PHYSIOTHERAPY IN SURGICAL CONDITIONS

[PT 310]

Dr. AMINU A. IBRAHIM (BPT, MPTh, Ph.D)

LECTURE NOTES FOR 3rD GRADE BPT STUDENTS

SPRING SEMESTER 2024-2025

DEPARTMENT OF PHYSIOTHERAPY, FACULTY OF APPLIED HEALTH SCIENCES

TISHK INTERNATIONAL UNIVERSITY

2024/2025

Spinal Surgery: Laminectomy

LECTURE OUTLINE

- Learning objectives
- 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:

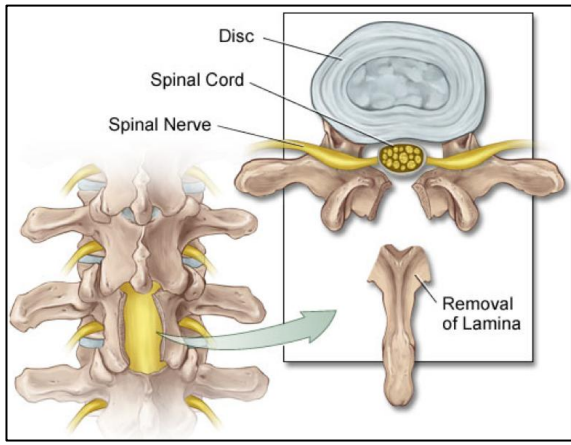
- Understand the indications and contraindications of laminectomy
- Understand the surgical procedures involved in laminectomy,
- Describe the preoperative & postoperative physiotherapy assessment for laminectomy
- Describe preoperative & postoperative physiotherapy treatment for laminectomy
- Recognize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

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

What is Laminectomy?

- Also called **decompression surgery**
- Surgical removal of the lamina (part of the vertebra) to create space & relieve pressure on the spinal cord or nerve roots.
- Commonly performed in the lumbar spine (L4, L5 & S1), to relieve pressure on the spinal cord or nerve roots caused by herniated IVDs, spinal stenosis or bone spurs.
- **Note: spinal stenosis, herniated IVDs & bone spurs (osteophytes) often occurs simultaneously.**

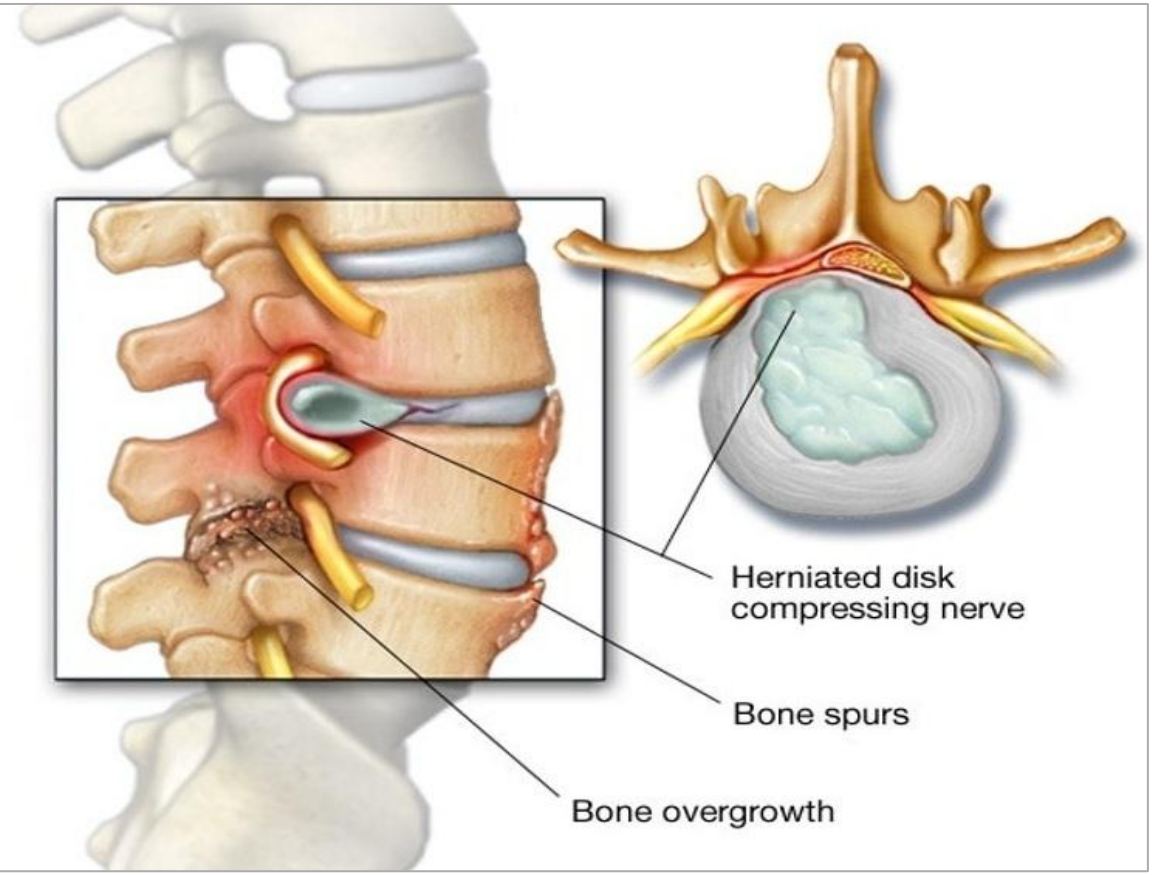


Indications:

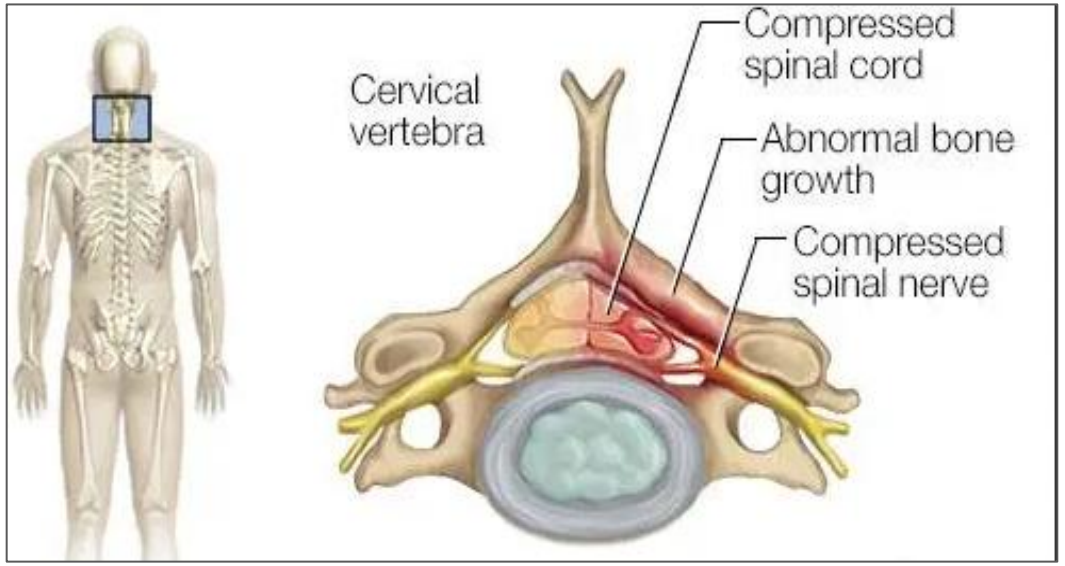
- Herniated IVD or bone spurs causing nerve compression.
- Spinal stenosis causing nerve compression.
- Chronic back or leg pain unrelieved by conservative Rxs leading to nerve root compression & weakness or numbness in the LLs.
- Trauma (fractures that compromise the spinal canal)

PHYSIOTHERAPY IN SURGICAL CONDITIONS

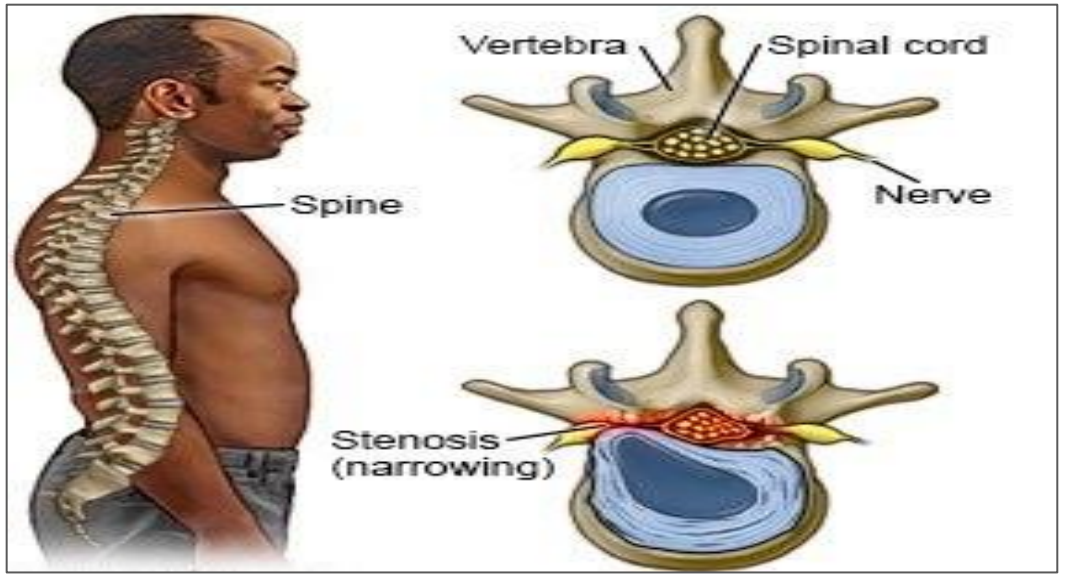
Laminectomy



Spinal stenosis



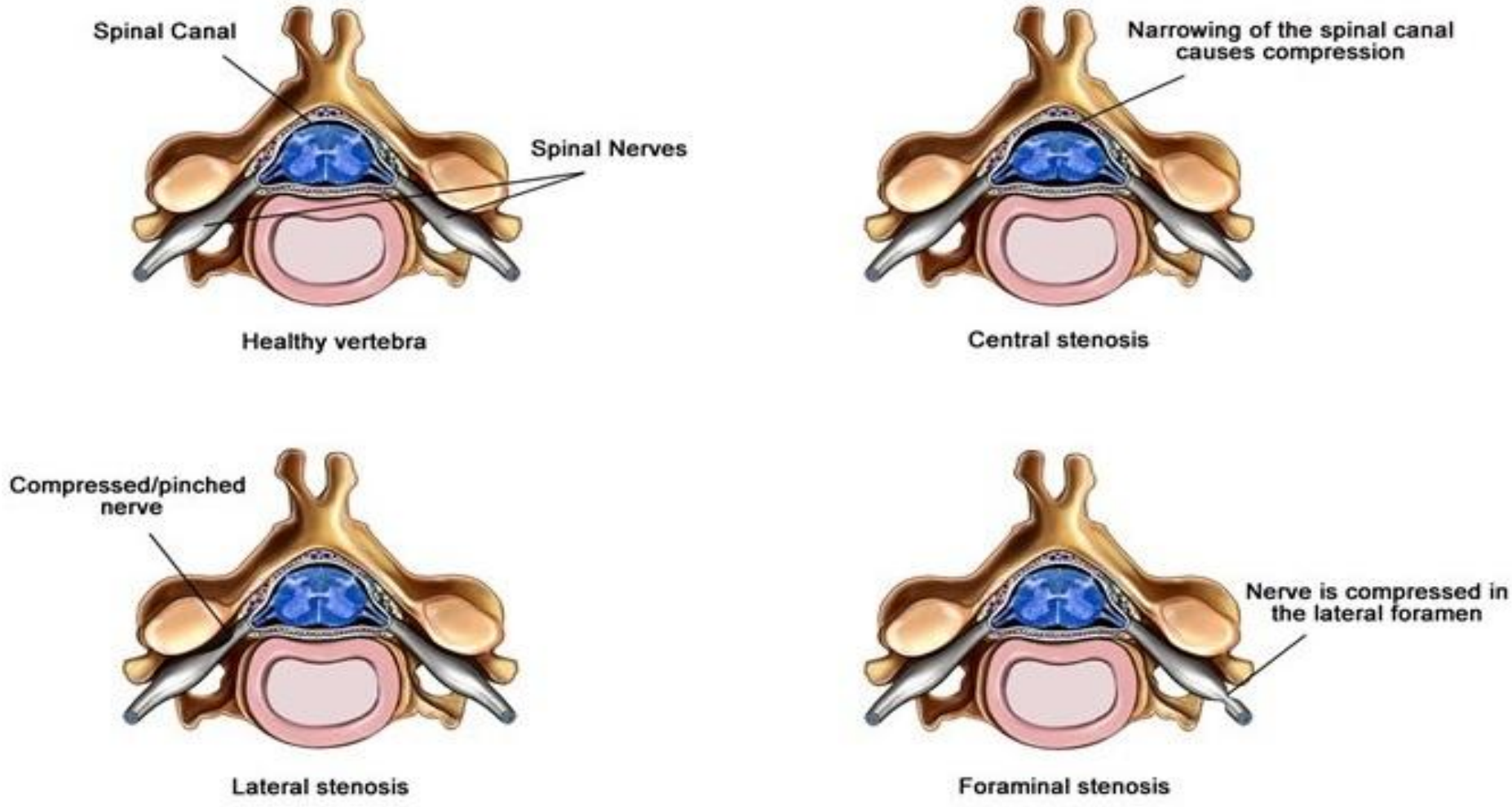
Cervical vertebral stenosis



Lumbar vertebral stenosis

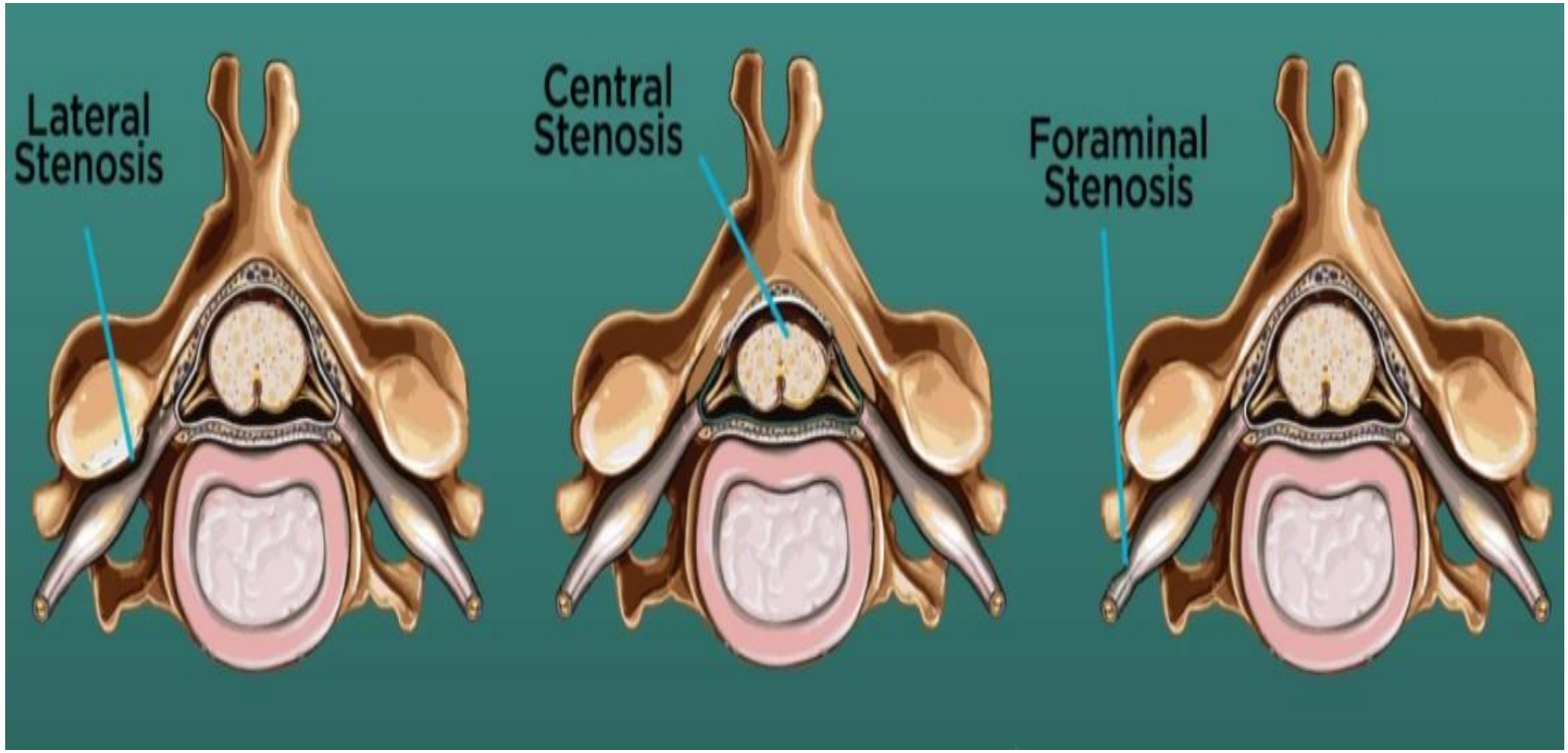
PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

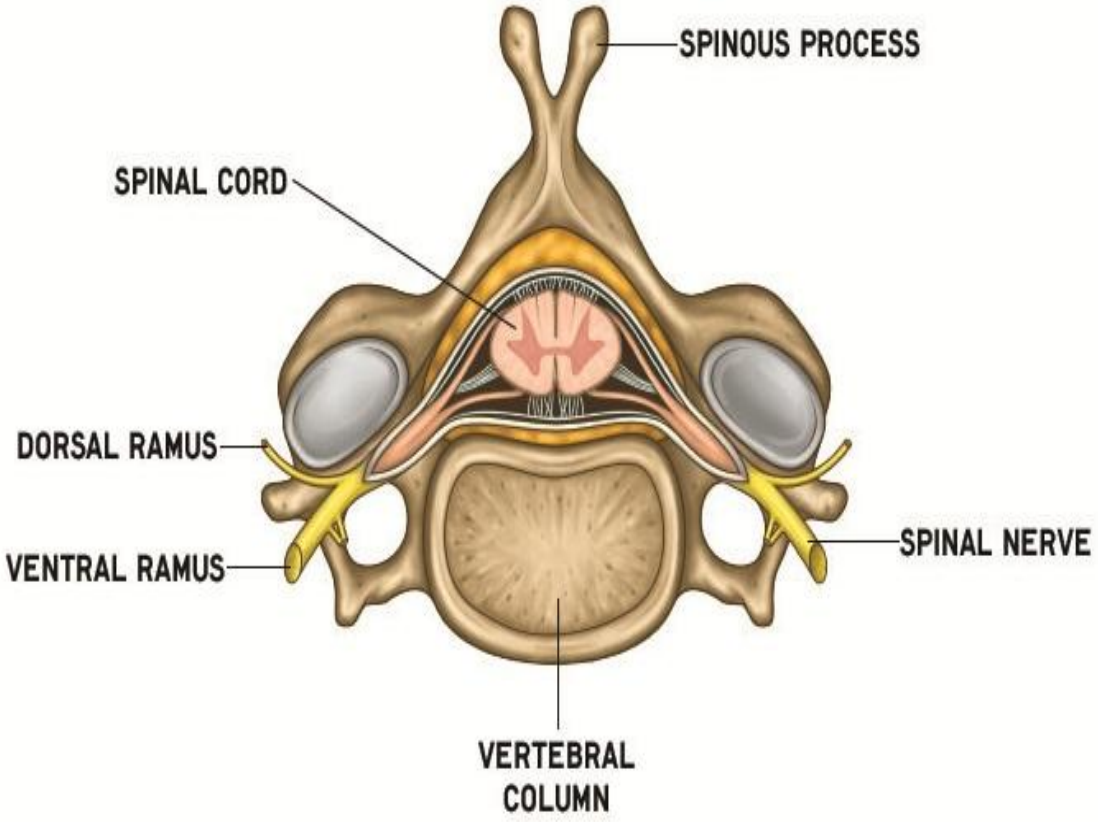


Types of spinal stenosis

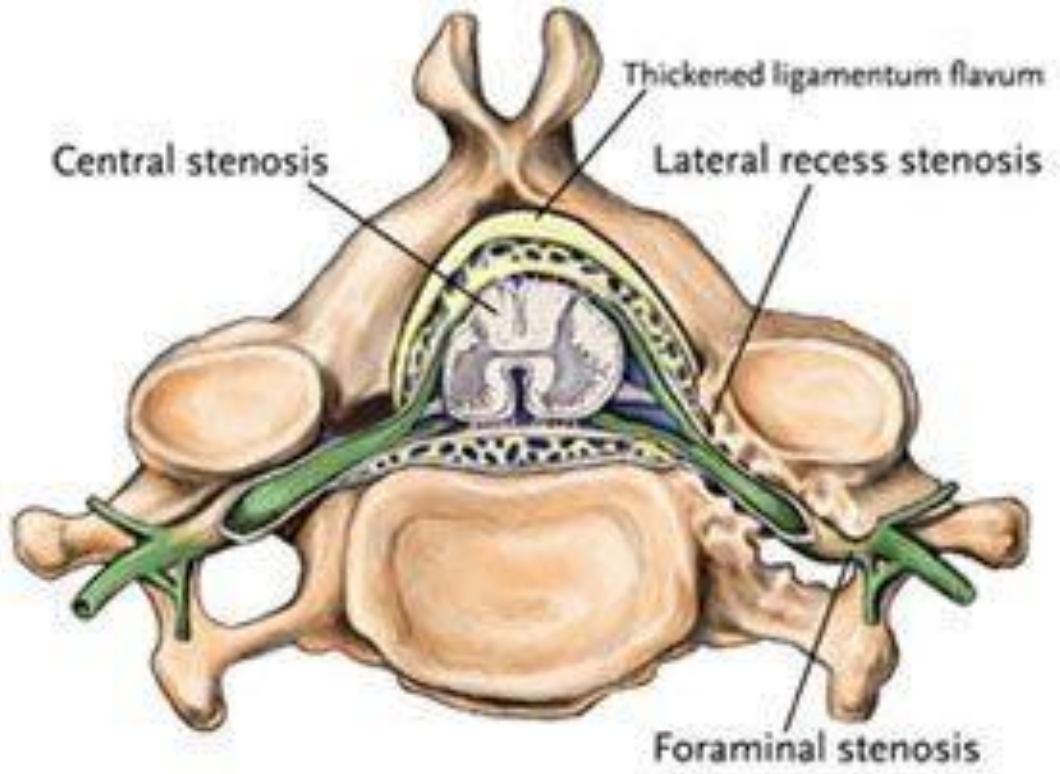
Laminectomy



Laminectomy



Healthy cervical vertebra

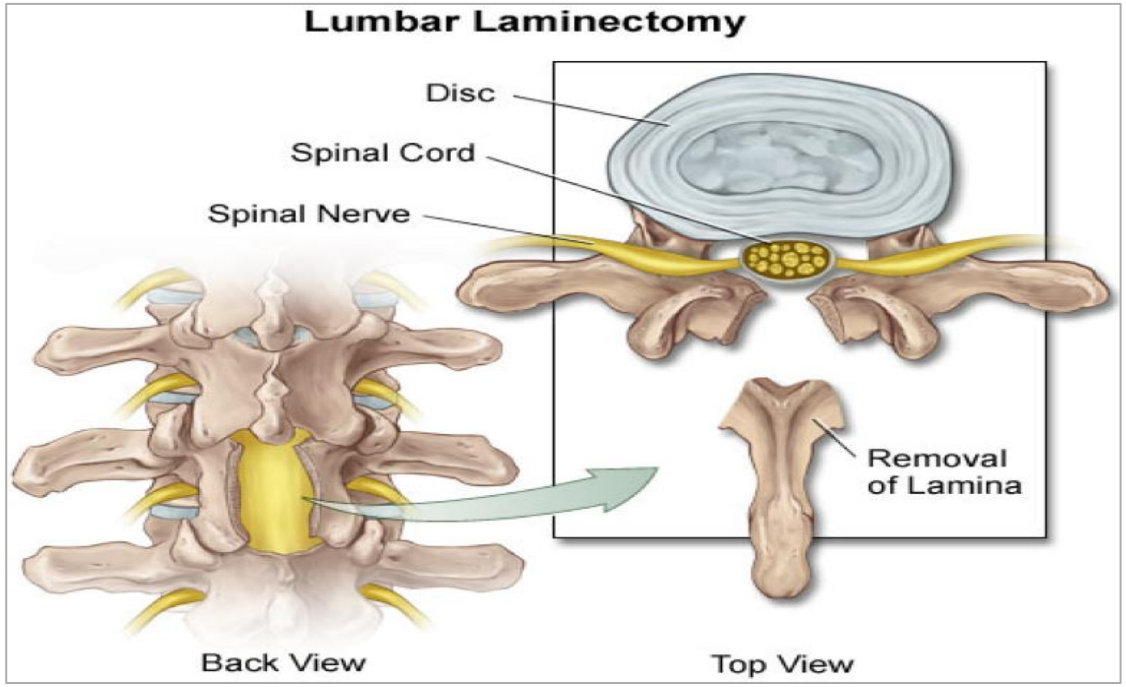


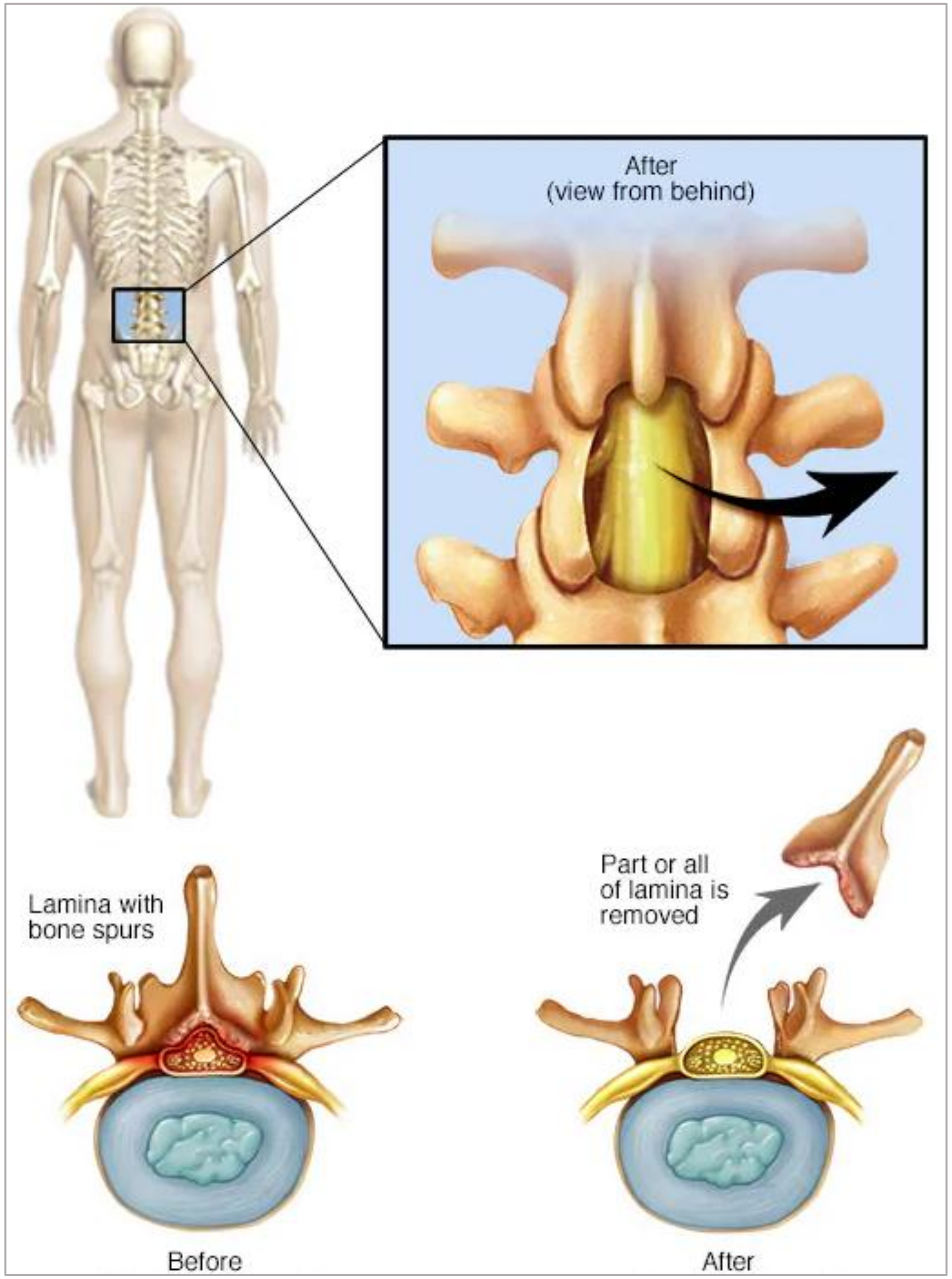
Cervical vertebral stenosis

Laminectomy

Surgical procedure

- An incision is made over the affected vertebra.
- The lamina is removed to decompress the spinal cord and/or nerve roots.
- Sometimes, bone spurs or ligaments that are compressing nerves may also be removed.





PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Surgical procedure (traditional laminectomy surgery)

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Surgical procedure (Endoscopic laminectomy surgery)

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Aspect	Traditional laminectomy	Endoscopic laminectomy
Surgical approach	Involves a larger incision to access the spine directly.	Uses a smaller incision and specialized endoscope.
Invasiveness	More invasive, with muscle and tissue disruption.	Minimally invasive, with less disruption to tissues.
Recovery time	Longer recovery due to larger incision and tissue disruption.	Faster recovery due to smaller incision and reduced tissue damage.
Pain post-Op	Typically, more pain due to the larger incision.	Generally, less pain due to minimal tissue trauma.
Hospital stay	Often requires a longer hospital stay (1-3 days).	Typically requires a shorter hospital stay (same-day discharge in some cases).
Scarring	Larger scar due to bigger incision.	Smaller scar due to tiny incision.
Complications	Higher risk of complications like infection and blood loss.	Lower risk of complications due to smaller incision.
Visibility	Direct view of the surgical area for the surgeon.	Limited view via the endoscope, requiring higher skill.
Indications	Typically for larger or more complex spinal issues.	Best for less complex cases or smaller herniations.
Cost	Generally lower cost due to more conventional methods.	Often more expensive due to advanced technology.
Post-op rehabilitation	May require more extensive rehabilitation.	Faster rehabilitation with less intensive therapy.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Contraindications

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

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy preoperative assessment

- Similar to Discectomy

Physiotherapy preoperative treatment

- Similar to Discectomy

Physiotherapy postoperative assessment

- Similar to Discectomy

Physiotherapy postoperative treatment

- **Different for cervical laminectomy and lumbar laminectomy**

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase I: day 0 to 6 weeks

- Prevent excessive initial mobility or stress on tissues
- Hard or rigid collar for 6 weeks
- Diaphragmatic breathing exercises
- Upper extremity extension isometric exercises

Philadelphia collar

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase II: Week 6-9 (Rx 2-3 times per week)

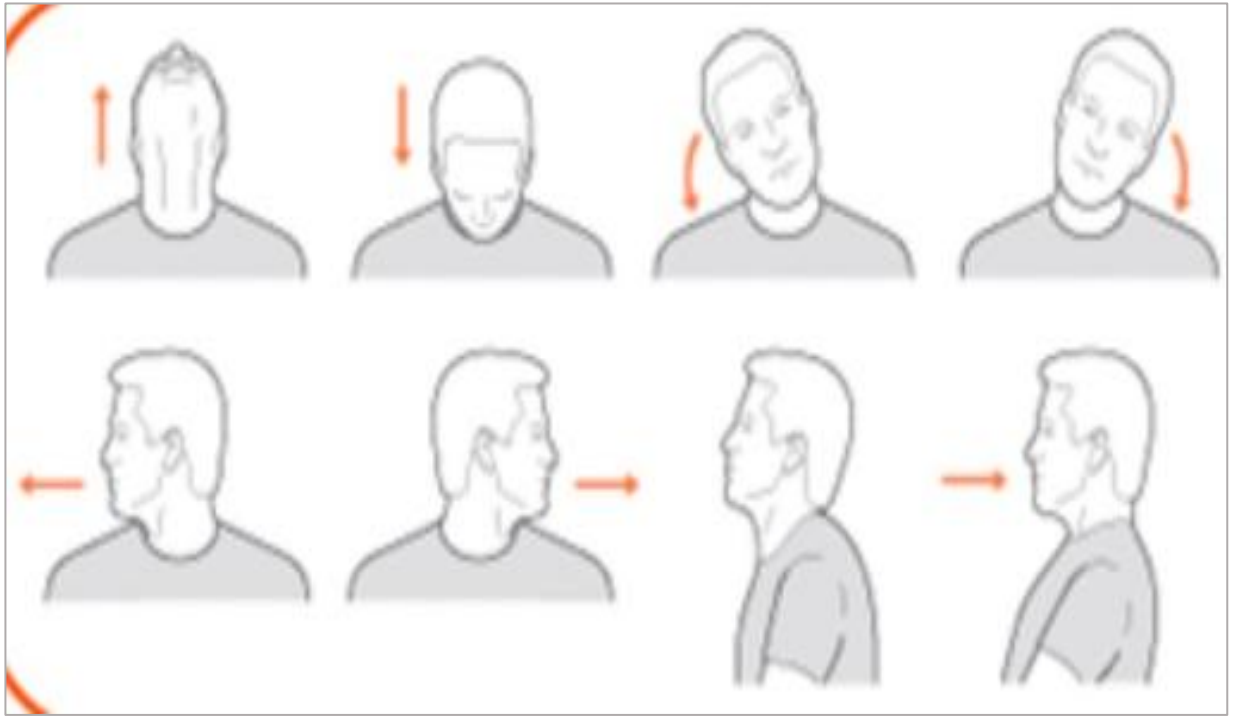
- Pain modalities (TENS/IFT, heat) for symptom modulation as needed.
- Cervical range of motion & isometric exercises.
- Scapular reeducation with shoulder shrugs, rolls, & retraction/depression exercises.
- Upper thoracic mobilizations: cat/camel, upper thoracic extension
- Restricted arm exercises (max 2kg), progress to overhead after 6 weeks.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

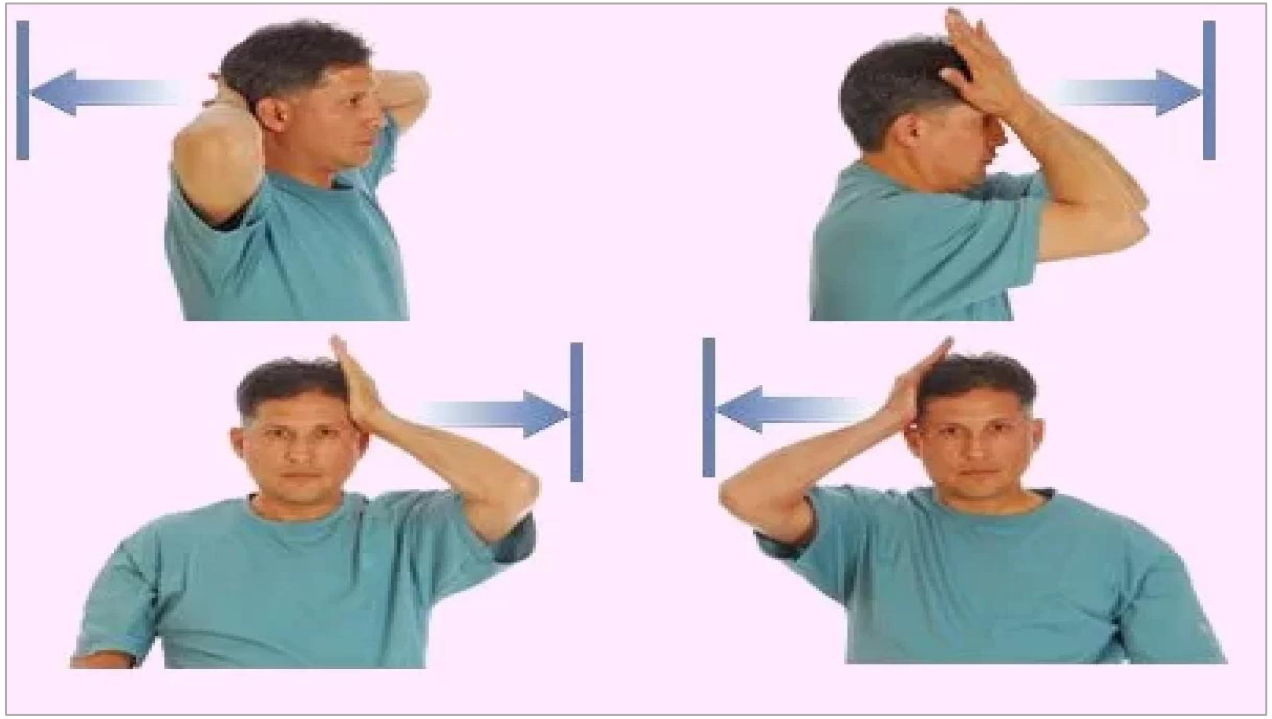
Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase II: Week 6-9 (Rx 2-3 times per week)



Neck ROM exercises



Neck isometric exercises

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

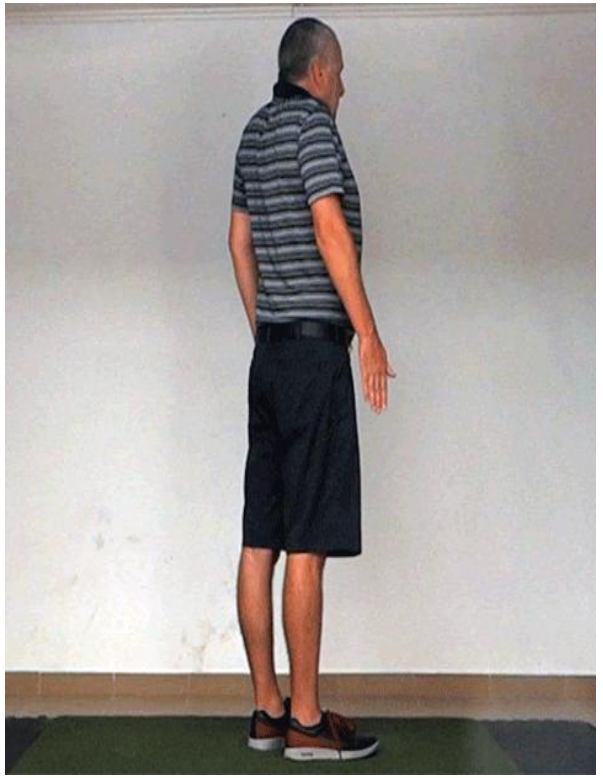
Physiotherapy postoperative treatment (cervical laminectomy)

Phase II: Week 6-9 (Rx 2-3 times per week)

Shoulder shrugs exercise

Shoulder rolls exercise

Shoulder retraction exercise



Shoulder depression exercise

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase II: Week 6-9 (Rx 2-3 times per week)

Cat and camel exercise

Upper thoracic extension exercise

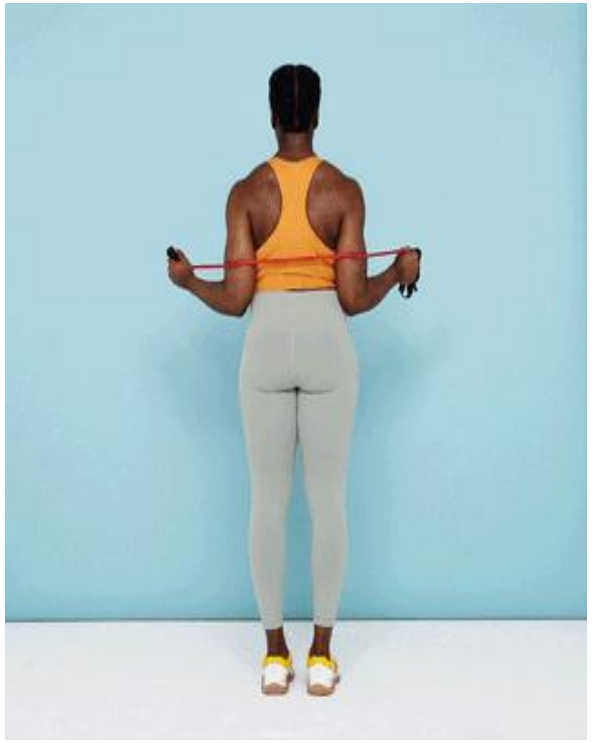
PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase II: Week 6-9 (Rx 2-3 times per week)






Restricted arm exercise

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase III: Week 9-12 (Rx 2-3 times per week)

- Posture training.
- Work/activity-specific training.
- Soft tissue mobilization to reduce guarding.
- Nerve mobilization (nerve glides) without reproducing symptoms.
- Upper extremity strengthening using free weight
- Scapular stabilization/strengthening (shrugs/rolls, chest press, seated rows, pull-downs, incline push-ups).
- Continue upper thoracic mobilization exercises.
- Progress ADLs & activity
- Cardiovascular training (treadmill, stationary bike).

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (cervical laminectomy)

Phase III: Week 9-12 (Rx 2-3 times per week)

Shoulder press exercise

Seated rows exercise

Shoulder pull down exercise

Shoulder incline ups exercise

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (Lumbar laminectomy)

Phase I: 0 to 2 weeks (protective phase)

1. Lumbar corset: may be needed depending on the surgeon or procedure
2. Education on movements/activity:
    - Avoid bending & twisting, lifting (**NO BLT**), pushing & pulling 5kgs or more for 2 weeks.
    - Limit sitting, including the car, to no more than 20 mins at a time (standing/walk breaks).
    - No extension ROM or rotation exercises for 8 weeks
3. Mobility exercises: heel slides, ankle pumps, leg lifts/SLR
4. Educate regarding posture & body mechanics
5. Light core exercise like bridging exercise (double then single), multifidus & TrA isometrics (bracing)
6. Light stretching: gluteal, quadriceps, hamstrings, calf, adductor
7. Functional exercise: sit to stand, side step, walking few steps
8. Advice to walk for 10 mins twice daily.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (Lumbar laminectomy)

Phase I: 0 to 2 weeks (protective phase)

Single knee to chest

Adductor stretch

Single knee to chest

Hamstring stretch

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (Lumbar laminectomy)

Phase II: 2-6 weeks (initial strengthening phase, 1-2 times a week, for ≥4 weeks)

1. Education on movements/activity:
   - Lifting restrictions: start with 2kg & progress to 5kg, maintain neutral spine with proper control.
2. Walking: aim for ≥30 minutes.
3. Stationary bike: can start at 2 weeks.
4. Core exercise progression: begin with isometrics, progress to body movements e.g. bridges, birddogs, spiderman.
5. Glute activation: continue exercises like hip extensions.
6. Modified squats: use a swiss ball for support.
7. Strength training: step-ups, leg press, wall squats, squats, etc.
8. Balance exercises: single leg stance, tandem, foam, with core bracing.
9. Upper/lower extremity exercises: Light resistive exercises (theraband, machines, free weights).
10. Stretching: continue stretching exercises.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Physiotherapy postoperative treatment (Lumbar laminectomy)

Phase III: 6-8 weeks (progression to advance strengthening)

1. Advanced core strength: progress to weight-bearing, balance, swiss ball etc.
2. Multi-planar exercises: progress to exercises involving both UL & LL extremities.
3. Continue strengthening exercise involving both UL & LL extremities.
4. Running and plyometrics: Begin after 8 weeks for return to sport (if symptoms stable & cleared).
5. Lumbar spine: focus on improving extension after 8 weeks (e.g., prone lying, standing extensions) without pushing to end-range (if no peripheralization).

Balance on swiss ball

Prone lying extension

Standing extension exercise

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Laminectomy

Complications

1. Unintentional dura tear
2. Iatrogenic neuropraxia (intraoperative nerve root injury)
3. Deep wound infection
4. Nerve/spinal cord injury
5. Epidural bleeding & hematoma
6. Vascular injury
7. Failed back surgery syndrome (FBSS)
8. Implant failure
9. CSF leak
10. 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