

International Society Of Limb Salvage

30th Anniversary Monograph





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MESSAGE

from **Wei Guo, ISOLS President 2010-2012**

This year is the 30th anniversary of the founding of ISOLS in 1981. Following the success of the recent meeting in Boston, we are now putting our best effort into organizing the present Symposium, one which will celebrate this special Anniversary in the historical city and capital of China on September 15-18, 2011. We thank you for joining us and look forward to an outstanding meeting. We received more than 600 abstracts submitted from 38 countries for this event. Three members of the scientific advisory board reviewed each abstract. We will try to provide as many presentation opportunities as possible, as well as inviting some oral abstracts to be presented as poster presentations. All the presenters are also invited to submit a manuscript to Clinical Orthopedic and Related Research. There will be a specific symposium of the best-selected papers from our meeting. To encourage communications via poster presentation, the committee has specially organized awards to be given out for the best posters. There will be a total of five first-place award recipients and five runner-up awards presented. We will announce the winners and present the prizes during the closing ceremony of the ISOLS. We would also like to take this opportunity to thank our sponsors who provide the prizes for this special event.

Presentations are divided into five minute and three minute presentations. Since there are many speakers and we have to follow a tight schedule, we hope that everyone is able to finish their speeches on time, as to ensure that the meetings can go according to plan. The poster presentation is integrated with the industrial exhibition and located near the coffee break area, allowing the members of this ISOLS meeting to fully make use of this opportunity to present with artistic flair. Since this is the 30th anniversary of ISOLS, we will be organizing an opening ceremony to commemorate this special event. Also, we would like to cordially invite you to our gala dinner, where there will be exciting performances, with an opportunity for those who would like to participate. If you would like to participate in a performance, we will do all we can to arrange it. We hope that this will be a great opportunity for interaction and we will strive to make this ISOLS Symposium a memorable experience for all participants.

We appreciate your contribution to this splendid scientific Symposium not only with your presentations but also your presence and discussion. Beijing, the City of Art and Culture, will provide an exquisite environment for an open exchange of ideas and new findings. Last but not least, we wish to express our gratitude to Ed Chao and all the members of ISOLS for putting together a wonderful monograph to commemorate the 30th Anniversary of our organization.



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Edmund Y.S. Chao Editor



There are several factors that motivated me to take on the task of editing this monograph, the primary one to express my sincere gratitude to those who have accepted me in this very specialized field as an equal. As a non-physician never

formally trained in oncology research, this has been a treasured opportunity for me. I had never anticipated that the work of a bioengineer in this field would be worthy of the honor and recognition bestowed upon me. As such, I have tried to put this volume together with humility, respect and caution. Be that as it may, I know that I am not likely to have done so without making a few mistakes, and for that, I would like to state my sincere apology in advance.

Thirty years is a long time for this organization to have thrived, especially in light of the expected and unexpected occasional adversarial comments and critiques. I credit this success to the many open-minded orthopaedic oncologic surgeons and basic scientists who are willing to listen and accept alternative approaches to problem-solving. Although musculoskeletal tumors have always been the pivotal, dominating discipline in this field, the saving of patients' limbs have become more acceptable in other clinical areas – and as originally envisioned by my colleagues when we organized the very first ISOLS Symposium (or Workshop). Having others join forces with tumor specialists permitted us to make astonishing advances, original discoveries which have benefited a variety of disciplines in orthopaedics and bioengineering. For this reason, a special section

of this book is devoted to some of these unique and extraordinary contributions and discoveries made by the members of this organization. The use of massive allograft, an allograft and vascularized autograft composite, clinical application of porous-coated implant for cementless fixation, and the concept of modular implants design are only a few such examples. These are also the attributes that allow this Symposium, now a formal Society, to continue a prosperous existence. It is my sincere wish that his book would serve as a testimonial of our success as a cross-disciplinary group with a strong and bonding interest.

Finally, this book could not have been possible without the contribution of faithful and enthusiastic members, many managing to never miss a single meeting in the past thirty years! The Board's approval and encouragement on this project has been the moving force for me to push it forward when I encountered many obstacles. Frank Sim has always stood at my side when the project became a struggle. I wish to thank Professor Guo's support in publishing this monograph, which has summarized an amazing period of thirty years since the first Symposium in Rochester, MN of 1981. The generous support from our industrial partners is very gratefully appreciated, especially as I have always believed that designing and improving tumor prostheses is in itself an act of charity. Finally, I wish to acknowledge in particular the whole-hearted support of Aspen, MP Inc. in Irvine, CA, by providing a dedicated graphic specialist, Robert Sabino, to assist with the editing process. Without him, this book would not have been possible.

Franklin H. Sim Co-Editor



Despite the fact that the management of patients with musculoskeletal sarcomas remains so very challenging, tremendous strides have been made in their care, with multiple disciplines working together to improve their outcomes. Sophisticated advances in related fields, including improved imaging, effective chemotherapy and advances in surgical techniques, have all come together to improve survival and enhanced the ability to carry out limb sparing surgery.

In the early 1970s, when limb salvage first began to flourish, most centers had a preferred method of reconstruction, such as arthrodesis, osteoarticular allografts, or megaprosthesis. Initially, implants were fabricated for each patient, generally requiring a two-stage procedure. Then, in the early 1970s, Dr. Chao developed the concept of segmental implants of varying sizes. This allowed surgery to be carried out in one stage, and in the late 1970s, the development of a modular prosthetic system advanced the reconstruction.

Toward the end of the 1970s, a number of exciting reports from different parts of the world suggested

we had arrived at an era of major advances in reconstruction utilizing tumor prostheses. While early results were encouraging, common biomechanical problems proved to be prevalent in this young group of patients, such as fracture, loosening, and dislocation. For this reason, in 1981 Mayo organized the first world wide international workshop on the design and application of tumor prosthesis. Surgeons, engineers and manufactures were invited to work together as a team to solve these challenging problems. It was clear that if results were to be improved, it would require a multi-disciplinary approach with bioengineering and material scientists and manufacturers playing a crucial role at the dawn of the limb salvage era. Subsequently, the International Society Of Limb Salvage Society played an instrumental role in the development of limb salvage reconstructive techniques. Lessons from physics, engineering and metallurgy have helped to improve the design and manufacturing

of these implants, and many important developments have improved the application of tumor prosthesis.

Currently, efforts continue to improve local control to maximize function in the reconstructed extremity. Close collaboration between clinical practice, basic science, and bioengineering has improved the range of both biological and non-biological reconstructions. Each reconstruction has its own advantages but also its own set of problems and limitations. Today, centers individualize the type of reconstruction depending on a number of factors related to the patient, location, and extent of resection. It is vital that such reconstructions continue to help restore function as well as provide durability in order to match the improved life expectancy of our patients. With all of this in mind, I have no doubt that The International Society Of Limb Salvage Surgery will continue to play a critical role in improving the nature of reconstruction in the future.

ISOLS

International Society Of Limb Salvage



Origin

Custom-made segmental prostheses were first used in the 1950s and 1960s, as way to replace the skeletal defects, a process led by the pioneering work of John Scales of Stanmore, UK. Following the introduction of improved imaging techniques and adjuvant therapies for local and systemic disease control, the concept of limb salvage using numerous methods of bone and joint reconstruction after tumor resection became increasingly well accepted. In the 1970s, Jack Ivins, the founder of orthopaedic oncology at The Mayo Clinic, anticipated the challenges involved in the use of custom-made implants and segmental bone allografts, and encouraged the planning of a workshop to discuss the problems and needs that lay ahead in this field. Ed Chao, a bioengineer working together with his teammate Frank Sim, an orthopaedic oncologic surgeon, worked together to plan the first international workshop on “Design and Application of Tumor Prostheses for Bone and Joint

Reconstruction.” Even without the endorsement of the Mayo Clinic, a workshop held at the Kahler Hotel in Rochester, Minnesota during September of ‘81.

Professor Kotz of Vienna ventured to organize the second workshop which was held in September of ‘83 in Vienna. At the time, few would have anticipated the turnout of these workshops or the generated momentum. Two years later, Bill Enneking lent his support and endorsement, by organizing the third meeting and changing the name from workshop to symposium in Orlando of ‘85. He served as the lead person to develop the limb salvage patient functional score system. No one could have speculated that these gatherings would evolve into a regular biannual International Symposium On Limb Salvage (the origin of the name ISOLS) and eventually become a professional society serving as the forum to exchange research, patient care and educational experience among orthopaedic surgeons, oncologists, bioengineers, and material scientists interested in limb salvage.

History

THE ENTHUSIASM AND camaraderie among the attendees of the first three workshops in Rochester, Vienna, and Orlando can only be described as monumental. Through a consensus of opinions, the participants voted to gather every other year and rotate among the American Continent, Europe and the Asian-Pacific regions. The first and second meetings were run as Workshops, the Symposium format was adopted thereafter to make fund raising easier. After the ‘87 Kyoto meeting, an ad-hoc Board was formed to make the Symposium Planning Committee, which consisted of the past, present, newly-elected Symposium chairmen, and a few volunteers from each region. This group was responsible for coordinating the event. Ed Chao was appointed as the secretary of the Committee and he was expected to prepare the Committee’s meetings, usually during the AAOS annual convention. The 1989 Symposium, under the leadership of Frantz Langlais with the close assistance of the Secretary, was particularly successful in fund-raising which had left a handsome surplus to the organization to subsidize future meetings and other organizational needs. To assure a legal status in managing the funds raised from the industry, the organization under a tentative name of ISOLS (International Symposium of Limb Salvage) was formally registered in France. At the magnificent meeting site of St. Marlo, off the French coast of Normandy, the organization of ISOLS was formally adapted by the participants in 1989 with a governing board. The Board subsequently approved a set of tentative bylaws and a small annual membership fee, thus creating a bona fide organization that also provides certificates

in encouraging participation. A formal bylaws to transform the organization from the Symposium to Society is enclosed in this monograph to reflect the outstanding contributions made by current Board members. Different countries and medical centers in each region have been competing to host future meetings with undiminished enthusiasm. The leadership roster shown below is a testimonial to the success of this organization.

List of Past ISOLS Leaders

1981	Rochester	Jack Ivins, Frank Sim, Ed Chao
1983	Vienna	Rainer Kotz
1985	Orlando	Bill Enneking
1987	Kyoto	Takao Yamamuro
1989	Saint Marlo	Frantz Langlais
1991	Montreal	Ken Brown
1993	Singapore	Robert Pho
1995	Florence	Mario Campanacci, Rodolfo Capanna
1997	New York	John Healey
1999	Cairns	Bill Marsden
2001	Birmingham	Simon Carter
2003	Rio de Janeiro	Reynaldo Jesus-Garcia
2005	Seoul	Han Koo Lee, Soo Yong Lee, Dae-Kyung Bae
2007	Hamburg	Winfred Winkelmann, Georg Gosheger
2009	Boston	Mary O’Connor, Mark C. Gebhardt
2011	Beijing	Wei Guo

Problems & Roadblocks

THROUGHOUT THE YEARS, different symposia chairpersons and the Board have received constructive criticisms from those within and outside of the group, but we have taken these critiques positively as a means to improve the quality of our meetings. The main concerns had been that ISOLS tended to overlap different MSTs, the Symposium contents appeared repetitious and dominated by only a few centers and groups, the gross lack of engineers and material scientists participation, and the questionable services provided to justify the membership dues. None of these seemed to affect the participation of the biannual event. The ISOLS

members are receive free CORR subscriptions and each ISOLS proceedings are published in CORR, thanks to the wonderful work of the past and present Boards, John Healey in particular. Even after the horrifying 9/11 tragedy, the majority of our members still showed up at the 2001 Symposium to make sure that our UK colleagues, under the leadership of Simon Carter, were fully supported and encouraged. It is amazing that our future meetings have already been scheduled up to 2013 and words are circulating that our colleagues from China are planning an all-out effort to make the 2011 Beijing meeting the “best ISOLS ever!”

Achievements

AS A GROUP WITH THE shared noble view of devoting the technology and advancement achieved to the care of patients, we have established the value of surgical limb reconstruction as a definitive management of musculoskeletal tumors. The use of porous coating on metallic implants to achieve biologic fixation was first applied to segmental prosthesis with great success, which predated its application in the regular joint replacement arthroplasty. The use of modularity in an implant design was reported in our 1981 Workshop with various systems developed for clinical applications by the 1983 workshop in Vienna. This innovation stimulated the implant design changes in the general joint replacement field. Many other concepts and techniques for skeletal defect reconstruction and the preservation of limb function were developed and perfected by ISOLS members through extensive collaboration. Many people have been involved with the developments in limb salvage reconstruction over the years, some being the early pioneering work in tumor prosthesis carried out in Stanmore by Sir John Scales and Ginger Wilson. Kotz developed his early prototypes in the ‘70s and Campanacci and his group at Rizzoli did large numbers and carefully evaluated the patients so they could identify deficiencies and make corrections, improving the newer designs. In the U.S., Mayo and

Memorial Sloan-Kettering group, Marty Malawer, and Jeff Eckhardt were responsible for many significant advancements in the tumor prosthesis field.

The biological reconstructions had parallel developments with people like Yakov in Delhi, India, and Bill Enneking working with a non-vascularized fibular graft, or Robert Cho in Singapore and Mike Wood at Mayo doing the early developmental work in vascularized fibular grafts. Vascularized fibular graft and allograft used for skeletal defect reconstruction have thus gained a wide acceptance due largely to the contributions made by members of ISOLS.

The ISOLS was responsible for the development of the functional and radiographic grading systems for all limb salvage procedures. The knowledge, techniques and principles established and rationalized by many within our group are being applied to other fields dealing with similar limb sparing and function preservation problems. The close working relationship of our members, the vast scope of the field with relatively focused aims, the interdisciplinary nature of the group, and the strong emphasis on quality of life improvement for the patients are some of the key factors responsible for the extraordinary success of this group.

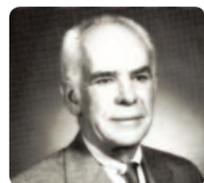
Concluding Remarks

AS AN ACADEMIC ORGANIZATION, ISOLS embraces several professional disciplines with the primary goal of improving patient care after limb preservation surgery. It serves well as a forum for surgeons, oncologists, scientists, and bioengineers to share their skill, knowledge, and experience. It is extremely pleasing to realize that what we have developed as a group is being applied to an even larger patient population with severe trauma, metabolic bone disease, and difficult revision surgery after failed joint arthroplasty, all facing the same dilemma of the possibility of limb amputation.

We should further explore the new technology to improve disease control and connective tissue regeneration for the possibility of replacing the missing limb segment as a vision of tomorrow. However, we must not lose sight of perfecting what we have developed to improve the quality of life in patients suffering from life threatening disease and debilitating surgery. Finally, let us fondly remember those who had made significant contributions to this organization but are no longer able to witness and enjoy the outcomes of their devoted hard work and noble goals.

1981

Rochester, Minnesota, U.S.



JOHN C. IVINS, “Jack”, was born and educated in Nebraska and received his MD in 1939. During WWII, he served as a colonel in the Army and after the war stationed in Hokkaido, Japan under the command of General McArthur.

Jack began his orthopaedic training in 1946 at Mayo and became a consulting staff in 1950. In his early orthopaedic career, Jack specialized in peripheral vascular surgery. Working with the pathologist David Dahlin, Jack devoted his major effort in orthopaedic oncology and became the foremost authorities on bone and soft tissue tumor in the world. He subsequently established the first Bone Tumor Registry in 1974.

After his retirement in 1980, Jack continued to assist in clinical and basic science oncology research. It was through his effort and encouragement, a

major NIH/NCI grant on “The Design and Application Segmental Bone and Joint Replacement Prosthesis” was awarded to the Mayo Clinic Biomechanics Lab in 1978 which helped incubate the concept of organizing the first ISOLS in Rochester, Minnesota and served as its co-chair. Jack attended several of the subsequent ISOLS meetings including the one in Singapore in 1993.

To prepare for a special lecture on segmental prosthesis design for the 1987 ISOLS symposium in Kyoto, Jack developed a set comprehensive slides outlining various pathways of prosthesis development to avoid pitfalls from material selection to implant retrieval to assure a successful application which are still being used by many today. Jack passed away in 1997 and he was honored by the orthopaedic oncology fellows trained in Mayo by forming the “Ivins Society” which meets every year to exchange clinical and basic science research experiences around the world.



FRANK H. SIM was born in Nova Scotia and received his MD from Dalhousie University-Halifax in 1965. He came to Mayo for orthopaedic training in 1966 and joined the consulting staff in 1970.

Although he has practiced actively in several areas in orthopaedics, bone and soft tissue tumor has always been his foremost devoted and favored specialty. He has carried a legendary orthopaedic tumor practice, one that has attracted fellows from every corner of the world in order to spend time with and learn from him. He is an amiable teacher and most generous person.

Besides his surgical skill and photographic

memory, Frank has a special talent of spotting talents and supports encouraging new ideas. Although he served as the Co-Principal Investigator on an NIH grant on the Design and Application of Segmental Bone and Joint Replacement Prosthesis for more than 20 years, he has been well-versed in other alternative limb sparing techniques, which makes him particularly valuable in ISOLS discussions. His seminal work on bone and soft tissue tumor and the new concept on implant fixation and soft tissue attachment are admired worldwide.

Frank has been an avid supporter of ISOLS, never missing a single meeting, and is a most respected and knowledgeable expert in the field of limb salvage surgery.



ED CHAO was born in China, grew up in Taiwan, and had a U.S. based career. His major job interest was in agricultural engineering, which had guided him into biomechanics logically and serendipitously. He learned his mechanics at VPI and

the University of Iowa but his biology and clinical at the Mayo Clinic.

His entire career is owed to his beloved, generous, and most forgiving colleagues at Mayo. The NIH/NCA

grant on Segmental Bone and Joint Replacement Prosthesis (1978-2002, with the last ten years rated as the Merit Grant) with Jack Ivins and Frank Sim had laid down the idea and foundation for organizing this Symposium. Among all his contributions, he values his limb salvage work and ISOLS involvement more than all others.

Being in the engineering profession, he appreciates the value and virtue of service. He hopes to be remembered as a taskmaster with a passion for helping others and the precision of engineering.

1983

Vienna, Austria



RAINER I. KOTZ was born and educated in Vienna. He had his orthopaedic training at the Vienna General Hospital under Karl Chiari and followed his chair in 1984. From the beginning, his speciality has been tumor orthopaedics. In 1975, he introduced HD-MTX, the first one in Europe, and in 1978 he wrote his thesis about “The Turning Point of Prognosis Through Adequate Surgery and Adjuvant Chemotherapy.”

In 1983, at the age of 42, he organized the 2nd ISOLS meeting in Vienna. His most important invention was the internationally patented “Modular Tumor

Prosthesis” in 1979 as well as the “Growing Prosthesis” patent in 1986. Since then he had been engaged in all improvements of the so called Kotz prosthesis. His career was dominated by presidencies in various societies: The Austrian Society of Orthopaedics, The Austrian Society of Surgery, The German Society of Orthopaedics and finally the SICOR presidency from 1999 to 2002, culminating in 2002 in the World Congress in San Diego.

After retiring in 2009 as head of the orthopaedic department of the Vienna General Hospital, Rainer started a second career as Medical Director in the “Wiener Privatklinik” opposite the General Hospital.

1985

Orlando, Florida, U.S.



WILLIAM FISHER ENNEKING was born in Madison, Wisconsin. He received his BS and MD at the University of Wisconsin in 1946 and 1949 respectively. During 1962-59, he completed his orthopedic training at the

University of Chicago. During his training, he spent substantial time on Surgical Pathology and Pathology of Musculoskeletal System, committing himself to the study and management of bone and soft tissue tumors.

William joined the staff at the University of Florida, working through the ranks to become the Eugene L. Jewett Professor of Orthopaedic Surgery, Professor of Pathology and Chair of Orthopaedic Surgery (1977-80), Distinguished Service Professor (1980-2004) and the Emeritus Professor from 2005 on. He has earned numerous distinguished awards

and citations including the Kappa Delta Awards three times (1958, 1972, and 1980), Socium Honoris Causa, Scandinavian Orthopaedic Society (1988), Doctor Honoris Causa, University of Coimbra, Portugal (1997), written six books, edited two books, published numerous refereed journal articles, and contributed many book chapters.

William’s landmark contributions are many. The grading system for musculoskeletal tumor, the use of autograft and allograft transplantation in limb salvage surgery, and the functional evaluation scoring system of tumor patients after limb salvage surgery being among the most notable achievements.

He is an avid sports enthusiast in fishing, tennis, and watching wild animals. William might be the only musculoskeletal tumor surgeon whose had a close encounter with an African wild buffalo!

1987

Kyoto, Japan



TAKAO YAMAMURO was born in Ayabe City near Kyoto. He obtained his medical education at Kyoto University and received an MD in 1956, and PhD in 1961. He started orthopaedic training at Kyoto University Hospital in 1957, and was further trained at Malmoe General Hospital (Lund University) in Sweden from 1961 to 1962 and Wesley Memorial Hospital (North-Western University) in Chicago from 1962 to 1963.

After coming back to Japan, he worked at two city hospitals practicing general orthopedic surgery until 1967, when he was promoted to Associate Professor of Kyoto University as a specialist of bone and joint tumors.

Deeply dedicated in saving limbs affected by malignant tumors from amputation, Takao was the first to introduce intra-operative radiation therapy (IOR) in 1971. The IOR resulted in complete necrosis of the tumor leaving the surrounding soft tissue intact, so that the limb could be salvaged by replacing the radiated bone with biomaterials.

In 1977, he was nominated to the Professor and

Chairman of Department of Orthopaedic Surgery of Kyoto University. He soon realized that it was urgent to synthesize various bio-compatible materials not only to replace tumor tissues but also to be used in many other medical fields. He established the Research Center for Biomaterials and Bioengineering in Kyoto University in 1980 serving as its director for four years. The research at the center became so successful that it was recently switched to the Research Institute for Frontier Medicine where the world known ips-cell was first produced.

He organized the ISOLS meeting in 1987 in conjunction with the Annual Meeting of the Japanese Orthopedic Tumor Society. At the meeting, chemotherapy and tumor prostheses were intensively discussed for the purpose of limb salvage. He was nominated to the Director of Kyoto University Hospital in 1991 and the President of SICOT in 1993.

Takao retired from Kyoto University in 1994 and later nominated to the Director of Kyoto School of University of the Air. Since 2001, he has been serving as the Director of the Research Institute for Production Development in Kyoto.

courteous, with a whimsical sense of humour. He reveled and excelled in extreme sports. He and Mereille traveled the world seeking challenges and knowledge. He was intelligent, energetic, and innovative and sought the best in all he did. He was a true Frenchman and an inspiration to us all. We will miss him desperately.

As Vice-President of EFORT, Frantz was preparing to take up the Presidency in 2008 as well as Presidency of SOFCOT, an indication of the highest regard. All members of ISOLS were shocked by his untimely death on June 15, 2007. At his Funeral Service in Rennes, the hundreds of people from all walks of life paid their respects and showed the great esteem with which he was regarded.

His passing is a profound loss to orthopaedics,

academia, to his patients and friends but, above all, to his beloved wife Mereille and family to whom we give our profound condolences. Those who knew Frantz Langlais were privileged to have met a truly exceptional man. We will never forget him. On behalf of ISOLS Board, Ed Chao took a trip to visit Langlais' wife, Mereille and his Department in Rennes, France in April 2011 and gave a belated memorial lecture in honor of Frantz in the special Langlais Memorial Library dedicated to him which will be reported in the "our missed" section in this monograph.

Editor's note: Much of this Leadership Biography was taken from a Special Passing Note prepared by the Board of EFORT (European Federation of Orthopaedics and Traumatology).

1989

Saint Marlo, France



FRANTZ LANGLAIS was the President of ISOLS and organized the 1989 meeting in Saint Marlo. Frantz joined the EFORT Executive Committee as the French National Delegate in succession to Professor Jacques Duparc, the first President. From the beginning it was apparent that he had an excellent background with a reputation as a first-class Academic Orthopaedic Surgeon, Teacher and Researcher as Head of the University Unit in Rennes. He quickly showed a unique ability to view matters in their entirety and then to express his views lucidly. He always spoke quietly with conviction and without compromise or fear and, above all, without rancor. We all benefited greatly from his wisdom.

As a member and Chairman of the Scientific Committee, he demonstrated what was possible in Europe with the help of colleagues who could assist EFORT in developing modern standards of clinical practice, education and research. Frantz had the

vision to see beyond France and Europe and made extensive contacts and collaborations for the benefit of EFORT, reaching as far as U.S., South America and several Eastern countries. As General Secretary of EFORT he demonstrated his considerable administrative skills with his management of statutes, agendas and protocols as well as bridging relationships with the National Societies and Specialty Societies, forming them together as the Community of Orthopaedic and Traumatology Surgeons of Europe.

Frantz was recognized by his membership of many international academic and orthopaedic societies, including the International Hip Society, European and North American Societies of Musculo-skeletal oncology (EMSOS, MSTs), European Orthopaedic Research Society (EORS, ORS), European Association of Musculo-Skeletal Transplantation (EAMST, President 1992), International Society Of Limb Salvage (ISOLS, President 1989), Orthopaedic Research Society of U.S., and Royal College of Surgeons of England.

Personally, Frantz was charming and always

1991

Montreal, Quebec, Canada



KEN BROWN completed his medical school training at the University of Manitoba and did a residency in orthopaedic surgery. A Masters in Surgery at McGill University soon followed. After residency, he was awarded a Samuel MacLaughlin Travelling Fellowship for two years. He studied pediatric orthopaedics at the A.I. Dupont Institute under the tutelage of Dr. Dean MacEwen. The following year he studied musculoskeletal oncology at the University of Florida in Gainesville with Dr. Bill Enneking and at the Rizzoli Institute in Bologna Italy with Professor Mario Campanacci. Upon completion of fellowship training, Ken returned to Montreal to begin practice at McGill University.

He was the recipient of the American British and Canadian travelling fellowship in 1991 and visited orthopaedic programs in 23 cities in Great Britain, Australia and New Zealand. Ken received the Eduard Samson award for research from the Canadian Orthopaedic Association for his work on growth plate transplantation. His most notable contribution to research was the examination of the effects of growth

plate transplantation and vascularized fibular grafts. His main areas of interest include musculoskeletal tumors, Ilizarov application and microvascular surgery. Ken is an active member of many societies including Limb Lengthening and Reconstruction Society, American Academy of Orthopaedic Surgeons, Association of Bone and Joint Surgeons, Pediatric Orthopaedic Society of North America, Musculoskeletal Tumor Society, Connective Tissue Oncologic Society and the American Society of Clinical Oncology. He is on the steering groups of the Soft Tissue Committee and the Bone Committee of the Children's Oncology Group. He has served as President of the International Society Of Limb Salvage between 1989 and 1991 and hosted the biennial meeting in Montreal in 1991.

Currently, Ken is a Clinical Professor in the Department of Orthopaedics at the University of British Columbia. He is on the active staff at the BC Children's Hospital and is a consultant for British Columbia's Cancer Agency. In addition to musculoskeletal oncology, his clinical interests include the treatment of limb length discrepancies and skeletal deformities in children.

1993

Singapore



ROBERT WAN-HENG PHO was born in Papua New Guinea on April 30th, 1949. He obtained his Bachelor of Medicine and Bachelor of Surgery from the University of Sydney in 1966, and obtained his Fellowship of the Royal College of Surgeons of Edinburgh in 1972. He joined the Faculty of Medicine at the then University of Singapore in 1974 and rapidly rose to the rank of Full Professor in 1984.

He was the Head of the University Department of Orthopedic Surgery at the Singapore General Hospital from 1986 to 1988 when the University used to have a presence there, as well as creating the first Unit devoted to Hand Surgery. When the University moved completely to the National University Hospital, Robert made Chief of the Department of Hand and Reconstructive Microsurgery from 1991 to 2000. He was among the first to introduce the technique of microsurgery to Singapore and the region.

His scholarship and clinical skills are legendary. He is internationally renowned as one of Asia's leading orthopedic surgeons in the area of Hand Surgery, as well as bone and muscle tumors. He has the rare privilege of being made an Honorary Member of the American Society for Surgery of the Hand, as well as being elected to the Presidency of the International Society Of Limb Salvage in 1993. His pioneering research in biological reconstruction in bone and joint surgery and upper limb prosthesis,

have resulted in 21 chapters and modules, 10 named Lectureships (including the Carl Hirsch Lecture at the Karolinska Institute and the Founder Lecture at the American Society of Surgery for the Hand), and more than 150 publications, all while working as a full time orthopedic surgeon. A 14-hour workday would be the minimum for Robert, taking breaks only on Sunday afternoons or when his patients were stable.

Besides his contributions to the University, he advises the Ministry of Health, the Subordinate Courts, and institutions throughout ASEAN, China, Japan, Europe, and North America. His expertise is recognized by being invited to serve as an International Editor of the Journal of the American Society of Reconstructive Microsurgery and a member of the Editorial Board of the Journal of Microsurgery.

His current clinical practice still includes complex surgeries like musculoskeletal oncology congenital hand surgery and orthopaedic reconstructive surgery. World renowned for his surgery and research, Robert is a much sought-after speaker at many international meetings. For his immense contributions to teaching, research and clinical medicine, Robert was awarded the title of Emeritus Professor by the National University of Singapore, the first surgeon in Singapore to receive this honor. He was also awarded the Lifetime Achievement Award by the Singapore National Healthcare Group in 2004 for his clinical work.

trained dozens of Italian and foreign surgeons, understanding the value of continued exchange of ideas and international relationships. In the mid to late '80s, he pursued the expansion of the Department of Musculoskeletal Oncology to include non-clinical activities such as research laboratories, understanding the need and future potential role of basic research and molecular biology. He was one of the founders of the European Musculo-Skeletal Oncology Society (EMSOS)

in 1987 and its first President during 1987-1990.

Starting in 1989, he held an annual Musculoskeletal Pathology Course, still maintained today to honor his memory. He became the Chairman of the Rizzoli Institute in 1995, devoting further energy and support to the hospital organization. Mario Campanacci died in 1999 after a heroic battle with cancer, his leadership remains severely missed.



RODOLFO CAPANNA was born in Rimini, Italy on December 11, 1951. He received his degree with honors on March 26, 1977 at the Medicine Surgery Faculty of Bologna University, specializing in the following: Orthopaedics and Traumatology (1980); Bioengineering and Biomedical Technology (1984); and Physiotherapy and Rehabilitation (1988).

From May to November of 1979, he was an Assistant Orthopaedic Medical Doctor at Codivilla-Putti Hospital in Cortina D'Ampezzo (which belonged to Rizzoli Orthopaedic Institute at the time). From 1980-1988 he served as Assistant Orthopaedic Consultant and from 1988-1993 as Senior Associate Orthopaedic Consultant at the staff of the 1st Orthopaedic Clinic of Rizzoli Orthopaedic Institute in Bologna (the Director at the time was Mario Campanacci). In 1990, Rodolfo qualified (Government Decree, November 27, 1990) to practice musculoskeletal transplantation. Rodolfo moved to Florence on December of 1993 to become Director of the 2nd Division of Orthopaedics and Traumatology at the "Careggi" University Hospital, University of Florence, Italy. In 1999, Rodolfo's department was acknowledged as the Referring Centre for the Oncological and Reconstructive Musculoskeletal Surgery in Italy, became the Director of Tuscany Bone Bank, and a member of the Regional Health Board for technological innovation.

Between 1996 and 2008, he was the Chairman of the Integrated Department of Orthopaedics and Traumatology of Careggi University Hospital in Florence, which includes 270 beds and seven sub-units: Oncological and Reconstructive Orthopaedics; General

Orthopaedics (shoulder, hip, knee); Traumatology; Hand Surgery; Reconstructive Microsurgery.

Since 1981, Rodolfo was involved as a Professor in several level I and II teaching programs for resident and master, first at the University of Bologna (1981-1993) and then at the University of Florence (1994-2008). He was the main researcher and member of eight major research programs of CNR (Council National Research) and Ministry of Health, and responsible for 29 current IOR research projects mainly regarding tumor treatment (osteosarcoma, Ewing, soft tissue sarcoma) and tumor surgery (limb salvage, prosthesis, massive allograft, bone bank). Since 1995, Rodolfo is a member of the Permanent Board Commission of the Italian Society of Orthopaedics and Traumatology to Ministry of Health and to Superior Health Institute, specializing in regulation on bone grafts and their substitutes. In 2008, he became a member of the new commission on "Staminal Cells and Tissue Engineering in Orthopaedics." He was involved in the development program and patented three different prosthetic systems (IOR Shoulder Prosthesis; Howmedica-Stryker Modular Resection System; Waldemar-Link Modular Megaprosthesis).

Rodolfo's various achievements also include being the author of many scientific publications on national and international journals, a member or honorary member of 13 international societies (some of which he served as President, Vice-President or Member of the Board), and was also in the editorial board of five international journals. A participant in several international training and service exchanges, particularly in the U.S. and at the Mayo Clinic, Rodolfo was a visiting observer for six months in 1980 and a visiting professor in 1993.

1993

Florence, Italy



MARIO CAMPANACCI was born and began his education in Parma, Italy. He received his MD in 1956 at the University of Bologna and completed his orthopedic training at the Rizzoli Institute in 1960. During his training, he spent substantial time on Surgical Pathology and Pathology of Musculoskeletal System, committing himself to the study and management of bone and soft tissue tumors. He joined the staff at Rizzoli as junior associate in 1961.

To refine his training in this growing field, he visited Dr. Lichtenstein at the Veteran Administration Hospital in San Francisco for six months and Dr. Milgram at the Hospital for Joint Disease in New York for two months between 1962-63. He became the head of the Musculoskeletal Oncology Unit of the Rizzoli in 1963. In the following years, he fully understood the need for a multidisciplinary approach to sarcomas and was one of the pioneers of multi-modal combined treatment and limb-salvage surgery for osteosarcoma.

Mario developed an endless and warm friendship with several emerging leaders of his time and

1997

New York, New York, U.S.



JOHN H. HEALEY, MD, was born in Lowell, Massachusetts on August 25, 1952. In 1974, he received his BS in Biology from Yale University and MD from the University of Vermont in 1978. John interned in General Surgery at the New England Medical Center Hospital in 1979, and orthopaedic residency at Hospital for Special Surgery (1979–1983), and served as a musculoskeletal oncology fellow.

Between 1983 and 1984, John returned to the Hospital for Special Surgery for fellowships in Biochemistry Research and Metabolic Bone Research. He was selected for the Leadership and Development Program training at the Sloan-Kettering Cancer Center to be groomed as a leader. He is now the Vice Chairman of Surgery for Education and Conferences and Chief of Orthopaedic Surgery at Sloan-Kettering Cancer Center.

Dr. Healey received numerous distinguished

honors and awards. Among these, a few are: a recipient of the Zimmer Award for Orthopaedic Research, since renamed Orthopaedic Research and Education Foundation (1985–1987); Kashiwagi—Sumihara Japan—United States Exchange Traveling Fellowship (1992), now called JOA—AOA Traveling Fellowship); Distinguished Academic Achievement Award, University of Vermont College of Medicine (2003); Orthopaedic Research Society Young Investigator Award (2003, with Dr. K. Kubo); Professor Peking University (Honorary, June 2005); Al Gordon Humanitarian Award (May 2006); Asphalt Green Community Center, New York, NY.

John also holds many inventions and patents, serves on numerous local and national committees and organizations. In addition to being a clinician, John is also an accomplished basic science investigator with many NIH RO1 grants serving as PI or CO-PI. He has published over 274 journal articles, edited one book and contributed 45 book chapters, and mentored many very accomplished fellows.

1999

Cairns, Australia



FRANCIS WILLIAM "BILL" MARSDEN (1935-2002) was Australia's grandfather of orthopaedic oncology. Graduating from University of Queensland in 1960 he entered orthopaedic surgery, a lifetime of dedicated work. His chosen path took him into the discipline of pediatric limb deficiencies and deformities and orthopaedic oncology. His commitment to these two areas reflected his interest in those specialized areas where so few have tread.

In leading the growth of orthopaedic oncology in Australia, Bill was pivotal in personally mentoring the development of centers in Queensland (Ian Dickinson), Sydney (Paul Stalley) and Melbourne (Peter Choong).

With the creation of such a critical mass, orthopaedic oncology went from being a special interest group into a fully-fledged multidisciplinary musculoskeletal tumor group with the inception of the Australian Sarcoma Group.

Bill was President of ISOLS in 1999 when he chaired the meeting in Cairns, Australia. This highly successful meeting opened the world to Bill's legacy and memories of that meeting still linger fondly in many members' memories.

Bill was widely read and had a particular love for good food, good wine, steam trains and classical music, of which Mahler was one of his favorites. These, together with his devotion to his patients and orthopaedic oncology, made him a much-loved man amongst his patients and colleagues.

2001

Birmingham, England



SIMON CARTER was born in Essex, UK and completed his schooling in medical studies at St. Thomas Hospital, London in 1979. His orthopaedic training started in 1984 at The Royal Orthopaedic Hospital in Birmingham where he studied Oncology under the guidance of Rodney Sneath. In 1992, Simon was appointed as a consulting orthopaedic oncologist at The Royal Orthopaedic Hospital after Rodney Sneath's retirement.

With his colleague Rob Grimer, the Oncology unit expanded to one of the largest units in Europe with the benefit of funding from the UK Department of Health. The unit has the benefit of a large prospectively maintained database. Coupled with the extensive use of endoprosthetic replacements, the Oncology unit at The Royal Orthopaedic Hospital has been instrumental in the development of advances in

prosthetic design.

Simon has been Director of the unit since 1998 and has seen the unit further expand and accept fellows and visitors from around the world. When Birmingham hosted the ISOLS meeting, Simon was the president from 1999 to 2001. This meeting unfortunately coincided with the 9/11 attacks and saw lots of registered participants withdrawing from the meeting. However, there was still an attendance of over 400 delegates for whom it is owed a very special thanks.

As a member of ISOLS since 1989, Simon has attended every meeting. As a trainee surgeon, it was a great honor for Simon to meet the "big players" in orthopaedic oncology and to have been accepted into their company. Being the president of ISOLS and bringing the Society into the new millennium was a great privilege for Simon.

2003

Rio de Janeiro, Brazil



REYNALDO JESUS-GARCIA, MD, PhD was born in Sao Paulo, on August 30, 1955. In 1979, he graduated from the Universidade Federal de Sao Paulo. He completed the General Surgery Residency in 1981 and the Orthopaedics Residency in 1983. At the end of Residency he started to study bone tumors and in 1986, started his Fellowship in the MD Anderson Cancer in Houston, U.S.. During the Fellowship in Bone Tumors, his chief was Professor John Murray, Professor Norman Jaffe, Professor Sidney Wallace, and Professor Robert Benjamin among others. In that time, protocols were starting to treat the bone tumor with neo-adjuvant chemotherapy.

After the Fellowship, Reynaldo returned to the Federal University in Sao Paulo, Brazil and kept in touch with Professor Murray and returned several times to MD Anderson. In 1992, Reynaldo was introduced by Professor Murray and Professor Jeffrey Eckhart and was admitted as an Associate Member in the American Musculoskeletal Tumor Society (MSTS) and started relationships with leaders in Orthopedic

Oncology in the United States. In Brazil, he introduced the needle bone biopsy and validated the Enneking Stage System, spreading its use throughout the country.

Reynaldo went to France in 1989 to attend the ISOLS in Saint Malro and started relationships with the international leaders. During the Symposiums in Singapore, Montreal, and Florence, he presented papers about osteosarcoma treatment, Ilizarov reconstructions to bone tumors, custom made prosthesis, and other topics related to limb salvage surgery. In New York, Dr. John Healey indicated him to be a board member of the Society and soon after started work organizing the secretary of ISOLS. In Cairns, Australia, he was indicated to be the next ISOLS President and was elected in 1999. The board decided to take the 12th ISOLS Symposium to Brazil in 2003, headed by Reynaldo and Professor Pires de Camargo (co-chairman).

After the Symposium in January of 2004, Professor Han Koo Lee of South Korea, the president of the Society, died in an accident. The Board of Directors met in San Francisco and decided, due to his leadership, expertise and dedication to the Society,

to retain Reynaldo as leader and president of the Society. However, with respect to the late president, he decided to create a new position as General Secretary of ISOLS. Having received support from all members of the board, Han Koo Lee was kept "in memoriam" as president the next two years. Reynaldo co-operated with the committee and the Korean organization in Seoul. The 13th ISOLS, held in September 2005, was a success. During the gathering, he passed the job of coordinating the Society to Professors Winkelmann and Gosheger of Germany.

Along with other board members, Reynaldo organized the position of the Secretary General, improved the numbers of participants of the Society,

and created the official site of ISOLS so others could collaborate with the study of limb salvage surgery. In Brazil, he was General Secretary and President of the Brazilian Musculoskeletal Tumor Association. With the knowledge he obtained from the ISOLS Symposia he could introduce and develop the use of bone needle biopsies, custom made prosthesis, allografts, vascularized fibular graft and other innovative techniques, allowing for the preservation of many patient's limbs. Presently, he serves as Chief of the Bone Tumor Department in the Universidade Federal de Sao Paulo and as the Director of the Brazilian Orthopaedic Society.

2005 Seoul, Korea



HAN KOO LEE completed his pre-medical work at Seoul National University, then attended the College of Medicine at Seoul National University, from which he graduated in 1954. He then faithfully performed his military duty in the Korean Army by serving in the Korean Army hospitals and at the 121st United States Army Evacuation Hospital. After the Korean War, Han Koo was one of the very few Korean physicians who received an internship and residency training in the United States during the 1950s.

In 1957, Han Koo served an internship at Columbia University affiliated hospital in the Manhattan section of New York, and then he entered a residency in orthopaedic surgery at the University of Kentucky in Lexington, KY. His mentor was William K. Massie Jr., MD, who trained at Massachusetts General Hospital and served as an Anna Kane Teaching Fellow at New York Orthopaedic Hospital.

Although Han Koo had hoped to continue his medical career in the United States after his residency and had obtained a fellowship position at New York Orthopaedic Hospital, he was recruited to Seoul National University Medical School in 1964, where he continued his professional career as a physician and professor. He taught modern orthopaedic surgery to young students and physicians and served as Professor and Chairman of Orthopaedic Surgery at Seoul National University. He founded the Korean Bone Tumor Society and the Korean Traumatology Association.

He also served as the president of several societies, including the Korean Orthopaedic Association, the Korean Knee Society, and the Asian Pacific

Musculoskeletal Tumor Society. Furthermore, as President of the International Society Of Limb Salvage (ISOLS), he completely devoted himself to hosting that group's 13th International Symposium on Limb Salvage that was scheduled to take place in Seoul, Korea in 2005. Sadly, his work was cut short by the tragic accident that took his life and the lives of his wife and mother-in-law, whom he unsuccessfully struggled to save from the fire.

Han Koo is survived by his three children. One of them, Francis, trained under his father and is currently working as Chief of the Tumor and Bone Disease Service and Director of the Center for Orthopaedic Research at New York Orthopaedic Hospital at Columbia University in New York as well as an active member of ISOLS. Han Koo was kind but determined. He followed both the modern and the traditional style of living, and he enjoyed mountain climbing, reading, watching movies, listening to music, and playing tennis and golf. He cared about residents and colleagues, and he established the Jeong-San (meaning "tranquil mountain," which was his pen name) Scholarship Award to enhance the orthopaedic education of younger generations.

When Han Koo taught medical students and residents, he always took the time to impart valuable lessons on medical ethics and on life in general in addition to the usual lessons in orthopaedic surgery. In particular, he would explain that there are three different types of doctors: a doctor who cures only a disease; a doctor who cures a person; and a doctor who cures a country (a "great" doctor). He himself ceaselessly practiced to be a doctor who cures a country. Han Koo Lee's indomitable spirit was remarkable to the very end, and he was an inspiration to us all.



DAE-KYUNG BAE, MD, PhD served as the 2005 ISOLS meeting Chairman. He was born on September 18, 1948 in Korea. Currently, he is the Professor and Director of Knee Reconstruction and Arthroscopic Surgery, Department of Orthopaedic Surgery, College of Medicine at Kyung Hee University Hospital, Seoul, Korea. Professor Bae received his MD in 1970, MS in 1973, and PhD in 1979 from Orthopaedic Surgery, Seoul National University, College of Medicine, Seoul, Korea. He completed his residency in Orthopaedic Surgery at the Seoul National University Hospital, College of Medicine, Seoul, Korea (1971-1975). From 1981 to 1982, he served as a Clinical Fellow at the Department of Orthopaedic surgery, St. Francis Hospital affiliated with Medical College of Wisconsin in Milwaukee.

From 1997 to 2003, he was the Chairman of the Department of Orthopaedics, College of Medicine, Kyung Hee University, Seoul, Korea. He also served as the President of the Korean Knee Society in 1997,

President of the Korean Society of Orthopaedic Biomechanics in 1999, President of the Korean Arthroscopic Society in 2000, President of the Korean Orthopaedic Research Society in 2001, and President of the Korean Bone and Joint Tumor Society in 2003. Additionally, Chairman and Board of Directors of the Korean Orthopaedic Association in 2003, Congress President of the 13th ISOLS in 2005, Congress President of the 4th Meeting of Asia-Pacific Knee Society in 2006, President of Asia Pacific Knee Society (2006-2008), President of CAOS, Korea (2009-2010), and President of the Korean Orthopaedic Association (2010).

Professor Bae published 275 papers and presented 204 meeting lectures. He is also a member of ISOLS, International Society of Arthroscopy Knee Society and Orthopedic Sports Medicine (ISAKOS), International Society of Orthopedic Surgery and Traumatology (SIROT), International Society of Orthopedic and Traumatology (SIROT), International College of Surgeon, council member to the Asian Pacific Orthopaedic Association, and a board member of both Asian Pacific Knee Society and Asian Pacific Arthroplasty Society.



SOO YONG LEE was born on December 29, 1950. After completing his premedical work at Seoul National University, he attended the College of Medicine at Seoul National University, from which he graduated in 1977. He then performed his military duty as the Korean Naval doctor. He finished his internship and residency from Seoul National University Hospital, specializing in Orthopedic Surgery. He then opened the Department of Orthopedic Surgery in the Korea Cancer Center Hospital, which is located in Seoul, and earlier served as chief of that department.

Soo Yong was really interested in surgical oncology. In 1986 he participated in the IAEA workshop course for radiation sterilization of surgical tissue. From 1988 to 1989, he studied oncogene in Japanese National Cancer Center Research Institute. From the St. Marlo ISOLS on, he has attended every meeting. When he

returned from Japan he started an oncology case conference with orthopedic doctors of other hospitals. Soo Yong has continued that case conference for three years, studying by himself and teaching the other doctors. In 1995, he held the 10th anniversary of his department, inviting Dr. Capanna, Dr. O'Conner, Dr. Uchida and Dr. Kawaguchi. It was the 1st International symposium of Orthopedic Oncology in Korea.

He also published a book, "Manual Of Orthopedic Oncology" (2nd edition), treated many osteosarcoma patients, and developed a temporary arthrodesis method for young children, which followed by stepwise lengthening and changing to a mobile joint. He also had used pasteurized autobone for reconstruction of bone defect. He has been in charge of the presidency of Korean Association of Tissue Bank and Korean Bone and Joint Tumor Society. Since 2005, Soo Yong has been responsible for overseeing the committee on membership of ISOLS.

2007 Hamburg, Germany



GEORG GOSHEGER is Chair of the Department of General Orthopaedics and Tumor Surgery at the Muenster University Clinics. The Department is subdivided in several sections, the tumor section containing 50% of the patient

population.

Born in 1967 in Dortmund, Germany, Georg finished his medical education in 1995 and entered directly into the field of tumor surgery. He worked together with Winfried Winkelmann for 12 years and got the title Professor due to his work on silver-coated tumor endoprostheses. The silver-coated

tumorprosthesis is patented and sold all over the world. Further research in tumor surgery unearthed different reconstruction methods such as growing-prosthesis, pelvic reconstruction and stump lengthening procedures.

He is a board member and treasurer of the European MusculoSkeletal Oncology Society (EMSOS), and in Germany he is the head of the German Association for Tumor surgery (DGOU).



WINFRIED W. WINKELMANN was born in the former East Germany in Biesenthal, near Berlin, in 1943. He moved to West Germany in 1958 and received his MD in 1971 from Heidelberg University. At the same year he started his orthopaedic training at the Department of Orthopaedics of the University of Heidelberg.

In 1974 he moved to the Department of Orthopaedics of the University of Duesseldorf and worked there under the leadership of Professor Schulitz until 1991. From 1991 to 2008 he was the

director of the Department of Orthopaedics at the University of Muenster.

During his time in Duesseldorf he started his work on bone and soft tissue tumors. His best ideas in surgical treatment of bone tumors, like hip rotationplasty, clavícula pro humero and hip joint transposition date from this time. During his time in Muenster he developed a new modular system of tumor prostheses (MUTARS) and together with his colleagues he built up one of the greatest tumor centers in Europe. As an emeritus, he is working today as a consultant of orthopaedic oncology at a private hospital in Hamburg.

2009

Boston, Massachusetts, U.S.



MARK C. GEBHARDT received his MD from the University of Cincinnati in 1975 and the orthopaedic residency training at the Harvard Combined Program (1978–1982). He has been an orthopaedic oncologist with an expertise in pediatric bone and soft tissue sarcomas and benign musculoskeletal tumors. He treats adults and children with sarcomas at the Children's Hospital and the Beth Israel Deaconess Medical Center. His research interests include limb salvage of bone and soft tissue sarcomas and the molecular biology of sarcomas and practiced orthopaedic oncology at the Massachusetts General Hospital for 20 years and has practiced at the Boston Children's Hospital since 1983.

In 2003, he was appointed Chair of the Orthopaedic Department at Beth Israel Deaconess Medical Center and rebuilt it from two members to a full service department with fourteen orthopaedic surgeons, three primary care physicians, two psychiatrists and several NP's and PA's. He also restored the residency program (part of the Harvard Combined Orthopaedic Residency Program) to the Beth Israel Deaconess Medical Center. The Department includes a musculoskeletal Unit with a rheumatologist and primary care sports medicine physicians and a recent multidisciplinary Spine

Center. He has had a leadership role in the institution as a member of the Chief's Council and Medical Executive Committee, and is Chairman of the Board of the Harvard Medical Faculty Physicians (HMFPP), which has more than 600 Specialists in 13 Departments. He is also on the Board of CareGroup, the overarching consortium that includes two other hospitals and President of the Massachusetts Orthopaedic Society. Also, he chairs the Orthopaedic committee of the Children's Oncology Group and is Past-President of the Connective Tissue Oncology Society, the Musculoskeletal Tumor Society and the Association of Bone and Joint Surgeons. He served on the AAOS Board of Directors and was Chair of the Board of Specialty Societies.

Mark has over 15 years of experience working for and being a Director of the American Board of Orthopaedic Surgery as well as being a member and ultimately the Chair of the ACGME Residency Review Committee for Orthopaedics and served on that Committee for nine years. He participates in the education of first and second year HMS students and directed the Core Curriculum for the Harvard Combined Orthopaedic Residency Program for ten years. He is the course director of the Boston Orthopaedic Pathology Course for New England Orthopaedic residents.



MARY I. O'CONNOR, MD, is Chair of the Department of Orthopaedic Surgery at the Mayo Clinic in Florida and served as President of the International Society Of Limb Salvage (ISOLS) from 2007 to 2009. Dr. O'Connor received her MD from the Medical College of Pennsylvania in 1985, completed her residency in orthopaedics at the Mayo Clinic in Rochester, MN in 1990 and her fellowship in orthopaedic oncology at the same institution in 1991. During medical school she was awarded the Eva Fernandez Fox Award for Personal Integrity, the Alma D. Morani Prize in Gross Anatomy and the National Health Policy Fellowship at the Department of Health and Human Services. During her residency she received the Mark B. Coventry Award for Outstanding Clinical Research. She joined the staff at the Mayo Clinic in 1991, and in 2004 she was honored with the Mayo Clinic Florida Distinguished Clinician Award. In 2005, she was named a "Local Legend" by the American Women's Medical Association and the National Library of Medicine as part of the "Changing the Face of Medicine" project co-sponsored by both institutions. In 2010 she was honored by the Jacksonville Business Journal as a "Woman of Influence" for her leadership roles in professional and community activities. She serves on the Executive Operations Board at Mayo Clinic Florida.

In addition to clinical duties, Dr. O'Connor has been active in research and education. With her mentor

Dr. Franklin H. Sim, she wrote landmark papers on salvage of the limb in the treatment of malignant tumors of the pelvis and shoulder girdle and has been published on a wide scope of oncology issues. More recently she has been active in the area of health care disparities and co-chaired the 2010 AAOS/ORSABS Research Symposium on Musculoskeletal Health Care Disparities publishing on sex and gender differences in knee osteoarthritis and on optimizing bone health care of hip fracture patients.

Dr. O'Connor was the first woman to be a member of the Musculoskeletal Tumor Society (MSTS), ISOLS, and the American Association of Hip and Knee Surgeons (AAHKS). She is President of the Association of Bone and Joint Surgeons and serves on the Board of Clinical Orthopaedics and Related Research. She is the past Presidents of ISOLS, AAHKS, MSTS and the Ruth Jackson Orthopaedic Society (RJOS), past Chair of the American Academy of Orthopaedic Surgeons Women's Health Issues Advisory Board and past member of the Advisory Committee on Research on Women's Health at the National Institutes of Health.

She has mentored many medical students interested in a career in orthopedics as well as residents and fellows focused on orthopaedic oncology and adult reconstructive surgery. She is co-editor of the Ruth Jackson Orthopedic Society Guide for Women in Orthopedic Surgery. Dr. O'Connor is committed to promoting women in the field of orthopaedic surgery and advancing the care of orthopaedic oncology patients.

2011

Beijing, China



WEI GUO was born in Qingdao, received his MD from Qingdao Medical College in 1984. He started his orthopaedic training at Qingdao Medical College and finished his training in Zhongshan Medical University and Peking Medical University, prior to receiving his PhD in Peking Medical University in 1993. He was a fellow in Orthopaedic Oncology at the Memorial Sloan-Kettering Cancer Center (MSKCC) between 1995 and 1998. Currently, Dr. Guo is a professor and chairman of the Department of Orthopaedic Oncology and a director of Musculoskeletal Oncology Laboratory of Peking University People's Hospital. He has dedicated his career to Orthopaedic Oncology for 27 years, performed more than 1,000 cases of complex limb salvage surgeries, published 121 papers and 5 orthopaedic books, and acted as an editor for 11

orthopaedic journals.

He is one of the pioneers to introduce advanced surgical techniques and strategies from abroad to China and has overcome several obstacles to reduce the bleedings during complicated sacropelvic tumor surgeries. As a leader of the Chinese Orthopaedic Oncology, Dr. Guo has trained more than 200 fellows/residents and spread his advanced surgical techniques and strategies all over China, dramatically improving the surgical results and long-term function of limb-sparing patients in Chinese population. Due to his outstanding contribution, Dr. Guo has received many national awards from Chinese Medicine Association, Ministry of Health and Ministry of Education of the People's Republic of China. Among those awards, Chinese Medical Science and Technology Award is the highest national awards in the field of medicine in China.

ISOLS 1981

Rochester, Minnesota, U.S.

THIS INAUGURAL MEETING (called Workshop then) marked the beginning of extensive collaborations and interchanges among related disciplines in the field of limb salvage. Though tumor prosthesis design and application were the main theme, other methods of bone and joint reconstruction were also reported. There were several breakthroughs that led the entire bone/joint replacement and musculoskeletal oncology field. Just to name a few, this group introduced the application of porous coating (the Ti Fibermetal) for implant fixation to bone; adapted and perfected the modular implant design concept; improved the use of segmental allograft in bone/joint replacement; first discovered the metal-to-metal wear particles causing massive bone resorption (only being identified as the pseudo-tumor years later); advanced several adjuvant chemo and radio therapy regimens. All of these have been incorporated in a separate section of this monograph.

This group also demonstrated the importance of closed collaborations with the custom implant industry making orphan devices to serve patients with unusual needs. It was with the very unique attributes and devotion as a group that this symposium is able to survive the test of time and adversities and continue as a forum and expanded into a professional society to serve the patients. There were 127 participants from 23 countries with a total of 56 twenty-minute papers. Ninety percent of the program was devoted to prosthetic implants with full participation industry

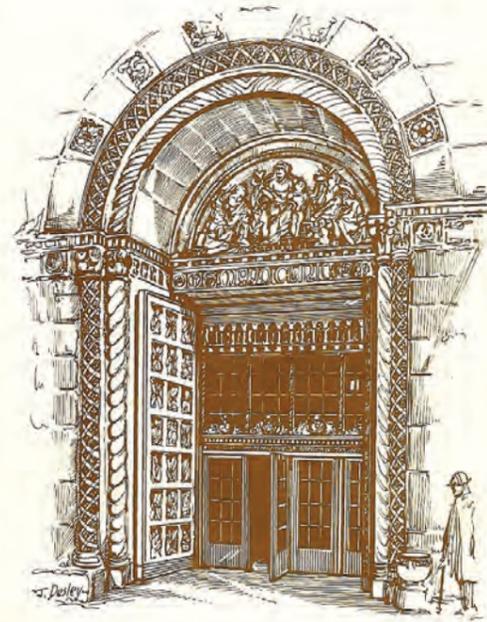
Chairpersons : Jack Ivins, Frank Sim, Ed Chao
 Dates : October 5-7, 1981
 Participants : 127 people from 23 countries

participation. A separate session in the Workshop was designated to the manufacturers to discuss problems in both custom-made and off-the-shelf implants. A final panel discussion on problems, long-term results and quality of life issues was conducted and summarized in the ISOLS Proceedings Book published in 1983 by Thieme-Stratton, NY.

THE DESIGN AND APPLICATION OF TUMOR PROSTHESIS FOR BONE AND JOINT RECONSTRUCTION

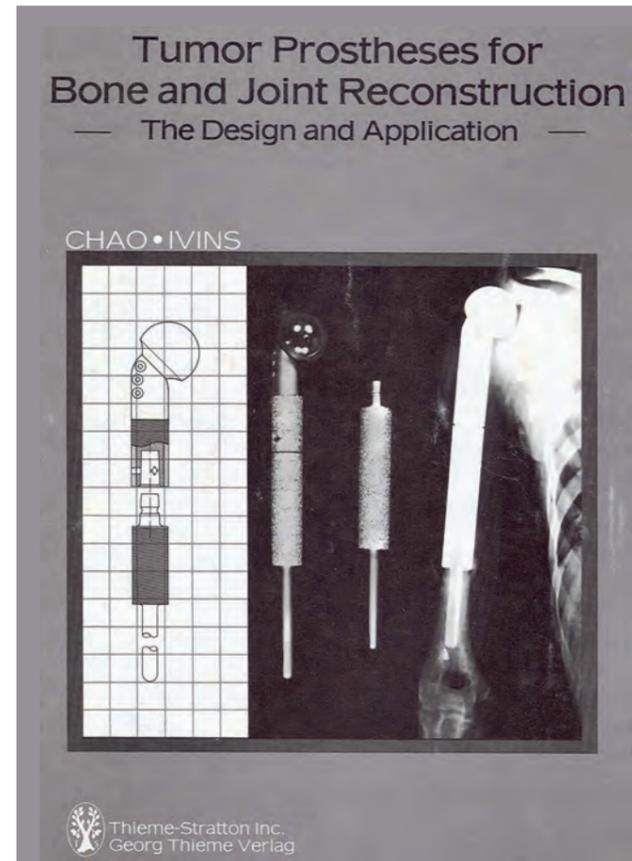
Heritage I, II, Kahler Hotel
 Rochester, Minnesota, U.S.A.

October 5-7, 1981



Workshop Chairmen:
 E. Y. Chao, Ph.D. and F. H. Sim, M.D.

The '81 ISOLS Symposium program with a stamp indicating its support from NCI/NIH.



The unique contributions of the ISOLS Symposium participants resulted in this Book published in 1983, which contained many original innovations preceding the fields of bone/joint replacement, biomechanics, and biomaterials in addition to musculoskeletal tumor management. The last five copies of this Book were donated to the winners of the best Posters at the Beijing ISOLS meeting, September 15-18, 2011.



S. Inoue and H. Hirotsu at the Zimmer exhibit desk



J. Ivins, K. Knahr, R. Kotz, N. Jaffe



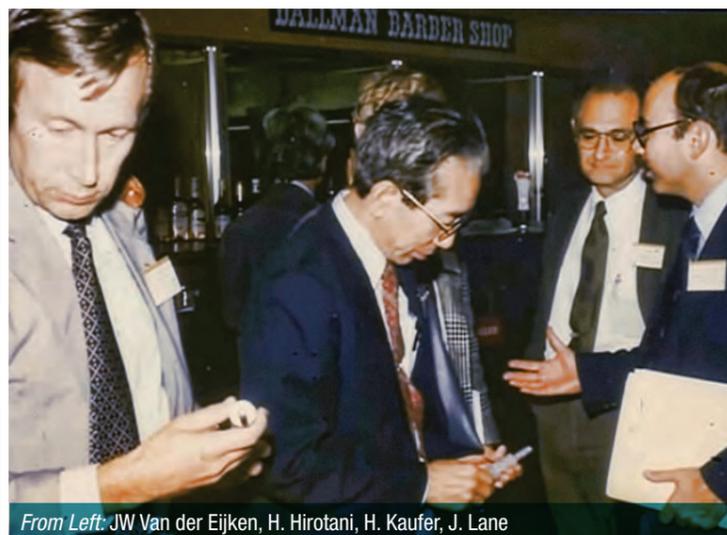
The 127 participants from 23 countries had gathered in Rochester in October 5-7, 1981 for three days to exchange their experiences and problems related to limb salvage.



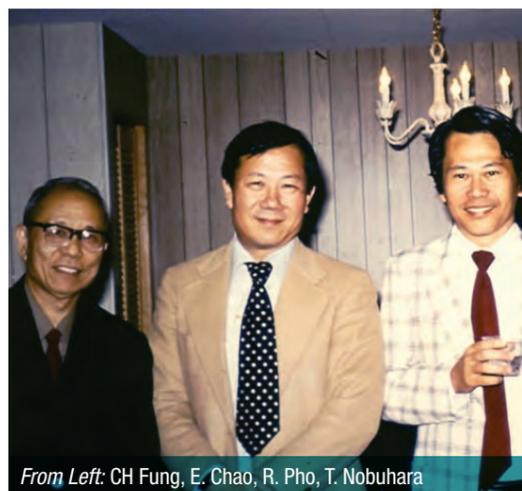
Ed Chao, T. Nobuhara, S. Inoue



Mr. and Mrs. F. Langlais



From Left: JW Van der Eijken, H. Hirotsani, H. Kaufer, J. Lane



From Left: CH Fung, E. Chao, R. Pho, T. Nobuhara



From Left: K. Takahashi, N. Takada, S. Inoue, HKL Nielson, M. Matsui, S. Tatezaki



From Left, Standing: DZ Yang, K. Tomita, S. Tatezaki, N. Takada, BF Qian, T. Nobuhara, R. Pho. From Left Sitting: S. Inoue, E. Chao, CH Fung, H. Hirotsani

ISOLS 1983

Vienna, Austria

Chairpersons : Rainer Kotz
 Dates : September 5-8, 1983

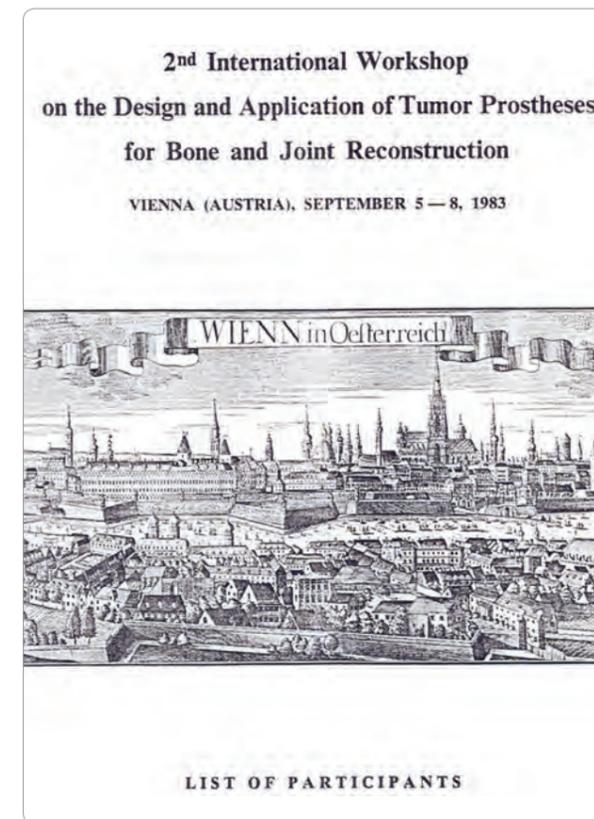
IN HIS WELCOME INTRODUCTION, Professor Rainer Kotz, the 2nd ISOLS workshop chairman, stated “For the first time ever an exhaustive “stock-taking” in the field of custom-made prostheses available for tumor operations was undertaken in Rochester in 1981. It represented the first step on the road to a systematic concerted action in this field.” Now, 30 years later, we will convene for the 15th meeting in Beijing, one shall exclaim, “Baby, you have come a long way!”

The meeting in Vienna was important as it carried the needed momentum to consolidate the common interest towards a formal organization. For that purpose, Rainer instigated special discussion on limb salvage problems and the functional outcome of reconstruction. Many legendary figures in orthopaedics, oncology, and medical sciences attended this meeting. A separate session on modular implant was staged to mark the earlier organized exchange on the biomechanics of its design principles and in the choices of materials.

Howmedica was first to introduce the KMFT system, with Kotz leading the development team for limb salvage application. This meeting, though small, had more material scientists and bioengineers joining the presentation and discussion, a much needed well-balanced group from different disciplines. From the orthopaedic device industry point of view, segmental bone/joint replacement prosthesis was still regarded as a special service to the surgeons and patients similar to that of the orphan drugs or devices not regulated by the FDA.

On a parallel line of development, Zimmer was ready to preview production of the modular Ti fibermetal coated segmental prosthesis system at this meeting. Unfortunately, the plan was cancelled by their newly appointed Director of Research and Development, a major setback to the company’s established reputation as a patient-service based commercial entity.

The social program of this meeting was truly spectacular, Beethoven’s “Fidelio” topping all the entertainment at the Vienna State Opera House. Professor Kotz concluded, “If this 2nd Congress of Vienna can help to turn the heterogeneous group of scientists attending the workshop in to a small band of brothers who together will be able to solve more rapidly and better the burning issues in our field...,” well said Rainer, we have just managed to solve some but not all issues and it only took 28 years!



Young Ulli Heise of Hamburg and Winfried Winkelmann of Dusseldorf.



Bill Enneking and H. Willert.



Dr. & Mrs. Jim Otis; Mark from Homedica.



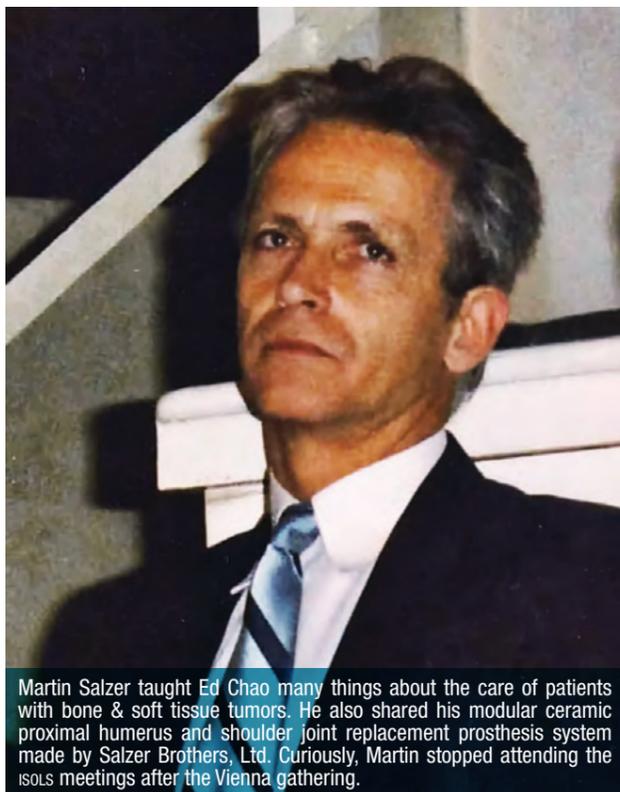
Mechthild Salzer-Kuntschik discussing a tumor case.



Y. Ogiwara and Joe Lane with another participant.



R. Kotz and G. Rosen of the Hospital for Special Surgery, New York.



Martin Salzer taught Ed Chao many things about the care of patients with bone & soft tissue tumors. He also shared his modular ceramic proximal humerus and shoulder joint replacement prosthesis system made by Salzer Brothers, Ltd. Curiously, Martin stopped attending the ISOLS meetings after the Vienna gathering.



Rainer, in his haydays a middle distance runner and very fine tennis player, was the inventor of the Howmedica's KMFTTR system for limb salvage application.



Eckhardt & Kotz.



Kotz & Dubosset.



Mike & Mrs. Lewis, Jeff Echardt, and Professor Akamatsu.



Dr. & Mrs. ZB Chan, Dr. & Mrs. Jim Johnston, Dr. Katsuro Tomita.

ISOLS 1985

Orlando, Florida, U.S.

Chairpersons : Bill Enneking & Gary Miller
Dates : October 2-5, 1985

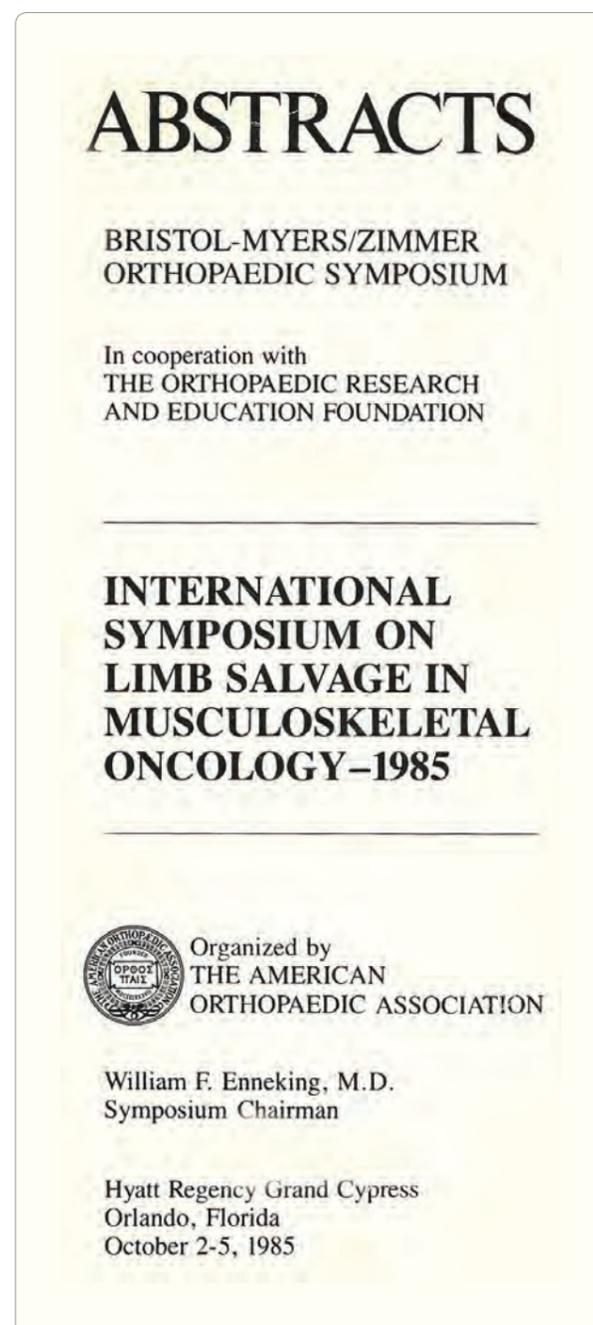
THIS MEETING GAVE the needed impetus and creditability of an informal gathering on the subject of limb salvage to move forward, thanks to our meeting chair, Bill Enneking, and his co-chair, Gary Miller. Because of his reputation, this symposium was generously funded as a Bristol-Myers/Zimmer Symposium as well as officially endorsed by the AOA, an incredible foresight of our leadership recognizing so early the proper relationship between academics and industry! The entire Symposium was structured into seven panels:

- 1 Fixation for prosthetic implant after tumor resection;
- 2 Functional results of reconstruction for periacetabular pelvic resections requiring sacrifice of the hip joint;
- 3 Functional results of modular and customized prosthetic devices after resection involving a joint;
- 4 Adjuvant therapy for local tumor control before and after resection;
- 5 Functional results following the resection of the tumors about the knee;
- 6 Effectiveness of Methylmethacrylate (PMMA) as physical adjuvant in local tumor control;
- 7 Short presentations of innovative techniques.

Each panel had a moderator giving an opening and closing statement, with the panelists and participants presenting topics related to the panel discussion theme, with ample time for discussion in between. This was truly a wonderful and creative way to cover a review of current state-of-the-art and future advances of all subjects intimately related to the limb salvage aspects of musculoskeletal oncology. In addition to the moderators, panelists, and participants, those remaining were assigned as auditors, thus involving all of the 160 symposium attendees. These topics also became standard subjects recurring in subsequent ISOLS symposia. It is worthwhile to mention that many of the current hot topics in orthopaedics had been discussed in our meetings which exemplified the inter-disciplinary nature of this group as its merited tributes spread far beyond the musculoskeletal oncology.

At the end, a formal Bristol-Myers/Zimmer Symposium Book was published based on the contributions made by the moderators, panelists and

participants. To assure that materials were submitted in time for editing, the Symposium Chair set the rigid rule of reimbursement based on receiving the manuscript, which worked perfectly. Today, this book entitled "Limb Salvage in Musculoskeletal Oncology" remains an important reference.



ISOLS 1987

Kyoto, Japan

Chairpersons : Takao Yamamuro
Dates : October 28-31, 1987

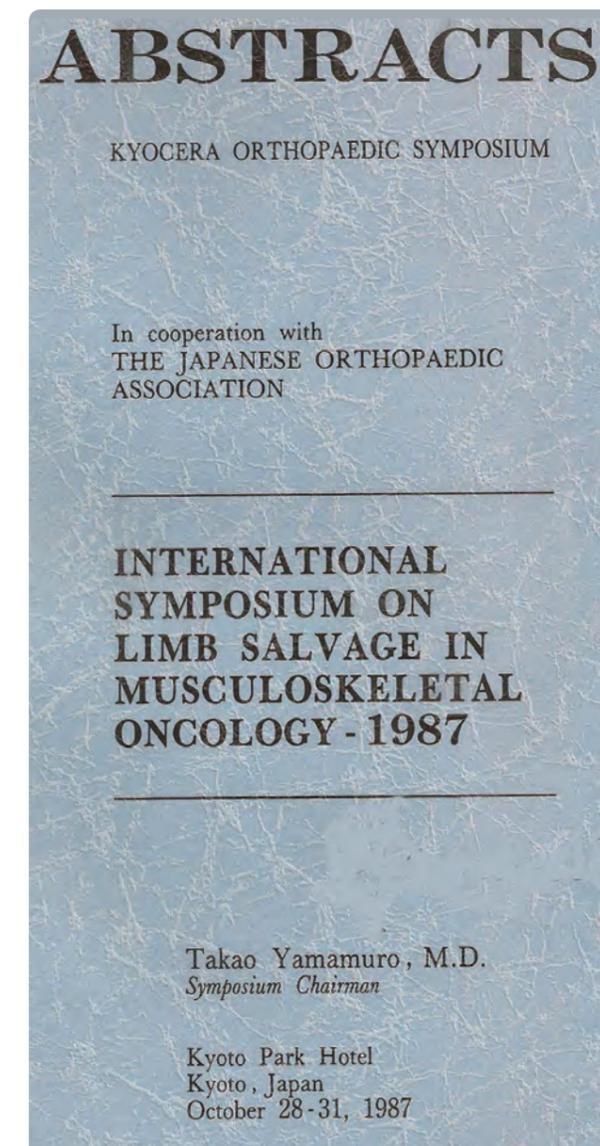
SINCE THE ORLANDO MEETING, the organizing committee decided to rotate the biannual symposia venue amongst three global regions: American Continent, the Asian-Pacific region, and the European Continent. Therefore, Kyoto was the first symposium to be held in Asia. Our meeting Chair, Takao Yamamuro successfully retained the Kyocera Cooperation's sponsorship, entitling the meeting as the Kyocera Orthopaedic Symposium on Limb Salvage. Officially endorsed by the JOA, the academia-industry relationship was transparent which set an ethical standard before the current confining and stringent situation. The entire Symposium was structured into 10 panel sessions:

- 1 Evaluation of Reconstruction after tumor resection;
- 2 Influence of Limb Salvage resections on the Rate of Long Term Survival in Malignant Tumors;
- 3 Limiting Factors for Limb Salvage Operation;
- 4 Rationales of Adjuvant therapies for Limb Salvage (Chemotherapy, Immuotherapy, Irradiation and Hyperthermia);
- 5 Biomaterial and Biomechanical Evaluation of Tumor Prostheses;
- 6 The Use of Ceramic Prostheses for Replacement of Bone Tumors;
- 7 Prosthesis vs Osteochondral Graft, Alternative Substitute for Bone Tumor;
- 8 Reconstruction after Resection of Large Bone Tumors about the Hip and Pelvis;
- 9 Functional Results Following Resection of Tumor in the Proximal Humerus and Tibia;
- 10 Innovative Techniques.

Keynote Speakers

There were two keynote speakers: Mario Campanaci from Rizzoli spoke on "Pelvic Resection for Treatment of Primary Bone Tumor" and Ulf Nilsson from the Karolinska Institute reviewed for us on "Results of Interferon Treatment of Osteosarcoma." The moderators, the panelists, and the speakers all brought a state-of-the-art experience in different areas of the orthopaedic and bioengineering fields, which made this Symposium an exciting experience

for all participants. Many of our discussion topics pioneered other fields, not just limb salvage. This unique distinction existed across the board in the ISOLS organization, which other orthopaedic surgeons, basic scientists, biomaterial and bioengineering specialists have no claim to. In addition to the 86 moderators, panelists, and speakers, the remaining 111 were actively participating as auditors, giving every participant a duty. To assure all panelists and speakers submitting their materials for another Symposium Book (entitled "New Development for Limb Salvage in Musculoskeletal Tumors," edited by Takao Yamamuro,



published by Springer Verlag in 1989, and contained 693 pages and 277 figures), our symposium chair withheld the expense reimbursement till receiving the manuscript. Many of the contributors had their original work published in this Book making it a definitive reference in limb salvage. Such talented

leadership was key to the success of other national and international organizations, leading to our own Professor Yamamuro being elected as the President of the Japanese Orthopaedic (1989–90), and several years later elected as the President of SICOT.

Beloved Colleagues



Although the above picture was not taken during the 1987 ISOLS, it contains two deeply missed people. Professor Han Koo Lee (far right) shall be covered in the “Our Missed” section of this monograph. David Dahlin (center), a dear friend and colleague, was a renowned bone pathologist whom everyone in ISOLS had the privilege of reading his books and numerous landmark articles. In 1989, our 1987 ISOLS organizer, Professor Takao Yamamuro was elected as the President of JOA and invited David Dahlin and Bill Ennecking as his Presidential lecturers. David was

retired then and had just lost his beloved wife, so naturally he was rather apprehensive in accepting such an honored invitation. However, after strong persuasion and insistence from Ed Chao, he accepted the invitation with both pride and happiness. Ed and David discussed details of the trip and the lecture in Japan several times. David was a modest person who discovered that after retirement an old man can feel like a child again. Twenty-two years later, these memories are beloved living testimonies. David, you are most assuredly loved and missed.

ISOLS 1989

Saint Marlo, France

Chairpersons : Frantz Langlais
 Dates : September 6–9, 1989

THE 5th ISOLS MEETING took more than two years to plan. At the end of the Orlando Workshop (or Symposium), an announcement was made to solicit sponsors amongst the Continental Europe countries for the 1989 Symposium. Already on the Symposium Planning Committee Frantz Langlais approached Ed Chao quite early with his strong intention to host the 1989 event. Ed recommended Frantz to submit his proposal before the end of 1985 since other European representatives were earnestly bidding for the same proposition. Frantz did exactly that and asked Ed to review the proposal before submitting it to the Planning Committee, half of which were Europeans.

During the 1986 AAOS annual convention, Ed Chao requested a Committee meeting with more than half of the members present. Although several other propositions were verbally presented, Frantz's written proposal had already circulated before the meeting resulting in a unanimous agreement to support France as the hosting country of the 1989 Symposium and Frantz Langlais as Chair. Frantz and Ed began their fund-raising effort during the 1986 AAOS meeting by visiting the chief executives of all the major orthopaedic device companies in person.

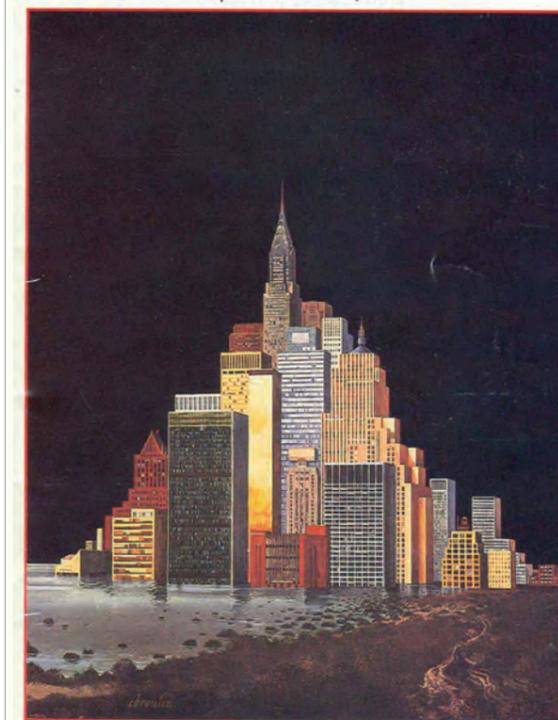
The 1989 meeting site and Symposium Chair were formally announced during the '87 ISOLS meeting in Kyoto. Frantz presented the preliminary plans, which stirred up enormous excitement and anticipation amongst the large numbers of participants in Kyoto. Frantz and Ed soon realized that to stage a first rate meeting they needed funds in addition to the registration fees. Both men formally wrote to the companies and visited their booths again in the

1987 AAOS to confirm their commitments. In 1988, Ed visited Frantz went over all the details of the meeting program. Frantz attempted to make the meeting an unforgettable event, which included spectacular scientific and social programs. He achieved success as well as generating a significant surplus, saved at the time and later used to help create the formal organization of the International Society Of Limb Salvage.

It is well said that, “People die twice, once as mortals, and the other in memory!” With his extraordinary achievements, Frantz shall live in the memory of this generation and the next.



 **5th International Symposium on Limb Salvage**
 Saint-Malo
 September 6th-9th, 1989



SCIENTIFIC PROGRAM



Professor Matejovsky from Prague, Jan and Doug Prichard.



Joyce & Harold Dick, Columbia University, New York.



Dr. & Mrs. Doug Pritchard.



Dr. & Mrs. Gary Bos.



Professor and Mrs. Mike Simon, Professor and Mrs. Steve Gitelis, the Chicago contingent.



On the dinner cruise to Chateaubriand. Here is the French group with Professor Tomelo and Languépin in the front.



Professor & Mrs. Henry Mankin; Professor & Mrs. Gary Friedlaender.



To reach St. Marlo, Frantz had arranged a special train just for the ISOLS participants from Paris. Here, Bill Enneking, Dr. Hiayashi of Okinawa and Rainer Kotz were ready to board the train.



Peter Ritschl of Vienna with Jane & Ed Chao inspecting the backdrop of Mont Saint Michele for the group pictures.



The aerial view of the majestic Mont Saint Michele.



The 1st ISOLS pilgrim group to the Mont St.-Michele. Can you find yourselves?



The 3rd ISOLS pilgrim group led by the lovely Mary Bee and the friendly and light-hearted Jim Johnston of San Francisco, while the others continue the success of ISOLS.



The 2nd ISOLS pilgrim group to the Mont St. Michele Abbey. Second from the left was Professor Harold Dick, chair of orthopaedics at Columbia University in New York, a dear friend who passed away a several years ago. His lovely wife, Joyce is on his left with Jane, Ed, Professor and Mrs. Robert Pho of Singapore.



The 4th ISOLS pilgrim group led by Professor and Mrs. Henry Mankin in the middle.

ISOLS 1991

Montreal, Quebec, Canada

IN THE EARLY YEARS, the ISOLS president enjoyed a lot of autonomy and flexibility with meeting plans. The first few meetings lacked an organizational structure since, at the time, no ISOLS Board existed. The new president relied heavily on past presidents for advice and assistance. There was no membership list and no start up funds available, fortunately, Ed Chao had kept a list of attendees from all of the previous ISOLS meetings. Without any organizational backup, it was a heavy financial risk to book a venue for the meeting, and arrange hotel rooms. Previous meetings in Orlando and Kyoto received huge financial grants from the industry, which helped to attract numerous presenters. For Montreal, the brunt of the cost had to be borne by the attendees. For the first time, ISOLS had a significant registration fee. One of the benefits of rotating international venues was the opportunity for each country to highlight its best cultural features. In order to have people attend the social events, the cost of the social program events were inclusive with the registration fees.

Within all the successful meetings, the program is the most important and essential ingredient.

Chairpersons : Ken Brown
 Dates : September 8–11, 1991

Since it was uncertain that enough surgeons would attend the meeting to cover expenses, attracting the widest group of potential presenters was the best strategy. Therefore, surgeons who had experience with revision hip surgery to address the tumor audience were also invited. Their experience and methods to treat difficult revision hip problems were different than oncologists. Several prominent revision surgeons agreed to be guest speakers. Also invited was a prosthetist from New York City, to talk about advances in the development of artificial limbs. For the Montreal meeting a theme was chosen, complications and how to prevent and treat them, to entice the interests of orthopaedic surgeons. After mailing out the information to potential presenters, a flood of abstracts were received, insuring a successful meeting.

Ken Brown was very fortunate to have Doctors Ed Chao, Rainer Kotz and Frantz Langlais to act as mentors. Those men met at the Mayo Clinic before the AAOS academy meeting to review abstracts and finalize the planning. During the AAOS, they were able to get firm commitments from industry to provide some funds and attend the meeting to showcase their medical devices. The financial support that industry provided came without any conditions. McGill Orthopaedics provided some funds for secretarial help. Osteonics, Biomet and Howmedica were particularly generous.

Manuscript

Most of the previous meetings presidents edited a textbook containing the papers presented at the meeting. It was usually difficult to get the completed manuscripts submitted after the meeting was over. We decided to get the textbook published before the meeting. We were able to accept the last manuscript seven days before the meeting began with the final textbook available at the start of the meeting. This was quite a noteworthy accomplishment, however, it did have a sour side. After the meeting was over, many of the presenters wished to submit their manuscripts to major journals for publication. The editor of JBJS at the time considered this “double dipping.” We considered that the book was only an extended proceedings of the meeting and only 300 books were produced. Many of the manuscripts in the book were less detailed than what was being submitted to the peer reviewed journals. Fortunately, the editors of other journals adopted a more flexible approach and did accept manuscripts as originals.

Social

In preparation for the meeting, a number of social events was considered, one of them being an authentic Quebec Cabane A Sucre “Sugar Shack” experience. This necessitated a 45-minute bus ride outside of Montreal. When all of the thirsty attendees departed the buses and drank their first drink, the cost had only included one drink. The bar had to be opened, otherwise a riot of sober doctors would have broke out. Although the Sucerie de la Montagne had music and dancing for entertainment, this was not part of the signed contract. The owner of the shack, who wore lumberjack attire and a huge white beard, proceeded to entertain everyone by getting audience participation. He had a competition to choose the champion outdoorsman among the ISOLS guests. Orthopaedic oncologic surgeons are very competitive so he had no trouble finding volunteers for the event. They were made to remove their socks and shoes and sit in a circle. Participants were given different objects to chop with an axe. After they had honed their lumberjack skills, the competitors were blindfolded for the final event. What the audience saw were blindfolded participants chopping up their own socks. All of the prominent ISOLS leaders who were involved displayed a good sense of humor and howled with laughter with the audience when they found out what they had done.

Conclusion

In the end, the meeting was a great success with more than 300 attendees. Ken Brown was happy to pass the presidential gavel to Dr. Robert Pho. Robert stated he felt some pressure because of the success in Montreal but was also greatly encouraged to host the event in Singapore.



Ian & Mrs. Dickenson, Ogihara & Eckardt with Keith Wright in the background

Dr. Kang, Ian Ed & Jane Chao

Editor's Note

The 1991 ISOLS meeting in Montreal had a very significant meaning for Ed Chao in several aspects. This was the 5th meeting and 10th year since the beginning of our gathering for the same cause and now the Society was formally established. Everyone shared the same enthusiasm with moving the organization forward. This meeting also maintained the proper balance of material sciences and bioengineering participation along with its core emphasis on musculoskeletal oncology. This was led by the Canada's Dennis Bobyn and the UK's Peter Walker, then in Stanmore taking John Scales' chair position.

Another interesting but important tribute to osteochondral allograft application merited special notation. This was the computer-aided preoperative planning and adjunct application of joint osteotomy needed for proper pressure reduction to the allograft, an original concept introduced by Allen Gross of Toronto, and achieved by Ed Chao using a special software, Osteotomy Analysis and Surgical Intervention System (OASIS). This concept along with more advanced software and database are now being used for allograft size matching and surgical planning in the frame work of Digital Bone Bank, spear-headed by our colleagues in Argentina.



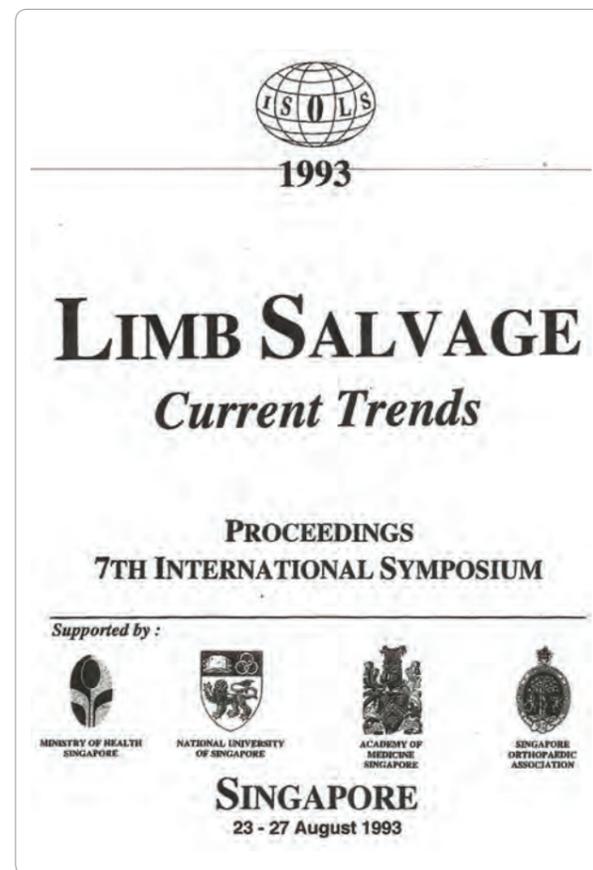
Jeff had lost his shoes and socks during the competition but borrowed someone's sneakers in order to play in the band.

ISOLS 1993

Singapore

Chairpersons : Robert WH Pho
 Dates : August 22-27, 1993

IN HIS MESSAGE to the industrial sponsors, Robert Pho stated, “the 7th International Symposium on Limb Salvage has once again been brought back to Asia, and Singapore has been given the honor to host this Symposium. This very prestigious international Symposium based on major reconstruction of musculoskeletal defect for tumor resection was first held at the Mayo Clinic in Minnesota, Rochester, U.S. in 1981 and since then has been rotating from the Asia-Pacific Rim, Europe and North America Continent biennially. It is the second time that this prestigious Symposium is brought back to Asia. More important, it will be held in Singapore, a gateway to the western Pacific Region, which has seen rapid advancement in medical sciences recently. The Symposium which is jointly sponsored by the Ministry of Health, National University of Singapore, Academy of Medicine and Singapore Orthopaedic Association will be held from August 22 to 27, 1993 in one of the leading hotels in Singapore. It will draw authorities and pioneers of surgery, medical research scientists, bioengineers and manufacturers together to discuss the latest research on oncological advancement in diagnosis and other modalities of treatment, especially in the bioengineering aspect, prosthesis, allograft and free tissue transfer. It represents extreme prestige and recognition for Singapore to host such an international event.” A well deserved thanks goes out to Robert for a strong endorsement of this group and its intended missions.



Symposium Proceedings Book

To outdo what Ken Brown did in Montreal, Robert also had his Symposium Proceedings Book entitled “Limb Salvage-Current Trends”, a total of 619 pages with 99 papers in 17 sessions plus 120 poster abstracts, readied at the meeting. He was even more creative by selling them for 32 dollars each, a bargain, to subsidize the meeting cost. All major contributors had managed to have their original work published in the volume. Chao and Sim’s contributions in the modular implant design was in the Biomechanics and Optimization of the Morse taper joint design, which is still being regarded as the earliest and most indepth biomechanical analyses on this subject today.

In the “Introduction,” Robert further stated that, “Limb Salvage has reached a height of sophistication with acceptable and predictable results. Despite this, there is a deficiency in out understanding of tumor biology and the lack of critical methods of assessment of the techniques in limb salvage. At



the 7th Symposium on Limb salvage, we aim to crystallize our knowledge on the basic concept in the field by emphasizing research related to the biology of tumor, tumor margin and different types of bony reconstruction using biological substitutes, endoprosthesis and other modality of treatment. We have also included a discussion on soft tissue reconstruction for minimizing the function and cosmetic drawbacks of limb salvage surgery.” Robert had truly incorporated many groundbreaking subjects, making this organization unique and challenging. He continued, “As this is the first time the Symposium is held in South-East Asia, we have also included different techniques that have been advocated by many less fortunate nations with limited resources to overcome limb salvage problems!” Robert’s comments

are sentimental, realistic, and true to this very day. A great deal of respect is owed to Robert for his life work and his involvement in ISOLS.

Scientific Contents and Social

The scientific contents of this Symposium were both broad and deep. The various research projects, innovative ideas, and clinical trials of new methods and implants were reaching a matured stage with longer follow-up. Hence, many presenters were anxious to show off their findings, which was both exciting and fulfilling for all participants. To have this happen in Singapore gave Ed Chao a special feeling since he had been helping Singapore since 1980. He was instrumental to Singapore physician’s advanced training shifting from the United Kingdom to the United States, starting with the orthopaedic training rotations. Ed was most impressed by every aspect of Singapore, which often gave him the ultimate sense of pride and gratification as a Chinese descendant struggling to survive and exceling in a different environment. The great success of the ISOLS meeting in Singapore was a very proud moment in Ed’s life. The social program was equally entertaining, the only caveat being temperatures of around 120° heat and 98% humidity was a punishment for die-hard tennis lovers like Ed.



A unique deed Professor Pho and his organizers did for ISOLS was to award a handsomely prepared certificate of gratitude to all previous ISOLS presidents.

Editor’s Note

For Ed Chao, 1993 was a significant point in time and a landmark for his orthopaedic career. It was at this time he took an early retirement from Mayo to join Hopkins. He was extremely apprehensive fearing

that the “desertion” of my beloved institution and people who taught him everything he knew about orthopaedics and limb salvage would severely affect working relations with orthopaedic oncologists and fellow ISOLS colleagues, even with a bargained condition of signing up Frank Frassica as an orthopaedic faculty at Hopkins as an exchange. Ed’s closest working colleagues at Mayo and elsewhere had repeatedly assured him that nothing would change their working and personal relationship and encouraged him to start another distinguished career. In retrospect, Ed very much doubts his decision, not so much on leaving Mayo but more on the choice of where to move to. Ed is a strong believer in fate and where one is lead to their destiny. There might have been regrets in the back of his mind but never in the choice with leaving engineering profession to enter orthopaedics services and devoting half of his time and effort working for ISOLS, its members, and the common goals the group shares and wishes to achieve.



York and Sherry Chow are in the front and you should know the rest including the ever-naughty Frank and always laughing Jim!



The oriental beauties: Mary Bee Johnston, Jane and Sherry Chow. No offense, Sherry, in our mind, you are always an oriental beauty!



The Chairman of ISOLS Singapore and his organizing committee members. The left is a dear friend Professor SP Chow from Hong Kong and on the right is our missing Ulf Nilsson from Sweden!



Many of Professor Pho's organizers all became very important leaders in Singapore health care.



Professor & Mrs. Langlais and Mrs. Tomita with Nilsson.



The organization committee's reception dinner.

ISOLS 1995

Florence, Italy

Chairpersons : Mario Capanacci, Rodolfo Capana
 Dates : May 10-12, 1995

CRITICALLY, 1995 WAS THE YEAR our Society formed a tentative set of bylaws with participation in the Limb Salvage meetings increasing steadily after the 7th symposium. The Board largely practiced established rules and abandoned the old traditions from the days of the Symposium "Organizing Committee" but there were unexpected niches and exceptions.

Site Selection

When the Symposium to be held in Europe was up for discussion during the 1991 Board meeting in Montréal, an announcement was made that those who wished to host the 1995 meeting should submit a proposal. As the Secretary of ISOLS, Ed Chao was very happy to receive formal and informal propositions from several countries including the strong bidders from Italy and Sweden, both of which submitted the most detailed and attractive written proposals. The Board members planned an in-depth and careful discussion of their choices and put everything to a vote, including the consolation plans following the parliamentary procedures which were very important for countries with significant contributions to limb salvage. Unfortunately, someone jumped the gun and communicated the premature decision of the Board, which had caused rather harsh responses mainly from Ian Goldie, Andris Kreicbergs and Professor Alho of Norway.

Ed Chao wishes to use this opportunity to express his most sincere apology to all the colleagues from the Scandinavian countries, especially Sweden, on behalf of that time's ISOLS Board. Although no one would question the wisdom of choosing Florence for the 1995 ISOLS site, in retrospect, the selection process and handling of the Board decision should have followed the established protocol. With great sensitivity and skillful diplomacy, a lesson should be learned by our present and future leaders.

Beautiful Florence

The Florence meeting was the first to have a combined group among the EMSOS, AMSOS and ISOLS in one of the most attractive cities in Europe. The meeting sites of the Palazzo dei Congressi and Centro Affari were situated in a beautiful garden in downtown Florence. The Palazzo dei Congressi consisted of an old comfortable 19th century villa with an annexed modern, efficient, and a well equipped and attractive facility.

All were in for an extraordinary treat, both

visually and emotionally, all the while conducting free interchange of ideas and discuss future advances on limb salvage in such a fantastic surrounding. The sightseeing and tour programs were excellent. A much appreciated and heartfelt thanks should be given to Mario and Rodolfo for putting together such a spectacular meeting for all.



Planning and Difficulties

During the planning for ISOLS Florence, conference support from the pharmaceutical and surgical implant industry began to be scrutinized by government agencies in the U.S., Japan, and the western Europe countries. This greatly changed the scene and made it far more difficult for symposium organizers to conduct the planning of the ISOLS symposium, and reaching a delicate financial balance while achieving the quality control of the meeting.

This was very much the issue in 1994 when Mario wrote to Ed, "You probably know better than us that in Italy pharmaceutical companies are totally prohibited to give any kind and any amount of money in favor of any kind of meeting, and they cannot participate, even with a registration fee. Other companies, not the pharmaceutical ones, are heavily restricted in their action towards meetings and one of the possibilities is just to sponsor a workshop and/or a symposium. We will try to find some sponsorship on behalf of eastern countries members, although this will not be easy!"

These reflected some of the difficulties our organizers have endured and serves as a reminder of a time when industrial support was accepted to offset the workshop costs. For example, in 1981, no registration fees were collected to pay for the travel and lodging expenses of the invited guests from Eastern Europe and China. All participants at the Florence ISOLS were overwhelmed by both the excellent scientific contents of the symposium and the stimulating environment, which ensures that ISOLS shall return to Italy once again.

FLORENCE 1995



May 8th-9th

JOINT MEETING EMSOS-AMSTS
European Musculo-Skeletal Oncology Society
American Musculo-Skeletal Tumour Society

May 10th-12th

8TH ISOLS
International Symposium on Limb Salvage



PRELIMINARY PROGRAMME
and
CALL FOR ABSTRACTS

ISOLS 1997

New York, New York, U.S.

Chairpersons : John Healey
Dates : September 10-12, 1997

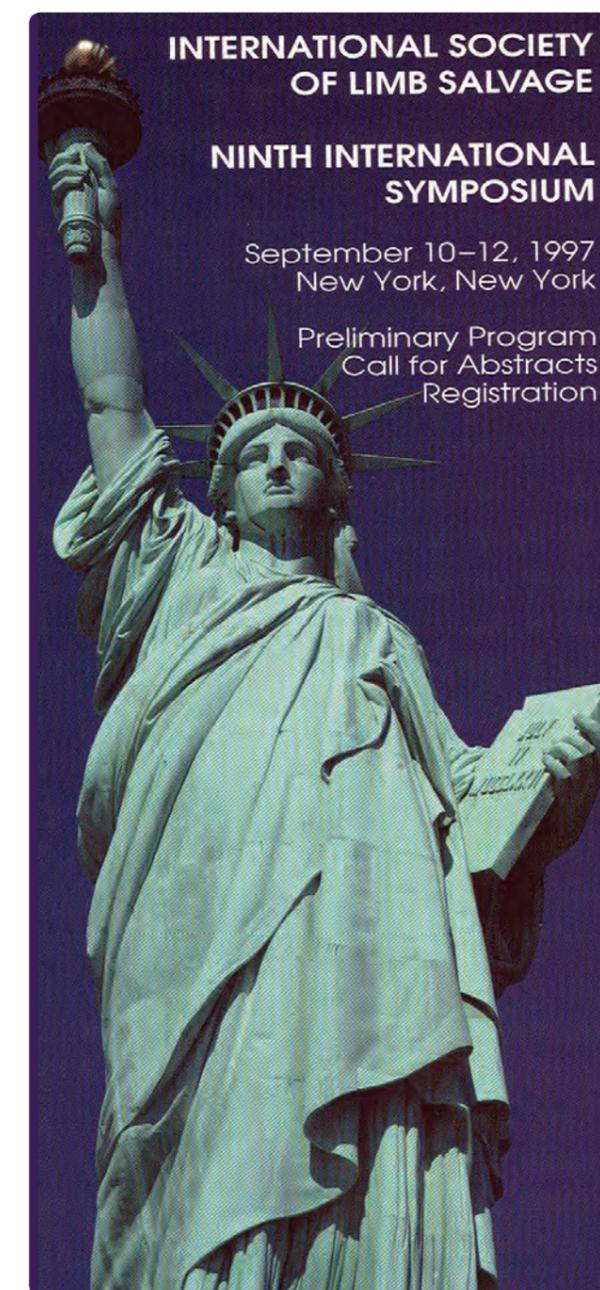
AS STATED IN THE WELCOME message by John Healey, the President of ISOLS and the 1997 symposium chairman, "Our Society has been instrumental in advancing the goal of limb preservation and has improved the care of musculoskeletal tumor patients around the world. This symposium will address where we have been and where we are headed. Presentation about the long-term results of limb reconstruction critically addresses the development and progress in limb salvage. Our functional evaluations have been broadened to include gait analysis and patient-generated assessment of quality of life and outcome. Our mission has expanded to the realm of soft tissue sarcoma where advances in staging and treatment have occurred, led by our keynote speaker Dr. Murray Brennan. Finally, we are entering the era of tissue engineering to recreate the structure and function of organs. Our second keynote speaker, Dr. Linda Griffith, is a pioneer in this field and will show us how to build upon the lessons learned in organ design." This meeting indeed set the stage to critically look at the obligations and accountabilities of our Society. It occurred that the 1997 symposium marked the end of the formal services of Ed Chao to ISOLS as the Secretary General since the beginning of our gathering in 1981.

Meeting

The New York meeting took place in two sites, the Sloan-Kettering Cancer Center and the Roosevelt Hotel. It also started simultaneous sessions for the first time in order to accommodate 49 ten-minute presentations and 120 five-minute short communications. Another 240 posters were presented which almost gave the impression of the early U.S. annual Orthopaedic Research Society meetings. The keynote lectures were timely and marked the end of an exciting century and looked critically to the beginning of a new millennium. With the Genome project going full-steam and gene-therapy on clinical trail, all seemed quite promising for solving the basic and practical problems facing us in the past.

One of Dr. Griffith's mentors, Dr. Vacanti once lectured on the regeneration of finger digits using the concept of tissue engineering while Ed Chao was in the audience. Ed ventured to make a comment that "finger digits are far more than just tissues and even more than an organ, they are really systems!" The idea of limb regeneration was naturally entering into our mind in the wake of stem cell technology. Fourteen years since the 1997 ISOLS symposium, it

seems that we are still long ways off from such remarkable inspiration. Hopefully, we will learn from all the lessons in research and patient care so that ISOLS will continue to serve as a forum for exchanging knowledge and experience in limb salvage and expand that into other musculoskeletal fields facing the same problems of preserving limbs.



ISOLS 1999

Cairns, Australia

THE 1999 ISOLS SYMPOSIUM in Cairns was probably one of the best-organized meetings on both the scientific and social aspects. The local organizing group consisted of Peter Choong, Ian Dickinson, Paul Stalley, Peter Steadman and David Wood under the devoted leadership of Bill Marsden. This year marked the end of the 20th Century and ISOLS had just completed its 8th biannual meeting and was now truly at a crossroad under stern criticisms. This meeting also marked the transition period from the 2x2 slides to the laser projection using the PowerPoint software. This created some difficult times and headaches for presenters.

Very innovative formats were introduced into the scientific program in response to the suggestions made by Isaac Meller of Tel-Aviv and others. Bill did a wonderful job of organizing three surveys before the meeting and formed three forums on Limb Salvage in Childhood, Resection Margins in Musculoskeletal Tumors, and Reconstruction after Resection of Pelvic Tumors.

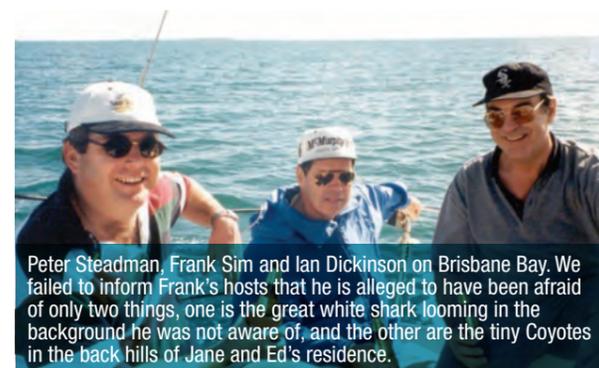
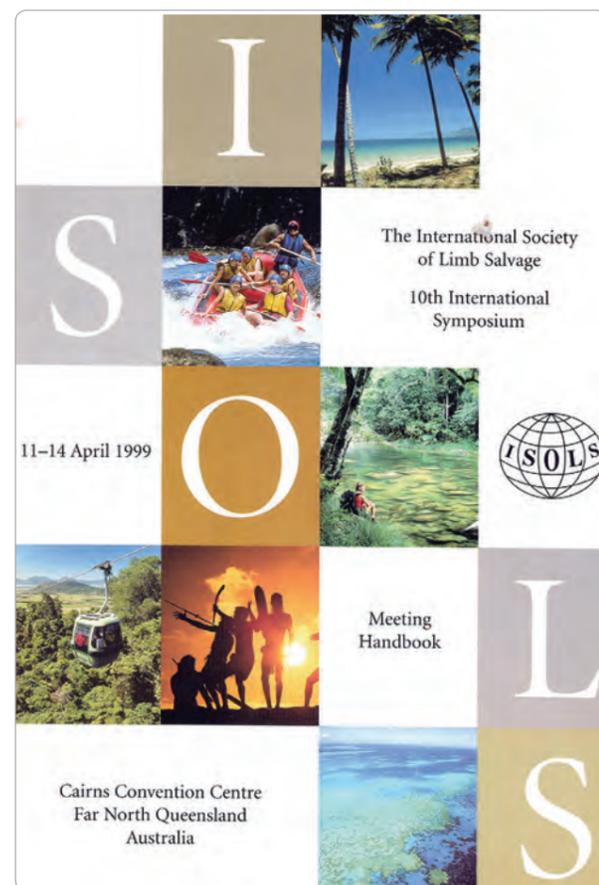
Chairpersons : Bill Marsden
 Dates : April 11-14, 1999

Presentations

To meet the requirement for podium presentation, the program provided simultaneous short free-paper sessions. Furthermore, breakfast discussions and the “end of day” case presentations, which seemed to have quenched many of the aggressive comments of our members. In a way, Bill and his Cairns meeting had miraculously revived the vitality of ISOLS and the organizers are owed a hug favor. To top it off, the timing provided a unique opportunity to attend the SICOT and SIROT conferences in Sidney after ISOLS, which offered many members and participants the ability to enjoy the exciting excursions through the natural wonders of the Great Barrier Reef and the Daintree rainforest.

Social

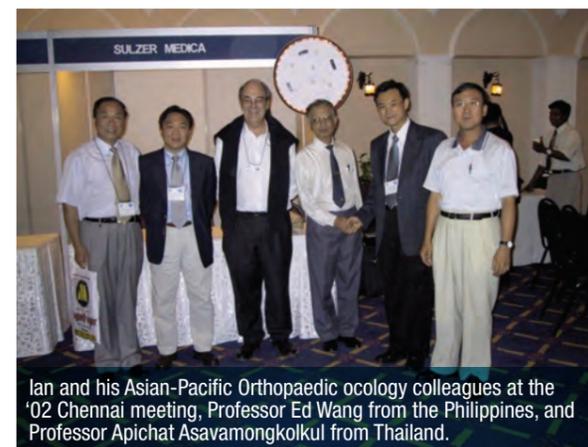
To Bill and all our friends down under, we salute to you. A number of snapshots are presented, some of which not all taken during the '99 ISOLS meeting in Cairns, but do carry the most memorable flashbacks of our members spending time and having fun together. Thank you, Bill and Australia, for hosting a wonderful event and keeping our group together.



Peter Steadman, Frank Sim and Ian Dickinson on Brisbane Bay. We failed to inform Frank's hosts that he is alleged to have been afraid of only two things, one is the great white shark looming in the background he was not aware of, and the other are the tiny Coyotes in the back hills of Jane and Ed's residence.



Ian and the famous Professor Mayal Natarajan from India, the convener of the '02 Asian-Pacific Musculoskeletal Tumor Society in Chennai, Mark Clayer from Australia, and Dr. Kang from Korea.



Ilan and his Asian-Pacific Orthopaedic ocology colleagues at the '02 Chennai meeting, Professor Ed Wang from the Philippines, and Professor Apichat Asavamongkolkul from Thailand.



Ilan and his wife Margaret, and Deborah Quinn, the 2008 Honorary Fellow of the Royal Australasia College of Surgeons in Hong Kong. We know that Frank is great, but one couldn't help to feel that there was a United Kingdom conspiracy going on!



Peter, Frank and Ian playing golf during the Australian Sarcoma Group meeting, 2004. The hosts were not aware that Frank plays golf with a hockey stick and Ed Chao a tennis racket!



Margaret & Ian Dickinson, Professor Tsuchiya and Professor Ed Wang in Manila, 2008.



The ISOLS Cowboys and the beautiful cowgirl. A special thanks to Ian for taking this most wonderful photo with the legendary and sorely missed Doug Pritchard, Jeff Eckardt, Justin Cobb, Ian, John Healey, and Paul Unwin. Peter Steadman in the back row, Judith Akol, Frank Sim and Simon Carter in the front. This was taken during the Australian Sarcoma Group meeting in Noosa, 2004. Legend also has it that a naughty girl in the background had her rabbit ears up behind Jeff's head. Care to guess who that was? The winner will receive a special ISOLS Award!

ISOLS 2001

Birmingham, UK

Chairpersons : Simon Carter
 Dates : October 10-12, 2001

THE PRESIDENT OF ISOLS and the organizer of the 2001 Symposium, Simon Carter, wrote in the Forward of his handsomely edited and printed Proceedings, "The International Society Of Limb Salvage (surgery) meets every two years for a free exchange of ideas and developments in the world of limb salvage. It is hoped that these proceedings will be used as a seminal work for the use of clinicians and researchers interested in our field of surgery. This book has been divided into sections, which coincide with the different sections of the meeting and contain papers and abstracts of all papers presented and also abstracts of posters submitted and distributed during the course of the meeting. The papers included within this book represent the developments and the results of investigations performed since the last ISOLS meeting in Cairns, Australia in 1999. The selection of the papers and posters hopefully encompasses the major areas of Orthopaedic Oncology with contributions from researchers and collaborators in many countries throughout the world to allow for a free exchange of ideas in order to further progress and improve patient care."

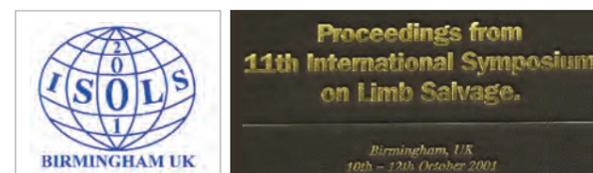
9-11

At the time Simon was writing his forward of the book, the 9-11 U.S. tragedy occurred. Apart from the tragedy itself, that disastrous event had seriously affected the attendance of the meeting and thus financial hardships, burdening our U.K. hosts in Birmingham and elsewhere. However, the spirit of ISOLS was upheld by those who would endure and venture the long-distance flights with the horrifying images of the collapse of the World Trade Center Twin Towers in New York and the enormous damage to the Pentagon in D.C. still vividly in many minds! Although the Board of ISOLS managed to subsidize the losses accumulated by the large absentees of the registered participants, the depressing circumstances affected the environment of the meeting and very much reduced the enthusiastic spirit of our hosts. We wish to express our profound appreciation to Simon and his colleagues' determination in maintaining the meeting and keeping the ISOLS tradition intact, all deserve our utmost respect and gratitude!

Stanmore Implants Worldwide & John Scales

In 2001 an important benchmark was reached for ISOLS. It was the 50th anniversary for Stanmore Implants Worldwide, Ltd (SIW), which had served many worldwide tumor surgeons with their patients'

limb salvage needs. The late Professor John Scales and his orthopaedic colleagues started their custom prosthesis design and production in 1949, 32 years before the first ISOLS Workshop held in Rochester of 1981. Although the first Co-Cr-Mo alloy proximal femur and hip joint replacement prosthesis was designed and made by Howmedica and used by Doctors Bohlman and Moore in Memphis in 1943, John Scales and associates were truly the pioneers in utilizing engineering expertise to systematically work out the problems in the early segmental bone/joint replacement applications. A special tribute to our UK colleagues was formally recognized in the 2001 ISOLS Symposium!



During the 2001 ISOLS Symposium in Birmingham, our missed 1999 ISOLS Chair, Bill Marsden was coaching and encouraging the 2003 co-chairs, Jesus-Garcia and Tamargo in keeping up a fine tradition.

Presentations & Monograph

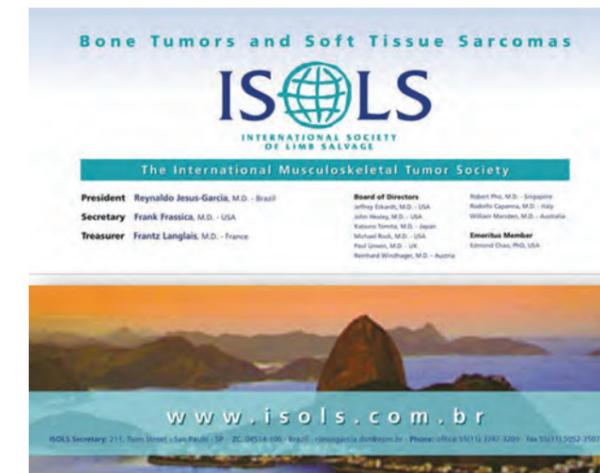
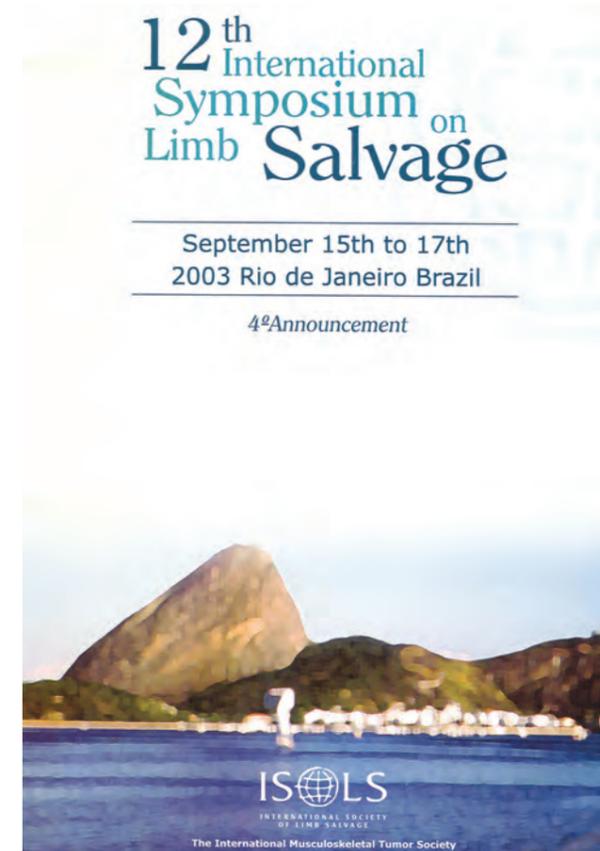
At the 2001 Symposium, there were 107 papers presented and 163 posters exhibited and discussed. Many of these were full manuscripts. Of particular interest was a paper authored by Springer, Sim, Hanssen, and Lewallen from the Mayo Clinic entitled, "The Modular Segmental Kinematic Rotating Hinge for Non-neoplastic Limb Salvage." This marked an important spin-off contribution made by our group as a whole. Another tradition holding all of us together and the limb salvage symposia has been the camaraderie amongst our members, many of which have very different backgrounds and expertise, and professional training. This spirit has also been demonstrated by the "big family" emotion well testified by many in the "Personal Reflections" section of this monograph. Finally, members of the ISOLS Board have always been willing to work extra to assure the organization and the symposium be continued and flourish for years to come.

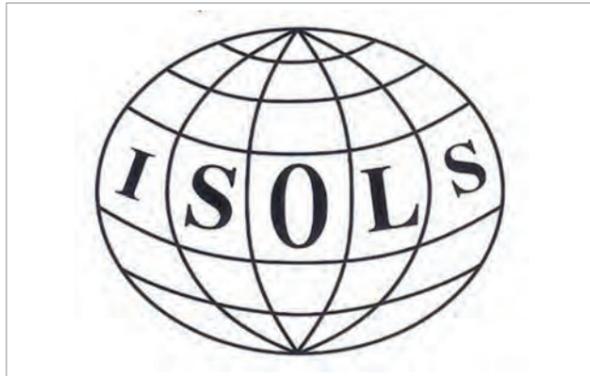
ISOLS 2003

Rio De Janeiro, Brazil

Chairpersons : Reynaldo Jesus-Garcia
 Dates : September 15-17, 2003
 Participants : 393 people from 32 countries

AMONG MANY UNIQUE THINGS Professor Jesus-Garcia had done for ISOLS, in addition to running this meeting, he created the most attractive ISOLS Logo and have been using it ever since. Reynaldo brought many to the most hospitable, beautiful and exotic South America for the first time and worked with a new Secretary General. He also established the versatile website for ISOLS, currently being maintained and updated, published the brief History of ISOLS in the '03 Proceedings prepared by the self-appointed historian of our organization, first to recognize the past ISOLS presidents, and established the category of Emeritus Member class of ISOLS. Reynaldo was also the only person to carry on his presidency duties for two more years to assure the success of the '05 meeting after the untimely passing of Professor Han Koo Lee of Korea. Socially, Reynaldo was the best Samba dancer, which Mary O'Connor and Robert Turcotte tried to emulate. The following is a well orchestrated highlight presentation of one of the most remarkable ISOLS meeting and will be remembered long into the future.

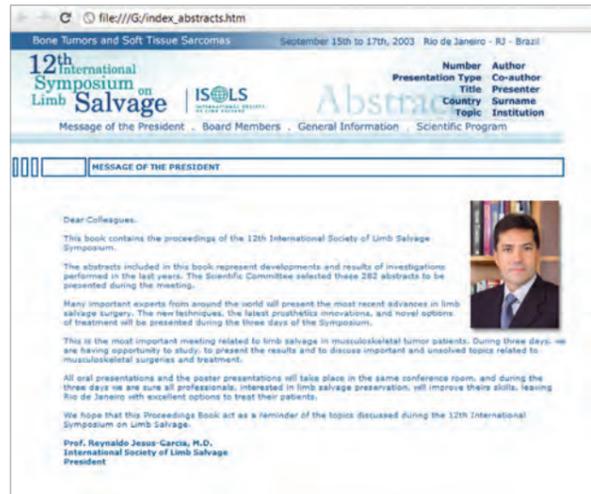




The isols Logo before 2003. In Brazil, the Organizing Committee decided to use a new logo for the 12th Symposium.



The isols Logo used in the Brazilian Symposium.



The Home Page of the 2003 ISOLS.



Rio de Janeiro, Brazil.



Announcements of isols.



The Museum where the Gala Dinner took place.



Doctor Reynaldo Jesus-Garcia and Marize Garcia, receiving the Members in the Gala Dinner.



The Chairman Reynaldo Jesus-Garcia, his wife Marize, Olavo Pires de Camargo the Co-Chairman and his wife Vera.



The German members and the President of ISOLS and his wife.



The Carnival dancers during the Gala Dinner.



Professor Gitellis and his wife during the Opening Cocktail.



Members from different parts of the world, during the Opening cocktail in the Military Fortification!



Mary O'Connor trying to sing!



Mary O'Connor trying to dance!



Professor Malawer and Antonio Aguilera looking at the dancers.

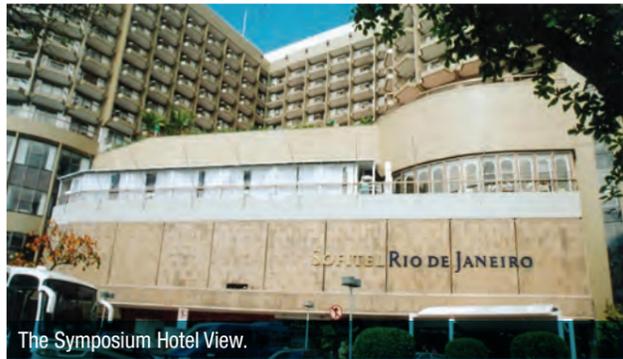


Everybody trying to dance.





The beautiful Copacabana Palace Hotel.



The Symposium Hotel View.



View of Copacabana from the Hotel of the Symposium.



The Symposium Conference Room.



Miguel Ayersa, MD.



Edmond Chao, PhD.



Domenico Campanacci, MD.



Domingos Luis Muscolo, MD.



Olavo Pires de Camargo, MD.



Patrick Lin, MD.



Steven Gitelis, MD.



Frantz Langlais, MD.



George Gosheger, MD.



Ross Wilkins, MD.



Professor Ed Chao and Professor Langlais.



Professor Robert Turcotte.



Professor Issac Meller.



Mary O'Connor, MD.



George Gosheger, MD.



Mark Gebhardt, MD.



Rodolfo Capanna, MD.



Nicola Fabbri, MD.



Yroyuki Tsuchiya, MD.



Mary O'Connor, MD.



The Conference Room.



Simon Carter, MD.



Allan Yasko, MD.



Norman Jaffe, MD.



Dr. Jesus-Garcia & Dr. Chao, receiving the Honor Plate as Presidents of ISOLS.



Professor Ed Chao's speech.





Hiroyuki Tsuchiya, MD, receiving his Prize of \$750,000.



Professor Jesus-Garcia transferring the ISOLS Presidency to Professor Han Koo Lee from South Korea.



Dr. Han-Soo Kim presenting the next ISOLS in South Korea, 2005.



Professor Langlais delivering to Professor Ed Chao the title of Honorary Member of ISOLS.



Professor Ed Chao delivering to Professor Langlais the title of Honorary Member of ISOLS.



The Conference Room.



ISOLS 2005

Seoul, Korea

Chairpersons : HK Lee, DK Bae, & SY Lee
 Dates : September 7-10, 2005
 Participants : 390 people from 33 countries

IN 2005, THE 13th ISOLS was held on September 7-10 in Seoul, Korea, which was the 3rd ISOLS meeting in Asia. This was the first ISOLS meeting in which the President of ISOLS, Professor Han Koo Lee, was not able to host due to his untimely passing just eight months prior to the meeting date. Under this most unusual circumstance, the immediate past President Professor Jesus-Garcia willingly stepped in to help, making sure that the ISOLS Board was fully behind this meeting. The Symposium was then co-hosted by Dr. Dae Kyung Bae, Chairman of the Organizing Committee and Dr. Soo Yong Lee, President of the Korean Bone and Joint Tumor Society. The ISOLS Seoul started with an opening ceremony in which a fantastic performance of Korean traditional drum music was staged.

Coming out of 42 countries, 353 participants came to Seoul to attend this meeting. From the 333 abstracts submitted, 119 interesting scientific papers were presented and 207 posters were displayed. During the three mini-symposiums, metastatic bone tumors, low-grade chondrosarcoma and modified autograft biological methods in skeletal reconstruction were discussed. In particular, the resected tumorous bone was excorporal-treated and used as recycled autograft, mostly practiced in East Asian and Oceania countries, was presented and discussed with great interest for the first time in ISOLS. Case discussions, electronic voting, and social programs in which every attendant could actively participate were also conducted during the Symposium.

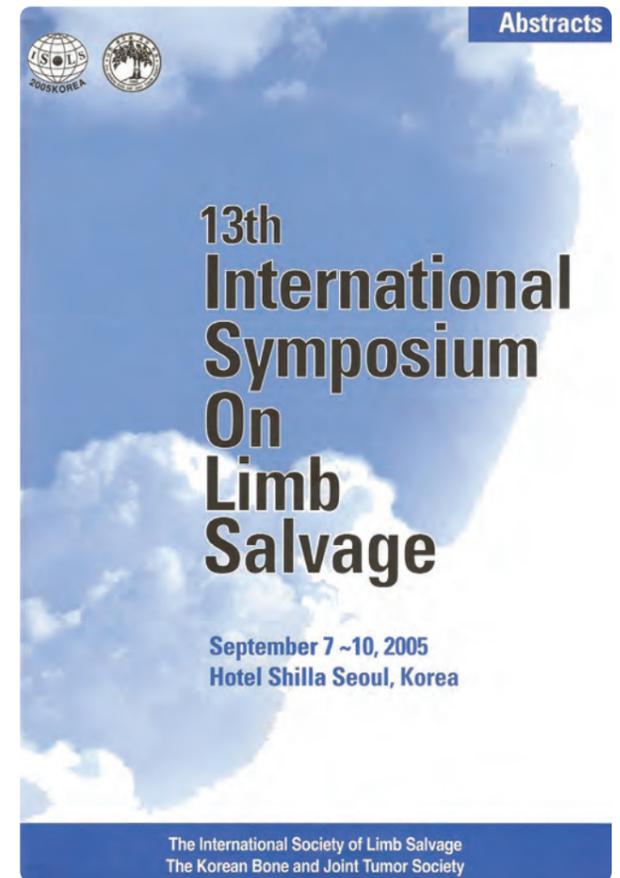
It was surprising to know that only 76 out of 353 registered attendees were members of ISOLS, a mere 22%. A substantial and wonderful surplus of \$29,500 was generated for ISOLS, thank you very much to all our hard-working Korean colleagues.



The modern and extremely well equipped meeting hall served as the center of ISOLS congress where all presentation and discussions took place.



Professor & Mrs. Orjan Berlin with Ed Chao during the reception.



The ISOLS Seoul Meeting Program.



The beautiful Korean traditional garden in Hotel Shilla where the reception was held with light music played by the quartet in the background.



Traditional Korean banquet with everyone sitting cross-legged on the floor. How did you manage your knees, Robert?



Robert Turcotte from Montreal, Fabrice Fiorenza from France, and Keith Hosking from Cape Town.



13th International Symposium On Limb Salvage

Seoul Korea

September 7 - 10, 2005, Hotel Shilla Seoul, Korea

The organizers of the Seoul ISOLS meeting gave their welcome addresses at the congress venue, the beautiful Hotel Shilla, where the vintage meets the ultra-modern new of the 21st Century.

ISOLS 2007

Hamburg, Germany

MORE THAN 700 ABSTRACTS were submitted for presentation on the 14th International Symposium on Limb Salvage in Hamburg, Germany 2007. It was decided that in order to give many speakers the possibility to present their important work sessions with oral, short communication and poster presentation were best. The first day of the symposium, September 11th, was a special residents-day with instructional courses on oncologic topics. More than 150 participants listened carefully to the lectures of the famous ISOLS members. Professor Winkelmann gave an overview of his decades performing rotationplasty, followed by Professor Healey teaching the audience on flap surgery. Professor Domenico Campanacci gave an outstanding lecture on vascular fibula grafts. Dr. Neel and Professor Gosheger reported on growing prostheses and tumor endoprostheses. The success of such a course in advance to the congress led to further resident days on the following EMSOS congresses.

The main program, September 12th to September 14th, started each oral session with overview presentations by famous members of the society. Germany (87 participants), Japan (87 participants) and United States of America (68 participants) had the most during the meeting. There were also single participants from Venezuela, Tunisia, Lithuania and the Czech Republic.

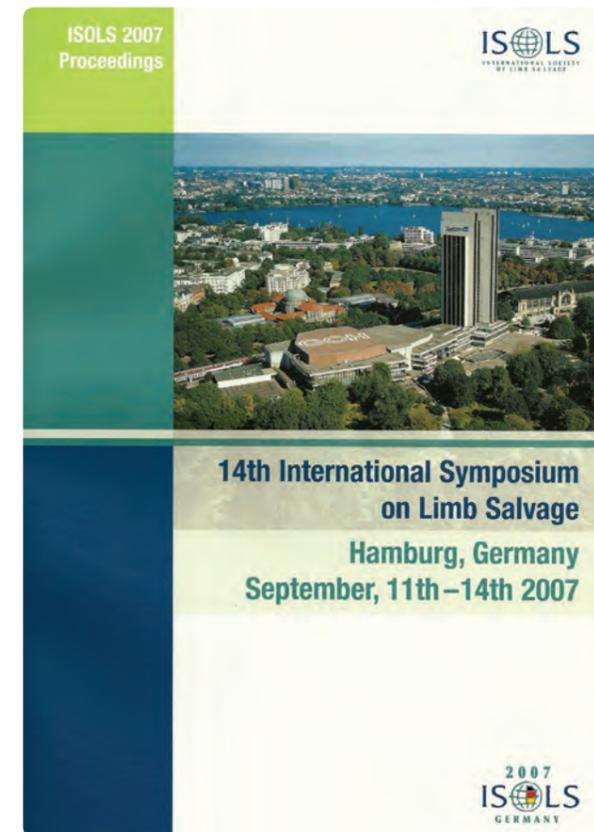
The short communication concentrated on three slides, with the most important aspects of the work followed by two minutes of discussion. This was a great success and forced the organizers to give more places to the room for short communication. There was a vivid discussion on the topics after a rapid presentation of methods and results. Furthermore, this kind of presentation enabled the organizers to invite more speakers to the meeting.

Japan (78 abstracts), China (50 abstracts), South Korea (33 abstracts), Thailand (12 abstracts), and



Chairpersons : W. Winkelmann, G. Gosheger
 Dates : September 11-14, 2007
 Participants : 714 people from 48 countries

Taiwan (7 abstracts) proved that Asia overwhelmingly participated. The participants were willing and ready for an exhausting travel to Hamburg, Europe.



Poster Presentation

The poster presentation was integrated with the industrial exhibition and located at the coffee-break and lunch area, thus guaranteeing that the poster presentations were visited frequently. During the lunch break and evening breaks, there was an offer of plenty German food and beverages. The German “Riesling white wine” was in favored by the participants. Also at the small tables in the break area and the booths there were intensive discussions on oncologic procedures and reconstruction techniques.



The Symposium Topics

- 1 Chemotherapy
- 2 Bioengineering
- 3 Limb Salvage in Young Children
- 4 Long Term Side-Effects After Therapy
- 5 Metastasis with Good Prognosis
- 6 New Developments in Tumorprosthesis
- 7 Biological Reconstruction
- 8 Interventional Therapy
- 9 Translational Research
- 10 Spinal And Pelvic Reconstruction
- 11 Revision Surgery
- 12 Free Topics

Special Highlights of the Scientific Presentations

Biological reconstructions proved a long lasting success after reconstruction but were also associated with a significant complication rate and the rehabilitation was very intensive. Some patients might have benefited with more endoprosthetic reconstruction and the possibility of early weight bearing and early functional success. The non-invasive growing prostheses had the potential to become reliable tools in reconstruction in younger patients. The long term results of the Birmingham and Vienna group underlined also the long term success of such reconstruction methods.

The results of endoprosthetic replacement became better in the last decade. Especially aseptic loosening and material failure seem to diminish due to the advances in the engineering and material improvements. Cementless fixation and bone bridging to Hydroxy-apatite collars are favored by a lot of members of the society. The problem of deep infection is still the focus of orthopaedic surgeons. Two groups, Stanmore and Muenster, presented their data on silver-stitched/silver-coated implants. They seemed to exclude side-effects and showed less infection in animal trials in comparison with historic data.

Special emphasis was laid down on the reverse endoprosthetic shoulder reconstruction, stump lengthening procedures and modular pelvic reconstruction systems.

As far as imaging is concerned the FDG-PET was an important method in the future in primary diagnosis and follow-up. A lot of abstracts reported on the success of detecting metastasis and early local recurrence. The award winner of the best poster reported on differentiation of benign and malignant pathologic fractures with FDG-PET.

Target Therapy

The broad field of target therapy was also one of the main topics and an outlook into the future. Genomic analysis and target therapy could be a treatment option for bone diseases in the future. The scientific committee decided on different awards.

Best Presentation • 5,000 Euro



Lee Jeys • Birmingham, UK

The Risks and Benefits of Radiotherapy with Massive Endoprosthetic Replacements

Best Short Communication • 3,000 Euro



Wang Guangzhou • China

2-D Dige and Maldi-tof-ms Analysis of the Serum Proteome in Human Osteosarcoma

Best Poster • 2,000 Euro



Shin Daegu • South Korea

Differentiation of Benign and Malignant Pathologic Fractures with F18 FDG-PET-CET in Musculoskeletal Tumors

Social

There was an enjoyable social program with a great party in the Radisson SAS-Hotel. After a while, all the participants went in after their travels to Hamburg. Some of the participants suffered from jet lag but DJ Thomak performed special techno music and woke up the society. The start of the symposium ended with dancing and singing together.

Every Sunday morning from 5 to 9.30 A.M.,





customers from near and far came to bargain with vendors praising wares of virtually every type at Hamburg's oldest, most traditional open-air market dating back to 1703. Locals and tourists alike found the market a worthwhile stop. At the foot of the century-old Fish Auction Hall, smart shoppers might find just the Chinese teapot they were hunting for, not to mention fresh fish. The "Fischauktionshalle" is one of the most fascinating places for evening functions in Hamburg.

The gala dinner deepened friendships from all over the world. Neither different religion nor different political situations kept the guests from celebrating an amazing evening. The evening started with a young German couple singing and playing the piano, followed by a buffet with different stations of selected food.

The original Scandinavian group ABBA, singers of the Hamburg musical group, fired up the society. Their ever lasting hits made the evening unforgettable.

It seemed to be impossible for the "James Smith and Friends Band" from New York to top the ABBA group, but it was very possible. Mary O'Connor, the host of the ISOLS 2009 meeting, supported James Smith, and the guests and members of the society had an unbelievable party.

The Sightseeing-Program led participants to a

City Centre Walk of Hamburg. A two hour boat-trip provided fascinating immersions of Hamburg and different visits of famous museums.

A special closing-party on the well known Reeperbahn of Hamburg was one of the most



unforgettable moments of ISOLS 2007. In Angies Nightclub, strikes the heart of St. Pauli. The legendary made the night an exclusive live-experience! Everybody enjoyed the "Hamburger Reeperbahn" under the blue dome of the Tivoli. Below are the last two official photos of the congress. There are no official photos of the unforgettable Reeperbahn party, and rightfully so. The ISOLS 2007



website is still available to this day. You can go to the homepage at www.isols2007.org and get information on the meeting. On the site, you can download MP3s of

the ISOLS 2007 music, the ISOLS 2007 video, and all the pictures of the meeting.

Below are the generous sponsors of the Hamburg 2007 meeting, without them the meeting could not have taken place.

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global.smith-nephew.com



ISOLS 2009

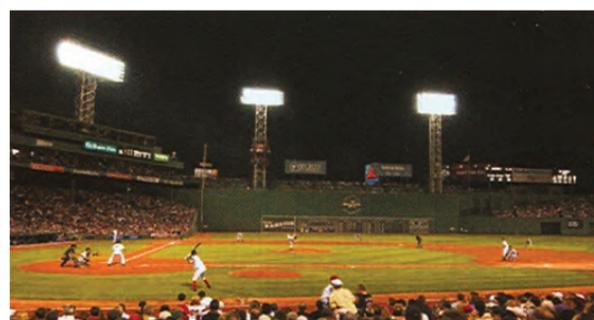
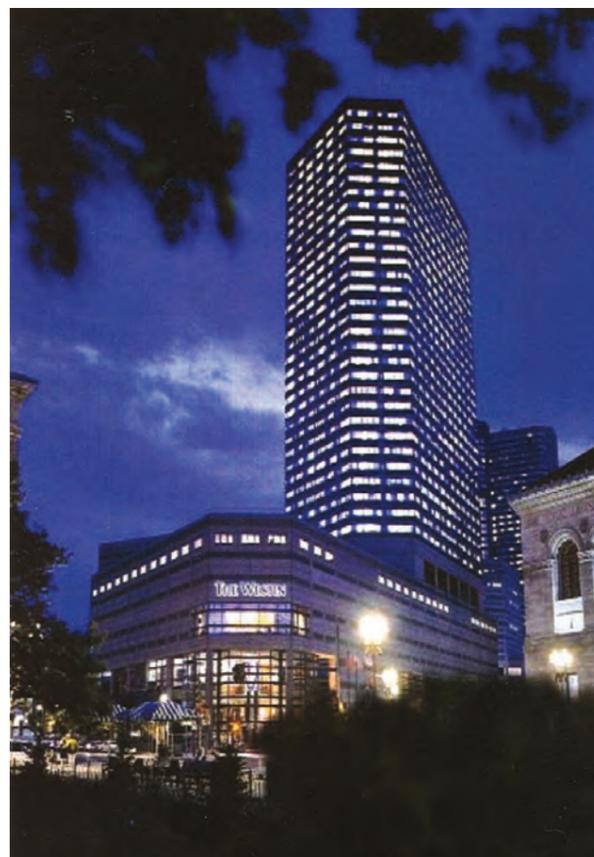
Boston, Massachusetts, U.S.

Chairpersons : M.I. O'Connor, M.C. Gebhardt
 Dates : September 22-24, 2009

IN 2009, THE COMBINED meeting of the International Society Of Limb Salvage, ISOLS, and the Musculoskeletal Tumor Society, MSTs, represented the largest gathering of orthopedic oncologists in the world. Held in Boston, the highly successful meeting was co-chaired by Doctor Mary I. O'Connor and Doctor Mark C. Gebhardt. The scientific program was of excellent caliber and filled with cutting edge information on musculoskeletal neoplasms and limb salvage surgery. Over 600 abstracts were submitted and reviewed by the scientific committee composed of members of both organizations. A new program format of short presentations allowed for ample discussion time of the 197 oral presentations. Over the next three and a half days, the meeting was very well received and led to lively interaction amongst the presenters and attendees. In addition, 172 posters were presented over the course of the meeting.

Manuscripts from the combined meeting were published just a little over one year after presentation as a symposium in Clinical Orthopaedics and Related Research (CORR) with doctors John H. Healey, Mary I. O'Connor and Mark C. Gebhardt as co-editors. Such timely publication is essential for education of the orthopaedic community and to provide a foundation for further advances. ISOLS expresses its gratitude to Dr. Richard Brand, Editor-in-Chief of CORR for his assistance with the symposium.

The 2009 combined meeting set records in attendance (630 registrants) and profits with both organizations receiving proceeds from the meeting. Seventeen major companies exhibited at the meeting enriching the experience of the attendees. A Nurses and Allied Health Professional Program was highly rated. The MSTs Founders Day Lecture was given by Dr. Rodolfo Capanna at the invitation of MSTs President Dr. J. Sybil Biermann and was outstanding. The Social Program was enjoyed by all and provided the opportunity to see old friends and meet new colleagues. The 2009 ISOLS/MSTs meeting served to strengthen both organizations and promote advances in musculoskeletal oncology.



15th International Symposium on Limb Salvage
 Boston, Massachusetts, USA
 September 24-27, 2009



2009 American Musculoskeletal Tumor Society Annual Meeting
 Boston, Massachusetts, USA
 September 22-24, 2009

Dear ISOLS Member,

Please mark your calendar for the 15th International Symposium on Limb Salvage to be held September 24-27, 2009 in Boston, Massachusetts at the beautiful Westin Copley Place Boston.

The 2009 ISOLS meeting promises to continue to present the leading research on limb salvage and orthopedic oncology treatments. A call for abstracts will be announced in Fall 2008. Please check the symposium website (www.ISOLS2009.org) in Spring 2009 for more information.

Additionally, the American MSTs meeting will be held immediately preceding ISOLS from September 22-24, 2009 at the Westin Copley Place Boston. All ISOLS members are cordially invited to attend. It will be an exciting educational meeting with a diagnostic quiz as well as state-of-the-art scientific presentations.

Boston will prove to be a highly favorable host city to a wonderful array of social programs. We will take advantage of the many historic venues in the Boston area. The comfortable, amenity-rich Westin Copley Place Boston is conveniently situated within walking distance of a wealth of trendy nightclubs, upscale shops, major corporations and landmark Boston attractions such as the Prudential Center, Boston Common and the Freedom Trail. Plus, there will be some fun social events that will show you a bit of Boston's rich history and culture - maybe even a chance to see the Red Sox play at Fenway Park.

We hope many of you will take advantage of both meetings when you visit Boston for the 2009 ISOLS symposium and the American MSTs annual meeting!

Mary I. O'Connor, M.D.
 Mary I. O'Connor, MD
 President-Elect ISOLS
 Chair, Department of Orthopedic Surgery
 Mayo Clinic
 Jacksonville, Florida

Mark C. Gebhardt, M.D.
 Mark C. Gebhardt, MD
 2009 MSTs Program Chair
 Chief of Orthopaedic Surgery
 Beth Israel Deaconess Medical Center
 Boston, Massachusetts

ISOLS 2011

Beijing, China

THE 2011 MEETING WILL MARK the 30th anniversary of the International Society Of Limb Salvage (ISOLS), and the 16th gathering of its kind. China is hosting her first meeting in the country's capital, Beijing. It is expected to draw large contingents from countries all over the world to learn and disseminate the scientific knowledge and clinical experiences on the treatment of musculoskeletal neoplasm. With the host country's huge patient population, a broad orthopaedic interest, and the generally parsimonious public, we hope that a wider range of discussion and exchange will ensue to cover not only the management of bone and soft tissue tumor in all aspects but also expanding to other prospects of limb salvage in general due to the traditional Asian culture of preserving limbs and body integrity at all costs. It would also be prudent to address the cost versus benefit issues in countries where bare-foot doctors and alternative medicine still cover enormous regions and population where western medicine is hardly accessible. Up to the last month of

Chairpersons : Wei Guo
 Dates : September 15-18, 2011
 Participants : 700 people from 32 countries

meeting preparation, there are over 400 participants coming from more than 32 countries already registered.

Although the topics of podium and poster presentation remain similar to that of the past meetings, participants from less developed and economically deprived countries shall voice their opinions and concerns over the need of the medical technology either unproven or unaffordable.

We certainly wish that the atmosphere and spirit of the meeting should not be carried away by the glamorous settings and backdrop of the meeting surroundings prepared for the 2008 World Olympics! This meeting will at least achieve three unique attributes: providing all members and participants a copy of our 30th Anniversary monograph; honoring our missed members and friends; and paying special tribute to our past presidents and meeting organizers. Finally, we look forward to this meeting with excitement and anticipation.

INTERNATIONAL SOCIETY OF LIMB SALVAGE 16th GENERAL MEETING



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ISOLS ISOLS



PREVIOUS MEETING STATISTICS

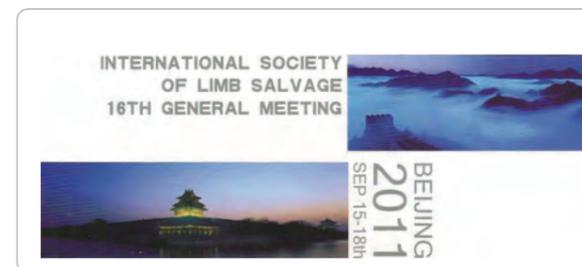
15th International Symposium on Limb Salvage and the Musculoskeletal Tumor Society, Boston, USA, September 23-26, 2009



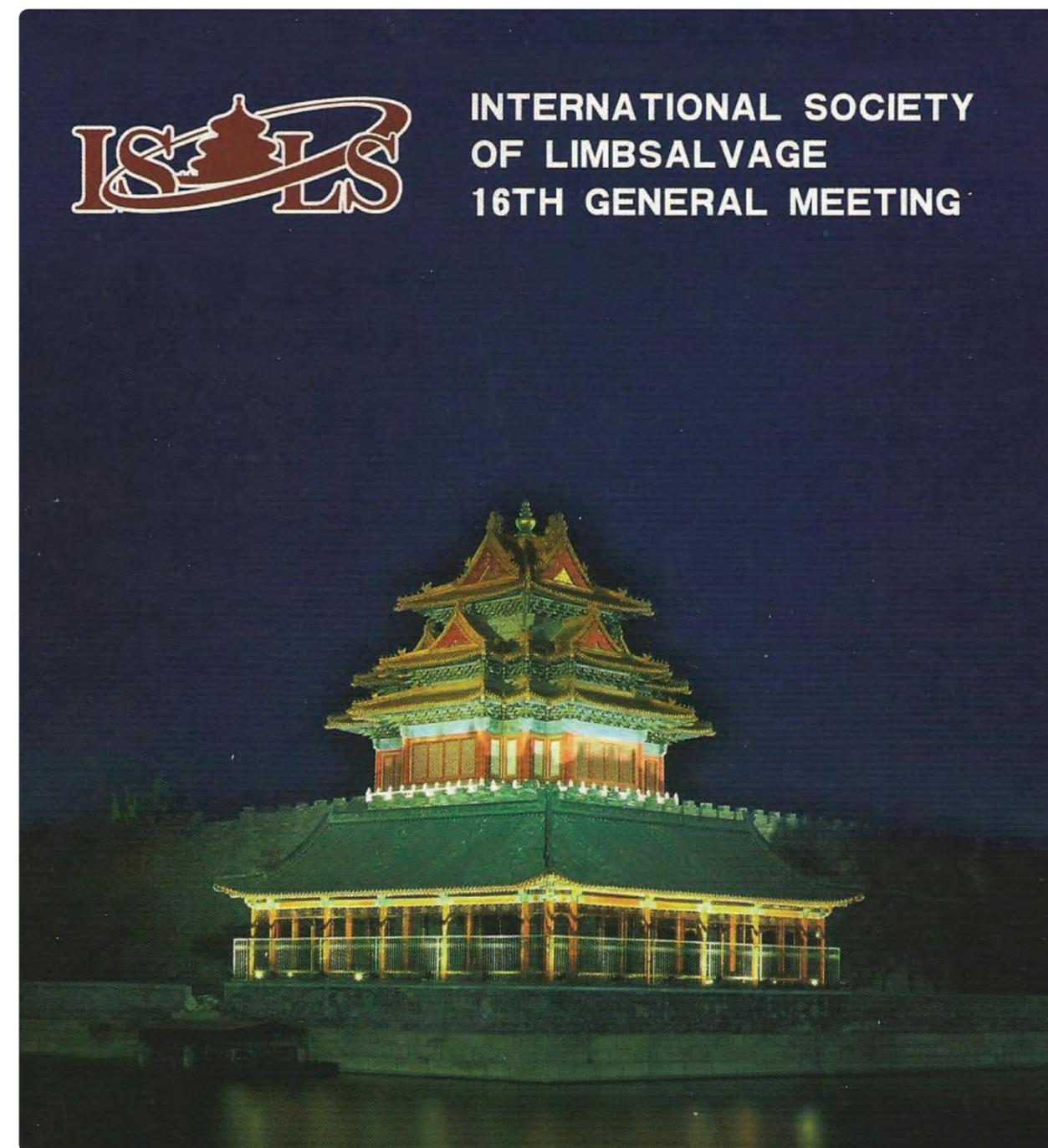
TOP THREE PARTICIPATING AREAS
 North America - 286 (45.5%)
 Asia Pacific - 183 (29.1%)
 Europe - 86 (13.7%)

OVER 700 PARTICIPANTS EXPECTED AT
 16th General Meeting of International Society of Limb Salvage,
 Beijing, China, September 15-18, 2011

The ISOLS previous meeting statistics and Beijing forecast.



Beautiful art work of the 2011 Beijing ISOLS Meeting.



ISOLS and the Success in Management of Musculoskeletal Oncology in Thailand

By Apichat Asavamongkolkul, MD

This short personal reflection demonstrates a close relationship and the importance of the International Society Of Limb Salvage (ISOLS) to musculoskeletal oncologists in Thailand. Regarding ISOLS meetings, we are able to utilize the information from oral presentations, posters, and discussions to help improve medical care of our patients with bone and soft-tissue tumor. Moreover, not only is it a good opportunity to meet and make friends with mentors and colleagues, but it is also a fruitful chance to gather and disseminate knowledge and experiences to medical students, residents, fellows, and other medical personnel interested. This contribution has outstandingly initiated a multidisciplinary system in enhancing the outcomes of patients' treatment. Undoubtedly, all mentors and professional colleagues who are experienced and efficient in musculoskeletal oncology in many institutes are members of the ISOLS as well (1-4).



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4

During the past ten to fifteen years, the Musculoskeletal Tumor Board Meeting in Thailand has arranged weekly with a multidisciplinary team in order to provide correct diagnosis and appropriate treatment to each bone and soft-tissue tumor patient



5



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(5-6). Responding to the significance toward medical treatment in the field, the meeting tends to include many effective medical centers in Thailand. Resulting from the fact that we have used the adjuvant treatment and the reconstruction techniques from the ISOLS meeting to upgrade survivorship and quality of our patient's life, the outcome of five-year survivorship of non-metastatic osteosarcoma patient has improved from 0-20% to 50% over the past twenty-five to thirty years. The number tends to be increasingly competitive with other developed countries. The number of musculoskeletal oncologists in Thailand has been growing recently. There are almost 30 qualified surgeons, who are active in teaching and providing service to patients, with the number surely



7

to increase gradually in the near future (7). According to residency training programs, we have arranged for rotation for each resident to participate in every procedure of musculoskeletal oncology practice. We also have a one-year musculoskeletal oncology fellowship program in which three to five young doctors participate annually. After attending the program, they will further their careers as full-time staff in medical training institutes.

On account of ISOLS principle, we have developed a close relationship with our neighboring countries in the Asian-Pacific region, resulting in the initiations of many formal musculoskeletal oncology organizations such as Asia-Pacific Musculoskeletal Tumor Society (APMSTS), and Eastern Asian Musculoskeletal Oncology Group (EAMOG). This cooperation has given us effective communications, knowledgeable conferences, information and experiences sharing, as well as many musculoskeletal oncology treatment investigations. Until now, we are active and are looking forward to organize activities in order to keep up our close relationships (8-10).



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With valuable knowledge, experiences, and friendships from mentors and colleagues in ISOLS, we, as a representative from Thailand, are very much appreciated and will determinedly transfer this achievement to Thai people. We have brought benefits to our people and will continue the collaboration with countries in this region and ISOLS to improve our knowledge and clinical skills and give better treatment outcomes to our patients with limb salvage procedures.



1



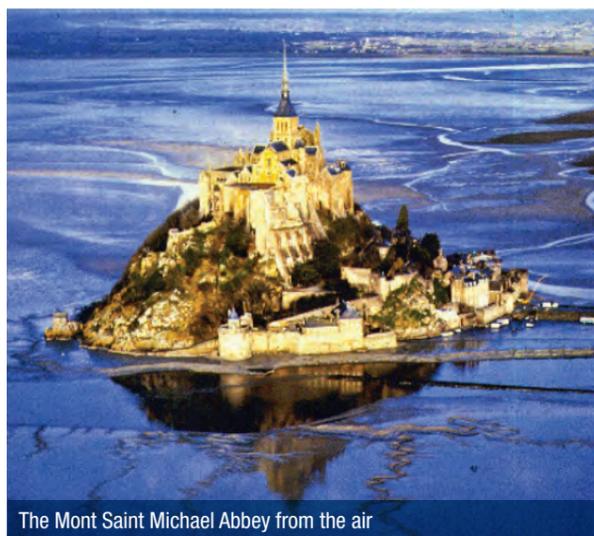
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The Honor to be Shared by All

By Ed Chao

I have attended countless honor, award and dedication ceremonies, but none could compare with what we attended, gracefully organized by the late Frantz Langlais during the 1989 ISOLS meeting in Saint Marlo. This endowment had nothing to do with what I had accomplished scientifically. It was mainly to honor someone who set his goal to serve the medical field, using his expertise in mechanics and engineering. More precisely, he chose to devote a major portion of his lifetime and energy to the field of limb salvage by learning from the best in order to be able to serve this profession well. This may sound altruistic, but you will be my judge and witness. The location, ambience and music of the ceremony (Celebration to Live in Beethoven's 9th Symphony) were truly spectacular. I was indebted to so many of you for joining the proceedings.

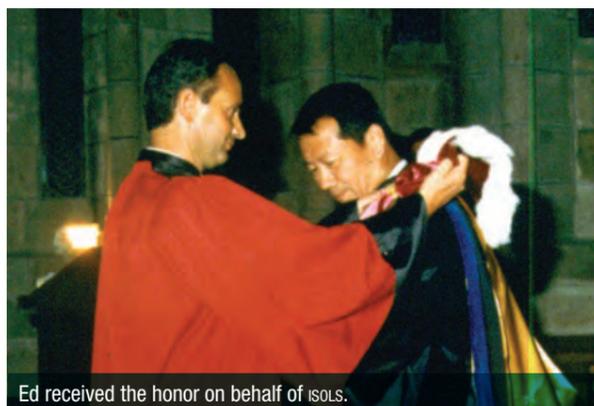
Although I was enormously grateful for this recognition, this should be an honor shared for those who have worked with me as well. At a time when so many scientists, physicians, and engineers tend to compete in monopolizing the procedures, reagents, devices, and other so-called intellectual properties in the hope of gaining fame and commercial success, we shared the experience of producing custom-made and modular prosthesis to benefit our patients, all in the name of charity.



The Mont Saint Michael Abbey from the air



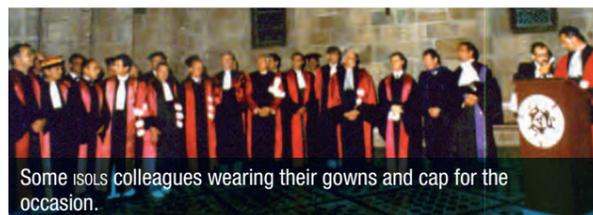
Ed with Jane in front of the Abbey.



Ed received the honor on behalf of ISOLS.

PROGRAMME	PROGRAMME OF THE CONCERT
16.30 Departure of the coaches in front of the "Palais du Grand Large" (St-Malo)	FIRST PART : Solo organ Prelude and Fugue in G Major BWV 541 J.S. BACH (1685-1750) <small>The first part of the program has the honor of a single musician and appears somewhat modest. The second part, which is more complex, has the honor of a soloist and a choir. The third part, which is more complex, has the honor of a soloist and a choir. The fourth part, which is more complex, has the honor of a soloist and a choir.</small>
17.30 Guided visit of the Mont-St-Michel	Chorale "Nun komm, der Heiden Heiland..." No. 9 of the 14 chorales for Leipzig J.S. BACH (1685-1750) <small>This chorale is one of the most beautiful of the 14 chorales for Leipzig. It is a beautiful example of the art of the chorale.</small>
19.15 Concert in the Abbey	Improvisation on a religious theme J.S. BACH (1685-1750) <small>The improvisation is a beautiful example of the art of the organist. It is a beautiful example of the art of the organist.</small>
20.00 Ceremony for the awarding of Honoris Causa diplomas	SECOND PART : Horn and Organ "Overture-hymn to the abbey-church" C.F. CUIYARD "Quoniam" J.S. BACH (1685-1750) <small>The second part of the program is a beautiful example of the art of the organist. It is a beautiful example of the art of the organist.</small>
21.00 Dinner	
23.00-23.30 Return to St-Malo by coaches	

The proceeding program of the ceremony



Some ISOLS colleagues wearing their gowns and cap for the occasion.

Who Owns the Intellectual Property in Health Care & Medicine?

By Ed Chao

One of my hopes of producing this monograph was for every member of ISOLS to have a place for their thoughts about the organization and all its meetings. Other related esoteric issues, such as the one here, are also welcome.

When the two scientists at Mayo invented cortisone in the 1950s, the intellectual property (IP) of this discovery was sold for two dollars! When we approached the Mayo Clinic committees about hosting the first International Workshop of Limb Salvage meeting, it was disapproved simply because we solicited industrial support to waive registrations fees and to support several participants from the less privileged countries, including China. Time and scene have changed so much as has the quality and

cost of health care. This personal reflection wishes to suggest that inventors of medical devices should share their IP with the patients and no profit should be derived from such discovery as we, in ISOLS have done just that for 30 years. We should be the role model for the entire profession and industry, not be influenced by the ridiculous verdict of Gary Michelson versus Medtronic, which is part of the reason for today's health care meltdown. After all, the original ideas of most innovations are decades old, only technology evolves with better materials, design modifications, manufacturing process and surgical technique to make them effective, safe and affordable. Besides, all of these have been tested in numerous patients, therefore they should be the co-owners of the IP.

The Importance of ISOLS

By Mary I. O'Connor



When Ed Chao gave me the opportunity to submit a 'personal reflection' page, I decided that I would share some of my thoughts on the importance of the International Society Of Limb Salvage. Our organization is evolving and growing. Due to the success of our 2009 meeting we are financially stable and can now support some administrative infrastructure to strengthen the Society. Our new bylaws will improve our organizational structure, primarily by electing different individuals as President and Chair of our biennial meeting. I can personally attest to the tremendous work of organizing the meeting, such that energy to devote to running the Society can be compromised. With the publication of the best manuscripts from our 2009 meeting as a symposium in Clinical Orthopaedics and Related Research, ISOLS has advanced. We will continue such

a publication following the Beijing meeting, allowing more rapid dissemination of our knowledge to our colleagues with the print publication distributed just over a year from the meeting. Such publications enhance the stature of ISOLS. All these efforts promote the growth and health of ISOLS. I hope that in the near future we will be able to collaborate on international clinical trials, which will advance the care we provide to our patients.

On a personal note I have been honored to serve as the ISOLS President from 2007 to 2009. I must thank Ed Chao who was instrumental in my nomination to the ISOLS Board many years ago, while the support of the ISOLS leadership has always been tremendous and I am proud of the progress we have made in these past years. The international friendships I have developed through ISOLS have been enriching from both a personal and professional standpoint. I know the best is yet to come for our Society.

My Personal Reflection

By Olavo Pires de Camargo



My first ISOLS was in 1985, in Florida, and invited to come with my father Professor Flavio Pires de Camargo to show his experience in the treatment of GCT with cementation. At that time it was still a novelty since he started this technique in

1974 together with Dr. Peerson but decided to publish it only after he was sure of the good results. I was only 32 years old at that meeting and very anxious to meet my idols: Professor Enneking, Professor Mankin, Professor Campanacci and many others. After my father presented his results, I was invited to answer the questions from the audience. It was a great challenge and I was very nervous!

Being a member of this group was very important to develop the orthopedic oncology in my country still incipient at that time. I had the opportunity to invite many ISOLS colleagues to visit the University of São Paulo to show their experience in bone tumors. Since then, I attended almost all ISOLS meetings culminating to become the co-chairman of the meeting in Rio together with Dr. Reynaldo Garcia. It was an honor

to receive in Brazil all my dear friends. It was an experience that I will never forget.

I consider the ISOLS as a family, and whenever one of my sons travels aboard, he will have the address and mobile phone number of an ISOLS member of the respective country, just in case. I am very proud to be a member of this family!

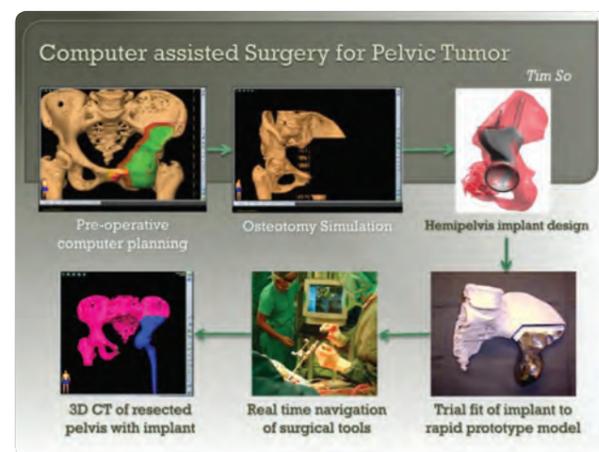
Computer-Assisted Surgery in Limb Salvage

By Timothy So

A great forum for exchange of ideas and innovations, ISOLS has also been an important place for building and renewing friendships. During the 2009 Boston meeting banquet, Keith Hosking and I were sharing ideas on computer-assisted surgery while enjoying a splendid dinner.



My wife Phyllis and I with Keith Hosking during the ISOLS 2009 meeting in Boston.



This is my computer-aided pelvic tumor resection planning and reconstruction using 3D image simulation and navigation technology on a chondrosarcoma case two years ago and the patient is doing very well today.

Thanks, ISOLS!

By Jin Wang, MD, PhD

The ISOLS meetings created the most wonderful opportunities and moments for me and offered me the chance to meet new friends, plane my career training, and catch up with old friends. During 2001, the 11th ISOLS in Birmingham, UK, I, a young fellow from Guangzhou, China, was offered to meet Professor Ian Dickinson from Brisbane, Australia. Subsequently, I became Professor Dickinson's first orthopedic oncology clinical fellow in 2002 (1).

In 2007, the 14th ISOLS meeting in Hamburg, Germany, I had a most memorable dinner with distinguished and well-known musculoskeletal oncologists and old friends at the Four Season Hotel: Peter Steadman, Scott Somerville, Frank Sim, Ian Dickinson, Jin Wang, etc. (2). The 14th ISOLS also offered me the best short communication award with 3,000 euros (4). At the 2011 International Multiple Disciplines Sarcoma Symposium held at the Sun-Yat-Sen University in Guangzhou, we invited many old friends to come and give lectures: Sim Franklin, Ian Dickinson, Jay Wunder, Stefano Boriani, Paul Unwin, Francis Hornicek, Frank X Pedlow, Duan Zhenfeng, Zhu Quansheng, Guo Wei, Niu Xiaohui, Wang Zhen, Shen Jingnan, Tao Huimin, Dong Yang, Huang Gang, Cai Lin, Lam Ying-lee, WY Ho, Dr. Kumtar, KC Wong, myself, etc. (5).



The farewell dinner before leaving in 2002.



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This slide was made by Ed Chao in 1989 on his vision of computer-assisted limb salvage surgery. It is amazing to witness the evolution of this concept and gradual maturation of the technique in recent years.

Composite Fixation of Bone & Soft Tissue to Metal Prosthesis

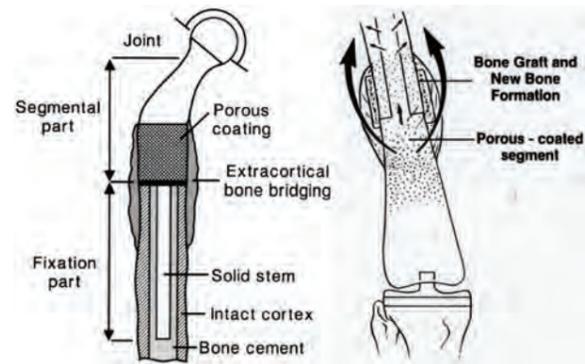
Contributed by Edmund Y.S. Chao & Frank H. Sim

Problems

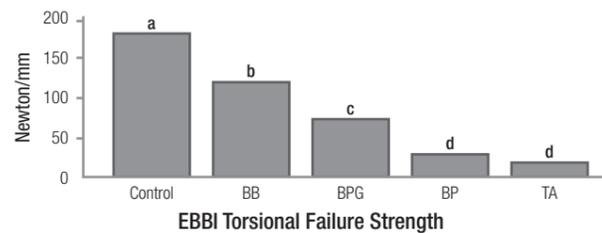
- Stem loosening or fracture.
- Metal and plastic wear particles cause pseudo-tumor.
- Inadequate soft tissue attachment to metal implant causes joint dislocation and poor function.

Solutions to Stem Fixation

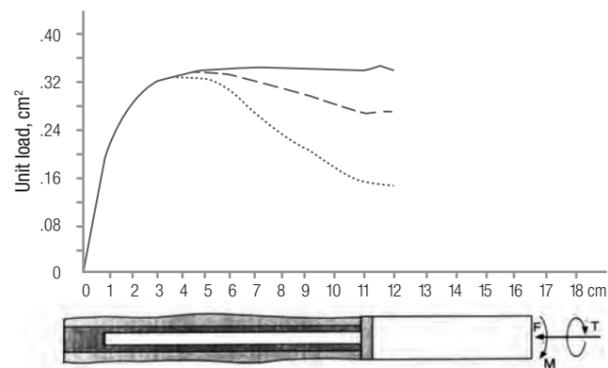
- Regular modular design concept.
- Solid stem for immediate cement fixation.
- Porous coating the shoulder region of the stem.
- Apply bone graft over the porous region for ingrowth.



The extra cortical bone bridging (EBBI) fixation concept for stem stress bypass and early prosthesis stability benefits.



BB bone graft with OP1
BPG bone graft with marrow
BP particulated autograft
TA no graft



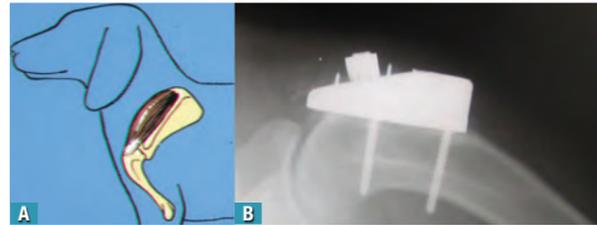
Stem stress reduction due to EBBI under torsional load. Bending has the same effect.

Solution to Tendon Attachment

- Replicate the tendon attachment to bone morphology.
- Develop the enhanced tendon anchor (ETA) device.
- Use canine shoulder model.
- Optimize the grafting technique.



The Enhanced Tendon Anchor (ETA) device used to achieve soft tissue attachment to prosthesis.

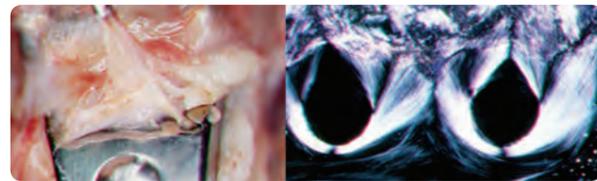


A The canine supraspinatis tendon insertion model.

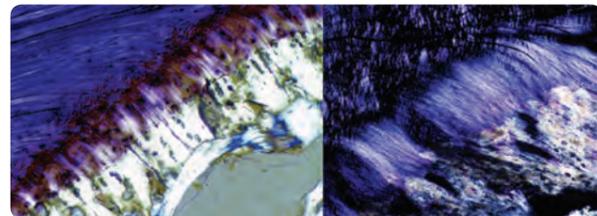
B The radiograph showing the attachment of the ETA to the proximal humerus.



Tendon with intact bone block, the ETA achieved secured bony insertion and normal attachment tensile strength.

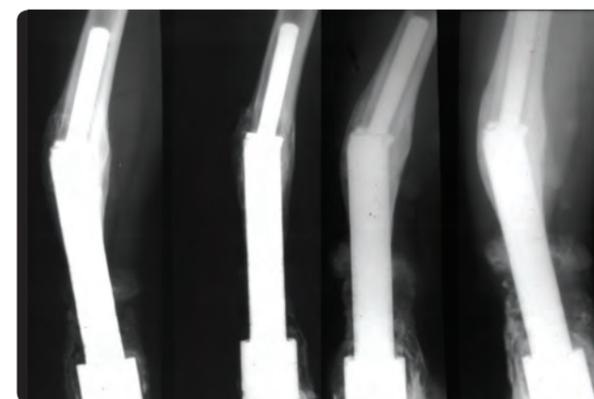
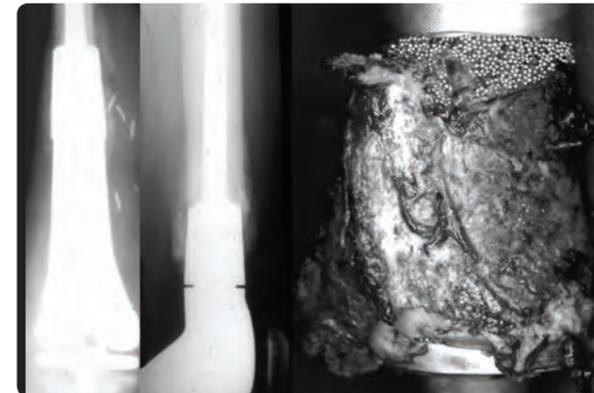


Direct tendon attachment to ETA generated fibrous ingrowth.



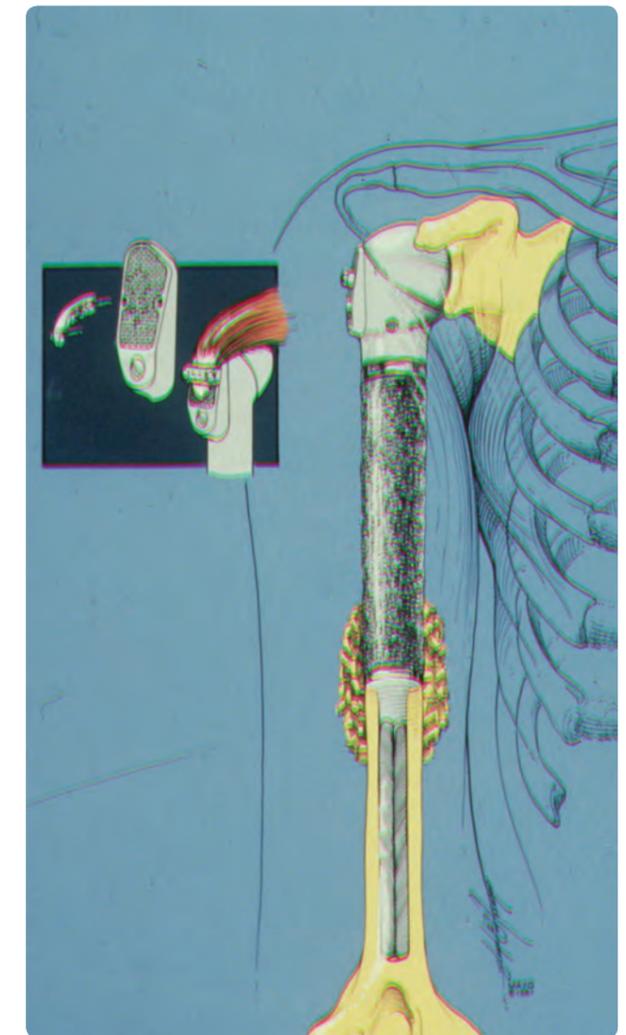
Bone graft plate plus ob1 generated the four-tendon insertion morphology. From upper right to low left: tendon fiber; uncalcified fibro-cartilage; calcified fibro-cartilage; bone.

Clinical Outcome



Discussion

- Allograft plus ob1 gives best EBBI but allograft plus marrow is more practical.
- Allo bone strips (Makisu device) is practical and effective.
- The ETA awaits clinical trial.
- Published technology no longer attracts industry's investment.
- Well-established techniques.



References

There were 38 refereed journal articles and 34 book chapters published.

Acknowledgement

The work presented here were conducted under NCI/NIH support for 23 years; the last 10 years were designated as a "Merit Award." DePuy, Zimmer & Howmedica/Stryker also generously helped to fund this program.

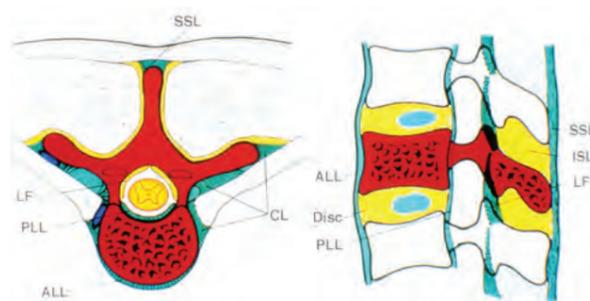
Contributors who are gratefully appreciated: Chin, HC; Frassica FJ; D Frassica; Y Nakao; Dueland T; Markel MD; Gottsauer-Wolf F; Young DR; Rock MG; Shih LY; Pritchard DJ; Egger E; Ikeda K; Inoue N; Hsu RWW; Virolainen P; Ohnishi I; Nagao M; An KN; Duda GN; Chu YH; Elias JJ; Shin DS; Weber KL; Lietman SA; Figuera CA; Malkani AL; Fucks B; Ilstrup DM; Schultz FM; Grabowski JJ; Tomita T; Robb RA; Lim J; Zhang R; Aro H.

Total En Bloc Spondylectomy (TES) for Spinal Tumors

Contributed by Tomita K., Kawahara N., Murakami H., Demura S., Kato S. & Tsuchiya H.
 Kanazawa University, Department of Orthopaedic Surgery

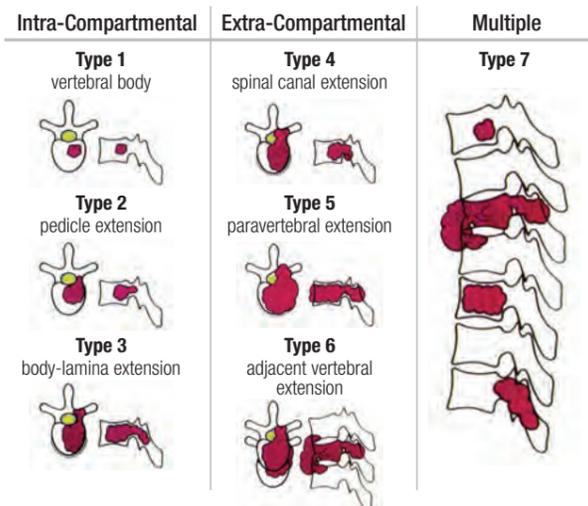
Principal Concept & Surgical Classification

Oncologic Concept of Spinal Tumors (Compartment and Barriers)



The tissues surrounding the spine served as barriers to spinal tumor progression. "The concept of compartment and anatomic barriers" should be applied to the spine. The surgical classification of spinal tumors was devised based on the pattern of local vertebral tumor progression and the type of surgery used to excise it. For type 2-6 lesions, TES is recommended.

Surgical Classification of Spinal Tumors / Metastasis



Surgical Strategy

Primary Spinal Tumors—TES is indicated for primary malignant spinal tumors or even aggressive benign tumors.

Surgical Staging	Contamination / Residual Tumor	Surgical Margin	Spinal Cord Salvage Surgery
Benign Tumor			
Latent			Do not touch!
Active	OK / OK	intralesional	Debulking (piecemeal)
Aggressive	OK / No	intralesional or marginal	Thorough excision (piecemeal / en bloc)
Malignant Tumor			
Low Grade	No / No	→ marginal or wide (radical : impractical) → Total en bloc excision	
High Grade	No / No		
with Metastases	No / No		

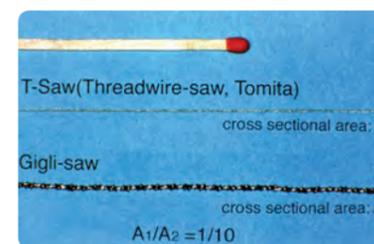
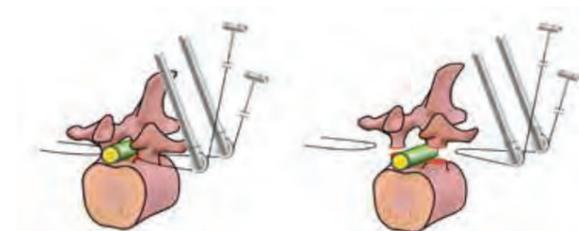
Surgical Classification of Spinal Tumor/Metastasis—The surgical strategy based on a prognostic scoring system provides guidelines for the treatment.

Factor / Point	Primary Tumor	Mets. to Vital Organ	Bone Mets.	Total P. Score	Life Expectancy	Treatment Aim	Surgery
1	slow growth	no met: 0	isolated	2	2y<	Long-term local control	En bloc exc.
2	moderate growth	controllable	multiple	3			
4	rapid growth	uncontrollable		4	1-2y	Middle-term local control	Debulking
				5			
				6	6-12m	Short-term palliation	Palliative decompression
				7			
				8	<3m	Terminal Care	No surgical treatment
				9			
				10			

Surgical Technique

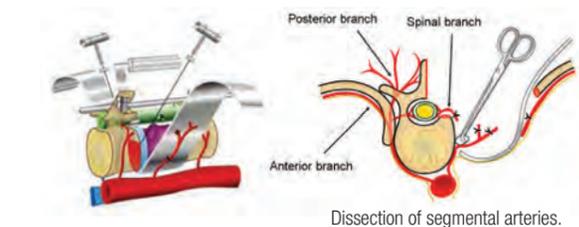
Posterior Approach

En Bloc Laminectomy

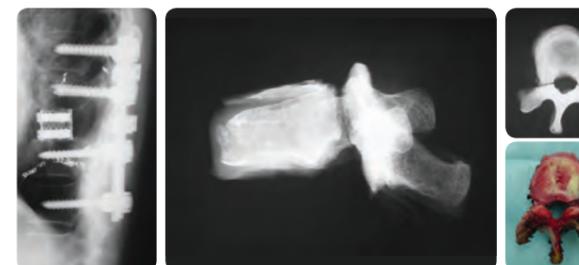
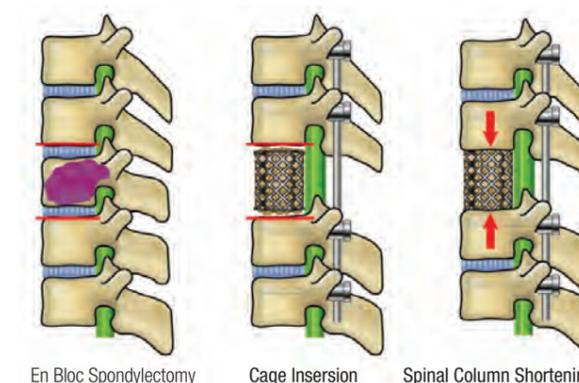


T-Saw to cut bone with negligible cutting loss.

En Bloc Corpectomy

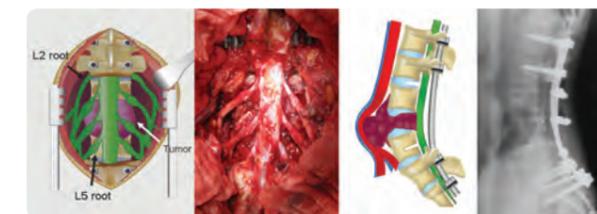


Spinal Shortening

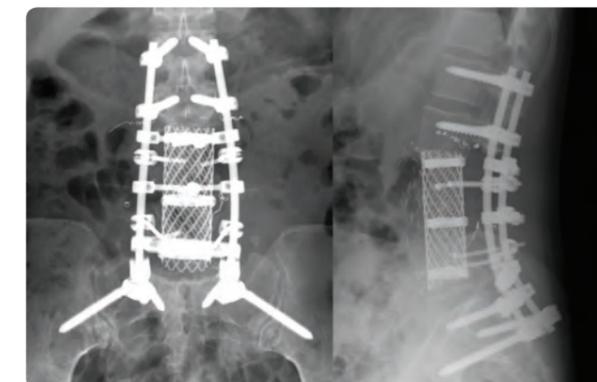


Posterior-Anterior Combined Approach

Tumor Dissection and Spinal Column Stabilization (Posterior)



En Bloc Corpectomy and Spinal Column Reconstruction (Anterior)

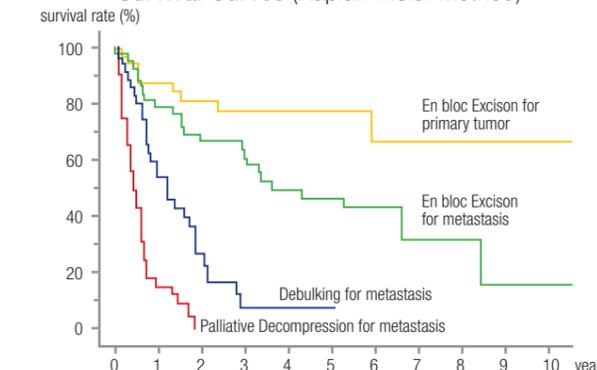


Results

Total en bloc spondylectomy (1989.8.1. _ 2010.2.28.)

Primary Malignant Tumor	27 cases
Aggressive Benign Tumor	28 cases
Metastatic Vertebral Tumor	129 cases

Survival Curves (Kaplan-Meier method)



Conclusive Remarks

For the best chance for survival, TES provides the patients with oncological curability and neurological improvement.

Limb Salvage Functional Scoring System

Contributed by **Rajani R., Enneking W.F.**

Abstract

The need for a standardized system of end result reporting of various surgical alternatives after limb salvaging and ablative procedures for musculoskeletal tumors was recognized as early as the first International Symposium on Limb Salvage (ISOLS) in 1981. During the ensuing four biannual symposia, ISOLS proceeded with a system field tested in 1989 by the Musculoskeletal Tumor Society (MSTS), a system of functional evaluation that has since been adopted by the MSTS and ISOLS for their joint studies and program presentation. In brief, the system assigns numerical values for each of six categories: pain, function and emotional acceptance in upper and lower extremities; supports, walking and gain in the lower extremity; and hand positioning and dexterity and lifting ability in the upper extremity. Demographic information and a patient satisfaction component were also included. A numerical score and percent

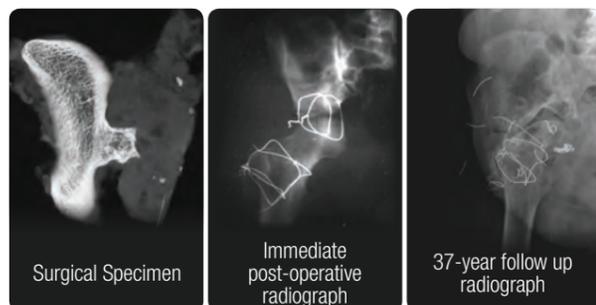
rating is calculated to allow for comparison of results. The system has been field tested in 220 patients with low (+/-) inter-observer variability. It has been well accepted by the participants, and its usage is recommended by the MSTS and ISOLS to facilitate valid comparative end results studies of musculoskeletal tumor reconstructions.

References

Enneking WF, Dunham W, Gebhardt MC, Malawar M, Pritchard DJ. A System for the Functional Evaluation of Reconstructive Procedures After Surgical Treatment of Tumors of the Musculoskeletal System. Clin Orthop Relat Res 1993, 286(1): 241-246.

Case 1

- History: 44-year-old male with chondrosarcoma underwent wide resection of right distal one-third ilium, acetabulum, hip joint, and proximal one-third femoral head.
- Reconstruction: pseudo-arthrosis femur to ilium.



CATEGORY	SCORE	COMMENTS
Pain	5	No meds
Function	2	Cardiac surgeon
Acceptance	4	Travels, speeches
Supports	1	Two Canadian crutches
Walking	3	Limited
Gait	1	Minor handicap
TOTAL SCORE	16	

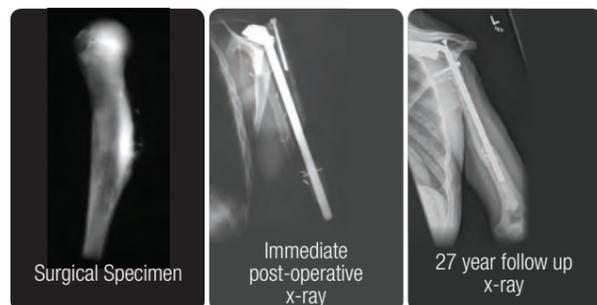
Case 3

- History: 15-year-old female underwent wide excision of a distal femur sarcoma.
- Reconstruction: Osteo-articular allograft: nonunion.
- Second recon: Vascularized fibular allograft and second allograft: union.
- Third recon: Hinged total knee mega-prosthesis.



Case 2

- History: 17-year-old male underwent wide resection of the left proximal humerus parosteal osteosarcoma.
- Reconstruction: Allograft arthrodesis of non-dominant shoulder.



CATEGORY	SCORE	COMMENTS
Pain	4	Occasional Aspirin
Function	4	Lab work, Lawn care
Acceptance	4	Accepted
Hand positioning	3	Not above shoulder
Dexterity	5	Normal
Lifting	4	Lifts 50 Pounds
TOTAL SCORE	24	

CATEGORY	NON-UNION	2 YEARS POST UNION	TKA	COMMENTS
Pain	2	4	5	No meds
Function	1	2	3	Recreational Restriction
Acceptance	1	3	4	Enthusied Satisfied
Supports	2	4	4	Occasional Support
Walking	1	3	4	Minor Limits
Gait	1	3	4	Almost Normal
TOTAL SCORE	8	19	24	

A Modular Hemipelvic Prosthesis System for Peri-Acetabular Tumors & Conservative Surgery for Sacral Giant Cell Tumor

Contributed by **W. Guo, T. Ji, XD Tang & Y. Yang**

People's Hospital, Peking University, Beijing

Introduction

- Intralesional and partial excision of sacrum GCT cause spinal instability and severe bleeding.
- Peri-acetabular resection of tumor requires secured reconstruction to restore weight-bearing function and improve quality of life (QOL).

Objectives

- Investigate if conservative surgery aided by effective hemorrhage control can achieve low recurrence rate in patients with GCT in sacrum.
- Design a modular hemipelvic prosthetic system and review its clinical trial outcome.

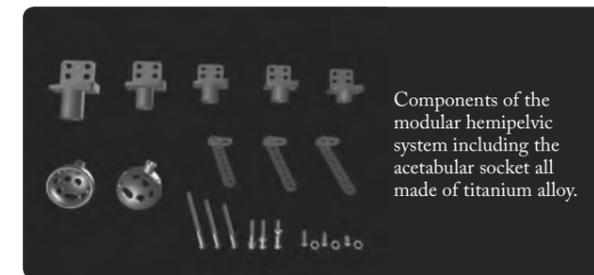
Methods & Materials

- Use balloon dilation catheter or abdominal aorta occlusion technique to control bleeding during tumor curettage.
- Retrospective review of 24 sacrum GCT patient's clinical outcome.
- Ti alloy was used to devise the modular hemipelvic implant system relying screw for iliac-pubic fixation and a socket to receive acetabular cup for hip joint replacement.
- Twenty-eight patients were reviewed for their three-year survival rate and function including quality of life assessment.

Methods & Materials *continued*



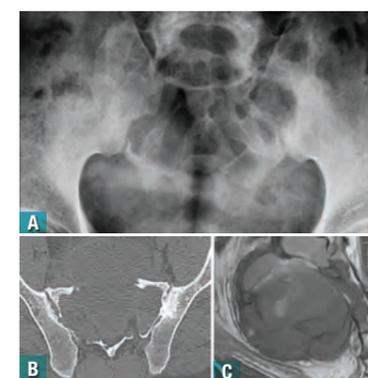
Front and side views of the modular hemipelvic prosthesis system fixed to the remainder of the pelvic ring.



Components of the modular hemipelvic system including the acetabular socket all made of titanium alloy.



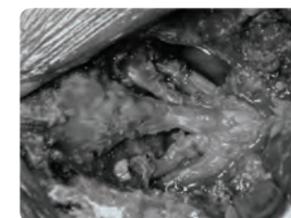
After of chondrosarcoma resection, reconstruction of a 42-year-old man. After 40 months, pubic connecting plate was fractured.



Forty-Five Year Old Man with Sacrum
A Plain X-ray.
B Axial CT.
C T2-weighted MRI mid-line sagittal image.



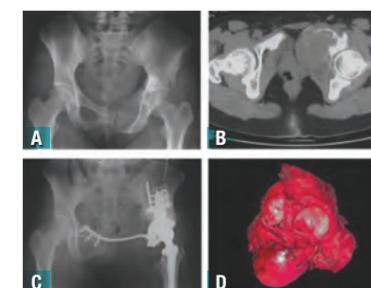
A Initial angiography of the lesion.
B A balloon in distal abdominal aorta.



Intra-operative picture of the dura and the preserved S2-S3 nerve root.



Postoperative radiograph showing the simple fixation using rods and pedicle screws.



Thirty-Five Year Old Woman with Chondrosarcoma
A X-ray showing the lytic lesion.
B The CT revealed the osseous and soft tissue involvement.
C Post-reconstruction.
D The en bloc resection specimen.

Results

Sacrum GCT: Intraoperative bleeding was reduced significantly at a mean of 3217ML. Intra and post-operative complications were similar to or lower than previously reported series. Local recurrence rate of 70% at five years and improved quality of life made this an improved conservative technique.

Peri-acetabular Tumor: Three year survival rate was 67%. There were two implant breakages but no revision was necessary due to scar tissue tightening and stabilization. The iliac-pubic fixation would be considered temporary. Muscle reconstruction is vital for hip function.

Discussion

Intraoperative bleeding control is vital in this type of surgery. Better technique and preoperative planning should be explored. Adjuvant GCR control technique may further improve the results. Antimicrobial coating and host tissue integration may decrease infection rate and provide stronger and more durable peri-acetabular reconstruction after tumor resection. This implant system can also be used in solitary periacetabular metastases to improve QOL.

Osseointegration as a Method for Bone-anchored Prosthesis in Amputees

Contributed by Rickard Brånemark & Örjan Berlin

Centre for Orthopaedic Osseointegration, Sahlgrenska University Hospital, Göteborg, Sweden

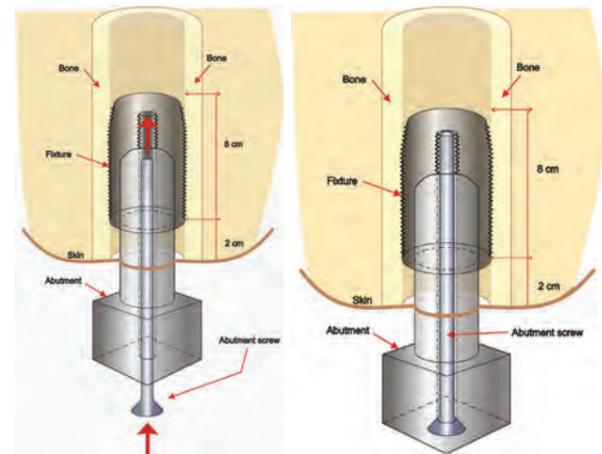
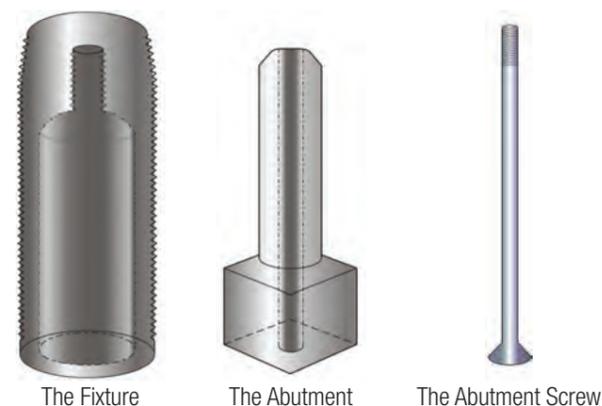
Problems

- Some patients can not use conventional socket prostheses after transfemoral (TF) amputations.
- Bone-anchored amputation prostheses is yet an unproven but promising method for these patients.
- The skin penetration area (SPA) may be prone to be the entrance to deep infection.

Solution to External Bone Anchoring

- Three component system with fixture, abutment and abutment screw (change of components possible).
- Guide instruments necessary for central alignment.
- Fixture countersunk by 2cm.
- Soft tissue plasty necessary to minimize movement of SPA.

The Opra System



The Fixture is inserted at the S1 operation and is left to osseointegrate for six months. At the S2 operation the hexagonal proximal end of the Abutment is inserted into the Fixture with a pressfit attachment making it unable to rotate. The Abutment is secured with the Abutment Screw.

Osseointegration



Direct anchorage of an implant by the formation of bony tissue around the implant without the growth of fibrous tissue at the bone-implant interface



Objectives

The purpose of this study is to improve quality of life for patients who cannot use conventional socket prostheses. The main indications are patients with TF amputations due to trauma or tumors.



Bony ingrowth in threads of a titanium screw. Osteocyte with osteopods attached to the titanium surface (electron microscopy).

Clinical Outcome

The prospective OPRA study includes 51 patients with 55 implants (1999–2010). Follow up is 2 years. The majority had TF amputations due to trauma (67%) or tumor (21%). One patient was lost to follow up. Two patients were excluded (unrelated to the procedure).

Three implants (6%) have been removed due to loosening (2) or infection (1). The crude revision rate has been 8% (4/51). The patients had an average of one superficial infection every two years. The infections were typically treated with the application of topical ointment or oral antibiotics combined with temporarily reducing the use of the external prosthesis. They all healed. There were six deep infections in four patients. All but one of these cases of infection was successfully treated by conservative means. Nine mechanical complications were reported in four patients (bent or fractured implant parts) and three skeletal fractures occurred. Prosthetic use, prosthetic functions and global quality of life were all significantly improved ($p < 0.001$) and prosthetic problems were reduced ($p < 0.001$).

Complications

OPRA—Pre-specified Adverse Events (AE)	Events	Subjects with Events (%)
Any Prescribed AE	77	41 (80%)
Superficial Infection	41	28 (55%)
Deep Infection	6	4 (8%)
Pain	7	7 (14%)
Loosening of OPRA	3	3 (6%)
Skeletal Fracture	3	3 (6%)
Trauma	8	8 (16%)
Mechanical Complication of OPRA	9	4 (8%)

Infections

	Incidents	Patients
Superficial None before seven months post-S2. All healed by conventional antibiotics.	41	28 (55%)
Deep All before eight months post S-2. None had preceding spf infection. Three healed by atbs alone, one re-operated after six months aggressive triple-comb of atbs.	6	4 (8%)
Total	47	32

OPRA—Study 1999–2008 Preliminary Conclusion

- Superficial infections are frequent and curable.
- Deep infections can be cured by targeted long-term atb's alone, sometimes after extraction and new or prosthesis.
- Mechanical complications are common in a long-term perspective. Necessitates "service operations".
- No complications with the Fixture (except loosening). No patient had an amputation to a higher level.
- "Second chance" can be successful.

Population

VARIABLE	(n=51)
Randomized / Started	51 (100.0%)
Treated / Safety population	51 (100.0%)
ITT Population	51 (100.0%)
PP Population	47 (92.2%)
Discontinued Patients	6 (11.8%)

- One withdrawn due to problems with contralateral leg.
- One lost to follow-up.
- One deceased six months after S2.
- Three implants removed before the two year follow-up.

OPRA—Demographics at Inclusion n=51 (55 implants)

Gender; Male / Female	28 (55%) / 23 (45%)
Age at inclusion (years)	44 (20–65)
Unilateral / Bilateral TF amputation	45 (88%) / 6 (12%)

Reason for amputation:

Trauma	33 (65%)
Tumor	12 (24%)
Peripheral Vascular Disease	2 (4%)
Other	4 (8%)

Time between amputation and surgery S1 (years) 12 (0.8–42)

Prosthetic user at inclusion 42 (82%)

Nationality:

Sweden	25 (49%)
Norway	14 (28%)
Spain	11 (22%)
England	1 (2%)

Discussion

We believe that the implementation of a standardized or surgical technique and the graded rehabilitation protocol are of utmost importance for the promising results so far. The benefits are in many instances related to the removal of the socket as attachment of the prosthesis to the stump. The amputee no longer has skin ulcers, pain when loading, and problems with stump volume changes. Normal sitting comfort and normal hip range of motion can be expected. All these changes lead to a significantly improved quality of life for the individual with a transfemoral amputation. Most complications can be handled appropriately.

References

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- Sullivan J, Uden M, Robinson KP, Sooriakumaran S. Rehabilitation of the trans-femoral amputee with an osseointegrated prosthesis: The United Kingdom experience. *Prosthet Orthot Int.* 2003; 27(2): 114–20.
- Tillander J, Hagberg K, Hagberg L, Brånemark R. Osseointegrated titanium implants for limb prostheses attachments: infectious complications. *Clin Orthop Relat Res.* 2010 Oct; 468(10): 2781–8. Epub 2010 May 15.

Why Current Tumor Implants Have Extramedullary Porous Coating

A Review of Studies Indicating That Extramedullary Porous Coating Prevents Diaphyseal Osteolysis

Contributed by Ward WG, Carter CJ, Ward CN, Dorey FJ, & Eckardt JJ

Background

Initial Objective of Extramedullary Porous Coating (obtain bone bridging) Failed

- Minimal wispy bridging bone, if any.
- Added cost.
- Delayed manufacturing.

Abandoned extramedullary porous coating for several years

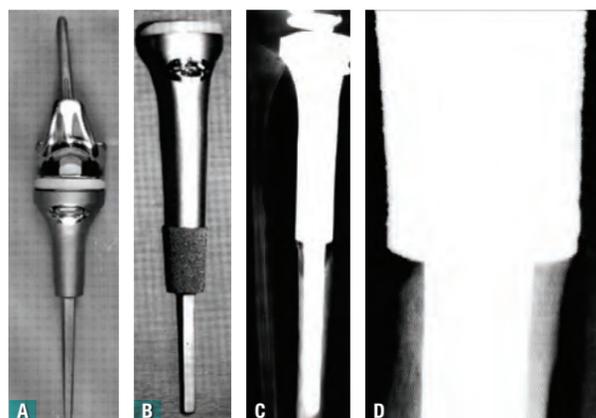
- Earlier failure of these more recent but smooth surfaced implants.

Three retrospective studies (all in cemented implants):

- Proximal tibia replacements.
- Proximal femur replacements.
- Distal femur replacements.

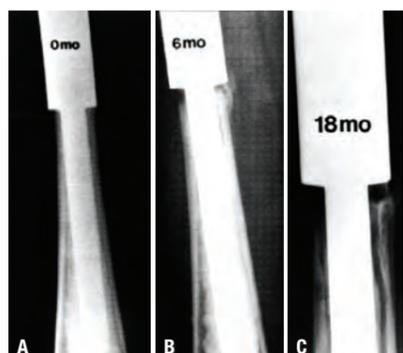
In all three studies, implants with extramedullary porous coating had greater longevity and delayed aseptic loosening compared to their smooth surfaced counterparts.

Proximal Tibia Study



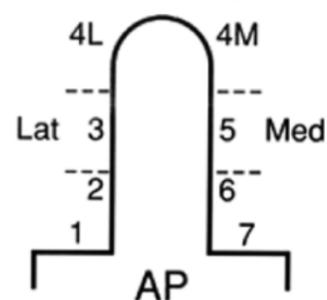
- A** Smooth prosthesis.
- B** Porous coated endoprosthesis.
- C** Ten months: no porous coating, early erosive osteolysis; evident by concave contour.
- D** Four years: post-op, porous coated endoprosthesis; no osteolysis.

Proximal Femur Study

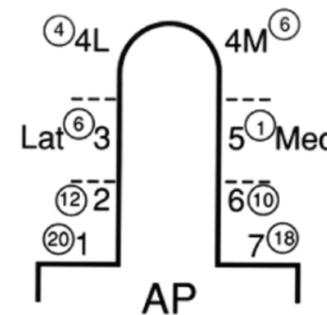


- A** Immediate postoperative.
- B** Six months postoperative: proximal cortical osteolysis.
- C** Eighteen months postoperative.

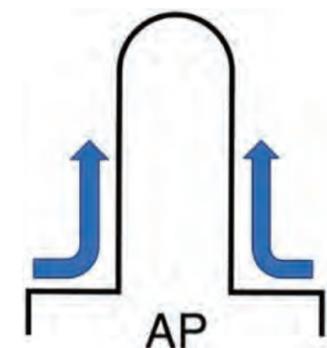
Distal Femur Study



AP Zones as utilized for analysis of radiolucent line analysis around the cemented intramedullary stems.

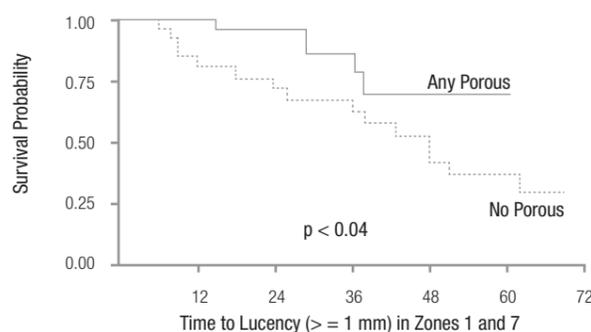


Total number of radiolucent lines (circles) in each zone. The frequency of radiolucent lines within each zone confirms the progression, beginning in junctional zones and then proceeding proximally along stem.



The arrows depict the progression of periprosthetic radiolucent lines and of loosening of the cemented stems.

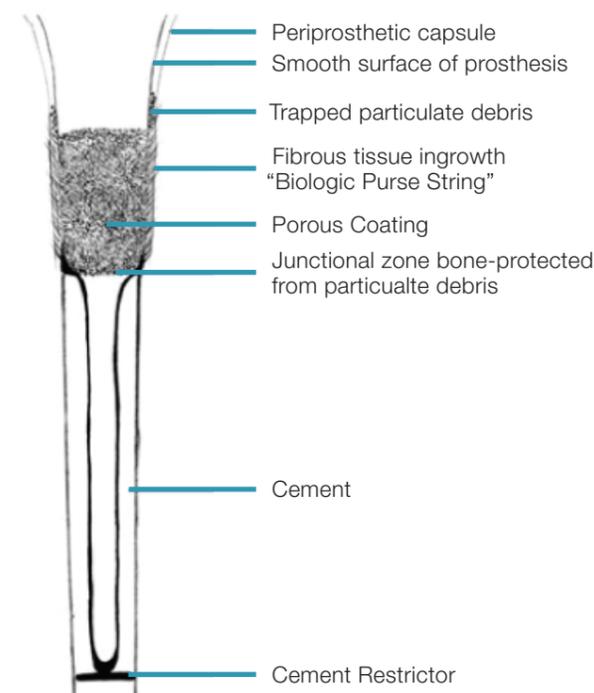
Protective Effect Of Em Porous Coating



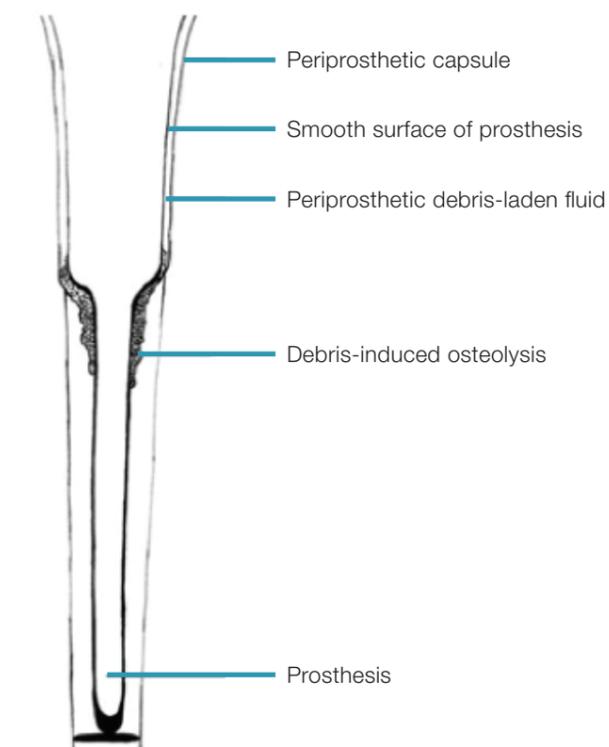
Survivorship curve with time to radiolucent lines in zones 1 and 7 for porous coating vs. no porous coating.

Composite Drawing of EM Porous Coating “Biologic Purse String” Effect

Tibial endoprosthesis with the porous coating ring.

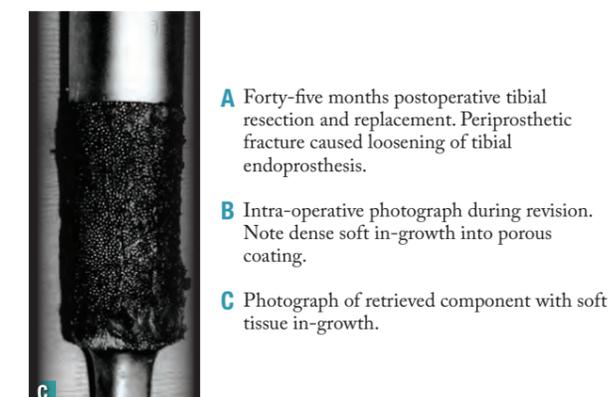


Tibial endoprosthesis without the porous coating ring.



Repeated Observation

- No extramedullary porous coating ring – osteolysis.
- Extramedullary porous coating ring – no osteolysis or delayed osteolysis.
- Growth of dense fibrous capsular tissue into porous coating.
- Appears to effectively seal end of prosthetic joint capsule – the so called “purse string effect.”



- A** Forty-five months postoperative tibial resection and replacement. Periprosthetic fracture caused loosening of tibial endoprosthesis.
- B** Intra-operative photograph during revision. Note dense soft in-growth into porous coating.
- C** Photograph of retrieved component with soft tissue in-growth.

Discussion

- Dense, fibrous tissue grows into extramedullary porous coating on endoprostheses.
- Seals prosthetic joint capsule from debris.
- Pseudo-capsule lined with synovial-like membrane forms on non-coated, smooth extramedullary surfaces of endoprostheses.
- Pseudo-capsules contain debris which accumulates inferiorly, due to gravity.
- Particulate debris causes osteolysis
- Circumferential extra-medullary porous coating protects host bone from osteolysis induced by debris-laden periprosthetic fluid, thereby enhancing long-term survival of the reconstruction.
- There could be other factors as well, such as dampening of biomechanical forces, from the porous coating soft tissue ingrowth – further studies are indicated.
- It is prudent to continue the application of extramedullary porous coating to massive bone-replacing endoprostheses.

References

Ward WG, Johnston KS, Dorey FJ, Eckardt JJ. “Extramedullary porous coating to prevent diaphyseal osteolysis and radiolucent lines around proximal tibial replacements. A preliminary report.” *J Bone Joint Surg Am.* 1993 Jul; 75(7): 976-87.

Function-Preserving Surgery with Distraction Osteogenesis Following Tumor Excision

Contributed by **Hiroyuki Tsuchiya**

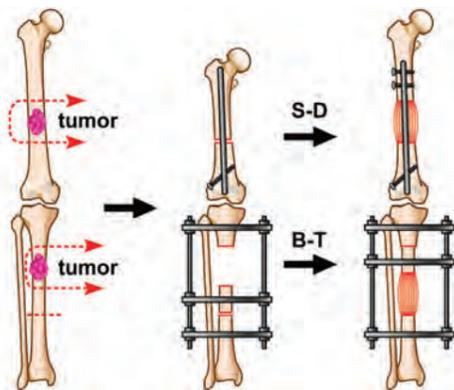
Department of Orthopaedic Surgery, Kanazawa University Graduate School of Medical Science

Distraction osteogenesis, also called callus distraction, callotaxis and osteodistraction is a surgical process used to reconstruct skeletal deformities and lengthen the long bones of the body. Since 1990, we have been using

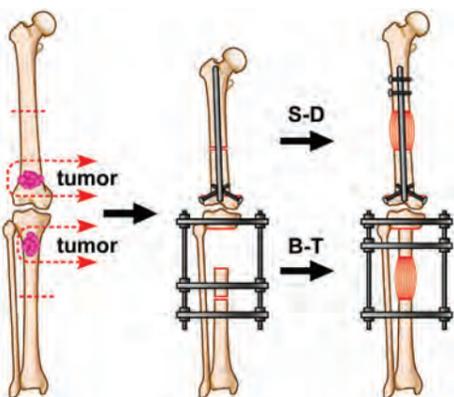
distraction osteogenesis, which can regenerate bone of sufficient strength and can preserve limb function.

Patients And Methods

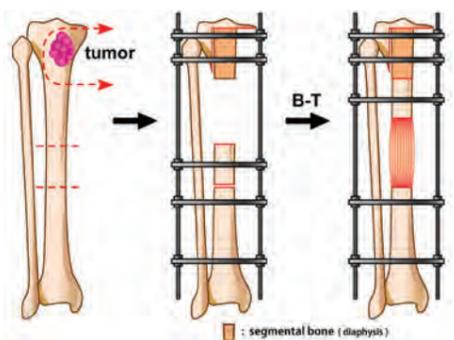
Type 1 (n=8) • Diaphyseal Reconstruction



Type 2 (n=7) • Metaphyseal Reconstruction



Type 4 (n=8) • Subarticular Reconstruction



S-D shortening distraction | B-T bone transport

Table 1. Patients Characteristics

TOTAL NUMBER OF PATIENTS	23
GENDER	
Male	8
Female	15
MEAN AGE	24.9 years old (5-79)
MEAN FOLLOW-UP PERIOD	123.3 months (40-217)
HISTOLOGY	
Osteosarcoma	10
Ewing Sarcoma	1
Low-grade Osteosarcoma	3
Adamantinoma	2
GCT	5
Osteofibrous Dysplasia	2

Table 2. Site Of Reconstruction

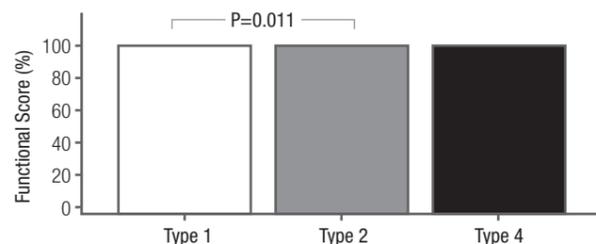
SITE	CLASSIFICATION OF RECONSTRUCTION		
	Type 1 (n=8)	Type 2 (n=7)	Type 4 (n=8)
Proximal Femur	0	0	0
Middle Femur	1	0	0
Distal Femur	0	5	0
Proximal Tibia	1	2	8
Middle Tibia	6	0	0

Results

Table 3. Mean Length Of Distraction

	LENGTHENING (mean mm ± SD)
Type 1	84.13 ± 27.50
Type 2	95.29 ± 30.30
Type 4	65.25 ± 25.11

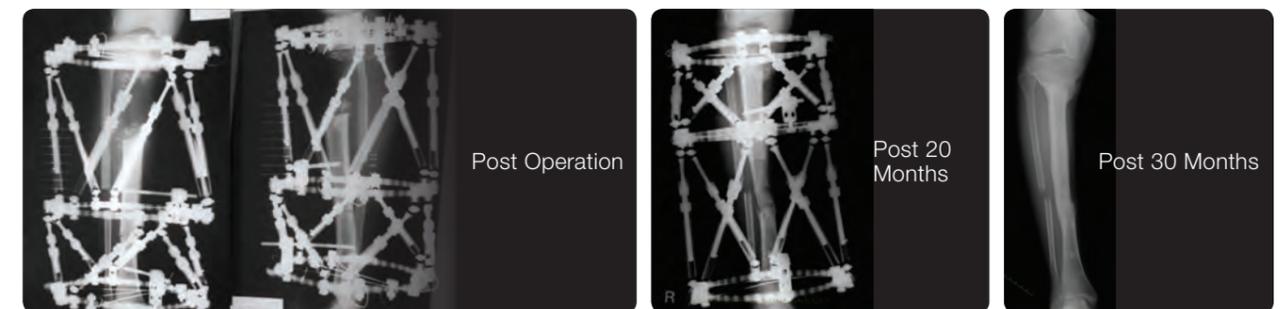
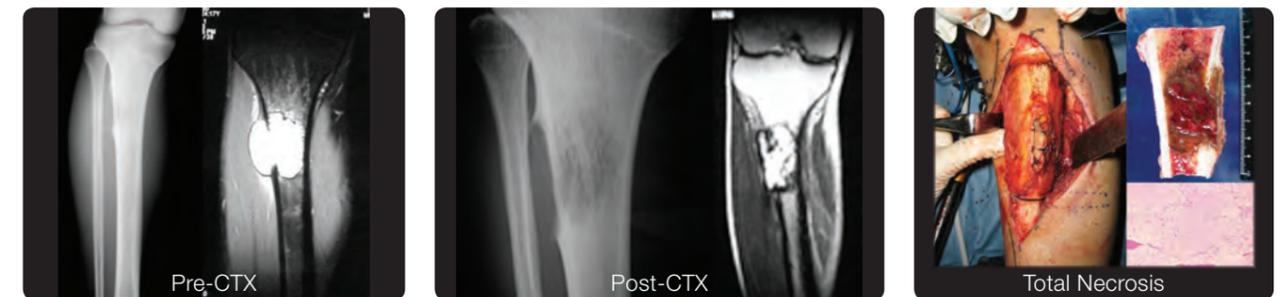
Figure 2. Musculoskeletal Tumor Society Score



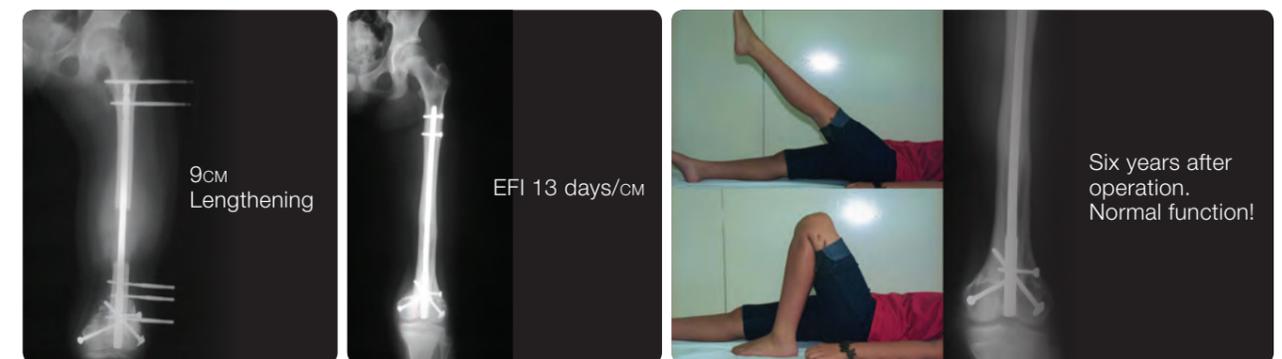
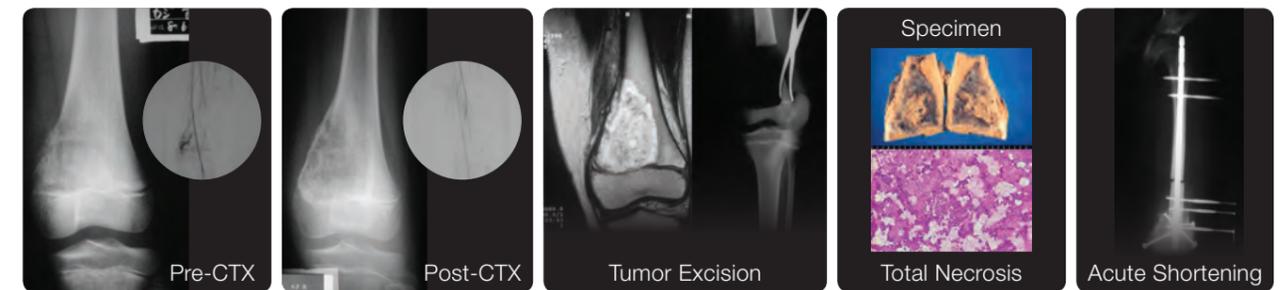
Tsuchiya H, et al. *J Bone Joint Surg Br.* 79:403-11, 1997.

Results continued

Type 1 Reconstruction • Seventeen Year Old Man Osteosarcoma of Proximal Tibia



Type 2 Reconstruction • Nine Year Old Girl Osteosarcoma of Distal Femur



Conclusions

- Reconstruction using distraction osteogenesis results in bone with sufficient biomechanical strength and durability.
- This technique is beneficial in patients in whom there is an expectation of long-term survival.
- Once the regenerated bone had matured and remodeled, no further complications occurred.

Massive Autograft Containing Tumor Treated by Liquid Nitrogen for Limb-Saving Surgery

Contributed by **Hiroyuki Tsuchiya**

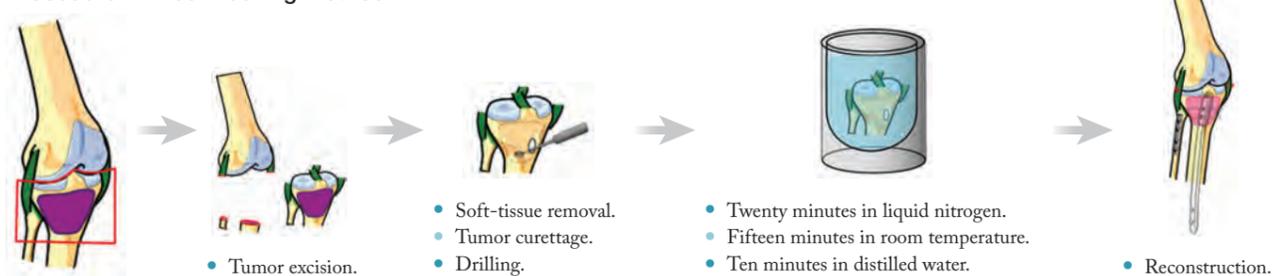
Department of Orthopaedic Surgery, Kanazawa University Graduate School of Medical Science

We have developed a new method of treating autografts, based on in vitro and in vivo experiments in 1999, which uses the hypothermic effect of liquid nitrogen. This procedure is a very useful and promising recycling system.

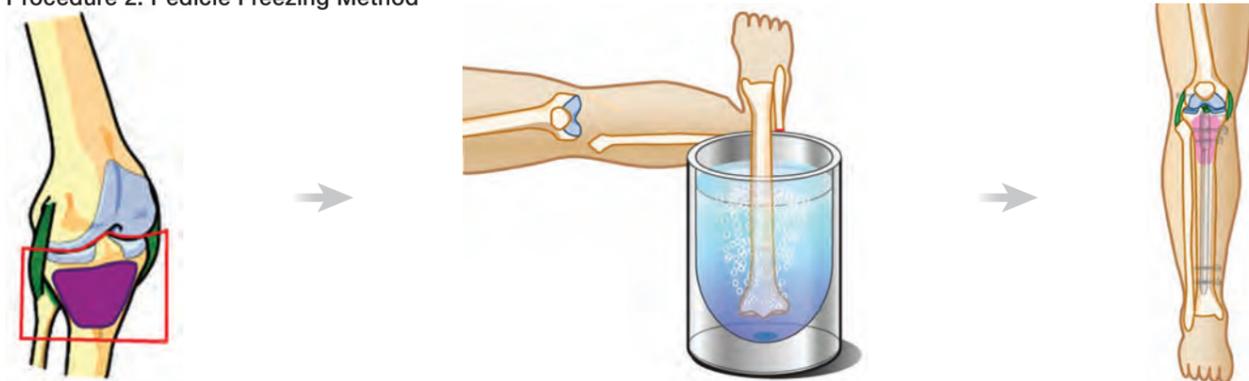
Yamamoto N, Tsuchiya H, Tomita K. J Orthop Sci. 8:374-80, 2003
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Operative Procedure

Procedure 1. Free Freezing Method



Procedure 2. Pedicle Freezing Method



Patients & Methods

91 Patients (52 males and females)

Mean follow-up periods	45 months (6-153 months)
Median age	38 years (7-76 years)

	POINTS	Procedures	POINTS
Bone sarcoma	69	Free freezing	50
Benign bone tumor	1	Pedicle freezing	41
Metastatic tumors	21		

Affected Sites	POINTS	Reconstruction	POINTS
Humerus	7	Composite prosthesis	28
Pelvis	15	Osteoarticular	18
Femur	47	Intercalary	45
Tibia	18		
Radius	2		
Scapula	1		
Calcaneous	1		

Results

The Limb Function (ISOLS score) in Eligible 82 Points

	Excellent	Good	Fair	Poor
Upper extremity	7	2	0	0
Lower extremity	42	13	4	0
Pelvis	7	3	3	1
	56/82 (68.3%)	18/82 (22.0%)	7/82 (8.5%)	1/82 (1.2%)

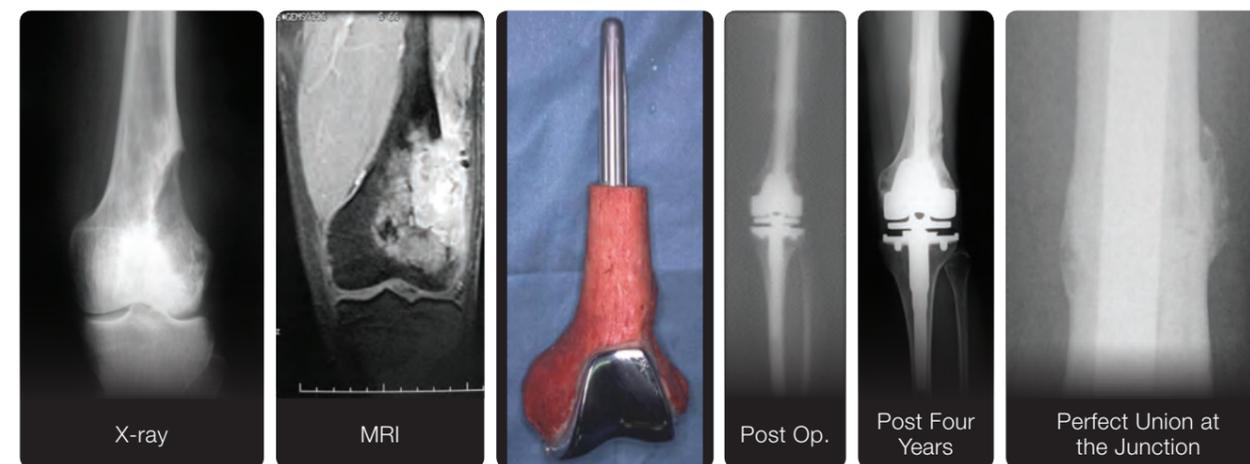
Complications	POINTS
Infection	9
Fracture	5
Implant breakage	4
Bone absorption	2
Arthroplasty due to OA	5
Non-union	11

Results *continued*

Fourteen Year Old Boy Osteosarcoma of Proximal Tibia



Thirty-Seven Year Old Male Osteosarcoma of Distal Femur



Results *continued*

Twelve Year Old Girl Osteosarcoma of Proximal Tibia



Conclusions

- The frozen autograft achieved success for reconstruction of malignant bone tumors.
- This is a new, simple, effective surgical technique for biological reconstruction that is still investigated but has potential for development.

Treatment of Malignant or Highly Aggressive Bone Tumors by Microwave Ablation

Contributed by **Qing-Yu Fan**

Tangdu Hospital, Fourth Military Medical University, Xi'an, China

Introduction

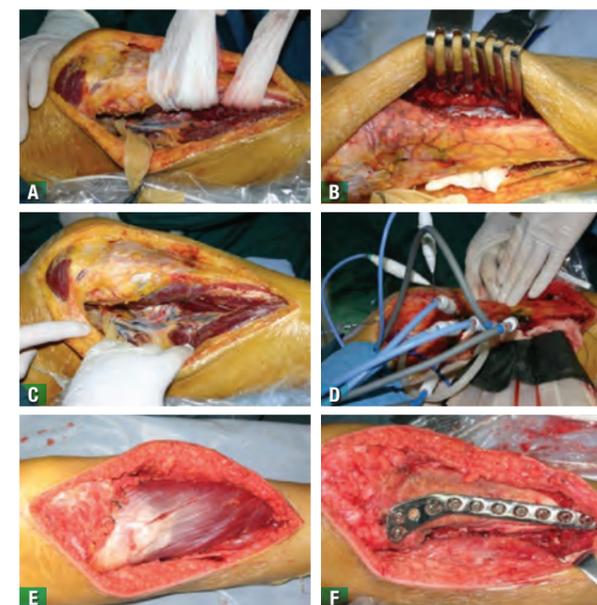
Microwave-ablation has shown promising potential in the treatment of malignancy of liver, lung, kidney, and prostate (Froedtert, 2010). We devised a novel technique in limb salvage surgery in long bones and pelvic region.

Methods

After completion of dissection of the tumor-bearing bone from surrounding normal tissues with a proper margin, the microwave antennae array was inserted into the tumor mass for emitting electromagnetic microwave that produces tumor cellular death via thermo-coagulation. Temperature was monitored to ensure any part of the tumor-bearing bone reached 70 to 80°C and kept for at least 20-30 minutes. The loose devitalized tumor tissues were removed by dissecting or curettage. The bony union of the treated bone with the host was achieved after augmentation procedure, using bone graft, filling defect by the mixture of bone chips with bone cement, and/or prophylactic fixation.

Indications

All of pelvic tumors, early stage of long tubular bone tumors, and isolated vertebral tumors are suitable for this technique to eradicate tumor mass for disease control. If the tumor destroys the bone so severe that the remainder of bone stock of weight-bearing bone is not enough to restore the tumor-bearing bone strength, we preferred to use other methods of limb reconstruction (prosthesis or allograft).



Typical Procedure for Osteosarcoma at Proximal Tibia

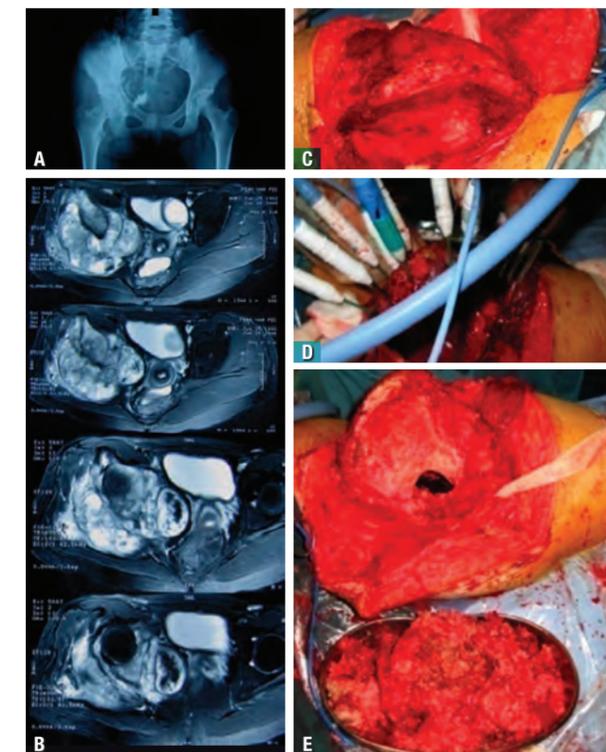
- A** Open the soleus tendinous arch to exposure the crotch of anterior and posterior tibia vessels.
- B** Dissect the anterior muscle group and cut the interosseous membrane.
- C** Dissect the posterior muscle group to accomplish the separation of tumor-bearing bone.
- D** Apply microwave ablation.
- E** Strengthening procedure.
- F** Transfer the medial belly of gastrocnemius muscle to cover dead bone.

Results

Starting in 1992 to present-day, more than one thousand patients (including 216 cases of pelvic tumors) were treated in this way. In majority of the patients alive, cosmetic and useful limbs were preserved. Because the adjacent natural joint was preserved, it can withstand the wear and tear. Once healing is occurred, it is durable without any further concern of the loosening. Average functional score is above 90%. Even though it is not every case has been uniformly satisfactory, sufficient success has been achieved. The oncological and functional results are encouraging. Hyperthermia deserves more attention than it has received now.

Discussion

The incidence of complications after microwave ablation is low: local recurrence rate, 7.8%; bone fracture, 1.3%; and infection, 1.2%. Compared with amputation and other types of reconstructions, microwave ablation at least does not jeopardize the patients' survival rate. We hope to get co-operation from advanced countries' colleagues, and excellent engineering support to make this novel method and technique more reliable and easy to apply.



Typical Procedure for Pelvic Tumor

- A** X-ray shows a case with chondrosarcoma in the pelvis.
- B** The MRI images showed tumor mass intruding into the sciatic foramen.
- C** Intra-pelvic and extra-pelvic exposure of the tumor.
- D** Microwave ablation and temperature monitoring.
- E** Tumor mass removal and underlying bony structure exposure.

Acknowledgment

Doctors Edmond YS Chao and Frank Sim were very helpful, suggestive, and encouraging.

Intentional Marginal Excision in Conjunction with Caffeine-Potentiated Chemotherapy for Osteosarcoma

Contributed by **Hiroyuki Tsuchiya**

Department of Orthopaedic Surgery, Kanazawa University Graduate School of Medical Science

Caffeine

- Xanthine analogue, has a DNA-repair inhibiting effect.
- Enhances the cytotoxic effects of anticancer drugs (cisplatin, doxorubicin, cyclophosphamide, and mitomycin c) and radiations.
- Caffeine-potentiated chemotherapy for high-grade bone and soft tissue sarcoma since 1989.

Indication of Intentional Marginal Excision

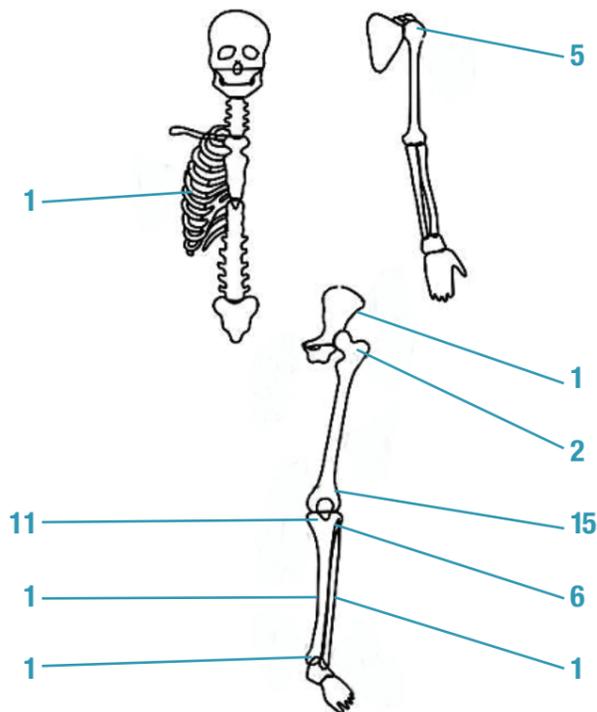
- Plain radiograph: sclerotic change or good margination of tumor.
- MRI: marked shrinkage of tumor extending into soft tissue.
- Angiogram: disappearance of tumor stain.
- Thallium 201 scintigram: disappearance of abnormal accumulation.

At least two of good responses (CR is highly expected)

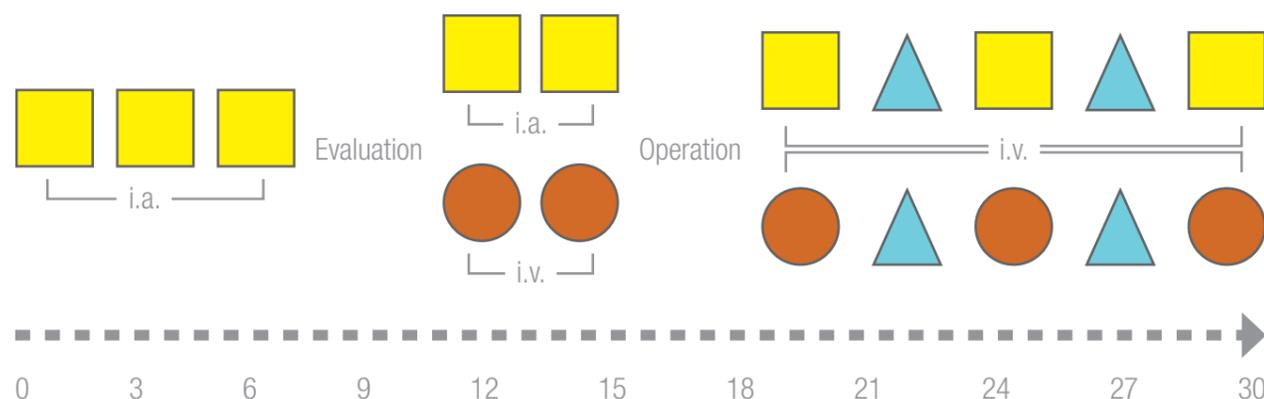
Patients and Methods

Patients	44
Mean Follow-Up Period	105 months (22-235)
Mean Age	15 years (5-72)

Gender	No. of pts.		Musculosurgical Staging System by Enneking	
Male	32	73	IIB	36 82
Female	12	27	III	8 18



Chemotherapy



Cisplatin	120 mg/m ²	1 day
Doxorubicin	30 mg/m ²	2 days
Caffeine	1.5 mg/m ²	3 days

Ifosfamide	3 mg/m ²	3 days
Etoposide	60 mg/m ²	3 days
Etoposide	1.5 mg/m ²	3 days

High-Dose MTX	6-12 g/m ²	1 day
Vincristine	1.5 mg/m ²	1 day

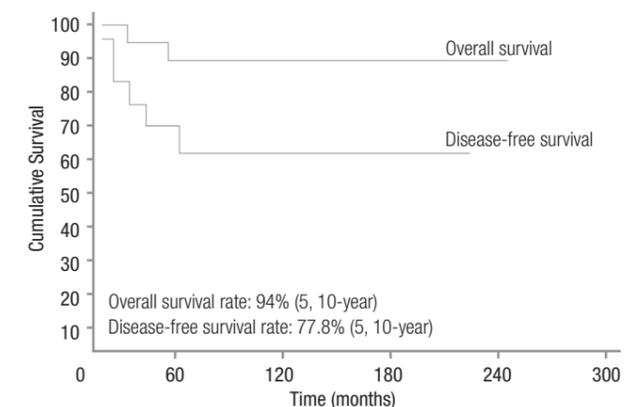
Results

Histological Response	Stage IIB (n=36)	Stage III (n=8)
Grade IV	25	4
Grade III	10	4
Grade II	1	0
Grade 1	0	0
Response Rate	97.2%	100%
Reconstruction Methods		Number of Points
Distraction osteogenesis		10
Frozen autograft		8
Frozen autograft, prosthesis composite		5
Autoclaved autograft, prosthesis composite		3
Allograft		2
Megaprosthesis		7
Resection only (fibula, rib)		8
VFG		1
Total	44	

The Limb Function (iSOLS Score) In Eligible 43 Points

	Excellent	Good	Fair	Poor
Upper Extremity	1	3	0	1
Lower Extremity	30	4	3	0
Pelvis	1	0	0	0
	32/43 (74.4%)	7/43 (16.3%)	3/43 (7.0%)	1/43 (2.3%)

Disease-Free and Overall Survival in Stage IIB (N=36)



Eleven Year Old Girl Osteosarcoma of Proximal Tibia



Conclusions

- Intentional marginal excision was beneficial to the patients who showed marked radiological effect after pre-operative caffeine-potentiated chemotherapy.
- It also had no adverse impact on survival or local recurrence.
- Precise evaluation of preoperative chemotherapy effects with plain radiography, angiography, MRI and 201-Thallium scan was the key to apply this procedure.

The Evolution of the Stanmore Extendible Massive Replacements

Contributed by **Dr. Paul Unwin**
Stanmore Implants Worldwide Ltd

Introduction

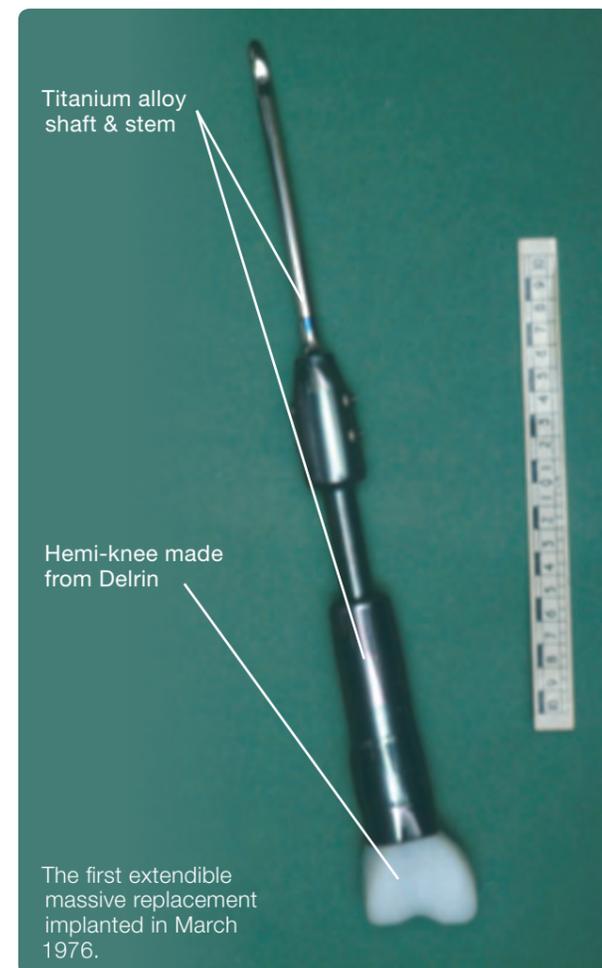
The advances in chemotherapy, imaging, surgery and implant technology have led to an increase in the use of endoprosthetic replacement. However, there is still controversy over the use of extendible endoprostheses to

Worm-Drive

Year Introduced	1976
Number Implanted	4

In 1976, Professor John Scales of the Centre for Biomedical Engineering (RNOH, Stanmore, UK) designed and fabricated the world's first extendible massive replacement. At that time, the mechanism utilised a worm-drive mechanism. This first extendible implant was a distal femoral replacement that incorporated a hemi-arthroplasty knee fabricated from the polymeric material Delrin. The extending mechanism was fabricated from cobalt chrome alloy (CoCrMo). The implant was lengthened by a T-key through a small stab incision.

After four implantations, (x3 distal femoral and x1 mid-shaft femoral) this extension method was abandoned because of mechanical problems with the precision fabrication of the worm-drive mechanism. One of the three distal femoral implants remained in situ for 41 months, was fully extended and was subsequently replaced with a definitive distal femoral replacement.

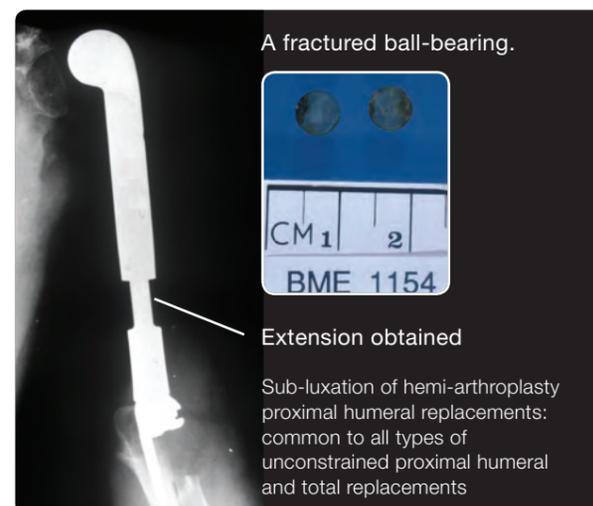
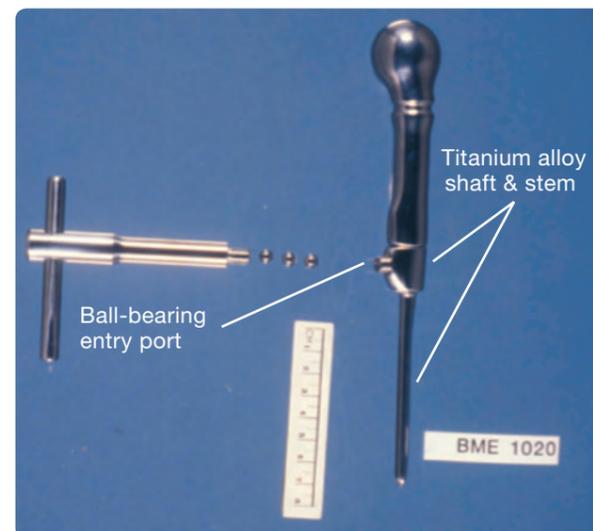


maintain leg length equality in the skeletally immature patients. This study looks at the evolution of the Stanmore extendible devices.

Ball-Bearing

Year Introduced	1982
Number Implanted	59

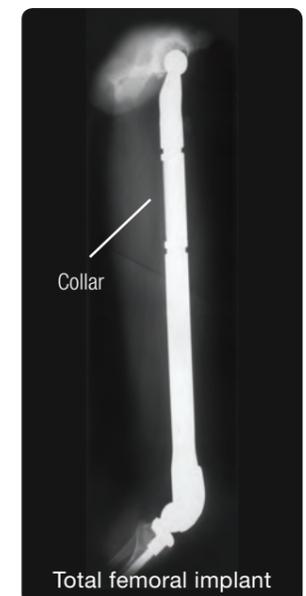
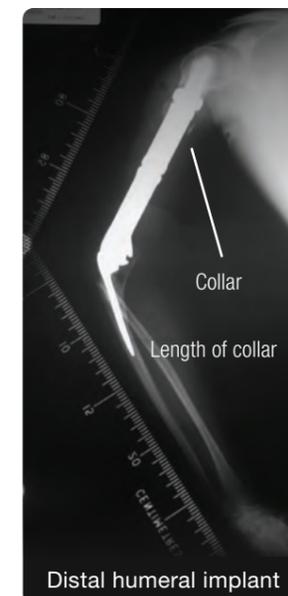
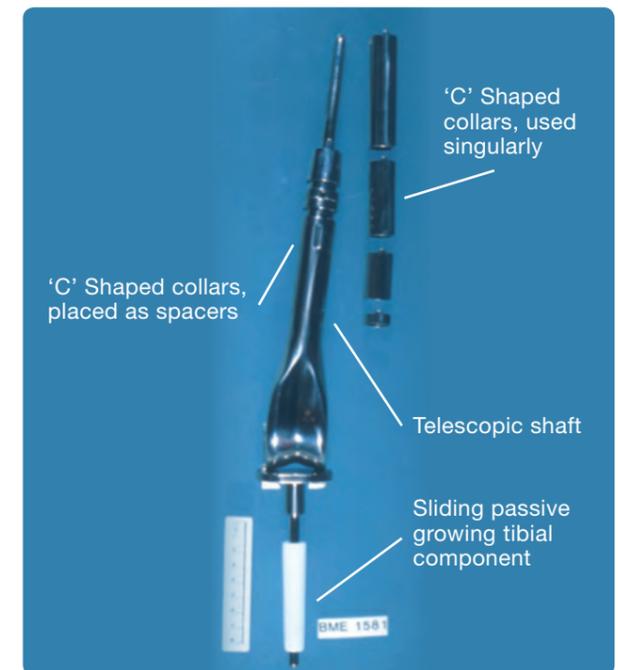
To overcome extending problems, a simpler mechanism was developed. This comprised of a hollow telescopic shaft into which a one-fourth inch ball bearings were placed via a portal. To lengthen the implant the portal plug was removed, a ball bearing was inserted into the stack of ball bearings and the portal plug replaced. This simpler mechanism still only required a small incision to be made and remained in service for over six years. Due to the construct of the mechanism the load was carried through the stack of ball bearings. In a small number of cases joint loading of the ball bearings lead to fracture and the fragments jammed the mechanism.



'C' Collar

Year Introduced	1988
Number Implanted	111

In 1988 the next generation of extending mechanism was launched. This utilized a "C" shaped interposition collar that was secured by rotating the collar by 90 degrees. A series of collars were made for each patient and the collar lengths were in 6MM increments. To extend the implant large scissor-action levers were required. In comparison to the former two mechanisms the incision was significantly larger.



Minimally Invasive Worm Drive

Year Introduced	1992
Number Implanted	618

By the early nineties, precision engineering had improved significantly enabling a new generation of worm-drive mechanism to be fabricated without the mechanical problems encountered with the first generation. Importantly the mechanism could be extended via stab incision. Over 600 extendible devices with this mechanism have been implanted. This mechanism has proved very successful and is still in use 19 years after its introduction. However, in a small percentage the extension mechanism had reversed and the mechanism does require surgical intervention.

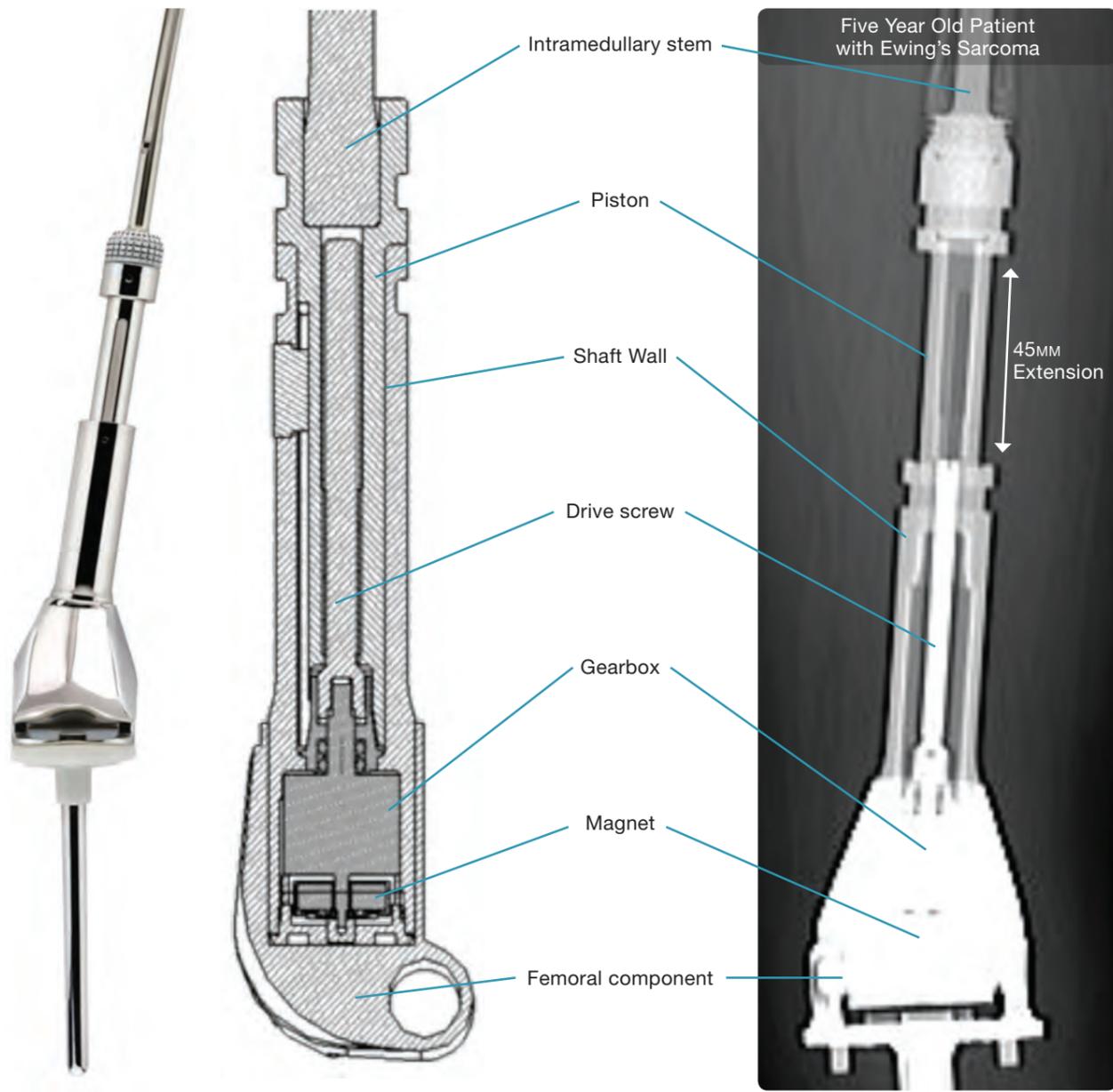


Extendible Mechanism: Non-Invasive (Inductively Coupled Electro-Magnetic)

Year Introduced 2002
Number Implanted 266

Non-Invasive (Inductively Coupled Electro-Magnetic) Stanmore's first non-invasive extendible device was implanted in November 2002 following a 10-year project. The mechanism utilizes a patented inductively coupled electromagnetic technology. To extend the implant a coil is placed around the limb. A rare-earth magnet (NdFeB) attached to a gearbox located within the shaft of the implant synchronizes with the electric current flowing through the copper wire in the external coil. It takes four minutes to lengthen the implant by 1mm.

Without the need for surgical intervention, it has a significant impact on quality of life and health economics. Since 2005 when a minor modification was undertaken to the mechanism, there have been less than 2% mechanical complications reported.



Distal Femoral Replacement: Side View

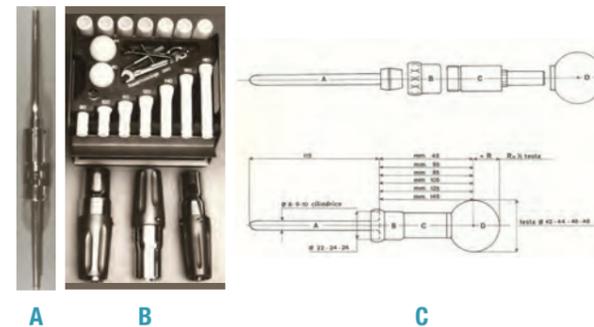
Duration: 38 Months

Modular Design of Bone/Joint Replacement Implant Systems

Contributed by Ed Chao & Frank Sim
Mayo Clinic & Foundation, Rochester, MN

Introduction

Although modular design of metal implants was in practice, the use of the self-locking Morse taper concept was first introduced and extensively investigated much earlier than that in the regular total joint replacement field. Therefore, this part of history should be included as a unique contribution of ISOLS to other fields in orthopaedics and biomechanics.



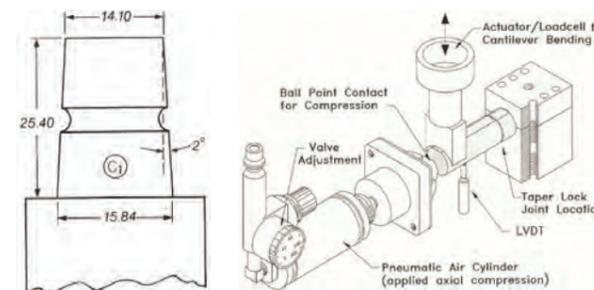
- A** The G. Monticelli stainless steel modular pathologic bone fracture fixation device.
- B** The M. Salzer ceramic modular proximal humerus prosthesis.
- C** The Campanacci/Capanna Ti-polyethylene modular proximal humerus prosthesis.

Problems

- Custom implant has many technical problems.
- Resection margin may change during surgery.
- Revision of failed custom implant is difficult.
- No fixation system available for allograft application.
- Mating material selection and surface finish.

Solution

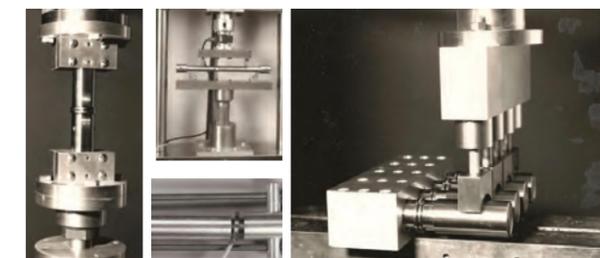
- Self-locking Morse taper optimization for modularity.
- Develop segmental allograft fixation plate system.
- Modular IM device for allograft-implant composite.
- Conduct biomechanical testing and FEM analysis.



Self-lock taper male component with anti-rotation set screw.

Schematic diagram for experimental fatigue failure test under varying axial compression.

Solution continued



Static and fatigue failure test set-up for axial compression, torsion and bending loads.

Results

- Taper angle (2-4°) and surface finish are critical.
- Ti alloy provides best locking strength.
- Set screws or other anti-rotation features are needed.
- High bending load causes taper gap opening.
- High stress produces cold-welding effect in small taper angle.
- Corrosion fatigue can generate wear particles.

Bone/Joint Replacement

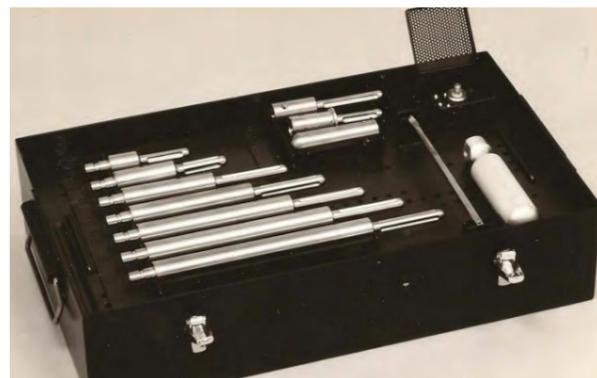


The modular tumor system (MTS) prosthesis system by Stryker with cement and extra-cortical bone bridging ingrowth fixation options.



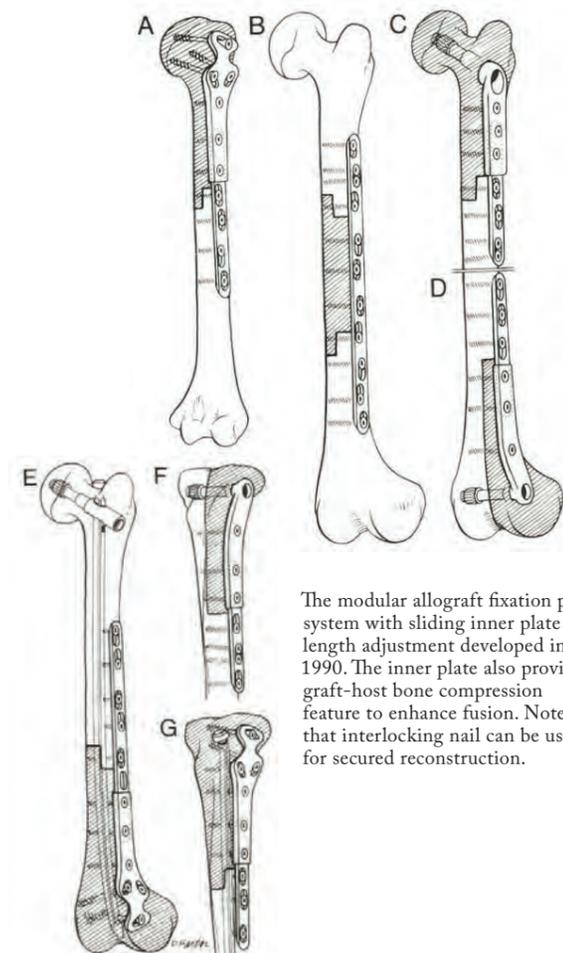
The Biomet Co-Cr-Mo modular bone and knee replacement system with compressible stem.

Metastatic Bone Lesion Fixation System



The Ti modular implant system for diaphyseal bone and proximal humerus pathologic lesion resection and replacement system. This implant is low cost and easy to use with press-fit and bone cement fixation options.

Intramedullary Allograft-Implant Composite Systems



The modular allograft fixation plate system with sliding inner plate for length adjustment developed in 1990. The inner plate also provides graft-host bone compression feature to enhance fusion. Note that interlocking nail can be used for secured reconstruction.



The Ti intramedullary fixed segmental bone replacement and joint fusion system with square body covered by porous pads and screw holes allowing segmental bone graft fixation and incorporation with the host bone.

Discussion

- Members of ISOLS pioneered the development of modular prosthesis.
- Current oncology implant systems have reached optimum.
- Custom implants are still needed in pelvis and sacrum.
- The pathologic fracture fixation system and the allograft/implant composite system require further improvement.
- Computer-aided preoperative planning era is a reality.
- New implant design ideas should be in public domain.

Acknowledgment

- Supported by NIH/NCA Grants CA 46583 and CA 23751.

Pioneering in Porous-Coated Metal Implant for Bone/Joint Reconstruction

Contributed by S. Gitelis, R.M. Urban, T.M. Turner, J. Galante, J. Ivins, F.H. Sim, E.Y.S. Chao
Rush Medical Center, Chicago, IL & Mayo Clinic & Foundation, Rochester, MN

Repeated Observation

- Ti fibermetal was the first viable porous coating technology in orthopaedic applications.
- Bone ingrowth and ongrowth had not been demonstrated in lab animals.
- Segmental bone/joint replacement in limb salvage initiated the animal and clinical trial on this technology.

Problems

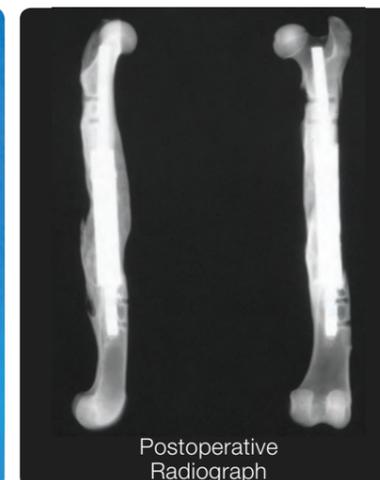
- To restore segmental bone/joint defects for limb functional requirements in activity of daily living.
- Long-term durable fixation with a porous ingrowth device without the use of bone cement.

Solutions to Long Bone Defects

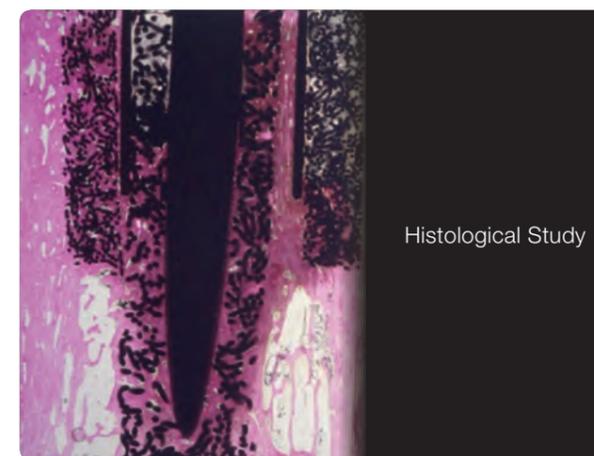
- Segmental porous coated Ti implant for diaphyseal and proximal femur replacement.
- Press-fit, side plate, or cement fixation.
- Autogenous bone graft over the implant body.
- Baboon mid-femur and canine proximal femur replacement (cement augmented stem fixation).



Baboon Implant Model



Postoperative Radiograph



Histological Study

Solutions to Long Bone Defects *continued*



Proximal Femur Implant

Early Post-op with Distal Stem Augmented Fixation and Successful Bone On-growth

Four Month Post-op with Weak Bone On-growth and Severe Bone Resorption

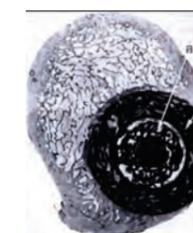
Results

Baboon Segmental Defect Study

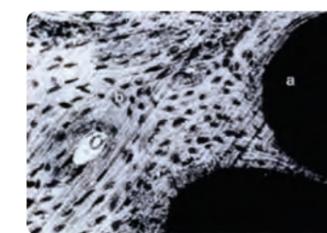
- Intramedullary porous bone ingrowth.
- Osseous integration into fiber metal space.
- Autogenous onlay grafts covered the intercalary titanium implant.

Canine Proximal Femur Replacement

- Canine proximal femur model less appropriate.
- Porous stem bone ingrowth similar to baboon results.
- Bone ongrowth over the implant not consistent.
- Significant cortical bone resorption at the femur/implant shoulder junction.



Cross-Section Histological Study



High Power Histology of Bone Ingrowth into Porous Titanium Implant

Discussion

Pioneering animal work of Galante and Rostoker led to the development of cementless implants for many orthopaedic applications. Rigid intramedullary fixation caused severe cortical bone resorption. These early work helped to develop the unique concept of extracortical bone bridging ingrowth fixation (EBBI).

Reference

1. GB Andersson, A Gaechter, JO Galante and W Rostoker JBJS Am. 1978;60:31-40.
2. E. Chao, JO Galante, ISOLS-Vienna Proceedings, 1983

Acknowledgment

Army contract DAD 17-71-C-i 102, NIH Grant AM16485 and NIH Grant CA 23751.

Three-Dimensional Morphometric Analysis of the Distal Femur: A Novel Method for Allograft Selection Using a Virtual Bone Bank

Contributed by L.E. Ritacco, A.A. Espinoza Orias, K. Sugisaki, L. Aponte-Tinao, G.L. Farfalli, M.A. Ayerza, D.L. Muscolo, N. Inoue
Italian Hospital, Buenos Aires, Argentina & Rush University Medical Center, Chicago, IL

Introduction

Tumor excision with wide surgical margins is the primary treatment of aggressive or recurrent benign bone tumors and malignant bone sarcomas. This requires a surgical resection, with the potential for large residual osseous defects. As the diagnostic and therapeutic techniques improve, patients with musculoskeletal sarcomas should expect increased survival, decreased complications and side-effects, and an improved quality of life. Functional longevity of the reconstruction becomes a major concern, especially in young and physically active patients. Emphasis has been placed on biologic reconstructive alternatives due to concerns involving the durability of prosthetic materials, and the increasing survivorship of patients with sarcomas. Poor anatomical matching of both size and shape between the host and the donor can significantly alter joint kinematics and load distribution, leading to articular fractures or joint degeneration. Determining the size and shape of the distal femur is critical for obtaining an appropriate allograft. In addition to this, it is difficult to plan an allograft on a distal femur deformed by the tumor (Fig. 2 A, B).

The objective of this study was to develop a protocol for searching and selecting a best-match distal femoral allograft from a virtual bone bank, and to verify its intra and inter-observer reliability. The feasibility of such protocol is based on our hypothesis, which states that the symmetry of the contralateral distal femur will provide the benchmark geometry for a best match in preoperative planning allograft selection (Fig. 2 A, B).

Methods

A total of thirty-three fresh-frozen whole femora were selected from the bone bank for this IRB-approved study, 15 right and 18 left (age range: 16-58, 35.9 ± 12.0; 22 males and 11 females) were scanned on a Toshiba Aquilion CT scanner, with a resolution of 0.877 pixels/mm and slice increments of 0.5mm. The 3-D reconstructions of all specimens were created from CT images. The following distal femur morphometric parameters were measured with specialized 3-D software (Mimics, Materialise, Belgium) on a plane perpendicular to the long axis of the bone (Fig. 1):

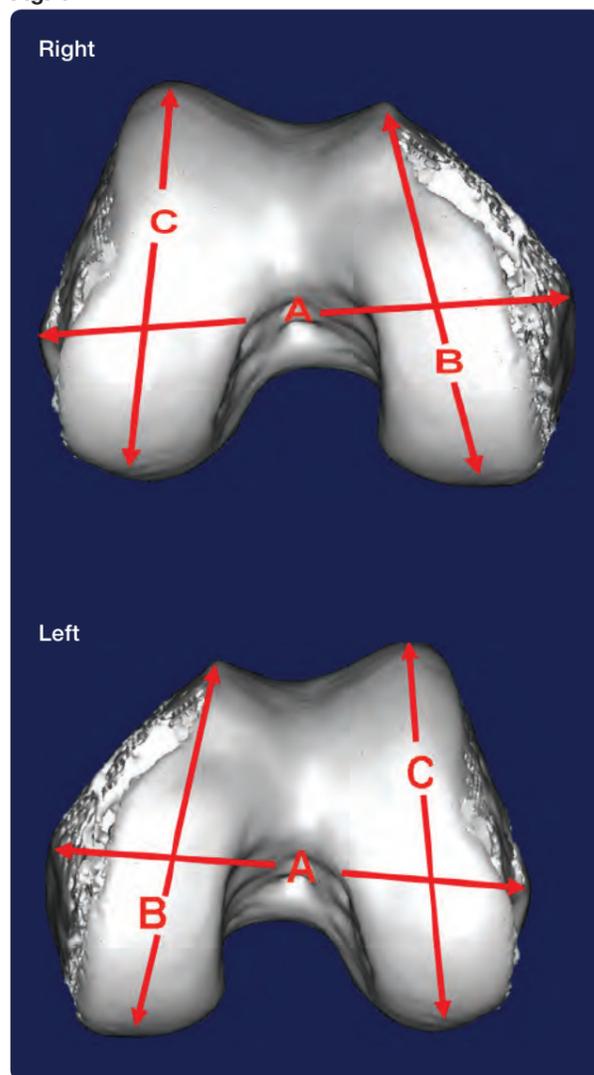
- 1 Transepicondylar axis (A): the distance between the most medial point in the medial epicondyle and the most lateral point in the lateral epicondyle.
- 2 Medial condyle distance (B), determined as the distance between the most anterior and most posterior points, respectively, in the anterior-posterior direction.
- 3 Lastly, the length of the lateral condyle (C) determined with the same method used for the medial condyle (Fig. 1).

Intra and inter-observer reliability of this protocol was assessed measuring 33 and 20 femora, respectively, and was evaluated using an intra-class correlation coefficient. Size symmetry was evaluated using R square (R²) coefficient between right and left A-B-C measures from the same donor in 10 cases (Fig. 1). The allograft matching protocol uses point-cloud models derived from the CT reconstructions. First, a mirror image of the left femur is created. This ensures function and shape matching. Next, the selected match is superimposed onto the right femur using a volume-merge technique developed in our laboratory (Fig. 2 C).

Methods continued

Finally, the position and orientation of the overlapping point clouds are evaluated numerically using a custom-written C++ closest-point distance algorithm. This analysis was carried out for ten femur pairs (Fig. 2 C, D, E).

Fig. 1

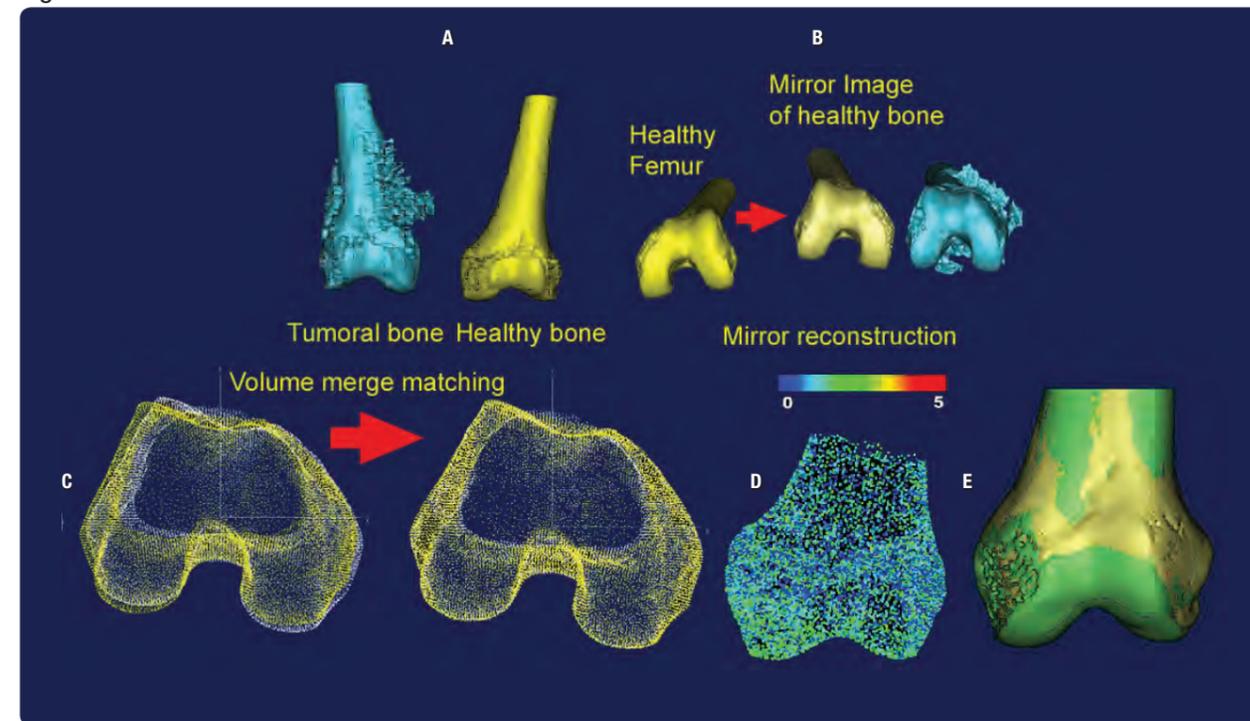


Distal View: A-B-C Size Analysis Parameters Between Right And Left Sides

- A Transepicondylar Axis
- B Medial Condyle Distance
- C Length of the Lateral Condyle

Methods continued

Fig. 2



Virtual allograft matching method.

- A Tumor and healthy femurs (same patient).
- B Mirror image of the healthy femur to be matched to the tumoral bone.
- C Volume merge superposition: yellow: right femur, white: contralateral side mirror image from the same donor.
- D Closest point algorithm graphical output measures goodness of fit. Color scale: 0 to 5 mm: Dark blue indicates exact match between two superimposed point clouds.
- E Visual verification of shape compliance.

Results

Protocol metrics: A single operator was tested for intraobserver repeatability while using the above-mentioned A-B-C protocol twice on thirty-three distal femoral allografts, obtaining an intraclass correlation coefficient of 0.99 in almost all measures (Table 1). Interobserver consistency of two separate observers was quantified when they measured the A-B-C parameters of twenty distal femoral allografts leading to an intraclass correlation coefficient of 0.99 in all measures. R² coefficient between right and left side was 0.99 in the ten pairs evaluated (Fig. 1). Shape compliance: Evaluation of the overlapped original and mirror point-cloud models with the custom C++ program found that the closest distance between points was 0.89±0.07mm. This result is within the CT slice thickness of 0.5mm and CT resolution of 0.877pixel/mm.

Table 1. Intraobserver Analysis Using the Proposed A-B-C Protocol.

Distance	Femurs	n	Intraclass correlation	95% CI	
				Lower Bound	Upper Bound
Transepicondylar	Right	15	0.997	0.991	0.999
	Left	18	0.999	0.998	1.000
Medial Condyle	Right	15	0.963	0.869	0.988
	Left	18	0.997	0.991	0.999
Lateral Condyle	Right	15	0.995	0.873	0.985
	Left	18	0.998	0.996	0.999

Discussion

This work demonstrates the usefulness of three-dimensional models when searching and selecting the best similar host-donor allograft match and proves our symmetry hypothesis. The results suggest that a robust technique that provides, reliability, and most importantly, repeatability, has been established. The same method can then be used to match a candidate from the bone bank to the patient's femur (Fig. 2 A, B). One limitation of this study is the small amount of samples. On the other hand, the results stemming from the use of this measurement protocol

enable accurate selection of allografts from a contralateral healthy femur CT achieving the best match possible considering the geometry of available allograft candidate femur specimens.

References

- [1] Ochia RS, Inoue N, Renner SM, Lorenz EP, Lim TH, Andersson GBJ, An HS. Spine 2006; 31(18):2073-8.

ISOLS Board Members

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Emeritus Member	Edmund Chao, PhD U.S.	<i>eyschao@yahoo.com</i>

Bylaws

This Association continues the activities of ISOLS which, upon the foundation of this Association, the original is dissolved.

§1 Name, Domicile & Scope of Activities

- 1 The name of the Association shall be "INTERNATIONAL SOCIETY OF LIMB SALVAGE".
- 2 The association shall locate its headquarters at Vienna. It is domiciled in Vienna and has worldwide activities.

§2 Purpose

- 1 The association is a non-profit organization. The purpose of the Association is to promote research, education and clinical practice related to musculoskeletal tumors and its foremost purpose is to improve patient care related to limb salvage interventions. It also serves as a forum for intellectual exchange among physicians, engineers, scientists and other persons interested in limb salvage, promotes advances in the field of limb salvage and ongoing education of persons engaged in the field of limb salvage.

§3 Means for Achieving the Purpose of the Association

- 1 The purpose of the Association is to be achieved by both the intangible and tangible means as specified in paragraphs 2 and 3.
- 2 Intangible means are obtained by:
 - A | organizing symposiums or conventions of scientists from different countries and of multiple disciplines;
 - B | publishing scientific papers in a number of media;
 - C | creating and maintaining a web site;
 - D | promoting cooperation among persons interested in limb salvage and promoting exchange of information among them;
 - E | prompting relationships with related fields of medicine and other professional and scientific associations;
 - F | producing guidelines.
- 3 The tangible means shall be raised through:
 - A | registration fees and membership dues;
 - B | incidental profits resulting from organizing scientific conventions and other events and undertakings of the association itself;
 - C | grants awarded to the association by manufacturing industries or other entities;
 - D | donations, fund raising drives, bequests and other contributions to the association.



§4 Categories of Membership

- 1 There shall be two membership classifications as set forth below.
- 2 Regular members are assigned all membership rights and duties.
- 3 Honorary members are awarded this status based on a history of significant contributions to the field of musculoskeletal oncology.

§5 Becoming a Member

- 1 Medical doctors, researchers, engineers and other persons with medically related qualifications, knowledge and expertise in musculoskeletal tumors and limb salvage techniques can apply for regular membership. The Board shall decide on admission of members. The application for regular membership is to be addressed to the Membership Chair of the Association and shall be accompanied by letters of recommendation from two regular members of the association. Admission may be refused without giving reason.
- 2 Honorary members are endorsed by the Membership Chair and the Board upon recommendation by the President, a member of the Board or a member of the society.

§6 Termination of Membership

- 1 Membership shall terminate upon death, in the case of legal entities and partnerships with legal capacity whenever the legal personality ceases to exist, or by resignation or expulsion.
- 2 Resignation from the association is possible at any time by written notice given to the Board.
- 3 The Board may expel a member who in spite of two written reminders and a reasonable extension of the term is in arrears with payment of membership dues. The obligation to pay any overdue membership dues is not affected by the aforesaid.
- 4 Expulsion of a member from the association may also be decided by the Board for gross violation of other membership duties and for dishonorable behavior.
- 5 Cancellation of honorary membership may be decided by the Board for the reasons specified in paragraph 4.

§7 Rights and Duties of the Members

- 1 Members have the right to attend all events of the Association and to make use of its facilities. Members may be required to pay a registration fee for some Association events. Regular Members have the right to vote in the General Meeting and run for an office. Regular members are required to pay an annual membership fee as determined by the General Meeting. The Board may elect to request payment of the annual membership fee on a biennial basis. Honorary members are not required to pay an annual membership fee.
- 2 Each member has the right to receive a copy of the Association bylaws.
- 3 A quorum (defined as least one tenth part of the members) may request the Board to convene a General Meeting.

- 4 In each General Meeting the members shall be given information on the activities and the financial situation of the Association. Whenever at least one out of ten members so requests and gives the reasons for such request, the Board shall give such information to the membership within four weeks of such a request.
- 5 The Board shall inform the members on the audited financial statements (rendering of accounts).
- 6 The members are obligated to promote the interests of the Association with their best efforts and to refrain from anything which might jeopardize the reputation and the purpose of the association. They shall comply with the Association's bylaws and with the resolutions of the officers and legal bodies of the Association.

§8 Officers and Governing Bodies

- 1 The officers and governing bodies of the association are the General Meeting, the Board, the Nominating Committee, the financial auditors and the panel of arbitration. Additional auditors can be appointed optionally.

§9 Means for Achieving the Purpose of the Association

- 1 The General Meeting is the "meeting of the members" [Mitgliederversammlung] in terms of the Associations Act [Vereinsgesetz, VereinsG] 2002. A regular General Meeting shall take place every two years, to the extent possible on the occasion and at the place of the INTERNATIONAL SYMPOSIUM ON LIMB SALVAGE, otherwise at the domicile of the association. In keeping with the international spirit of the organization, the location of the General Meeting will rotate among the regions of the world with the three primary regions being 1. Asia-Pacific, 2. The Americas, 3. Europe. The Board may elect to approve a meeting location outside this rotation.
- 2 A special meeting shall take place upon:
 - A| a resolution of the Board or of the regular General Meeting,
 - B| a motion filed in writing by at least one out of every ten members,
 - C| upon request of the auditors (§ 21 (5) sentence one of VereinsG),
 - D| a resolution of the (an) auditor(s) (§ 21 (5) second sentence of VereinsG, § 11 (2) third clause of the subject bylaws),
- 3 An order of a court appointed guardian (§ 11 (2) last sentence of the subject bylaws) within a four weeks' period.
- 4 All members shall be invited to the regular and special General Meetings at least two weeks before their scheduled date in writing, by telefax or by e-mail (to the fax number or e-mail address communicated to the association by the member). The invitation to attend a General Meeting shall contain the agenda. The meeting shall be convened by the Board (subparagraphs 1 and 2 lit a-c), by the/an auditor/s (subparagraph 2 lit d) or by a court appointed guardian (subparagraph 2 lit e).
- 5 Motions for the General Meeting shall be filed with the Board at least two days before the scheduled date in writing, by telefax or by e-mail.
- 6 Legally effective resolutions can be adopted only for items on the agenda – with the exception of resolutions on a motion to convene a special meeting. Motions from the floor can be added to the agenda upon resolution of the General Meeting. The addition of a new item to the agenda of the General Meeting requires a majority vote of the regular members present at the meeting.

- 7 All members are authorized to attend the General Meeting. Only regular members have the right to vote with each having one vote. Honorary members shall not have the right to vote. By way of a power of attorney issued in writing, members may appoint other members proxies for exercising their right to vote.
- 8 There shall be a quorum in the General Meeting irrespective of the number of members present.
- 9 In general, the elections shall be held and the resolutions adopted with a simple majority of the valid votes cast. Resolutions modifying the bylaws of the Association or dissolving the Association shall be adopted with a qualified majority of two thirds of the votes cast and valid.
- 10 The President will preside over the General Meeting. If the President is prevented from attending, the President-elect shall preside over the General Meeting. If the latter one is also prevented from such activity, the Secretary followed by the most senior Board Member shall preside over the General Meeting. Before the office of the President-elect is installed the Secretary followed by the most senior Board Member shall preside over the General Meeting in case that the President is prevented from attending.

§10 Duties of the General Meeting

- 1 The following matters are reserved to the General Meeting:
 - A| adopting the resolution on the budget;
 - B| approval of the management report and the financial statements, in this act the financial auditors shall be involved;
 - C| election and removal of the Members of the Board and of the auditors;
 - D| approval of transactions entered into between auditors and the associations;
 - E| formal approval of the conduct of business of the Board;
 - F| decision on the amount of the membership dues for regular members.
 - G| adopting resolutions modifying the bylaws and deciding on the voluntary dissolution of the association;
 - H| deliberations and adopting resolutions on other items of the agenda.

§11 Management Board

- 1 The Board consists of the President, the Secretary, the Treasurer, the immediate past two Presidents, and an additional six members for a total of 11 regular members. Board members shall serve without compensation and cannot receive any remuneration as employees of the Association. Beginning in 2013 the Board composition will change to include a President-elect and only the immediate Past-President shall be on the board.
- 2 The Board shall have geographic diversity. Of the 11 members of the Board, at least 3 shall reside in each of the following three regions:
 - A| Europe
 - B| North and South America
 - C| Asia and Pan-Pacific

- 3 The Board shall be elected by the General Meeting upon proposal of the Nominating Committee. If an elected Board Member resigns or is removed from office, the Board has the right to appoint in his/her place another Member eligible to be elected, and for such appointment the approval of the General Meeting shall be obtained retroactively. If, without being completed by co-opting, the Board is not available at all or for an unpredictably long period of time, each auditor has the obligation to promptly convene a special General Meeting in order to elect a new Board. If also the auditors are not able to act, each regular member aware of the emergency shall request the court of law having jurisdiction to appoint a legal guardian who shall without delay convene a special General Meeting.
- 4 The term of office of the Board members shall be two years; re-election is admissible. The maximum term of office shall be six years. Each office of the Board shall be performed in person. From 2013 on a President-elect is elected by the General Meeting upon proposal of the Nominating Committee for a term of office of two years. After this period he will become President for a term of office of two years and will then be on the Board for another two years as Past-President.
- 5 The Board shall be convened by the President in writing or by word of mouth, and if he is prevented from attending, by the President-elect followed by the Secretary. If the latter are also prevented from attending for an unpredictably long period of time, any other Board member may convene the Board. Before the office of the President-elect is installed the Secretary followed by a Past-President shall convene the Board in case that the President is prevented from attending. If the latter are also prevented from attending for an unpredictably long period of time, any other Board member may convene the Board.
- 6 There shall be a quorum in the Board if all of its members have been invited and at least half of them are present.
- 7 The Board adopts resolutions with a simple majority of the votes; in case of a tie, the vote of the President shall be the casting vote.
- 8 The Board shall be chaired by the President, and if he or she is prevented from attending, by the President-elect followed by the Secretary. If the latter are also prevented from attending, such Board Member present who is oldest in seniority or who is appointed to do so by the majority of the remaining Board members shall preside over the meeting. Before the office of the President-elect is installed the Secretary followed by a Past-President shall convene the Board in case that the President is prevented from attending. If the latter are also prevented from attending, such Board Member present who is oldest in seniority or who is appointed to do so by the majority of the remaining Board members shall preside over the meeting.
- 9 Except by death and expiry of the term of office (para 3), the term of office of a Board member shall terminate by removal (para 9) and resignation (para 10).
- 10 Any Board member may resign at any time by notice to be given in writing. The declaration of resignation shall be addressed to the Board, or, in the case of resignation of the Board as a whole, to the General Meeting. Such resignation shall be effective only upon election or co-opting (para 2) of a successor.

§12 Nominating Committee

- 1 The Nominating Committee will serve to identify new Board members for approval at the following General Meeting. The Nominating Committee will be composed of 2 Board members elected by the board, the immediate Past President who shall serve as Chair of the Nominating Committee and 2 members elected from the membership during the General Meeting for a total of 5 members of the Nominating Committee. Individuals may serve on no more than two Nominating Committees. The President shall not serve on the Nominating Committee.

§13 Duties of the Board

- 1 The Board is responsible for the management of the association. It is the “managing body” (“Leitungsgorgan”) in terms of the Associations Act 2002. The Board is conferred all duties not allocated to another body of the association by the bylaws. Its scope of powers comprises in particular the following matters:
 - A) to organize an accounting system in compliance with the requirements of the association, with cash inflow and cash outflow being recorded on an ongoing basis and with a register of assets to be kept, as the minimum requirement;
 - B) to prepare the annual budget, the management report and the financial statements;
 - C) to plan and convene the General Meeting in the cases of § 9a (1) and (2) lit. a – c of the subject bylaws;
 - D) to inform the members of the association on the activities, the finances and the audited financial statements of the association;
 - E) to administrate the assets of the association;
 - F) to admit and expel regular and special members of the association;
 - G) to hire and terminate employment of staff of the association.

§14 Special Duties of Individual Board members

- 1 The President shall conduct the day to day business of the Association. The first Secretary shall give support to the President in conducting the business of the association.
- 2 The President-elect is in charge of organizing the next INTERNATIONAL SYMPOSIUM ON LIMB SALVAGE following his election.
- 3 Until the responsibility for organizing the INTERNATIONAL SYMPOSIUM ON LIMB SALVAGE goes to the President-elect in 2013 (for organizing the 2015 meeting), the President is in charge of organizing the next INTERNATIONAL SYMPOSIUM ON LIMB SALVAGE following his election.
- 4 The President represents the association vis a vis third parties and entities. In order to be legally effective, documents executed in writing by the association shall be signed by the President and the first Secretary, documents regarding financial matters (dispositions regarding the value of asset items) shall be signed by the President and the Treasurer. Transactions between Board members and the association are subject to approval by another Board member.
- 5 Transactional powers of attorney to represent the company vis a vis third parties or entities or to sign on behalf of the association shall be issued exclusively by the Board members as specified in para 2.
- 6 In case of an emergency the President is authorized to issue instructions in matters falling within the powers of the General Meeting or of the Board, in his or her own discretion on a stand alone basis; such instructions, however, require notification of the entire Board in as immediate a manner as possible. The President presides over the General Meeting and the Board meeting.
- 7 The first Secretary keeps the minutes of the General Meeting and of the Board.
- 8 The Treasurer is responsible for proper management of the finances of the association.
- 9 In cases of their not being available, the President-elect shall substitute for the President, the past President shall substitute for the Secretary.

§15 Financial Auditors

- 1 The General Meeting shall elect two auditors for a term of two years. Re-election is admissible. The auditors must not be members of any executive body which is the object of their audit – with the exception of the General Meeting.
- 2 The auditors are in charge of monitoring the business activities on an ongoing basis and of auditing the finances of the association with regard to the accounts being rendered properly and to the use of funds in accordance with the bye laws. The Board shall submit documentation and give information to the auditors as required. The auditors shall report to the Board the result of the audit.
- 3 Transactions between auditors and the association are subject to approval by the General Meeting. In addition, auditors are subject to the stipulations of § 11 (8) through (10) accordingly.

§16 Auditors

- 1 The Board may appoint, but is not required to appoint, one or two individuals to serve as auditors of the Association. The Auditor(s) may perform the duties prescribed in the following clauses with respect to the Association’s business affairs and assets:
 - 2 request the Management Board and employees to report on the business, or audit the state of the Association’s business and assets;
 - 3 audit the state of the Management Board’s execution of duties and prepare audit reports as stipulated in laws and regulations;
 - 4 attend the meetings of the Management Board and express opinions when necessary;
 - 5 report to the Management Board and the General Meeting when the Auditors deem that a Board member has performed or is likely to be performing improprieties, or when the Auditors discover significant improprieties or facts contrary to laws and regulations or these Articles of Association;
 - 6 request that the President call a meeting of the Management Board, when the Auditors deem it necessary to report as provided in the preceding clause. Due to the international nature of the Association, if a timely face-to-face meeting is not possible then a telephone or internet based meeting should be arranged. Such a meeting should be held within 4 weeks of the request of the Auditors;
 - 7 otherwise exercise their authorization under laws and regulations.

§17 Arbitration

- 1 The Association’s in-house panel of arbitration shall resolve any disputes resulting from relationships in the association. It is a “Reconciliation Institution” [“Schlichtungseinrichtung”] in terms of the Associations Act 2002 and not a court of arbitration in terms of §§ 577 ff Code of Civil Procedure.
- 2 The panel of arbitration is composed of three regular members of the Association. It is constituted by one party nominating to the Board in writing a member to be arbitrator. Upon request by the Board issued within a period of seven days, the other party shall nominate a member of the panel of arbitration within a period of 14 days. After being notified by the Board within seven days, the arbitrators nominated shall elect within another 14 days a third regular member to be the chairman of the panel of arbitration. In case of a tie, the appointee shall be decided by drawing lots. The members of the arbitration panel must not be members of any executive body which is the object of the litigation – with the exception of the General Meeting.
- 3 The panel of arbitration renders its decision after having heard both parties, with all its members present, with a simple majority of the votes. It decides to its best knowledge and belief. Its decisions shall be final within the association.

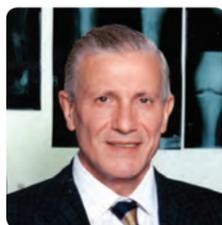
Introduction

By Ed Chao

I remember reading somewhere that “people die twice, once as mortals and once in memory.” ISOLS is a small organization and nearly everyone knows each other as members of a large family. This section was created for us and those who come after us, to help remember our many colleagues who not only made such great contributions to ISOLS, but did so in many other areas and will live on in memory.

Mario Campanacci

By Nicola Mabbri



Mario Campanacci was born and initially educated in Parma. He received his MD in 1956 at the University of Bologna and completed his orthopedic training at the Rizzoli Institute in 1960. The early phase of his career was mostly dedicated to Surgical Pathology and Pathology of Musculoskeletal System, committing him to the study and management of bone and soft tissue tumors. He joined the staff at Rizzoli as junior associate in 1961. His passion for pathology, however, lasted throughout his life, making him not only a refined clinician and skilled surgeon but also an experienced pathologist of the Musculoskeletal System. To refine his training in this growing field, he visited Dr. Lichtenstein at the Veteran Administration Hospital in San Francisco for six months and Dr. Milgram at the Hospital for Joint Disease in New York for two months in between '62 and '63. He became then the head of the Musculoskeletal Oncology Unit of the Rizzoli in 1963.

Early on, he realized how important it was to review x-rays along with histopathology assessment in the diagnosis of musculoskeletal lesions, and he emphasized the importance of accurate recording and filing of all clinical information. At the same time, he reviewed several thousands of tumor cases filed at the Rizzoli Institute, maturing a very solid knowledge and experience. In the following years,

The list is long but I am sure there are some who have escaped our search. As such, during the memorial service at the beginning of every ISOLS meeting, names not mentioned here can be added to the list, so that our Master of Ceremonies might be able to pay proper tribute to all beloved members and friends we have missed greatly.

he fully understood the need for a multidisciplinary approach to sarcomas and was one of the pioneers of multimodal combined treatment and limb-salvage surgery for osteosarcoma.

In the mid-late '80s, he pursued the expansion of the Department of Musculoskeletal Oncology to include also non-clinical activities such as research laboratories, understanding the need and future potential role of basic research and molecular biology. He was one of the founders of the European Musculo-Skeletal Oncology Society (EMSOS) in 1987 and its first President between 1987 and 1990.

He developed an endless and warm friendship with several leaders of his time and trained dozens of Italian and foreign surgeons, understanding the value of continue exchange of ideas and international relationships. The relationship with Bill Enneking was particularly “special” to him, leading to a combined Musculoskeletal Pathology Course, held annually in Bologna starting in 1989. Teaching was another passion for him and he really enjoyed spending time with the students and answering questions. The course is still maintained today in his memory, held by the Rizzoli staff with the participation of an international guest faculty.

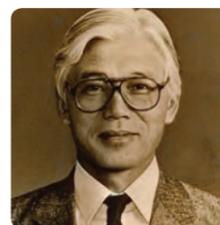
Mario Campanacci's attitude was calm and reflective, apparently cold on first impression. On the contrary, he was thoughtful and capable to transmit real passion for the study of Musculoskeletal Oncology; he mentored young clinicians and researchers committed to this field throughout his

life. In 1995 he became the Chairman of Rizzoli Institute, devoting further energy and support to the hospital organization. Mario Campanacci died

in 1999, only four years after he chaired the ISOLS meeting in Florence, after a heroic battle with cancer. His leadership remains severely missed today.

Yoshio Ogihara

By Atsumasa Uchida



Professor Yoshio Ogihara graduated from Mie University, School of Medicine in 1964. He carried out his medical training in orthopaedic surgery, subsequently obtaining his doctoral degree. In 1984, he was appointed professor and chairman of orthopaedic surgery in Mie University. During his 10 year professorship, he had great achievements in clinical and research works on orthopaedic oncology. He organized several academic meetings as the President of the Central Japan Orthopaedic and Traumatologic Association, the Japanese Musculoskeletal Tumor Society, and the Ise-Shima Bone and Soft Tissue Tumor Seminar.

Dr. Ogihara was born in Tokyo and spent his high school life in Osaka. He later moved to Nagoya to study at the university. He enjoyed city life in his younger days, and also took pleasure in doing many sports such as tennis, skiing and swimming. Although he got married late in life at age 48, he had the opportunity to perfectly enjoy family life with his wife and two daughters during the remaining 10 years.

The following Chinese poem was written by Shoin Yoshida, a great educator as well as a thinker from the end of the Edo period, who died without fulfilling his life's ambition. Nonetheless, he would accept his destiny as it was meant to happen, believing his students would undertake the responsibility of continuing what he wanted to do. Dedicated to the memory of Dr. Ogihara:

吾今為病死 死不負君親 悠々天地事 鑑照在明神
吾今為病死 (ware ima kuni-no tame-ni shi-su), I am dying due to my illness.

死不負君親 (shi-shite nao kunshinn-ni somukazu), Even if I die, I will never lose my loyalty to my duty and the faith to my family.

悠々天地事 (yuyu-tari tenchi-no koto), I understand how endless and frail the world is.

鑑照在明神 (kansyou meishin-ni ari), God knows that I have fulfilled my duty.

I believe that Dr. Yoshio Ogihara had a similar state of mind when he spent his last moments. The highly acclaimed lecture he made at the 8th ISOLS meeting held in Florence of Italy, a few months before his death, gave a deep impression in the mind of all the participants. At that time, he had not been able to eat any longer, and during his trip to Europe he was being treated with intravenous nutrition. I assume that he must have been surviving in a sense of “I am sacrificing my life for my country.” After coming back from his trip, I understand that he was extremely busy working on the preparation of the conference as the director of the 1st Asia-Pacific Musculoskeletal Tumor Society Meeting and also I understand that he had no time to spend with his family. He must have been feeling of “Even though I die, I will never lose my loyalty to my master and the faith to my family members.” I am terribly sorry to say that he demised just before he could witness the success of his well-prepared conference. I am certain that he accepted his fate in his heart saying, “I understand how endless and frail the world is.” All of the participants in the conference were eternally grateful to Dr. Ogihara. I believe that this conference will confer a great favor to patients in developing countries and I would like to give great praise to his distinguished achievements. This is truly the state of mind of “God knows that I have done the right thing.” Dr. Ogihara passed away after an extended battle with gastric cancer in July 1995, aged 58. Many shall remember him as someone totally devoted to the cause of limb salvage for the sake of patients' welfare.



Professor Ogihara with Professor Sim, Dr. Kang, Professor and Mrs. Han Koo Lee in Korea, 2004

Frantz Langlais

By Ed Chao



Frantz Langlais was born, raised and schooled all in Rennes of the Brittany region of France off the beautiful Normandy coastline. After he obtained his MD at the University of Rennes, Frantz went to Paris for his orthopaedic training under the legendary Professor Merle d'Aubigne. I was told that Professor d'Aubigne rarely treated his students warmly and with affection but Frantz was an exception.

I first met Frantz during the 1981 ISOLS meeting in Rochester. Even though he did not present a paper, we engaged in an extended discussion and developed a mutual admiration and I invited Frantz back to Mayo for a long stay. As a perfect French gentleman, he appeared early in the morning fully dressed with coat and tie but covered with his morning gown and came downstairs to site at the dinning table and waited for breakfast to be served. Jane had two growing boys and she had never really served formal breakfast. When she saw Frantz at the dinning table, she was really quite embarrassed and we started having formal breakfasts for the rest of Frantz's stay at our house. Whenever we were in Paris, Frantz would insist that we stayed at their apartment, which was very close to Chinatown. He would also let us use his car. Their generosity typified the spirit of the brotherhood among the ISOLS members.

After the ISOLS Board elected Frantz to organize the 1989 meeting, he and I had been in constant contact



This was the first time I have ever seen this most distinguished French gentleman in casual dress.

for two full years. Numerous faxes would come back and forth since there was no e-mail service in those days. We started the planning quite early and visited all the key orthopaedic implants companies for two consecutive AAOS conventions for fund raising, hoping to cover the meeting needs as well as to establish our Society's nonexistent treasure chest. We were



Frantz defended his proposition of honoring me by his University.

quite successful and Frantz was able to run the most memorable social and scientific events of the 1989 ISOLS. The unspent surplus of the funds he managed to raise went into a French bank under the name of the International Symposium of Limb Salvage (ISOLS) first created at the 89' meeting, to which we all say thank you, Frantz, for a job most well done. Frantz continued to serve as the Treasurer for our Society (formally created as Society at the Florence meeting under the guidance of Professor Campanacci and Professor Capanna) with me as the Secretary until we both retired from the Board in 1997.

Frantz has made several major contributions in the musculoskeletal tumor field, among which he did the extensive biomechanical experimental test of the Guepar total knee prosthesis and modified it for the early segmental bone/joint replacement application. Frantz was also instrumental in the development of

the Biomet modular segmental bone/joint replacement prosthesis with the tapered neck region of the stem to enhance intramedullary fixation without the use of bone cement. He was also a leader in long bone fracture fixation field and developed an IM nail system.

Besides ISOLS, Frantz had been occupying leadership positions in other key organizations



The instrumented Guepar knee prosthesis done by Professor Langlais in his younger days



The Biomet segmental bone and knee joint replace system with tapered proximal stem based on Frantz' original idea.

in Europe as described in his biographical sketch. Frantz was modest, unselfish but passionate, and had a personality totally devoted to the causes of others. I indeed miss him very much but there will certainly be others to lead this Society now and in the future with the same passion and spirit.

In June 15, 2007, we were all shocked and saddened by the untimely death of Frantz. Although a short memorial of his passing was held at the ISOLS-Hamburg meeting, I was determined to go to Rennes and pay my tribute to his wife and the orthopaedic department at the University Hospital. On April 23, 2011, I finally made the trip to France and gave a memorial lecture in the Frantz Langlais Orthopaedic Library. In the bookshelves are all his neatly arranged ISOLS proceedings from 1981 to 2005. According to Mireille, Frantz did not have other hobbies except working,

reading and listening to classic music. I wish to dedicate this monograph to Frantz and all others who have passed away ahead of us and their contributions to this Society shall forever be remembered with love and respect!

ESPACE FRANTZ LANGLAIS



The 1989 honoring ceremony with Jane and the official interpreter with a portable megaphone.



After the lecture in the Library honoring Professor Langlais, I posted with Mireille, Professor Herve Thomazeau who succeeded Frantz and my close friend Professor Federick Schuind of Brussels who accompanied me for the trip.



The same interpreter 22 years later posted with Mireille and I after my lecture. It has been a long time!

Han Koo Lee

By Han Soo Kim



Professor Han Koo Lee was born on November 3, 1929 in Korea. He graduated from Seoul National University College of Medicine in 1954. Professor Lee moved to u.s. after completing his military service in Korea. He had his orthopedic

resident training at the University of Kentucky in Lexington, Kentucky and took a clinical fellowship at the New York Orthopaedic Hospital. After returning to Korea, he began to work as a faculty member at Seoul National University Hospital in 1969. He served as the chairman or president on several scientific societies including the Korean Orthopaedic Association, the Korean Society of Traumatology,

and the Korea Knee Society. He founded the Korean Bone and Joint Tumor Society (KBJTS) in 1990 and led the society as the president for a decade. Professor Lee also hosted Asia-Pacific MSTs Seoul meeting as the chair in 1998 in Seoul.

As a board member of ISOLS and the President of ISOLS, he wanted to devote himself to the success of the 13th ISOLS Seoul meeting in 2005, which was his earnest hope. Unfortunately, in January 2004, just after constructing the organizing committee for 2005 Seoul ISOLS, he suddenly passed away with his wife due to a tragic fire accident at his apartment, which was a truly huge shock and sorrow for the members of KBJTS and ISOLS.

Professor Han Koo Lee was gentle, humorous and wise. He was very energetic in the academic field. Many of his friends and ISOLS members miss him and remember his tremendous achievement in Orthopaedic Oncology field during his lifetime.



F. W. Marsden

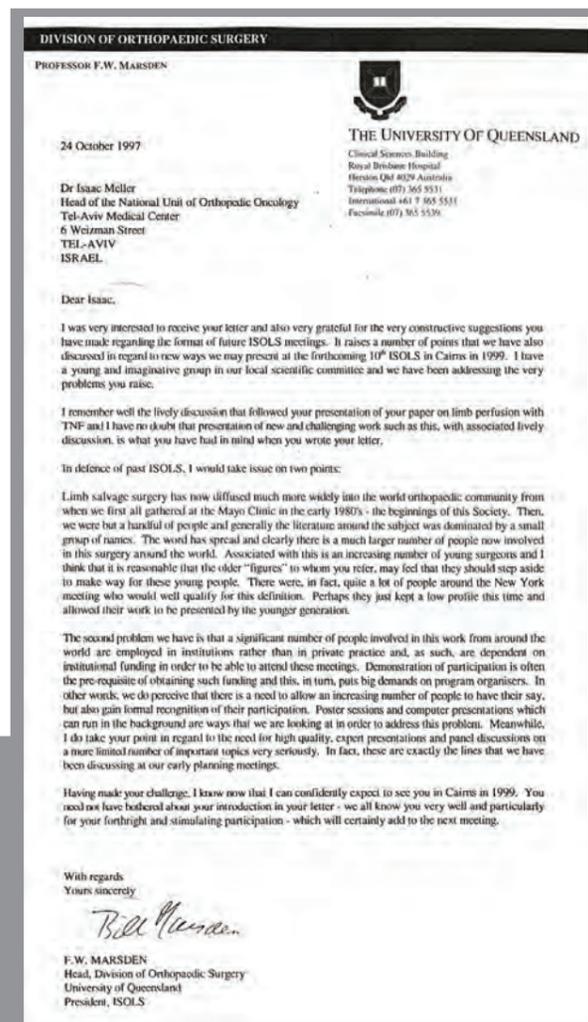
By Ed Chao



Bill Marsden not only served as the Chairman of the 1999 ISOLS meeting in Cairns, Australia but also acted as the President of ISOLS in the 1997-1999 period, during which I resigned as the Secretary General and passed on my duties to Frank Frassica

of Johns Hopkins University. However, I was still in close contact with Bill and promised him that I would assist him in any way I could during the transition period. I began to appreciate his most attractive personality with thoughtfulness and wisdom unmatched by many I worked with in the past. During the time of Bill's leadership, the ISOLS organization and its biannual symposia were going through a difficult period with many who were rather critical about the organization and its eventual fate for the future. Bill acted as an extremely polished diplomat, a calm but determined statesman who not only held the organization together, but also worked hard to solidify the subsequent three ISOLS meetings in Birmingham, Rio de Janeiro and Seoul. What an extraordinary accomplishment for all of us and the

On Oct. 7, 1997, Dr. Isaac Meller of Tel-Aviv, Israel wrote to all ISOLS Board members warning that, "the scientific level of these last meetings (ISOLS) is slowly but surely deteriorating,...the structure/format of meeting does not change making it more and more boring... in 1-2 more meetings such as..., it will die..." Dr. Meller also outlined a set of five recommendations as how future ISOLS meetings should be ran. As the President of ISOLS, Bill took this as his challenge and responded to Dr. Meller in a letter with restrained but highly persuasive tone. Fourteen years later, ISOLS is still viable and ever more active. Thank you Professor Marsden, your are sorely missed.



field of Limb Salvage.

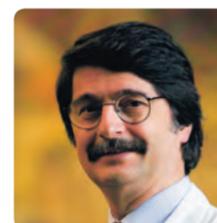
Still under the term of his ISOLS presidency, the board needed to decide on the ISOLS meeting site in Asia-Pacific region. In 2005, Korea had bid twice in the past. Some members expressed concerns on the level of musculoskeletal tumor work there to render the right to host the big meeting. As the immediate past President of ISOLS, Bill visited Korea during the Asian-Pacific Musculoskeletal Tumor Society meeting in Seoul in 2000 with nothing but high praise on Korea. I am sure that many still reminisced the high quality of the 2005 ISOLS meeting in Seoul, another foresight of Bill's. Likewise, Bill was a big support for the Rio de Janeiro meeting in 2003 but he never was able to witness the fruits of his strong encourage

and endorsement.

Professor Marsden had several academic interests besides orthopaedic oncology. In the early '90s, he discussed with me on the issue of metal particles induced hypersensitivity of the surrounding tissues and wanted to initiate a collaborative project with Mayo and John Hopkins. This was much earlier than the stir that recently swept through the total joint replacement field. In 1987, when I hosted the Hoffmann External Fixation Conference in Rochester, I invited Bill as he was experimenting the possibility of bone resection and transport to reconstruct diaphyseal defect after tumor eradication. Bill passed away in 2002 but his legacy as a leader and a gentleman shall forever be remembered by all of us!

Mario Mercuri

By Nicola Fabbri



Mario Mercuri was born in 1950 and graduated from University of Bologna Medical School in 1977. He completed his orthopedic training at the Rizzoli Institute in 1980 and joined the staff in 1981.

Initially interested mostly in traumatology and joint reconstruction, he then focused on orthopedic oncology, becoming a member of the "tumor team" headed by Professor Campanacci. As part of this group, Mario Mercuri was one of the most gifted and active surgeons, experiencing different reconstructive techniques in the quickly developing field of limb salvage.

In 1999, following Professor Campanacci's death, he became the Chairman of the Musculoskeletal Oncology Department in Bologna. Under his direction, the volume of tumor cases surgically managed at the Rizzoli substantially increased, refining indications and application of various limb salvage techniques.

Throughout his career, Mario was an eclectic surgeon and despite his primary commitment to tumors he remained active in other areas of orthopedics such as hip and knee reconstruction. He was always curious towards advances in orthopedics and other surgical disciplines, and inclined to apply innovations to the field of musculoskeletal oncology. Numerous Italian and foreign surgeons have been trained in Bologna during his leadership.

Mario Mercuri had a very sociable attitude and an easygoing character. He enjoyed dining out and, as a tradition, hosting dinner for the Rizzoli

Musculoskeletal Oncology Team, the foreign fellows and the rotating residents a few times per year. Christmas time, end of quarter rotation, and the beginning and end of the summer were circumstances in which Mario used to gather his people and take them out for dinner.

In 2009, after the submission of the Rizzoli Institute for hosting ISOLS 2013 meeting in Bologna, he received unanimous positive feed-back from the board and became appointed as the ISOLS President. Along with his group, he promptly started working on the subject, choosing the venue and setting of the background organization. He was also part of the organizing Committee of the European Musculo-Skeletal Oncology Society (EMOS) setting the 2012 annual meeting in Bologna.

Despite a courageous fight with cancer, he died in May 2011. His memory, however, will be forever honored.



Professor Mercuri with Dr. Emanuela Palmerini, medical staff at Rizzoli

James R. Neff

By Ed Chao



A native of Kansas, Doctor James Russell Neff attended public schools in Topeka and graduated from the University of Kansas School of Medicine in 1966. His training in orthopaedic surgery at the University of Michigan was

interrupted by service in the us Navy aboard the uss George Marshall as a Lieutenant Commander. After completing his orthopaedic residency at Michigan, he took a fellowship at the University of Florida in musculoskeletal oncology. In 1975, James returned to the University of Kansas and in 1983, he was appointed professor of surgery. James moved to the University of Nebraska in 1991 as the professor and chairman of Orthopaedics and Rehabilitation. Two procedures that James was known for were the rotationplasty and hemipelvectomy after receiving special training in Vienna. James was also inventive and the well-known modular segmental bone replacement and knee fusion device, the “Neff Nail” system was named after him.

James served in the esteemed role of examiner for the American Board of Orthopaedic Surgery for nearly 20 years, on the osteosarcoma committee of the National Children Oncology Group, as President of the American Musculoskeletal Tumor Society, on the executive committee of the American Orthopaedic Association, and as the chair-elect of the Musculoskeletal Transplant Foundation. He was awarded the University of Kansas Distinguished Medical Alumni Award posthumously. James attended the first ISOLS meeting in Rochester and never missed one until he became seriously ill. In 1992, James wrote a private letter to me expressing his pleasure and privilege of being a member on ISOLS. He also indicated that this very specialized group should concentrate more on limb salvage techniques and less on tumor biology and adjuvant therapies, which would have been covered fully and in depth by the musculoskeletal tumor societies in different countries. Several other members of our society also shared the same sentiment. As a testimony to this fact, in May of 1992, James wrote a personal letter to me in which he addressed:

“Dear Ed, While recently at a meeting in Canberra, Australia, it became apparent to me once again that we should, if all possible, strive to preserve the group that you’ve developed years ago with interests in experimental prostheses. It’s quite apparent that the issue of limb preservation and surgical and clinical technology has a part to bear with these interests whereby the engineers and metallurgists with specific interests in developing either composites or new exotic materials has a place in our future. Within the format of the Musculoskeletal Tumor Society, there is little effort to preserve this particular group and their specific interest.”

Bravo, Jim! You voiced the same thoughts that had preoccupied the minds of many of us for a long while. Although the Society seems to strive forward with vigor and prosperity, the lack of engineers and metallurgists actively participating in the discussion and heated debate in the recent meetings has created a sounding alarm for the future of this organization. Jim, we miss you very much indeed.

One of James’ close friends and colleagues, David Anuta, retired Vice President for manufacturing and custom products of Zimmer Holdings, Inc., also a member of ISOLS, said about James and our society, “he was one of the most innovative clinicians, supported the use of the modular tumor prosthesis system and other limb salvage devices...., ISOLS is a group of premier thinkers, visionaries, miracle workers and simply great surgeons!”

James passed away after an extended battle with cancer, in July 2005 at age 65. Many shall remember

him as someone totally devoted to cause of limb salvage for the sake of patients’ welfare.

Editor’s note: much of this memoir was taken

Douglas J. Pritchard

By Mary I. O’Connor



Douglas J. Pritchard, MD was a giant among orthopaedic oncologists. His passing reflects the loss of a gentle leader in our field, a founding member of the Musculoskeletal Tumor Society and an individual who was instrumental in shaping the

modern practice of orthopaedic oncology.

Doug was born on Christmas Day, 1937 in Kewanee, Illinois and raised in Des Moines, Iowa with his two brothers. A voracious reader all his life, he first mastered comic books by age 10 and as an adult effortlessly dispensed with the New York Times crossword puzzle before starting surgery. Growing up in a home filled with music, Doug was an accomplished trombonist by age 12 and leader of his own dance band as a teenager. But the activity during his youth that most changed his life was delivering newspapers.

Due to his years of outstanding service as a paperboy, the Des Moines Register and Tribune awarded Doug the prestigious “Paperboy’s Scholarship” which took Doug from Iowa to New Hampshire for high school at Phillips Exeter Academy. He excelled in academics and was accepted at Harvard College. After completing his undergraduate studies, he remained in Boston at Tufts Medical School and performed his general surgery internship in Hartford, Connecticut. Following medical school, Doug served in the army and attained the rank of captain. Thereafter he began his orthopaedic residency at the Mayo Clinic in Rochester, Minnesota, and upon completion of his training in 1972 was invited to join the Mayo staff. Doug became a Professor of Orthopedic Surgery in 1984 and led the orthopaedic oncology section at Mayo from 1980 to 1999. He retired from surgery in 2000 and fully retired from clinical practice in 2005.

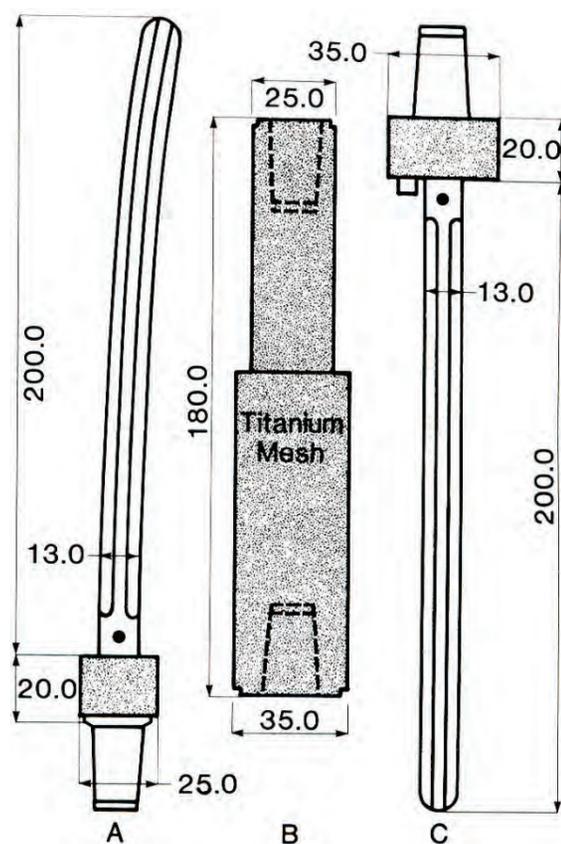
During Doug’s distinguished career at Mayo he authored or co-authored over 200 academic publications, was pivotal in the development of treatment protocols for pediatric sarcoma patients through the Children’s Cancer Study Group and trained and mentored numerous orthopedic oncologists as well as residents in the Mayo program. He collaborated extensively with the “Mayo Team” of

Franklin H. Sim, MD, Thomas Shives, MD, Mike Rock MD, Edmund Y.S. Chao, PhD., Krishnan K. Unni, MD and many medical and radiation oncologists. His focus was always on the needs of the patient. He routinely gave his home telephone number to his sarcoma patients. Over the span of his 33-year career, thousands of patients received his compassionate and thoughtful care.

Ewings sarcoma was always a particular focus for Doug and the current management of such patients is related to Doug’s research. In 1986 Doug and co-authors Ross Wilkins MD, E.O. Burgert, Jr. MD, and Krishnan K. Unni MD, published a landmark paper in Cancer on the Mayo experience with 140 patients with Ewings sarcoma of bone. The study showed the complete surgical excision of the primary tumor improved five-year survival (74% vs. 34%) and recommended that patients with surgically accessible lesions undergo complete excision combined with chemotherapy and, in selected patients, also radiation therapy. Doug chaired the Bone Tumor Strategy Committee at the Children’s Oncology Group from 1981 to 1989.

Doug’s leadership positions included serving as President of the Musculoskeletal Tumor Society, Associate and Deputy Editor at the Journal of Bone and Joint Surgery and Chair of the American Academy of Orthopaedic Surgery Instructional Course Lectures committee. Doug’s battle with liver cancer and Parkinson’s disease was dignified and inspiring to all. Despite his ill health and severe affliction from Parkinson’s disease, Doug continued to participate in alumni events during the last year of his life. As Peter Choong, MD told me, if you simply closed your eyes and just listened to Doug’s words you would hear in them the same clarity of thought and wisdom he shared with so many of us over the years.

Douglas J. Pritchard was a great and gentle man, an outstanding teacher, a wonderful mentor, a compassionate surgeon and loving husband and father. His dry sense of humor was always engaging and he took great pride in being a Mayo Clinic orthopedic surgeon and trained many outstanding orthopedic oncologists. We have truly lost a great friend.



Modular Titanium Mesh Intramedullary Rod

John Scales, Hugh Jackson Burrows, & Ginger Wilson

By Paul Unwin



Professor John Scales

Three of the unsung pioneers of limb salvage surgery are Professor John Scales, and consultant orthopaedic surgeons Mr. Hugh Jackson Burrows and Mr. Ginger Wilson. In 1948, John (then Dr. John Scales) was asked to establish

the Plastics Research Unit (PRU), a subdivision of the newly formed Institute of Orthopaedics set up in collaboration with the Royal National Orthopaedic Hospital. In a red brick one-storey building at the far end of the 140-acre hospital site, John established the PRU with the aim of developing orthotics and prosthetics from the new materials developed during WWII. John, who was a medic, had huge amounts of energy, foresight and a prowess for engineering and it was this that led him to a great biomedical engineer.

In the summer of 1949, Professor H.J. Seddon approached John about fabricating an internal proximal femoral amputation prosthesis for a patient with polyostic fibrous dysplasia who was to undergo a hip disarticulation. A block of Perspex (PMMA) was purchased from I.C.I. and John hand whittled the block (it is said in his garage) into an anatomically shaped proximal-femur. On the 2nd of August 1949, pioneering surgery took place. This was the first ever implant to be designed and fabricated by this unit. And what is more remarkable is that it was not revised until 2001, some 52 years later. The patient led an active life throughout. Shortly after this pioneering operation, the Plastic Research Unit changed its name to the Department of Biomedical Engineering (BME) and began extensive research into metallic alloys for orthopaedic implants. In the following year, May 1950, the first proximal humeral replacement fabricated from polyethylene and secured with stainless steel plates was implanted in a 37-year-old lady with chondrosarcoma. The patient died of metastatic disease in May 1965 with her original implant still in situ. This was just the beginning of the limb salvage revolution that was taking place at Stanmore. John teamed up with Mr. Jackson Burrows and Mr. Wilson (known affectionately as Ginger), both renowned orthopaedic surgeons based at the Royal National Orthopaedic Hospital. Five more polymeric (Nylon) bodied implants secured with metal extra-cortical plates were implanted over the next four years, and these were two proximal femoral, two proximal humeral and one distal femoral replacement. The latter was implanted in 1952 and is considered the world's first distal femoral and knee joint replacement.

The next implant was one of the most remarkable

landmarks in the history of limb salvage and this implant was the second distal femoral replacement. In 1952, a young lady who was planning to get married, was diagnosed with a GCT of the left distal femur. Amputation was advocated but was refused until after the wedding. As an alternative, she was told of a radical treatment that had been performed at Stanmore once. She opted to be the second. With his team, John designed an all-metal alloy distal femoral replacement with medial and lateral side plates for both femoral and tibial components. The implant was entirely fabricated from Vinertia (CoCrMo alloy) including the knee bearing and the medial and lateral extra-cortical plates. The young lady led a very active life and routinely walked her children to school and back, averaging some five miles daily. In 1975, a fracture at the root of the lateral extra-cortical side plate was identified and it was considered that a revision was required. The revision custom-made distal femoral replacement, this time with a cemented long femoral intra-medullary stem and a fixed hinged knee replacement with polyethylene bushes. The original implant had remained in situ for 251 months (20 years and 11 months). Each May, the patient returned for her annual review and in 2010, 35 years after her only revision procedure and 56 years after her first surgery, our patient still remains delighted with her limb salvage surgery, considering that this was only temporary and that limb amputation was inevitable. This patient has been the inspirational for many BME bioengineers and RNOH surgeons.

Over the next three decades, they designed and implanted 112 massive limb salvage implants (see below). Many of these implants were truly ground

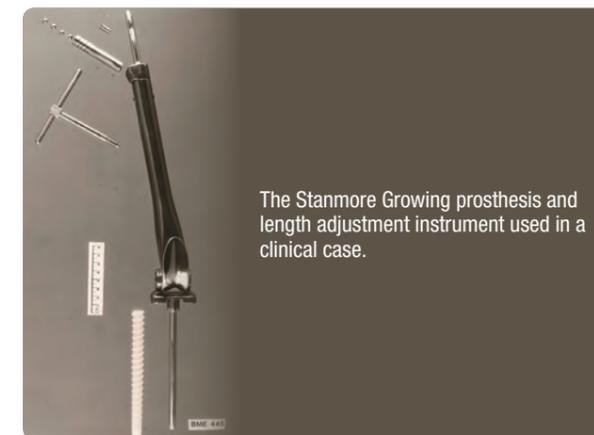


Stanmore Ti distal femur & knee replacement prosthesis with UHMWPE hinge bushing & patella button.

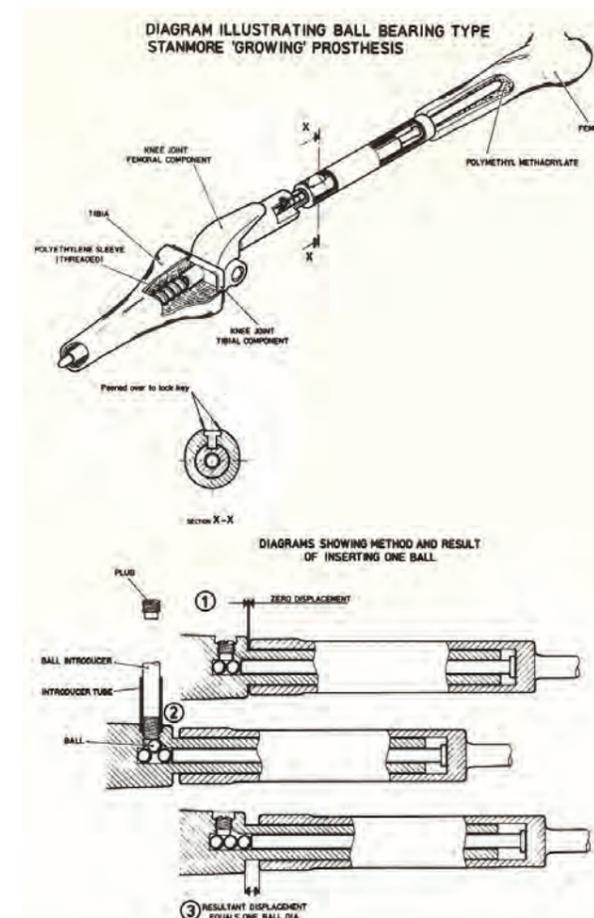
breaking. Bone cement (PMMA) was first used with the 20th patient specific Stanmore massive replacement in January 1963. And from then onwards, all massive implants were secured using a cemented intra-medullary stem. High molecular weight polyethylene (RCH 1000) used in knee hinge bushes and acetabular cups was not introduced until 1969 and up until then, knee joints were metal-on-metal articulations and hips were either hemi-arthroplasty or metal-on-metal. Currently there are still a number of patients that still retain their original proximal femoral replacement that incorporates a metal-on-metal head. The team developed and implanted a range of custom-made limb salvage implants, as follows:

Implant Type	Number	First Implantation
Distal femoral	33	April 1952
Proximal femoral	48	March 1951
Proximal femoral amputation prostheses	2	August 1949
Total femoral	2	June 1978
Proximal tibial	5	June 1980
Distal tibial	1	July 1981
Proximal humeral	20	May 1950
Distal humerus and proximal ulna	1	February 1969

By the early 1970s, the design, fabrication and implantation had become much more routine and with the development of adjuvant therapies, more malignant tumour resections were becoming possible. Each year, the number of custom-made implants produced by BME increased rapidly. One great challenge still required, overcoming limb salvage implant technology for skeletally immature patients. In 1976, another significant milestone in limb salvaging occurred. John was the first in the world to design and manufacture an extendible limb salvage implant. Mr. Rodney Sneath at the Royal Orthopaedic Hospital (Birmingham) implanted this extendible distal replacement in March 1976. In 1988, John and Rodney Sneath met to discuss the next big innovation, non-invasive extendible implant mechanisms, and proposed the idea of inductively coupled electromagnetic technology. This is now incorporated into the Stanmore Implants JTS non-invasive extendible EPR's. In 1987, John handed over the reins of the Department for Biomedical Engineering (University



The Stanmore Growing prosthesis and length adjustment instrument used in a clinical case.



Design and application principles of the Stanmore's Growing Prosthesis for distal femur and knee replacement

College London) to another great pioneering bioengineer: Professor Peter Walker. And concurrently, Ginger Wilson handed over his practise to another worthy successor: Mr. Steve Cannon. Looking back at

the challenges the surgeons and engineers faced, it is truly remarkable what was achieved. Without their foresight, tenacity and great skills, it is unlikely that the limb salvage implants that are now used today would be so advanced. I would like to think that the pioneering spirit of pushing the boundaries of limb salvage is still very much present.

Editor's note: John Scale's group was indeed the pioneer in segmental bone/joint replacement using custom-made Ti implants in limb salvage surgery. We

all owe them for sharing their invaluable experience gained in the choice of materials and joint/stem design. Peter Walker, who succeeded John also made a significant contribution in the limb salvage field as his innovative design of the Rotating Hinge knee prosthesis was first adapted for the custom-made prosthesis and then the modular distal femur or proximal tibia and knee joint replacement prosthesis by Ed Chao. We should, by all means, get the engineers involved in the future.

Bertil Stener

By Örjan Berlin & Björn Gunterberg



Bertil Stener attended the inaugural meeting of ISOLS in 1981 and was one of the early well-known profiles of the society. He can be found in the center of the classic portrait of the first ISOLS attendees from 1981, seated where the two

diagonals from the corners of the photo intersect, as always a well-focused man. Bertil was born in a rural area as a son of a farmer in the outskirts of Gothenburg in Sweden March 19, 1920. He graduated from The University of Uppsala School of Medicine in 1948. His first professional years included collaboration with the legendary Professor Erik Moberg, "the Father of Hand Surgery", and from that era stemmed his interest in ligamentous injuries. From 1953 until 1964 he functioned as a general surgeon, but his focus gradually shifted towards orthopedic surgery. In 1964 he joined forces with another orthopedic giant, Carl Hirsch, and succeeded him as the Professor of Orthopedic Surgery at Sahlgrenska University Hospital in Göteborg in 1970 until 1986.

Scientifically, there are three areas that caught Bertil's attention. The first is the Neurophysiology of ligament-muscular protective reflexes, in his doctoral thesis described as phenomena or reflexes, now still referred to as the much cited Stener Reflex among doctors of Sports Medicine. The second is Ligamentous injuries and associated skeletal injuries of the thumb and fingers. The focus on ligamentous injuries led him to describe the mechanism of the rupture of the ulnar collateral ligament of the metacarpophalangeal joint of the thumb (JBJS 1962), an injury still known as the Stener lesion of the thumb. Third is Musculo-skeletal tumor surgery. This came to be his main effort from 1956 until his retirement in 1986. Early on, he understood the microscopic battle that was ongoing in the zone

where the tumor met the healthy tissues. He stressed the importance of having a cuff of healthy tissue all around the excised tumor specimen to have a safe surgical margin in order to avoid local recurrence. His studies on micro-angiography of sarcomas gave him this insight. Bertil formulated his idea into what we today refer to as "The Stener Principle of Musculoskeletal Tumor Surgery. To preserve maximum function and yet achieve a sufficient surgical margin, biopsy can be omitted when the history, physical examination and radiographic examinations of various kinds indicates malignancy, and the tumor has such a position it can be removed completely without significant loss of function." By applying this principle he epitomized the goal of ISOLS, to save limbs in patients afflicted with musculoskeletal sarcomas. His philosophy regarding surgical treatment of musculoskeletal tumors is well described in CORR (191, 1984).

Bertil was one of the first in the world to introduce and perform total spondylectomy of one or several vertebrae of the spine (1970–1971). He always came up with innovative custom-made solutions for such reconstructions. He was also one of the first to do hemi-corpectomy on a young patient who is still alive today. In 1978 (Spine) he described the technique of sacral amputation, still a classic in musculoskeletal oncology literature. The AAOS honored Bertil Stener by inviting him as The Presidential Guest speaker in 1984 in Atlanta. His ingenious techniques for reconstruction of the spine, long before instrumented fusions were introduced, combined with his excellent anatomical drawings, stunned the audience.

He retired in 1986 after a long and extraordinary career honored by an International Symposium entitled "Musculoskeletal Oncology 1986—A Tribute to Bertil Stener". Present at that event were most of his prominent contemporaries of Musculoskeletal Tumor Surgery and Oncology. After his retirement

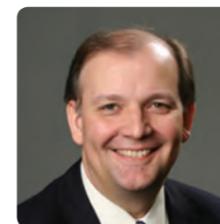
he continued to nurture his interests, among other things as a linguist. He was fluent in English, French, German and Spanish apart from his well-versed Swedish. He also was an extraordinary illustrator, a fact that can be observed in his many publications, nearly always combined with his enlightening drawings. Bertil Stener passed away on November 30, 1999, just short of his 80th birthday. We who have had the great fortune to work with this remarkable man came to know him as a modest, humble man with great integrity and a generous heart. With his strong empathy, his grateful patients in particular loved him. An extended life and career portrait of

Bertil Stener, including a list of his publications, can be found at: Acta Orthopaedica Scandinavica 57, 566-574, 1986.

Editor's note: Bertil was indeed a gentle giant both in physical and intellectual stature. We played tennis at both the Rochester and Vienna ISOLS meetings, always way after the regular meeting and social hours since he did not wish to miss any presentations nor the chance to interact with other fellow members of ISOLS. I had no idea that Bertil was so well-known and accomplished in several other areas, but this has really been the rule, not the exception, among so many in the ISOLS organization.

Alan W. Yasko

By Dr. Carlos E. Cuervo



In his 26-year career as an orthopaedic surgeon, Dr. Yasko devoted his life to treating malignant bone and soft tissue tumors in adults and children. He was an international expert in treatment of musculoskeletal tumors, especially tumors of the pelvis.

Alan William Yasko was born in Harrisburg, Pennsylvania. As a child, his family moved to Fairborn, Ohio, where he spent his early school years and graduated from Fairborn Baker High School in 1976. He received a bachelor's degree in biological science from Wright State University in Ohio in 1980, then went to Northwestern University Medical School in Chicago, where he earned his medical degree in 1984. From 1984 to 1989, Alan completed his orthopaedic surgery residency at Case Western Reserve University in Ohio. There, he met his future wife, Laura. They were married in September 1990. From Ohio, Alan moved to New York and completed two fellowships: one in musculoskeletal oncology at the Memorial Sloan-Kettering Cancer Center and a second in metabolic bone disease at the Hospital for Special Surgery.

In 1991, Alan joined the prestigious MD Anderson Cancer Hospital in Houston, where he eventually became chief of orthopaedic oncology. After 15 years in Texas, he joined the Feinberg faculty in 2006 as a professor of orthopaedic surgery and also became chief of musculoskeletal oncology at the Lurie center. Alan also had a special fondness for children with bone and muscle tumors, which prompted his interest in bone regeneration and biomaterials resulting in his receiving numerous National

Institutes of Health grants. These interests also resulted in his design of an expandable prosthesis for child amputees. In Texas, Alan started a winter tradition of taking amputee children on a skiing trip. Upon moving to Chicago, he continued the trip with young patients from Northwestern and Children's Memorial Hospital.

I meet him at MD Anderson in 1998, he accepted me like a fellow observer with him. Ten years later I became the president in the SLATME (Latin American Tumor Society) and I invited him to our meeting to be a special guest to talk about his experience. The meeting took place in CanCun México in August 18-22, 2010. He arrived at the hotel on August 18 in the afternoon, and that night he suffered a pulmonary embolism. He passed away just three hours before the inaugural ceremony on August 19, 2010. This very sad notice was the first part of the inauguration speech in our congress. He was very well known as an excellent oncology orthopedic surgeon in our society but we are also going to remember him as a really nice person, very good friend, and a teacher to many of us.



Professor Yasko with Mrs. and Professor Jesus-Garcia (in the middle) and Professor and Mrs. Carlos Cuervo (on the side) during the Hamburg ISOLS gala dinner in 2007.

Editing this book took more time and far more personal devotion than I anticipated. But it was a profound experience of joy and even love, especially at the twilight of my career and life. As a self-appointed historian of ISOLS, I had harbored the desire to do this task for years, in the hopes of paying tribute to those who had gone before us, and lest we forget, whose heels we shall follow in due time. With this dream having become reality, I feel a sense of fulfillment far beyond any achievements I have managed to attain in my professional life.

On a personal note, I have always felt drawn to the Odyssey so vividly described by Homer, its mythical events laced with moral and ethical undertones. In a way, I see in this tale my awkward role in the field of limb salvage, a voyage rather foreign to me and survived only by the divine grace of the Goddess Athena or Minerva. As Homer has written about how Athena spoke

to Odysseus on the test of hardships before he reached his homeland, "I am here once more to tell you all the trials you must suffer... Endure them all. You must!" Then, the test of life having begun, Homer stated "Sing to me of the man, Muse, the man of twists and turns driven time and again off course, once he had plundered the hallowed heights of Troy!" In all honesty, it was this spirit that guided me during the task of putting this monograph together.

Not all ISOLS members and their loved ones are of the same faith, yet I am sure we all share the strong belief of fate and destiny. Let me conclude this monograph, then, with mention of Friedrich von Schiller, the lyricist who beautifully orchestrated Beethoven in the famous 9th Symphony, a score that many of you heard in the Closing Ceremony of ISOLS '89 and an event so impressively and meticulously put together by our beloved Frantz Langlais.

FRIEDRICH VON SHILLER

ODE AN DIE FREUDE

*O Freunde, nicht diese Töne!
Sondern lasst uns angenehmere anstimmen
und freudenvollere!*

Freude, schöner Götterfunken,
Tochter aus Elysium,
Wir betreten feuertrunken,
Himmlische, dein, Heiligtum!
Deine Zauber binder wieder,
Was die Mode streng geteilt;
Alle Menschen werden Brüder,
Wo dein sanfter Flügel weilt.

Wem der grosse Wurf gelungen,
Eines Freundes Freund zu sein,
Wer ein holdes Weib errungen,
Mische seinen Jubel ein!
Ja, wer auch nur eine Seele
Sein nennt auf dem Erdenrund!
Und wer's nie gekonnt, der stehle
Weinend sich aus diesem Bund.

Freude trinken alle Wesen
An den Brüsten der Natur;
Alle Guten, alle Bösen
Folgen ihrer Rosenspur;
Küsse gab sie uns und Reben,
Einen Freund, geprüft im Tod;
Wollust ward dem Wurm gegeben,
Und der Cherub steht vor Gott!

Froh, wie seine Sonnen fliegen
Durch des Himmels prächt'gen Plan,
Laufet, Brüder, eurc Bahn,
Freudig, wie ein Held zum Siegen.

Seid umschlungen Millionen.
Diesen Kuss der ganzen Welt!
Brüder! Überm Sternenzelt
Muss ein lieber Vater wohnen.
Ihr stürzt nieder, Millionen?
Ahnest du den Schöpfer, Welt?
Such' ihn über'm Sternenzelt!
Über Sternen muss er wohnen.

ODE TO JOY

*O friends, no more these sounds!
Let us sing more cheerful songs,
more full of joy!*

Joy, bright spark of divinity,
Daughter of Elysium,
Fire-inspired we tread
Thy Sanctuary.
Thy magic power re-unites
All that custom had divided,
All men become brothers
Under the sway of thy gentle wings.

Whoever has created
An abiding friendship,
Or has won
A true and loving wife,
All who can call at least one soul theirs;
Join in our song of praise;
But any who cannot must creep tearfully
Away from our circle.

All creatures drink of joy
At nature's breast.
Just and unjust
Alike taste of her gift;
She gave us kisses and the fruit of the vine,
A tried friend to the end.
Even the worm can feel contentment,
And the cherub stands before God!

Gladly, like the heavenly bodies
Which He set on their courses
Through the splendour of the firmament;
Thus, brothers, you should run your race,
As a hero going to conquest.

You millions, I embrace you.
This kiss is for all the world!
Brothers, above the stary canopy
There must dwell a loving Father.
Do you fall in worship, you millions?
World, do you know your Creator?
Seek Him in the heavens,
Above the stars must He dwell.

ODE A LA JOIE

*Mes frères, cessons nos plaintes!
Qu'un cri joyeux élève aux cieux nos chants
de fêtes et nos acords pieux!*

Joie! Joie! Fille du vieil-Empyrée,
Flamme prise au front des dieux,
Nous entrons l'âme enivrée
Dans ton temple glorieux.
Ton magique attrait resserre-
Quand la mode ex vain détruit;
L'homme est pour tout homme un frère,
Où ton aile nous conduit.

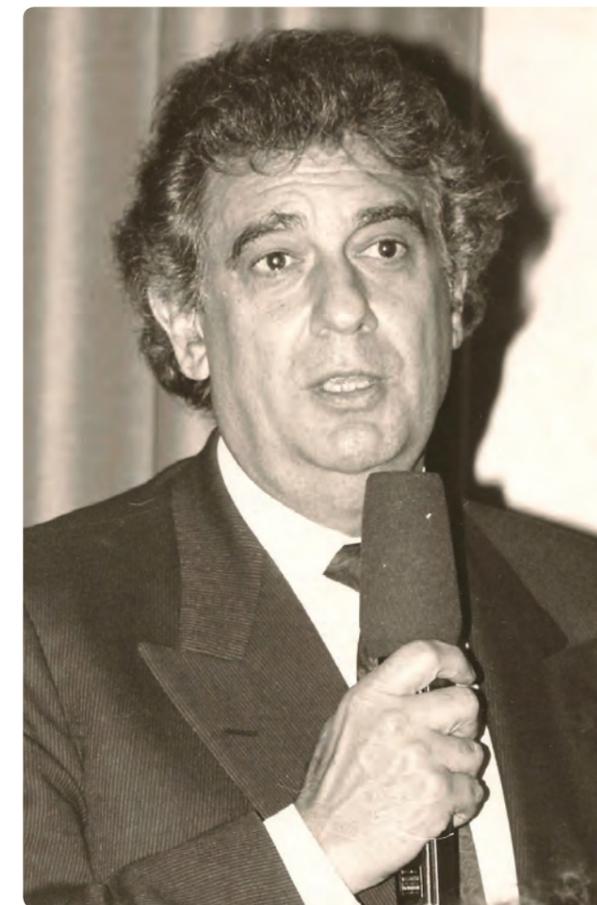
Si le ciel comblant ton âme,
D'un ami t'a fait l'ami,
S'il te donne un cœur de femme,
Suis nos pas au seuil béni!
Viens, si tu n'aimas qu'une heure
Qu'un seul être sous les cieux!
Vous que nul amour n'effleure,
En pleurant, fuyez ces lieux!

Bois la joie au bruit des chants,
Tous, de roses, sa parure,
Ont leur part,
Bons et méchants.
Elle a tout: raisins qu'on presse,
Sûrs amis, baisers de feu,
Donne au ver rampant l'ivresse,
Et le chérubin voit Dieu.

Fiers, tels les soleils d'or volent
Sur le plan vermeil des cieux,
Faites frères votre voie:
Gais, tels vont combattre
Les héros emplis de gloire!

Qu'ils s'enlacent tous les êtres!
Un baiser au monde entier!
Frères, au plus haut des cieux
Doit régner un tendre père.
Tous les êtres se prosternent?
Pressens-tu ce père, Monde?
Cherche alors le Créateur
Au-dessus des cieux d'étoiles!

Finally, I requested my friend Placido Domindo to play our 30th birthday song and sing Friedrich von Schiller's 'Ode to Joy' to honor all our beloved and missed members and friends, and he gladly obliged!



“Happy Birthday ISOLS!”

ACKNOWLEDGEMENT

by Ed Chao



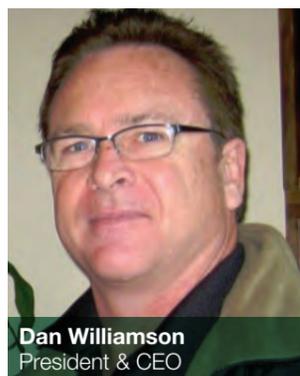
Following my retirement and move to southern California in recent years, I was planning only to teach, lecture and mentor while spending more time with my wife Jane. What I did not know was that someone had been trying to reach me at The Mayo Clinic, Johns Hopkins and the National Academy of Engineering for nearly two years. That person was Geof Garth, Vice President of Aspen medical devices and he wanted me to help their R&D work in spinal braces.

Thanks to having met Geoff and his partner Dan Williamson, and learning about what Aspen does, I have had the most wonderful experience since first moving to Hopkins in 1993. Quite simply, they produce the best spinal braces in the world, devoting enormous amount of R&D and patient service with more material selection, biomechanics and manufacturing considerations than any other orthopaedic implant manufacturers I have known.

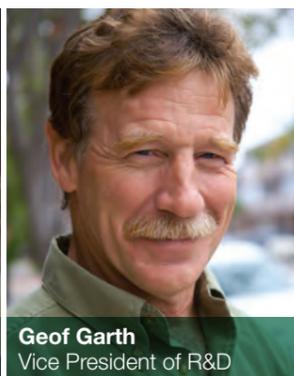
When they learned I would be working on the ISOLS 30th Anniversary Monograph, they graciously offered to assist in the graphic design and desktop editing process, and this has been the savior of this enormous project since I started it only one year ago. I have also been so very pleased that Aspen was willing to participate in this project, because I see the potential for them to become involved in limb salvage patients' service in difficult cases besides those of the spine. For example, in my view, the Tinkoff-Lindber procedure leaving the limb frail after en bloc resection of malignant tumor around the shoulder girdle requires better braces in the future, in order



to allow patients the use of their preserved arm and hand with both comfort and stability. We may or may not go back to this procedure for upper limb salvage, and as such, the notion of using exo-skeletal devices to provide support, stability, function and even a power source would be a fine future topic to be included in our Symposia. Thank you Aspen, for your enormous support of this monograph, and your contribution to our pride in what the members of ISOLS have been able to accomplish.



Dan Williamson
President & CEO



Geof Garth
Vice President of R&D

