



Updates in Cervical Spine Treatment

Chairperson: Chadi Tannoury,
MD, FAOA, FAAOS

Monday, March 27th, 2023
11:25-12:20pm



The Spectrum of Neck Injuries

Tony Tannoury, MD



The Role of Conservative Management in Reversible Injuries

Roberto Feliz, MD

Anesthesiologist/Interventional Pain Management

Reversible vs Irreversible

Typical example: Case

The Role of Conservative Management in Reversible Injuries

What is a “reversible injury?”

- What does Reversible Injuries means?
 - That the injured cells can regain homeostasis and return to a morphologically (and functionally) normal state.

The Role of Conservative Management in Reversible injuries

What happens in Reversible Injuries?

REVERSIBLE

- Cellular Swelling
 - Local release of Mediators of Inflammation.
 - These Mediators lead to cellular membrane ionic shift and fluid shifts, cellular swelling.
 - We must aim to stop cellular swelling, ASAP, to prevent Cellular death and chronic pain: IRRIVERSIBILITY.

IRRIVERSIBLE

- Persistent Cellular swelling, leads to localized cellular DEATH, Chronic PAIN
 - CNS Bombardment keeps occurring.
 - NMDA Receptor Activation leading to Wind-Up, Central Sensitization/ Neuroadaptation/neuroplasticity.
 - Neuro-inflammation (Microglia/Astroglia neuronal glia cells activation)
 - Opioids induced Toll Receptor activation.

The Role of Conservative Management In Reversible Injuries

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Work Related Injuries
Workshop

The Role is to reduce the
acute inflammation to
prevent conversion from
Acute Pain into chronic pain.

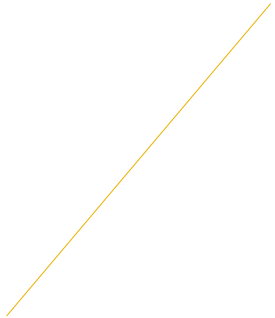
The Role of Conservative Management In Reversible Injuries

“Treat early and treat aggressively”

- The ER Doctors and/or Primary care doctors are missing the point.
- Must change how they approach and treat acute injuries: Stop/reduce the cellular Swelling, ASAP.
- BEFORE: CNS Bombardment Occurs, NMDA Receptor becomes active, Neuroinflammation develops = Chronic pain/Irreversibility occurs.

The Role of Conservative Management for Reversible Injuries

How to prevent acute pain from progressing into Chronic pain?

- Proposal: to ER and Primary care Clinicians: Must change the paradigm:
 - Learn and encouraged to reduce the acute inflammation (not with rest, neck collar, Nsaids/Tylenol (minimize opioids usage)
 - Encouraged to Inject/block/infiltrate: Cortisone and/or PRP for acute reduction in Cellular Swelling.
- 



Chadi Tannoury, MD

Medical Director, Orthopedic Ambulatory Clinic

Associate Professor – Orthopedic Surgery

Director, Spine Research

Boston University Medical Center

Neck Session

The Role of Cervical Surgery in
Irreversible Injuries

15 min

Disclosure

- I have something to Disclose (Website)

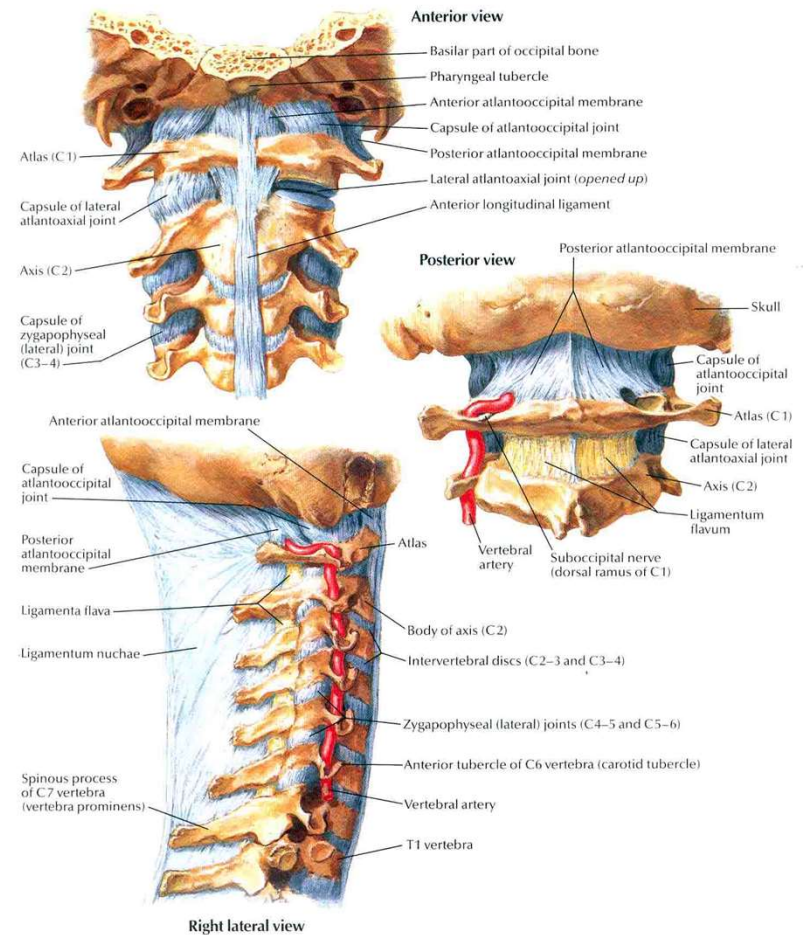
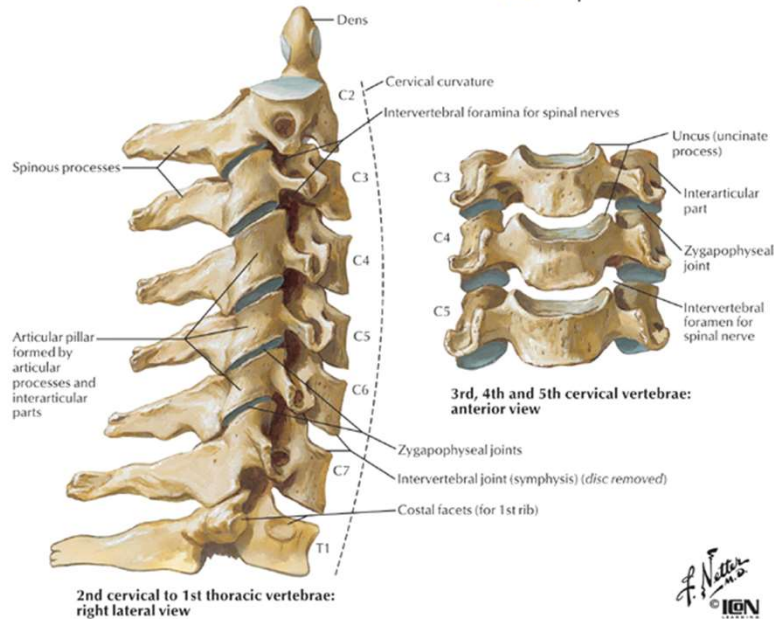
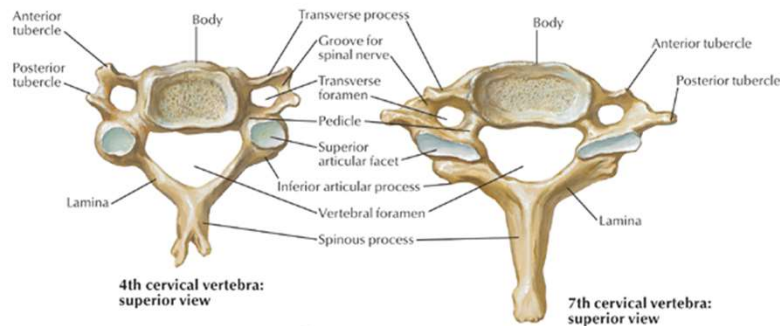
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**Work Related Injuries
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Anatomy

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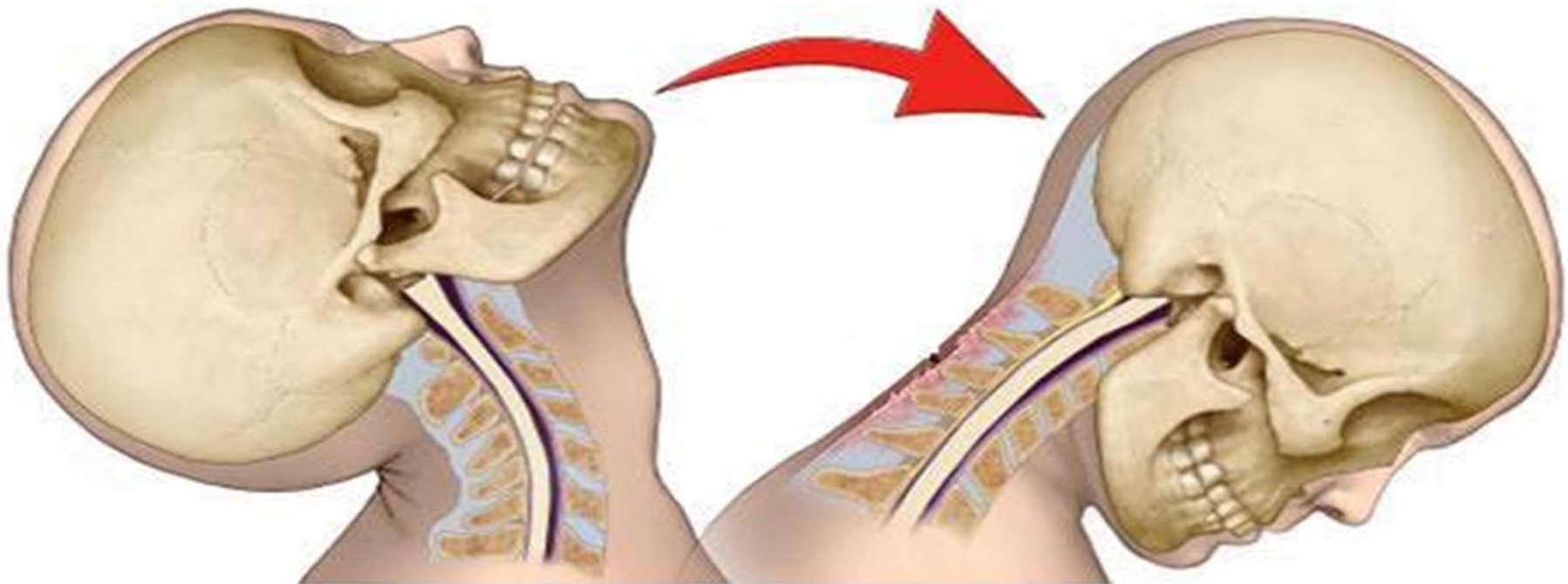
Work Related Injuries
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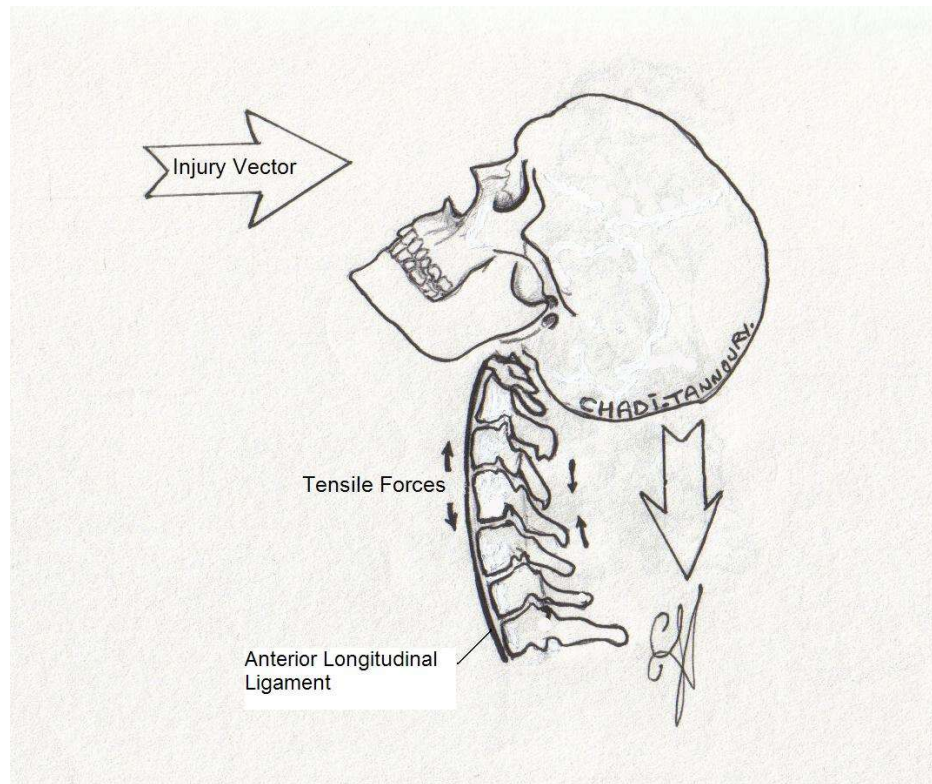
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Cervical Injury



Injury Transfer to Cervical Spine



Irreversible Injuries

- MECHANICAL instability

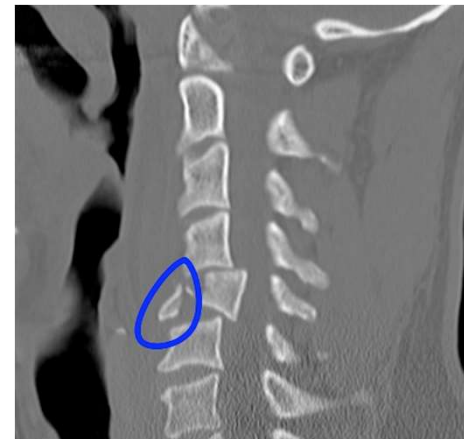
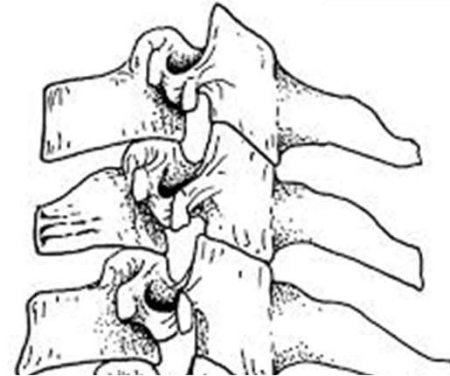
- BONE:
 - Fractures
- DISCOLIGAMENTS:
 - Disc herniations
 - Dislocations

- NEUROLOGIC instability

- Spinal cord compression/injuries
- Nerve compression/injuries

Cervical Fractures

- Vertebral Body:
 - Compression fractures
 - Burst fractures
- Facet fractures
 - Subluxation
 - Dislocation



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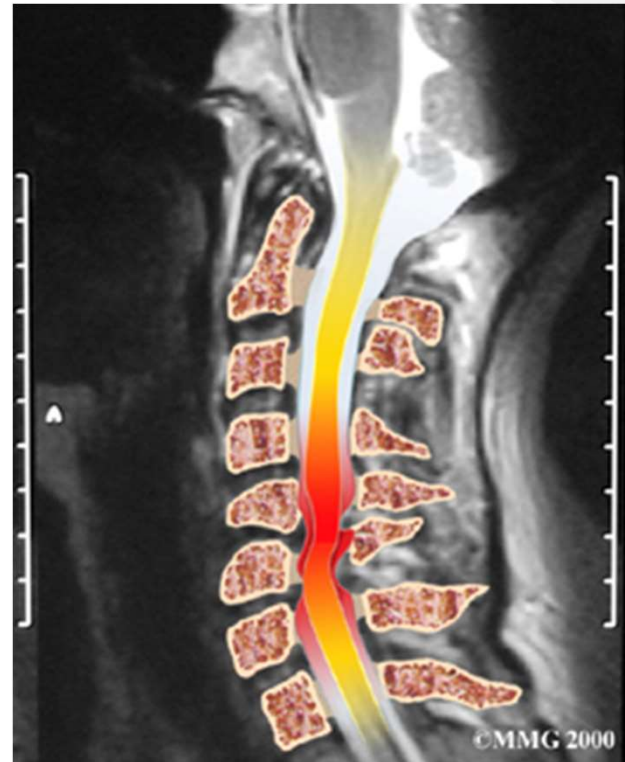
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Facet Fractures / Dislocation



Spinal Cord Compression/Injury

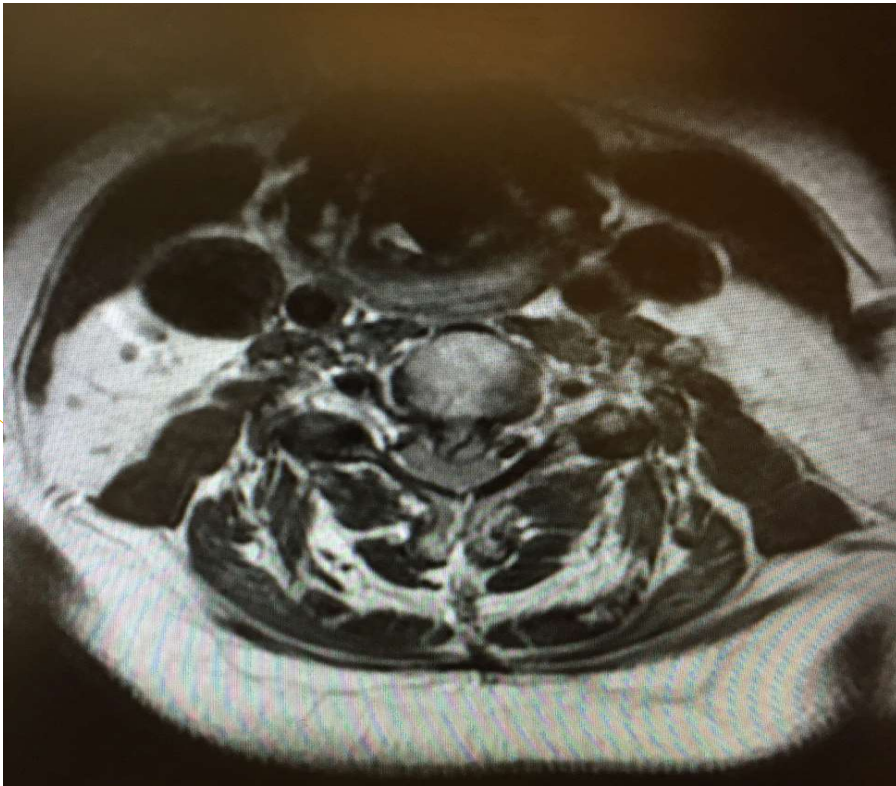
- Incomplete cord injury:
 - Some neurology preserved below injury
 - Muscle weakness
 - Sensory changes
- Complete cord injury:
 - No neurology preserved below injury
 - No muscle contractions
 - No sensations



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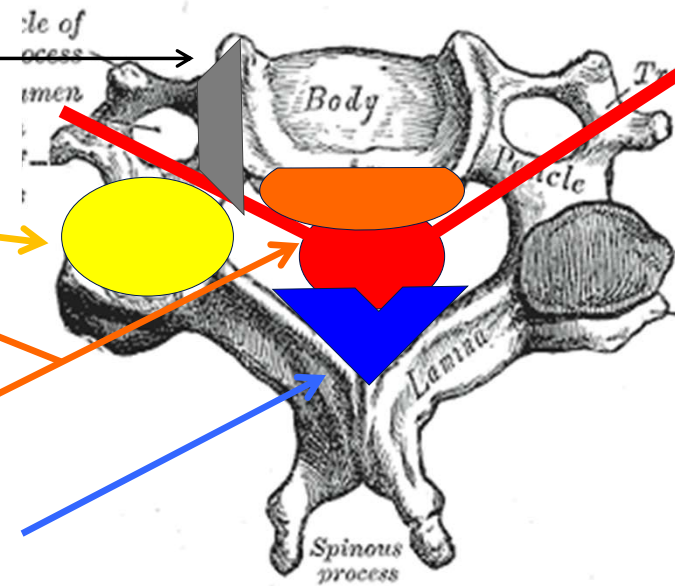
Traumatic Disc Rupture



Nerve/ Cord Injuries

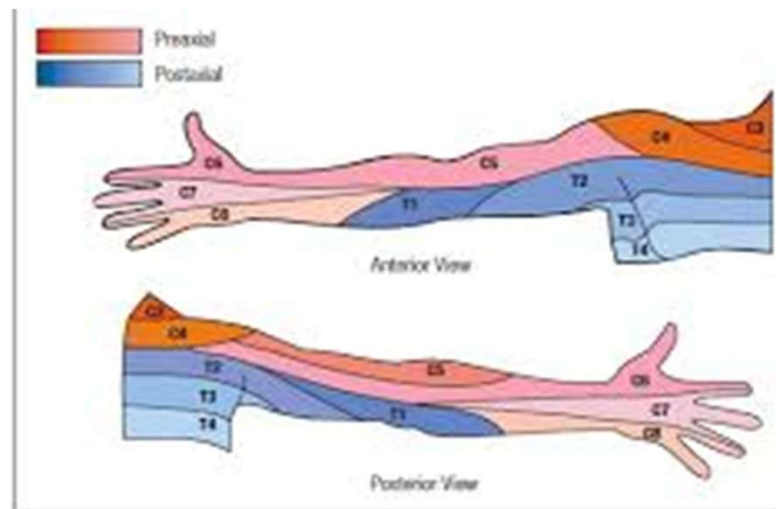
- Direct Mechanical compression NRoot/Cord:

- Uncus joint
- Facet joint
- Disk Osteophyte Complex
- Disc Herniation – OPLL - Frx
- Infolding Lig flavum / Lamina Frx



Nerve Root Compression - Injury

- PINCHED NERVE: weakness in a muscle group
- Pain is often accentuated by maneuvers that stretch the involved nerve root. Some examples include:
 - Coughing
 - Sneezing
 - Reaching



MANAGEMENT

- Neurologic Decompression
 - Removing offending structures
 - Disc
 - Ligaments
 - Bone
- Restore Alignment + Stability:
 - Adding bone graft
 - Adding hardware



Surgical Options - Terminology

- Anterior cervical discectomy and fusion (ACDF)
- Anterior cervical corpectomy and fusion (ACCF)
- Cervical disk arthropasty – replacement (cTDR)

- Posterior cervical laminotomy - Foraminotomy
- Posterior cervical laminectomy & Fusion
- Posterior cervical laminoplasty

Anterior Surgery

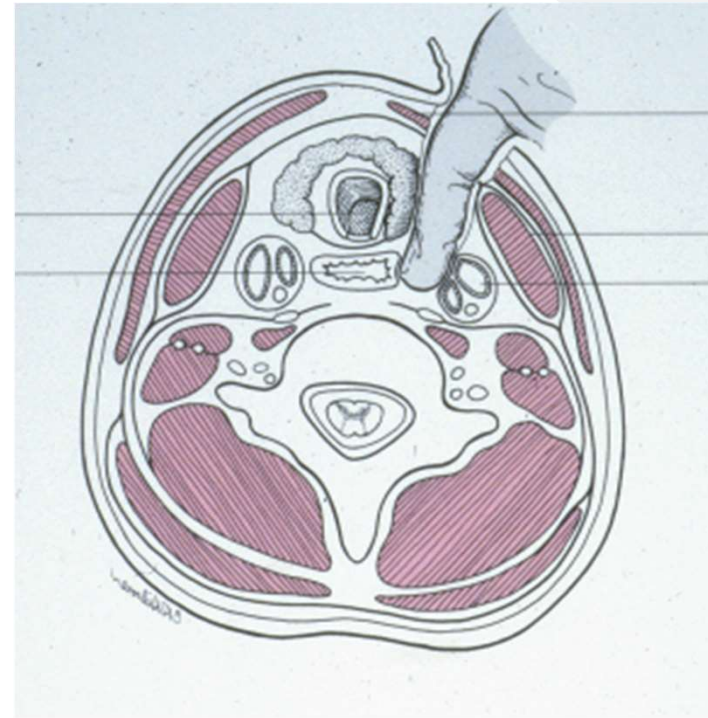
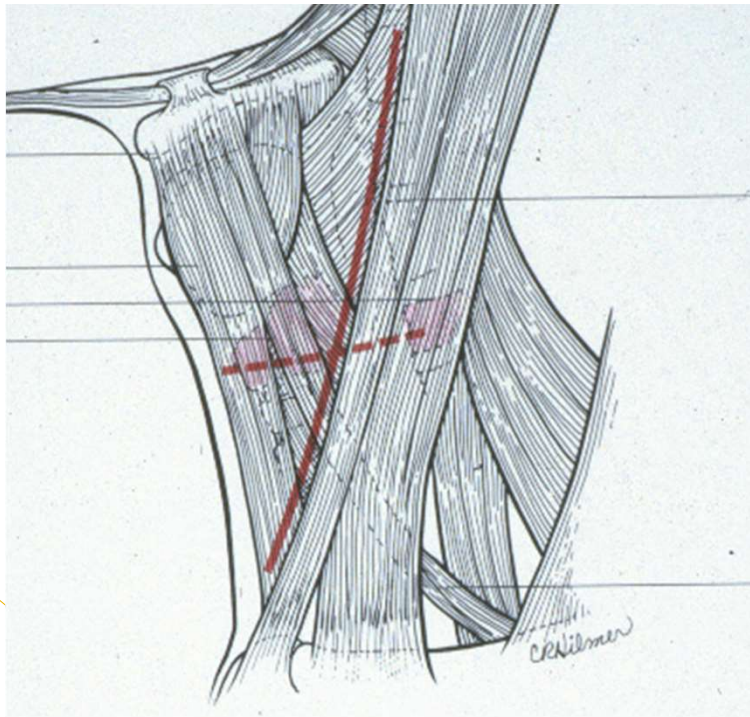
- Mild Neck extension

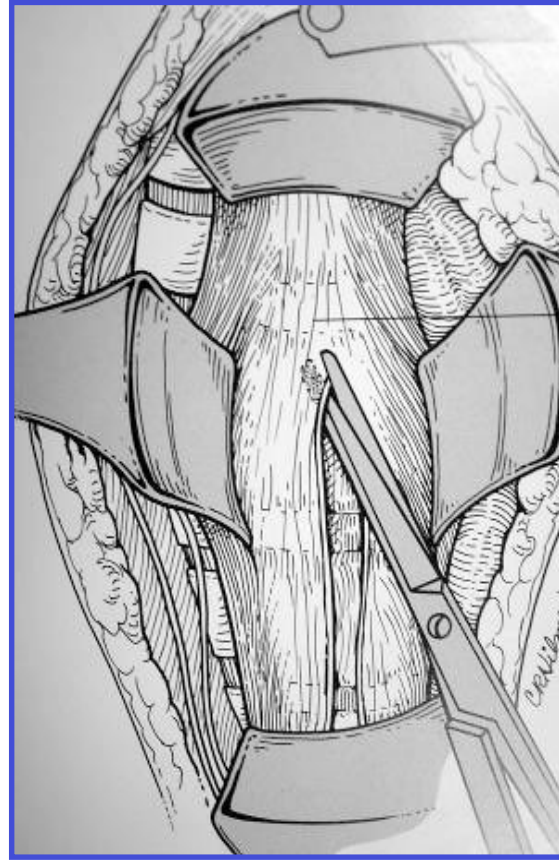
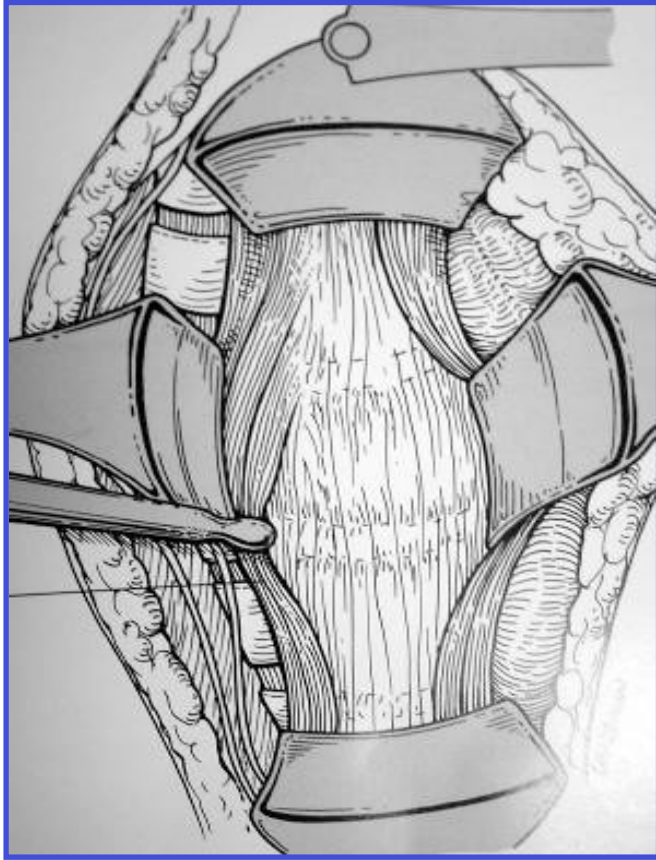


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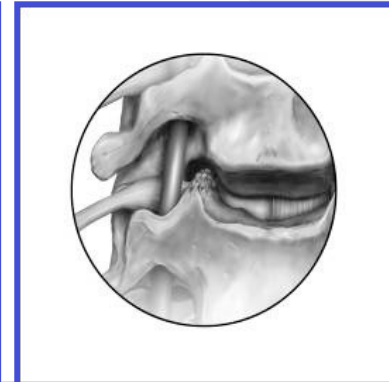
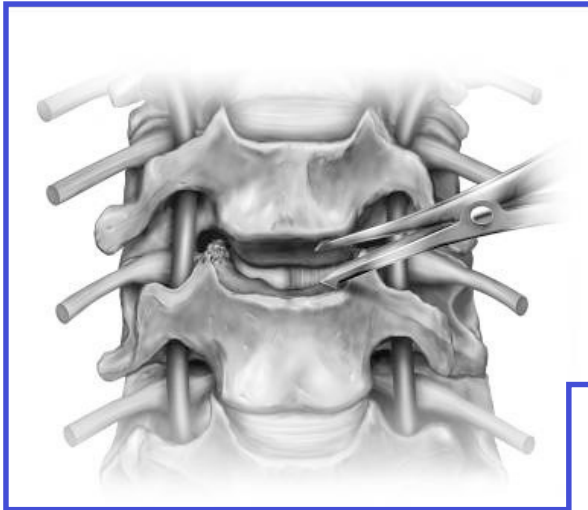
Anatomy



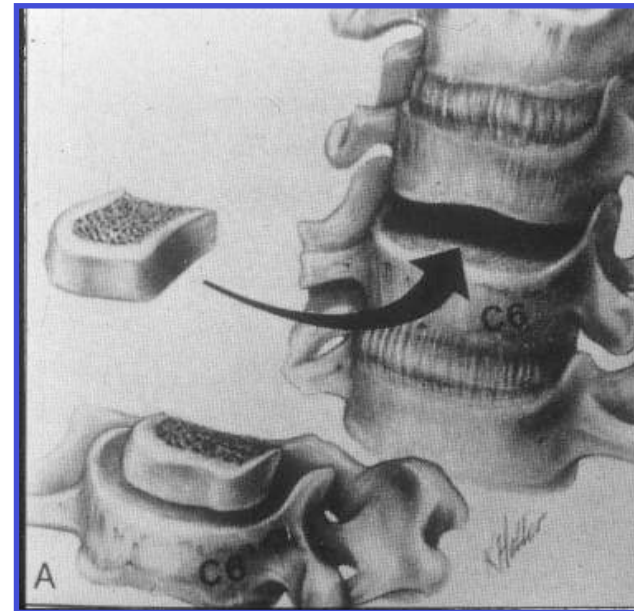
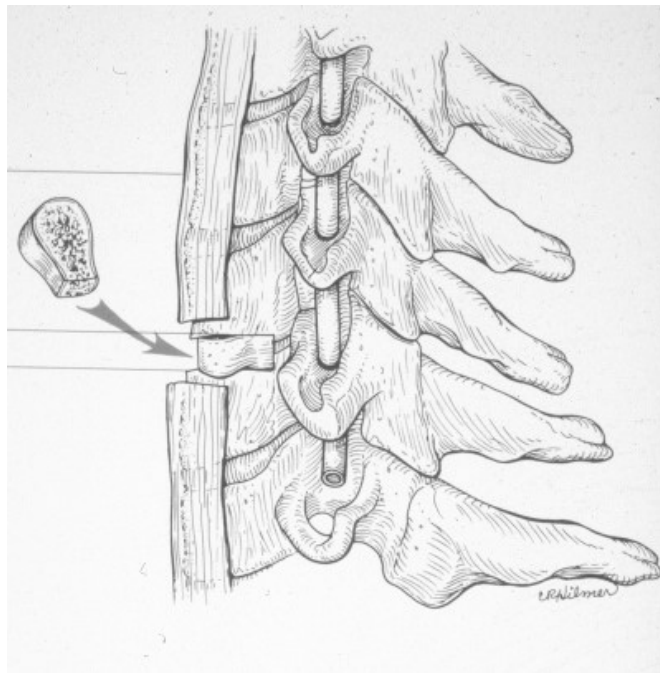


Discectomy and Decompression

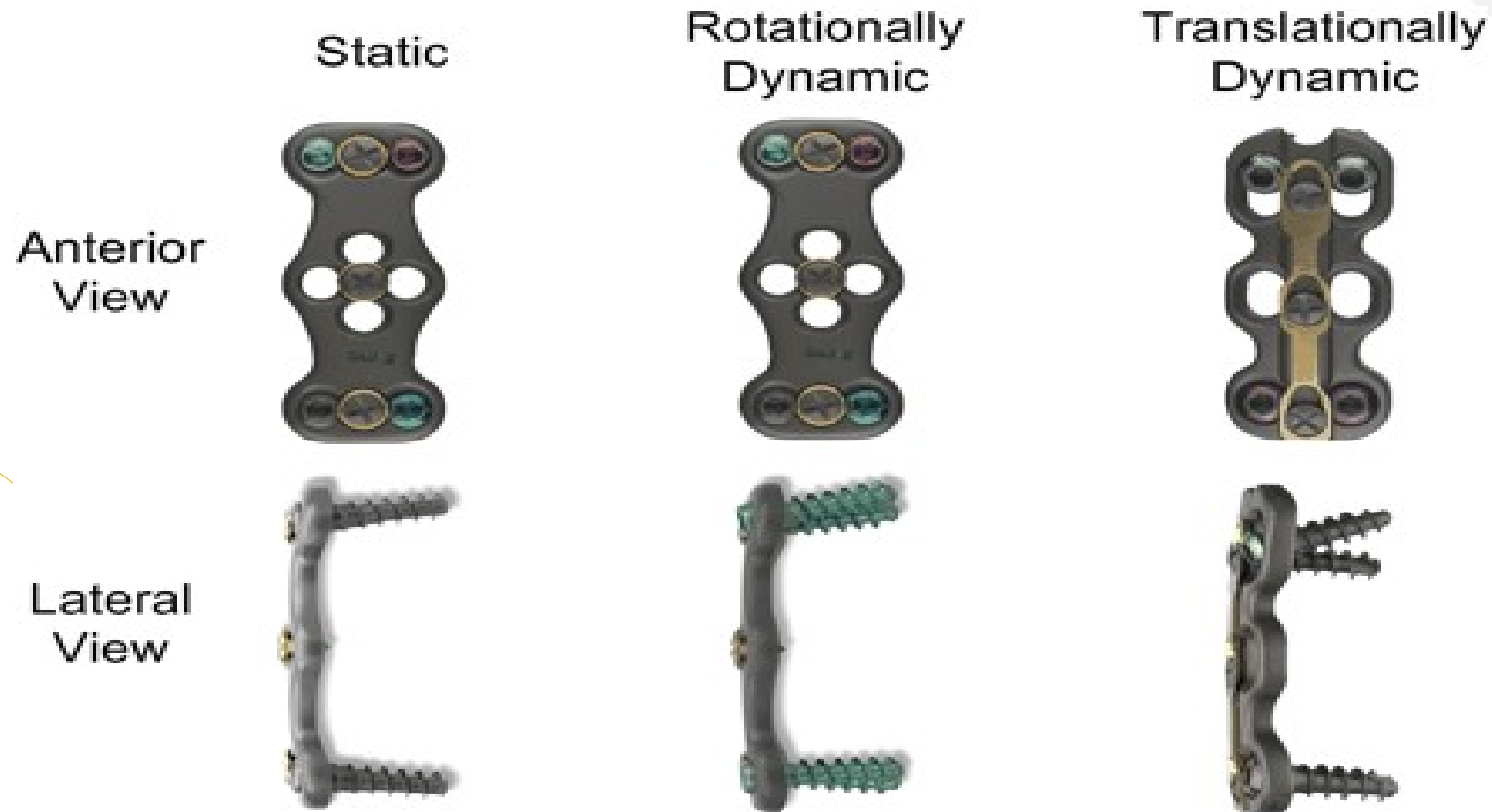
- HT: 5-10mm
- W: 10-15mm
- Depth: 12-17mm



Bone Graft Placement

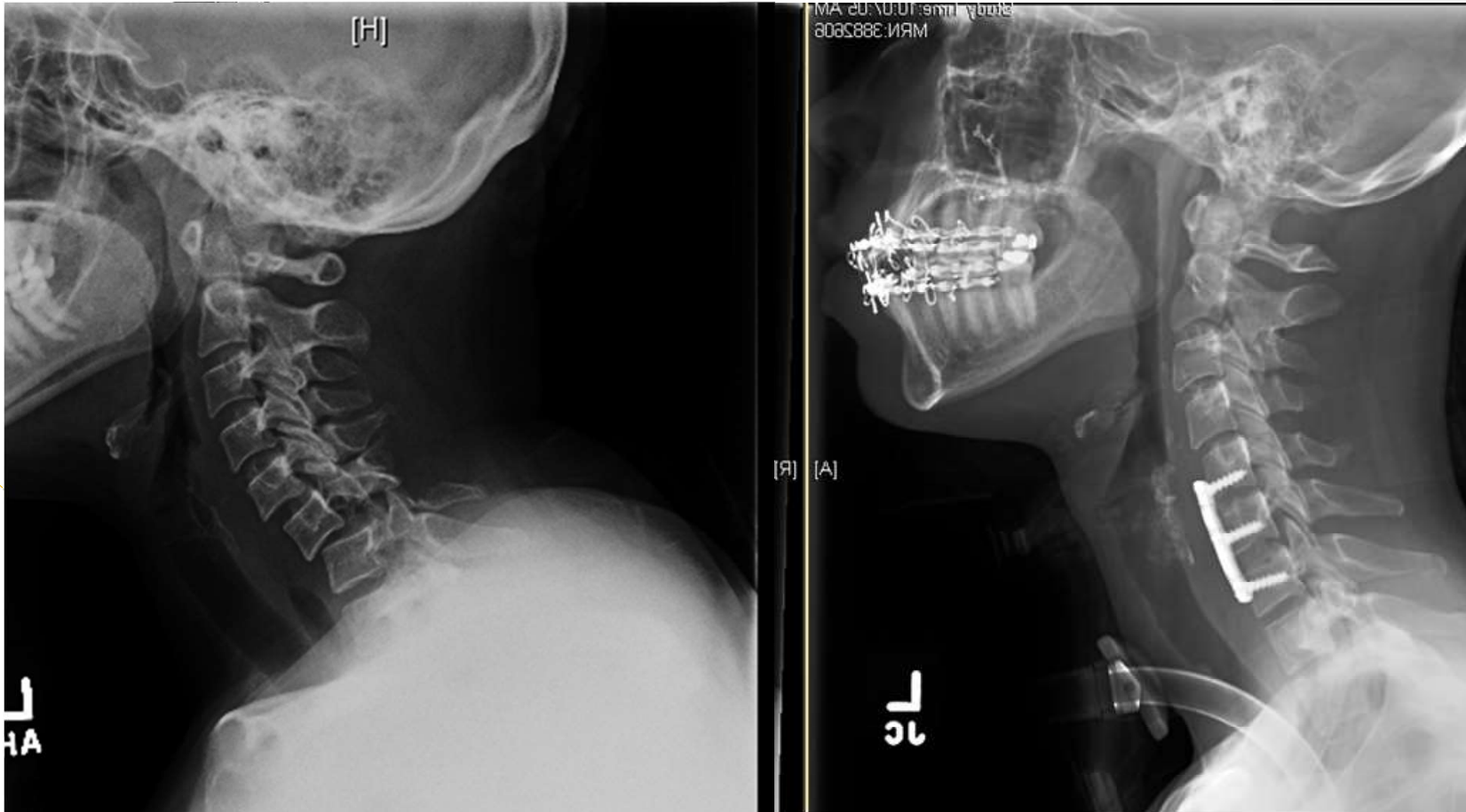


Anterior Plating

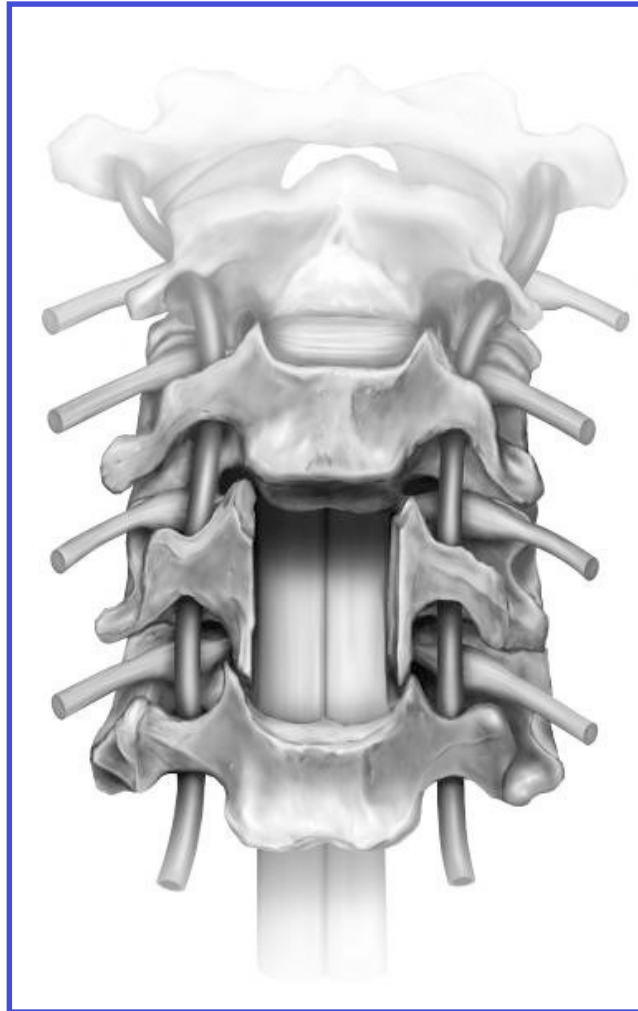


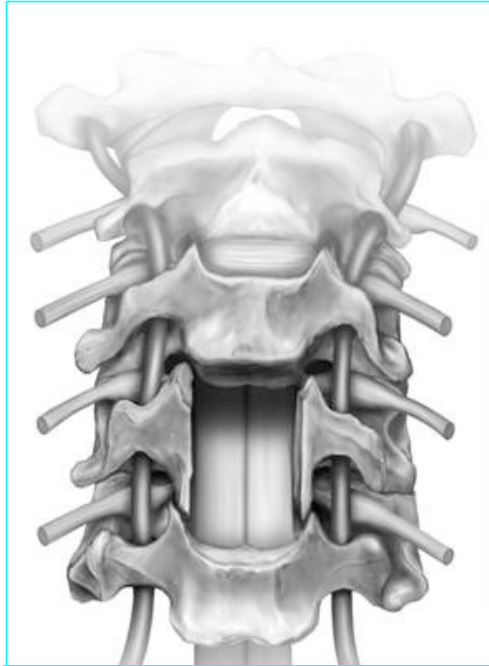
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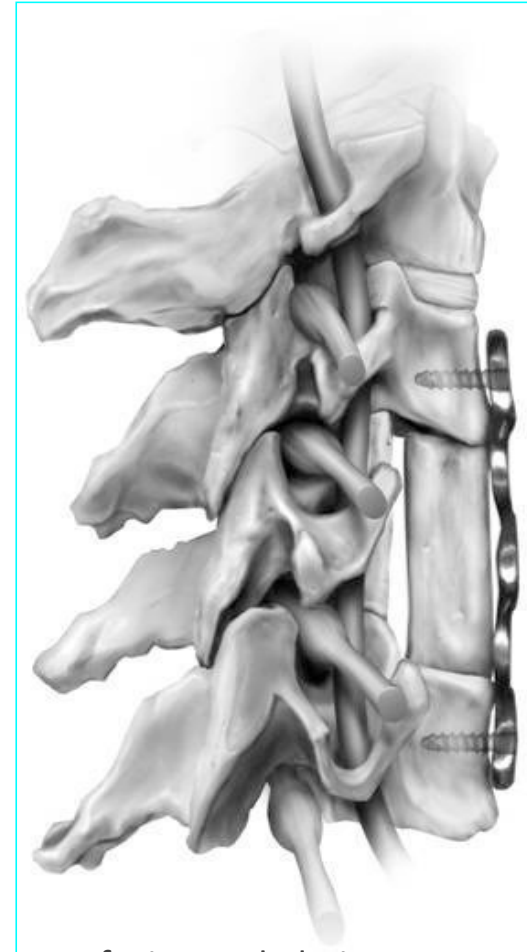


Corpectomy





corpectomy



fusion and plating



Cervical Disc Arthroplasty

- Artificial disc replacement
- Preserves ROM
- Decrease risk of adjacent DD
 - ***Decrease Reoperation rate***
 - 1 level: ACDF 17.3% vs cTDR 4.5%
 - 2 level: ACDF 21% vs. cTDR 7.3%

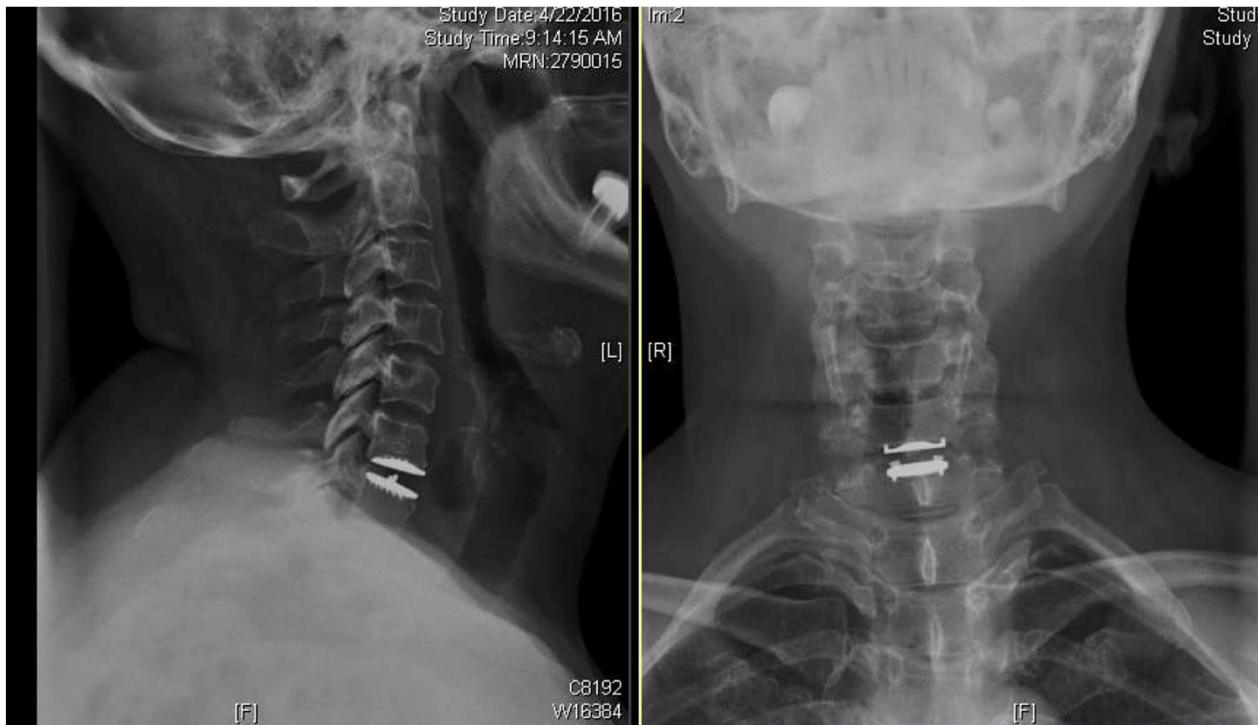


Jackson JNS 2016 (5 yr f-up)

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45 y F with C7 radiculopathy





Posterior Cervical Options

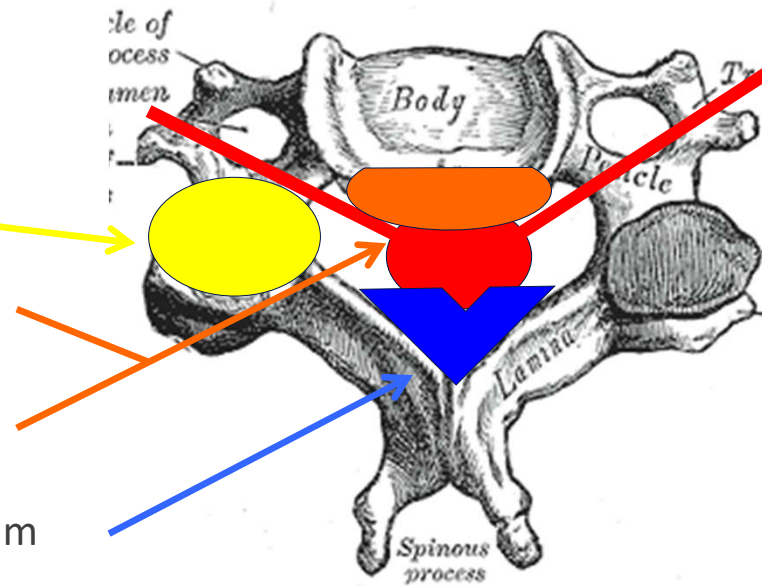
Radiculopathy/ Myelopathy - Pathophysiology:

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- Direct Mechanical compression NRoot/Cord:

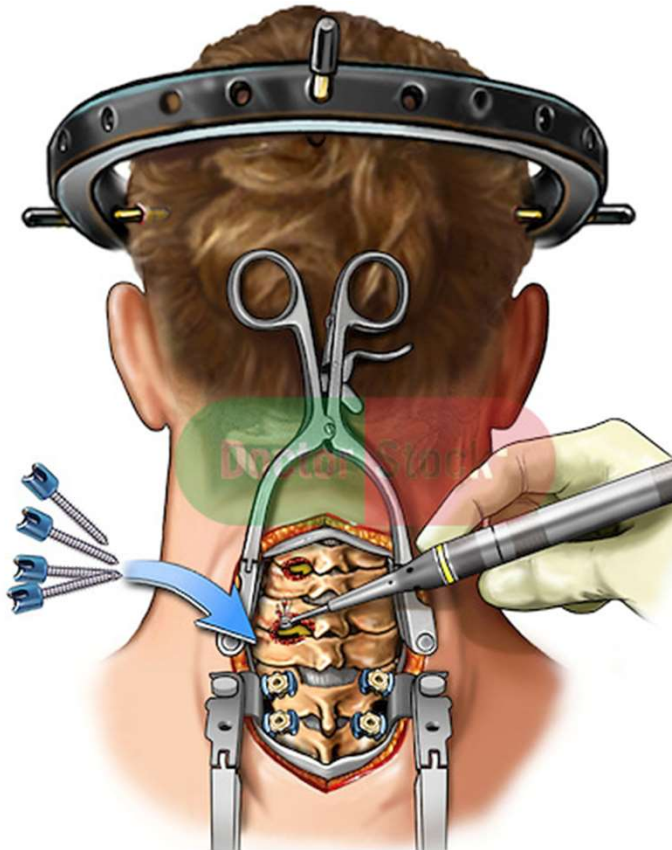
- Facet joint
- Disk Osteophyte Complex
- OPLL
- Infolding Ligamentum flavum



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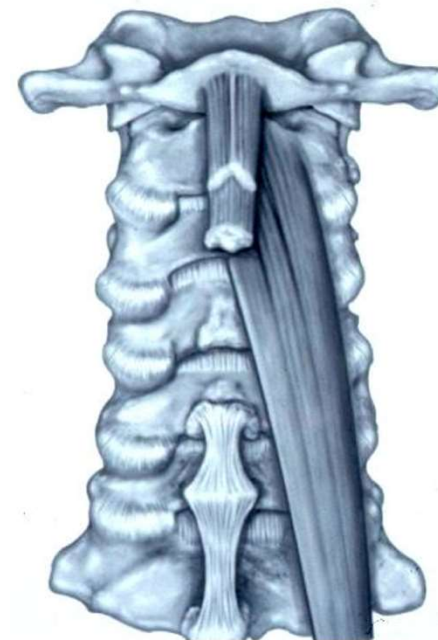
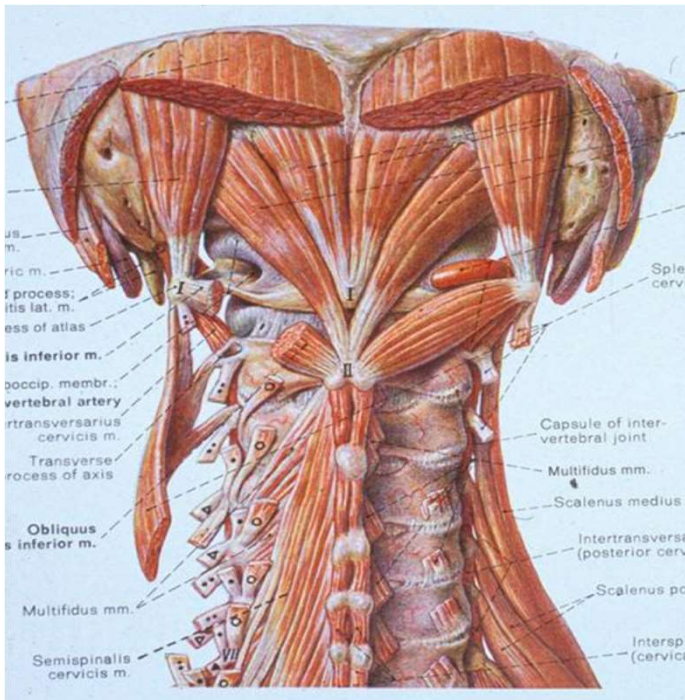
Cervical Foraminotomy



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Not tissue preserving!

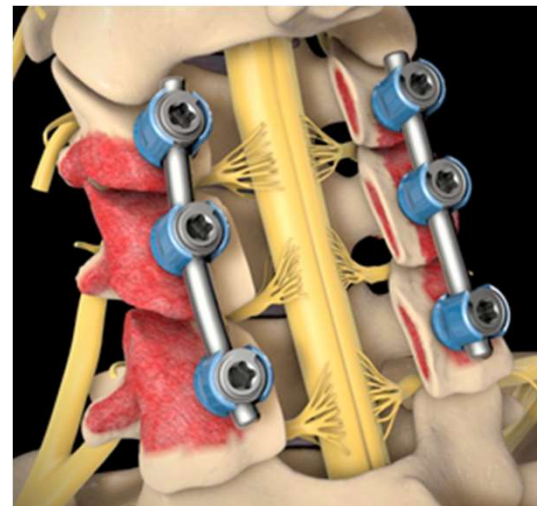
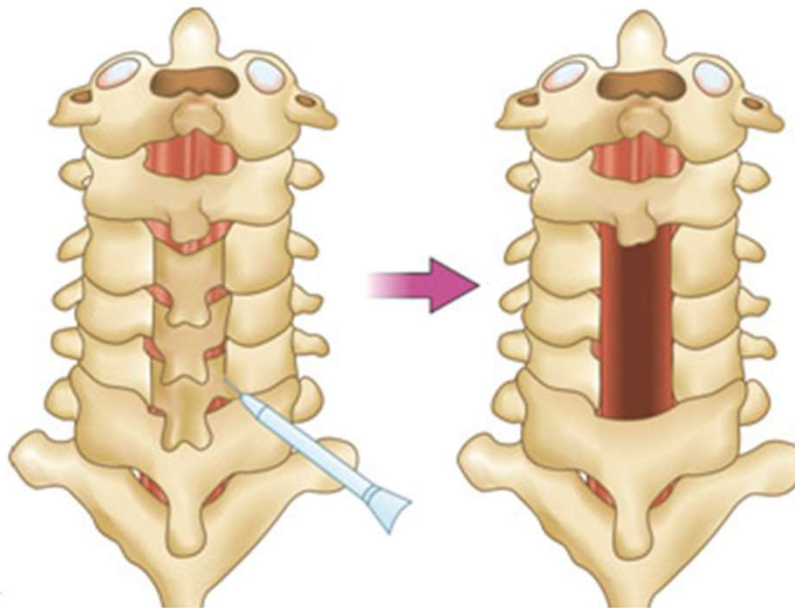


Multifidus is destroyed !!

Cervical laminectomy and fusion

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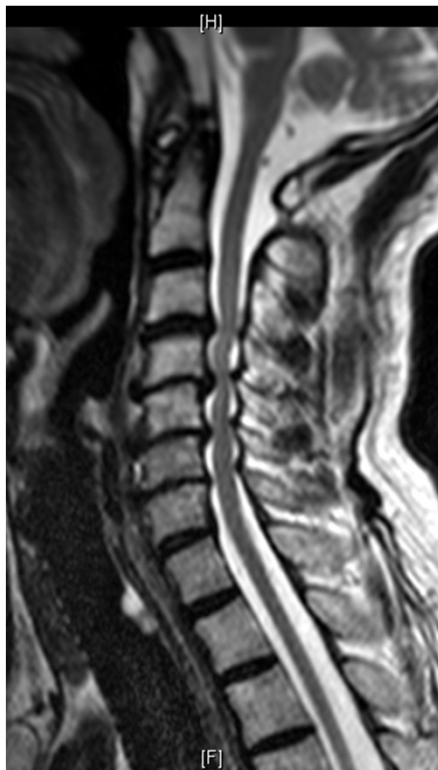
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56 y M w Myelopathy



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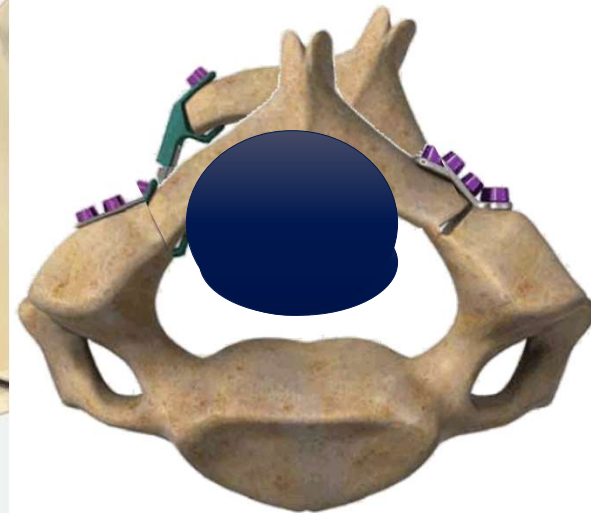
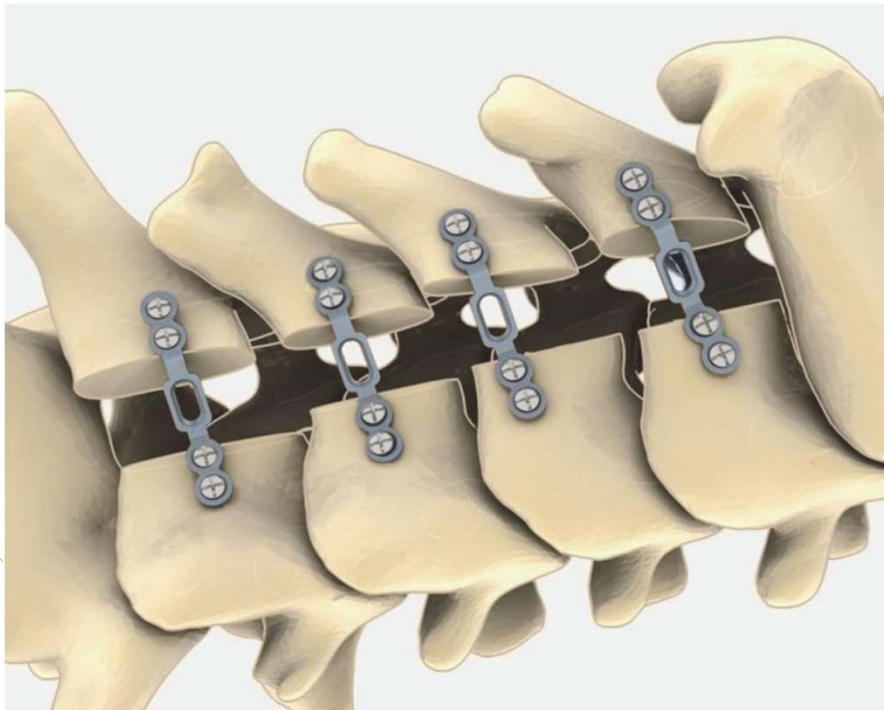
21 y M with MotorCycle Accident



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Cervical Laminoplasty



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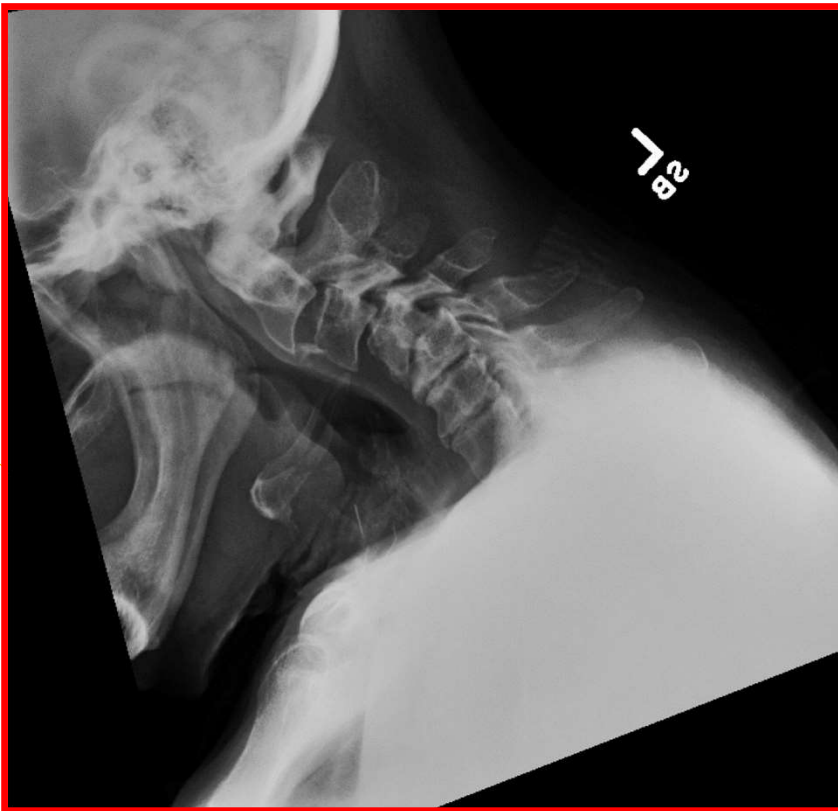
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Combined Ant-Post CF

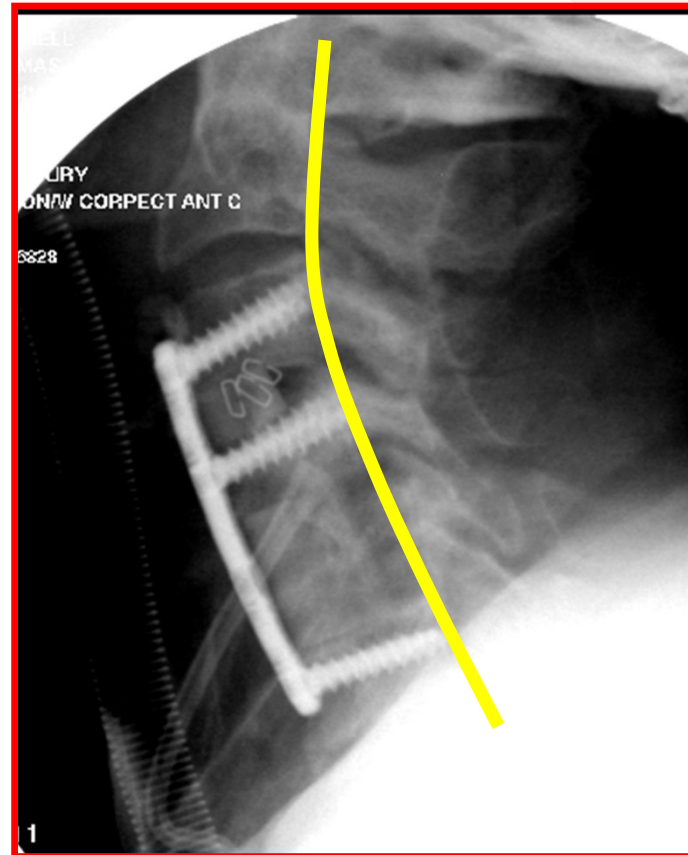
60 y M w MVA + severe weakness



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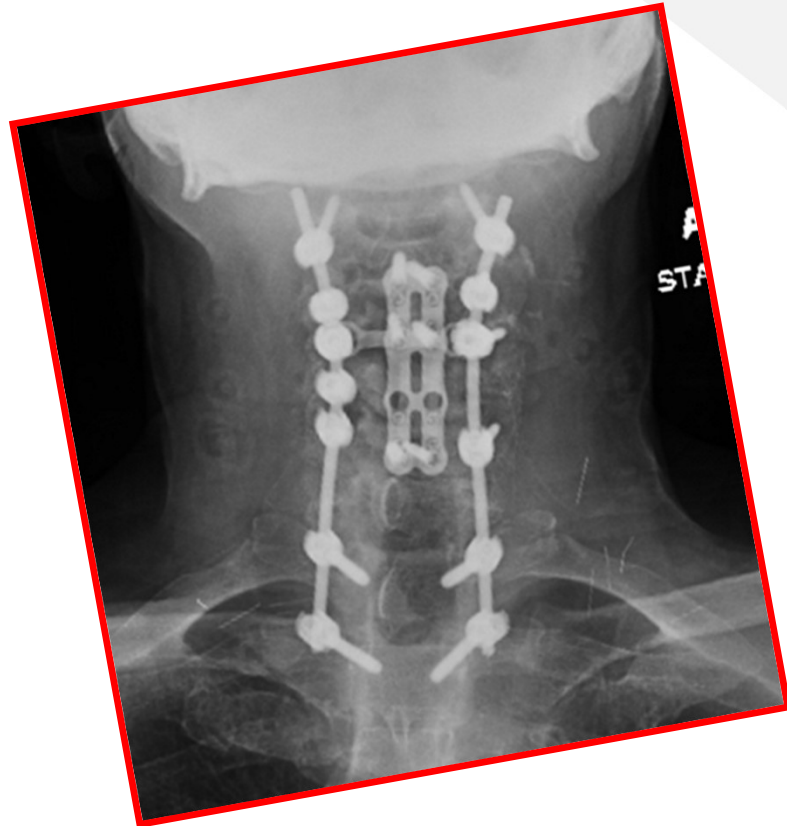
Stage I: Corpec C5-ACCF C3-6



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Stage II – Post Lami Fusion



The background features a light gray diagonal band crossing the frame from the top-left to the bottom-right. On the left side, there is a large yellow rectangle and a smaller gray rectangle, both partially cut off by the edge. In the top-right corner, there is a small dark blue parallelogram. A thin yellow line runs diagonally across the bottom-right area, and a thin blue line runs diagonally across the bottom-left area.

CONCLUSION

UNDERSTANDING Pathology & Treatment

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- Neurologic instability:
 - Urgent Decompression
- Mechanical Instability:
 - Restore Alignment
 - Stabilization
- Anterior:
 - ACDF/ACCF
 - Anterior fixation
 - cTDR
- Posterior:
 - Laminectomy/foraminotomy
 - Instrumentation – fusion (Fracture stabilization)
 - Laminoplasty
- Combined

The background features a light gray diagonal band crossing the frame from the top-left to the bottom-right. On the left side, there is a large yellow parallelogram and a smaller gray parallelogram above it. In the top-right corner, there is a dark blue parallelogram. A thin yellow line extends from the bottom-right towards the center, and a thin blue line extends from the bottom-left towards the center.

Thank You!



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Case Presentation

Subtitle

Patient AA

- 27 YO Male who presents with sub-axial cervical spine injury after motorcycle accident.
 - Associated injuries: Left lung contusion, left 2/3rd rib fracture
 - BMI 26.45
 - PMH: Denies
 - PSH: Knee arthroscopy
 - Meds: None
 - Receptionist, ambulates independently, no toxic habits



Physical Exam

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Motor	C5	C6	C7	C8	T1
Left	1	1	0	0	0
Right	1	1	0	0	0
Sensory	C5	C6	C7	C8	T1
Left	1	1	1	1	1
Right	1	1	1	1	1

Motor	L2	L3	L4	L5	S1
Left	1	0	0	0	0
Right	1	0	0	0	0
Sensory	L2	L3	L4	L5	S1
Left	1	1	1	1	1
Right	1	1	1	1	1

- Babinsky equivocal
- Hoffman negative
- Clonus negative
- DRE decreased tone, decreased sensation in saddle

Muscle and Sensory Grading

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Muscle Grading

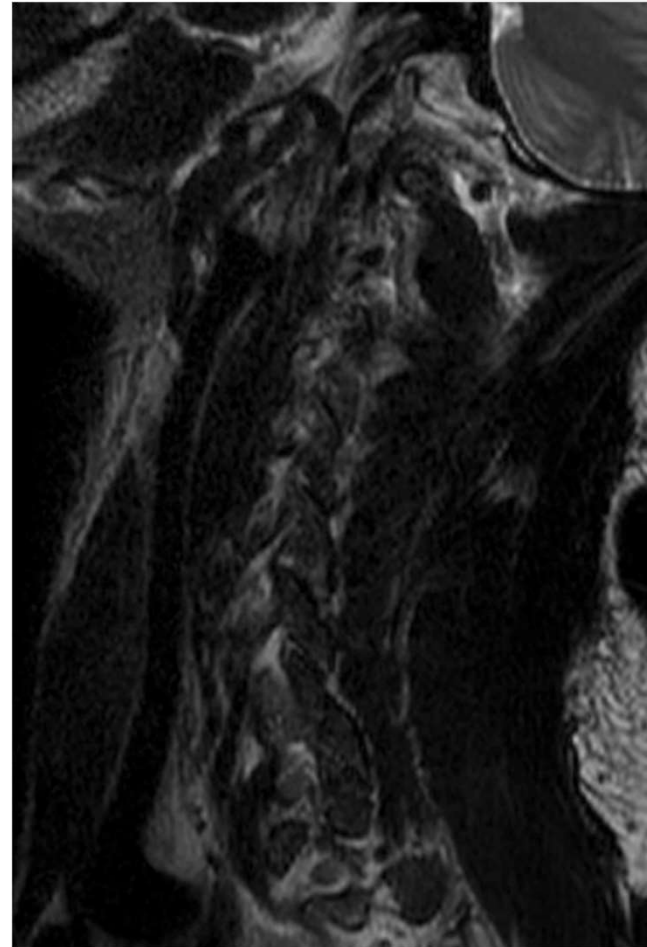
- 0 = total paralysis
- 1 = palpable or visible contraction
- 2 = active movement w/ gravity eliminated
- 3 = active movement against gravity
- 4 = active movement against gravity with some resistance
- 5 = normal strength against resistance

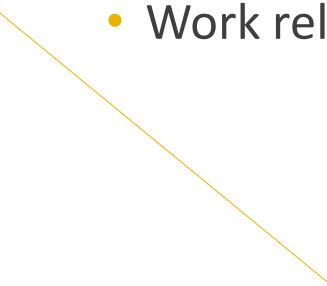
Sensory Grading

- 0 = Absent
- 1 = Altered
- 2 = Normal

Our Patient Imaging

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- Diagnosis?
 - Treatment Options / Urgency?
 - Work related? Compensable?
- 

Our Patient

- OR for posterior cervical laminectomies
- C3-C5, posterior fusion C2-C6 with fixation



- Decadron 10mg x 3 Post op
- MAP goals >85 72 hours

Our Patient

- Discharged to rehab.
- Seen 3 months post op. Ambulating without assistance. Motor grossly preserved.

