PHYSIOTHERAPY IN SURGICAL CONDITIONS

[PT 310]

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LECTURE NOTES FOR 3rD GRADE BPT STUDENTS

SPRING SEMESTER 2024-2025

DEPARTMENT OF PHYSIOTHERAPY, FACULTY OF APPLIED HEALTH SCIENCES

TISHK INTERNATIONAL UNIVERSITY

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Spinal Surgery: Discectomy

LECTURE OUTLINE

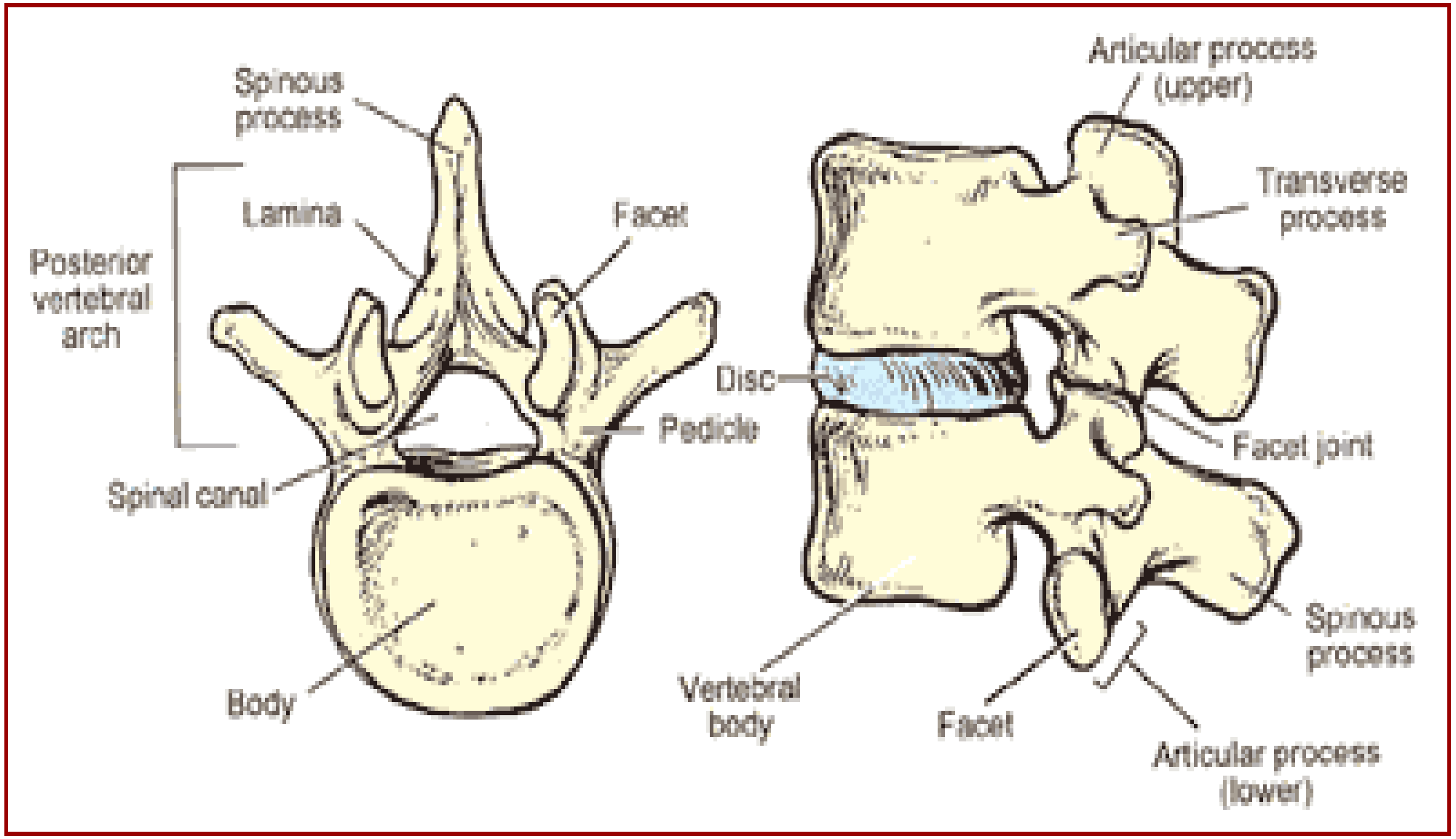
- Learning objectives
- Introduction to spinal surgeries
- Brief anatomy of the spine
- Definitions/indications
- Surgical procedures/ types of incision techniques
- Contraindications
- Preoperative assessment and treatment
- Postoperative treatment/rehabilitation
- Complications
- Review
- Reading resources/additional materials

PHYSIOTHERAPY IN SURGICAL CONDITIONS

LEARNING OUTCOMES

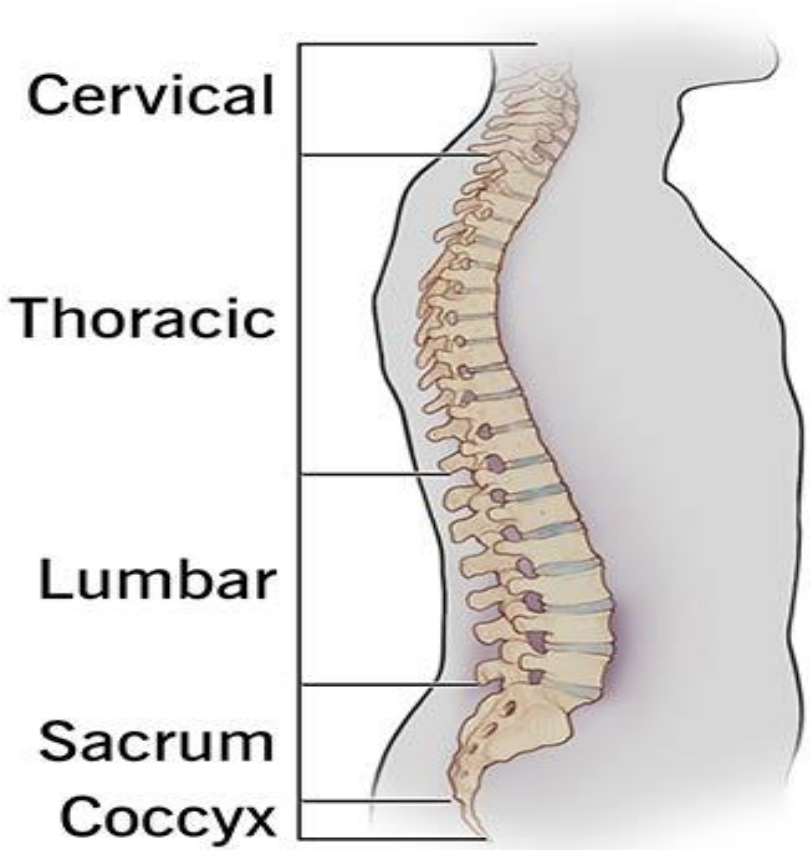
At the end of this lecture, the students should be able to:

- Understand the indications and contraindications of discectomy, laminectomy, & fusion surgeries
- Understand the surgical procedures involved in discectomy, laminectomy, & fusion surgeries
- Describe the preoperative & postoperative physiotherapy assessment for discectomy, laminectomy, & fusion surgeries
- Describe preoperative & postoperative physiotherapy treatment for discectomy, laminectomy, & fusion surgeries
- Recognize common early & late postoperative complications of discectomy, laminectomy, & fusion surgeries

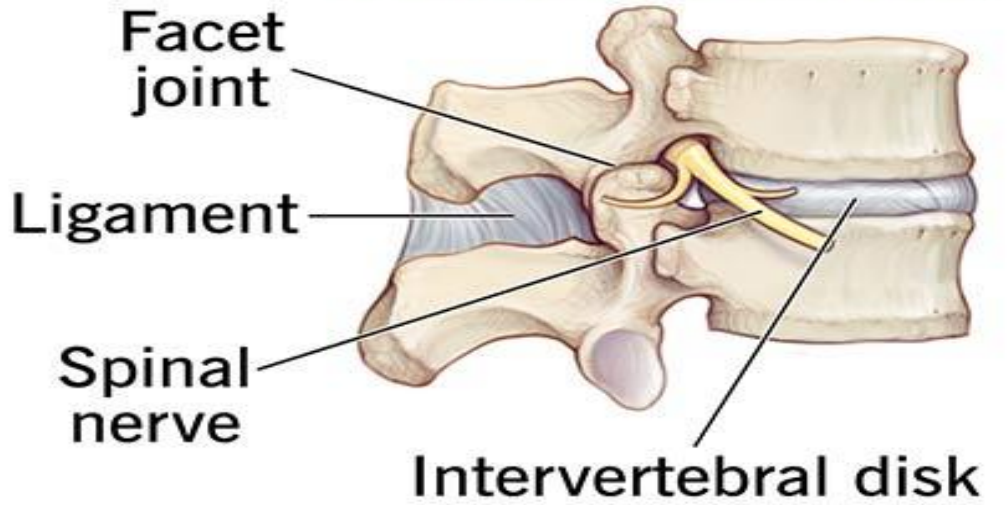

Spinous process
Lamina
Facet
Posterior vertebral arch
Spinal canal
Pedicle
Body
Articular process (upper)
Transverse process
Disc
Facet joint
Vertebral body
Facet
Spinous process
Articular process (lower)

Spine (backbone)

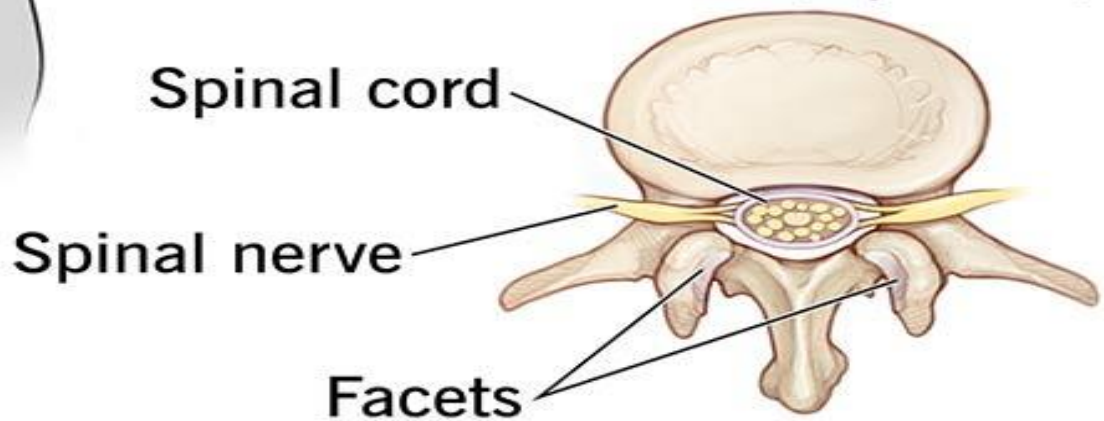
Parts of the spine

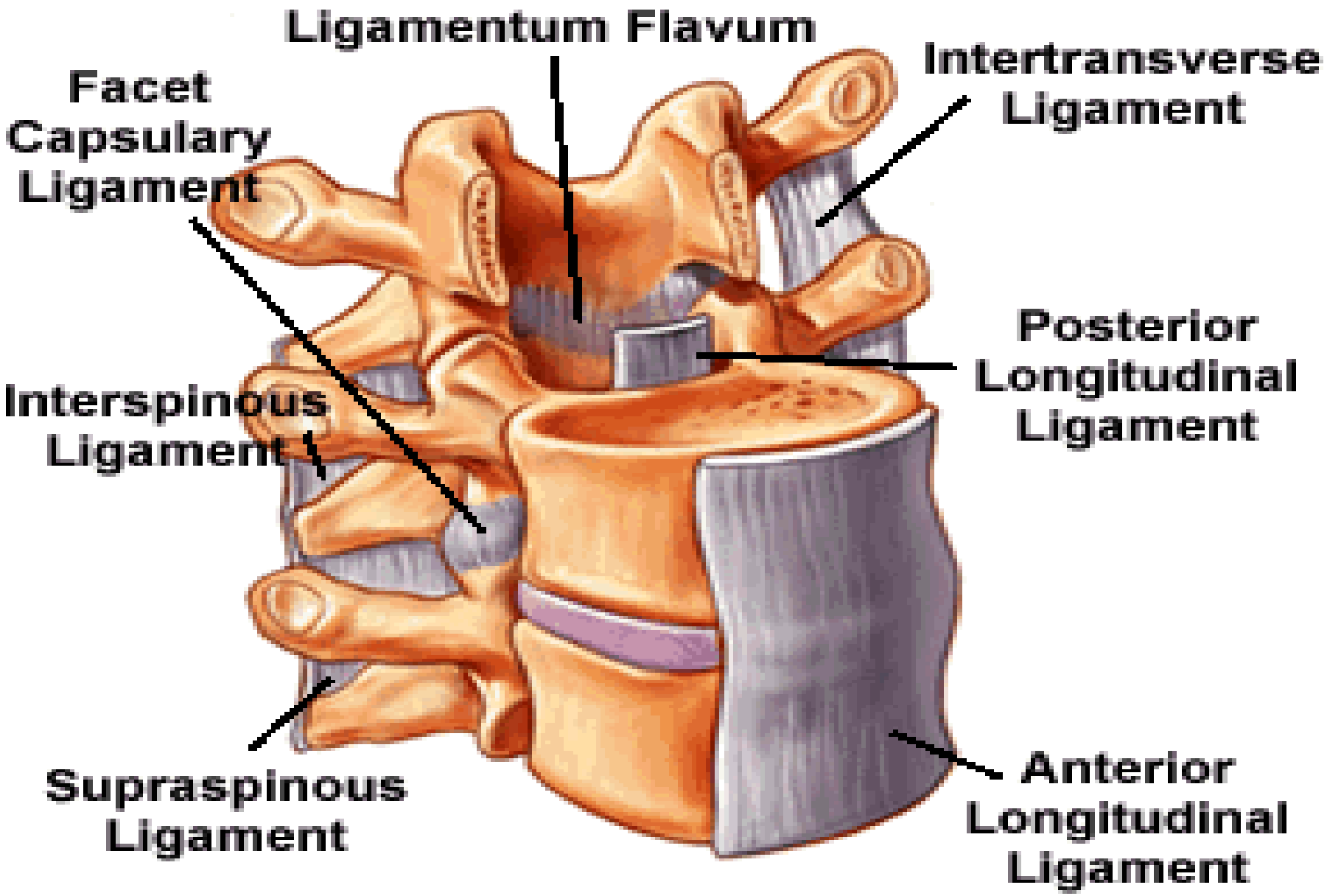


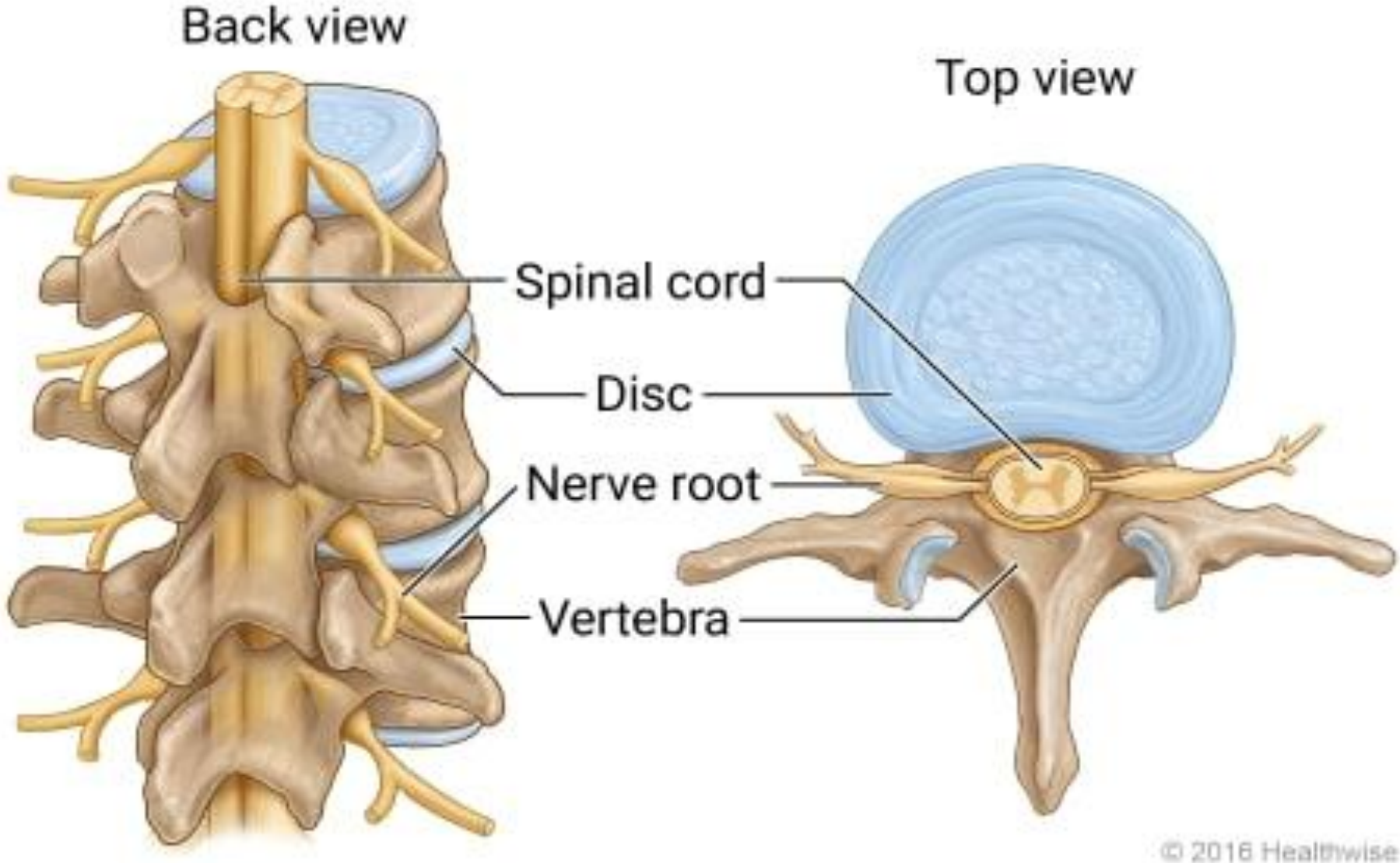
Vertebrae (side view)



Vertebra (top view)




Ligamentum Flavum
Facet Capsulary Ligament
Intertransverse Ligament
Posterior Longitudinal Ligament
Interspinous Ligament
Supraspinous Ligament
Anterior Longitudinal Ligament


Back view
Top view
Spinal cord
Disc
Nerve root
Vertebra
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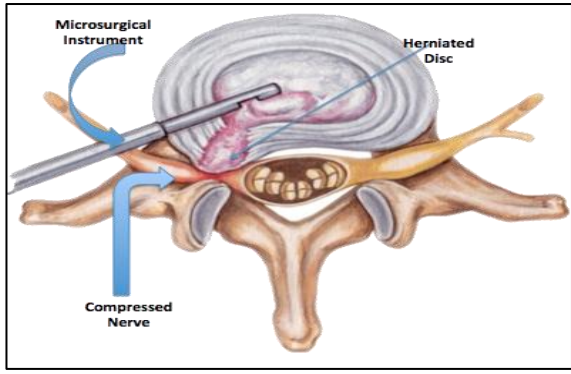
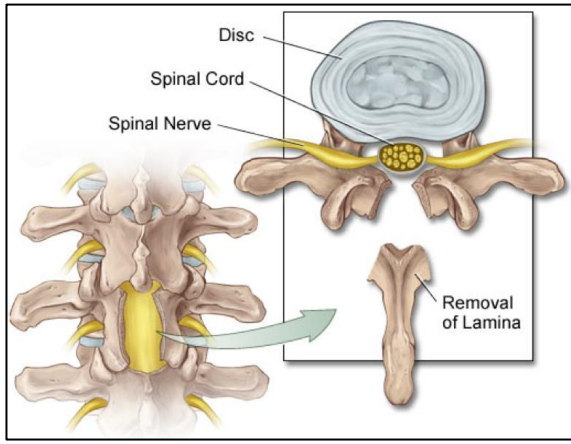
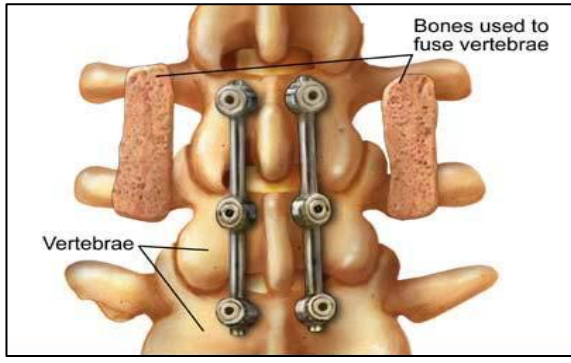
Discectomy, laminectomy, & fusion surgeries

Introduction:

- Commonly performed procedures for specific LBP conditions e.g. herniated discs, spinal stenosis, degenerative disc dx (DDD).
- Often considered when conservative Rxs (physical therapy & medication) fail.
- Frequently performed in individuals aged 30–60 years, but can be done at any age.
- Mostly performed in the lumbar spine
- Can be costly (thousands of dollars) depending on the complexity, hospital, & location.
- Effective in relieving symptoms, but requires careful consideration of risks, costs, & long-term benefits.
- PT plays an important role in post-surgical care & rehabilitation







Discectomy

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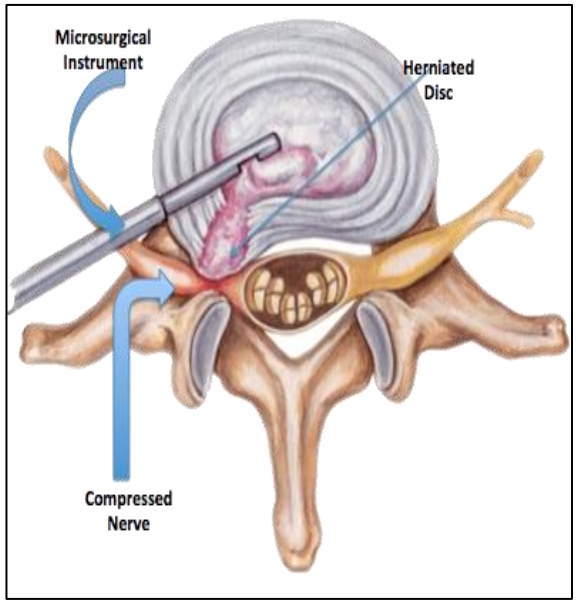
Discectomy

What is Discectomy?

- Surgical removal of a portion or the entirety of a damaged intervertebral disc (IVD).
- Often performed to relieve pressure on the nerve roots caused by herniated IVDs & reduce symptoms.

Indications:

- Herniated disc causing
  - severe nerve compression.
  - severe persistent pain, numbness, or arm or leg weakness
- Not responsive to conservative Rxs.
- A herniation may contain **nucleus pulposus, vertebral endplate cartilage, apophyseal bone/osteophyte & annulus fibrosus.**



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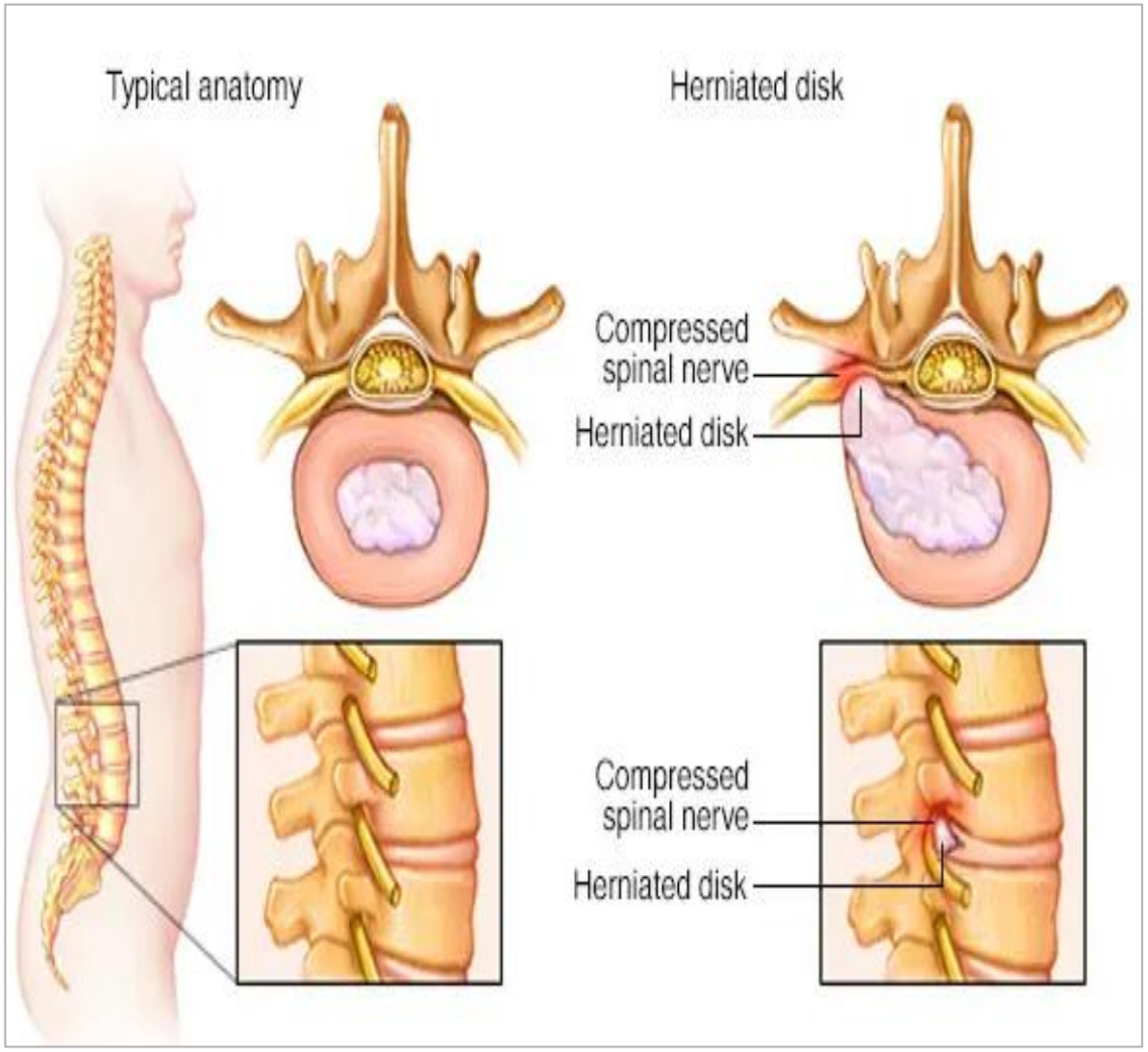
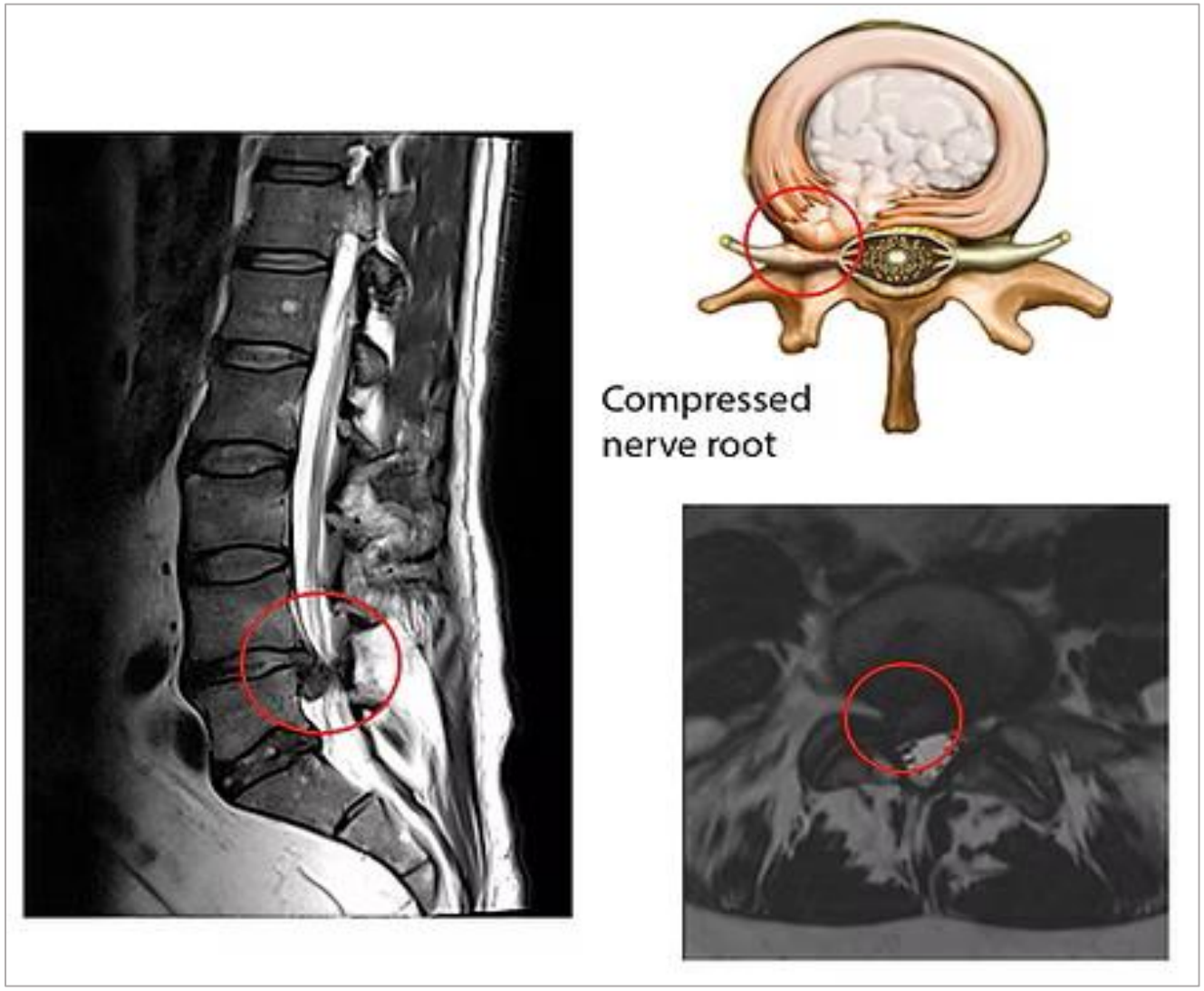
Discectomy





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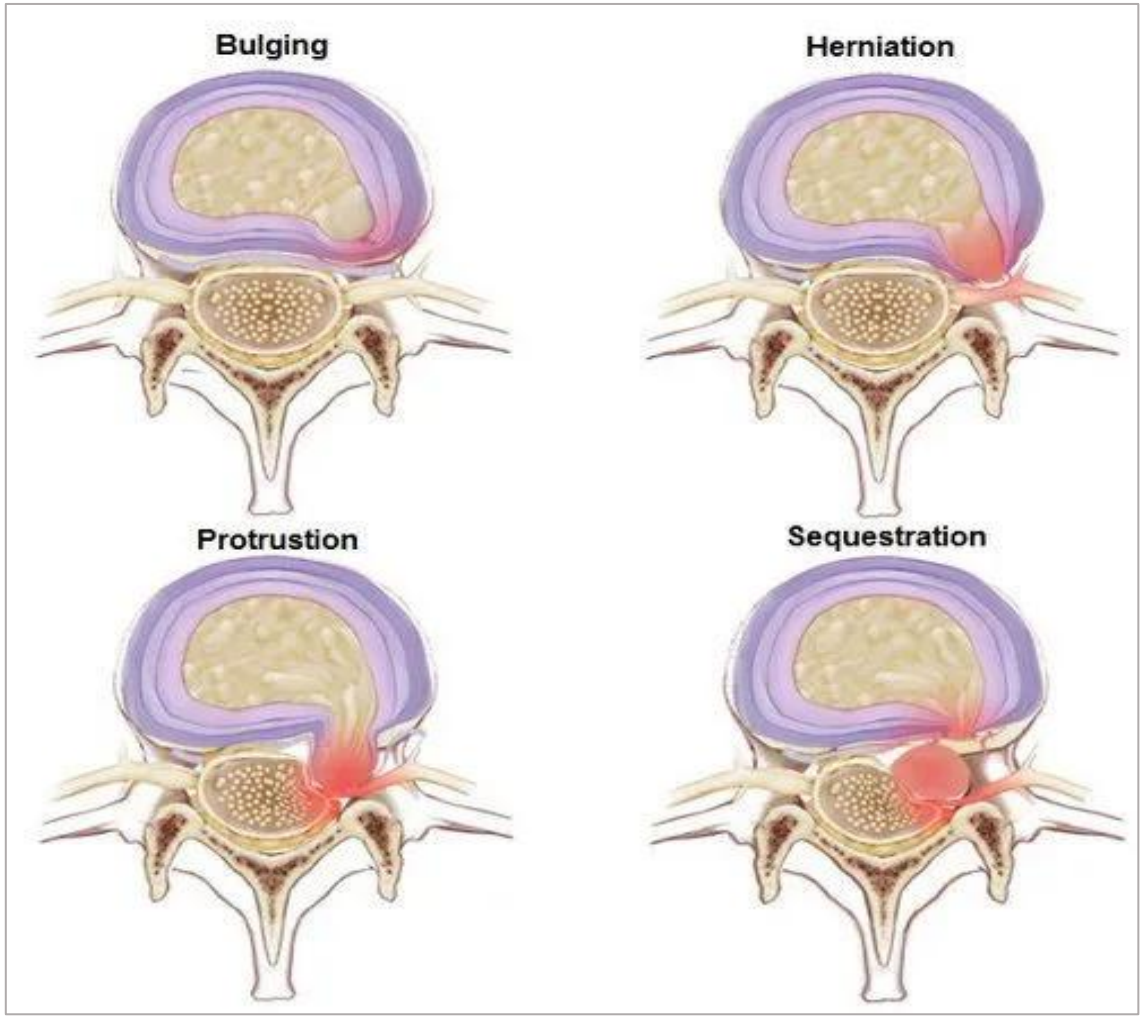
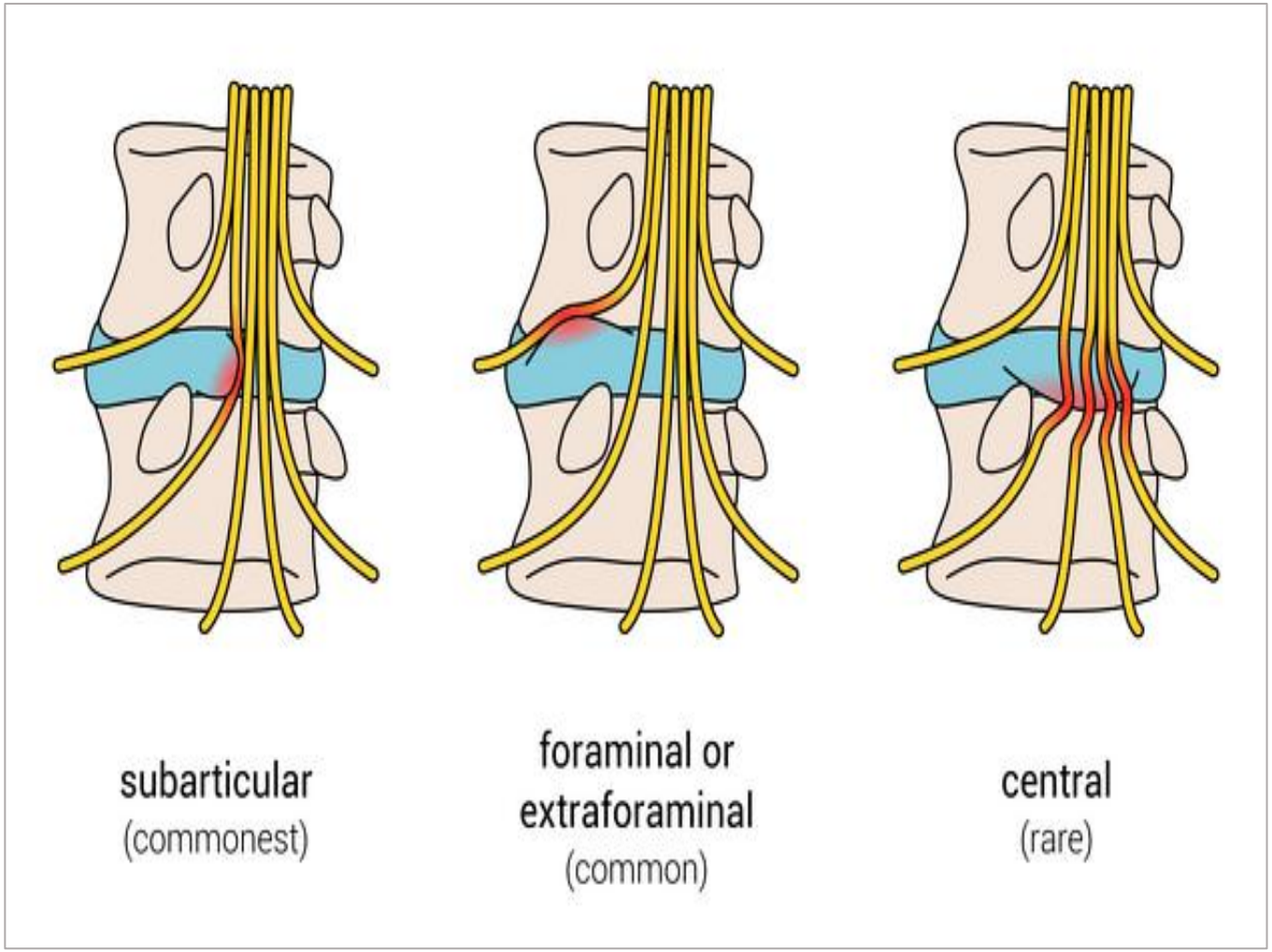
Discectomy



Stages of IVD herniation



Types/location of IVD herniation

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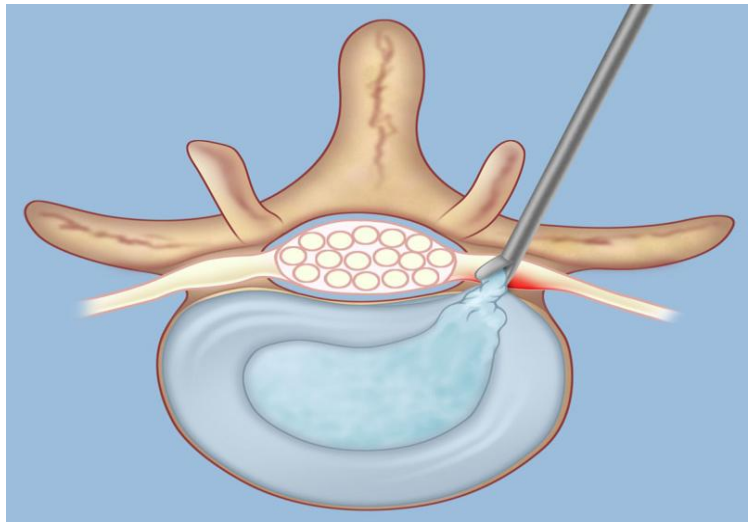
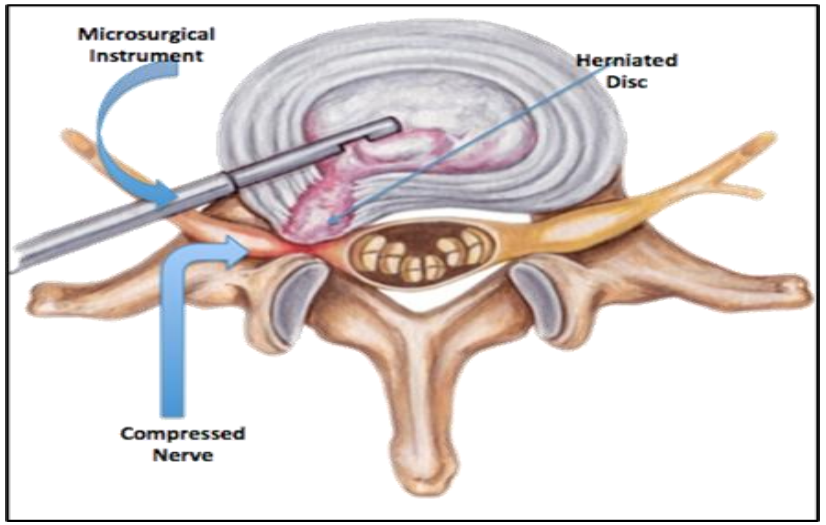
Discectomy

Surgical procedure

- Nowadays **microdiscectomy** (minimally invasive discectomy) is done as it is a more refined & less invasive form of discectomy.
- An incision is made near the affected disc, & the damaged portion of the disc is removed.
- In some cases, a portion of the vertebra may be removed for better access.
- The goal is to relieve pressure on the spinal cord or nerve roots.





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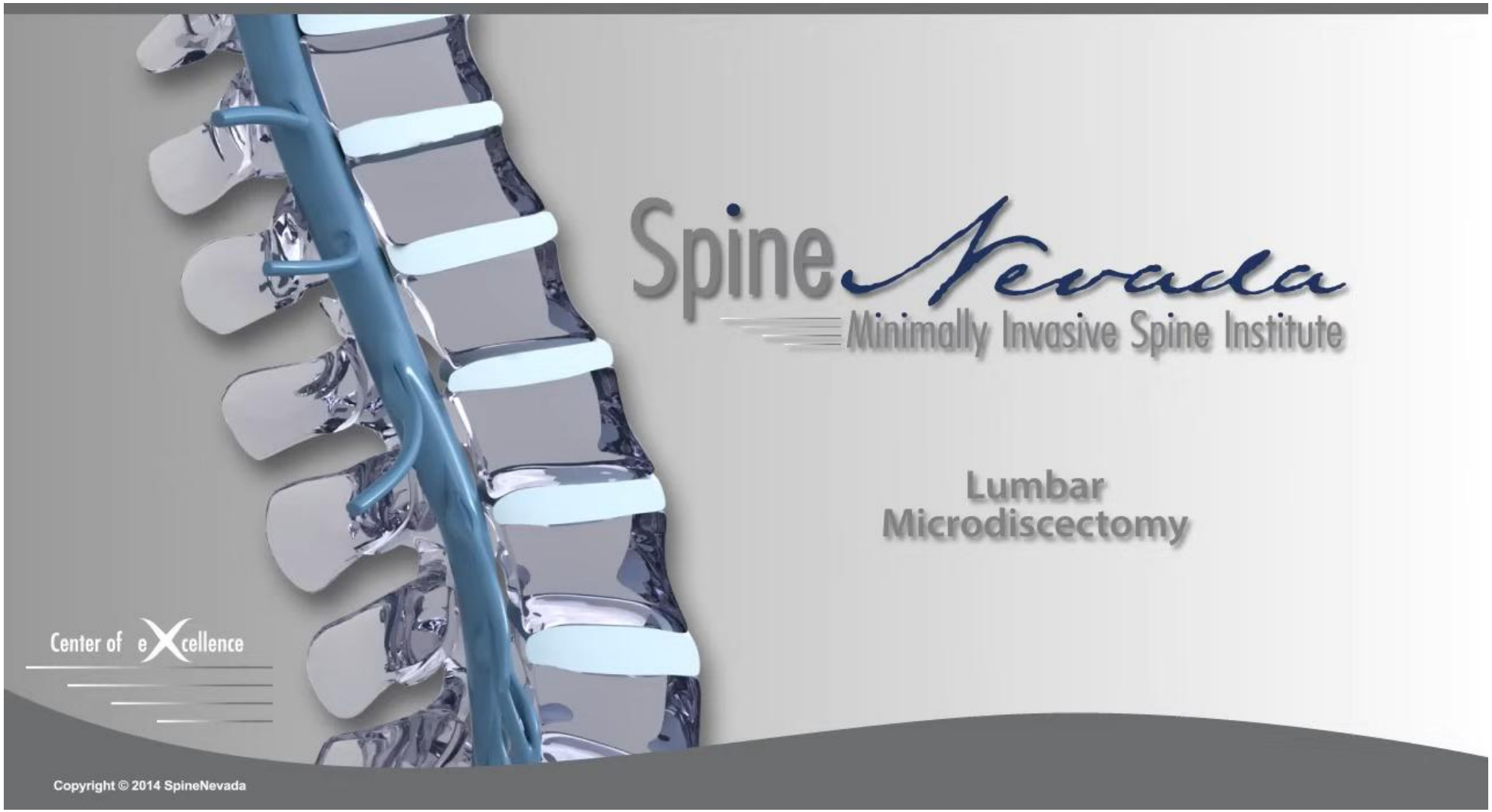
Discectomy

Surgical procedure (microdiscectomy without bone removal)



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Discectomy, laminectomy, & fusion surgeries

Surgical procedure (microdiscectomy with bone removal)

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Discectomy

Contraindications

1. Severe spinal instability: Inadequate spine stability
2. Active infection: Infection in the spine or surrounding areas.
3. Severe osteoporosis: Fragile bones that may not heal properly
4. Severe neurological deficits: Significant nerve damage.
5. Obesity: Increased risk of complications.
6. Uncontrolled health conditions: Poorly controlled diabetes, heart disease, etc.
7. Failure of conservative Rxs: If conservative Rxs haven't been tried or there's no clear surgical indication, surgery may not be recommended.
8. A vertebral fracture that requires fusion or instrumentation
9. Malignant tumors

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Discectomy

Physiotherapy preoperative assessment

- Subjective history
- Pain: type, intensity, & location of pain (e.g., radiating leg pain or back pain).
- Spinal ROM: lumbar flexion, extension, rotation & side bending
- Muscle strength/endurance (core, lower back & legs)
- Posture: check for any postural abnormalities or spinal misalignment
- Neurological assessment: signs of nerve compression (e.g., reflexes, sensation, motor function).
- Functional mobility: assess the patient's ability to perform ADLs (e.g. walking, bending, or sitting)
- Psychosocial factors (e.g., anxiety, fear)

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Discectomy

Physiotherapy preoperative treatment

- Pain management: using modalities like heat, cold, or TENS/IFT to manage pain.
- Postural education: teach correct posture & body mechanics to reduce spine strain.
- Strengthening exercises: focus on core (TrA contractions), lower back, & abdominal muscles.
- Flexibility & mobility: gentle stretches to maintain ROM & flexibility.
- Aerobic conditioning: low-impact activities (e.g., walking, cycling) to maintain fitness.
- Activity modification: advise on avoiding activities that strain the spine.
- Psychological preparation: address anxiety & mentally prepare for recovery.

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Discectomy

Physiotherapy postoperative assessment

- Pain monitoring: track post-surgery pain levels & monitor for signs of complications.
- Spinal ROM: reassess spine flexibility to ensure safe movement.
- Muscle strength: Re-evaluate strength, particularly in the back, legs, & core, to ensure recovery.
- Neurological monitoring: check for any improvements or setbacks in nerve function, including reflexes & sensation.
- Functional mobility: assess recovery of daily function, such as walking, sitting, & bending.
- Gait analysis: reassess gait & balance to identify any abnormal patterns that may affect recovery.
- Scar tissue & soft tissue healing: assess healing of soft tissues around the surgical site

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Discectomy

Physiotherapy postoperative treatment

The goal is to alleviate pain, restore function, & enhance recovery while protecting the spine

- Pain management: using cold, heat, or TENS/IFT to manage postoperative pain.
- Breathing exercise: to improve cardiorespiratory fitness.
- Postural & movement education: teach safe movement patterns (e.g. avoid lumbar flexion) & posture to protect the spine.
- Gentle ROM: e.g. ankle pumps, SLR to restore flexibility.
- Strengthening exercises: begin strengthening the core, back, & lower body muscles to support the spine (TrA contractions, gentle bridging, gluteal sets, quads/hams sets, adduction sets)
- Walking & gait training: encourage early walking & proper gait to improve mobility & balance.
- Scar tissue management: promote soft tissue healing & reduce scar tissue formation.
- Gradual return to activity: slowly increase functional activities & exercise intensity.
- Education on activity modification: advise on avoiding high-impact activities or improper movements that could stress the spine.

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Discectomy

Physiotherapy postoperative treatment

- **Note: some patients could be discharged on the postoperative day, but still they might need to be on out-patient physiotherapy.**

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Discectomy

Complications

1. Unintentional dura tear (9%): can lead to CSF leakage & subsequent complications like meningitis
2. Iatrogenic neuropraxia (1–2%): intraoperative nerve root injury
3. Surgical site infection (2–3%), with wound dehiscence occurring in 1% to 2%
4. Epidural bleeding & hematoma
5. Vascular injury (< 1%): Aorta & inferior vena cava are particularly at risk in the L1-L4 region
6. Failed back surgery syndrome (FBSS): recurrence rates of 3–15% & instability rates of 20% during 10 years of follow-up have been observed
7. Anesthesia risks: reactions or complications related to anesthesia.

QUESTIONS AND COMMENTS

REVIEW

OTHER READING SOURCES

TEXT

1. *O'Shea, J. (2019). Principles of physiotherapy in surgery and rehabilitation. Cambridge University Press.*
2. *Dutton, M. (2017). Orthopaedic examination, evaluation, and intervention (3rd ed.). McGraw-Hill Education.*

THANKS FOR LISTENING