

Non-invasive physical therapy treatments in failed back surgery syndrome

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Chronic Pain – Scope of the Problem

- 9% – 28% of the population suffers from moderate to severe chronic non-cancer pain
- 86 million Americans suffer from chronic pain
- 66 million Americans partially/totally disabled
 - 8 million disabled by LBP
- 65,000 cases of permanent disability diagnosed annually
- 100 billion dollars in annual economic losses
- 40 million physician visits per year
- 515 million lost workdays annually

Pain Types

- *NOCICEPTIVE PAIN*

- results from ongoing activation of mechanical, thermal, or chemical nociceptors
- typically opioid-responsive
- eg. pain related to mechanical instability

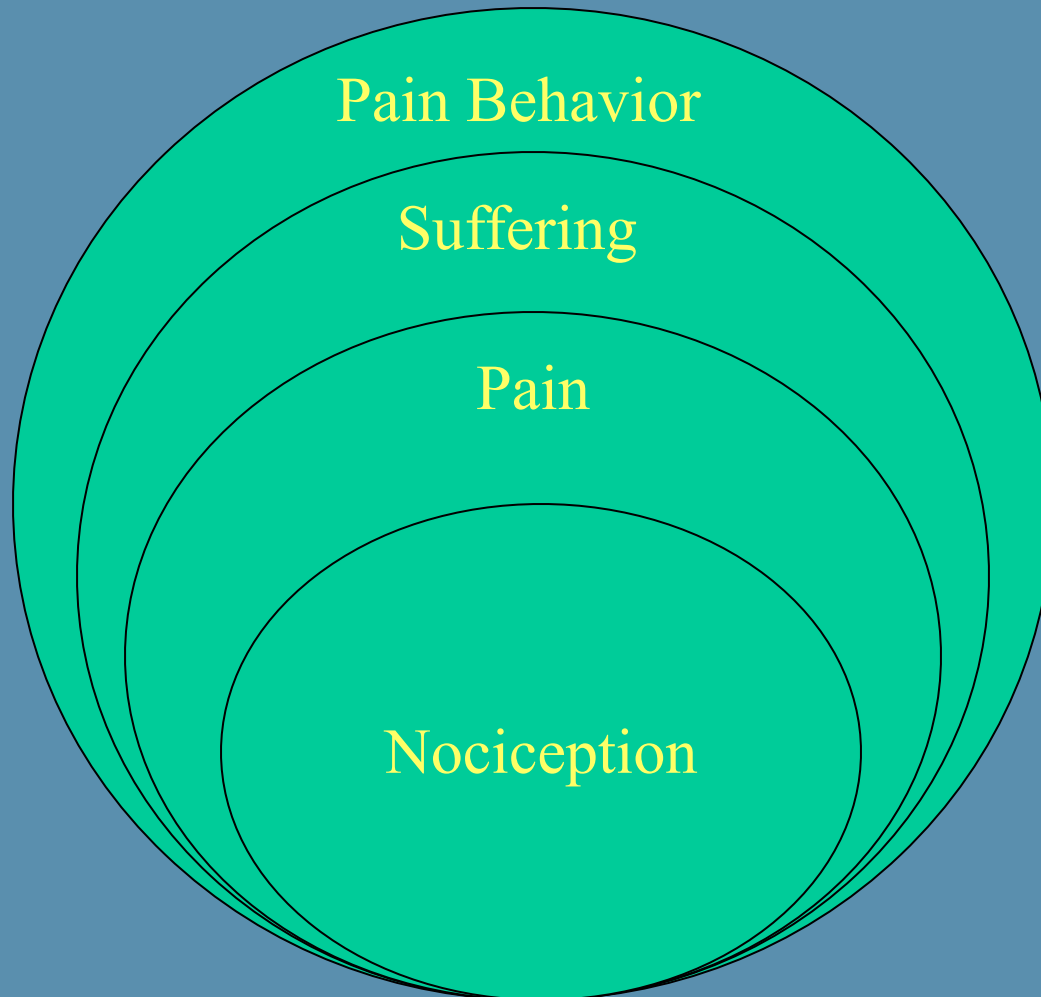
- *NEUROPATHIC PAIN*

- spontaneous or evoked pain that occurs in the absence of ongoing tissue damage
- typically opioid-resistant***
- eg. pain secondary to nerve root injury

Neuropathic Pain

- Pain in absence of ongoing tissue damage
- Pain in an area of sensory loss
- Paroxysmal or spontaneous pain
- Characteristics of pain: burning, pulsing, stabbing
- Allodynia, hyperalgesia, or dysesthesias
- Delay in onset following injury
- Presence of major neurological deficit
- Poor response to opioids

Biopsychosocial Model of Pain



Failed Back Surgery Syndrome

- FBSS is a term applied to a heterogeneous group of individuals who share only one characteristic - continued back and/or extremity pain following one or more spinal operations
- 15% of patients will experience persistent or recurrent symptoms
- Spectrum of abnormalities ranging from purely organic to purely psychological, but in most cases consists of a physiological abnormality complicated by psychological factors
- FBSS is perhaps the prototypical example of chronic pain as a biopsychosocial disorder

Failed Back Patient Profile

- Pain and suffering often disproportionate to any identifiable disease process
- Depression
- Physical deconditioning
- Inappropriate use of physician-prescribed medications
- Superstitious beliefs about bodily functions
- Failure to work or perform expected physical and cognitive activities
- No active *medical problems* that can be remediated with the expectation of relief of pain

The “Ds” of FBSS

- Disuse
- Deconditioning
- Drug misuse
- Dependence
- Depression
- Disability

Post-operative Causes of Back Pain

Deconditioning

Muscle spasm

Myofascial pain

Spinal instability

Diskogenic pain

Facet arthropathy

Infection

Pseudarthrosis

Loose hardware

Arachnoiditis

Trauma

Wrong level fused

Insufficient levels fused

Pseudomeningocele

Graft donor site pain

Psychosocial factors

Post-operative Causes of Leg Pain

Retained disk fragment

Recurrent HNP

Far lateral disk

Lateral recess stenosis

Inadequate decompression

Wrong level decompressed

Nerve root injury

Retained foreign body

Epidural fibrosis

Arachnoiditis

Synovial cyst

Root sleeve meningocele

Loose hardware

Facet fracture

Psychosocial factors

Goals of Chronic Pain Management in Patients with FBSS

- *Functional improvement*
- *Functional improvement*
- *Functional improvement!!!*
- Improvement in physical activities and exercise tolerance
- Reduction in narcotic use
- Reduction in healthcare consumption
- Return to work
- Pain reduction

Principles of Chronic Pain Management

1. “Single most important ingredient is the existence of health care providers who are willing to work together as a team.”
2. Providers must take an interest in chronic disease and not be overly focused on acute illness as is fostered by the biomedical model
3. Commitment of the provider to the patient

Principles of Chronic Pain Management

4. Patient must be motivated to change their lives and must be willing to do the therapeutic work
5. Treatment represents the beginning of a journey to reclaim one's life from the pain problem; long-term support is required to maintain success
6. Patient selection is a key to success. Attempting to treat the untreatable results in demoralization of the treatment team

Multidisciplinary Pain Management

- Collaborative efforts of a group of providers
 - Physicians
 - Nurses
 - Psychologists
 - Physical Therapists
 - Vocational counselors
 - Social workers
 - Support staff
- Team work is essential
- Extensive interactions between team members
- Adequate space

Multidisciplinary Pain Programs

- No single accepted format
- Generic concept and plan common to all programs of this type
- Based on biopsychosocial model of pain
- Complaint of pain generated by a combination of events in any particular patient
- Simultaneously address all issues
- Present patient with a single treatment program that encompasses all the *TREATABLE* issues

Common Features of Multidisciplinary Pain Management

- Physical therapy and rehabilitation
- Medication management
- Patient education about pain and body function
- Psychological treatments
- Coping skills training
- Vocational assessment
- Therapies targeted toward improving the likelihood of return to work
- Surgical interventions for selected patients

Multidisciplinary Pain Clinic Personnel

- Physicians
 - Neurosurgeon
 - Orthopedic surgeon
 - Anesthesiologist
 - Neurologist
 - Physiatrist
 - Internal medicine
 - Psychiatrist
 - Addictionologist
- Nurses
- Psychologists
- Physical Therapist
- Occupational Therapist
- Vocational counselor
- Social worker
- Dietician
- Recreational staff
- Administrative support staff

Failed Back Surgery Syndrome

Surgical Complications

- Disk space infection
- Iatrogenic instability
- Nerve root injury
- Retained disk fragment
- Recurrent disk herniation
- Inadequate decompression
- Complications of fusion and instrumentation
- Adhesive arachnoiditis

Failed Back Surgery Syndrome

Physician Decision Making

 *Poor patient selection*

 *Poor patient selection*

 *Poor patient selection*

 *Poor patient selection*

 *Poor patient selection*

 *Poor patient selection*

 *Poor patient selection*

The most common cause of failed back syndrome is poor judgment on the part of the physician.

Surgery prescribed as a last resort, with a hope and a prayer that it might alleviate the pain.

When in doubt, it's a good idea to take a history and examine the patient



Evaluation of the Patient with FBSS

- Detailed pain history including prior treatments and ***MOST IMPORTANTLY*** the outcome of each
- Obtain appropriate imaging studies (including those on which surgical decisions were based)
- Attempt to establish the underlying cause of the pain; however.....

DO NOT get caught up in an endless search for
THE PAIN GENERATOR



Pain History

- Where is it located?
- Does the pain radiate?
- When did it start and under what circumstances?
- What is the quality of the pain?
- What is the severity of the pain (VAS scores)
- What factors make it worse?
- What factors make it better?
- Are there associated symptoms?

Pain History

- Effect of pain on sleep
- Medications taken for pain
- Health professionals consulted
- Patient's beliefs concerning the cause of pain
- Expectations of outcome of treatment
- Family expectations
- Pain reduction required for “reasonable activities

Treatment History

 What therapies have been tried and what were the outcomes?

 Physical therapy

 Injections

- Epidural steroids, nerve root blocks, facet blocks, etc

 Medication history

 What drugs?

 Dose?

 How long?

 Effect?

Physical Examination

- Rarely diagnostic
- Principally serves to establish the current level of physical impairment
- Lack of physical abnormality should not be used to deny a patient evaluation and therapy *if indicated*

Examination of the Lumbar Spine

Inspection, palpation, and evaluation of ROM

- Abnormalities of muscle tone
- Local tenderness
- Reduced ROM

Neurological exam

- Muscle strength
- Sensation
- Reflexes

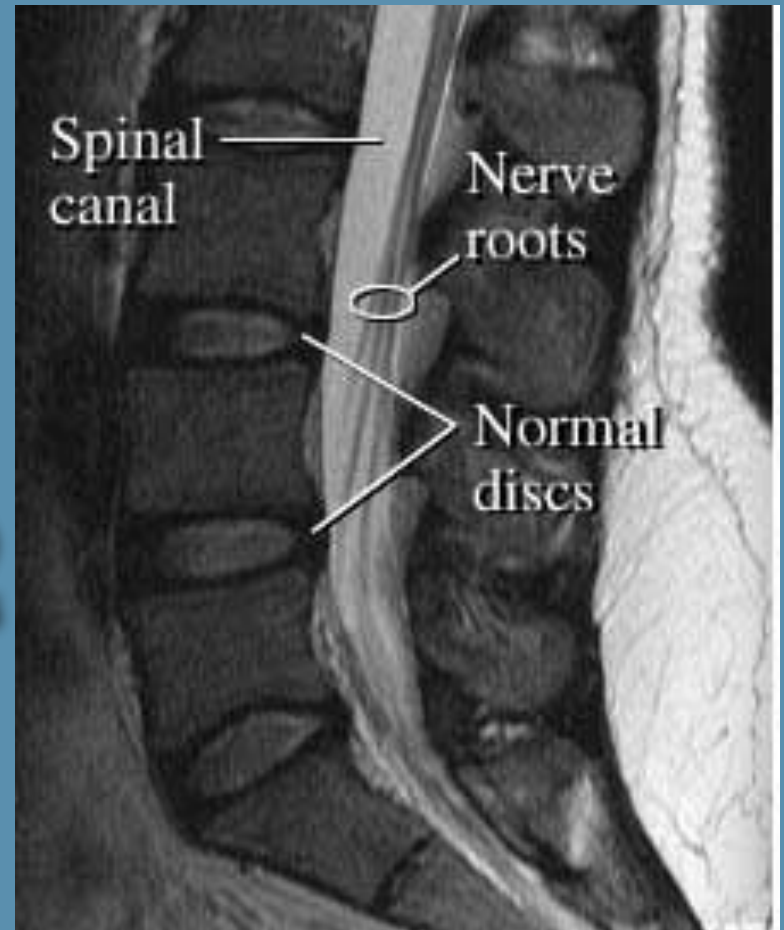
Nerve root tension signs

- Sciatic and femoral stretch test



Imaging Studies

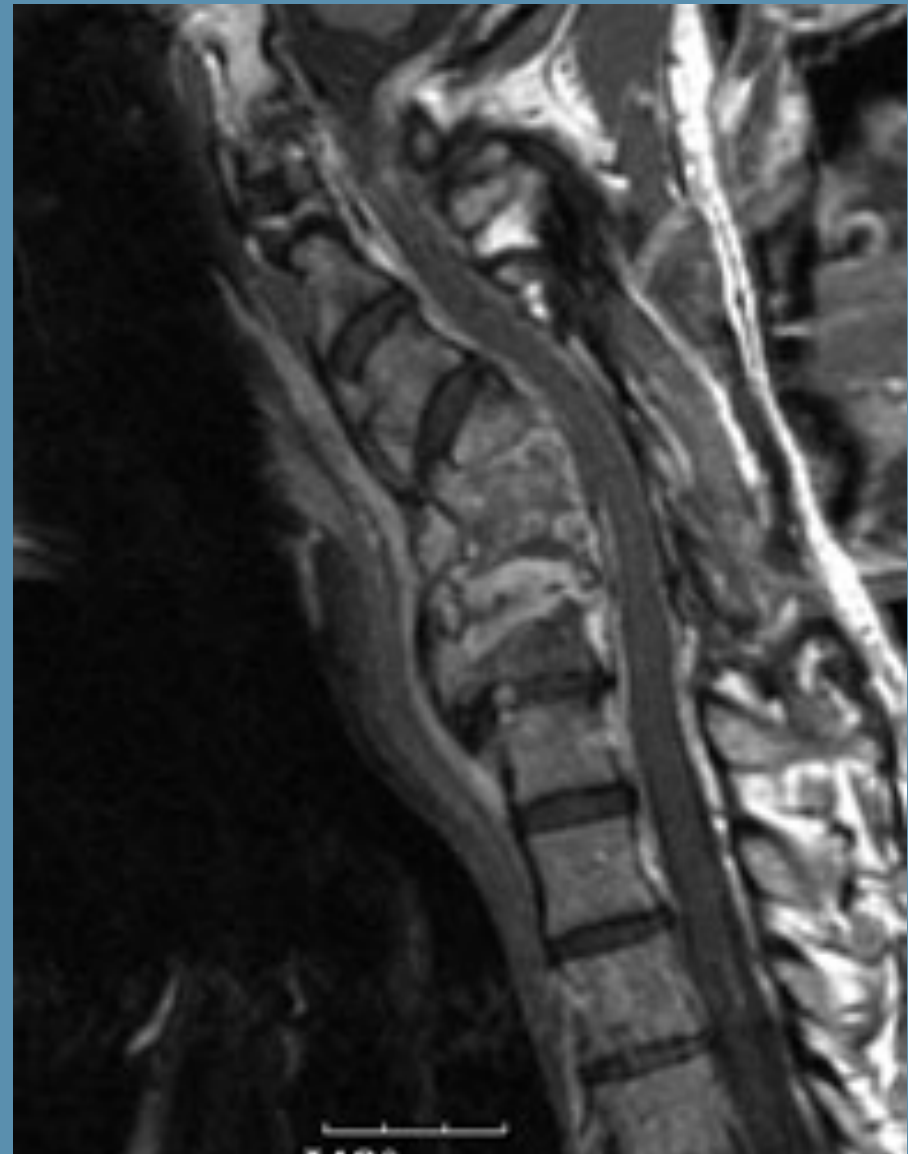
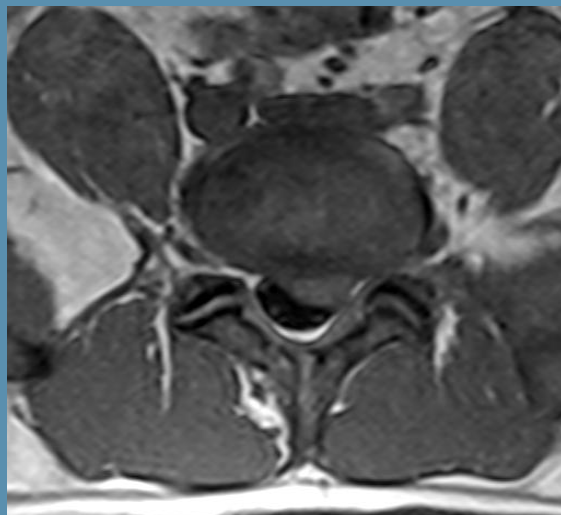
- Static plain radiographs
 - Spinal alignment
- Flexion/extension views
 - Instability
- Computed tomography (CT)
 - Bony surgical defects
 - Hardware placement
 - Fusion mass
- Magnetic resonance imaging (MRI)
 - Soft tissue and neural structures
- Radionuclide imaging
 - Technetium99 bone scan
 - Indium111 WBC scan



Surgically-Correctable Pathology



Surgically-Correctable Pathology



Electrophysiological Studies

- EMG is likely of greater utility in FBSS than in primary low back pain and sciatica
- Greatest use is for establishing the presence of a peripheral neuropathy
- May be helpful for defining a feigned neurological deficit
- Rarely using in decision-making regarding treatment



Diagnostic Blockade

- Rationale is straightforward
- In practice, it is much more complicated
- Specificity may be low
- Single blocks (positive or negative) have a high error rate
- Placebo controls provide the most accurate information
- Multiple blocks using different agents

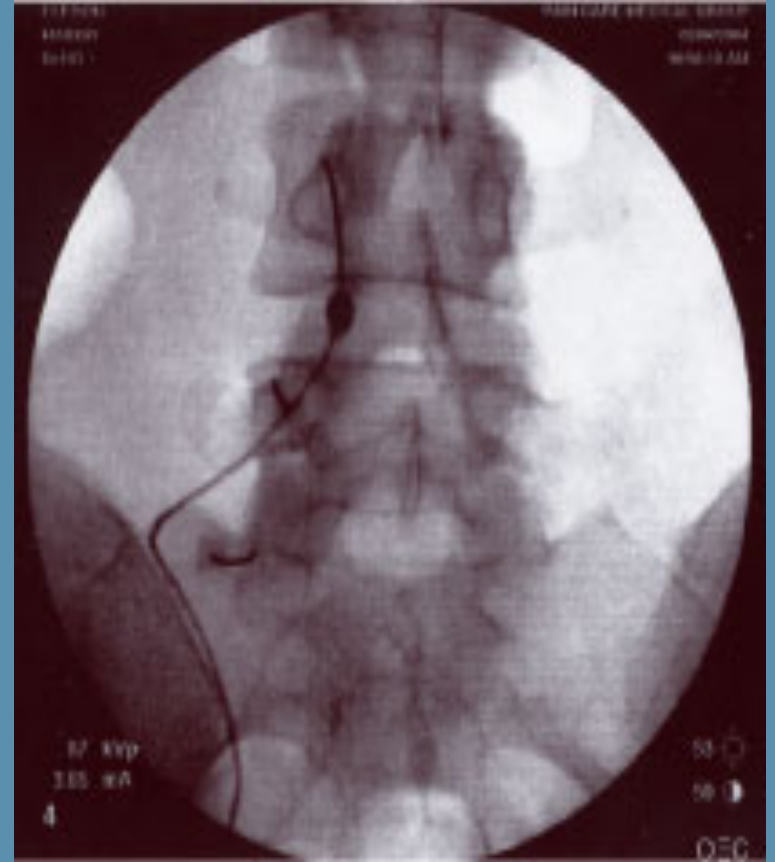
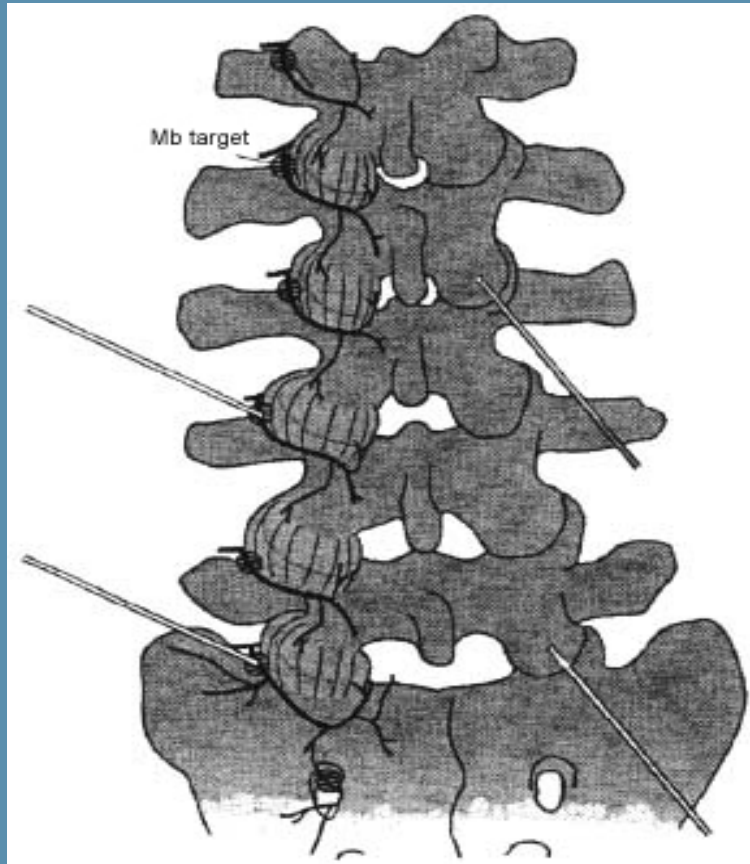


***BLOCKS ARE ADJUNCTS AND SHOULD NEVER BE
SUBSTITUTED FOR SOUND CLINICAL JUDGEMENT !***

Sensitivity and Specificity of Diagnostic Blocks

- Differences in pain processing
- Technical aspects
 - Incorrect needle placement
 - Large volumes of anesthetic
- Effects local anesthetics
- Psychological issues
 - Environmental cues, expectations, anxiety, etc.
- Placebo response

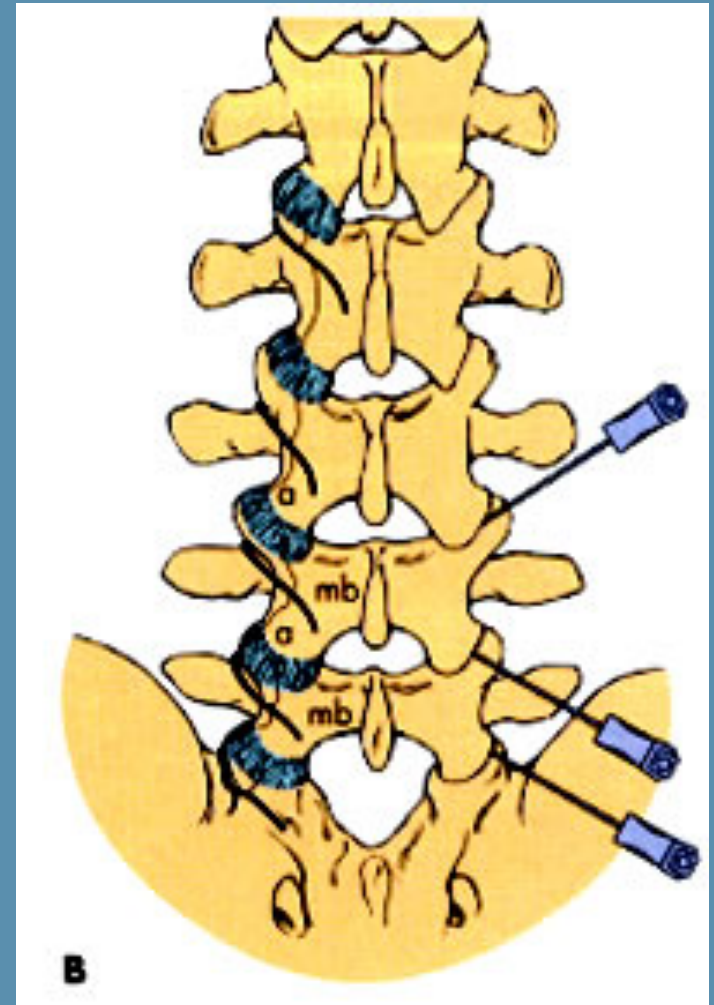
Facet Block



● Blockade of the innervation of the facet joint will relieve pain in some patients with facet disease

Facet Block

- Rarely useful in patient with FBSS
 - Transitional facet disease above a fused level
- Anatomy obliterated and accurate block not possible
- Blockade of pseudarthrosis may sometimes be useful



Selective Nerve Root Block

- Must be done accurately to provide any useful information
- One root at a time
- Small volume of local anesthetic without steroids
- Confirm the presence of an adequate block
- Confirm findings on repetitive blocks



Therapeutic Heat

- Increases muscle temperature, decrease spindle sensitivity, increases blood flow
- Pain relief, increase in tissue extensibility, reduction of muscle spasm
- Superficial heat
 - Greatest effect 0.5cm from skin
- Deep heat
 - Ultrasound diathermy
 - Heat up to 5cm deep to skin
 - Treatment of deep soft tissues
- Hydrotherapy
 - Buoyancy minimizes stress to joints

Cold Therapy

- Affects muscle spindle and may modulate neurotransmitters
- Provides longer pain relief than heat
- Ice and gel packs, vapocoolant sprays, cold baths
- Particularly useful for trigger points,
- Treatment of choice for acute injuries

TENS

- Electrical energy transmitted from skin surface
- Rationale based on “Gate Theory” of pain
- Most effective at high-frequency, low-intensity
- “Acupuncture TENS” – high-intensity, low-frequency
- Questionable benefit for chronic back pain

Therapeutic Exercise and Massage

- Essential for restoration of function
- “Hurt” vs. “Harm”
- Stretching exercises
- Strengthening exercises
- Aerobic exercises
- Therapeutic massage

Anticonvulsant Agents (AEDS)

- Similarities in pathophysiology of neuropathic pain and epilepsy
- All AEDS ultimately act on ion channels
- Efficacy of AEDS most clearly established for neuropathic conditions characterized by episodic lancinating pain
- Most clinical studies have focused on DPN and PHN
- *Use of AEDS in patients with FBSS is nearly entirely empiric*

Antidepressant Analgesics

- Relieves all components of neuropathic pain
- Clear separation of analgesic and antidepressant effects
- Although other agents (eg anti-epileptics) may be regarded as 1st line therapy over antidepressants, there is no good evidence for this practice
- More selective agents are either less effective or not useful (serotonergic, noradrenergic)

Guidelines for Use of Antidepressants in Pain Management

- Eliminate all other ineffective analgesics
- Start low and titrate slowly to effect or toxicity
- Nortriptyline or amitriptyline for initial treatment
- Move to agents with more noradrenergic effects
- Consider trazodone in patients with poor sleep pattern
- Try more selective agents if mixed agents ineffective
- Do **NOT** prescribe monoamine oxidase inhibitors
- Tolerance to anti-muscarinic side effects usually takes weeks to develop
- Withdraw therapy gradually to avoid withdrawal syndrome

Antidepressants for LBP-RCT

Author	Agent	No.	Effect	Comments
Jenkins et al., 1976	Imipramine 50mg 4 weeks	44/59	No	Parallel design
Alcott et al., 1982	Imipramine 150mg 8 weeks	41/50	No	Parallel design; poss role for pain
Godkin et al., 1990	Trazadone 200mg	42	No	Parallel design Serotonergic agent
Usha et al., 1996	Fluoxetine 20mg Elavil 25mg Placebo 4 weeks	59	Yes	Parallel design Fluoxetine more effective with fewer SE
Atkinson et al., 1998	Nortriptyline 100mg Inert placebo	57/78	Yes	Parallel design Non-depressed pts
Dickens et al., 2000	Paroxetine 20mg	61/92	No	Parallel design

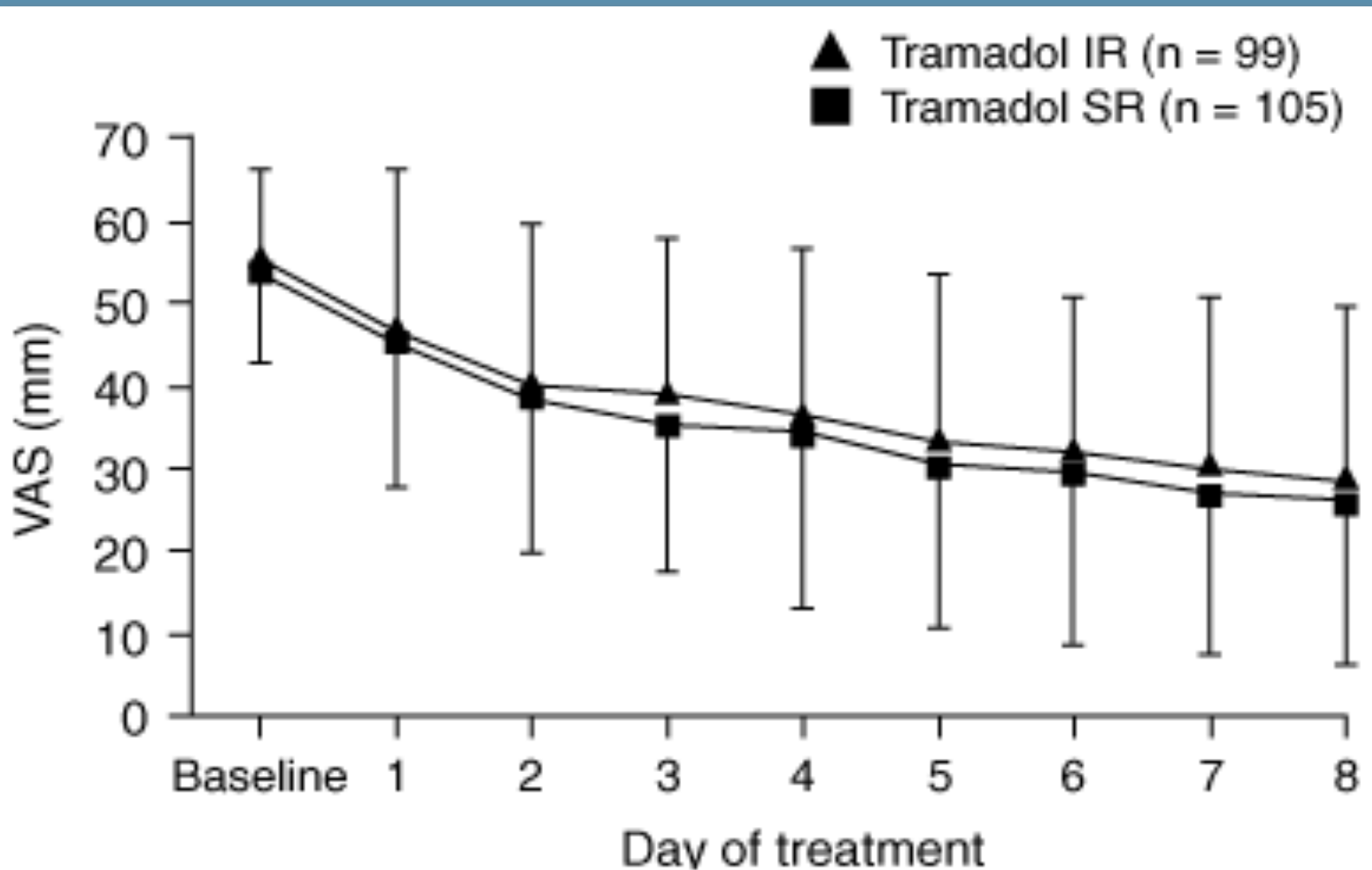
Opioid Therapy - RCT

<u><i>Pain Type</i></u>	<u><i>Study</i></u>	<u><i>Control</i></u>	<u><i>Results</i></u>
Nociceptive	Arner & Meyerson, 1988	Placebo	Pos
	Kjaersgaard-Anderson, 1990	Paracetamol	Pos***
Neuropathic	Arner & Meyerson, 1988	Placebo	Neg
	Dellemijn & Vanneste, 1997	Placebo/Valium	Pos
	Kupers, et al., 1991	Placebo	Pos
	Rowbotham et al., 1991	Placebo	Pos
Idiopathic	Arner & Meyerson, 1988	Placebo	Neg
	Kupers, et al., 1991	Placebo	Neg
	Moulin et al., 1996	Benztropine	Pos***
Unspecified	Arkininstall et al., 1995	Placebo	Pos***
	Mays et al., 1987	Placebo/Bupiv	Pos

Opioid Therapy – Prospective *Uncontrolled Studies*

<i>Pain Type</i>	<i>Reference</i>	<i>Results</i>
Nociceptive	McQuay et al., 1992	Pos
Neuropathic	Fenollosa et al., 1992	Pos
	McQuay et al., 1992	Mixed
	Urban et al., 1986	Pos
Idiopathic	McQuay et al., 1992	Neg
Mixed/Unspecified	Auld et al. 1985	Pos
	Gilman & Lichtigfeld, 1981	Pos
	Penn and Paice, 1987	Pos
	Plummer et al., 1991	Mixed

Tramadol for LBP



NSAIDS for Chronic LBP

 One systematic reviews of 2 studies within framework of Cochrane Collaboration

 NSAID vs. Placebo
 Better short-term pain relief


 NSAID vs. Acetaminophen (N=4)
 No difference in short-term pain relief
 Better overall improvement

Corticosteroids

- Useful in the short term for treatment of radicular pain
- Limited role in the long-term treatment of FBSS
- Epidural or transforaminal steroids for selected patients
 - ▶ Cochrane Review (Nelemans, et al., 2002)
 - ▶ Most trials included patients with radicular pain
 - ▶ *No significant difference in pain relief after 6 weeks or 6 months between ESI and placebo*

Topical Treatments

Aspirin preparations

 Eg. aspirin in chloroform

Local anesthetics

 Topical 5% lidocaine patch

EMLA

 Eutectic mixture of local anesthetics

Capsaicin

Cannabinoids

- Strong laboratory data supporting an analgesic effect of cannabinoids
- Efficacy of cannabinoids in human has been modest at best
- Effectiveness hampered by unfavorable therapeutic index
- Campbell (2001) – systematic review of 9 clinical trials of cannabinoids
 - Cancer pain (5), Chronic non-cancer pain (2), acute pain (2)
 - Analgesic effect estimated equivalent to 50-120mg codeine
 - Adverse effects reported in all studies
- RCT have shown modest benefits when compared with placebo
- Increased incidence of psychiatric illness and cognitive dysfunction

Botulinum Toxin for Chronic LBP

World Congress

- Botulinum toxin type A
 - World Congress data reported:
 - mean reduction in VAS score of 2.6 points ($P < 0.001$)
 - significant reductions in pain in all evaluated muscles ($P < 0.04$)
 - A 2001 RCT showed:
 - significantly reduced pain levels at 3 weeks ($P = 0.012$) and 8 weeks ($P = 0.009$) vs saline group
 - No patient experienced side effects
- Botulinum toxin type B
 - reduced lumbar pain intensity in 23 of 35 patients (66%)
 - pain intensity reduced from an 8 to 10 to a 0 to 2 NRS score

NRS=numeric rate scale.

Multidisciplinary Treatment Outcomes

- Decrease in pain self-rating by about 30%
- Opioid consumption reduced by about 60%
- Pain-related physician visits decrease by 60%
- Physical activities increase by 300%
- Gainful employment occurs in 60%

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