

Divisions of the Skeletal System

- The human skeleton consists of roughly 206 named bones
- Grouped into two principal divisions:
 - Axial skeleton
 - Appendicular skeleton

Bones of the Axial Skeleton

- There are 80 bones in the central (axial) skeleton
- These bones comprise the:
 - Skull
 - Vertebral column (including the sacrum)
 - Ribs
 - Sternum

Bones of the Skull

- 8 Cranial Bones (Bones of the Braincase)
 - Frontal bone (1)
 - Parietal bone (2)
 - Temporal bone (2)
 - Occipital bone (1)
 - Sphenoid bone (1)
 - Ethmoid bone (1)
- 14 Facial Bones
 - Mandible (1)
 - Maxilla (2)
 - Zygomatic bone (2)
 - Nasal bones (2)
 - Lacrimal bones (2)
 - Palatine bones (2)
 - Inf. Nasal conchae (2)
 - Vomer (1)

Bones of the Skull

- Fontanelles ("little fountains")
- soft, mesenchyme-filled spaces between cranial bones in babies.
- They become suture joints in adults
- Allow for skull bone movement during birth and rapid brain growth during early childhood

Bones of the Skull

- Besides protecting the brain, the skull provides a framework for:
 - Attachment of muscles that move various parts of the head
 - Attachment for muscles that produce facial expressions
- The facial bones form the framework of the face and provide support for the entrances to the digestive and respiratory systems.

The Vertebral Column

- There are 7 cervical vertebrae
 - the neck region labeled C1-C7 .
- There are 12 thoracic vertebrae—articulate with the ribs (T1-T12).
- There are 5 lumbar vertebrae
 - support the lower back labeled L1-L5
- The sacrum and coccyx
 - single bones that result from the fusion of several vertebrae.

The Vertebral Column

- When viewed from the front, a normal adult vertebral column appears straight.
- When viewed from the side, it has four slight bends which constitute the normal spinal curvatures.

The Vertebral Column

- The cervical vertebrae comprise the bony spine in the neck:
 - C1 is called the Atlas because it holds up the head
 - Named for the Titan of Greek mythology that supported the world.
 - C2 is called the Axis because it provides a pivot, allowing the head to turn on the neck.

The Vertebral Column

- Because the lumbar vertebrae (5) bear greater loads, they are much more stout than their superior cousins (the cervical and thoracic vertebrae).

The Thorax

- The thoracic cage is the final part of the axial skeleton.
- In addition to the thoracic vertebrae, it is formed from:
 - The sternum
 - The ribs and costal cartilages
- Its functions are to enclose and protect the organs in the thoracic and abdominal cavities:
 - Provide support for the bones of the upper limbs
 - Play a role in breathing



The Thorax

- The bottom 5 pairs of ribs (and this number can vary from one individual to another) are called false ribs.
- Pairs 8–10 also called vertebrochondral ribs
- Attach indirectly to sternum by joining costal cartilage of rib above
- Pairs 11–12 also called vertebral (floating)ribs
- No attachment to sternum

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Divisions of the Skeletal System

- The axial skeleton
- consists of the bones that lie around the longitudinal axis of the human body:
- Skull bones, auditory ossicles (ear bones), hyoid bone, ribs, sternum (breastbone), and bones of the vertebral column
- The appendicular skeleton
- consists of the bones of the upper and lower limbs (extremities) and the bones forming the girdles that connect the limbs to the axial skeleton.

Bones of the Skull

- The skull protects and supports the brain and special sense organs.
- Besides forming the large cranial cavity, the skull also forms several smaller cavities.
- Nasal cavity
- Orbits (eye sockets)
- Paranasal sinuses
- Small cavities which house organs involved in hearing and equilibrium

Bones of the Skull

- The braincase (neurocranium) has 8 bones:
- frontal,
- occipital (not shown)
- ethmoid
- sphenoid bone
- paired temporal
- parietal bones.

Bones of the Skull

The paranasal sinuses are prominent features of the frontal bone, ethmoid bone, sphenoid bone, and maxillary bones.

Hyoid Bone

- Not a bone of skull
- Does not articulate directly with another bone
- Movable base for tongue
- Site of attachment for muscles of swallowing and speech

The Vertebral Column

From the cervical region to the sacrum, each vertebra has a large central hole, or vertebral foramen in which the spinal cord can travel.

- At each segmental level, on both the right and left sides, an intervertebral foremen is formed for the exiting spinal nerves.

Vertebral Column

- Relative to the dorsal view of the body, the cervical and lumbar curves are concave(cupping in),
- The thoracic and sacral curves are convex(bulging out).

The Vertebral Column

- Without these first two specialized cervical vertebra, the head-on-neck range of motion would be very limited.



The Vertebral Column

- The sacrum is a single triangular body formed from a fusion of 5 separate vertebrae in-utero (during fetal development).

The Thorax

- The sternum or "breastbone" is located anteriorly in the center of the thoracic wall.
 - Consists of the manubrium, body, xiphoid process
- The 12 pairs of ribs give structural support to the sides of the thoracic cavity.
- The costal (having to do with the ribs) cartilages are bars of hyaline cartilage connecting the sternum to the ribs.
 - Contribute to the elasticity of the thoracic cage

Bone Markings

- Bones have characteristic surface markings
 - structural features adapted for specific functions.
- There are two major types of surface markings:
 - Depressions and openings
- Allow the passage of blood vessels and nerves
- Form joints
 - Processes
- Projections or outgrowths that form joints
- Serve as attachment points for ligaments and tendons

Bones of the Skull

- The bones of the skull are grouped into two categories:
 - Cranial bones
 - Facial bones

Bones of the Skull

- A suture is a "seam" – an immovable joint typically found between bones of the skull.
- Sagittal suture not shown but found between superior aspect of parietal bones

Bones of the Skull

- With the exception of the ethmoid sinuses, the other paranasal sinuses are paired.
 - They are lined with mucus membranes that humidify and warm the air.
 - Reduce weight in the skull
 - Help to resonate the sound of our voice

The Vertebral Column

- The spine is composed of a series of bones called vertebrae.
- Vertebrae typically consist of:
 - A body (weight bearing)
 - A pedicle and lamina forming the vertebral arch (surrounds the spinal cord)
 - Processes (points of attachment for muscles)

The Vertebral Column

- A tough fibrocartilage intervertebral disc is found between the bodies of adjacent vertebrae.
 - It functions to absorb vertical shock and helps form joints which are strong yet still permit movement of the spine.

Intervertebral Discs

- Cushion like pad composed of two parts–Nucleus pulposus
- Inner gelatinous nucleus
- Gives disc its elasticity and compressibility
 - Anulus fibrosus
- Outer collar composed of collagen and fibrocartilage

The Vertebral Column

- Various conditions may exaggerate the normal spinal curves, sometimes causing severe disability.
 - scoliosis, kyphosis, lordosis

The Vertebral Column

- Below the neck, each of the 12 pairs of thoracic vertebrae articulate with a rib to form the posterior part of the thoracic cage.

The Vertebral Column

- The coccyx, commonly referred to as the tailbone, is the final segment of the bony spine.
 - It is also an in-utero fusion of 3–5 separate vertebrae.

The Thorax

- The upper 7 rib pairs are called true ribs because they attach "directly" to the sternum (with just a small piece of costal cartilage).

