American Society for Peripheral Nerve

Fall 2011 • Volume 1, Issue 2

The Newsletter is a publication of the American Society for Peripheral Nerve. Views expressed by various authors are not necessarily those of the ASPN.

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Ivica Ducic, MD, PhD

Message From the President

Dear Colleagues,

As ASPN President, I appreciate the opportunity and the privilege to help guide the American Society for Peripheral Nerve over the past 10 months. Since the upcoming 2012 meeting in Las Vegas is only few months away, I wanted to share with you several important highlights.

As we announced earlier this year, we switched our organizational management support from SAMS (American Society for Plastic Surgery's Specialty Association Management Services) to Medical Association Management (MAM). Ms. Krista Greco and her wonderful MAM team have undertaken rather extensive task of transitioning all management activities. Although transitions may be challenging, as ASPN President interacting nearly on a weekly basis with MAM, I wanted to thank them for a very professional and smooth transition.

ASPN Newsletter, led by Dr. Nash Naam this past year underwent several major improvements including selected personal success stories, clinical views and expert panel case discussions. I do not know if we have enough nice words to thank Dr. Naam and his associated editorial board for keeping and developing the Newsletter into a currently great and interesting professional link for our society members.

I am also pleased to share with you a new and improved website (www.peripheralnerve.org). New features including council photos and a searchable membership directory to make it easy not only for society members but also for patients and general public to get a whole picture of what our society is and stands for. Since this is an ever evolving project, we are certainly most appreciative to all who were and are involved with its development and updates.

As we did in the past two years, considering great interest, our plan is to continue the ASPN/PSEF Combined Pilot Research Grant. It would provide up to $10,000 in start-up funding for beginning researchers in our Society, posing as an important tool for enabling the ASPN to grow in the right direction. Everybody's effort and support is greatly appreciated.

This brings us to the scientific program for the upcoming 2012 AAHS/ASRM/ASPN meeting, taking place in beautiful and never-resting Las Vegas. In collaboration with ASRM and AAHS we continued to work on selecting the best possible speakers for panels and instructional courses, so that across all three societies we will be able to offer and share a great deal of knowledge related to hand, nerve and reconstructive surgery. Presidents and scientific program chairs from both ASRM and AAHS were most helpful in addressing the needs and concerns of our society, proving once again a continued great relationship between our three societies.

I want to thank you again for the opportunity and privilege to serve as ASPN President this year. I look forward to an outstanding 2012 Las Vegas meeting and welcome all of you to come there.

Ivica Ducic, MD, PhD
ASPN President

From the Editors Desk

Advances in peripheral nerve research in the last 4 decades opened the door to peripheral nerve surgeons to choose from several available options to treat nerve injuries. The culmination of the research worldwide is bearing fruits now in the choices for surgical reconstruction of nerve injuries. This is no more evident than in the case presentation of this issue of the newsletter. You will see that our panelists suggested different methods of treatment to manage the same problem. The section of Case Presentation generated a great deal of excitement amongst our readership. Please feel free to send me any interesting or challenging case to be included in the Case Presentation section.

The integration of basic and clinical research is also evident in this issue of the newsletter as you will find a nice mix of exciting basic and clinical research articles from Paul Cederna's work on "Bio - Artificial neuromuscular junction" to Chris Novak's article on cold intolerance, to Dr. Rosenwasser group's investigation of rat sciatic nerve regeneration. Also a new section of Book Review has been added. As our first reviewer, Dr. Allan Belzberg shares his insight on Tom Brushart's new book "Nerve Repair".

The exciting integration of basic and clinical research will be the hallmark of our next annual meeting in sleepless Las Vegas in January 2012. I add my voice to that of our president Dr. Ducic in inviting all of you to Las Vegas as the scientific program promises to be very much as exciting as it is informative.

Your feedback is critical to the development and the progress of this newsletter. The newsletter is YOURS!! So your participation is vital to the success of the newsletter's mission.

I would like to extend my deep thanks and appreciation to all of you who contributed to this edition. A special thank you is also extended to Mrs. Alice Romano who continues to dedicate all her unlimited energy, enthusiasm and expertise to the production of this newsletter.

I would welcome all your comments, suggestions, critiques and criticism. Please stay connected.

Thank you

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Future ASPN Meetings

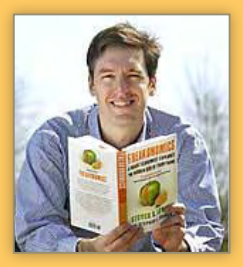
2012 Annual Meeting
January 14-15, 2012
Red Rock Casino Resort & Spa
Las Vegas, Nevada

2013 Annual Meeting
January 11-13, 2012
Naples Grande Resort & Club
Naples, Florida

2014 Annual Meeting
January 10-12, 2014
Grand Hyatt Kauai Resort & Spa
Kauai, Hawaii

2015 Annual Meeting
January 23-25, 2015
Atlantis Resort & Casino
Paradise Island, Bahamas

2012 Annual Meeting Keynote Speaker



Professor Steven Levitt has agreed to be the AAHS-ASPN-ASRM 2011 distinguished keynote speaker.

Professor Steven Levitt is the author of the bestselling book, Freakonomics, and Superfreakonomics and is the William Ogden Professor of Economics at the University of Chicago. He is also a contributing author to the NY Times with his weekly blog, Freakonomics which has also been turned into a movie. ■

A prosthetic hand better than Luke Skywalker's? Researcher says it's possible

A University of Michigan researcher says he's developing something even better for amputees who've lost the all-important important human extremity.

In the future, users of a real-life bionic hand could be able to control it in much the same way they would control a human hand. But unlike Luke's, it will also be able to feel, said Paul Cederna, plastic surgery professor and associate surgery chief at the University of Michigan Health System.

Cederna said prosthetic hands have been around for a long time, and many recipients still like to use a hook. There are high-tech devices out there, too, he said, various incarnations of mechanical hands.

"But there's no great way to control them to provide fine digital dexterity. "

He's talking about the kind of dexterity that would allow a person to stretch the prosthetic hand, or play the piano, or type on a keyboard. That would require interface between the brain's peripheral nerve signals, which carry the brain's instructions on how to move, and the prosthetic device. And then to feel, sensory nerves in the prosthetic hand would need to communicate messages back to the brain so that it could recognize feelings like warmth associated with a loved one's face, a light touch or a pin prick, Cederna said.

Amputees still have all the nerves in their residual limb that carry the same information they used to carry. That information stops where the amputation begins.

In Cederna's hand, signals coming down a nerve assigning an action to move a thumb would be fed to a prosthesis, which would then move its thumb. And because researchers plan to perfect the interface by regenerating muscle, instead of bothering the nerve, the idea is the hand would be good for long-term use, say 60 years or so.

Flickr Commons photo

He hopes to move the research to human trials in the next three years. Now, researchers are studying and monitoring signals from the peripheral nerves in rats and decoding them, so those signals would be ready to feed to a prosthesis if the rat had one.

Cederna's research is being funded by the Department of Defense, which is also responsible for taking care of active duty personnel who have lost limbs in combat situations. The Army Research Office is also providing funding. If he proves in animal trials that the project has long term sustainability, more federal funding could come his way. ■

Juliana Keeping is a health and environment reporter for AnnArbor.com. Reach her at julianakeeping@annarbor.com or 734-623-2528. Follow Juliana Keeping on Twitter

U-M Device Offers New Hope For Amputees

Dr. Paul Cederna's
Bio-Artificial Neuromuscular Junction

The warmth from holding a child's hand in yours or the security of feeling your feet planted firmly on the ground-these are experiences so common, so ordinary for most of us we take them entirely for granted. But for the 1.7 million people living without a limb, these simple experiences are what many miss most. Now, a groundbreaking new device created by surgeons at the University of Michigan holds the promise to restore limb function and sensation for amputees by connecting a sophisticated robotic prosthesis directly to the peripheral nerves.

Called a "bio-artificial neuromuscular junction," the new device combines muscle tissue with an organic polymer to connect severed nerves to a prosthetic limb. "The nerves in an amputated arm or leg remain connected to the brain, so the brain forever will continue to send signals down those nerves, trying to tell the hand or foot what to do, even if the hand or foot isn't there," says Dr. Paul Cederna, U-M Professor of Plastic Surgery and lead researcher on the project. "With our technique, we're connecting these nerves to our device-the nerves send signals that communicate with the prosthesis, which then operates just like a normal hand."

Dr. Cederna's team isn't the first to try and tackle this complex problem. In fact researchers across the globe have been working for years to figure out how to make prosthetic limbs function like a normal arm or leg. But to date, none have provided a realistic long-term solution.

One of the main challenges is creating a device with staying power. The body ultimately rejects foreign material-it builds up scar tissue around metal probes or wires and, over time, the connections stop working. This issue has been a key problem with efforts to implant probes in the brain that transmit signals to a robotic limb-highly sophisticated technology that has been shown to work, short-term, in animal studies.

Cont'd on pg 4 ▶

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The problem is these kinds of technological solutions don't last-they're artificial and the body knows it. Most people don't want to risk brain surgery if their prosthesis will only work right for a few years," adds Dr. Brent Egeland, plastic surgery resident and lead author of the team's findings, which were recently published in The Journal of Plastic and Reconstructive Surgery.

To avoid this issue, Dr. Cederna's team harvests muscle cells from the patients themselves and grows them in culture. The muscle cells are then transferred to a scaffold coated with an organic polymer called PEDOT, which conducts electricity. The whole device is then assembled together and attached to the end of a severed nerve. The device converts instructions from the nerve to an electronic signal that wirelessly controls the prosthesis.

"Because the device uses muscle tissue as its anchor, the nerve actually grows into it and reinnervates the muscle cells-just as it would if it were attached to a normal arm or leg," adds Cederna. "After a few weeks, the nerves establish connections with the muscle cells and stabilize. In the end, we have long-term connection of nerve to muscle."

So far, the peripheral nerve interface has remained stable for more than 18 months and counting in animal trials. "The connection is stable and the electrical signals out of these devices are extremely reliable. The typical rat lives to around two years, so already our device has lasted for nearly 75 percent of its life. Obviously, the real test will be how long they last in humans," says Cederna, who is optimistic human trials will start within three years.

"The biggest hurdle we have in front of us is securing approval for use in humans, but Iím extremely hopeful that process will go smoothly. We have been careful to select biologic components for our device with minimal to no risk to the patient. Everything except the electroconductive polymer we're using is material that is already approved for use in humans," adds Dr. Egeland.

If ultimately successful, the new device in combination with a highly sophisticated robotic prosthesis, such as the DEKA Arm being developed by noted inventor Dean Kamen would revolutionize treatment options for amputees.

"Prosthetic legs have come a long way, but arms haven't fundamentally changed since World War II. They are still primarily mechanical devices like the old ones, with fixed hooks or hooks that open and close. Now they have prosthetic hands that look like hands, but they don't enable fine motor control or provide any ability to play the piano, type on a typewriter, or perform other tasks that require fine motor control. They also don't give any sensory feedback, so there is no sense of temperature or pressure," says Cederna.

If connected to a high-tech prosthetic device equipped with sensors in the fingertips, Dr. Cederna's device would convert signals in the prosthesis into an electrical current that would feed into the sensory nerves and deliver that sensation back to the brain, so then the brain knows what the prosthesis is feeling.

"Really, the only limit would be how high-tech this prosthesis can be. If they can put a pressure transducer and light touch sensors in the prosthesis, someone might be able to reach down, grab a cup of hot coffee in a Styrofoam cup and pick it up without dropping it because they can feel how much pressure they have on the Styrofoam cup without crushing it. Even more exciting would be the ability to reach down and grab their child's hand, feel the warm touch of the hand, and not hurt the child by closing the hand too tightly," adds Cederna, clearly enthusiastic about
his work.

"Most of my patients are laborers-they're contractors or farmers. They can use hooks to get their heavy work done, but they cant hug their kids the way I can hug mine. If our new device can give them that...well, it would be amazing," says Cederna.

Nearly one out of every 200 people in the U.S. has an amputated limb, and more than 185,000 new amputations are performed every year. Dr. Cederna's research is currently being funded, in part, by a Department of Defense, Multidisciplinary University Research Initiative Grant. To learn more, read the team's paper, In Vivo Electrical Conductivity Across Critical Nerve Gaps Utilizing Poly(3,4-ethylenedioxythiophene)-Coated Neural Interfaces in the Journal of Plastic and Reconstructive Surgery. ■

McCabe Fulbright Award

Steve McCabe, MD, past president of the ASPN has been awarded a Fulbright award to teach and perform research in Italy in 2012.

He will teach Research Methodology for a semester at the University of Siena. This region of Italy is home to a an active research group for carpal tunnel syndrome and peripheral nerve compression.

CIHR Operating Grant Announcement

Congratulations to ASPN members Tessa Gordon and Greg Borschel who recently had their federal grant proposal, "Improving functional recovery after peripheral nerve injury" funded by the Canadian Institutes of Health Research (CIHR Operating Grant). In this three year project, they plan to study the effect of using small numbers of donor axons to reduce the effects of chronic denervation in a rat model.

Case Presentation:

Presenter: Thomas Tung, MD

Panelist: Allan Belzberg, MD, Ph.D; A. Lee Dellon, MD, Ph.D; Jin Bo Tang, MD; Gregory H. Borschel, MD

A 29 year old right hand dominant male patient sustained a laceration of the left volar proximal forearm on a large piece of glass about 1 month ago. He was treated at a community hospital where his wound was washed out and closed. The lacerated muscle was reapproximated and the surgeon dictated that he thought the ulnar nerve was transected and he approximated it loosely. The patient was therefore referred for further management.

On physical examination he has a well healed oblique forearm scar, and complete ulnar motor and sensory deficit. At reexploration the ulnar nerve is adherent to surrounding muscle and neuromatous proximal and distal stumps joined through gross scar tissue.

Points for Discussion:

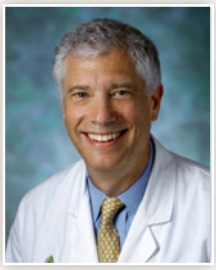
1. Primary repair or graft

2. Transpose ulnar nerve at elbow?

3. Decompress Guyon's canal?

4. Will intrinsics reinnervate in time?

5. Consider distal AIN nerve transfer at re-exploration, or later?



Allan Belzberg, MD, Ph.D

The first point to make is that you went ahead and re-explored the wound. That is something that not all nerve surgeons would have done. Yet, it was critical to do in this case as clearly the primary nerve repair that had been performed did not have much hope for a functional recovery. In general when I have any doubts about surgery performed elsewhere, I tend to re-explore early.

The goal on the current surgery is to get an end to end tension free repair. By doing a transposition of the ulnar nerve, this does not necessarily shorten the length…I tend to mobilize proximal and distal as possible (without damaging small muscle branches) and see if a tension free repair can be achieved. If the transposition helps with length then I will do it, but it really depends on the proximal end location. I would likely add a decompression at Guyon's canal to put the nerve in the best possible position for axonal growth and recovery

If a gap is present, I would use sural nerve graft. I would not consider a tube. The prognosis for recovery even of some intrinsic is still reasonable. Would not consider a AIN distal transfer unless there was a problem performing the ulnar nerve repair. Would want to see an advancing Tinel's sign post repair.

I Would go with aggressive ROM exercises for the hand to maintain he joints and ligaments.

A. Lee Dellon, MD, Ph.D

I would:

1. Under the concept that for best nerve regeneration, there can be no proximal or distal sites of compression,

a. Do a submuscular transposition of the ulnar nerve at the elbow at the time of ulnar nerve reconstruction, and **b)** open Guyon's canal.

The effect of a distal site of compression on neural regeneration.

Johnston RB, Zachary L, Dellon AL, Mackinnon SE, Gottlieb L.
J Reconstr Microsurg. 1993 Jul;9(4):271-4;

2. Resect the neuroma, and reconstruct the ulnar nerve with a single large bioabsorbable conduit, leaving a 3 to 5 mm gap between the two ends of the ulnar nerve within in the conduit. My preference is still to use the PGA Neurotube, although I have no financial interest in this device. The patents expired two years ago. It is the only conduit demonstrated by level I evidence to provide better results than a primary repair or a nerve graft.

Cont'd on pg 6 ▶

Continued from pg 5

A randomized prospective study of polyglycolic acid conduits for digital nerve reconstruction in humans.

Weber RA, Breidenbach WC, Brown RE, Jabaley ME, Mass DP.
Plast Reconstr Surg. 2000 Oct;106(5):1036-45;

3. Do the distal "baby sitter' of the terminal motor branch of the AIN into the motor ulnar just above the wrist, as an end to side, AIN into the side of the ulnar motor, using a perineurial window, and do this also at the primary operation.

Nerve transfers: indications, techniques, and outcomes.

Tung TH, Mackinnon SE.
J Hand Surg Am. 2010 Feb;35(2):332-41.

Jin Bo Tang, MD

Professor and Chair, Department of Hand Surgery, Chair, Hand Surgery Research Center, Nantong University, Nantong, China

I will attempt to repair the lacerated ulnar nerve using direct end-to-end suture and transpose the ulnar nerve anterior to the elbow to lessen the tension on the repaired ulnar nerve. I believe that at the time of surgical exploration, i.e., 1 month after trauma, the nerve ends can still be fresh enough for direct repair after careful dissection and resection of scar and neuroma. The wound in the proximal forearm was lengthy, but it was not a crush injury and appears not to involve extended tissue loss. The nerve defect is not likely to be long, though gapping can be obvious due to the delay of nerve repair. Anterior transposition of the ulnar nerve at the elbow would effectively ease the tension. I will not seek to decompress Guyon's canal, and not consider distal AIN nerve transfer at the time of re-exploration, which may be reserved as a later option.

Gregory H. Borschel, MD, Ph.D

I would first transpose the ulnar nerve stumps and if a tension free repair could be performed after debriding the nerve stumps I would perform an end to end repair. If tension remains following transposition then I would use an autologous sural nerve graft.

Regarding the intrinsic muscles, especially if he required a nerve graft proximally, then I would transfer the pronator quadratus branch of the anterior interosseous nerve to the deep motor branch of the ulnar nerve (necessitating release of Guyon's canal).

He would probably recover enough sensory function with ulnar nerve grafting to avoid the need for further sensory reconstruction.

What was actually done?

Thomas Tung, MD

The wound was re-explored as the previous surgeon had stated that he "approximated the nerve loosely" and clearly a good technical repair was not performed. The neuroma was resected but primary repair was not possible. The ulnar nerve was transposed to decrease graft length and reinnervation distance a little, and mimimize chance of cubital tunnel compression after swelling. Guyon's canal and carpal tunnel were released. Cabled nerve graft reconstruction was done with 3 cables using the dorsal cutaneous branch of the ulnar nerve as donor graft. I hesitate to rely on conduits or processed allografts for critical motor reinnervation.

For this case, we also did reverse end-to-side distal AIN to ulnar motor branch as Dr. Dellon suggested, to augment any recovery he may get from the graft reconstruction. This can be seen in a sense as a motor babysitting operation, but the term babysitting is not appropriate as this will be permanent. It potentially provides for some faster reinnervation and Dr. Mackinnon likes to use the term 'supercharging' her motor reinnervation from the graft. It has essentially no donor morbidity, and seems to be a reasonable compromise between the aggressive approach of doing a direct end-to-end nerve transfer, which would preclude any chance of recovery from the graft reconstruction, and not doing any transfer and risking a long denervation time which may preclude successful reinnervation because of loss of motor endplates and atrophic changes.

If the injury were any more proximal, I would have done direct end-to-end nerve transfer. Any more distal I would have relied on my grafts and not done a motor nerve transfer at the primary operation.

Research Grant Committee Report

Congratulations to the 2011 ASPN/PSF Combined Pilot Research Grant recipient **Jacob Alant, M.D.**, from The University of Calgary for his project **"Motor Axon Misdirection in Traumatic Neuroma-in-Continuity Injury."**

The ASPN/PSF Combined Pilot Research Grant is available to young investigators interested in pursuing basic or clinical research related to peripheral nerve disorders. This grant is designed to support early-phase research that potentially will be incorporated into subsequent applications for extramural funding. Applications for the July 2012-June 2013 funding (up to $10,000) are to be submitted via The PSF's proposal CENTRAL grant website no later than **December 1, 2011**.
Visit www.peripheralnerve.org for more information.

Thomas H. Tung, MD
Research Grant Committee Chairperson

Rat Sciatic Nerve Regeneration Using Insulin-like Growth Factor-1 Enriched White Adipose Tissue Flap as a Biologic Scaffold

Ayhan Kilic, MD1; Bukola Ojo, BS2; Rebecca A Rajfer, BS1; Geoffrey Konopka, MD, MPH1; Daniel Hagg, PhD3; Eugene Jang, MS1; Yelena Akelina, DVM1; Jeremy J Mao, DDS, PhD3; Melvin P Rosenwasser, MD1; Peter Tang, MD, MPH1

1. Columbia University, Department of Orthopaedic Surgery, New York, NY, USA
2. Mount Sinai School of Medicine, New York, NY, USA
3. Tissue Engineering and Regenerative Medicine Laboratory, Columbia University College of Dental Medicine, New York, NY, USA

This work was recently presented at the 6th Congress of the World Society for Reconstructive Microsurgery in Helsinki, Finland, June 2011.

Source of Funding: This study was funded by a grant from the Orthopaedic Scientific Research Foundation (OSRF) and suture materials were donated by Angiotech Pharmaceuticals, Inc.

ABSTRACT

Background: White adipose tissue and insulin-like growth factor-1 (IGF-1) have shown potential to enhance peripheral nerve regeneration. We hypothesized that a white adipose tissue flap (WATF) enriched with IGF-1 as an in vivo biologic scaffold would accelerate nerve regeneration in a sciatic nerve crush injury model.

Methods: Forty male Sprague-Dawley rats were divided, in a two-by-two factorial design, into four arms. All rats underwent a crush injury to one sciatic nerve and received a pedicled WATF, controlled local release of IGF-1, both, or no treatment at the lesion area for 4 weeks (Figure 1). The WATF was composed of adipose tissue derived from the inguinal region. IGF-1 was delivered from polylactic-co-glycolic acid (PLGA) microspheres embedded in fibrin gel adjacent to the crush injury. The primary outcome was maximum isometric tetanic force (ITF) of the tibialis anterior (TA) muscle as normalized to the contralateral side. Secondary outcomes included histomorphometric measurements of sciatic nerve sections taken 1mm distal to the lesion, and recovery of TA muscle weight.

Results: At 4 weeks, groups with WATF had a mean of 49.3% recovery of maximum ITF as compared to 39.4% in those without ($p<0.05$). There was a statistically significant 11.3% increase in myelin thickness and 13.1% increase in total axon count in the WATF-only group versus control ($p<0.01$). The TA muscle weights were similar across all groups. Both functional and histomorphometric data suggest that the presence of IGF-1 suppressed the effect of the WATF.

Conclusions: We created a sciatic nerve axonotmesis experimental model in rats, which demonstrated improved function and histomorphometry with the use of a pedicled WATF. IGF-1 does not enhance the regenerative effect of the WATF.

Clinical relevance: Use of a WATF may enhance repair and regeneration of peripheral nerve injuries.

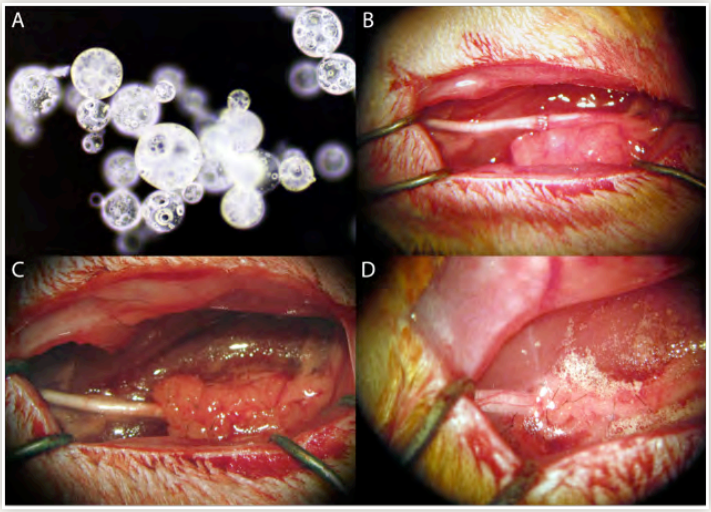


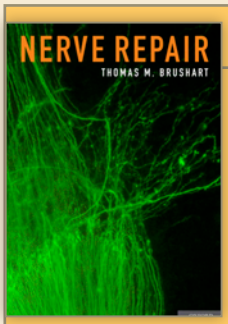
Figure 1:

A. Optical microscope image of lyophilized insulin-like growth factor-1/ polylactic-co-glycolic acid (IGF-1/ PLGA) microspheres at magnification x40.

B. Crush injury model.

C. Crush injury after application of white adipose tissue flap (WATF).

D. Crush injury after application of both WATF and IGF-1/ PLGA microspheres.



Book Review

Thomas Brushart is one of the outstanding clinician-scientists of our times. He has made major contributions to the literature concerning the biology of axonal regeneration. In Nerve Repair, a single authored text, Brushart reviews the published science underlying our understanding of nerve injury and repair. While he is a surgeon, this is not how to manual but rather a why to explanation. He has undertaken a monumental task of reviewing the science of peripheral nerve biology. Rather than producing encyclopedic volumes of data and hypotheses, he distilled the information down to a manageable read complemented with his clinical insights. I enthusiastically recommend this text to those interested in nerve injury and repair, be they a neuroscientist focused on basic science, clinical science, translational science or a peripheral nerve clinician looking for a better understanding of their discipline.

Allan Belzberg MD FRCSC,
Director of Peripheral Nerve Surgery, Department of Neurosurgery, The Johns Hopkins School of Medicine.

2012 ASPN Annual Meeting

Meeting Information:

As they say, "What happens in Vegas stays in Vegas!" Well we know this won't be true of the 19th Annual Meeting of the American Society for Peripheral Nerve! Please join us January 13-15, 2012 at the beautiful **Red Rock Casino Resort & Spa** in Las Vegas, Nevada. We have a fantastic meeting planned and aspire to inspire you with an awesome program of teaching, learning, sharing and networking that you will not hesitate to bring back to your friends and colleagues at home.

Registration NOW OPEN!

AAHS, ASPN and ASRM are offering reduced registration rates on all combination meeting registration. You must register for at least 2 meetings to take advantage of the reduced rates.

Housing

Sleeping rooms are available at **The Red Rock Casino Resort & Spa**. Make a reservation online or contact the hotel directly at **1-866-767-7773** and refer to group code: ASPN. Rooms and rates are limited and will be confirmed on a space available basis **until December 10, 2011 or until the block is full**, whichever occurs first. One night room & tax will be held as a deposit at the time of booking. Upon arrival a credit card will be requested and authorized for room, tax & $100 per day for incidentals. At the time of check out/departure the deposit will be credited toward the final bill and the remaining balance will be charged, any leftover authorization will be released back onto the card used at the time of check in. We encourage you to make your reservation as soon as possible to ensure room rate and availability.

Red Rock Casino Resort & Spa
11011 W. Charleston | Las Vegas, NV 89135
Reservations: 1-866-767-7773
Group Code: ASPN

Las Vegas, Nevada.

Situated in the state of Nevada in the western part of the United States, Las Vegas offers a little fun and adventure for everyone. Only a short ride away from one of the most exciting streets in America, the downtown Las Vegas Strip is recognized around the world for its fine dining, extravagant entertainment, endless shopping, and gaming galore. Nestled in the beautiful desert landscape, the weather promises sunny winter days at around 65° F during the day on average. For valuable information about all things Las Vegas, visit the city of Las Vegas' travel website at **http://www.lasvegasnevada.gov/Visitor/default.htm**.

Red Rock Casino Resort & Spa

A new standard in hotel accommodations in Las Vegas is being set at Red Rock Resort. Whether you're an early-riser or stay-up-all-nighter, the hotel's luxurious Las Vegas accommodations offer a spacious retreat from the action and excitement. And then, there's the view which is simply the best in Las Vegas lodging. Visit **www.redrocklasvegas.com** for more information.

Casino Gaming, Golf, Spa and Attractions

Exciting Las Vegas gambling awaits at Red Rock Resort's state-of-the-art casino. Featuring thousands of games, the casino at Red Rock offers a comprehensive Las Vegas gaming experience that will surely add to this town's gambling legend. From the Keno lounge to the Bingo room to the slots floor, whether you're a high-rolling blackjack pro or cocktail-sipping penny-slots player, there's enough Las Vegas casino gambling action at Red Rock for players of all pluck. Fun-seekers of all ages can play the day away at Red Rock Resort. For outdoorsmen (and women), our resort-style pool and spa, the spectacular Red Rock canyon and championship golf are par for the course. Or find some indoor's Las Vegas family fun at Red Rock's movie theater, bowling center and Kids Quest indoor play area.

2012 Exhibitors

American Society of Hand Therapists
Angiotech
Aptis Medical, LLC
Assi-Accurate Surgical
Auxilium Pharmaceuticals, Inc.
Auxilium Pharmaceuticals, Inc.
AxoGen
Checkpoint Surgical, LLC
Cook Medical
Core Essence Orthopaedics, Inc.
Elsevier (Saunders-Mosby)
Hand Rehabilitation Foundation
Hologic, Inc
Instratek, Inc.
Integra Lifesciences
Leica Microsystems
Lifecell Corporation
Lippincott Williams & Wilkins
Mayo Foundation
Medartis, Inc.
Medical Modeling Inc.
Medlink USA, Inc.
Microsurgery Instruments, Inc.
Orthoscan, Inc.
Osteomed
Plastic Surgery Education Network (PSEN)
Razek Equipamentos Ltda
Skeletal Dynamics
Small Bone Innovations, Inc.
Spectros Corp.
Surgical Acuity, Inc.
Synovis Micro Companies Alliance, Inc.
Synthes CMF
TriMed, Inc
ViOptix, Inc.

ASPN Program Schedule

Friday January 13, 2012

8:00 am - 11:00 am **ASPN Council Meeting**

11:00 am - 11:05 am **President and Program Chair Welcome**
Ivan Ducic, MD, PhD Gedge Rosson, MD
ASPN President Program Chair

11:05 am - 12:00 pm **Joint AAHS/ASPN Panel: Evidence Based Approach to Peripheral Nerve Problems: Things I Don't Do Anymore and How I Do It Now**

Moderator: Dean Sotereanos, PhD
Invited Panelists: Donald Lalonde, MD; A. Lee Dellon, MD; Gregory Buncke, MD; A. Lee Osterman, MD

This panel will take a hard look at evidence-based reasons why some of our senior surgeons have modified their practice over the years.

12:15 pm - 1:30 pm **Scientific Paper Session 1 & Lunch**

1:30 pm - 2:00 pm **Invited Lecture**
Professor Uros Ahcan, MD, PhD
Advances in (Upper Extremity) Peripheral Nerve Surgery

Peripheral nerve surgery in the upper extremity encompasses acute nerve injuries, entrapment neuropathies and nerve sheath tumors.

Patients with peripheral nerve disorders require multidisciplinary care, proper microsurgical technique and constantly updated knowledge from experimental laboratories and basic science. Comprehensive review of options for surgical nerve interventions and the operative techniques used in peripheral nerve surgery of the upper extremity will be outlined.

2:00 pm - 2:15 pm **Break with Exhibitors**

2:15 pm - 3:15 pm **ASPN Instructional Courses**

301 Failed Upper Extremity Nerve Decompressions – What's Next?

Instructors: Allen Van Beek, MD; Gregory Buncke, MD

This course will focus on the controversies between open versus endoscopic techniques of carpal and cubital tunnel surgeries, and highlight the difficulties and experience with complex redo surgeries for failed decompressions.

302 Controversies in Brachial Plexus Surgery

Instructors: Julia Terzis, MD; Allan Belzberg, MD; Howard M. Clarke, MD, PhD

This course will review the relevant anatomy of the brachial plexus and how it is affected in obstretrical, tumor, and post-traumatic surgery. We will review what factors play a role in spontaneous regeneration and how they can be used to predict prognosis. The various surgical options for the typical injuries seen by the peripheral nerve surgeon are highlighted.

303 Targeted Reinnervation

Instructors: William Kuzon, MD; Paul Cederna,

MDAs prosthetics improve, the ability to interface the motor and sensory systems becomes increasingly important. This course will review the anatomy, techniques and goals of targeted muscle in reinnervation and targeted sensory reinnervation.

304 Scratch Collapse Test

Instructors: Lorna Kahn, PT, CHT; Susan Mackinnon, MD

This instructional course describes The Scratch Collapse Test (SCT). The SCT is very useful in evaluating patients with multiple levels of nerve compression and muscle imbalance, and especially in prioritizing multiple neuromuscular problems within the same extremity. It is especially helpful in evaluating difficult neuroma pain patients. This course describes the nuances of the SCT and uses videos of patient exams to illustrate its utility.

305 Management of Peripheral Nerve Tumors

Instructors: Robert Spinner, MD; Martjin Malessy, MD

Advances in management of peripheral nerve tumors have occurred in the past two decades that have improved our diagnosis and treatment of these lesions. This course highlights important developments related to intraneural and extraneural lesions.

3:15 pm - 4:15 pm **Scientific Paper Session 2**

4:15 pm - 5:15 pm **Peripheral Nerve Transplantation**
Moderator: Maria Siemionow, MD, PhD
Invited Panelists: Gerald Brandacher, MD; Thomas Tung, MD

This panel will highlight the advances in Peripheral Nerve Transplantation, both in terms of feasibility of nerve transplantation as a single tissue, and the role of the nerve component in a vascularized composite tissue allograft.

Saturday January 14, 2012

6:30 am - 8:00 am **Breakfast with Exhibitors**

7:00 am – 8:00 am **AAHS/ASPN/ASRM Instructional Courses**

201 Management of Failed Carpal Tunnel Surgery

Chair: A. Lee Osterman, MD

Instructors: Miguel A. Pirela-Cruz, MD; Josh Abzug, MD; Nash A. Naam, MD; Nancy Davidson, MD, TC/L; Carlos Henriguo Fernandes, MD

Failure of symptom resolution after carpal tunnel release or recurrence of pain can be a result of several factors, including incorrect diagnosis, incomplete release or scarring of the nerve.

This course will cover assessment of a patient who has failed carpal tunnel release, indications for repeating surgery and strategies during surgery based on pathological changes found. Non operative treatment and therapy modalities will also be discussed.

202 Carpal Tunnel Syndrome- Update (ABPS MOC)

Chair: Donald H. Lalonde, MD

Instructors: Peter Murray, MD; Ather Mirza, MD; Michael Bednar, MD

Participation in this course can count towards part IV of the ABPS practice improvement modules as part of the MOC for ABPS diplomats if they have uploaded their 10 consecutive cases on the ABPS web site.

The course will cover principles and basic science of carpal tunnel syndrome as well as clinical and neurophysiological assessment. Evidence based outcome studies will be used to compare open and endoscopic surgery.

203 Nerve Transfers vs. Tendon Transfers: Timing, Treatment Options and Post Operative Therapy

Instructors: Thomas Tung, MD; Justin Brown, MD; Christine Novak, PhD, PT

This course will discuss the indications, patient selection and surgical techniques for tendon transfers to restore writ flexion and extension and reconstruction of biceps and triceps muscle function in the upper arm to restore elbow flexion and extension.

This course will also detail the evolving techniques of multiple nerve transfers in the upper extremity. The importance of timing in decision making will be highlighted.

204 Controversies in Management of Complex Regional Pain Syndromes: Surgery vs. Non-Operative Treatment Options and Validated Methods to Study Outcomes?

Instructors: Ivan Ducic, MD; Wyndell Merritt, MD

Neuropathic pain, particularly when CRPS may be involved, can be especially vexing for the peripheral nerve surgeon. This course will discuss both the operative issues and non-operative modalities in the multi-disciplinary care of these patients. Validated methodologies for outcomes studies will be highlighted.

205 Winning the Future: How to Best Train the Next Generation of Microsurgeons

Instructors: Charles Butler, MD; Randy Sherman, MD; Michael Neumeister, MD; J. Brian Boyd, MD

This panel of experts will discuss what they feel is the best way to train future microsurgeons with respect to the current financial constraints and the limitations of the 80 hour work week.

206 Bench to Bedside: Translational Research in Microsurgery

Chair: Geoff Gurtner, MD

Instructors: Terry Myckatyn, MD; Justin M. Sacks, MD

This esteemed panel of scientist will discuss the opportunities of translational medicine and provide the latest knowledge in ongoing translational topics within surgery.

8:00 am - 8:15 am	**President Welcome Steven McCabe, MD Ivan Ducic, MD, PhD Keith E. Brandt, MD** **AAHS President ASPN President ASRM President**
8:15 am - 9:30 am	**Joint AAHS/ASPN/ASRM Panel: Nerve Transfers vs. CTA vs. Robotics** **Moderator:** Gedge Rosson, MD **Invited Panelists:** Susan Mackinnon, MD; W. P. Andrew Lee, MD, FACS; Oskar Aszmann, MD

With significant advances in nerve transfers, vascularized composite allotransplantation, and prosthetics, it is not always clear how these evolving techniques relate. This panel of experts will highlight their experiences with these modalities.

9:30 am - 10:00 am	**Break with Exhibitors**
10:00 am - 11:00 am	**Joint Presidential Keynote Lecture Steven Levitt**

Steven Levitt is an economist who is a brilliant but uncomplicated man who uses simple questions to reach startling conclusions. Though he has no political agenda his theories have set off a firestorm of controversy and has had both conservatives and liberals up in arms. Levitt has shown other economists just how well their tools can make sense of the real world. Winner of the 2004 John Bates Clark Medal, he is currently the William B. Ogden Distinguished Service Professor of Economics at the University of Chicago. He co-authored the best-selling book Freakonomics and its sequel Superfreakonomics.

11:00 am - 12:00 pm	**AAHS/ASPN/ASRM Joint Outstanding Paper Presentations**
12:00 pm -1:00 pm	**ASPN Business Meeting with Lunch (Members Only)**
1:00 pm - 2:30 pm	**Scientific Paper Session 3**

2:30 pm - 2:50 pm **Break with Exhibitors**

2:50 pm - 4:00 pm **Scientific Paper Session 4**

4:00 pm - 4:30 pm **Invited Lecture Tessa Hadlock, MD**
Research in Facial Paralysis

This talk will highlight contemporary clinical challenges in the paralyzed face and research approaches to address them. It will also outline the current state of the art in basic science approaches to maximizing facial nerve regeneration in animal models.

4:50 pm - 5:45 pm **Special Session: Poster Presentations**

6:00 pm - 7:30 pm **ASPN/ASRM Welcome Reception**

Sunday January 15, 2012

7:30 am - 8:25 am **ASPN Instructional Courses**

306 Neuro-Imaging

Instructors: Aaron Filler MD; John Carrino, MD; Allan Belzberg, MD

Clinical practice for managing nerve injuries and entrapments often does not include imaging such as MRI. This course will discuss the evidence on the utility and methodology of nerve imaging with MRI as well as the problems and limitations.

307 Tissue Engineering and Nerve Repair

Instructors: Gregory Evans, MD, FACS; Rajiv Midha, MD

This course will discuss new ideas of bioengineering for the construction of improved artificial nerve conduits. Various types of biomaterials, transplanted cells, and the potential application of stem cells will be explored.

308 Current Approach to Facial Palsy and Future Directions

Instructors: Tessa Hadlock, MD; Rick Redett, MD

Facial reanimation surgery continues to evolve and improve, particularly with the increasing use of alternate recipient nerves. This course addresses the latest techniques for the treatment of incomplete and complete facial paralysis.

309 Controversies in Lower Extremity Compression Neuropathy Treatment, "New" Sites of Compression & Management of Failed Decompressions.

Instructors: A. Lee Dellon, MD; Gedge Rosson, MD

This course will explore the controversies inherent in lower extremity nerve compressions, particularly when the diagnosis of compression overlaps with some other underlying peripheral neuropathy. In particular, "new" and less common sites of compression and their surgical approaches will be highlighted.

310 Painful Peripheral Nerve Injury: Evidencebased Approaches and Validated Methods to Assess Outcomes and QoL

Instructors: Oskar Aszmann, MD; Henk Coert, MD

Surgical management of painful peripheral nerve injuries remains challenging. Join this course to discuss factors predictive of outcome, evidence-based approaches, and validated methods to objectively assess patient's quality of life.

8:30 am - 9:30 am **Scientific Paper Session 5**

9:30 am - 10:00 am **President's Invited Lecture Tessa Gordon, PhD**
Evidence-Based Science Behind the Timing of Surgical Repair of Peripheral Nerve Injuries

Whilst it is well recognized that peripheral nerves can regenerate lost axons after injury, functional recovery is too frequently disappointing. Dr. Gordon

10:00 am - 10:15 am **Break with Exhibitors**

10:15 am - 11:15 am **Joint ASPN/ASRM Panel:**
Reconstructive Challenges: Head to Toe
Moderator: Ivan Ducic, MD, PhD
Invited Panelists: Eduardo Rodriguez, MD; Samir Mardini, MD; James Higgins, MD

Attendees will be exposed to the most challenging reconstructive problems. Encompassing the entire body, the latest problem solving techniques for these complex issues will be discussed and debated.

is a neuroscientist presently working at the Hospital for Sick Children in Toronto, and a Professor Emeritus at the University of Alberta in Edmonton. She will present evidence for progressive deterioration of axon regeneration with time and distance and the potential of brief electrical stimulation to accelerate the outgrowth of axons. Evidence from animal and human studies are indicating promising surgical strategies to promote nerve repair after injury.

11:15 am - 11:45 am **Scientific Paper Session 5**

11:45 am – 12:00 pm **Closing Remarks and Awards**

12:00 pm – 1:00 pm **ASPN Council Meeting**

Nonoperative Versus Operative Management*

A Rationale for Changing Our Lexicon

To the Editor:

Words matter. They matter in many settings, but few would dispute their critical importance in the context of the physician-patient relationship. Why do physicians cling to the arcane and misleading dichotomous parlance of "conservative" versus "surgical" treatment? The following case poignantly illustrates the dangerous pitfalls for a patient when a choice is framed between conservative management and "surgery."

A 73-year-old woman presented to her general practitioner with a 3-month history of paresthesia in her right hand. She reported that she awoke with pain in her hand that responded to shaking and rubbing. On physical examination, there were no motor findings. Sensory examination demonstrated a loss of pinprick in the median nerve distribution. A Tinel sign was elicited on percussion of the median nerve at the wrist. A diagnosis of Carpal Tunnel Syndrome was made and, although a discussion of a surgical option was undertaken, "conservative care" was suggested by the primary practitioner. She was instructed on the use of a wrist splint at night and sent home.

The patient returned 4 weeks later with symptom progression. A nonsteroidal anti-inflammatory was prescribed. The patient returned in 2 weeks with gastrointestinal complaints. A cytoprotectant was added to the regimen. After 10 days, the patient, suffering from diarrhea and lethargy, presented to the Emergency Department where she was diagnosed with dehydration. She was treated with intravenous fluids and discharged home. The patient was readmitted to the Emergency Department 12 hours later with shortness of breath and was found to be in mild congestive heart failure. She was treated with a diuretic and discharged home again.

In follow-up with her general practitioner, some weakness in her hand and atrophy of the abductor pollicis brevis were noted. An electrodiagnostic study was requested, which confirmed the diagnosis of Carpal Tunnel Syndrome. The patient was referred to a rehabilitation medicine specialist for continued conservative care. She was again instructed on the use of night splints as well as some gentle stretching exercises.

The patient's pain continued and she received a steroid injection into the region of the carpal tunnel, which provided 3 weeks of improvement followed by a reoccurrence of significant pain. A second injection was given and she developed immediate pain and weakness in the hand. Ultrasound imaging revealed a small hematoma, and she was told to keep the hand elevated.

The patient self-referred to a surgeon who recommended operative intervention. A surgical decompression of the median nerve was performed under local anesthetic. Operative time was 15 minutes with patient leaving the facility 2 hours after arriving. She wore a bandage for 12 hours and then kept the incision clean and dry. Sutures were removed 10 days after operation, and she was back to full activities 2 weeks later. At her 4 week postoperative follow-up visit, she was found to have complete resolution of pain. There was some numbness and weaknessthat persisted, likely related to the prolonged duration of the nerve compression.

To understand why our medical community frames treatment options in terms of conservative versus surgical, the evolution of surgery as a discipline must be examined. Prior to the turn of the 19th century, a surgeon was a rudimentary practitioner of little formal education, who had learned a trade through a haphazard apprenticeship. A surgeon was only sought out after all other treatment options were exhausted. With no anesthetic agents and no antiseptic techniques, patients suffered crippling pain, a myriad of complications, and an untimely demise. The aura of death surrounded the surgeon, and patients avoided surgery at nearly all costs. There was nothing conservative about the early days of surgery. It was rightfully viewed as a last-ditch effort.

For the surgeon to join the established medical community the following 3 essential aspects needed to be developed: a formal and rigorous system of education, operative anesthesia, and a lowered mortality/morbidity rate. Numerous medical and scientific advances contributed to the evolution of surgery as a discipline but the paradigm truly shifted and success was achieved with the Apothecaries Act of 1815. This called for apprenticeship to be replaced with proper education and sound surgical principles. This was followed by Joseph Listers' antiseptic techniques, which gained a foothold beginning in 1867 (with case reports in 5 successive issues in the Lancet).1 Finally, by the second half of the 19th century anesthetic agents were in widespread use and, ergo, surgery came to earn its rightful place in the medical establishment. At present, surgery is accepted as an integral part of health care management.

With an understanding of this historical perspective, is it any wonder that the medical community subconsciously and unwittingly refuses to shed the partisan lexicon of conservative versus surgical treatment? The connotation of the word conservative conjures up images of "safe," "low-risk," and "nonradical." On the other hand, the word surgical (when juxtaposed with conservative) connotes "harmful," "high-risk," and perhaps "last-ditch." The literal meanings of these words become obscured by the emotional overtones, subjective interpretations, sociocultural values, and historical baggage.

It is imperative that we empower our patients to make informed and objective decisions about their medical treatment options. As the aforementioned case reveals, there are times when conservative management may carry far greater risk than surgical management. The opposite holds true as well: sometimes surgical management carries greater risk than conservative care. Accordingly, we need to reframe the lexicon. We must use terminology that does not carry strong connotative meaning that subconsciously influences our patients' decisions. More neutral words are required. We should stop framing the choice in terms of conservative versus surgical, "invasive," or "nonconservative." Instead, let us use the words "medical management" versus "surgical management," or "nonoperative management" versus

"operative management," because words really do matter to our patients

… and rightfully so. ■

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*This article has been published before in the Annals of Surgery, Volume 252, Number 4, October 2010

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Cold Intolerance After Upper Extremity Nerve Injury

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Cold intolerance may occur with exposure to cold temperatures following traumatic upper extremity injuries and it is an abnormal response which results in pain, sensory alteration, stiffness and/or color changes.1-13 The intensity of symptoms may vary and severe symptoms with poor outcome have been reported in patients with bony, tendon, nerve and vascular injuries.2,4,14-19 Previous studies have shown that painful cold intolerance may persist for many years.4,8,13,19 Symptoms can be particularly difficult in patients who report cold intolerance with exposure to air conditioning and ventilation systems, handling certain materials and cold water immersion because of the increased frequency of symptoms.25 Most of the approaches to minimize cold intolerance include protective strategies to decrease activities in cold temperatures, warm clothing including gloves/mittens and environmental alterations.25 In general, these strategies have directed towards patient comfort with cold exposure.

There is a great deal of variability in the results reporting patient and injury factors related to cold intolerance. Related factors have included smoking, women, crush injuries, replantation injuries, bony injuries, vascular injuries, complex trauma, no sensory return, and post-operative complications.4,5,13,18,21,22 However, conflicting results regarding these factors have been reported in different studies. Irwin et al. reported higher cold intolerance in patients who smoked or had a crush or avulsion injury but the symptoms were not related to age, sex, site of injury, or associated injuries or time to onset of symptoms.8 In a prospective cohort study, Craigen et al. reported increased symptoms in patients with bony injuries.5 In our study of patients with brachial plexus injuries, women reported more cold intolerance although this factor was not retained in the regression model. Similarly, there have also been conflicting results regarding the association between cold intolerance and return of sensation.4,13 Alterations in rewarming patterns, prolonged symptom relief and different brain responses have been reported in patients with cold intolerance compared to control subjects.19,23,24

To investigate the biomedical and psychosocial factors associated with outcome after traumatic upper extremity nerve injury, we evaluated 158 patients who were at least 6 months following injury.17 These patients reported high levels of disability, pain and cold intolerance. The significant predictors of disability were cold intolerance, brachial plexus injury, pain, age, unemployment, time since injury and pain catastrophizing. In our assessment of patients with brachial plexus nerve injury (median time from injury 14 months), we found substantial cold intolerance.20 There were 61 patients (41 men, 20 women) with a mean age of 40 years (sd 17 years). Assessment included patient reported questionnaires: Cold Intolerance Severity Scale (CISS), short-form McGill Pain Questionnaire (sfMPQ), SF-36, Disabilities of the Arm, Shoulder and Hand (DASH), Pain Catastrophizing Scale (PCS) and Post-traumatic Stress Disorder Checklist (PCL-C). The mean ± sd scores were: CISS 34 ± 26, DASH 52 ± 19, PCS 15 ± 14, PCL-C 36 ± 15, VAS pain intensity 4.4 ± 3.2 and SF-36 physical 39.2 ± 9.1 and mental 43.4 ± 13.7 composite scores. Bivariate analysis indicated that the CISS was significantly higher in women ($p < .05$) and correlated with the McGill pain rating index ($r = .50$), pain intensity ($r = .47$), DASH ($r = .33$), PCS ($r = .27$) and PCL-C ($r = .23$). The final regression model (dependent variable CISS scores) accounted for 33% of the variance with the following variables; McGill pain rating index (Beta = .406, $p < .001$), DASH score (Beta = .268, $p = .04$) and time since injury (Beta = .268, $p = .03$). The scores from the PCS and PCL-C and geographic location were not retained in the final regression model, which indicated that these factors were not significantly related to cold intolerance as measured by the CISS. However, pain and disability were significant predictors of cold intolerance (CISS scores) in these patients with brachial plexus injuries.

Cold intolerance is a complex clinical problem that has been associated with high levels of morbidity in patients following upper extremity trauma. Recognition of the factors related to the onset and persistence of symptoms will assist in identifying the modifiable factors which may be targeted and lead to efficacious treatment approaches. ■

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