Spinal Injuries
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Spinal Injuries

- Incidence 30-40/ 1,000,000 person
- The mortality rate 40-50%
- Most common in the cervical region (55%)
- The peak incidence in the young age group (15-25 year-old)
- Motor vehicle accidents acounts for 50% followed by falls (25%), athletic accidents (15%), and penetraing injuries (10%)

Acute evaluation and ER management

- Strict spine precautions (immobilization)
- Emergency resuscitation (ABC..)
- Comprehensive approach
- Always expect multiple trauma (neuroexam, chest, abdomin,muskuloskeletal…)
- Differentiate hggic from neurogenic shock

Neurological and radiological evaluation

- In awake patients, both motor and sensory examinations in all extremeties
- Unconcious patients: muscle tone, reflexes, rectal sphinctor tone, priapism

Radiological evaluation

Lateral C.S. Xray:
- Accuracy 70-80%
- check alignement, bone and disc space pathology
- Prevertebral soft tissue at C2-C4:
(retropharyngeal < 7mm)
and at C5-C7:
(retrotracheal <20mm)

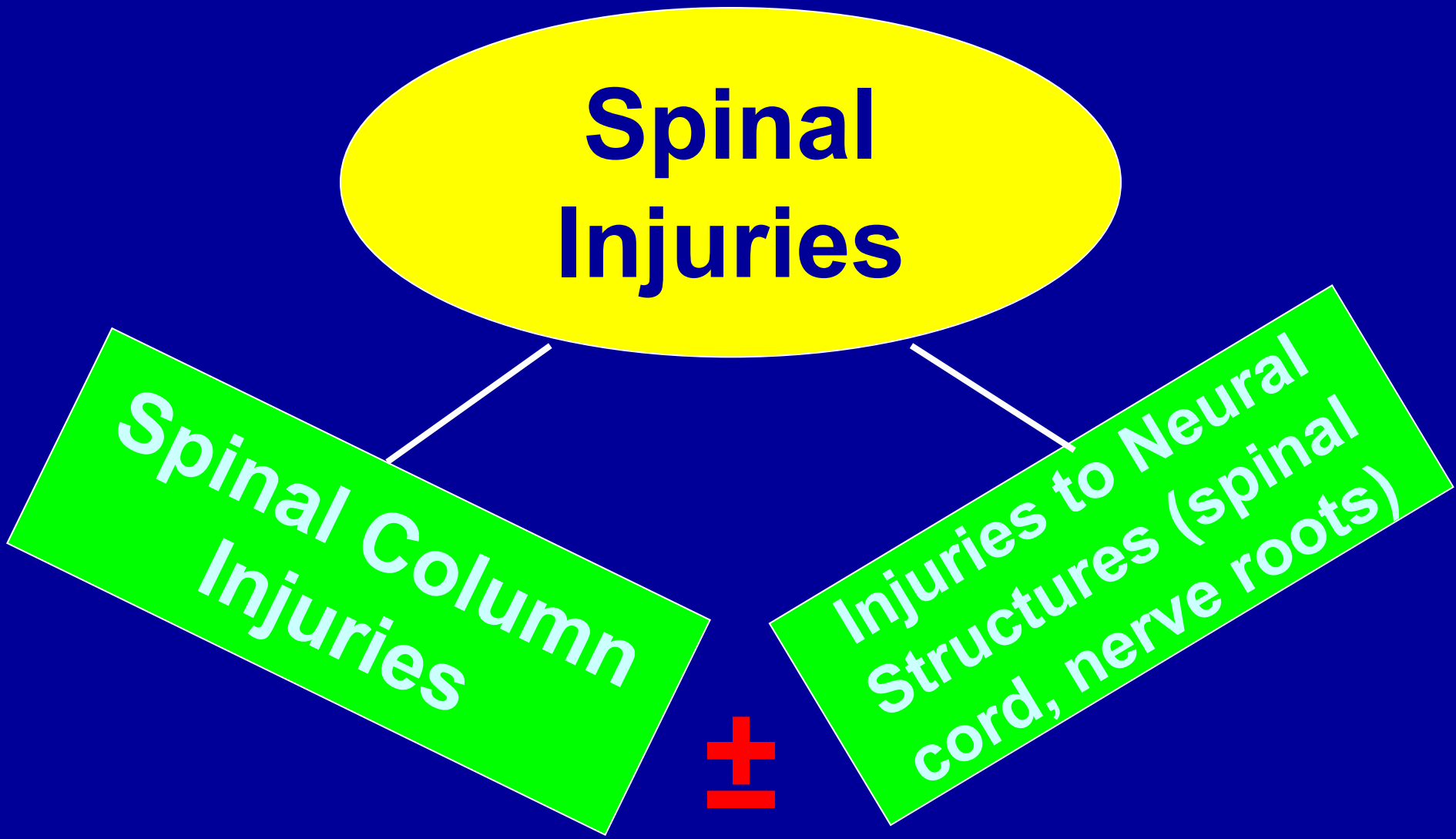
Radiological evaluation

Dorsal spine Xray:
-Not accurate

-Lumbar Spine Xray:
70% accuracy

Radiological evaluation

CT scan and MRI in case of clinical suspicion or abnormal Xray


Spinal Injuries
Spinal Column Injuries
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Injuries to Neural Structures (spinal cord, nerve roots)

Neural injury
secondary injury

- local swelling at the site of injury which pinches off blood (hypoperfusion and ischemia)
- Excessive release of glutamate and excitotoxicity of neurons and oligodendrocytes at the site of injury
- Infiltration by immune cells (microglia,neutrophils)
- Free radical toxicity
- Apoptosis/necrosis

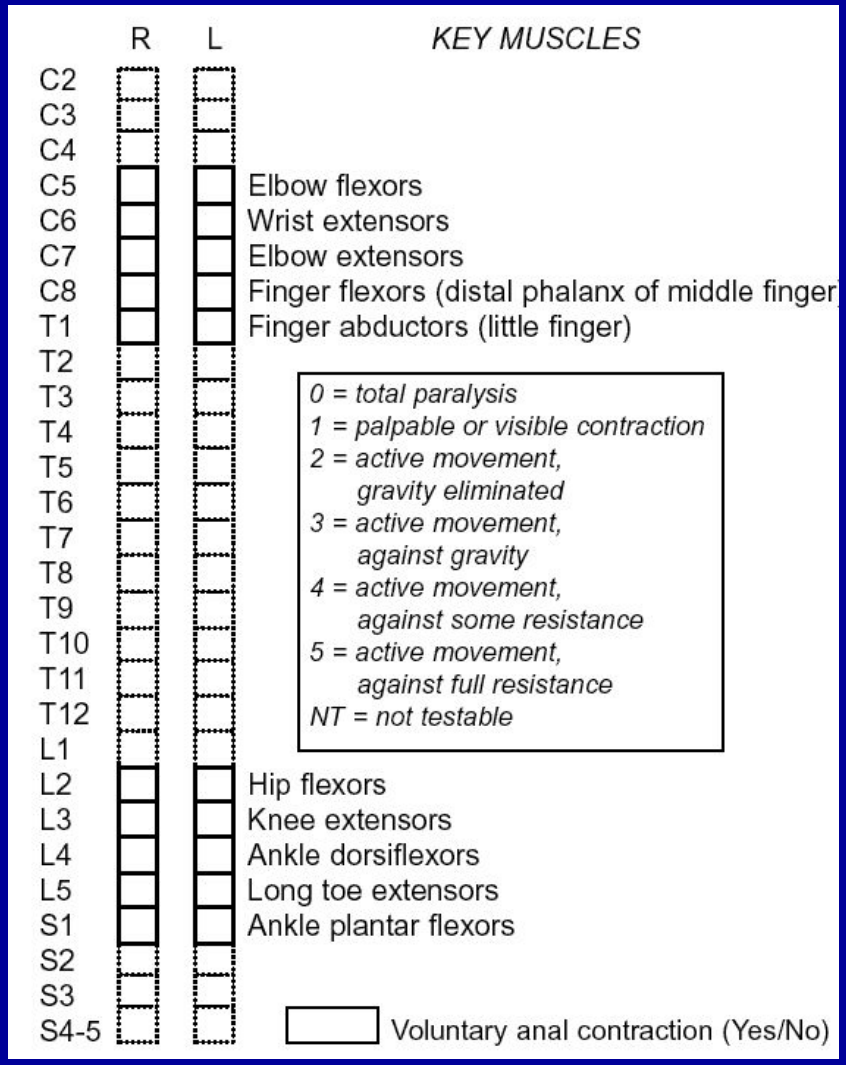
General Management Guidelines
Role of steroids

- The North American Spinal Cord Injury Study (NASCIS) showed definite benefit of I.V. high dose methylprednisolone
- Given for complete and incomplete injuries
- Should be given within 8 hours of the injuries
- Dose: 30mg/kg over 1 hr loading dose then 5.4mg/kg/hr for 23 hrs or 48 hrs

Spinal Shock

Transient loss of all neurological function (motor, sensory, and autonomic) below the injury level for 1-2 weeks

Spinal Injuries
Injury level



Spinal Injuries

ASIA IMPAIRMENT SCALE:

A =Complete: No motor or sensory function is preserved

B =Incomplete: Sensory but not motor function is preserved

C =Incomplete: Non-useful motor function is pre-served below the neurological level

D =Incomplete: Useful motor function is pre-served below the neurological level

E =Normal: Motor and sensory func-tionare normal.

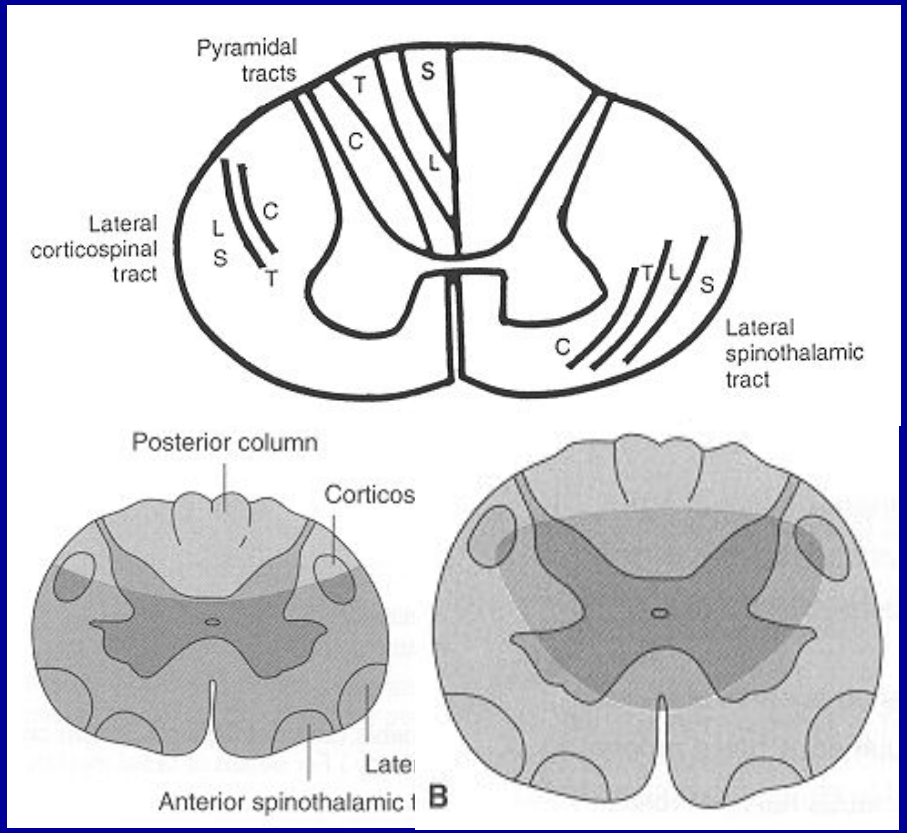
Incomplete Spinal Injuries

CLINICAL SYNDROMES:

Central Cord: greater motor deficit in the upper extremities

Brown-Sequard: dissociated sensory loss, ipsilateral paralysis

Anterior Cord: paraplegia, quadriplegia



Incomplete Spinal Injuries

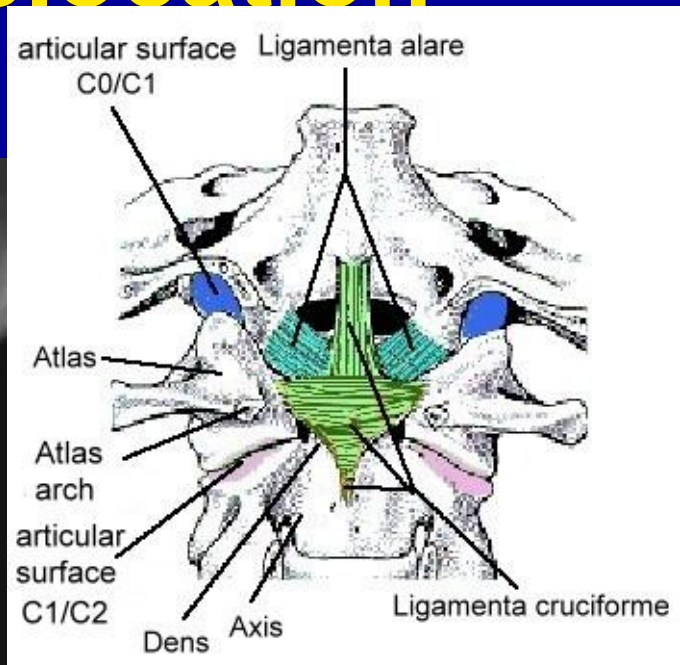
CLINICAL SYNDROMES:

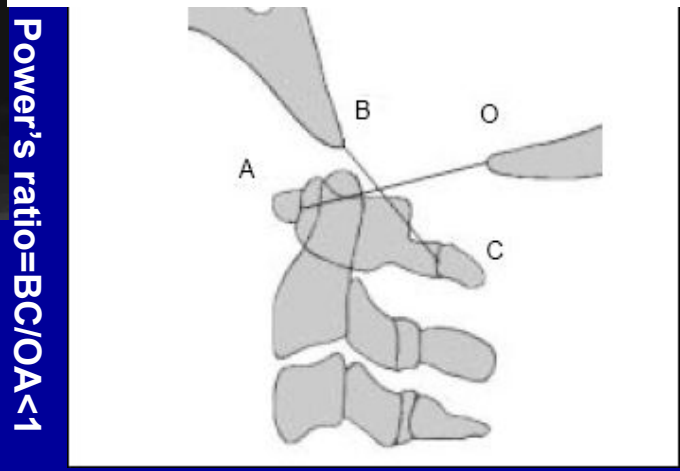
Conus Medullaris: saddle anesthesia, incontinence (painless, symmetrical)

Cauda Equina: saddle anesthesia, incontinence (painful, asymmetrical)

Spinal Column Injury
Atlanto-occipital dislocation

- Atlanto-occipital dislocation (AOD) is a devastating condition that frequently results in prehospital cardiorespiratory arrest
- accounts for 1% of spinal trauma.
- AOD occurs 3 times more commonly in children than adults,
- hyperextension.
- Unstable

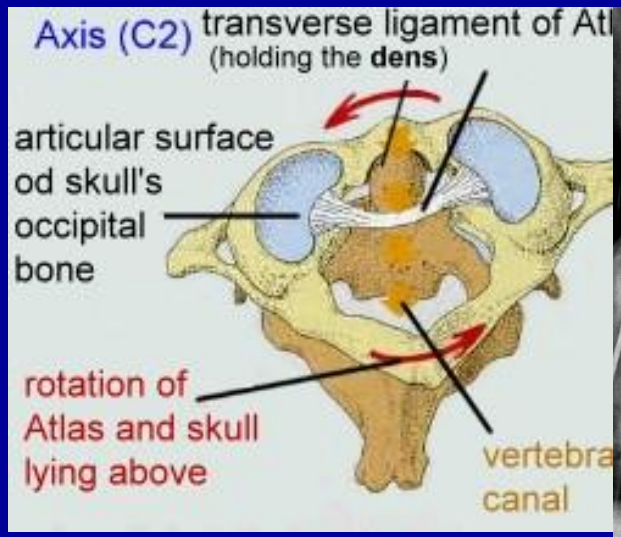


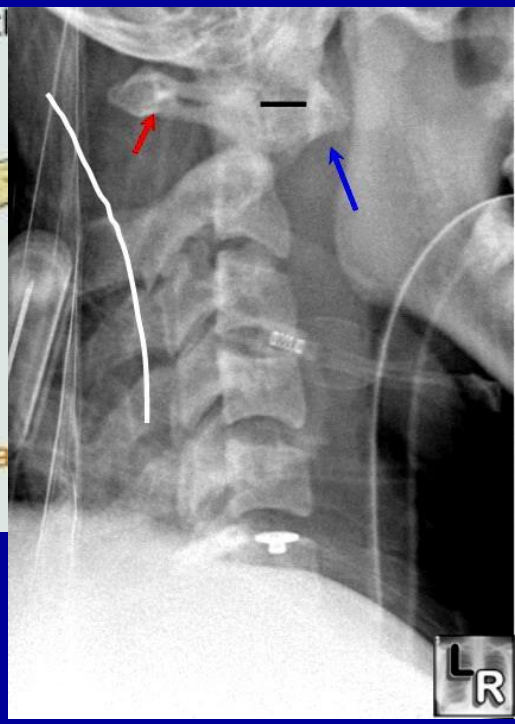


Power's ratio=BC/OA<1

Spinal Column Injury
Atlanto-Axial dislocation

- Lower mortality than Atlanto-occipital dislocation
- 1/3 of patients have deficit
- Transverse ligament injury
- AAD occurs more commonly in children than adults
- Non-traumatic in downs syndrome and Rheumatoid arthritis
- Unstable

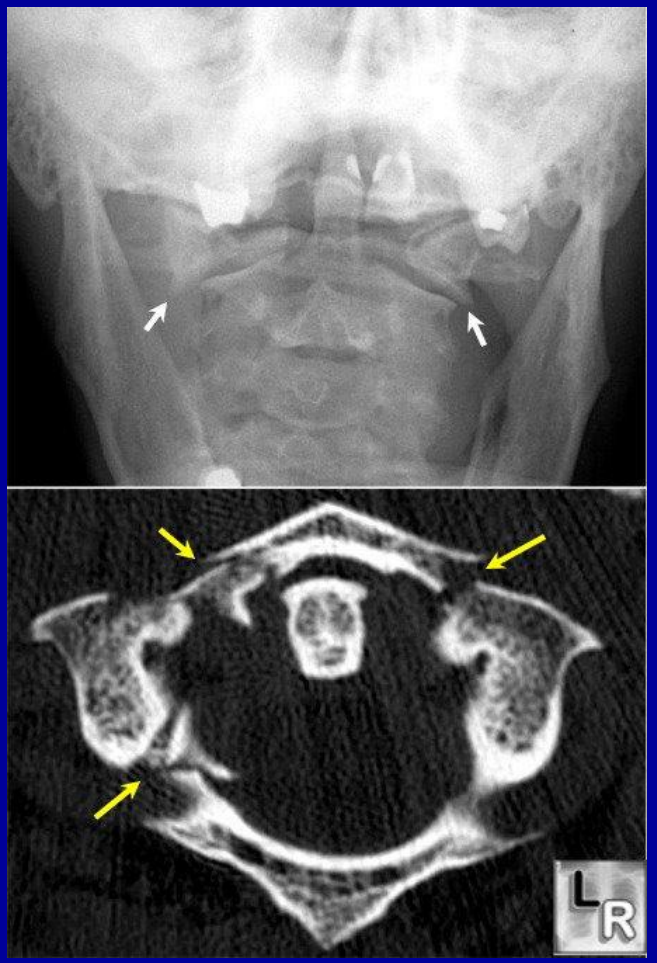




ADI> 5mm

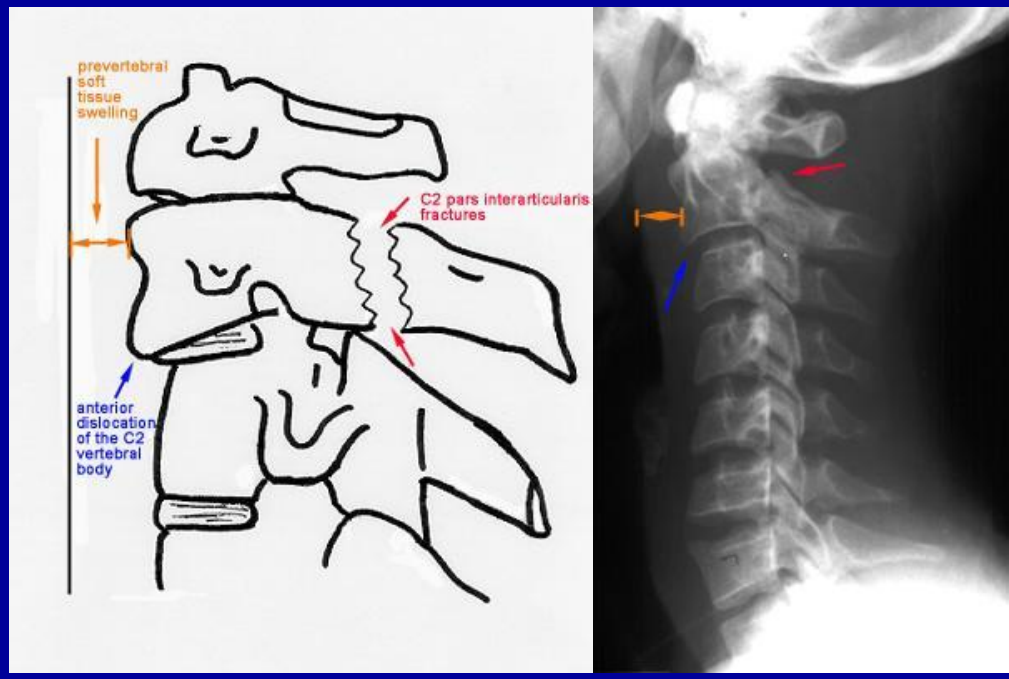
Spinal Column Injury
Atlas (C1) fractures

- Described as Jefferson #
- Axial load
- Usually no neurological deficit
- 1/3 have C2 #
- Usually stable



Spinal Column Injury
Axis (C2)

- Includes Hangman's # and Odontoid process #



HANGMAN'S #

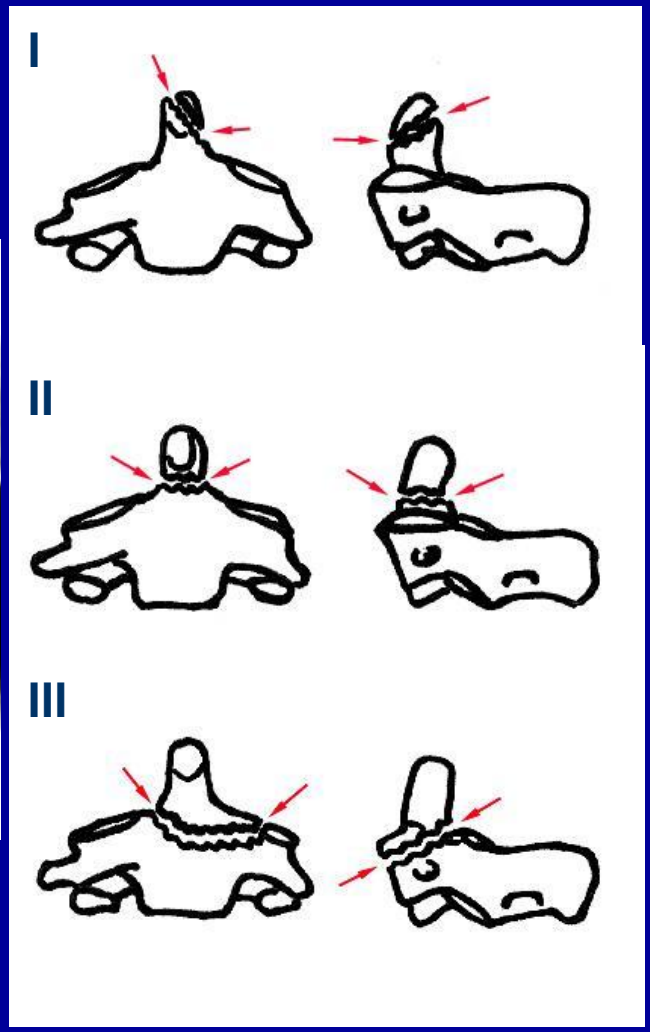
- Bilateral # of the isthmus of the pedicles of C2 with anterior sublaxation of C2-C3
- Hyperextention and axial loading
- Usually stable

Spinal Column Injury
Axis (C2)

- Includes Hangman's # and Odontoid process #

Odontoid #

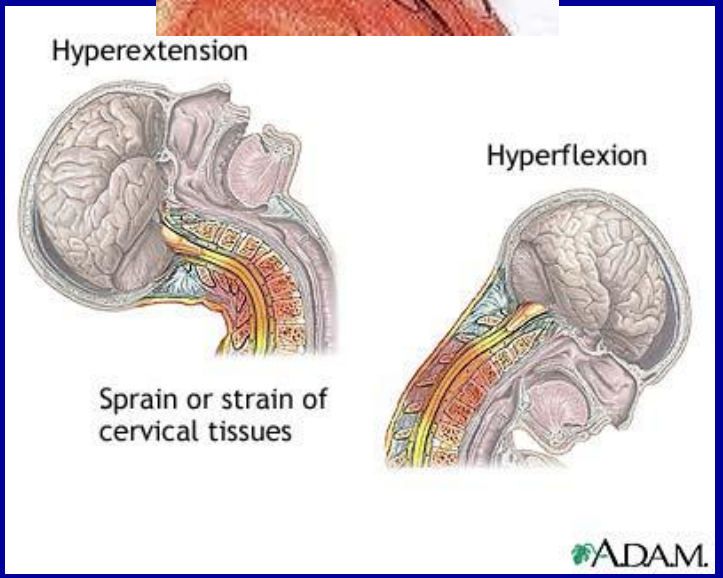
- Flexion injury
- 15% of all cervical injuries
- II unstable,I & III stable



Spinal Column Injury Subaxial (C3-C7)

Whiplash injury:

- Traumatic injury to the soft tissue in the cervical region
- Hyperflexion, hyperextention
- No fractures or dislocations
- Most common automobile injury
- Recover 3-6 months



Spinal Column Injury
Subaxial (C3-C7)

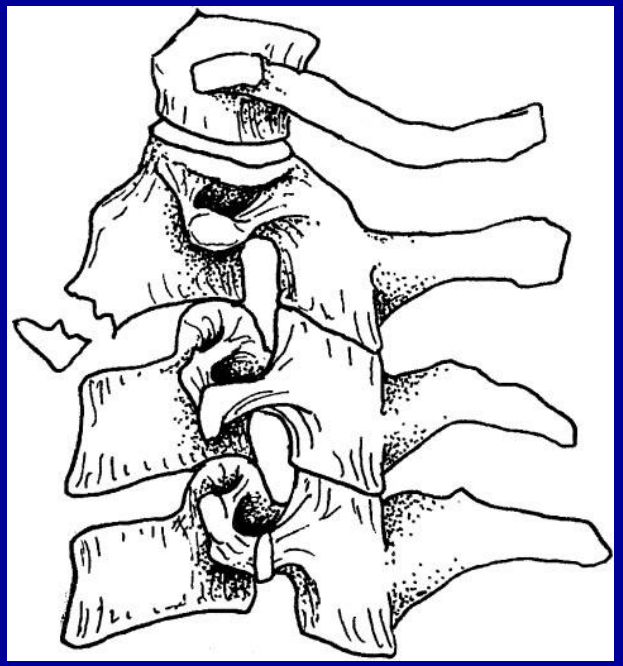
Vertical compression injury:

- Loss of normal cervical lordosis
- Burst #
- Compression of spinal cord
- Unstable
- Requires decompression and fusion

Spinal Column Injury Subaxial (C3-C7)

Compression flexion injury (teardrop #)

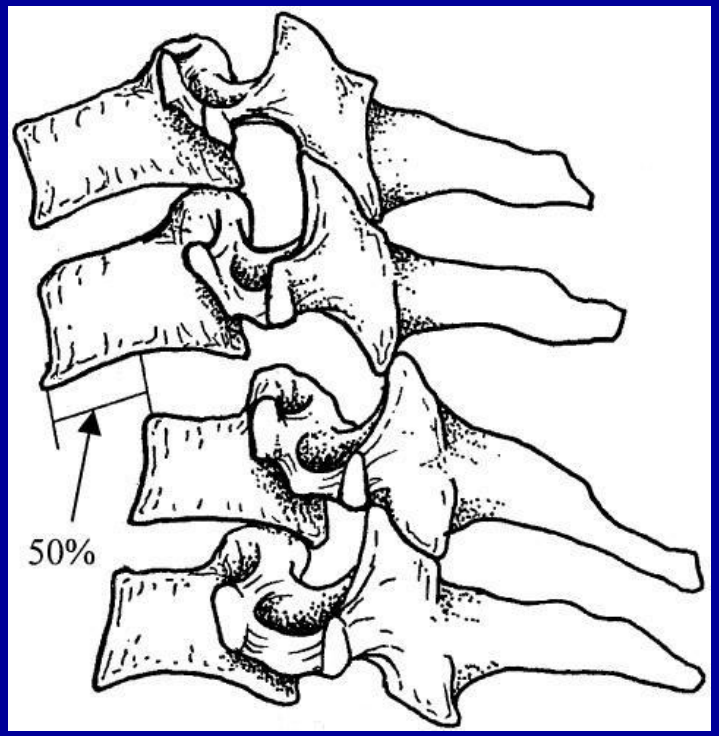
- Classical diving injury
- Posterior elements involved in >50%
- Displacement of inferior margin of the body
- Unstable
- Requires stabilization



Spinal Column Injury
Subaxial (C3-C7)

flexion distraction injury (locked facet)

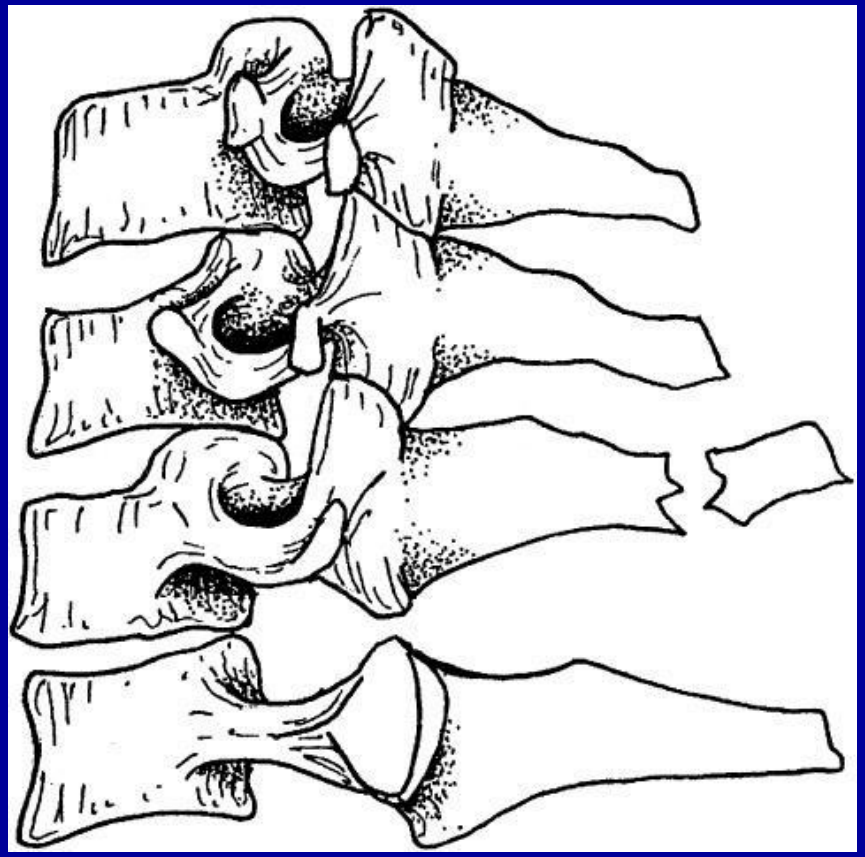
- >50% displacement
- Unstable
- Requires reduction and stabilization



Spinal Column Injury
Subaxial (C3-C7)

extention injury (# posterior elements)

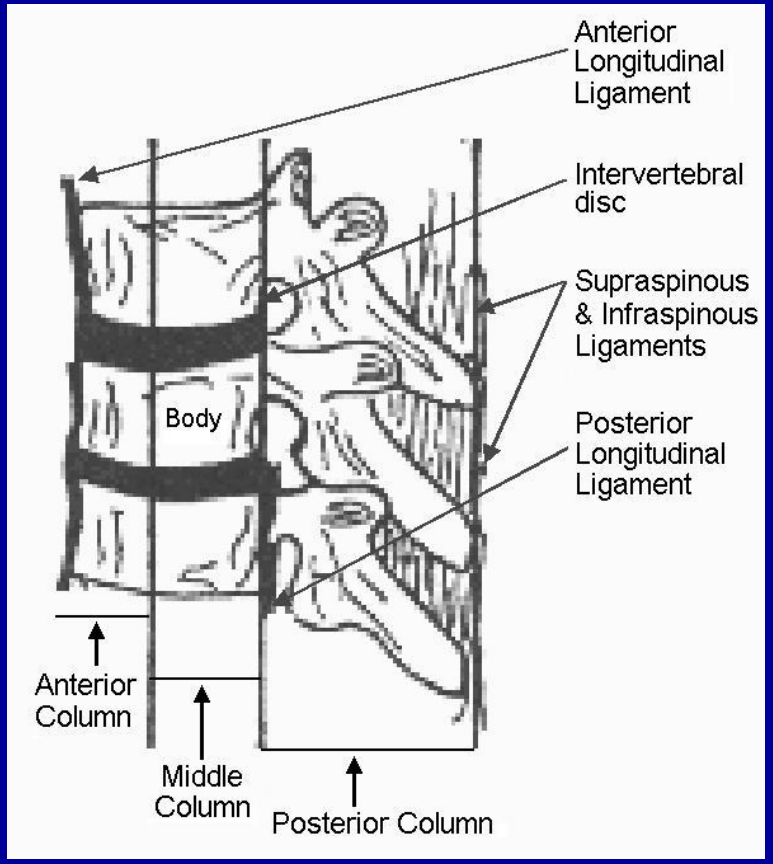
- # lamina, pedicles or spinous process
- With or without ligamentous injury
- Usually stable



Spinal Column Injury
Thoracic and lumbar

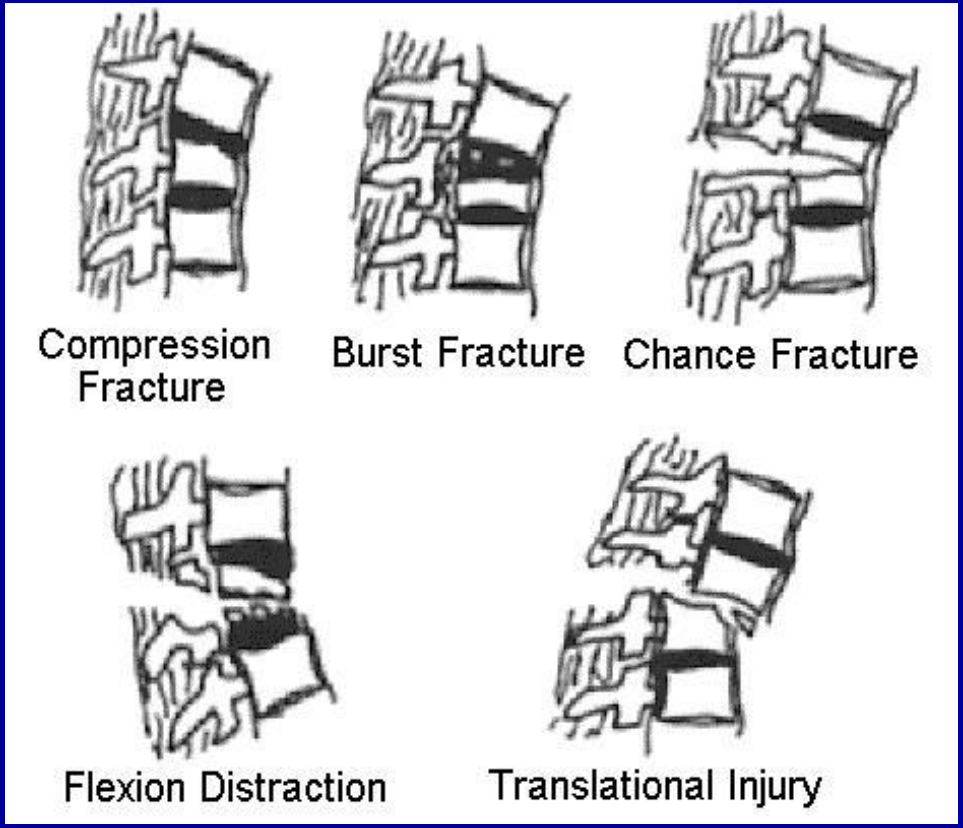
Stability (three column model of Denis)

- Injury affecting two or more column is unstable



Spinal Column Injury
Thoracic and lumbar

- Compression #
- Burst #
- Chance # (seat belt)
- Flexion distraction
- Fracture dislocation



General Management Guidelines

- Strict spine precautions (immobilization)
- Emergency resuscitation (ABC..)
- Comprehensive approach
- Neurological and Radiological assesment.
- Always expect multiple trauma (neuroexam, chest, abdomin,muskuloskeletal…)
- Differentiate hggic from neurogenic shock

General Management Guidelines
External vs Internal stabilization