

The **21st** Annual Advanced Interventional

Pain Conference

and **Practical Workshop** with Fluoroscopic and
Ultrasound Guided Techniques

Developments in Neuromodulation

29-31 August, 2016

Budapest, Hungary



The **32nd FIPP**
Examination

1 September, 2016

Budapest, Hungary

**Program
Book and
Syllabus**

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GREETINGS

Dear Friends,

Our program, the 21st Annual Advanced Interventional Pain Conference and Practical Workshop in Budapest Conference, reflects significant changes, developments and recognizes the needs in evolutionary trail. Traditionally over the last twenty-one years, this program developed into the best in this field. The clinical relevance is able to attract the finest speakers just like you will observe. Our emphasis is improvement with increased safety and better quality treatment of patients suffering from intractable miserable chronic pain. Neuromodulation is evolving in producing more evidence, improved technology and surprising new treatments and modalities for conditions that one would never have expected.

In order to meet this need, we are adding 3 extra fresh cadaver stations, including 1 to focus on dorsal root ganglion (DRG) stimulation. Participants interested have a chance to learn how to place durable electrodes of any of our neuromodulation sponsors. The program has been put together following a lot of consideration by the program committee and Dr. James E. Heavner who left us very unexpectedly after we completed this program. DRG stimulation and function is one of the main emphasis where significant clinical experience and teaching will mesh with the practical opportunities of the participants.

Effective treatment in chronic pain, central pain, neuropsychiatric disorders, peripheral and central painful conditions is becoming realities. One inescapable fact is that interventional pain works and saves lives from unnecessary misuse and overuse of opioids. The surprising long term favorable outcomes and reduction in surgical interventions in spinal disorders is coming from multiple studies, laboratory and clinical studies in the field. We are fortunate to have one of the leaders Dr. Anthony Yeung in minimally invasive surgical procedures. First opportunity to hear about high frequency stimulation by Dr. Adnan Al-Kaisy and his new experience with DRG stimulation as well as Dr. Robert Levy and Dr. Marshall Devor will enlighten us about the new and exciting revelations and basic sciences of the DRG.

Ultrasound guidance is gaining wider use and acceptance and we are happy to see that the opportunity is there for our participants to take part in the educational process for the second year in a row at our Budapest Conference. In the awards ceremony, we shall not only recognize the new graduates of WIP's FIPP Examinations but also graduates of the CIPS Ultrasound Examination. For the second year in the row, we shall recognize two of the great for the Trail Blazer Award, Dr. John Loeser and Dr. James E. Heavner.

The FIPP Examination for the major part came out of our initial use of cadavers 34 years ago at Texas Tech University Health Sciences Center in Lubbock, Texas. The numbers of FIPP graduates is close to 1,000 and the respect and credibility together with the pride of those who successfully completed the process is spreading worldwide.

We are ever so grateful to our sponsors who help to maintain the quality and integrity of the program. Every year we have to earn the quality stamp of approval as evidenced by the participants coming from so many countries. Budapest has the culture, climate, food, music and the ambiance where you make friends and keep friends. One of the hallmarks is that every single participant leaves with more knowledge for better and safer patient care.

I have to thank the local arrangement chairperson, Dr. Edit Racz, and the committee. The Scientific Program Committee with the wisdom and vision of Dr. James E. Heavner have succeeded in putting together an outstanding program. We are grateful for the leadership of Dr. Kris Vissers, our WIP President along with the Executive Committee, the Section Chairs and all the members who come to participate. The Ultrasound Program has been in cooperation with Dr. Agnes Stogicza and Dr. Michael Gofeld. The program reflects that the faculty themselves are leaders in their field as well as WIP. The planning of the local arrangements through the local arrangement committee and Sandra Vamos and Bea Golovanova with Congressline has always been outstanding. The WIP office staffs of Dianne Willard and Mark Tolliver and the volunteers that make the process work are all appreciated, especially Paula Brashear, my long-time secretary.

We look forward to seeing you in Budapest.

IT'S NEVER TOO LATE; YOU CAN SIGN UP AT THE DOOR!

Gabor B. Racz, MD, DABIPP, FIPP
Program Director
Grover E. Murray Professor,
Professor and Chairman Emeritus at TTUHSC
Founder and Past President WIP
Member of WIP Executive Board

WIP Council

Executive Board

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Dianne L. Willard, Executive Officer – USA

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Meir Bennun, MD, FIPP – Israel

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Peter G. Courtney, MBBS, FIPP - Australia

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Pauline Du Plessis, MD, FRCA, FIPP – Africa

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Magdi Ramzi Iskander, MD, FFARCS, FIPP – Middle East

Edvin Koshi, MD, FRCA, FIPP – Canada

Sang Chul Lee, MD, PhD, FIPP – NE Asia

Martin Marianowicz, MD, FIPP – Central-Eastern Europe

Philippe Mavrocordatos, MD, FIPP – Switzerland

Patrick R. McGowan, MBChB, FRCA, FIPP, FFPMRCA – UK

Nuri Süleyman Özyalçın, MD, FIPP - Turkey

Edit Racz, MD, FIPP - Hungary

José R. Rodríguez Hernández, MD, FIPP – Puerto Rico

Mehran Kouchek, MD, FIPP - Iran

Irene K. Kouroukli, MD, PhD, FIPP – Mediterranean

Jan Van Zundert, MD, PhD, FIPP – Benelux, Belgium

Frank J.P.M. Huygen, MD, PhD, FIPP – Benelux, Netherlands

Alex Sow Nam Yeo, MD, PhD, FIPP – SE Asia

Board of Examination

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Psychometrician

Gerald A. Rosen, MA EdD

Congress Organizers

Program Director: Gabor B. Racz, MD, FIPP

Co-Director: James E. Heavner, DVM, PhD, FIPP (Hon)

Local Arrangement Committee Chair

Edit Racz, MD, FIPP

Agnes Stogicza, MD, FIPP, CIPS

Lorand Eross, MD, PhD, FIPP

Scientific Planning Committee

Adnan Al-Kaisy, MD, FIPP

Fabricio Dias Assis, MD, FIPP

Richardo Ruiz-López, MD, FIPP

Sang Chul Lee, MD, FIPP

Ultrasound

Agnes Stogicza, MD, FIPP, CIPS

Michael Gofeld, MD, FIPP, CIPS

In Memoriam

P. Prithvi Raj, MD, FFARCS, DABPM, FIPP
(September 13, 1931 – February 27, 2016)

WIP Founder and Past President

James E. Heavner, DVM, PhD, FIPP (Hon)
(April 25, 1944 – May 18, 2016)

Faculty

Adnan A. Al-Kaisy, MB, ChB, FIPP (UK)

Mert Akbas, MD, FIPP (Turkey)

Javier de Andres, MD, FIPP (Spain)

Hemmo Bosscher, MD, FIPP (USA)

Aaron Calodney, MD, FIPP (USA)

Kenneth B. Chapman, MD, FIPP (USA)

Miles Day, MD, FIPP (USA)

Chris Declerk, MD, FIPP, CIPS (Belgium)

Lee Dellon, MD, PhD (USA)

Marshall Devor, PhD (Israel)

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Lorand Eross, MD, PhD, FIPP (Hungary)

Juan Carlos Flores, MD, FIPP (Argentina)

Ira Fox, MD, FIPP (USA)

Ludger Gerdesmeyer, MD, PhD, FIPP (Germany)

Michael Gofeld, MD, FIPP, CIPS (Canada)

Craig Hartrick, MD, FIPP (USA)

Standiford Helm, MD, FIPP (USA)

Robert Levy, MD, PhD (USA)

John D. Loeser, MD, FIPP (USA)

Thiago Nouer, MD, CIPS (Brazil)

Charles de Oliveira, MD, FIPP, CIPS (Brazil)

Vikram Patel, MD, FIPP (USA)

Edit Racz, MD, FIPP (Hungary)

Gabor B. Racz, MD, FIPP (USA)

Ricardo Ruiz-López, MD, FIPP (Spain)

Hariharan Shankar, MD, FIPP, CIPS (USA)

Michael Sommer, MD, FIPP, CIPS (Netherlands)

Peter Staats, MD, MBA, FIPP (USA)

Agnes Stogicza, MD, FIPP, CIPS (USA-Hungary)

Andrea Trescot, MD, FIPP (USA)

Jan Van Zundert, MD, FIPP (Belgium)

Kris Vissers, MD, FIPP (Netherlands)

Richard Weiner, MD (USA)

Anthony Yeung, MD (USA)

General Information

Conference Dates and Site

29-31 August, 2016 • Kempinski Hotel Corvinus Budapest

H-1051 Budapest, Erzsébet tér 7-8.

Practical Workshop Dates and Site

29-31 August, 2016 • Semmelweis University Labs

H-1091 Budapest, Üllői út 93.

FIPP Exam

1 September, 2016 • Semmelweis University Labs

H-1091 Budapest, Üllői út 93.

Bus transfer

Daily bus transfers are provided within the venues (Kempinski - Semmelweis University).

Conference Website

www.congressline.hu/pain2016

Language

The official language of the Conference is English.

CME Accreditation and Designation

We are pleased to inform you that the 21st Annual Advanced Interventional Pain Conference and Practical Workshop with Fluoroscopic and Ultrasound Guided Techniques was granted 18 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME).

The 'World Institute of Pain (WIP)' (or) '21st Annual Advanced Interventional Pain Conference and Practical Workshop with Fluoroscopic and Ultrasound Guided Techniques' is accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide the following CME activity for medical specialists. The EACCME is an institution of the European Union of Medical Specialists (UEMS), www.uems.net.

The '21st Annual Advanced Interventional Pain Conference and Practical Workshop with Fluoroscopic and Ultrasound Guided Techniques' is designated for a maximum of (or 'for up to') 18 hours of European external CME credits. Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity.

Through an agreement between the European Union of Medical Specialists and the American Medical Association, physicians may convert EACCME credits to an equivalent number of AMA PRA Category 1 Credits™. Information on the process to convert EACCME credit to AMA credit can be found at www.ama-assn.org/go/internationalcme.

Live educational activities, occurring outside of Canada, recognized by the UEMS-EACCME for ECMEC credits are deemed to be Accredited Group Learning Activities (Section 1) as defined by the Maintenance of Certification Program of The Royal College of Physicians and Surgeons of Canada.

Opening Hours of the Registration Desk at Hotel Kempinski

Sunday, 28 August	14.00 – 19.00
Monday, 29 August	07.00 – 13.30
Tuesday, 30 August	07.00 – 13.30
Wednesday, 31 August	07.30 – 13.30

FIPP Exam Registration at Hotel Kempinski

Wednesday, 31 August	16.00 – 19.00
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Registration Fee

(Regular Fees after 15 July 2015)

Pain Conference & Practical Workshop WIP member	1600 Euro
Pain Conference & Practical Workshop non WIP member	1800 Euro
Pain Conference WIP member	1150 Euro
Pain Conference non WIP member	1350 Euro
Accompanying person fee	350 Euro
Award Ceremony Dinner	120 Euro
FIPP Exam registration fee	2500 USD

Meals

Coffee breaks, lunches, welcome cocktail and award ceremony dinner are included in the registration fee.

Internet

Free of charge Wi-Fi service available at the venue.

Commercial Exhibition

The exhibition will be opened from Monday, 29 August until Wednesday, 31 August at the Hotel Kempinski Ballroom foyer. Delegates will have the opportunity to meet representatives of pharmaceutical and diagnostic equipment companies at their stands to discuss new developments and receive up-to-date product information.

Hotels

Kempinski Hotel Corvinus Budapest ***** (Conference venue)

H-1051 Budapest, Erzsébet tér 7-8.

Hotel Central Basilica ***

H-1051 Budapest, Hercegprímás u. 8.

Conference Secretariat

CongressLine Ltd.

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H-1065 Budapest, Révay köz 2.

Phone: +361 429 0146, Fax: +361 429 0147

Official Social Events

Faculty Dinner (only for Faculty Members)

Sunday, 28 August, 2016, 19.00-21.00

Hotel Aria, High Note Skybar Pavilion

Dress Code: business casual

Meeting point: Hotel Kempinski lobby at 18.30

Welcome Cocktail (for all registered guests)

Monday, 29 August 2016, 20.00-22.00

Kempinski Hotel, Ballroom

Program: Csillagszemű Dance Ensemble

Dress Code: Business casual

Award Ceremony Dinner (for all registered guests)

Tuesday, 30 August, 2016, 20.00-23.00

Museum of Hungarian Agriculture (1146 Budapest, Vajdahunyadvár)

Program: Organ Concert, Award Ceremony and Monarchia String Quartet

Dress Code: formal

Meeting point: Hotel Kempinski lobby at 19.30

Useful Information

How to get to the Conference Venue (Hotel Kempinski)

To reach the Conference Venue there are several means of transport:

Metro station "Deák Ferenc tér" junction (M1 – yellow line, M2 – red line, M3 – blue line)

From the airport to the conference venue use the miniBUD, fixed rates for passengers (One way transfer: 3900 HUF / cca 14 EUR, return transfer: 6900 HUF / cca 25 EUR from the airport to the Kempinski Hotel Corvinus Budapest or to inner city hotels), Tel: +36 1 550 0000; www.minibud.hu

or use the **PAIN2016 Official Taxi Company**: City Taxi +36 1 211 1111, www.citytaxi.hu

(Rate: 7000-9000 HUF = cca 23-30 Euro).

To reach the Hotels or the Congress Venue and to avoid any inconvenience, please use the official

PAIN2016 taxi company:

City Taxi

Phone: +36 1 211 1111



Credit card payment is available in every car of City Taxi.

Please note, that all licensed Budapest taxi companies have yellow cars and has same rates for all companies, placed clearly visible on the screens.

Climate

The climate of Budapest is continental. In August usually nice warm weather can be expected with a max. temperature of 25-28°C, while the lowest temperature during the night ranging between 12-15 °C. Nevertheless some rainy days can be expected.

Insurance

The registration fees do not include provision for the insurance of participants against personal accidents, illness, cancellation, theft, property loss or damage. Participants are advised to take adequate personal travel insurance.

Currency

The Forint (HUF), the official national currency, is convertible. The exchange rates applied in Budapest banks, official exchange offices and hotels may vary. All the major credit cards are accepted in Hungary in places displaying the emblem at the entrance.

Exchange rate: 1 Euro = 310 HUF 1 USD = 283 HUF in August, 2016

Credit Cards

In general, VISA, EC/MC and American Express credit cards are accepted in most restaurants, cafés, shops and petrol stations.

Stores and Shopping

The opening hours of Budapest stores are generally 10.00-18.00 on weekdays and 10.00-13.00 on Saturday. The shopping centers are open from 10.00-21.00 from Monday to Saturday and from 10.00-18.00 on Sunday.

Pharmacies

Budapest's pharmacies (gyógyszertár in Hungarian) are well stocked and can provide medicaments for most common ailments. Each of the 23 districts has an all-night pharmacy open every day, a sign on the door of any pharmacy will help you locate the closest one.

Electricity

The voltage in Hungary is 220V, 50 Hz AC.

Parking

If you drive a personal or rented car, always try to park at a guarded parking lot and do not leave any valuables in the car. Please note, that Budapest is divided into paying areas, with one parking meter in each street. The maximum parking time duration is 2 hours, tariffs may vary.

Detailed Program

MONDAY, 29 AUGUST 2016

General Lectures

Room III.

- 07:40** **Opening Remarks**
Gabor B. Racz, MD, FIPP, Program Director
Kris Vissers, MD, FIPP, President of WIP
Agnes Stogicza, MD, FIPP, CIPS Local Arrangement Committee
Moderator: Serdar Erdine, MD, FIPP
- 08:00** **Scarring Triangle Cases**
Gabor B. Racz, MD, FIPP
- 08:30** **Drugs and Pumps for Intrathecal Drug Delivery**
Ira Fox, MD, FIPP
- 09:00** **Surgical Interventions via the Lumbar Intervertebral Foramen for Degenerative Conditions**
Anthony Yeung, MD
- 09:30** **Current Trends in the Treatment of Facial Pain**
Miles Day, MD, FIPP
- 10:00** **Coffee Break**
Moderator: Craig Hartrick, MD, FIPP and Miles Day, MD, FIPP
- 10:30** **Ultrasound in Interventional Pain Management**
Andrea Trescot, MD, FIPP
- 11:00** **Progress in Regenerative Medicine Pain Therapy**
Aaron Calodney, MD, FIPP
- 11:30** **Innovations in RF for Interventional Pain Management**
Richardo Ruiz-López, MD, FIPP
- 12:00** **Failed Neck Surgery Syndrome**
Gabor B. Racz, MD, FIPP
- 12:30** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops
Ultrasound and Fluoroscopic-guided Procedures

Ultrasound Lectures

Room I+II.

- 07:40** **Opening Remarks**
Gabor B. Racz, MD, FIPP, Program Director
Kris Vissers, MD, FIPP, President of WIP
Agnes Stogicza, MD, FIPP, CIPS Local Arrangement Committee
Moderator: Agnes Stogicza, MD, FIPP, CIPS
- 08:00** **Ultrasound basics, benefits and limitations**
Vikram Patel, MD, FIPP
- 08:30** **Lower Extremity, sonoanatomy (Lecture and Live Demo)**
Michael Sommer, MD, FIPP, CIPS
- 09:00** **Lumbosacral spine, sonoanatomy (Lecture and Live Demo)**
Charles de Oliveira, MD, FIPP, CIPS
- 09:30** **Peripheral nerves, sonoanatomy (Lecture and Live Demo)**
Agnes Stogicza, MD, FIPP, CIPS
- 10:00** **Coffee Break**
- 10:30** **Live models – Workshops (Lower Extremity and Lumbosacral spine)**
- 12:30** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops
Ultrasound and Fluoroscopic-guided Procedures

07:30 – 08:45 Moderator: **Gabor B. Racz**, MD, FIPP, **Ira Fox**, MD, FIPP
Industry Technical Presentations
(not part of CME program; see industry section of program on Page 51.)

General Lectures

Room III.

Moderators: **Javier de Andres**, MD, FIPP and **Mert Akbas**, MD, FIPP

- 08:45** **Peripheral Nerve Role in CRPS**
John D. Loeser, MD, FIPP
- 09:15** **Neuromodulation: New Directions**
Robert Levy, MD, PhD
- 09:45** **Is Cancer Pain Management Evolving?**
Kris Vissers, MD, FIPP
- 10:15** **Coffee Break**
- 10:45** **Electrical Neuromodulation Overview – Optimal Stimulation Site and Parameters**
Peter Staats, MD, MBA, FIPP
- 11:15** **Axial Back Pain Treatment with High Frequency Spinal Cord Stimulation Update**
Adnan A. Al-Kaisy, MD, ChB, FIPP
- 11:45** **Study Design**
Ludger Gerdesmeyer, MD, PhD, FIPP
- 12:15** **Evolving Neuromodulation Systems**
Richard Weiner, MD
- 12:45** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops
Ultrasound and Fluoroscopic-guided Procedures

Ultrasound Lectures

Room I+II.

Moderator: **Agnes Stogicza**, MD, FIPP, CIPS

- 08:45** **Upper extremity sonoanatomy (Lecture and Live Demo)**
Hariharan Shankar, MD, FIPP, CIPS
- 09:15** **Cervical spine sonoanatomy (Lecture and Live Demo)**
Christ Declerk, MD, FIPP, CIPS
- 09:45** **Pelvic pain (Lecture and Live Demo)**
Thiago Nouer, MD, CIPS
- 10:15** **Coffee Break**
- 10:30** **Live models - Workshops (Upper extremity, Cervical spine, Pelvic pain)**
- 12:30** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops
Ultrasound and Fluoroscopic-guided Procedures

WEDNESDAY, 31 August 2016

General Lectures

Room III.

- Moderator: Kenneth B. Chapman, MD, FIPP**
- 07:30** **Current Trends in Radiofrequency Facet Denervation**
Standiford Helm, MD, FIPP
- 08:00** **Review of Evidence for Pulsed RF**
Jan Van Zundert, MD, FIPP
- 08:30** **Alert! Radiation Safety**
Juan Carlos Flores, MD, FIPP
- 09:00** **Common Low Back Pain**
Hemmo Bosscher, MD, FIPP
- 09:30** **Neurosurgical Approaches to Chronic Pain Management**
Lorand Eross, MD, PhD, FIPP
- 10:00** **Minimally Invasive Treatment of Spinal Stenosis**
Peter Staats, MD, MBA, FIPP
- 10:30** **Coffee Break**
Moderator: Craig Hartrick, MD, FIPP
- 11:00** **FOCUSED DISCUSSION: The DRG - Linking Pain and Treatment Mechanisms**
Impulse Discharge Originating in the DRG
Marshall Devor, PhD
The Clinical Science Behind DRG Stimulation and the ACCURATE RCT
Robert Levy, MD, PhD
Neuromodulation of the DRG
Adnan A. Al-Kaisy, MB, ChB, FIPP
Clinical Interpretation
Gabor B. Racz, MD, FIPP
- 12:45** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops

Ultrasound Lectures

Room I+II.

- Moderator: Michael Gofeld, MD, FIPP, CIPS**
- 08:00** **Hydrodissection for neuropathic pain and neuralgias**
Thiago Nouer, MD, CIPS
- 08:20** **Pulsed radiofrequency of peripheral nerves**
Charles de Oliveira, MD, FIPP, CIPS
- 08:40** **Cryoablation of peripheral nerves**
Agnes Stogicza, MD, FIPP, CIPS and Christ Declerk, MD, FIPP, CIPS
- 09:10** **Hand and foot sonoanatomy**
Vikram Patel, MD, FIPP
- 09:30** **Neuropathic pain of the knee and the ankle**
Lee Dellon, MD, PhD
- 10:00** **Coffee break**
Moderator: Andrea Trescot, MD, FIPP
- 10:30** **Major nerves in chronic pain. It is not all regional anesthesia!**
Andrea Trescot, MD, FIPP
- 10:50** **Wrist Pain of Neural Origin: Role for Partial Denervation**
Lee Dellon, MD, PhD
- 11:10** **Peripheral nerve stimulation**
Michael Gofeld, MD, FIPP, CIPS
- 11:30** **Hemiplegic shoulder pain**
Michael Gofeld, MD, FIPP, CIPS
- 11:50** **Trigeminal and Glossopharyngeal nerves, ultrasound imaging**
Hariharan Shankar, MD, FIPP, CIPS
- 12:10** **Ultrasound versus Fluoroscopy Guidance in Interventional Pain Management**
Javier de Andres Ares, MD, FIPP
- 12:30** **Lunch**
- 13:30** **Transport to University**
Labs Afternoon workshops

FIPP and CIPS Awards Ceremony

30 August, 2016 Museum of Hungarian Agriculture

Masters of Ceremony for the Evening

Gabor B. Racz, MD, FIPP, Founding Conference Director

Opening Remarks

Agnes Stogicza, MD, FIPP, CIPS, Local Organizing Committee

Kris Vissers, MD, FIPP, WIP President

Memorial Remarks

Craig Hartrick will give memorial for Dr. Phulchand Prithvi Raj, MD, FIPP, Founder and first President of WIP, pioneer and world leader in regional anesthesia and pain management. Clinical physician, educator, global speaker, research and publications

Gabor B. Racz will give memorial for Dr. James Edward Heavner, DVM, PhD, FIPP (Hon), workshop director and co-director of Budapest Conference since 1996, President Texas Pain Society Foundation. Educator, global speaker, research and publications

Special Recognition: Trail Blazer Award

John D. Loeser, MD, FIPP **presented by Peter Staats**, MD, MBA, FIPP

James E. Heavner, DVM, PhD, FIPP(Hon) **presented by Gabor B. Racz**, MD, FIPP

Comments

Kris Vissers, MD, FIPP, WIP President

Peter Staats, MD, MBA, FIPP WIP – Board of Examination Chair

Presentation of Certificates

Peter Staats, John D. Loeser and **WIP Board of Examination Members**

FIPP (Fellow of Interventional Pain Practice) honorees from Budapest 2015, Miami 2015 and New York City 2016

CIPS (Certified Interventional Pain Sonologist) honorees from Miami 2015 and New York City 2016

FIPP NEW HONOREES

to be recognized 2016 Awards Ceremony in Budapest

Budapest 29th FIPP (Fellow of Interventional Pain Practice)

Examination August 27, 2015

895	Wael Mohamed Abdelkhalek, MD, FIPP	Egypt
896	Tohotom Peter Bartha, MD, FIPP	Hungary
897	Gergely Péter Bokrétás, MD, FIPP	Hungary
898	Klaas Buyse, MD, FIPP	Belgium
899	César A. Ceballos Maya, MD, FIPP	Colombia
900	Christine Cleary, MD, FIPP	Ireland
901	Mohamed Adly Shahat Abdallah Elramely, MD, FIPP	Egypt
902	Paulo Renato Barreiros da Fonseca, MD, FIPP	Brazil
903	Manuel Herrero Trujillano, MD, FIPP	Spain
904	Lúcio César Hott Silva, MD, FIPP	Brazil
905	Jinyoung Jeong, MD, FIPP	South Korea
906	Gaby J.A. Kox, MD, FIPP	Belgium
907	Pierluigi Manchiaro, MD, FIPP	Italy
908	Aliaksandr Mudrakouski, MD, FIPP	Ireland
909	Rashmi Murab, MD, FIPP	India
910	Gurumoorthi Ramasamy, MD, FIPP	India
911	Taher Thabet, MD, FIPP	Egypt
912	Hisashi Tomie, MD, FIPP	Japan
913	Antonius Hono Wijono, MD, FIPP	Indonesia
914	James Yu, MD, FANZCA, FFPANZCA, FIPP	Australia
915	Muhammad Zubair, MBBS, FCPS (ANESTHESIOLOGY), FIPP	Pakistan
841	Pranab Kumar, MBBS, MD, FRCA, FIIPP	UK
778	Basabjit Das, MBBS, MD, FCARCSI, DPMCAI, FPMCAI, FIPP	Ireland

Miami 30th FIPP (Fellow of Interventional Pain Practice)

Examination December 5, 2015

916	Sangmin Ahn, MD, FIPP	USA
917	Mohammed Fawaz Alsharif, MD, FIPP	Saudi Arabia
918	Oscar R. Benitez Pacheco MD, FIPP	Argentina
919	Seungpyo Choi, MD, FIPP	South Korea
920	Marco Antonio Helio da Silva, MD, FIPP	Brazil
921	Alan Gonzalez Cota, MD, FIPP	USA
922	Jorge Guajardo Rosas, MD, FIPP	Mexico
923	Yasir Eltayeb A. Hassan, MD, FIPP	Qatar
924	Ajith Nair, MD, MPM, FIPP	USA
925	Fernando José Goncalves Do Prado, MD, FIPP	Brazil
926	Juan Ignacio Reyes Torres, MD, FIPP	Mexico
927	Bahman Ben Shamloo, MD, FIPP	USA
928	Hariharan Shankar, MD, CIPS, FIPP	USA
929	Shabrez Tariq, MD, FIPP	USA
930	Yasser Younis AbuSief Tolba, MB, ChB, MSc, PhD, FRCA, FCARCSI, EDIC, EDAIS, FCCP, FCCIM, FIPP	Saudi Arabia
931	Anouk van Veenendaal, MD, FIPP	Netherlands
932	Amit Verma, MD, FIPP	India
933	Giambattista Villa, MD, FIPP	Italy
934	Alicia Villarreal Fuentes, MD, FIPP	Spain

New York City 31st FIPP (Fellow of Interventional Pain Practice) Examination May 24, 2016

935	Sami Moustafa Abdelmaksoud, M.Sc., MD, DPHE, FIPP	Qatar
936	Fathi Saleh Hassan Al-Kadhi, MBBS, JBA, ABA, FIPP	Qatar
937	Corrie Avenant, MD, FIPP	South Africa
938	Umasreedevi Cherukupalli, MD, MBA, FIPP	India
939	Ateeq Ur Rehman Ghafoor, MBBS, MRCS, DPMCAI, FCAI, FIPP	Ireland
940	Johan Haumann, MD, FIPP	Netherlands
941	Ahmed Sobhi Mohamed ElSayed Hegab, MD, FIPP	Egypt
942	Corey W. Hunter, MD, FIPP	USA
943	Chia-Shiang Sean Lin, MD, FIPP, CIPS	Taiwan
944	Lucien Parrillo, MD, MPH, FIPP	USA
945	Isaac Peña Vergaria, MD, FIPP	Spain
946	Alireza Susanabadifarahani, MD, FIPP	Iran
947	Julianka Teodorczyk, MD, FIPP	Netherlands

CIPS NEW HONOREES to be recognized 2016 Awards Ceremony in Budapest

Miami 3rd CIPS (Certified Interventional Pain Sonologist) Examination December 5, 2015

12	Anwar Samhari Mat Arshad, MD, FIPP, CIPS	Malaysia
13	Mohamed Ibrahim Badr, MD, FIPP, CIPS	United Arab Emirates
14	Carlos Buxó, MD, CIPS (first CIPS from Puerto Rico)	Puerto Rico
15	Manuel Cifrian Perez, MD, FIPP, CIPS	Spain
16	Pierre d'Hemecourt, MD, CIPS	USA
17	Christ Declerck, MD, FIPP, CIPS (first CIPS from Belgium)	Belgium
18	Jinyoung Jeong, MD, FIPP, CIPS	South Korea
19	Ravi Krishna Kalathur, MD, CIPS (first CIPS from India)	India
20	Aliaksandr Mudrakouski, MD, FIPP, CIPS (first CIPS from Ireland)	Ireland
21	Charles Amaral de Oliveira, MD, FIPP, CIPS	Brazil
22	Etienne Prinsloo, MD, FIPP, CIPS	Canada
23	James Robles, MD, FIPP, CIPS	USA
24	Hwa Yong Shin, MD, PhD, FIPP, CIPS	South Korea
25	David Spinner, DO, CIPS	USA
26	Agnes R. Stogicza, MD, FIPP, CIPS (first CIPS from Hungary/USA)	USA

New York City 4th CIPS (Certified Interventional Pain Sonologist) Examination May 24, 2016

27	Abdulmuhsen Alsahhaf, MD, FFR, FIPP, CIPS (first CIPS from Kuwait)	Kuwait
28	Mohammed Fawaz Alsharif, MD, FIPP, CIPS (first CIPS from Saudi Arabia)	Saudi Arabia
29	Alan Berkman, MBChB, FRCPC, FIPP, CIPS	Canada
30	Chia-Shiang Sean Lin, MD, FIPP, CIPS (first CIPS from Taiwan)	Taiwan
31	Rajendra Kumar Sahoo, MD, CIPS	Canada
32	Wilson Tay, MD, FIPP, CIPS (first CIPS from Singapore)	FIPP Singapore
33	Yasser Reda Toble, MD, FIPP, CIPS (first CIPS from Egypt)	Egypt
34	Navita Vyas, MD, CIPS	India

Syllabus

GABOR B. RACZ, MD, ABIPP, FIPP

BIOGRAPHICAL SKETCH

Dr. Racz graduated from The University of Liverpool Medical School, completed his residency at State University of New York and served on staff there until 1978. At Texas Tech University Health Sciences Center in Lubbock, Texas he is Grover Murray Professor, Professor and Chair Emeritus in Department of Anesthesiology and Co-Director of Pain Services. Dr. Racz is Director of the Annual Advanced Pain Conference and Practical Workshop in Budapest since the first conference in 1996. He is a Founder and Past President of WIP, currently serving on the WIP Executive Board as well as Executive Board of American Society of Interventional Pain Physicians. He is a Founder and first President of Texas Pain Society and Director of the annual TTUHSC Pain Symposium from 1983-2012. He is widely published in book chapters, journal articles and three books describing his techniques in spinal cord and peripheral nerve stimulation, neurolysis, radiofrequency thermocoagulation and other interventional procedures, and he travels around the world lecturing and instructing workshops. His latest book published in 2016 is a second edition of Techniques of Neurolysis, edited with Dr. Carl E. Noe. He has received numerous recognitions and awards from organizations around the world including Distinguished Professor Award for Lifetime Achievement from Texas Tech University Health Sciences Center and the Lifetime Achievement Award(s) from American Society of Interventional Pain Physicians. He will receive the Lifetime Achievement Award in October from National Spine & Pain Center in Washington DC.

LECTURE

THE SCARRING TRIANGLE

Numerous studies have confirmed the safety and efficacy of neuroplasty, also known as percutaneous lysis of adhesions, in the lumbosacral, thoracic, and cervical areas. 1-9 The clinical experience is overwhelming in favor of neuroplasty in patients suffering from radiculopathy as well as back pain. Additionally, the systematic review of neuroplasty for spinal stenosis is strongly supportive. 12 A number of concepts have been recognized that enhanced the safety of the procedures. One of the significant concerns with any intraspinal injections is loculation of the injected fluid in a confined space. This danger is present with single-shot epidural injections, transforaminal injections, as well as improper catheter placements. In the lumbosacral approach, an important lesson learned was the danger of mid-canal placement in the presence of lateral recess scarring in the lumbar trans-sacral approach. A consequence of fluid injection is that it can increase pressure and compress the blood supply to the spinal cord including the cauda equina. Implementing methods to avoid loculation in the subdural space from midline injections is shown. 3-6 Large loculation in the subdural space may need simple aspiration. Flexion with rotation has shown to help dissipate the pressure from loculation in the thoracic subdural area. 7 The flexion-rotation technique has been helpful, especially in the dispersal of injectants in the lateral-cervical neuroplasty.

Clinical presentation of patients suffering from dense scar tissue that starts by the accumulated loose disc fragments (nucleolus pulposus material) and gradually encapsulating more laterally to the medial side of the lateral recess and distally beyond the L5, S1 nerve roots to include the S2 nerve root. A common presentation in patients is lower back pain and associated dysesthesia, in the L5 lateral calf distribution and pain along the S1 lateral foot area. If the S2 nerve root is involved, the pain may radiate down the posterior aspect of the thigh and leg, Achilles tendon, and to the sole of the foot. Weakness in dorsal and plantar flexion is secondary to the stretch injury of the L5-S1 nerve root, leading to both ischemia and motor deficit that can present as foot drop. Cases involving scar formation from surgeries such as microdiscectomy, fusion, and artificial disc replacement at the L5-S1 that failed to resolve the associated pain will be accessible on PainCast (www.paincast.com).

The treatment algorithm that was found to be the most cost-effective is opening the scarring triangle through the above described procedure using an 18g RX-2™ Coudé® needle with a 21g VERSA-KATH® catheter. The following and associated volumes for the procedure are as follows: 5 mL of contrast, 5 mL of hyaluronidase, 5 mL of anesthetic, and 5 mL of steroid. 1-3 months later a caudal sacral hiatus neuroplasty procedure to the L5-S1 ventral lateral and depending on the dye spread, a transforaminal mid-canal second catheter with the three repeat hypertonic saline injections are described.6,10,11

The deleterious effects of the ischemic injury to both the nerve roots of the pelvis and lower extremities has taught us the importance of careful catheter placement. The catheter should not be inserted in the midline of the sacral hiatus. Midline catheter placement increases the chance to enter the subdural space at the S2-3 area. At this level, hypertonic saline volume expansion can cause ischemic injury to the pelvic and lower extremities. In order to prevent such an ischemic injury, one should implement a variation of the lateral view contrast spread. In addition, an observational time is required to confirm there is no motor block from the injected anesthetic. A motor block normally develops within 15-18 minutes post-injection. Therefore to avoid this complication, a waiting period of 20-30 minutes is recommended before hypertonic saline is injected – the concern is the development of a motor block, which can lead to respiratory and cardiac arrest if the patient is not continuously observed such as in a busy clinic setting. Deleterious effects such as respiratory and cardiac arrest can develop as a result of motor block. Continuous observation by trained personnel and pulse oximetry monitoring is helpful in preventing such occurrences. If subdural injection occurs, it can readily be aspirated from the subdural space.6, 10, 11

The beneficial effect of both preventing and reversing scar tissue formation has been identified by Birkenmaier et al. In his study, he discusses the effects of human fibroblast regeneration inhibition, using live tissue cultures, in mediums of various concentrations of NaCl, from normal saline (0.9%) to hypertonic (10%) as well as other injectants commonly used in epidural injections including triamcinolone. There has not been any valid study to support neurotoxicity or chemical neuritis from the use of hypertonic saline. Prolonged untreated ischemia from the volume induced, vascular compression can be readily reversed by aspiration in the subdural space. This vascular compression can also be decreased by performing flexion and rotation which will facilitate lateral drainage in the epidural areas. Any easily misinterpreted conclusion by Birkenmaier et al., is that the neuroplasty procedure is that of a mechanical lysis, when in fact the disruption of scar tissue is done by fluid dissection under pressure, where the fluid finds the path of least resistance with catheter placement in the appropriate tissue plane. The second issue of the Birkenmaier et al., evaluation of stiffness of the epidural catheter to carry out lysis of adhesions. (Reference) The study was based on the misconception that the lysis procedure is a mechanical procedure. The comparison of the location of the catheter first published in 1989 and twenty-two years later when the procedure has to be repeated in 2008, it conclusively proves that the catheter does not move from the original concept of ventral lateral catheter placement. (Reference) This presumption is that neuroplasty or lysis of adhesions is unfounded and invalid. The most likely explanation is the Angelo Rocco compartmental filling principle as he has been described.10

A rare case where caudal neuroplasty can be problematic is at the high sacral, lateral to the S1 nerve root and medial to the L5 nerve root. For over 30 years, it was misinterpreted as possibly a bony abnormality of the sacrum. During the last couple of years, through the work of Teske et al., and that of Matsumoto's S1 transforaminal, this unexplained obstruction has been accessible with an 18g RX-2™ Coudé® needle with a VERSA-KATH®. Using the principle of Angelo Rocco where injection within the ventral scar area, high pressure fluid initially includes contrast followed by hyaluronidase, local anesthetic and steroid, then 20-30 min later 10% sodium fluoride.9 Results have been good, as shown in the 6-month follow up in the 39 patients study by Matsumoto et al. 8 Furthermore, the study continued up to a 12-month follow up with favorable outcomes but has not been published. Teske et al., discovered a triangular space to be 1.1 mL, bilaterally between the L5 and S1 nerve roots above the disc; later to be called the SCARRING TRIANGLE. The major result of the scarring is back pain caused by the dura being stuck to the posterior longitudinal ligament. This also causes L5-S1

radiculopathy and dysesthesia. The major contribution of Matsumoto's observation was the ability of the smaller gauge VERSA-KATH® to be placed between the dense scar tissue and the posterior longitudinal ligaments in patients while the regular size epidural catheters could not, epiduroscopy, and surgery including fusion and artificial discs.

Large numbers of failed surgeries have resulted from fusion and disc replacements, because the pathology appeared to be in the lateral recess. The pain relief was measured from one to several months for both local pain and dysesthesia, particularly in the L5 distribution. The catheter can be advanced through the S1 foramen or transforaminally and can be ipsilateral or contralateral.8 It is predictable that many of these patients will eventually be treated with DRG neuromodulation and stimulation. The frequency of these cases is relatively rare and can be prevented by the approach described above.

References

1. Ludger Gerdesmeyer, MD, PhD, et al. Percutaneous Epidural Lysis of Adhesions in Chronic Lumbar Radicular Pain: A Randomized, Double-Blind, Placebo-Controlled Trial. *Pain Physician* 2013; 185-196
2. Park EJ, Park SY, Lee SJ, Kim NS, Koh DY. Clinical Outcomes of Epidural Neuroplasty for Cervical Disc Herniation. *J Korean Med Sci* 2013; 28: 461-465
3. Racz GB, Heavner JR. Complications Associated with Lysis of Epidural Adhesions and Epiduroscopy. In: Neal JM, Rathmell JP, eds. *Complications in Regional Anesthesia and Pain Medicine*. 1st ed. Philadelphia, PA: Saunders Elsevier; 2007; Chapter 30: 301-311
4. Racz GB, Heavner JE. Complications Associated with Lysis of Epidural Adhesions and Epiduroscopy. In: Neal JM, Rathmell JP, eds. *Complications in Regional Anesthesia and Pain Medicine*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013; Chapter 33: 373-384
5. Racz GB, Day MR, Heavner JE, Smith JP. The Racz Procedure: Lysis of Epidural Adhesions (Percutaneous Neuroplasty). In: Deer TR, Leong MS, Buvanendran A, Gordin V, Kim PS, Panchal SJ, Ray AL, eds. *Comprehensive Treatment of Chronic Pain by Medical, Interventional, and Integrative Approaches*. Vol. 50, 1st ed. New York, NY: Springer; 2013:521-534
6. Gabor B. Racz, James E. Heavner, Jeffrey P. Smith, Carl E. Noe, Adnan Al-Kaisy, Tomikichi Matsumoto, Sang Chul Lee and Laszlo Nagy (2014). *Epidural Lysis of Adhesions and Percutaneous Neuroplasty, Pain and Treatment*, Dr. Gabor Racz (Ed.), Chapter 10; ISBN: 978-953-51-1629-5, InTech, DOI: 10.5772/58753. Available from: <http://www.intechopen.com/books/pain-and-treatment/epidural-lysis-of-adhesions-and-percutaneous-neuroplasty>
7. Racz GB, Apicella E, Vohra P. Collegial Communication and Problem-Solving Intraspinous Canal Manipulation, Consultants Corner. *Pain Practice* 2013; Volume 13, Issue 8, pp. 667-670.
8. Matsumoto T, Kitagawa H. Treatment of lower back and leg pain using Racz Catheter-Matsumoto Way (via S1 intervertebral foramen). Poster Presentation. 2014 WIP World Congress Maastricht.
9. Rocco AG. Epidural space as a Starling resistor and elevation of inflow resistance in a diseased epidural space. *Regional Anesthesia* 1997; 22: 167-177.
10. Racz GB, Heavner JE, Noe CE, Al-Kaisy A, Matsumoto T, Lee SC, Nagy L. Epidural Lysis of Adhesions and Percutaneous Neuroplasty. In: Racz GB, Noe CE, eds. *Techniques of Neurolysis*, 2nd Edition. Switzerland: Springer; 2016; Chapter 8: 119-143
11. Racz GB, Heavner JE. Introduction to Lysis of Adhesions. In: Racz GB, Noe CE, eds. *Techniques of Neurolysis*, 2nd Edition. Switzerland: Springer; 2016; Chapter 1: 1-12
12. Helm S, Racz GB, Gerdesmeyer L, Justiz R, Hayek SM, Kaplan ED, El Terany MA, Knezevic NN. Percutaneous and Endoscopic Adhesiolysis in Managing Low Back and Lower Extremity Pain: A Systematic Review and Meta-analysis. *Pain Physician*. 2016 Feb;19(2):E245-82.

IRA FOX, MD, DABPM, FIPP, ABIPP

BIOGRAPHICAL SKETCH

Ira B. Fox, MD, DABPM, FIPP, ABIPP founded Anesthesia Pain Care Consultants in June 1996. He has spent more than 30 years treating patients with acute and chronic pain. Dr. Fox did his residency in anesthesiology and pain in New Jersey where he was chief resident.

Dr. Fox maintains five board certifications: American Board of Interventional Pain Physicians (ABIPP); World Institute of Pain (WIP) – Fellow of Interventional Pain Practice (FIPP); American Board of Pain Medicine (DABPM); and the American Board of Anesthesiology with added certification in Pain Management. Dr. Fox serves as an examiner for the FIPP Board Certification and ABIPP Interventional Practical Examination.

Dr. Fox is chairman of the World Institute of Pain Committee on Project Development. He has also been chairman of the Advisory Board, honorary treasurer, and is on the executive board since 2011. Dr. Fox has served as a trustee for the World Institute of Pain Foundation. He is the president of the World Society of Pain Clinicians and a lifetime member of the American Society of Interventional Pain Physicians. Dr. Fox holds the distinction of being the Inaugural Executive Examiner at the WIP & American Academy of Pain Medicine Ultrasonography (AAPMU) 1st Annual WAPMU International Congress.

He was elected “America’s Top Physician” by the Pain Management Consumers’ Research Council of America, and is listed as a Top Doctor in Broward County by Castle Connolly Medical Ltd. every year for the past ten years. Anesthesia Pain Care Consultants won the South Florida Business Journal Award for Excellence in Health Care in 2008. Dr. Fox has been published extensively. He lectures internationally and has had numerous media appearances which can be seen on the Anesthesia Pain Care Consultants website at www.AnesthesiaPainCare.com.

LECTURE

DRUGS AND PUMPS FOR INTRATHECAL DRUG DELIVERY

- History of intrathecal medication
- Review of indications and trial methods for IT drug delivery devices
- Patient selection
- Summarize literature / studies
- Advantages and Comorbidity considerations
- Recommendations from the Polyanalgesic Consensus Conference 2012
- Discuss new technology in IT therapy
- Present new drugs and therapy decision making for IT therapy
- Describe current opioids and non-opioids for IT drug delivery
- Review of dosing recommendations for IT drug delivery
- Discussion of complications and management of inadequate analgesia

ANTHONY T. YEUNG, MD

BIOGRAPHICAL SKETCH

Dr. Anthony Yeung is Founding Associate of Desert Institute for Spine Care in Phoenix, Arizona and Volunteer Professor, Department of Neurosurgery at the University of New Mexico. Dr. Yeung developed the FDA approved Yeung Endoscopic Spine System (YESS™) allowing for surgical decompression of the disc, spinal canal and lumbar foramen. He has authored over 75 peer reviewed scientific articles, publications and book chapters on endoscopic spine surgery and related topics.

LECTURE

SURGICAL INTERVENTION VIA THE LUMBAR INTERVERTEBRAL FORAMEN FOR PAINFUL DEGENERATIVE CONDITIONS OF THE LUMBAR SPINE

The patho-anatomy and degenerative processes in an aging spine are partly defined by Wolfgang Rauschnig’s anatomic cryosections of cadaveric specimens. Theories of pain generation and principles of minimally invasive spine surgery are suggested by close examination of these specimens. If the endoscopically visualized patho-anatomy is studied in-vivo in a conscious, partially sedated patient, spinal pain can be better understood. Rational endoscopic treatment options may then develop and evolve.

Clinical assessment alone of painful back and leg pain is not completely adequate in determining the source of pain in endoscopic or surgical planning. (Hicks et al., 2009) It necessitates additional imaging and interventional diagnostic and therapeutic studies to answer where the source of pain originates. Current imaging creates both false positive and false negative clinical conclusions of up to 30%. (van Rijn et al., 2006) Diagnostic blocks of the nerves supplying a likely painful structure and its pain relief are helped by performing nerve and foraminal injections in understanding and treating lumbar pain. (Yeom et al., 2008, Hodge, 2005, Pfirrmann et al., 1999, Jonsson et al., 1988, Link et al., 1998, Castro and van Akkerveeken, 1991) The ability to visualize and palpate pathoanatomy in the degenerative spine in an awake patient may be of added value in planning treatment of those conditions. To elucidate theories of pain generation by probing the pathoanatomy in a conscious patient, and treating the pain generator by decompressing, ablating, and irrigating the source of pain is the goal of this presentation. The findings also serve to advance and evolve the minimally invasive endoscopic technique for treatment of the symptomatic degenerative spine.

The endoscopic foraminal approach to the spine and disc is a technique that allows access to degenerative pathoanatomy without altering normal anatomy.

MILES DAY, MD, DABA, DABIPP, FIPP

BIOGRAPHICAL SKETCH

Dr. Miles Day is the Traweek/Racz Endowed Professor in Pain Research in the Department of Anesthesiology and Pain Medicine at Texas Tech University Health Sciences Center in Lubbock, Texas. He is the Medical Director of the Pain Center at Grace Clinic and is the Pain Medicine Fellowship Director at Texas Tech University Health Sciences Center. As an academician and educator, he has trained over 85 pain medicine fellows over the past 18 years. He lectures regionally, nationally, and internationally on a variety of pain medicine topics, but has a special interest in the treatment of chronic facial pain. He has authored several original articles and numerous book chapters.

LECTURE

NEUROMODULATION FOR HEADACHE AND FACIAL NEURALGIAS

The treatment of headaches and facial neuralgias can be a daunting task for pain medicine physicians especially when conservative therapy has limited success. Interventional procedures such as occipital nerve blocks, sphenopalatine ganglion blocks and trigeminal nerve/ganglion blocks can bridge this gap, but on rare occasions even these are unsuccessful. Given the success of spinal neuromodulation for a variety of diagnosis, application of neuromodulation, both extra- and intracranially, for refractory headaches and facial neuralgias has given the pain medicine physician a new treatment for the most refractory patients.

Deer, T, Mekhail N, Peterson E, et al. The appropriate use of neurostimulation: stimulation of the intracranial and extracranial space and head for chronic pain. *Neuromodulation* 2014;17:551-570.

ANDREA TRESBOT, MD, FIPP

BIOGRAPHICAL SKETCH

Andrea Tresbot, MD is chair of the education committee of WIP, past president of the American Society of Interventional Pain Physicians (ASIPP), past president and current director at large of the Florida Society of Interventional Pain Physicians (FSIPP), current president of the Alaska Society of Interventional Pain Physicians (AKSIPP), a former board member of ASIPP, a member of the Board of Directors of the World Institute of Pain (WIP), a former professor at the University of Washington in Seattle, Washington, and previous director of the pain fellowship programs at the University of Washington and the University of Florida. She graduated from the Medical University of South Carolina, with internship and residency in anesthesia at Bethesda Naval Hospital and a fellowship in pediatric anesthesia at National Children's Hospital in Washington. She is a Diplomate of the American Board of Anesthesiology, a Diplomate of the American Board of Interventional Pain Physicians, and a Fellow of Interventional Pain Practice. Dr. Tresbot is board certified in anesthesiology, pain management, interventional pain management and critical care. She was a pain clinic director in private practice for 15 years before she moved to academics. She has returned to private practice, where she splits her time between Alaska and Florida. Dr. Tresbot has authored more than 100 peer-reviewed articles and textbook chapters, and she is the editor and senior author of a new pain textbook (Peripheral Nerve Entrapments – Clinical Diagnosis and Management). She is also co-author of PainWise – A Patient's Guide to Pain Management, as well as co-editor of the three-volume pain review textbook Pain Medicine & Interventional Pain Management – A Comprehensive Review. She speaks nationally and internationally on topics of pain medicine and interventional pain management.

LECTURE

ULTRASOUND IN INTERVENTIONAL PAIN MANAGEMENT

Ultrasound (US) has expanded the techniques available to the pain clinician. There have been a variety of indications for US that have increased the safety (such as stellate ganglion block) or improved the visualization (such as peripheral nerves). For other techniques (such as caudal or lumbar epidural), US provides access guidance but no information about the flow of medication. As US techniques evolve, we can expect an expansion of indications.

AARON K. CALODNEY, MD, FIPP

BIOGRAPHICAL SKETCH

Aaron Kenneth Calodney, MD is Past President of the Texas Pain Society. He currently is President of the American Society of Interventional Pain Physicians (ASIPP). He has served on the board of the International Spine Intervention Society for many years and was Director of Education. Dr. Calodney is board certified in Anesthesiology and carries subspecialty certification in Pain Management through the American Board of Anesthesiology.

Dr. Calodney earned his medical degree from the University of Missouri School of Medicine and completed a family medicine internship at St Joseph's Hospital in Syracuse, New York. His residency in anesthesiology and subsequent interventional pain management fellowship was completed at the University of Texas Health Science Center at Houston. He subsequently completed a fellowship in pediatric anesthesia at the Denver Children's Hospital.

With particular interest in Spine and special interests including Neuromodulation and Intrathecal Drug Delivery, Biological treatment of the painful degenerative disc, Peripheral nerve injury, and Radiofrequency ablation, Dr. Calodney has presented and published many articles and textbook chapters. He is actively involved in clinical research and has delivered over 250 invited lectures in the US and abroad.

Dr. Calodney is a member of the American Society of Anesthesiologists, American Society of Regional Anesthesia and Pain Medicine, and many other professional societies.

He is an author of the first Evidenced Based Treatment Guidelines in Interventional Pain and Evidenced Based Guidelines for the Use of Opioids published in the Pain Physician journal and on the National Guideline Clearinghouse. Dr. Calodney previously was appointed by the governor of Texas to serve on the Advisory Committee on the Regulation of Controlled Substances Act.

LECTURE

PROGRESS IN REGENERATIVE MEDICINE PAIN MANAGEMENT

RICARDO RUIZ-LÓPEZ, MD, FIPP

BIOGRAPHICAL SKETCH

- President, Founder and CEO of CLINICA VERTEBRA, Barcelona Spine & Pain Surgery Center, (1987) Barcelona, Spain
- Executive Member of the Board of Directors of HOSPITAL DELFOS, (since 1997) Barcelona, Spain
- Founder (1993) and President (2011-2013) of the WORLD INSTITUTE OF PAIN, USA

LECTURE

INNOVATIONS IN RF FOR INTERVENTIONAL PAIN MANAGEMENT

In the last decades we have witnessed a dramatic increase in the awareness of the physiopathology of chronic pain syndromes, as well as with the description of new interventional techniques and the definition of indication criteria for their use as a surgical treatment.

Since the inception of radiofrequency (RF) as a means of treatment for chronic pain conditions many developments have been achieved being used in other areas of Medicine, such as interventional cardiology and hepatology which have taken advantage of the unique properties of this type of technology.

The implementation of pulsed radiofrequency has provided clinicians with a new therapeutic spectrum, as this modality of radiofrequency treatment does not increase temperature above 43°C, avoiding neural damage. There is still some controversy on its mechanism of action, but probably post-synaptic phenomena take place after the exposure to electric fields as increased c-fos gene expression in laminae 1 and 2 of dorsal horn has been shown in animal experimental studies.

Pulsed radiofrequency has broadened its indications, enabling us to use it in multiple pathologies like Median Nerve Neuropathy and other peripheral entrapment nerve injuries, intra-articular disorders, chronic Myofascial pain, etc. New devices has led clinicians to treat chronic pain with transcutaneous pulsed RF.

Gradually, RF techniques have been focused to produce denervation of the posterior annulus, along with a sophistication of surgical techniques and / or minimally invasive, specifically endoscopic surgery and laser ablative techniques.

Recent advances enable us to denervate the sinuvertebral nerves with specially designed cannulae (directional field radiofrequency) and other alternative areas for cannula placement to produce lumbar disc annuloplasty through transforaminal approach.

Further modifications in the electrical parameters of conventional RF and length of exposure to pulsed RF will ensure better results and increase safety with the various procedures currently used in clinical settings.

GABOR B. RACZ, MD, ABIPP, FIPP

LECTURE

FAILED NECK SURGERY SYNDROME

Cervical neuroplasty or initially referred to as lysis of adhesions was published in the first edition of techniques of neurolysis in 1989. The long-lasting effect came to recognition with the understanding of the likely mechanisms from the injected components. The first case presented as neck, shoulder, and arm pain, secondary to C4, 5, 6 cervical osteophytes that produced pain along with a reduction in movement of the upper extremity on one side. Two years later in 1986, the other side was similarly affected. Cervical catheters were placed in the C4-5 ventral-lateral epidural space and three separate injections of local anesthetic, followed by hypertonic saline (10% NaCl) infusion. The patient was a professor at the same institution so regular observations were made, so the procedure never had to be repeated. Because of such positive results from the two procedures, the site-specific (ventral-lateral) technique was adopted and became standardized. The injected medications included contrast, hyaluronidase, local anesthetic, steroid, and three separate injections of hypertonic saline. The scarring nature of surgery was recognized, and the information gained gradually utilized to adopt some basic principles. Additional information which came from the medico-legal experiences as an expert witness, led to the evolution of the technique. Loculation of injected material fit into several categories. One being when the loculated fluid cannot run off (dispersed) and the patient will present with pain secondary to ischemia from compression of the blood supply or the cord. Therefore, it was recognized early to avoid heavy sedation or anesthesia, allowing the patient to report the pain. With experience, one learns to recognize many different types of pain secondary to contacting painful nerve root. The injection site should be the ventral lateral epidural space, as the nerve roots act as a guide encouraging the fluid to spread laterally. Secondly, the movement of the spinal cord and the dural sac is influenced by the movement of the head and neck. This movement of the cervical dural sac led to the understanding of the importance of the flexion and rotation. The flexion enlarges the neuroforamina where the inferior pars slides superiorly over the superior pars, which intern causes an increase of the foramen size, allowing for lateral runoff. The unique aspect of this video clip is having three cervical spinal cord stimulating electrodes adhere to the dura and show remarkable mobility of the dura. (www.paincast.com – Cervical Lysis and Sub Occipital Decompression). Flexion rotation will facilitate the fluid to spread longitudinally as well as through the enlarged neural foramen during the flexion aspect.

Delayed loculation resulted from an increase in fluid volume secondary to the hyperosmolar injected solution absorbing fluid, leading to increased pressure from the volume expansion. For example, 10% sodium chloride will expand the volume injected by eleven-fold to become 0.9% so 10 mL at 10% NaCl will increase to 110 mL at 0.9% NaCl. One such case, from the injection of contrast and noticing the contrast spread within the scar tissue resulted in same-side pain, weakness, and numbness, the symptoms and signs developed. This eleven-fold expansion can be extremely dangerous in the absence of runoff, allowing pressure to build up drastically, surpassing that of the capillary profusion pressure which can cause pain, weakness, numbness, and death of the tissue. The flexion and rotation of the spine will allow lateral runoff and encourage fluid escape proximally as well as distally. This principle has been used in resolving an inadvertent subdural spread between two surgical sites in the thoracic area by the utilization of flexion rotation.⁷

Patients are sent to the emergency room for the pain caused by this volume expansion within the spinal canal, usually involving hours of waiting followed by imaging. This dangerous wait time can be avoided by performing the previously mentioned flexion rotation motions.

Failed neck surgery syndrome is becoming a recognized entity. The explanations for failed surgeries are numerous and be prevented. The intent of the presentation is to share thirty years of experience in site-specific catheter placement within the cervical spine. Simultaneously, the evidence for the use of epidural steroids, hypertonic saline, hyaluronidase, and various opioids mixtures became known and practical.

In addition, recognition that injured nerves changes their excitability from a silent nerve to a

spontaneously firing one was discovered when a median nerve responded to a peripheral nerve stimulator. The resolution of this hyperactivity helped to determine was if now CRPS Type II. 1 Somewhat later, Devor et al., demonstrated by using a RAT Injury Model, that the DRG cells can also fire spontaneously.³

One of the most frequently seen problems is how to determine the site of surgery. The methodology of diagnosing where the pain generator came from led to the use of selective stimulation nerve root by nerve root by the dorsal root ganglion area. Stimulation of the nerve root to the point of paresthesia helped the patient to identify the exact site of the pain generator. 1, 2, 3

Practical and technical considerations from the clinical experience led to the recognition of the danger sign of loculation-related compression of blood supply in the cervical spinal cord (PVCS – Peri-Venous Counter Spread). To decrease the pressure on the vessels, simple head and neck flexion with rotation (bilaterally) can be performed. This is done by chin to shoulder going from left to right. This motion will help open up areas to allow for lateral runoff. This is done by chin to shoulder, going from approximating the chin to the shoulder left and right.

Also recognized is the mobility of the dura independently from the spinal cord within the spinal canal. Restriction of this dural movement from adhesions is major contributor to neck pain. A recent 128 patient, prospective-randomized study demonstrated that cervical lysis of adhesions does reduce unnecessary surgical intervention.⁵ Both moderate and severe cervical spinal stenosis responded equally well to lysis of adhesions. It must be noted that midline injection during this procedure should be avoided. A more lateral injection will promote the opening of lateral runoff.⁶

References

1. Heavner JE, Racz G, Diederich JM. Peripheral nerve stimulation: current concepts; in Waldman SD, Winnie AP (eds): *Interventional Pain Management*. Philadelphia, Saunders, 1996, pp 423-425
2. Carragee E, Larkin TM, Cohen S. A Novel Technique for Delivery of Epidural Steroids and Diagnosing the Level of Nerve Root Pathology. *Journal of Spinal Disorders & Techniques*. Philadelphia, Lippincott Williams & Wilkins Inc., Volume 16, No. 2, pp. 186-192.
3. Devor M, Janig W, McLachlan E, Michaels M. Peripheral Nerve Injury Triggers Noradrenergic Sprouting Within Dorsal Root Ganglia. *Nature* 363, 543-546.
4. Ludger Gerdesmeyer, MD, PhD, et al. Percutaneous Epidural Lysis of Adhesions in Chronic Lumbar Radicular Pain: A Randomized, Double-Blind, Placebo-Controlled Trial. *Pain Physician* 2013; 185-196
5. Park EJ, Park SY, Lee SJ, Kim NS, Koh DY. Clinical Outcomes of Epidural Neuroplasty for Cervical Disc Herniation. *J Korean Med Sci* 2013; 28: 461-465
6. Park CH, Lee SH, Jung JY. Dural Sac Cross-Sectional Area Does Not Correlate with Efficacy of Percutaneous Adhesiolysis in Single Level Lumbar Spinal Stenosis. *Pain Physician* 2011; 14: 377-382.
7. Racz GB, Apicella E, Vohra P. Collegial Communication and Problem-solving: Intraspinal Canal Manipulation. *Pain Practice*, 13:8, 2013 667-670

VIKRAM B. PATEL, MD, DABA, FIPP, DABIPP

BIOGRAPHICAL SKETCH

Dr Vikram B. Patel is an interventional pain specialist with years of experience and has trained numerous pain physicians across the globe. Currently he is the Director at Phoenix Interventional Center for Advanced Learning near Chicago, USA. He has published numerous book chapters and journal articles and has directed cadaver courses for several years at ASA, ASRA-PM, CCF etc. He is an examiner for FIPP and DABIPP examinations and has served as a Board member for the FIPP Board of Examination.

LECTURE

ULTRASOUND BASICS, BENEFITS AND LIMITATIONS

Objectives:

Upon completion of this presentation, the attendee would be able to:

- a. Understand the basic mechanism of diagnostic ultrasound

- b. Get familiar with various types of ultrasound transducers (probes) and their uses
- c. Select proper equipment for a given study
- d. Learn various advantages and drawbacks in the use of ultrasound
- e. Learn how to identify various tissues on an ultrasound image

Key Points:

- a. Use of ultrasound for interventional procedures has been gaining popularity in the recent years and is a recognized modality in current practices
- b. Avoidance of radiation is one of the major advantages of ultrasound usage
- c. Ability to see fluids such as blood and inflammatory exudates is an added advantage during interventional procedures
- d. One of the biggest drawbacks is inability of ultrasound to penetrate osseous structures and thus blocking the view distal to the bone
- e. Ability to recognize the ultrasound image requires extensive knowledge of human anatomy and various acoustic characteristics of different tissues
- f. Knowledge of mechanism of ultrasound delivery and interpretation is a must for any ultra-sonologist.

MICHAEL SOMMER, MD, PHD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Micha Sommer moved to Maastricht University Medical Centre, The Netherlands, in 2002 and became a fellow in chronic interventional pain medicine. Since then, he has been working in this field along with anaesthesiology, mainly, paediatric anaesthesia. His special interest is focused on sonography in interventional pain medicine. He attended numerous workshops in Toronto, Canada, at the Mayo Clinic in Rochester, USA, and in Füssen, Germany.

He is an instructor of sonography in pain medicine at the WAPMU workshops, the LSORA pain workshops in London, the IPMN workshop in Warsaw, at the Dutch pain association, and for private companies. In the department of chronic pain medicine Maastricht, he was the first to start interventional pain management with ultrasound guidance. Meanwhile, the department performs around 900 ultrasound-guided procedures a year.

LECTURE

SONOANATOMY OF THE HIP AREA AND LOWER EXTREMITY

In this lecture sonoanatomy of the following structures is demonstrated: sacral hiatus, sacroiliac joint, piriformis muscle, trochanteric area, psoas muscle and psoas tendon from anterior, lateral femoral cutaneous nerve, hip joint, knee joint, suprapatellar recess, and collateral ligaments.

CHARLES DE OLIVEIRA, MD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Dr. Charles Oliveira is an Interventional Pain Physician at Singular Pain Center, Campinas-SP, Brazil.

LECTURE

LUMBOSACRAL SPINE, SONOANATOMY

This presentation addresses the most frequently-utilized ultrasound-guided procedures in the lower back, namely facet, middle branch, nerve root, psoas muscle, quadratum lumborum, caudal, and sacroiliac joint blocks.

AGNES STOGICZA, MD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Dr. Agnes Stogicza is an Assistant Professor at the University of Washington, Seattle. She has spent 14 years treating patients with acute and chronic pain, teaching fellows, residents and medical students. She is a member of the World Institute of Pain (WIP) Education Committee, and serves as an examiner for the FIPP and CIPS Board Certification. She has specialized training in fluoroscopic and ultrasound-guided minimally invasive interventional acute and chronic pain procedures as well as regional anesthesia techniques; medication management for medically challenging chronic pain patients is also part of her practice. Cryoneuroablation, one of the treatment options for neuropathic pain and neuralgias, is among her main interests, and, with the close cooperation of University of Washington Hernia Center, she has extensive experience with diagnostic and therapeutic procedures for chronic abdominal and groin pain patients. Her other main interest is cervicogenic headaches, for which cryoneuroablation also often proves to be helpful.

LECTURE

PERIPHERAL NERVES, SONOANATOMY

Peripheral nerves are responsible for a number of pain conditions from neuralgias and neuropathies to simple entrapment syndromes. Recognition of peripheral nerves on ultrasound is guided partly by understanding US morphology of the actual nerves, and larger part by understanding anatomy, path of the nerves and surrounding structures.

By the end of the lecture the one is expected to understand the

1. Clinical relevance of major and smaller peripheral nerves
2. The ir appearance on ultrasound:
 - a. Differences between hyper- and hypoechoic appearance of nerves
 - b. Recognize some major and some minor nerves, like:
 - i. Brachial Plexus from the roots to the final nerves, like superficial radial nerve.
 - ii. Lower abdominal nerves, like ilioinguinal, iliohypogastric, genitofemoral nerves
 - iii. Lateral femoral cutaneous nerve
 - iv. Intercostal nerves
 - v. Greater Occipital nerve at the C1-2 location.
 - vi. Sciatic, tibial and peroneal, femoral and saphenous nerves (if time allows with live scanning).

JOHN D. LOESER, MD, FIPP

BIOGRAPHICAL SKETCH

Dr. Loeser is Professor, emeritus, of Neurological Surgery and Anesthesia and Pain Medicine at the University of Washington in Seattle, WA, USA.

LECTURE

THE ROLE OF PERIPHERAL NERVES IN CRPS

Complex Regional Pain Syndrome (CRPS) has thus far defied mechanistic explanation, although theories and suppositions abound. Type II clearly follows an injury to a major peripheral nerve and this clinical phenomenon leads to the concept that the pain syndrome is based upon a peripheral nerve injury. Type I follows injury to the extremity without a peripheral nerve injury and its mechanistic basis is more opaque. Furthermore, the mechanistic basis for the onset of the pain syndrome may not be the underlying cause of the chronic pain, thereby complicating an understanding of why CRPS persists. Many of the clinical phenomena suggest central aspects to the pain as well as peripheral nerve and tissue factors. This presentation will focus upon the known peripheral nerve factors that could contribute to both the onset and the perpetuation of the pain syndrome. Evidence from both patients and experimental models will be discussed.

ROBERT M. LEVY, MD, PHD

BIOGRAPHICAL SKETCH

Robert M. Levy is the Director of the Marcus Neuroscience Institute and Chairman of the Sandler Department of Neurosurgery and Professor at Florida Atlantic University in Boca Raton, Florida. His medical degree was earned at Stanford University Medical School, where he also received his doctorate in neurosciences and completed a postdoctoral fellowship. He performed a postdoctoral fellowship and residency in neurological surgery at the University of California-San Francisco, with mentors including Drs. Howard Fields, Dr. Charles Wilson and Dr. Yoshio Hosobuchi. He then served as Professor of Neurological Surgery, Physiology, and Radiation Oncology at the Feinberg School of Medicine of Northwestern University. He then was Professor and Chairman, Department of Neurological Surgery and Co-Director of the UF Health Jacksonville Neuroscience Institute at the University of Florida College of Medicine in Jacksonville, FL. Dr. Levy has authored several textbooks and published over 200 journal articles. He has been the recipient of many national and international honors and awards and has been listed in the Best Doctors in America since its inception. Dr. Levy is currently on the Board of Directors of the International Neuromodulation Society and he serves as Editor-in-Chief of the journal Neuromodulation:Technology at the Neural Interface. His current research involves novel applications of neurostimulation and targeted drug delivery to the brain.

LECTURE

NEUROMODULATION: NEW DIRECTIONS

Despite a long period of scientific quiescence, the field of neuromodulation has undergone a tremendous Renaissance of research and technologic innovation. The first 30 years of spinal cord and peripheral nerve stimulation development produced only three major evolutionary additions: percutaneously implanted coaxial leads, implantable pulse generators and rechargeable pulse generators. In the past 15 years, however, there has been both evolutionary and revolutionary progress resulting in tremendously improved clinical outcomes.

Evolutionary changes include the ability to introduce paddle leads using percutaneous techniques, using segmented stimulating leads which allow for directional stimulation and the use of novel stimulation targets such as the dorsal root ganglion.

Disruptive changes include the use of what has been termed “novel waveforms” which are, in fact, novel pulse sequences to improve SCS and PNS efficacy. These include high frequency (10K Hz and higher) peripheral nerve and spinal cord stimulation, burst stimulation and direct neural feedback modulated stimulation. These technologies have increased the efficacy of stimulation trials to nearly 90% and the long term therapeutic efficacy of over 75%. More importantly, these novel approaches have or are being subjected to randomized controlled trials establishing a high level of medical evidence to support their use.

KRIS C. P. VISSERS, MD, PHD, FIPP

BIOGRAPHICAL SKETCH

K. Vissers is anesthesiologist, professor in Pain and Palliative Medicine and chairman of the Radboud Expertise Center of Pain and Palliative Medicine of the Radboud University Nijmegen Medical Centre in the Netherlands. He is also scientific chairman of the Department of Anesthesiology, Pain and Palliative Medicine of this University. He is currently President of the World Institute of Pain.

LECTURE

IS CANCER PAIN MANAGEMENT EVOLVING?

Upon completion of this session attendees should be able to discuss:

- The incidence and prevalence of pain in patients with cancer at the different stages of the disease
- The need for close monitoring of pain in cancer and its evolution
- The different potential causes of pain in patients with cancer
- The complexity of the pain in cancer and the need for multidimensional management
- The different steps in the management of cancer pain, including evidence based guidelines for interventional pain management

Key points

Pain is the most frequently reported symptom in patients with cancer. It is present at all stages of the disease.

Appropriate pain management can only be achieved when the pain frequency and intensity is documented and followed as a guide for treatment adaptation

Pain is in theory a physical experience, but it is well known that the psychological aspect, the potential for coping and accepting, as well as the spiritual component are important

The WHO pain ladder has the merit of having drawn the attention to a step wise treatment schedule. The newer developments clearly indicate a place for the adjuvant – anti neuropathic drugs.

The need for a multidimensional, multidisciplinary management of the different aspects of pain including physical, emotional and social factors, is now accepted.

The interventional pain management techniques offer an important possibility to reduce pain while reducing the need for pain medication and its side effects in patients with complex diseases and difficult to treat pain. The use of those techniques should be considered earlier in the treatment plan.

PETER S. STAATS, MD, MBA, FIPP

BIOGRAPHICAL SKETCH

Peter S. Staats, MD, MBA was the founder of the Division of Pain Medicine at Johns Hopkins University School of Medicine in 1994 and served as its director for 10 years. He has trained fellows and residents from around the world in the areas of pain management and neuromodulation. He is currently a founder and managing partner of Premier Pain Centers, and on the board of directors of electrocore medical.

He is currently the Past President of the American Society of Interventional Pain Physician (ASIPP), Southern Pain Society, NJ society of Interventional Pain Physicians and the North American Neuromodulation Society.

Dr. Staats continues to serve as Adjunct Associate Professor at Johns Hopkins in the Department of Anesthesiology and Critical Care Medicine.

He is also a fellow of the World Institute of Pain and the North American Neuromodulation Society (WIP). He is currently Chair of the Board of Examination for WIP. He is the author of over 300 hundred articles, abstracts and book chapters regarding pain management and neuromodulation. He has written or co-edited 10 books on the science and clinical practice of interventional pain medicine. He remains active with patients and clinical research in a variety of areas related to pain and neuromodulation.

Dr. Staats patents have resulted in novel drug treatment strategies that are commercially available. His work has been featured numerous times in local and national media of all kinds, including the Discovery Channel, Good Morning America, the BBC, along with multiple journals JAMA the lancet among others. He has won numerous awards, from local to national and international, including New Jersey Top Doctor since 2007 through present and Americas Top Doctor since 2001 and has received the physician of the year award from NY, NJ and West Virginia pain societies and the Presidents distinguished service award from the Southern Pain Society and “the state society award” from ASIPP (2014).

LECTURE

ELECTRICAL NEUROMODULATION OVERVIEW – OPTIMAL STIMULATION SITE AND PARAMETERS

ADNAN A. AL-KAISY, MD, CHB, FIPP

BIOGRAPHICAL SKETCH

Dr Al-Kaisy is currently Clinical Lead and Consultant at the Pain Management and Neuromodulation Centre Guy's and St Thomas Hospital. He trained in Chronic Pain Medicine at The Walton Centre, Liverpool for Neurology and Neurosurgery. He has a fellowship in Chronic Pain Management at University of Toronto Hospital, Canada.

He has a number of publications and research in a variety of categories in pain management.

He is the chair of the London Spine Forum, vice chair of the World Institution of Pain UK and Ireland and chair of the Hands on Workshop and London Spine Pain Symposium at Guy's and St. Thomas' Hospital.

His interest is in the management of spine and neuropathic pain. He has extensive experience in Neuromodulation: Spinal Cord Stimulation for Failed Back Surgery Syndrome, Intractable Angina, Nerve Lesion, and Sacral Nerve Stimulation for Urinary Incontinence, Interstitial Cystitis and Bowel Incontinence. He is a clinical pioneer of High Frequency Stimulation. He is the P.I of a number of researches looking into efficacy of High Frequency Stimulation in the management of various pain conditions including headache. Most recently he pioneered a new technique to stimulate the Dorsal Root Ganglion in the management of neuropathic pain using a transgrade approach.

LECTURE

AXIAL BACK PAIN TREATMENT WITH HIGH FREQUENCY SPINAL CORD STIMULATION UPDATE

Introduction: The effective use of spinal cord stimulation (SCS) for low back and leg pain is almost predominantly restricted for pain as a result of previous spinal surgery. This study represents 24 month data on a cohort of patients with low back pain not caused by back surgery treated with a novel high frequency spinal cord stimulator.

Objective: To determine if long term outcomes for treating low back pain without previous spinal surgery with SCS could be sustained at 24 months.

Methods: A cohort of 21 patients with chronic low back pain without previous spinal surgery were implanted with a spinal cord stimulator capable of delivering 10000Hz stimulation. Patients were selected by a multidisciplinary team and all had a trial stimulation prior to permanent implantation.

Follow up was at 24 months.

Results: 20 out of 21 patients received a permanent implant. Improvements in pain intensity, quality of life, functional improvement and medication use were seen at 24 months. No serious adverse events were noted.

Conclusion: The safe and effective use of high frequency spinal cord stimulation for low back pain without previous spinal surgery is sustained long term at 24 months.

LUDGER GERDESMEYER, MD, PHD, FIPP

BIOGRAPHICAL SKETCH

Chairman of the Orthopaedic/Trauma Department of the University of Kiel, Germany

LECTURE

STUDY DESIGN

RICHARD WEINER, MD

BIOGRAPHICAL SKETCH

Dr Richard L. Weiner, MD FACS FANN is a board certified neurosurgeon with Dallas Neurosurgical and Spine Associates, and Vice-Chair of the Department of Neurosurgery at Texas Health Resources Presbyterian Hospital, Dallas, Texas, USA. He is also a Clinical Associate Professor of Neurosurgery at the University of Texas, Southwestern Medical School in Dallas, Texas, USA. He has been involved in developing and implementing surgical and neuromodulation treatments for a variety of chronic pain indications over the past 35 years and developed subcutaneous neurostimulation for headaches and other peripheral nerve conditions.

LECTURE

EVOLVING NEUROMODULATION SYSTEMS

The field of Neuromodulation over the past few years is seeing a rapid growth in the array of new devices, implant techniques and novel programming algorithms directly applicable to improving the lives of our patients with chronic pain unresponsive to other treatment modalities. Various configurations of frequencies, waveforms and electrodes integrated within both wired and wireless hardware devices should help increase the armamentarium needed to be inventive and successful in the pain management arena.

HARIHARAN SHANKAR, MD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Dr. Hariharan Shankar is a Professor of Anesthesiology at the Medical College of Wisconsin, Milwaukee, USA. He is Board certified in Anesthesiology and Pain medicine. He is the Director of the Pain clinic at the Zablocki VA Medical Center, Milwaukee. Besides his active teaching role for both the anesthesia residency and the pain medicine fellowship programs for which he has received "Teacher of the Year" awards, he is one of the pioneers in the use of ultrasound imaging and lectures nationally and internationally about the use of ultrasound imaging in pain medicine. He has to his credit many abstracts, book chapters, and peer reviewed publications. His area of research is in the use of ultrasound imaging for pain medicine interventions.

LECTURE

UPPER EXTREMITY SONOANATOMY

Objectives

- At the end of the lecture, the participants would be able to review the anatomy and sonoanatomy relevant for shoulder, elbow and wrist joints and associated structures

CHRIST DECLERK, MD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Dr. Christ Declerck MD, FIPP, CIPS is a board certified anesthesiologist and works as a staff member of the Multidisciplinary Pain Center in Bruges, Belgium.

The MPC consists of three fulltime Pain Physicians with clinical and teaching activities in the Tertiary Referral Hospital Saint Jan and General Hospital Saint Lucas.

The MPC utilizes a multi-modal approach combining minimally invasive fluoroscopic and ultrasound-guided interventions with targeted medical therapies and the involvement of physical therapists and other consulting specialists when appropriate.

A residency program in our center is provided where the goal is to develop the residents into pain physicians with strong foundation in patient care and interventional pain therapy.

Dr. Declerck 's interests include basic and advanced interventional pain management more specific ultrasound-guided nerve ablation techniques.

Spinal Cord stimulation , Peripheral Nerve Modulation and intrathecal drug delivery systems. A more specific interest and experience of his is the treatment by cryoneurolysis of peripheral nerves, SI joints and cervical facet syndromes.

LECTURE CERVICAL SPINE SONOANATOMY

Ultrasound equipment is more ergonomic in use than fluoroscopy and it is also less expensive. It has no radiation exposure and allows real-time visualization of muscles, nerves, blood vessels and soft tissue and brings more accuracy to target the nerves and joints. The major limitations for ultrasound are the loss of resolution with increased depth and lack of visualization behind bony structures. For the neck pain procedures, I'm convinced, that ultrasound is the best choice for imaging and approaching the targeted nerves.

In this lecture we will discuss the ultrasound guided diagnostic and therapeutic interventions for cervical facet syndrome, cervicogenic headache and radicular cervical pain syndromes. We will focus on the safety of the procedures, anatomical landmarks and structures and discuss the feasibility of some interventions. Thorough knowledge of the anatomy is the cornerstone for safe cervical spinal pain interventions. As with any new technique that is highly user dependent, the physician is advised to use judgment, and target higher risk areas once the easier targets mastered.

THIAGO NOUER, MD ANESTHESIOLOGIST INTERVENTIONAL PAIN CIPS

LECTURE PELVIC PAIN (LECTURE AND LIVE DEMO)

Ultrasound examination and procedures for diagnose and treatment in pelvic Pain.

STANDIFORD HELM, MD, FIPP

BIOGRAPHICAL SKETCH

Dr. Helm is the medical director of The Helm Center for Pain Management, a comprehensive, multidisciplinary pain management center located in Orange County, California. Dr. Helm has been a Fellow of Interventional Pain Practice since 2003. He has subspecialty certification in Pain Medicine from the American Board of Anesthesiology. He is a diplomate of the American Board of Interventional Pain Physicians and the American Board of Pain Medicine. Dr. Helm went to Harvard College and to Tufts University School of Medicine. He did an Internal Medicine internship at Boston City Hospital and did his Anesthesia training at UCLA. Dr. Helm has been practicing interventional pain management in 1982. Dr. Helm is a past President of the American Society of Interventional Pain Physicians. He has published and lectured extensively on a variety of interventional pain management topics.

LECTURE CURRENT TRENDS IN RADIOFREQUENCY FACET DENERVATION

Objectives

Upon completion of this presentation attendees will be able to discuss

- Issues in the diagnosis of facet disease
- Diagnosis in the absence of a gold standard
- The advantages and disadvantages of various different approaches to diagnosing facet disease
- Alternative ways of treating facet disease other than heat ablation
- Different ways of applying radiofrequency to ablate nerves
- New frontiers in the heat ablation of nerves.

References

- Falco FJ, Manchikanti L, Datta S, Sehgal N, Geffert S, Onyewu O, Singh V, Bryce DA, Benjamin RM, Simopoulos TT, Vallejo R, Gupta S, Ward SP, Hirsch JA. An update of the systematic assessment of the diagnostic accuracy of lumbar facet joint nerve blocks. *Pain Physician*. 2012;15:E869-907.
- Falco FJ, Manchikanti L, Datta S, Sehgal N, Geffert S, Onyewu O, Zhu J, Coubarous S, Hameed M, Ward SP, Sharma M, Hameed H, Singh V, Boswell MV. An update of the effectiveness of therapeutic lumbar facet joint interventions. *Pain Physician*. 2012;15:E909-953.
- Holz SC, Sehgal N. What is the correlation between facet joint radiofrequency outcome and response to comparative medial branch blocks? . *Pain Physician*. 2016;19:163-172.
- Manchikanti L, Nampiaparampil DE, Manchikanti KN, Falco FJE, Singh V, Benjamin RM, Kaye AD, Sehgal N, Soin A, Simopoulos TT, Bakshi S, Gharibo CG, Gilligan CJ, Hirsch JA. Comparison of the efficacy of saline, local anesthetics, and steroids in epidural and facet joint injections for the management of spinal pain: A systematic review of randomized controlled trials. *Surg Neurol Int* 2015; 6:S194-S235. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4431057/>
- Mekhail N, Cheng J. Temperature mapping of cooled radiofrequency lesion of human cadaver thoracic facet medial branches. *Clin J Pain*. 2011;27:56-61.
- Costandi S, Garcia-Jacques M, Dews T, Kot M, Wong K, Azer G, Atalla J, Looka M, Nasr E, Mekhail N. Optimal temperature for radiofrequency ablation of lumbar medial branches for treatment of facet-mediated back pain. *Pain Practice*. 2015.
- Bajaj PS, Napolitano J, Wang W, Cheng J, Singh JR. Cooled versus conventional thermal radiofrequency neurotomy for the treatment of lumbar facet-mediated pain. *PM&R*. 2015;7:1095-1101.
- Manchikanti L, Hirsch JA, Falco FJ, Boswell M. Management of lumbar zygapophysial (facet) joint pain. *World J Orthop*. 2016.
- Lord SM, Barnsley L, Bogduk N. Percutaneous radiofrequency neurotomy in the treatment of cervical zygapophysial joint pain: A caution. *Neurosurgery*. 1995;36:732-739. Lord SM, Barnsley L, Bogduk N. The utility of comparative local anesthetic blocks versus placebo-controlled blocks for the diagnosis of cervical zygapophysial joint pain. *Clin J Pain*. 1995;11:208-213.
- Cohen SP, Strassels SA, Kurihara C, Griffith SR, Goff B, Guthmiller K, Hoang HT, Morlando B, Nguyen C. Establishing an optimal "cutoff" threshold for diagnostic lumbar facet blocks: A prospective correlational study. *Clin J Pain*. 2013;29:382-391.
- Cohen SP, Williams KA, Kurihara C, Nguyen C, Shields C, Kim P, Griffith SR, Larkin TM, Crooks M, Williams N, Morlando B, Strassels SA. Multicenter, randomized, comparative cost-effectiveness study comparing 0, 1, and 2 diagnostic medial branch (facet joint nerve) block treatment paradigms before lumbar facet radiofrequency denervation. *Anesthesiology*. 2010;113:395-405.
- Ball RD. The science of conventional and water-cooled monopolar lumbar radiofrequency rhizotomy: An electrical engineering point of view. *Pain physician*. 2014;17:E175-E211.
- Foley J. Focused ultrasound state of the field. Charlottesville: Focused Ultrasound Foundation;2016.
- Brown M, Farquhar-Smith P, Williams J, Ter Haar G. The use of high-intensity focused ultrasound as a novel treatment for painful conditions—a description and narrative review of the literature. *British journal of anaesthesia*. 2015;115:520-530.
- Weeks EM, Platt MW, Gedroyc W. Mri-guided focused ultrasound (mrgfus) to treat facet joint osteoarthritis low back pain—case series of an innovative new technique. *European radiology*. 2012;22:2822-2835.
- Black MA, Craig BA. Estimating disease prevalence in the absence of a gold standard. *Statistics in medicine*. 2002;21:2653-2669.
- Toft N, Jørgensen E, Højsgaard S. Diagnosing diagnostic tests: Evaluating the assumptions underlying the estimation of sensitivity and specificity in the absence of a gold standard. *Preventive veterinary medicine*. 2005;68:19-33.
- Garrett ES, Eaton WW, Zeger S. Methods for evaluating the performance of diagnostic tests in the absence of a gold standard: A latent class model approach. *Statistics in medicine*. 2002;21:1289-1307.

JAN VAN ZUNDELT, MD, PHD, FIPP

BIOGRAPHICAL SKETCH

Jan Van Zundert is head of the multidisciplinary pain centre of the Ziekenhuis Oost-Limburg, Genk, Belgium. He has a scientific affiliation with the Maastricht University Medical Center, Maastricht, The Netherlands. He is currently head of sections of the WIP and is active in other pain societies. His main research interests are: Pulsed Radiofrequency, and Evidence Based Pain Medicine. He is an active promotor of integrated patient care with respect of a clinical pathway.

LECTURE

REVIEW OF THE EVIDENCE OF PULSED RADIOFREQUENCY

At the end of this session participants will be able to discuss:

- The principle of Pulsed radiofrequency in comparison with conventional radiofrequency.
- The evidence of PRF in cervical radicular pain
- The evidence of PRF in lumbosacral radicular pain
- The evidence of PRF in occipital neuralgia
- The evidence of PRF in facial pain
- The evidence in other peripheral nerve pain syndromes such as e.g. shoulder pain

Key points

Pulsed radiofrequency is an alternative delivery method of the high frequency current, with current delivered in pulses followed by a silent period to allow produced heat to be washed out. The aim is to keep the electrode tip temperature below the neurodestructive level of 42°C. Since the first publication in 1998, there are now approximately 200 publications with 24 RCT's. The studies on the potential mode of action was reported in 33 publications of basic research. PRF adjacent to the cervical DRG was documented to be effective in the treatment of cervical radicular pain.

There are indications of the effectiveness of PRF adjacent to the lumbar DRG for the treatment of lumbosacral radicular pain.

PRF treatment of the occipital nerves was shown to be effective in the treatment of occipital neuralgia. A RCT comparing the effect of RF with PRF of the Gasserian ggl for the management of trigeminal neuralgia showed the effect of PRF to be of shorter duration. In the RF group facial numbness was reported.

Case series of PRF treatment of the Gasserian ggl for the management trigeminal neuralgia report pain relief without the risk of complications. Long-term follow-up showed good to excellent result that lasted for a mean period of 20 months.

PRF treatment of the pterygopalatine ggl was studied for the management of cluster headache equally resulted in pain relief in 54% of the patients lasting for a mean period of 29 months.

There is increasing evidence of the effect of PRF of the suprascapular nerve for the management of shoulder pain.

PRF treatment of peripheral nerves is studied for the management of a variety of pain syndromes. Up till now no neurological complications have been reported.

JUAN CARLOS FLORES, MD, FIPP

BIOGRAPHICAL SKETCH

Prof Dr Juan Carlos Flores is Director of CAIDBA (EPP Award) Pain Center; Professor of Anatomy of La Plata School of Medicine Buenos Aires Province, Argentina; Fellow Interventional Pain Practice; Chairman Latin American Section World Institute of Pain; Chief of Pain Medicine of Clínica San Camilo; Director del Workshop Universitario CAIDBA sobre Técnicas Intervencionistas para Tratamiento del Dolor Refractario 2015/2016; Autor Textbook: Medicina del Dolor, Perspectiva Internacional.

JC Flores Elsevier. Prof Flores works from 2005 with World Institute of Pain globally and specially in the Latin American Section very close with educational objectives in cadaver workshops and examination activities.

From May of 2001 when Dr Racz visited Buenos Aires Dr Flores is giving Cadaver Workshop every year. Director Centro de Atención Integral del Dolor Buenos Aires CAIDBA www.caidba.com EPP Award 2011-2015

Director del Workshop Universitario CAIDBA sobre Técnicas Intervencionistas para Tratamiento del Dolor Refractario 2014/2016. Workshop with Ultrasonography and Fluoroscopy under Cadaveric and Hybrid Human Simulators

Profesor Asociado de Anatomía Cátedra Prof Galli Universidad Nacional de La Plata, Buenos Aires, Argentina

Director of Laboratories of Unit Anatomico-Clinic of Pain Cathedra of Anatomy Prof Galli UNLP (La Plata School of Medicine)

Director del Área de Investigaciones Básicas y Aplicadas en Medicina del Dolor de la UNLP (La Plata School of Medicine)

Chairman Latin American Section World Institute of Pain

Past Chairman WFSA & CLASA Training Center Pain Medicine

Jefe Sección Medicina del Dolor Clínica San Camilo

Miembro del Comité Editorial Pain Practice, Rev Españ del Dolor, Rev Uruguaya de Anestesiología y Reanim y Past - Rev Argentina de Anestesiología

Past President Argentinian Federation of Anesthesia, Analgesia and Reanimation

Past President Pain Foundation (Fundación Dolor) Argentina

Past Director Carrera de Médicos Especialistas en Anestesiología de la Universidad de Buenos Aires

Past Director del Curso Universitario de Expertos en Medicina del Dolor y Cuidados Paliativos de la Fundación Dolor y la Universidad de Buenos Aires

LECTURE

ALERT! RADIATION SAFETY

Objectives:

Upon completion of this presentation attendees will be able to discuss

- Ionizing radiation. Which are their biological effects?
- Which are the levels of exposition to X Rays of people that work in operating room?
- Which kind of measures we can take to minimize our exposition during pain procedures?
- Consideration to take account during workshops to protect trainees, technicians and instructors?
- Basic knowledge what must manage the pain expert who use pain procedures with X Rays
- How much mili-sievert exposes your body when are you using pulsed mode or continuous mode?

Key Points

- What type of radiation and risk of contamination we must know and protect for?
- Biological effects of radiation?
- Which are the shielding or protective resources to decrease patient and staff exposure to X Rays?
- Criteria, check list, and rules before use X-Rays for pain procedures
- Improving of knowledge of anatomy and radiology decrease radiation exposition.
- What general principles could include Guidelines for Radiation Safety?
- During education and training process must we use specific recommendations, curricula and evaluation about Radiation Safety to teach to protect trainees and ourselves?

HEMMO BOSSCHER, MD, FIPP

BIOGRAPHICAL SKETCH

Hemmo Alexander Bosscher was born January 25th 1959 in Amersfoort, The Netherlands. He completed his medical school at the Vrije Universiteit in Amsterdam obtaining his medical degree in 1988. He did an internship in internal medicine at the Veteran Administration, Georgetown University, in Washington D.C. and residency in Anesthesiology at the University of Massachusetts in Worcester. He received additional fellowship training in pediatric anesthesiology at the Hospital for Sick Children in Toronto, Canada and cardiac anesthesiology at the Antonius Hospital in Nieuwegein, The Netherlands. In 1997 Dr. Bosscher took a position as assistant professor in anesthesiology at Texas Tech University in El Paso, Texas. However, interest in the treatment of chronic pain changed his career path. After completing a pain management fellowship at Texas Tech University in Lubbock, Texas, he started a successful private pain management practice in Lubbock, but has kept a clinical appointment at Texas Tech University and is currently associate professor there. Since 2014, his practice is part of the Grace Health System in Lubbock.

Dr. Bosscher's ongoing research involves the endoscopic evaluation of the spine in patients with low back pain. With the late Dr. James E. Heavner, DVM, FIPP, he published a series of papers and has given a number of presentations on the topic. He is currently a member of the American Society of Anesthesiologists, World Institute of Pain, and American Society of Anatomists. He is also active as a workshop instructor and examiner for the Federation of Interventional Pain Physicians and the Texas Pain Society.

Hemmo and his wife, Karen, of twenty-four years have two children, Michelle and Jennifer and a grandson Jayden. Hemmo's interests outside the realm of pain management are music, mathematics and golf.

LECTURE

COMMON LOW BACK PAIN

Objectives

- To present a hypothesis of the pathogenesis of "Common Low Back Pain"
- To illustrate the theory with examples of its application to pain practice.

KEY POINTS

- Epiduroscopy research suggests that in patients diagnosed with non-specific low back pain, a specific site in the spinal canal exists from where low back and/or leg pain originates.
- A peridural membranous structure in the neural foramen forms a suprapedicular compartment where inflammatory mediators released from a damaged disc or facet joint may accumulate.
- Hypothesis: Non-specific low back pain originates from inflammation and sensitization of this well innervated membrane.
- Since this specific pathological condition is common, it may be referred to as "Common low back pain" instead of "Non-specific low back pain".
- The theory is consistent with clinical evaluation of low back pain and interventions currently performed in pain practice.
- PACIF targets the suprapedicular compartment directly

LORAND EROSS, MD, PHD, FIPP

BIOGRAPHICAL SKETCH

Dr. Lorand Eross is the head of the Functional Neurosurgical Department and Center of Neuromodulation at the National Institute of Clinical Neuroscience in Budapest. He is the director of the Epilepsy Program at the institute. He got his PhD degree at Semmelweis University in 2010 in epilepsy surgery. His main interest is epilepsy surgery, movement disorder surgery, neurosurgical treatment of pain, spasticity and neuromodulation. He has an active research group in the field

of epilepsy, chronic pain. He developed new intraoperative localisation method for invasive recordings in epilepsy surgery. His activity includes research and development of in vitro and in vivo electrophysiological and optical investigation methods. He is lecturer at the Medical faculty of the Semmelweis and the Szeged Universities and at the Pazmany Peter Catholic University, Faculty of Information Technology in bionical sciences.

LECTURE

NEUROSURGICAL APPROACHES TO CHRONIC PAIN MANAGEMENT

Objectives

Upon completion of this presentation attendees will be able to discuss

- What sets neurosurgical approaches from other interventional pain therapies
- The difference between ablative and neuromodulative procedures
- Barriers to the use of ablative and neuromodulative approaches in clinical practice
- Expected outcomes
- Future direction of neurosurgical pain therapies

Key Points

- Selective ablative procedures rarely used today in neurosurgical clinical practice for pain
- Microsurgical DREZotomy, percutan cervical cordotomy, thalamotomy for nociceptive pain, and more often percutan Gasserian ganglion thremocoagulation for Trigeminal neuralgia left nowadays in the minimal invasive neurosurgical practice in pain surgery.
- Barriers to the use of these procedures in clinical practice include limited training opportunities, and the procedure is technically demanding.
- Invasive neuromodulation or neural network surgery includes primary motor cortex, DBS, SCS, periferial nerve and field stimulation for neuropathic pain.
- Accumulating evidence in SCS indicates neuromodulation is safe, clinically effective, and a cost effective procedure in failed beck surgery syndroma and CRPS.
- MCS is the most effective in thalamic pain. Multitarget DBS can help for central neuropathic pain after spinal cord injury. Periferial nerve stimulation effective in cervicogenic headache, migraine and Cluster headache, but we need more clinical evidences for these procedures.
- Neural network surgery offers a range of opportunities in basic and translational research seeking to improve management of neuropathic pain.

References

1. Burchiel K, editor , Surgical management of pain NY, Thieme 2002
2. Lozano A., Gildenberg Ph, Tasker R editors, Textbook of Stereotactic and Functional Neurosurgery Springer 2009
3. Kanpolat Y.,Savas A., Bekar A., Berk C. Percutaneous controlled radiofrequency trigeminal rhizotomy for the treatment of idiopathic trigeminal neuralgia:25 year experience with 1600 patients Neurosurgery 2001;48(3):524-32
4. North RB, Kidd DH, Frarrokhi F, Piantadosi S. Spinal cord stimulation versus repeated lumbosacral spine surgery for chronic pain: A randomized control trial. Neurosurgery 2005;56(1):98-106
5. Jeanmonod D, Moprel A. Central lateral Thalamotomy for Neuropathic Pain in Lozano A., et al editors, Textbook of Stereotactic and Functional Neurosurgery 2009, p:2082-2096

PETER STAATS, MD, MBA, FIPP

LECTURE

MINIMALLY INVASIVE TREATMENT OF SPINAL STENOSIS

MARSHALL DEVOR, PHD

BIOGRAPHICAL SKETCH

Marshall Devor is the Alpert Professor of Pain Research at the Department of Cell and Developmental Biology, Institute of Life Sciences, and the Center for Research on Pain, at the Hebrew University of Jerusalem (HUJI) in Jerusalem, Israel.

LECTURE

IMPULSE DISCHARGE ORIGINATING IN THE DRG

Objectives

Upon completion of this presentation attendees should have an understanding of:

- the dorsal root ganglion (DRG) as the location of primary sensory neurons.
- the origin, internal structure, location and connectivity of the DRG.
- the types of neurons and supporting cells present in the DRG.
- impulse activity in intact DRG neurons.
- ectopic electrogenesis in DRG neurons after nerve injury.
- subthreshold oscillations as drivers of ectopic impulse generation.
- suppression of ectopic impulse generation with membrane stabilizing drugs.
- central sensitization as an amplifier of peripheral sensory input.
- the role of DRG ectopia in phantom limb pain.
- evidence for DRG ectopia in radicular low back pain.
- DRG suppression versus DRG stimulation.

Key Points

- The DRG is not merely a passive structure in the transmission of sensory signals from the peripheral to the central nervous systems (PNS to CNS).
- Ectopic discharge originating in the DRG contributes to neuropathic pain.
- Phantom limb pain is probably driven by spontaneous ectopic discharge generated in the DRG, rather than dysfunctional cortical plasticity.
- The DRG is a therapeutic target for the control of chronic pain.

References

Defrin R, Devor M, Brill S (2014) Tactile allodynia in patients with lumbar radicular pain (sciatica). *Pain* 155:2551-2559.

Devor M (1999) Unexplained peculiarities of the dorsal root ganglion. *Pain suppl.*6:S27-S35

Devor M (2013) Neuropathic pain: pathophysiological response of nerves to injury. Chapter 61. In: Wall and Melzack's Textbook of Pain (McMahon, S. L. et al., eds), pp 861-888 London: Churchill Livingstone.

Nordin M, Nystrom B, Wallin U, Hagbarth K-E (1984) Ectopic sensory discharges and paresthesiae in patients with disorders of peripheral nerves, dorsal roots and dorsal columns. *Pain* 20:231-245.

Vaso A, Adahan HM, Gjika A, Zahaj S, Zhurda T, Vyshka G, Devor M (2014) Peripheral nervous system origin of phantom limb pain. *Pain* 155:1384-1391.

Wall PD, Devor M (1983) Sensory afferent impulses originate from dorsal root ganglia as well as from the periphery in normal and nerve injured rats. *Pain* 17:321-339.

ROBERT M. LEVY, MD, PHD

LECTURE

THE CLINICAL SCIENCE BEHIND DRG STIMULATION AND THE ACCURATE RCT

While initially thought to be a passive structure providing nutritional and energetic support to the proximal and distal primary sensory axons, the dorsal root ganglion has more recently been demonstrated to play a critical role in the modulation of pain transmission from the periphery to the central nervous system. The DRG plays a particularly critical role in the development and maintenance of chronic neuropathic pain. As a result of peripheral nerve injury and the cascade of events that follow it, DRG cells become hypersensitized and respond to activation thresholds 50% lower than normal DRG cells. DRG stimulation takes advantage of this potentially therapeutic window; stimulation across the DRG functionally blocks the output of the incoming peripheral pain fibers and DRG.

Following a series of proof of concept trials (in the US) and prospective trials (in Europe and the UK), a large scale, prospective randomized trial of DRG stimulation versus conventional dorsal column stimulation was performed. The ACCURATE trial evaluated safety and efficacy of DRG stimulation as well as a number of secondary and tertiary variables. In all primary measures, DRG stimulation proved to be superior to dorsal column stimulation at a high level of statistical significance. The study results will be discussed in detail. The results of the study have led to FDA approval of DRG stimulation and designation by the FDA as a superior therapy to dorsal column stimulation in the United States.

ADNAN A. AL-KAISY, MB, CHB, FIPP

LECTURE

NEUROMODULATION OF THE DRG

Introduction: Chronic neuropathic pain is a widespread problem with social and economical impact. Many patients with neuropathic pain continue to suffer despite optimal therapy. Despite considerable clinical neuroscience research, development of rationally based novel treatments has been slow. Dorsal root ganglion (DRG) has a significant role in the managing chronic pain. Recently, neuromodulating this targeted site is resulting in remarkable outcomes.

Objective: To explore the safety and efficacy of Noval TransGrad DRG stimulation technique in a cohort of subjects who were suffering with chronic neuropathic pain, refractory to conventional treatments.

Methods: A cohort of 67 patients with neuropathic pain affecting upper or lower limbs underwent trial of DRG stimulation using TransGrad technique. Patients were selected by a multidisciplinary team. Follow up was from 6 months up to 4 years.

Results: 42 out of 67 patients received a permanent implant. Improvements in pain intensity, quality of life, functional improvement and medication use were seen at 4 years. No serious adverse events were noted.

Conclusion: The safety and efficacy of DRG stimulation using TransGrad technique in the management of neuropathic pain has been sustained for up to four years.

GABOR B. RACZ, MD, FIPP

LECTURE

THE DRG - LINKING PAIN AND TREATMENT MECHANISMS CLINICAL INTERPRETATION

In clinical decision making, understanding the mechanism of action is critically important. In the late 80's and early 90's, the use of peripheral nerve stimulation by implanting electrodes close to the involved nerve allowed us to understand better the peripheral action in patients. One of such patients presented with an injured median nerve which was found to have spontaneous firing. The spontaneous firing increased with upper extremity movement, which explained why the patient would tend to assume a protective, flexion position in a case of upper extremity nerve involvement. The sustained spontaneous firing will result in behavior modifications and sustained immobility. Devor et al., nicely demonstrated single-cell, spontaneously firing of the dorsal root ganglia in the animal injury model preparation. The pain generator in the periphery thus is responsible for involvement of the dorsal root ganglion and the secondary changes in the spinal cord. Clinical findings have supported this concept of suppression of spontaneous firing in the periphery and the dorsal root ganglion which can rapidly to stop the allodynia "touch-me-not pain" but not the other components of pain.

The simple fact that site-specific suppression of both the GRG and nerve proximal to the site of injury from dilute, local anesthetic leads one to deduce that the site of action for allodynia stems from the spinal cord. Therefore, sustained suppression of the DRG and peripheral nerves are necessary for the reversal of deep, aching pain and shooting, radicular pain.

Suggesting that the cranial components are not the site of action for allodynia comes from the failure of deep brain stimulation to stop allodynia.

In rare instances, it is hard to establish where the pain generator comes from. In one patient, no other pathology could be identified except for an ipsilateral separation of pseudo-arthritis of the L5 transverse process to ilium. The patients had severe allodynia, inability to weight bear, and walk. The left lower extremity was wasted. Caudal epidural approach for placing the catheter tip to L4 DRG and infusing 6 mL of 0.1% ropivacaine with 5 mcg/ml fentanyl resulted in the removal of allodynia but unable to find any painful areas. Following five day infusion, the patients was pain free but unable to weight bear. Two weeks of physical therapy resulted in virtual normal weight bearing and ambulation. Patient can identify the painful locations simply by application of pressure and marking them with a felt-tipped marker or pen. The local anesthetic infiltration into the pain generator sites with small volume of 1% lidocaine indicates disconnect of the pain inciting area. The spinal cord involvement is further confirmed by the spreading of the allodynia to distant sites. Following sustained, around-the-clock infusion, the allodynia retracts to the original site of injury level and can be reversed. However, if the pain generator sites remain painful, they can be eliminated by longer lasting cryoneurolysis. Upper extremity spreading of allodynia to the thoracic sympathetic ganglia can be treated, following a diagnostic block, by radiofrequency thermocoagulation, which can result in long-term pain relief (6-12 months); the edema also resolves. Motor contractions can be rapidly reversed with injecting the muscles involved in the spasm such as flexor carpi ulnaris and the flexor digitorum profundus with 100 units of botulinum toxin. The combination of treatment rather and resistive exercises with working closely with physical therapy can result in recovery. The representative type of cases will be posted on PainCast (www.paincast.com) that can be linked to this presentation.^{1,2,3,4}

The issue use of incorporating fentanyl into the epidural infusion maybe helpful with the non-DRG firing related pain. In a couple of instances, the targeted L4 DRG catheter migrated down to the S1 area, and the patient reported the return of pain along with the inability to void. Repositioning the catheter to the L4 DRG resulted in resolution of the pain along with the ability to void urine. The small, sacral volume infusion was enough to abolish unintentional micturition but failed to block the DRG site-specific pain pathway. The fentanyl part of the infusion was not effective in the blocking the pain that is likely coming through the L4 DRG. Special precaution is needed, because with five days

of fentanyl infusion with success in treating the pain, the procedure has led to acute withdrawal that requires treatment with 0.1-0.2mg clonidine facetious.

References

1. Heavner JE, Racz G, Diede JM. Peripheral nerve stimulation: current concepts; in Waldman SD, Winnie AP (eds): Interventional Pain Management. Philadelphia, Saunders, 1996, pp 423-425
2. Gabor B. Racz and Carl E. Noe (2012). Complex Regional Pain Syndrome, Pain Management - Current Issues and Opinions, Dr. Gabor Racz (Ed.), InTech, DOI: 10.5772/39059. Available from: <http://www.intechopen.com/books/pain-management-current-issues-and-opinions/complex-regional-pain-syndrome>
3. Devor M, Janig W, McLachlan E, Michaels M. Peripheral Nerve Injury Triggers Noradrenergic Sprouting Within Dorsal Root Ganglia. Nature 363, 543-546.
4. Racz GB, Noe CE, Heavner JE, Calvillo O, Day MR. Treatment recommendations for patients with Allodynia due to CRPS. 8th WIP World Congress Poster Presentation. New York, NY 2016.

THIAGO NOUER, MD, CIPS

LECTURE

HYDRODISSECTION FOR NEUROPATHIC PAIN AND NEURALGIAS

Concept, review of literature, cases.

CHARLES DE OLIVEIRA, MD, FIPP, CIPS

LECTURE

PULSED RADIOFREQUENCY OF PERIPHERAL NERVES

Possible mechanisms of action of pulsed radiofrequency in peripheral nerves and review of the literature.

AGNES STOGICZA, MD, FIPP, CIPS AND CHRIST DECLERK, MD, FIPP, CIPS

LECTURE

CRYOTHERAPY FOR PERIPHERAL NEUROPATHY

Treatment of neuralgias and neuropathic pain is rather challenging. Once the particular nerve is identified with diagnostic injection, cryoablation, radiofrequency ablation, stimulation of the central of peripheral nervous system are among the available treatment options. All of these methods have their obvious and less obvious benefits and disadvantages.

Cryoablation offers an advantage over radiofrequency ablation in that it lyses the axons and myelin sheathes without damaging the perineurium and epineurium (Wallerian degeneration). This allows the nerve to regenerate over time with a lower likelihood of a resulting neuroma as compared to RFA or surgical neurectomy. It is our experience that with cryoablation, patients are conferred the benefits of RFA with fewer complications. The pain relief usually lasts 6 month, and then as the nerve re-grows, usually pain returns. However, the procedure can be repeated with similar success rate afterwards.

The publications are mainly case reports, case series, and retrospective analysis, and no randomized controlled trials available. Most of the available literature supports cryoablation of the intercostal nerves often arising after thoracotomy, cryoablation of the greater occipital nerves, ilioinguinal/iliohypogastric nerves after hernioraphy or C-section, but case reports are available on other, less

frequently targeted nerves.

This lecture will discuss the physiologic effects of cryoablation, will demonstrate the technique itself through a few commonly encountered cases that well represent the advantages and disadvantages of cryoablation.

VIKRAM PATEL, MD, FIPP

LECTURE HAND AND FOOT SONOANATOMY

Objectives:

Upon completion of this presentation the attendee would be able to:

- Understand the anatomical landmarks of hand and foot as related to interventional pain procedures
- Learn various disease states that can be effectively diagnosed and treated in hands and feet using ultrasound guidance
- Learn proper transducer placement for various landmarks
- Learn how to interpret different joints, tendons and nerves in hand and foot under ultrasound imaging

Key Points:

- Precision is the key in hand and foot interventions due to the anatomical size of the structures
- Proper identification of joints, tendons and nerves requires thorough knowledge of the anatomy of hand and foot
- Proper alignment and use of the ultrasound probe is required for optimal identification of structures in hand and foot
- Various conditions such as carpal tunnel syndrome, neuromas of the foot, plantar fasciitis etc can be effectively diagnosed and treated with interventions using ultrasound guidance
- Ability to identify the nerves and blood vessels during the procedure helps avoid unwanted damage to these structures and provides a safe modality for treatment

LEE DELLON, MD, PHD

BIOGRAPHICAL SKETCH

A. Lee Dellon, MD, PhD is a Professor of Plastic Surgery and Professor of Neurosurgery at Johns Hopkins University, in Baltimore, Maryland, U.S.A. Dr Dellon's clinical practice and research is related to the diagnosis and treatment of Peripheral Nerve pain problems. He is the author of 4 books, 102 book chapters, and 450 peer reviewed articles.

LECTURE NEUROPATHIC PAIN OF THE KNEE AND ANKLE

Objectives

Upon completion of this presentation attendees will be able to discuss:

Barriers to the use of epiduroscopy in clinical practice

- Anatomic pathways of knee and ankle joint innervation
- When and how to do a nerve block of the knee and ankle joint
- Positive Predictive Value of Nerve Block in Joint Denervation
- Partial versus Total joint denervation
- Results of Partial Knee Denervation after total knee arthroplasty and in sports injuries

Key Points

- Building upon the known success of partial wrist joint denervation, anatomic and clinical studies have been done related to the knee and ankle joint.
- After injury, in a joint that is structurally stable, residual joint pain is of neural origin.
- Although anatomy textbooks show no joint innervation, the pathways for the knee and for the sinus tarsi have been described in the scientific literature.
- Persistent knee or ankle pain after sprain, joint surgery, or resection/arthroplasty can be of neural origin.
- A nerve block that relieves knee or ankle pain by > 5 on VAS has a 90% positive predictive value for successful partial joint denervation.

References

- Horner G, Dellon AL. Innervation of the human knee joint and implications for surgery. Clin Orthop Relat Res. 1994 Apr;(301):221-226.
- Dellon AL, Mont MA, Krackow KA, Hungerford DS. Partial denervation for persistent neuroma pain after total knee arthroplasty. Clin Orthop Relat Res. 1995 Jul;(316):145-150.
- Dellon AL, Mont MA, Mullick T, Hungerford DS. Partial denervation for persistent neuroma pain around the knee. Clin Orthop Relat Res. 1996 Aug;(329):216-222.
- Rab M, Ebmer J, Dellon AL. Innervation of the sinus tarsi and implications for treating anterolateral ankle pain. Ann Plast Surg. 2001 Nov;47(5):500-504.
- Dellon AL. Denervation of the sinus tarsi for chronic post-traumatic lateral ankle pain. Orthopedics. 2002 Aug;25(8):849-851.
- Dellon AL. Partial joint denervation II: knee and ankle. Plast Reconstr Surg. 2009 Jan;123(1):208-217.
- Dellon AL. Partial joint denervation I: wrist, shoulder, and elbow. Plast Reconstr Surg. 2009 Jan;123(1):197-207.
- Dellon AL, Andonian E, Rosson GD. Lower extremity complex regional pain syndrome: long-term outcome after surgical treatment of peripheral pain generators. J Foot Ankle Surg. 2010 Jan-Feb;49(1):33-36.

ANDREA TRECOT, MD, FIPP

LECTURE MAJOR NERVES IN CHRONIC PAIN. IT IS NOT ALL REGIONAL ANESTHESIA!

Ultrasound (US) was rapidly accepted in anesthesia, since the major nerves associated with regional anesthesia (such as the brachial plexus) are readily visualized. These large nerves have not usually been the target of pain management. However, with certain modifications, these nerves can be identified and treated under US guidance to provide significant, long-term pain relief as well as diagnosis.

LEE DELLON, MD PHD

LECTURE NEUROPATHIC PAIN OF THE WRIST

Objectives

Upon completion of this presentation attendees will be able to discuss:

Barriers to the use of epiduroscopy in clinical practice

- Anatomic pathways of wrist joint innervation
- When and how to do a nerve block of the wrist joint
- Positive Predictive Value of Nerve Block in Joint Denervation

- Partial versus Total joint denervation
- Results of Partial Wrist Denervation after wrist sprain/fracture

Key Points

- Partial wrist denervation is as successful as total wrist denervation.
- After injury, in a joint that is structurally stable, residual joint pain is of neural origin.
- Although anatomy textbooks show no joint innervation, the pathways the central, radial and ulnar wrist have been described in the scientific literature.
- Persistent wrist pain after sprain, joint surgery, or resection/arthroplasty can be of neural origin.
- A nerve block that relieves knee or ankle pain by > 5 on VAS has a 90% positive predictive value for successful partial joint denervation.

References

1. Dellon AL, Seif SS, Anatomic dissections relating the posterior interosseous nerve to the carpus, and the etiology of dorsal wrist ganglion pain. J Hand Surg Am. 1978;3(4):326-332.
2. Dellon AL, Mackinnon SE, Daneshvar A. Terminal branch of anterior interosseous nerve as source of wrist pain. J Hand Surg Br. 1984;9(3):316-322.
3. Dellon AL. Partial joint denervation I: wrist, shoulder, and elbow. Plast Reconstr Surg. 2009; 123(1):197-207.
4. Dellon AL. Partial dorsal wrist denervation: resection of the distal posterior interosseous nerve. J Hand Surg Am. 1985;10(4):527-533.
5. LaPorte DM, Hashemi SS, Dellon AL., Sensory innervation of the triangular fibrocartilage complex: a cadaveric study. J Hand Surg Am. 2014;39(6):1122-1124.

MICHAEL GOFELD, MD, FIPP, CIPS

BIOGRAPHICAL SKETCH

Current appointment:

Associate Professor, University of Toronto

Staff Physician, Department of Anesthesia and Pain Medicine, University Health Network, Toronto, Canada

Professional Societies:

President: World Academy of Pain Medicine Ultrasonography

Vice-Chair, Board of Examination, World Institute of Pain

Creative Professional Activity:

Chair, Chronic Pain Registry Committee, Advisory Board, Ontario Ministry of Health and Long Term Care

Peer-Reviewed Journals

Section Editor: Current Headache and Pain Reports (Neuromodulation), Pain Practice (Ultrasonography)

Associate Editor: Regional Anesthesia and Pain Medicine

Peer-Review Publications: 40 Book Chapters: 39

Experience:

Clinical: Neuromodulation, musculoskeletal and neurological diagnostic and procedural ultrasonography, radiofrequency, vertebral augmentation, spinal injections, managing complex cancer and non-cancer pain, advanced imaging (high-frequency ultrasound, CT, navigation)

Education: medical student curriculum, chronic pain fellowship, CME courses

Research: preclinical and clinical interventional pain studies including multicenter trials, patient-oriented research.

Administration: Chronic pain clinic protocols, design and maintenance of triage and clinic database, quality improvement projects

Research Interests:

Mechanisms of neuromodulation, novel image-guided approaches, joint denervation, chronic pain

outcomes

Clinical interests:

Non-surgical treatment of osteoarthritis and other musculoskeletal conditions, nerve injuries, sport injuries, facial pain and headaches

LECTURE

PERIPHERAL NERVE STIMULATION

Peripheral Nerve Stimulation (PNS) has the longest history among other neuromodulation methods. First clinical use of PNS by German-English physician Julius Althaus was documented in 1859. The modern use of PNS blossomed at the period when the Gate Control Theory was published, but later its popularity waned because of invasiveness, poor reimbursement and lack of approved equipment. Nonetheless, PNS survived because philosophically it made more sense targeting specific injured nerve rather than “blasting” entire region with SCS, responders tended to remain satisfied for a long time and archived functional benefits.

The current renaissance of PNS is attributable to the novel, approved by FDA and CE, percutaneous leads. There is a clear trend to introduce wireless devices thus eliminating cumbersome pulse generators and connections and decreasing the cost of care.

The mechanism of action is probably related to activation of Aβ fibers or induction of the anodic block.

New clinical applications have been emerging offering effective treatment of an array of chronic conditions, including peripheral nerve injuries, migraine, urinary incontinence and post-stroke pain.

LECTURE

HEMIPLEGIC SHOULDER PAIN

The incidence of post-stroke shoulder pain varies from 9% to 73%. It appears the spasticity and hemiplegic shoulder pain are related. It is uncertain whether shoulder subluxation causes hemiplegic shoulder pain (HSP) or addressing an abnormal biomechanics can prevent HSP. It is uncertain if strapping helps to prevent or reduce HSP. There is limited evidence that shoulder slings may prevent the development of subluxation. Aggressive ROM exercises result in a markedly increased incidence of HSP. Ultrasound treatment is not helpful, but NSAIDs may be helpful. It is unclear whether injections of botulinum toxin may reduce pain or improve ROM. Non-invasive functional electrical stimulation may help to reduce or prevent subluxation, but not pain. On the contrary, an invasive neuromuscular or peripheral nerve stimulation may help to alleviate pain, but has no influence on biomechanics.

Either intramuscular or peripheral nerve (axillary nerve) stimulation is a promising effective method which should be offered more often for patients with HSP.

HARIHARAN SHANKAR, MD, FIPP, CIPS

LECTURE

TRIGEMINAL AND GLOSSOPHARYNGEAL NERVES, ULTRASOUND IMAGING

JAVIER DE ANDRÉS ARES MD, FIPP

BIOGRAPHICAL SKETCH

Coordinator of Pain Unit at Hospital Universitario La Paz-Madrid-Spain.

Head of Clínica del Dolor de Toledo. Board certified Anesthesiologist 1996.

Fellowship in Pain Treatment 1998. FIPP Fellow of Interventional Pain Practice Budapest 2008.

Hassenbusch award 2008.

Spanish coordinator of Radiofrequency Group (Sociedad Española del Dolor).

LECTURE

ULTRASOUND VERSUS FLUOROSCOPY GUIDANCE IN INTERVENTIONAL PAIN MANAGEMENT

Objectives

Upon completion of this presentation attendees will be able to discuss

- The rationale for interventional pain techniques under fluoroscopy or ultrasound
- Barriers to the use of ultrasound in clinical practice
- Barriers to the use of fluoroscopy in clinical practice
- Advantages of ultrasound
- Advantages of fluoroscopy
- Expected outcomes using ultrasound. Unexpected outcomes
- Expected outcomes using fluoroscopy. Unexpected outcomes
- How ultrasound findings compare with fluoroscopy findings
- Future direction of interventional pain techniques under vision

Key Points

- All interventional Pain Techniques should be performed under direct vision.
- The rationale for performing Interventional Pain Techniques under direct vision is that it provides information that aids reaching the suspected target and it helps avoiding complications.
- Barriers to the use of ultrasound in clinical practice include targets under bone structures.
- Barriers to the use of fluoroscopy in clinical practice include non-visualized targets nor vascular structures.
- Accumulating evidence indicates ultrasound is superior to fluoroscopy in certain body areas, while there is limited (though growing) evidence in spinal techniques.
- Future direction of visual techniques with better technology is now being investigated.

References

1. Gofeld M. Ultrasonography in pain medicine: a critical review. *Pain Pract.* 2008;8:226–240.
2. Chen C et al. Ultrasound guidance in Caudal Epidural Needle Placement. *Anesthesiology* 2004; 101:181-4.
3. Narouze S et al. Ultrasound-Guided Interventional Procedures in Pain Medicine: A Review of Anatomy, Sonoanatomy, and Procedures: Part II: Axial Structures. *Regional Anesthesia & Pain Medicine* 2010;35-4: 386-396.
4. Huntoon MA. Ultrasound in pain medicine: advanced weaponry or just a fad? *Reg Anesth Pain Med.* 2009;34:387–388.
5. Gofeld M, Christakis M. Sonographically guided ilioinguinal nerve block. *J Ultrasound Med.* 2006;25:1571–1575.

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Industry Technical Presentations

TUESDAY, 30 AUGUST, 2016

Moderators: Gabor B. Racz, MD, FIPP and Ira B. Fox, MD, FIPP

- 07:30** Epimed International
Chad Diebold, European Sales Manager
- 07:45** Boston Scientific – Novel Stimulation Algorithms and the Future of SCS New Technology and Comparative Real World Clinical Data
Thomas Collard, Director of International Business Development
- 08:00** Stimwave Technologies, Inc.
Laura Perryman, MS, MBA, Chairman and CEO
- 08:15** Ziehm Imaging GmbH
Axel Kouril, Marketing
- 08:30** Nevro
Kerry Bradley, Director, Clinic Science & Research

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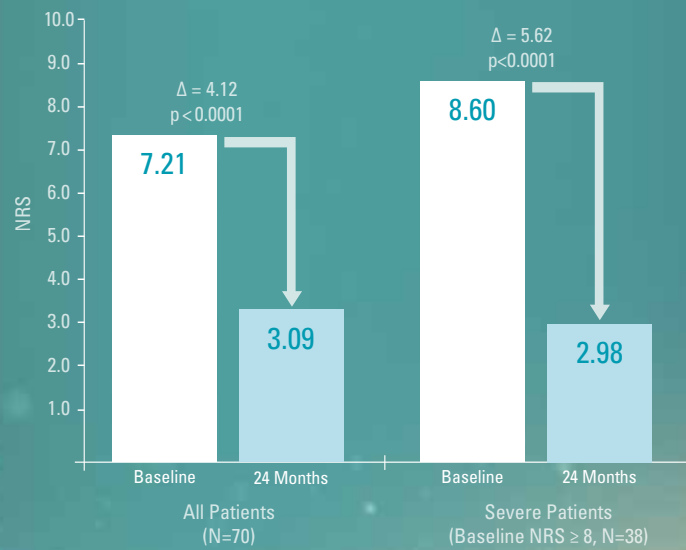
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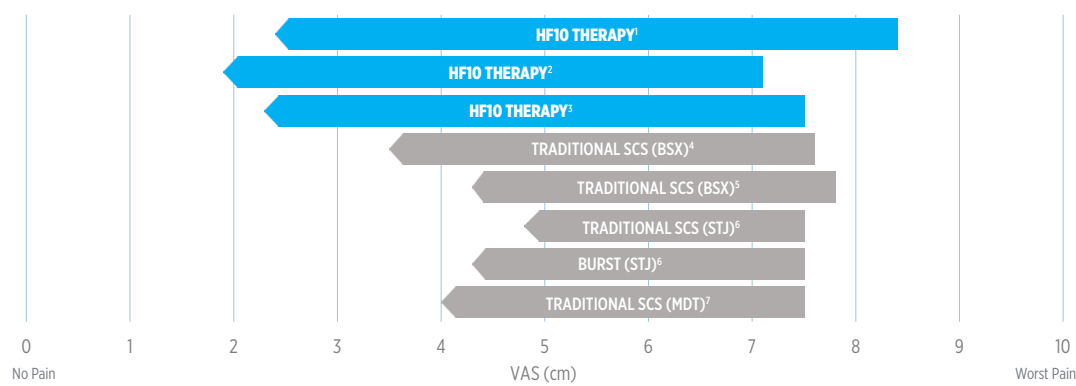
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REFERENCES:

- Al-Kaisy A, Van Buyten J-P, Smet I, Palmisani S, Pang D, Smith T. Sustained effectiveness of 10 kHz high-frequency spinal cord stimulation for patients with chronic, low back pain: 24-month results of a prospective multicenter study. *Pain Med.* 2014;15:347-354.
- Kapuraj, Leonardo et al. Novel 10-kHz High-Frequency Therapy (HF10 Therapy) Is Superior to Traditional Low-Frequency Spinal Cord Stimulation for the Treatment of Chronic Back and Leg Pain: The SENZA-RCT Randomized Controlled Trial. *Anesthesiology* Vol. 123 No 4, October 2015
- Deer, T. SUNBURST Trial Results. Presented at NANS 2015 and St. Jude Investor call December 11, 2015
- Kumar, K. The effects of spinal cord stimulation in neuropathic pain are sustained: A 24-month follow-up of the prospective randomized controlled multicenter trial of the effectiveness of spinal cord stimulation. *Neurosurgery* 2008;63:792-710



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