Lumbar & Cervical Disc Herniation

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Lumbar Disc Pathology

- Disc Degeneration: Desiccation, narrowing of the disc space, annular tears, osteophytes

- Disc Bulge: Generalized displacement (>50% of the circumference) of the disc

- Disc Herniation: Localized displacement (<50%) of the disc. There are several types:

Lumbar Disc Herniation
Types of Disc Herniation

- Focal: (<25% of the circumference)
- Broad Based: (25-50%)
- Protrusion: Herniated fragment has no narrow neck
- Extrusion: Herniated fragment has a narrow neck
  - Migration: Extruded disc fragment might displace up or down
- Sequestration: Free disc fragment
- Intravertebral disc herniation (Schmorl's node)

Red Flags in Low Back Pain
(need special diagnostic tests)

Condition	Red Flags
Cancer or Infection	Old age, weight loss, UTI, fever, immunosuppression, IV drug abuse, pain not improving with rest
Spinal #	H/O trauma, On steroids, > 70 yrs.
Cauda Equina Syndrome	Acute urine retention, loss of anal tone, saddle anesthesia, Progressive LL weakness

When Red Flags excluded

Patients without Red Flags can be observed for ≈ 4 weeks before special diagnostic tests as most of them will improve

(Symptomatic treatment with analgesics can be given during that period)

Clinical Picture

- Low Back Pain: (disc degeneration, bulge)

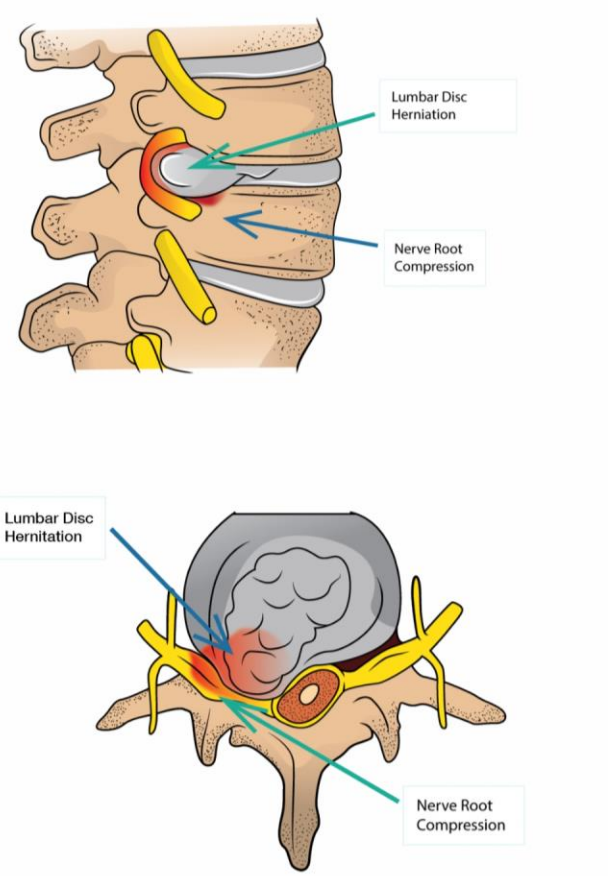
- Radiculopathy: (herniated disc compressing the nerve root)
  - Sensory (sciatica, sensory loss)
  - Motor weakness
  - Reflex (hypo or areflexia)

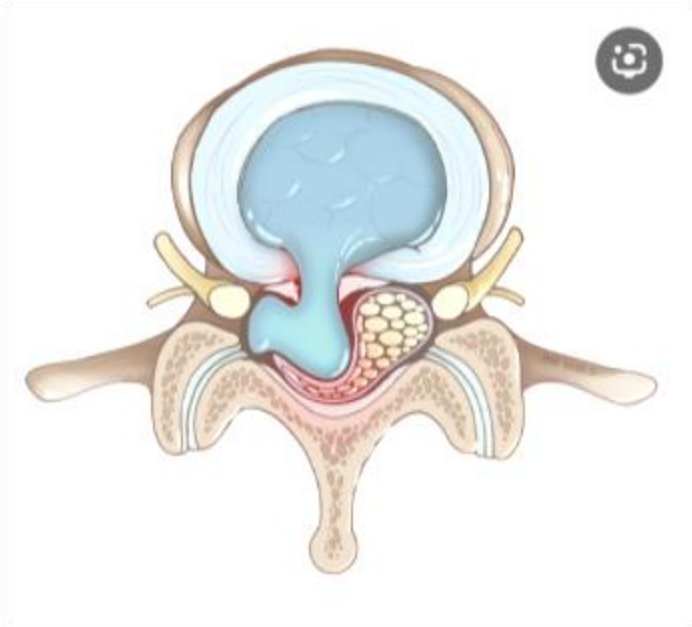
- Cauda Equina Syndrome: (In large central disc). See later

Radicular pain (Sciatica)

- Dermatomal distribution
- Improves upon flexing the knee & thigh
- Increases with cough & straining
- Positive nerve root tension sign (Lasegue’s sign or straight leg raising - SLR)

Lumbar Disc Herniation





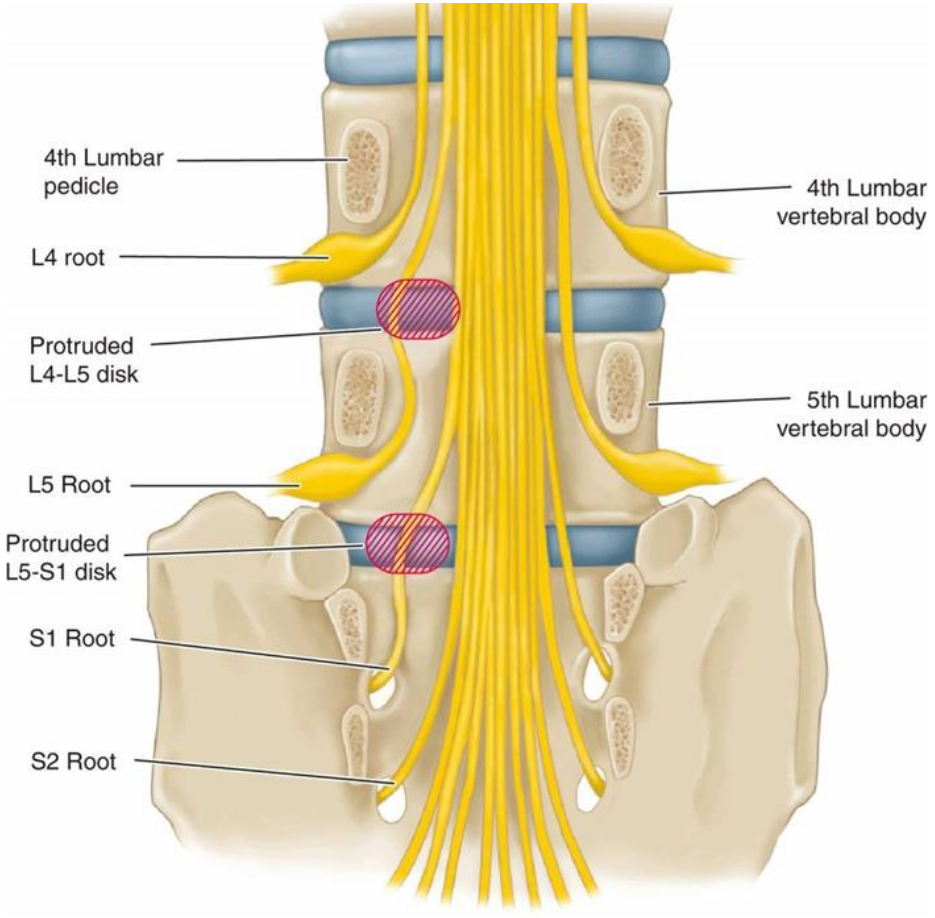
Lumbar Disc Herniation Facts

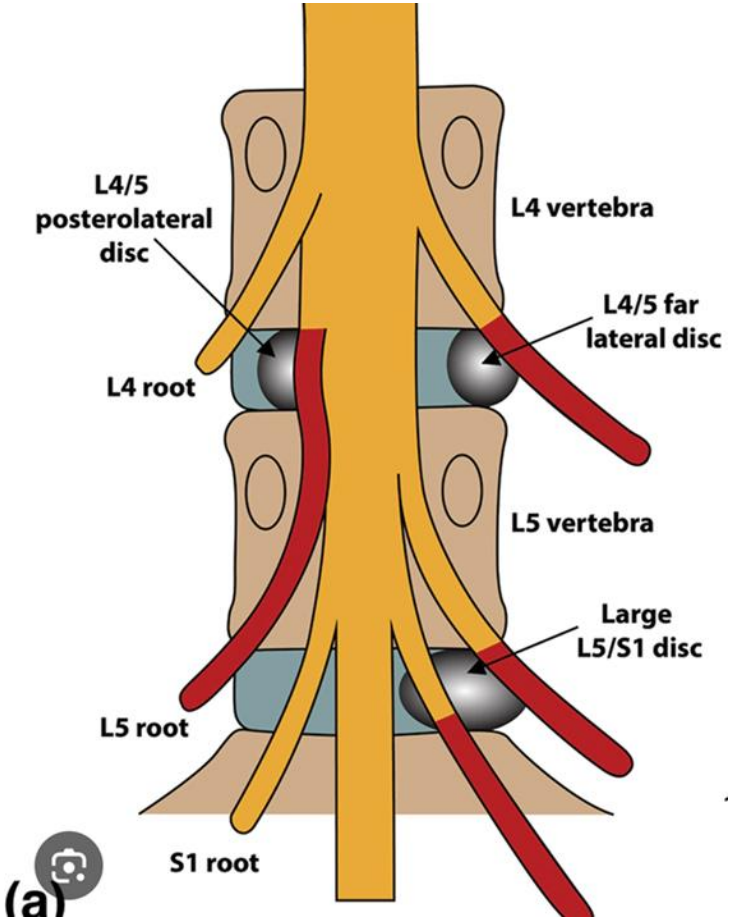
- In the L-spine, the nerve root exits below the pedicle of the like-numbered vertebra

- The intervertebral disc space is below to the inferior portion of the pedicle & the root exiting under it, so the exiting root usually is not compressed, but the one below it (traversing root)

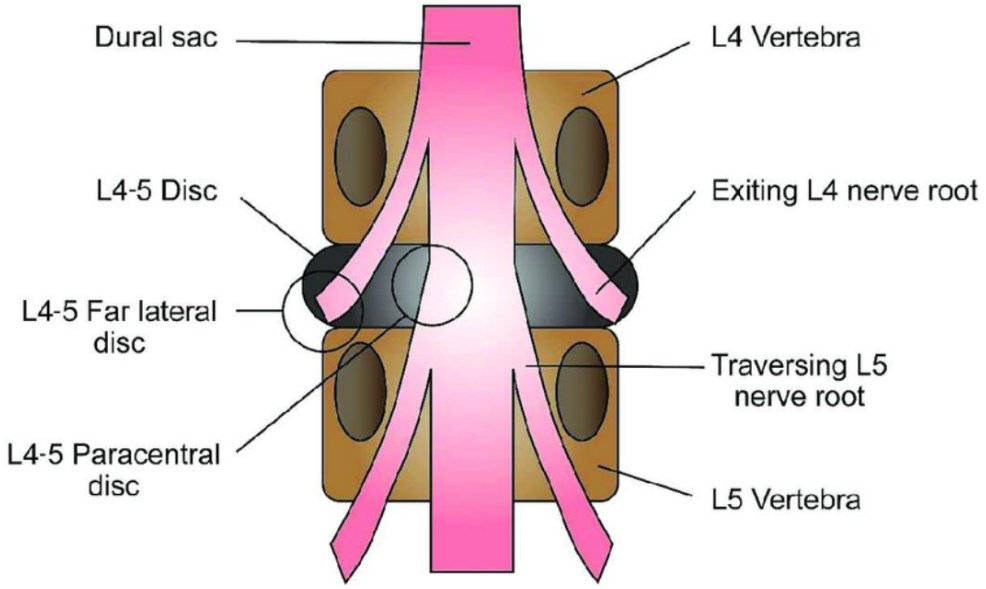
- For example: L4-L5 disc herniation will compress the L5 root & so on.

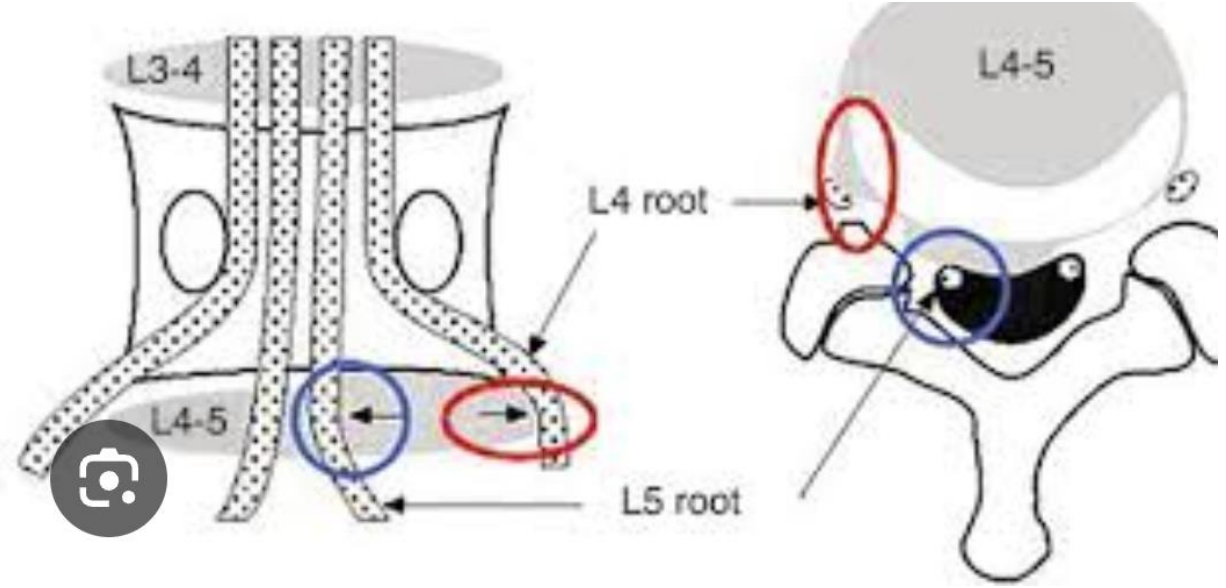
Lumbar Disc Herniation





Lumbar Disc Herniation





Lumbar Disc Syndromes

	Level		
	L3-4	L4-5	L5-S1
Root	L4	L5	S1
%	5%	45%	50%
Reflex	Knee	-	Ankle
Weakness	Knee ext.	EHL, ankle drosiflexion	Ankle platarflexion
Hypesthesia	Medial malleolus	1st & 2d toe web space	Lateral malleolus
Pain	Ant. thigh	Post LL	Post LL to the ankle

Radiographic Evaluation

- Myelography
- CT myelography
- CT
- MRI (The best)

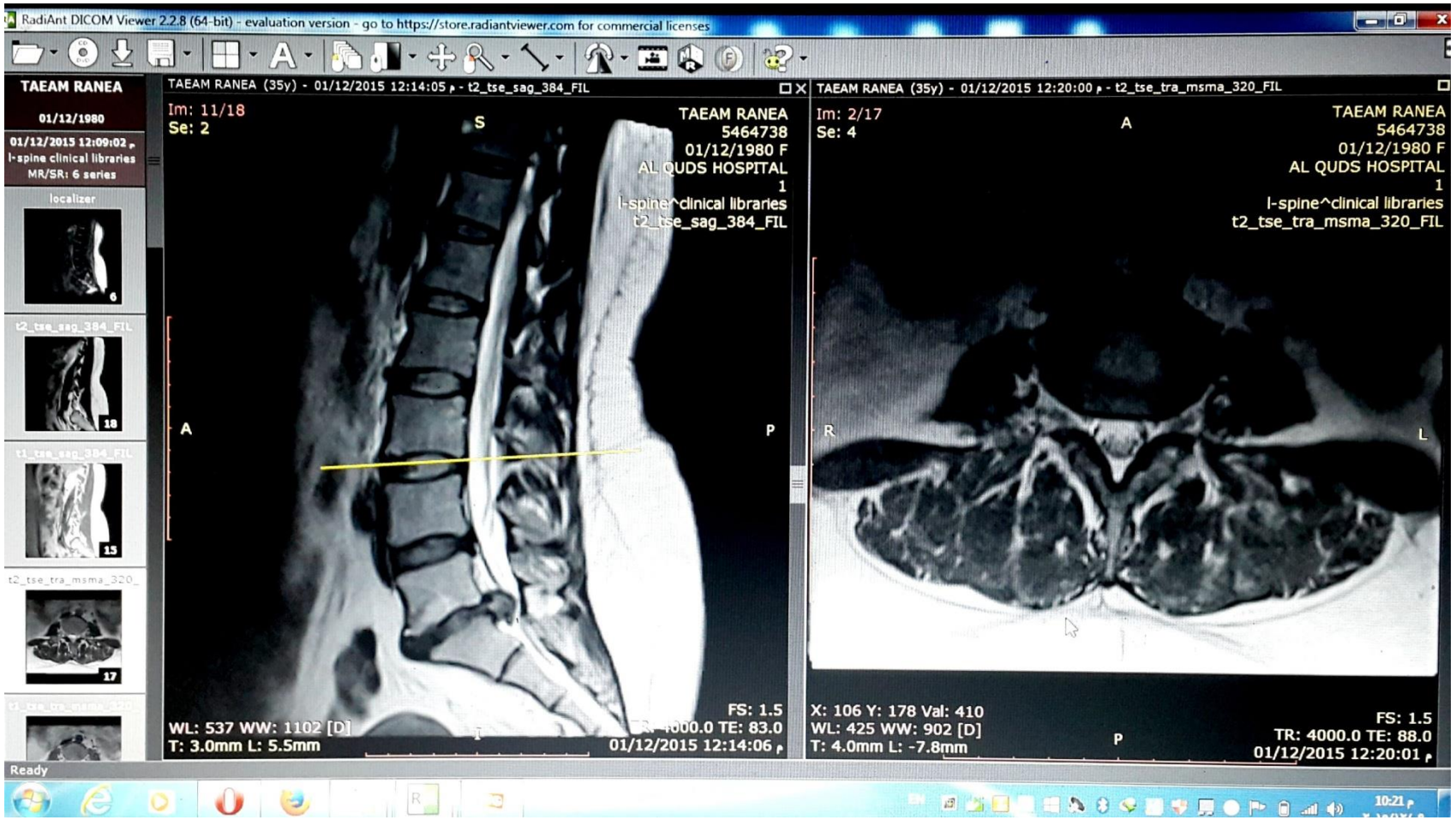
Advantages of MRI

- More sensitive & specific than CT or Myelography
- As sensitive & specific as CT myelography but less invasive
- Gives sagittal plane
- No radiation
- Best for far lateral disc herniation
- Best for previously operated disc pts.

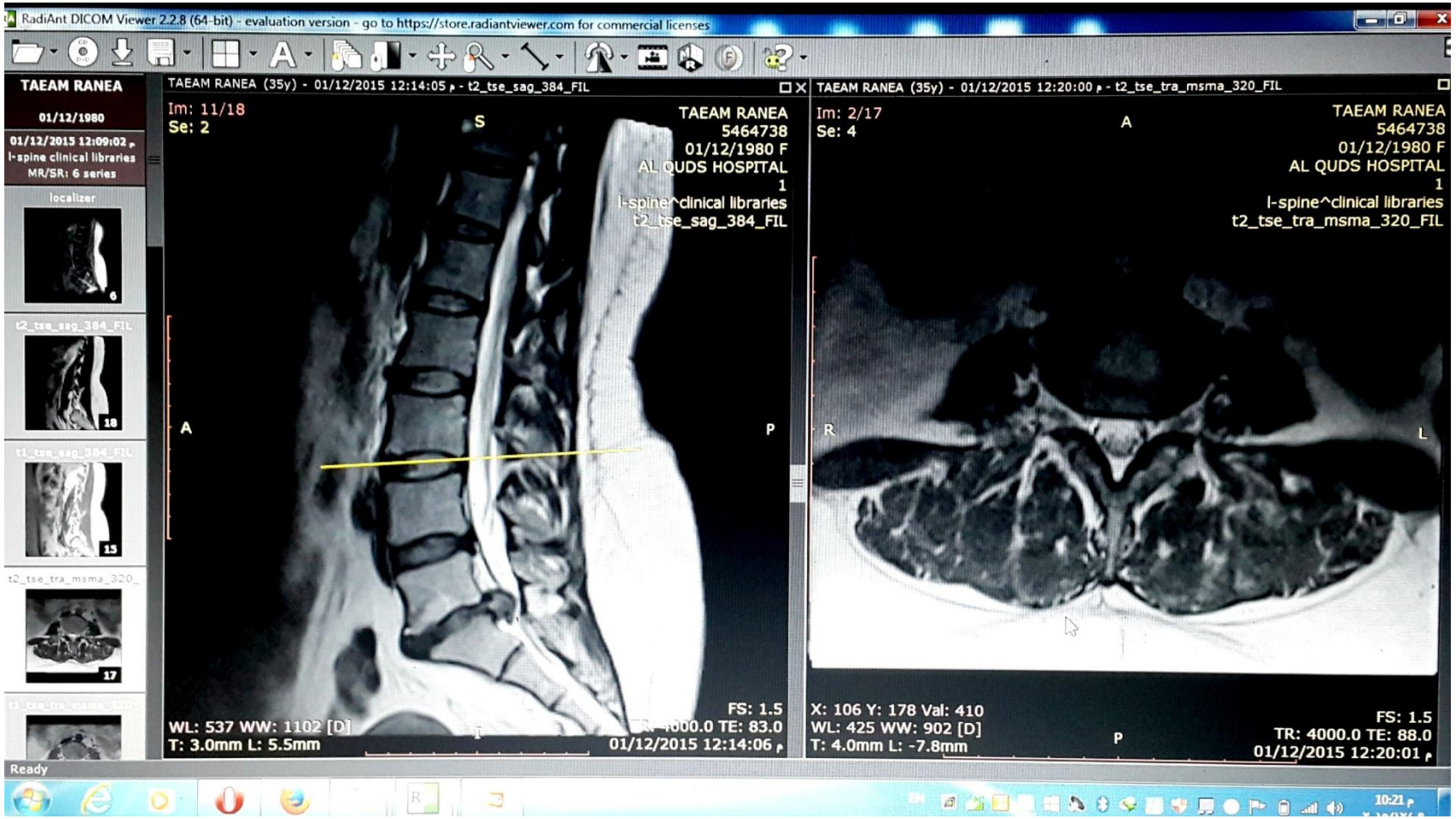
Disadvantages of MRI

- Movement artifacts (pain, claustrophobia)
- Slow
- Not good for bone
- Not good for acute blood
- Not easily available
- Expensive
- A number of contraindications

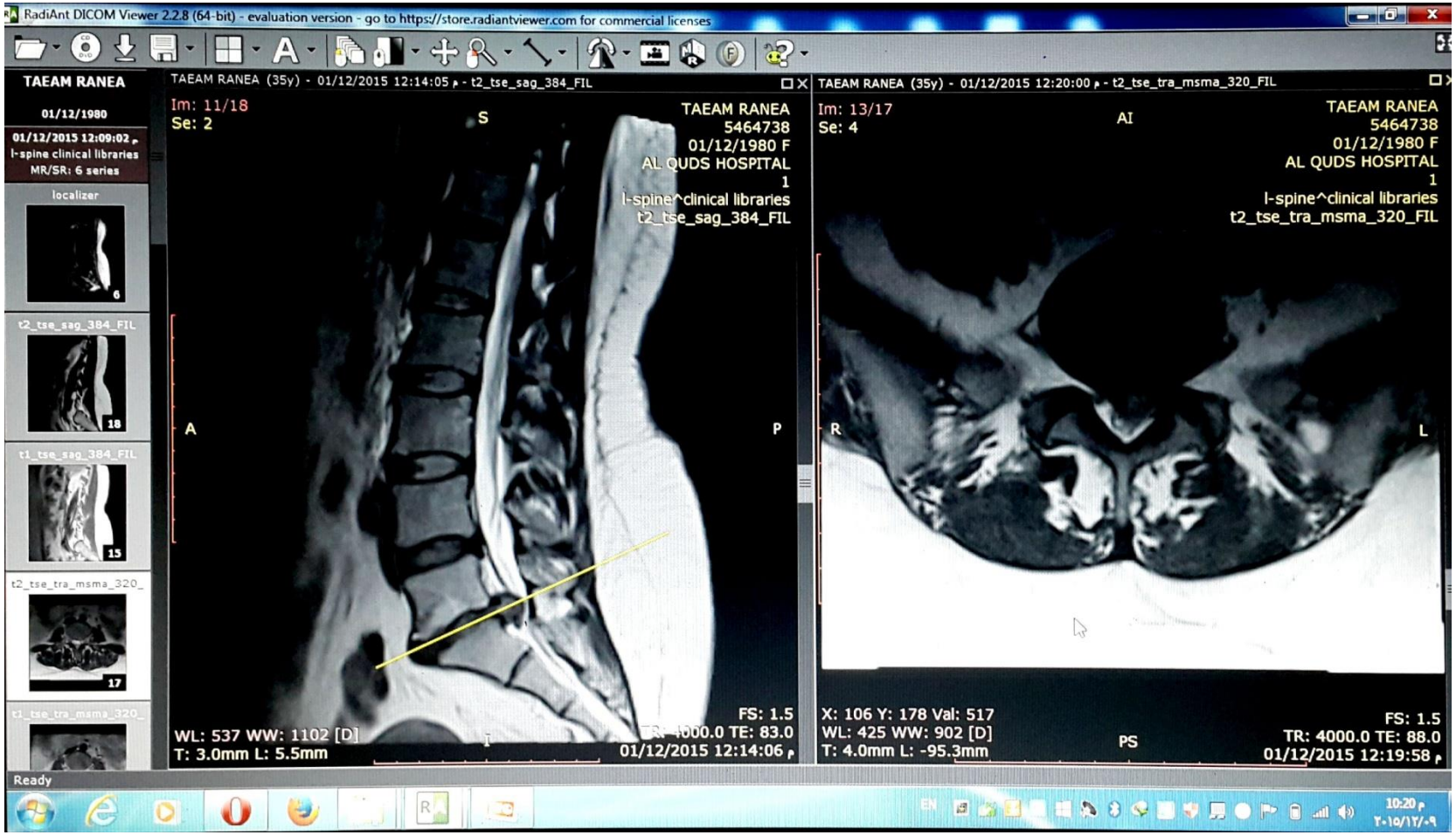
Is there a disc herniation?



Normal axial cut taken at L3-4 level, while the disc herniation is at L5-S1 level on Sagittal



Lt L5-S1 disc herniation



Huge central L4-5 disc H.

Pending CES







Treatment
Conservative

- Most surgeons will treat patients with acute radiculopathy from disc herniation conservatively for ≈ 6 weeks as long as no indication for emergent surgery & the pt is cooperative.

- 70% will improve in 4 weeks
- 85% will improve in 6 weeks

Treatment
Conservative

- Bed Rest: an option for severe radicular pain (Max. 3 days). Prolonged bed rest is worse (weakness, stiffness, more pain)

- Activity: The goal is to achieve tolerable level of discomfort while continuing sufficient physical activity. Avoid: Heavy lifting, Prolonged sitting, Bending the back

Treatment
Conservative

- Exercise:
  - 1st 4 weeks: low stress exercises: walking, swimming
  - Later: exercises for trunk muscles
- Analgesics:
  - NSAIDs & Paracetamol
  - Opioids may be used for very severe pain for short period
- Education:
  - Explanation of the condition to the pt
  - Proper posture, sleeping positions, lifting techniques

Surgical Treatment
Indications

- Failure of conservative treatment for 6 weeks
- Indications for emergency surgery (at any time)
- +/- The pt doesn't want to invest time trying conservative treatment, if it is possible that he will still require surgery at the end of trial

Surgical Treatment
Indications for emergency surgery

- Cauda Equina Syndrome (CES)

  (usually huge central disc)

  (seen in 1-2% of herniated discs coming to surgery)

- Acute or Progressive motor deficit

- Intolerable pain in spite of adequate narcotic pain medication

Cauda Equina Syndrome (CES)

- Sphincter disturbance
- Saddle anesthesia
- Significant motor weakness (bilateral usually)
- Low back pain & sciatica (bilateral usually)
- Bilateral absence of Achilles reflex
- Sexual dysfunction

Surgical Options for HLD

- Standard open lumbar laminectomy & discectomy
- Microdiscectomy (using the microscope, less invasive, same efficacy, maybe more difficult)

Surgical Treatment

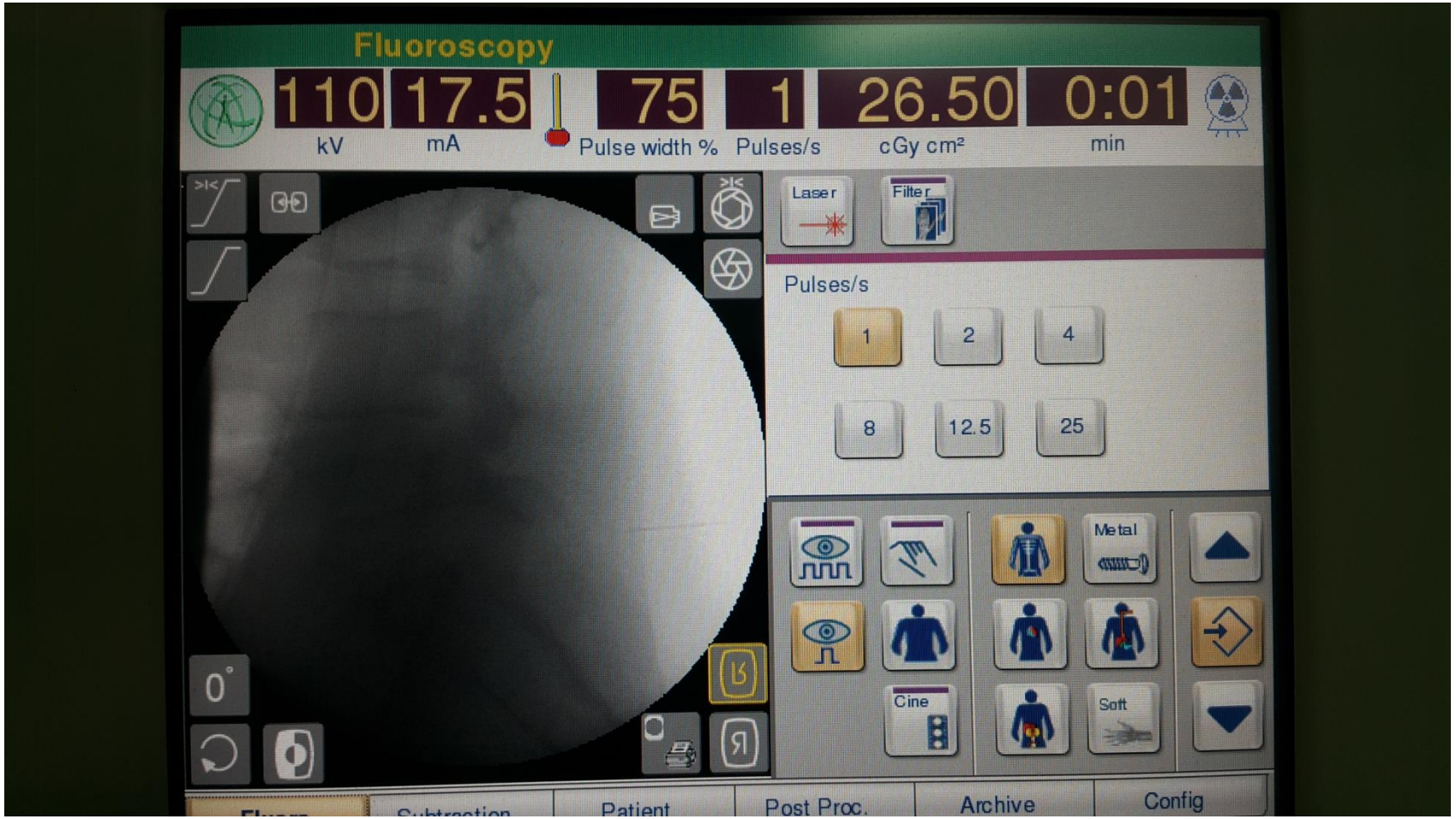
Prone position



X-ray level identification



L5-S1 level marked with a needle



Skin marking



Preop MRI & the removed disc





Postop Check

- Dressing (Blood, CSF)
- Motor Power (relevant to the root)
- Sings of CES

Surgical Treatment
Possible complications - Common

- Infection 1-5%
- Root injury ≈ 5%
- Unintended durotomy with CSF leak ≈ 6% (Higher in redo surgeries – up to 18%)
- Recurrent disc (same level in 6%)
- Missed disc fragment (gives no adequate pain relief)

➢ Back pain will not respond well to surgery as root pain!

Surgical Treatment

Complications - Uncommon

- Injury to structures anterior to vertebral bodies (great vessels, ureters, bowel)

  → Don’t go deeper than 3cm!
- Wrong site surgery → 4.5/10000
- CES (postop spinal EDH) → 0.21%
- Postop visual loss (↑Blood loss, ↑Duration)
- Complications of positioning (neuropathies, eyes, C-spine)

Outcome of Surgical Treatment

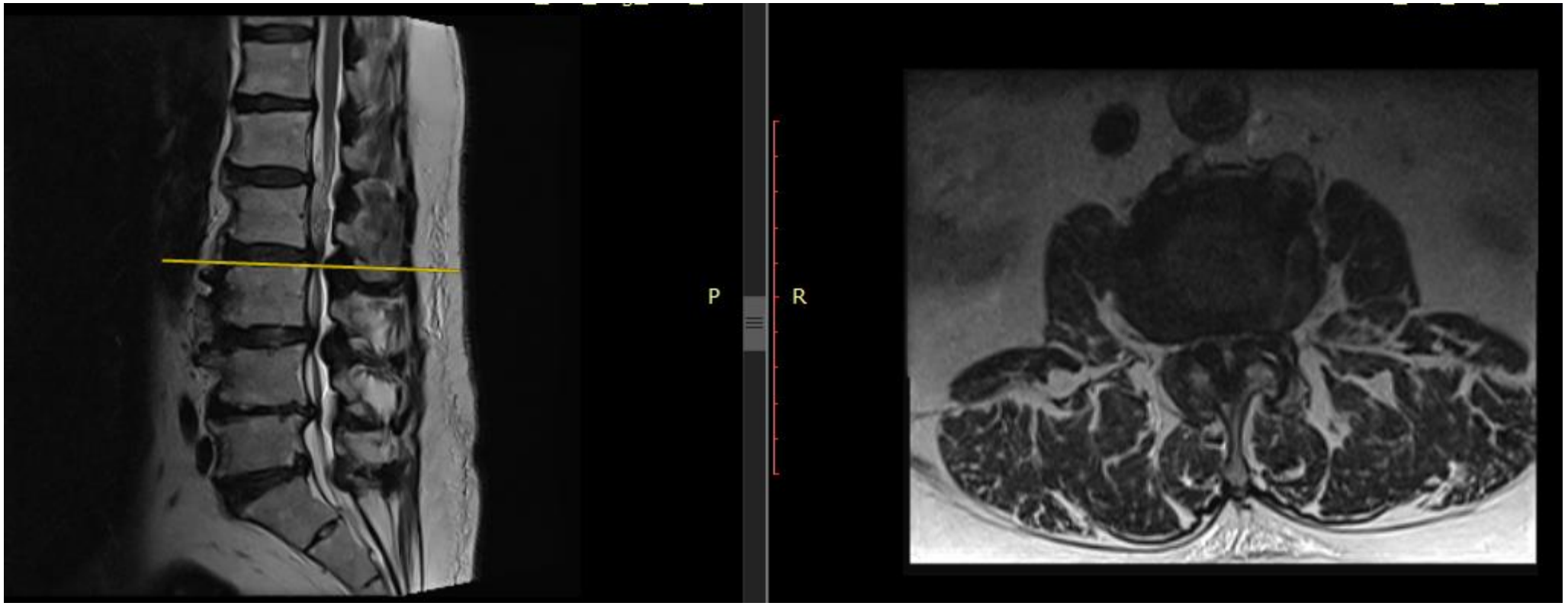
- At 1 yr.
  - 73% had complete relief of leg pain
  - 63% had complete relief of back pain

- At 5-10 yrs.
  - The numbers were 62% for each category
  - 86% were better than preop

Lumbar Stenosis



Lumbar Stenosis

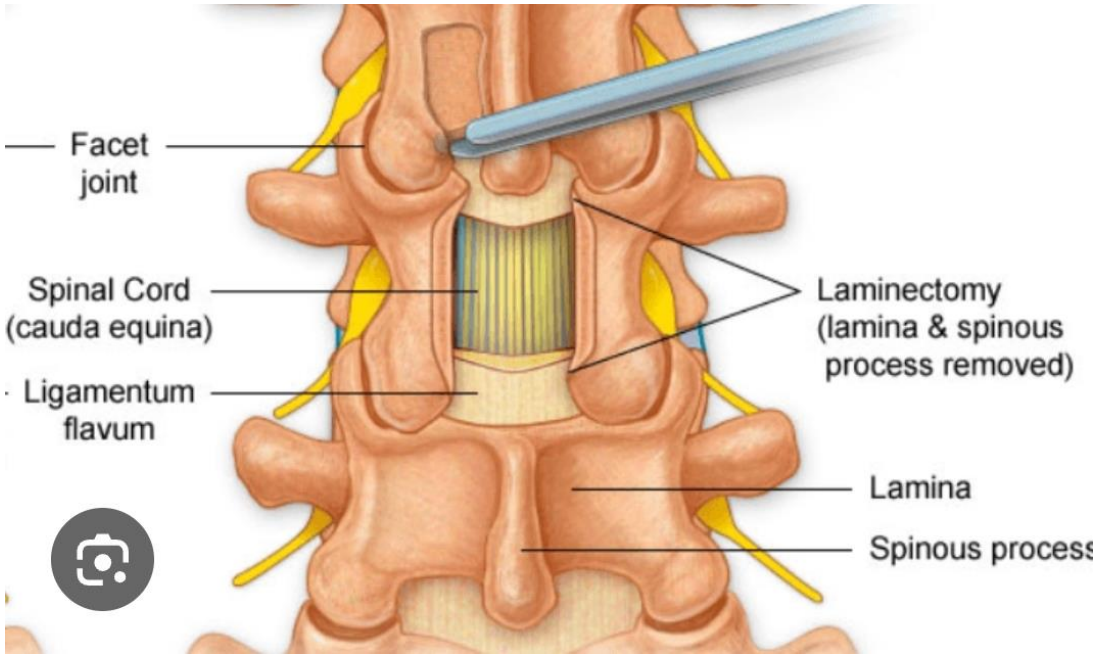


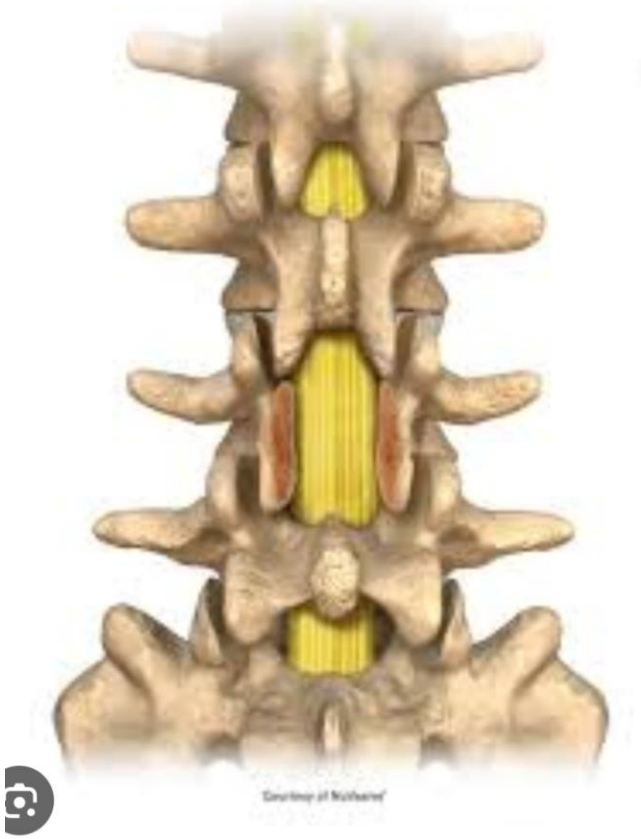
Lumbar Stenosis



Lumbar Stenosis

Treatment - Laminectomy





Routine Postop Rehabilitation

- Ambulation: 8hrs postop
- Exercises: the day after surg
- Sitting: Avoid prolonged sitting
- Bracing: generally not needed
- Driving: 2 wks.
- Lifting: < 10 kg for 4-6 wks.
- Back to work: 6 wks. (light: 4 wks., hard: 8-12)
- Back to sport: 10 wks.

➢ Remain mobile, return to full activities & work quickly

Any exceptions or deviation from that rehab protocol?

This should be clearly instructed by the surgeon!

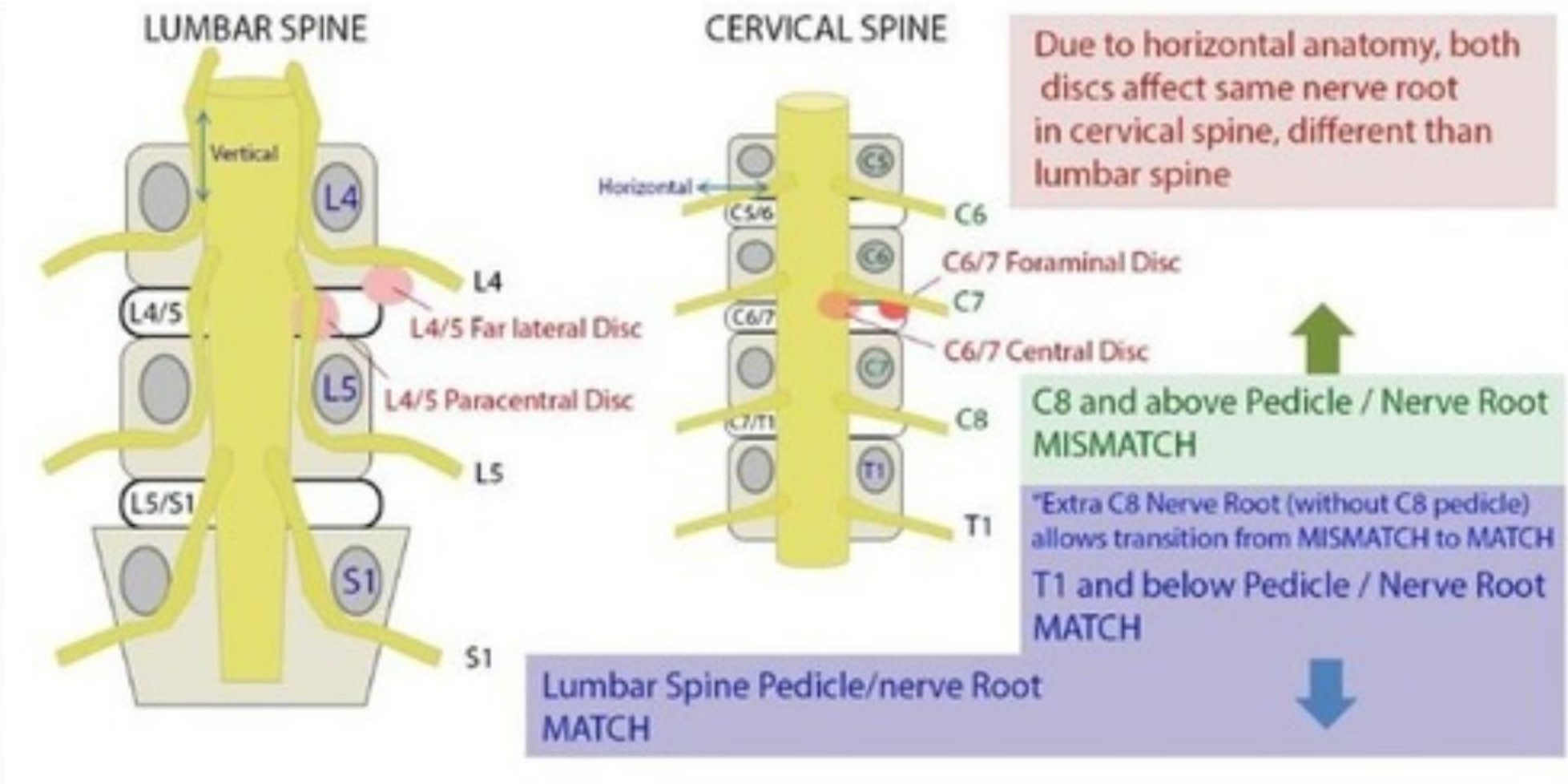
For example:

- Prolonged bed rest in case of dural tear
- Brace in case of instability

Cervical Disc Herniation Facts

- In the C-spine, the nerve root exits above the pedicle of the like-numbered vertebra
- The intervertebral disc space is close to the inferior portion of the pedicle & the root exiting under it.
- For example: C5-C6 disc herniation will compress the C6 root & so on.

Cervical Disc Herniation

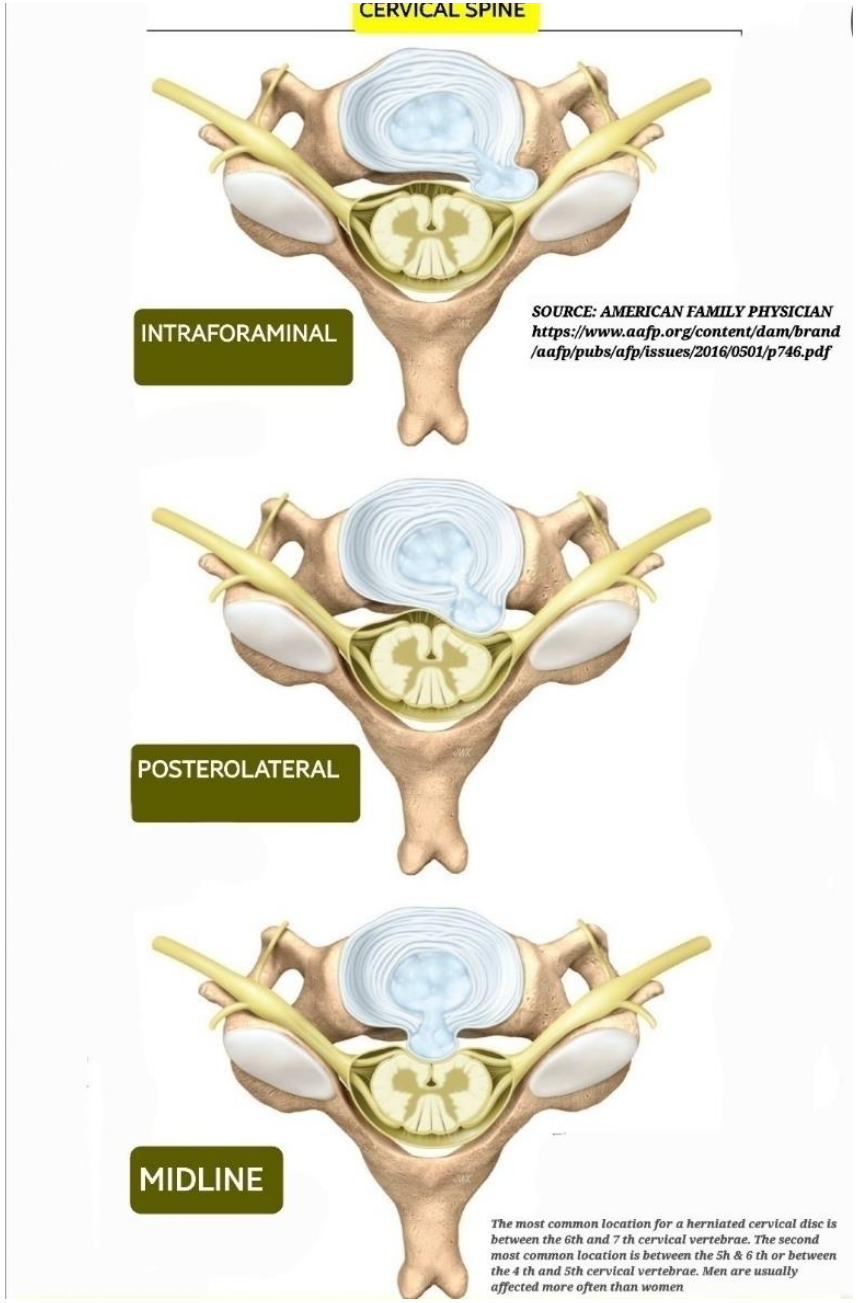


Cervical Disc Syndromes

	Level of herniated cervical disc			
	C4-C5	C5-C6	C6-C7	C7-T1
%	2%	19%	69%	10%
Root	C5	C6	C7	C8
Reflex	Biceps	Brachioradialis	Triceps	---
Motor	Deltoid	Forearm flexion	Forearm ext.	Finger flexion
Hypesthesia	Shoulder	Thumb	Fingers 2,3	Fingers 4,5

Clinical Picture

- Neck pain
- Radiculopathy (lateral disc)
- Myelopathy (central disc)



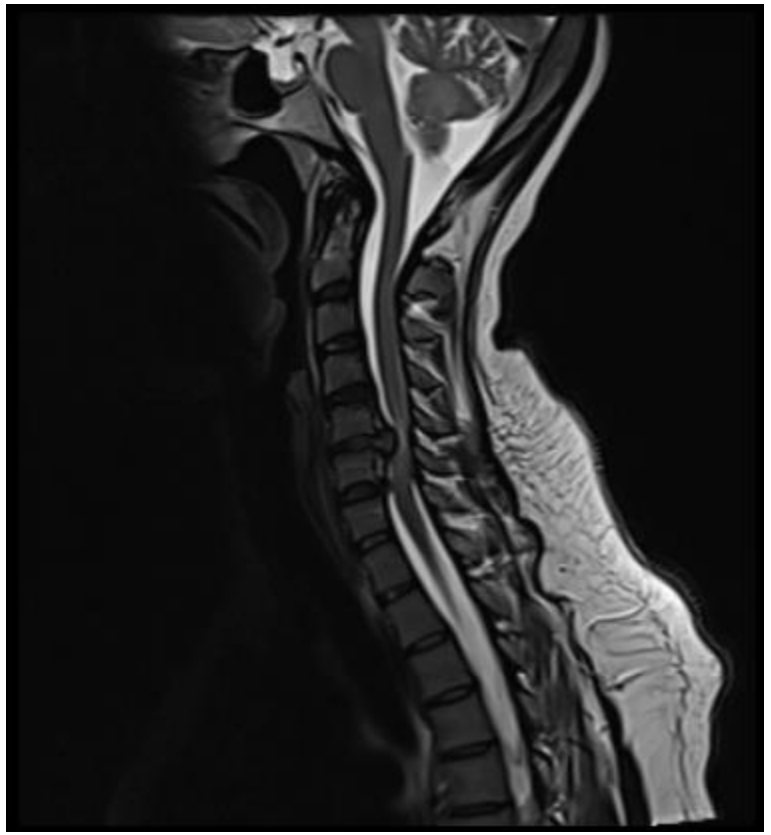
Clinical Signs

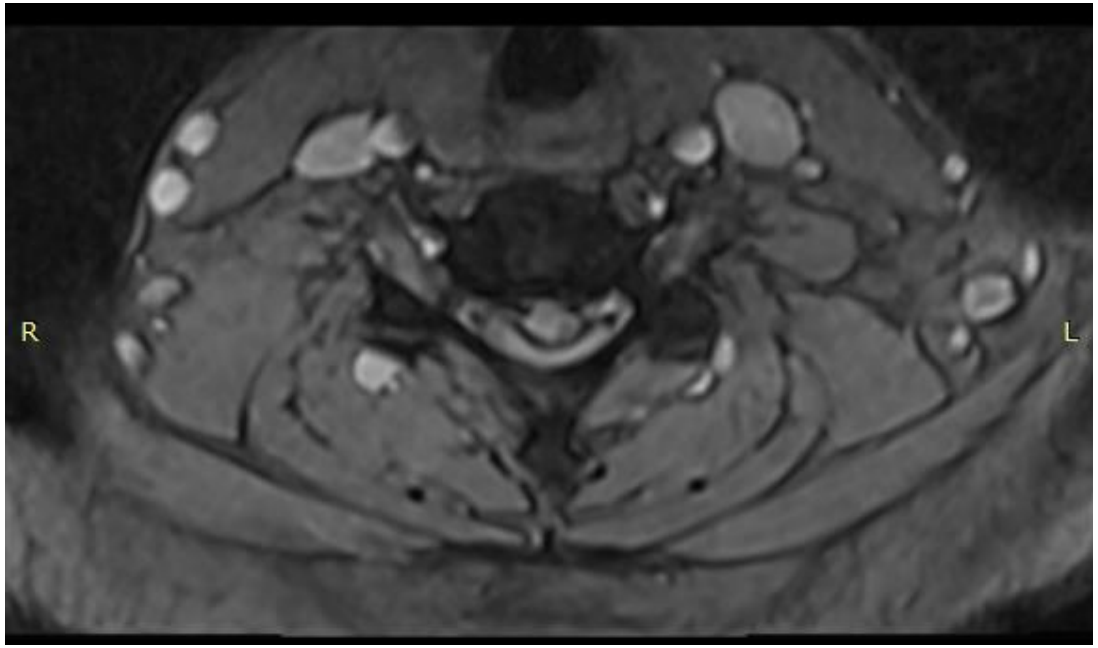
- Painful limitation of neck motion
- Extension usually aggravates the pain
- Abduction relief sign (Shoulder)
- Spurling’s sign
- Axial manual traction
- ± Lhermitte’s sign
- ± Myelopathy (UMN lesion in both LL)

Evaluation

- MRI (good, noninvasive)
- Myelo CT (good, invasive)
- Plain CT (poor, esp. at lower cervical discs)

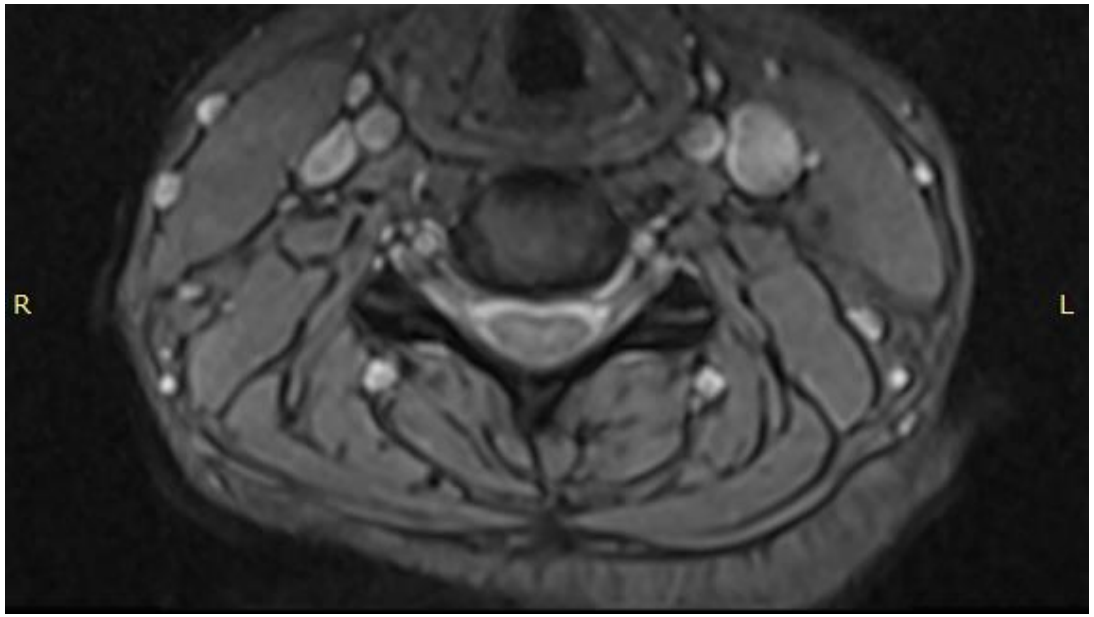
MRI



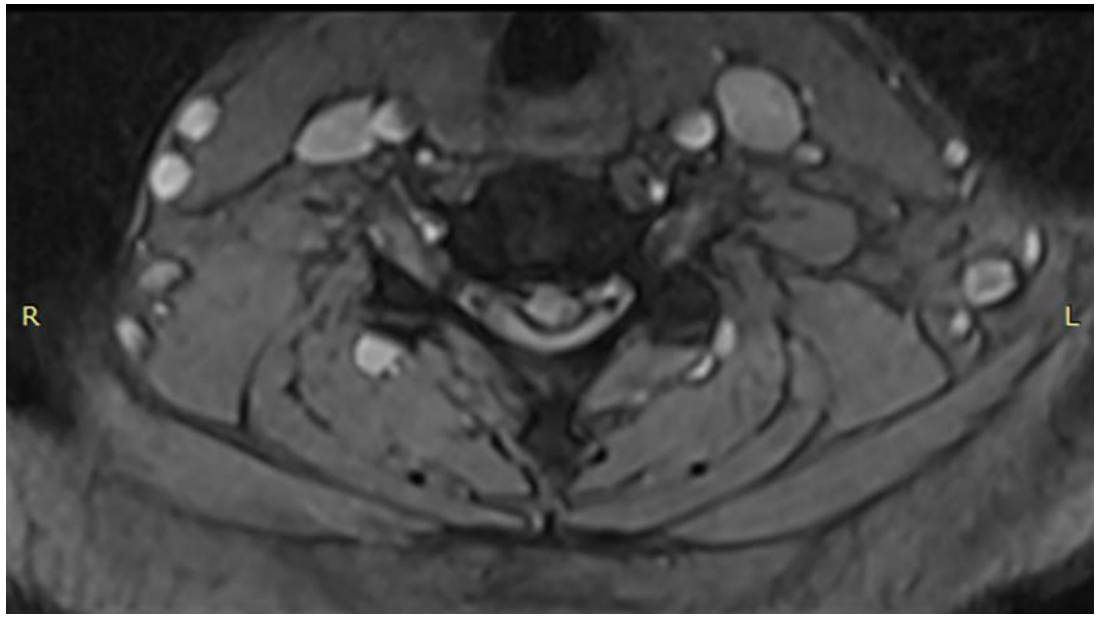


MRI

Normal axial cut



Axial cut with disc herniation



MRI


Im: 6/9
Se: 301
S
955255443
01-06-1964 M
European Gaza Hospital
620401974
CS
T2W_TSE
A
P
FS: 1.5
WL: 1037 WW: 1802 [D]
I
T: 4.0mm L: 6.2mm*
02-09-2019 1:54:54 PM


Im: 2/20
Se: 502
A
955255443
01-06-1964 M
European Gaza Hospital
620401974
CS
smFFE
R
L
FS: 1.5
WL: 2048 WW: 4095 [D]
P
L: -2.6mm*
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Which investigation is this?



Treatment
Conservative

> 90% of cervical discogenic radiculopathy will improve with conservative treatment in few weeks

- Analgesics
- NSAIDs
- Sometimes short course of steroids
- Physiotherapy

Treatment
Surgical

Indications:

- Failure of conservative treatment

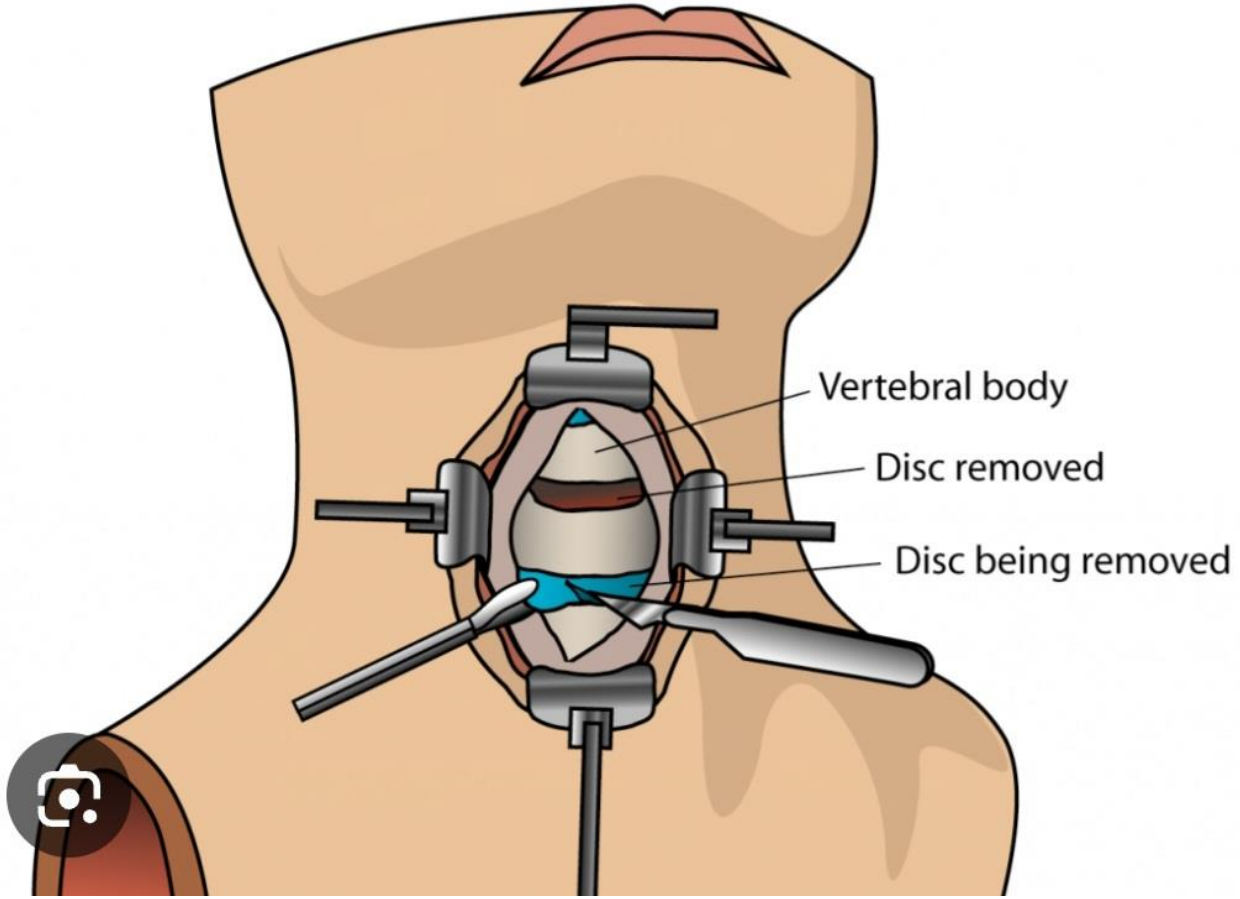
- Progressive neurodeficit while on conservative treatment

Surgical Treatment
Options

- Anterior approach:
  - Discectomy alone (ACD)
  - Discectomy + Fusion (ACDF)
    - Without plating
    - With plating
  - ACD + artificial disc (arthroplasty)

- Posterior approach:
  - Cervical Laminectomy
  - Keyhole Laminotomy

Anterior Cervical Discectomy



Advantages of anterior approach

- Safe removal of osteophytes
- Fusion
- The only approach for central disc

Disadvantages of anterior approach

- Adjacent level disease (if fusion is performed)
- In Multiple level ACDF, devascularization of the vertebral bodies my occur

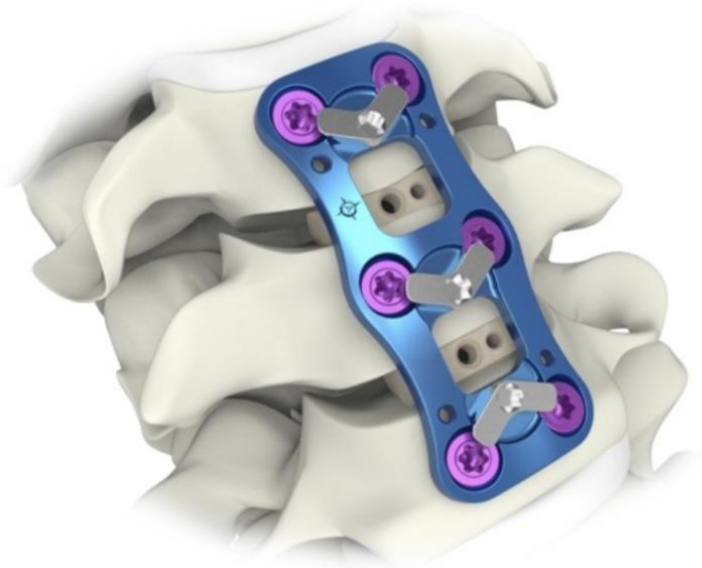
Post op check

- Hematoma (surgical site)
  - Resp. Distress
  - Swallowing difficulty
  - Tracheal deviation
- Weakness (involved nerve root)
- Long tract signs
- Hoarseness

Complications of ACDF

- Exposure injuries (esophagus, trachea, RLN, carotid & vertebral arteries, thoracic duct, internal jugular v., CSF fistula, Horner syndr.)
- Cord or root injuries
- Fusion problems (failure, extrusion, donor site complications)
- Others (hematoma, infection, dysphagia, hoarseness, adj. level degeneration)

Anterior cervical plating





Artificial Disc





Posterior cervical decompression

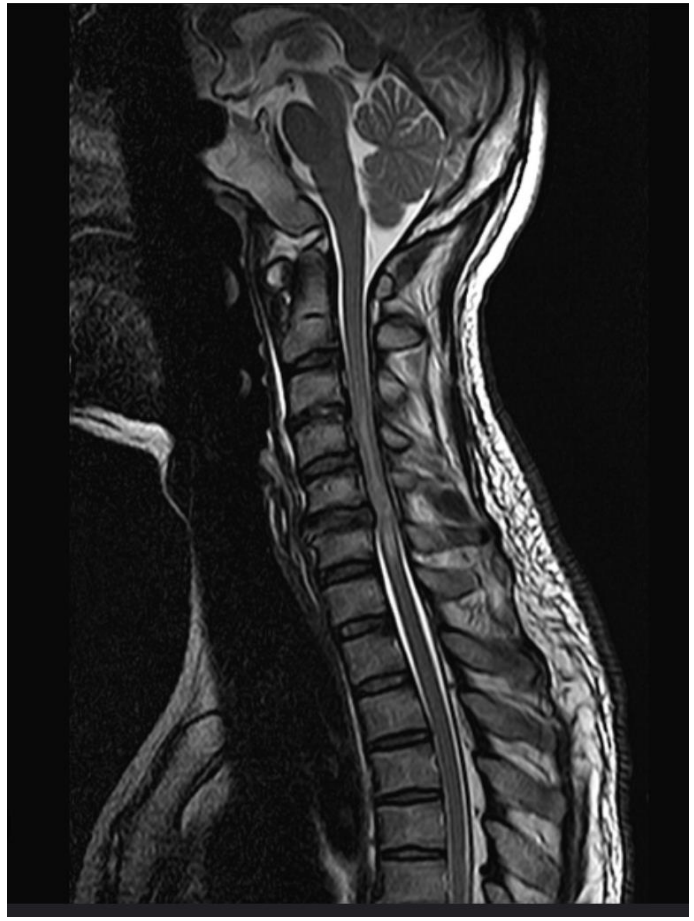
Cervical laminectomy

Indications:

- Multiple cervical discs (≥ 3)
- Where is cervical stenosis in addition to the anterior pathology
- In professional speakers & singers (where is the 4% risk of permanent RLN damage with ACD is unacceptable

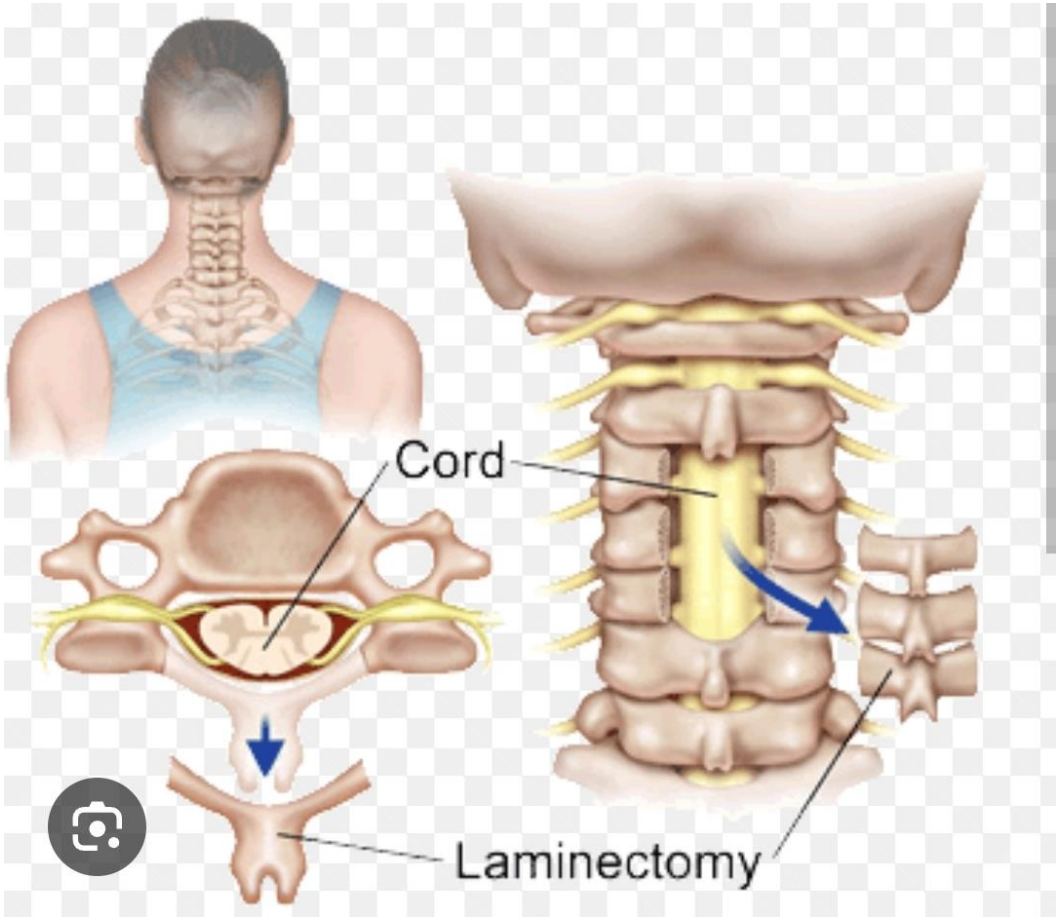
Cervical stenosis





Posterior cervical decompression

Cervical laminectomy



Posterior Keyhole laminotomy

Indications:

- Monoradiculopathy with posterolateral soft disc herniation
- Professional speakers or singers (with lateral disc)
- For lower (C7,C8,T1) or upper (C3,C4) discogenic radiculopathy in a patient with a short neck (difficult ant. approach)

Thanks



Any Questions?