The WSRM Newsletter
Summer 2020
Volume 9, Issue 2

World Society for Reconstructive Microsurgery

In this edition

Message from the Editor

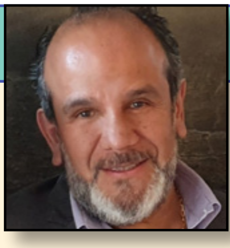
David W. Chang, MD
President WSRM

I hope you and your family are doing well during this COVID-19 pandemic. This is a very difficult time for all of us. While many of us are trying to return to normal way of life as we are recovering from this pandemic, others are still suffering as the incidence of COVID-19 continue to rise depending on what part of the world we live in. Certainly, COVID-19 pandemic is still active and continue to affect all of us in the world.

As you are aware, the WSRM Executive Council decided that in the best interest of our organization and for the safety of our members, to postpone the 11th congress of the WSRM to **June 1th - 4th , 2022, in Cancun, Mexico**. I would like to thank Dr. Eric Santamaria and his organizing team who had to make adjustments and are working hard to plan wonderful scientific and social programs in beautiful Cancun, and I expect it will be the best WSRM meeting ever.

I would also like to express my special thanks to Dr. David Chiu, who will be hosting the **12th WSRM meeting in NYC, May, 2023**, as originally planned, for his graciousness in supporting the postponing of the 11th WSRM meeting to 2022 due to this unique historical situation. I am certain that it will be a sensational meeting and I ask that we all show our appreciation to Dr. David Chiu and do our best to support the 12th WSRM meeting in the "Big-Apple".

This is a very unique time in our history with unique challenges that none of us will ever forget. While these times have been difficult and challenging, I do believe that we will learn valuable lessons from these events that will make us stronger and our society better. Thank you and wish you and your family the best. Please be safe.



Invitation to WSRM 2022

Eric Santamaria, MD
WSRM 2022
Congress Chairman

Dear Microsurgeons from Around the World, Colleagues And Friends:

I would like to take this opportunity to provide updated information on the 11th World Society for Reconstructive Microsurgery Congress scheduled to be held in Cancun, Mexico, from June 9 to 12, 2021.

The COVID 19 pandemic is still active and has affected every country in the world, including the development of our academic activities and conferences. In recent months, many conferences have been postponed to the second half of this year, and due to restrictions still in place in some countries, some of these have been moved back to next year or canceled. Without being pessimistic, it is worrying to know that some colleagues are still afraid to start traveling until better preventive health conditions exist, and other colleagues and sponsoring companies will begin to recover financially starting later this year.

Our priority is the safety, well-being and health of all attendees: members, associates, colleagues, exhibitors, administrative and logistical personnel in each of the acts involved in carrying out our great academic event.

Based on the above, an extraordinary meeting of the WSRM Executive Committee was recently convened, and the details, advantages and disadvantages for the holding of the congress in June 2021 were discussed. The conclusion was reached of postponing the 11th congress of the WSRM from **June 1 to 4, 2022 in Cancun, Mexico**.

Together with the scientific and organizing committee, we will continue to work hard with the commitment to offer a high-quality congress and meet the highest standards, which have always characterized our congresses. It will be an honor to have your understanding of this fact, and I would like to ask for your support so that you do not stop attending this meeting.

I apologize for any inconvenience this may cause as a result of this situation affecting everyone globally, and I look forward to welcoming you, your family, and your colleagues in 2022.

Historian's Note

David T. W. Chiu, MD
Historian

The World Society for Reconstructive Microsurgery (WSRM) - Our forum

In 1999, WSRM was born as a union of two international microsurgical societies, the ISRM (International Society of Reconstruction Microsurgery) and the IMS (International Microsurgery Society). WSRM was officially inaugurated during its first congress in Taipei, Taiwan in 2001. This union embraced the ideals of both founding organizations and is reflected in its mission statement:

"To stimulate and advance knowledge of the science and art of microsurgery and to provide an international forum for the exchange of ideas."

WSRM is a medical professional society that is governed by an elected council and president. Governance is updated in a two-year cycle. The society is professionally managed by the Chicago-based ISMS group which has been with WSRM since its inception. The central activity of WSRM is the Congress which is held biennially in various parts of the globe. Through this meeting WSRM brings together a critical mass of microsurgical experts, practitioners and scientists, leaders in regional and national scientific societies, health care agencies and academic institutions from all parts of the world. A melting pot of new ideas and innovations, the congress provides a forum for critical argument and discourse. Through this process, traditions are challenged, and knowledge is advanced. Through its biennial congress, WSRM provides a consensus on global standards of care through its many educational courses, invited lectures, and panels. The ultimate goal is improved care and outcomes for the patients we serve. These collective efforts help define and encourage the resolve of new generations of young microsurgeons who will carry the torch into the future.

In reflecting on the history of WSRM, I fondly recall its magnificent inauguration in Taipei, Taiwan. The Congress was masterfully officiated by President, Professor, Viktor Meyer and adroitly orchestrated by the Congress Chairman, Professor Fu-Chan Wei. The Congress attracted 440 participants. Despite being one of the last "slide-carousel" technology meetings, the scientific program was comprehensive, the presentations were crisp, and discussions cogent. The meeting set a high bar for the future congresses

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As reflected in the minutes of the first business meeting of WSRM on November 2, 2001, the combined roster was 603 active members. However, it was noted that only 33% of these members actually paid dues. Only 21% of the active members paid dues in both 1999 and 2000. Aiming to streamline the administration and solidify a commitment of the membership, the council resolved to name 128 members, who dutifully paid their dues and who wholeheartedly answered the call to support and contribute to the new society, as "founding members".

Founding Members

Roberto Adani, MD
Hiromi Akatsu, MD
Tanetaka Akizuki, MD
Robert Allen, MD
Hirotaka Asato, MD
Sirpa Asko-Seljavaara, MD
Bishara Atiyeh, MD
Ronald Azze, MD
Audrej Banic, MD
Joseph Y Bao, MD
Yaffe Batia, MD
J. Jean Baudet, MD
Michael Beltsios, MD
Alexandros Beris, MD
Allen T. Bishop, MD
Willy Boeckx, MD
Theodosios Boundouris, MD
Ueli Buechler, MD
Huifang Chen, MD
David T. W. Chiu, MD
Duke Whan Chung, MD
William J. Cockburn, MD
Stephen G. Coleman, MD
Rodolfo.Contraera-Gamboa, MD
Richard W. Dabb, MD
Avron Daniller, MD
A. Lee Dellon, MD
Frederico A. Deschamps, MD
Antonio Di Cataldo, MD
Christos G. Dimitriou, MD
Tassos Dionisopoulos, MD
Papanicolaou Eparminodi, MD
David M. Evans, MD
Abdallah S. Farrukh, MD
Axel-Mario.Feller, MD
Simon P. Frostick, MD
Toyomi Fujino, MD
Alexandru.Georgescu, MD
Gunter K. Germann, MD
Marc Goldstein, MD
Xiaosong Gu, MD
P.J. Gullane, MD

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Founding Members

Ashok Gupta, MD
Suresh C. Gupta, MD
Stelios.Haidemenakis, MD
Amos G.Hall, MD
Geoffrey G Hallock, MD
Sean G. L. Hamilton, MD
Takao Harashina, MD
Kiyonori Harii, MD
Richard E. Hayden, MD
Chiu-Ming Ho, MD
Yoshihide Hori, MD
Heribert Hussl, MD
Koichiro Ihara, MD
Guilio Ingianni, MD
Katia Ioannou, MD
Michael E. Jabaley, MD
Craig H. Johnson, MD
Gerald H. Jordan, MD
Hiroshi Kamiishi, MD
James Katsaros, MD
Alex Keller, MD
Lofton Kennedy, MD
Roger Khoury, MD
Andrew L. Koman, MD
Joseph E. Kutz, MD
William M. Kuzon, MD
Alastair Lamont, MD
Marco Lanzetta, MD
Kwang Suk Lee, MD
W. P. Andrew Lee, MD
Paul G Lendvay, MD
L. Scott Levin, MD
Guillermo Loda, MD
Allan M. Macleod, MD
Hallene Maragh, MD
Yu Maruyama, MD
Hani S Matloub, MD
Nancy H. McKee, MD
Emmanuel G. Melissinos, MD
J. Craig Merrell, MD
Wyndell H Merritt, MD
Claudia Meuli-Simmen, MD
Viktor E Meyer, MD
Jose Monsivais, MD
Foad Nahai, MD
Martin J. Naughton, MD
Peter C. Neligan, MD
Koichi Nemoto, MD
Milomir Ninkovic, MD
Setsuo Ninomiya, MD
Genzaburo Nishi, MD
Motohiro Nozaki, MD
Kitaro Ohmori, MD
Harilaos T. Sakellarides, MD
Charles E. Shapiro, MD
Panayotis N. Soucacos, MD
Jean Yves St. Laurent, MD
Mario Manbor Stadler, MD
Hans U. Steinau, MD
Berish Strauch, MD
Robert J. Strauch, MD
William M. Swartz, MD
Tsuyoshi Takato, MD
Eugene.Tan, MD
Yoshio Tanaka, MD
Geoffrey Ian Taylor, MD
Julia K. Terzis, MD
Abraham Thomas, MD
Satoshi Toh, MD
Yoshitsugu Tomita, MD
Shuhei Torii, MD
Tsu-Min Tsai, MD
David Tullis, MD
Joseph Upton, MD
Fredrick A Valauri, MD
Allen L. Van Beek, MD
Nicholas B. Vedder, MD
Simo K Vilkki, MD
Fu-Chan Wei, MD
Norman Weinzweig, MD
H. Bruce Williams, MD
N. John B. Yousif, MD
William A. Zamboni, MD
Aristides B M. Zoubos, MD
Ronald M. Zuker, MD

Those members who paid at least one year of dues (33%) were deemed "active members". In the ensuing years, and through its Bylaws, WSRM has continued to adjudicate membership status by enforcing dues payment compliance. To date, our active membership has risen to 446 members. At our 2019 Congress in Bologna, Italy, the number of registrants was 1,600, 366% of the membership, which is a significant improvement as compared to the 73% membership participation rate during the inaugural congress. This is a reflection of not only the excellence of our congress program but also the value and influence of our core roster of bonafide active members.

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Year	President	Chairman	Venue
1999 – 2001	V Meyer	FC Wei	Taipei, Taiwan
2001 – 2003	FC Wei	G Germann H Steinau	Heidelberg, Germany
2003 – 2005	W Morrison	G Loda	Buenos Aires, Argentina
2005 – 2007	J Terzis	A Beris PN Soucacos C Vlastou	Athens, Greece
2007 – 2009	B Strauch	K Doi I Koshima	Okinawa, Japan
2009 – 2011	PM Soucacos	E Tukiainen	Helsinki, Finland
2001 – 2013	Kazuteru Doi	Robert Walton	Chicago, Illinois, USA
2013 – 2015	L. Scott Levin	Raja Sabapathy	Mumbai, India
2015 – 2017	David C. C. Chuang	Myong Chul Park	Seoul, Korea
2017 – 2019	Isao Koshima	Geogio De Santis Marco Innocenti	Bologna, Italy
2019 – 2021	David Chang	Eric Santamaria Javier Lopez Alex Cardenas	Cancun, Mexico

Through persistence and the dedication of our members and leadership, over the past two decades, WSRM is marching steadily forward in accordance to its mission. As our society enters into its third decade, we can look back and be proud of what we have accomplished together:

1. We have reached out to expand our membership to include younger microsurgeons from all over the world and continue to distill a membership of the most qualified, dedicated and contributing members in the global arena of reconstructive microsurgery.

2. We have consistently produced a scientific congress of the highest caliber.

3. We have embraced all surgical, medical and scientific specialties that have interest in and utilize microsurgical solutions in their clinical and investigative endeavors. Our unique forum celebrates an expanding horizon inclusive of all genres from aesthetic restoration to transplantation to prosthetic robotic technology, and beyond.

4. We have endeavored to promote the application of reconstructive microsurgery to the global community via regional symposia and clinical mission services.

5. We continue to dedicate ourselves to the advancement of the field of microsurgery and complex reconstruction and nurture the next generation through programs such as early involvement in the society's committee and leadership structures, one-on-one interactions with the masters at our biannual meetings, and most recently, the young surgeon's lectureship which identifies and acknowledges outstanding contributions by young members.

The WSRM leadership remains hard at work to continue stimulating and advancing the art and science of reconstructive microsurgery and endeavors to promote the society as an international forum for the exchange of ideas. WSRM's global inclusion of all interested parties reflects its core values of education and the highest qualities of healthcare unsullied by nationality, religion, or political disposition. By cultivating a benevolent culture, WSRM remains unencumbered in its quest to expand the horizons of reconstructive microsurgery. And, in a more profound sense, becomes a global oasis for microsurgical knowledge and learning and hopefully, a sparkle of human harmony and world peace.

Mini Review

Has the COVID-19 pandemic sparked a new era of virtual reality for surgical education? The Annual Penn Flap Cadaveric Course Goes Virtual and Free

Authors: Saïd C. Azoury, MD
Zvi Steinberger, MD
Stephen J. Kovach, MD
L. Scott Levin, MD

From: The Division of Plastic Surgery and Department of Orthopedic Surgery, University of Pennsylvania

Medicine and its teachings have evolved over the years, beginning as secret sorcery being passed from one generation to the other, then through stewardship of mentors and mentees, followed by establishment of schools to teach the art of medicine and anatomy. In later years, with the ability to travel long distances and even overseas, individuals visited prestigious institutions to learn from renowned scholars, lecturers, innovators and surgeons. Then, in the early 1990s, the world wide web became publicly available and since, individuals have had increasing access to information, lectures, research, and other scholarly work from the confines of their home or office.

In the face of the Covid-19 pandemic, the means by which we educate the next generation has to dramatically change. The pandemic has enforced a new set of social distancing rules, restrictions to follow for the foreseeable future. Scholarship, education, clinical care and research have been challenged. Innovation in care delivery includes an expanded use of telemedicine to meet the healthcare needs of all patients. The pursuit of research too has adapted, as now data and analyses are exchanged in "on-line" or "teleconference" updates, rather than in person meetings. Educational meetings and cadaveric flap courses such as the Penn Flap Course are no exception.

To be effective, the reconstructive microsurgeon must integrate advanced technical training and extensive knowledge of anatomy with a broad understanding of the indications and limits of reconstructive techniques. Educators and students have sought better methods for learning these skills by way of cadaver labs, simulation, and online curriculum. In this current so-called "virtual reality" era, cadaveric lab sessions may be performed online, with instructors and participants joining from all around the world, but viewing perhaps from the convenience of their home, and comfort of day clothes. During those sessions, we are also able to field and respond to questions, and even solicit input from international experts. With high-definition technology, relevant anatomy and flap dissections can become perhaps even clearer than in person, with zoom-in and -out capabilities to paint the big picture. The "virtual reality" that has resulted from the Covid-19 pandemic will have a long-lasting impact on educational conferences and labs in the future. This presents unique advantages for the resident, fellow and practicing surgeon, as travel time, expenses, and many related scheduling conflicts are eliminated. Undoubtedly, with face-to-face meeting time and travel time reduced, there is less time out of training and practice for the busy participants and instructors, respectively.

The Penn Flap Course at the University of Pennsylvania was started in 2017 and is an annual weekend course focused primarily on dissections and techniques pertinent to locoregional and free- flap reconstruction of the torso/trunk, head and neck, upper/lower extremities, and breast. Teaching methods include didactic lectures, case presentations, and most importantly cadaveric flap dissections. The course is open to residents, fellows and practicing surgeons from around the world. The educational goal of this course is to provide an opportunity for participants to observe experts dissect common and complex flaps used in microsurgical practice and understand their utilization through clinical examples. None of these goals and objectives have been neglected by transitioning to a virtual course. However, we do feel that the ability to feel and handle the tissues during the dissections is an important aspect that facilitates learning, and this will be difficult to replace. Further, the well-known "see one, do one" method of teaching will need to find a place virtually – typically, an instructor would perform and teach a flap dissection for instance on one limb, and immediately following the participants perform the same dissection on the contralateral limb for reinforcement of basic principles. Perhaps this could be done virtually as well in the future, as the instructor observes and guides by viewing online.

The need for improved education related to microsurgical principles and flap dissection is becoming an increasingly important topic and virtual interactive sessions will continue to have a role. Interspersed through the course are case presentations and lectures that reinforce integration of anatomic knowledge and reconstructive technique with their clinical implementation. As part of plastic surgery residency and micro and hand surgery training, it has been suggested that using a cadaveric laboratory to familiarize residents with the dissections used in procedures can safely facilitate competency prior to operating on a patient. The presented virtual flap course provides a combination of approaches including didactics and cadaver dissections with internationally renowned instructors of various reconstructive domains. This virtual reality era has allowed us to take, on the shoulders of giants, huge steps forward. Despite the challenges of the Covid pandemic, we are forging ahead to educate the next generation of microsurgical leads. Future trainees will look back on events today, both in society and the world of surgery, and reflect on the continuum of progress and current challenges that remain to be solved. As much as we are excited about this new method of teaching, we look forward to hopefully seeing and meeting all participants in-person again

Journal of Reconstructive Microsurgery

Bernard T. Lee, MD, MBA, MPH, FACS
Editor-in-Chief, JRM
Editor-in-Chief, JRMO

Welcome from the Journal of Reconstructive Microsurgery!

We have had a successful year at the journal with exciting papers from a variety of fields in microsurgery. There are a few new developments from the Journal including a new collaboration with the International Microsurgery Club. This IMC-JRM collaborative effort sponsors a monthly virtual journal club for authors to present a chosen manuscript and answer questions from the readership. This highlighted paper is available free for the month to encourage participation. As a reminder, one of the benefits of WSRM membership is an online subscription to JRM. We have had a great response to these educational events, especially during the Covid-19 pandemic as the IMC has over 14,000 active members.

Some other upcoming highlights for the year include two Special Topic Issues. The first is a compilation of the best scientific papers from the WSRM 2019 meeting in Bologna. The second is an issue on Reconstruction of the Lower Extremity with Guest Editors JP Hong and Geoffrey Hallock. We are busy putting the final touches on these two issues and look forward to everyone's feedback.

One final note, we are always looking for members to review papers; please contact our administrative office at jrm-editorialoffice.thieme.com.

Bernie

Bernard T. Lee, MD, MBA, MPH, FACS
Editor-in-Chief, Journal of Reconstructive Microsurgery
Editor-in-Chief, Journal of Reconstructive Microsurgery Open

What's New in Microsurgery: New Options in Practice

Breakthroughs in Robotic Assisted Peripheral Nerve Reconstruction

Lisa Wen-Yu Chen, MD[1], Mei Goh, MD,[2] Raymond Goh, MBBS (Hon), FRACS (Plast)[3],Yin-Kai Chao, MD[4], Jung-Ju Huang, MD, FACS[1], Wen-Ling Kuo,[5] Johnny Chuieng-Yi Lu, MD[1], David Chwei-Chin Chuang, MD[1], Tommy Nai-Jen Chang, MD[1].

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Introduction

Peripheral nervous system (PNS) is composed of motor, sensory, and autonomic nerves.[1] The common patterns of neuropathic injury to the PNS include traumatic rupture or avulsion of the nerve, external compression, viral infection related neuritis, or neurogenic tumor formation.[2,3] Motor nerve reconstruction is the most commonly applied clinically such as brachial plexus reconstruction, facial reanimation, and extremity reconstruction.[4] Sensory reconstruction was thought to be less important as the denervated skin is able to recover gradually by skin-to-skin neurotization from the normal adjacent skin. However, in certain areas such as corneas, tongue, lips, nipples, fingers, toes, and external genitalia, quick return of normal sensation is important to function, therefore nerve reconstruction is recommended. [5-8]

Autonomic nervous system (ANS) has two components, sympathetic and parasympathetic nervous system. ANS modulates superficial body receptors, internal organs, and blood vessels. Superficial body receptors include sweat glands, salivary glands, lacrimal glands, sebaceous glands, ciliary muscles, and hair follicles. Internal organs include brain, cardiovascular, respiratory, gastrointestinal, genito-urinary, and the reproductive and endocrine system. On blood vessels, sympathetic nerves contribute to vaso-

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constriction.[9] One clinical scenario highly relate to this filed is how to reconstruct the sympathetic trunk after endoscopic thoracic sympathectomy (ETS). ETS is thought to be the standard treatment for severe facial blush, palmar, craniofacial, foot and axillary hyperhidrosis by permanently eliminating the thoracic sympathetic trunk.[10] Although effective, it may disorients the balance of the body system and causes many intolerable side effects.[11,12] Therefore, the reversal surgery, sympathetic trunk reconstruction, has been studied and attempted for decades. The results can be variable and not guaranteed under thoracoscopic approach since the local anatomy was complicated, the good quality of nerve stump was not confirmed, and the surgeons lack of microsurgery training to handle the details.[13,14]

Robotic-assisted approaches are a tremendous revolution to modern surgery. Compared to traditional surgery, robotic surgery is considered superior as (1) it is minimally invasive; (2) it allows a magnified three-dimensional high definition visualization of the surgical field (3) endo-wrist instrumentation provides intuitive control; (4) it eliminates physiological hand tremors; (5) it enhanced surgeon console ergonomics; (6) it has a shorter learning curve; and (7) reduce the extent of dissection and surgical time, for better recovery.[u]

Although lacks of haptic feedback and the high price, robotic surgery is still more and more popular in the surgical fields located deep within the body cavity in many specialities.[10,12,16] In microsurgery, it is also a hot issue in recent years. From literatures, microvascular anastomosis, muscle flap harvesting, pedicle dissection, lymph-venous anastomosis have been reported.[15,17] However, the use of robotics in peripheral nerve reconstruction still lacks persuasive evidence. Hereby we present our two innovations in this filed.

1. Sympathetic trunk intervention

The introduction of robotics in sympathetic trunk reconstruction provides three-dimensional vision, higher flexibility of instruments within deep dissections, and delicate manipulation of nerves. In 2016, Connery et al reported three cases of robotic sympathetic trunk reconstruction, two of the cases had improved outcomes.[10] In 2019, Chang et al described a modified technique discussing the coaptation of both the sympathetic trunk and intercostal nerves. Different degrees of improvement were reported at 3-6 months following primary surgery in all seven cases.[11] All the nerve defects were successfully reconstructed with robotic coaptation by end-to-end suturing with sural nerve grafts, none were converted to open surgery. In the Chang et al series, the ruptured intercostal nerves were simultaneously coapted to the nerve graft in either end-to-side or side-to-side fashion, which mimics the ruptured grey and white communicating fibers in normal anatomy. By July 2020, Chang and Chao's teams in Chang-Gung Memorial Hospital in Taoyuan, Taiwan have completed 23 clinical cases, including 20 males and 3 females, with an average age of 40 years old, and an average of 18 years after primary ETS. Most patients had 60-70% improvement of the systemic symptoms within 6 months, recovery time for cases with complicated history was found to be longer. A short follow-up period and limited number of cases may limit the potential significance of the outcome, and positive subjective feedback was provided by patients in both studies, however, this approach is physiologically and technically feasible and the good outcome can be expected in the future.[10,11]

Connery and Chang's studies concluded that the use of robotics in sympathetic nerve reconstruction was superior to conventional approaches. The robotic system provides a minimally invasive approach and delicate microsurgery reconstruction. There is a strong indication for the use of robotics in peripheral nerve reconstruction compared to other fields in peripheral nerve reconstruction as the target surgical field is deep and difficult to access via conventional approaches. (Figure 1A-C)

Figure	Description
1A	Fascicular repair between the first nerve graft and the intercostals
1B	Coapt the second nerve graft to the proximal sympathetic trunk
1C	Schematic diagram of this technique

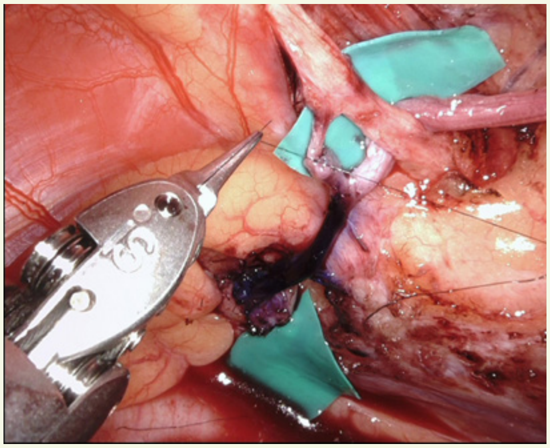

Figure 1A

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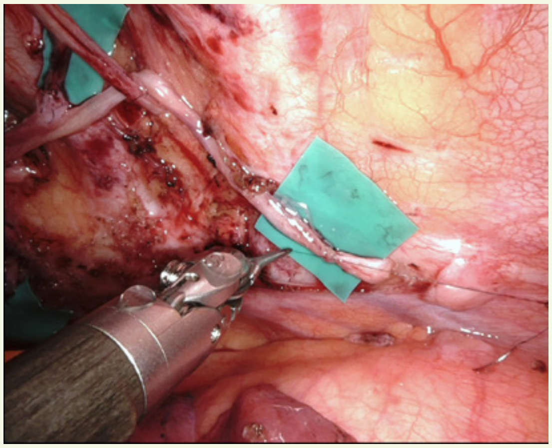
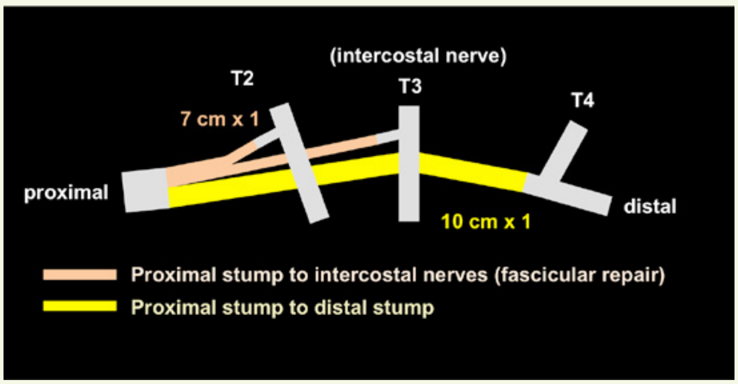


Figure 1B

Figure 1C



2. Peripheral nerve harvest

The most discussed use of robotics in peripheral nerve harvesting is for intercostal nerve. Miyamoto et al demonstrated the telerobotic technique on three porcine models in 2016.[17] There was no conversion to open approach, and no surgical complications reported. They claimed robotic-assisted intercostal nerve harvest could solve the disadvantages of an open approach, such as extensive incisional scar, extensive dissection, pleural damage and thoracic cage deformity.[18,19] Since 2020, the senior author (TNJC) started to use this technique clinically when doing the nipple neurotization by harvesting the main trunk of 4th intercostal nerve and coapted to the stump of the lateral cutaneous branch via 8-0 nylon via the true lateral incision (4.5 cm in length) when the combination of the robotic breast cancer excision and autologous reconstruction by free flap. The 30-degree scope was used in this procedure for the clear visualization of the intercostal space that was easier for the nerve harvest and not rupture to the pleura. The pectoralis major muscle was elevated and the instruments camera can deep into the intercostal space to visualize and elevate the nerve precisely and avoid injuring the pleura. After reached the medial limit the nerve was cut (usually 9-10 cm in length) and the nerve was was coapted to the lateral cutaneous branch of 4th intercostal nerve for elongation, prepared for the nipple neurotization after the flap inset. The whole procedure was smooth without complications, no case refer to open approach. From our experience the intervention of the robot allow the small incision in the autologous breast reconstruction and the functional outcome was satisfied. (Figure 2A-B)

Figure	Description
2A	The nerve dissection via the Robot system from lateral to medial
2B	After the nerve graft (9.5 cm) inteposition and elongation

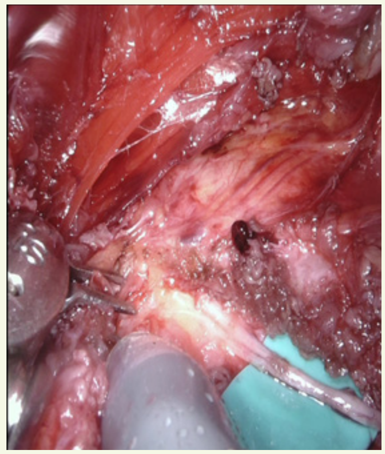


Figure 2A

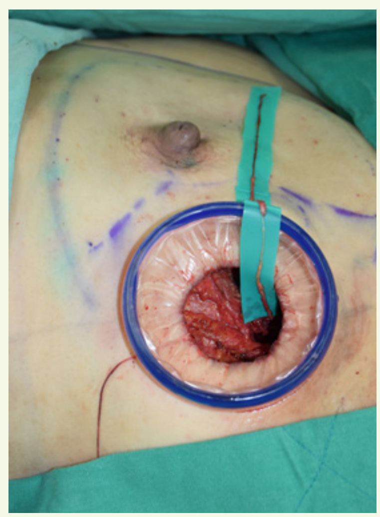


Figure 2B

Discussion

From a review of current literature, the clinical advantage in peripheral nerve surgery is still limited. From the experiences of early adopters, some used robotics instead of a microscopy after open dissection. The aforementioned advantages improve patient outcomes as limited dissections reduces patient discomfort, improves recovery time, and reduces hospitalization time. For surgeons, improved ergonomics reduces physical discomfort, decreasing mental workloads, and enhances surgical quality.[20]

The main factors which prevent the widespread use of the robotic system in peripheral nerve surgery include (1) high cost,[21] (2) lack of dedicated microsurgery instrumentation designed for microsurgery, (3) most peripheral nerve surgeries

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are superficial so direct exploration is straightforward. From literatures, the number of clinical cases documented are low, therefore the benefits of use of robotics is questionable in most conditions. We highlight some possible indications that may be developed in the future.

(1) Brachial plexus reconstruction
The dissection of the brachial plexus is challenging, in particularly the proximal spinal nerves close to the spinal cord, and retro-clavicular nerves. The use of the robotic approach may reduce the size of incision, allow ease of identification of anatomical landmarks, access structures in difficult to access locations, and prevent damage to surrounding structures, and prevent the need for an osteotomy of the clavicle.[22]

(2) Deep areas of the body (thoracic cage, retroperitoneum)
Thoracic cage and retroperitoneum are currently commonly explored by robotic systems. In thoracic cage, not only sympathetic trunk, the intervention of phrenic nerve, intercostal nerve, decompression of thoracic outlet, and neurogenic tumor approach are the possible indication. In retroperitoneum, robotic-assisted nephrectomy/lymphadenectomy, hysterectomy and lumbar sympathectomy are widely performed,[23-25] however robotic-assisted nerve surgery is still rare. Many studies have discussed nerve-sparing techniques in robotic-assisted prostatectomies, however robotic nerve interventions such as pudendal nerve reconstruction after oncological resection, or complicated neurogenic tumor excisions, nerve decompression, are rarely discussed. These fields are potentially areas to develop.

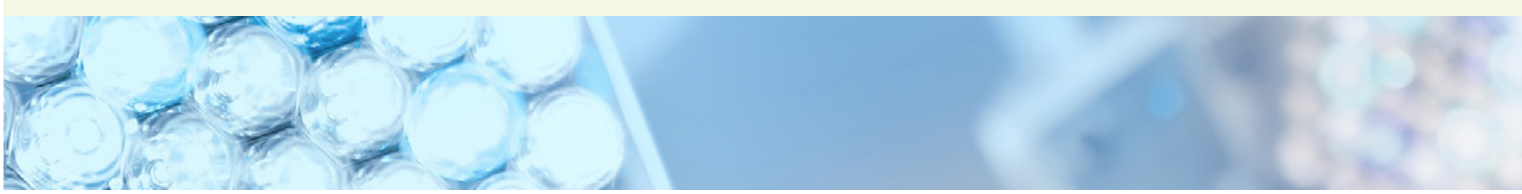
(3) Combined surgery with other specialties
Combined cases with other surgical specialties to perform various robotic-assisted surgeries at the same time. As the use of robotic systems are in high demand, it may be financially beneficial to perform robotic-assisted surgeries as combined cases. For example, robotic-assisted intercostal nerve harvest surgery for nipple neurotization accompanied with robotic-assisted breast cancer resection and reconstruction. This also provides avenues for cross-education and collaboration across different surgical disciplines with the use of the robotic systems.

Conclusion

Robotic-assisted surgery is still in the early stages of development for its use in peripheral nerve surgery. There have been many documented cases with positive results. We believe the use of the telerobotic system in the field of peripheral nerve surgery will develop to become increasingly popular in the future and provide solutions to challenging circumstances which arise from traditional approaches.

Reference

1. Felten DL, O'Banion MK, Maida MS. *Netter's Atlas of Neuroscience*. 3rd ed. Philadelphia: Elsevier; 2016:153-231.
2. Bouche P. *Handbook of Clinical Neurology*, Vol. 115: Elsevier; 2013:311-366.
3. Siao P, Kaku M. A Clinician's Approach to Peripheral Neuropathy. *Seminars in Neurology*. 2019;39:519-530.
4. Chuang DC. Adult brachial plexus reconstruction with the level of injury: review and personal experience. *Plast Reconstr Surg.* 2009;124:e359-369.
5. Brunelli GA., Brunelli F, Brunelli GR. Microsurgical reconstruction of sensory skin. Ann Acad Med Singapore. 1995;24:108-112.
6. Koaik M, Baig K. Corneal neurotization. *Curr Opin Ophthalmol*. 2019;30:292-298.
7. Mucci SJ, Dellon AL. Restoration of lower-lip sensation: neurotization of the mental nerve with the supraclavicular nerve. *J Reconstr Microsurg*. 1997;13:151-155.
8. Overgoor ML, de Jong TP, Kon M. Restoring tactile and erogenous penile sensation in low-spinal-lesion patients: procedural and technical aspects following 43 TOMAX nerve transfer procedures. *Plast Reconstr Surg.* 2014;134:294e-301e.
9. Gibbins I. Functional organization of autonomic neural pathways. *Organogenesis*. 2013;9:169-175.
10. Connery CP. Reconstruction of the Sympathetic Chain. Thorac Surg Clin. 2016;26:427-434.



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12. Bryant AS, Cerfolio RJ. Satisfaction and compensatory hyperhidrosis rates 5 years and longer after video-assisted thoracoscopic sympathotomy for hyperhidrosis. *J Thorac Cardiovasc Surg*. 2014;147:1160-1163.e1161.

13. Purves D, Thompson W, Yip JW. Re-innervation of ganglia transplanted to the neck from different levels of the guinea-pig sympathetic chain. *J Physiol*. 1981;313:49-63.

14. Telaranta T. Secondary sympathetic chain reconstruction after endoscopic thoracic sympathicotomy. *Eur J Surg. Supplement*. 1998:17-18.

15. Liverneaux PA, Berner SH, Bednar MS, Parekatti SJ, Mantovani Ruggiero G, Selber JC. *Telemicrosurgery: robot assisted microsurgery*: Springe; 2013.

16. Panchulidze I, Berner S, Mantovani G, Liverneaux P. Is haptic feedback necessary to microsurgical suturing? Comparative study of 9/0 and 10/0 knot tying operated by 24 surgeons. *J Hand Surg Asian Pac*. 2011;16:1-3.

17. Miyamoto H, Serradori T, Mikami Y, et al. Robotic intercostal nerve harvest: a feasibility study in a pig model. *J Neurosurg*. 2016;124:264-268.

18. Kovachevich R, Kircher MF, Wood CM, Spinner RJ, Bishop AT, Shin AY. Complications of intercostal nerve transfer for brachial plexus reconstruction. *J Hand Surg Am*. 2010;35:1995-2000.

19. Pondaag W, Malessy MJ. Intercostal and pectoral nerve transfers to re-innervate the biceps muscle in obstetric brachial plexus lesions. *J Hand Surg Eur* Vol. 2014;39:647-652.

20. Lee MR, Lee GI. Does a robotic surgery approach offer optimal ergonomics to gynecologic surgeons?: a comprehensive ergonomics survey study in gynecologic robotic surgery. *Gynecol Oncol*. 2017;28:e70.

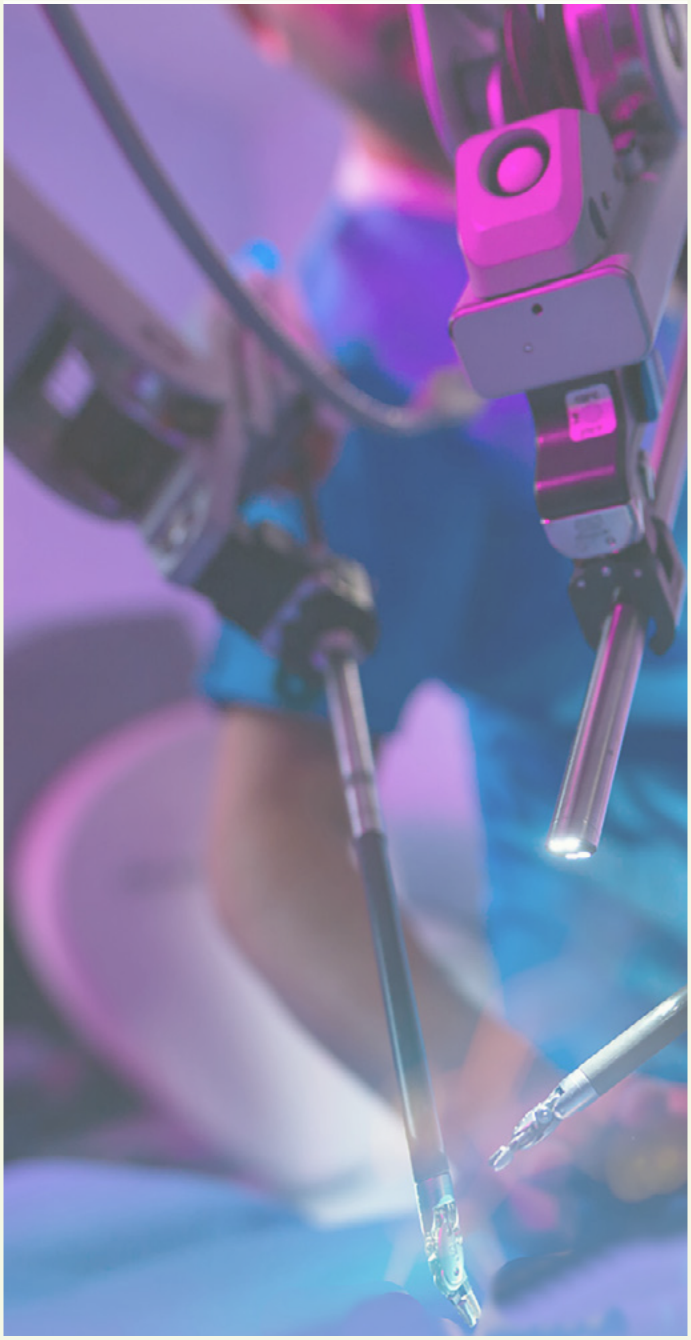
21. Tan YPA, Liverneaux P, Wong JKF. Current Limitations of Surgical Robotics in Reconstructive Plastic Microsurgery. *Front Surg*. 2018;5:22.

22. Garcia JC Jr, Lebailly F, Mantovani G, Mendonca LA, Garcia J, Liverneaux P. Telerobotic manipulation of the brachial plexus. *J Reconstr Microsurg*, 2012;28:491-494.

23. Sen I, Agarwal S, Tharyan P, Forster R. Lumbar sympathectomy versus prostanoids for critical limb ischaemia due to non-reconstructable peripheral arterial disease. *Cochrane Database Syst*. 2018;4:Cd009366.

24. Porreca A, D'Agostino D, Dente D, et al. Retroperitoneal approach for robot-assisted partial nephrectomy: technique and early outcomes. *Int Braz J Urol*. 2018;44:63-68.

25. Tselos A, Moris D, Tsilimigras DI, et al. Robot-Assisted Retroperitoneal Lymphadenectomy in Testicular Cancer Treatment: A Systematic Review. *J Laparoendosc Adv Surg Tech A*. 2018;28:682-689.



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Summer 2020 – Volume 9/ Issue 2

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