

# Common Spine Surgeries: Indications and Complications

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# Common Cervical Spine Surgeries

- ACDF
- ACCF
- ACDA
- Posterior Cervical Laminectomy and Fusion
- Posterior Cervical Laminoplasty
- Posterior Cervical Foraminotomy

# ACDF

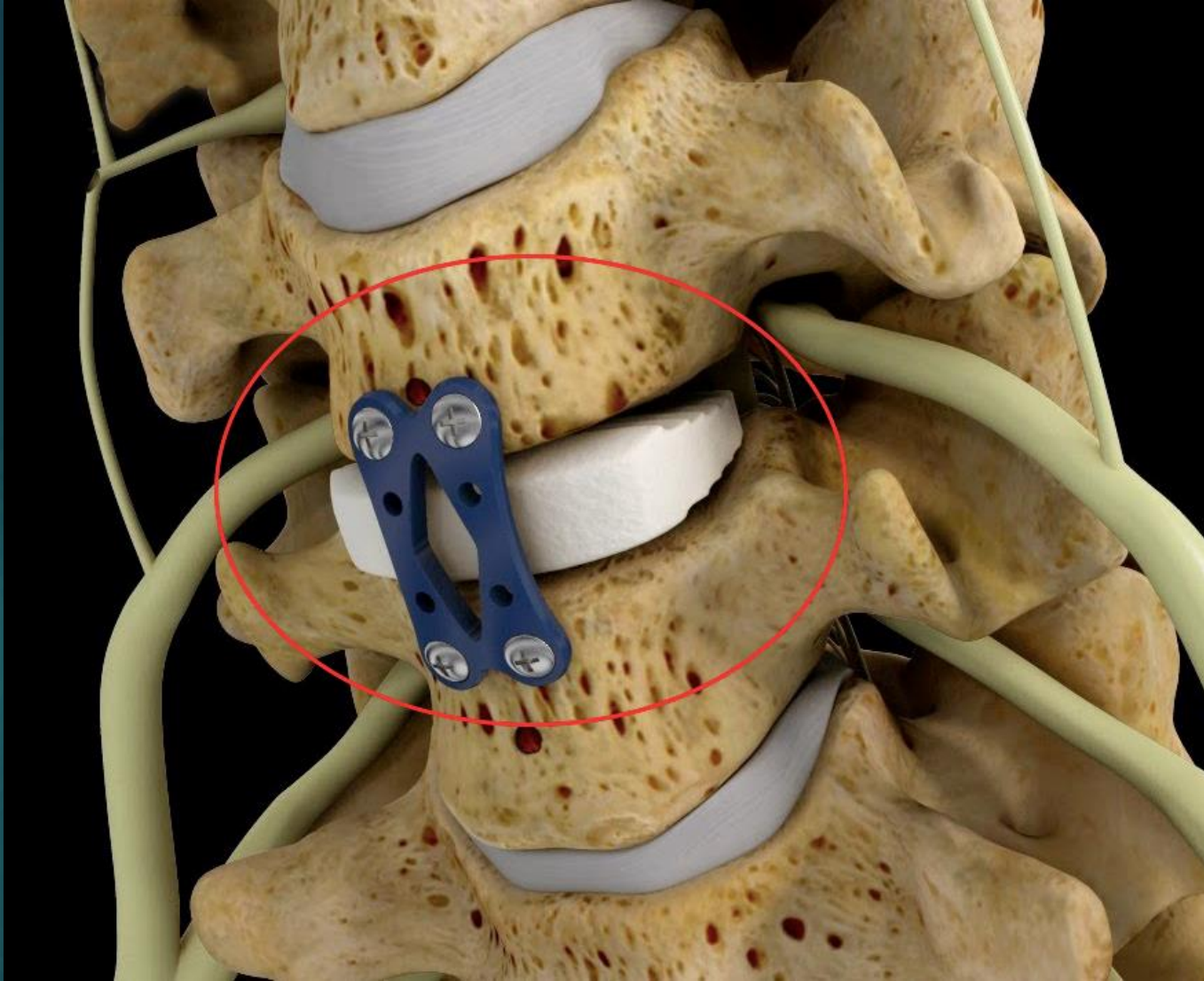
## Anterior Cervical Discectomy and Fusion

### INDICATIONS

- ▶ Gold standard in surgical treatment for cervical radiculopathy
- ▶ Disc herniation
- ▶ Degenerative cervical spondylosis (osteophytes, discosteophyte complex)
- ▶ OPLL
- ▶ Cervical kyphosis

### COMPLICATIONS

- ▶ OR complications: vertebral artery injury, recurrent laryngeal nerve injury (1%), dural tear, spinal cord injury
- ▶ Immediate post-op complications: retropharyngeal hematoma, **dysphagia**, dysphonia, graft dislodgement
- ▶ Long term complications: **pseudarthrosis**, adjacent Segment disease (3%), instrumentation failure, loss of motion



ACDF



ACDF



# ACCF

## Anterior Cervical Corpectomy and Fusion

### Indications

- ▶ Bone tumor
- ▶ Bone infection
- ▶ Trauma to the vertebral body
- ▶ Extensive degenerative bone changes / osteophytes

### Complications

Same as ACDF

% to 20% rates of graft migration





ACCF

# ACDA

## Anterior Cervical Disc Arthroplasty

### Indications :

- Single level disease with minimal arthrosis of the facets
- When we want to preserve mobility
- When trying to avoid adjacent disc disease

### Complications:

#### Similar to ACDF:

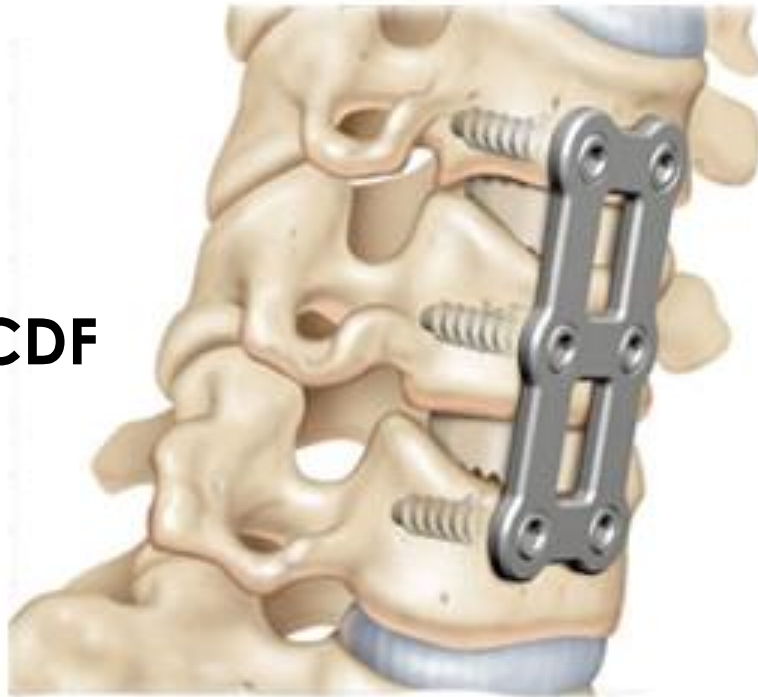
- Minimal blood loss/minimal pain/minimal risk of infection
- Dysphagia due to soft tissue swelling
- Laryngeal nerve injury
- Hemangioma
- Graft dislodgement



ACDA



**ACDF**



**ACDA**



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# Posterior Cervical Instrumentation Fusion

laminectomy, laminotomy, foraminotomy

## Indications:

- ▶ Multilevel compression/degenerative changes with kyphosis of  $< 10$  degrees
- ▶ Neck pain associated with degenerative facets
- ▶ Congenital central stenosis

## Complications :

- ▶ Higher rates of infection
- ▶ Higher blood loss compared to anterior approach
- ▶ Postoperative neck pain
- ▶ Wound breakdown
- ▶ C5 palsy
- ▶ Injury to the vertebral artery
- ▶ Degeneration of disk levels above or below surgery level
- ▶ Stretch on the nerves from the spinal cord drifting backwards







# Posterior Cervical Laminoplasty

## Indications:

- ▶ Congenital cervical stenosis
- ▶ Useful when maintaining motion is desired
- ▶ Avoids complications of fusion so may be indicated in patients at high risk of pseudoarthrosis

## Complications:

- ▶ Late instability or deformity
- ▶ Postoperative neck pain
- ▶ Higher infection rates compared to anterior approach





# Posterior Cervical Foraminotomy

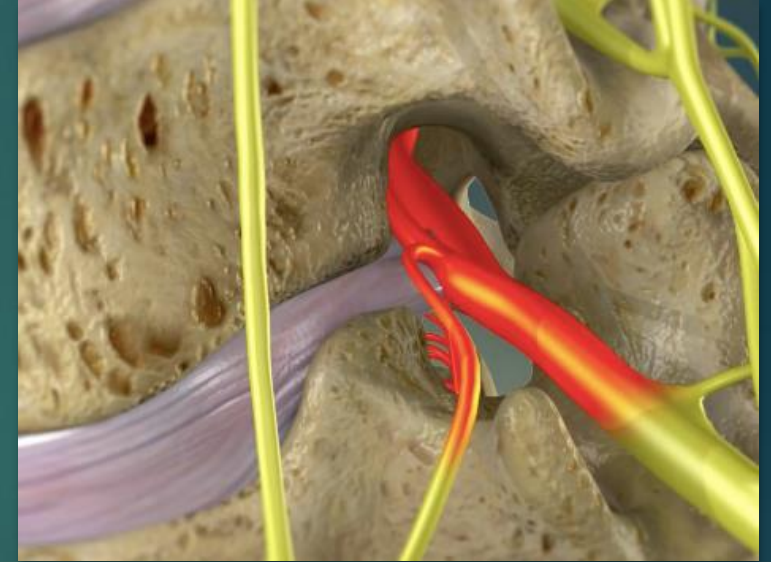
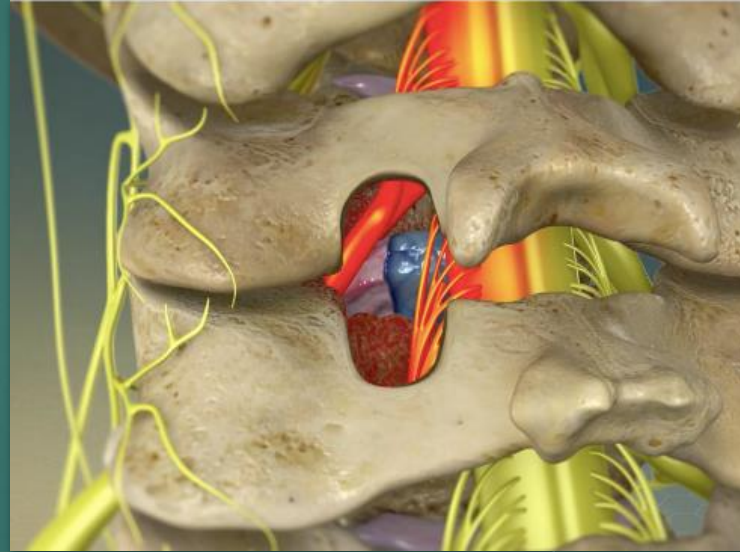
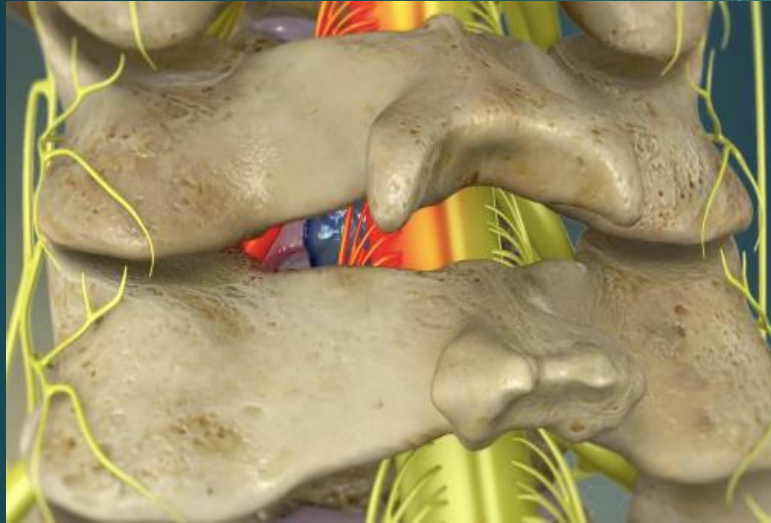
## Indications:

- ▶ Foraminal disc herniation causing cervical radiculopathy
- ▶ Osteophytic foraminal narrowing

## Complications:

- ▶ Post-operative neck pain /stiffness
- ▶ Nerve injury
- ▶ Recurrent disc herniation





## Common Lumbar Surgeries:

- Microdiscectomy
- Lumbar Decompression
- PSSIF
- PSSIF with PCO, PSO and VCR

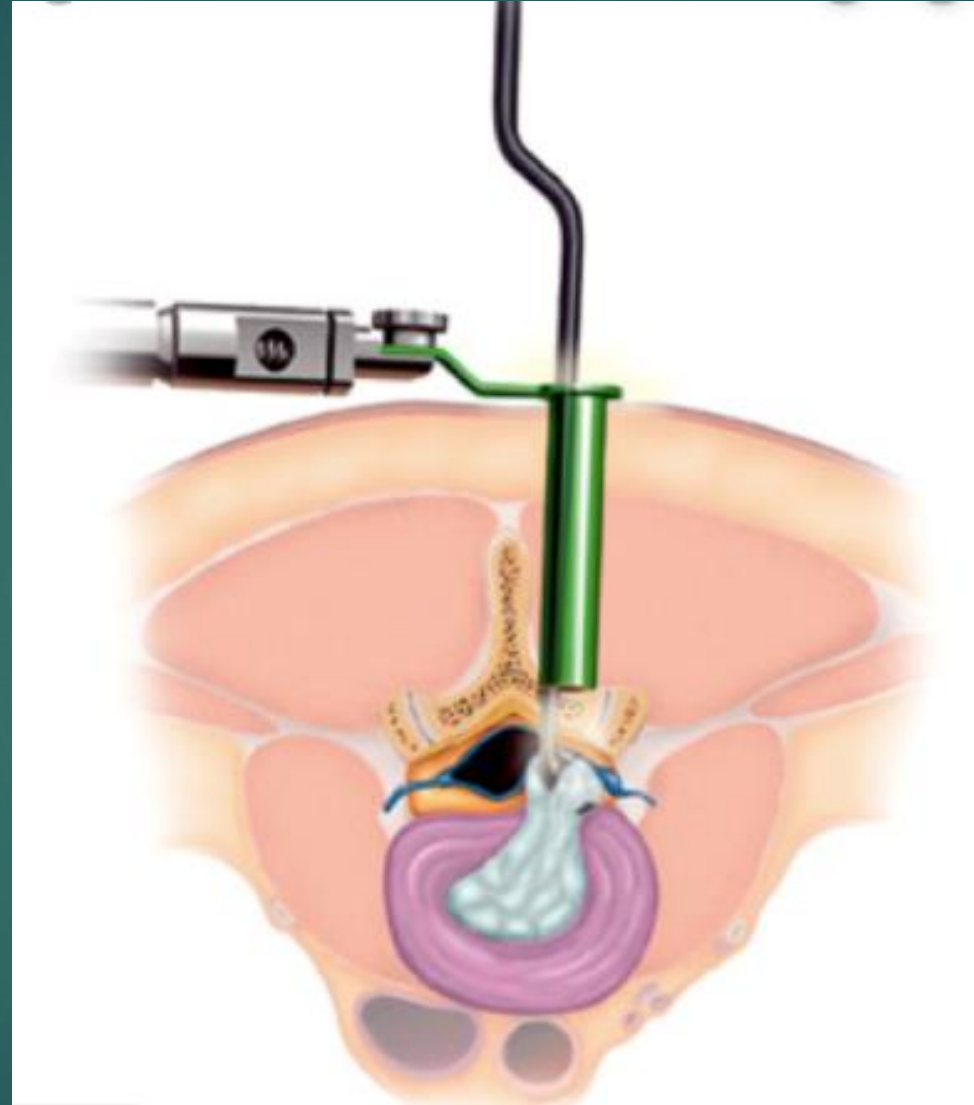
# Lumbar Microdiscectomy

## Indications:

- ▶ Persistent, worsening pain, due to disc herniation
- ▶ Significant weakness
- ▶ Cauda equina syndrome

## Complications- minimal :

- ▶ Dural tear (1%)
- ▶ Recurrent HNP
- ▶ Discitis (1%)



# Lumbar Decompression

laminectomy, laminotomy, discectomy, foraminotomy

## Indications

Spinal stenosis causes by:

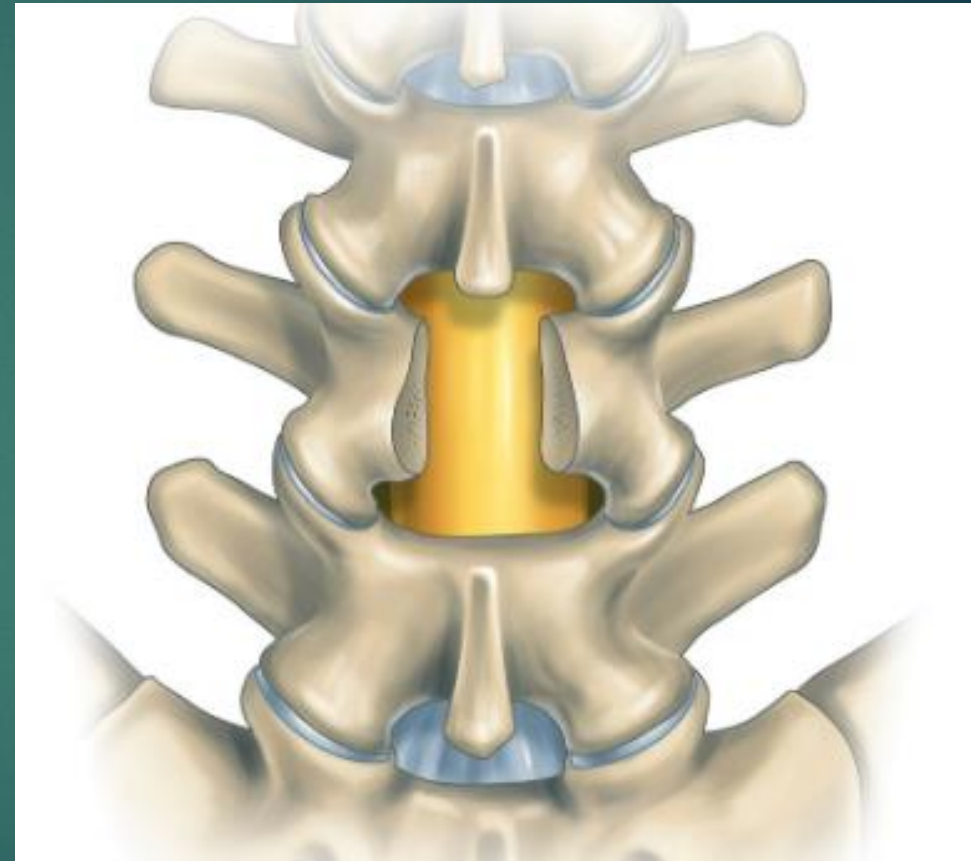
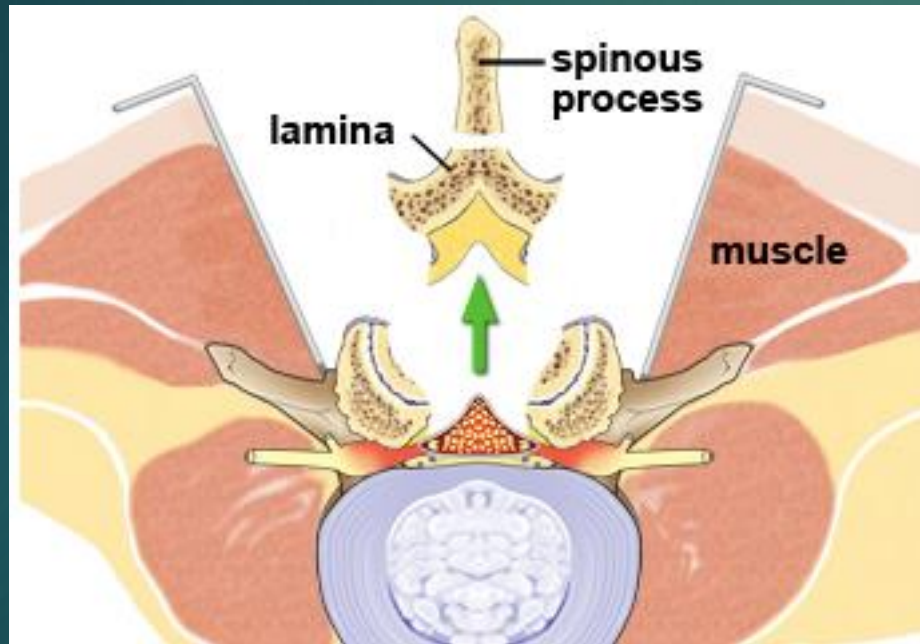
- ▶ Disc herniation
- ▶ Degenerative changes such as overgrowth of the ligament, osteophytes,, facet arthropathy

## Complications

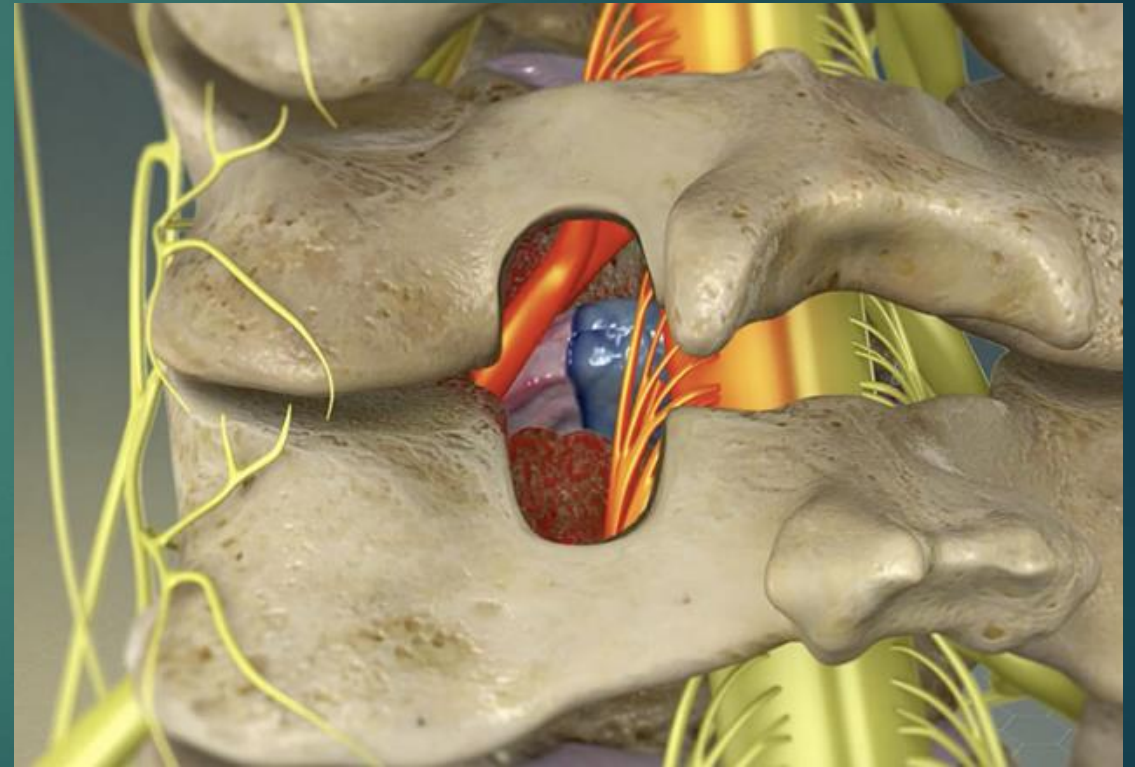
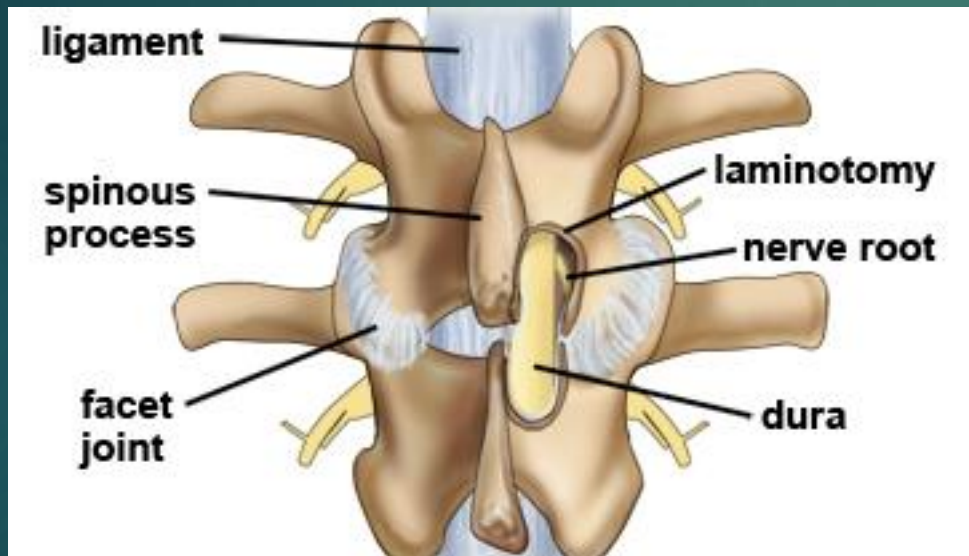
- ▶ Infection
- ▶ Dural tear
- ▶ Epidural hematoma
- ▶ Instability



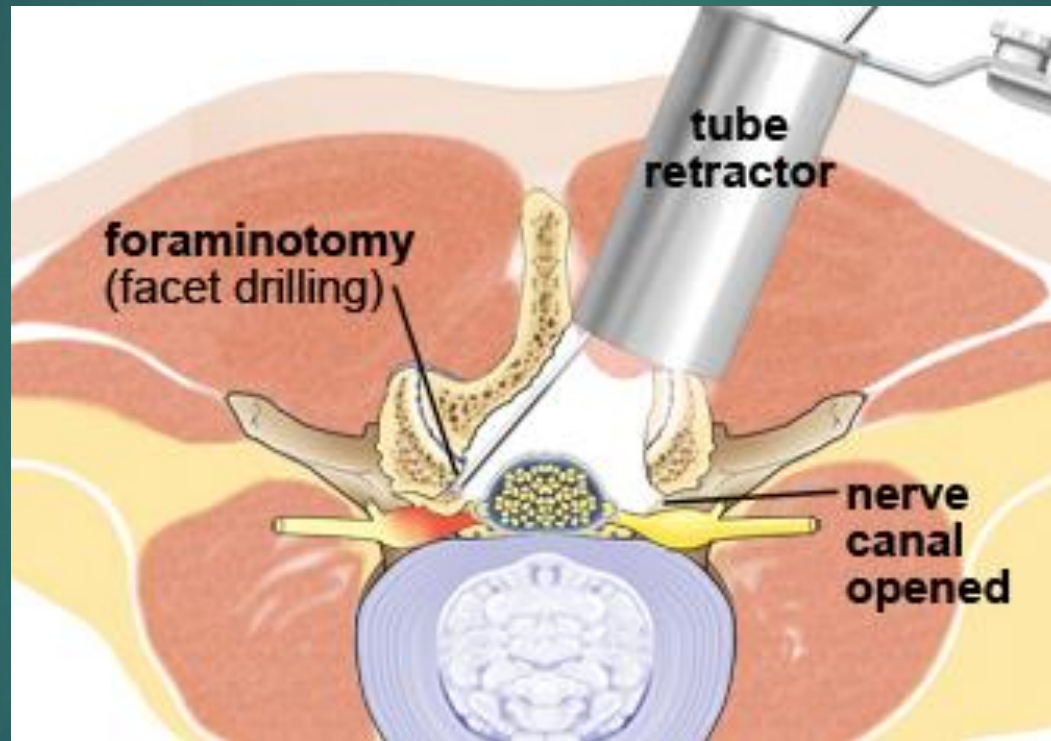
# Laminectomy



# Laminotomy (unilateral)



# Foraminotomy



# Posterior lumbar decompression and fusion (PLIF, TLIF)

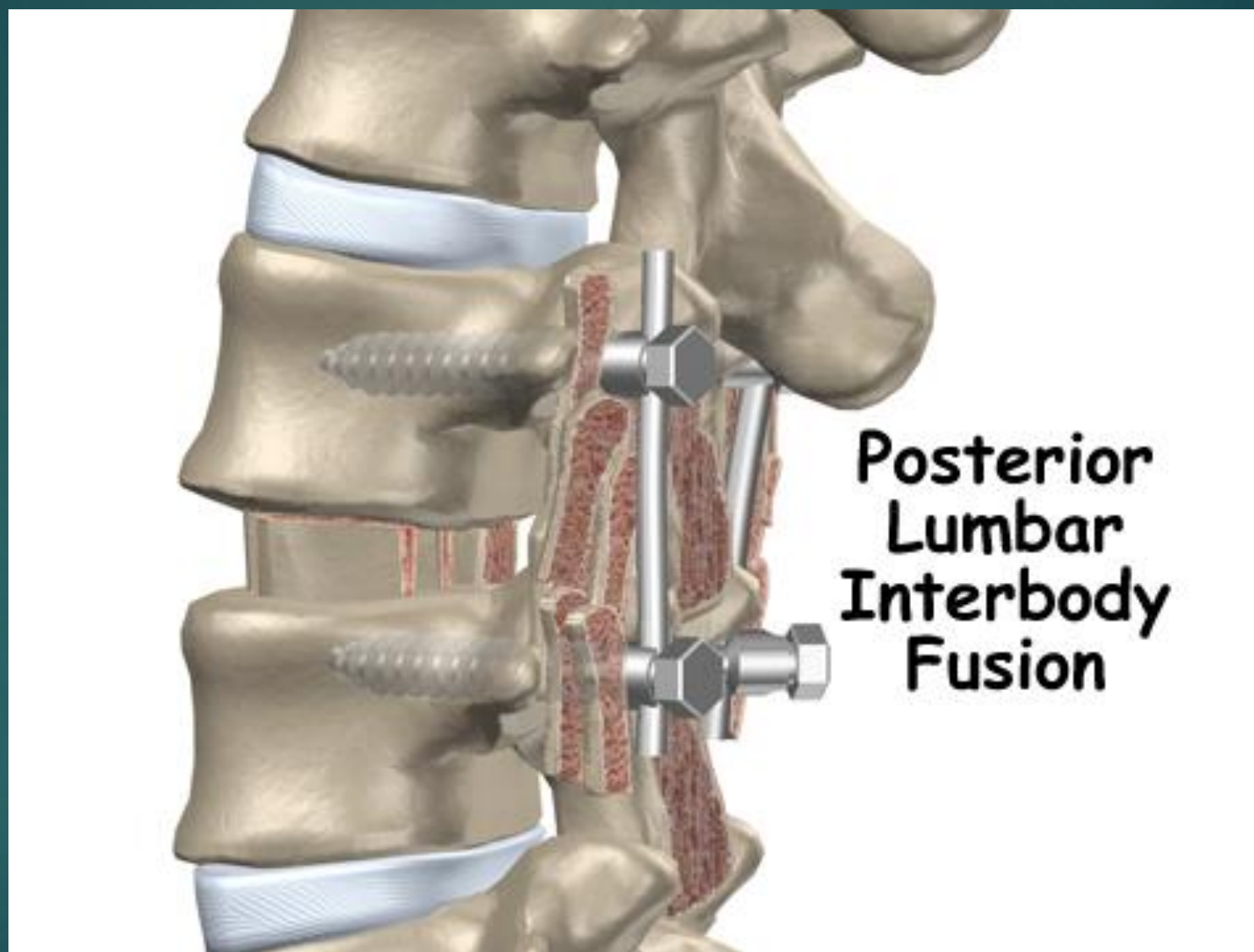
## Indications

- ▶ Multilevel decompression where big portion of the lamina needs to be removed / high risk for instability
- ▶ Spinal instability
- ▶ Spondylolisthesis
- ▶ Spondylosis
- ▶ Degenerative scoliosis

## Complications

- ▶ Dural tear
- ▶ Nerve damage
- ▶ Wound infection (10%)
- ▶ Pneumonia (5%)
- ▶ Risk of adjacent segment degeneration >30% at 10 years







T10-pelvis PSSIF



# PSSIF with osteotomies (PCOs, PSOs, VCRs)

## ► Indication

- Progressing spinal deformity
- Idiopathic scoliosis (thoracic)
- Degenerative scoliosis (lumbar)
- Congenital kyphosis
- Curve > 50 degrees
- Sagittal imbalance
- Cosmetic
- Cardiopulmonary decline

## ► Complications

- Neurological deficits
- Pseudarthrosis
- Venous thromboembolism
- Dural tear (3%)
- Infection (1.5%)
- Implant Failure
- DVT/PE





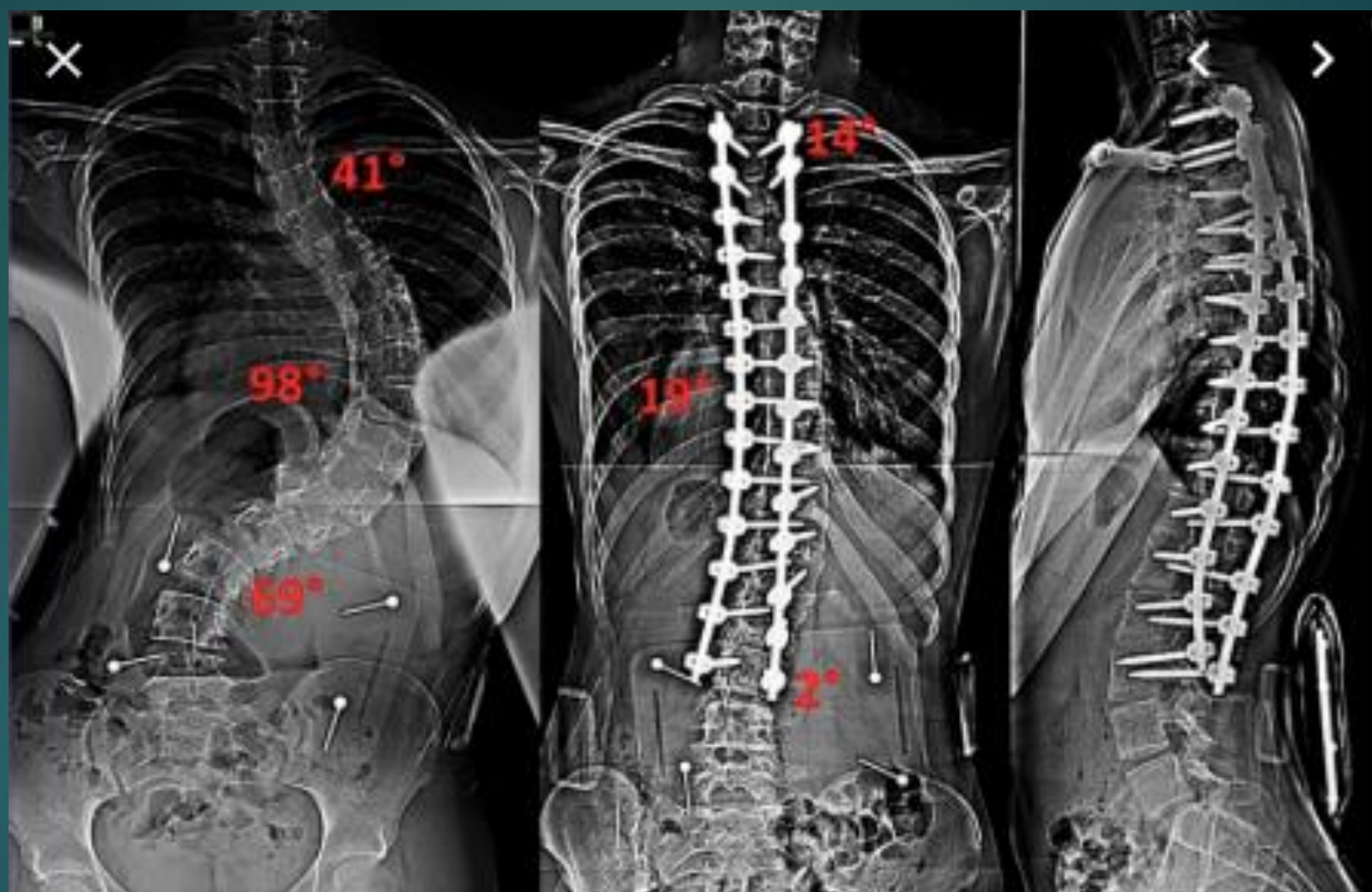
**A: Posterior Column  
Osteotomy (PCO)**



**B: Pedicle Subtraction  
Osteotomy (PSO)**



**C: Vertebral Column  
Resection (VCR)**







## 28y/o with Marfan's syndrome



23 y/o patient, diagnosed with spinal cord cyst at age of 2, which led to temporary loss of upper and lower extremity functions, then chronic weakness and following severe trunk weakness, progressive kyphoscoliosis, worsening deformity, atrophy of her left LE











# References:

- ▶ Furman, et al. (2017). Atlas of Image- guided Spinal Procedures. 2<sup>nd</sup> ed.
- ▶ Isack, et al. (2012) Degenerative Lumbar Spinal Stenosis: Evaluation and Management. Journal of the American Academy of Orthopaedic Surgeons. 20(8).
- ▶ Koreckij, T.D. et al. (2019). Cervical Disc Arthroplasty. Journal of the American Academy of Orthopaedic Surgeons.
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- ▶ Medtronic. (2019). Cervical Disc Replacement Treatment Options.
- ▶ Shamie, N. (2019) Update on Lumbar Stenosis and Spondylolisthesis. California Orthopaedic Association.
- ▶ Woods, B. Hillbrand, A. (2015) Cervical Radiculopathy: Epidemiology, Etiology, Diagnosis, and Treatment. Journal of Spinal Disorders and Techniques. 28(5).

Thank You