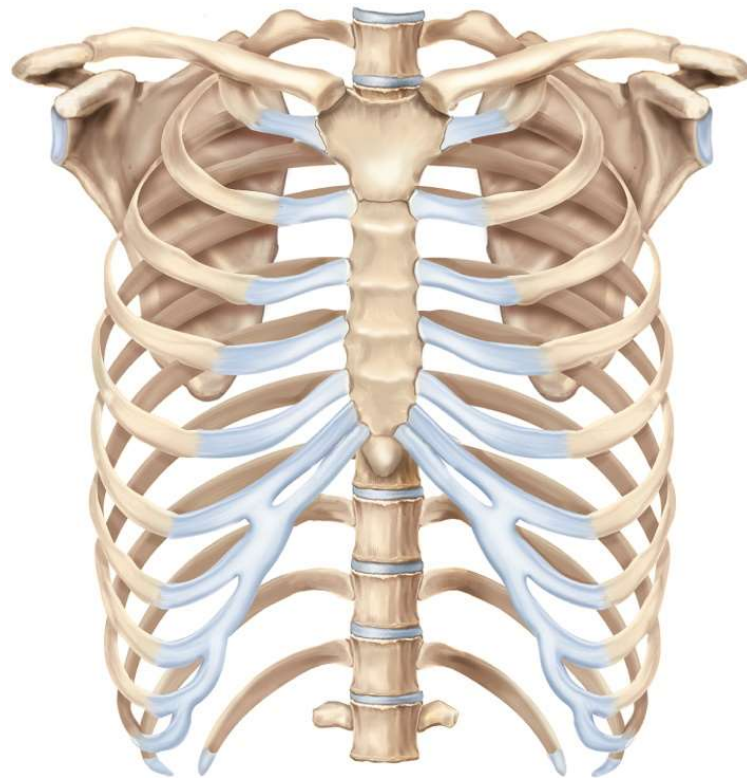
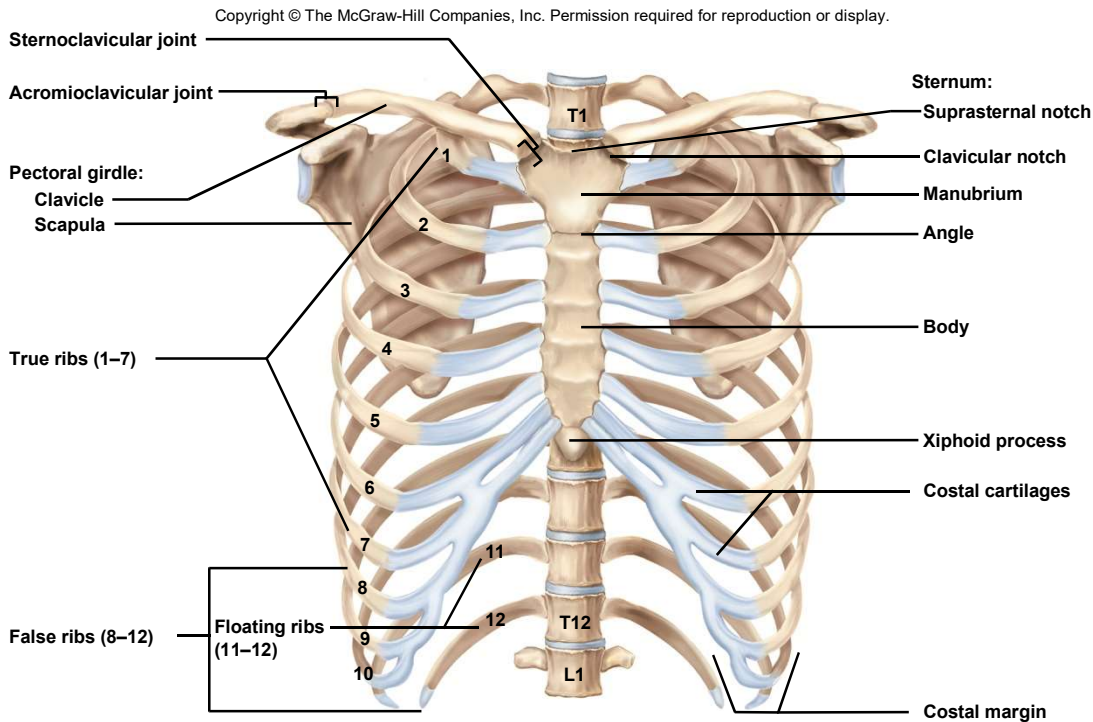


Chapter 8.3

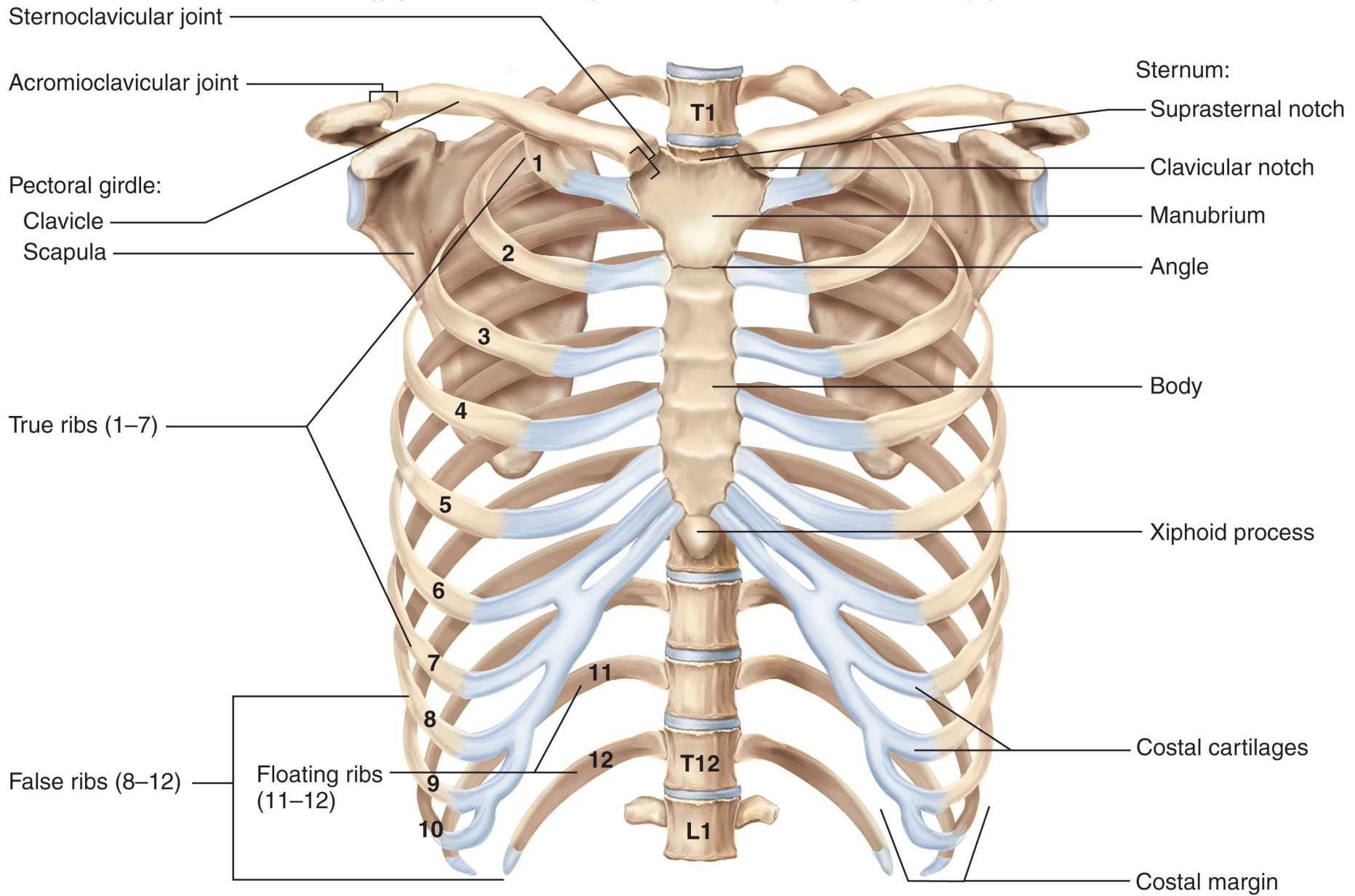
The Thoracic Cage, Ribs, Vertebrae and Spinal Column



Thoracic Cage

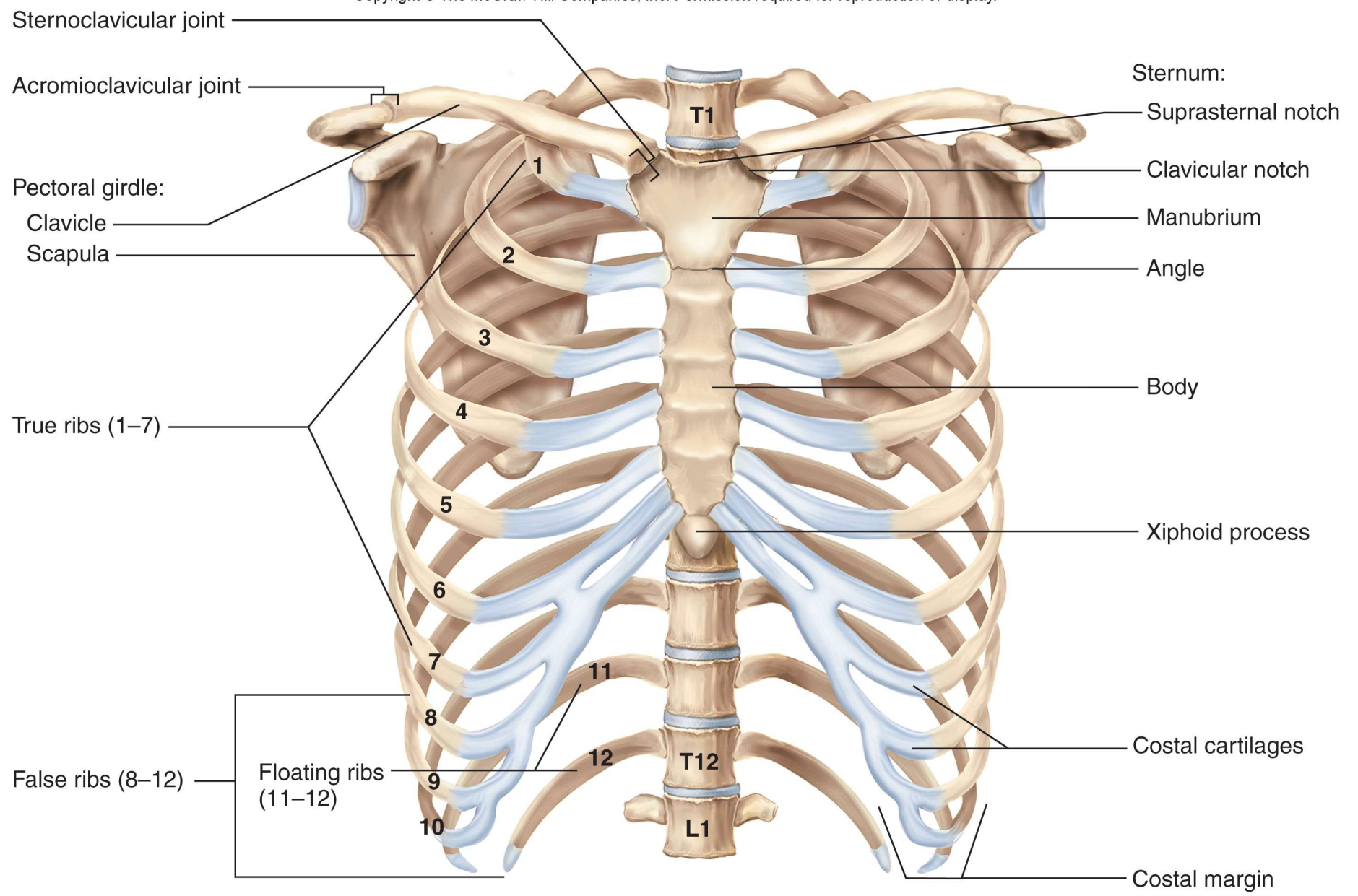


- consists of **thoracic vertebrae**, **sternum** and **ribs**
- forms conical enclosure for lungs and heart
- provides attachment for pectoral girdle and upper limbs
- broad **base** and narrower **apex**
- rhythmically expanded by respiratory muscles to draw air into the lungs
- **costal margin** – inferior border of thoracic cage formed by the downward arc of ribs
- protect **thoracic organs**, but also the **spleen**, most of the **liver**, and to some extent the **kidneys**

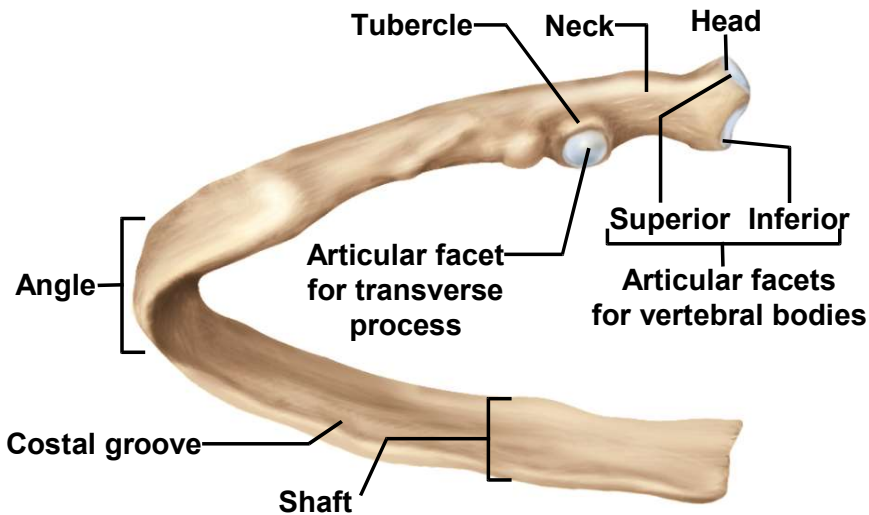


Sternum

- **sternum** (breastbone) – bony plate anterior to the heart
- divided into **three regions**:
 - **manubrium**
 - broad superior portion
 - **suprasternal (jugular) notch** medially
 - **clavicular notches** – articulate with clavicle
 - ribs attach along scalloped lateral margins
 - **body (gladiolus)**
 - longest part of sternum
 - **sternal angle** – point where body joins manubrium
 - ribs attach along scalloped lateral margins
 - **xiphoid**
 - inferior end of sternum
 - attachment for some of abdominal muscles
 - in cardiopulmonary resuscitation, improperly performed chest compressions can drive xiphoid process into the liver and cause a fatal hemorrhage

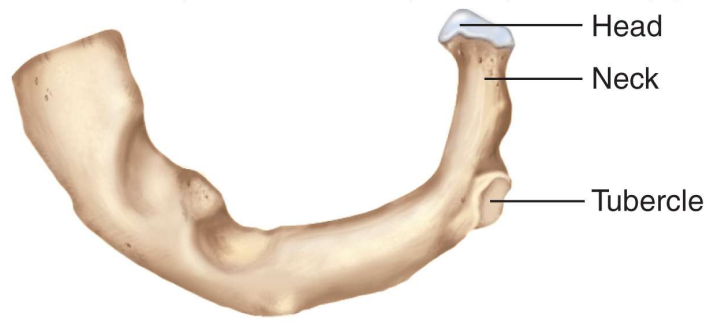


The Rib

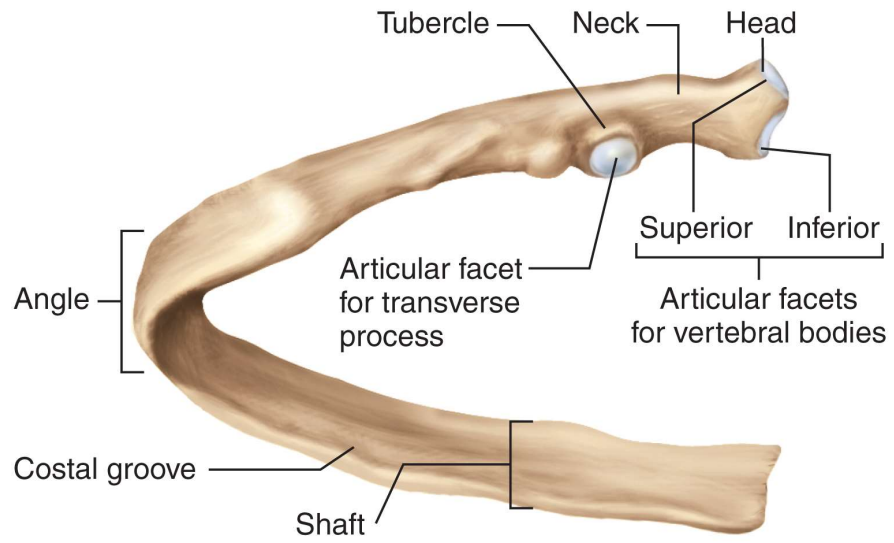


(b) Ribs 2–10

- **12 pairs of ribs** // no difference between sexes
 - **posterior (proximal) end** attached to vertebral column
 - **anterior (distal) ends** mostly attached to the sternum
 - **costal cartilages** composed of **hyaline cartilage** attach anterior ends to sternum
- **head** – portion of the rib that articulates with the thoracic vertebrae
 - superior articular facet
 - inferior articular facet
- **neck** – narrow portion distal to the head
- **tubercle** – wider rough area distal to the neck
 - articulates with **transverse costal facet** of vertebra
- **angle** – lateral curve of rib
- **shaft** – long, gentle sloping, blade-like portion of rib // **costal groove** on inferior margin of shaft



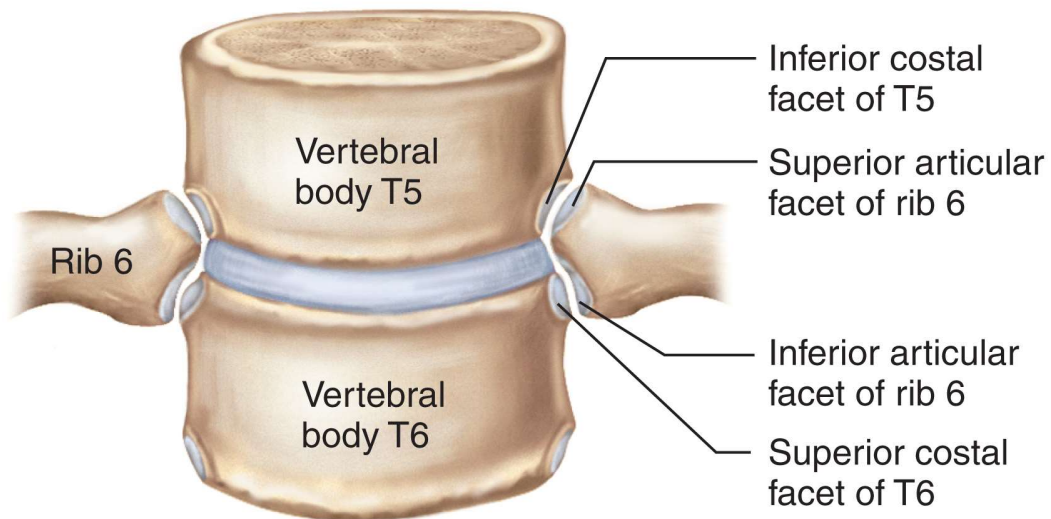
(a) Rib 1



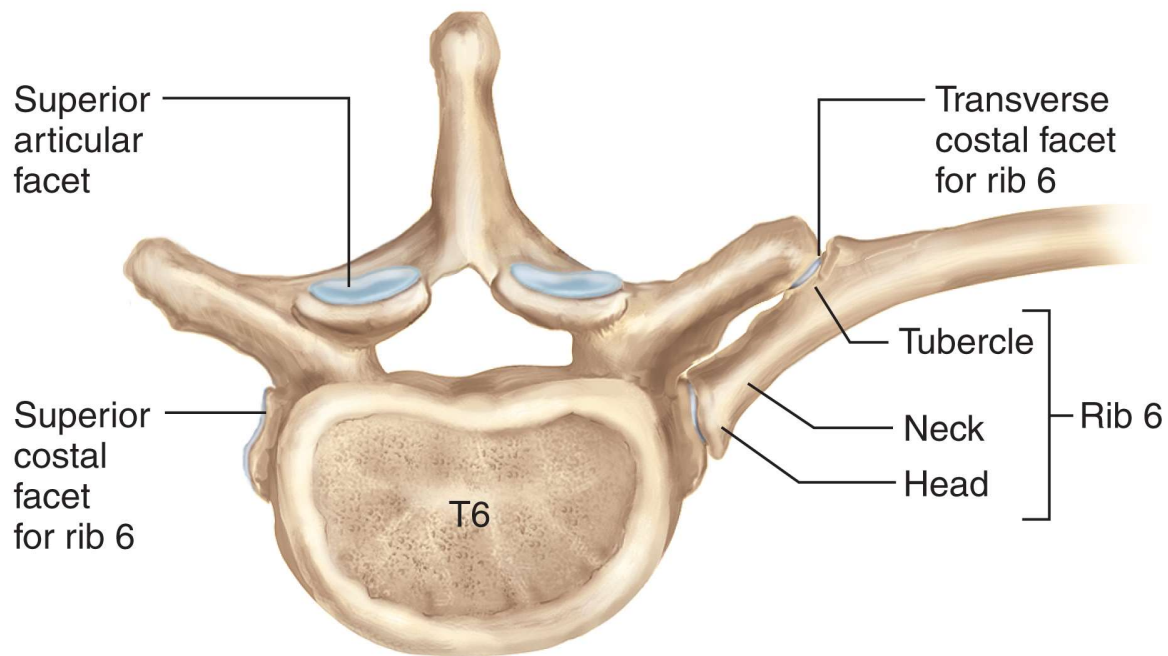
(b) Ribs 2–10



(c) Ribs 11–12



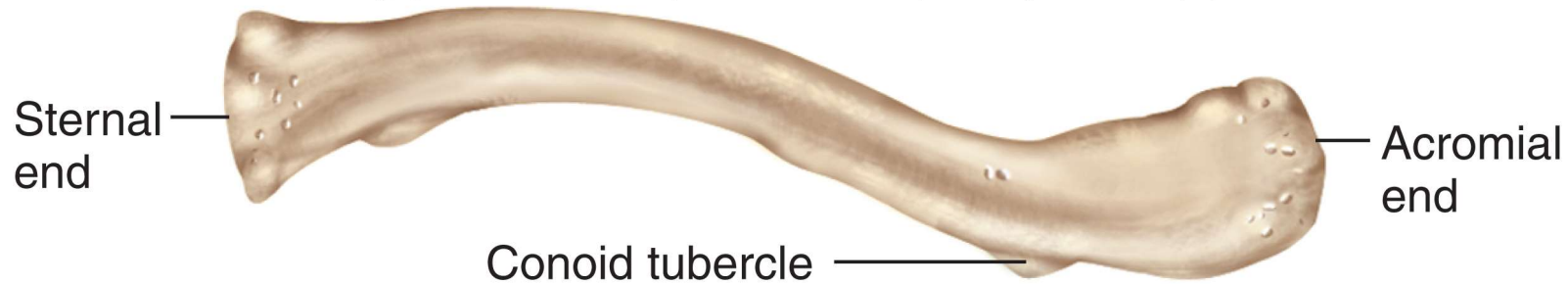
(a) Anterior view



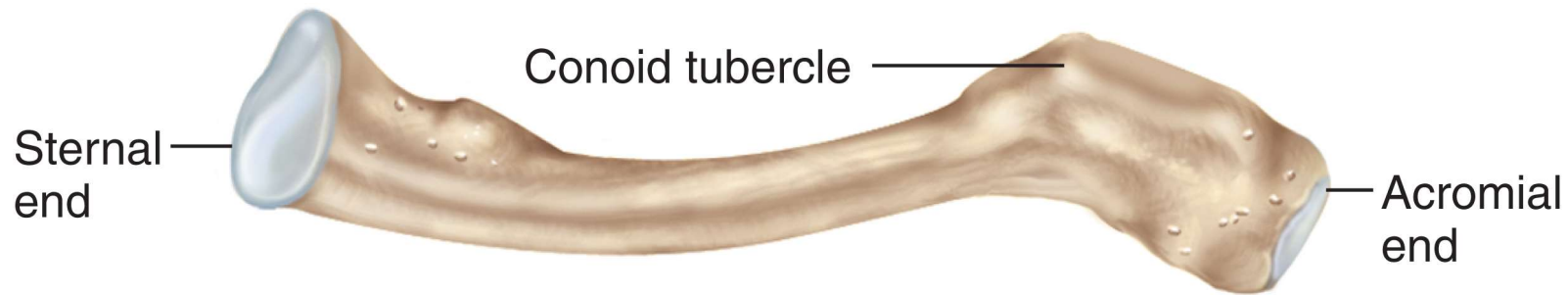
(b) Superior view

The Clavicle / The Scapula's Boney Attachment to the Sternum

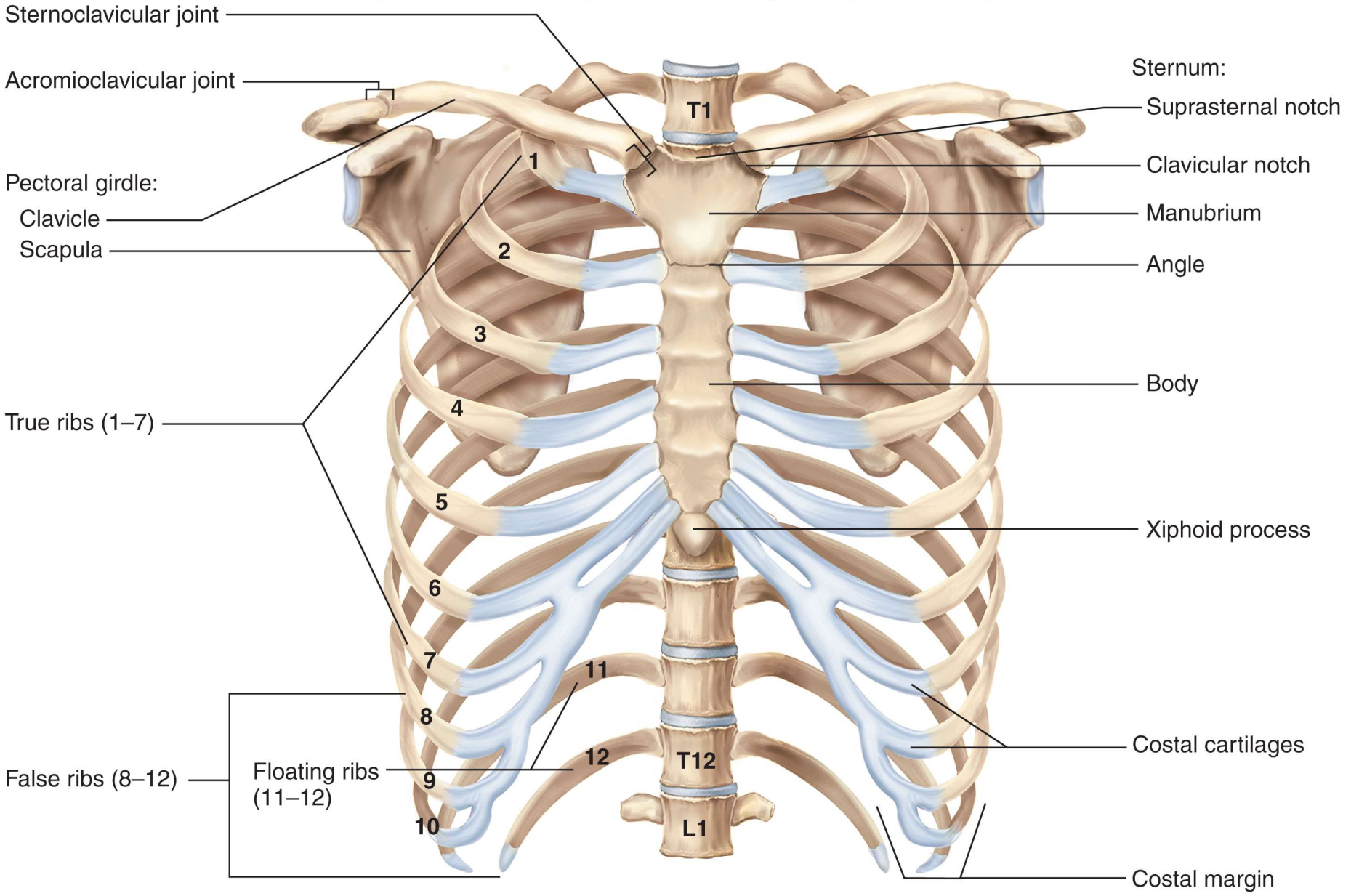
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(a) Superior view

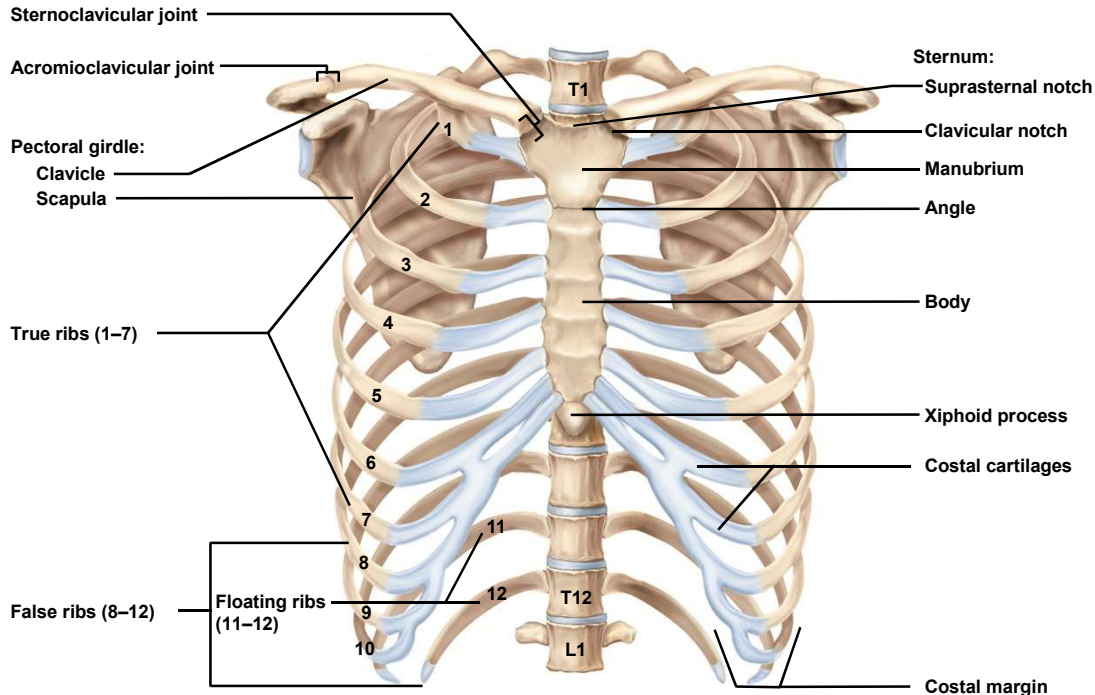


(b) Inferior view



True, False and Floating Ribs

- **True ribs (1-7) // each has costal cartilage which connects directly to the sternum**
- **False ribs (8-12) // lack independent cartilaginous connection to the sternum**

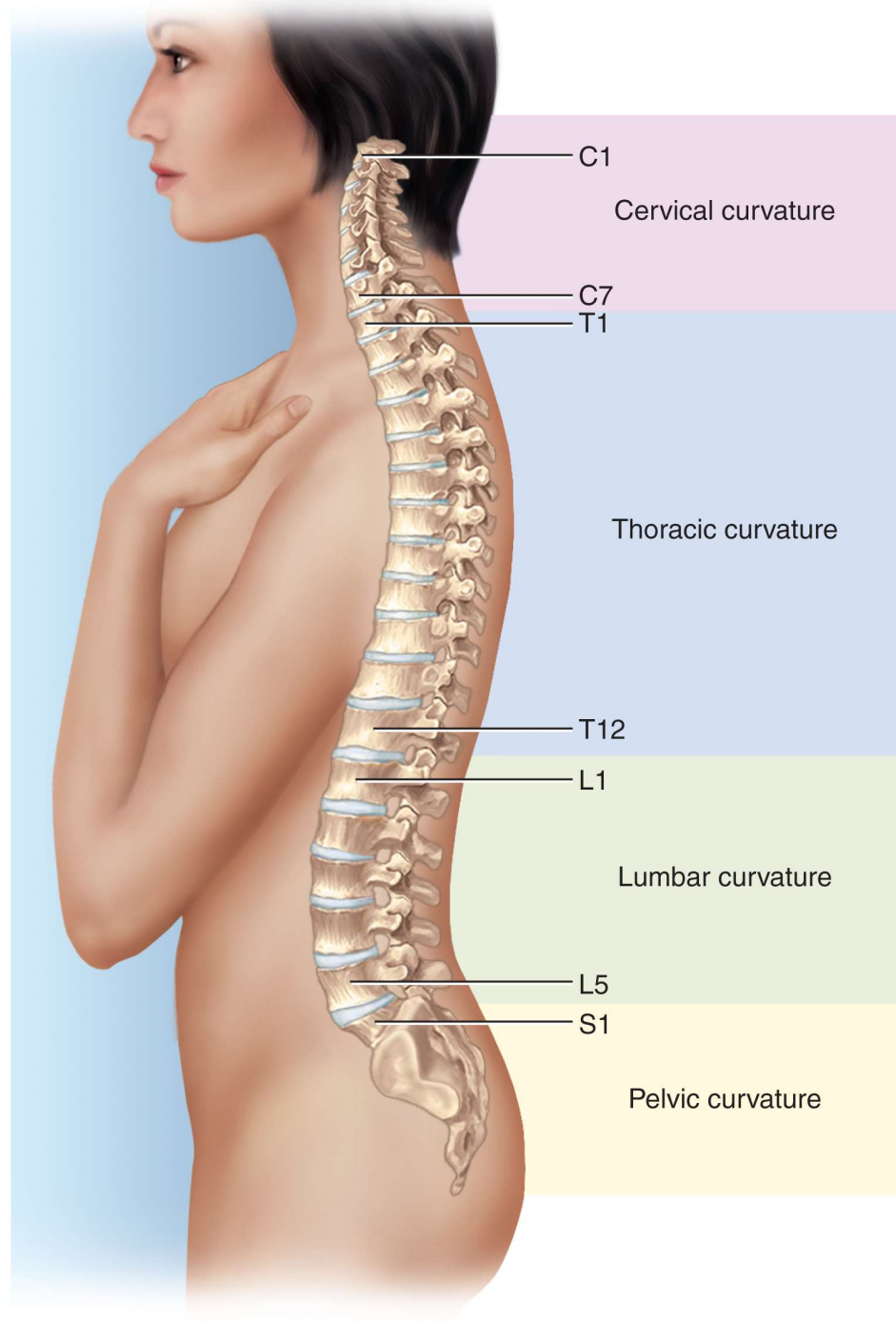


- **Floating ribs (ribs 11 – 12) // only articulate with bodies of vertebrae T11 and T12**

- **do not have tubercles**
- **do not attach to transverse processes of the vertebra**
- **no cartilaginous connection to the sternum or any of the higher costal cartilages**

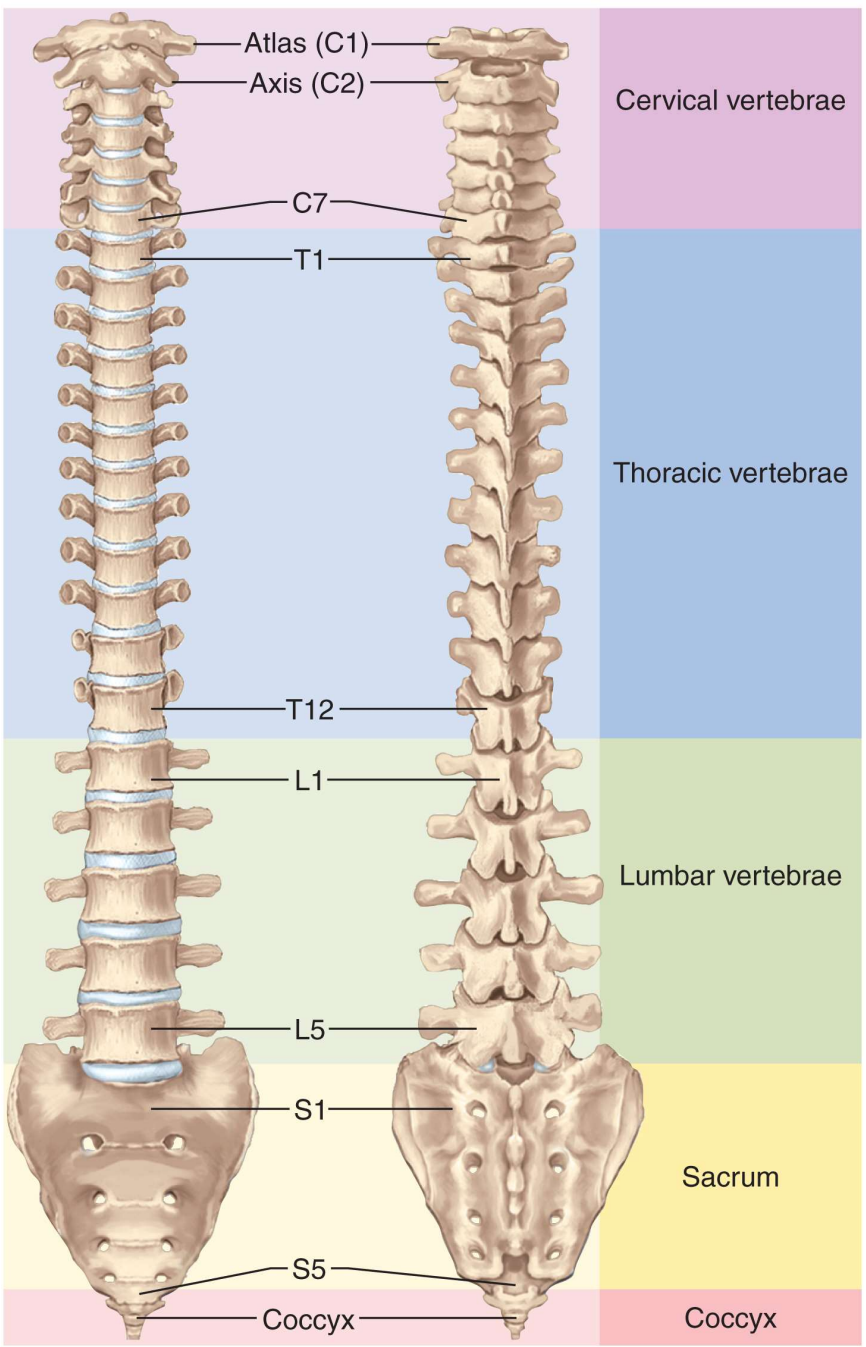


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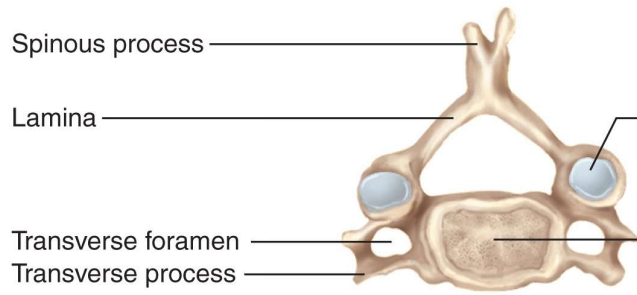
Anterior view

Posterior view



Superior views

Lateral views



Superior articular facet

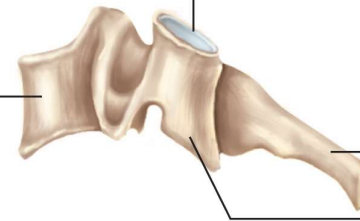
Body

Spinous process

Lamina

Transverse foramen

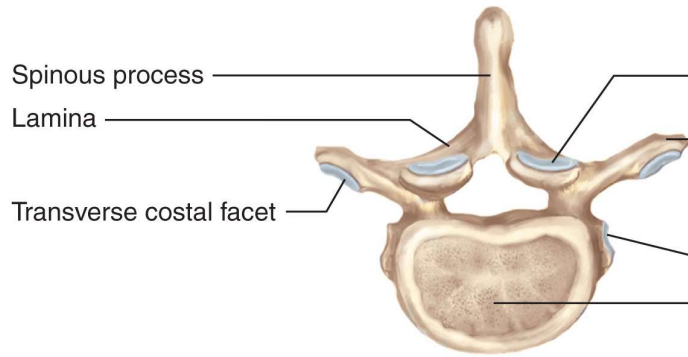
Transverse process



Spinous process

Inferior articular process

(a) Cervical vertebrae



Superior articular facet

Transverse process

Superior costal facet

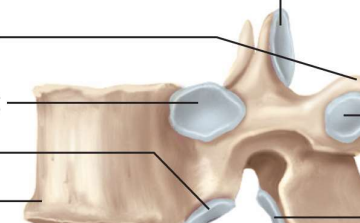
Inferior costal facet

Body

Spinous process

Lamina

Transverse costal facet

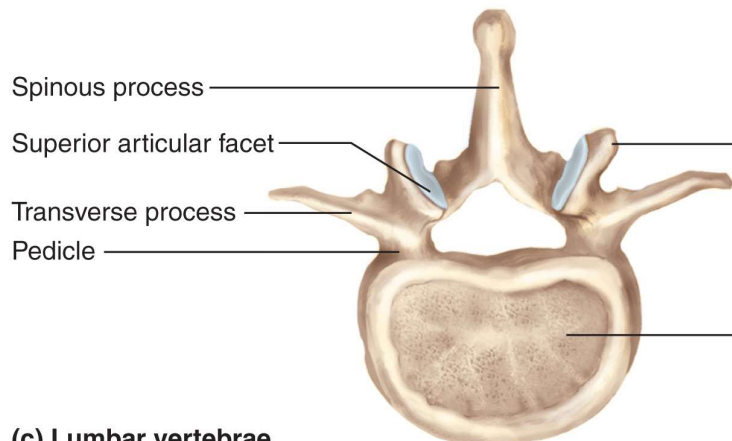


Transverse costal facet

Inferior articular facet

Spinous process

(b) Thoracic vertebrae



Superior articular process

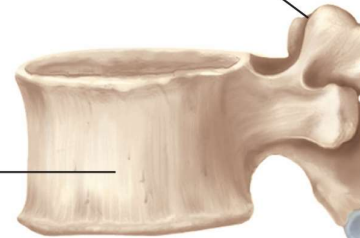
Body

Spinous process

Superior articular facet

Transverse process

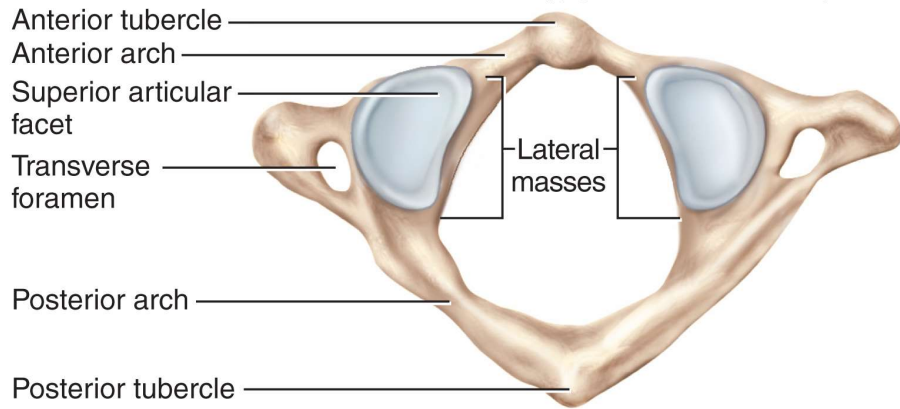
Pedicle



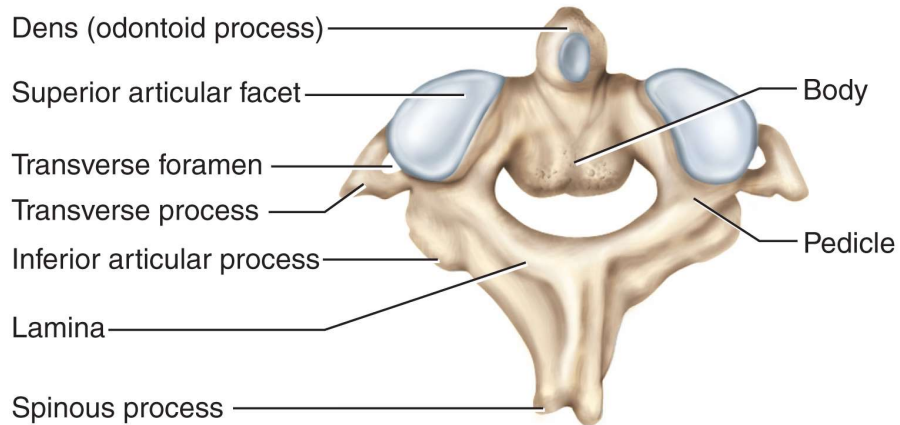
Spinous process

Inferior articular facet

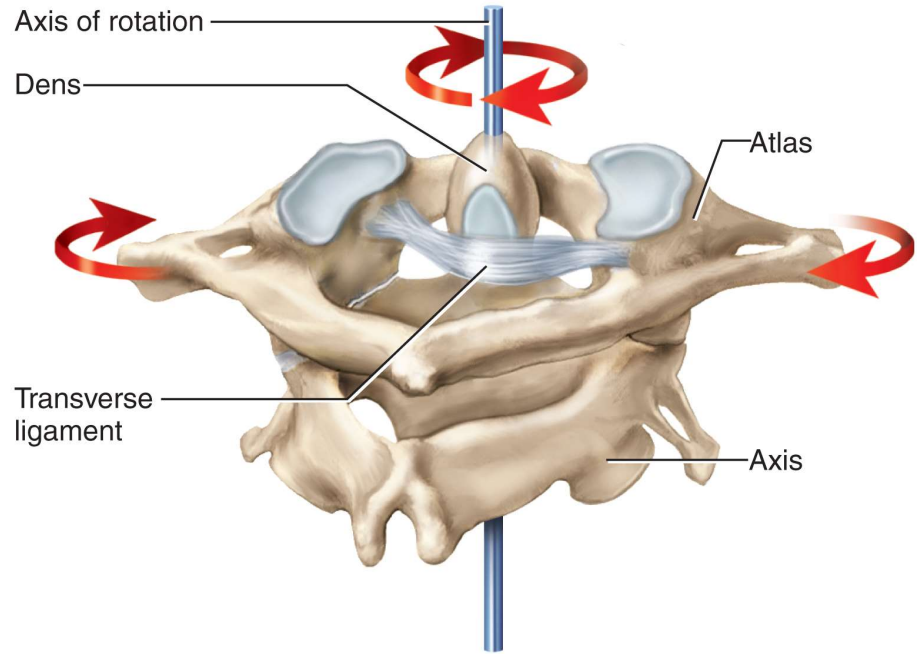
(c) Lumbar vertebrae



(a) Atlas

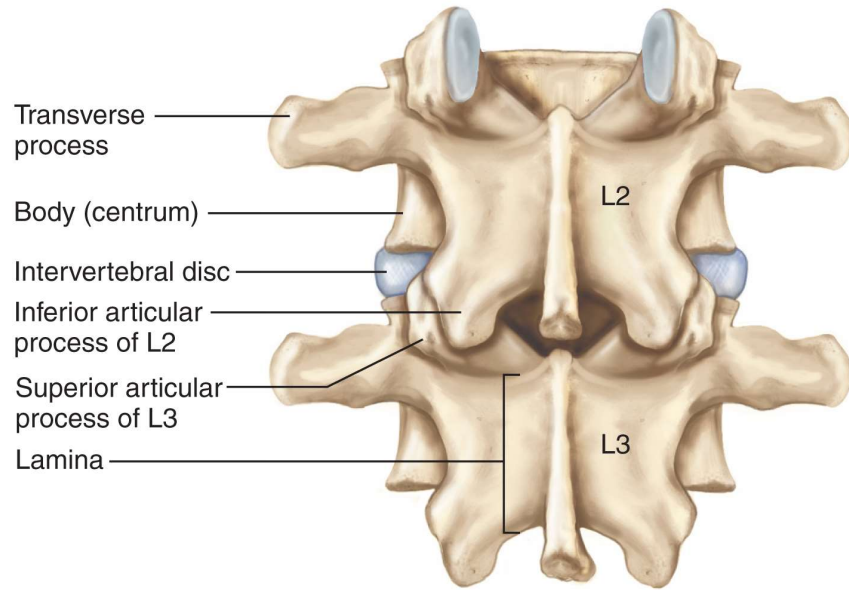


(b) Axis

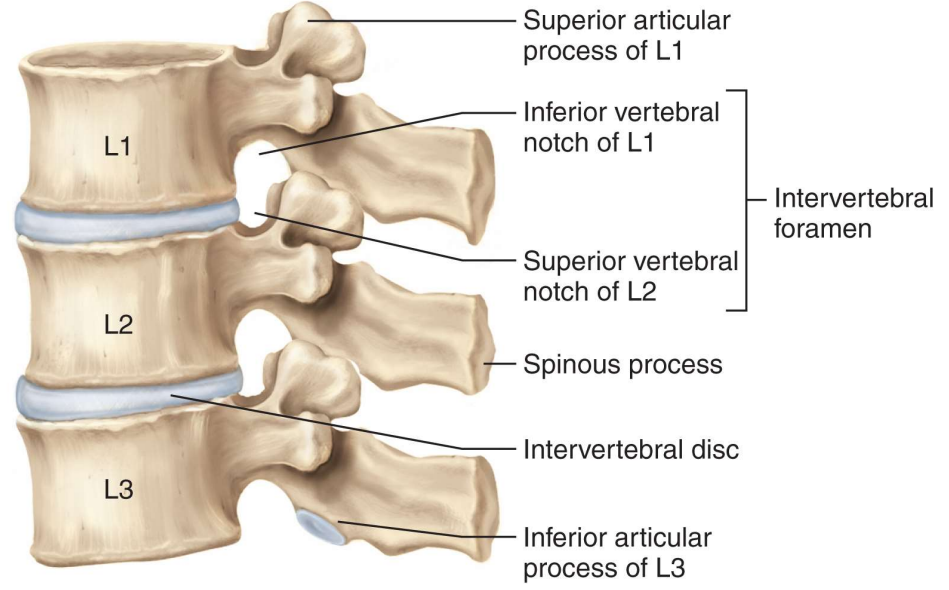


(c) Atlantoaxial joint

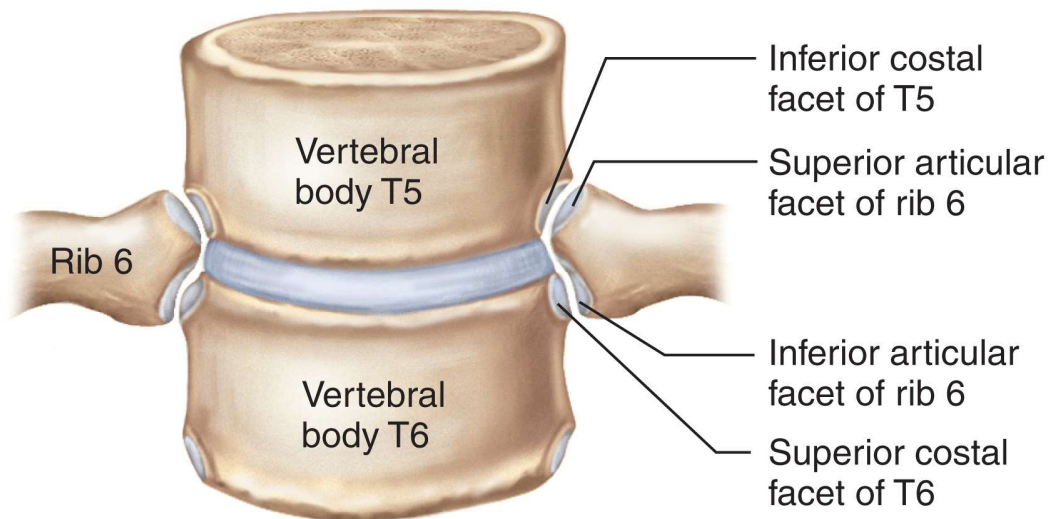
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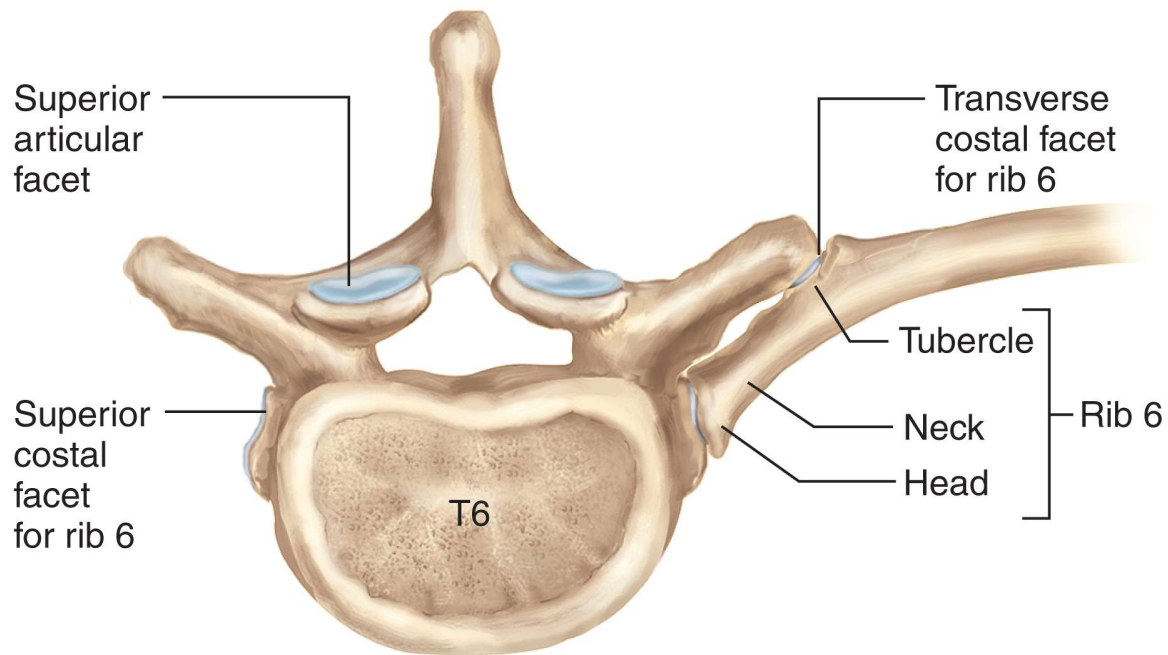
(a) Posterior (dorsal) view



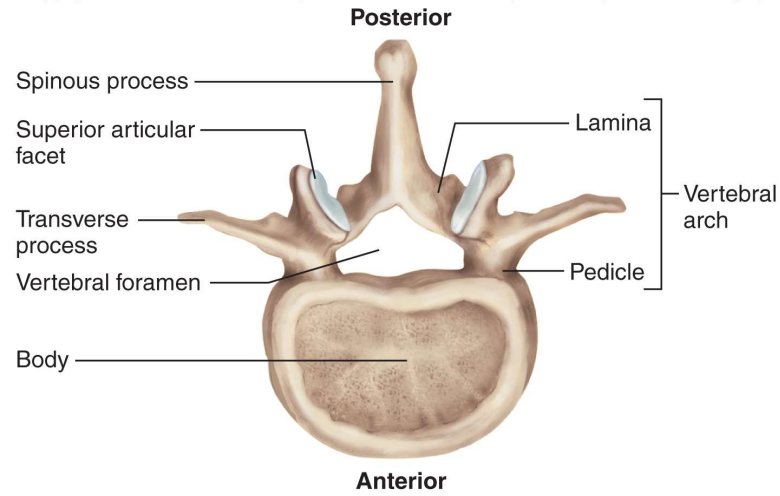
(b) Left lateral view



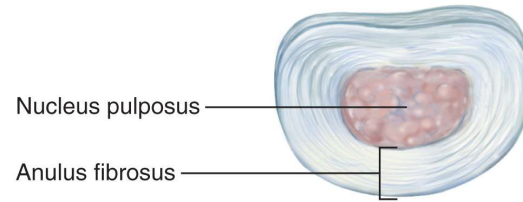
(a) Anterior view



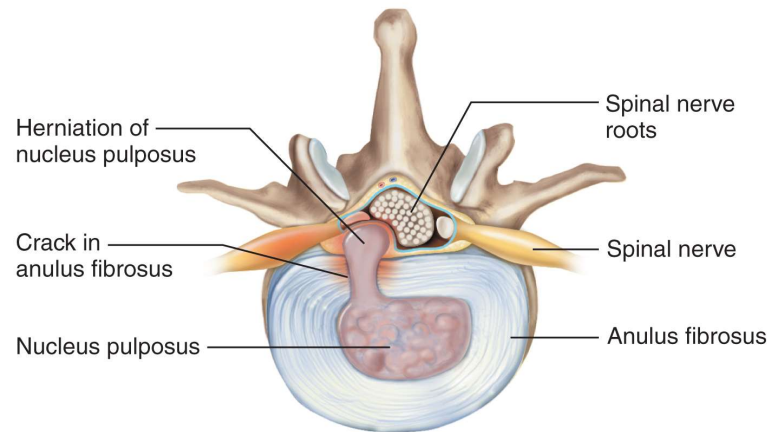
(b) Superior view



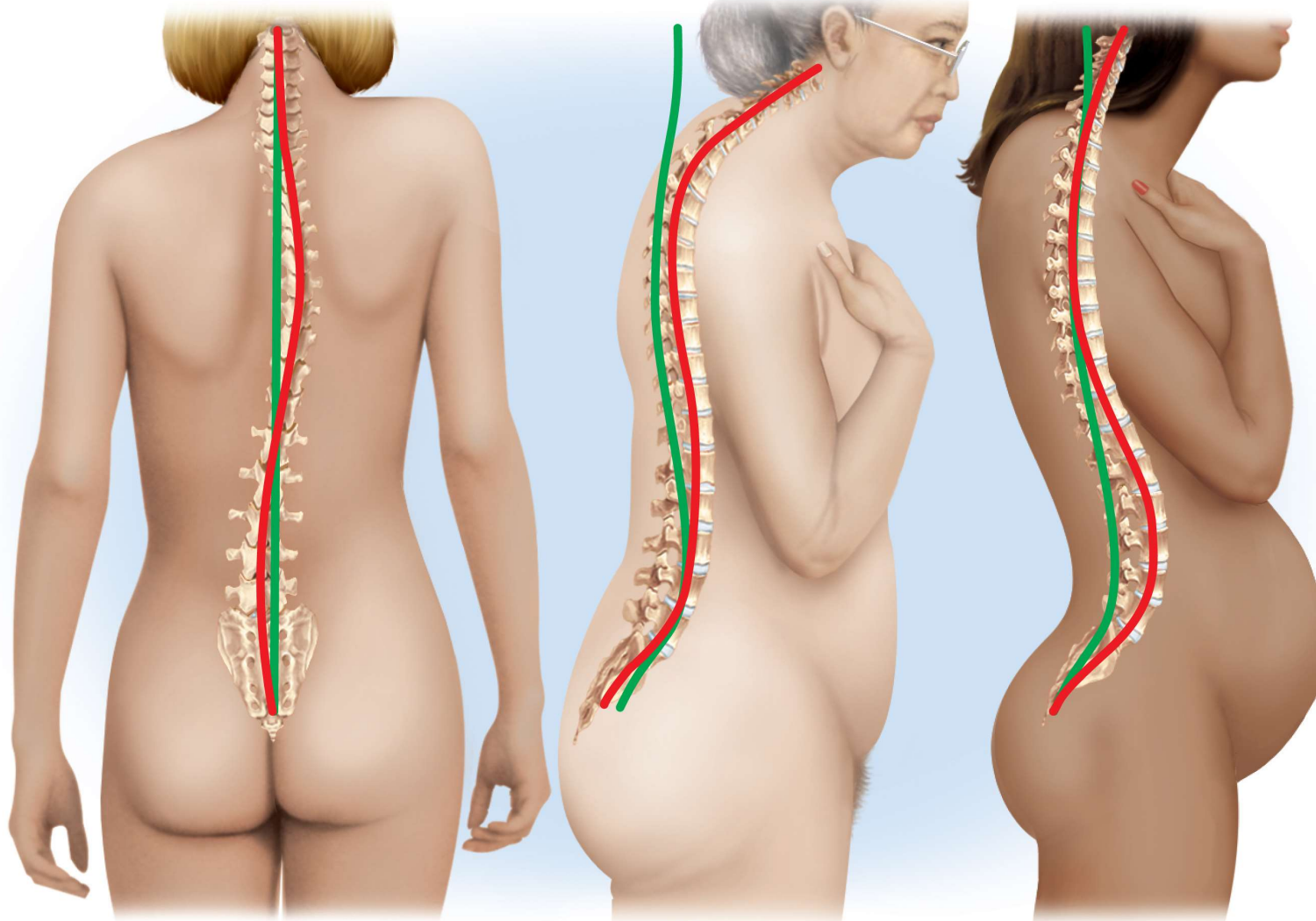
(a) 2nd lumbar vertebra (L2)



(b) Intervertebral disc



(c) Herniated disc



(a) Scoliosis

(b) Kyphosis
("hunchback")

(c) Lordosis
("swayback")

Key

- Normal
- Pathological