

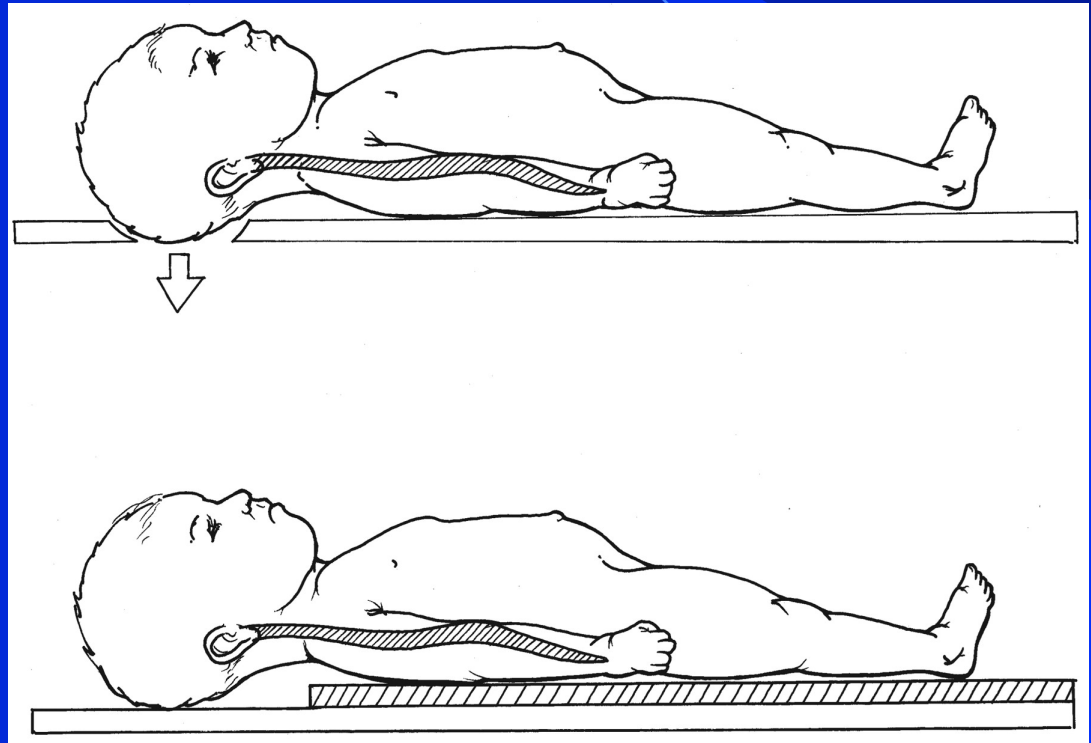
# **Cervical Spine Injuries in children**

An aerial photograph of a city, likely Montreal, showing a dense urban landscape with a river (St. Lawrence River) and several bridges. In the center, a large hospital complex with multiple interconnected buildings is visible, surrounded by greenery. The text is overlaid on the top and bottom left of the image.

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CHR Citadelle  
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# General

- Adequate transportation
- History
- Physical
- Ap/Lat Xray
- Bone Scan ?
- CT scan ?



# The issues

- Radiology of the growing spine
- The “Abnormal” child - spine
  - Minor Trauma
  - Sports
  - Anesthesiology
- The “Normal” child
  - Rare but can be devastating !
- Trauma ?

# Radiology

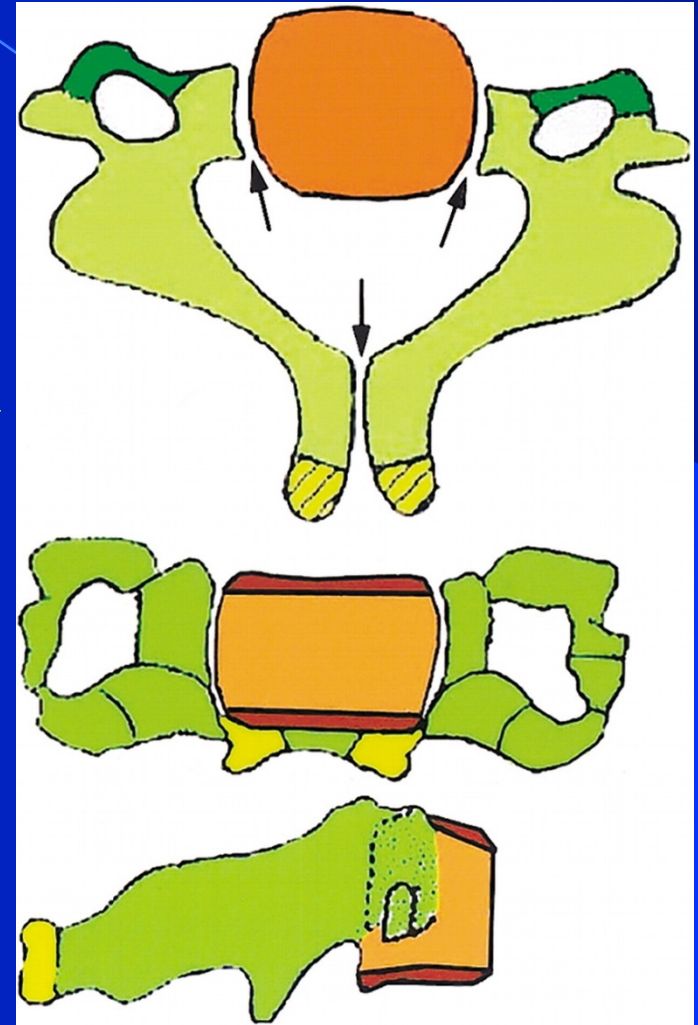
- Birth : cartilage !  
A few ossification centers
- Xray age one
  - No dens
  - Partial post elements...



- Complex embryology....congenital anomalies
-

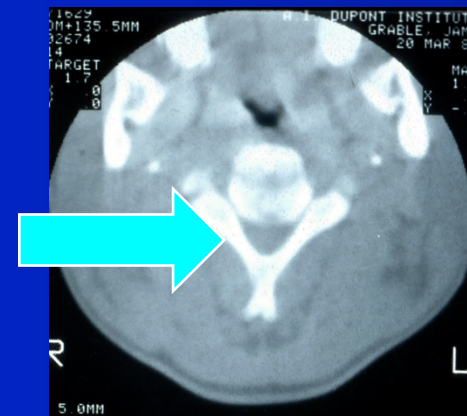
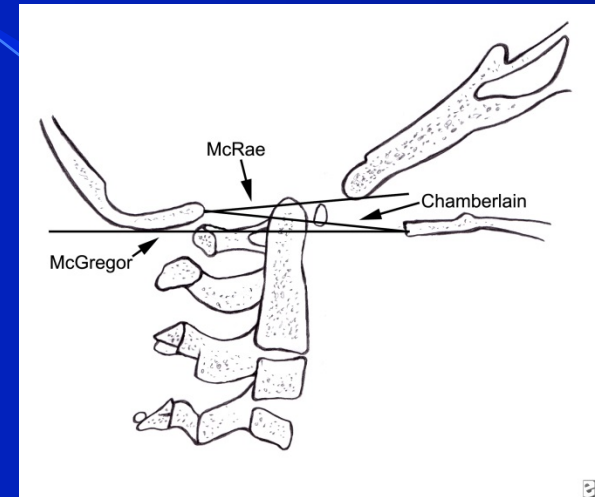
# Generalities

- Below 8- 11 years
  - 50 % rotation occiput – C2
  - Big head
  - Increased ligamentous laxity
  - Upper level lesions
- Older child
  - Lower levels
  - C5-C6 more mobile



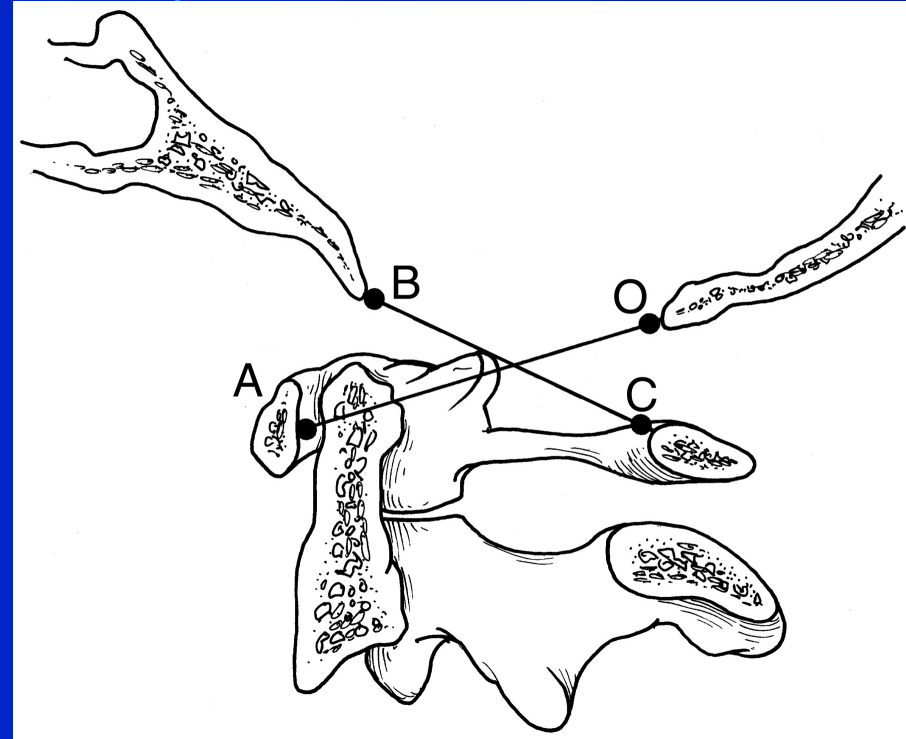
# Occiput C1 anomalies

- Basilar impression - Dens 4.5 mm above foramen
- Associated :
  - Occiput C1 fusion
  - Atlas anomalies
- General :
  - osteogenesis imperfecta
  - rickets ,syndromes, dwarfs
- “Silent”
- Minor trauma.....
- Anesthesia ? Sports ?



# Occiput – C1 Instability Trauma

- Major Trauma
- “Autopsy” finding
- Forced hyperextension  
Distraction
- Quadriplegia
- Motor weakness
- Powers Ratio :  $BC/AO < 1$



# Occiput – C1 Instability Non Trauma

- Rare... Normal child

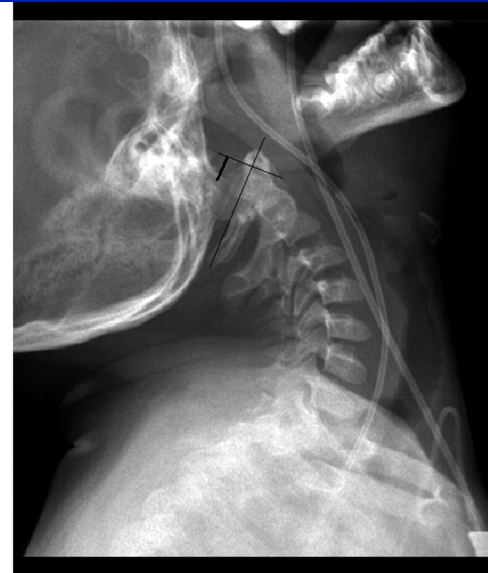
- Torticollis
- Neck Pain
- Vomiting
- Vertigo

- Down Syndrome

- Sports ?
- Anesthesia



A



B



Special Olympics

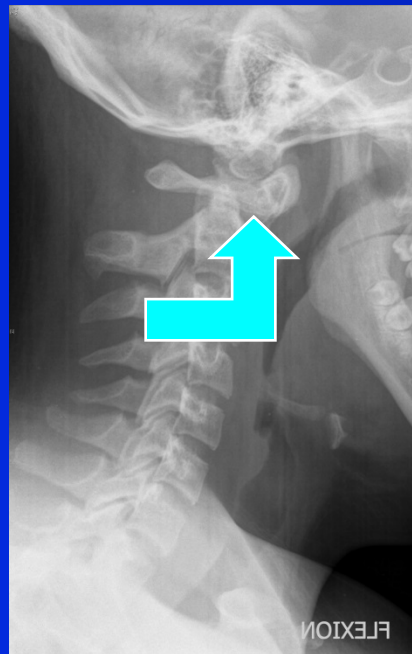
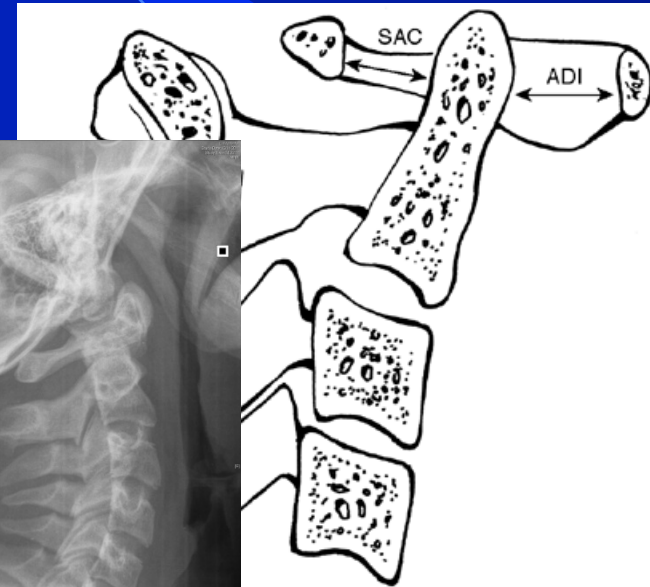
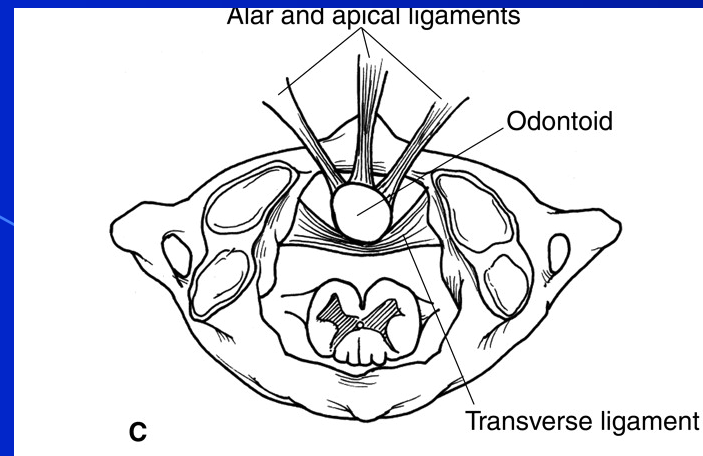


# C1-C2 Instability

- Rule of Steel
- Down syndrome
- Kniest, Larsen
- JRA

Sports ?  
Anesthesia

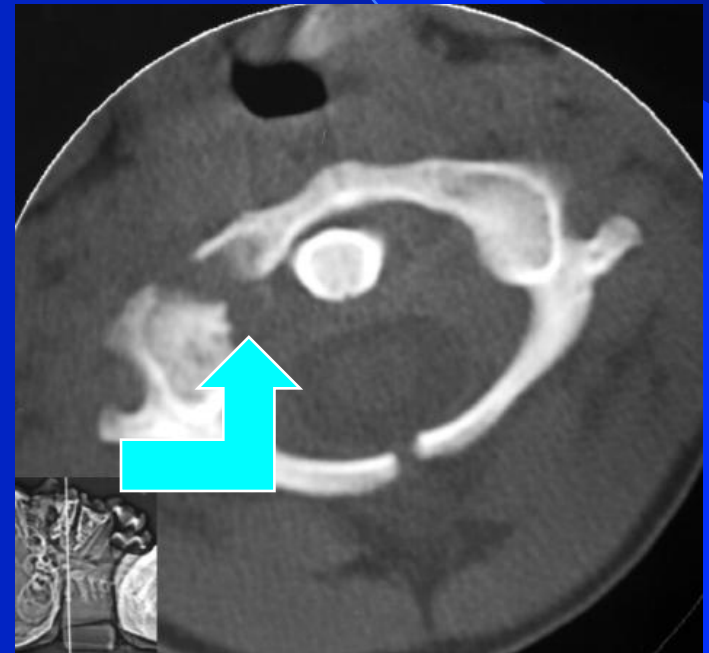
- Fusion ?



# Jefferson's Fractures

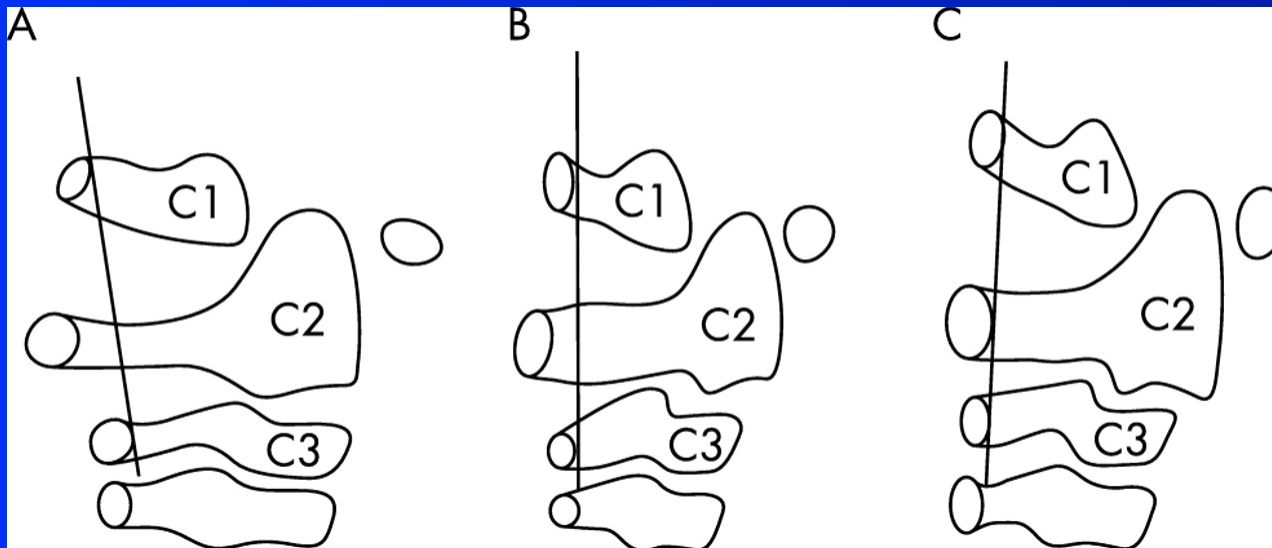
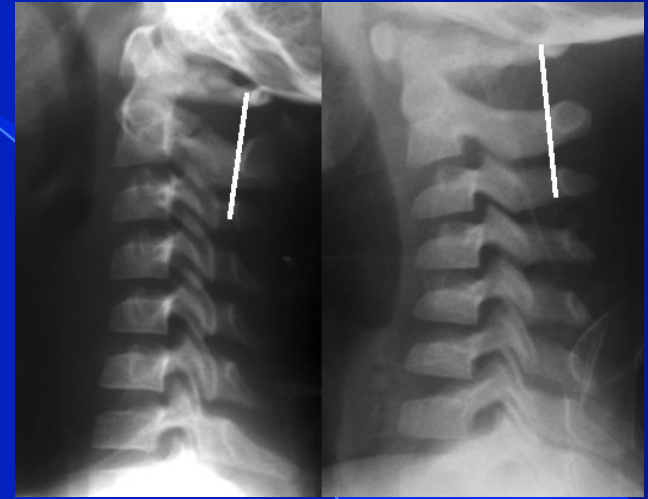
- Jefferson

- Rare
- Conservative treatment  
Minerva – Halo Cast



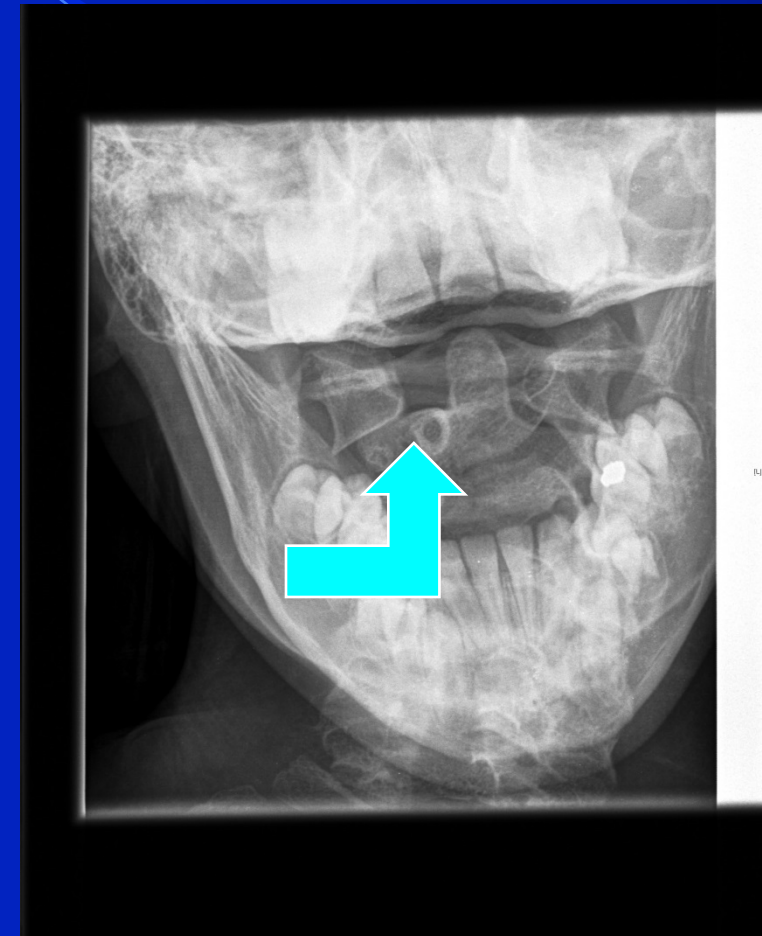
# Hangman's Fracture

- Trauma ?  
Conservative treatment
- Spondylolysis ?
- Pseudosubluxation C2-C3  
NORMAL

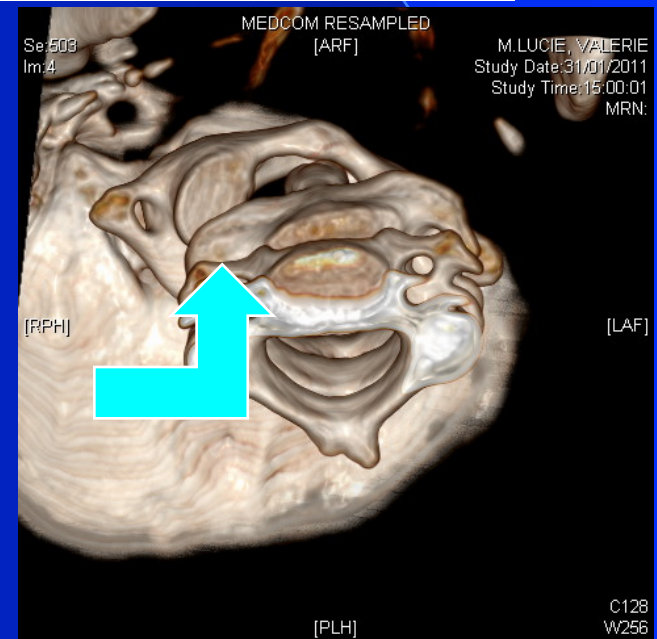
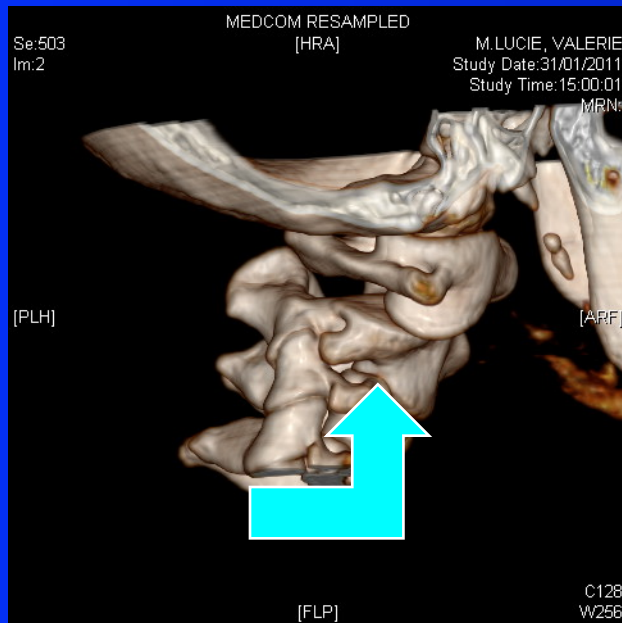
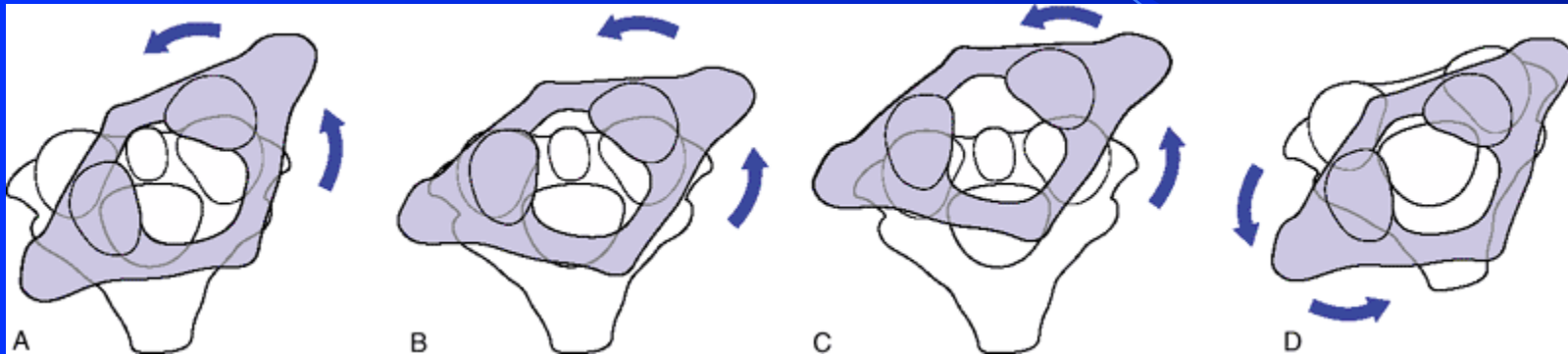


# Atlantoaxial rotatory displacement

- **Frightening XRAY !**
- Minor trauma
- Grisel's syndrome  
Upper respiratory infection
- Teeth
- Clavicle fracture...
- ?



# Atlantoaxial rotatory displacement

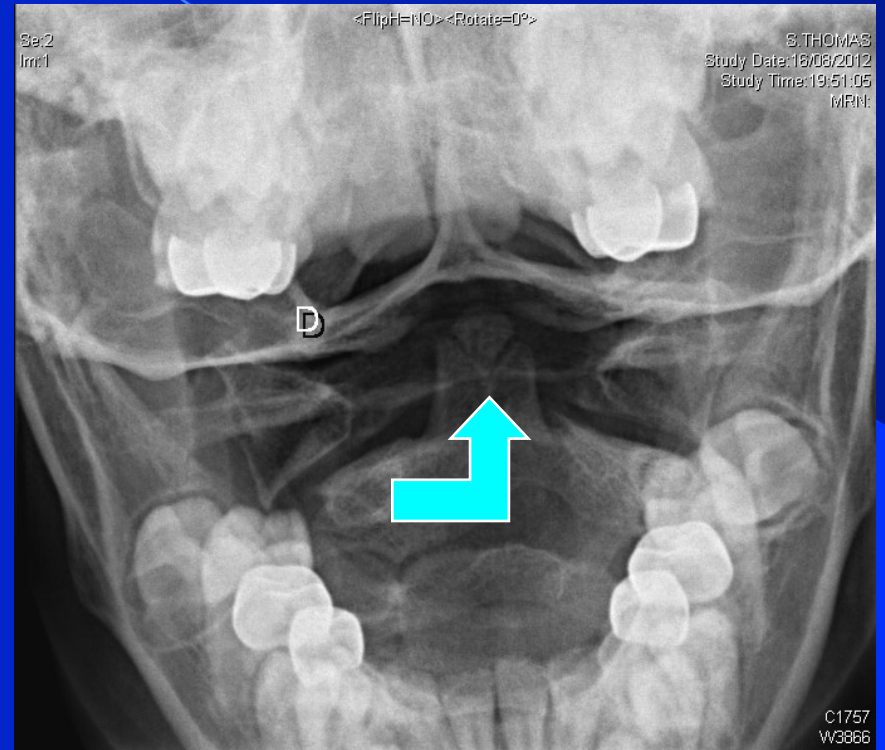


# Atlantoaxial rotatory displacement

- Conservative: Antiinflammatory, cervical collar  
valium
- Traction
- Surgery...rare

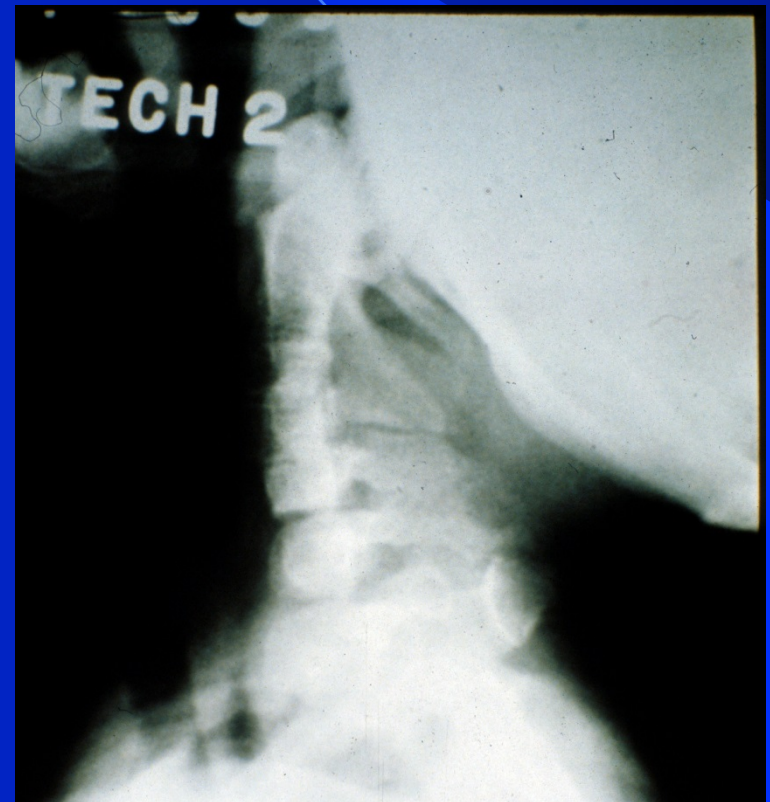
# Odontoid injuries

- Frequent
- Many false positives
- Conservative



# Klippel Feil Syndrome

- Fusion of cervical spine vertebra
- Other cong anomalies spine
  - Sprengel's
  - Basilar Impression
  - Atlas-Axis fusion
  - C1-C2 subluxation
  - Diastomyelia





# Klippel Feil Syndrome

- **NORMAL**

- Danger in the mobile zone
- Sports ?
- Minor trauma ?

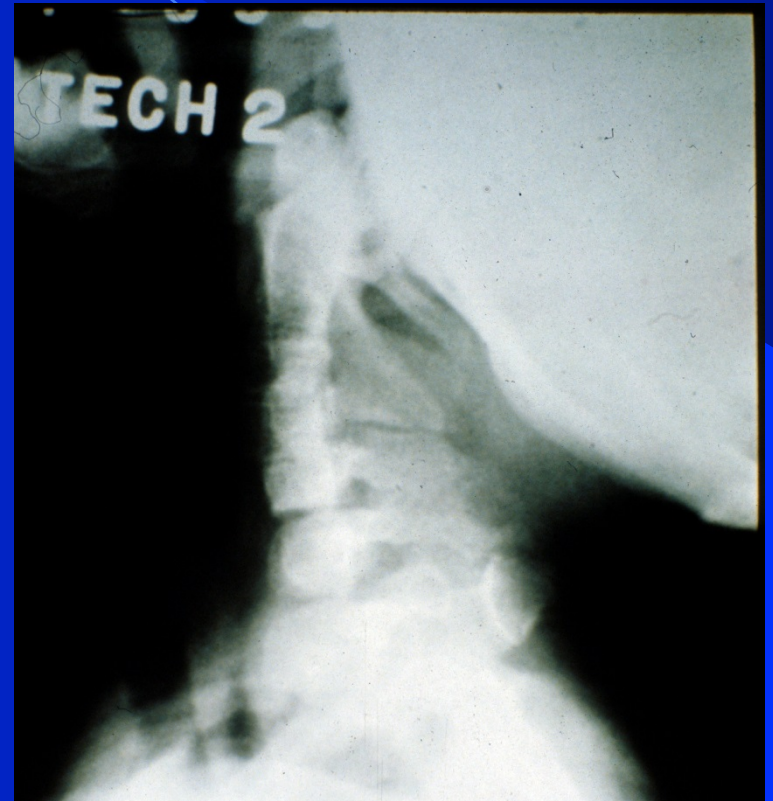
- Mental retardation

- Hydrocephalia

- Myelomenigocele

- VI , VII nerve palsy

- Root or Cord compression



# SCIWORA

- Spinal cord Before bone and ligaments !
- MRI ?

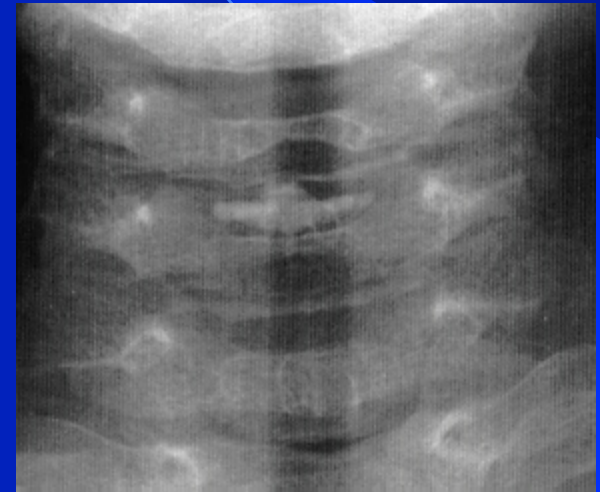
# Lower Cervical Spine Injuries

- Fractures
- Dislocation
- Ligamentous Disruption



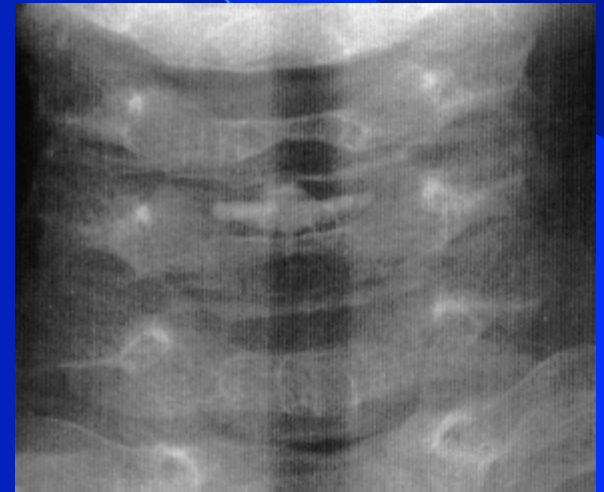
# Intervertebral Disc Calcification

- Acute Onset ...trauma ?
- Pain
- Torticollis
- Decreased motion
- Lower cerv spine are
- Boys > girls
- Unknown etiology



# Intervertebral Disc Calcification

- Antiinflammatory
- Valium
- Cervical collar
- Traction
- Excellent
- Gradual resolution



# Conclusions

- Beware of « syndromic- dwarf child »...  
Xray before general anesthesia
- Beware of congenital anomalies
- Radiology pitfalls...  
Absent ossification  
Overdiagnosis

