PAIN SPECIALISTS AUSTRALIA

Sensitisation: what is it?
Low tech and high tech treatments

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Father, husband & exerciser

#GPADD18

Disclaimer

- Conflicts of interests related to this talk
  - Consultant, advisor to Boston Scientific & Nevro, Abbott
  - All proceeds, to a practice educational fund
- My aim is twofold:
  - To reduce pain & the suffering it causes
  - To improve the practice of neuromodulation

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Summary

- Define central sensitization in persistent pain
- Low tech therapies
- High tech therapies

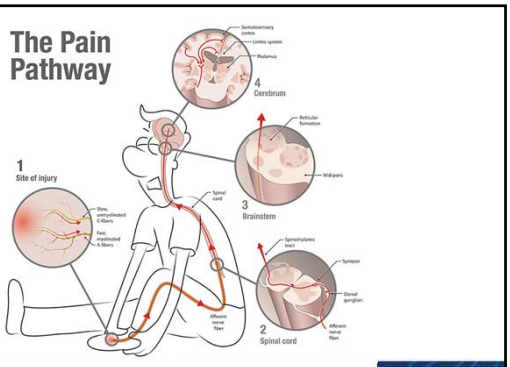
Neuropathic pain

History: disease/lesion affects somatosensory system
Symptoms: in anatomical distribution related to part of somatosensory system injured
Signs: negative &/or positive sensory phenomenon
Diagnostic test: confirms damage to somatosensory system

Neuropathic pain

Negative sensory
Positive sensory
Autonomic
Psychological

Spontaneous pain - ongoing or paroxysms
Evoked pain - allodynia or hyperalgesia



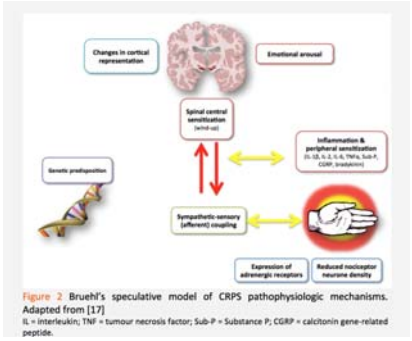
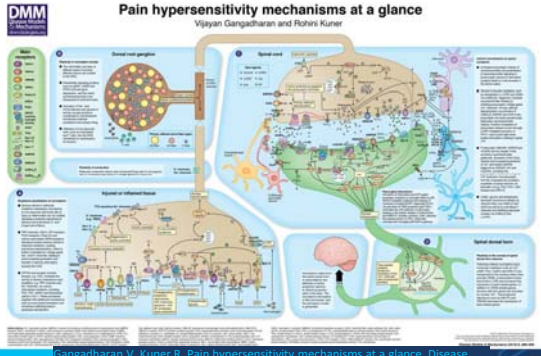
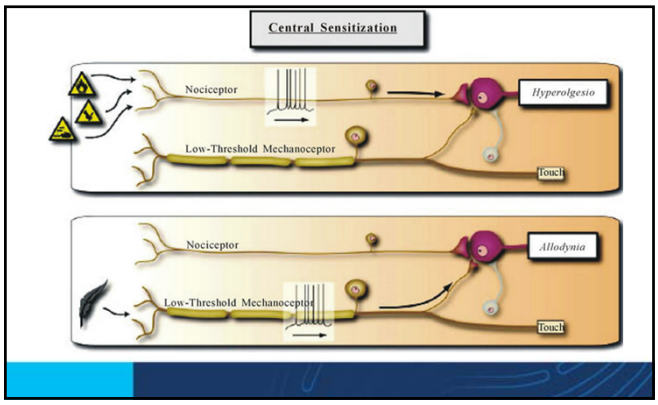


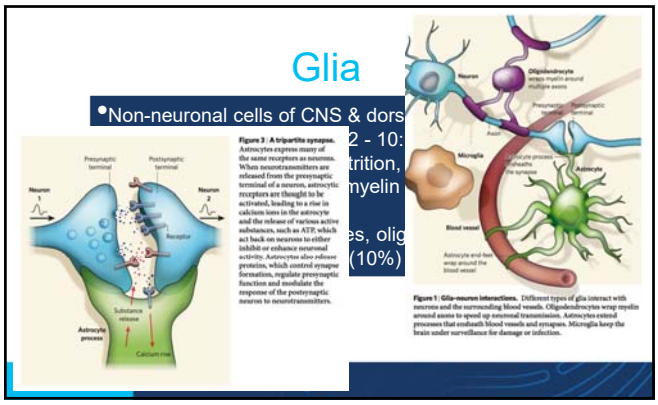
Figure 2 Bruehl's speculative model of CRPS pathophysiologic mechanisms. Adapted from [17]
IL = interleukin; TNF = tumour necrosis factor; Sub-P = Substance P; CGRP = calcitonin gene-related peptide.

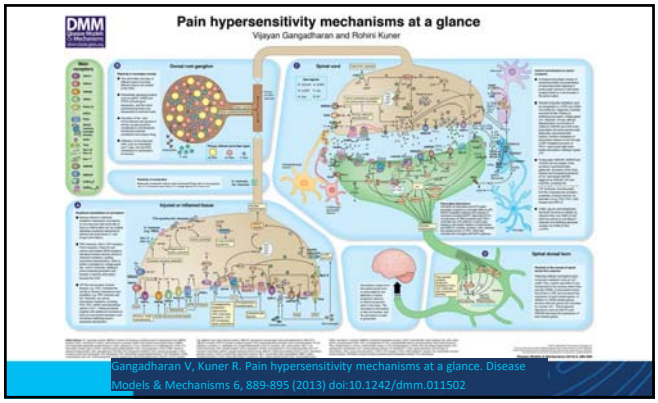
Bruel S. An Update on the Pathophysiology of Complex Regional Pain Syndrome Anesthesiology 2010; 113:713–25



Gangadharan V, Kuner R. Pain hypersensitivity mechanisms at a glance. Disease Models & Mechanisms 6, 889-895 (2013) doi:10.1242/dmm.011502


Central Sensitization
Nociceptor
Hyperolgesia
Low-Threshold Mechanoceptor
Touch
Nociceptor
Allodynia
Low-Threshold Mechanoceptor
Touch


Glia
•Non-neuronal cells of CNS & dors
2 - 10:
trition,
myelin
es, olig
(10%)


DMM
Pain hypersensitivity mechanisms at a glance
Vijayan Gangadharan and Rohini Kuner
Gangadharan V, Kuner R. Pain hypersensitivity mechanisms at a glance. Disease Models & Mechanisms 6, 889-895 (2013) doi:10.1242/dmm.011502

Who gets central sensitisation?

- RA, OA, TMJ disorders
- Fibromyalgia
- Deep tissue hyperalgesia in back pain
- Headaches
- Neuropathic pain
- Complex regional pain syndrome (CRPS)
- Post surgical pain
- Visceral hyperalgesia

Opioid-induced hyperalgesia

- State nociceptive sensitization caused by opioid exposure
- Paradoxical response, patients on opioids for pain —> more sensitive to pain stimuli
- Type of pain: same or different from original pain
- Distinct, definable
- Explain loss of opioid efficacy in some patients

Lee M, Silverman SM, Hansen H, Patel VB, Manchikanti L. A comprehensive review of opioid-induced hyperalgesia/ Pain Physician. 2011 Mar-Apr;14(2):145-61.

Opioid-induced hyperalgesia

- Glutaminergic system - glutamate and NMDA
- Spinal dynorphins
- Decending facilitation
- Genetic influences - COMT, polymorphisms
- Neurotransmitters - substance P, glutamate, adrenergic receptors, noradrenaline, dopamine
- Peripheral / spinal / supra spinal mechanisms

Lee M, Silverman SM, Hansen H, Patel VB, Manchikanti L. A comprehensive review of opioid-induced hyperalgesia/ Pain Physician. 2011 Mar-Apr;14(2):145-61.

Opioid-induced hyperalgesia

•Former opioid addicts maintained on methadone have some forms of pain hypersensitivity

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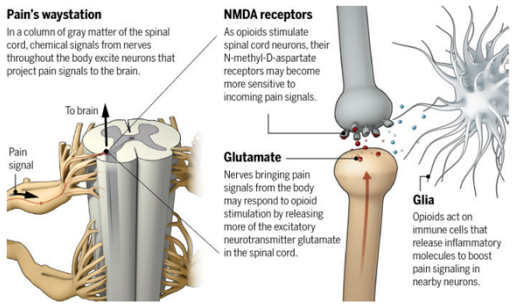


www.sciencemag.org/news/2016/11/why-painkillers-sometimes-make-pain-worse

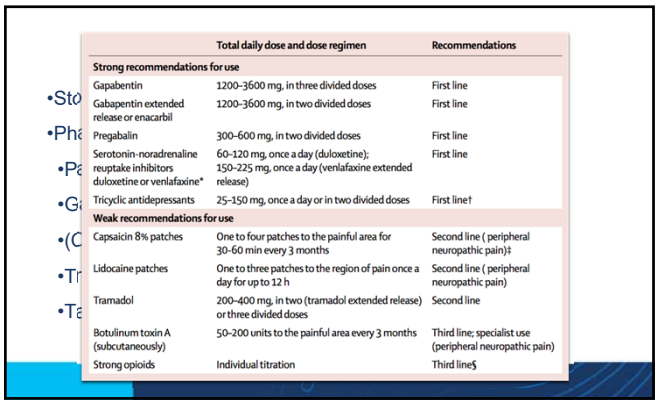
Low-tech treatments

•Stop the offending agent

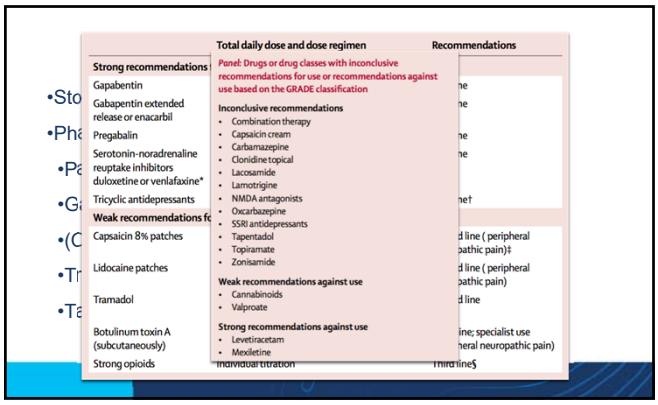
•Pharmacotherapy -

- •Paracetamol, NSAIDS
- •Gabapentinoids, TCA, SNRIs, ketamine
- •(Opioids)
- •Tramadol
- •Tapentadol

Nijs J *et al.* Treatment of central sensitization in patients with 'unexplained' chronic pain: what options do we have? Expert Opin. Pharmacother. 10.1517/14656566.2011.547475 © 2011 Informa UK, Ltd. ISSN 1465-6566



	Total daily dose and dose regimen	Recommendations
Strong recommendations for use		
Gapabentin	1200–3600 mg, in three divided doses	First line
Gabapentin extended release or enacarbil	1200–3600 mg, in two divided doses	First line
Pregabalin	300–600 mg, in two divided doses	First line
Serotonin-noradrenaline reuptake inhibitors duloxetine or venlafaxine*	60–120 mg, once a day (duloxetine); 150–225 mg, once a day (venlafaxine extended release)	First line
Tricyclic antidepressants	25–150 mg, once a day or in two divided doses	First line†
Weak recommendations for use		
Capsaicin 8% patches	One to four patches to the painful area for 30–60 min every 3 months	Second line (peripheral neuropathic pain)‡
Lidocaine patches	One to three patches to the region of pain once a day for up to 12 h	Second line (peripheral neuropathic pain)
Tramadol	200–400 mg, in two (tramadol extended release) or three divided doses	Second line
Botulinum toxin A (subcutaneously)	50–200 units to the painful area every 3 months	Third line; specialist use (peripheral neuropathic pain)
Strong opioids	Individual titration	Third line§



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Capsaicin 8% patches		
Lidocaine patches		
Tramadol		
Botulinum toxin A (subcutaneously)		
Strong opioids	Individual titration	Third line§

Panel: Drugs or drug classes with inconclusive recommendations for use or recommendations against use based on the GRADE classification

Inconclusive recommendations
- Combination therapy
- Capsaicin cream
- Carbamazepine
- Clonidine topical
- Lacosamide
- Lamotrigine
- NMDA antagonists
- Oxcarbazepine
- SSRI antidepressants
- Tapentadol
- Topiramate
- Zonisamide

Weak recommendations against use
- Cannabinoids
- Valproate

Strong recommendations against use
- Levetiracetam
- Mexiletine

Low-tech treatments

- (Understanding & pain education)
- Manual therapy and joint mobilisation (short-term)
- Stress management (deals with the emotional and cognitive aspects of sensitisation)
- TENS (not sustainable)
- Virtual reality

Nijs J *et al.* Treatment of central sensitization in patients with 'unexplained' chronic pain: what options do we have? Expert Opin. Pharmacother. 10.1517/14656566.2011.547475 © 2011 Informa UK, Ltd. ISSN 1465-6566

High-tech treatments

Pulsed radiofrequency

- DRG - cervical radicular pain
- Supra scapular nerve
- Inguinal heriooraphy pain
- Discogenic pain
- Testicular pain

Chua NHL, Vissers KC, Sluijter ME. Pulsed radiofrequency treatment in interventional pain management: mechanisms and potential indications—a review. Acta Neurochir (2011) 153:763–771

High-tech treatments

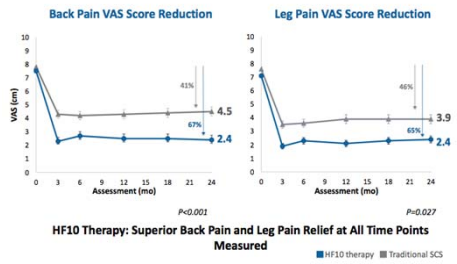
- IV - ketamine, lidocaine, bisphosphonates
- Nerve blocks - lumbar radiculopathy, cervical radiculopathy
- Epidural injections - lumbar & cervical radiculopathy & brachialgia, spinal stenosis, FBSS, CRPS, PHN
- Spinal cord stimulation - FBSS, CRPS, traumatic & brachial plexus

Mailis A, Taenzer P. Evidence-based guideline for neuropathic pain interventional treatments: Spinal cord stimulation, intravenous infusions, epidural injections and nerve blocks. Pain Research & Management : The Journal of the Canadian Pain Society. 2012;17(3):150-158.

Conditions *likely to respond*	Failed back surgery syndrome[1] SFP Complex regional pain syndrome[1] SFP Refractory angina pectoris[1] SFP Neuropathic pain secondary
Conditions that *may respond*	Pain associated with peripheral vascular disease Brachial plexopathy e.g. partial traumatic, post irradiation Axial pain following surgery Intercostal neuralgia e.g. post-thoracotomy Other peripheral neuropathic syndromes e.g. trauma
Conditions that *rarely respond*	Pain associated with spinal cord damage[1] SFP Central pain of non-spinal cord damage[1] SFP Spinal cord injury

Neuromodulation (spinal cord stimulation) in the management of patients with chronic pain. PM9 (2011). Faculty of Pain Medicine of the Australian and New Zealand College of Anaesthetists.

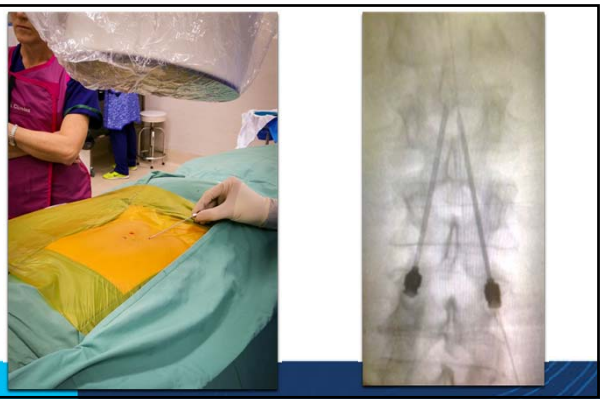
Durable Back and Leg Pain Relief to 24 Months

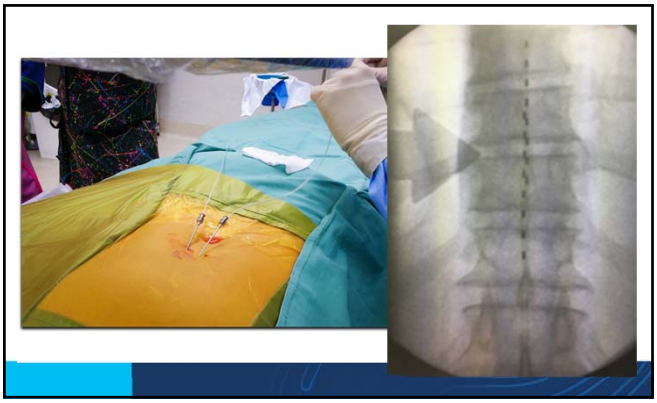


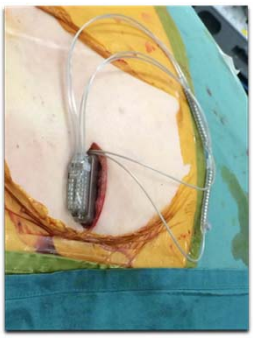
HF10 Therapy: Superior Back Pain and Leg Pain Relief at All Time Points Measured

HF10 therapy Traditional SCS

Kapural L, et al. Comparison of 10-kHz High-Frequency and Traditional Low-Frequency Spinal Cord Stimulation for the Treatment of Chronic Back and Leg Pain: 24-month Results from a Multicenter, Randomized, Controlled Pivotal Trial. Neurosurgery 79:667-677.







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