

Chapter 7

Skeletal System

Skull

A. The skull is made up of 22 bones: 8 cranial bones, 13 facial bones, and the mandible.

B. The Cranium encloses and protects the brain, provides attachments for muscles, and contains air-filled *paranasal sinuses* that reduce its weight and increase vocal resonance.

1. The frontal bone features include the *supraorbital foramen* and the *frontal sinuses*.

2. Parietal bones lie at the sides of the skull, just behind the frontal bone. They join along the midline *sagittal suture* and meet the frontal bone along the *coronal suture*.
3. The occipital bone forms the back of the skull and the base of the cranium. Features include the *lambdoid suture*, *foramen magnum*, and *condyles*.

4. The temporal bones form parts of the sides and base of the cranium. Features include the *squamous suture, external auditory meatus, mandibular fossae, mastoid process, styloid process, and zygomatic process.*
5. The sphenoid bone helps form the base of the cranium, sides of the skull and portions of the orbits. Features include the *sella turcica* and *sphenoidal sinuses.*

6. The ethmoid bone is located in front of the sphenoid bone. Features include the *cribriform plates, crista galli, a perpendicular plate, superior and middle nasal conchae, and ethmoidal sinuses.*

C. Facial Skeleton has 13 immovable bones and a movable lower jawbone which forms the basic shape of the face and provide attachments for muscles that move the jaw and control facial expressions.

1. The maxillae form the upper jaw, hard palate, floor of the orbits, sides of the nasal cavity, house the upper teeth, and contain large maxillary sinuses. Features include the *hard palate, maxillary sinuses, palatine* and *alveolar processes, and alveolar arch.*

2. Palatine bones are L-shaped bones located behind the maxillae that form the floor & lateral walls of the nasal cavity and the posterior portion of the hard palate.
3. Zygomatic bones form the cheekbones and lateral walls of the orbits. Features include the *temporal* and *zygomatic processes*, which form the *zygomatic arch*.
4. The lacrima bones form part of the medial walls of the orbits.
5. Nasal bones form the bridge of the nose.

6. The vomer bone makes up a portion of the nasal septum.
7. Inferior nasal conchae are fragile, scroll-shaped bones that support mucous membranes in the nasal cavity.
8. The mandible, or lower jawbone, supports the lower teeth and includes the *mandibular condyle*, *coronoid process*, and *alveolar arch*.

D. Infantile Skulls are not completely developed and have fontanelles (soft spots) that are membranous areas of incomplete intramembranous ossification.

Vertebral Column

A. The vertebral column is composed of bony vertebrae separated by fibrocartilagenous *intervertebral discs*, connected together by ligaments and extends from the skull to the pelvis. It supports the head and trunk and protects the spinal cord that passes through its *vertebral canal*.

B. A typical vertebrae consists of a *body*, *pedicles*, *laminae*, *spinous process*, *vertebral foramen*, *transverse process*, *superior and inferior processes* and a *intervertebral foramina*.

C. Cervical Vertebrae

1. These seven bones are the smallest of the vertebrae that comprise the neck and support the head and have distinctive *transverse foramina*.
2. The first vertebra is the atlas, supports the head. It has two *facets* that articulate with the occipital condyles.
3. The second vertebra is the axis, with its, tooth-like dens that pivots within the atlas.
4. Features that separate cervical vertebrae from the rest are the bifid spinous processes and transverse foramina.

D. Thoracic Vertebrae

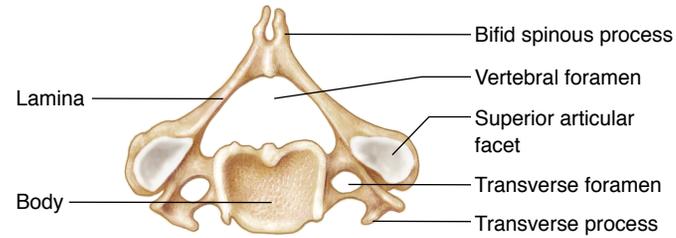
1. Twelve thoracic vertebrae articulate with the ribs and are larger and stronger than the cervical vertebrae.

E. Lumbar Vertebrae

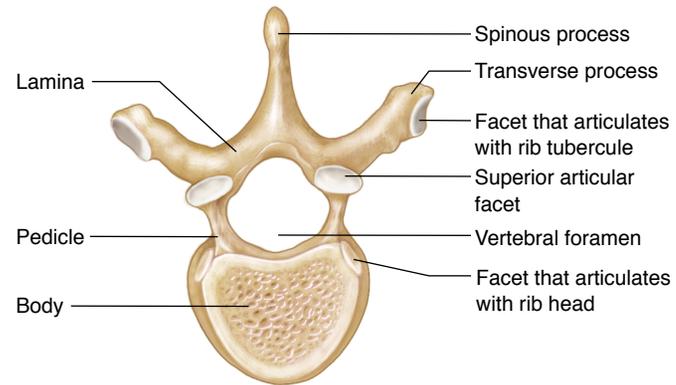
1. The five massive lumbar vertebrae support the weight of the body and are located in the small of the back.

Fig07.18

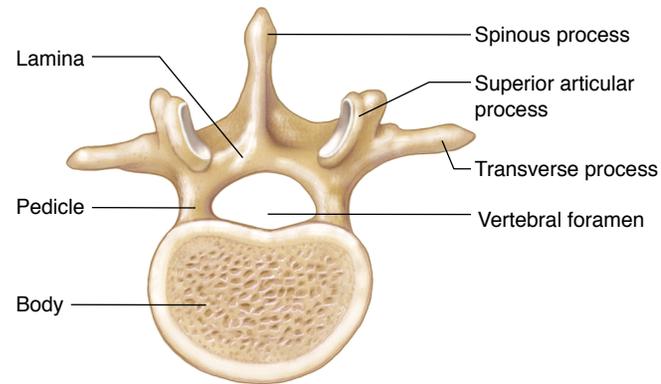
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(a) Cervical vertebra



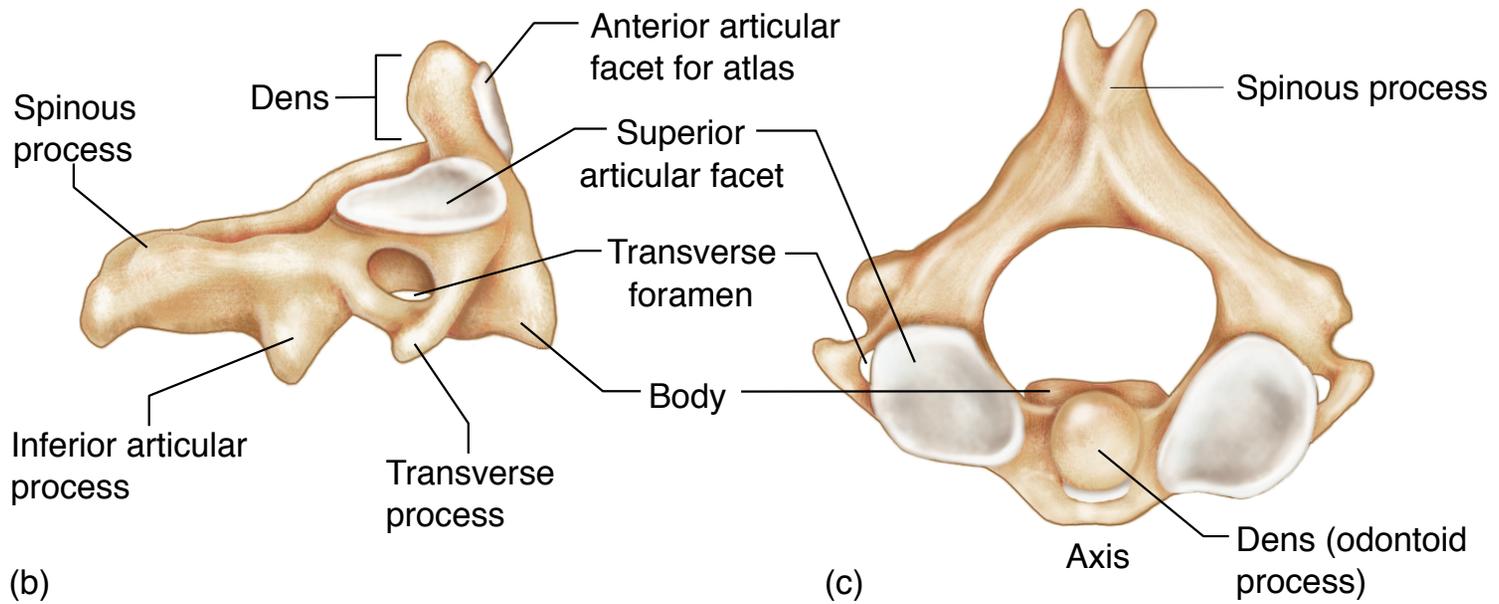
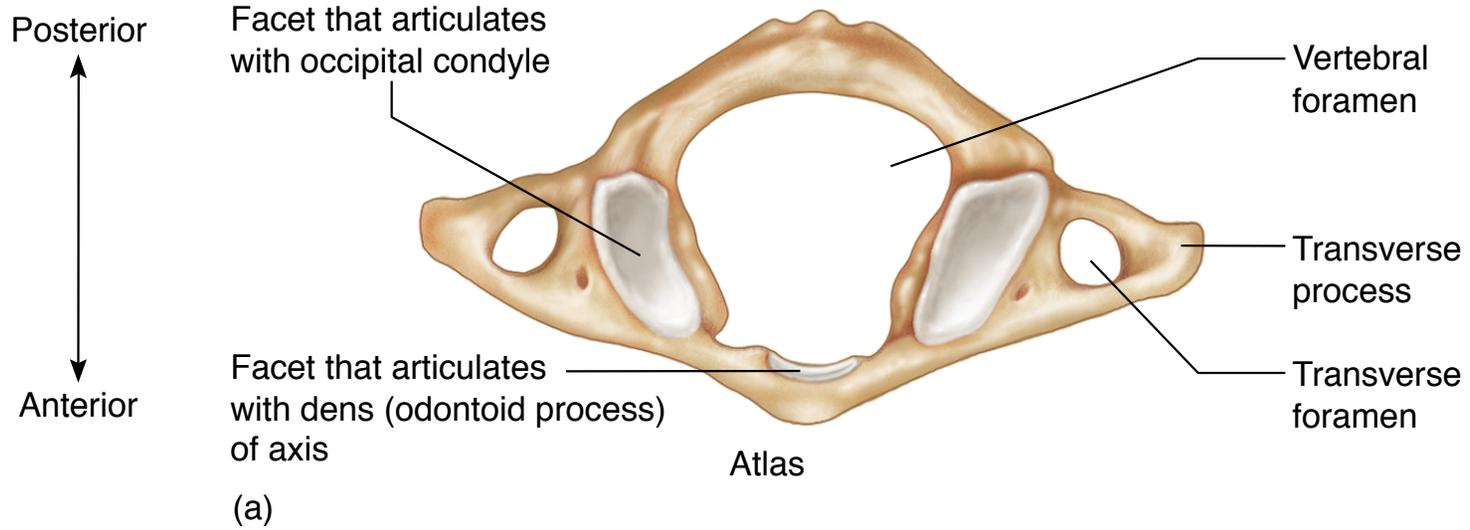
(b) Thoracic vertebra



(c) Lumbar vertebra

Fig07.19

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F. Sacrum

1. The sacrum is a triangular structure at the base of the vertebral column made up of five vertebrae fused together into one bone.
2. Features include a ridge of tubercles, posterior sacral foramina, sacral canal, sacral hiatus and four pairs of anterior sacral foramina.

E. Coccyx

1. The coccyx is the lowest part of the vertebral column and is typically composed of four fused vertebrae

Thoracic Cage

- A. The thoracic cage includes the ribs, thoracic vertebrae, sternum, and costal cartilages.
- B. It supports the pectoral girdle and upper limbs, protects the viscera in the thoracic and abdominal cavities and plays a role in breathing.

- C. Ribs normally humans have 12 pairs that attach to the thoracic vertebrae.
1. The first seven pairs of ribs are *true* (or vertebrosteral) *ribs* that join the sternum directly by their costal cartilages.
 2. The remaining five pairs are *false ribs* because that do not reach the sternum directly. The first three pairs join the cartilages of the seventh rib, and the last two pairs are *floating ribs*, because they have no cartilaginous rib attachments.

3. Features of a typical rib include a shaft, *head*, and *tubercle*.
 - a. The head articulates with the vertebra *facet* and the tubercle articulates with the transverse process of the vertebrae.
- D. Sternum (breastbone) is located along the anterior midline of the thoracic cage.
1. Its features include an upper *manubrium*, middle *body*, and lower *xiphoid process*.