Anatomy of Human Skeleton

1-The Axial Skeleton:

-Skull - Hyoid bone

-Vertebral column -Thoracic (rib) cage

2-Appendicular skeleton

-Limbs -Girdles

Bone description is for practical only

The skull

Overview of Skull Geography

►The cranium serves to:

- Enclose brain
- Provide attachment sites for some head and neck muscles
- Formed of frontal,2 parietal,and occipital bones.These bones are connected by fibrous joints (sutures)

►Facial bones:

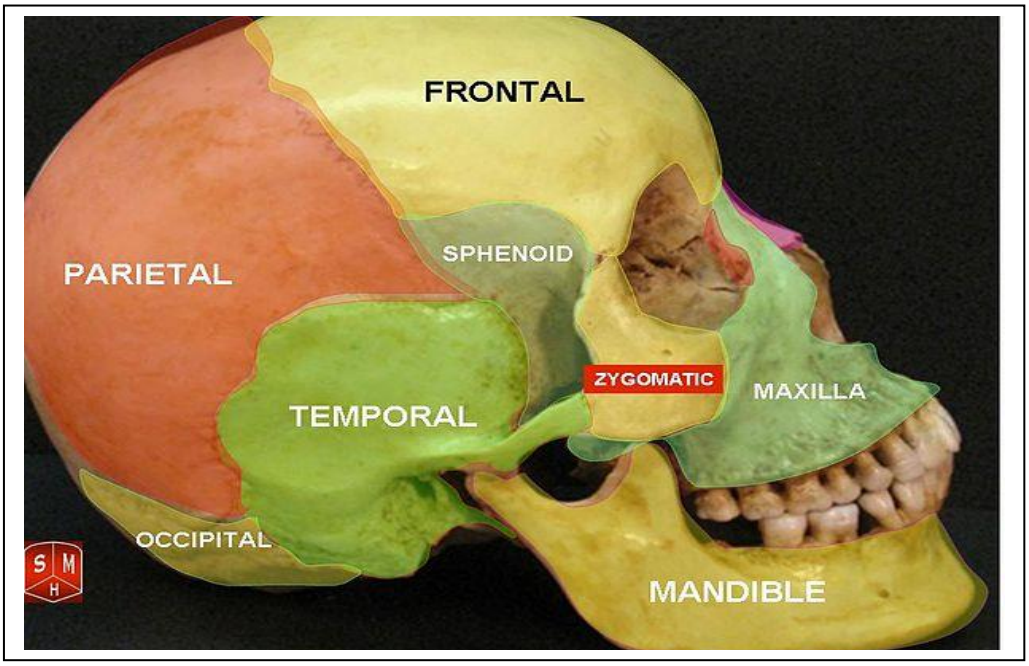
They are Nasal bone,zygomatic bone and maxilla

serve to:

- Form framework of the face
- Form cavities for the sense organs of sight, taste, and smell
- Provide openings for the passage of air and food
- Hold the teeth in place
- Anchor muscles of the face

►The skull contains smaller cavities:

- **Middle** and **inner ear cavities** – in lateral aspect of cranial base
- **Nasal cavity** – lies in and posterior to the nose
- **Orbits** – house the eyeballs
- **Air-filled sinuses** – occur in several bones around the nasal cavity (pneumatic bones).



Vertebral column

►**Extension:**The column extends from the base of the cranium (skull) to the tip of the coccyx.

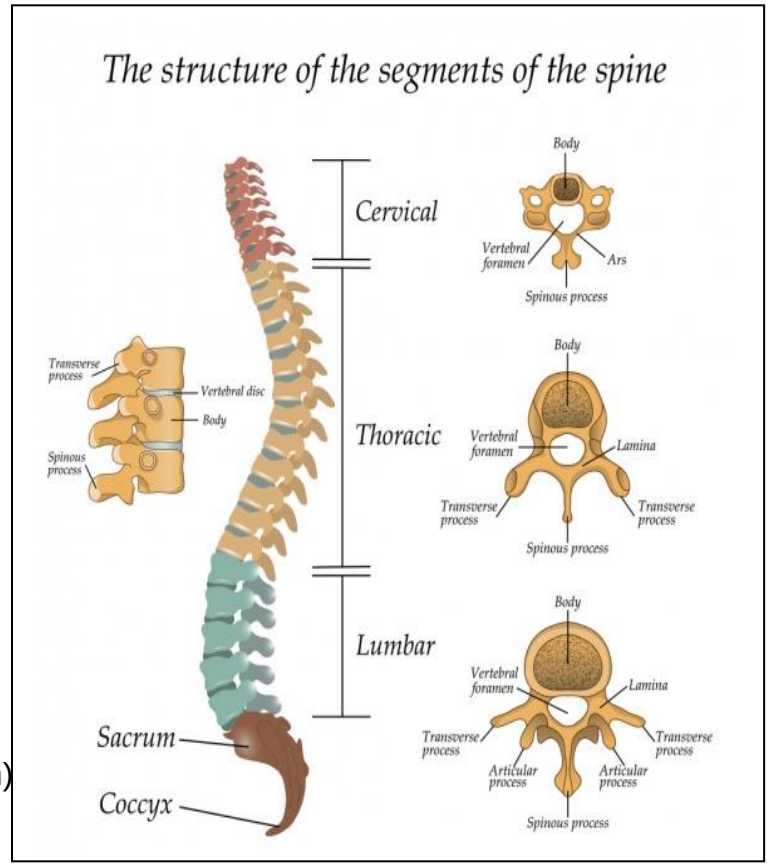
►**Function:**In addition to protecting the spinal cord, the column supports the weight and transmits it to the pelvis and lower limbs.

Length: In adults, it is 72–75 cm long, of which approximately one quarter is formed by the IV discs that separate and bind the vertebrae together.

►Curvatures of the spine

●In utero, the spinal column develops with a single mild curvature in the median plane which is convex when viewed from a posterior position.

●During infancy, extra curvatures develop. cervical and lumbar curvatures are c (lordosis).



►Regions

-Cervical (7 vertebrae)
-Thoracic (12 vertebrae)
-Lumbar (5 vertebrae)
-Sacral bone (1)
-Coccygeal bone (1)

►Parts

-Vertebral body
-Vertebral foramen
-Vertebral arch
-Sup.and inf.articular processes
-Transverse process
-Articular facets for rib (thoracic region)
-Spinous process

►Structure of the vertebrae

- Vertebrae from different parts of the vertebral column share certain key features :

-The **vertebral body** is the most anterior part of a vertebra and is critical for weight-bearing and support.

-From the posterior aspect of each vertebral body arises a **vertebral arch** which completely encloses the vertebral foramen containing the spinal cord.

- The arch comprises two pedicles—short processes arising from either side of the vertebral body, connected by a single lamina.

-On either side of the vertebral arch there is a bony spinous projection (**transverse process)** and a spinous process arises from the peak of the two laminae. It projects inferiorly and overlaps the vertebral bone below.

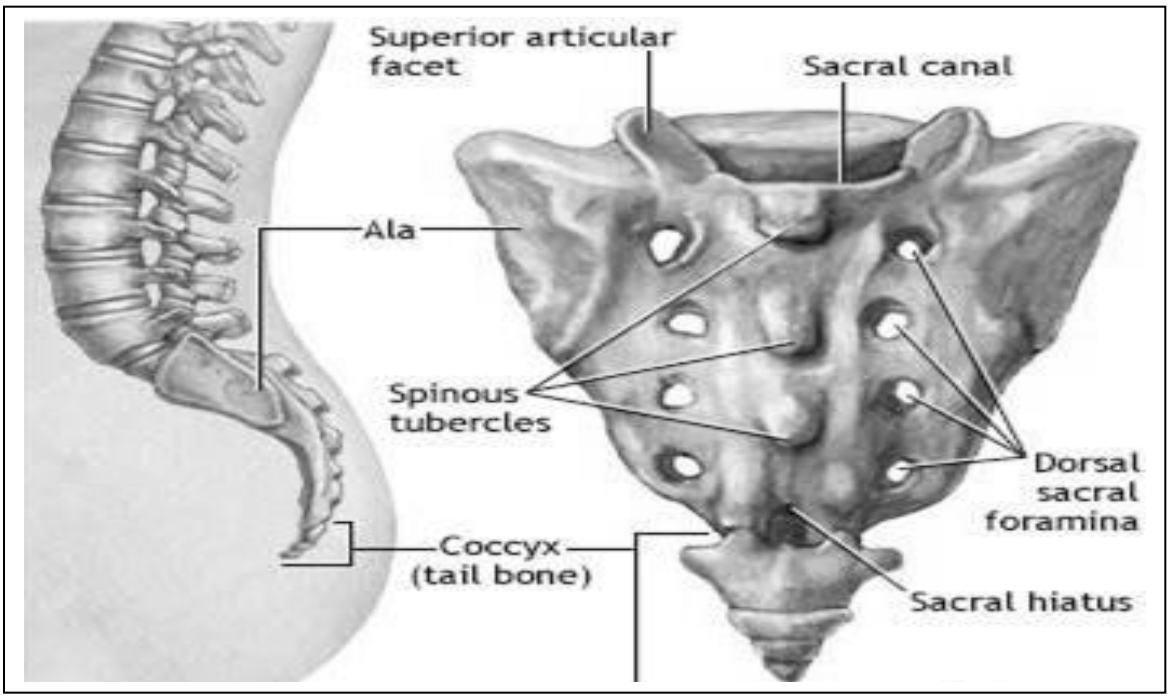
-**Superior and inferior articular processes** are found at each join between the laminae and pedicles and these articulate with the corresponding processes on the vertebral bodies immediately above and below.

►Sacrum

-The wedged-shaped sacrum is usually composed of five fused sacral vertebrae in adults . It is located between the hip bones and forms the roof and posterior wall of the pelvic cavity.

- The sacral canal is the continuation of the vertebral canal in the sacrum

-It contains dural sac(ends at S2) and filum terminl (extention of pia matter).



The coccyx (tailbone) :

It is a small triangular bone that is usually formed by fusion of the four rudimentary coccygeal vertebrae.

-The coccyx is the remnant of the skeleton of the embryonic tail-like caudal eminence, which is present in human embryos from the end of the 4th week until the beginning of the 8th week

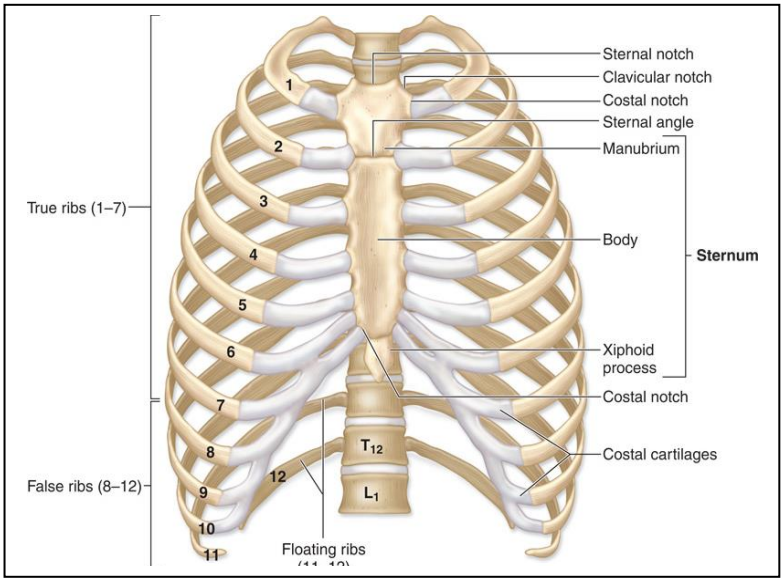
Thoracic Cage and Sternum

►Parts:

●Thoracic vertebrae (12 segments)

●Ribs (12 pair) ,they are
a-True ribs (1st-7th ribs),attached to the sternum
b-False ribs

●Sternum (manubrium, body).



Appendicular skeleton

-The primary function is movement. It includes bones of the upper and lower limbs.Girdles attach the limbs to the axial skeleton.

The Pectoral Girdle:

-Consists of the clavicle and the scapula

-Pectoral girdles do not quite encircle the body completely

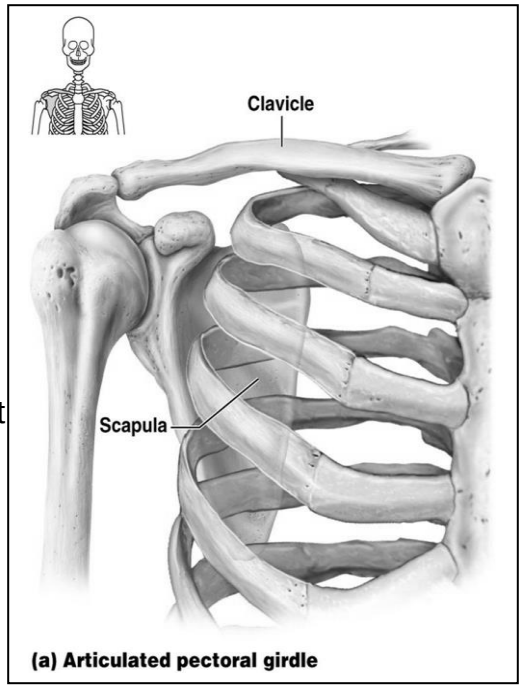
-Medial end of each clavicle articulates with the manubrium and first rib

-Laterally – the ends of the clavicles join the scapulae

-Scapulae do not join each other or the axial skeleton

-Pectoral girdle provides attachment for many muscles that move the upper limb .

- -Only clavicle articulates with the axial skeleton



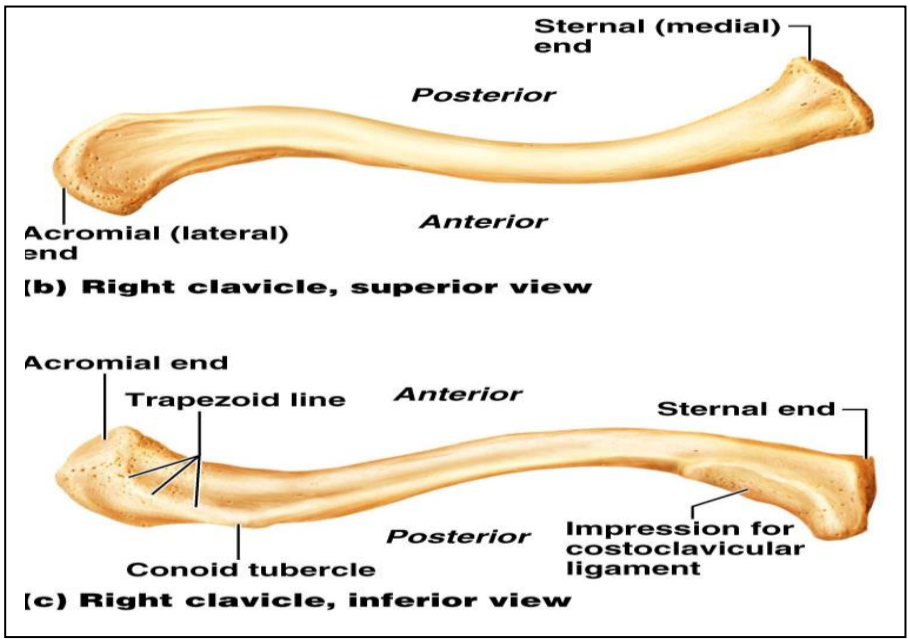
Clavicle

Function:

-Provide attachment for muscles
-Hold the scapulae and arms laterally
-Transmit compression forces from the upper limbs to the axial skeleton.

General features:

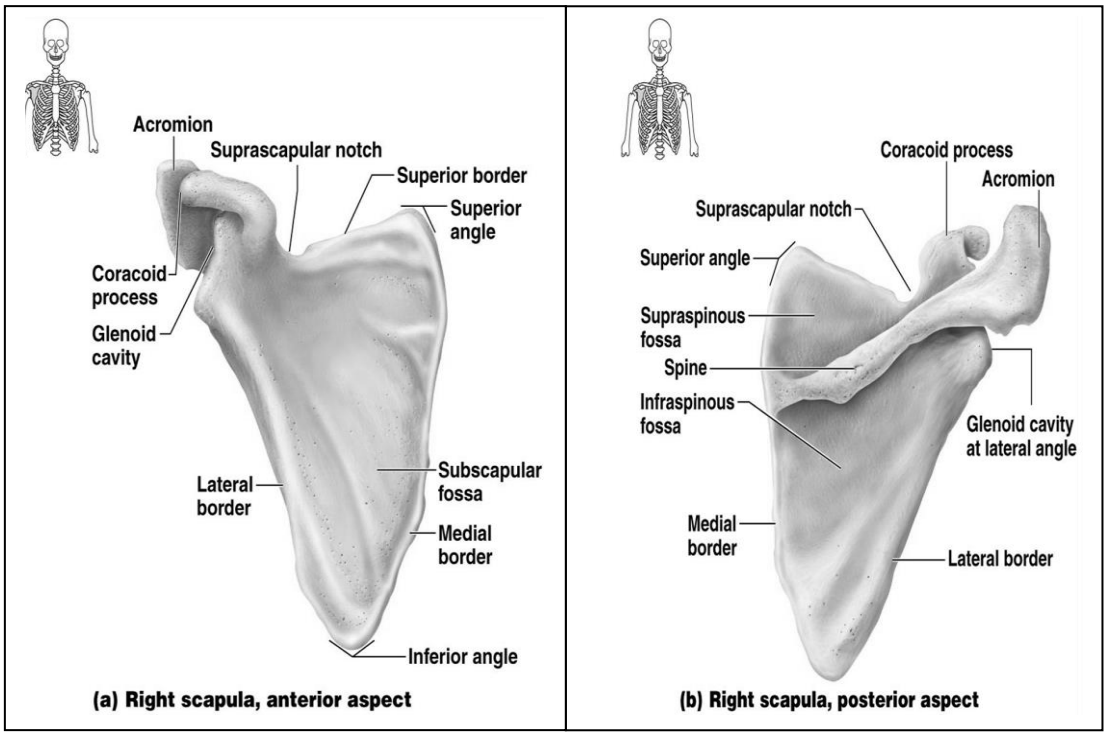
-The clavicle (collar bone) connects the upper limb to the trunk . The shaft of the clavicle has a double curve in a horizontal plane.
–Its medial half is convex anteriorly, and its sternal end is enlarged and triangular
-where it articulates with the manubrium of the sternum at the sternoclavicular (SC) joint (synovial joint) .
-Its lateral half is concave anteriorly, and its acromial end is flat where it articulates with the acromion of the scapula at the acromioclavicular (AC) joint .
The medial two thirds of the shaft of the clavicle are convex anteriorly, whereas the lateral third is flattened and concave anteriorly.



Scapula

-The scapula (shoulder blade) is a triangular flat bone that lies on the posterolateral aspect of the thorax, overlying the 2nd‑7th ribs..
-The convex posterior surface of the scapula showsis unevenly divided by, **the spine** of the scapula,
-The spine continues laterally as the flat, expanded **acromion.**
-Superolaterally, the lateral surface of the scapula has a **glenoid cavity ,** which receives and articulates with the head of the humerus at the shoulder joint (synovial).

-The beak-like **coracoid process** is superior to the glenoid cavity, and projects anterolaterally.



The Humerus

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The only bone of the arm.It Articulates with the scapula at the shoulder and articulates with the radius and ulna at the elbow

-The spherical head of the humerus articulates with the glenoid cavity of the scapula.

-**The anatomical neck** of the humerus indicates the line of attachment of the shoulder joint capsule. -

-The inferior end of the humeral shaft widens as the medial and the lateral epicondyles.

-The distal end of the humerus—including the trochlea, capitulum, olecranon,coronoid, and radial fossae—makes up the condyle of the humerus .

Radius&Ulna

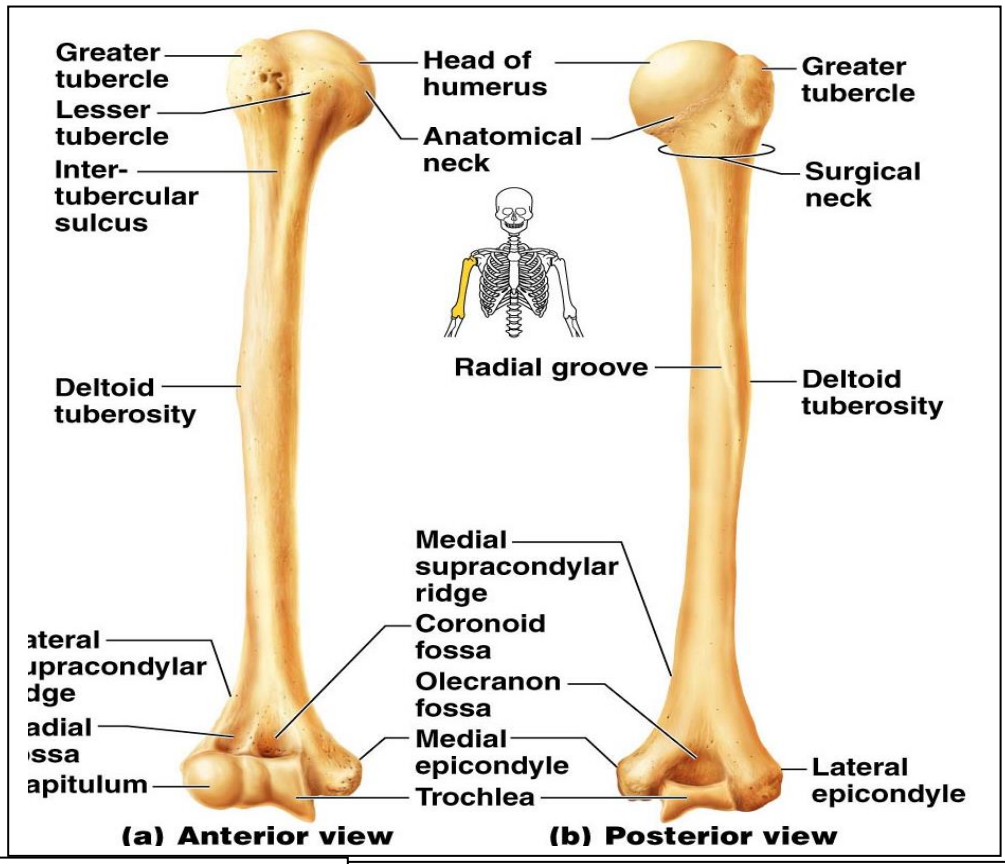
-Proximal ends articulate with the humerus

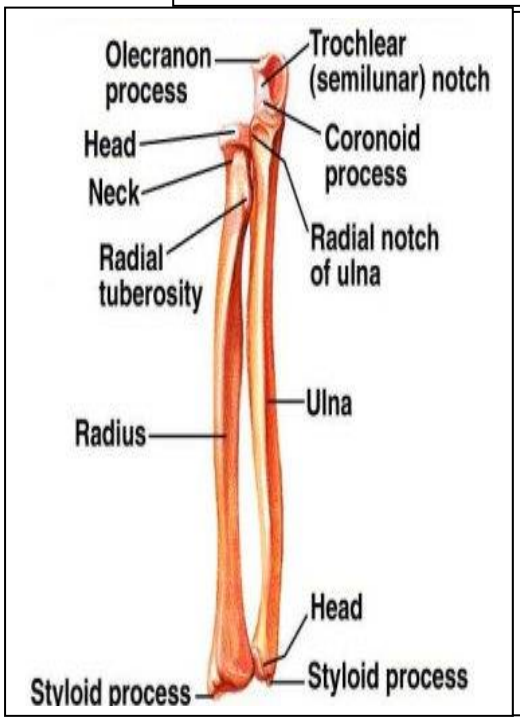
-Distal ends articulate with carpals

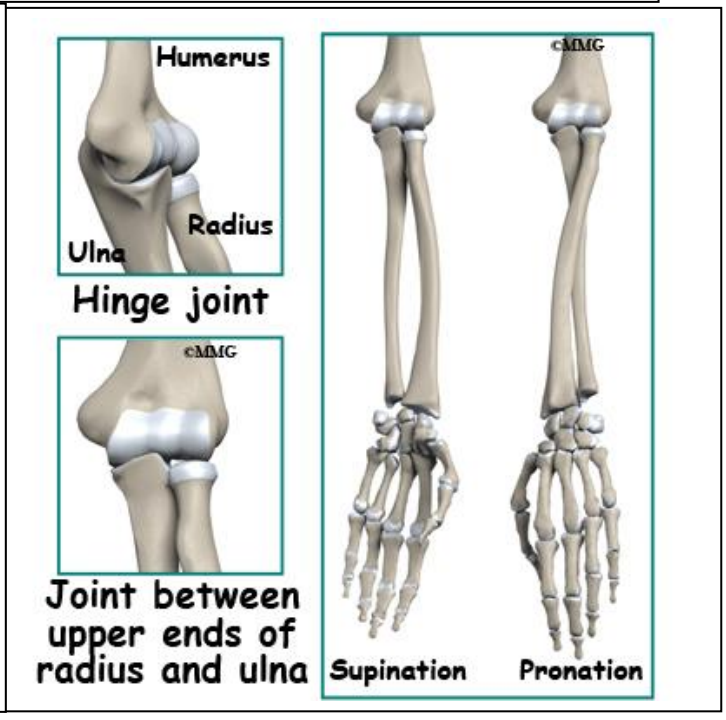
-Radius and ulna articulate with each other at the proximal and distal radioulnar joints

-The **interosseous membrane int**erconnects radius and ulna

-In anatomical position:the radius is lateral and the ulna is medial







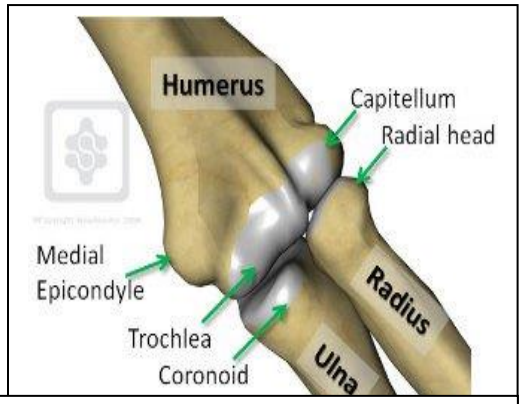
-The **ulna** is the stabilizing bone of the forearm and is the medial and longer of the two forearm bones.

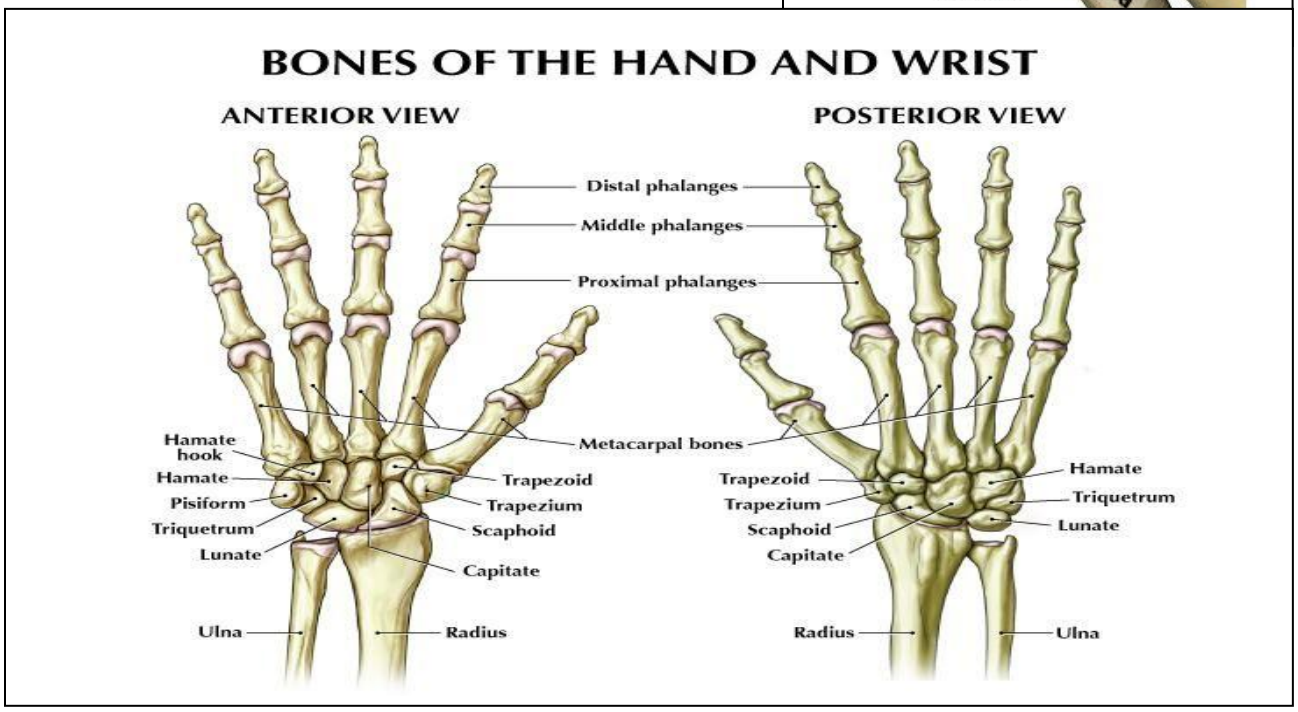
N.B:<u>The ulna does not participate in−the wrist (radiocarpal) joint.</u>

Bones of the hand:

-The carpus is composed of eight carpal bones, arranged in proximal and distal rows.

-The metacarpus forms the skeleton of the palm of the hand between the carpus and phalanges. It is composed of five metacarpal bones.





BONES OF LOWER LIMB

The skeleton of the lower limb (inferior appendicular skeleton) may be divided into two **functional components:**

►pelvic girdle:

−composed of the sacrum and right and left hip bones joined anteriorly at the pubic symphysis. -

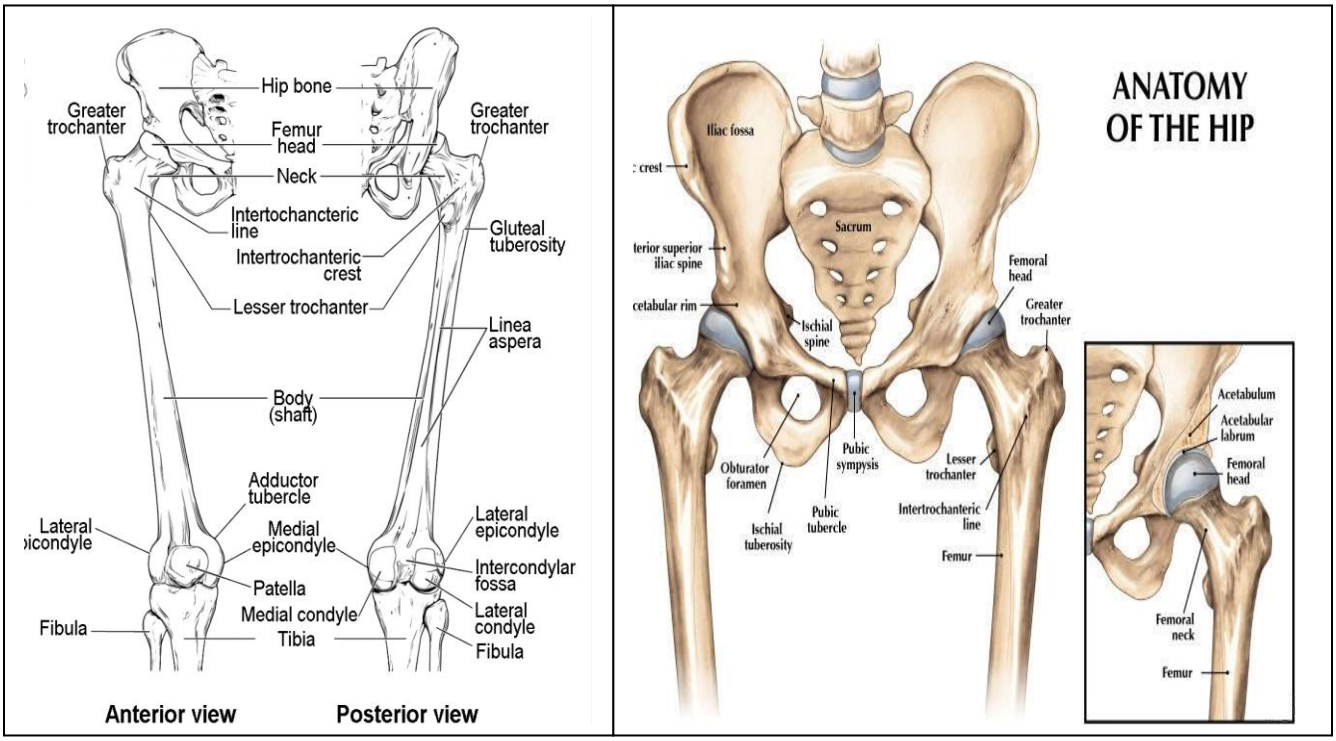
-It attaches lower limbs to the spine,Supports visceral organs and attaches to the axial skeleton by strong ligaments

- The mature hip bone is the large, flat pelvic bone formed by the fusion of three primary bones–ilium, ischium, and pubis.
The acetabulum is the large cup-shaped cavity or socket on the lateral aspect of the hip bone that articulates with the head of the femur to form the hip joint.

►The bones of the free lower limb

1-Femur

-The femur is the longest and heaviest bone in the body. It transmits body weight from the hip bone to the tibia when a person is standing . Its length is approximately a quarter of the person´s height. The femur consists of a shaft (body) and two ends, superior(proximal) and inferior (distal) ends.



The tibia

-articulates with the condyles of the femur superiorly and the talus inferiorly ,so it transmits the body's weight.
-articulates with the condyles of the femur superiorly (knee joint) and the talus inferiorly (Ankle joint) ,so it transmits the body's weight. The superior end shows medial and lateral condyles and tibial tuberosity
-The distal end of the tibia is smaller than the proximal end,it shows the medial malleolus .

-The fibula

-mainly functions as an attachment for muscles, but it is also important for the stability of the ankle joint.

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N.B:

The shafts of the tibia and fibula are connected by a dense **interosseous membrane** composed of strong oblique fibers descending from the tibia to the fibula (*tibiofibular syndesmosis*).

Bones of Foot

-The bones of the foot include the tarsus, metatarsus, and phalanges. There are 7tarsal bones, 5 metatarsal bones, and 14 phalanges.

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