Chapter 15

Spine

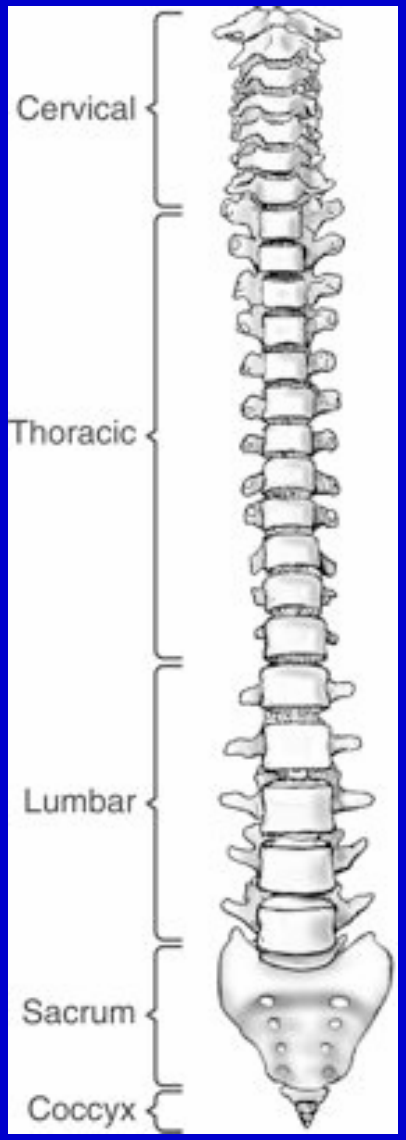
Learning Objectives

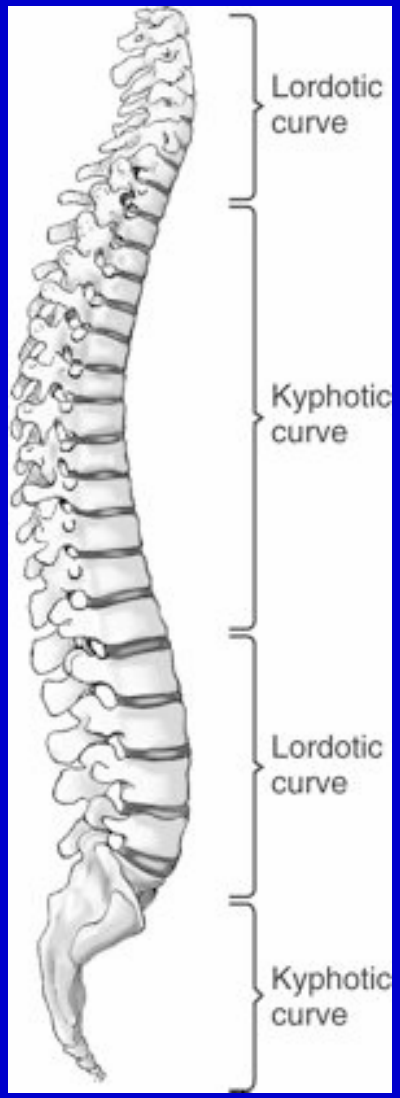
- Name the regions that make up the spine and identify each on an anatomic diagram and on a radiograph
- Identify on a diagram the parts of a typical vertebra
- Identify significant positioning landmarks for the spine by palpation

Learning Objectives

- Demonstrate correct body and part positioning for routine projections and common special projections of the spine
- Correctly evaluate radiographs of the spine for positioning accuracy
- Describe and recognize on radiographs abnormalities and pathologic conditions common to the spine

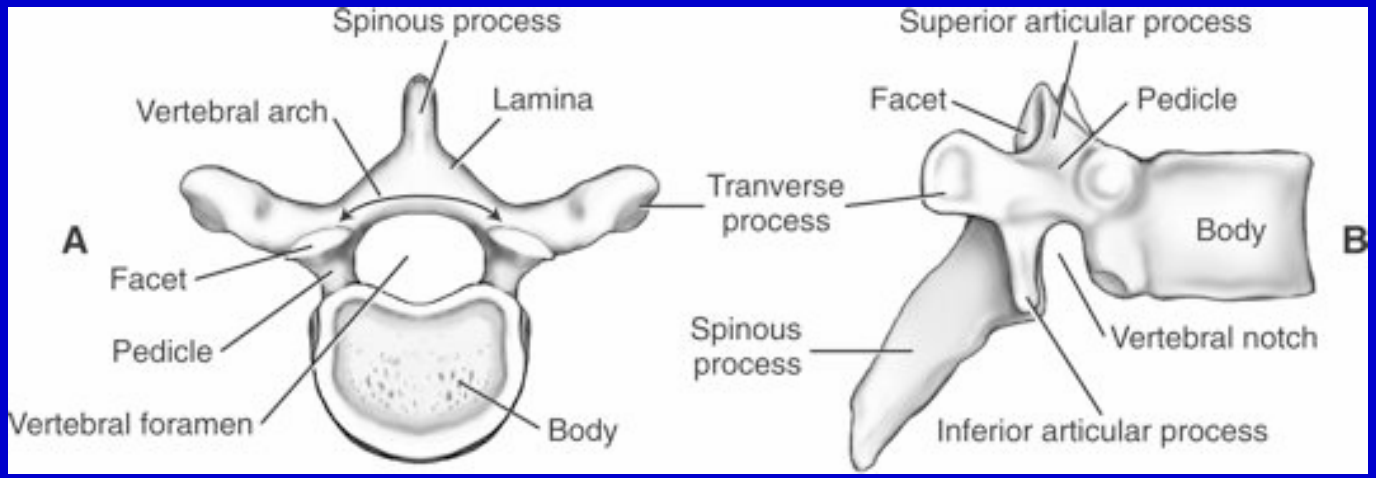
Spinal Regions and Curvatures





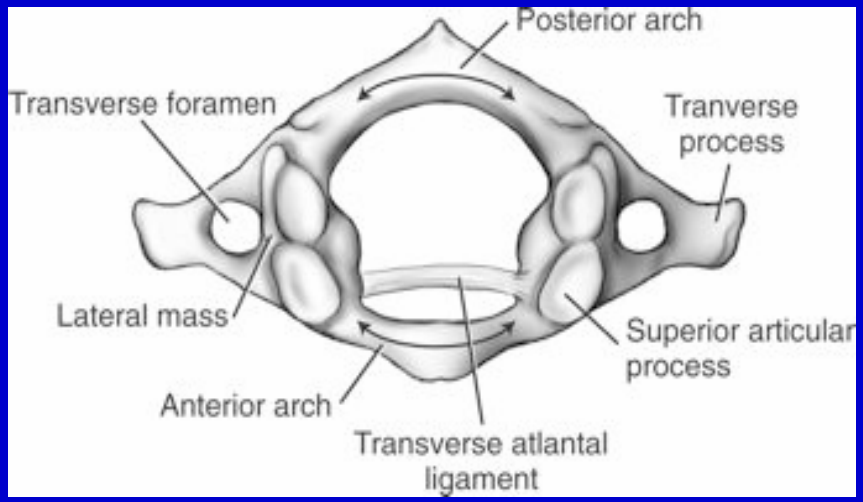
Parts of a Typical Vertebra

- Body
- Pedicle
- Transverse Process
- Lamina
- Vertebral Arch
- Spinous Process
- Facet
- Superior and inferior articular processes
- Vertebral notch
- Vertebral foramen

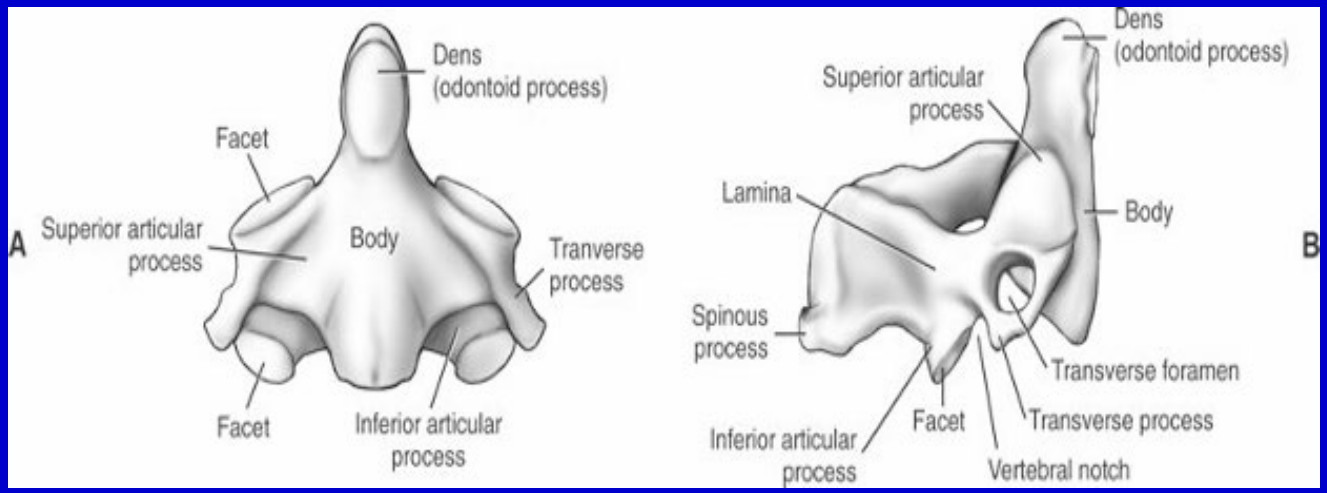


Cervical Spine

- C1 or Atlas

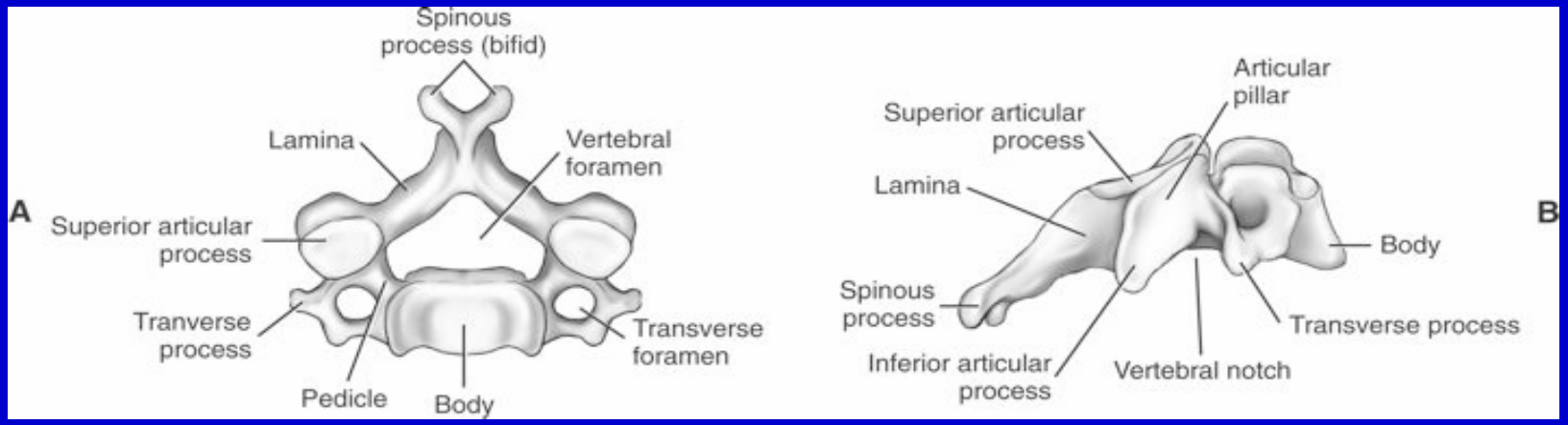


- C2 or Axis

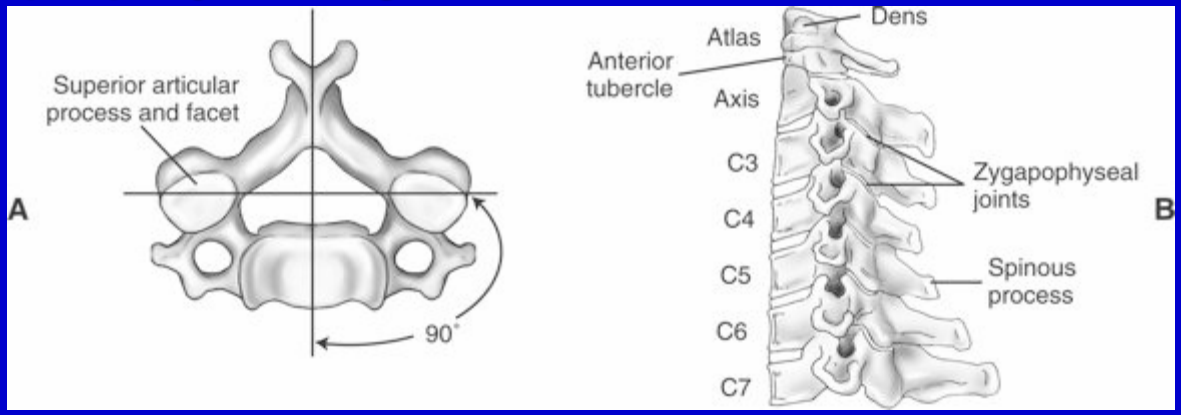


Cervical Spine

- Typical Vertebra (C3–C7)

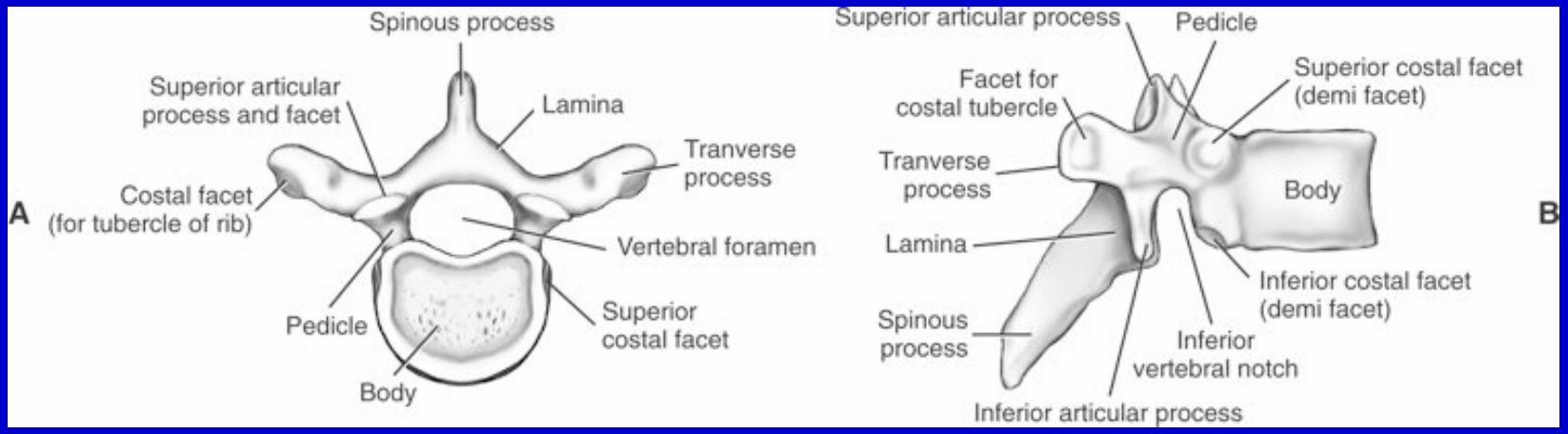


- Zygapophyseal joints

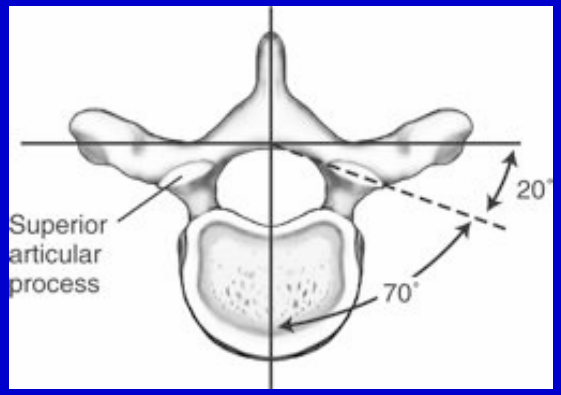


Thoracic Spine

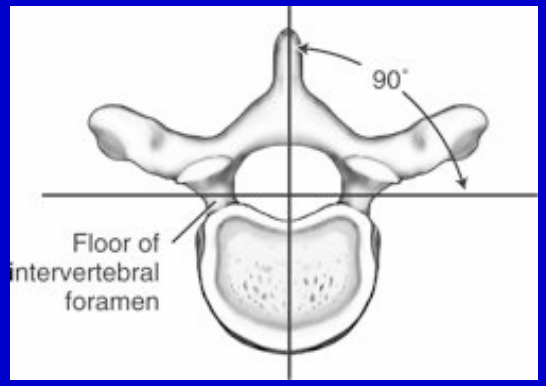
- Typical Vertebra (T1–T12)



- Zygapophyseal joints

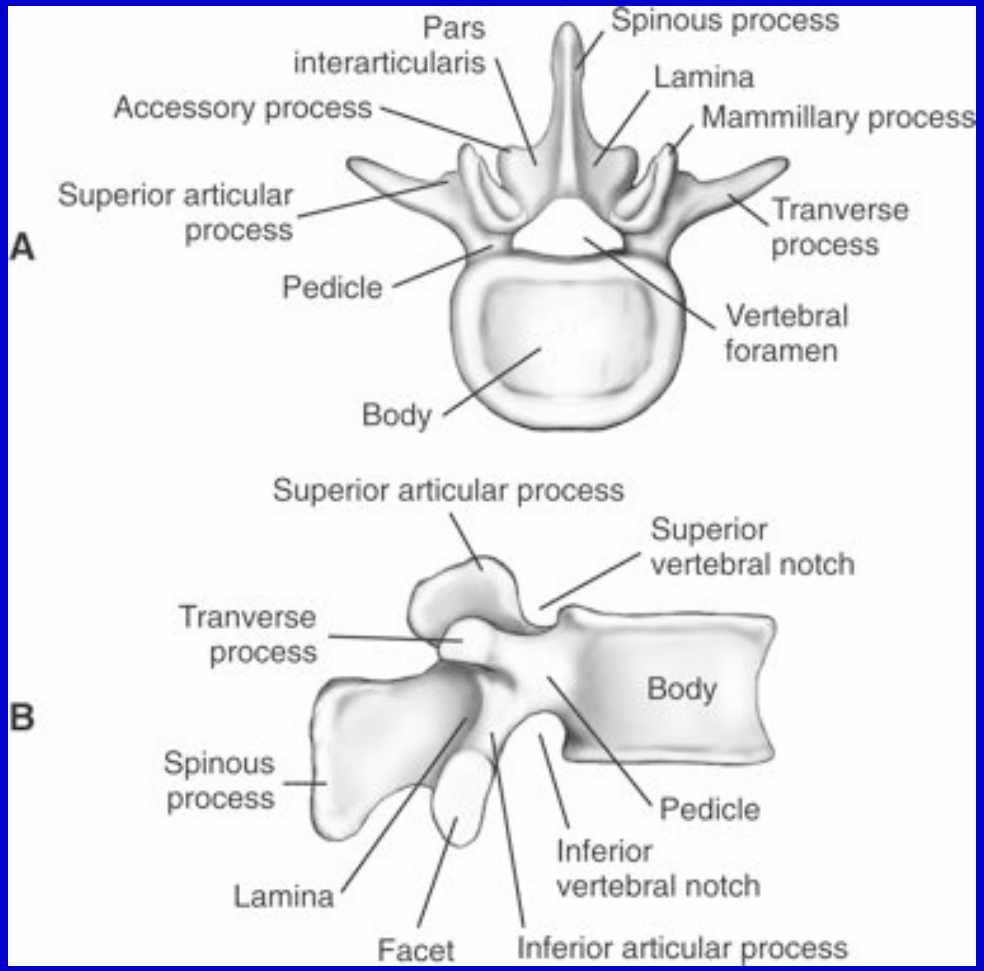


- Intervertebral Foramen



Lumbar Spine

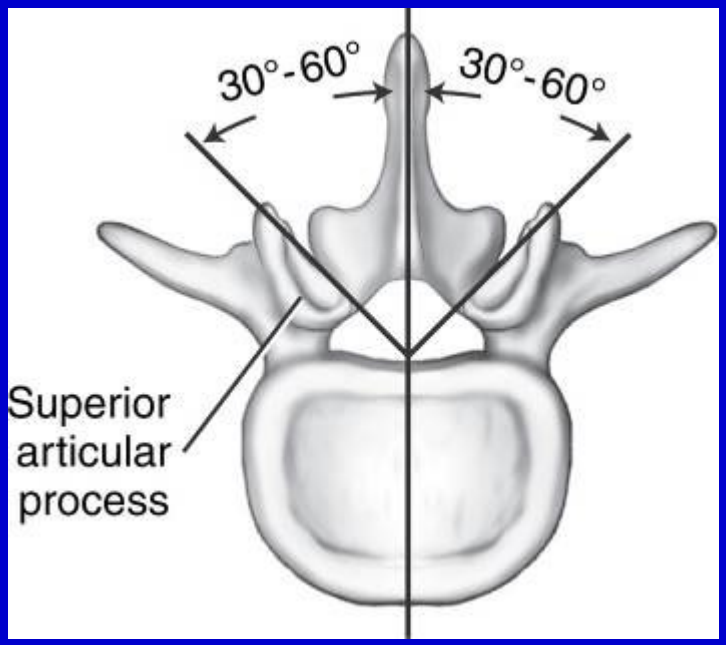
- Typical Vertebra (L1–L5)

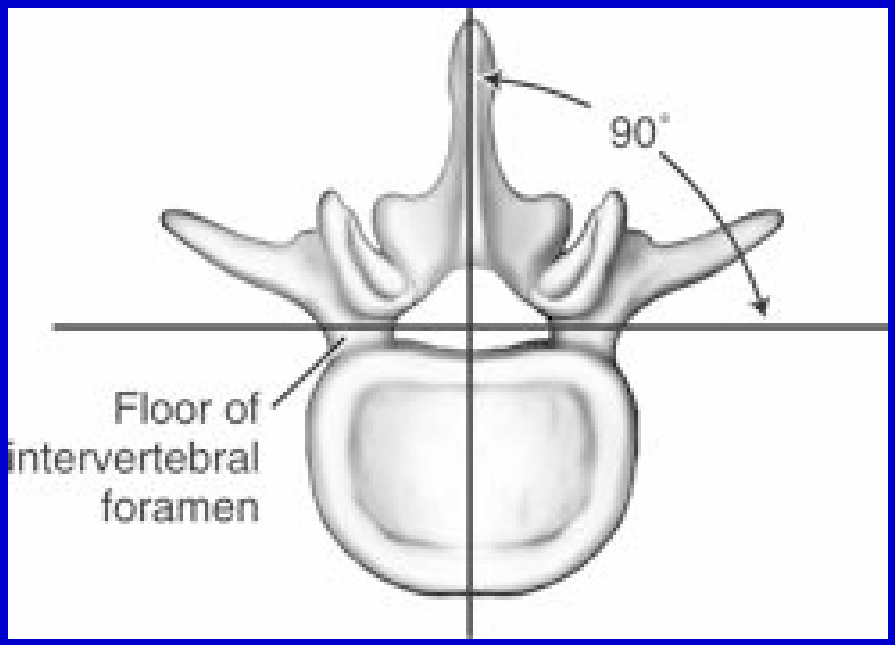


Lumbar Spine

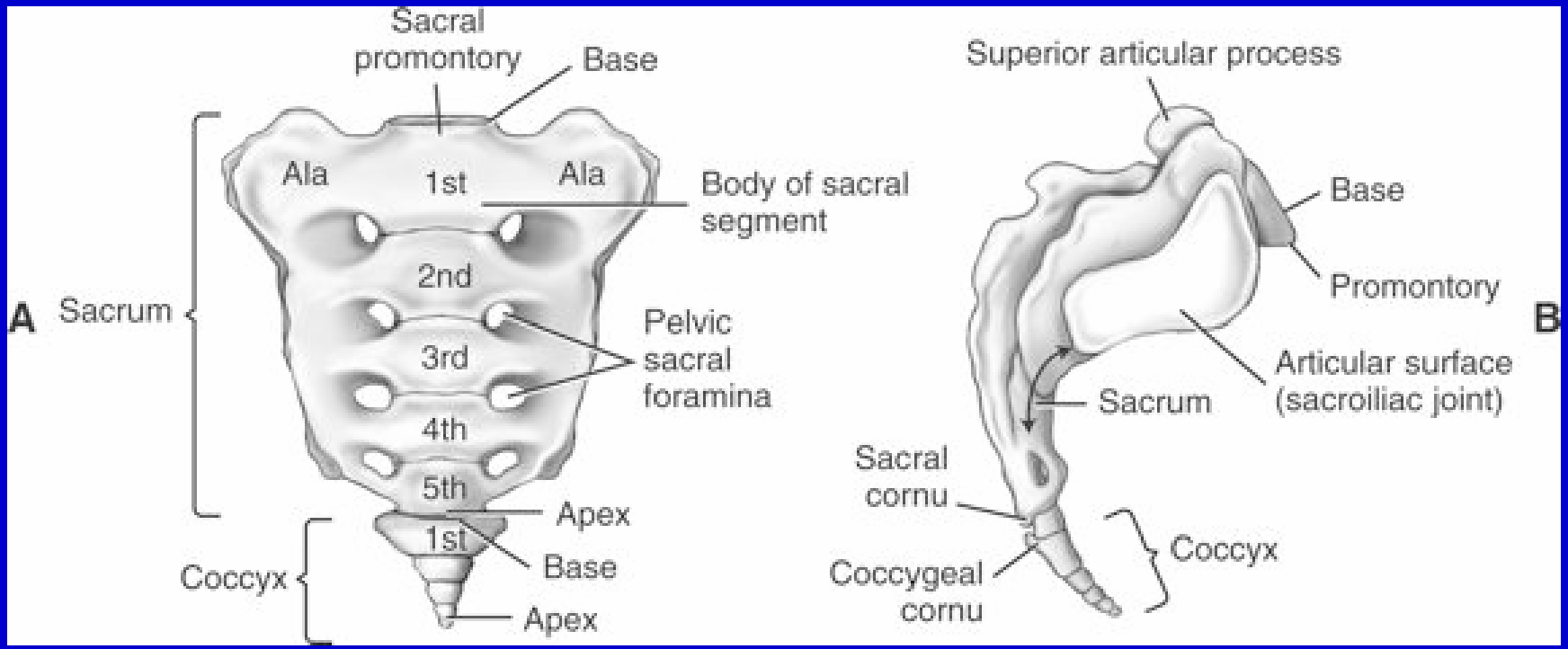
Zygapophyseal joints

- Intervertebral foramen

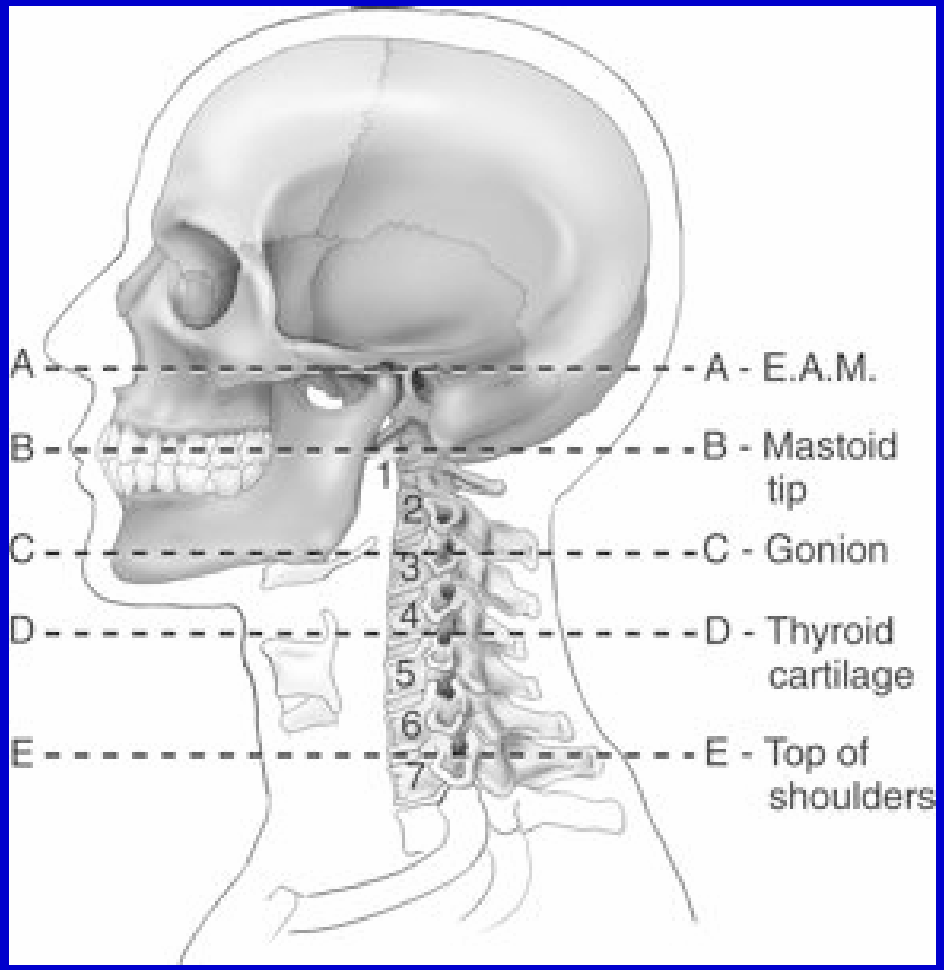




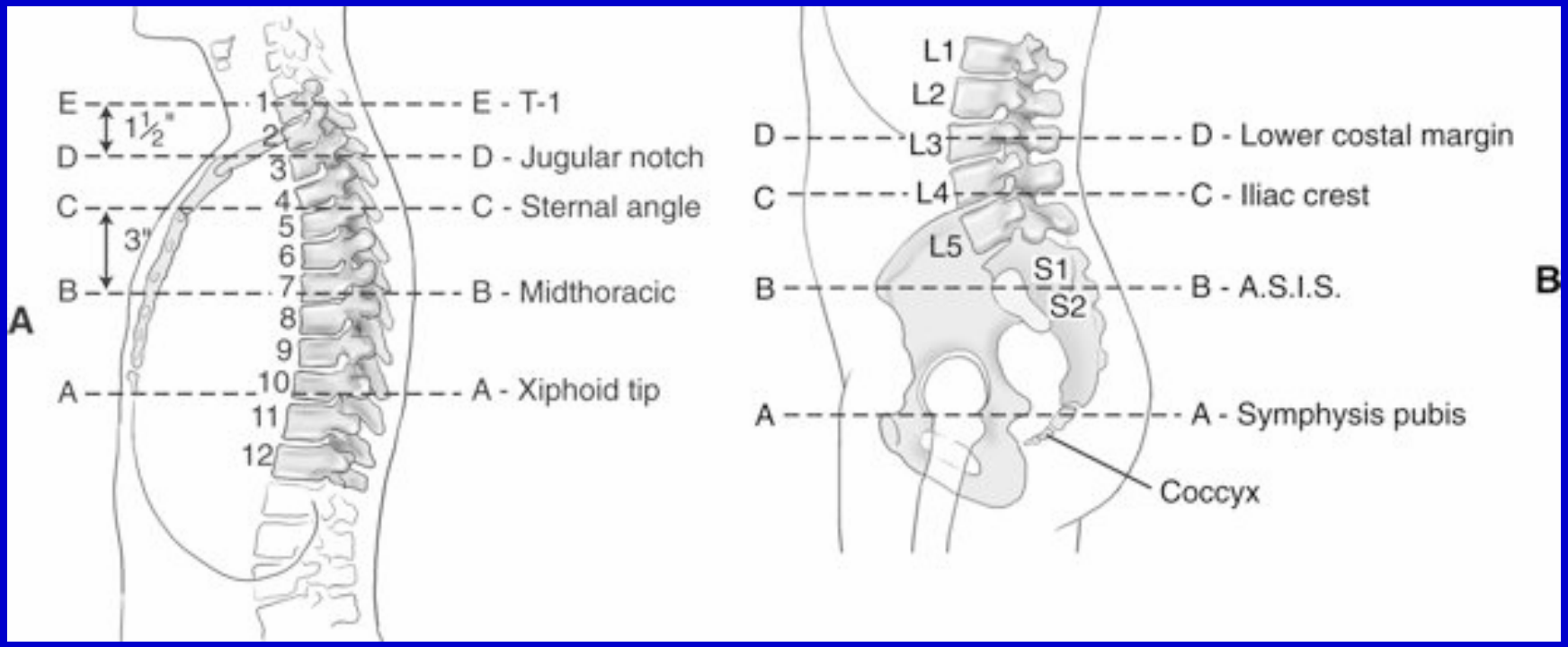
Sacrum and Coccyx



Palpable Landmarks for Cervical Spine Positioning



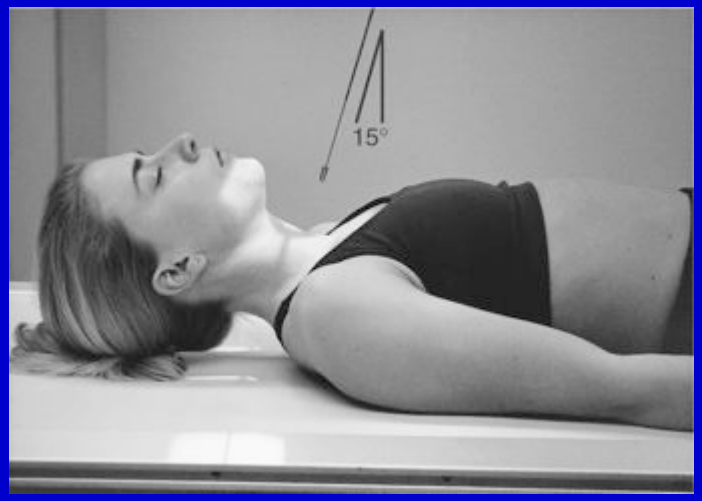
Palpable Landmarks for Thoracic and Lumbar Spine Positioning

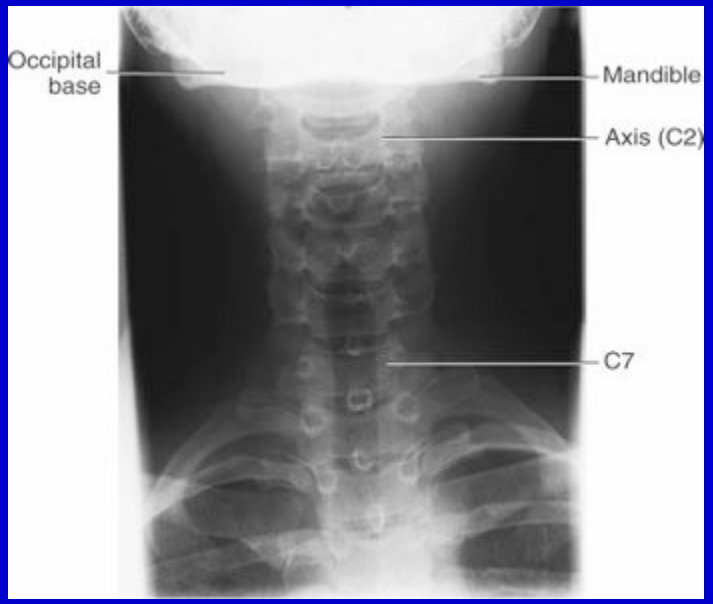


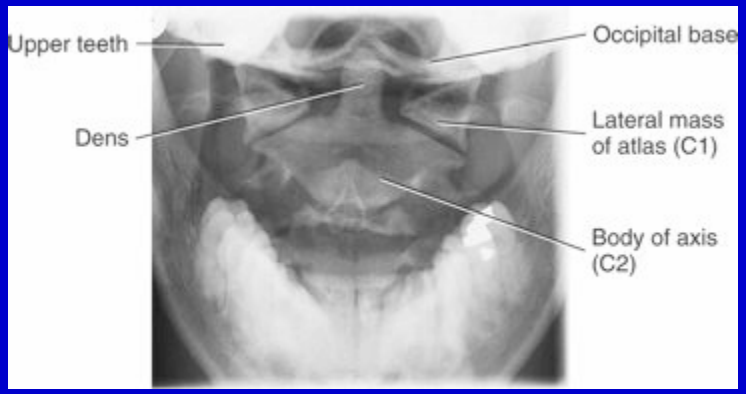
Examination of the Spine

- Place IR in Bucky tray
- Place patient erect in front of upright cassette holder or recumbent on table
- Remove jewelry, clothing, or other items that may be within the radiation field
- Place appropriate image markers
- Shield gonads

AP Axial and Open Mouth Projections of the Cervical Spine





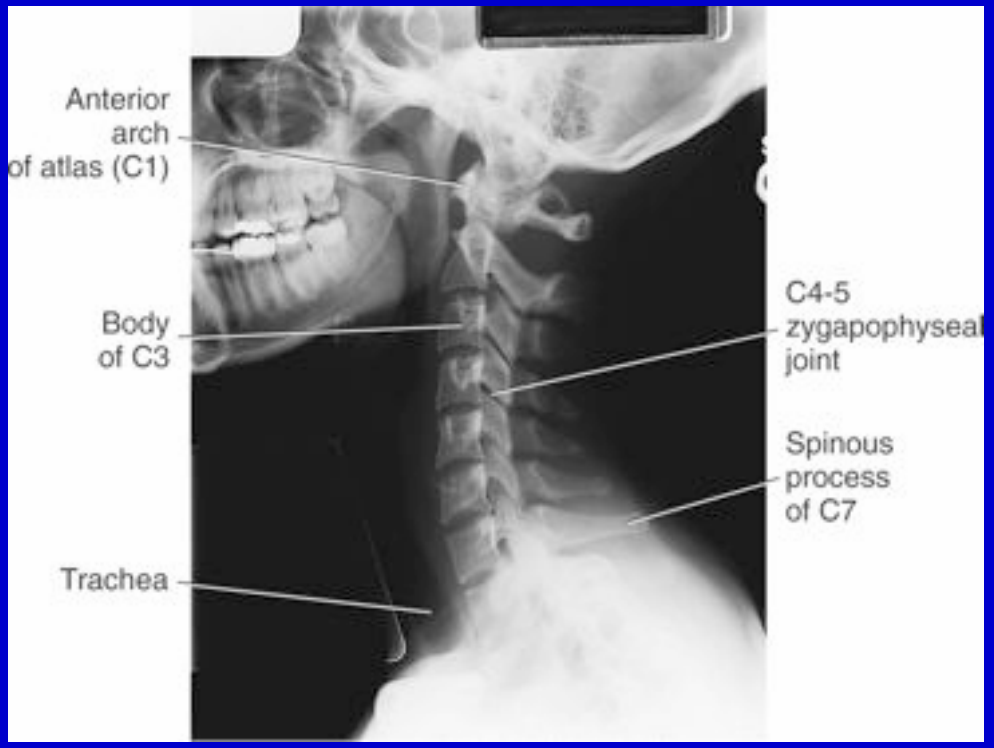


Clicker Question

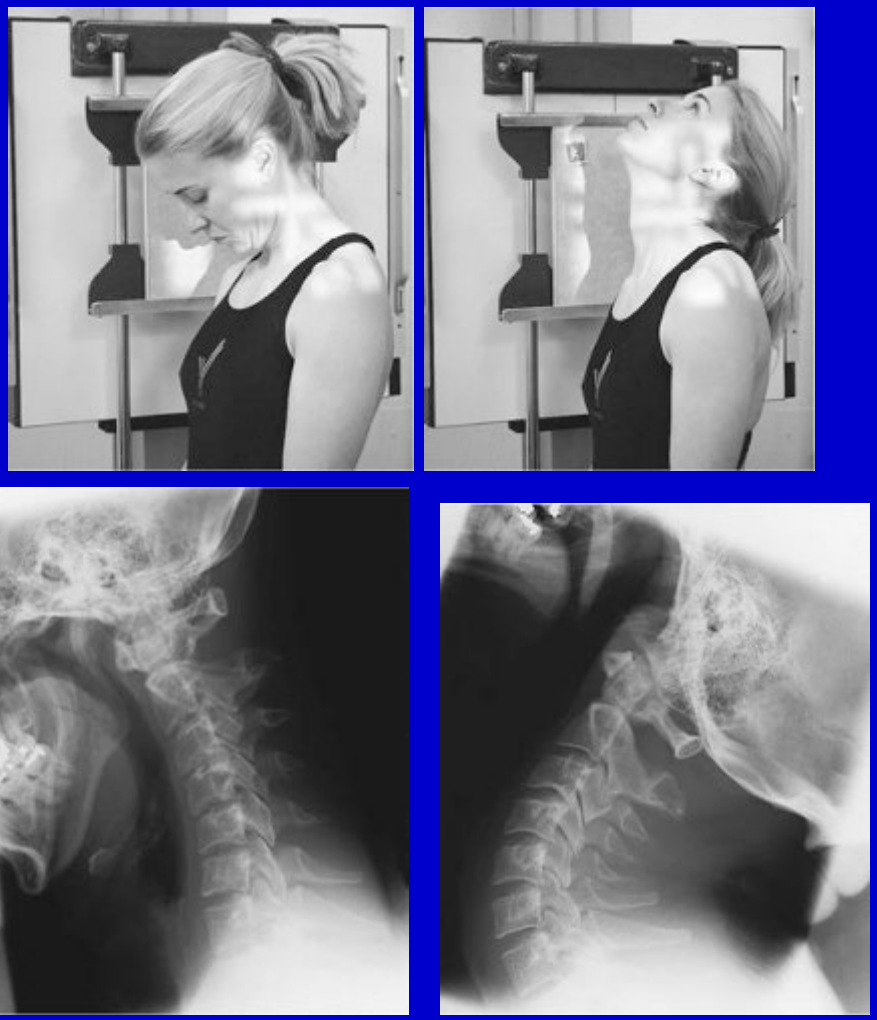
Which landmarks are used to position the patient for an AP axial projection of the cervical spine?

a) mental point and gonion
b) mental point and base of skull
c) EAM and gonion
d) EAM and base of skull

Lateral Projection of the Cervical Spine in the Neutral Position.



Lateral Cervical Spine Projections in Flexed and Extended Positions

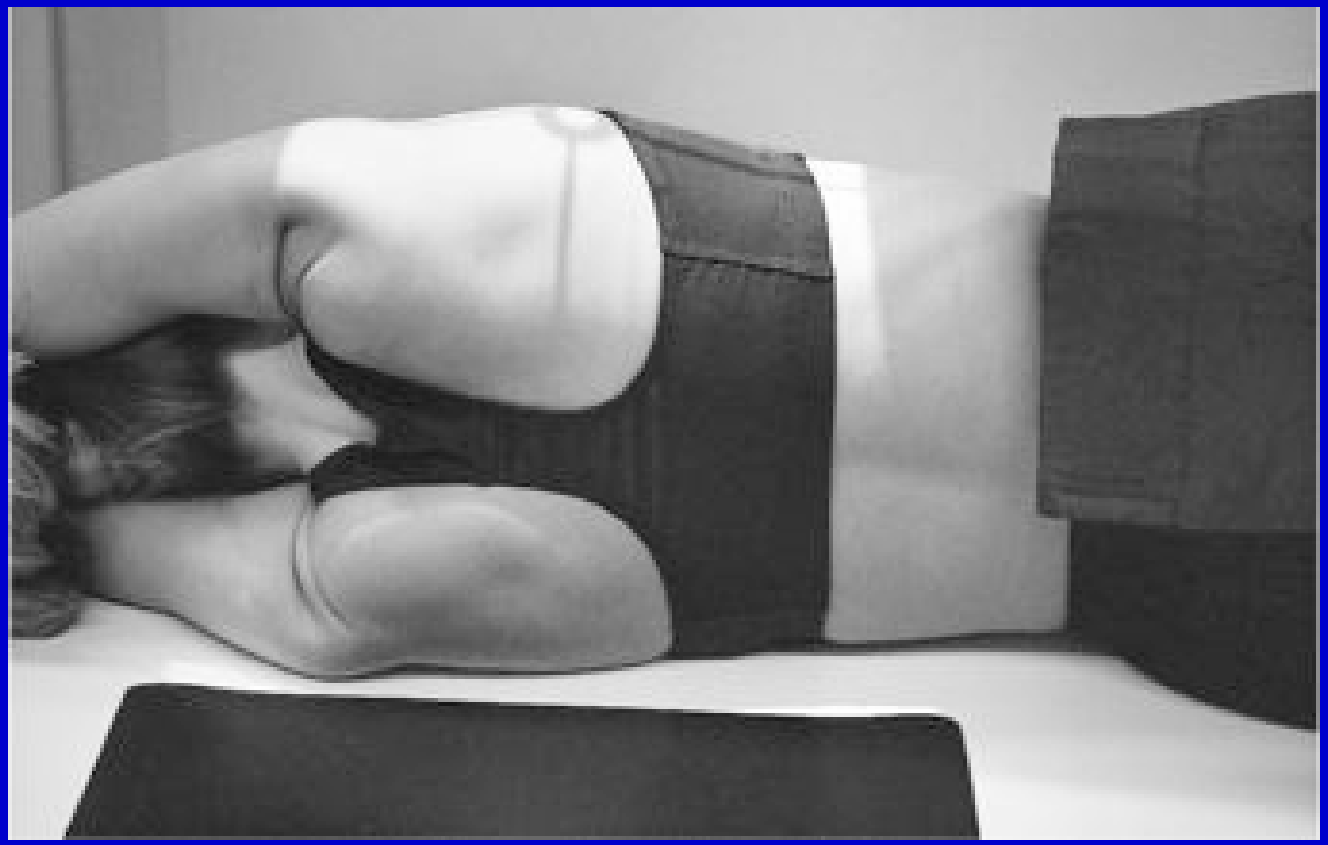


AP Axial Oblique Projection of the Cervical Spine

Lateral Projection for the Cervicothoracic Region (Swimmers)

AP Projection of the Thoracic Spine

Lateral Projection of the Thoracic Spine

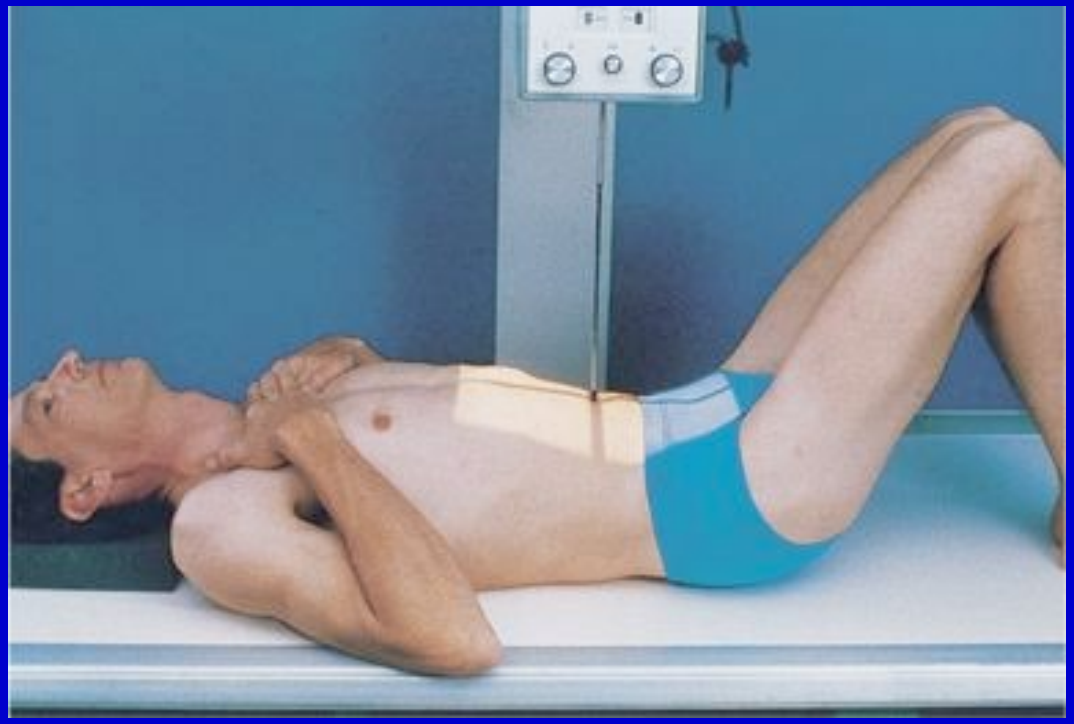


Clicker Question

For a lateral projection of the thoracic spine the patient is instructed to:

a) breathe throughout the exposure
b) suspend respiration on inspiration
c) suspend respiration on expiration

AP Projection of the Lumbar Spine



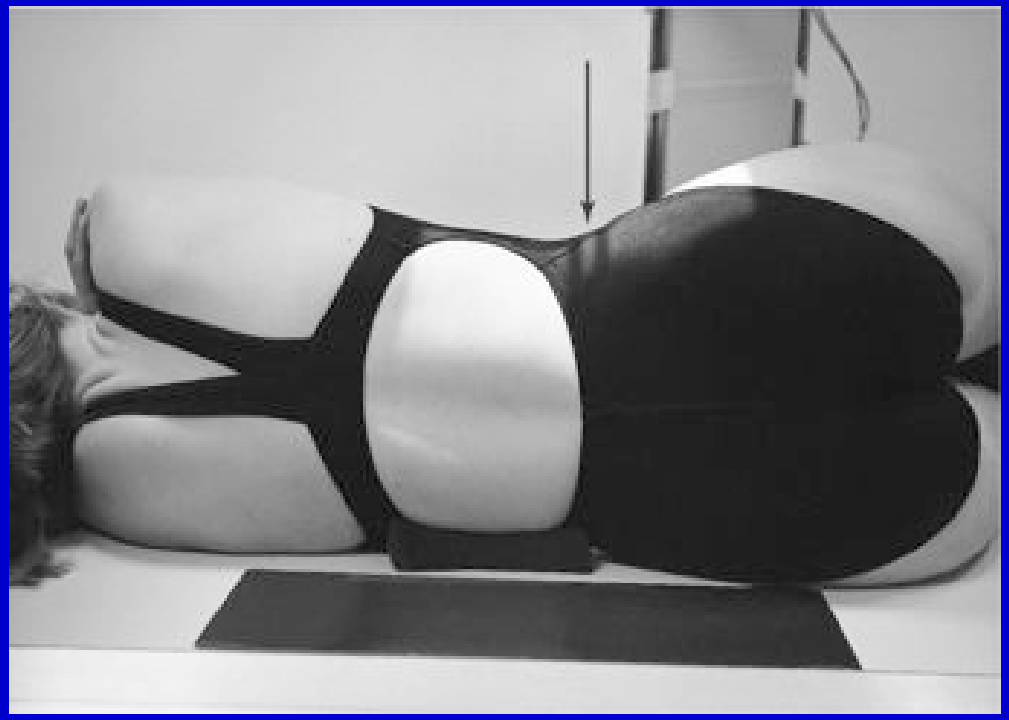
Clicker Question

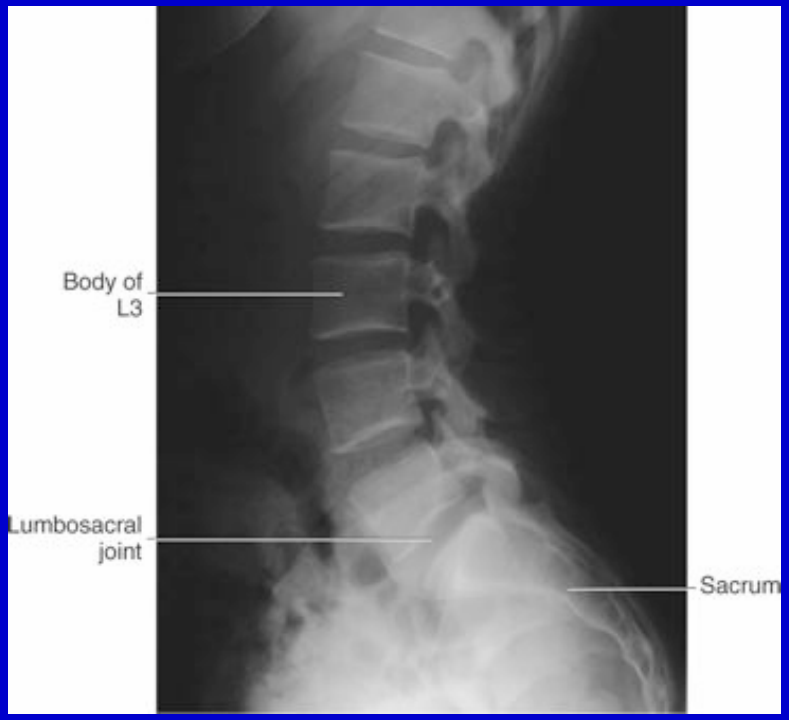
For an AP projection of the lumbar the CR is directed to the level of the:

a) anterior superior iliac spine
b) anterior posterior iliac spine
c) iliac crest
d) lower costal margin

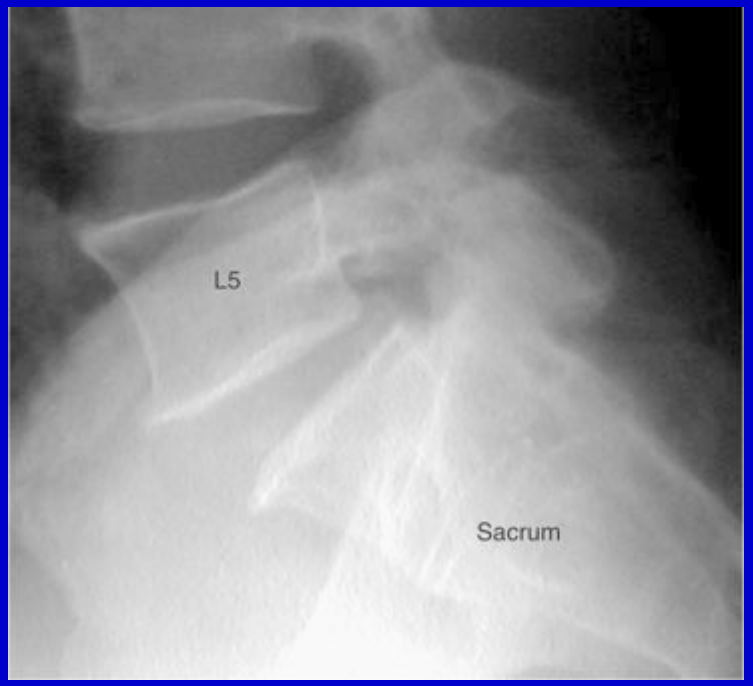
AP Oblique Projection of the Lumbar Spine

Lateral Projection of the Lumbar Spine

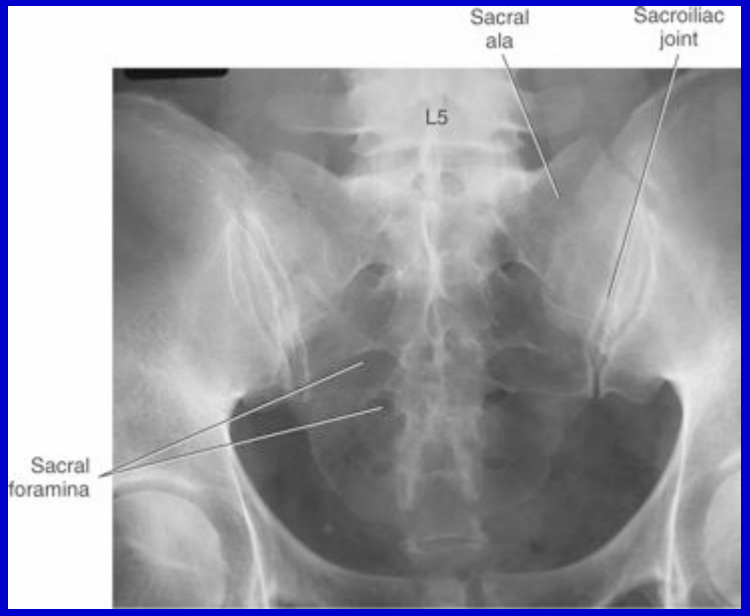




Lateral Projection of the Lumbosacral Junction



AP Axial and Lateral Projections of the Sacrum

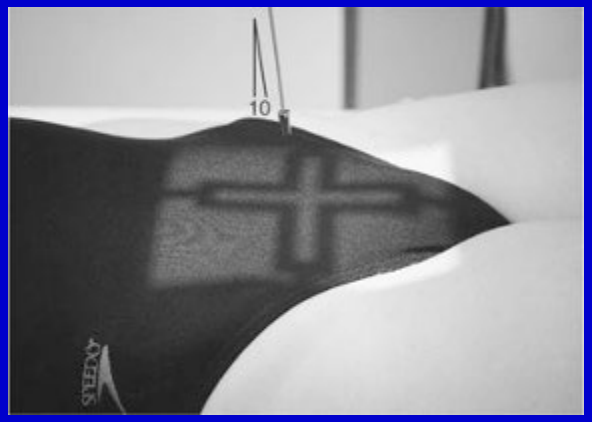


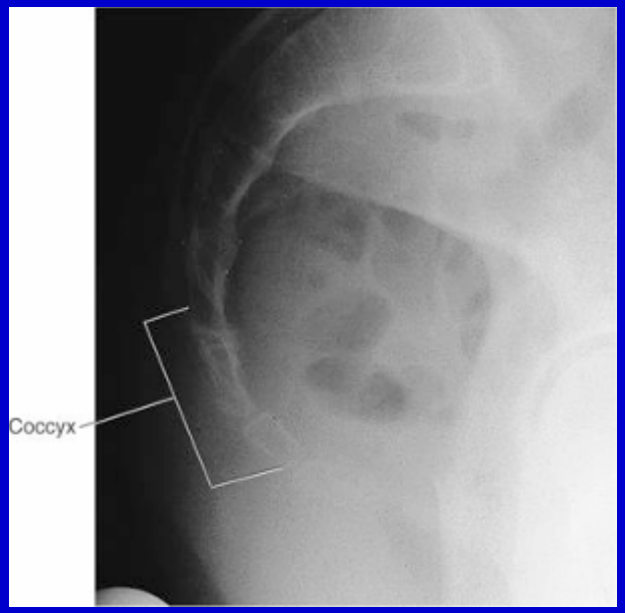
Clicker Question

For an AP axial projection of the sacrum the CR is directed:

a) 10° cephalad
b) 10° caudad
c) 15° cephalad
d) 15° caudad

AP Axial and Lateral Projections of the Coccyx





Clicker Question

The anode heel effect is useful for radiographs of the:

a) cervical spine
b) lumbar spine
c) thoracic spine
d) sacrum and coccyx

Pathology

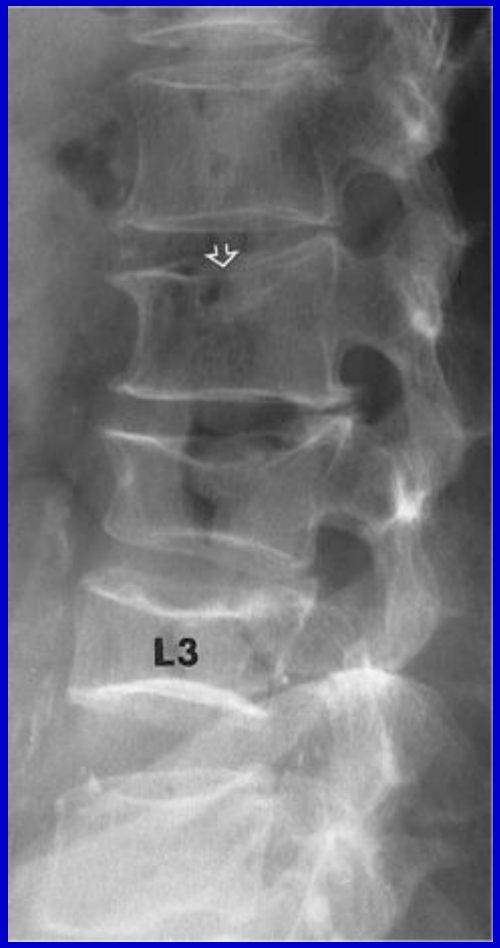
- Anomalies
  - Transitional vertebra
  - Anomalous ribs
  - Sacralization of L5
  - Extra vertebrae
  - Spina bifida

Clicker Question

A congenital anomaly in which the neural arch fails to close is termed:

a) spina bifida
b) sacralization
c) transitional vertebra

Pathology



- Fractures
  - Compression
  - Pathologic
- Disk Pathology
  - Degeneration
  - Herniation

Summary

- Cervical and lumbar regions have a lordotic curve
- Thoracic and sacral/coccygeal regions have a kyphotic curve
- Bony landmarks such as the mastoid tip, jugular notch, and iliac crest are used to position the spine

Summary

- Basic projections include
  - Cervical Spine
    - AP, oblique, lateral
  - Thoracic Spine
    - AP and lateral
  - Lumbar Spine
    - AP, oblique, and lateral
  - Sacrum
    - AP, axial, and lateral
  - Coccyx
    - AP, axial, and lateral

Summary

- Anomalies of the spine include transitional vertebra, anomalous ribs, sacralization, extra vertebrae, and spina bifida
- Fractures of the spine include compression and pathologic
- Pathologic conditions of the disc include degeneration and herniation