

INTERNATIONAL SPINE INTERVENTION SOCIETY
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### ABOUT ISIS

The International Spine Intervention Society is an association of physicians interested in the development, implementation and standardization of percutaneous techniques for the precision diagnosis of spinal pain. By constituting a forum for the exchange of ideas, by undertaking research, and by holding public lectures, the association seeks to consolidate developments in diagnostic needle procedures, to identify and resolve persisting controversies, to publicize

#### Upcoming Events

**October**

**Radiofrequency**  
Phoenix, AZ - Marriott  
October 13 - 14, 2007

**European Radiofrequency/IDET Workshop**  
Muenster, Germany  
October 27 - 28, 2007

**November**

*Chaired Lecture*

# www.spinalinjection.com

**A Information Survey**  
Please click [HERE](#) for AMA Announcement>

**2008 Event Schedule now available!**

[Go to Event Schedule Page>](#)  
**Fluoroscopic Imaging, Memphis, Sept 7:** FULL  
**Phase I Lumbar, Memphis, Sept 8-9:** FULL  
**Radiofrequency, Phoenix, Oct 13-14:** FULL  
**Radiofrequency, Muenster, DE, Oct 27-28:** Open  
**Clinical Anatomy & Imaging, New Orleans Nov 3-4:** Open

[Go to ISIS Online Store/Event Registration>](#)  
Member login required for members to register for member's only courses. Some courses are open to the public. Non-members must

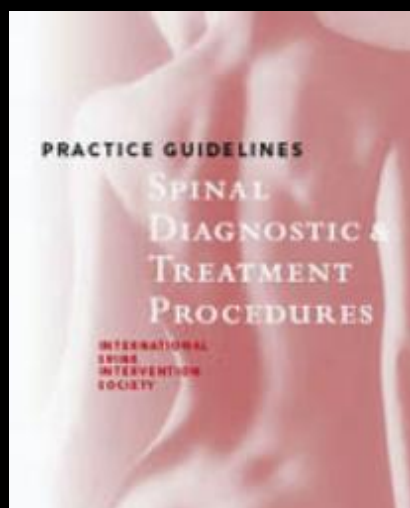
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**US Membership Form**

[MS Word Format >](#)  
[PDF >](#)

**International Membership Form**

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[PDF >](#)



## ISIS Practice Guidelines:

The most authoritative and best written book on safe and effective performance of spinal interventional procedures with sufficient levels of evidence of effectiveness.

**Indeværende må være købt henne ved den indre arbejdsplads.**

**ISIS hænder - oven på Seminar i Munster  
Oktober 2007**



## ***ISIS Precepts***

- Understand the Anatomy (Nik Bogduk)
- Understand the Radiology (Charlie Aprill)
- Utilize Precision Diagnostic Injections to Arrive at a Diagnosis (Rick Derby)
- Utilize Therapeutic Injections and Neural Ablation to Achieve Longer Term Responses
- ISIS Technique Approaches To The Pain Generators Are Not the Only Techniques, but Represents the Consensus Best Approach To Ensure Accuracy and Avoid Complications

ISIS tro indsprøjtninger er anvendeligt for diagnose og omgås ,  
men er ikke den bare metoder at burde pleje omgås kronisk jag

## Sources of Spinal Pain

- Nociceptive pain due to inflammatory agents (zygapopysal joints arthrosis, capsular tears, cartilagenous degradation)
- **Nociceptive pain due to ingrowth of nerves into injured or degenerative structures (nucleus pulposus, annular rents)**
- Neuropathic due to intraneural scarring and edema, NMDA receptor activation, WDR neuron activation, ubiquitin proteins, metastatic neural involvement

ISIS gør den besværlig leg mange lettere

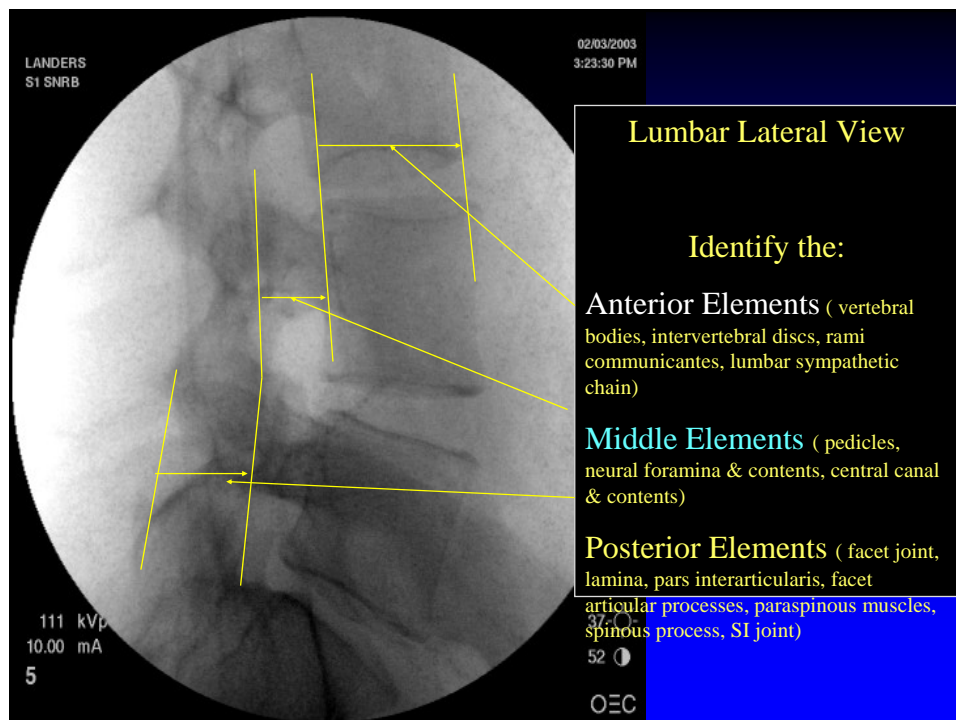


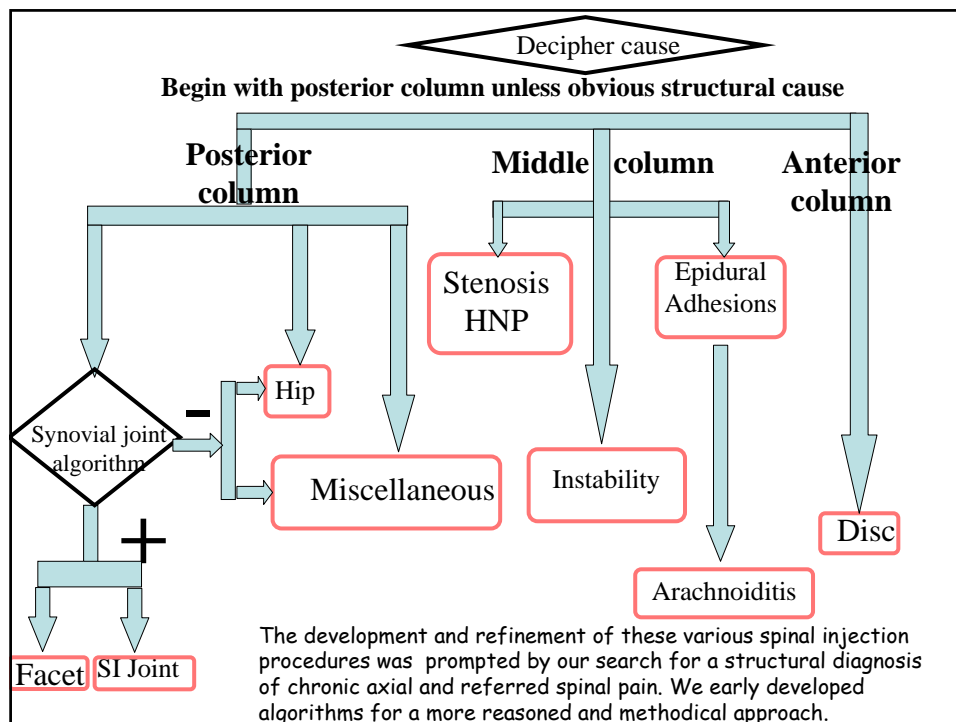


# Differential Dx: Low Back Pain

Muscle strain  
Ligament/tendon injury  
Sacroiliac joint syndrome  
Lower lumbar zygapophyseal joint syndrome  
Hip joint pain  
Compression fracture  
Stress reaction

Stress fracture  
Spondylolysis  
Spondyloarthropathy  
Marfan syndrome  
Fibromyalgia  
Myofascial pain syndrome  
Disk Related  
Neoplastic disease





## Limitations of Radiological Diagnostics:

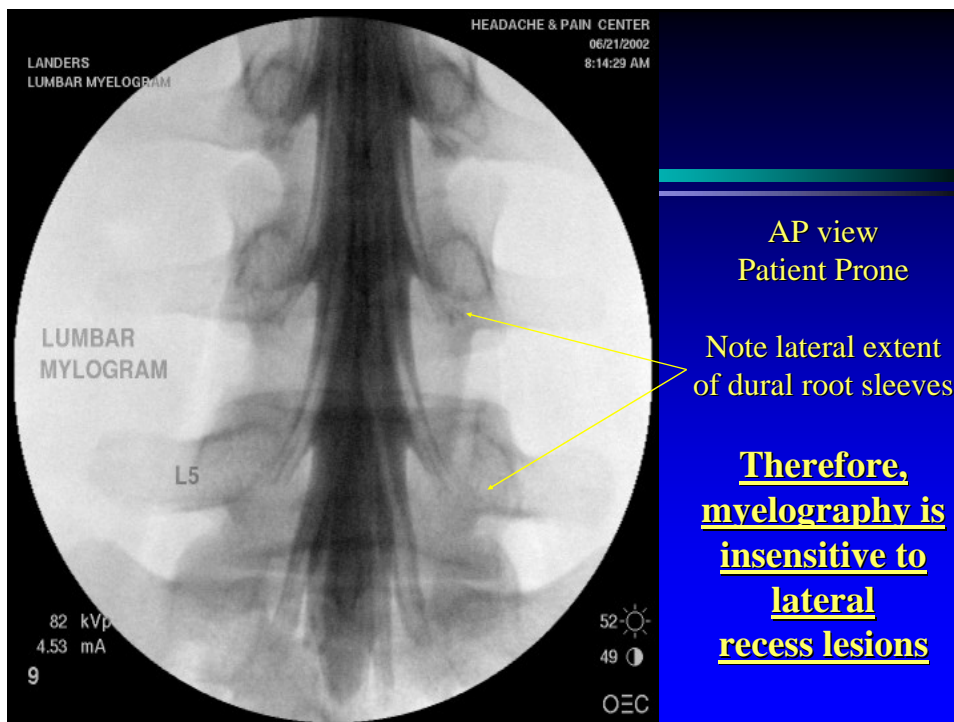
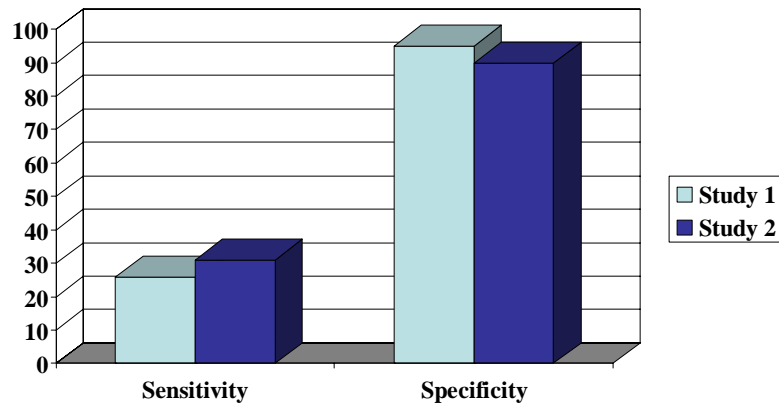
- Even though macroscopically visible and histologically evident, it was not always possible to demonstrate experimental annulus injuries by contrast-enhanced magnetic resonance imaging Spine. 2002 Dec 15;27(24):2806-10. The diagnostic value of contrast-enhanced magnetic resonance imaging in the detection of experimentally induced anular tears in sheep. Lappalainen AK, KÄÄRÄPÄ E, Lamminen A, Laitinen OM, GrÄNBLAD M.
- SI induced pain requires diagnostic injections given the insensitivity of clinical tests J Am Acad Orthopedic Surg 2004; 12: 255-65

## Predictive Value of MRI Annular Tears vs. Discogram

Study 1: Spine. 1998 Feb 15;23(4):453-7. The value of lumbar spine magnetic resonance imaging in the demonstration of annular tears.

Study 2: Spine. 1998 Oct 1;23(19):2074-80. Interobserver reliability of detecting lumbar intervertebral disc high-intensity zone on magnetic resonance imaging

and association of high-intensity zone with pain and annular disruption.



## Diagnostic Limitations of H&P

- "The existing literature does not support the use of historic or physical examination findings to diagnose lumbar zygapophysial joint pain." *Anesthesiology*. 2007 Mar;106(3):591-614.  
Pathogenesis, diagnosis, and treatment of lumbar zygapophysial (facet) joint pain. Cohen SP, Raja SN.



## Diagnostic Spinal Injections

### Diagnostic Injections

Selective Spinal Nerve Blocks

Sacroiliac (17%)

Facet – Zygapophysial (15-40%)

Medial Branch

Discography (40%)

Sympathetic Blockade





## Physical Examination

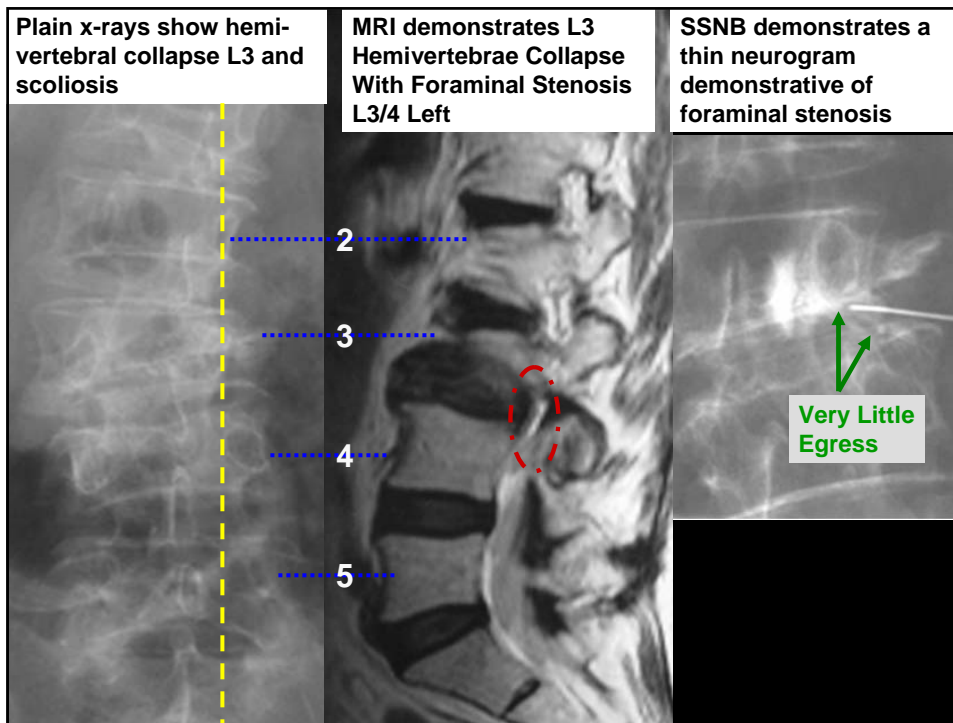
To assure that the patient is an appropriate candidate for the scheduled procedure without any contra-indications.

To diagnose by physical examination.



## Patient 1

59 year old female, longstanding asthma glucocorticosteroid dependent with 2 month history of left sided pain and numbness in the anterior left thigh. Moderate extensor weakness of the knee. Straight leg raising negative. Crossed SLR not possible (hip pain).



## *Selective Spinal Nerve Block (SSNB)*

**2% Lidocaine 1cc injected with excellent relief >80%**

**DX: Foraminal Stenosis Induced Radiculopathy L3**



## Diagnostic Spinal Injections

Diagnostic injections answer the question:  
What anatomical structure is painful?

Where is the pain generator?



## Diagnostic Spinal Injections

Surprisingly, the nociceptive  
pain generator model works for  
patients with mixed  
nociceptive/hypersensitization  
complexes



## **Diagnostic Spinal Injections**

### **Selective Spinal Nerve Block (SSNB)**



## **Diagnostic Spinal Injections**

### **Lumbar Radicular Pain**

Defined by its mechanism

Stimulation of:

Sensory (dorsal) root of spinal nerve

or

Dorsal root ganglion

IASP, 1994



**Radicular Pain is not  
synonymous  
with Radiculopathy!**

**Radicular Pain is A Single and  
Subjective Clinical Feature that May  
Be Part of Radiculopathy**



## **Radiculopathy**

Pathological disorder affecting the function of nerve roots

Features - depending on which fibers affected:

- Sensory Loss (numbness)

- Motor Loss (weakness)

- Reflex Loss

- Paresthesia

- Pain

**Objective Neurological Findings**



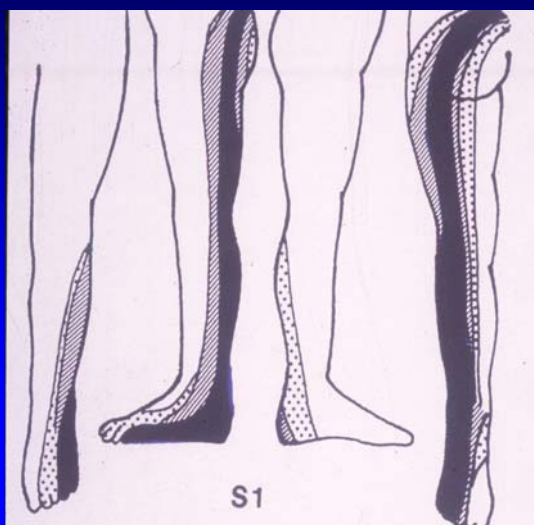
## Radicular Pain or Radiculopathy

Disc Herniation or  
Foraminal Stenosis  
98 %

Other Lesions  
2%



## Lumbar Radicular Pain



Quality – Shooting,  
lancinating,  
electrical

Pattern - Band like

Distribution –  
Distal >  
Proximal

Cutaneous  
component





## Lumbar Radicular Pain Differential Diagnosis

### Entrapment Neuropathies (Peripheral)

#### Lateral femoral cutaneous nerve (*meralgia paresthetica*)

Sensory loss suggests L4  
Obesity, pressure ASIS  
History of DM often present

#### Common Peroneal nerve - around head fibula

Etiology - tight cast (pressure), trauma  
Sensory Loss - L5  
Motor Loss - L5 - Ext Hallucis longus

#### Posterior tibial nerve (Tarsal Tunnel)

Pain in ball of foot when standing  
Sensory loss S1

**EMG** will  
differentiate  
peripheral  
neuropathy  
from radicular  
pain.



## Lumbar Radiculopathy

### Clinical features

1. Root Pain
  2. Root irritation signs (SLR)
  3. Root Compression signs (motor, sensory)
  4. Positive imaging
- When 3 out of 4, high likelihood of HNP or bony entrapment**



## **Lumbar Radiculopathy**

**Pretest probability suggests the diagnosis**

Young - HNP

Old - Foraminal or spinal stenosis

Post surgery - Epidural fibrosis with NR involvement

**A definitive diagnosis requires imaging**

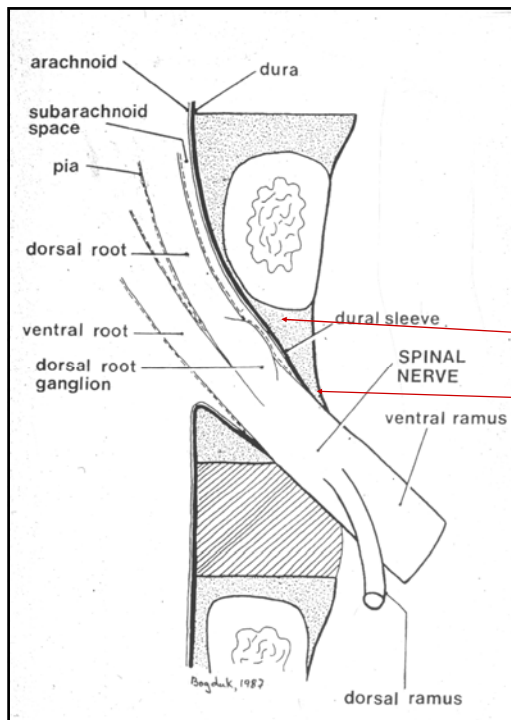


## **Lumbar Radiculopathy: Differential Diagnosis**

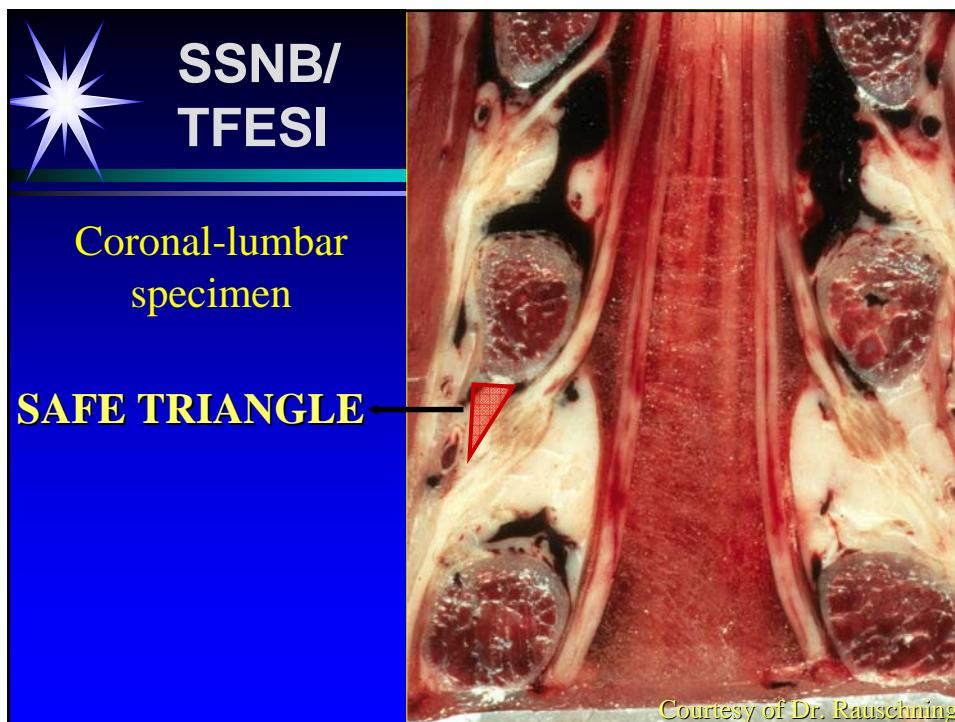
**Psoas Myofascial Pain with Sciatic  
N. Irritation**

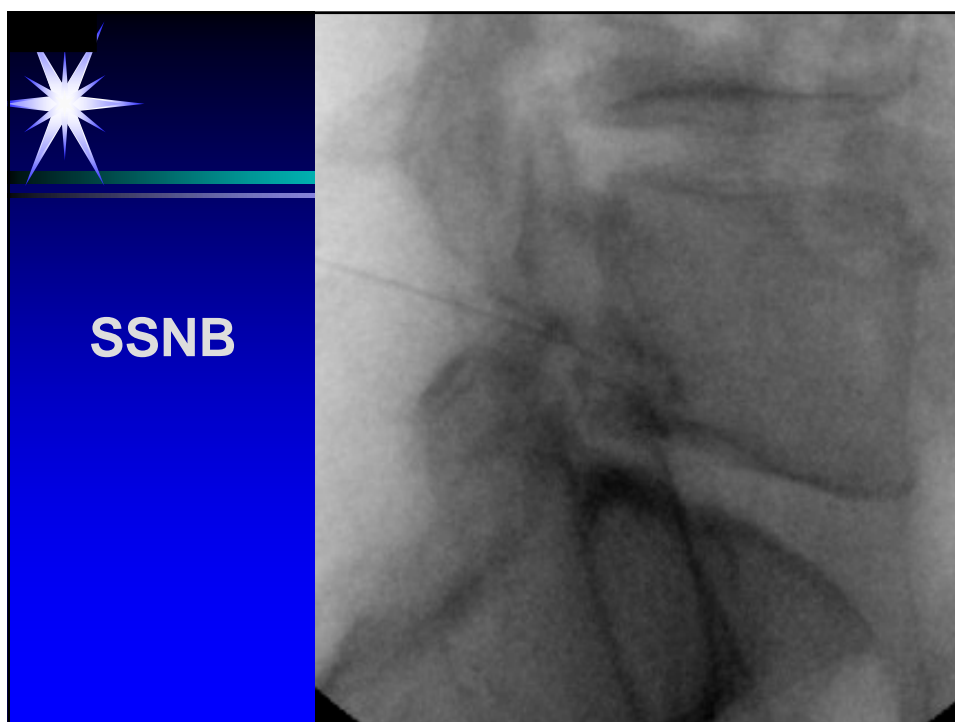
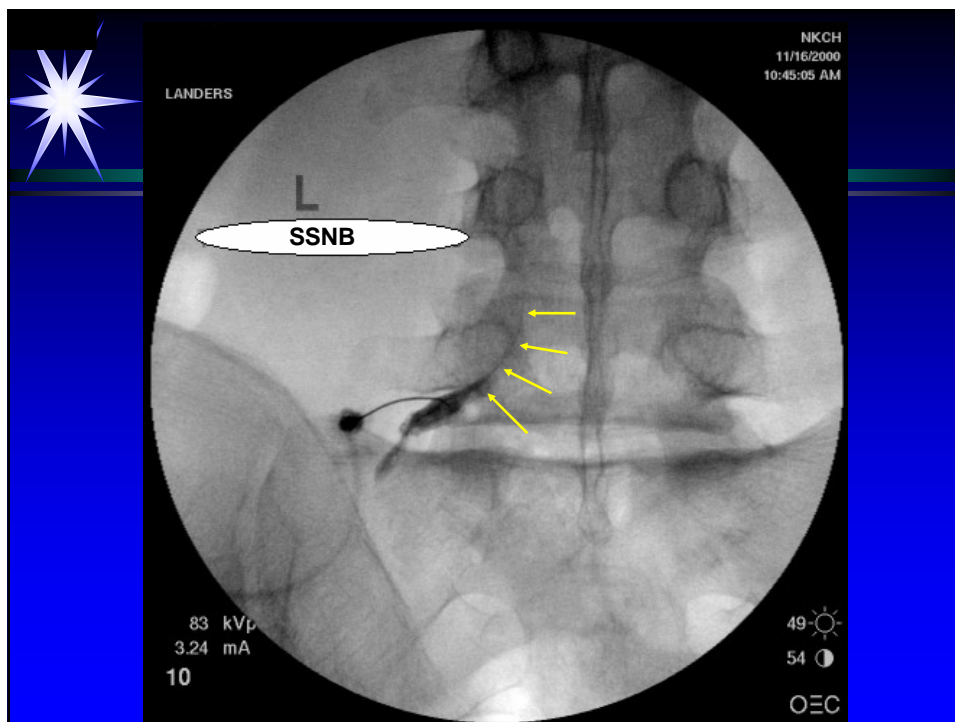
**Extraforaminal Spinal Nerve  
Entrapment**

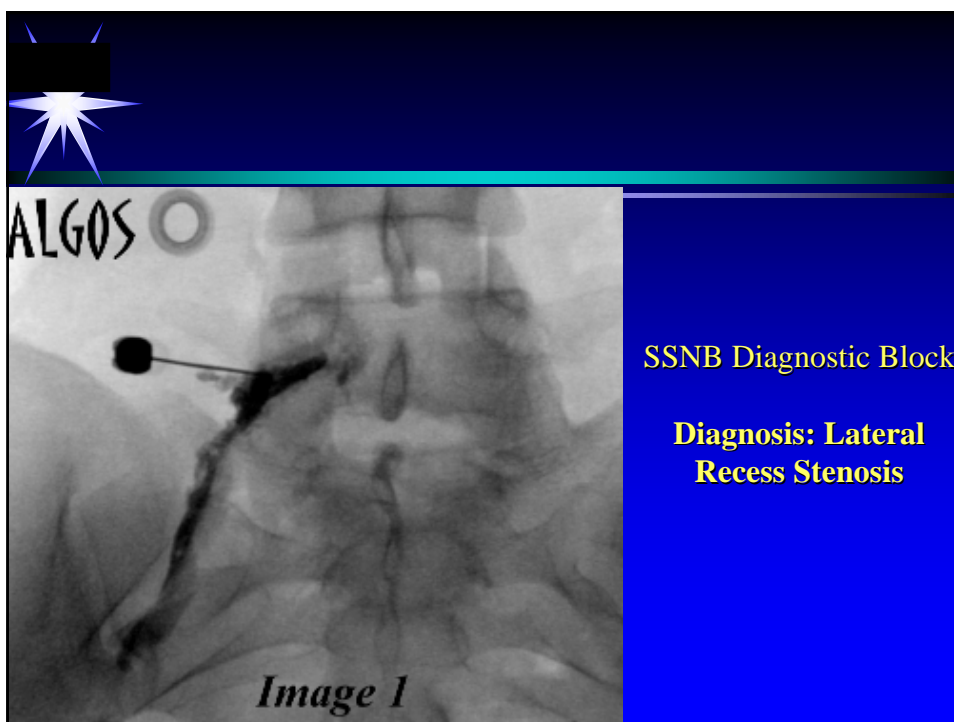
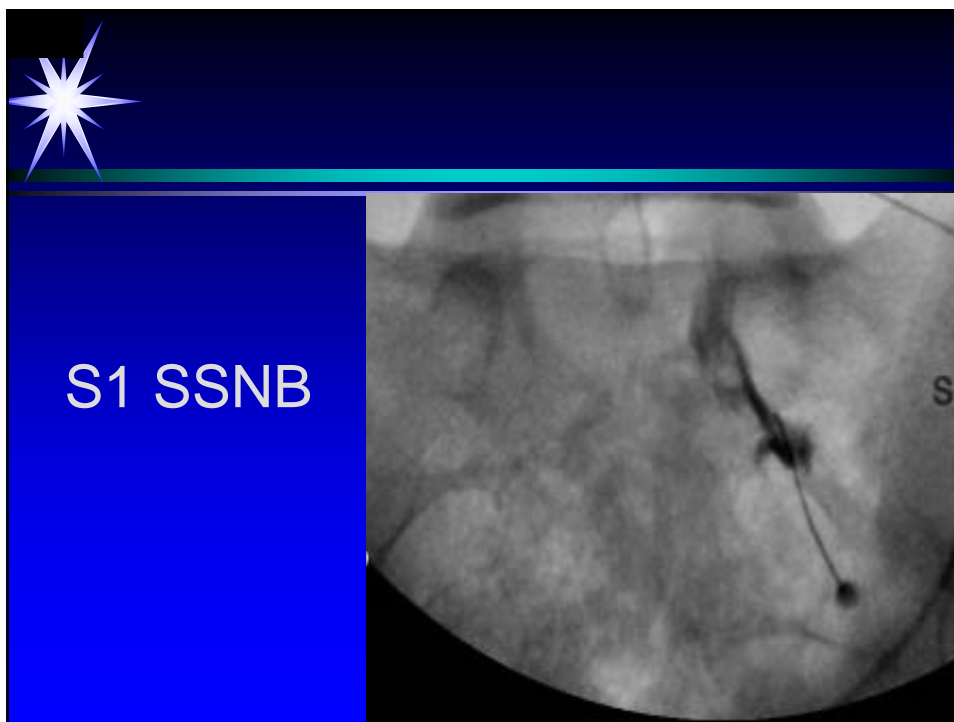
**Plexopathy**




**SSNB**









**Patient 1 Subsequently Had a  
Transforaminal Epidural Steroid  
Injection at L3/4 with 3cc 0.25%  
bupivacaine plus 80mg  
methylprednisolone**

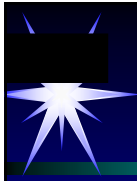


## **TFESI**



Transforaminal Epidural Blocks are Similar to SSNB with the Exception Of Higher Volume to Assure Entry into the Epidural Space and the Use of Steroids Instead Of Local Anesthetics Only. It is Imperative To Be Assured No Vascular Uptake Is Occurring

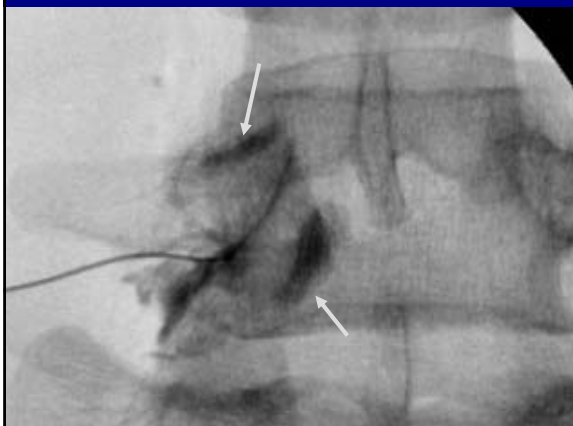




Lateral  
Fluoroscopy  
View:  
TFESI



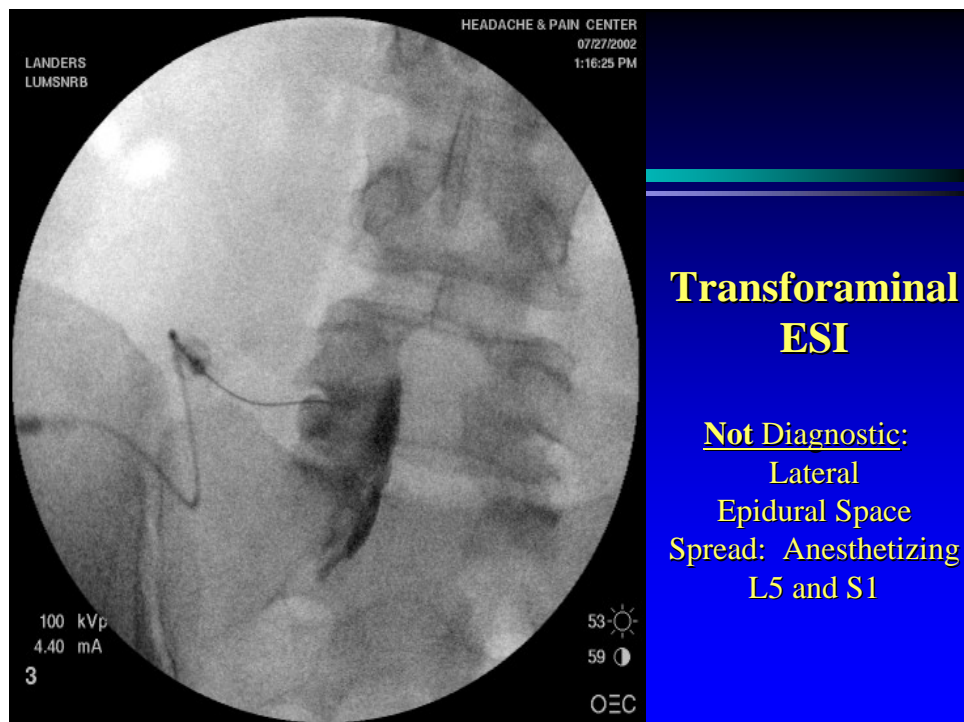
# TFESI

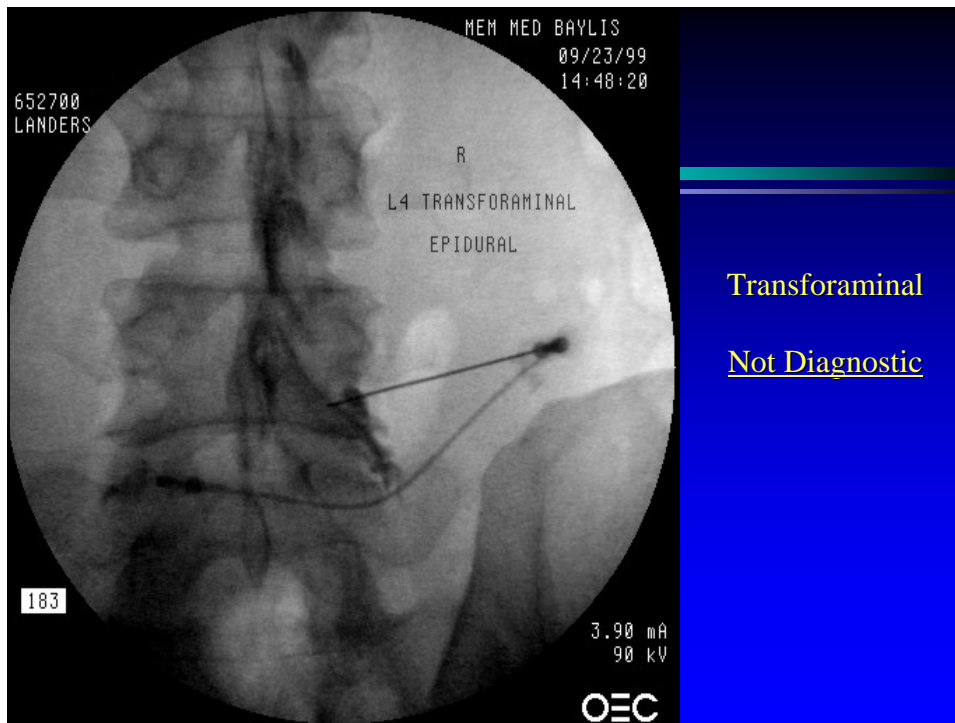


*Proper Technique Will  
Demonstrate Contrast  
In the Epidural Space*



## Other Examples of Transforaminal Epidural Steroid Injections:





**Patient 1 Had No Relief from The TFESI  
But Desires Other Interventional Pain  
Modalities Prior to Considering Surgery.**

**TFESI In This Case May Have Been  
Insufficient Due To Degree of Stenosis**



## Interlaminar Epidural Indications

**Radicular** symptoms unrelieved by  
conservative therapy

Herniated nucleus pulposus

Foramenal stenosis

Spinal Stenosis

Compression Fracture?



## Epidural Steroids

### Interlaminar

#### Advantages

Many practitioners (any anesthesiologist, *etc.*)

#### Disadvantages

Blind injections

Epidural space?

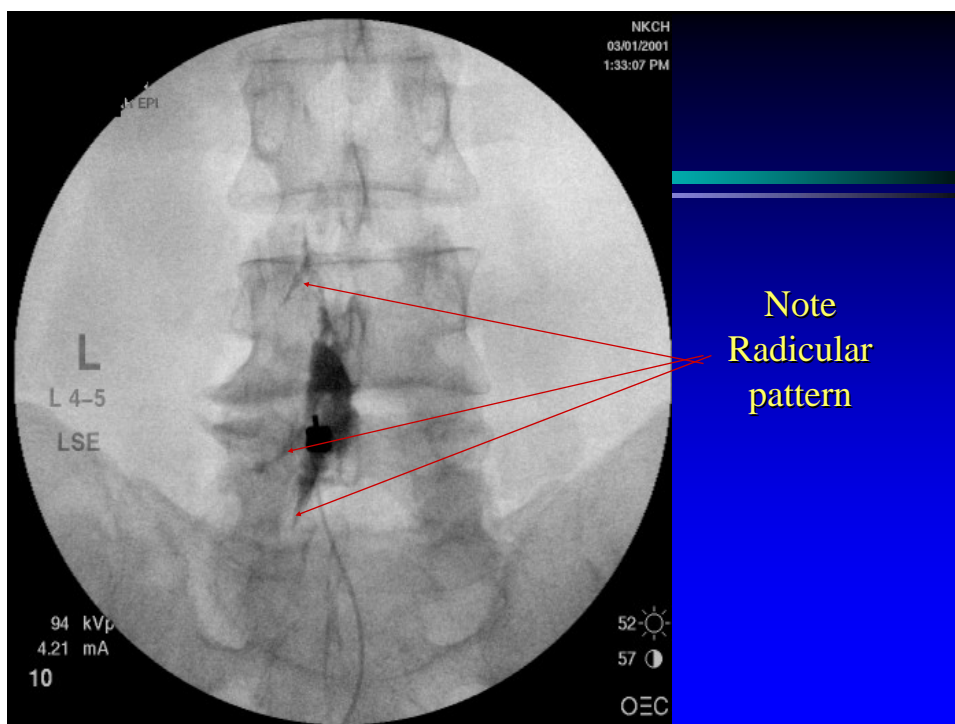
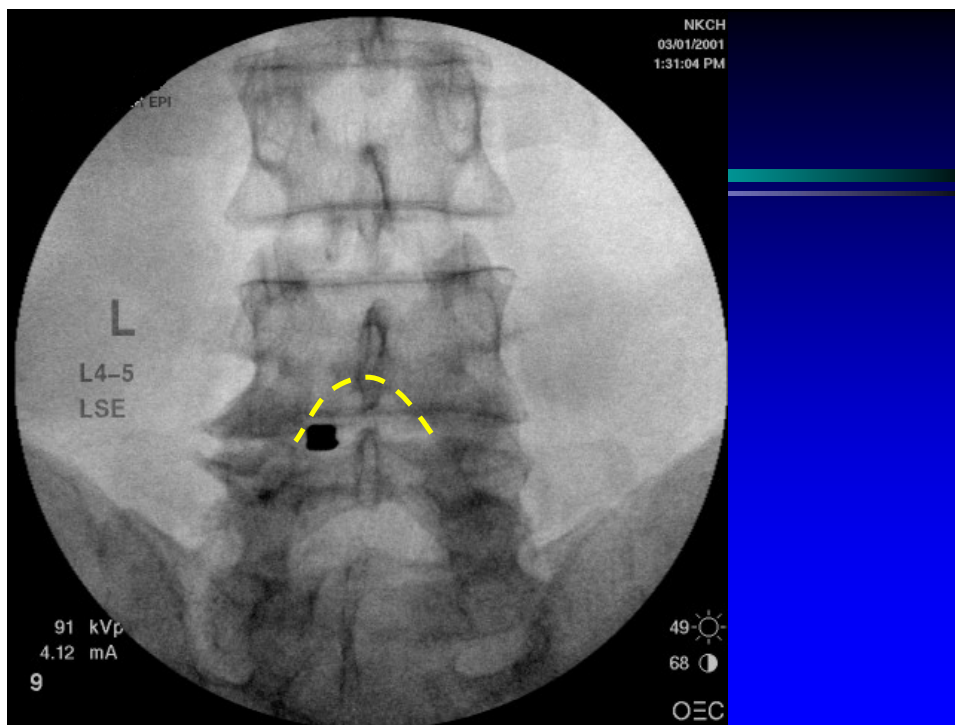
Level?

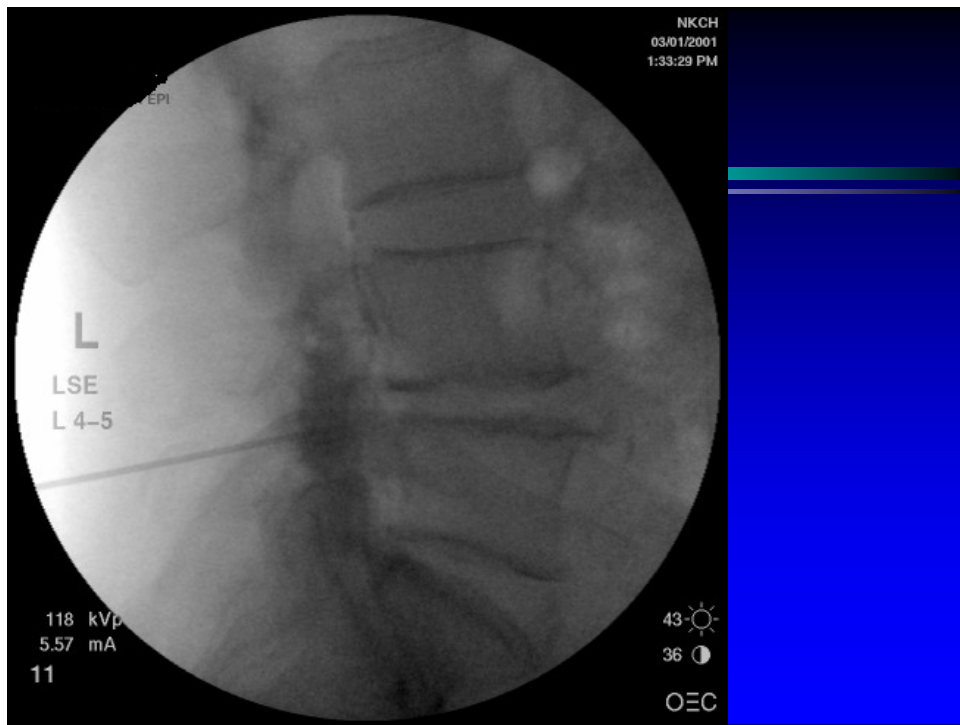
Spread of injectate to side of problem

Drug injected usually fails to reach desired ventral epidural  
space

Unable to use post-surgery

**Fluoroscopy - Guarantees epidural injection only**









# Epidural Steroids

## Caudal

### Advantage

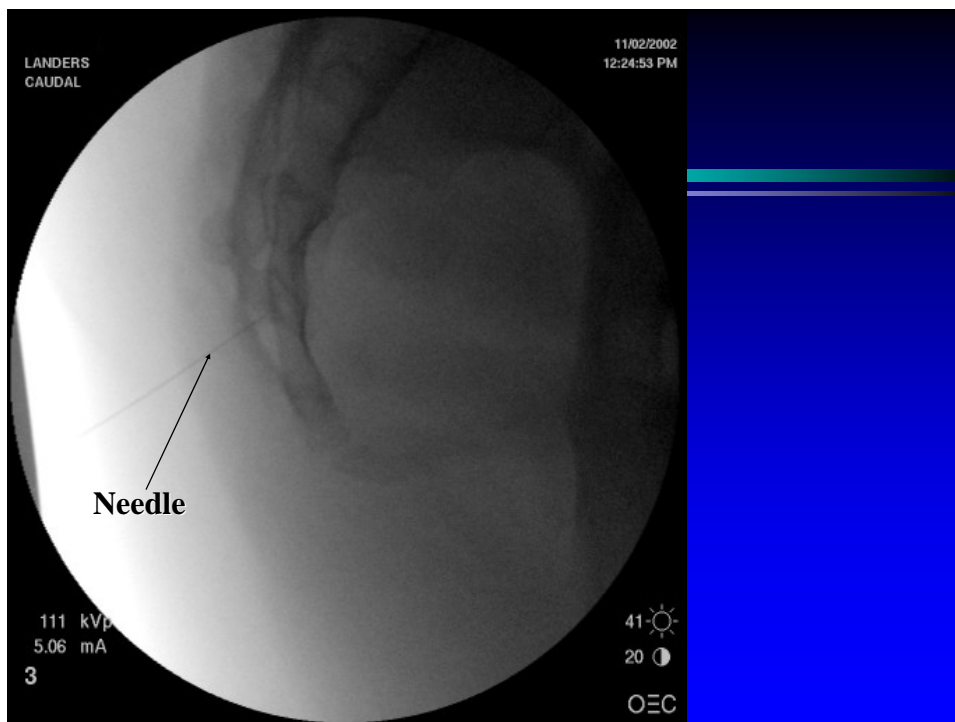
- Drug injected flows to ventral epidural space
- Less risk dural puncture

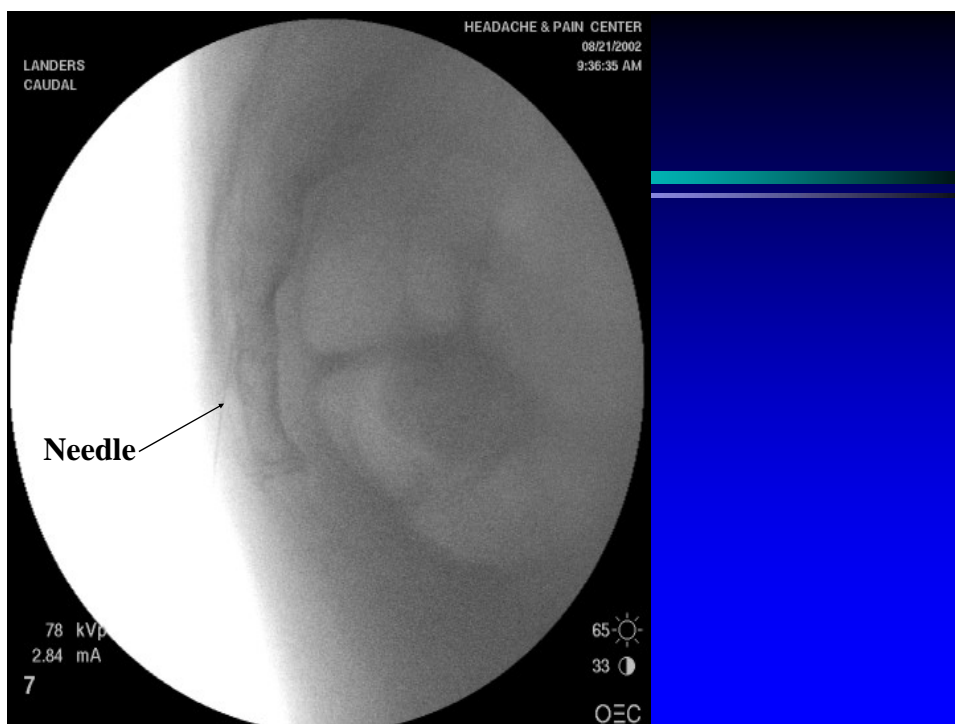
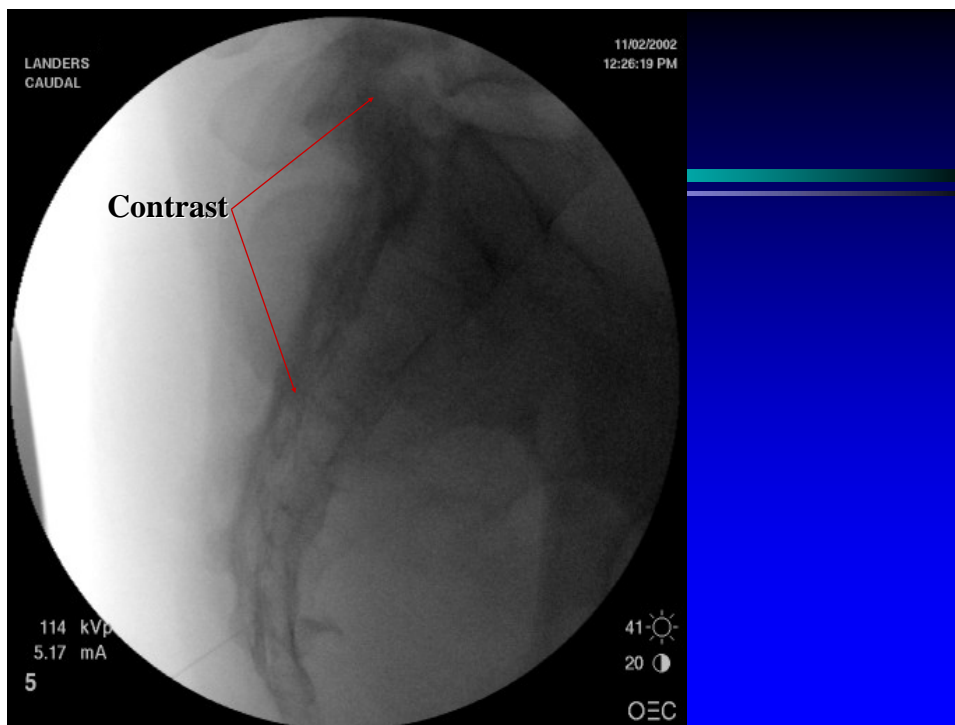
### Disadvantage

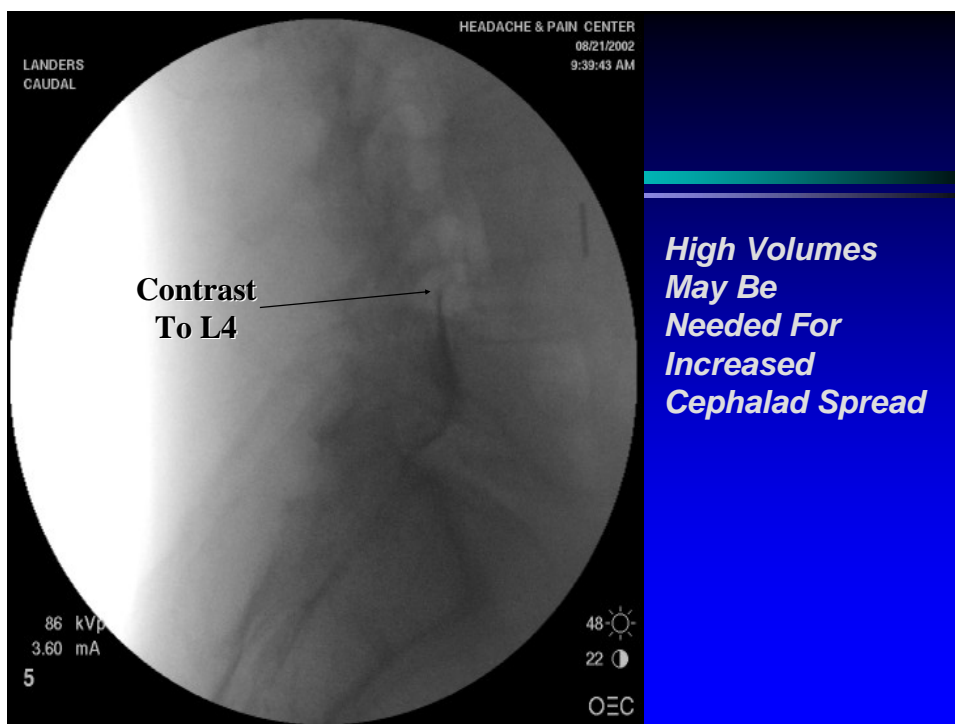
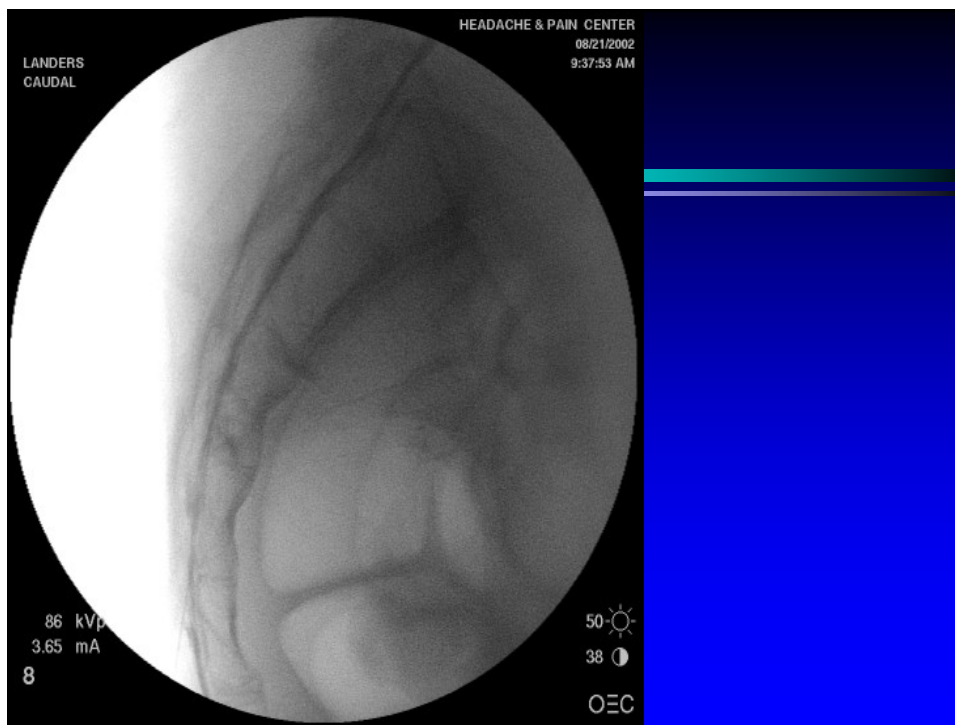
- Blind injections - up to 30% non epidural
- Large volumes needed, therefore , low concentration of steroid


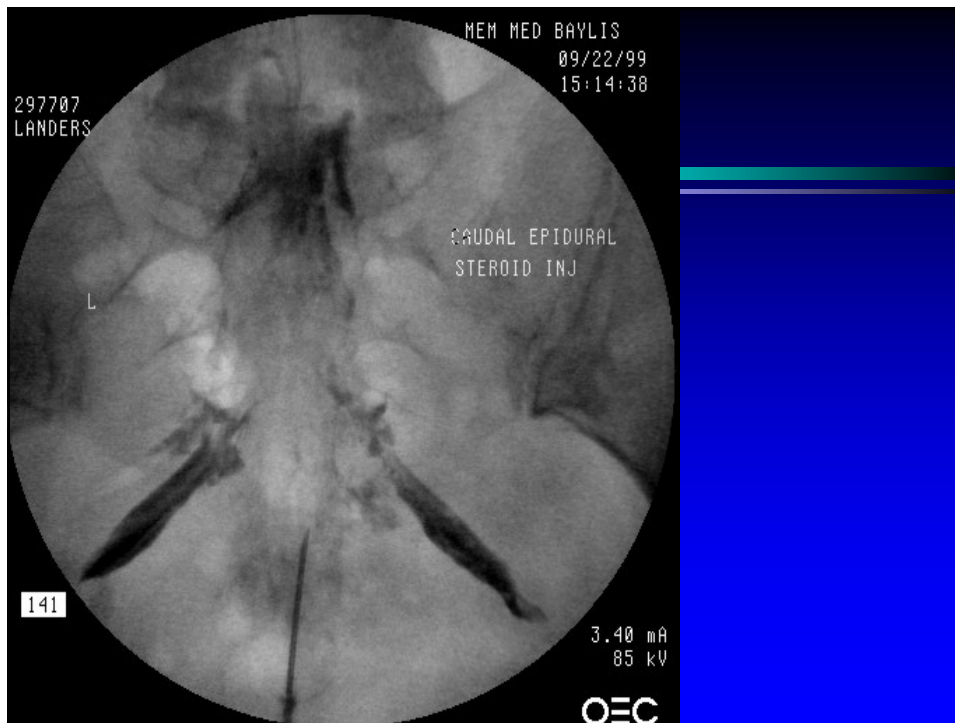
### Fluoroscopy

- Guarantees epidural injection only









## ***Patient 2***

***29 Year Old Patient With 6 Month History Chronic Low Back Pain, Daily, Worse When Standing, No Prior Trauma But Does Work In a Heavy Lifting Job. Physiotherapy, TENS, medications have minimally helped.***



## ***Patient 2***

***Physical Exam: Mild Low Back Tenderness Over the L5 Spinous Process; No numbness, No weakness, Negative SLR. Trunk extension does not worsen pain. Flexion is possible only to 35 degrees due to low back pain. No muscle spasm.***



## ***Patient 2***

***TRIGGER POINT INJECTION:***

***No relief, even temporarily***



## PATIENT 2: MRI



### Disc Desiccation

No Significant Height Loss

No Osteophytosis or End Plate Lipping

No HNP or Bulging

HIZ Present (Red Arrow)

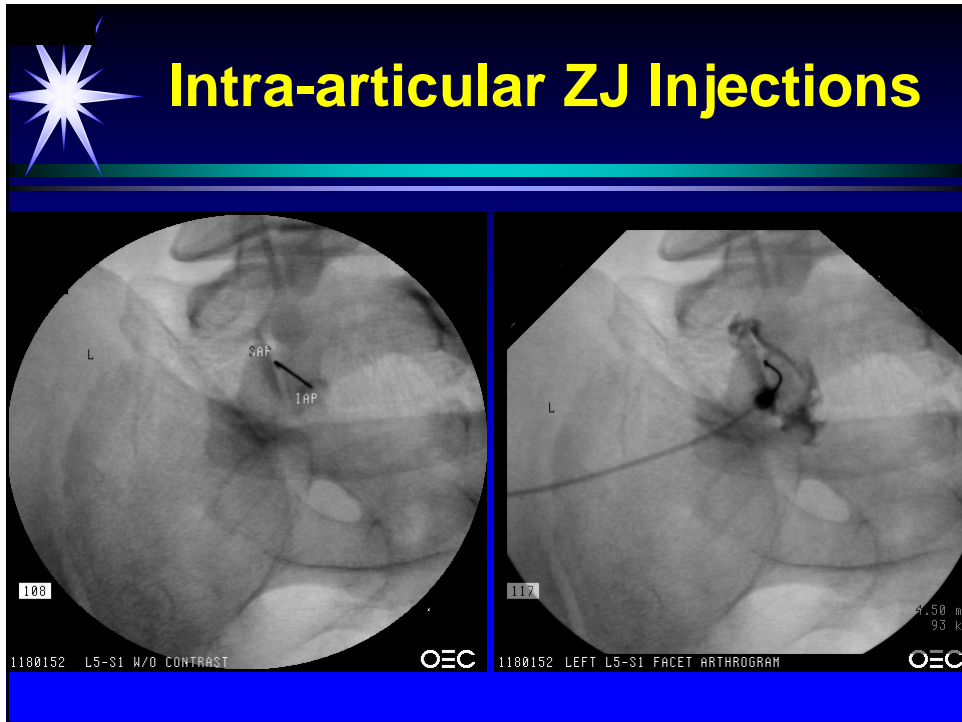


## Presumptive Diagnosis:

**Degenerative Disc Disease**

**Rule Out Zygapophyseal  
Arthropathy**







## **Intra-articular ZJ Injections**

**Provided only 25% relief in this patient**




## **Options:**

Continue conservative therapy since it is not likely patient is a candidate for fusion based on maintenance of normal disc height and age

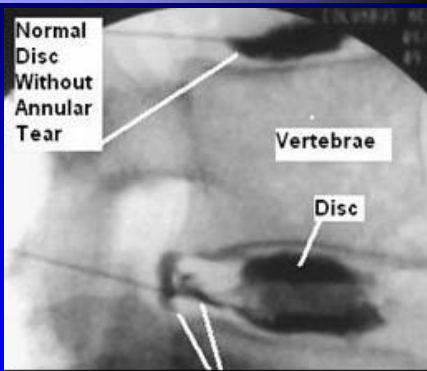
Discography if further interventions are being considered (ADR, IDET, Biaculoplasty)





## *Lumbar Disc Stimulation*

**Discography Demonstrated Annular Tear With Concordant Pain L5/S1 Only**



Normal Disc Without Annular Tear

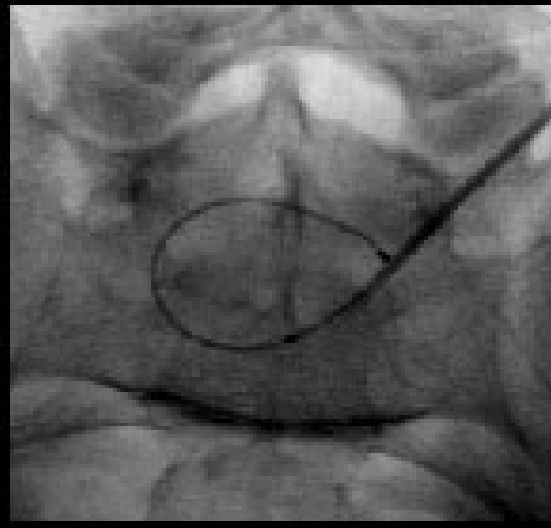
Vertebrae

Disc

Radial and Circumferential Tears



## ***IDET***



## ***Patient 3***

**65 Year Old Male, Former Laborer carrying heavy loads (>50kg) for 40 years. Gradual Onset of Low Back Pain with Referral Into the Buttocks and Posterior Thighs. Pain is Worsened By Getting Up From A Sitting Position, Truncal Flexion or Extension More Than 15 Degrees, and is an Deep Achy Quality. The Pain When Sitting Is in the Gluteal Area with Much Less Low Back Pain. On Lying Recumbent, the Pain in the Gluteal Area and Low Back Largely Disappears. No History of Trauma. No Numbess, No Weakness.**



## ***Patient 3***

Physical Exam: Truncal flexion to 80 deg, extension to 5 deg only (sharp pain right low back). Extension plus rotation produces worsening low back pain. Tenderness over LS junction to deep palpation but also tenderness to deep palpation over PSIS. SLR (-), Reflexes normal, Motor normal, Sensory exam normal. Pelvic distraction positive for pain gluteal, Pelvic compression negative. FABER positive. No troch tenderness.



## ***Patient 3***

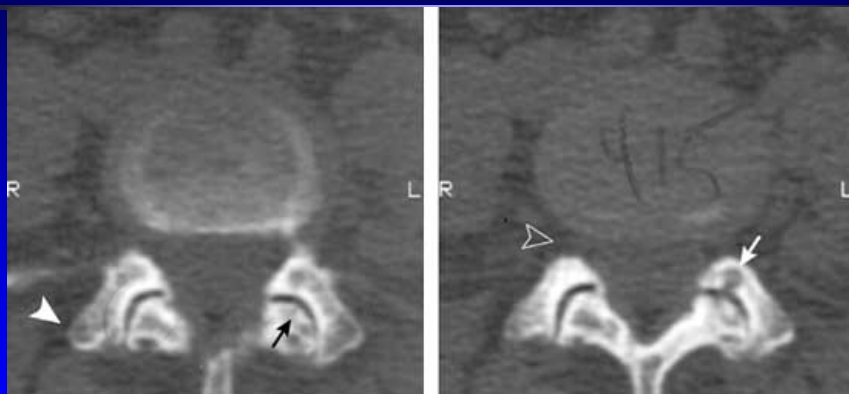




## Link Between DDD and ZJ Arthropathy



## Early Findings Facet Arthropathy



Subchondral sclerosis and cyst formation with osteophytic overgrowth



## **Late Findings Facet Arthropathy**



Severe Disc Joint Space Narrowing With Irregular Joint Surfaces

## **End Stage Facet Arthropathy**



Remodeling of the Joints with Severe Hypertrophic Changes and Medial Angulation of Posterior Joint



## Delphi Experts Dx: Facet Arthropathy

Positive response to facet joint injection, localized unilateral LBP, positive medial branch block, pain upon unilateral palpation of the LZJ or transverse process, lack of radicular features, pain eased by flexion, and pain, if referred, located above the knee.

Phys Ther. 2007 Aug 7; [Epub ahead of print] Indicators of Lumbar Zygapophyseal Joint Pain: Survey of an Expert Panel With the Delphi Technique. Wilde VE, Ford JJ, McMeeken JM.






***Results from Medial Branch Blocks:***

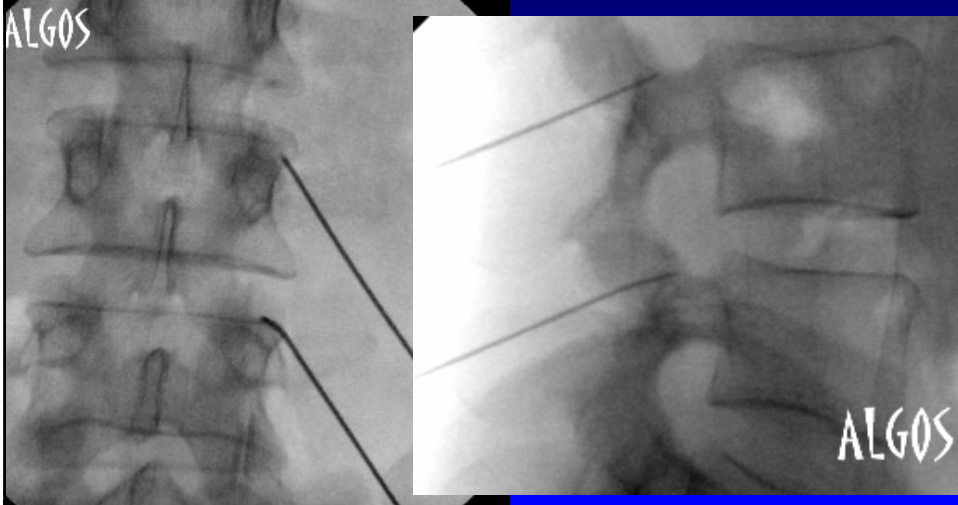
- Placebo control: 15% pain reduction
- Bupivacaine MBB: 85% pain relief in the low back but persisting buttock pain
- Reliability of Test and Patient: Good

***Proceed with Radiofrequency Thermal Ablation of MBB***



Needles  
Inserted  
To  
Maximize  
Active Tip  
(10-15mm)  
Contact  
Surface  
Area  
With  
Nerve

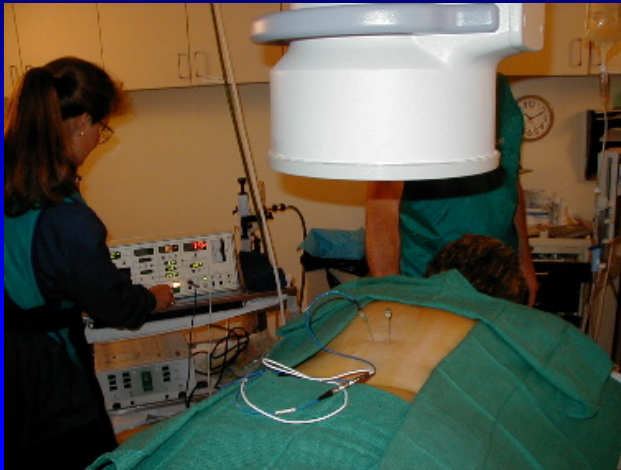
***Proceed with Radiofrequency Thermal Ablation of MBB***



ALGOS

ALGOS

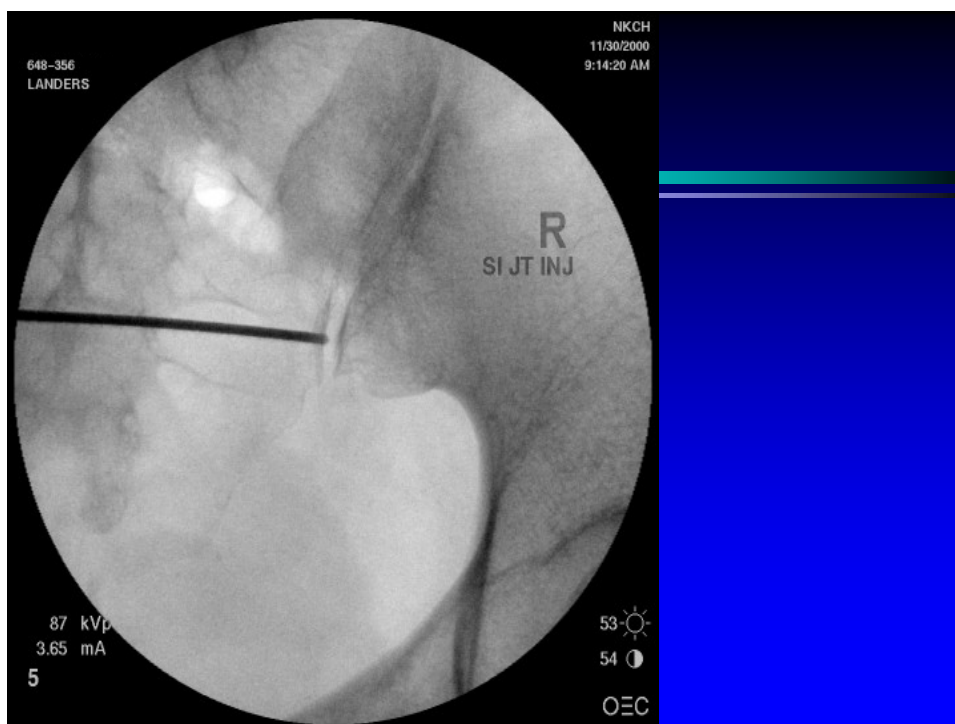
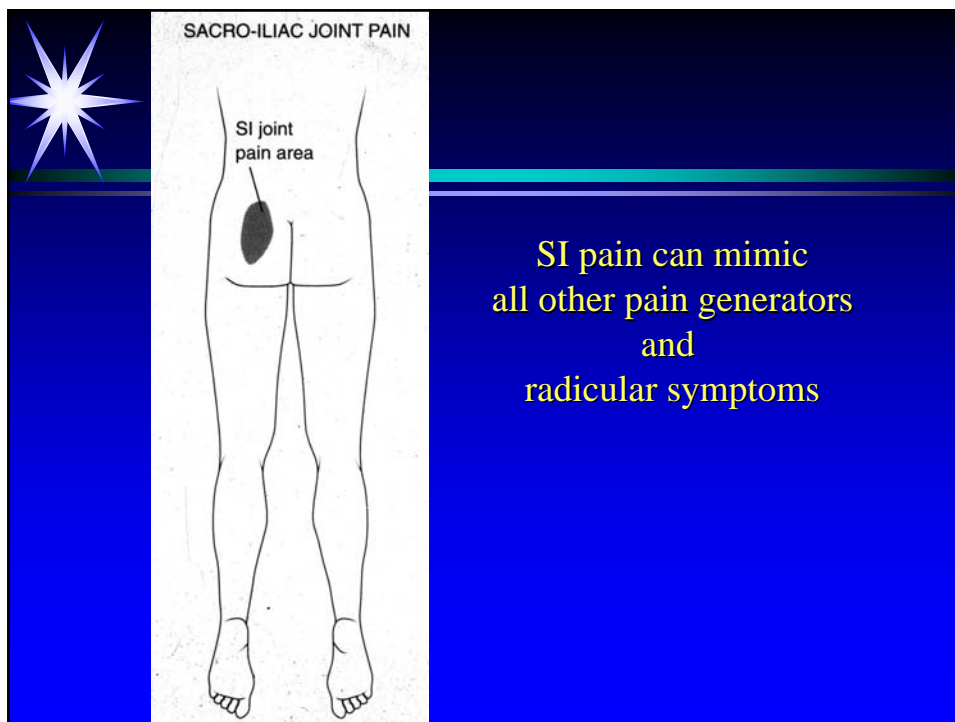
## ***Proceed with Radiofrequency Thermal Ablation of MBB***

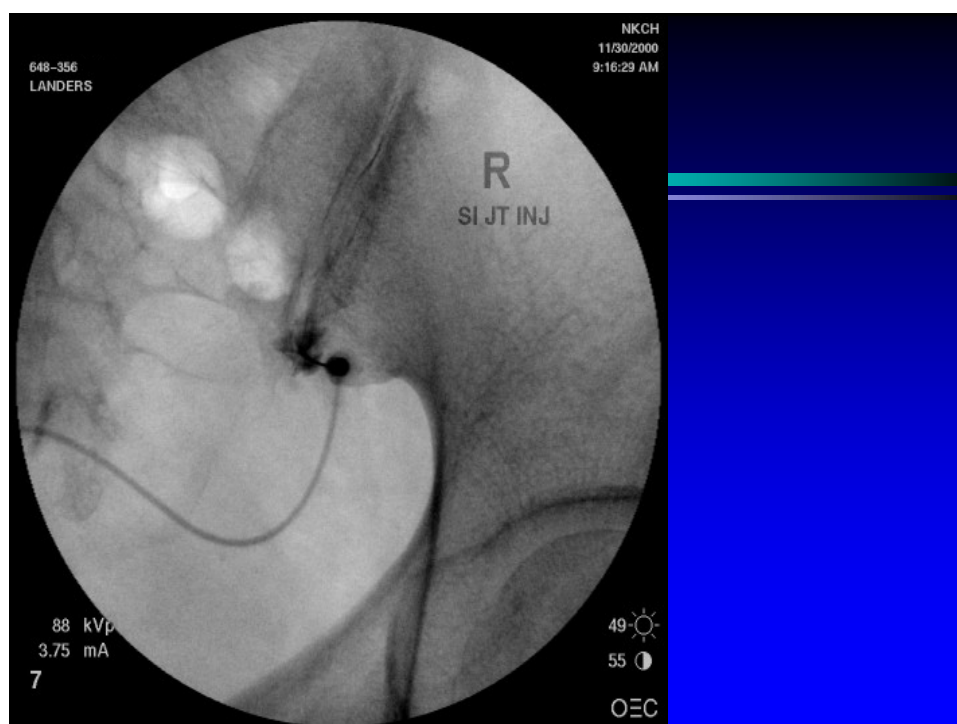
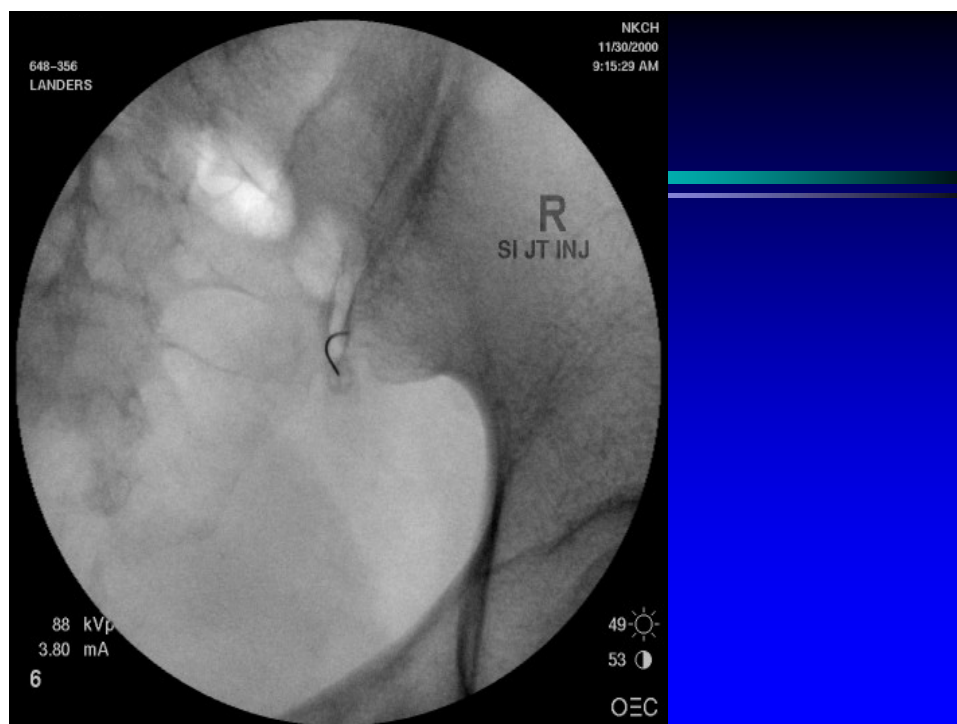


60 sec ablation  
80 deg Celsius  
For each medial  
Branch

## ***Low Back Pain 90% Improved But Continues Gluteal Pain***

Possibilities:  
Secondary myofascial pain  
Sacroiliac Arthropathy







## Long Term SI Treatments (Investigational)

### SINERGY

Laser Denervation (Ho YAG)

Bipolar or Unipolar Joint RF

Cryoneurolysis

Posterior Foraminal RF

Dorsal Lat Ramus Implantable Stimulator

Enbrel (AS, Psoriatic)

Thank You For Your Attention

