

# Syllabus

# SERDAR ERDINE, MD, FIPP

## BIOGRAPHICAL SKETCH

Prof. Serdar Erdine MD,FIPP is the immediate past president of WIP and CEO of the World Institute of Pain Foundation. He is the chairman of the Istanbul Pain Center affiliated with Istanbul Bilim University.

## PERCUTANEOUS INTERVENTIONS FOR TRIGEMINAL NEURALGIA

### Objectives

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

- What sets percutaneous interventions for trigeminal neuralgia apart from other interventional pain therapies
- The rationale for performing percutaneous interventions for trigeminal neuralgia
- Indications for each percutaneous intervention for trigeminal neuralgia
- Expected outcomes of percutaneous interventions for trigeminal neuralgia
- Complications of percutaneous interventions for trigeminal neuralgia
- State of the art for percutaneous interventions for trigeminal neuralgia

### Key Points

Definition of a good result is not easy

- Variation of the follow-up also affects the decision making
- Learning curve-experience is important
- No method is curable
- Cure is unpredictable, recurrence rate is predictable
- All techniques have advantages and disadvantages
- RF is still the preferred technique
- It is less morbid more cost effective than open techniques
- Glycerol causes mild complications, less effective
- Balloon causes mild sensorial loss
- Recurrence rate for open techniques may be similar

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# OLAV J. J. M. ROHOF, MD, PHD, FIPP

## BIOGRAPHICAL SKETCH

Dr. Olav Rohof (04-06-1950) MD, PhD, FIPP is an anesthesiologist and interventional pain specialist, and head of the pain clinic of Orbis Medical Center in Sittard Geleen, the Netherlands.

As an anesthesiologist he has been working full time in the pain clinic since 1989.

He has trained many colleagues from all over the world.

He has special interest and experience in trigeminal neuralgia and facial pain, back pain, neck pain and headache, treatment of joints and CRPS. In 2002 he wrote his thesis on the RF treatment of the ganglion Gasserii in trigeminal neuralgia (University of Bonn Germany).

## DISCOGRAPHY

### Objectives

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

1. Definitions: Disc stimulation, Discography, provocative discography, disc manometry(1)
2. Patient selection, in- and exclusion criteria
3. Procedure and technique
4. The level(s) to be tested?
5. In disc stimulation use of disc manometry is advised, if available
6. Evaluation of results of disc stimulation and discography
7. Complications
8. Differential Diagnosis
9. Discography still indicated?
10. Results of a prospective pilot study of pulsed RF disc treatment in the nucleus following lumbar discography

### Key points:

- Definitions
  - **Disc stimulation:** a procedure developed to define a painful intervertebral disc by intradiscal injection .
  - **Discography:** injection of dye to describe the internal disc morphology.
  - **Provocative Discography:** a combination of both of the above.
  - **Disc manometry :** disc stimulation with intradiscal pressure measurement.
  - Only to be used when interventional treatment for reduction of discogenic pain is considered.
- Patient selection: chronic low back pain with or without (pseudo)radicular irradiation for longer than 3 months, not reacting on conservative therapy and medication, in which facet- and SI-joint pain have been excluded or treated without sufficient result.
- Procedure and technique will be presented.
- Combination of history, physical examination and additional examinations (MRI, EMG, CT) determines the probably involved levels to be tested.
- A suspected normal level functions as control level.
- Disc manometry, technique and criteria will be discussed (2,3)
- Evaluation of results of disc stimulation will be discussed according to ISIS and IASP criteria.
- Evaluation of discography using the Dallas Discogram Scale (5)
- Discitis is the mostly feared complication, prophylactic use of antibiotics is advised in international guidelines, intravenously or intradiscally, in the "two needle technique" questionable (4)

- DD: trauma, fracture, tumour, infection, neurologic disease, visceral pain
- Despite controversial literature lumbar (provocative) discography and disc manometry still is the gold standard for confirming the diagnosis discogenic pain. A strong patient selection is needed to improve the results of invasive intradiscal treatments.
- Technique and results of a prospective pilot study of Pulsed RF disc treatment in the nucleus following lumbar discography

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# RICARDO RUIZ-LÓPEZ, MD, FIPP

## BIOGRAPHICAL SKETCH

Ricardo Ruiz-López, MD, Neurosurg., FIPP, is Director of Barcelona Spine and Pain Institute (Institut de Columna Vertebral / Clínica del Dolor de Barcelona), Executive Member of the Board of Directors of Hospital Delfos (Barcelona) and CEO Project for Barcelona Spine & Pain Surgery Clinic.

After receiving his MD degree from the University of Madrid in 1975 and the Board of Neurosurgery in 1980, he founded in 1986 Clínica del Dolor de Barcelona.

His major areas of scientific interest are the Neurosurgery of Pain, the Interventional Techniques and Surgery for Spinal Chronic Pain Conditions, and the development of new organizational models for Patient 's Care.

Editor of a number of medical journals, he has published extensively on Pain Management and Interventional Pain Therapies.

He is a Founding Member of various National and International Medical Societies on the Pain Field, and Visiting Professor and Lecturer at European and American Universities.

President of the Organizing Committee of the II EFIC Congress (European Federation of IASP Chapters) "Pain in Europe" Barcelona, September 1997 and of the 3rd World Congress on Pain of WIP (World Institute of Pain), Barcelona, September 2004.

President of World Institute of Pain (WIP) 2011-2014, President of the Catalan Pain Society (Catalonia, Spain) 2006-2010, and Permanent Trustee of the World Institute of Pain Foundation, NC. USA.

## MINIMALLY INVASIVE TECHNIQUES FOR DISCOGENIC PAIN

Minimally invasive spine surgery has evolved rapidly within the last two decades in an effort to decrease morbidities associated with open procedures.

Low back pain of discogenic origin is a highly prevalent condition. Internal disc disruption has been described as the internal disruption of disc architecture of the disc without signs of disc protrusions or without positive signs for nerve root compression. Tears that appear in the layers of the annulus fibrosus allow nuclear material to irritate sensitive sinu-vertebral nerve-endings. Concentric annular tears and rim lesions are often present. The modified Dallas discogram classification is now the gold standard for the computer tomography (CT) classification of annular tears. It classifies discal lesions into five possible severities of the radial annular tear. Provocation discography is the most accurate diagnostic procedure, with two components to it: an attempt to reproduce the patient 's pain by injecting contrast material into the disc, and to perform a painless discogram in the adjacent disc. Gadolinium-enhanced magnetic resonance imaging is an alternative to CT discogram.

There are several therapeutic options for discogenic pain, ranging from conservative management to open surgery. In this review we described most percutaneous techniques that are currently being used to treat discogenic pain with and without disc herniation, as well as some of the emerging minimally invasive surgery techniques for disc removal.

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# RAFAEL JUSTIZ, MD, MS, FIPP, DABIPP

## BIOGRAPHICAL SKETCH

Dr. Rafael Justiz is currently the Director of Interventional Pain Management , Department of Neurosciences, Saint Anthony's Hospital, Oklahoma City, Oklahoma.

Dr Justiz earned a Bachelor and Masters in Sciences from Florida International University in Miami, Florida, and his Doctor of Medicine from Medical college of Wisconsin. He completed his anesthesia residency at the University of South Florida in Tampa, and received his fellowship in Interventional Pain Management at Texas Tech University in Lubbock, Texas. Dr. Justiz joined the faculty at the international pain institute at University Health Sciences Center and now is currently in private practice.

He is board-certified in anesthesiology by the American Board of Anesthesiology and has Added Qualifications in Pain Management by the same board. He also holds the WIP Fellow in Interventional Pain Practice certification (FIPP) and is a Diplomate of the American Board of Interventional Pain Physicians (ABIPP).

Dr Justiz has published several book chapters and journal articles. His areas of interest's include peripheral field/spinal cord stimulation and treatment of refractory head and facial pain.

## VERTEBRAL BODY STABILIZATION TECHNIQUES

### Objectives

Upon completion of this presentation attendees will be able to discuss

- Osteoporosis
- Treatment options for osteoporosis
- Vertebral Augmentation
- Identify patient and workup
- Different Techniques
- How to perform vertebral augmentation
- Complications

### Key Points

- Discuss osteoporosis including risk factors, epidemiology, its economic effects and clinical consequences. Look at the guidelines for determining osteoporosis, and be able to recognize the disease process and what treatment options there are available.
- Discuss ideal patient selection and workup, and define fracture configurations.
- Discuss different imaging modalities that can be used and their differences.
- Discuss how vertebral augmentation reduces pain and what mechanism are involved.
- Look at the indications, contraindications and relative contraindications involved with vertebral augmentation.
- Discuss the different techniques employed in vertebral body augmentation, transpedicular and extrapedicular approaches. Look at the anatomical landmarks and proper imaging technique for safety. In detail define how each technique is performed and the approaches that can be employed including proper trajectory and vertebral access.
- Recognize the common complications and practice safe techniques to avoid these complication

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# OLAV J. J. M. ROHOF, MD, PHD, FIPP

## (PULSED) RF TREATMENT OF DISC AND JOINTS

### Objectives

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

1. An overview of RF and PRF disc treatment techniques (1)
2. Treatment of articular pain in small and large joints (2)
3. Causes of articular pain, prevalence, pathophysiology
4. New technique of PRF treatment of the Lateral Atlanto Axial (LAA) joint
5. Results of 1 yr follow up of first 100 cases of PRF AA joint treatment (5) Technique PRF treatment Knee, shoulder, trapezio-metacarpal, and hallux valgus (2)
6. Results PRF treatment Knee, shoulder, trapezio-metacarpal, and hallux valgus (2)
7. Shoulder treatment with PRF suprascapular nerve, on indication combined with the one entry – 3 compartment block .

### Key points

1. There is equivocal evidence about RF heating techniques of the disc, a prospective pilot study on PRF disc treatment shows promising results, but this should be confirmed in a randomised study.(6)
2. Osteoarthritis (OA) is the most common type of joint disease (22% of the adult population), pain is the major symptom determining functional loss; there is a poor correlation between pain and radiological changes; Infiltration with steroids are short lasting (3)
3. Pulsed RF treatment of small joints like the lateral AA joint without any injection is more accessible in the supine position with a true lateral fluoroscopic approach , and has remarkable relatively long-lasting results. (4, 5)
4. Diagnostic tools: History, clinical examination, radiology, blood tests and biomarkers.
5. Approaches for PRF treatment of the knee, shoulder, trapezio-metacarpal and metatarso-halyngeal joints will be presented.
6. Results of PRF treatment (2) will be presented.
7. Small joints respond particularly well to PRF treatment
8. Results of PRF treatment of Shoulder and Knee joints are superior to steroid infiltrations
9. Discussion: PRF treatment of large joints combined with viscosuppletion with hyaluronic acid, but without corticosteroids.

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# JOSEPH D. FORTIN, MD

## BIOGRAPHICAL SKETCH

Dr. Fortin is Medical Director of Spine Technology and Rehabilitation and Clinical Professor of Indiana University School of Medicine, Fort Wayne, Indiana.

## SACROILIAC PAIN 2011

### Objectives

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

- The unique anatomical and biomechanical features of the sacroiliac joint.
- Key clinical features of patient presenting with symptomatic sacroiliac joints.
- Diagnostic evaluation of SIJ dysfunction.
- Rehabilitation of SIJ dysfunction.
- Interventional techniques for addressing SIJ pain.

### Key Points

- The sacroiliac joint is a putative source of low back pain and sciatica. The prevalence of sacroiliac joint dysfunction is between two and thirty percent.
- The SIJ is a true synovial joint with hyaline cartilage on the sacral side and fibrocartilage on the iliac side. The articular surfaces have numerous interdigitating ridges and depressions.
- The ventral ligaments are a thin extension of the capsule and the dorsal ligaments are a series of discontinuous bands.
- Mechanically, the sacroiliac joint is a relay station transmitting loads to and from the trunk and lower extremities.
- Histological analysis of the sacroiliac joint has verified the presence of nerve fibers within the joint capsule and joint ligaments. While the levels of innervation and divisions of SIJ innervation have been the subject of debate. A fetal correlate study found no receptors in the ventral capsule and concluded that the SIJ is innervated by the sacral dorsal rami.
- No physical exam findings are unequivocally pathognomonic of sacroiliac joint pain. The Fortin Finger Test is a reliable indicator of sacroiliac joint pain, yet it lacks sensitivity.
- Controlled diagnostic blocks appear to be the sole direct method of distinguishing symptomatic versus asymptomatic sacroiliac joints.
- Rehabilitative measures include manual medicine techniques, pelvic stabilization exercise to allow dynamic postural control, and muscle balancing of the trunk and lower extremities.
- Interventional techniques include image-guided intra-articular steroid injections, radiofrequency neurotomy, cryotherapy, prolotherapy, and fusion. There is a paucity of controlled trial son any treatment measure.

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

## BIOGRAPHICAL SKETCH

Professor Vissers is an anesthesiologist, professor in Pain and Palliative Medicine and chairman of the Academic 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.

## EPIDURAL INJECTIONS

### Objectives

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

- The indications and rationale for epidural application of corticosteroids
- The interlaminar and transforaminal approach of the epidural space at the lumbar and cervical region
- The evidence for epidural injections (interlaminar and transforaminal) in the cervical region
- The evidence for epidural injections (interlaminar, transforaminal and caudal) in the lumbar region
- The side effects and complications reported in the literature at cervical and lumbar level
- Explain measures to be taken to perform epidural injections in the safest way possible.

### Key points

- Cervical radicular pain is defined as pain perceived as arising in the arm caused by irritation of a cervical spinal nerve or its roots
- Lumbosacral radicular pain is characterized by a radiating pain in one or more lumbar or sacral dermatomes; it may or may not be accompanied by other radicular irritation symptoms and/or symptoms of decreased function.
- The rationale for epidural corticosteroid injections is to administer the anti-inflammatory compound as close as possible to the inflamed nerve root.
- For the interlaminar administration a midline approach is used. The injection is made in the posterior compartment. The spread towards the ventral part of the epidural space could be limited
- The transforaminal administration of corticosteroids aims at injecting the corticosteroid directly onto and around the nerve root.
- There are no comparative trials investigating interlaminar and transforaminal injections at cervical level.
- An older randomized trial compares interlaminar injection with intramuscular injections and finds the former to yield superior results. One more recent study investigates the added effect of morphine and another trial compares a single injection with continuous infusion.
- A randomized controlled trial compares the effect of cervical transforaminal injection of corticosteroid plus local anesthetic with local anesthetic alone or saline and found no difference in outcome between the three groups.
- The effect of lumbar epidural interlaminar corticosteroid injections was studied in systematic reviews. These conclude that this technique provides pain relief for a relative short duration.
- Lumbar transforaminal epidural corticosteroid administration was studied in randomized controlled trials. One trial demonstrated that this treatment is effective for the management of contained herniations.
- Cervical transforaminal epidural corticosteroid administration has resulted in several cases of serious unexpected and unexplained complications and therefore is not recommended.
- Anatomic variations of the vascular supply in the cervical area supports the statement that there is no safe area for needle placement in the cervical foramina. The side effects and complications reported with the use of the interlaminar cervical epidural corticosteroid injections are in the vast

majority of the cases minor and transient. There are however two reports of permanent damage to the spinal cord which occurred in sedated patients.

- In the lumbar region side effects of interlaminar corticosteroid administration are comparable to those reported for the cervical area. With transforaminal epidural administration cases of neurological complications have been reported.
- To reduce the risk of complications epidural injections should always be performed under radiographic control with use of contrast medium. When optimal needle placement is achieved a test dose of local anesthetic and an observation period of 60 sec is recommended.
- The use of non-particulate corticosteroid is preferred by some.

## Recommended literature

\* of special interest

\*\* of outstanding interest

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# JOSEPH D. FORTIN, MD

## IMAGING FOR INTERVENTIONAL PAIN MANAGEMENT 2011

### Objectives

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

- Selecting and applying appropriate imaging studies in a clinical context.
- Utilizing a structure and function approach to interpreting imaging studies.
- Limitations of various imaging studies, as well as the combined benefits of specific modalities.

### Key Points

- Imaging studies represent a key diagnostic tool for the pain management physician; yet lack of a concerted exposure to integrate these modalities in pain management training programs is widely recognized.
- Understanding the indications for the various imaging modalities and how alterations in imaging anatomy may reflect an injury mechanism provides the pain management physician a powerful compliment to their diagnostic armamentarium.
- Plain films still fulfill the basic roles within our diagnostic scope for screening trauma victimcases; when ruling out instability, examining for benign bone conditions and providing a comparative or complimentary study to magnetic resonance imaging, computerized tomography, or ultrasound.
- CT has higher spatial resolution than MRI and consequently provides superior contour resolution for depicting contour changes and cortical bone margins.
- For superficial structures ultrasound has resolution that exceeds MRI and consequently is especially effective in examining most parts of the peripheral musculoskeletal system. It is also arguably the most dynamic and portable imaging modality. Ultrasound is limited by being operator dependent, having a small field of view, suboptimal tissue contrast, and requiring low frequency at the cost of resolution for deep tissue penetration.
- Scintigraphy is very sensitive for AVN, occult fractures, and most osseous tumors and infections. Unfortunately, it is radiologically non-specific.
- MRI is the study of choice for evaluating soft tissue pathology including the intrathecal space and it's neurovascular contents. It is also an elegant modality for staging degenerative, inflammatory, or traumatic marrow space changes.

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# RAY M. BAKER, MD, FIPP

## BIOGRAPHICAL SKETCH

Dr. Baker is a Clinical Professor of Anesthesiology (adjunct) at the University of Washington. He is the Immediate Past President of the North American Spine Society and the incoming President of the International Spine Intervention Society.

## CONTROVERSIES IN THE DIAGNOSIS OF PAINFUL LUMBAR DISC DEGENERATION 2011

### Objectives

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

- The definition and key features of a diagnostic criterion standard
- The role of advanced imaging in the diagnosis of painful lumbar disc degeneration (DD)
- The role of the history and physical examination in the diagnosis of painful lumbar DD
- The role of provocation discography in the diagnosis of painful lumbar DD
- Controversies in the diagnosis of painful lumbar DD, including:
  - The limitations of provocation discography
  - The potential risks of provocation discography
  - The link between provocation discography and expensive treatments, especially lumbar fusion
- The potential role of novel technologies in the diagnosis of painful lumbar DD

### Key Points

- Utilizing the Sackett and Haynes definition of a criterion standard, there exists no Gold Standard for the diagnosis of painful lumbar DD.
- Advanced imaging is helpful in excluding patients with normal MRIs from the diagnosis of painful lumbar DD.
- Compared with provocation discography, MRI loss of signal intensity, high intensity zones, and end-plate (Modic) changes are modestly helpful at best (+LR 3) in diagnosing patients with painful lumbar DD.
- The history and physical examination are of limited utility in diagnosing patients with painful lumbar DD.
- Provocation discography is still a controversial test for painful lumbar DD. There is no ability to compare it with a criterion standard, there is a high false positive rate in patients with certain co-existing conditions, and it has been linked to poor outcomes from lumbar fusion surgery. Recent studies have also raised the possibility that disc puncture might accelerate disc degeneration.
- Limited evidence supports novel technologies in the diagnosis of painful lumbar DD, including MR Spectroscopy.

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# COSIMO BRUNI, MD

## BIOGRAPHICAL SKETCH

Dr. Bruni is in charge of the Clinical Trials Unit, Department of Biomedicine - Division of Rheumatology, University of Florence, Italy

## JOINT PAIN AND ITS TREATMENT WITH BIOLOGICAL AGENTS AND DRUGS

### Objectives

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

- The importance of pain in rheumatic diseases
- The role of cytokines in inflammation and pain
- How to assess joint pain in daily practice
- How to assess disease activity in Rheumatoid Arthritis
- Biological therapy and Target therapy
- Effects of TNF- $\alpha$  inhibitors on pain during RCTs
- The comparison between Biological drugs and DMARDs
- Goals of therapy in Rheumatic diseases

### Key Points

- Pain is one of the main features of rheumatic diseases and its management is an area of increasing research.
- Pain in rheumatic diseases is strictly connected with inflammation, whose pathogenesis depends on many cytokines as TNF- $\alpha$ , IL-1 $\beta$  and IL-6, which have also a very important role in the maintenance of pain and in the CNS.
- Old drugs like DMARDs are able to control mainly inflammation, with a minor effect on disability and bone damage.
- It's important to assess Pain in daily practice and it is also a parameter of the Disease Activity Score (DAS), which is the best index to assess disability too.
- Biological drugs are produced using biotechnology and are directed against specific cytokines or molecular pathways: this is the so-called Target Therapy.
- The first biological drugs were TNF- $\alpha$  inhibitors, which proved to be effective in reducing pain, improving quality of life and managing disease activity in RA and other rheumatic and non-rheumatic diseases, as shown by many RCTs.
- In rheumatological diseases the sooner the therapy is started, the better the disease activity is controlled, as patients seem to be more prone to favourable treatment outcome during the very start of the disease.

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# LUMBOSACRAL SPINAL ENDOSCOPY ROUND TABLE

**SCIENCE BACKGROUND: JAMES E. HEAVNER, DVM, PHD, FIPP (HON)**

**CLINICAL PERSPECTIVE: HEMMO A. BOSSCHER, MD, FIPP**

**APPLICATION TO ARACHNOIDITIS: JAN PETER WARNKE, MD**

## **Objectives**

Upon completion of this round table presentation attendees will be able to discuss

- Key developments leading to the use of flexible endoscopes in the spinal canal
- Primary reasons for performing spinal endoscopy
- Indications and techniques for performing epiduroscopy and thecaloscopy
- How patients benefit from spinal canal endoscopy

## **Key Points**

- Advent of small, flexible fiberscopes and suitable light sources, as well as techniques to introduce scopes into the spinal canal is the foundation for spinal endoscopy
- Spinal canal endoscopy provides direct viewing of structures within the canal thereby aiding in determination of abnormalities involved in chronic low back pain and/or pain radiating to the lower extremities
- Spinal canal endoscopy allows direct therapeutic intervention while viewing sources of pain
- Spinal canal endoscopy may identify causes of pain that cannot be determined by physical examination and imaging (CT scan, MRI)
- Major surgical intervention can often be avoided by using minimally invasive spinal canal endoscopy.

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# COLD ALLODYNIA, NERVE ENTRAPMENT, RADICULOPATHIES AND ILLUSIONS: THE SCIENCE AND THE CLINICAL

**THE SCIENCE: JAMES E. HEAVNER, DVM, PHD, FIPP (HON)**

**THE CLINICAL: GABOR B. RACZ, MD, FIPP**

## **Objectives**

Upon completion of this round table presentation attendees will be able to discuss

- Cold allodynia and hyperalgesia as frequent clinical findings in patients with neuropathic pain
- Mechanisms and nerve pathways implicated in cold allodynia and hyperalgesia
- Case examples of cold allodynia and hyperalgesia in patients with neuropathic pain
- Therapies – what works, what does not work and why

## **Key Points**

- Cold allodynia and hyperalgesia are associated with injuries to both the central and peripheral nervous systems
- In general, little is known about mechanisms of cold allodynia and hyperalgesia. NMDA-receptor mediated central sensitization is involved in cold hyperalgesia but other mechanisms are also present
- The normal human brain can be tricked to perceive cold allodynia (thermal grill illusion) which might provide clues to how nerve injury produces cold allodynia and hyperalgesia
- Sympathetic block may relieve cold allodynia/hyperalgesia, but may not be successful if the block is not complete

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# ANDREA TRESOT, MD, FIPP

## BIOGRAPHICAL SKETCH

Dr. Andrea Trescot is a private practice physician in St. Augustine, Florida.

## PATHOPHYSIOLOGY AND PHARMACOLOGIC MANAGEMENT OF NEUROPATHIC PAIN

### Objectives

- Upon completion of this presentation, attendees will be able to discuss:
- Some of the common causes of peripheral neuropathy
- Some of the common pharmacologic and nonpharmacologic treatments of peripheral neuropathy
- Some of the new directions in the treatment of peripheral neuropathy

### Key points

- Peripheral neuropathy is not a homogeneous process, but rather encompasses a large, diverse group of nerve pathologies.
- There are multiple causes of peripheral neuropathy.
- Although diabetes is the most common cause of peripheral neuropathy, most cases of peripheral neuropathy never have a defined etiology.
- Most of the treatments are pharmacologic, but there are increasingly options for interventional treatment

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

## PHARMACOLOGICAL MANAGEMENT OF CANCER PAIN

### Objectives

At the end of this presentation attendees will be able to discuss:

- The value of following the WHO pain ladder in the management of cancer pain
- The role of adjuvant treatment such as antidepressants and anti-epileptics
- The appropriate use of breakthrough medication
- The control of side effects and complications
- The role of palliative cancer treatments such as chemotherapy and bisphosphonates
- The right dose calculation for an opioid switch

### Key points

- The management of cancer pain requires a multidisciplinary and multifactorial approach. The treatment may consist of tumor oriented interventions supplemented with symptomatic pain management.
- The most important step in reaching an adequate pain control in patients with cancer is a good understanding of the underlying pain mechanism, in order that the right treatment can be chosen
- The first step in pain treatment is antitumor therapy by the medical oncologist if indicated
- In case of pain caused by bone metastases, bisphosphonates may be considered.
- Basic pharmacological treatment aims at achieving constant steady state plasma levels, which is preferentially achieved by long-acting formulations.
- Patients should be instructed to use immediate release preparations for control of breakthrough pain.
- The use of step two of the WHO pain ladder is no longer recommended.
- Only weak recommendation can be used to support combination step three opioid therapy.
- There is evidence to support the efficacy and tolerability of hydromorphone for moderate to severe cancer pain as an alternative to morphine and oxycodone.
- Alternative administration routes to oral opioids such as parenteral, transdermal and rectal administration may be considered. There is no significant difference in efficacy or side effects between administration routes.
- There is a weak recommendation for using spinal opioids in adult patients with cancer.
- In case of tolerance or severe side effects on opioid analgesics, opioid switch is recommended.
- When opioid therapy is started it is recommended to prescribe osmotic laxatives.
- Vomiting and nausea may be controlled by prokinetics and dopamine antagonists
- The direct clinical evidence in cancer-related pain and renal impairment is insufficient to allow formulation of guidelines. The risk of opioid use is stratified according to the activity of opioid metabolites and potential for accumulation. Fentanyl, alfentanil and methadone are the least likely to cause harm when used appropriately. Morphine may be associated with toxicity in patients with renal impairment.
- The role of adjuvant therapy (e.g. antidepressants and anti-epileptics) has become evident when neuropathic characteristics are present.
- Side effects of the central nervous system caused by opioid analgesics, such as sedation and hallucinations, may wear off over time.
- Delirium, myoclonus and hyperalgesia may be controlled by opioid switching
- For the management of opioid intoxication opioid antagonists such as naloxone are recommended.
- Recently, opioid antagonists, that do not cross the blood brain barrier have been developed. Simultaneous use of those antagonists and opioids may prevent gastro-intestinal side effects.

## Recommended literature

\* of special interest

\*\* of outstanding interest

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# LORAND EROSS, MD, PHD, FIPP

## BIOGRAPHICAL SKETCH

Dr. Lorand Eross is the director of Functional Neurosurgical Program and head of the Functional Neurosurgical Department at the National Institute of Neuroscience in Budapest. He is a board certified neurologist and neurosurgeon. He has got his PhD degree at Semmelweis University, Faculty of Medicine in 2010. His main interest is epilepsy surgery, movement disorder surgery, pain treatment, spasticity, intraoperative neuromonitoring and neuromodulation. He is teaching at Semmelweis University at the Faculty of Medicine and at Pazmany Peter University Faculty of Information Technology. His research activity is in vitro and in vivo electrophysiological investigational methods in epilepsy.

## CURRENT NEUROSURGICAL APPROACHES TO THE TREATMENT OF PAIN

### Learning objectives:

This summary focuses exclusively on neurosurgical procedures against pain. SCS and periferial nerve stimulation will be discussed by other authors.

### Key Points:

The neurosurgical treatment of pain is divided into two subgroups: ablative and neuroaugmentative therapies.

**Ablative procedures** include all types of surgical interventions, when an irreversible action is taken to stop pain.

**Neurolysis:** separation of a peripheral nerve from the surrounding structures to which is adherent. The use of internal neurolysis is clearly necessary in dissecting an injured nerve for interfascicular nerve graft or to evaluate a neuroma-in-continuity.

**Trigeminal neurectomy:** Peripheral trigeminal neurectomy can be useful in elderly debilitated patients who cannot undergo more substantive procedure for V1 division neuralgia. 50-60% of trigeminal neuropathic pain cases are successfully treated with neurectomy.

**Dorsal Root ganglionectomy and Dorsal Rhizotomy (DR):** The largest series of DR in cancer pain was published in 1982 by Sindou and Lapras, success rate was 47% in a series of 585 patients.

**Sympathectomy:** Currently surgical sympathectomy is reserved for treating hyperhidrosis, sympathetically maintained pain and limited cases of vasculitis (i.e. Raynaud's syndrome). The success rate of sympathectomy in the literature after 1990 ranges from 65% to 100%.

**Dorsal Root Entry Zone lesioning:** Indications for drezotomy includes 1.Cancer pain that is limited in extent (e.g.: Pancoast syndrome), 2.Persistent neuropathic pain, 3.Disabling hyperspasticity, especially when associated with pain. Surgery in the DREZ must be considered within the frame of all the methods belonging to the armamentarium of pain surgery.

**Midline myelotomy:** Gildenberg and Hirschberg (1984) performed myelotomy for visceral pain with excellent results in 8 out of 12 patients. Punctuate midline myelotomy after laminectomy at T8 level for malignant visceral pain found efficient by Nauta et al. (2000). This technique has limited indication today.

**Anterior Cordotomy:** The ideal candidates for Percutan Cordotomy (PC) are cancer patients with unilateral localized pain if the primary malignant disease is under control. The initial success rate of 3742 cases collected by Lorenz was 75 to 96%.

**Percutaneous extralemniscal myelotomy:** Indicated in cancer patients with pelvic or lower trunk or lower extremity pain. Kanpolat reported 15 cases, with rectal, pancreatic, colon, renal tumors without complication rate. 6 of the 15 patient had complete 5 of 15 cases had partial pain relief.

**Mesencephalotomy:** Amano in 1998 reported 76% long-term pain relief in patients with central and deafferentation pain with an overall morbidity of 4%. No recent report of this procedure in practice.

**Medial Thalamotomy (MT):** MT is capable of alleviating neuropathic and nociceptive pain and has the advantage of low morbidity. Medial thalamotomy in any nucleus is more effective in relieving nociceptive than neuropathic pain and those results are modest: 46% relief of nociceptive usually cancer

pain and 29% in neuropathic pain.

**Stereotactic cingulotomy:** 394 patients were reported until today, in patients with benign origin 53% was useful and 47% of non-useful. In malignant pain the result was just similar. The initial good response to cingulotomy progressively fades over time.

**Hypophysectomy:** There are few clinical report on hypophysectomy for pain in the literature since 1984. Recently some center reported on few patients gamma knife hypophysectomies with limited results.

**Percutan Radiofrequency Trigeminal Gangliolysis or Rhizotomy:** In summary of several series of RF trigeminal rhizolysis 99% of patients became pain free immediately after the procedure. In a review of 1200 patients followed 1-20 years (mean 9 years), 93 % reported excellent or good results, and 4% reported fair results because undesirable side effects, 1% reported poor results because of severe denervation dysesthesia. RF trigeminal rhizolysis is effective in primary trigeminal neuralgia. RF leasioning can effectively treat paroxysmal facial pain associated with tumors and multiple sclerosis.

**Percutan Retrogasserian Glycerol Rhizotomy (PRGR)** PRGR is a useful minimal invasive technique in trigeminal neuralgia when MVD is not possible. Long term pain control (7 years) was 85%; the 11 years follow up in Lundsford series showed 77% pain relief.

**Microvascular decompression (MVD)** for Trigeminal Neuralgia: Jannetta reported a total success rate of 88% at 1 year and 74% at 10 year follow up. MVD is the treatment of choice for patient with typical trigeminal neuralgia, with MRI diagnosed neurovascular compression if the patient medical condition allow the risk of craniotomy.

**Posterior Fossa Trigeminal Rhizotomy (PFTR):** Several contemporary neurosurgeons indicate PFTR when MVD surgery or other procedures failed. In 3% of patients operated with MVD no vascular compression is found. In these cases an optional treatment strategy could be partial sectioning the nerve.

**Gamma Knife Radiosurgery for Trigeminal Neuralgia:** With this method by the end of 2010 more than 17 000 patients were treated worldwide. Approximately 75% of patients achieve good (pain free on medication) or excellent results (pain free w/o medication) within 1-8 weeks of the initial treatment.

**Neuromodulative therapy** includes only reversible neurostimulation type procedures: **Primary Motor Cortex Stimulation (MCS):** Chronic epidural MCS can control central deafferentation pain in 45-75% of cases. The best results were observed in central post-stroke pain and trigeminal neuropathy (>90%). The results improved during the last 10 years due to better targeting of the motor cortex (fMRI, neuronavigation, SSEP, intraoperative stimulation).

**Deep Brain Stimulation (DBS):** In general patients with refractory neuropathic pain should undergo paraesthesia producing stimulation, whereas those with nociceptive pain should undergo periventricular gray/periaqueductal gray matter stimulation, long-term success rate varies between 26% to 72%. The best results of DBS are in cancer pain, FBSS, cervical and brachial avulsions and peripheral neuropathy.

**Gasserian Ganglion Stimulation:** Stimulation of the gasserian ganglion presents a surgical option with atypical trigeminal pain. In a large clinical series of 182 patients 92 had more than 50% pain relief and 82 were implanted. At long-term follow up 70% of patients had 75 -100% pain relief. The most benefiteres were patients with neuropathic pain after intervention of the maxillary sinus, posttraumatic facial pain, and those with severe dysesthesia after trigeminal destructive procedures.

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# LIONG LIEM, MD, FIPP

## BIOGRAPHICAL SKETCH

Dr. Liong Liem, MD, FIPP, is director of the multidisciplinary Pain Clinic in St. Antonius Hospital, Department of Anesthesiology, Intensive Care and Pain Medicine, Nieuwegein, The Netherlands.

## FACIAL PAIN AND CERVICOGENIC HEADACHE

### Objectives

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

- The pathophysiology of and risk factors for facial pain
- The diagnostic criteria for facial pain and cervicogenic headache.
- Questions to determine the differential diagnosis of facial pain.
- Physical examination to find evidence for cervicogenic headache
- Treatment options for facial pain and cervicogenic headache if conservative therapy fails.

### Key Points

- Persistent idiopathic facial pain (PIFP) is described as a persistent facial pain that does not have the classical characteristics of cranial neuralgias and for which there is no obvious cause. The pathophysiology is unknown.
- Forming a diagnosis is a process of elimination of other causes of facial pain and is possible if the pain is present daily and throughout all or most of the day.
- Treatment of PIFP requires a multidisciplinary approach of psychological counseling and pharmacological therapy, Amitriptyline is the primary choice. Invasive procedures can be considered if pharmacological treatment fails.
- Cervicogenic headache is characterized by unilateral headache symptoms which arise from the neck and radiates to fronto-temporal region and possible to the supraorbital region.
- Physical examination to diagnose cervicogenic headache encompasses movement tests of the cervical facet joints and soft tissues of the neck.
- Injection of the n. occipitalis major or RF treatment can be preformed if conservative treatments falls short.

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# SANG CHUL LEE, MD, PHD, FIPP

## BIOGRAPHICAL SKETCH

Prof. Sang Chul Lee is a Professor and Chairman of the Department of Anesthesiology and Pain Medicine, Seoul National University College of Medicine, and the President of Korean Spinal Pain Society and Korean IASP chapter.

## ULTRASOUND GUIDED TREATMENT 2011

### Objectives

Upon completion of this presentation attendees will be able to discuss

- Why we should use ultrasound as a guidance method in pain treatment
- What basic principles of ultrasound imaging are
- For what ultrasound guided is used in the field of pain treatment
- Relationships between the inserted needle and inner structures
- Proper postures during ultrasound guided intervention
- How Sonoanatomy compare with real anatomy
- Examples of ultrasound application for pain treatment

### Key Points

- Ultrasonography has potential usefulness in pain management including diagnosis and interventional treatment.
- The rationale for performing ultrasound guided treatment is that it provides information that aids in establishing a diagnosis and prognosis, locating areas of pathology, and providing therapy via a real-time visualization.
- Ultrasonography is the only modality that allows direct visualization of relationships between the inserted needle and inner structures such as vessels or nerves in the way of target areas to avoid an iatrogenic injury of them.
- Barriers to the use of ultrasound in clinical practice include necessity of training for operation due to some limitations of ultrasound-guided intervention such as unrecognized intravascular injection.
- Expected outcomes include ruling in or out area or areas of pathology, facilitating treatment, better forecasting of prognosis and future treatment options.

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# ADNAN A. AL-KAISEY, MB CHB, FFRCA, FPMRCA, 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 variety of categories in pain management. His interest is in 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. Dr Al-Kaisy was voted the Hospital Doctor of the Year in 2001 for the Pain Management.

## HIGH FREQUENCY SPINAL CORD STIMULATION IN THE MANAGEMENT OF AXIAL BACK PAIN

### Objectives

Upon completion of this presentation attendees will be able to discuss

- The role of conventional Spinal Cord Stimulation (SCS) in management of Failed back Surgery Syndrome (FBSS).
- Limitations of conventional SCS in the management of Axial Back Pain (ABP)
- Strategies used to improve the efficacy of the conventional SCS
- What is high frequency stimulation?
- How does high frequency stimulation work? How safe is it?
- What are the advantages of high frequency stimulation for patients, operators and providers?
- Future direction of high frequency SCS

### Key Points

- Spinal Cord Stimulation is evidence-based treatment used in the management of chronic pain conditions.
- While SCS is very effective for radicular pain, one notable area that SCS has had less success in is ABP, which is a mix of nociceptive and neuropathic pain.
- In conventional SCS, paraesthesia coverage has been essential for pain relief. However, coverage of low back pain without dorsal root stimulation and without undesirable stimulation is difficult to accomplish.
- One promising approach for this unmet need is high frequency SCS using up to 10 KHZ.
- In a multi-centre prospective European open label study with 84 implanted patients, high frequency SCS technology showed significant relief for chronic back pain in difficult-to-treat patients, such as predominant back pain patients.
- Leads can be placed in anatomic midline rather than physiologic midline, making the procedure simpler. Paraesthesia mapping step is not required, making the time for high frequency SCS surgery more predictable and potentially shorter.
- Future directions of HF SCS includes use of different algorithms in programming, different applications and advances in equipment technology.

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# MURRAY H. ROSENTHAL, DO, FAPA

## BIOGRAPHICAL SKETCH

Dr. Murray Rosenthal, a board-certified psychiatrist and Fellow of the American Psychiatric Association, is Chief Medical Officer of Millennium Laboratories. Prior to joining Millennium, Dr. Rosenthal was Senior Medical Director and CEO of California Clinical Trials (CCT), a multi-site, phase 1-4 CNS research group. During his tenure at CCT he conducted over 450 clinical trials in all areas of Central Nervous System (CNS) research.

## THE ROLE OF URINE DRUG TESTING IN PAIN MANAGEMENT

### Objectives

Upon completion of this presentation attendees will be able to discuss

- The rationale for performing urine drug testing (UDT) on patients taking opioids
- How do Point of Care Urine Testing (POCT) and laboratory confirmation compare
- Limitations of POCT
- What are common objections to UDT testing?
- APS Guidelines for testing; when to test
- How to assess false positives and negatives
- Using UDT to assess you patient and practice; what could unexpected results indicate
- Current and future research

### Key Points

- Physicians guessing at patient compliance on opioids is less than chance
- UDT is becoming a part of physician-patient treatment contract
- Patients need to understand the UDT as a routine procedure like monitoring Bp in hypertension.
- The POCT and confirmation have different uses based upon their sensitivity. One gives instant snapshot and the other can be used over time to assess levels compare to large patient populations on similar medications.
- Testing should be both routine and at key times during changes in treatment or significant changes in a patient's clinical picture.
- By assessing huge databases of patient samples, we have observed patterns of use and misuse which will be discussed

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