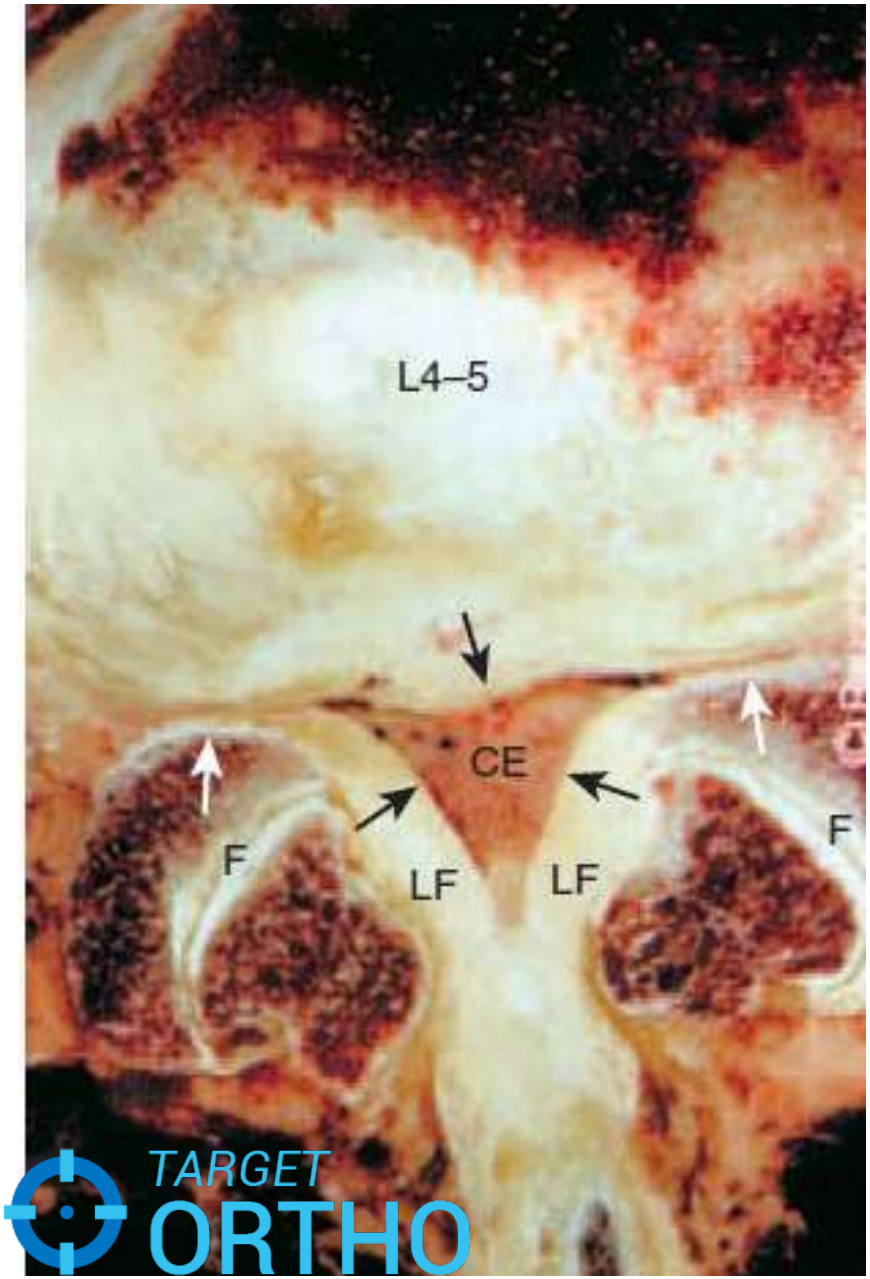
Lumbar canal stenosis

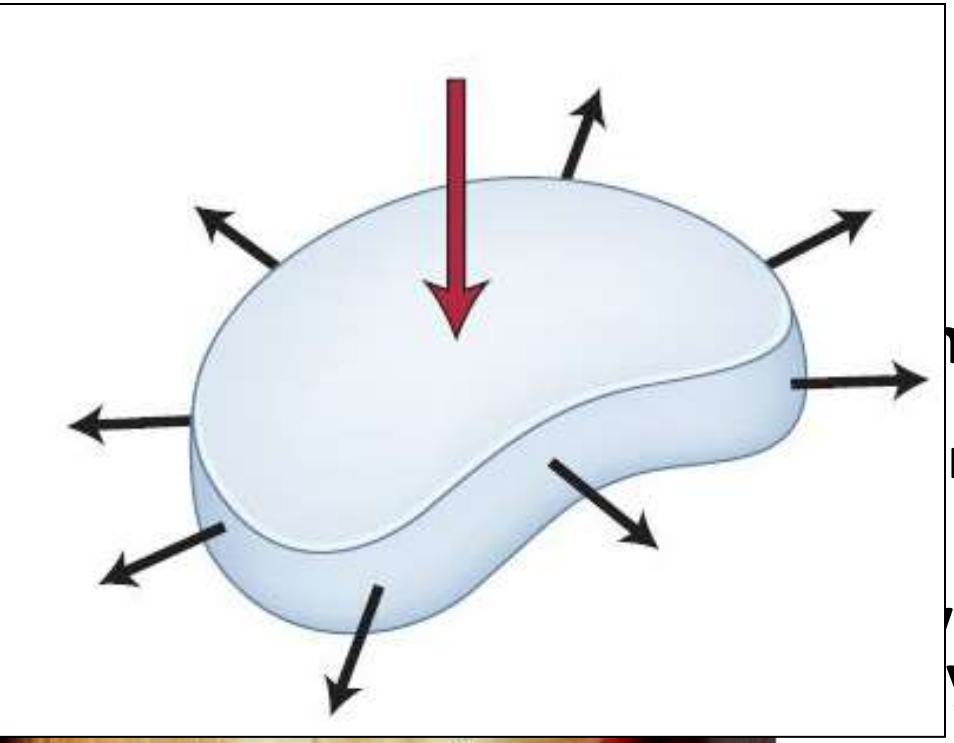
Lumbar spinal stenosis

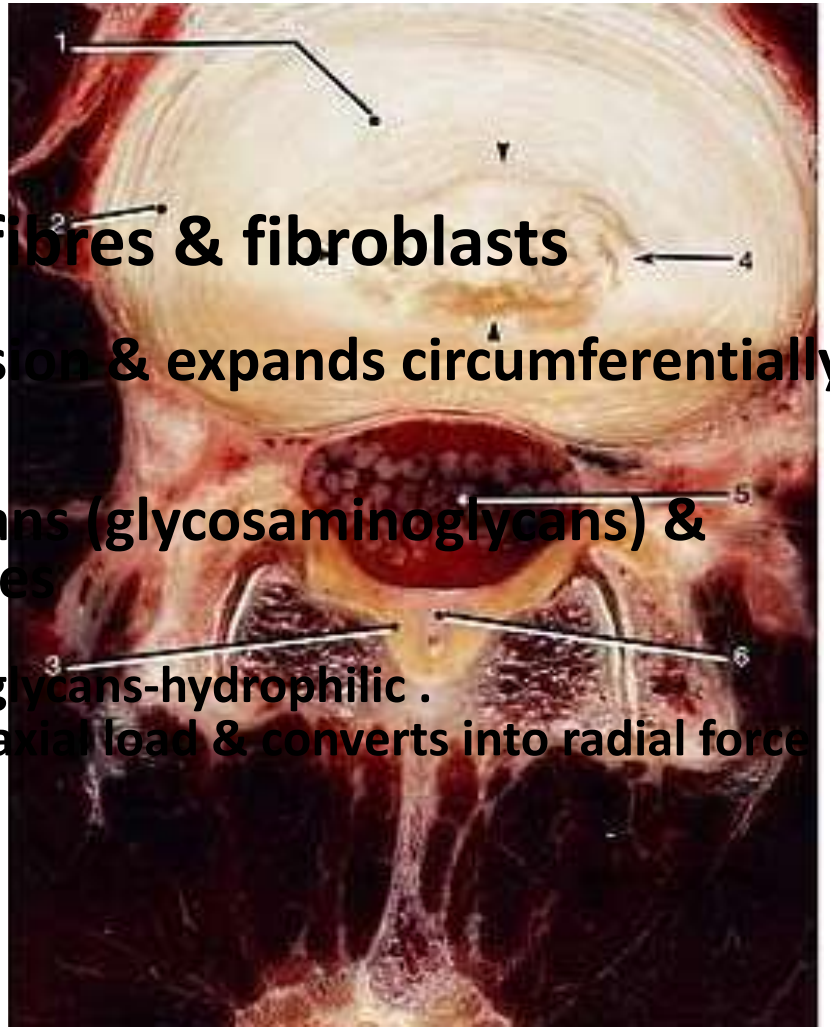


- Narrowing of the lumbar canal, causing compression of the dural sac and nerve roots

Classification

Congenital / developmental stenosis	Acquired stenosis
• *Idiopathic* • *Achondroplastic* – multiple level • Congenital rare, about 9% of patients.	• *Degenerative* – **M/C-L4-L5** followed by L5-S1/L3-L4 Age 50s and 60s. • *Metabolic* – pagets disease fluorosis





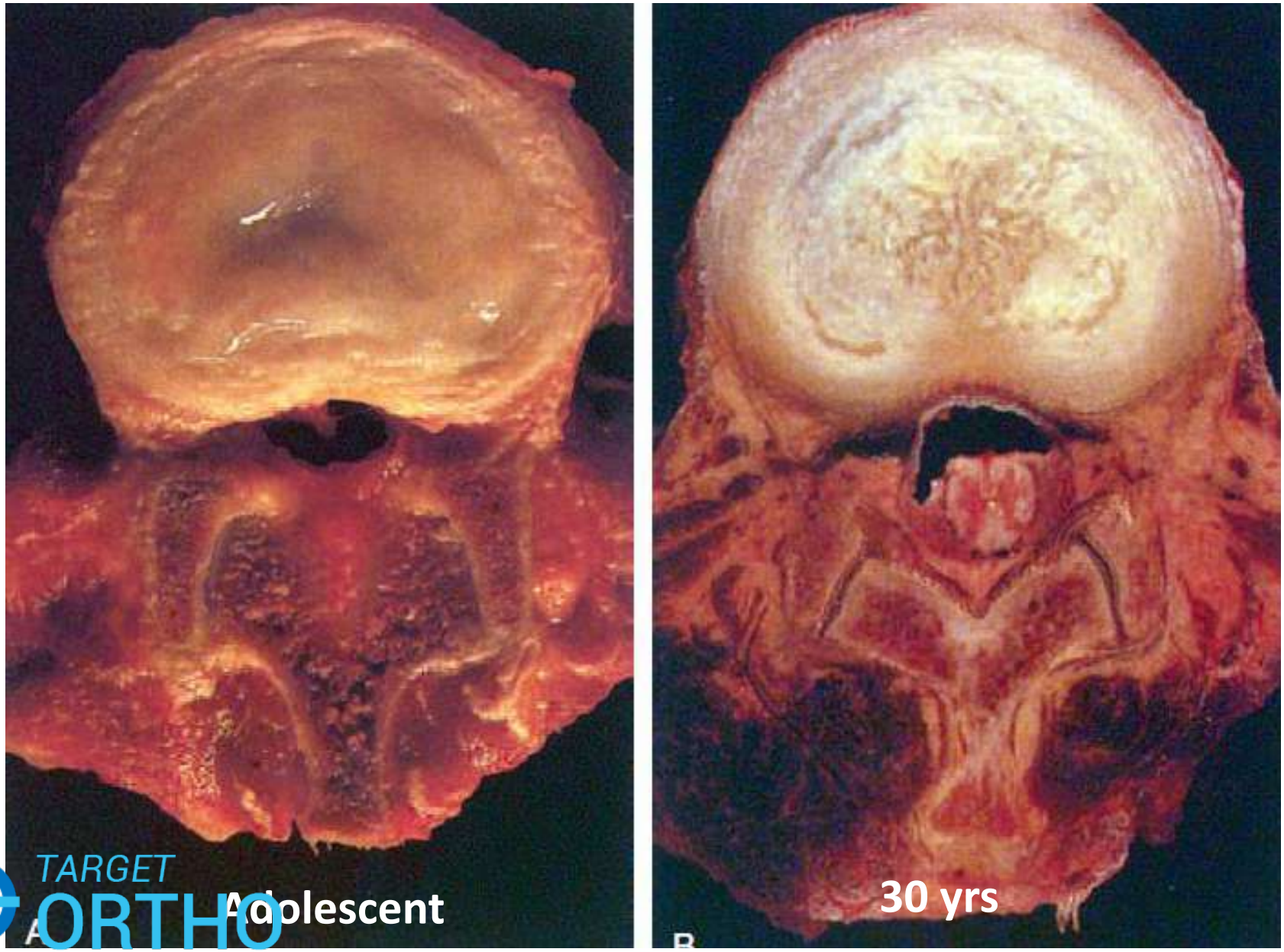
n fibres & fibroblasts

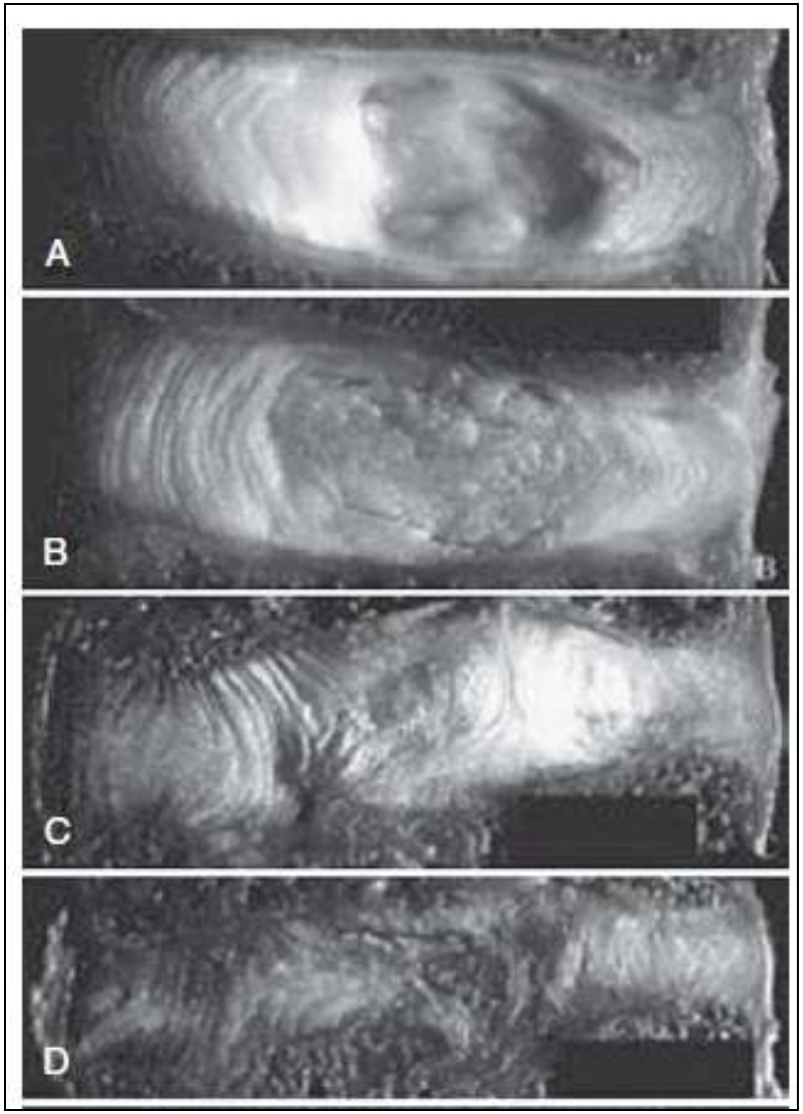
ns on & expands circumferentially

ycans (glycosaminoglycans) &
ytes

- Glycosaminoglycans-hydrophilic .
- Receives the axial load & converts into radial force

Disc degeneration





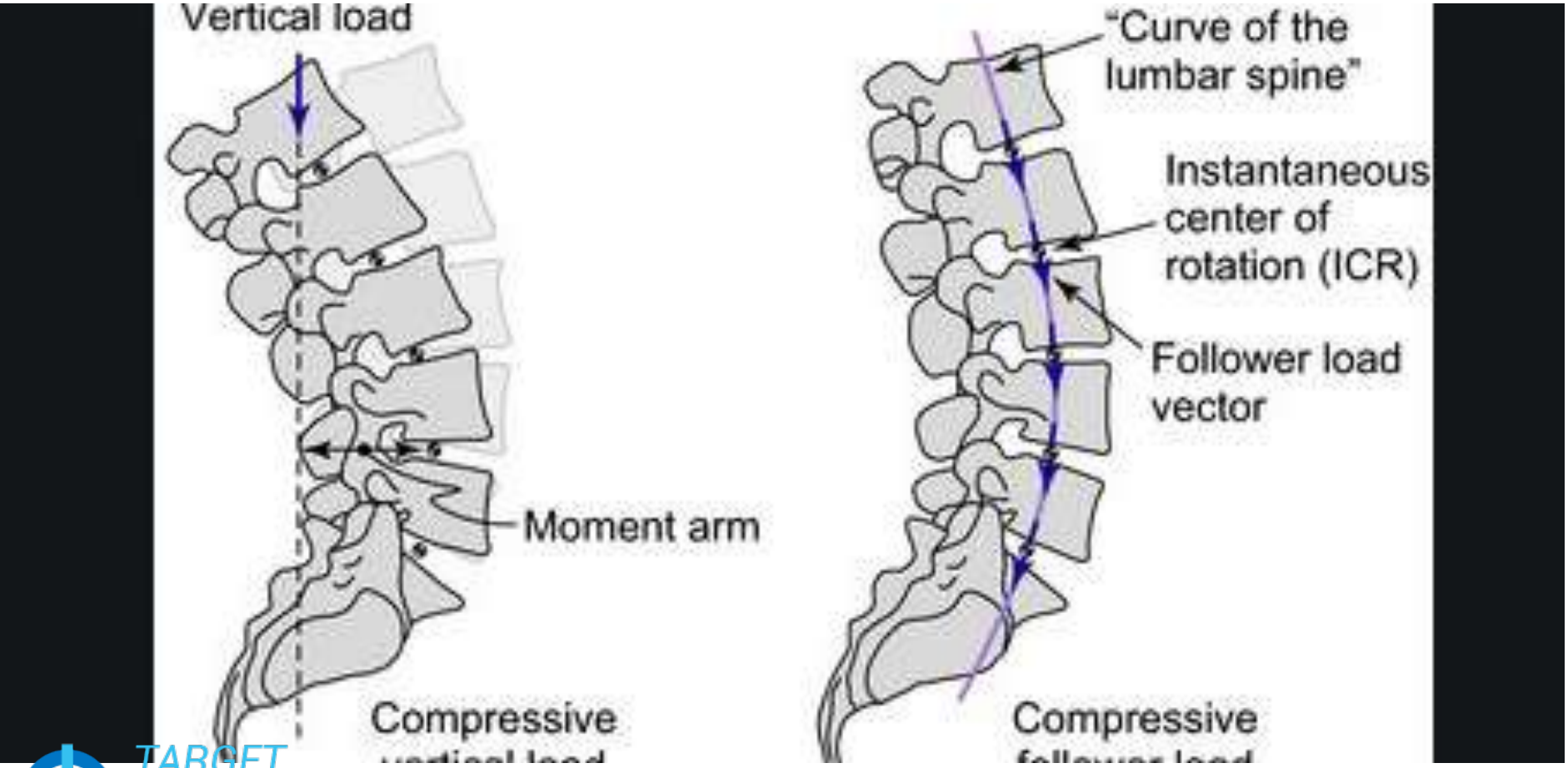
Young disc

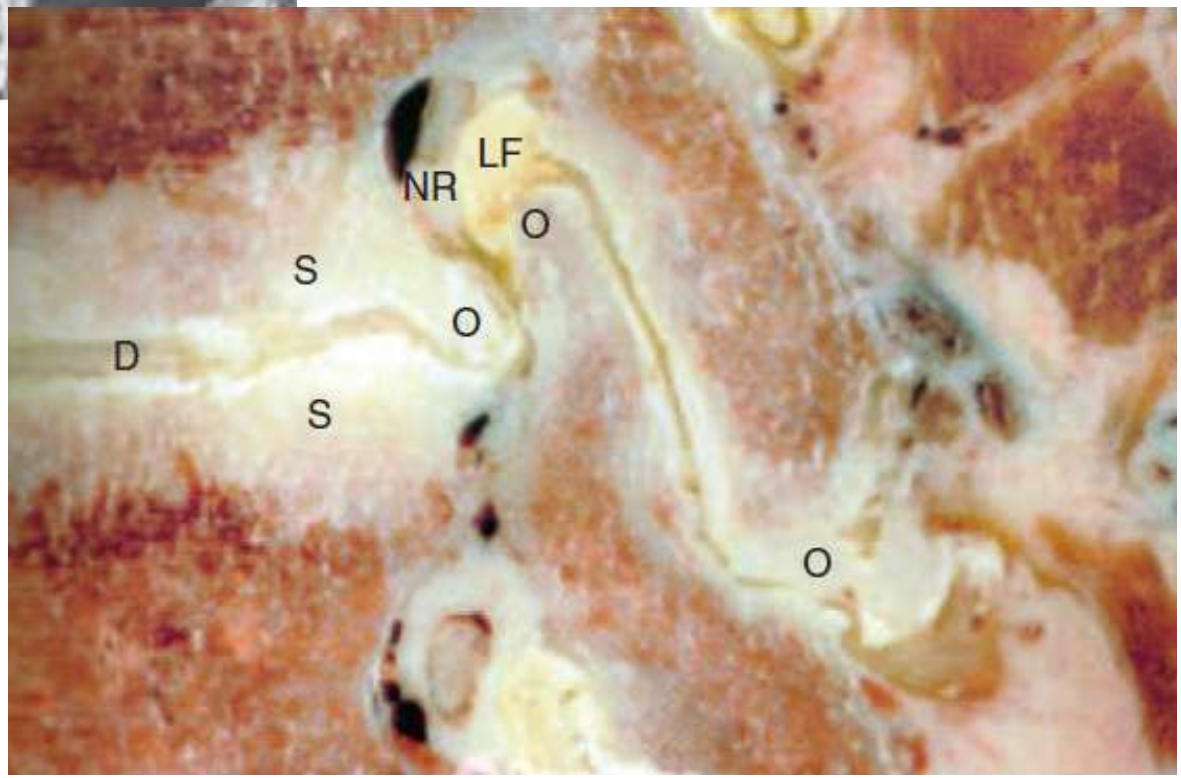
Mature disc

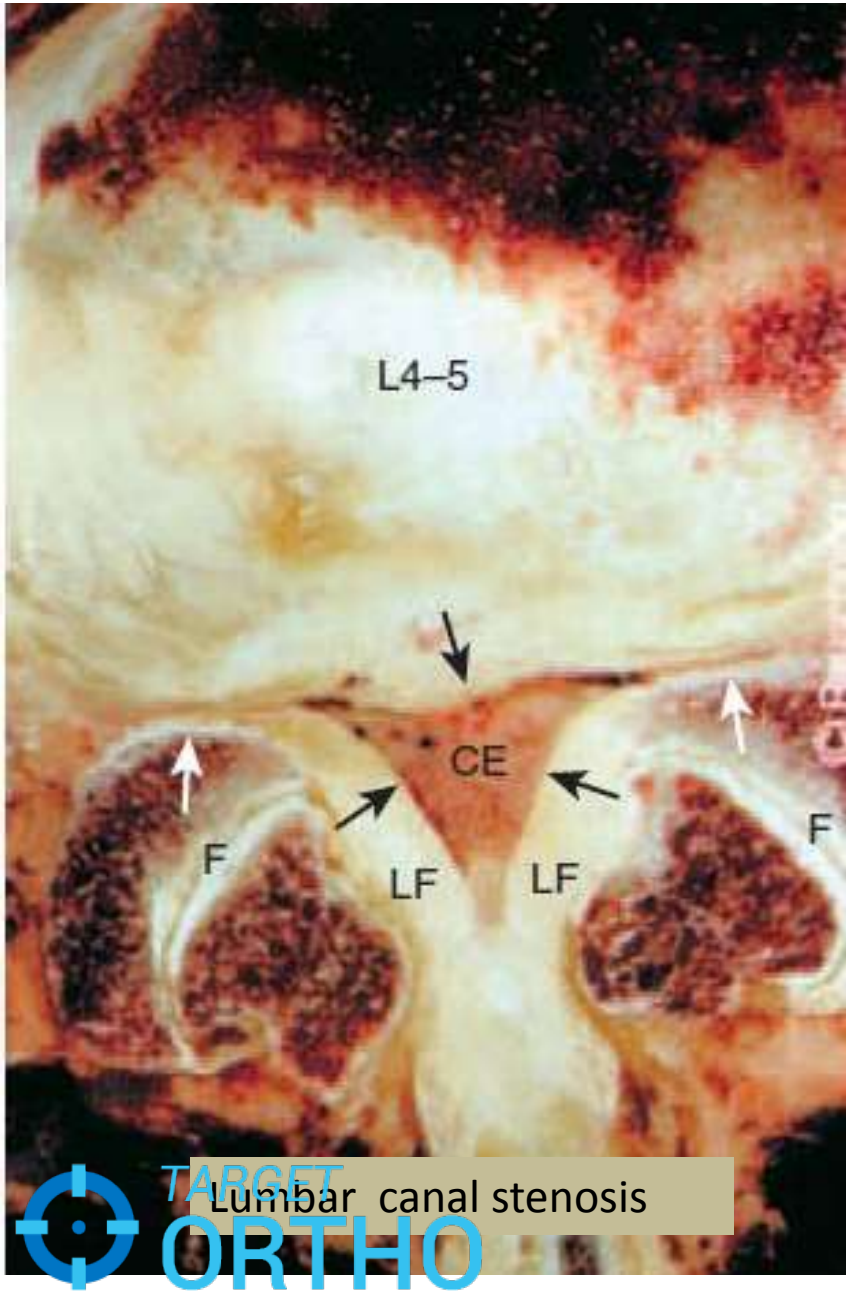
Disrupted disc – inferior end plate disruption

Disrupted disc with collapse

Altered load sharing







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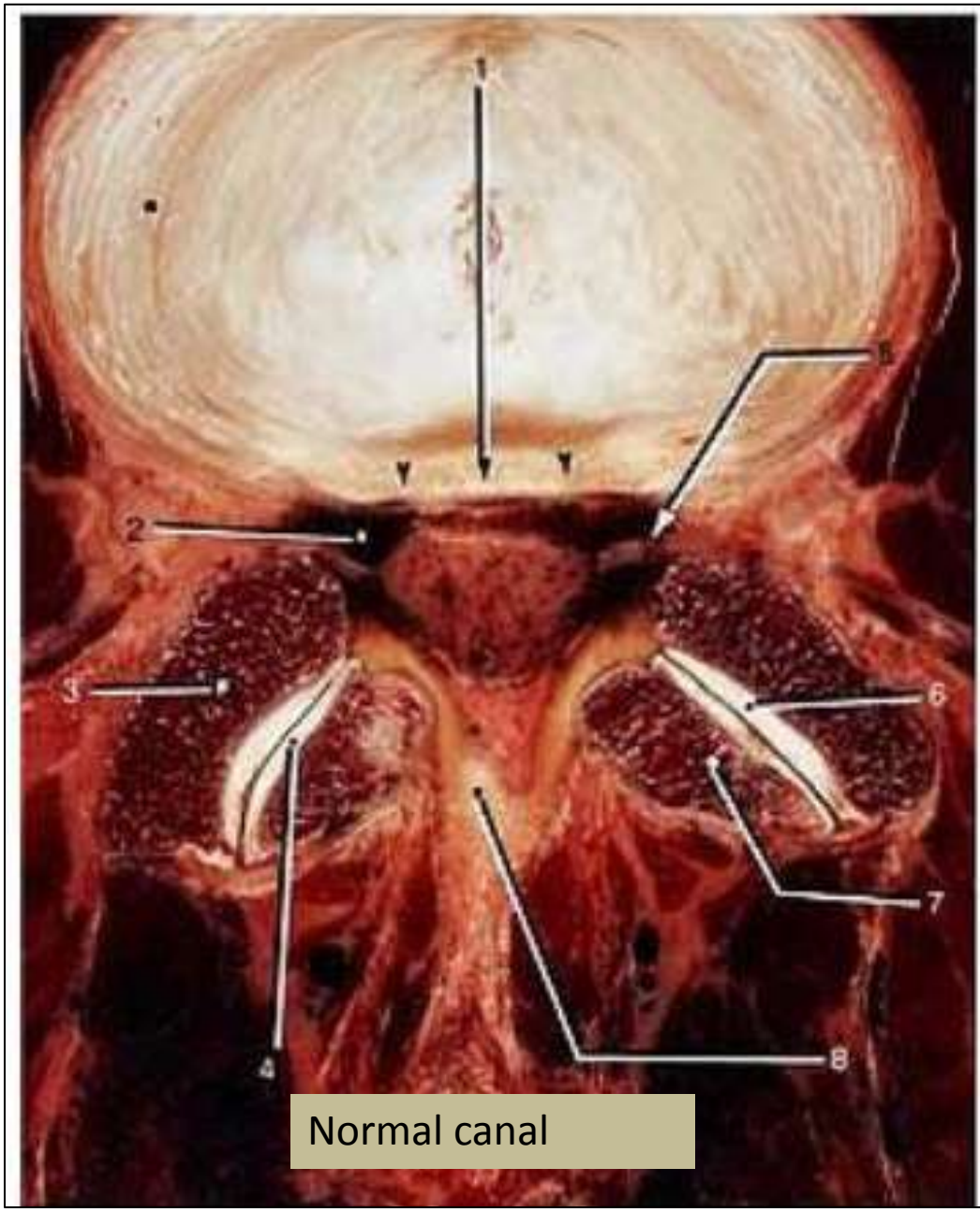
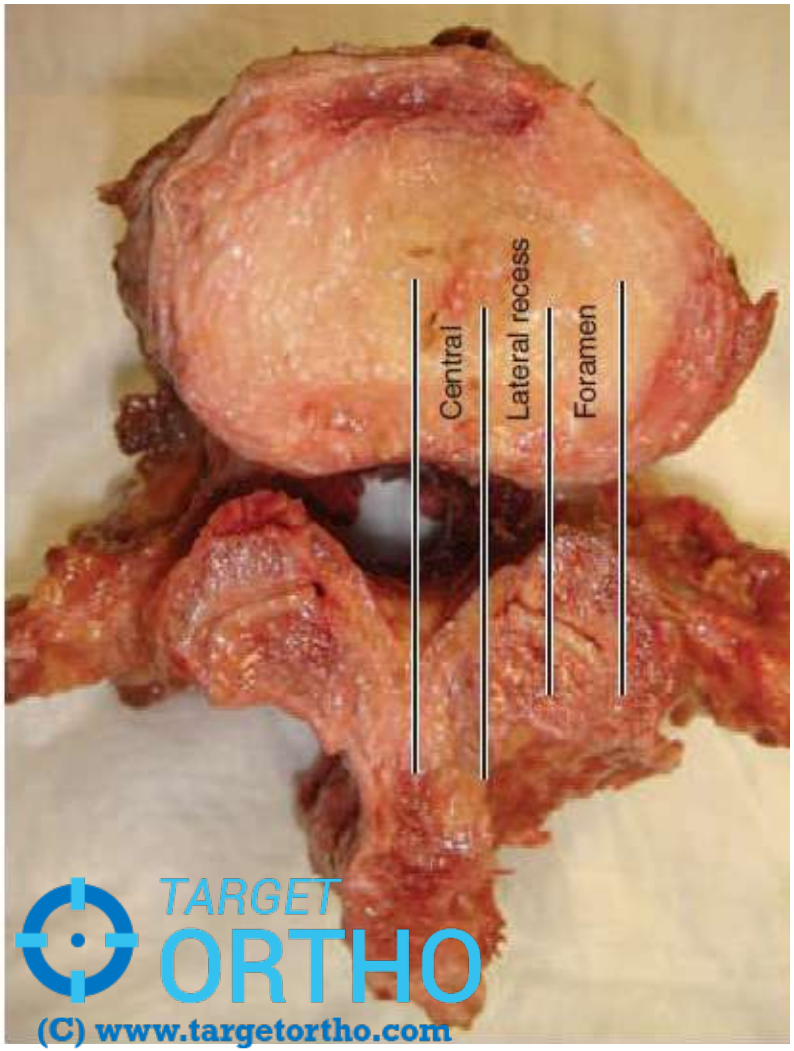
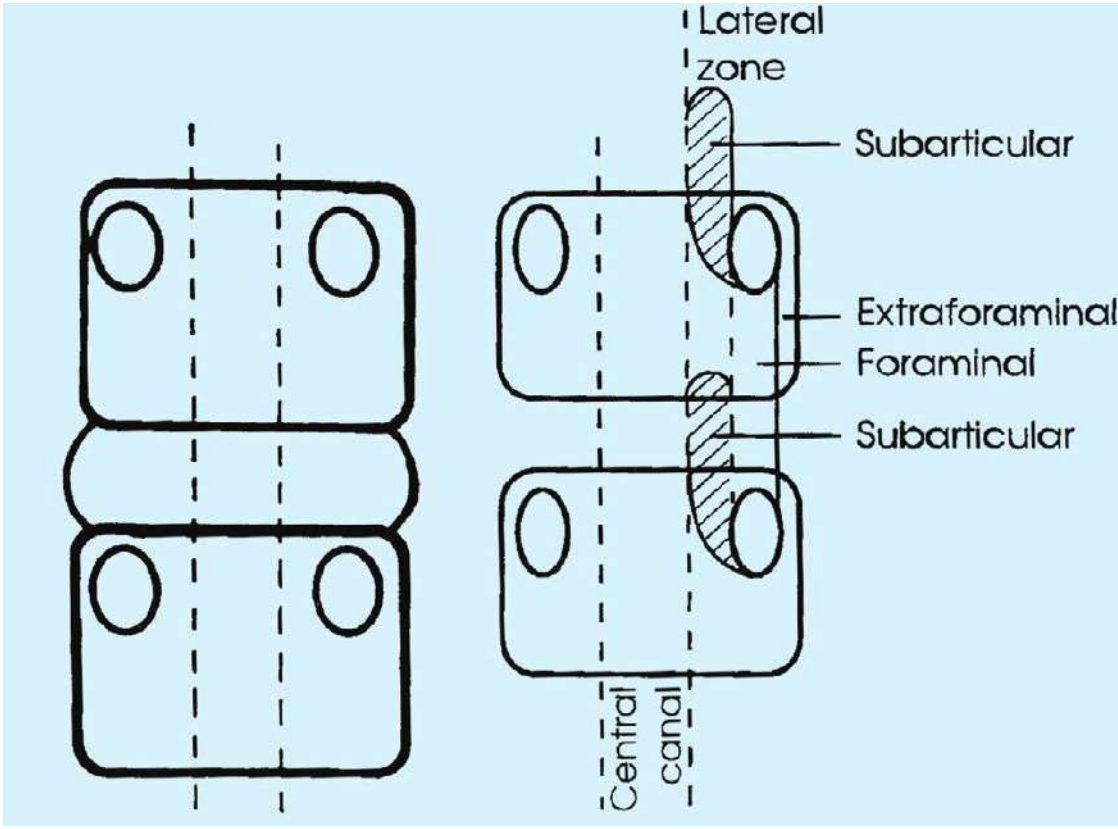


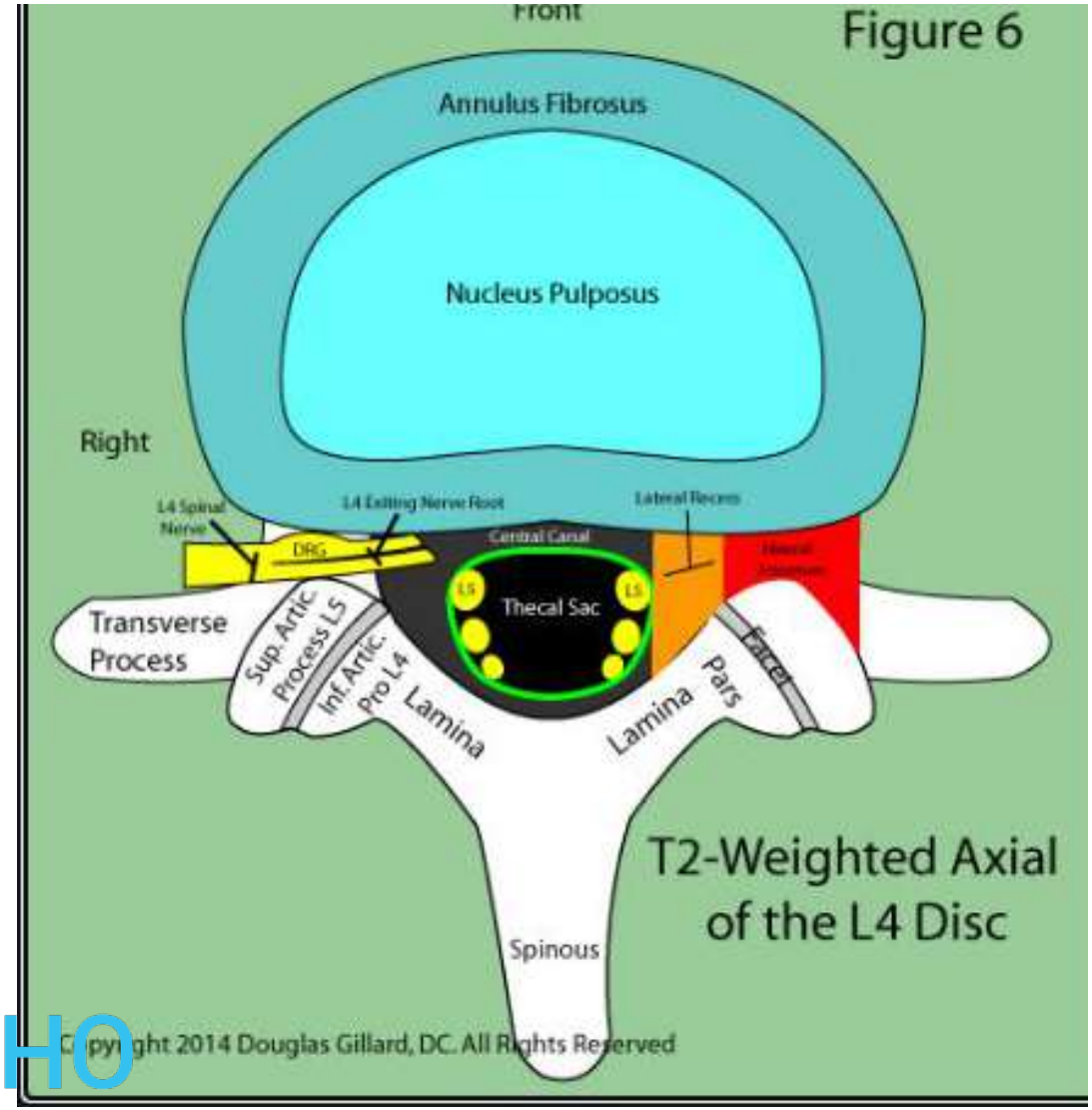
Normal canal

Anatomical classification





Boundries of lumbar canal



Clinical features of lumbar canal stenosis

- Low back pain- 65%
- Claudication pain- 80%
- Radicular pain
- Cauda equina syndrome

Claudication pain/ radicular pain

Factors responsible:

- **Nerve dysfunction**

1. direct mechanical compression
2. secondary to vascular embarrassment
3. Inflammatory mediators

Neurogenic claudication

- Intermittent pain or paresthesia in the legs brought on by walking and standing/extension which is relieved by sitting or lying down

- diminished root function, radicular pain and neurologic defecits.

Vascular vs neurogenic claudication

Evaluation	Vascular	Neurogenic
Walking distance	Fixed	Variable
Palliative factor	Standing	Sitting/bending
Provocative factor	Walking	Walking/standing
Walking uphill	Painful	Painless
Bicycle test	Positive (painful)	Negative
Pulse	Absent	Present
Skin	Loss of hair; shiny	-
Weakness	Rarely	Occasionally
Back pain	Occasionally	Commonly
Back motion	-	Limited
Pain character	Cramping—distal to proximal	Numbness, aching—proximal to distal
Atrophy	Uncommon	Occasionally

Differentiation of symptoms of vascular claudication from those of neurogenic claudication

Cauda equina syndrome

- **Most dramatic presentation- Rare**
- Low back pain
- Bilateral sciatica
- Saddle anesthesia
- Motor weakness
- Bowel and bladder incontinence


L4
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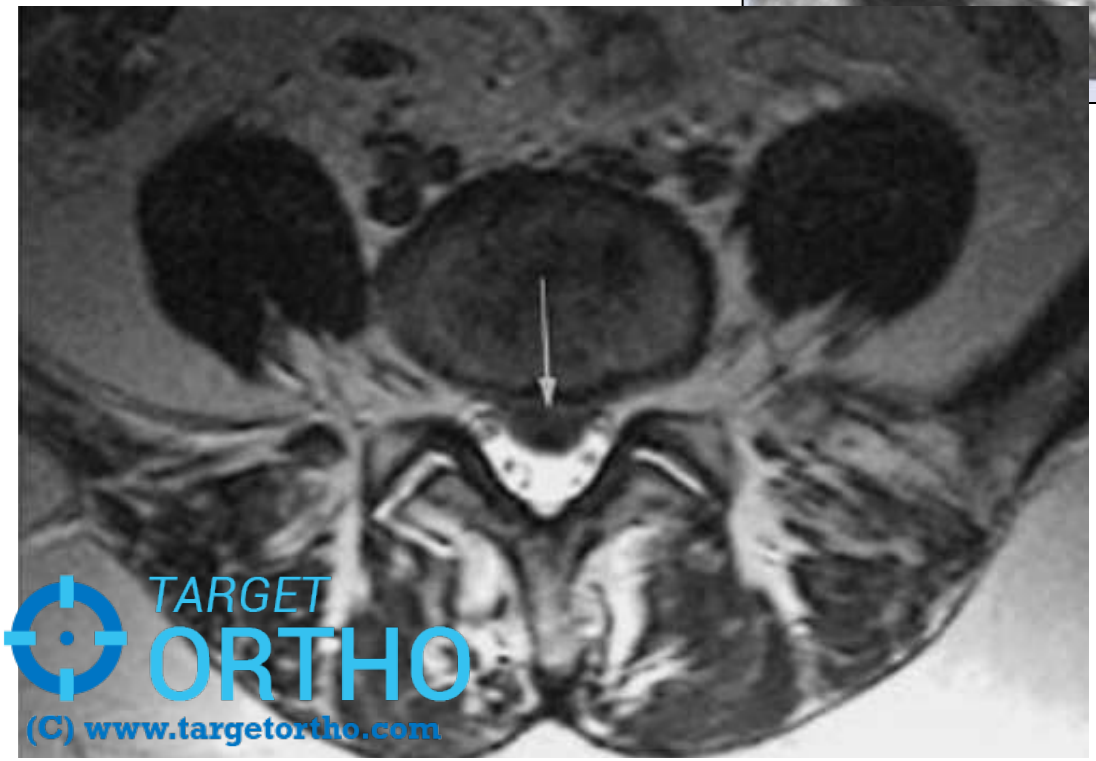
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Natural history of LCS

- **After the initial presentation of symptoms secondary to spinal stenosis**

i. 20% of patients worsen with nonoperative treatment.

ii. 40% stay the same

iii. 40% improve

- **Moderate stenosis pts - treated nonsurgically, because acute deterioration not seen**

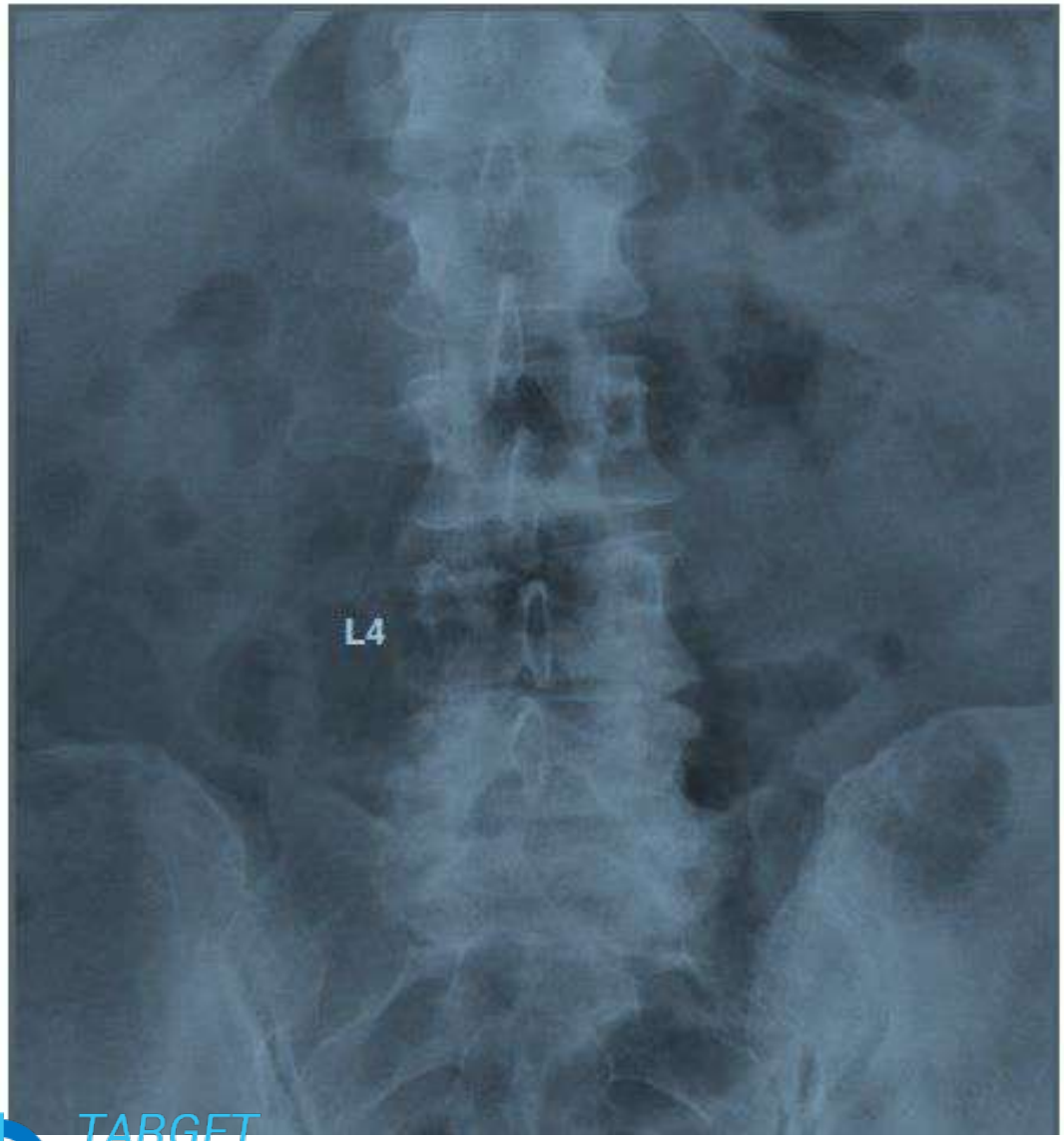
Physical examination

- Examination of motor power, sensation, reflexes
- Gait – forward stooping
- Distal pulses should be carefully evaluated.
- Upper extremity reflexes and a cervical examination- to r/o myelopathy

IMAGING AND DIAGNOSTIC STUDIES

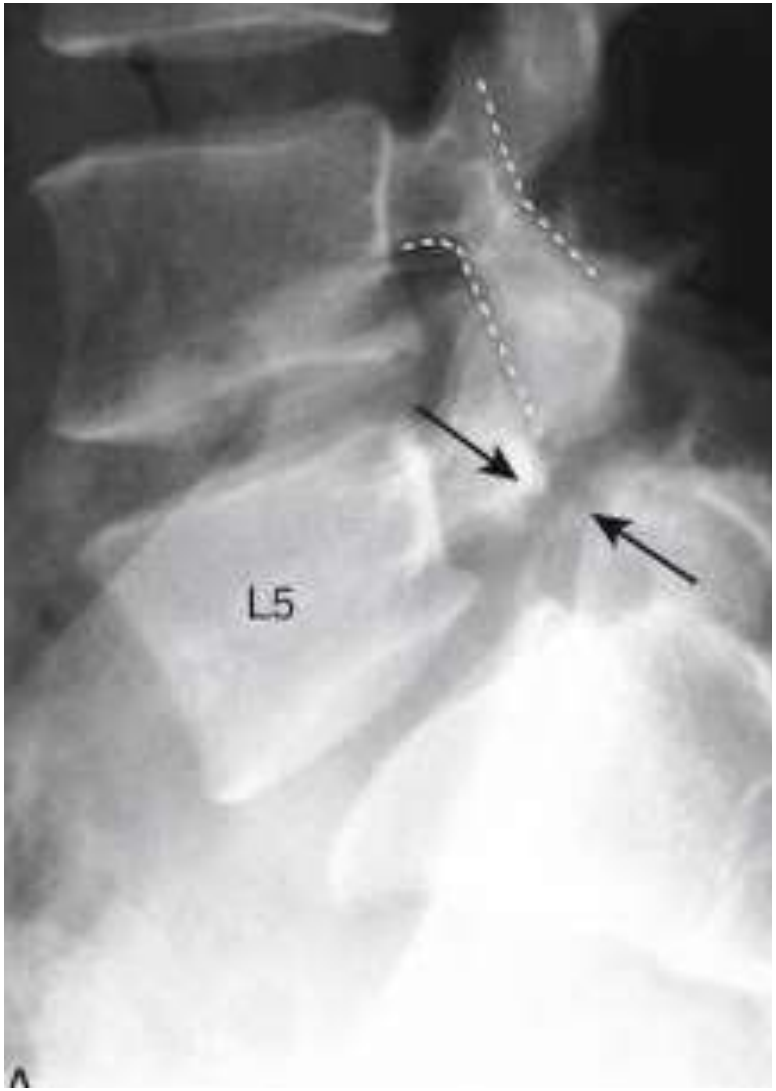
- **PLAIN RADIOGRAPHS**
- narrow interpedicular distance on the AP congenital stenosis
- degenerative stenosis - spondylotic changes

X ray-



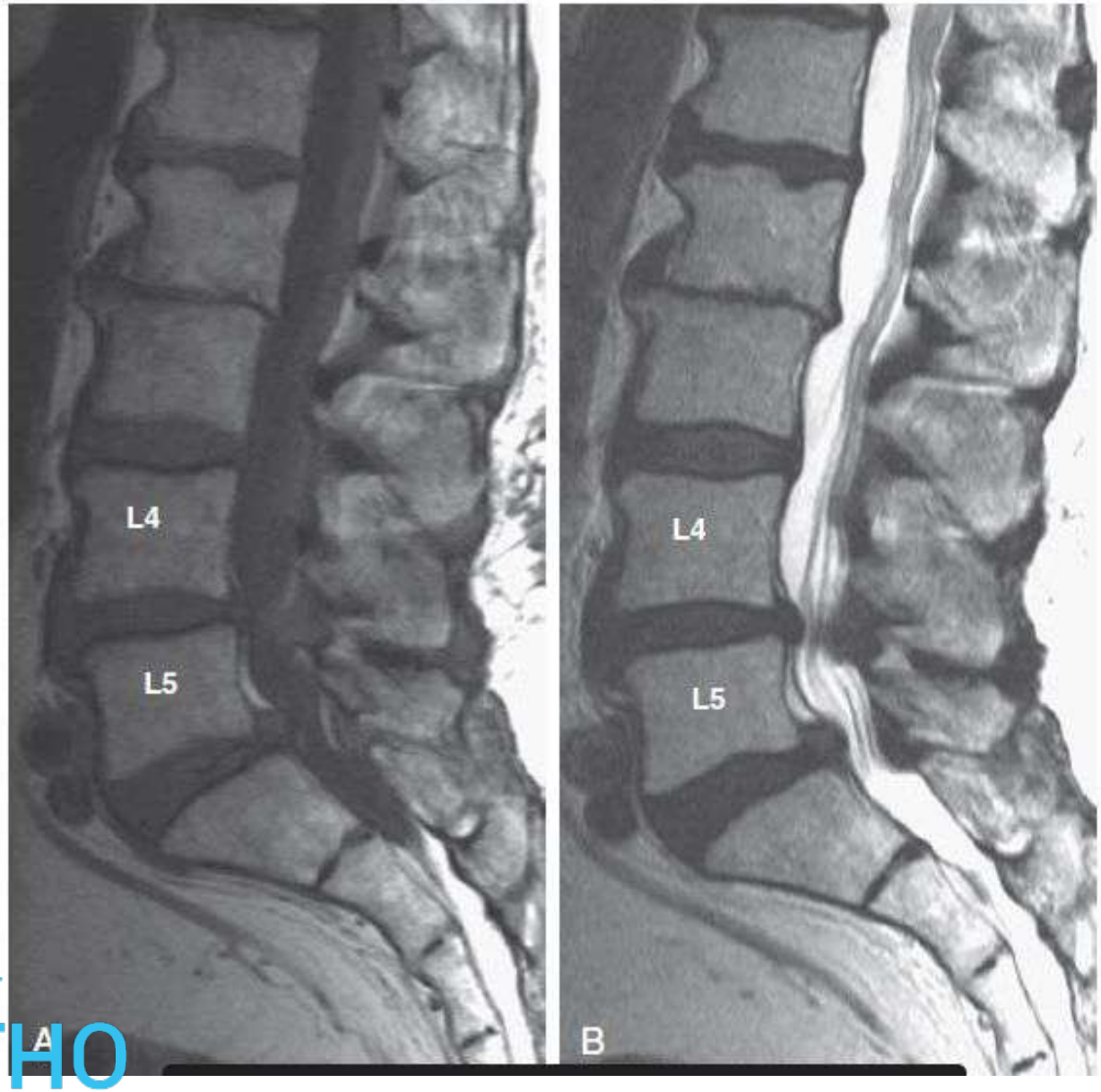
instability

X- ray



Instability

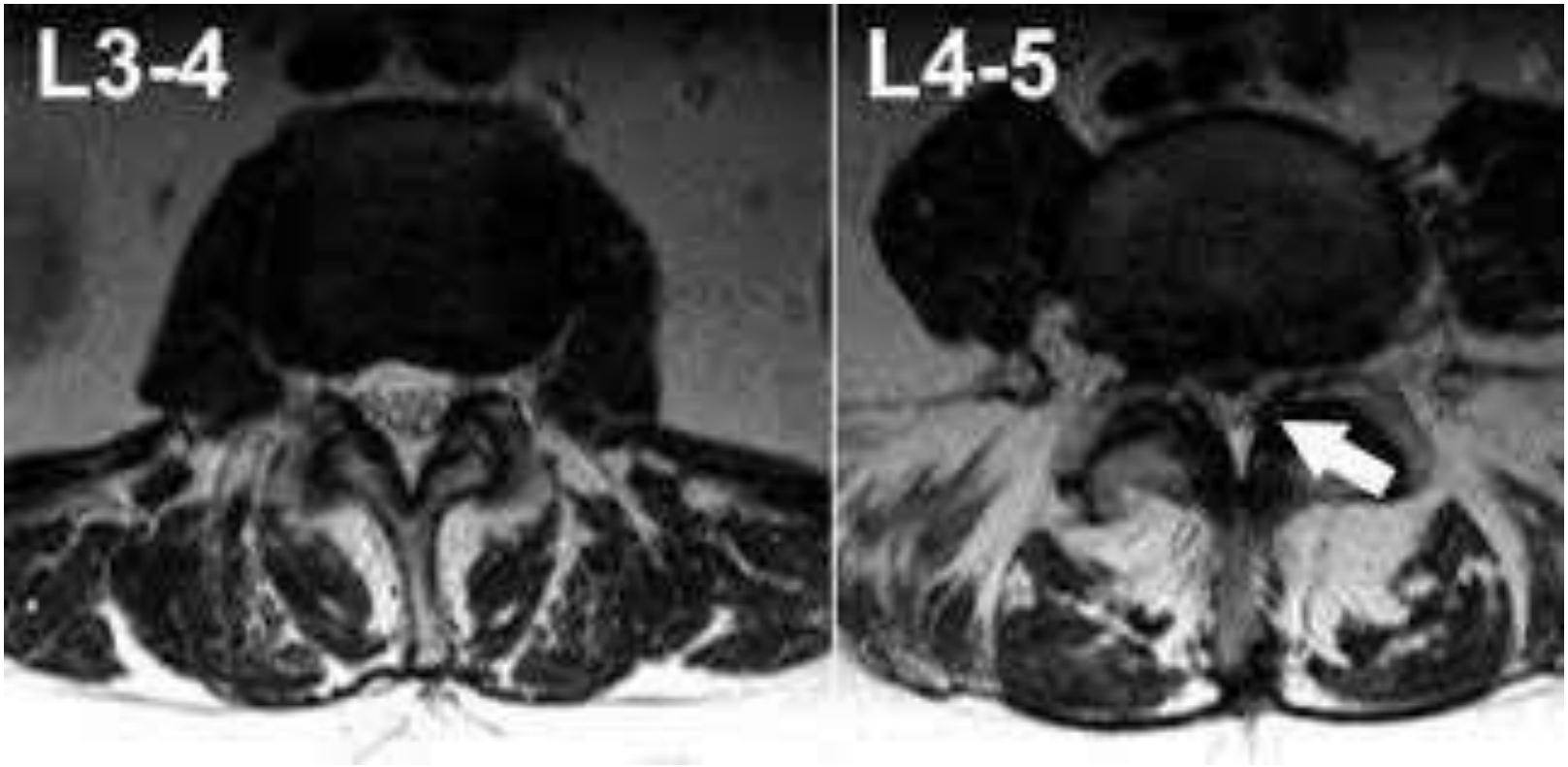
Mri – whole spine to r/o myelopathy



Sag image

Axial image

Lcs with disc



MAGNETIC RESONANCE IMAGING

- 30% to 50% of asymptomatic adults have abnormal MRI findings.

Differential Diagnosis

- *Vascular conditions*
  - Peripheral vascular disease
  - Abdominal aortic aneurysm
- *Musculoskeletal diseases*
  - Hip arthritis
  - Knee arthritis
  - Pelvic and/ or sacral disorders
  - Exertional compartment syndrome

Differential Diagnosis

- *Neurologic disorders*
- Diabetic neuropathy
- Peripheral neuropathy
- Cervical myelopathy
- Other demyelinating diseases
- Peripheral nerve entrapment

Treatment

Surgery

- Neurodefecit
- Pain

Conservative

- Others

Nonoperative Treatment

- Activity modification
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Physical therapy
- Cryotherapy and heat therapy
- Ultrasound
- Transcutaneous electrical nerve stimulation (TENS)
- Traction
- Bracing
- Epidural steroid injection (ESI)
- Selective nerve root block (SNRB)

What I do ?

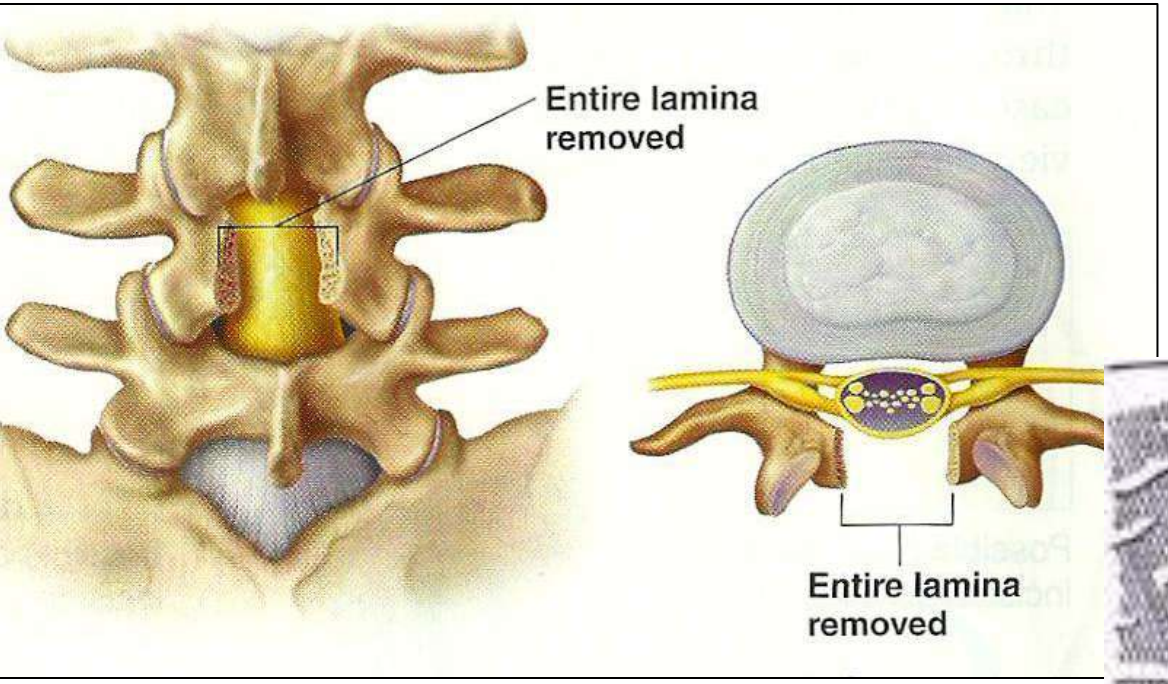
- Spinal flexion exercises
- Pregalin
- Analgesics

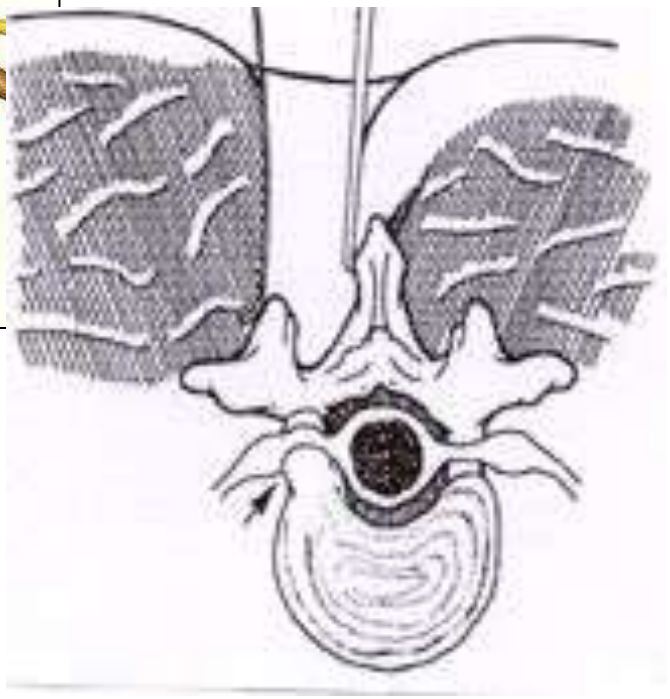
Exercise video

SURGICAL MANAGEMENT

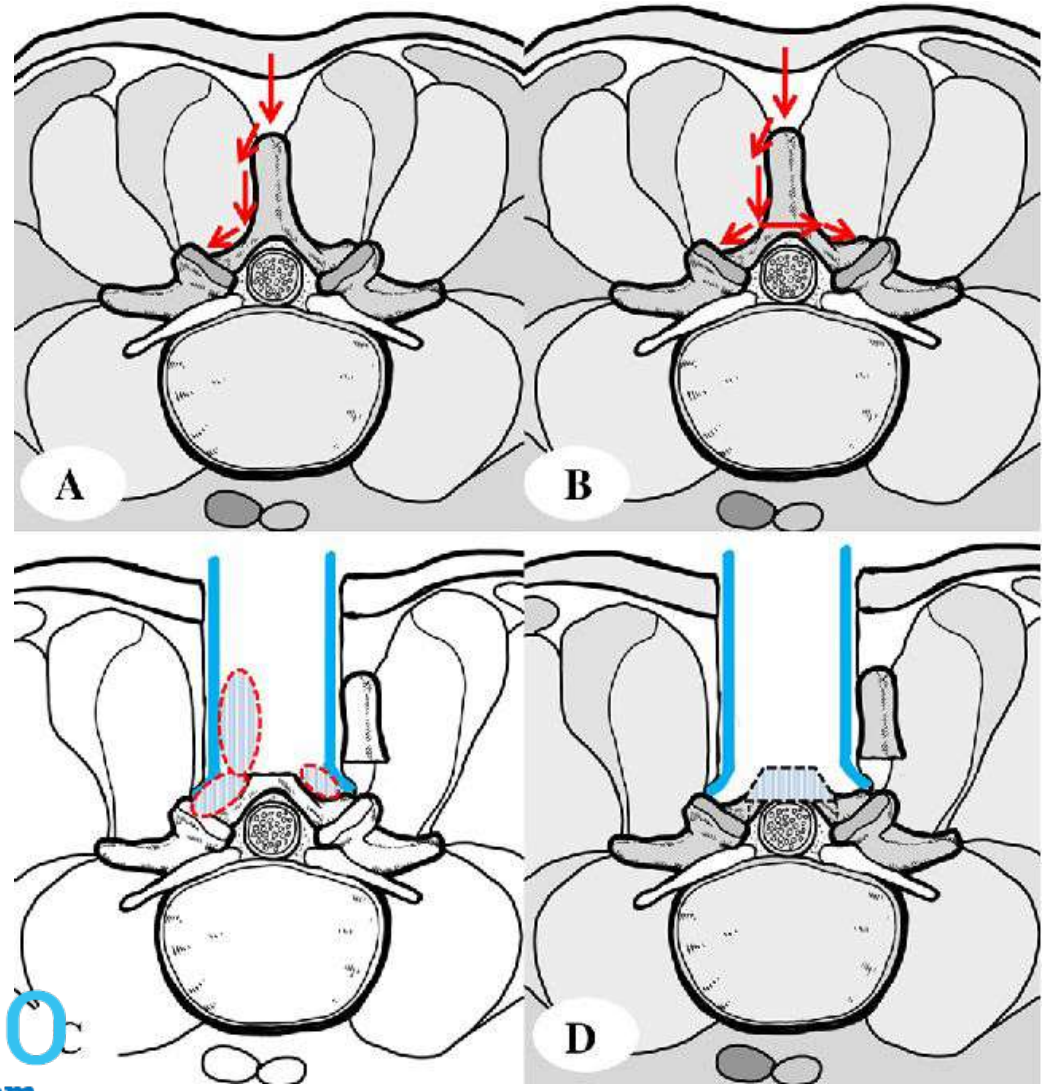
- Conventional laminectomy
- Micro decompression
- Tubular decompression
- Decompression + stabilisation

Central conventional laminectomy

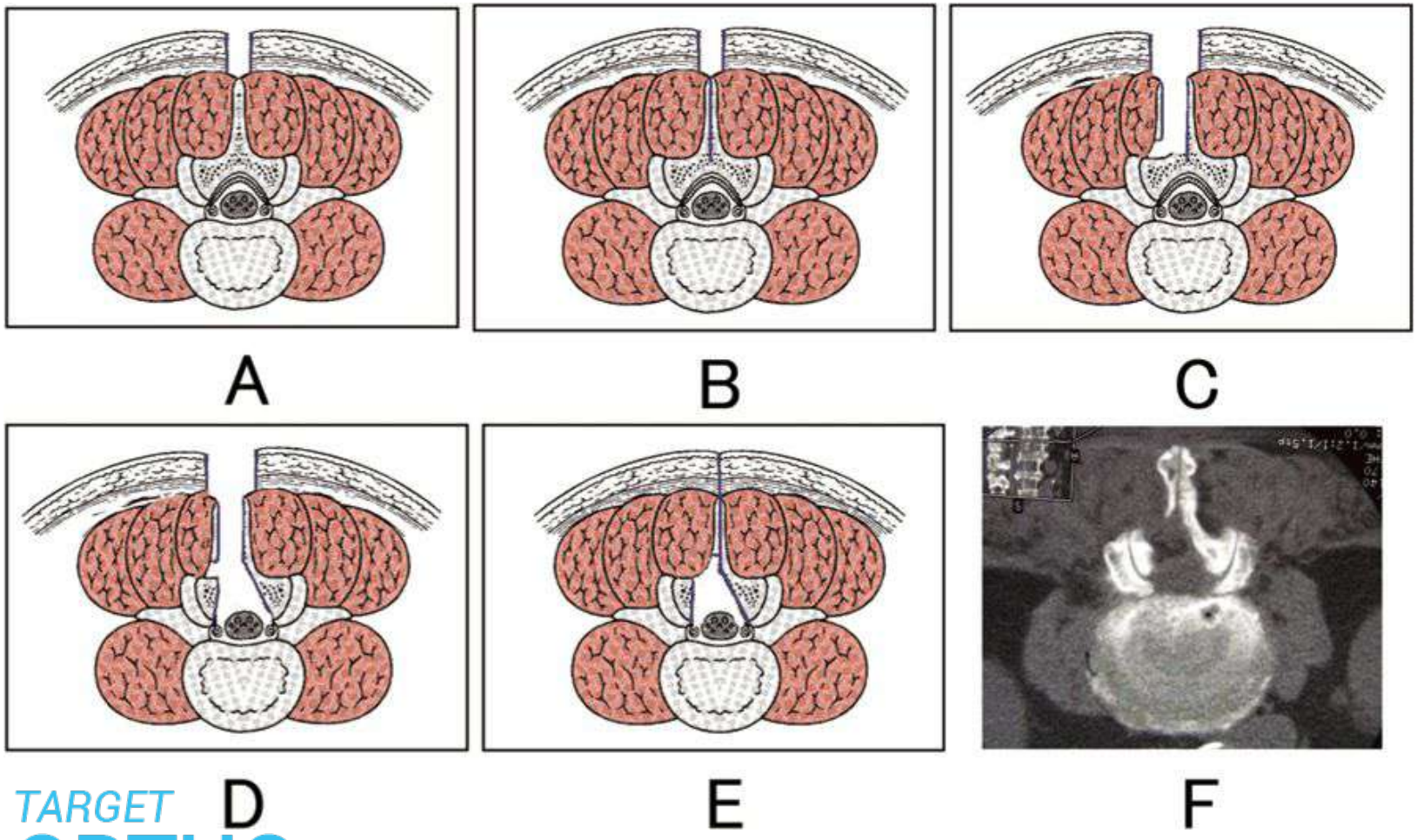




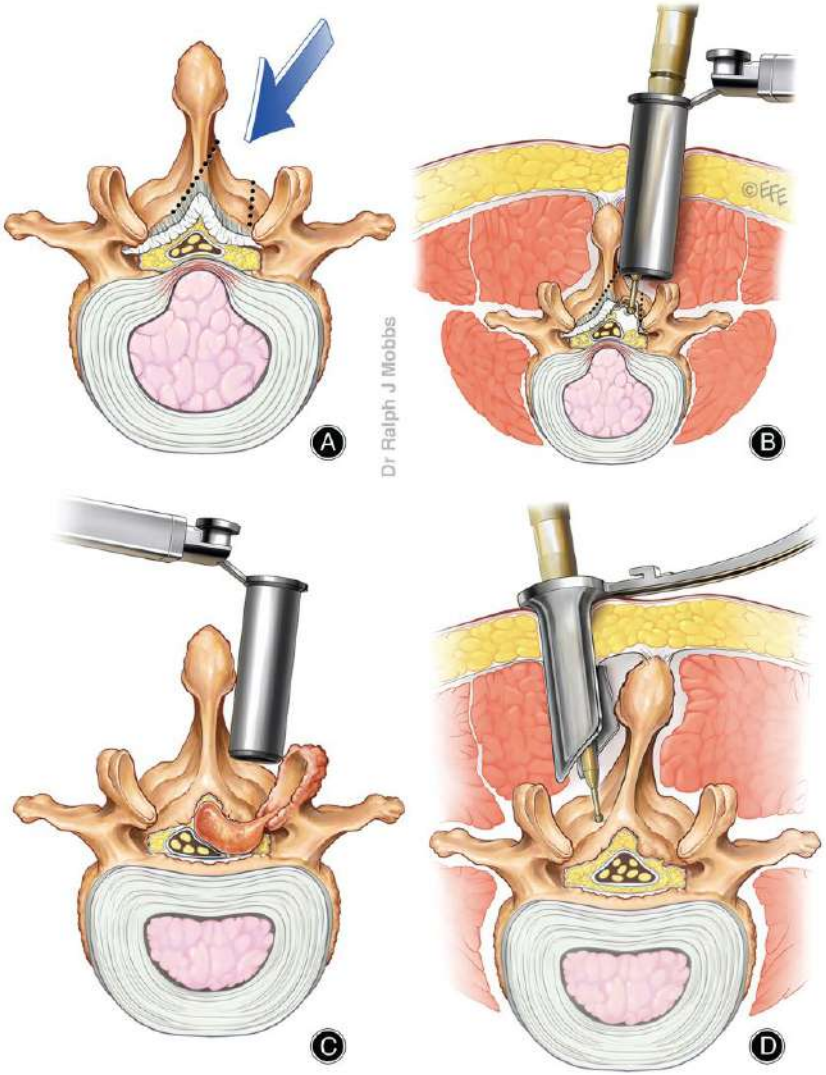
Spinous process base osteotomy



Spinous process split approach



Tubular decompression



Surgery video

NEUROGENIC CLAUDICATION

- SHARP DISCOMFORT WITH NUMBNESS
- PROXIMAL TO DISTAL
- DO WELL ON THE BICYCLE
- UPHILL WALKING RELIEF FOR STENOTIC PATIENTS WALKING
- DOWNHILL IS LESS TOLERABLE

VASCULAR CLAUDICATION.

- PRESENTS WITH CRAMPING, OR TIGHTNESS
- PROCEEDS FROM DISTAL TO PROXIMAL
- DEVELOP SYMPTOMS WITH BOTH BICYCLE AND TREADMILL TESTING.

Neurogenic claudication

- Presents with
  - insidious onset of buttock, thigh, and calf pain
- Pain is often poorly localized
- Increased pain and paresthesias with
  - Ambulation and extension
- As symptoms progress,
  - Weakness or giving way may be seen
- Severe cases present
  - With rest pain, neurogenic bladder
- Cauda equina syndrome
  - At the most extreme.

HISTORY

1. leg pain 80% of patients
   - back pain 65%

❖ typical neurologic presentation is
   - complaints consistent with neurologic claudication,
   - radiculopathy, or both

Anatomy

- Normal midsagittal dm > 13 mm.
- *Relative stenosis* – dm between 10 and 13 mm
- A*bsolute stenosis - dm less* than 10 mm.

- The normal thecal sac measures 16 to 18 mm. The area of the normal sac should be more than 100 mm2.
- Moderate stenosis -between 76 and 100 mm2,
- Severe stenosis the-area less than 76 mm2

Clinical feacture

- Radiculopathy,
- Neurogenic claudication,
- Mechanical back pain,
- Cauda equina syndrome (rarely) .

LATERAL RECESS

- Normal > 5 mm in ht.
- *Relative stenosis* -between 3 and 5 mm,
- *Absolute stenosis < 3 mm.*

NORMAL FORAMINAL Ht

- is 20 and 23 mm.
- If < 15 mm and posterior disc height < 4 mm -root compression .