Alternatives in Pain Management

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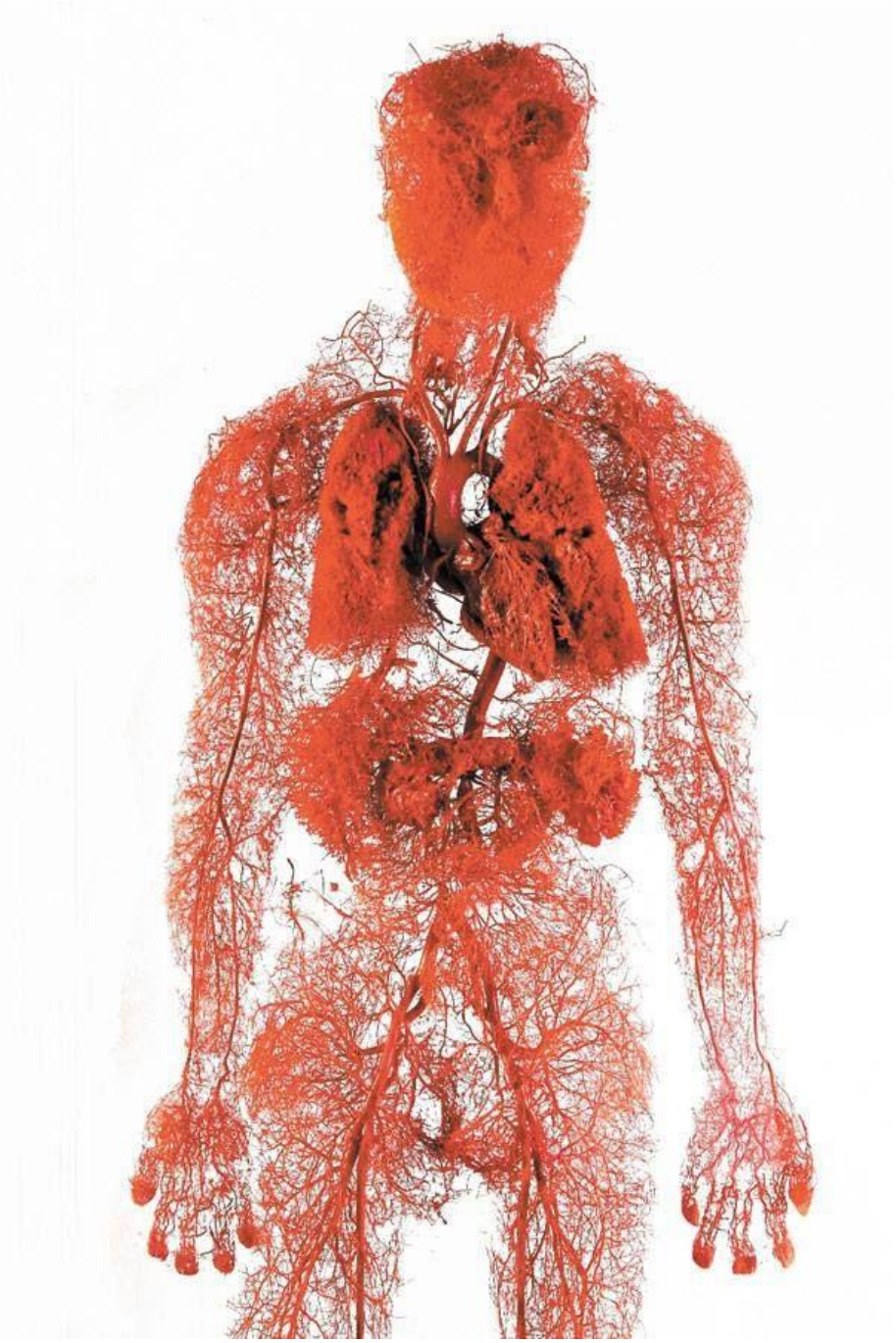
Disclosure

Dr. Michael Bottros has no relevant financial interests to disclose.

Outline

- Introduction
- Pathophysiology
- Risk Factors
- Nonpharmacological Options
- Adjuvant Medications
- Interventional Approaches
- Conclusion



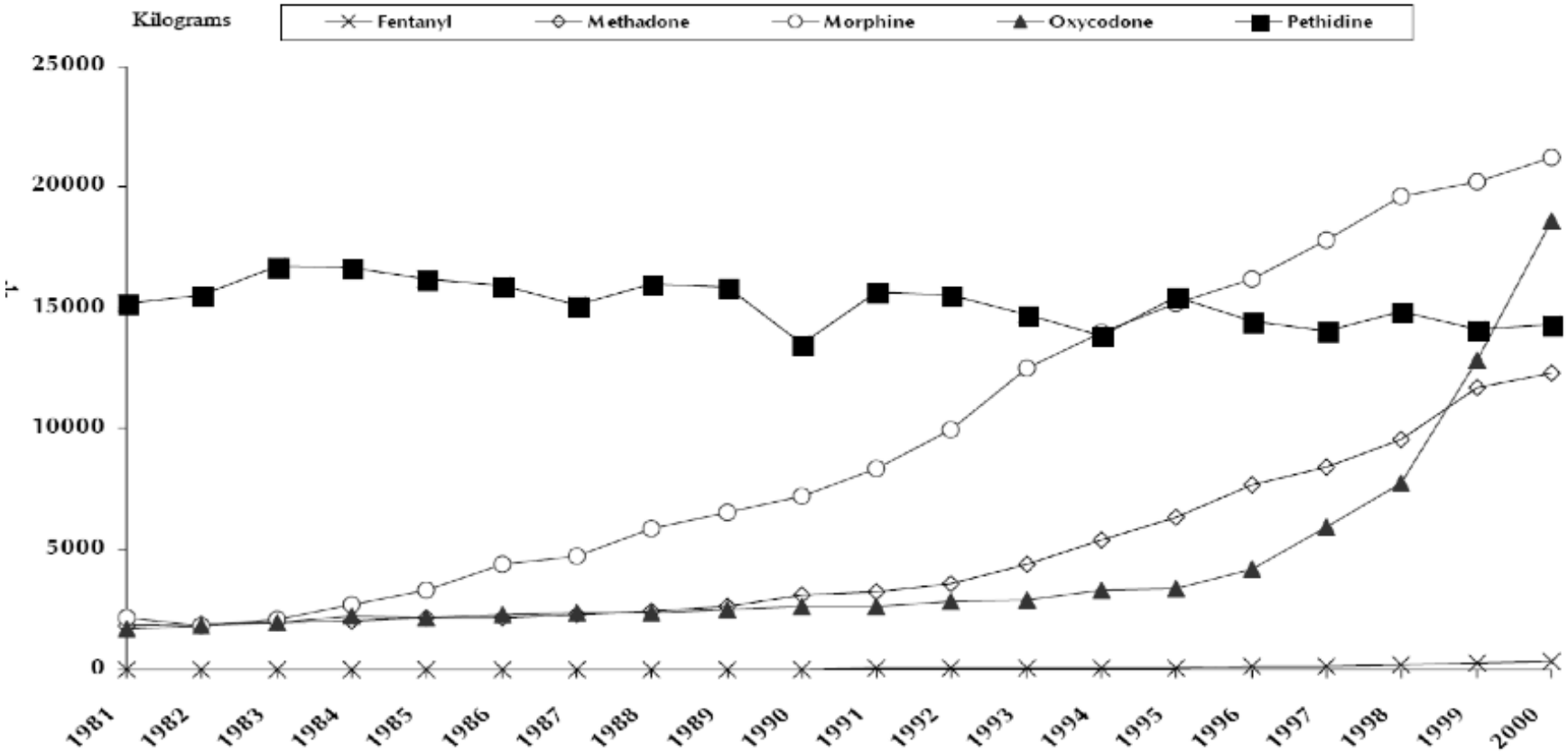
Introduction

- Number of patients with chronic pain has increased
- 1.5 billion people worldwide suffer from chronic pain[1]
- 3- 4.5% of the global population suffers from neuropathic pain[1]
- 100 million Americans suffer from chronic pain[2]

1. Global Industry Analysts, Inc. Report, January 10, 2011.
2. Institute of Medicine Report from the Committee on Advancing Pain Research, Care, and Education: Relieving Pain in America, 2011.

Global Consumption of Opioid Analgesics

1981 - 2000



Source: International Narcotics Control Board

Domains of Chronic Pain

Quality of Life

Physical functioning
Ability to perform activities of daily living
Work
Recreation

Psychological Morbidity

Depression
Anxiety, anger
Sleep disturbances
Loss of self-esteem

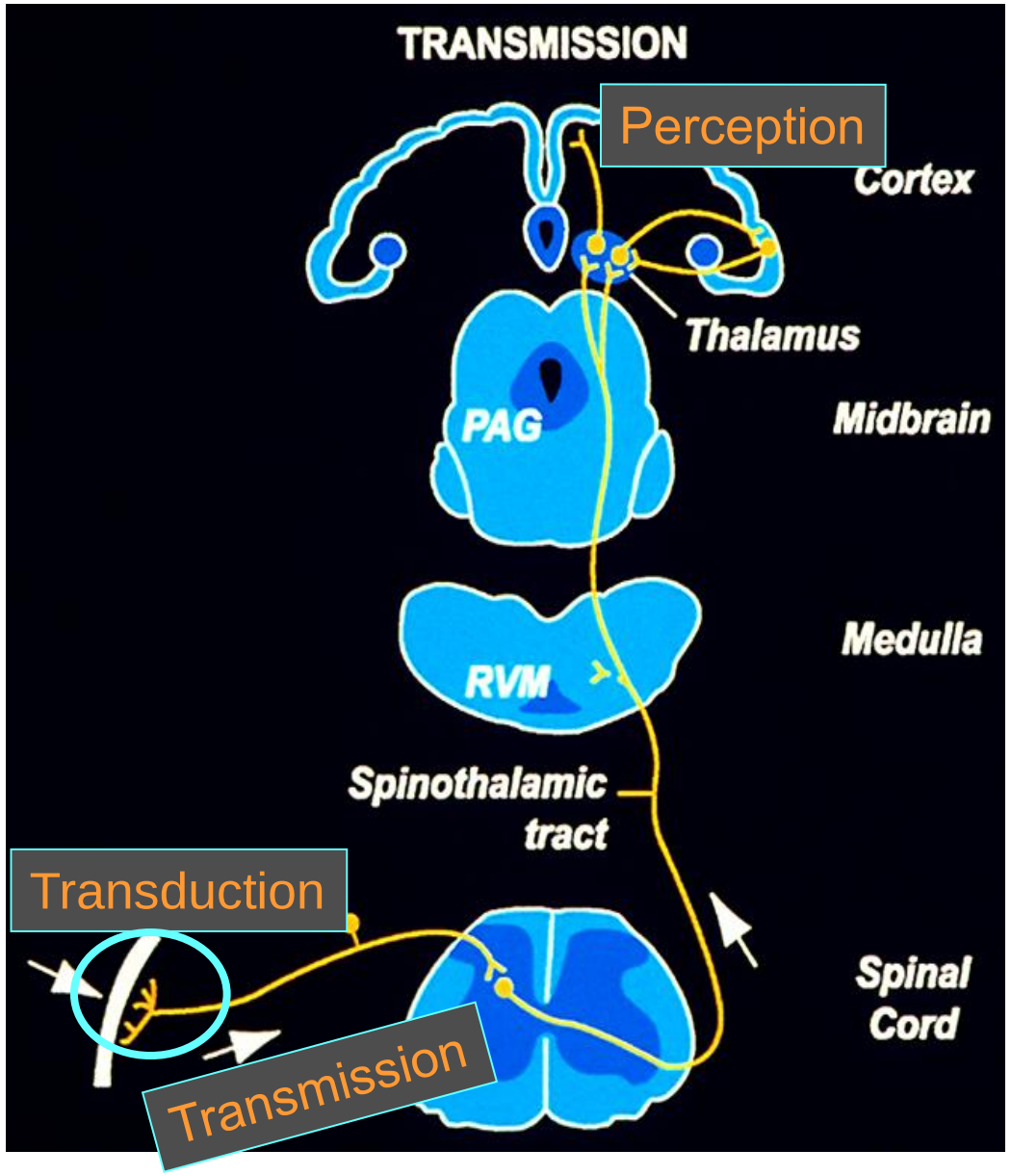
Social Consequences

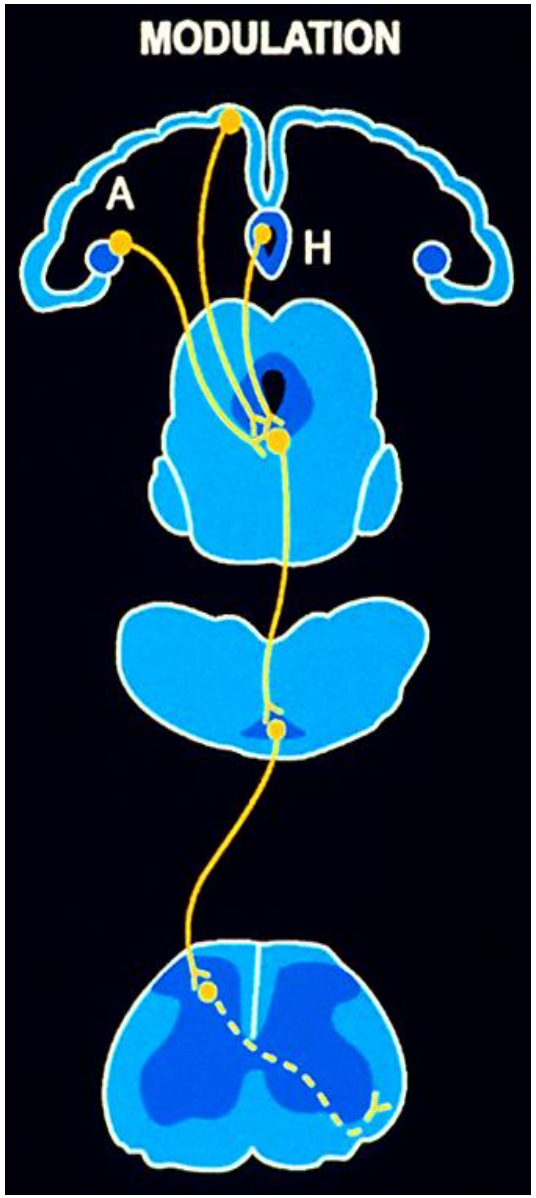
Marital/family relations
Intimacy/sexual activity
Social isolation

Socioeconomic Consequences

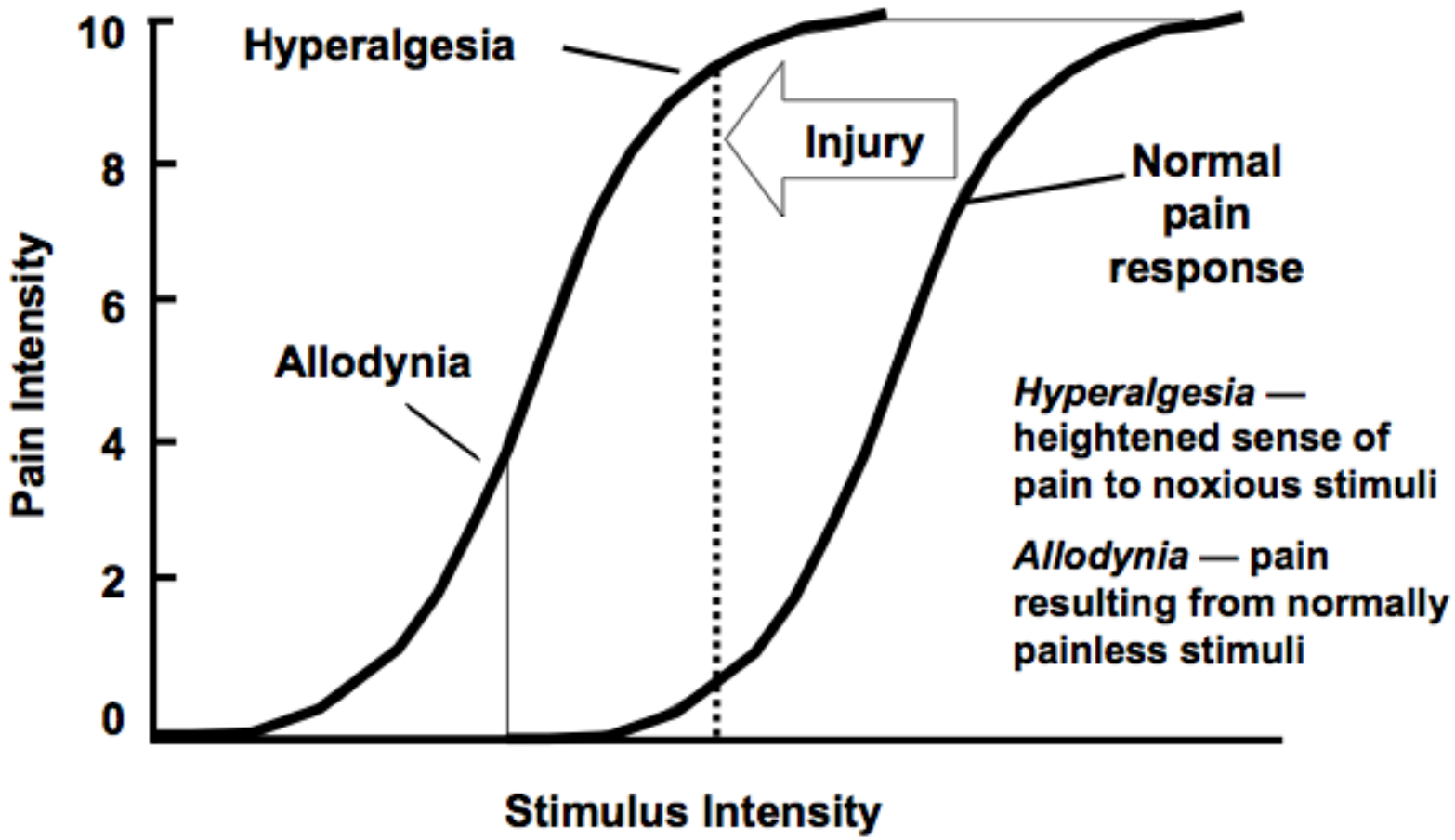
Healthcare costs
Disability
Lost workdays

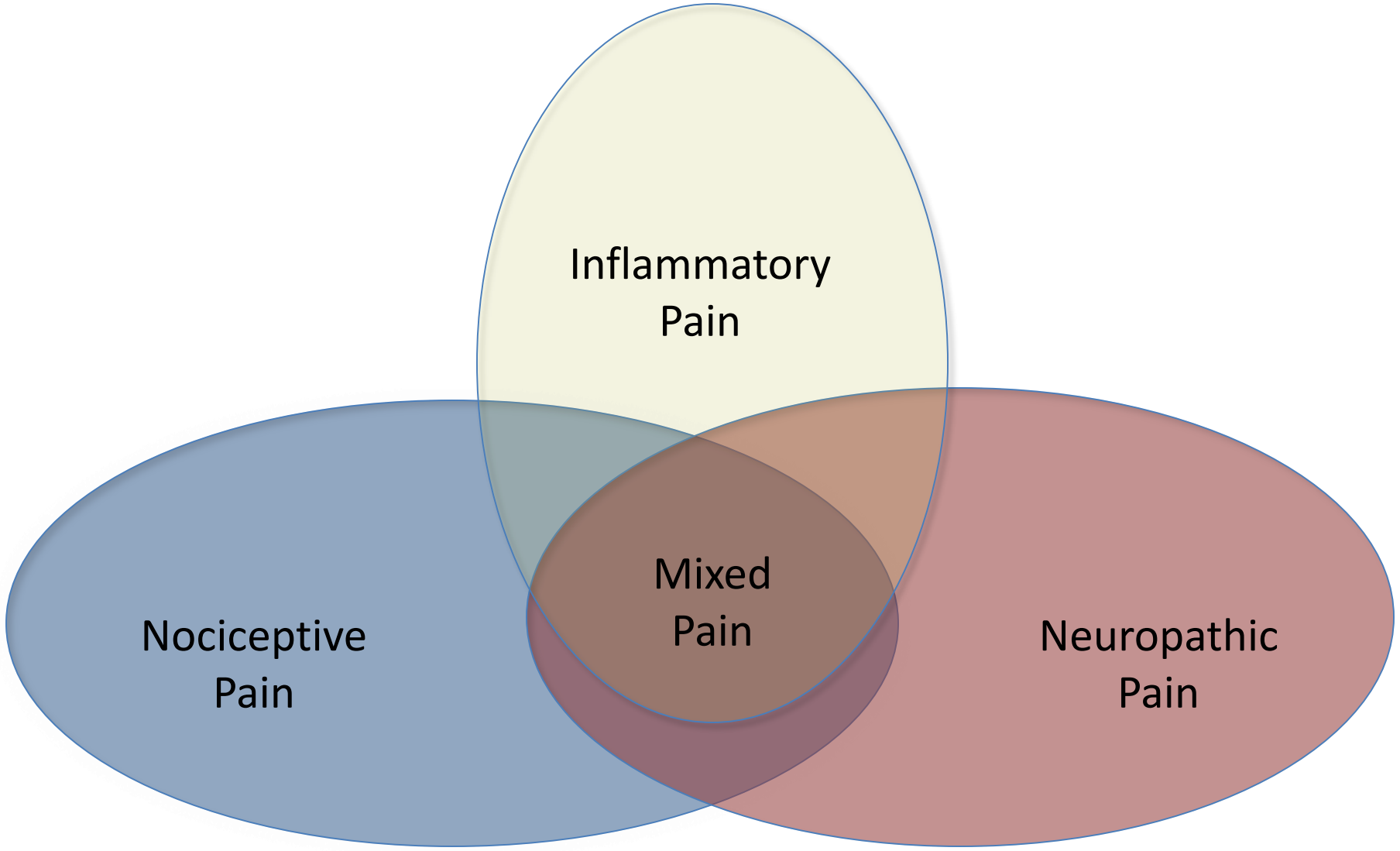
Peripheral and Central Pathways for Pain





Sensitization




Inflammatory Pain
Nociceptive Pain
Mixed Pain
Neuropathic Pain

Risk Factors

Contents lists available at SciVerse ScienceDirect

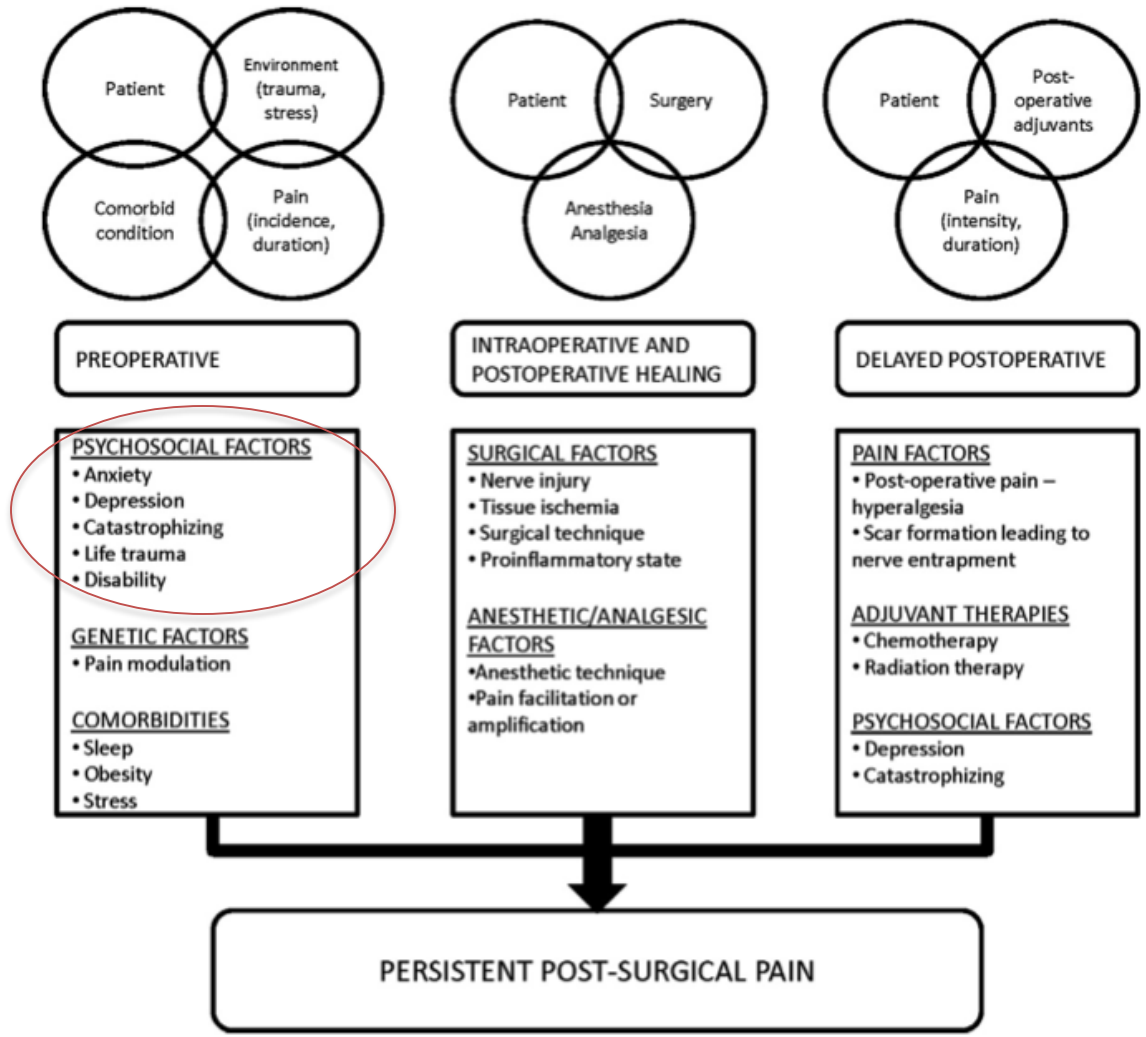
European Journal of Pain Supplements

journal homepage: www.EuropeanJournalPain.com

Preventing chronic pain following acute pain: Risk factors, preventive strategies, and their efficacy

Kai McGreevy, Michael M. Bottros, Srinivasa N. Raja *

Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University, School of Medicine, 292 Osler, 600 North Wolfe Street, Baltimore, MD 21287, USA



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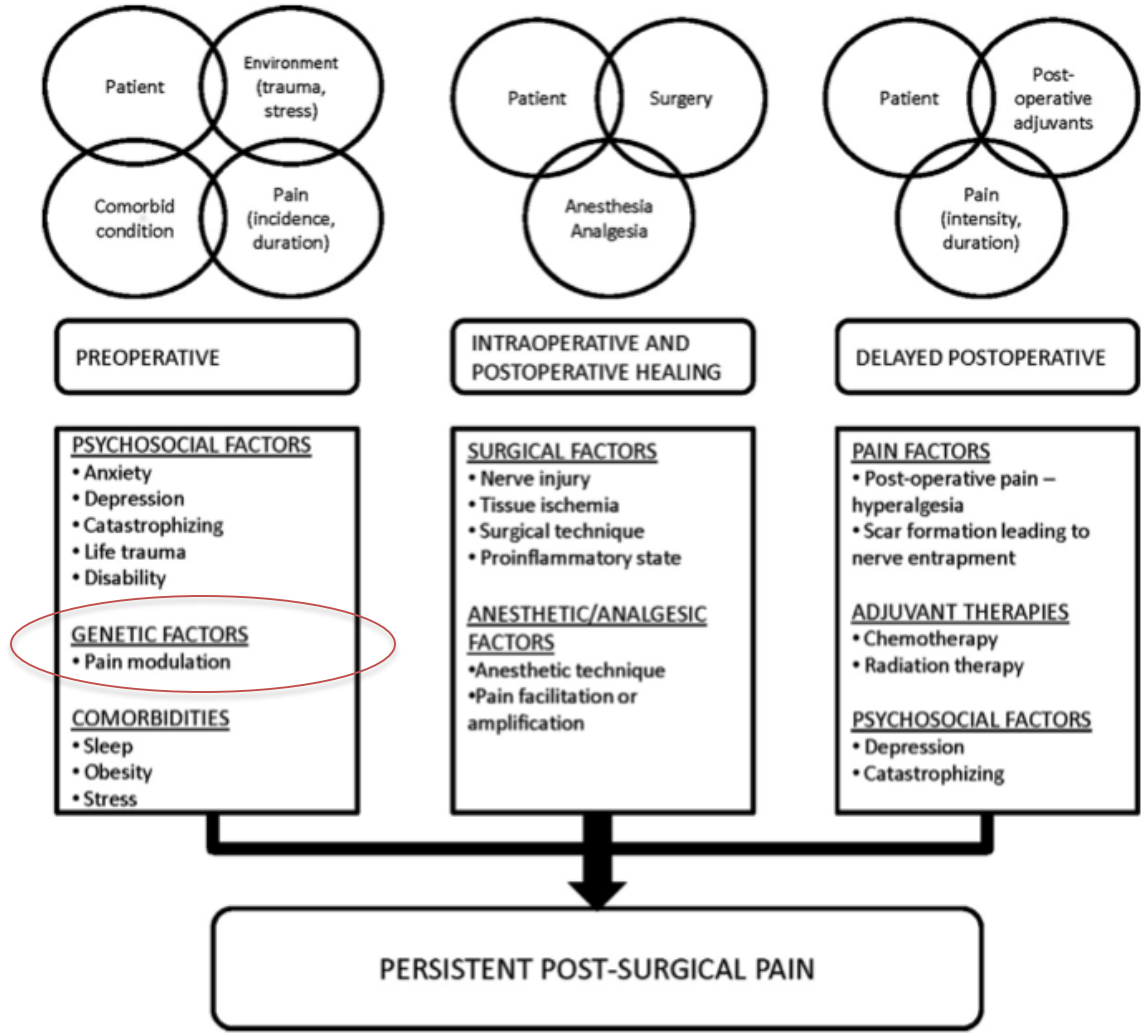

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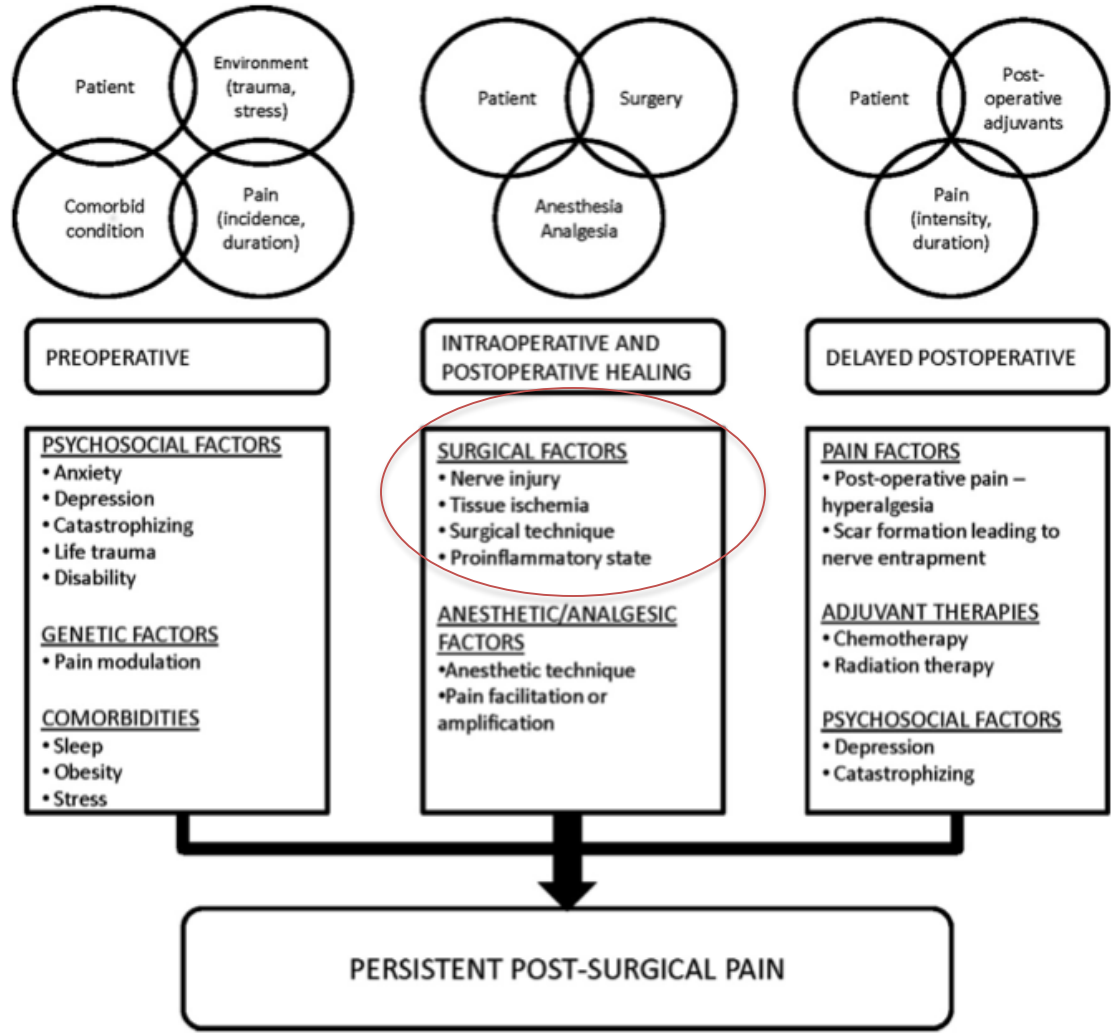

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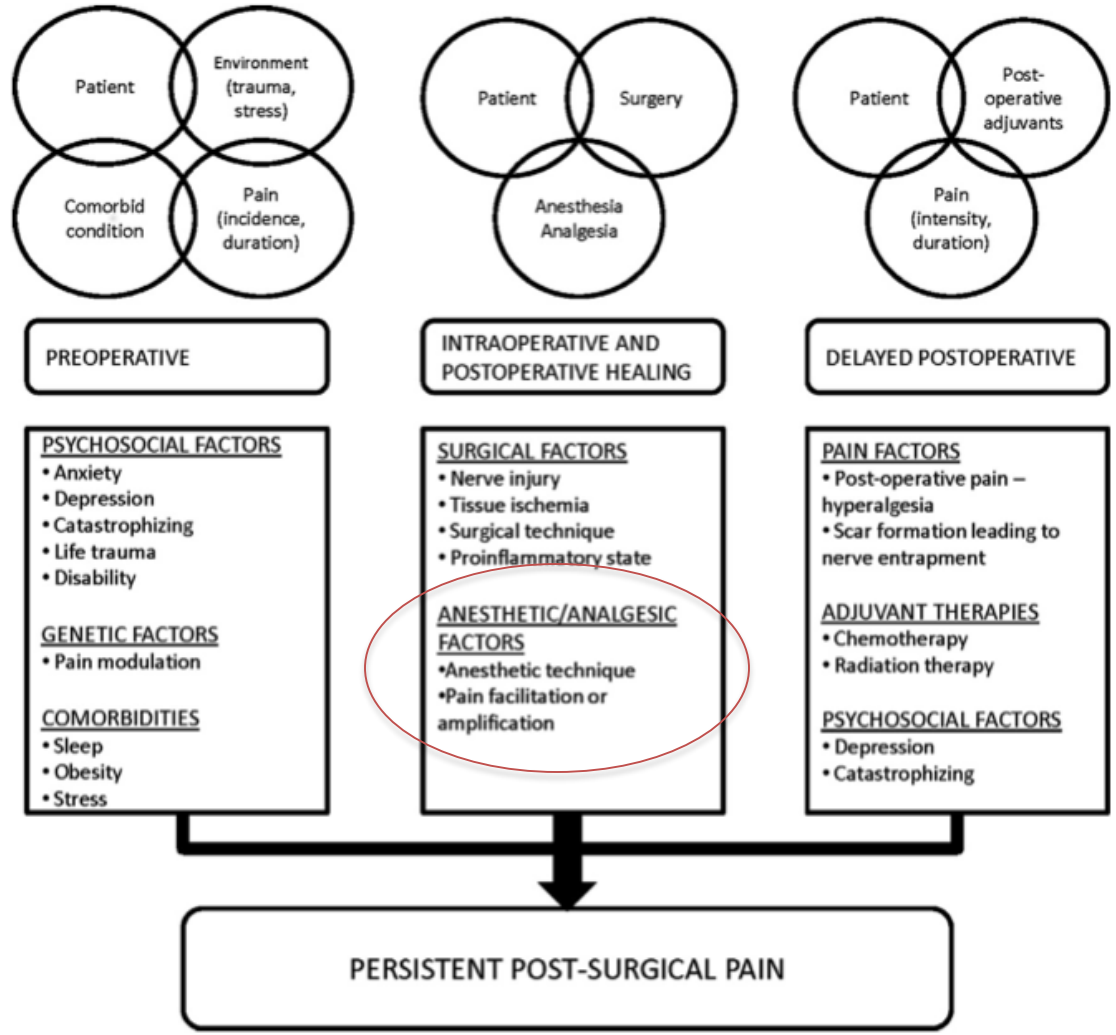

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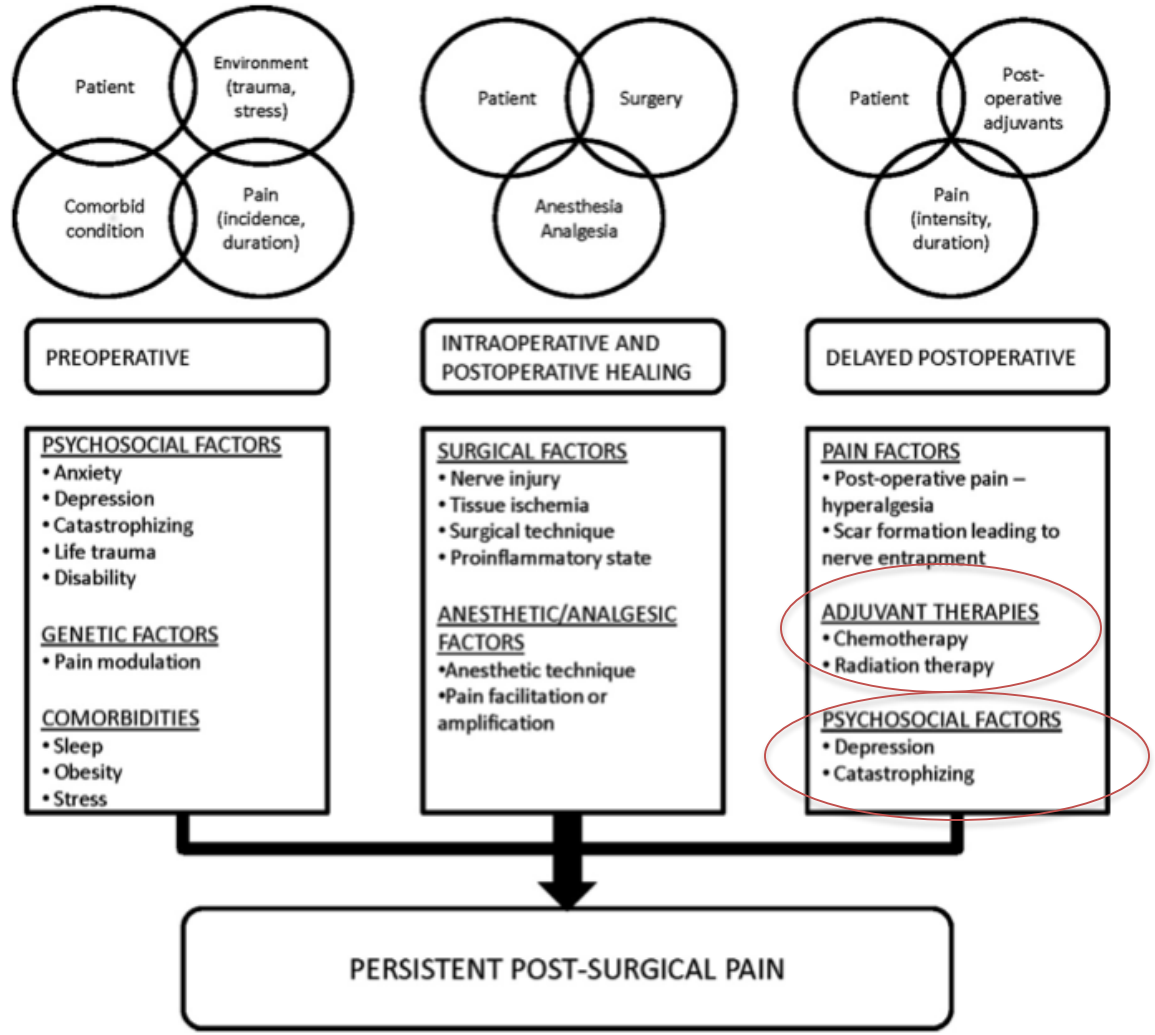
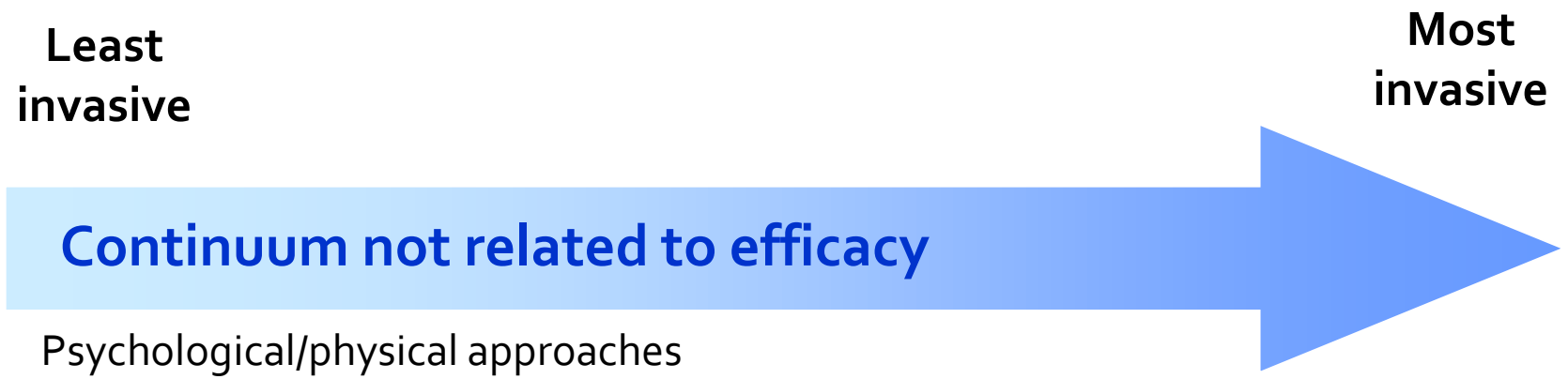


Pain Treatment Continuum



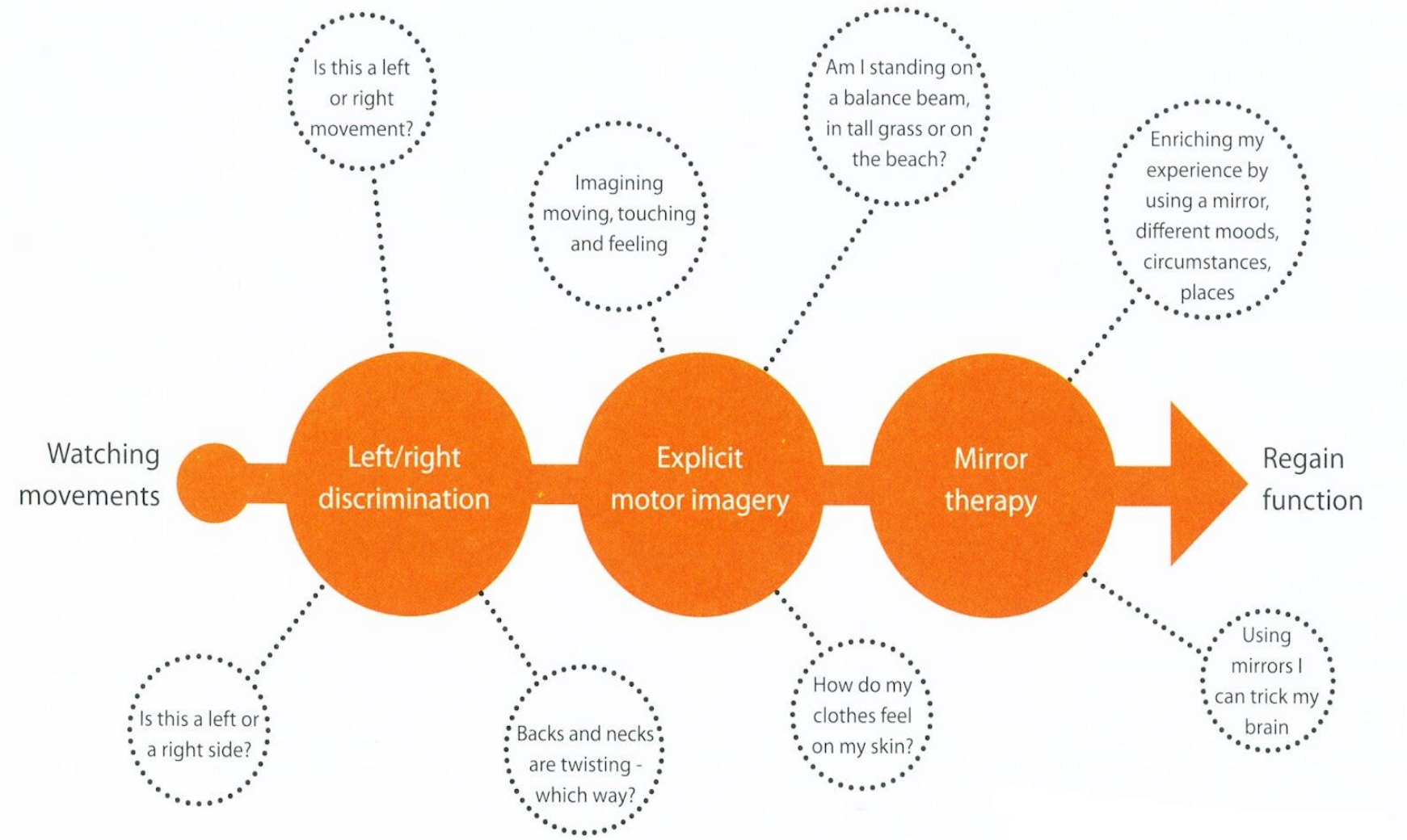
*Consider referral if previous treatments were unsuccessful.

Nonpharmacological Options

Nonpharmacologic Options

- Biofeedback
- Relaxation therapy
- Physical and occupational therapy
- Cognitive/behavioral strategies
  - meditation; guided imagery
- Acupuncture
- Transcutaneous electrical nerve stimulation

Graded Motor Imagery



Results

- Opioid use: following the treatment process, overall there is a significant reduction in opioid use, $p<0.001$.
  - Pre GMI: 48 of 92
  - Post GMI 19 of 92
- Functional improvement: following GMI, there is a significant improvement in functionality
  - Median improvement of 32% on quick DASH, $p<0.001$
  - Median improvement of 22.5% on LEFS, $p<0.001$
- NRS Scores: Median scores showed significant improvement, $p<0.001$
  - Pre GMI: 6/10
  - Post GMI: 3.2/10

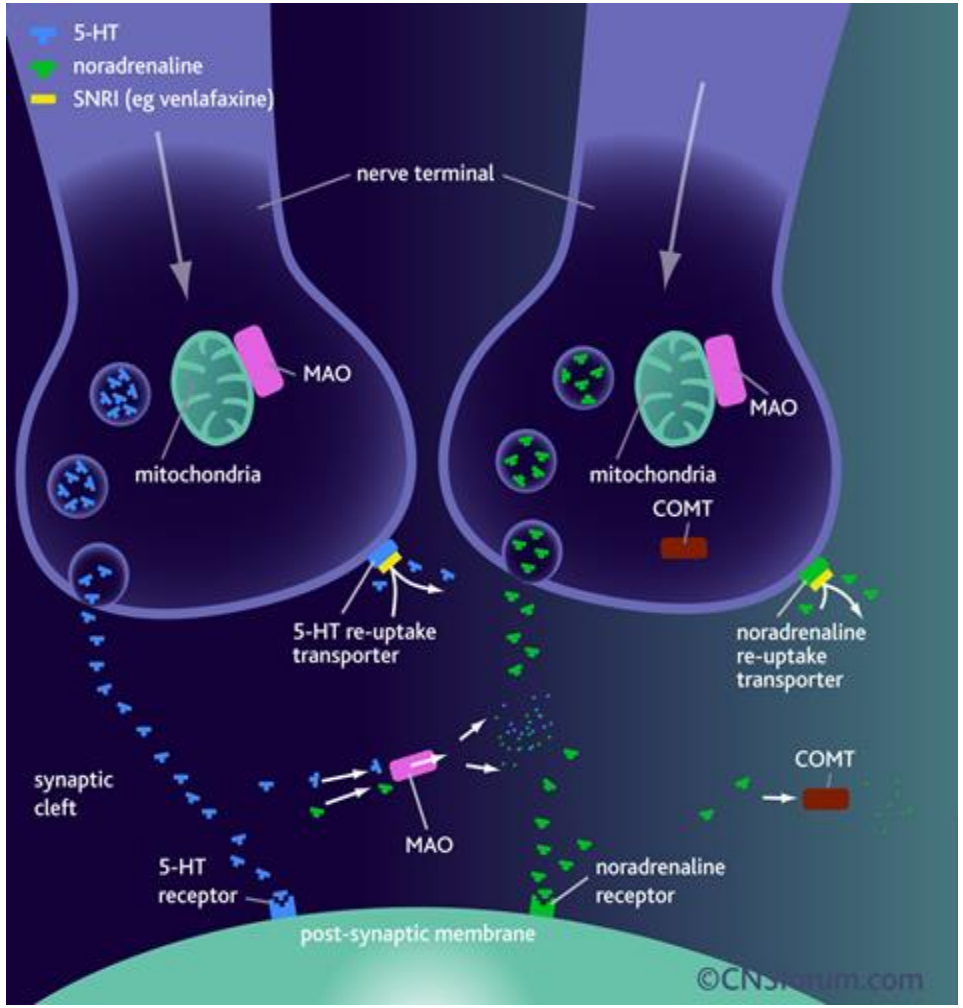
Adjuvant Medications

Single-Dose Analgesics: >50% Relief for Moderate-Severe Postoperative Pain

Drug	Mean NNT	95% CI
Codeine 60mg/Acetam PO 1000mg	2.2	1.7 - 2.9
Rofecoxib PO 50mg	2.3	2.0 - 2.6
Ibuprofen PO 600mg	2.4	1.9 - 3.3
Oxycodone PO 15mg	2.4	1.5 - 4.9
Ibuprofen PO 400mg	2.7	2.5 - 3.0
Meperidine IM 100mg	2.9	2.3 - 3.9
Morphine IM 10mg	2.9	2.6 - 3.6
Ketorolac IM 30mg	3.4	2.5 - 4.9
Acetaminophen PO 1000mg	3.8	3.4 - 4.4
Tramadol PO 100mg	4.8	3.4 - 8.2
Codeine PO 60mg	9.1	6.0 - 23.4

Tricyclic Antidepressants

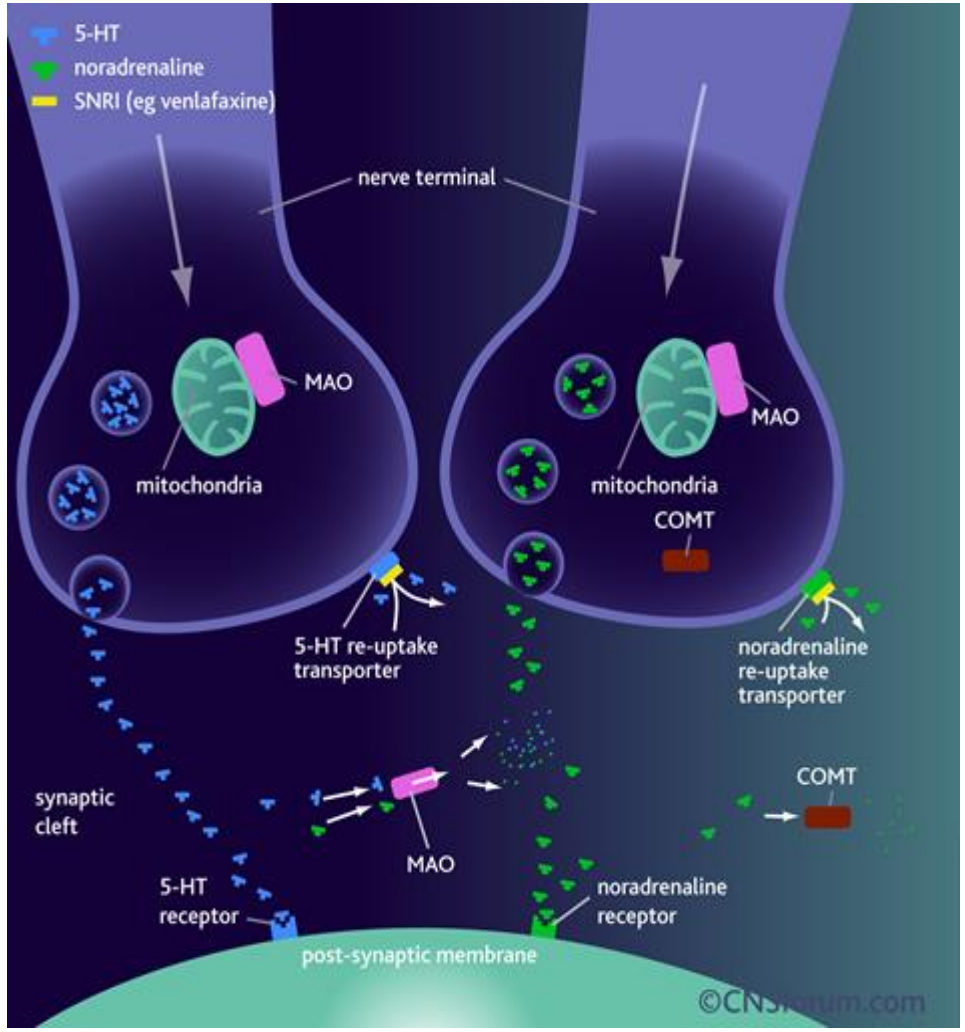
- Inhibit the reuptake of NE and 5HT.
- Enhance inhibition from the brainstem to the spinal cord.
- Shown positive results in painful diabetic neuropathy, postherpetic neuralgia (PHN), painful polyneuropathy, and postmastectomy pain
- Efficacy was shown in patients with and without comorbid depression.



Jensen TS, Madsen CS, Finnerup NB. Curr Opin Neurol 2009;22(5): 467–474
O'Connor AB, Dworkin RH. Am J Med 2009; 122(10, Suppl):S22–S32

Serotonin Norepinephrine Reuptake Inhibitors

- Duloxetine (Cymbalta) and Venlafaxine (Effexor) are the two serotonin–norepinephrine inhibitors studied for the treatment of neuropathic pain
- Milnaciprin (Savella) is another SNRI that is effective for fibromyalgia, but has not been studied for neuropathic pain
- The EFNS and NeuPSIG recommend SNRIs as first line options for the treatment of painful diabetic neuropathy and the Canadian Pain Society recommends this class of medications as second-line treatment options.

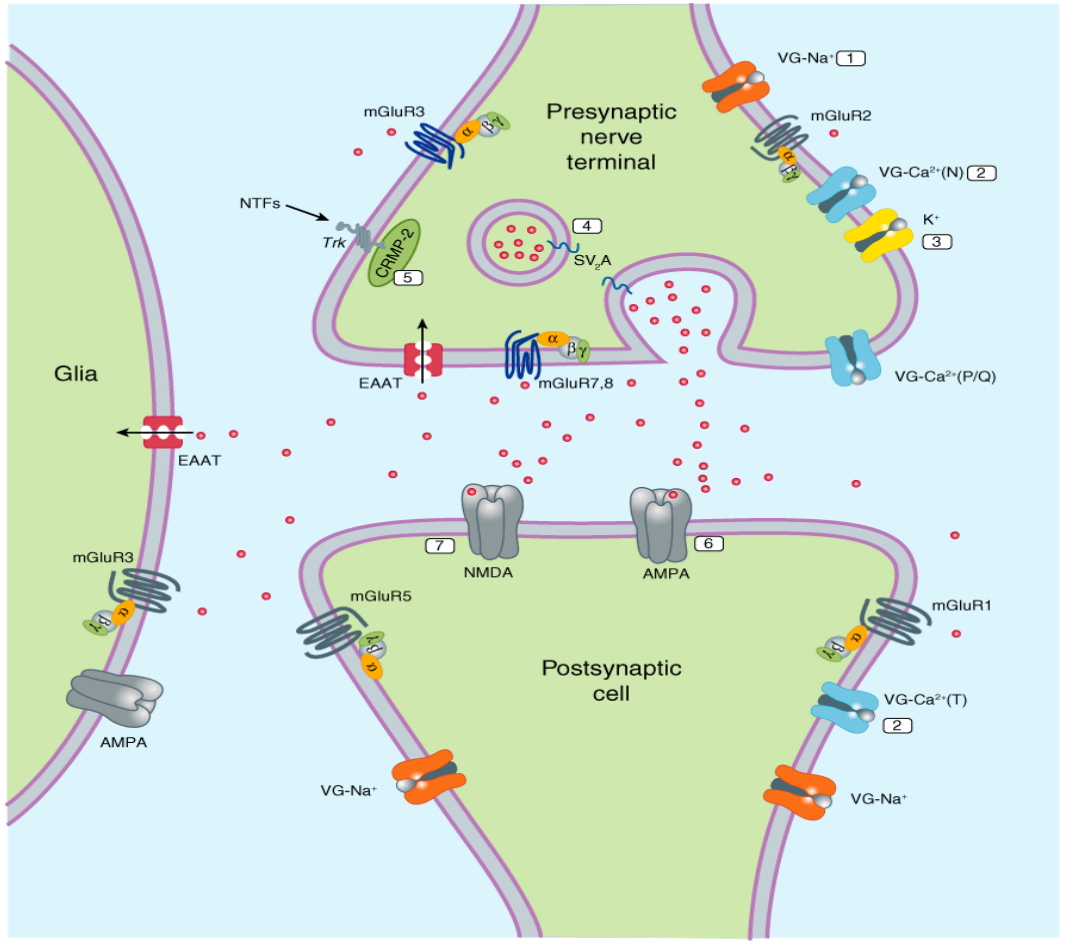


Dworkin RH, et al. Pain 2007;132(3):237–251
Attal N, et al. Eur J Neurol 2010;(Apr):9
Moulin DE, et al. Pain Res Manag 2007;12(1):13–21

Calcium Channel Alpha-2 Delta Ligands

- Gabapentin (Neurontin) and pregabalin (Lyrica) are structurally similar to GABA, although they do not bind to GABA receptors.

- They are thought to exert their beneficial effects on neuropathic pain by binding to the *alpa-2-delta subunit* of voltage-dependant calcium channels. (2)
  - This leads to reduction of the influx of calcium into neurons throughout the central nervous system (CNS).
  - This in turn may decrease the release of glutamate, norepinephrine, and substance P.



Jensen TS et al. Curr Opin Neurol 2009;22(5): 467–474

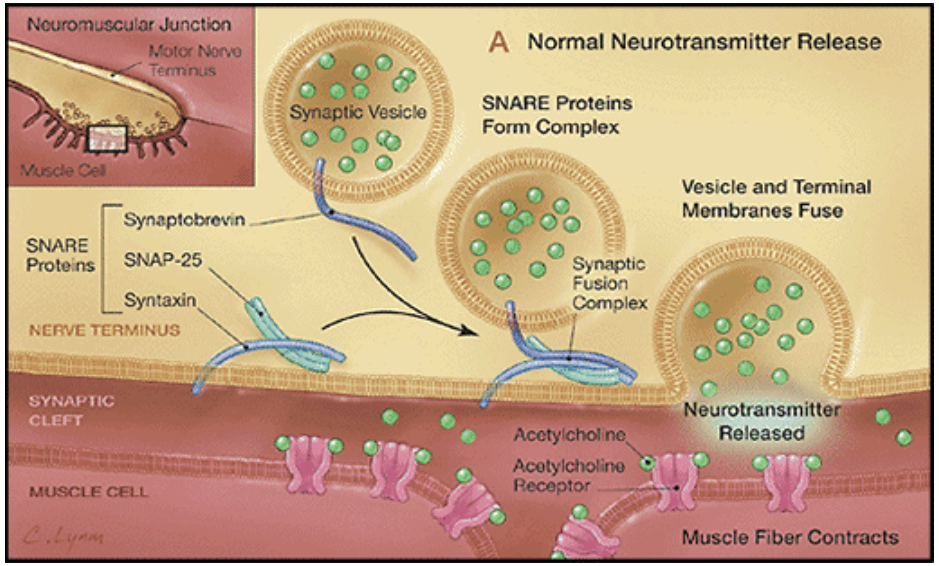
Topical Lidocaine

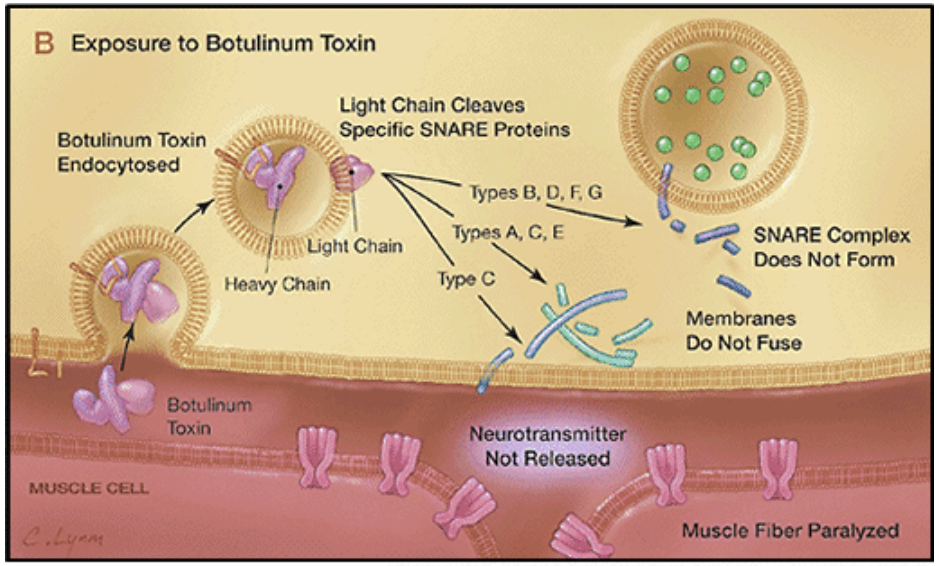
Topical lidocaine is thought to reduce discharges of small afferent nerve fibers by blocking voltage-gated sodium channels.

It is available in gel and transdermal patch formulations. The transdermal patch is FDA approved for treatment of PHN

Botulinum Toxin

- Intradermal botulinum toxin was superior to placebo in a single study of 29 patients with DPN. Studies in PHN have inconsistent results. Further research is needed to determine its role in neuropathic pain treatment.

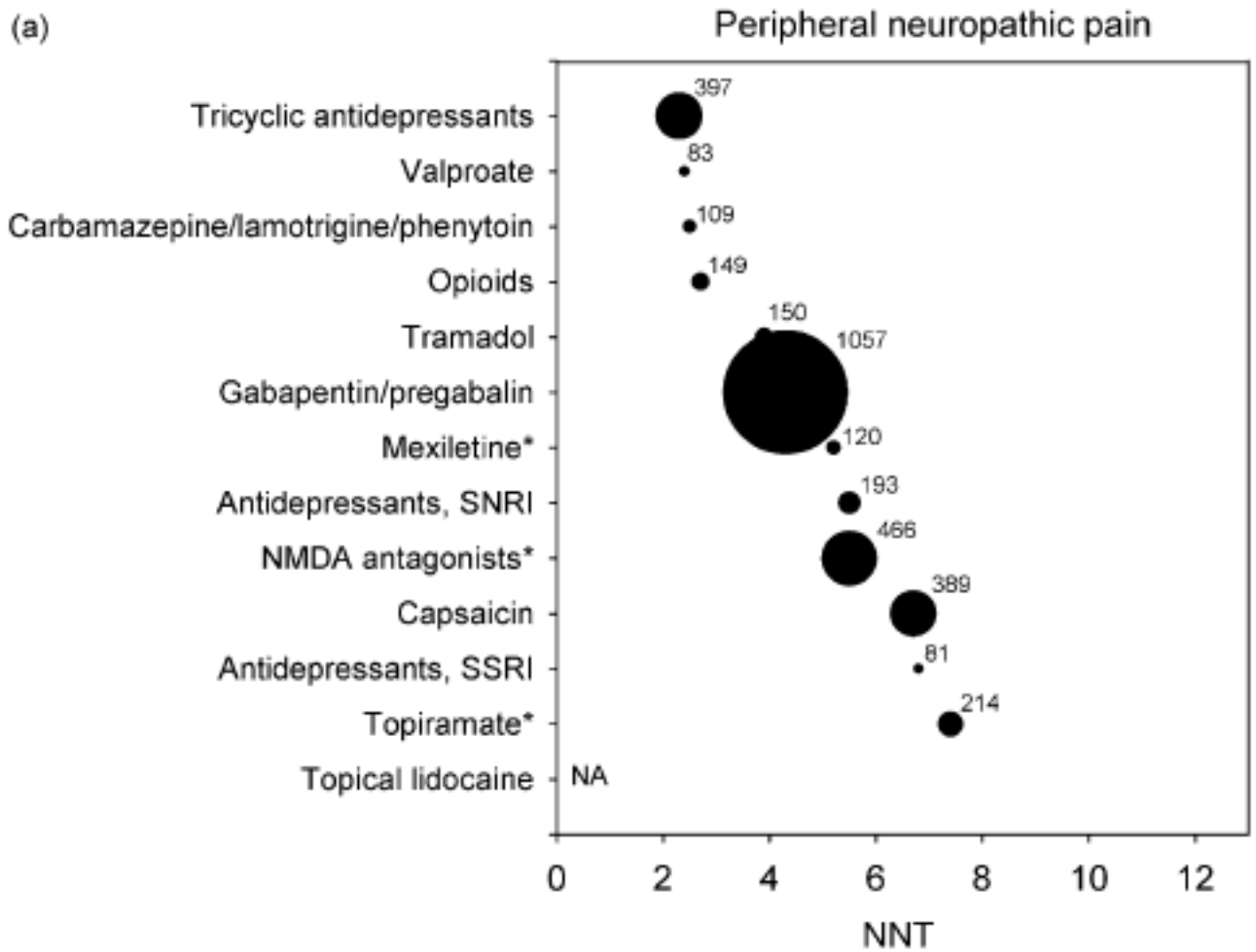




JAMA. 2001;285:1059-1070. © American Medical Association

Yuan RY, et al. Neurology 2009;72(17):1473–1478
Dworkin RH, et al. Mayo Clin Proc 2010;85(3, Suppl):S3–S14

Efficacy of neuropathic pain therapies



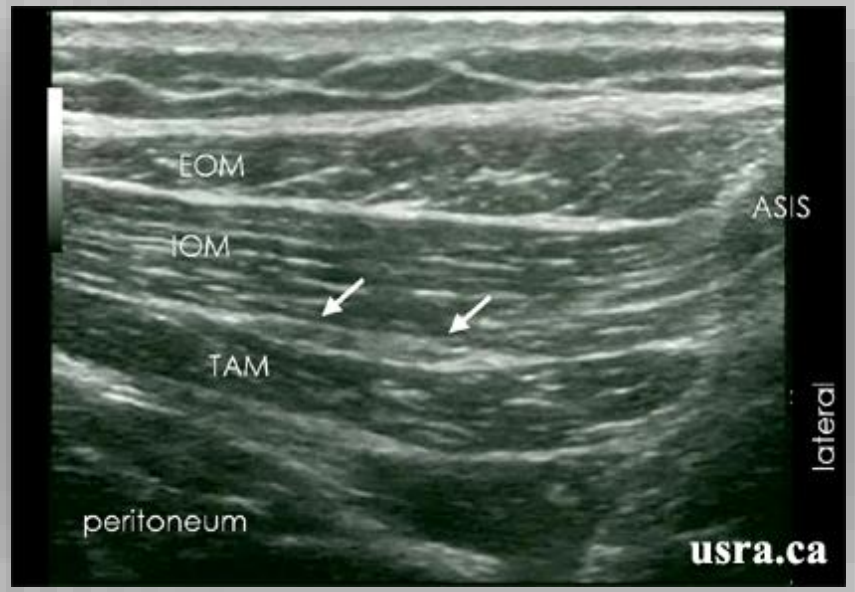
N.B. Finnerup et al. / Pain 118 (2005) 289–305

Interventional Approaches

Epidural Steroid Injections

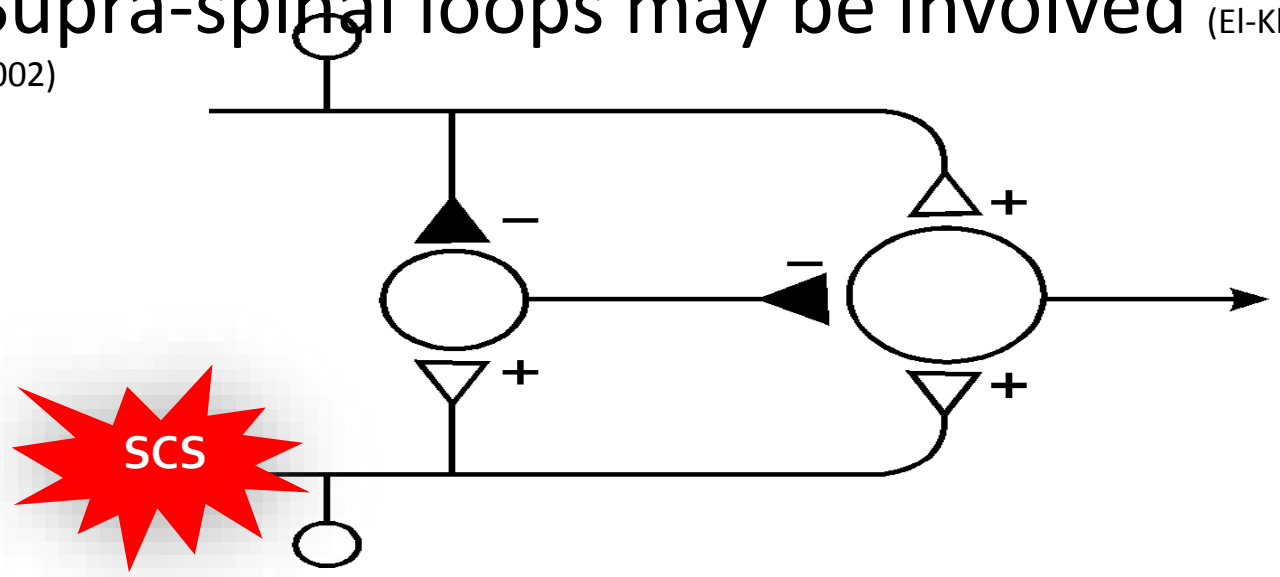
Dorsal Root Ganglion Injections

Ultrasound Guided Injections

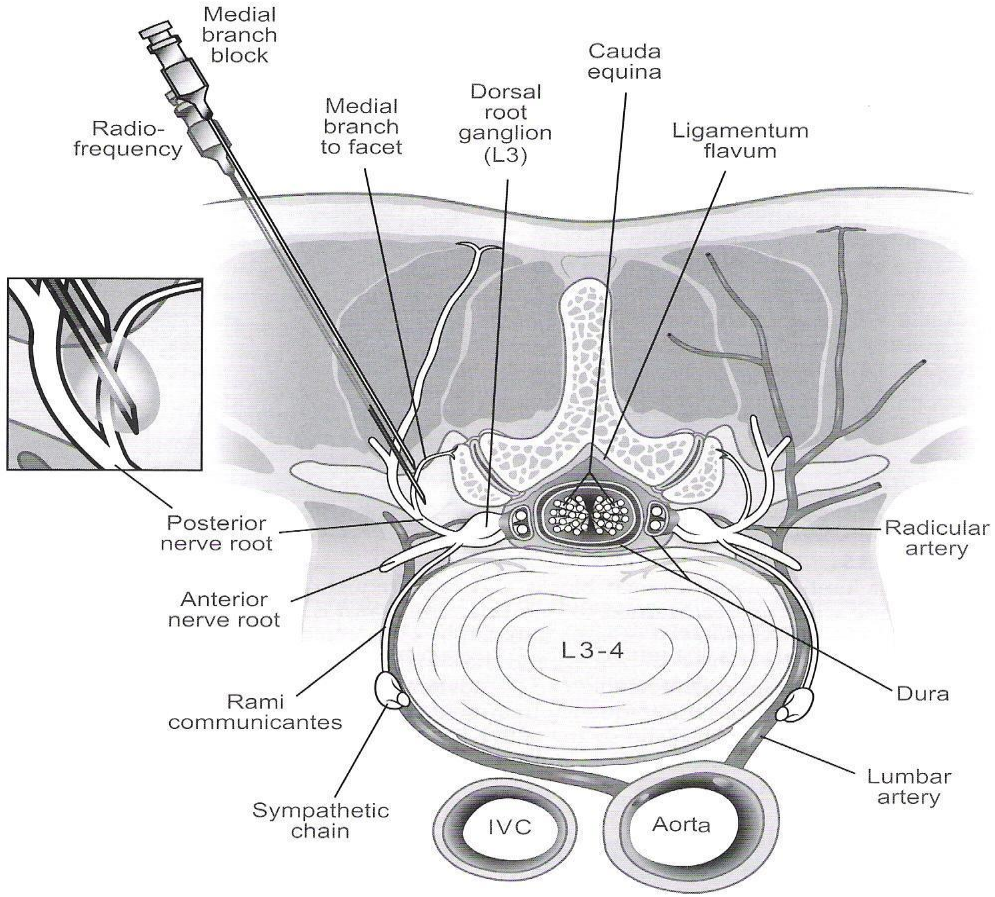


Spinal Cord Stimulation

- SCS activates inhibition via large diameter afferents in the dorsal column
- Suppresses both acute/chronic nociceptive pain signals at segmental level (Garcia-Larrea et al 1989)
- Supra-spinal loops may be involved (El-Khoury et al 2002)



Radiofrequency Ablation



- Rathmell, *Atlas of Image-Guided Intervention*, 2006

SI Joint Injection

- “Gold standard” in diagnosing SI joint pain.
- Has been shown in various studies to be both diagnostic and therapeutic for a duration of 6 months to 1 year.

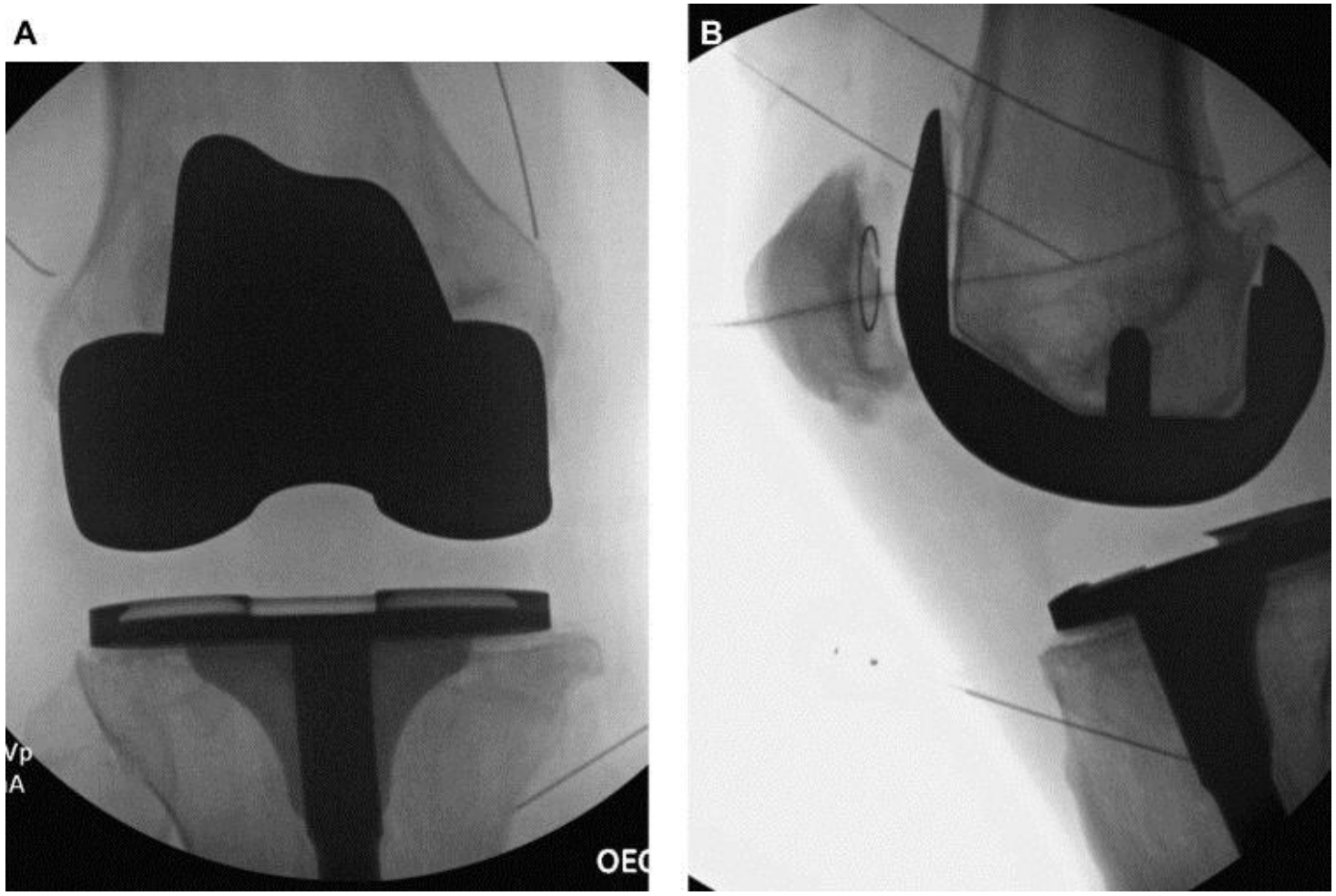
Anesth Analg, 2005; 101:1440–53.

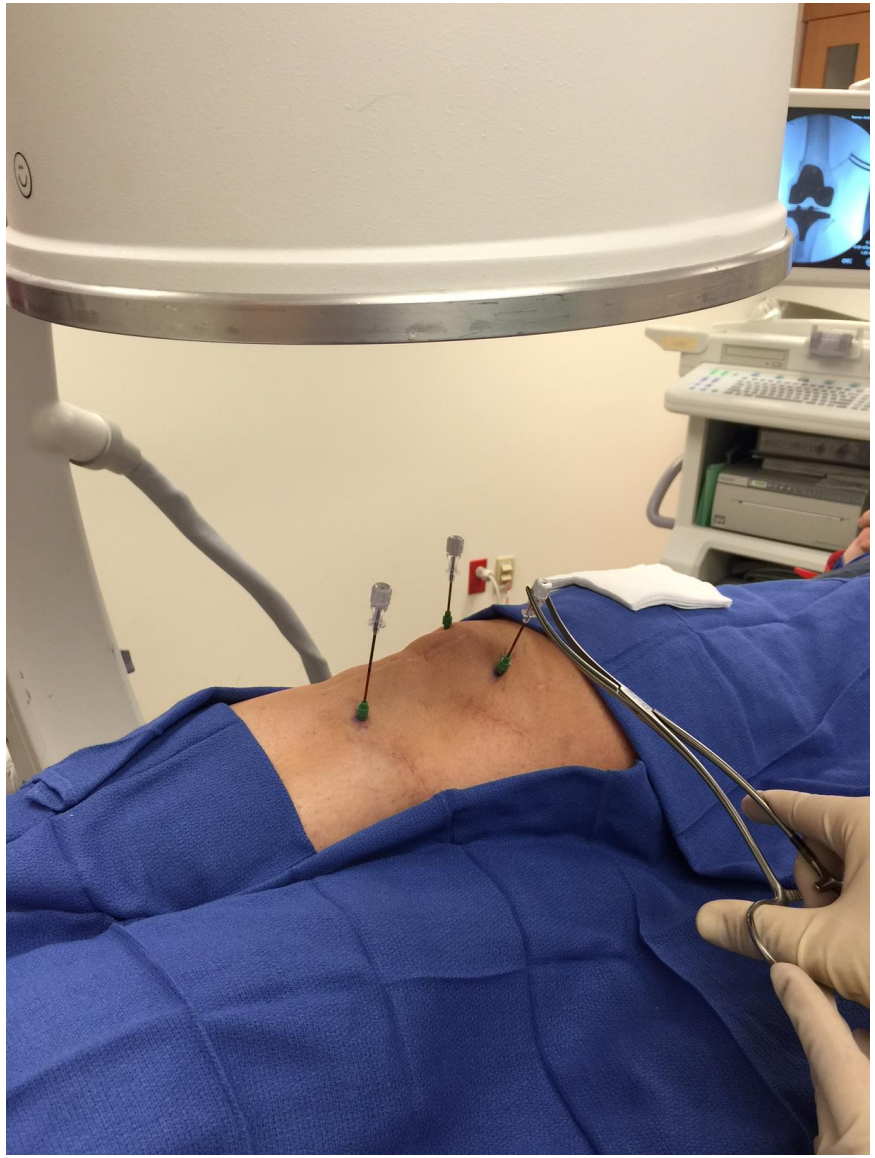
Lateral Sacral Branch Denervation

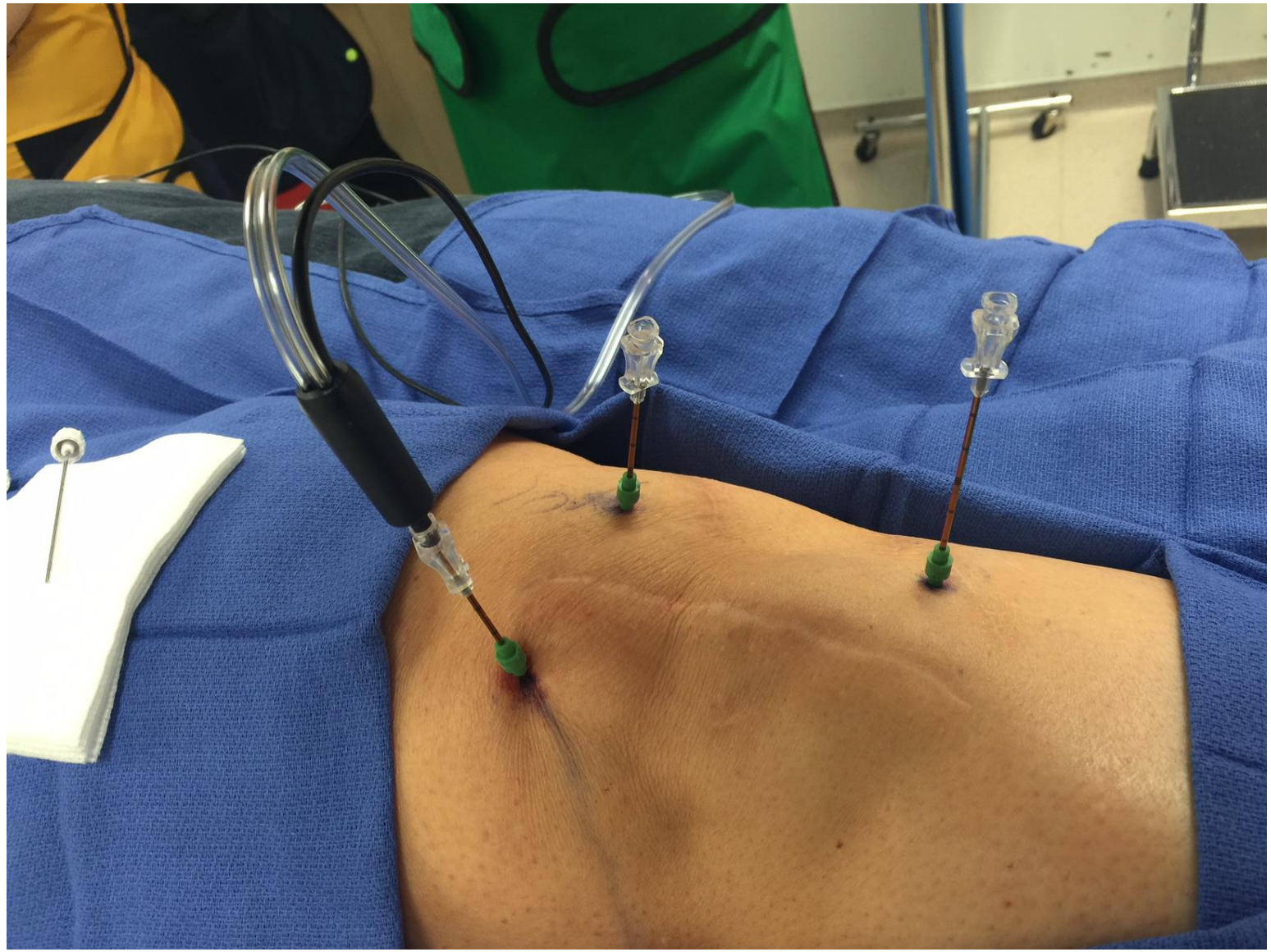
- Used for over 12 years
- For those who have obtained effective but short-term relief with SIJ blocks
- Numerous controlled and uncontrolled studies have demonstrated benefit

Expert Rev Neurother. 2013 Jan;13(1):99-116.

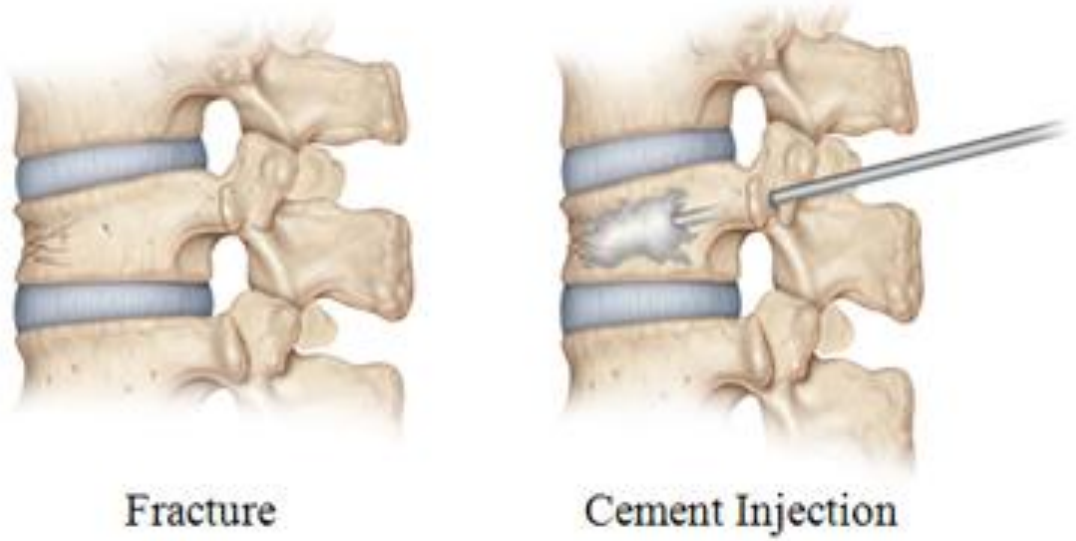
Genicular Radiofrequency Ablation

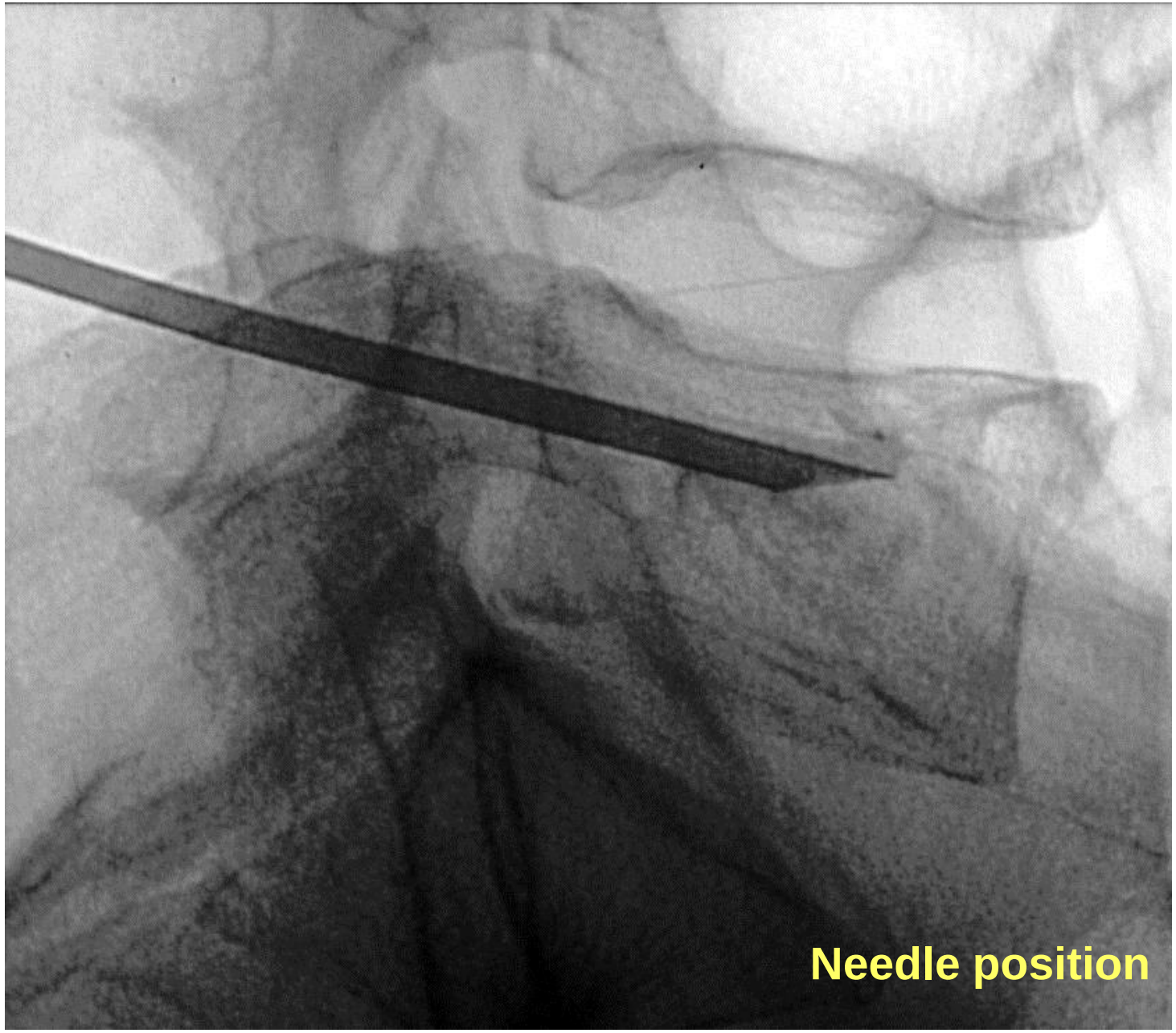




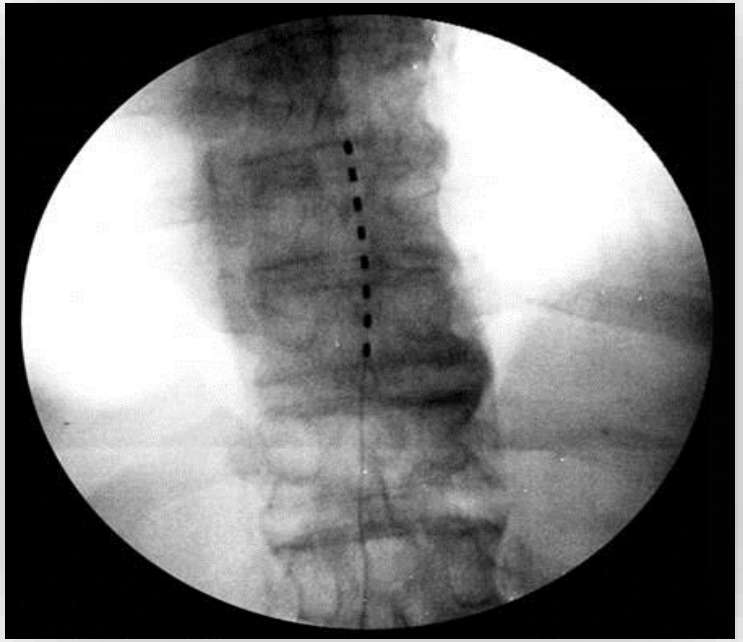


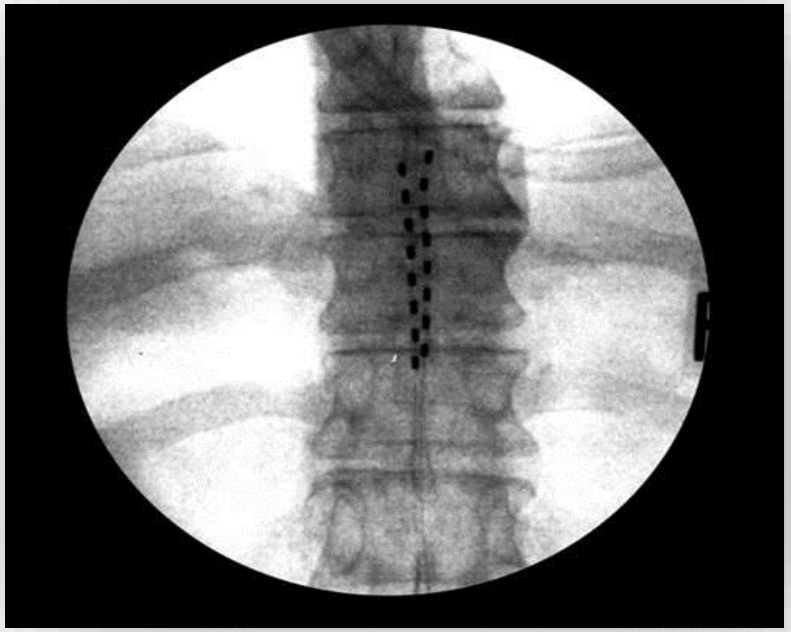
Vertebroplasty




Needle position

Spinal Cord Stimulation





Implantation

Conclusions

- Chronic pain can be multifactorial and complex.
- Risk factors can predispose individuals to chronic pain.
- Treatment should be multimodal and multidisciplinary.
- In carefully selected patients, interventional therapies can be a safe and effective part of these treatment algorithms.


BARNES-JEWISH