Back to work: Exploring injuries of the spine and how to best support the injured worker in their recovery

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Welcome to the INJURY INSIGHT Series

INJURY INSIGHT is a webinar series designed to educate and inform adjusters, employers, and industry stakeholders on the rehabilitation and recovery process of injuries, illnesses, diagnoses, and treatments, both common and uncommon, within workers' compensation.

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About this session

This Injury Insight session is all about the spine. Participants will learn about the anatomy of the spine, common mechanisms of injury and prevention methods for work injuries. Common symptoms and work-up including physical exam findings and imaging will be reviewed. Treatment options, ranging from physical therapy, medications, interventional physiatry injections and surgery will be discussed. Minimally invasive surgical options allowing earlier return to work will be emphasized. Post-operative rehabilitation, obstacles in recovery, and timelines to return to work will also be discussed.

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Dr. Symeon Zannikos, MD

Dr. Zannikos has been with Orthopedics New England since 2014. He received his Bachelor of Arts degree in Kinesiology with an emphasis in Biomechanics from Rice University in Texas. Dr. Zannikos also received a Master of Arts in Kinesiology and Biomechanics from The University of Texas at Austin. In 2008, he received his medical degree from The University of Texas Medical School at San Antonio. From there, Dr. Zannikos finished his internship in General Surgery and residency in Orthopaedic Surgery at Tufts Medical Center. He then completed his fellowship in Reconstructive Spine Surgery with The Boston Spine Group.

From years 2008-2013, Dr. Zannikos served as a Clinical Associate in Orthopaedic Surgery and Instructor for the medical student (MSI) Physical Diagnosis Labs at Tufts Medical School. Dr. Zannikos is published in peer-reviewed journals and has presented research at several local and regional meetings. He keeps current on medical knowledge by attending national meetings and courses related to spine surgery. His clinical interests include minimally invasive spine surgery, muscle-sparing approaches to the spine, treatment of back injuries in athletes, disc herniations, and cervical, thoracic, and lumbar degenerative disorders.

When he's not seeing patients, Dr. Zannikos' outside interests include exercising, history, and spending time with friends and family.

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Anatomy, Common Mechanisms of Injury, and Prevention

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Anatomy

- Lumbar spine
  - Relevant anatomy
  - Pain generators
- Cervical spine
  - Relevant anatomy
  - Pain generators

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CERVICAL SPINE

- **Roles of the Cervical Spine**
  - **Protecting the spinal cord**.
  - **Supporting the head and its movement**. The cervical spine handles a heavy load, as the head weighs on average between 10 and 13 pounds.
  - **Facilitating flow of blood to the brain**.
    - These openings for the blood vessels are present only in the vertebrae of the cervical spine from C1 down to C6.

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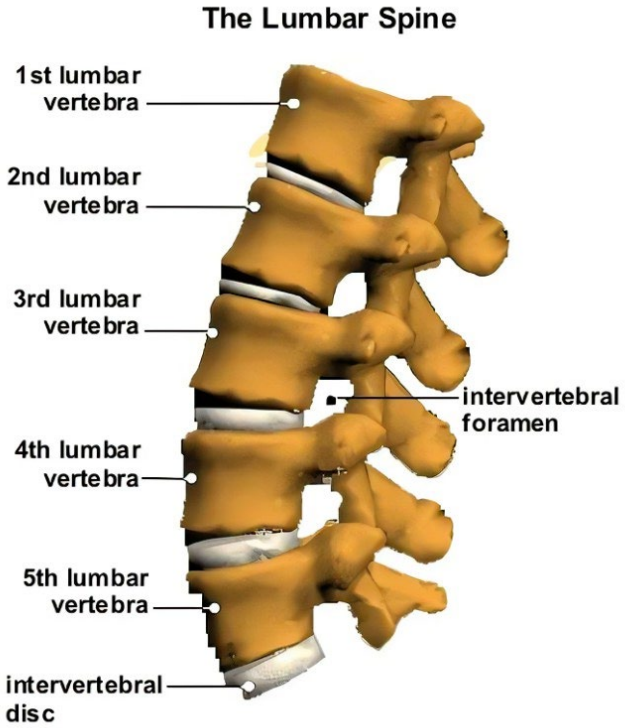
LUMBAR SPINE

- **Functions of the Lumbar Spine**
  - **Support and stabilize the upper body.**
  - **Allow truncal movements.**
  - **Protect the spinal cord and cauda equina.**
  - **Control leg movements.**



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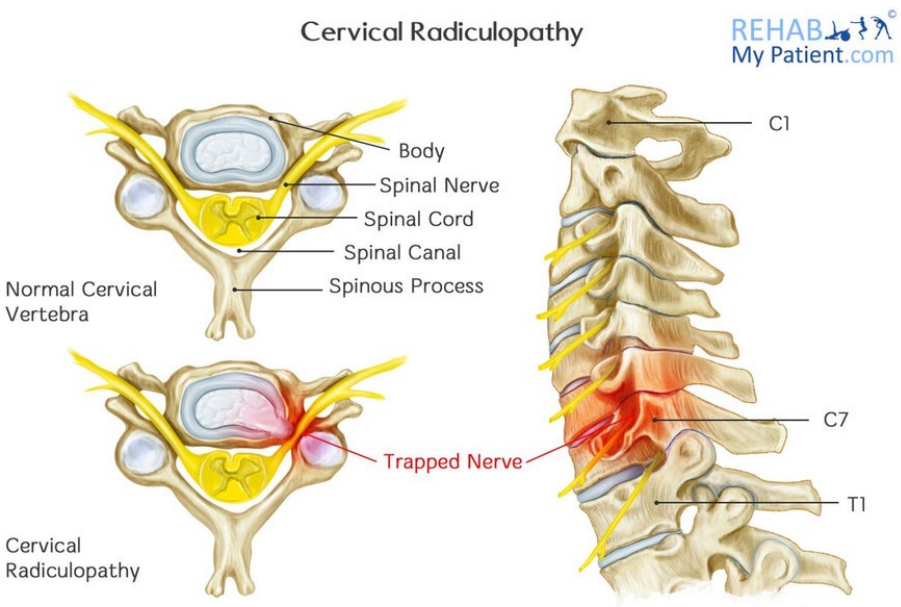
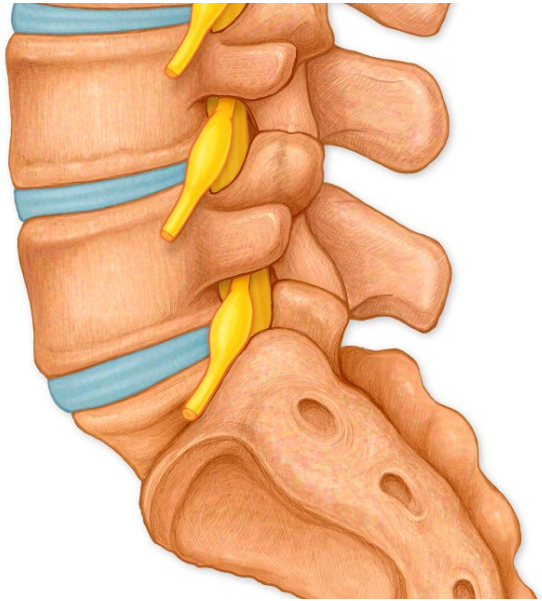
Spinal Nerves





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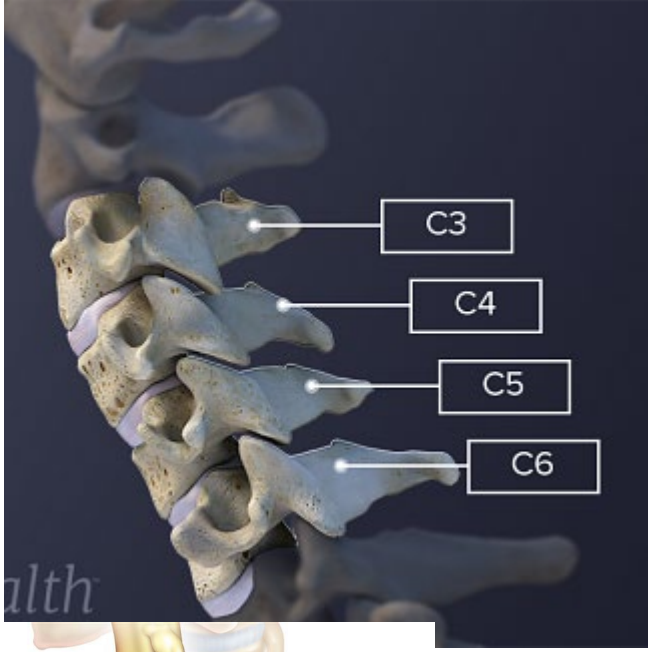
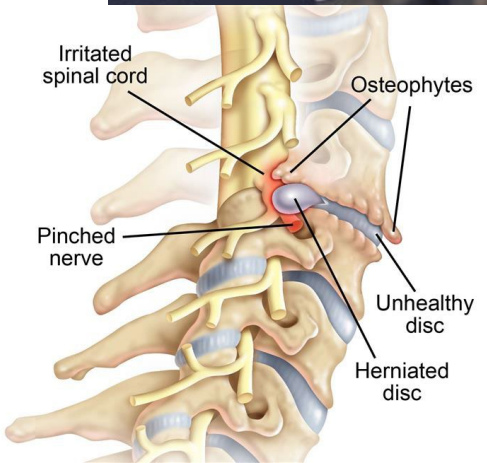
Facet Joints

- **Facet joints:**
  - Allow movements between adjacent vertebrae, determine the direction of movement and limit excessive movement.
  - Help carry loads, particularly during backward bending and twisting movements of the spine.





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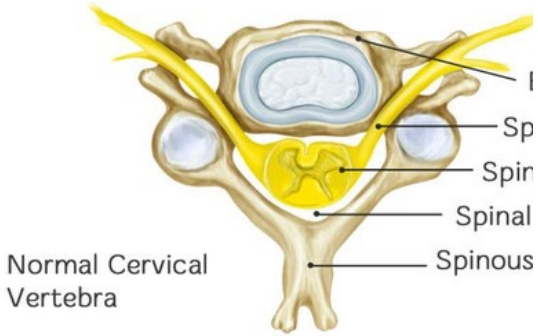
Intervertebral Discs



- Annulus fibrosus
- Nucleus pulposus
- The primary functions of these discs are to:
  - Distribute compressive loads placed on the spine, providing shock absorption properties
  - Maintain the distance between the vertebral bodies during movement
  - Provide flexibility to the spine and prevent excessive movements
  - Create and maintain the lordotic (backward C-shaped) curve of the lumbar spine

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Common mechanisms of injury

- Single accident injuries
  - MVA, whiplash
  - Falls
  - Trauma
- Overuse injuries
  - Repetitive lifting
  - Exacerbation of chronic injuries

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Prevention methods for work injuries

- Safety and wellness plans at work
- Pre-placement physicals
- Education of employees and staff
- Safety vulnerabilities specific to job
- Protection equipment
- Adequate staffing
- No shortcuts
- Monitor safety measures
- Orderly work place

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Clinical Presentation & Work-up

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Common presenting symptoms

- Lumbar
- Cervical
- Red flags

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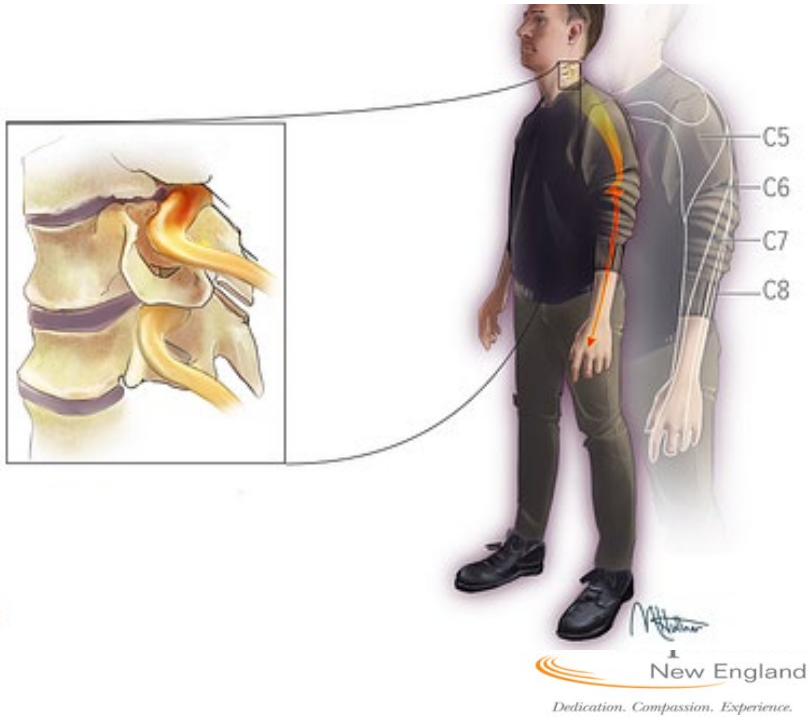
Cervical

- **Neck pain**. This pain is typically felt toward the back or side of the neck.
- **Radicular pain**. Shoulder, arm, hand, and/or fingers. It can sometimes feel hot or electric.
- **Cervical radiculopathy**. A pinched nerve or nerve root inflammation may also cause numbness and/or weakness to radiate down into the shoulder, arm, hand, and/or fingers.
- **Symptoms worsen with specific head positions or activities**.
- **Neck stiffness**.



Lumbar

- **Leg pain**. The leg pain is typically worse than low back pain.
- **Nerve pain.** Usually described as searing, sharp, electric, radiating, or piercing.
- **Variable location of symptoms**. Depending on variables such as where the disc herniates and the degree of herniation.
- **Neurological symptoms**. Numbness, a pins-and-needles feeling, weakness, and/or tingling may be experienced in the leg, foot, and/or toes.
- **Foot drop**.
- **Back pain.**

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Red Flags

- Weakness
- Bowel/bladder issues
- Nighttime pain
- Abnormal physical exam findings
- Fevers

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Physical Exam

- Axial versus radicular
  - Cervical
  - Lumbar

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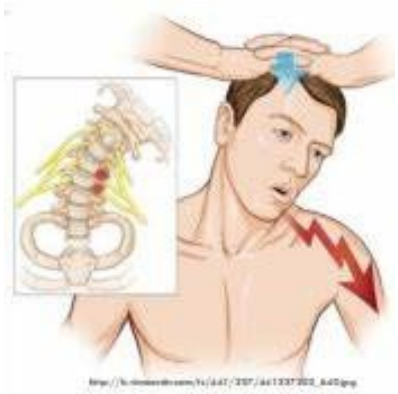
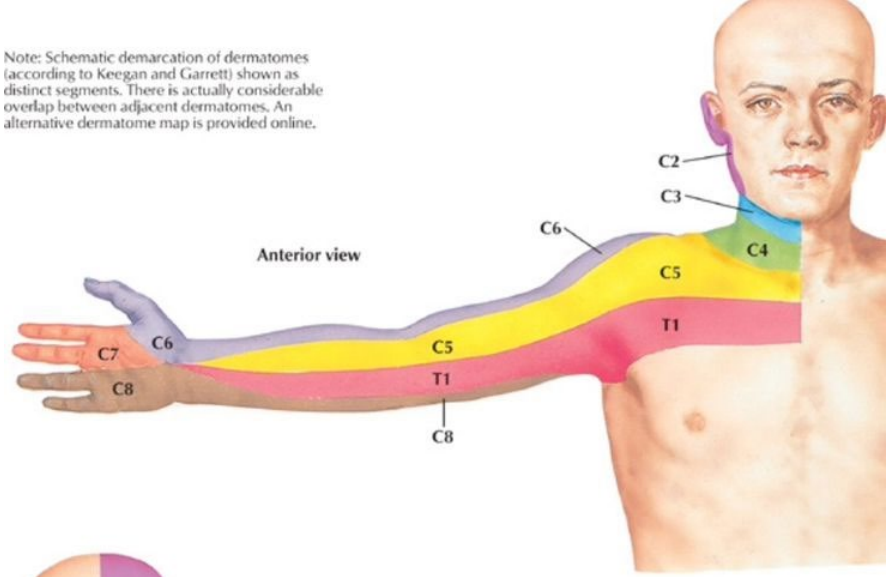
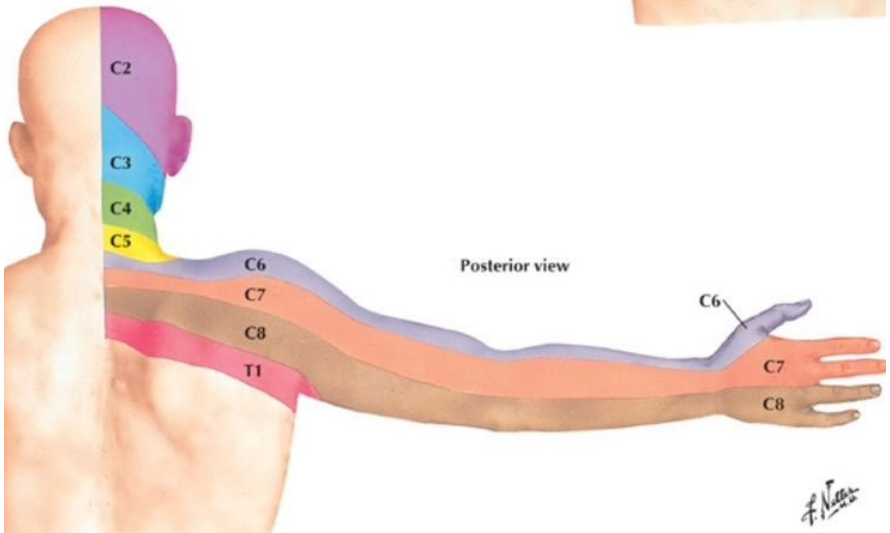
Cervical

- Spurlings
- Shoulder movement







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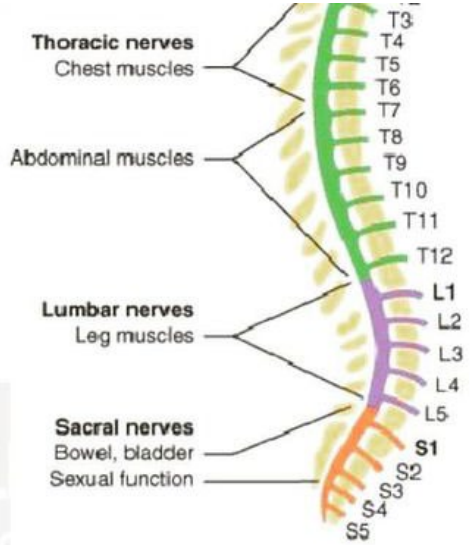
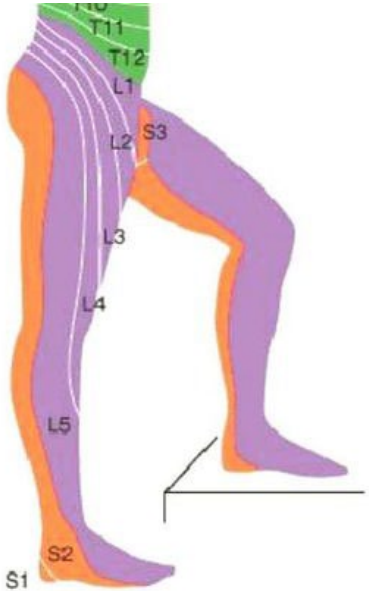
Lumbar

- SLR
- Hip movement
- SIJ





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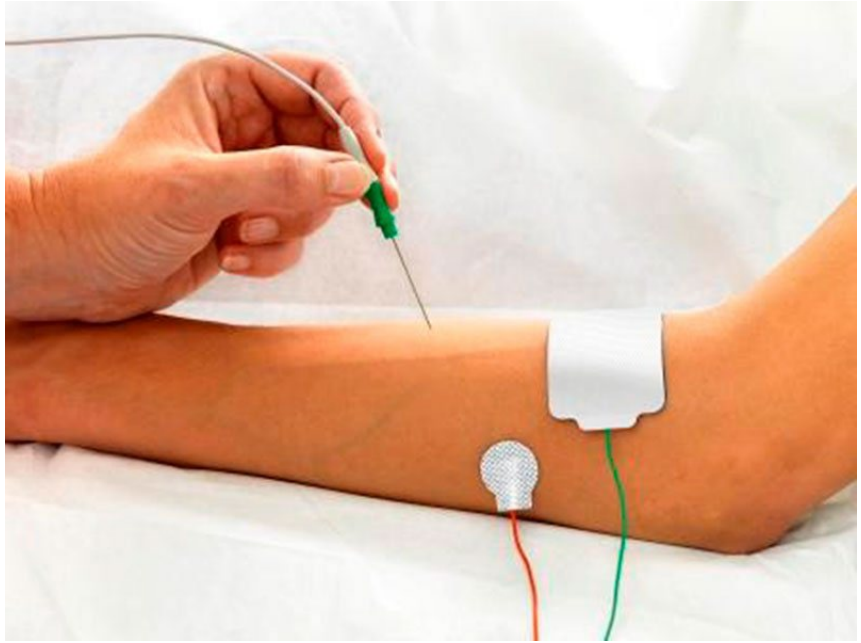
Work-up

- Labs
  - Infection
  - Inflammatory arthritis
- EMG
  - Peripheral compression
  - Unclear dermatome
  - Nerve damage and recovery?



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Imaging

- X-ray
  - Alignment
  - Fractures
  - Spasms, positional

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Imaging

- MRI
  - Six weeks
  - Soft tissue
    - HNP
    - Tumor
    - Etc..
  - Infection
  - Stress fracture
  - Arthropathy

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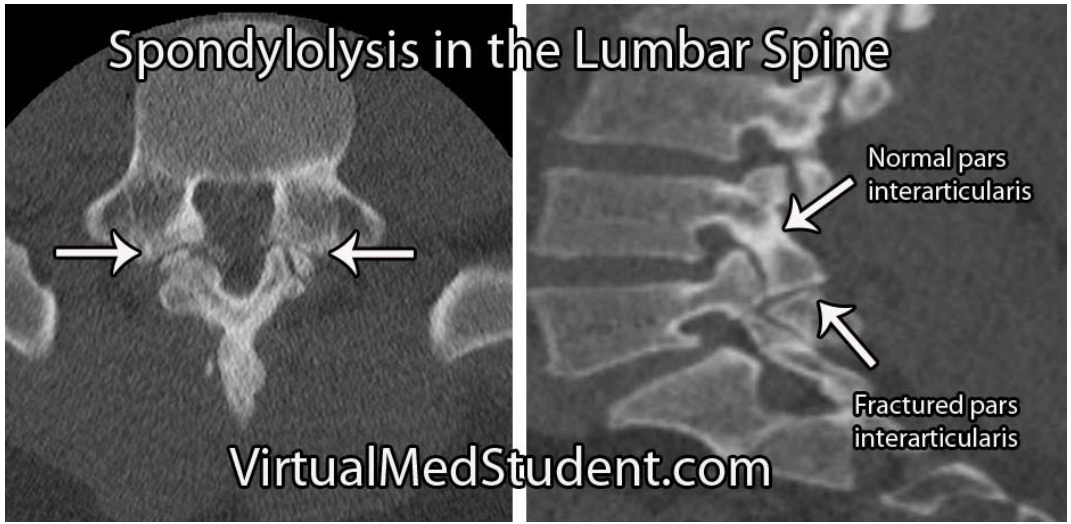
Imaging

- CT
  - Bony anatomy
  - MRI C/I



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Treatment Options

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Non-surgical

- Physical Therapy & Chiropractic
  - 1st line
    - Back school: improvement in pain and function
    - HPE no different than general medical treatment
  - 6 weeks?
  - US: no evidence
  - Dry needling: no level one studies

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Nonsurgical

- In patients with subacute or chronic low back pain, traction is not recommended to provide clinically significant improvements in pain or function.

- In patients with chronic low back pain, addition of acupuncture to usual care is recommended for short-term improvement of pain and function compared with usual care alone.

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Nonsurgical

- In patients with low back pain, work hardening may be considered to improve return to work.
  - Grade of Recommendation: C

- Aerobic exercise is recommended to improve pain, disability, and mental health in patients with nonspecific low back pain at short-term follow-up.
  - Grade of Recommendation: A

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Nonsurgical

- Medications
  - NSAIDs – TOC for most spine-related issues
    - Kidney function
  - Steroids
    - Acutely for radicular
  - Others
    - Gabapentin & Lyrica
    - TCA/SSRI → not for acute radiculopathy
    - Topical cream: capsicum only one that has shown effectiveness
      - Lidocaine patch: NASS, no evidence

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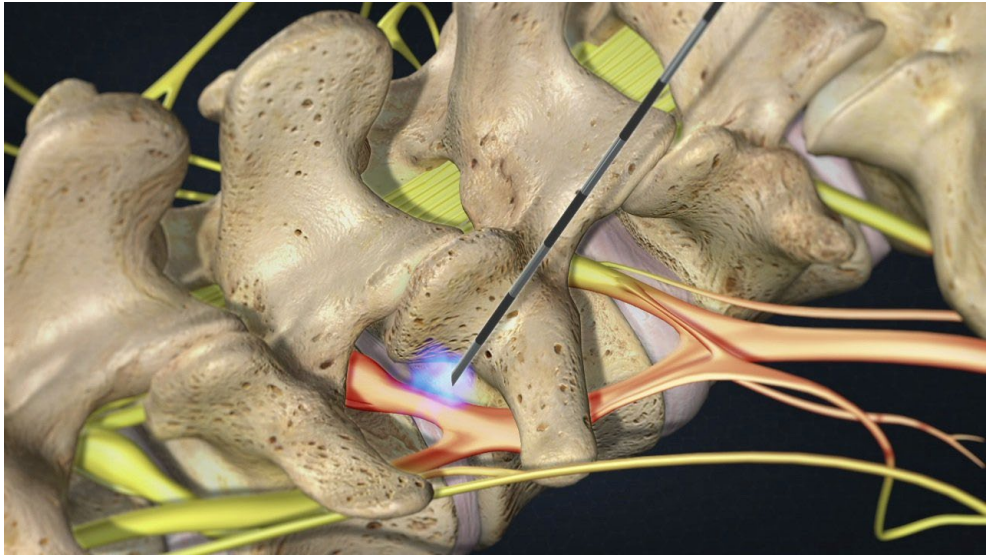
Interventional Physiatry

- ESI
  - Radicular pain
- TPI
  - Myofascial pain
- RFA vs facet blocks



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Facet block focus

- In patients selected for facet joint procedures using diagnostic criteria of physical exam and a response to a single diagnostic intra-articular injection with 50% relief, it is suggested that intra-articular injection of steroids provides no clinically meaningful improvement at 6 months.
  - Grade of Recommendation: B
- Thermal radiofrequency ablation is suggested as a treatment for patients with low back pain from the zygapophyseal joints. The outcomes of this procedure become more reliable when more stringent diagnostic criteria are used. The relief from these ablations is durable for at least 6 months following the procedure.
  - Grade of Recommendation: B

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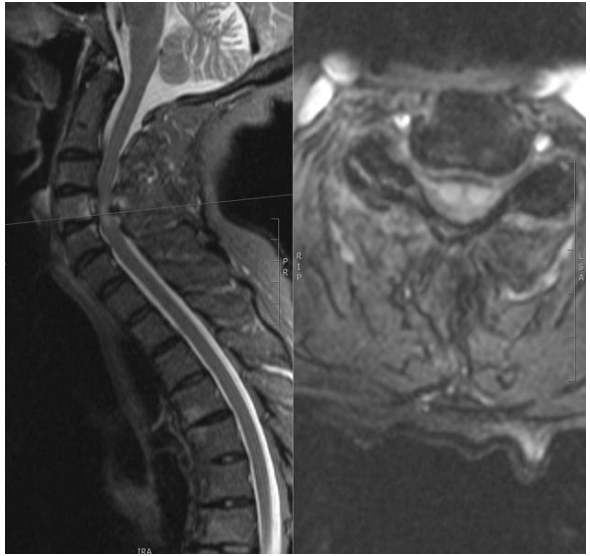
Surgical Indications

- Failure of 6 weeks of conservative therapy
  - **SPORT trials AT analyses for HNP, SS**
- Progressive weakness
- Weakness in major group <3/5
- Intractable radicular pain*
- Myelopathy (cervical or thoracic only)
- Bowel/bladder
- Infection (sometimes)



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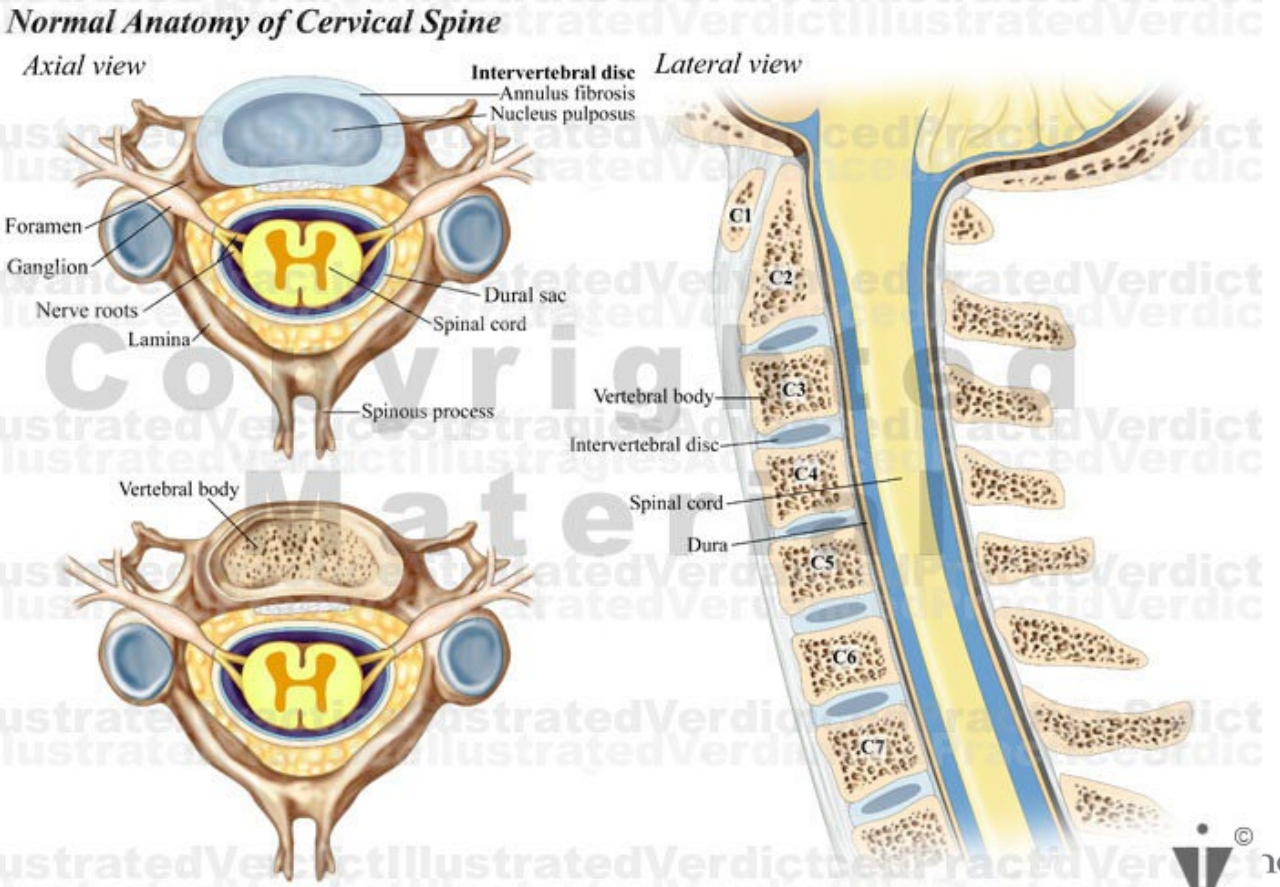

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Surgery - Cervical

- Anterior cervical discectomy and fusion
- Cervical disc replacement
- Posterior cervical foraminotomy

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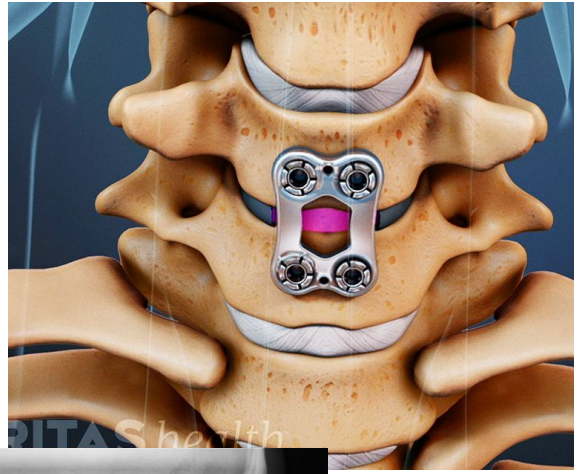
Surgery - Cervical

- Anterior cervical discectomy and fusion
  - Gold standard
  - Outcomes 30+ years
  - Permanent
  - Insensitive to facet degeneration
  - Limitations

- Cons: ASD for multilevel



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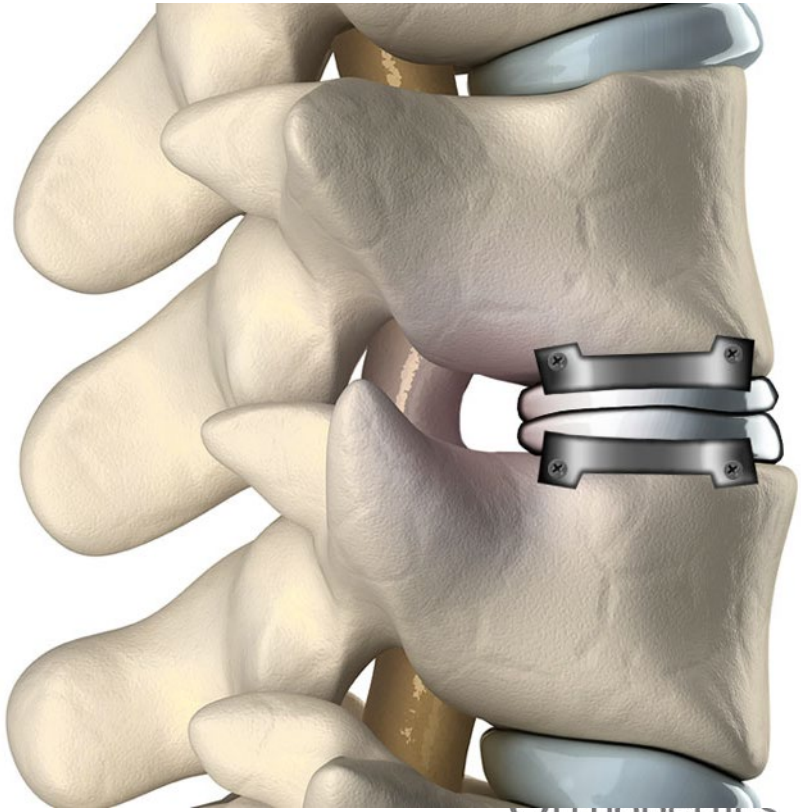
Surgery - Cervical

- Cervical disc replacement
  - Soft tissue compression
  - Preserved facets
- Less ASD?
- Improved ROM
- RTW faster?



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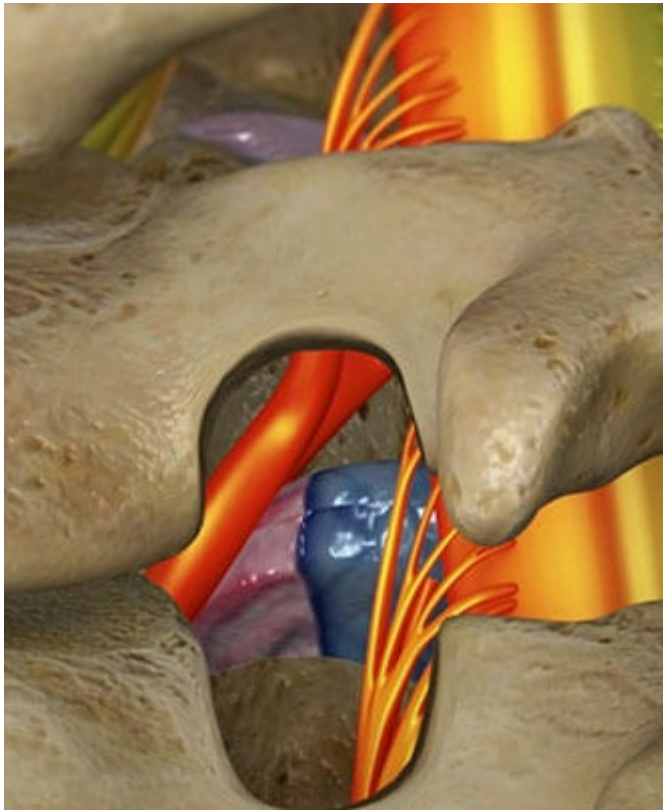
Surgery - Cervical

- Posterior cervical foraminotomy
  - No implants
  - Maintains motion
  - Limited decompression
  - Neck pain!



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Surgery - Lumbar

- Decompression surgery
- Decompression and fusion
- MIS
  - Tubular surgery
  - Endoscopic surgery

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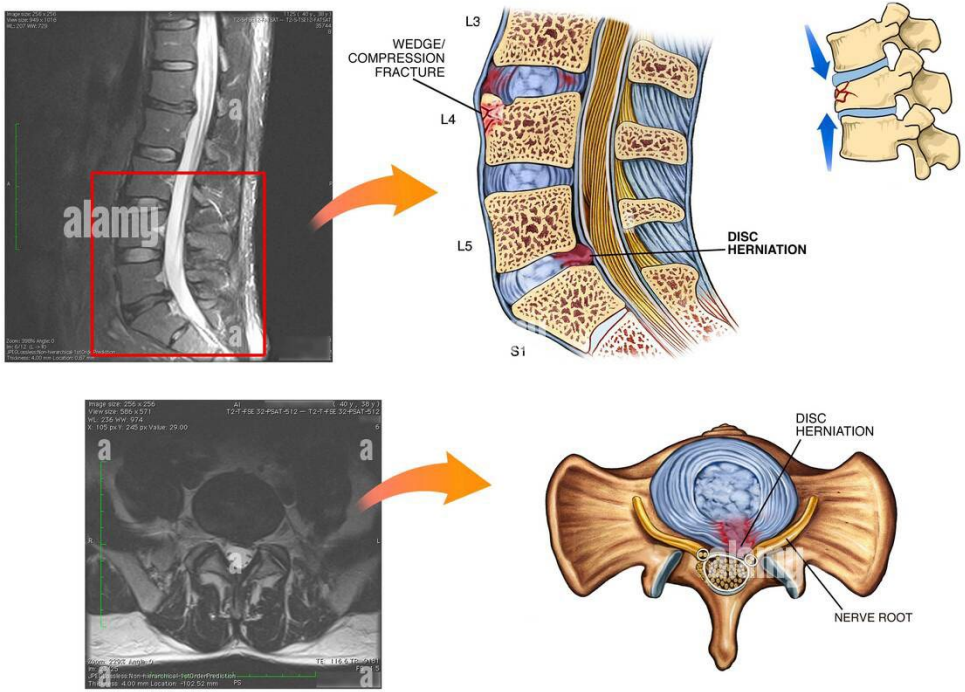
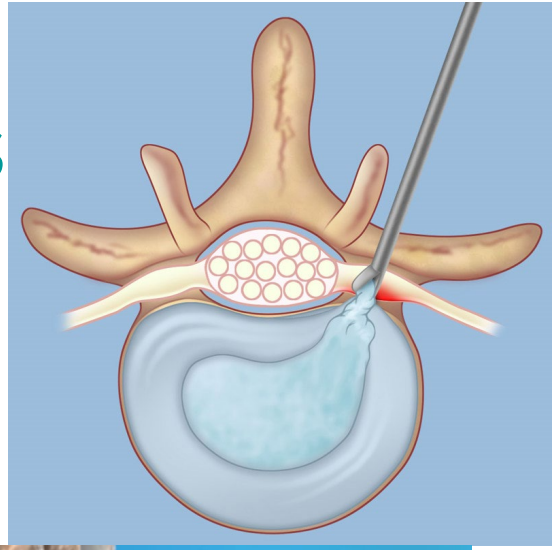
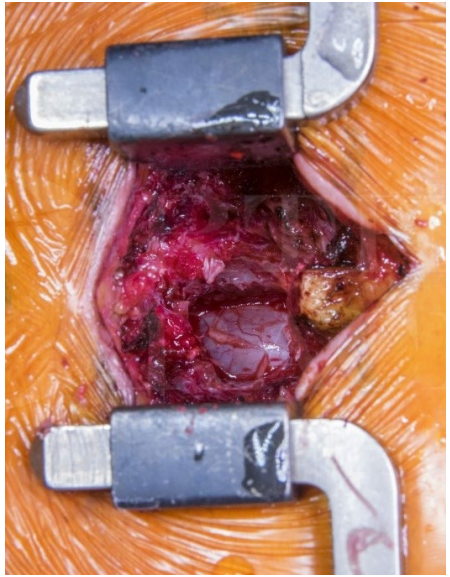
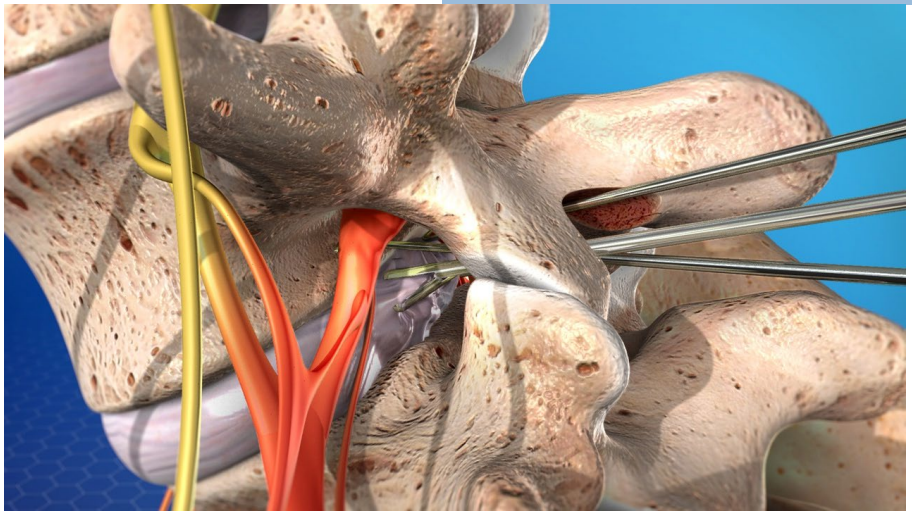


Lumbar Surgeries

- Decompression surgeries
  - Laminectomy
  - Hemilaminectomy
  - Microdiscectomy







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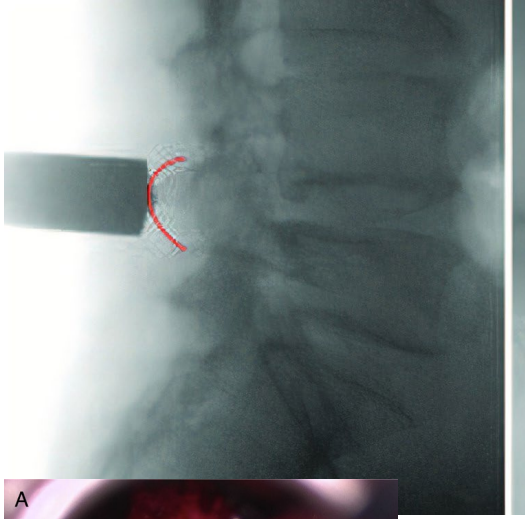
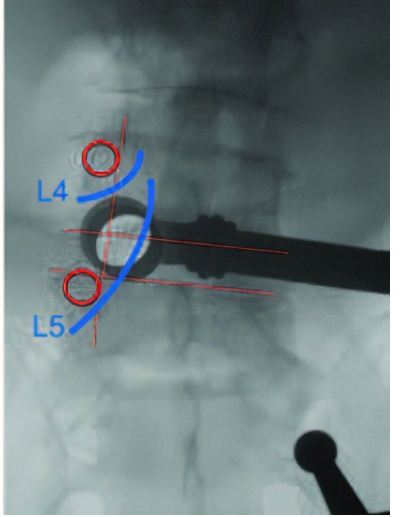
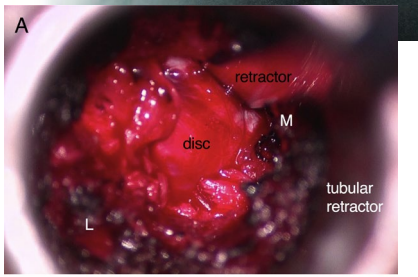
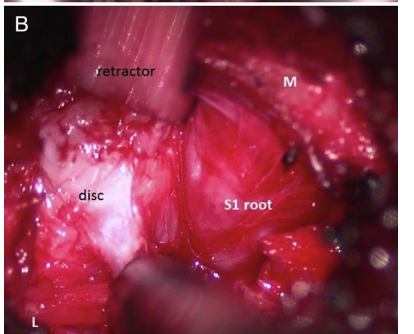
Minimally Invasive

- Tubular decompressions
  - Faster recovery
  - Less EBL









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Minimally Invasive

- Endoscopic decompressions and fusion
- J Spine Surg. 2020 Jan
  - Faster RTW for discectomy

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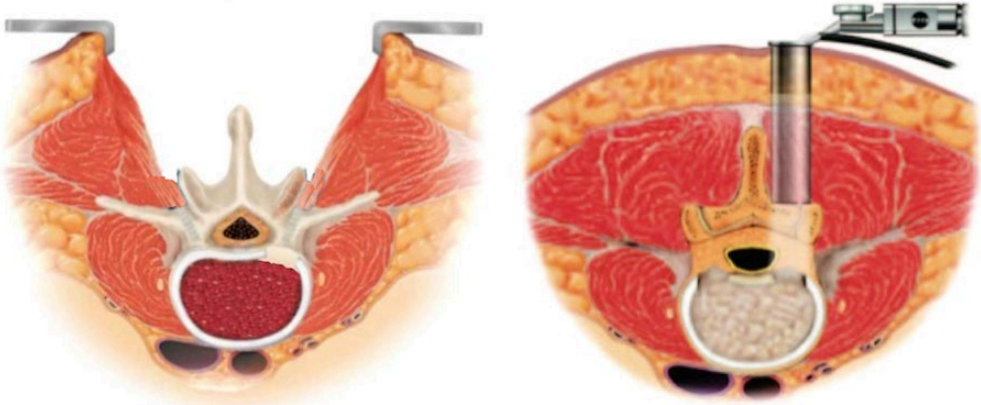
Minimally Invasive Fusions

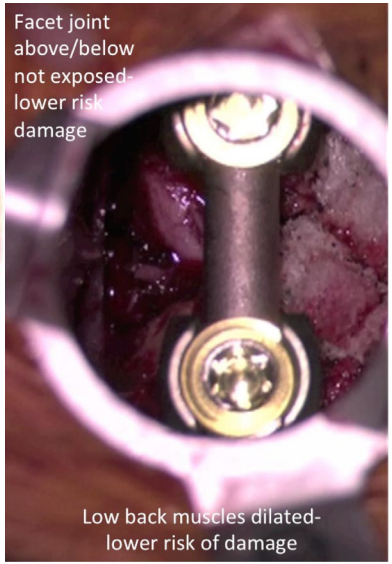
Which Would You Prefer?

Open

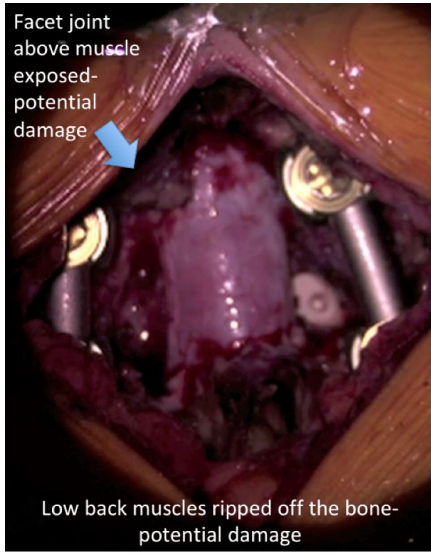
Tubular MIS



Images taken from Medtronic



Tubular minimally invasive lumbar fusion



Open lumbar fusion

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Word of Caution on Lumbar Fusions

- Should be reserved for instability
- Spondylolisthesis
- Iatrogenic
- Spinal fusion for axial back pain due to a “degenerative diagnosis” is a coin toss.

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Post-operative rehabilitation

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Cervical

- Limited BLT for 1-2 weeks
- 8 lb weight limit
- One level ACDF: 6 weeks clear for all activities
- 6-12 weeks for more strenuous exercise
- Increased duration of limitations for multilevel
- PT at 4-6 weeks if needed
- Quicker RTW with CDR?

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Lumbar Decompression

- Limited BLT 1-2 weeks
- Risk of reherniation
- After 2 weeks: more BLT, driving, sedentary work
- After 6 weeks: most daily activities
- PT: around 3-4 weeks after surgery

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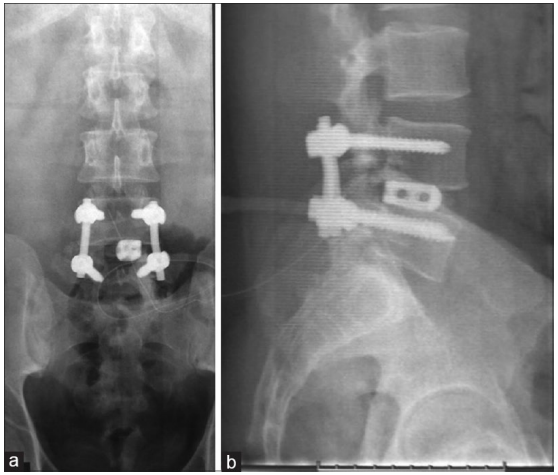
Lumbar Fusion

- For 1-3 mos avoid:
  - Excess lifting (anything over 10 to 15 pounds)
  - Bending forward and backward
  - Twisting the upper body to the sides
- PT around 6 weeks
- 3 mos: increase exercise, helps fusion
- 6 mos: more strenuous activities and work
- 1-2 years for complete recovery



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Timelines to return to work

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Cervical

- Single level
  - 2-6 weeks for sedentary
  - 6-12 weeks for strenuous depending on accommodations
- Multilevel
  - 6 weeks for sedentary
  - 12 weeks + for strenuous

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Lumbar Decompression

- 2-4 weeks for sedentary
- Up to 3 mos for labor intensive

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Lumbar Fusion

- By **4 to 6 weeks** after lumbar fusion surgery, most patients are cleared to return to school or work that does not involve physical labor.
- 6 months or more for physically intensive jobs.

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RTW literature

- JNS 2021: 71% (n: 1800) RTW after 1- or 2-level lumbar spine surgery.
  - Most patients who undergo a nonfusion procedure RTW after 6 to 8 weeks, whereas patients undergoing a fusion procedure RTW at 12 weeks.
- Working preoperatively significantly increases the likelihood of early RTW.

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Obstacles

- JNS 2021: Symptoms lasting more than 2 years, an increased number of comorbidities, an education level below high school, and an active workers' compensation claim ($p < 0.05$). There were fourfold odds of not returning to work for patients who had not been working preoperatively (OR 4.076, 95% CI 3.087–5.383, $p < 0.001$).
- Int J Environ Res Public Health. 2021 Jun: WC patients report higher pain, more dissatisfaction, delayed RTW, poor outcomes.

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Obstacles

- JAAOS 2017: Patients not receiving WC who underwent spinal surgery had a high chance of returning to employment within 1 year if they had been working at least 3 months before the date of surgery.
- J pain 2022: Less likely to RTW in older, litigation, CLBP, depression, physical jobs.

Obstacles

- Spine 2020: Poor outcomes in patients with predominantly axial pain, active litigation, older patients and primary diagnosis of DDD.
- DDD & Fusion: 1/3 report poor outcomes, ½ improve.
- Spine 2011: Most injured workers who are disabled by their back pain remain disabled after their fusion surgery, with fewer than 50 percent returning to work. 41% increased pain medication after surgery.

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Conclusion

- Return to work in the WC population depends on multiple factors.
- Most studies show that delay of treatment and OOW duration prior to surgery are negative factors.
  - Also more likely to obtain lawyer
- Conservative care will suffice for most patients but in a select population surgery will be more successful in early RTW, improved pain and QOL.

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Questions?

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Next Session

September 7, 2022

Complex Spinal Injury Rehabilitation & Recovery; Interdisciplinary Strategies to Maximize Function and Return to Work

Dr. Jerold Kaplan, MD, Gaylord Specialty

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