

Challenging Cases in Spinal Trauma

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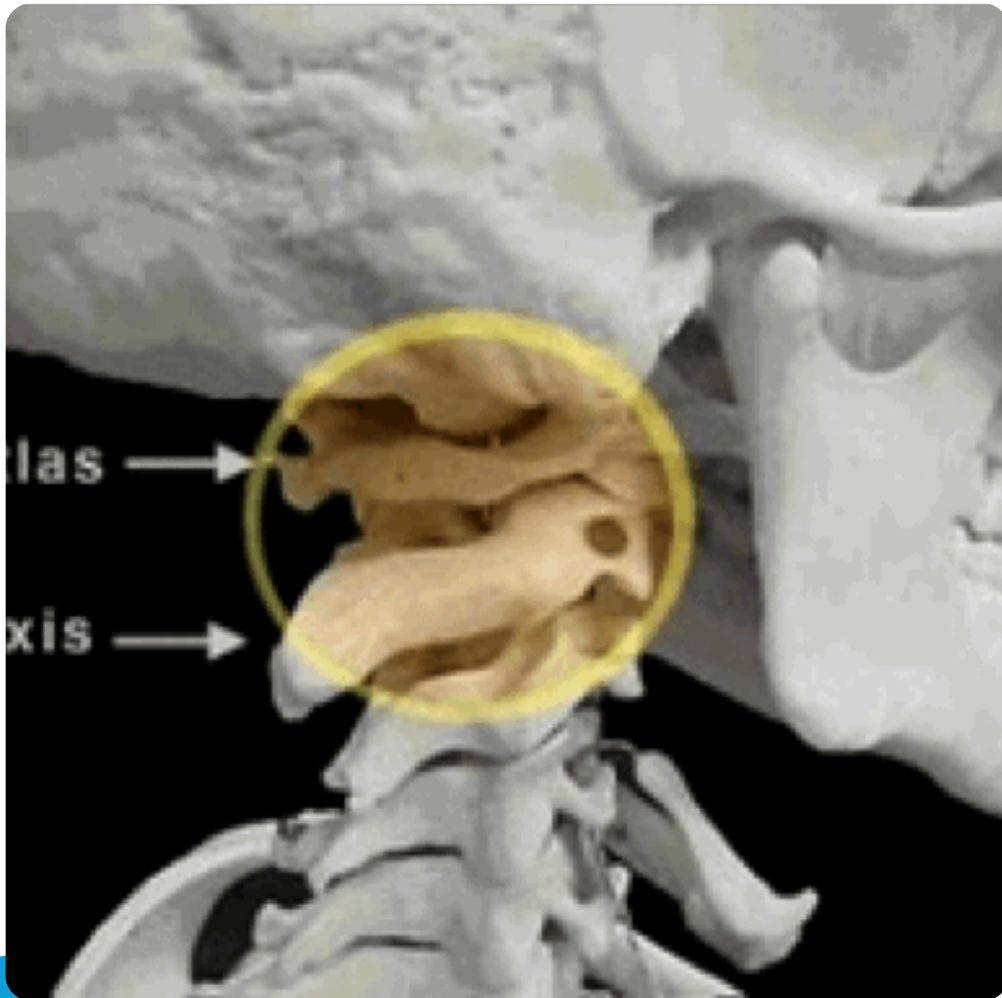
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Spinal Trauma

- Incidence
 - 55 per million
 - Impact can be significant
- Epidemiology
 - MVAs – 48%
 - Falls – 16%
 - Violence – 12%
 - Sports accidents – 10%
 - Other – 14%
- Non-contiguous spine injuries occur in 15%



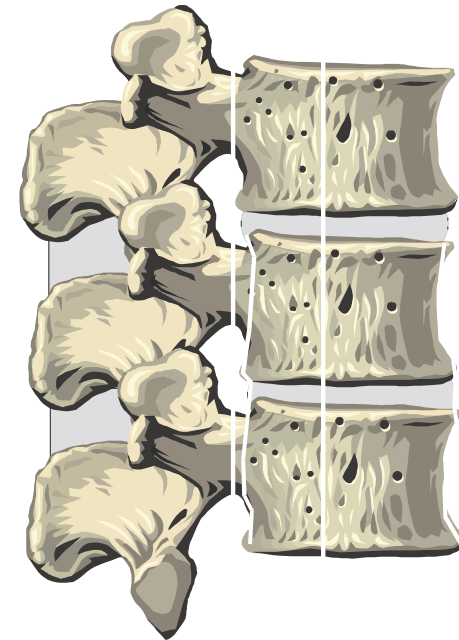
Spinal Trauma

- Older adults are more susceptible
 - Osteoporosis, osteopenia, ankylosing spondylitis, hyperostosis, etc..
- Upper cervical spine is the most common injury
- Spinal cord injury is more likely to be incomplete

Anatomy

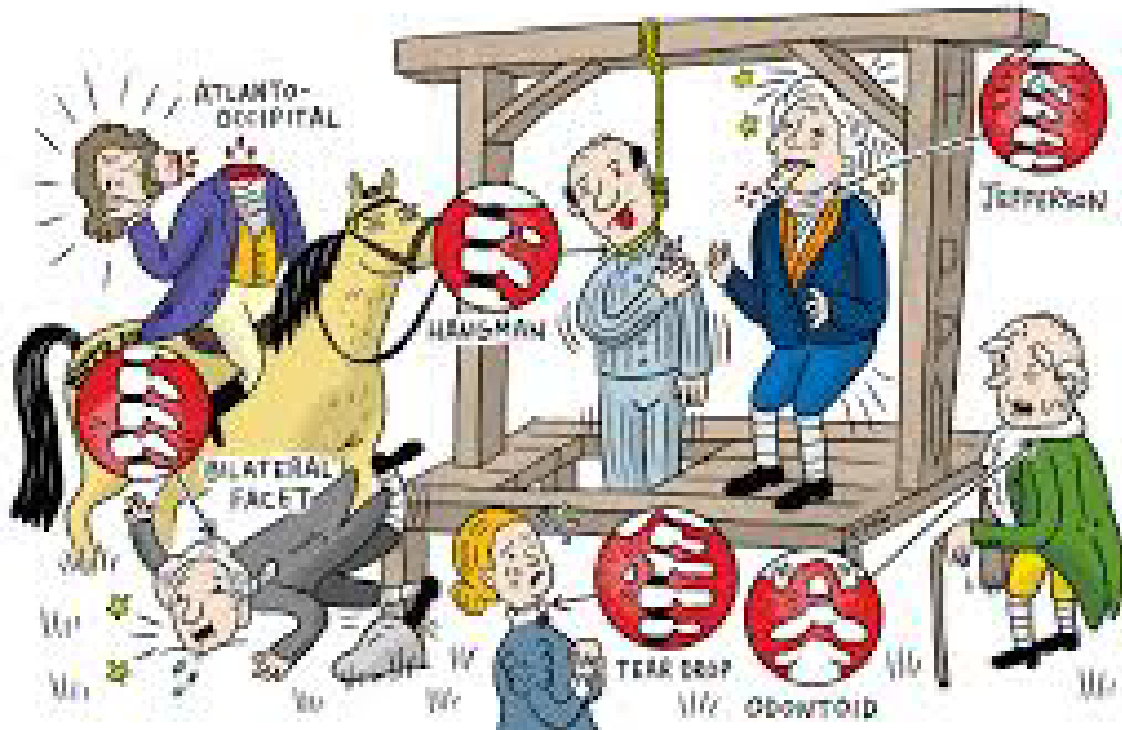
Anterior vertebral body withstands axial load and compression

Posterior ligamentous complex is a tension band that resists forward flexion or kyphosis



Cervical Fractures

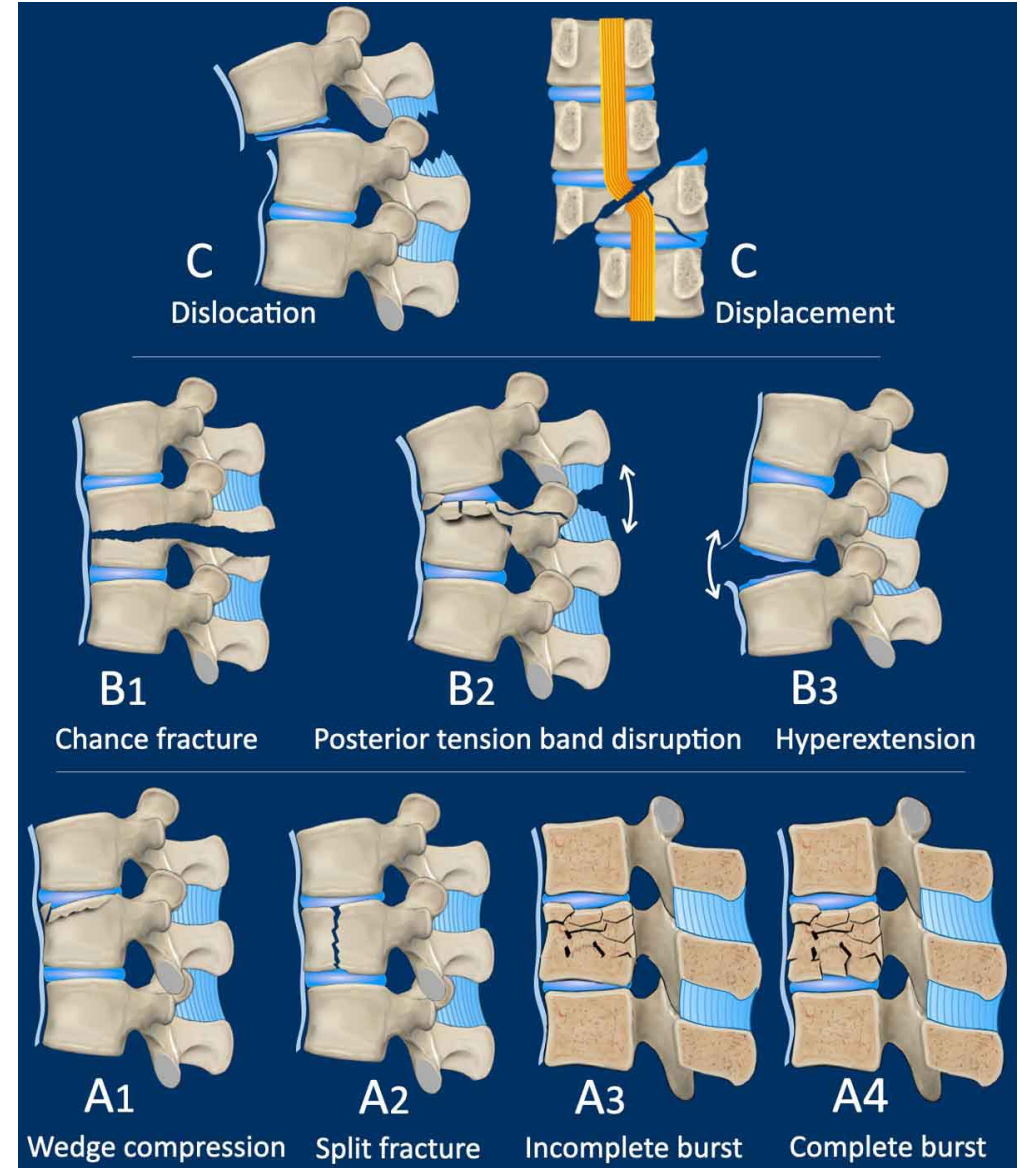
JEFFERSON BIT OFF A HANGMAN'S THUMB



- Unstable
 - AOD
 - Facet dislocations
 - Odontoid
 - Flexion teardrop
 - Hangman's
 - Jefferson's
 - Depending on the stability of the TAL

Fracture Types

- Compression
 - Non-operative
- Burst
 - Sometimes operative
- Flexion distraction (Chance variants)
- Hyperextension (pre-existing ankylosis)
- Translational (bad)



Case # 1

- 30 year old male
- Last seen at a rave party
- Found in a sewer
 - 20 feet below a manhole
- Complaining of neck and back pain
 - Cold
 - 135/72, 64, 16
 - No movement of his lower extremities
- 90 minute extrication



Scene

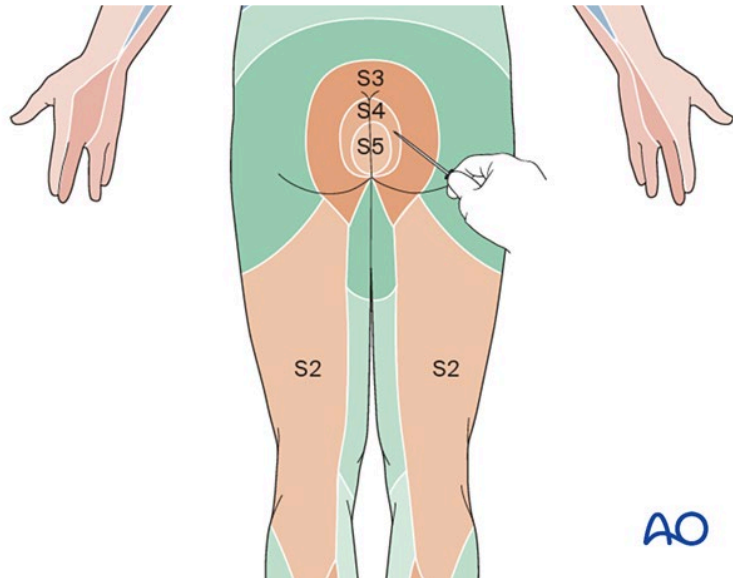
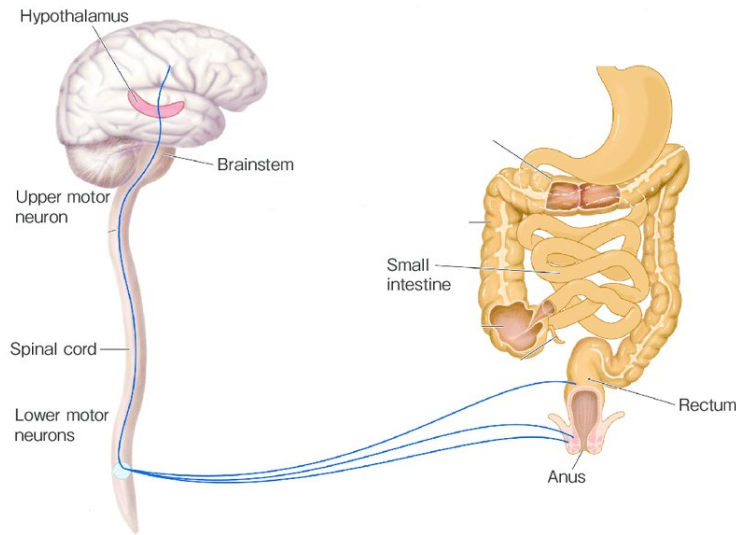


Scene



**SFFD Chief
Luis Ibarra-
Rivera**





AO

Physical Exam

- 84/60, 56, 24, 91%, 34.5 C
- Phonating
- Tenderness to palpation at neck and back
 - T4 step off
- No motion of the lower extremities
- One of the last indications for a rectal exam

Spinal Trauma

- Spinal versus neurogenic shock
 - Neurogenic shock
 - Altered hemodynamic state
 - Hypotension
 - Bradycardia
 - Hypothermia
 - Spinal shock
 - Altered physiologic state
 - Flaccid paralysis
 - Anesthesia
 - Loss of bowel/bladder control
 - Hemorrhagic until proven otherwise



Concurrent Injuries

- There are associated injuries in 50% of cases
 - 20% have pulmonary injuries





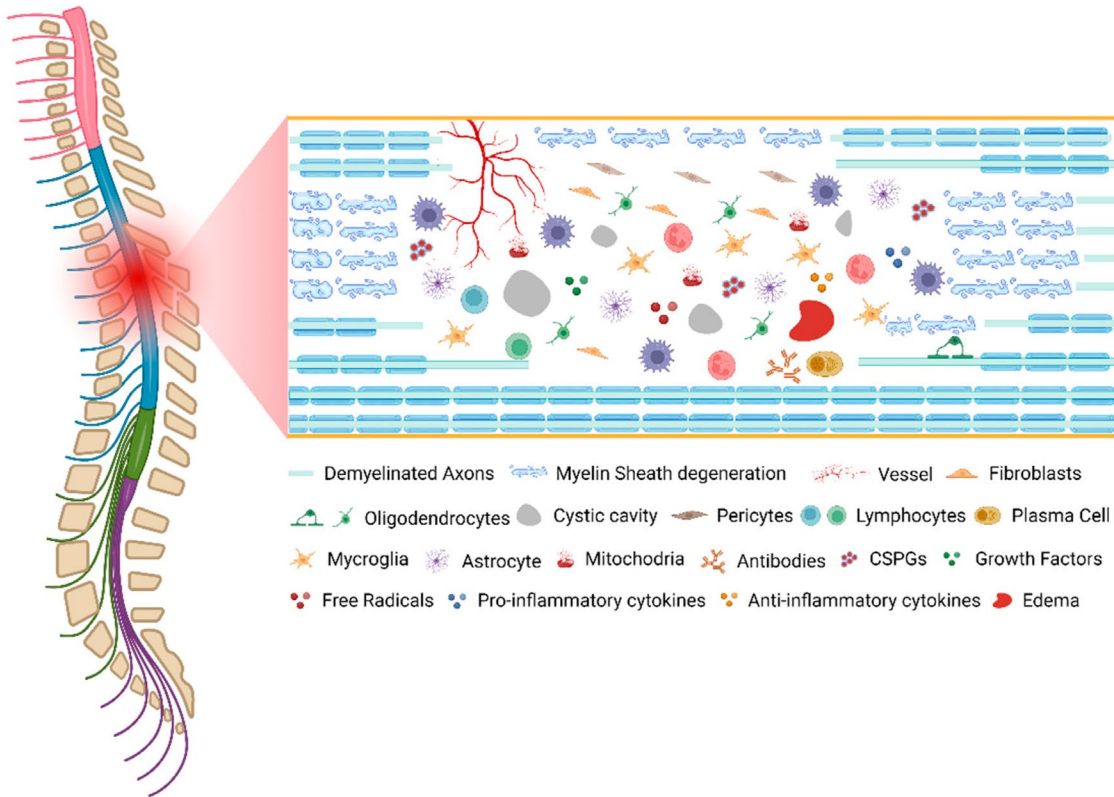
Management

- Maintain a MAP > 80 (85)
 - Continuous MAP exceeding 80 mmHg beginning in the prehospital setting has a significant impact on neurologic outcome
 - Haldrup et al
 - J Neurosurg Spine, 2020
- Early decompressive surgery

Blood Pressure Management

- Norepinephrine
 - Avoids reflex bradycardia
 - Start at 3 ug/min
 - 0.05 ug/kg/min
 - If you get to 10 ug/min or more think of adding:
 - Vasopression
 - Does not cross the blood-brain barrier
 - Doesn't augment cardiac output
-





Steroids

- Guidelines remain vague
- “Cannot be definitively recommended”
 - ACS Spine Injury Consensus Guidelines
 - 2022



Spinal Motion Restriction

- Backboards
- Cervical Collars
 - No value in penetrating trauma
 - ACS Best Practice Guidelines – Spine Injury
 - 2022
- Awake, cooperative patients
- Obtunded patients

Spinal Motion Restriction

- Cervical spine motion restriction after blunt trauma
 - The Brass Tacks: Concise reviews of published evidence
 - Serigano, Riscinti
 - Acad Emerg Med, 2021
 - Cochrane systematic review searched for trials studying the effects of spinal immobilization
 - **No studies of sufficient quality were found**



Cervical Collars

- **No studies of sufficient quality were found**

Cervical Collars

- Known harm
 - Increased intracranial pressure
 - May be worse with underlying elevated ICP
 - Complicates airway management
 - Increased risk of aspiration
 - Concealed wounds
 - Patient discomfort/agitation
- No known benefit





Cervical Collars

- **Known harm**
- **No known benefit**



Case # 2

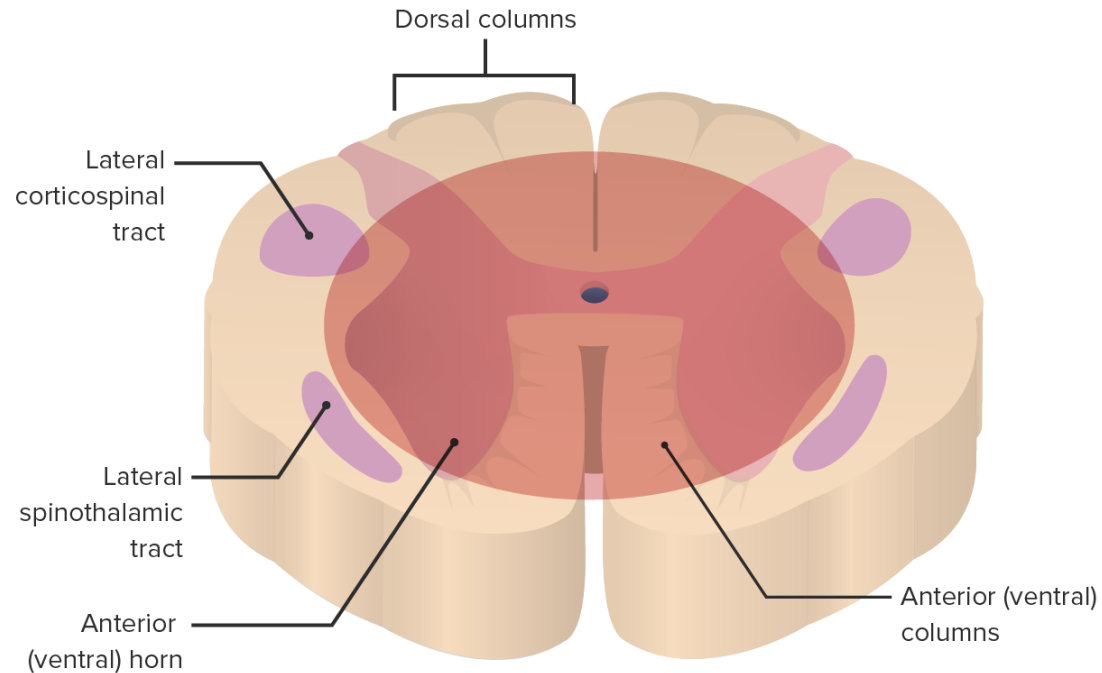
- 76 year old male
- Fell forward onto his chin
- Initially unresponsive per bystanders
 - Mental status now improved
- Work up negative
- Repeat exam
 - Moving all extremities
 - No focal deficit

Follow Up

- Sent in by PCP 2 days later
 - Hands not working right
 - Weakness in grip bilaterally
 - Right > left
- MRI
 - Cord compression with edema at C4/C5
- Decompressive surgery with some resolution of symptoms



Central Cord Syndrome



- Most common incomplete spinal cord injury
- More common in older patients
- Gross movement may be intact
 - Subtle weakness in grip

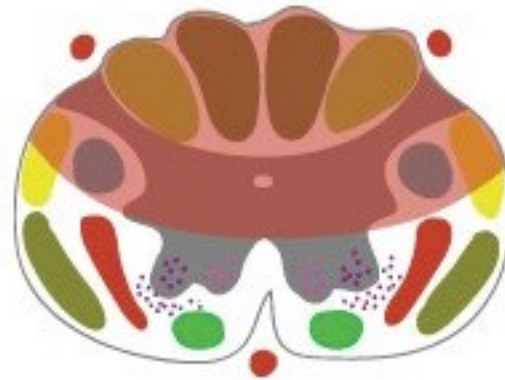
Spinal Cord Syndromes

- Anterior Cord
- Posterior Cord
- Central Cord
- Brown-Sequard



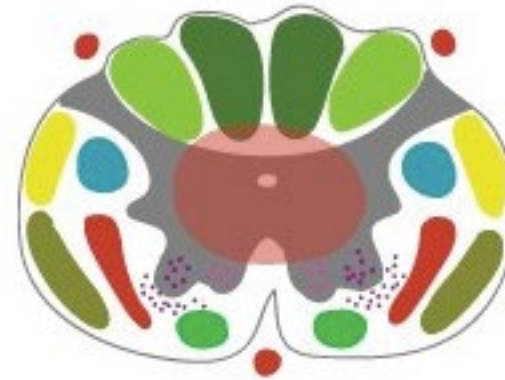
Anterior Cord

Bilateral motor, pain/temperature



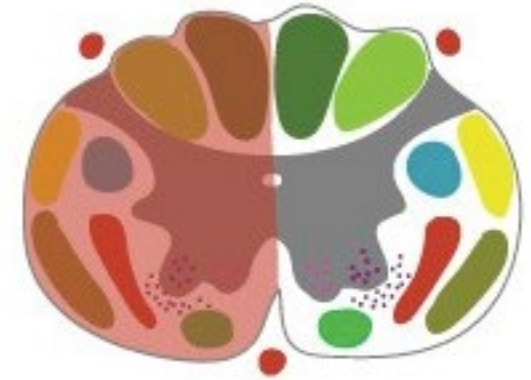
Posterior Cord

Bilateral proprioception



Central Cord

Bilateral upper extremity weakness, pain/temperature



Brown-Sequard

Unilateral weakness, contralateral pain/temperature

Summary

- Think about spinal cord injury
- Maintain MAPs of 85-90
 - Norepinephrine
 - Can add vasopressin
- Steroids continue to provoke debate
 - No good evidence to support
- Neuro exam on admission AND discharge
- Respect the elderly





Thank You!



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