting over the proximal phalanx for cords restricting

FIG. 2 Second stage; dermofasciectomy after 4 weeks.

PIPJ movement *(Fig2)*. The external fixator was kept in situ throughout and used to maintain correction until the graft had taken.

Results

At follow up (6 to 48 months, mean 21 months) the mean preoperative PIPJ deformity improved from 75° to 37° postoperatively. Based on Tubiana's evaluation of Dupuytren's contractures the result was categorised as excellent if less than 20° residual flexion deformity (14, 37%of digits), good if between 21°-40° (12,32%0, fair if between 41°-60° (7,18%)and poor (5,13%) if greater than 60°. From the results it can be seen that 69% had an excellent or good correction of their PIP joint contracture and there was a mean PIP joint deformity correction of 37.3°.

The overall rate of complications was 32% , with 8 pin track infections resolved by antibiotics,1 pin loosening, 1 recurrent contracture requiring arthrodesis, 1 complex regional pain syndrome and 1 PIP osteoarthritis attributed to excess application of rubber bands. CRPS in this series, in Citron and Messina's series[5], 9 of 13 cases developed complex regional pain syndrome (CRPS), which was attributed to the speed of their deformity correction. The lower incidence of CRPS in this series , may be due to the fixation permitting MP and PIP joint motion rather than continuous distraction, and is applied as the first of the two stages.

This study demonstrates that this two-stage procedure for severe or recurrent Dupuytren's contracture can be performed safely, with likely correction of the deformity. It can be performed for any digit, because of its size and position and is acceptable to patients. Any mini external fixator utilising 1.6mm pins and allowing 2 pins to be connected by a clamp can be used. This biological correction technique may be an adjunct for the hand surgeon to minimise the need for salvage procedures or amputation in severe or recurrent cases.

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SECTION iv Congenital, Dupuytren's Contracture, Infection

Chronic Tuberculous infections of the Hand and Wrist

14 CHAPTER

S Roohi Ahmad

History

Tuberculosis dates back to 8000 BC with fossils showing signs of its presence in the form of the gibbus of Pott's disease and to 3000BC in the mummified remains from Northern Egypt. Robert Koch revealed the bacteria responsible for tuberculosis a few years after he discovered the anthrax bacillus in 1882. Mortality rates from the infection were high prior to the advent of antituberculous chemotherapy, but since its introduction in the 1950's, both morbidity and mortality have been dramatically reduced. In the 20th Century, extra-pulmonary tuberculosis was on the decline especially in industrialised countries, however with the advent of the Human Immunodeficiency Virus (HIV), tuberculosis has made a comeback.

Epidemiology

Tuberculosis is the leading infectious cause of death in the world.[1] (90% of these cases are in non-industrialised countries) Re-emergence of tuberculosis in the developed countries may be attributed to:

- The HIV pandemic,
- Multi-drug resistant tuberculous strains,
- Emigration of an Asian population,
- Rampant intravenous drug abuse,
- An increasing homeless population,
- A susceptible western aging population,
- Increased exposure to healthcare workers,
- Decline in the implementation of anti-tuberculosis programmes.

South East Asia remains an area where orthopaedic surgeons are most likely to encounter cases of osteoarticular tuberculosis.[2]

Clinical Presentation

Tuberculosis cases maybe pulmonary (85-90%) or extra-pulmonary in nature (10-11% of which involves bones and joints forming 1-3% of all TB cases). About half of the musculoskeletal infections (50%) involve the spine, one third the long bones and major joints (pelvis, hip, femur, knee and tibia), 7% the ribs, and the rest (less than 10%) the smaller bones of the upper limb. Tuberculosis tenosynovitis of the hand forms less than 1% of skeletal tuberculosis as cited by Kotwal and Khan.[3]

Musculoskeletal tuberculosis can be divided into:

- Osteo-articular (arthritic) tuberculosis with synovial disease
- Tuberculous osteomyelitis (dactylitis) *(Fig. 1)*
- Soft tissue disease comprising synovitis / myositis / bursitis or "cold" abscesses.

The main presenting complaints are pain, swelling and stiffness, with discharging sinuses forming only 10% of the cases[3]. Low-grade fevers, malaise, lymphadenopathy, anorexia and weight loss may also be present. Patients usually have an indolent clinical presentation resulting in a delay in the diagnosis of up to 3 years, especially in developed countries where there is a low index of suspicion.

The initial presentation is one of diffuse swelling of the wrist due to either flexor *(Fig. 2)* or extensor tenosynovitis *(Fig. 3)*. This may be an acute inflammatory presentation *(Fig. 2)* or a more gradual onset with less inflammatory symptoms.

FIG. 1 Tuberculosis of the short tubular bones of the hands and feet is known as Spina ventosa (also called tuberculous dactylitis or TB of the Hand). Lytic lesions with a sclerotic rim and multiple layers of subperiosteal bone formation results in a spindle-shaped expansion. It is seen more in children below 5 years of age due to the abundant blood supply entering the middle of the phalanx via the nutrient artery where the inoculum first gets lodged.[3]

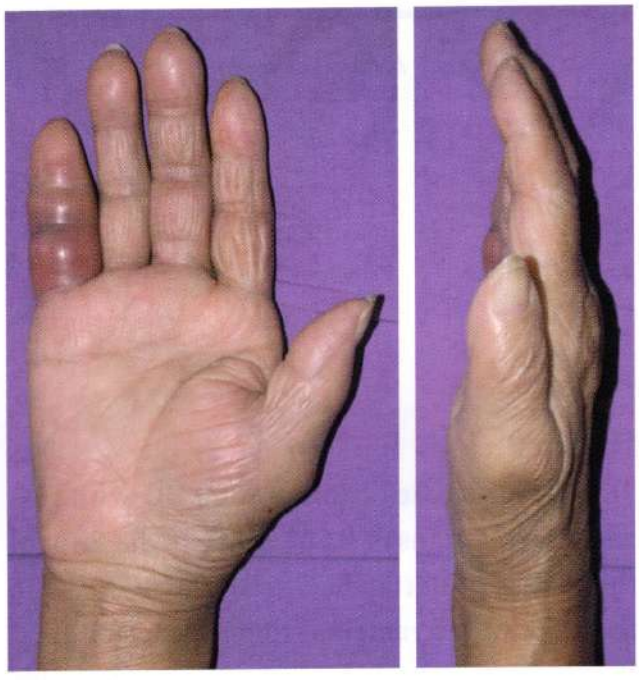

FIG. 2 AP and lateral views right wrist - of a 63 year old lady with a week's duration of pain followed by swelling of the right small finger and a 4 month history of volar wrist swelling. She had a good ROM of her wrist but pain on flexion of the small finger (SF). Although there were no radiographic changes in this patient, the Phemister triad of juxta-articular osteoporosis, marginal erosions and narrowing of joint space must be evaluated on plain X-Rays. She had no constitutional symptoms or contact history but there was a small pleural effusion in the horizontal pulmonary fissure of her rightright lung.

Classification

Tuli developed a classification system in osteoarticular TB which streamlines clinical and radiological presentation with treatment and prognosticates the disease *(Table 1)* [4].

FIG. 3 Chronic localised swelling of the extensor aspect of the right wrist.

Differential Diagnosis

Tuberculosis is known as the great mimicker. Thus it may simulate a variety of diseases but primarily neoplastic (both primary and metastatic lesions), infectious and degenerative processes should be considered. Although in an endemic population, it is the prime suspect and chemotherapy is usually started based on clinical presentation (chronic onset of synovial swelling, raised ESR, positive Mantoux test and suggestive radiographic evidence). In Western countries biochemical or histological confirmation is usually sought. This maybe in the form of a positive polymerase chain reaction (PCR), or the presence of acid-fast bacilli (AFB) and positive cultures (rarely positive and may take 6-8 weeks to identify).

Stages	Clinical features	Radiological findings	Effective Treatment	Outcome
Stage I Synovitis	Soft tissue swelling, 25% loss of motion	Soft tissue swelling, osteopenia	1. Chemotherapy, 2. ROM exercises, 3. splinting	Full ROM minimal residual deficit
Stage II Early arthritis	Soft tissue swelling, 25-50% loss of motion	Soft tissue swelling, Marginal joint erosions and diminution of joint space	1. Chemotherapy 2. ROM 3. +/- synovectomy	restoration of 50-75% ROM
Stage III Advanced arthritis	75% loss of motion	Marginal erosions, cysts, significant loss of joint space,	1. Chemotherapy 2. joint débridement 3. osteotomy 4. arthro-desis/plasty	May or may not have ROM Stable, painless joint after salvage
Stage IV Advanced arthritis	75% loss of motion Subluxation or dislocation	destruction of joint surface + subluxation or dislocation	1. Chemotherapy 2. joint débridement 3. osteotomy 4. arthro-desis/plasty	Stable, painless joint after salvage
Stage V Ankylosis	Ankylosis	Ankylosis	1. Chemotherapy 2. joint débridement 3. osteotomy 4. arthro-desis/plasty	Stable, painless joint

TABLE 1 Stages of osteoarticular tuberculosis (Tuli SM)

Treatment

Chemotherapy

Antituberculous chemotherapy is the mainstay of treatment and chemotherapy is approximately 90% effective in eradicating the disease, provided that patient compliance and appropriate drug combination is adhered to.[2] Although the combination may vary, first-line drugs, – namely Streptomycin, Isoniazide, Rifampicin and Pyrazinamide are bactericidal, while Ethambutol and Thiocetazone are bacteriostatic – are given for a duration of 4 months followed by another 8 months of Isoniazide and Rifampicin in soft tissue infections. In bony lesions, the treatment is usually continued for 18 months. Due to the toxic effects in higher doses, multi-drug therapy is the norm in treating TB allowing its continuation over a sufficient period. It also helps to take care of initial drug resistance and delay development of secondary resistance.[5]

Second-line or reserve drugs, - capreomycin and kanamycin are bactericidal whereas ethionamide, cycloserine and PAS are bacteriostatic. Generally they are reserve drugs because they are less effective than the first-line drugs and their toxicity is higher. Organisms also become rapidly resistant to them.[5] They are used when there is resistance to the first-line agents and in certain cases of tubercular abscess.[2] Atypical mycobacteria, especially M marinum, also responds to the second-line IV therapy (see below).

Physiotherapy

The joint involved as well as adjacent joints are put through a ROM to prevent stiffness and stretch out the ligaments. Splinting may be necessary to prevent contractures and also to reduce spasm, especially at night.

Surgery

Most cases fortunately respond to chemotherapy and only in approximately one in four cases is surgery recommended. There are definite indications for surgical intervention (both diagnostic and therapeutic) in TB of the hand. Preferably 2 to 4 weeks of anti-tuberculous chemotherapy should be initiated before any surgical intervention is undertaken to reduce the bacterial load.

Indications for Surgery:

DIAGNOSTIC

- For purposes of obtaining a histological diagnosis or a smear.
- When there is no response to anti-tuberculous chemotherapy after 6-8 weeks

THERAPEUTIC

- Synovectomy
- Drainage of abscess
- Carpal tunnel decompression
- Débridement / Curettage
- Osteotomy / Arthrodesis / Arthroplasty
- Relative indication
  - Failure of conservative treatment
    - heavy bacterial load
    - personal or occupational reasons.

Problems and Results

A number of factors affect a positive outcome. These could be due to either a diagnostic issue or if the diagnosis is correct, there is a poor clinical response to the chemotherapy due to either a problem with the patient, organism or the disease.

Diagnostic dilemmas

- Since the response to chemotherapy depends more on the duration of the lesion at presentation rather than its extent, any delay in diagnosis results in a less favourable outcome.
- The diagnosis may be wrong! Based on a high index of suspicion, therapy may have been started but it no actual infection was present and thus an erroneous diagnosis.

– It may be a different strain of Mycobacterium. M marinum is a common atypical organism presenting in 1-4% of cases.[5] In Peninsular Malaysia, where the country is surrounded on three sides by water and the fishing industry is a major income earner for those along the coastal areas, it is under diagnosed. M marinum does not respond to first line drugs, but will respond to intravenous administration of aminiglycosides and fluoroquinolones.

Non responders

– Non-compliance (patient)

Compliance is important due to the protracted duration of therapy. Careful close physician monitoring with the implementation of DOTS (Direct Observed Treatment Strategy) has improved compliance, improving cure rates of osteoarticular TB to 90%.[5,6]

– Heavy load (disease)

There are numerous reasons (both medical and surgical) where this could occur. Medically, in patients with an immunocompromised state (HIV, diabetics, those on onco-chemotherapy, radiotherapy) the bacterial load or replication rate may exceed the scope of the chemotherapy. Also in such patients, compliance may be an issue. Surgically, the bacterial load may be walled off in an abscess, sequestered in bone, in caseous material, or isolated in a continually discharging sinus. Sinuses should heal within 6-12 weeks after starting therapy, but all of these are better addressed by surgical drainage to allow the chemotherapeutic agents to then penetrate the abscess.

– Multidrug-resistance TB (organism)

Once the diagnosis is made and treatment initiated, rarely (1-3%) there maybe "primary treatment failure" where there is no improvement at all after institution of first-line chemotherapy, with proper compliance and physician monitoring. This is because of inherent resistance to the first-line drugs. Drug sensitivity testing (DST) is performed and second-line (reserve) therapy is instituted during the interim period.

On occasion initial improvement is followed by failure with the development of secondary resistance. If only one bactericidal agent was used, then inevitably resistance has developed to that drug and 3 other standard drugs should be continued for a period of 1 year after successful clinical response.[5] If two or more bactericidal drugs were used in standard therapy protocols, then the cause is either non-compliance or improper physician monitoring (or both) and new drugs plus or minus the reserve drugs should be initiated.

Successful outcome to therapy, followed by a "relapse" may be due to the late replication of organisms known as "persisters" which remain dormant during treatment and reactivate later. Relapse is particularly noted in caseous lesions. The good news is that the organisms are still sensitive to the first line drugs. These drugs (Isoniazide and Rifampicin) must be given for a longer duration to ensure elimination. Rifampicin is the only drug effective against persisters.[5]

Multidrug-resistance tuberculosis (MDR-TB)

MDR-TB is defined as a strain of M. tuberculosis which has developed resistance to Isoniazide and Rifampicin.[6] Resistance to one drug is in the range of 13%, while multidrug-resistance is encountered in 1-2% of cases.[2] MDR-TB should be suspected if disease activity isn't controlled after 4-6 months of uninterrupted standard drug therapy or if more lesions appear despite multidrug therapy. Other causes being excluded, 2nd-line drugs can be started. Since these are less potent and not as well tolerated, improper use can lead to non-compliance and further drug resistance. Most studies recommend a combination of five drugs to combat

FIG. 4 Clinical picture of left thumb showing sinuses on dorso-radial aspect with concomitant flexor synovitis. The x-ray shows destruction of the proximal phalnx head and subluxation of the MCP joint (Tuli stage IV).

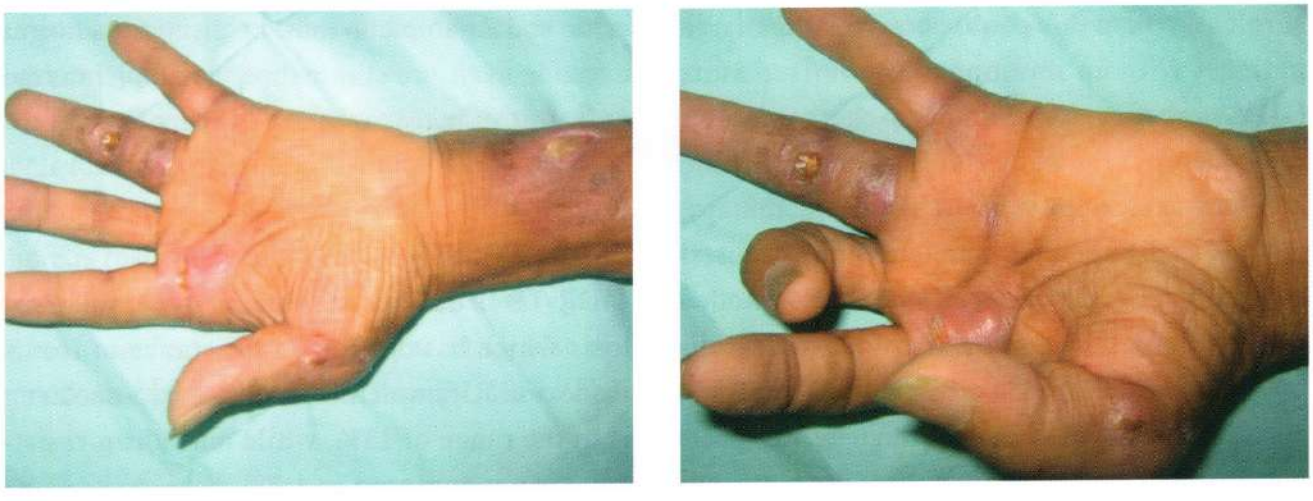

FIG. 5 Florid re-activation of the disease at multiple sites including the index, ring and small fingers with destruction / rupture of the flexors in the latter two.

MDR-TB.[6] Bearing in mind their poor potency and penetration, this allows us to fight the high bacillary content while reducing the toxic effect by reducing the dosages. In prescribing the 5 drugs, first-line agents are used whenever possible. An injectable agent (aminoglycoside or capreomycin) and a quinolone are usually included. A second-line bacteriostatic agent such as ethionamide and cycloserine are added as well.

FIG. 6 **A.** Surgical débridement was necessary (28th October 2005) with sample of the tissue taken. He was then started on the reserve drugs and improvement was gradually seen. **B.** Six months later, the sinuses and ulcers have healed and he had some functional recovery in the ring and small fingers as well.

Case Study

A patient presented to the hand clinic in April 2005 with a discharging sinus from the proximal phalanx of his left thumb *(Fig. 4)* of 1 years' duration. He was immediately admitted, baseline investigations done and started on 1st-line chemotherapy for 2 weeks. He was continued as an outpatient (respiratory clinic to monitor TB treatment) on a combination" regimen and DOTS for 3 monthsafter which he was seen in the hand clinic.

There was a florid spread of the disease with open discharging ulcers and re-activation of the sinuses *(Fig. 5)*. He was admitted and carefully re-assessed for compliance, atypical mycobacteria and drug resistance (using the liquid media system BACTEC). PCR was positive for MTB and BACTEC showed resistance to Rifampicin. He was placed on first (Isoniazide) and second-line drugs for 4 months with some resolution and it was decided to débride the remaining soft tissue and bony lesions. Positive results were seen as early as a month after surgery. In six months all the active lesions had dried up *(Fig.6)*.

Solutions

Implementation of the following factors will help in the treatment of MTB:

- Patient education, a high index of suspicion, and correct & timely intervention
- Re-diagnosing non-responders methodically.
  - PCR
  - Biopsy and culture
  - DST
  - Repeat ESR, Mantoux, CXR
  - Culture for atypical bacteria
- Improve compliance by
  - DOTS and providing incentives in terms of travel allowance or food vouchers.[6]
  - Developing better longer acting drugs with less toxicity
- Reduce "heavy load" issues
  - In HIV infection: longer treatment with careful monitoring
  - Immunomodulation to upgrade cell-mediated immunity (levamisol)
- Early surgical intervention in non-responders as a means of diagnosis and treatment
- Develop new drugs with more potency and

fewer side effects and also new techniques in immunomodulation.

– Develop new drugs that eradicate the dormant population of MTB organisms. This will reduce the incidence of active infection from the population who are latently infected with MTB (one third of the world population)! [7]

The genome of MTB has recently been elucidated. Identification of virulence genes will help develop specifically targeted chemotherapeutic agents.[7]

Mycobacterium tuberculosis is pandemic and waiting in the wings. Its resurgence has brought many new issues which can be carefully monitored and prevented. Practicing the above will help in management of problem cases and curtail it to some degree.

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SECTION v Microvascular Reconstruction

15 CHAPTER

Replantation

James R. Urbaniak

Perhaps replantation surgery has benefited more from contributions of hand surgeons located worldwide than any other clinical area of hand surgery. Although successful replantation was performed in research animals around the turn of the 20th century by Carrel in France and Hopfner in Germany, the clinical accomplishment of limb replantation was not realized until the 1960s. In 1962, Malt in Boston successfully replanted a completely amputated arm of a 12-year-old boy. Three years later Komatsu and Tamai of Japan reported the first successful replantation of an amputated digit. During the same year Zhong-Wei reported the successful replantation of an amputated digit in China. Over the next one or two decades microsurgeons from around the world began reporting viability rates greater than 80% in replantation of digits and hands. An abbreviated list of these surgeons include: Beimer in Germany, Foucher and Merle in France, Meyer in Switzerland, Ikuta and Tamai in Japan, Lendvay, O'Brien and Morrison in Australia, Tsai in Formosa, Pho in Singapore, Soucacos, Beris and Malizos in Greece, Godina and Stevanovic in Yugoslavia, Buncke, Kleinert, Kutz, Tupper and Urbaniak in the United States among many others.

Throughout the world replantation has been established as an effective method of reconstructing the upper limb that has sustained a complete or incomplete amputation. Universally most replantations are performed in centers with experienced microvascular teams and the essential equipment.

Preparation of the Amputated Part

Devascularized tissue will survive about 6 hours of warm ischemia. Since cooling diminishes the metabolic needs of the tissue, an amputated part may be successfully replanted 12 hours after severance if it is cooled. Because digits have no muscle tissue, proper cooling will allow successful restoration as long as 30 hours after amputation.

Two basic methods are used to preserve the amputated part: (1) immersion of the part in Ringer's lactate solution in a plastic bag and placement of the bag on ice, and (2) wrapping the part in a cloth moistened with Ringer's lactate solution and placement into a plastic bag on ice. Care must be taken to prevent freezing of the part. The vessels should not be ligated or perfused because intimal damage may result.

Selection of Patients

Good candidates for replantation are selected according to the following priorities:

(1) thumb *(Fig. 1A,B,C)*,
(2) multiple digits,
(3) palmar amputations *(Fig. 2A,B,C,D)*,
(4) most body parts in a child,
(5) wrist or forearm *(Fig. 3A,B,C)*,
(6) elbow or proximal (only if sharply severed),
(7) individual digit distal to the FDS insertion.

This listing is not a strict order of preference, however, and if other factors are favorable, replantation should be attempted.

Contraindications of replantation include:

(1) severely crushed or mangled parts,
(2) multiple-level amputations,
(3) amputations in patients with serious injuries or diseases,
(4) arteriosclerotic vessels,
(5) mentally unstable patients, and
(6) an individual finger in an adult proximal to the FDS insertions.

There are, however, social, ethnic, and religious beliefs which often vary in difference countries about the significance of the loss of an amputated part that influence the decision regarding replantation.

Surgical Technique

It is not within the scope of this chapter to detail the meticulous technique of replantation, and only the surgical sequence of events will be outlined. One member of the team takes the amputated part immediately to the operating theater to begin the debridement and dissection. Oth-

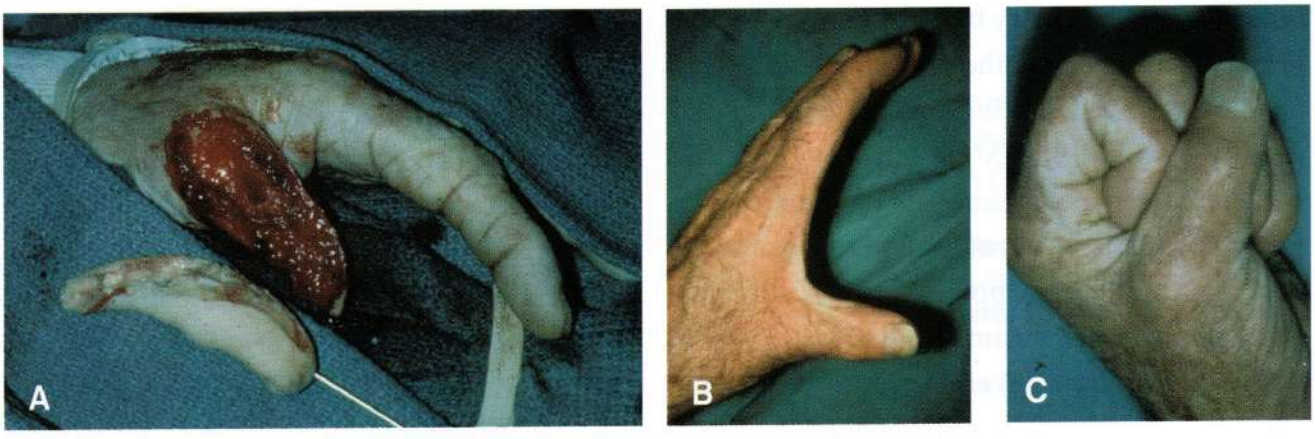

FIG. 1 **A.** Oblique amputation of thumb in a 66 year-old-male. Vein grafts were necessary for vascular repairs. **B. & C.** Postoperative results.

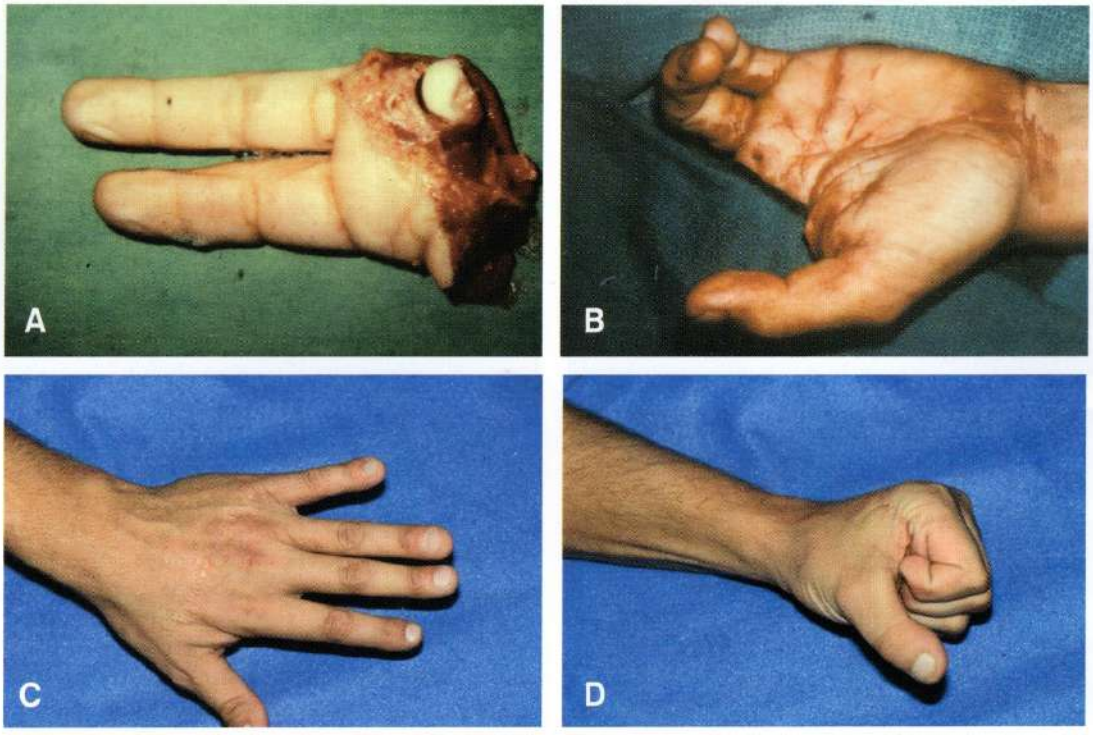

FIG. 2 **A. & B.** Complete amputation of index and long fingers through distal metacarpals. **C. & D.** Near normal range of motion was achieved in this young male who returned to work as a meat cutter.

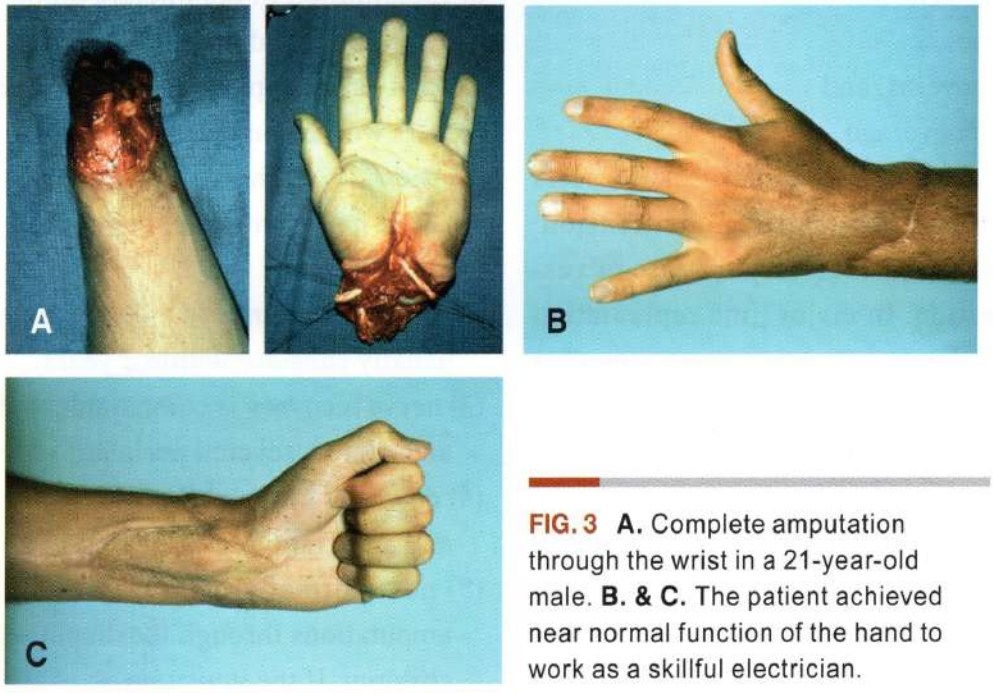

FIG. 3 **A.** Complete amputation through the wrist in a 21-year-old male. **B. & C.** The patient achieved near normal function of the hand to work as a skillful electrician.

er members of the team prepare the patient, and, when possible, the operation is performed under axillary block anesthesia.

The sequence of steps is as follows:

(1) isolate and tag the vessels and nerves,
(2) debride,
(3) shorten and stabilize the bone,
(4) repair extensor tendons,

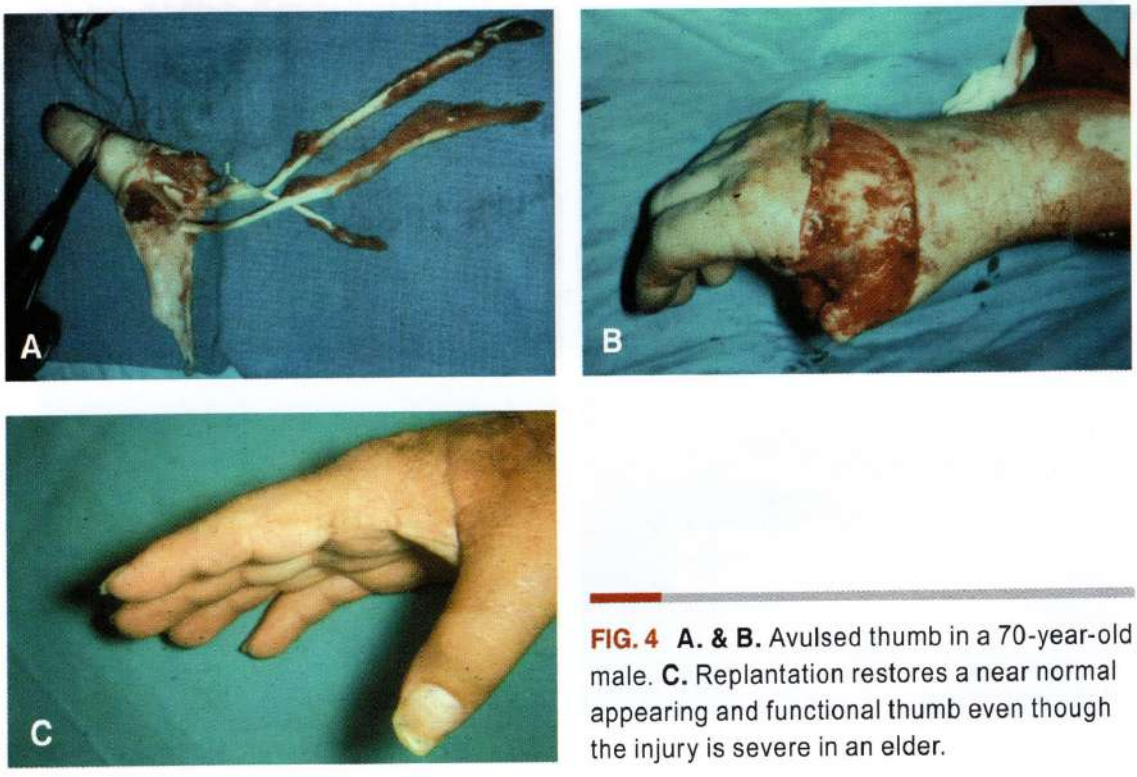

FIG. 4 **A. & B.** Avulsed thumb in a 70-year-old male. **C.** Replantation restores a near normal appearing and functional thumb even though the injury is severe in an elder.

(5) repair flexor tendons,
(6) anastomose arteries,
(7) repair nerves,
(8) anastomose veins, and
(9) obtain skin coverage.

None of the structures especially the vessels and nerves should be repaired under tension. Vein grafts are often necessary for ease of vessel approximation. In major limb replantation (proximal to the wrist), temporary vascular shunts of silicone tubes may be necessary initially to provide early revascularization of the amputated part.

Postoperative management includes the use of anticoagulants, vasodilators, a warm environment, and close monitoring of the perfusion of the replanted part.

Results

Many replantation centers can now achieve better than 90% viability rates in revascularizations of incomplete amputations and greater than 80% of replantation of completely amputated parts. The results based on our long-term follow-ups as well as the reports from major replantation centers worldwide reveal the following:

(1) the active range of joint motion should be about half of normal, depending on the level of injury,
(2) cold intolerance is a definite problem that usually subsides within 2 years,
(3) nerve recovery is comparable to the repair of an isolated, severed peripheral nerve,
(4) cosmetic acceptability is usually better than any amputation revision or prosthesis,
(5) near-normal growth may be anticipated in amputations through the diaphyseal region of children. If the injury involves the epiphyseal plate, growth will almost always be retarded, although excessive growth has been reported.
(6) our experience reveals that it is worthwhile to replant many severely avulsed parts, not just the guillotine-type of deletions *(Fig. 4A,B,C)*

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SECTION v Microvascular Reconstruction

Upper Extremity Vascular Disorders: Occlusive and Vasospastic Disease

16 CHAPTER

L. Andrew Koman

The incidence and prevalence of upper extremity vascular disorders, while less common than vascular problems in the lower extremity, heart, or brain comprise a significant and increasing societal burden. Aberrant vascular flow secondary to non-penetrating occlusive disease (aneurysm, thrombosis and embolism) is estimated to have a prevalence of 10 to 25 % of the population over 55 years of age and increases with age. It is highest in patients with diabetes mellitus, collagen vascular diseases, and dialysis-dependent renal failure. Significant cold intolerance or vasospastic disorders (eg. Raynaud's syndrome and phenomenon) impact negatively over 10% of the general population and 20-30% of pre-menopausal women. Vasospastic disorders may be independent of occlusive events, may be secondary to thrombosis or embolism, or be exacerbated with resultant necrosis by secondary thrombosis. These disorders produce cold intolerance, numbness, ulceration, and/or gangrene. Abnormalities of perfusion are the result of occluded vascular structures, vascular function, or both. Vascular insufficiency occurs when blood flow compromises cellular perfusion with resultant cell damage, cellular injury, and pain.

Occlusive Disease

The problem

Thrombosis of the ulnar artery at the wrist occurs in over 10 percent of individuals who use their hands instead of tools. Single or repeated trauma damages the intima and internal elastic lamina expose the media and

in the presence of stasis and a hypercoaguable state (Virchow's Triad) result in aneurysmal dilatation, thrombosis and embolism *(fig. 1)*. The sequelae range from symptoms of pain, cold sensitivity and numbness that are: 1) tolerable and for which no physician consultation is sought; 2) significant but without ulcers or necrosis; and 3) progressive with ulceration and/or gangrene. In most patients there is a history of repeated trauma to the hypothenar eminence, pain, cold intolerance, and numbness. Exposure to chemicals, a family history of clotting disorders, and smoking are important to document. The physical exam should determine variations in skin temperature and texture (the ulnar digits are often cooler and dryer to the touch); the presence or absence of a pulsatile mass over Guyon's canal, ulcers, and or atrophy. In severe cases, the rubor of arterial insufficiency may be accompanied by splinter hemorrhages in the nails (emboli), and necrotic areas in the fingers. An Allen test will demonstrate abnormal or absent flow through the ulnar artery. Testing that should be considered are:1) coagulation profiles, 2) noninvasive evaluation of arterial perfusion with digital and brachial pressures and waveforms, 3) stress testing to determine the relative importance of vasospasm to arterial compromise, and 4) contrast arteriography.

The Solution

Addressing the underlying pathophysiology in a patient-oriented treatment approach is important to obtain optimal results. Symptoms and signs are related to the location and extent of the thrombosis or aneurysm, the presence and quality of collateral circulation, and the effects of secondary vasospasm. Smoking cessation is crucial for all patients and if combined with oral medications (e.g. calcium channel blockers) is sufficient for many patients with focal and mature thrombosis without significant embolic occlusions and in the presence of adequate collateral circulation.

In patients with focal and stable thrombosis or aneurysm, adequate collateral circulation (as determined by a digital brachial index (DBI) of > than 0.7; arteriography and/or stress testing) and with refractory symptoms; resection and ligation combined with peripheral sympathecto-

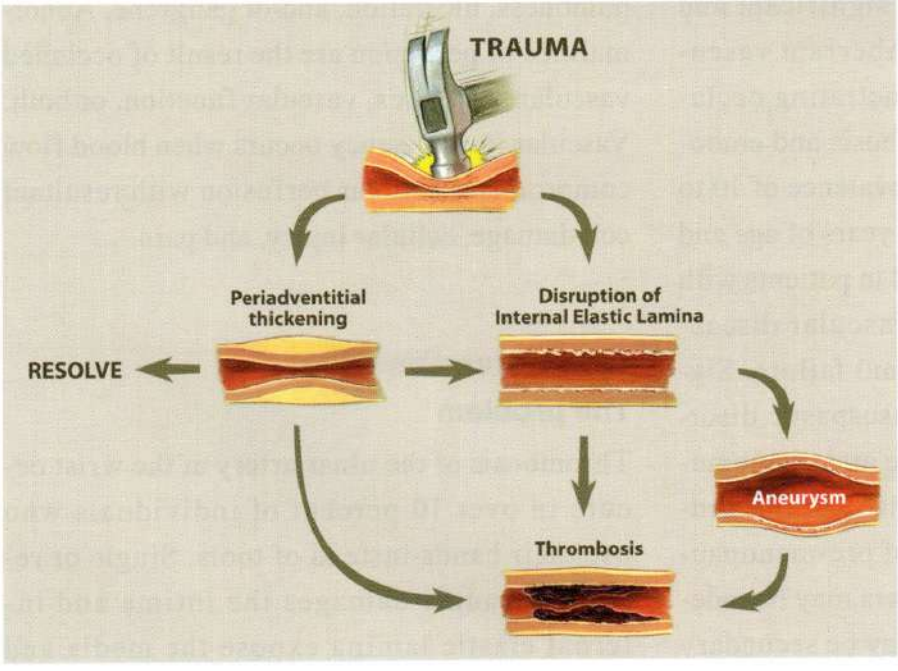

FIG. 1 trauma produces injury to the vessel and may result in either external scarring which may compress e the vessel and occlude flow or injury to he vessel . If the injury damages the internal elastic lamina aneurysmal dilatation may occur with subsequent turbulence and hypercoagulation If the intima is damaged and media is exposed, thrombosis may occur— with or without embolization .

my produces good to excellent results. Patients with poor collateral circulation (as evidenced by a DBI < 0.7 or arteriography which demonstrate inadequate collateral flow); require arterial reconstruction for optimal results.

Arterial reconstruction may be accomplished by resection of the involved segment and end-to end repair (< 15 %), interposition grafting (reversed interposition vein graft; non- reversed –valvulotomised vein grafts; or arterial grafts) or bypass grafting (figure 2- patient with occlusion of the superficial arch creating pain and ulcers on the index and long fingers. The thrombosed area (black) was isolated and excised; the arch was ligated after the origin of the common digital artery to the ring little and a branched reversed graft anastomosed proximally end-to-side to the radial artery and end- to- end to the common digital arteries of the long-ring and index-long.). *(Fig. 2)*

Pioneers

Harold Kleinert described reconstruction of the superficial arch and ulnar artery in 1965; René Leriche, professor off surgery in Lyon, described resection and ligation to treat abnormal sympathetic tone associated with thrombosed arteries in the 1930s. Koman and Urbaniak developed physiologic treatments guidelines based on physiologic principles to manage ulnar artery thrombosis in 1981-5.

Vasospastic Disorders

The problem

Vasospastic disorders include Raynauds Dis-

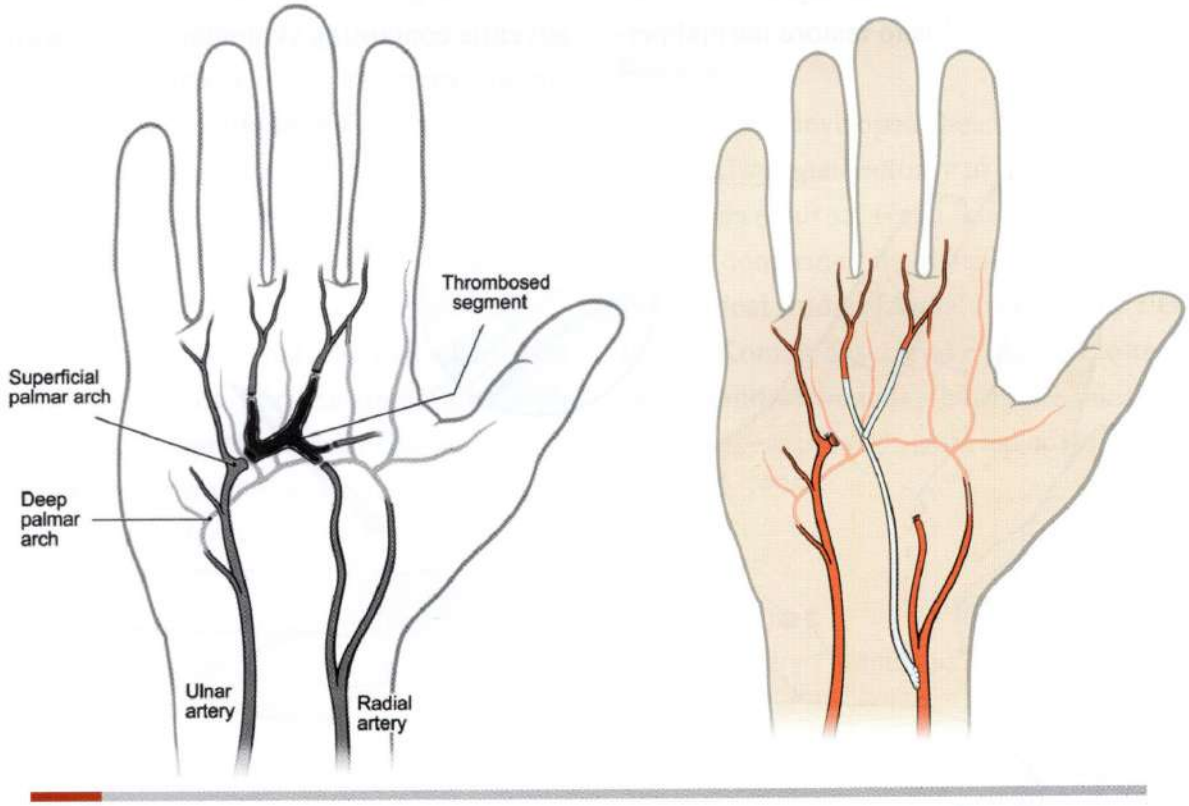

FIG. 2 Results of all successful treatments improve but rarely eliminate symptoms. Success in arterial reconstruction – in the absence of systemic disease or coagulation abnormalities – approach 95% patency rates; however, the presence of these comorbid conditions decreases patency to 80%. Furthermore, late thrombosis will result in a re-exacerbation of symptoms.

ease and Raynauds phenomenon. In both exposures to cold produces vasospasm in a classic triphasic response pattern that is associated with significant pain. Raynauds disease occurs in premenopausal women, is self limited spontaneously abating in middle age and produces rarely ulcers or gangrene. In contradistinction, Raynauds phenomenon is secondary to a disease process (usually collagen vascular or autoimmune), is progressive, often produces ulcers, contributes to thrombotic arterial events and is associated with gangrene. Evaluation should include an assessment of vascular reactivity and arterial structural integrity. The possibility of thrombosis is evaluated by Allen testing at the wrist and digits, Doppler assessment, and arteriography .

The solution

The primary treatment of vasospastic disease is medical and the goal is to restore normal perfusion patterns and maximize nutritional blood flow. Any underlying medical conditions must be managed optimally; symptomatic Raynauds is treated primarily with calcium channel blockers.

However, refractory symptoms, non-healing ulcers or threatened tissue loss may require surgical intervention. Non-healing ulcers are often associated with arterial thrombosis; which should be reconstructed, if possible. In refractory patients and patent vessels but severely symptomatic vasospasm and unreconstructable arterial occlusions, peripheral sympathectomy is the option of choice. *(Fig. 3)*

Peripheral Sympathectomy in the palm or digits is effective in maximizing nutritional digital flow. There are two basic techniques. Individual digits are approached through zigzag incisions: (Bruner), the digital arteries and nerves are identified and sympathetic connections to digital nerves are transected and the adventia containing sympathetic nerves are dis-

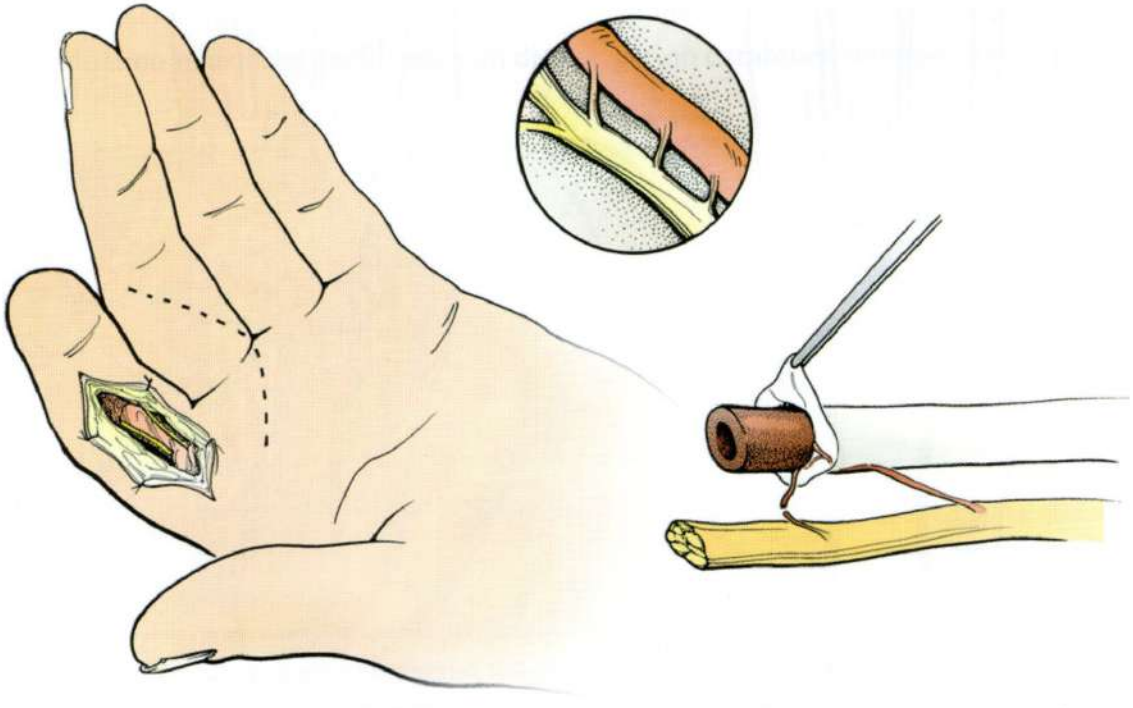

FIG. 3 Digital sympathectomy.

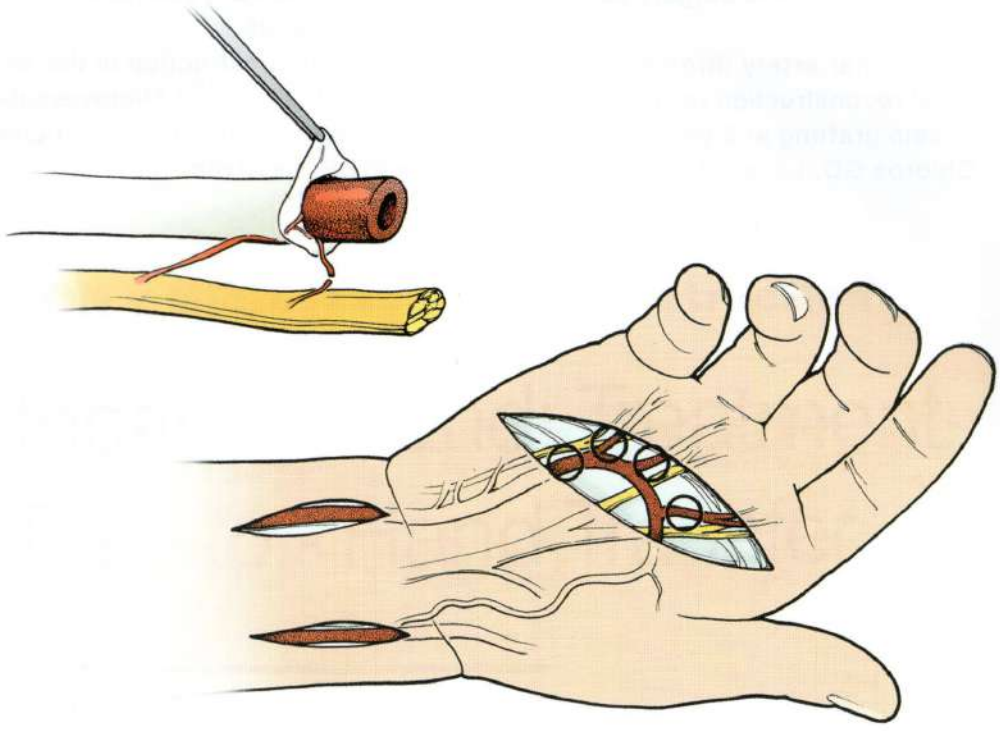

FIG. 4 Peripheral sympathectomy in wrist and palm.

sected from the artery using an operating microscope *(Fig 3)* Technique of Flatt and Wilgus) In the second Using the palmar technique developed by Koman, a sympathectomy of all four digits and the thumb may be achieved using 3 or 4 incisions *(Fig 4)*. The radial artery, ulnar artery, the superficial arch, the three common volar digital arteries, and the superficial arch are dissected, sympathetic connections to digital nerves are severed and the adventia is partially dissected under the operating microscope. A fourth dorsal incision in the anatomic snuffbox, the deep branch of the radial artery and origin of the deep arch is exposed and mobilized to remove adventitia; a fourth incision is used if there are significant symptoms in the thumb .

Permanent cervicothoracic sympathectomy should be avoided. In patients with vasospastic symptoms; arterial occlusions should be repaired, if possible.

Pioneers

Adrian Flatt developed the concept of peripheral digital sympathectomy to manage refractory Raynauds (Journal Hand Surgery; 5:550; 1980); Wilgus confirmed its efficacy in experimental and clinical studies (Annals of Surgery 193:693; 1981). Koman described a method to treat the entire hand without extending the incisions onto the fingers in 1995 (Journal of Hand Surgery 20A:790; 1995)

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SECTION v Microvascular Reconstruction

Metacarpal Hand: Treatment by Toe - to - Hand Transfer

17 CHAPTER

Steven L. Henry, Fu-Chan Wei

The Problem: Metacarpal Hand

Among the most devastating conditions encountered in our field is the metacarpal hand, wherein all digits of a hand have been amputated proximal to their functional length. For the typical patient—a factory worker or other manual laborer—the injury instantaneously transforms his hand from a primary instrument of productivity and employment to an almost useless appendage. Often, however, there is one saving grace: the preservation of structures proximal to the amputation. For this reason the metacarpal hand also represents one of our field's greatest reconstructive opportunities.

The Solution: Toe-to-Hand Transfer

Toe transfer is widely regarded as the best treatment for the metacarpal hand, a condition so debilitating as to indisputably justify the risk and effort (surgical and rehabilitative) attendant to the procedure. At Chang Gung Memorial Hospital, we have utilized toe-to-hand transfer to reconstruct nearly 200 patients with a metacarpal hand. The following comprise our principles of treatment and preferred methods.

Managing the initial injury. Although it is possible and safe to perform toe transfer acutely, in most cases of metacarpal hand the initial management is preparatory. The familiar paradigm of revision amputation, in which bone is shortened and tendons and nerves are resected proximally, is diametrically opposed to what is desirable for toe transfer.[1] Every effort should be made to preserve the length and integrity of bone, joints, tendons, vessels, and nerves, even

if local skin is deficient. To this end, it is usually necessary to recruit soft tissue coverage from elsewhere. While regional flaps, such as the radial forearm flap, may seem propitious, they may also expend valuable recipient vessels for future toe transfers. For this reason we prefer the pedicled groin flap, which provides an abundance of tissue that not only covers the acute wound but also can later be utilized to cover the transferred toes, protect the pedicle(s), deepen web spaces, release contractures, and minimize the amount of skin that must be taken from the foot *(Fig. 1)*.

FIG. 1 Wound coverage with a pedicle groin flap.

FIG. 2 After combined second and third toe transfer to the middle and ring finger and before the second stage of thumb reconstruction. Note the thumb prosthesis, which helps to determine the proper length and position of the future thumb.

Outlining the reconstructive strategy. An optimal reconstruction consists of an opposable thumb (or at the very least, a stable post) and two fingers to provide strong and stable tripod pinch.[2] If the four fingers are amputated proximally but the thumb still maintains a functional length (the so-called type I metacarpal hand), only two lesser toes are needed for reconstruction of two fingers. If all five digits are amputated proximal to their functional length (type II metacarpal hand), both a thumb and finger(s) must be restored *(Fig. 2,3,4,5)*. When the majority of the thumb metacarpal and thenar muscles are intact, the great toe is transferred simultaneously with the lesser toes. When the thumb is amputated more proximally and thenar function is inadequate, a two-stage approach is preferable, such that the fingers are reconstructed first and a prosthesis is used to determine the proper length and position of the future thumb construct[3] *(Fig. 2)*. Finally, when the thumb's basal joint is destroyed, the goal is downgraded to provide only an immobile post.

Choosing the donor toes. It is fortunate that the foot functions quite well without a full complement of toes[4] *(Fig. 5)*. Certainly, the deficit incurred by taking toes from the foot is far outweighed by the benefit of giving them to the metacarpal hand. Nonetheless, the choice of donor toes must be made thoughtfully so as to maximize function at both recipient and donor sites. When only two lesser toes are required, bilateral second toes can be transferred, although two neighboring toes—typically the second and third toes—can be harvested on a single pedicle and can include a web space, metatarsophalangeal joints, and a substantial length of the metatarsals, if needed. When it is necessary to take

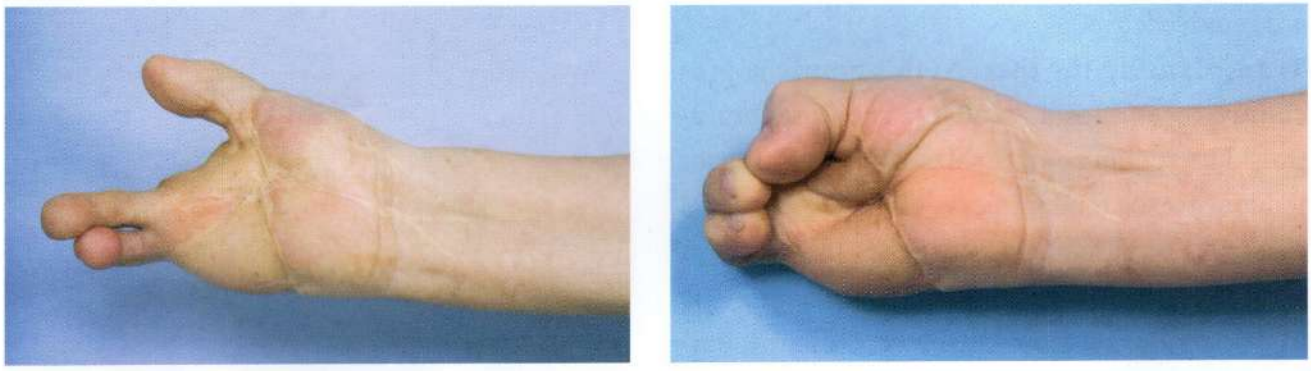

FIG. 3 & 4 Appearance and function of the reconstructed metacarpal hand seven years post-operation.

the great toe—the foot's most valuable commodity—donation is made from the non-dominant foot, typically the left (non-driving) foot. The great toe is always divided at the base of the proximal phalanx, preserving a small stump of bone with—and sparing substantial morbidity to—the functionally important first metatarsophalangeal joint. If the great toe is used, the ipsilateral second toe must be spared to maintain the foot's balance. The lesser toes, then, are harvested from the other foot *(Fig. 5)*.

Preparing the recipient site. The skin overlying the amputation stump is incised in cruciate fashion, permitting insetting of the toe's skin (which itself is harvested with a vertical fish mouth pattern) and providing wide exposure of the recipient vessels, nerves, tendons, and bone. Either the common or proper digital artery (usually the larger ulnar digital artery) can be used and may be skeletonized at the sub-adventitial plane to mitigate the potential for vasospasm. A sizable vein on the dorsum of the hand is isolated. Nerve stumps should be prepared under the microscope, carefully resecting neuromas while preserving as normal or nearly normal nerve length as possible. Tendon sheaths, if still present, should be preserved. Periosteal stripping should be minimized. The bone stump can be cautiously smoothed to permit good bone-to-bone contact; however, it must be remembered that only 5 mm of bone is required for interosseous wiring, so even a tiny stump of proximal phalanx is worth saving.

Harvesting the toes. The dorsal web space adjacent to the donor toe(s) constitutes the anatomic keystone of the harvest and is where dissection begins.[5] In this area, just above the intermetatarsal ligament, the dorsal and plantar metatarsal arteries merge and then immediately diverge into the proper digital arteries of the neighboring toes. The larger of the metatarsal arteries—the dorsal in 70% of feet—is chosen as the pedicle and is traced in retrograde fashion. Dissection is easier dorsally and can be carried all the way to the dorsalis pedis if necessary. Plantar dissection is more difficult and if continued beyond the mid-metatarsal level can cause substantial morbidity. In these cases, a vein graft should be used if additional pedicle length is required. Once the artery is isolated, the tourniquet is released and the toe(s) inspected for vascularity. Topical lidocaine or papaverine can be useful to allay vasospasm—and the surgeon's apprehension—at this stage. A dorsal vein, the extensor and flexor tendons, and the digital nerves are transected proximally; the bone is divided at the appropriate level; and, after the recipient site is fully prepared, the toe(s)

are removed.

Transplanting the toes. At this point the procedure resembles a "well-planned" replantation. The sequence of repairs is: bone, extensor tendon, flexor tendon, nerves, artery, vein, and skin. Our preference is to use 28G interosseous wires, which require minimal stump length and provide very stable fixation, permitting early mobilization. As transferred toes are prone to flexion contracture, the extensor tendons are repaired under tension with all joints held in extension. Flexor tendon coaptation occurs in the palm. The interphalangeal joints are pinned in extension. Standard microscopic techniques are used for the nerves, artery, and vein. The skin is tailored and loosely closed.

Postoperative care. We prefer a light dressing for the hand rather than a bulky dressing or splint, which can collect blood and constrict the transferred toes. The patient is monitored in the intensive care unit for three to five days—supposedly, enough time for the endothelium to heal. Color, turgor, capillary refill, temperature, Doppler signal, and pulse oximetry can all be used to assess the transplant. Early failure is usually a consequence of vasospasm, which can be minimized by keeping the patient warm and well-hydrated and forbidding nicotine, caffeine, chocolate, and excessive stimulation. Daily aspirin (325 mg) is also administered and continued for at least two weeks. One should maintain a low threshold for re-exploration should conservative measures fail to ameliorate the condition within one hour.

Rehabilitation. The great effort, stress, and expense of toe transfer will all be for naught if a rigorous rehabilitation protocol is not followed.[6] Assuming solid bone fixation was achieved, mobilization can begin as early as four days after the procedure. Sensory recovery can be excellent, with moving 2-point discrimination well under 10 mm, but only if sensory re-education exercises are performed diligently. Secondary procedures are not uncommon and include tenolysis, arthrodesis, and web space deepening.

FIG. 5 Appearance of the donor feet seven years post-operation.

In conclusion, toe-to-hand transfer provides mobile, sensate, "like" tissue for reconstruction of missing digits in the metacarpal hand, restoring a high degree of function to a ravaged appendage. The amount of time, skill, and effort required to achieve a good result is formidable, but the reward—for the patient and reconstructive surgeon alike—is immeasurable.

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SECTION v Microvascular Reconstruction

Free Flaps in Upper Limb Reconstruction

18 CHAPTER

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The Problem

The goals of soft tissue reconstruction of the upper extremity are to provide stable coverage and if possible restore function. Free flap coverage can facilitate coverage and aid in reconstruction of damaged and missing anatomical structures. If performed as a one stage procedure, free flaps surgery results in time as well as cost savings.

The Solution

The main applications of free flap reconstruction in the upper limb are for patients with traumatic injuries, extensive scar contracture due to trauma or burns, defects following tumor extirpation, infection and congenital anomalies. Free flap transfer in upper limb is indicated when a local or regional flap cannot be used, due to the extent or the complexity of the defect. Defects after mutilating injuries and tumors excision are particular amendable to free flap reconstruction because composite flaps are able to provide multiple tissue components on one pedicle. In certain cases flaps can be used as flowthrough flaps, providing blood supply to a complete or partially amputated segment, or to provide blood supply to a second free flap.

Timing of Reconstruction

Reconstruction can be performed as a single stage or as a multi staged procedure. Staged procedures are indicated for congenital malformations, depending on the age of the patient, and in cases of infection, when the final reconstruction

can be performed only after controlling the infection. For defects resulting from trauma or tumor excision, we prefer immediate reconstruction of all structures and free flap coverage following radical debridement, especially if arteries and veins are exposed. If the patient is unstable or definitive debridement cannot be performed due to questionable tissue viability, then serial debridement and a staged reconstruction should be considered. The advantages of the radical debridement and immediate free flap reconstruction can be summarized as:

- single operation and anesthesia
- avoid additional tissue loss due to desiccation, edema, granulation tissue and secondary infection.

Flaps Basic Principles

The selection of a free flap depends on:

- defect etiology and/or mechanism; size and depth of the defect; exposed structures; structures needing reconstruction; necessity to restore sensation; degree of contamination; skin color and texture; length of the vascular pedicle; donor site morbidity.

Fasciocutaneous or fascial flaps are to be used for superficial defects and good skin quality. Perforator flaps are preferred due to their decreased donor site morbidity. Muscle or musculocutaneous flaps are indicated in cases requiring dead space obliteration or for functional reconstruction. More complex defects need composite flaps, including skin, deep fascia, muscle, tendon, nerve or bone. The choice of flap depends also on the patient's acceptance of the procedure as well as surgeon preference and experience.

The vascular anastomoses should be performed outside of the zone of injury. Flaps with long and large caliber pedicles are preferred. The recipient vessels should be matched with the dimensions of the flap vessel. Sometimes, in large defects or when the recipient's vessels are remote, the use of arterio-venous loops are indicated.

Vigilant postoperative flap monitoring is essential in preventing possible failure due to spasm or thrombosis. The color, temperature and capillary refill are the clinical signs to be observed, especially in the first few days. If a problem is encountered by clinical examination or invasive monitoring, the anastomoses can revised often resulting in salvage of the flap.

Fasciocutaneous Flaps

Fasciocutaneous are indicated for the coverage of superficial defects and provide a very-good gliding surface for tendons. Some fasciocutaneous flaps can be harvested as composite flaps for functional reconstruction. In the attempt both to increase the flaps dimension and decrease the donor site morbidity, techniques, such as flap preexpansion, are useful.

Radial forearm flap:

- thin flap
- long pedicle of large caliber
- matching color skin, convenient for defects on the hand
- as a composite flap: can include vascularized tendons, brahioradialis muscle, a segment of radius, sensory nerves
- as an axial flap: can be used as flow-through to revascularize a distal segment or to provide blood supply a second flap
- two or more skin islands can be harvested on the same vessel
- disadvantages: the morbidity of the donor site (relatively conspicuous and generally needing skin graft closure); risk of fracture of the radius if harvested as osteofasciocutaneous flap.

Ulnar forearm flap

- the same advantages, disadvantages and indi-

cations as the radial forearm flap
- advantages the donor site: can often be closed primarily, hairless skin.

Posterior interossious artery flap
- used as a distally pedicled flap or as perforator propeller flap
- for the coverage of distal finger defects, it can be used as free flap
- survival is enhanced by the anastomosis of a cutaneous vein
- disadvantages: the variation of perforator locations and the proximity to the posterior interosseus nerve.

Lateral arm flap
- blood supply: posterior radial collateral artery
- color and texture gives a very good cosmetic match
- can include: a segment of up to 10 cm of humerus and/or a segment of the triceps tendon
- sensate: posterior cutaneous nerve of the arm
- can be used as flow-through flap
- if divided transversely (respecting the intermuscular septum) can cover two different defects
- direct suture at the donor site (if width less than 8 cm)
- disadvantages: paresthesis over the proximal forearm, hair on skin

Groin flap
- blood supply superficial circumflex iliac artery
- advantages: large size; skin texture; possibility of harvest as a composite flap (including a large block of bone and/or fascia from the abdominal wall); minimal donor site morbidity
- disadvantages: short pedicle; inconstant vessels anatomy; soft tissue bulk; curvature of the iliac crest

Scapular/parascapular flap
- blood supply: circumflex scapular artery (and branches)
- advantages: long and large pedicle; relatively thin and hairless; composite chimeral flap (scapular and parascapular skin islands, latissimus dorsi and/or serratus anterior, scapula or rib segments); direct closing of the donor site (width up to 15 cm)

Anterolateral thigh perforator flap *(Fig. 1)*
- blood supply: musculocutaneous or septocutaneous perforator from the descending branch of the lateral femoral circumflex artery
- advantages: very generous, reliable, and possibly sensate skin paddle; long vascular pedicle; can be thinned; can include tissue from the fascia lata; minimal donor site morbidity

Biceps femoris perforator flap
- blood supply: generally - middle musculocutaneous perforator passing through the short head of the biceps femoris, either from the popliteal or profunda femoris artery
- medium-sized pedicle
- possibly direct closure of the donor site
- ideal for first web-space contracture release
- disadvantages: poor color match; not indicated in obese patients

Osteocutaneous fibular flap
- blood supply: peroneal artery (skin paddle, fibula, and if necessary a cuff of soleus muscle)
- can be used as simple fasciocutaneous flap
- donor site: may require skin graft, possible FHL contracture

Dorsalis pedis flap
- blood supply: dorsalis pedis artery
- advantages: very thin; possibility of reinnervation; composite flap (extensor tendons, and/or the second metatarsal)
- disadvantages: hypertrophic unstable scars of the donor site

First web-space skin flap
- blood supply: first dorsal metatarsal artery
- very good quality skin, similar to that on the volar surface of the fingers and hand
- disadvantages: scarring

FIG. 1 A 57 year old man, victim of an electrocution, is treated by a large anterolateral thigh flap revascularized through the ulnar artery.

Fascial Flaps

Fascial are indicated for superficial defects on the dosum of the hand or fingers. They provide very thin coverage. They are very advantageous from donor site viewpoint, but the flap must be covered with a skin graft, which can produce further contractures.

The most used such flaps are:

- forearm fascia (radial artery)
- lateral arm fascia (posterior radial collateral artery)
- serratus fascia (thoracodorsal artery)
- temporoparietal fascia (superficial temporal artery)

Muscle Flaps

Indications include: reconstruction of complex three-dimensional defects; heavily contaminated wounds; functioning transfers; bone carrier.

Latissimus dorsi flap

- blood supply: thoracodorsal vessels
- provides a large amount of tissue
- useful for coverage and filling defects
- muscle or musculocutaneous flap
- possible composite chimeral flap, similar to the scapular/parascapular flap
- possibly functional transfer (especially biceps)

Serratus anterior flap

- based on the same vessels as latissimus flaps
- very thin
- possibly part of chimeric composite flaps
- successfully used for metacarpal reconstruction (with one or more rib segments)

Rectus abdominis flap

- blood supply: deep inferior epigastric vessels
- very useful for reconstruction of complex defects
- can be used without muscle (deep inferior epigastric artery perforator flap)

Gracilis flap

- blood supply: medial circumflex femoral vessels

- muscle or musculocutaneous flap
- useful for coverage, but especially as functional muscle transfer

Vascularized Bone Transfers

Many fasciocutaneous, fascial or muscle flaps can include vascularized bone segments, and may be very useful in the reconstruction of complex defects. The (fibula and the iliac crest) can also be harvested as independent vascularized bone flaps. The harvesting techniques, the advantages and disadvantages are the same, but their indication is in the reconstruction of bone defects without accompanying soft tissue defects.

Pioneers

A few are mentioned, but there are many others:

- GI Taylor (free groin flap)
- K Harii and RT Manktelow (Gracilis)
- S Tamai (free muscle transplants in dogs)
- J. Baudet and TM Nassif (scapular and parascapular)
- Wayne Morrison (wrap-around toe to hand transfer)

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