



*Department of Neurosurgery
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PERCUTANEOUS RADIOFREQUENCY ABLATION FOR TREATMENT OF LUMBAR FACET PAIN SYNDROME

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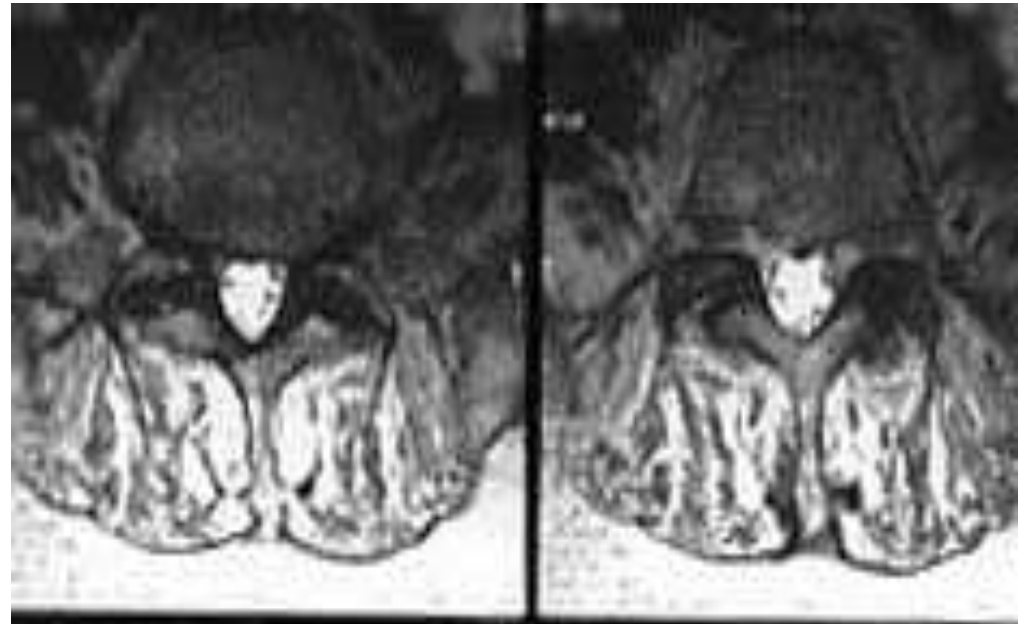


Case presentation



- Male patient. 55 years old ,
- Complaining from low back pain for 4 years.
- Tried Medical treatment

- Tried different forms of Physical Therapy
- Not tolerating and not compliant to do back muscle strengthening exercises
- On regular use of NSAID for pain relief





What is Next?

Patient has exhausted conservative treatment and still in pain.

What IF?

Patient has associated co-morbidity and cannot perform major surgery like fixation



Back pain generators



Lumbar Facets

Disc degeneration and prolapse

Soft tissue and ligaments

Spondylolysis and spondylolysis

Unclear



Lumbar Facet Pain Syndrome



Lumbar facet joint

Referral patterns of facet pain

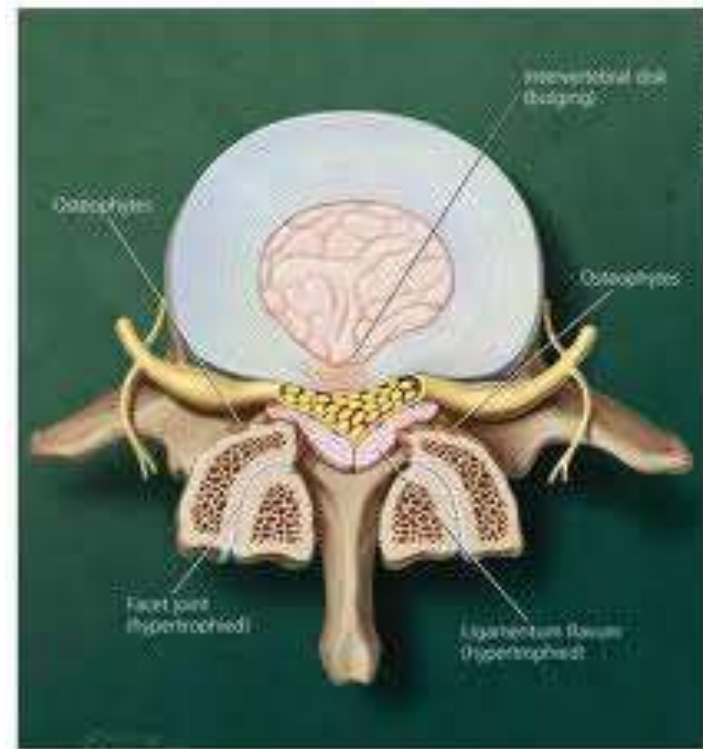


Chronic, Mechanical pain characterised by:

- **Stiffness and pain that increase with twisting and bending backwards**
- **Age: It affects mainly adult subjects**
- **Location: Pain is Mainly paraspinal , may refer but not radicular**
- **Worse when getting out of bed and with prolonged standing**
- **Increase with extension or rotation**

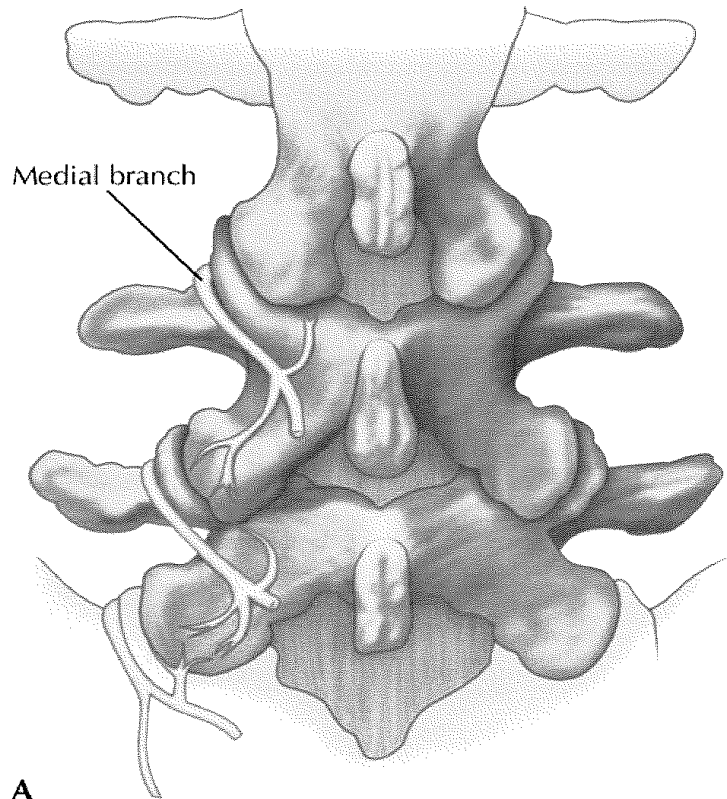


Innervation of the lumbar facets





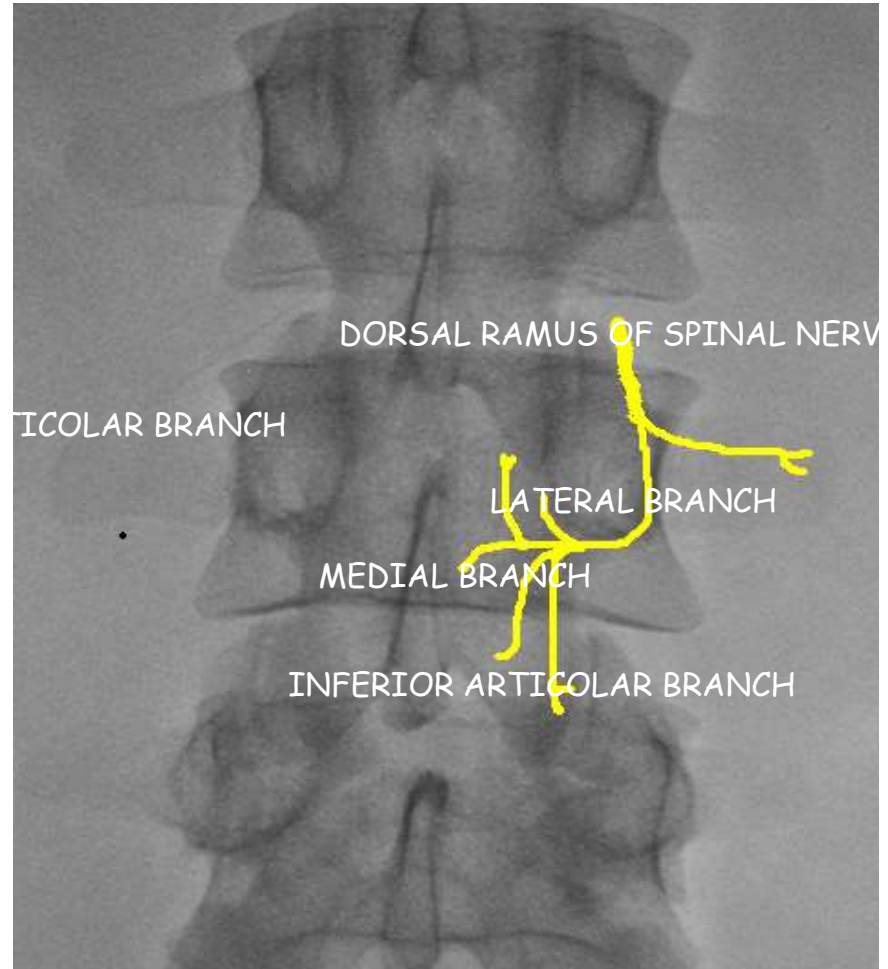
Anatomy: relevant nerves



L3

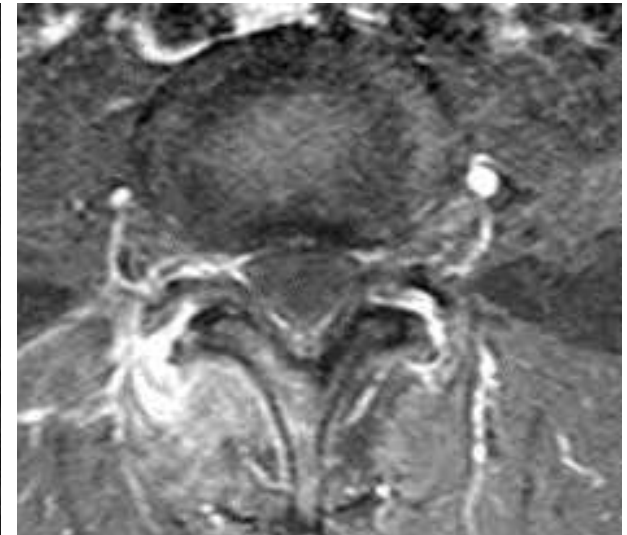
L4

L5





Radiological Findings on MRI Gd



*Enhancing inflammatory soft tissues
changes surrounding facet joints*



Facts

- *Poor correlation between severity of pain and extent of facet degeneration on radiology*
- *Facet disease may be symptomatic even with minimal findings on imaging*
- *Pain is related to irritation of joint innervation, because of capsular distension, synovitis, friction between two articular processes*

Thus radiology is not diagnostic as much as excluding other pathology



Treatment Modalities for lumbar facet syndrome



Mainstay

- **Physical Therapy**
- **Education**
- **Medications**

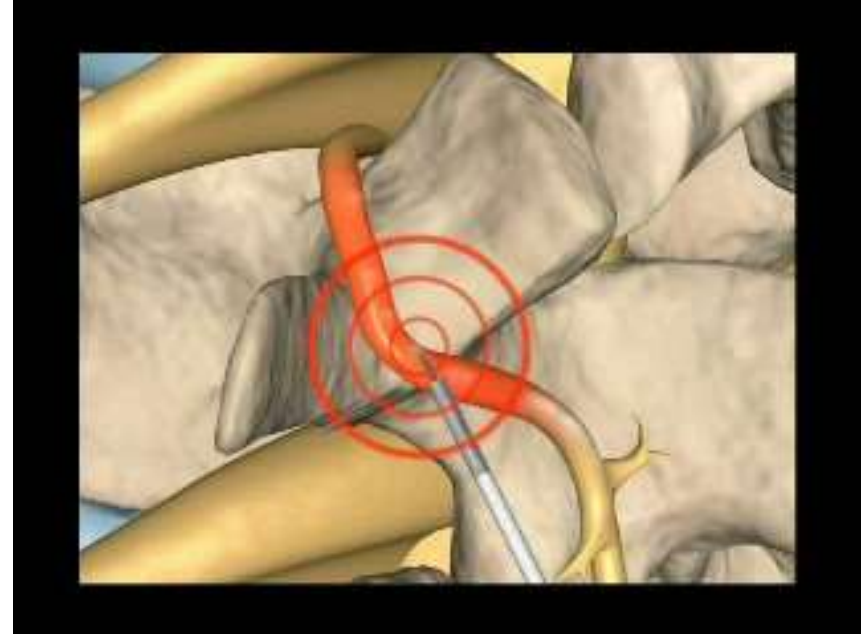
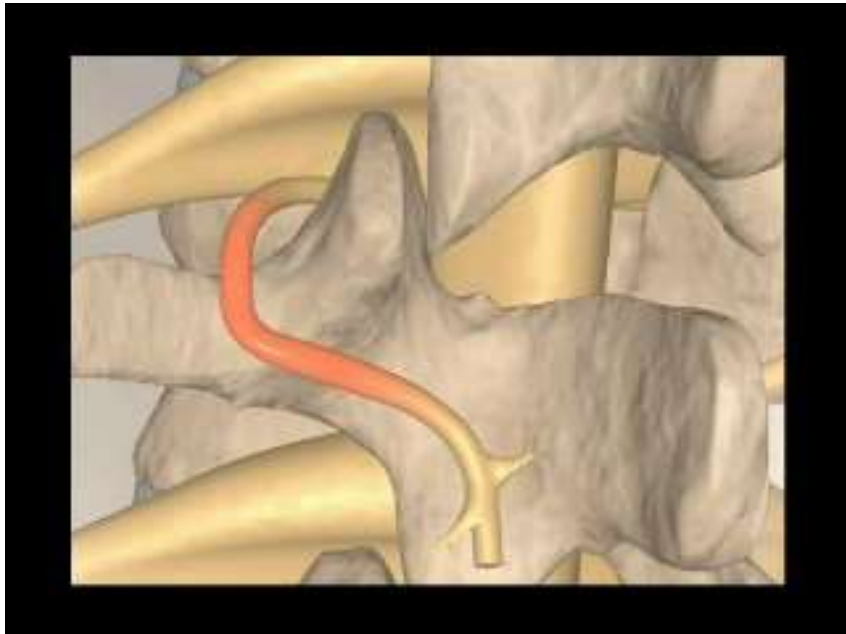
Resistant

- **Injections (intra-articular)**
- **Radiofrequency ablation**



Percutaneous radiofrequency neurotomy

- *Ablation of the **lumbar medial branch** responsible for the sensitivity of facet joints*
- *Using Radiofrequency technology which produces well controlled heat using an electrode needle positioned under fluoroscopic guide*
- *To interrupt nerve conduction,*



pain relief



Patients selection

- *Lumbar pain with typical signs of facet joint syndrome for at least 6 months (idiopathic or residual pain after spine surgery)*
- *Little response to pharmacological and physiotherapy treatment*
- *Degeneration of zygapophysial joints detected by Xray, CT and MRI Gd*
- *Absence of neurological signs*
- *positive medial branch block in doubtfull cases*



Contraindications

- *Local or systemic infections*
- *Coagulation disorders*
- *Neurological deficit*



The procedure

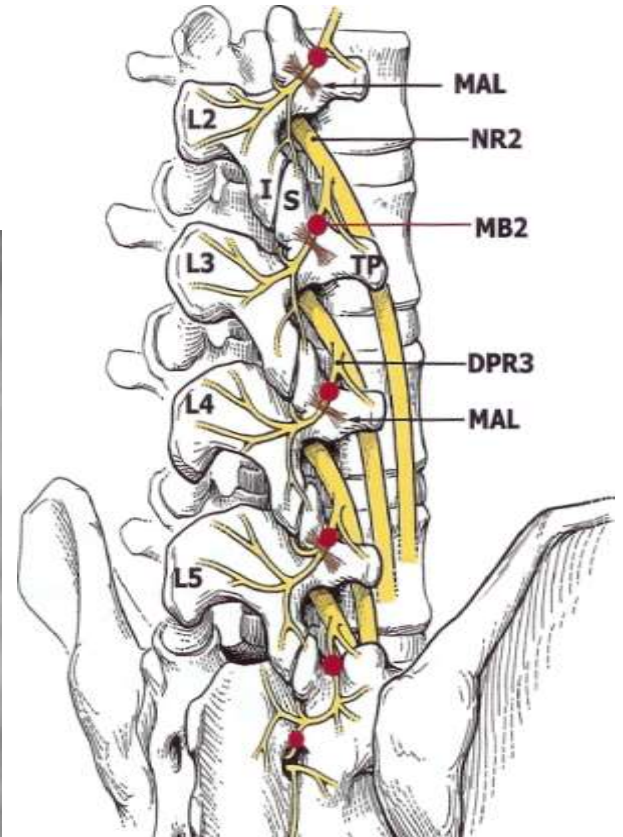
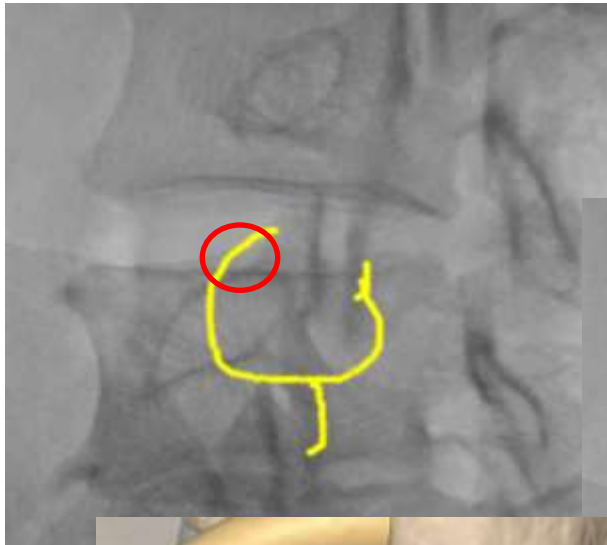


- Done on Day-case basis
- Procedures are done in OR with Local analgesia without general anesthesia
- Neurotomies are done at 3 lumbar levels L3/4, L4/5 and L5S1 to maximize pain relief





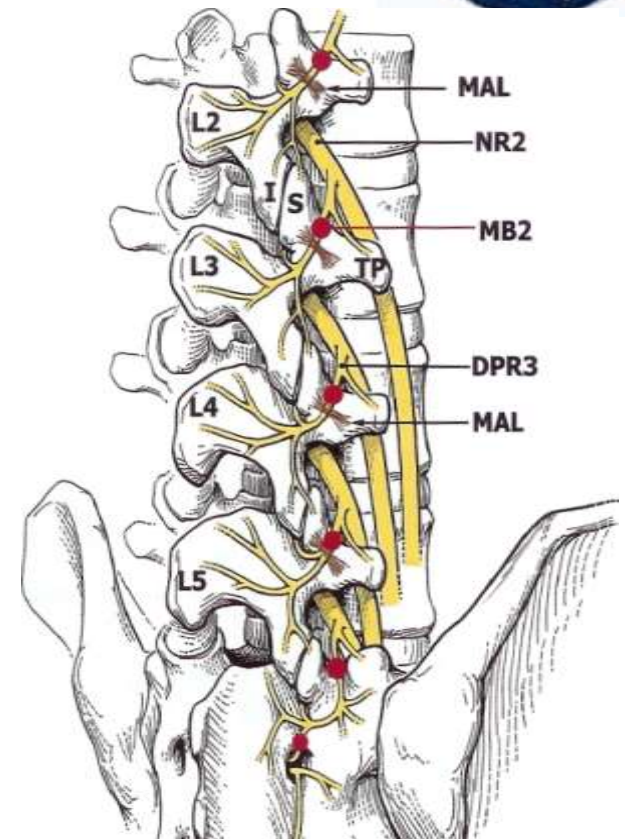
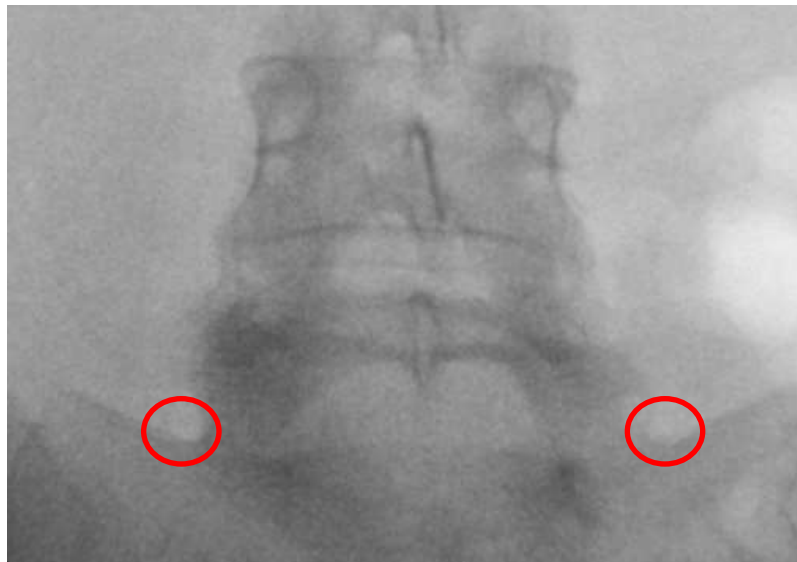
Target Point selection on Skin For L3/4, L4/5



*Between the transverse and
articular process*



Targets L5S1 *(L5 dorsal ramus)*



*On the ala of the sacrum just lateral to
the articular process!*



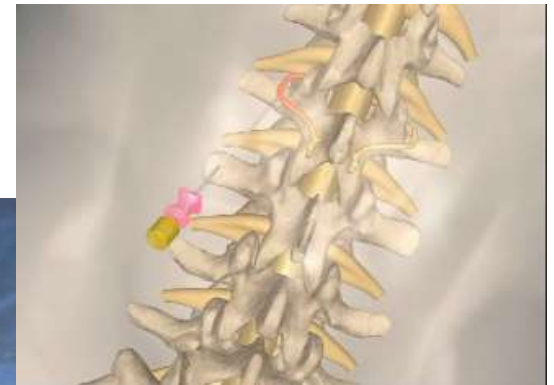
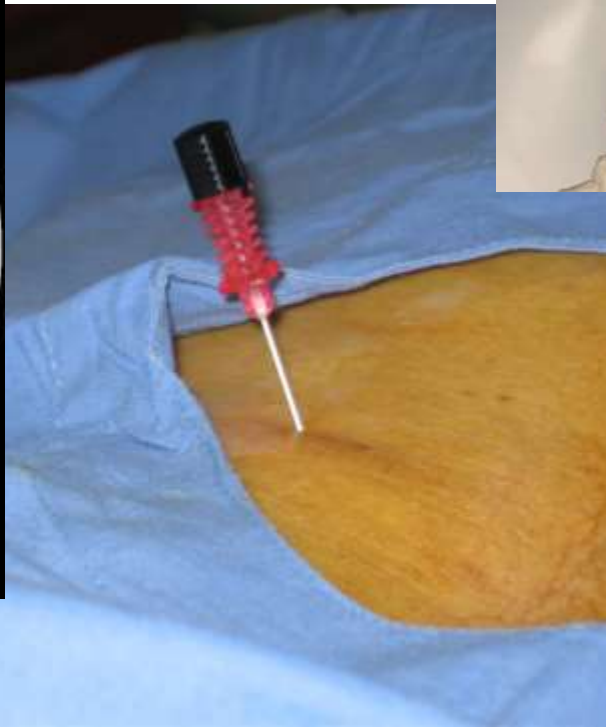
After target selection:

Needle positioning under fluoroscopic guide





*Needle positioning under fluoroscopic guide:
operative position confirmed*

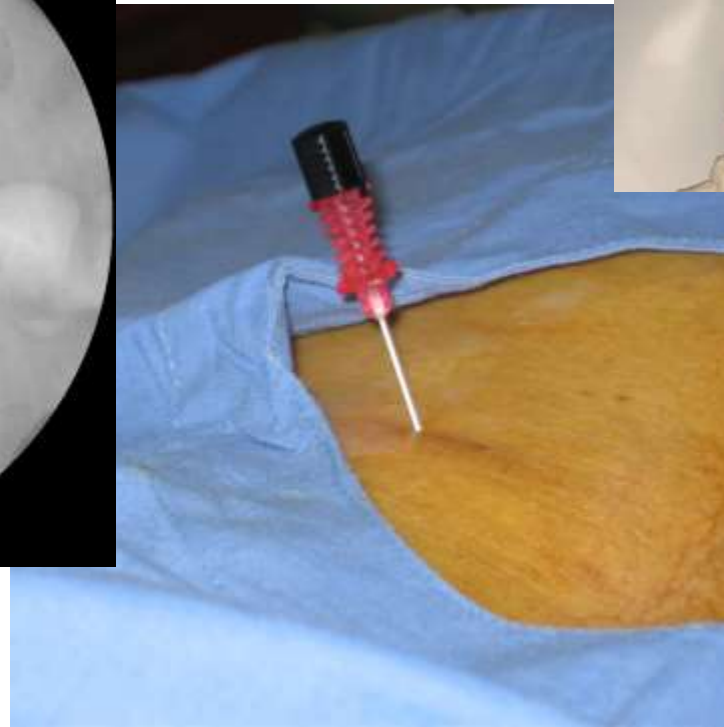




Check back in different angle

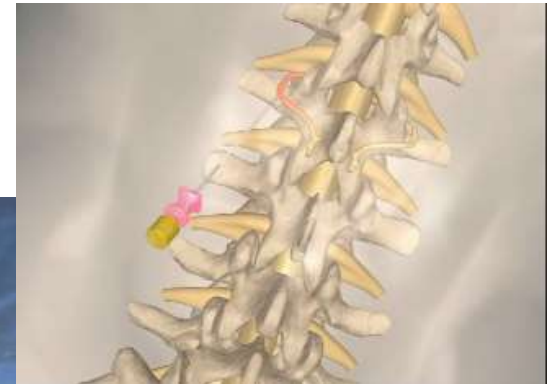
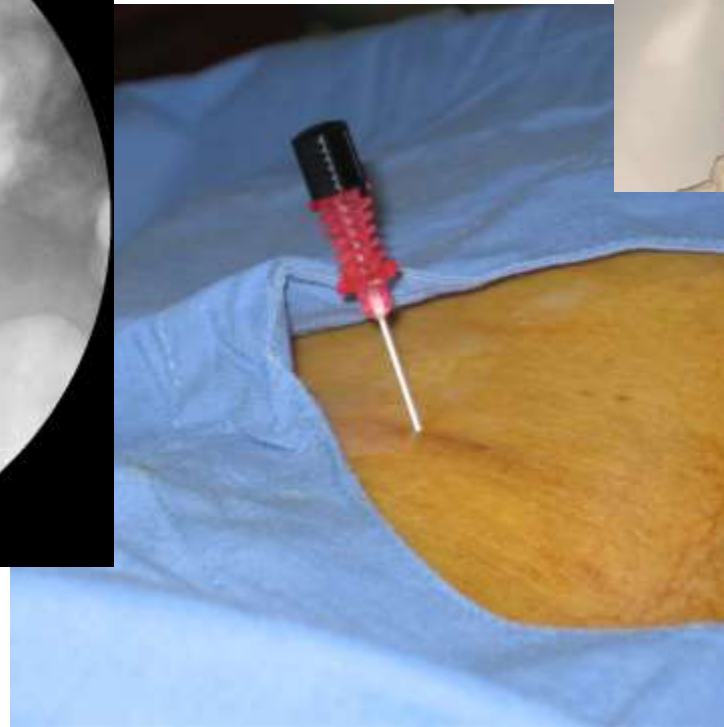


*Needle positioning under fluoroscopic guide:
operative position*





*Double check in another Angle:
Needle positioning under fluoroscopic guide.
operative position*





*L5/S1 Location:
Needle positioning under fluoroscopic guide:
operative position*

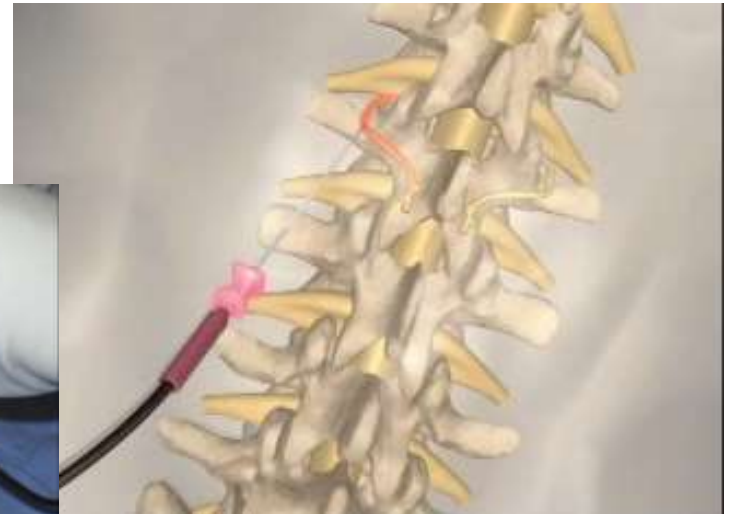
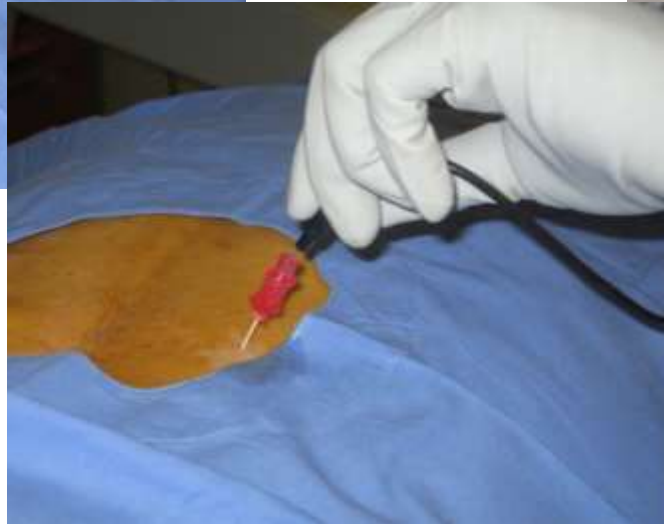
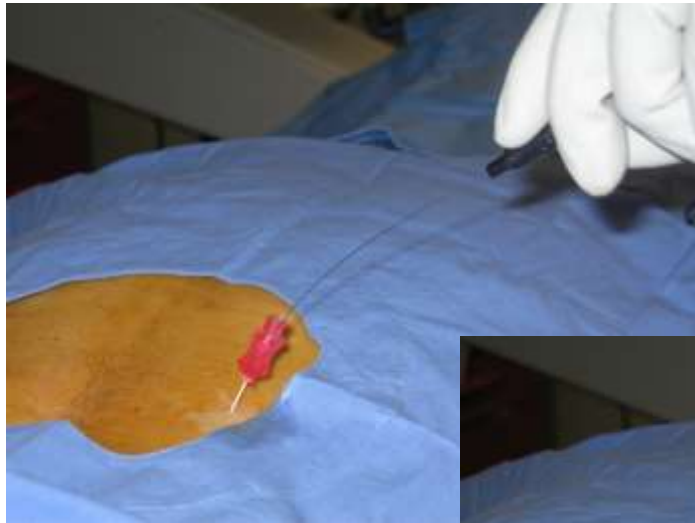




Radiofrequency Phase



Insertion of the electrode

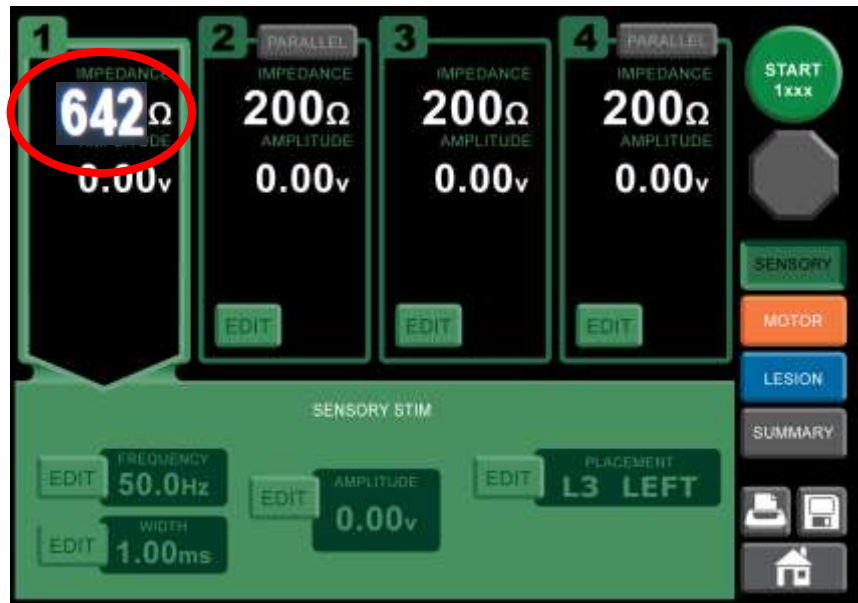




Maximization of safety

NEUROPHYSIOLOGICAL CHECK

*Impedence values between 200 e 800 Ohms
are significant for the correct target*





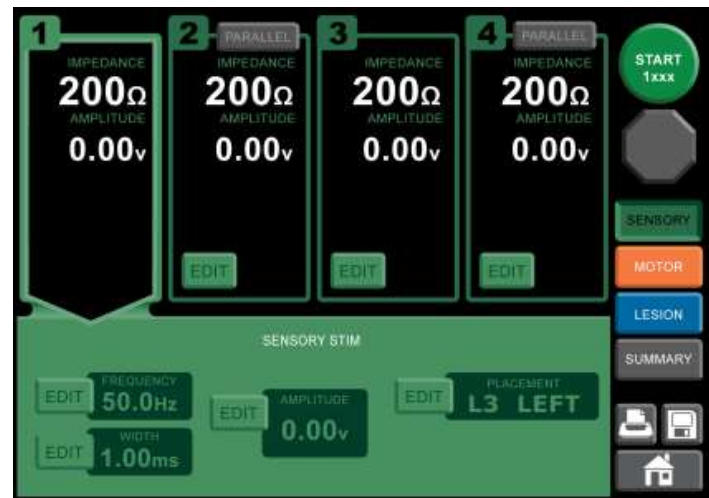
Certainty of position

SENSORY STIMULATION TEST

Parameter settings:

Frequency 50hz

Intensity 0,2 - 0,7V





Exclusion of motor response

MOTORIAL STIMULATION TEST

Parameter settings:

Frequency 2hz

Intensity 0,2 - 1V

The screenshot displays a software interface for motor stimulation. It features four channels (1-4) and a global parameter section. Channel 1 is highlighted with an orange border. The global parameters are set to Frequency 2.0Hz, Amplitude 0.00v, and Width 1.00ms. The placement is set to L2 LEFT. The interface includes buttons for EDIT, START, SENSORY, MOTOR, LESION, SUMMARY, and a home icon.

Channel	Impedance	Amplitude	Width	Frequency	Placement
1	200Ω	0.00v	1.00ms	2.0Hz	L2 LEFT
2	200Ω	0.00v			
3	200Ω	0.00v			
4	200Ω	0.00v			



Final stage of treatment



The Neurotomy

Parameter settings:

80° for 60"

The screenshot displays a control panel with four numbered channels (1-4) and a central control area. Channel 1 is active, showing a temperature of 37°C, a time of 90s, and an impedance of 310Ω. Channels 2 and 3 are in a 'PARALLEL' state with 37°C, 90s, and 250Ω. Channel 4 is also in 'PARALLEL' but has a time of 0s and 250Ω. The central area includes a 'START 12xx' button, a 'SENSORY' button, a 'MOTOR' button, a 'LESION' button, and a 'SUMMARY' button. At the bottom, there are buttons for 'SET TEMP' (80c), 'HOLD TIME' (90s), 'RF OUTPUT', and 'PLACEMENT' (L4 LEFT). There are also waveforms for 'Thermal' and 'Pulse'.





Complications

- Infection
- Haematoma
- Neurological injury
- Unsuccessful procedure



Tips for successful procedure

- ✓ Proper patient selection
- ✓ Ideal Image positioning
- ✓ Accurate needle insertion
- ✓ Application of electrical stimulation
- ✓ Appropriate RF application time
- ✓ In-depth knowledge of spinal and neurological anatomy and radiology.



Follow up

- *VAS 0-100 analysis baseline and 1w, 1m, 6m, 12m after the procedure*



Our Study



Material and methods:

The study included 63 patients with chronic low back not responding to conservative treatment .patients were positive responders to medial bundle branch block test. All patients were treated by radiofrequency lesion making for the nerve at 60 to 80 degrees

Results:

At 12 month follow-up, patients **46%** (29) patients had excellent outcome (70 pain reduction on vas), **33%**, (21)patients had good outcome (50%pain reduction on vas), **21%** (13) patients had poor outcome (short response or less than 50% improvement).



Results



No procedural complications

No infections



Take Home Message



- Radiofrequency ablation produces pain relief by denervating the facets.
- A group of safety parameters has to be instituted for accurate needle position
- In experienced Hands, the results are satisfactory with minimal complications



Conclusions



Conclusion: Lumbar medial branch neurotomy by means of RFD is an effective and safe procedure in reducing chronic back pain in patients with facet joint syndrome



Thank you