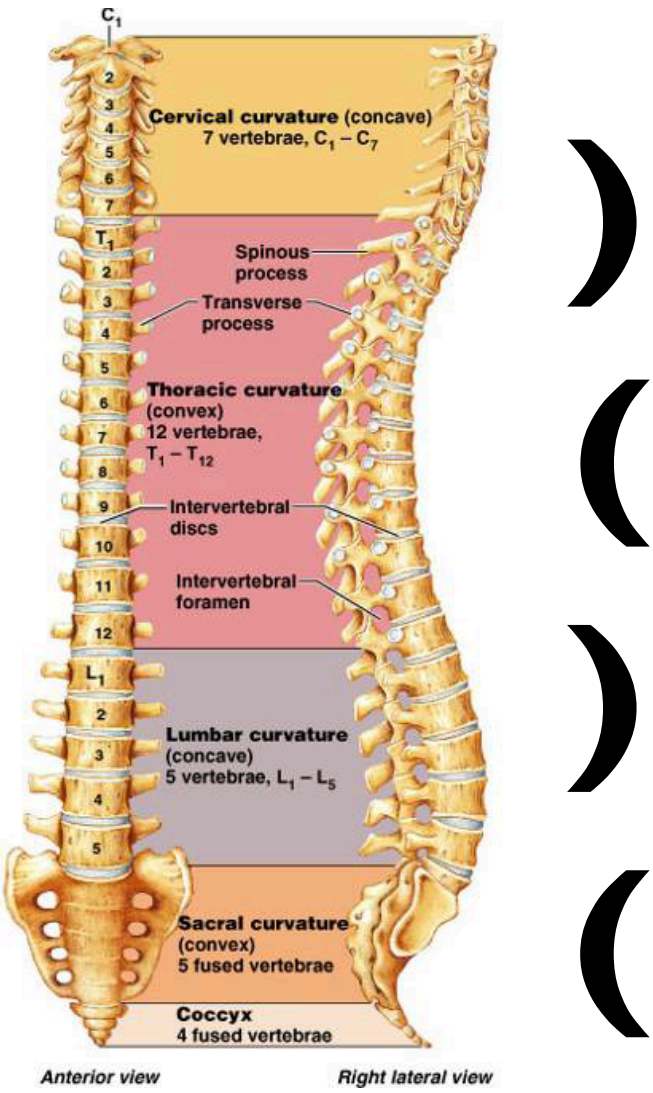

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Vertebral Column

Forms skeleton of back and main part of axial skeleton.

- 33 vertebrae articulating at anterior and posterior intervertebral joints.
- Vertebrae has 5 regions, but only 24 are movable.
- In adults, 5 sacral vertebrae are fused to form sacrum and 4 coccygeal vertebrae are fused to form coccyx.
- Vertebrae connected by paired, posterior zygapophyseal joints (facet joints) between articular processes, and strong anterior and posterior longitudinal ligaments.

Cervical Vertebrae (7)
- neck region

Thoracic Vertebrae (12)
- Posterior to thoracic cavity

Lumbar Vertebrae (5)
- Supports the lower back

Sacral Vertebrae (5)
- Fused, immovable

Coccygeal Vertebrae (3 or 4)
- Fused, immovable

Vertebral Body

- Drum shaped, found on anterior side, weight bearing region

Spinous process

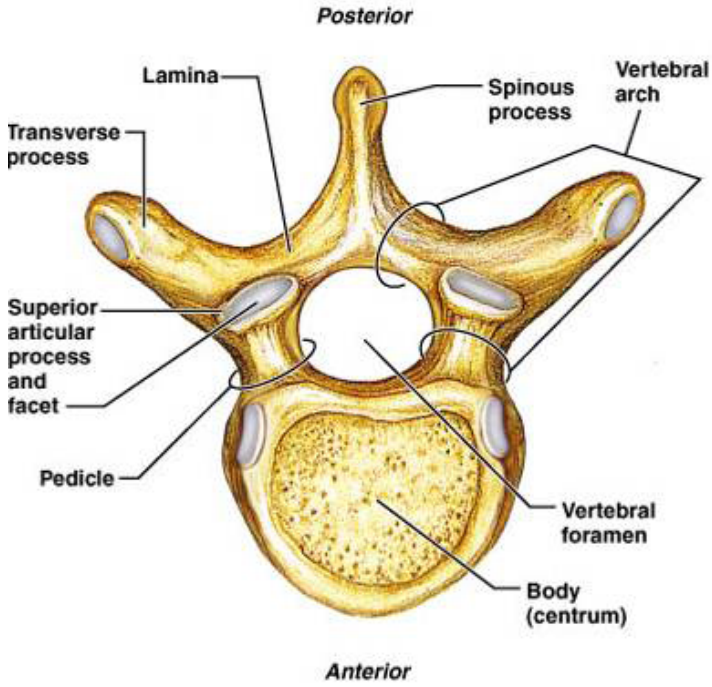
- A singular posterior projection arising at junction of the 2 laminae

Transverse process

- Projects laterally from each side of vertebral arch
- Spinous and transverse processes are attachment sites for:
  - Muscles (movement)
  - Ligaments (stabilisation)

Vertebral foramen

- Opening formed by anterior (body) and posterior (vertebral arch)
- Houses spinal cord (medulla spinalis), spinal roots, connective tissue and blood vessels



Spinal Column HD

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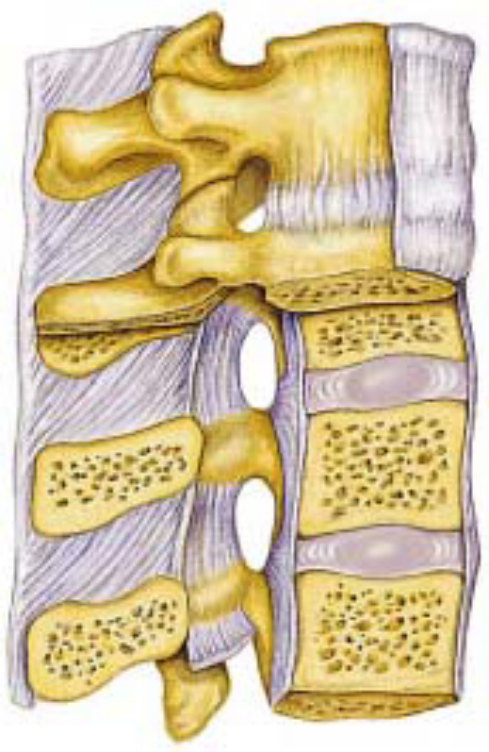


Intervertebral Foramina

- Lateral opening between 2 articulating vertebrae.
- Allows the spinal nerves to exit the spine (passage of spinal nerve root, dorsal root ganglion, and transforaminal ligaments.)
- Spinal ganglia (dorsal root ganglia) nerve roots form spinal nerve.

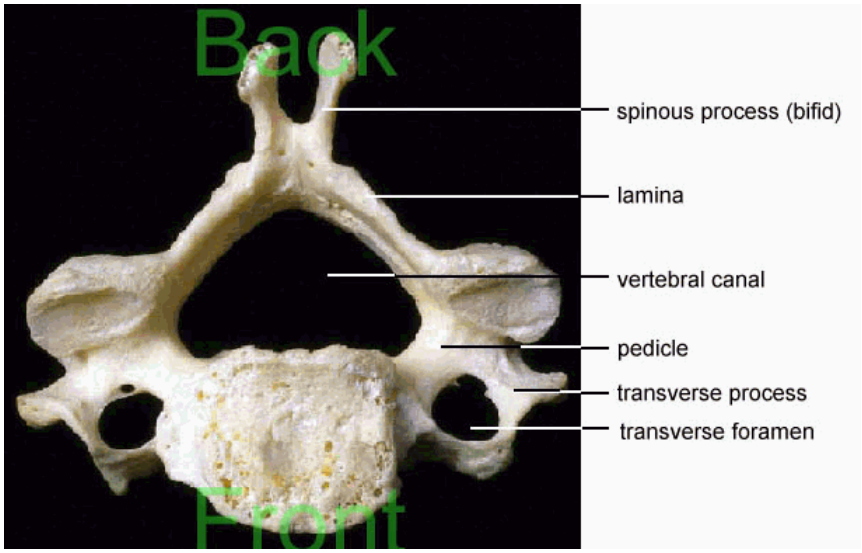
Intervertebral Discs

- Ring of fibrocartilage with soft center between vertebrae
- Found from the 2nd vertebrae to the sacrum
- Form strong joints and absorb vertical shock

Cervical Vertebrae (7)

- Lightest and smallest
- Vertebral foramen is large and triangular
- Articulating surfaces allow for wide range of motion
- Transverse foramina
  - hole in transverse process for vertebral blood vessel passage
- Bifidspinous process– split tip

- C7–vertebra prominens



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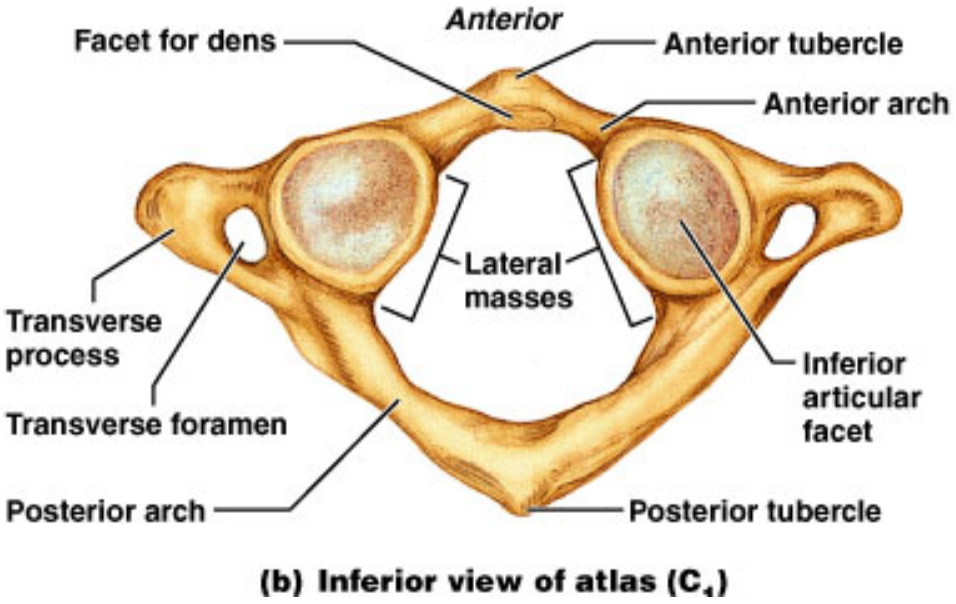
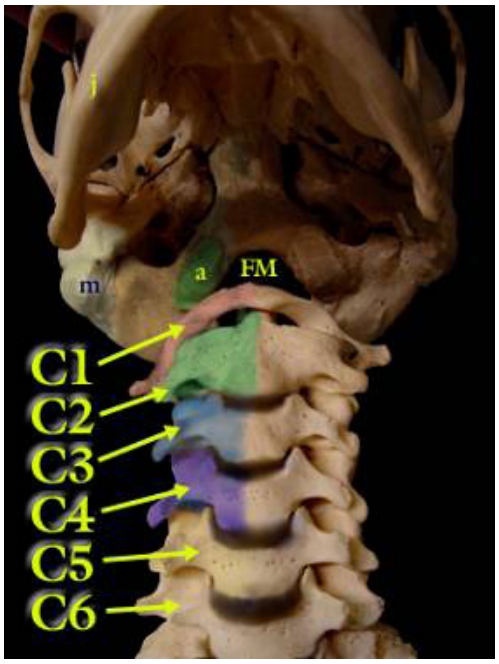


(b) Inferior view of atlas (C_1)

C1 Atlas

- Supports the"globe" a ring of bone
- Lacks a body and a spinous process
- Superior articulating surfaces
- Articulates with occipital condyles
- Allows for motion



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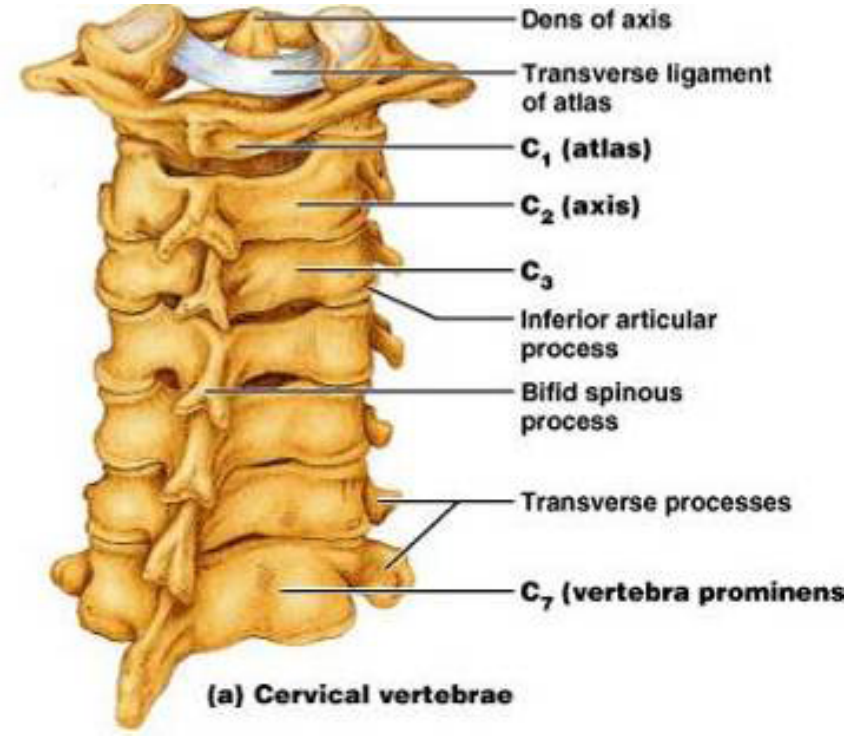
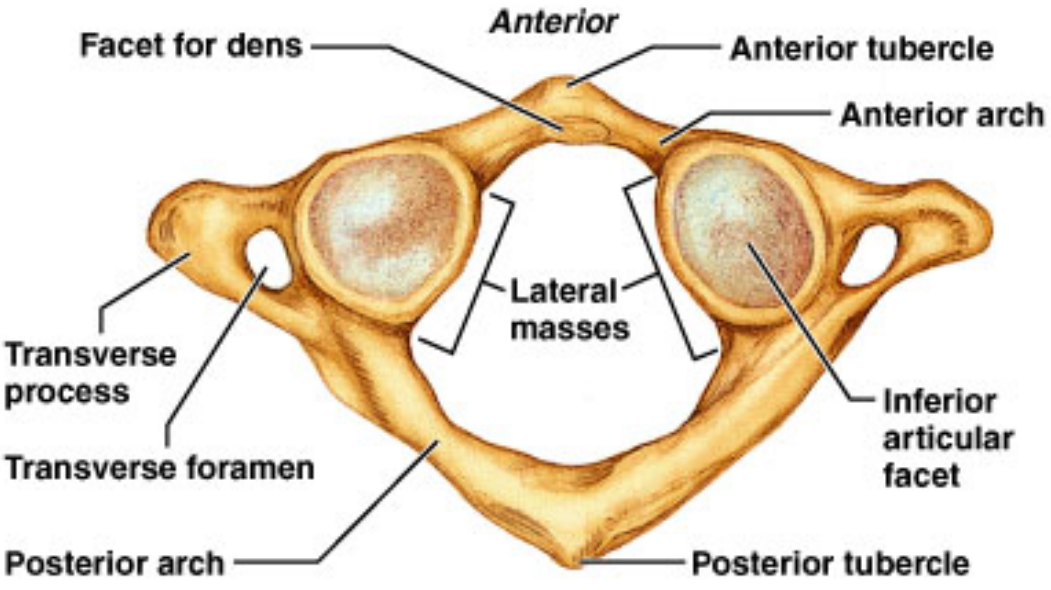
C2 Axis

Similar to other cervical vert. except for the knob-like dens that project superiorly from body

•Body and dens (odontoid process)
• Dens allows head to rotate on the neck's axis
• Allows for limited range of motion



(a) Cervical vertebrae



(b) Inferior view of atlas (C_1)

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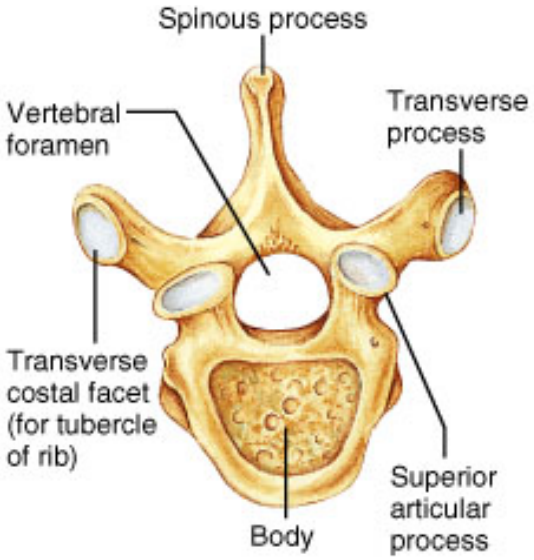
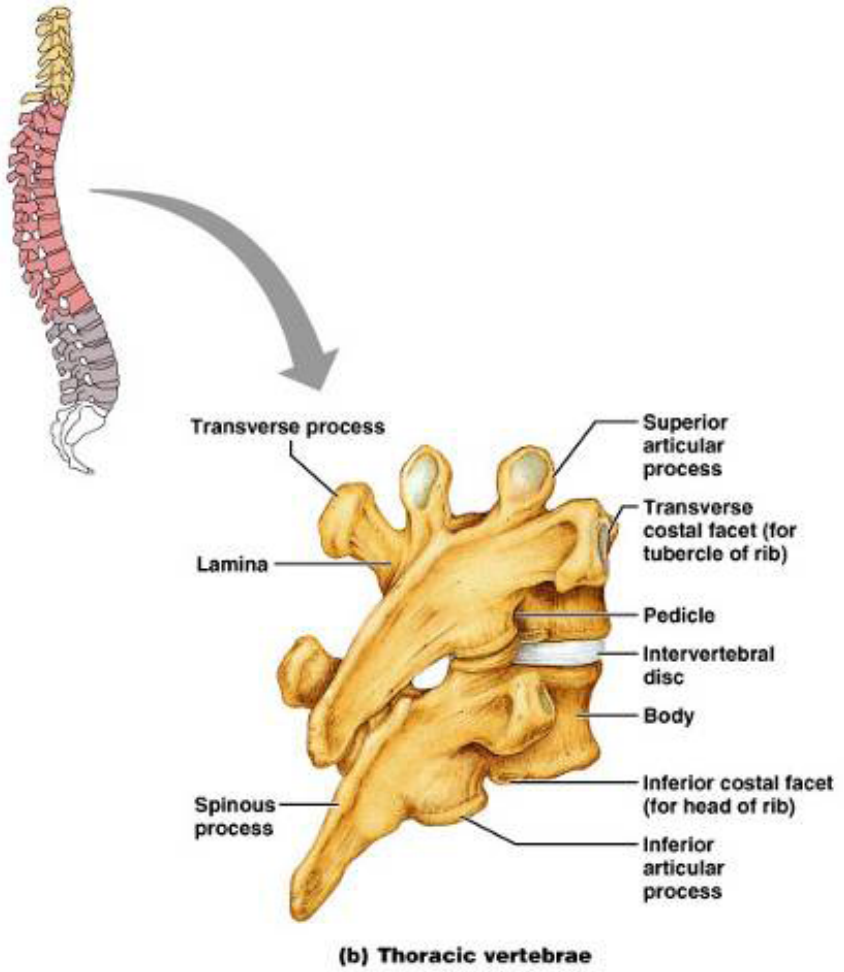
Thoracic Vertebrae (12)

• Larger than cervical vertebrae
• Longer and heavier transverse processes pointed downward (inferiorly)
• Body roughly heartshaped
• Articulation facets – facets for articulating with ribs and other vertebrae
• All are faceted on transverse processes for rib articulation





(b) Thoracic vertebrae

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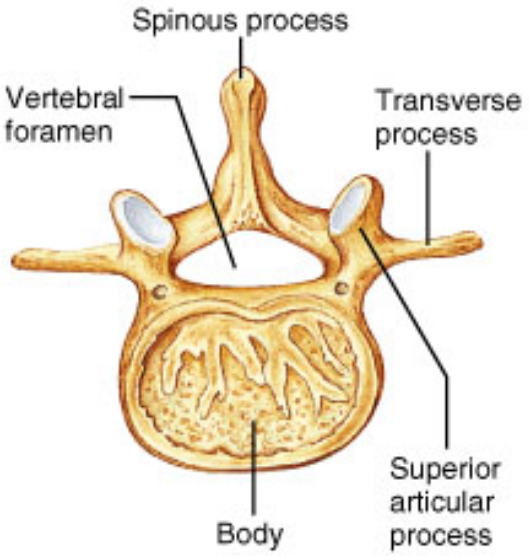
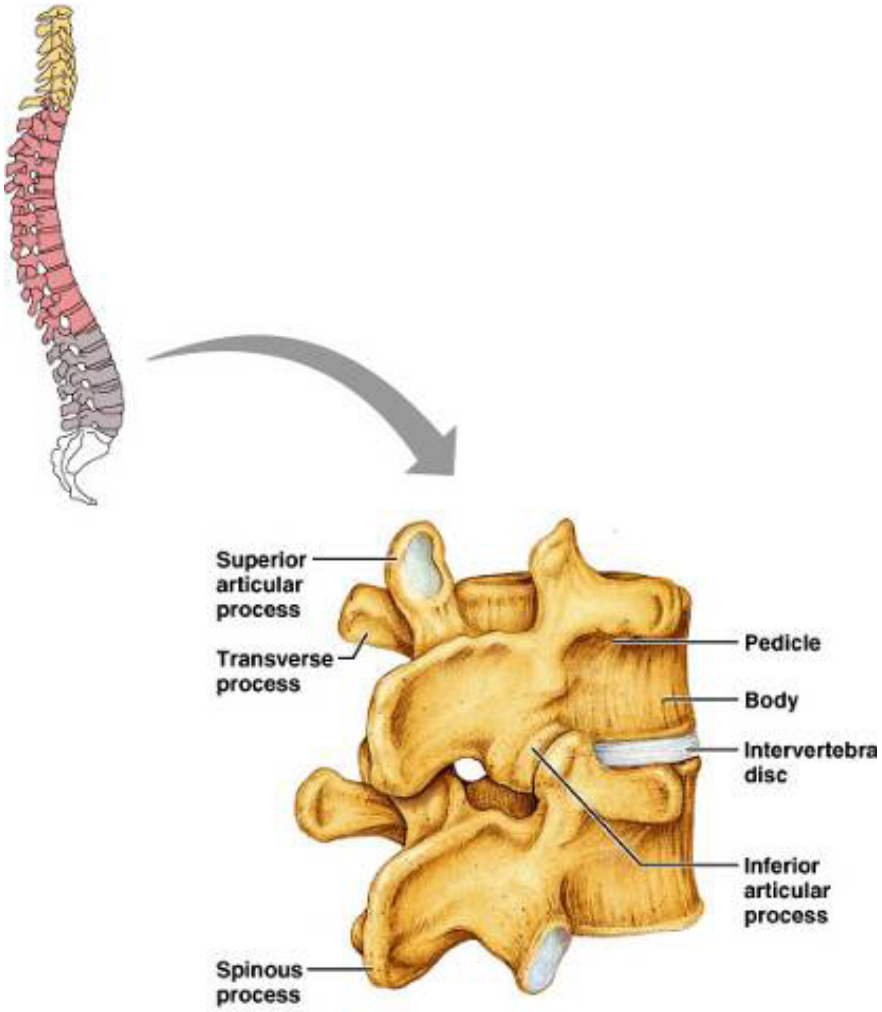
Lumbar Vertebrae (5)

- Supports more body weight than other vertebrae so large and sturdy
- Body is large and kidney bean shaped
- Spinous process
  - Short, flat, thick hatchet shaped that project straight posteriorly and suited for muscle attachment
- Transverse process
  - Short, thick process that projects laterally





(c) Lumbar vertebrae

Spinal Column HD

Table 7.3 Regional Characteristics of Cervical, Thoracic, and Lumbar Vertebrae (2 of 3)

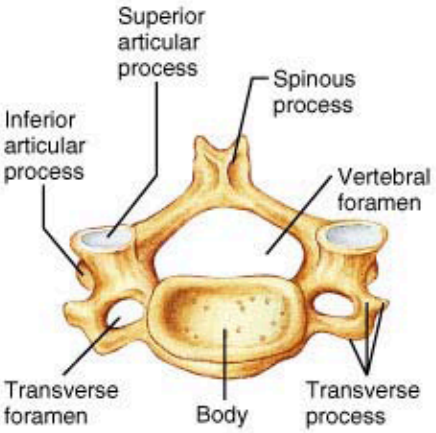
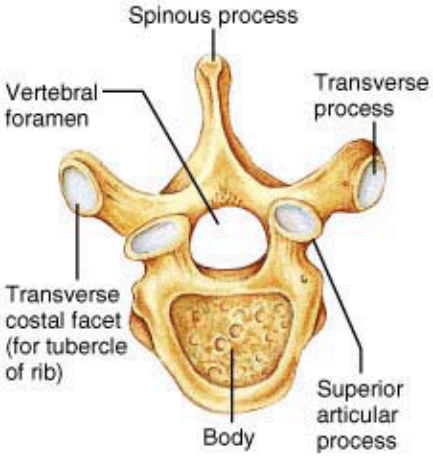
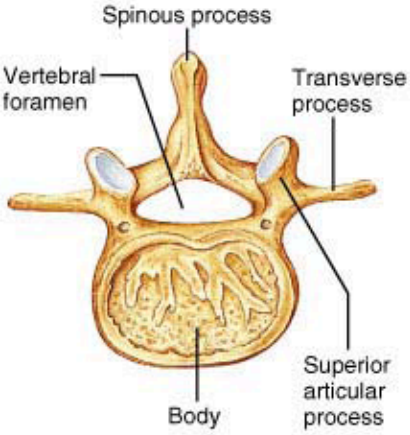
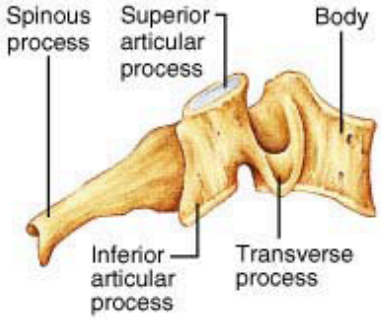
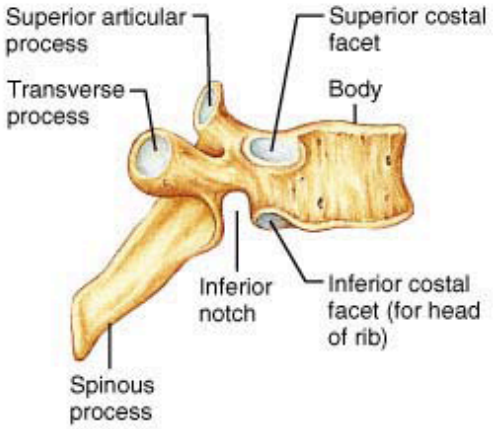
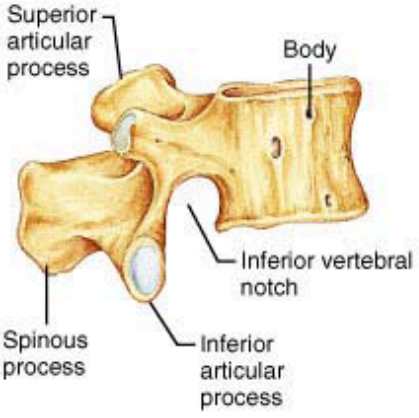
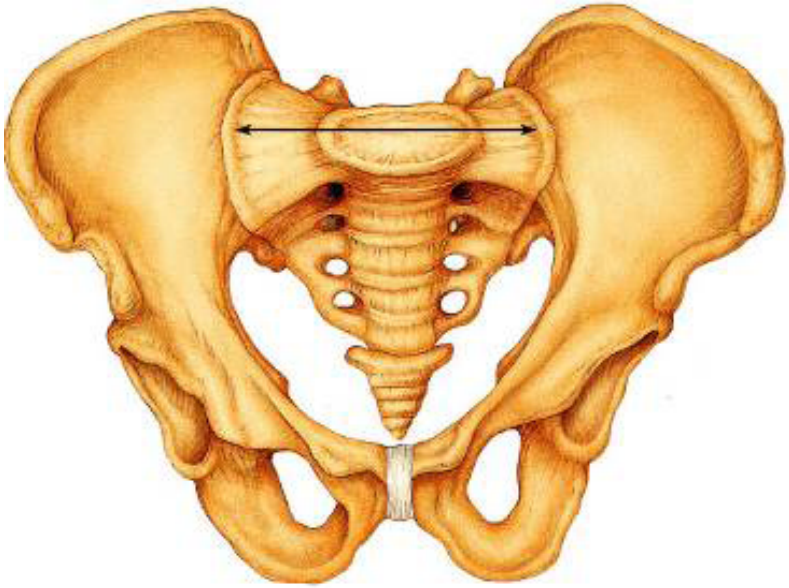
Characteristic	Cervical (3–7)	Thoracic	Lumbar
SUPERIOR VIEW	 (a) Cervical	 (b) Thoracic	 (c) Lumbar

Table 7.3 Regional Characteristics of Cervical, Thoracic, and Lumbar Vertebrae (3 of 3)

Characteristic	Cervical (3–7)	Thoracic	Lumbar
RIGHT LATERAL VIEW	 (a) Cervical	 (b) Thoracic	 (c) Lumbar

Spinal Column HD

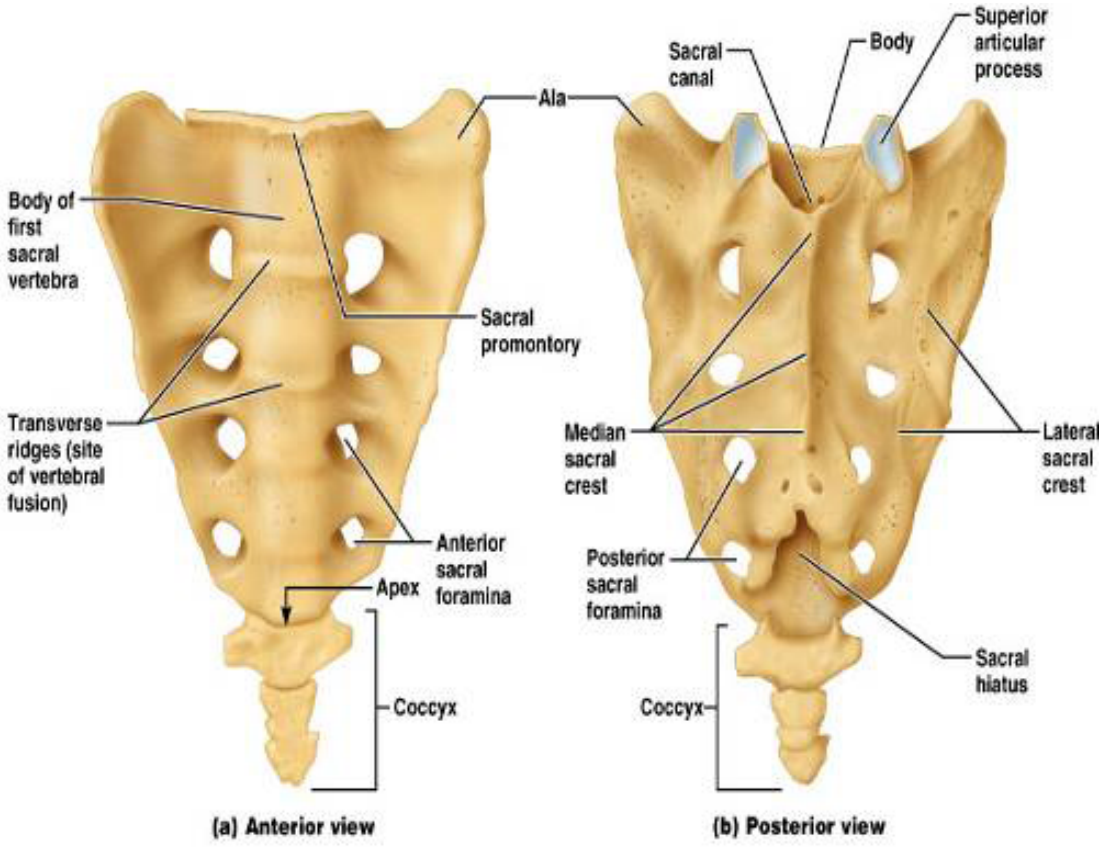
Sacrum



Fusion of 5 vertebrae which begins in mid teens and completed by mid 20s

Serves as strong foundation for pelvic girdle (posterior wall of pelvis)

- Sacral canal – opening in which vert. canal continues w/in sacrum
- Sacral hiatus – exit at inferior end of sacrum
- Ala – flaring "wings"
- Auricular surface – articulation with the 2 hip bones (ilium) to form the sacroiliac joints of the pelvis



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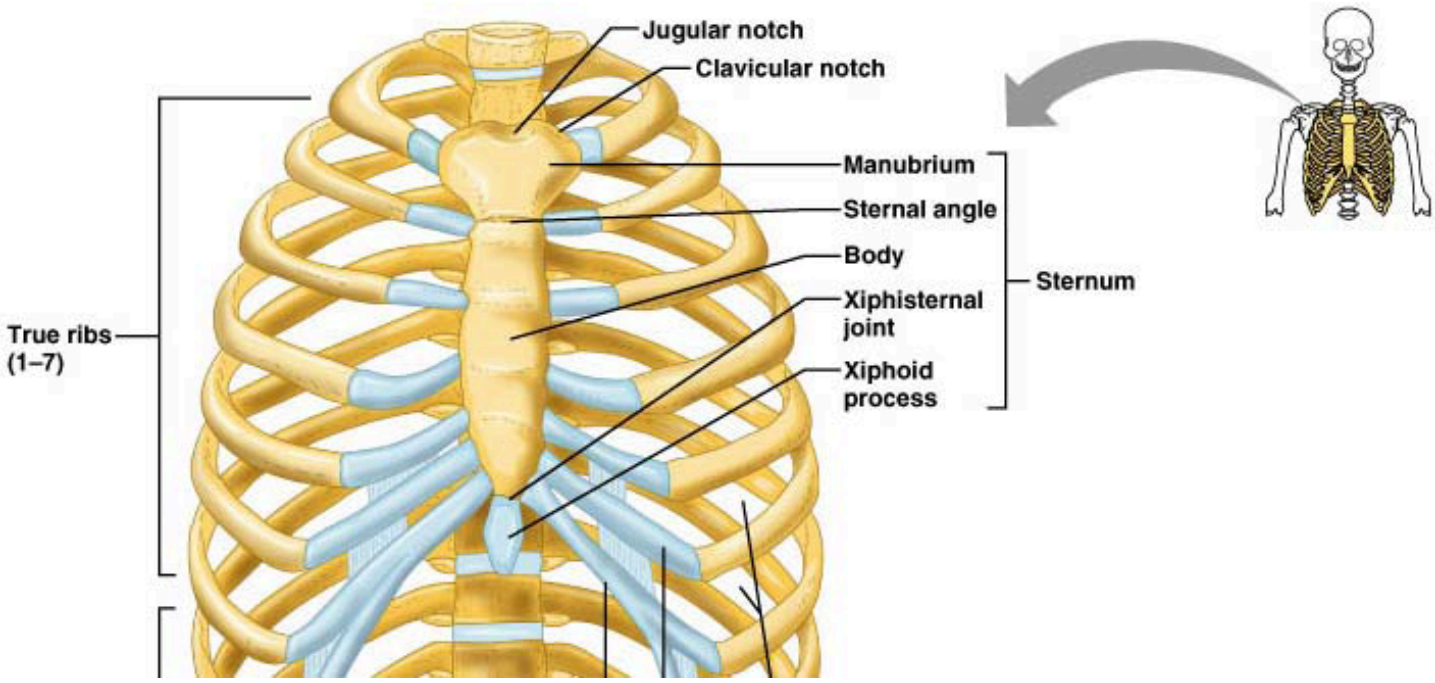


Rib Cage

Sternum

- flattened breast bone
- approx. 15 cm long
- 3 pieces

Manubrium

- Triangle shaped, articulates laterally w/ clavicles and costal cartilage of the 1st and 2nd ribs
- Joined to body of sternum by fibrocartilage that forms sternal angle (references point for 2nd rib)

Body

- Mid and largest portion, formed by 4 bones that fuse after puberty.
- Side notches articulate with 2nd to 7th ribs

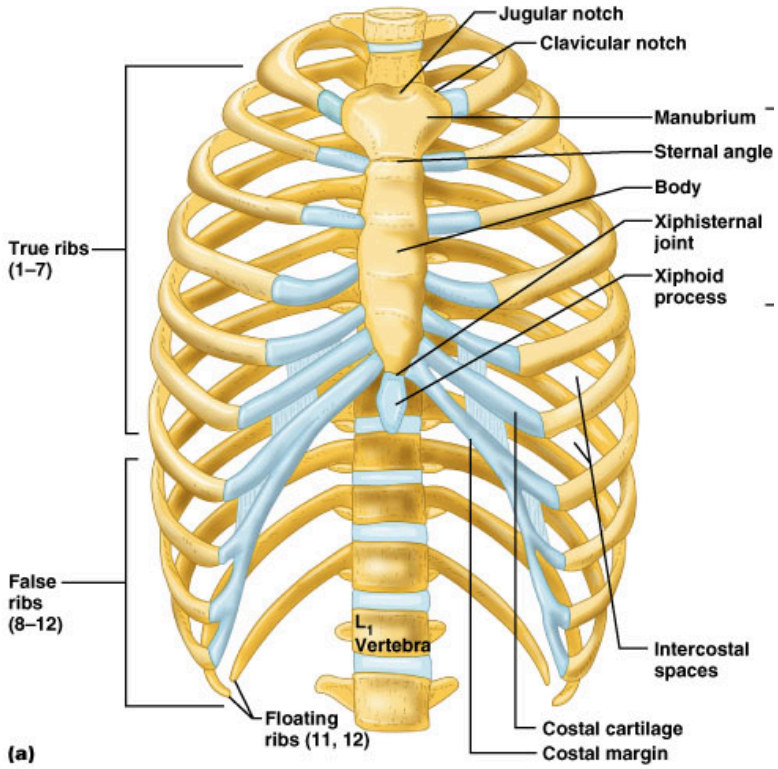
Xiphoid process

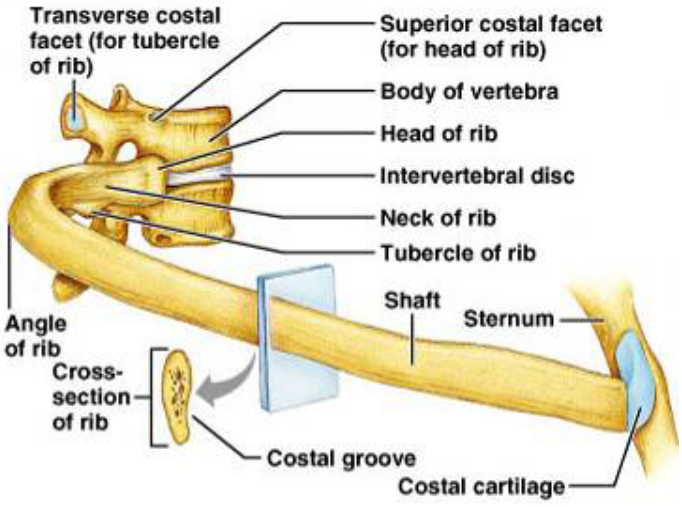
- Inferior, smallest portion, made up of hyaline cartilage that ossifies until about 40s.
- Can puncture internal organs during CPR or sharp blow

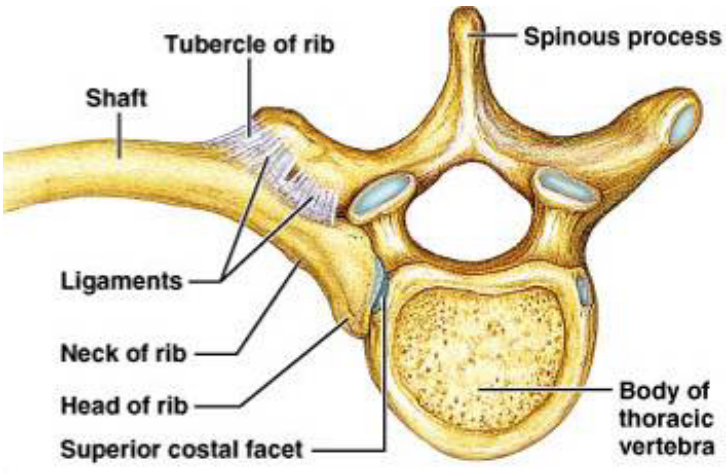
Yoga Bloom
by
CORA WEN

Ribs

- 12 pairs that form flare in thoracic cage
- Articulate with thoracic vertebrae
- Increase in size (1 – 7) then decrease (8-12)
- True ribs
  - Superior 7 pairs attached directly to sternum by costal cartilage
- False ribs
  - Inferior 5 ribs that attach to sternum indirectly
    - Ribs 8-10 join via inferior cartilage connection to 7th.
- Floating ribs
- Rib pairs 11 and 12 terminate in abdominal muscle







Spinal Column HD

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Spinal Curvature Problems

Scoliosis

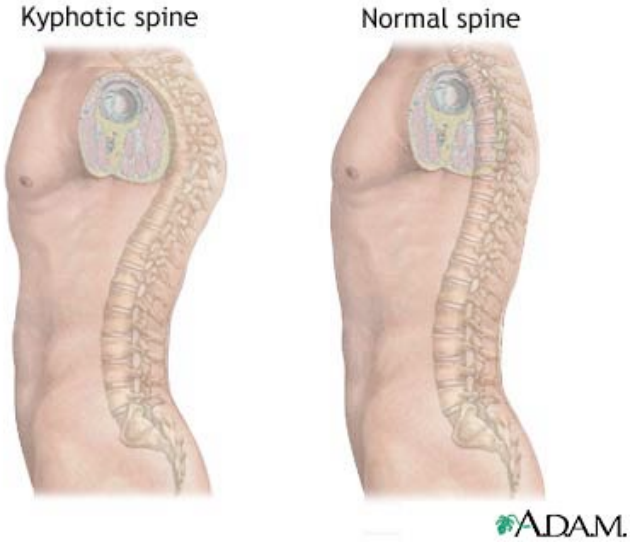
- Lateral curve that effects thoracic region most commonly, especially girls
- Abnormal vertebrae, unequal leg lengths, muscle paralysis.

Kyphosis

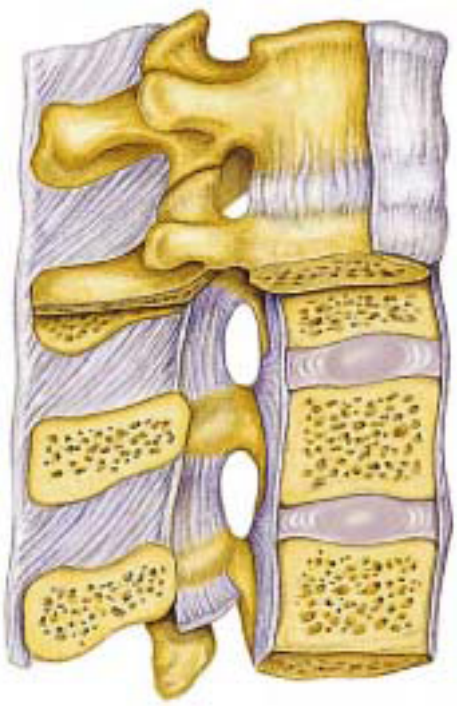
- Exaggerated thoracic curve, "hunch back"
  - Common in aged women due to fractures following osteoporosis

Lordosis

- Exaggerated lumbar curve,"swayback"
- Temporary condition in obese men and pregnant women attempting to preserve center of gravity
- Herniated or "Slipped" Disc
- Rupture of nucleus pulposus (gelatinous rubber-like ball) through anulus fibrosus (fibrocartilage ring)

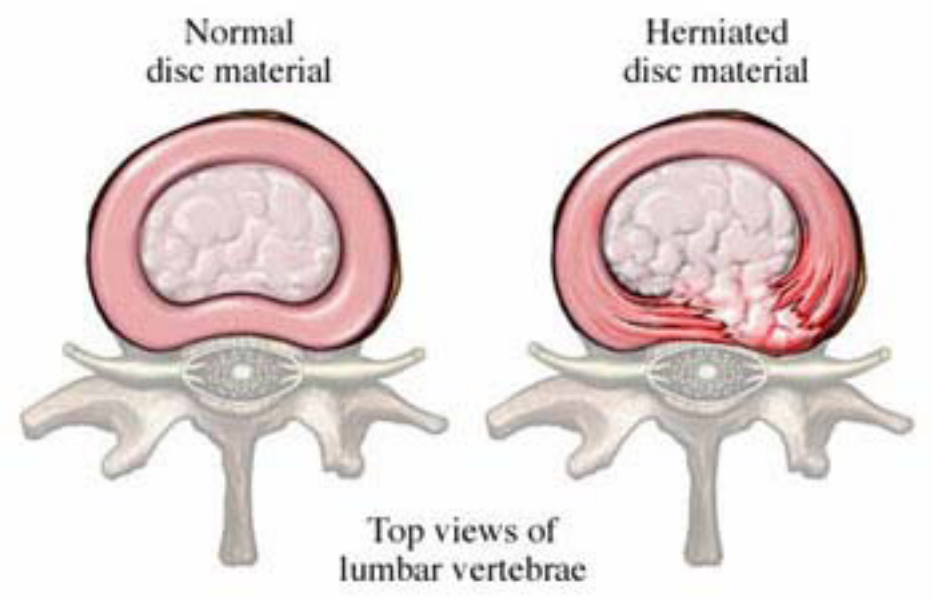


Spinal Column HD



Herniated or "Slipped" Disc

- Rupture of nucleus pulposus (gelatinous rubber-like ball) through anulus fibrosus (fibrocartilage ring)



Joints

Flexible connective tissues:
- Form joints
- Hold bones together
- Allow for some degree of movement

Articulations join:
- bone to bone
- bone to cartilage
- or teeth to bony sockets

Lashed together:
- resist crushing and tearing while providing some range of movement

Joints

Weakest points of the skeleton
Generally, the closer bones fit together, the stronger the joint, but tightly fitted joints restrict movement
- Based on the material that binds the bones together
- Based on the degreee of movement they permit

Syntharthorses

- The sutures in the skull are examples of immovable joints.

Amphiarthroses

- slightly movable
- ribs connected to the sternum by costal cartilages
- symphysis pubis and the joints between the vertebrae
- intervertebral disks are also of this type.

Diarthroses

- Joints of the pectoral and pelvic girdle, knee joints, etc.

Diarthroses: Synovial Joints

- Freely movable
- Each joint contains a fluid filled joint cavity called the **synovial cavity** that separates articulating bones.