General Anatomy

Lecture 4: Appendicular Skeleton (1): Bones of Upper Limb

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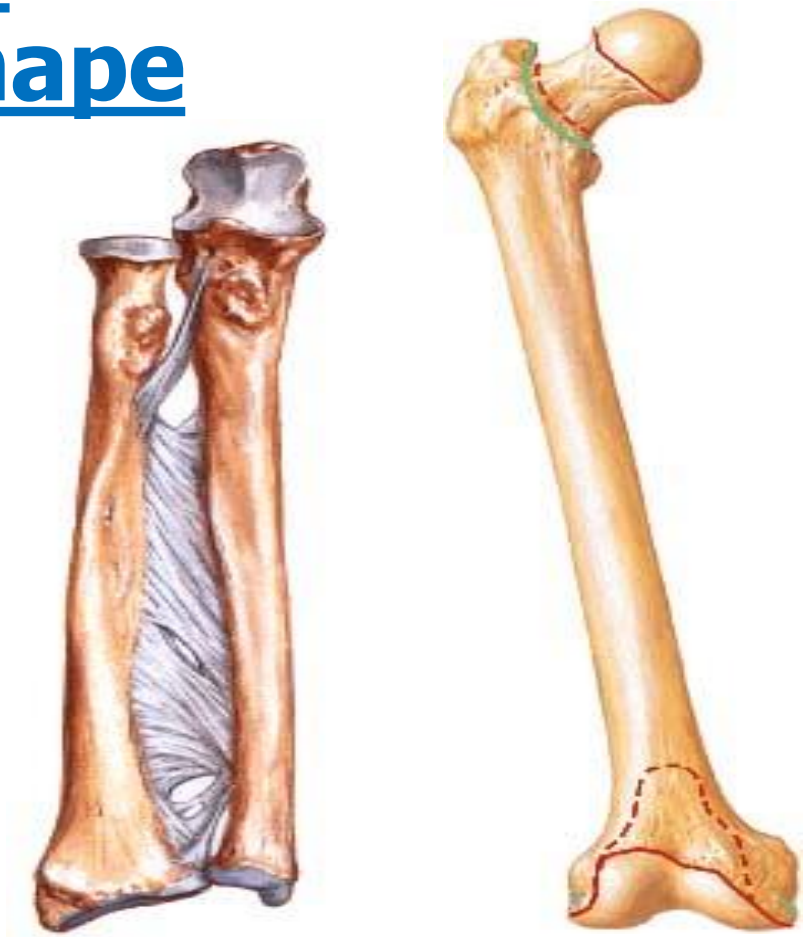
Classification of Bones

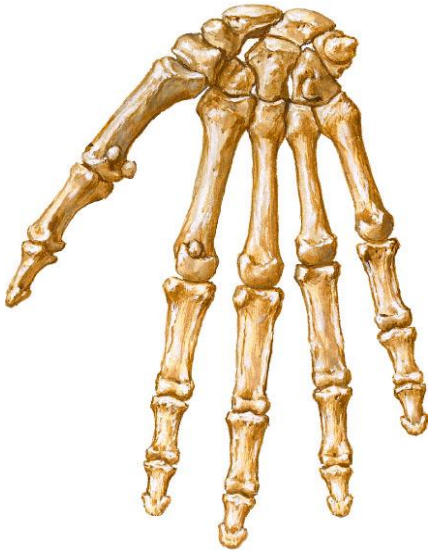
(A) Morphological (Anatomical) classification according to shape of bone:

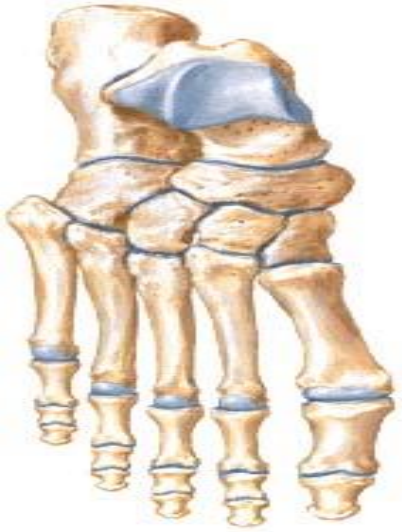
1. **Long bones: have 2 ends & a shaft as bones of proximal & intermediate segments of the limbs (humerus, radius, ulna, femur, tibia & fibula).**



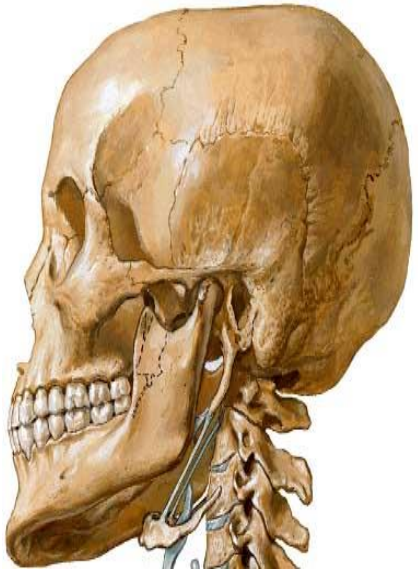
Classification of Bones (contd)

2. **Short bones:** as carpal & tarsal bones. These bones are strong & help in limited movements.

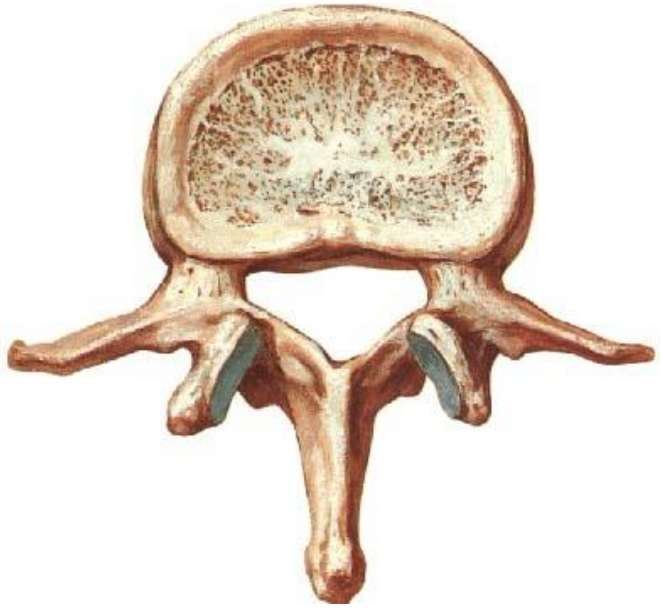




3. **Flat bones:** as scapula, sternum & skull cap. These have wide surface for muscle attachment or protection.

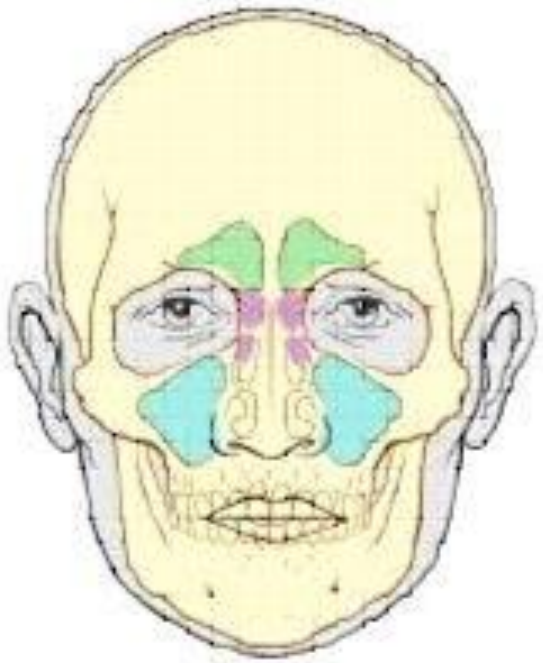


4. **Irregular bones: as vertebrae & hip bones.**



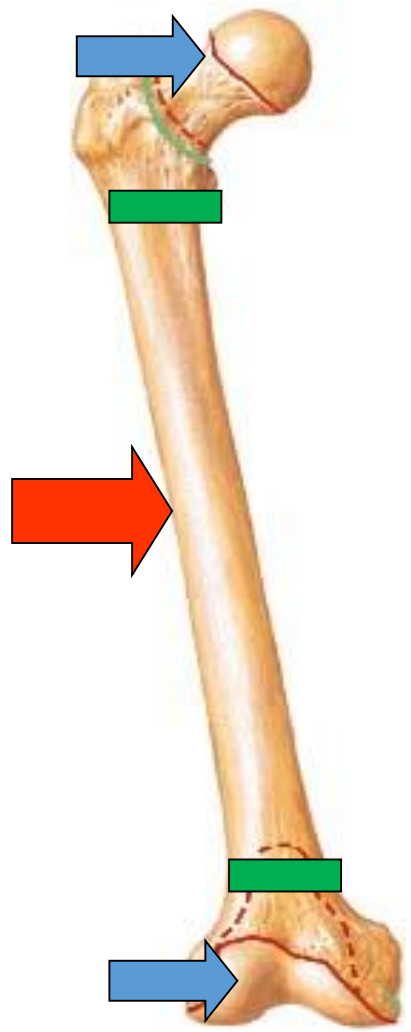
5. **Pneumatic bones: contain air-filled spaces lined with mucous membrane (paranasal sinuses) in skull bones (maxilla & frontal bones) to reduce the weight of skull, help in resonance of voice & warm air.**

6. **Sesamoid bone: are small nodules of bone found in the tendons of certain muscles to reduce friction over bony surfaces. e.g. patella & pisiform bones.**



@ Parts of a growing long bone:

1. 2 ends called epiphysis.
2. A shaft called diaphysis.
3. Epiphyseal plate of cartilage between the diaphysis & epiphysis. This is the most important factor for the growth of bone in length.
4. The part of the shaft close to the plate is called metaphysis.



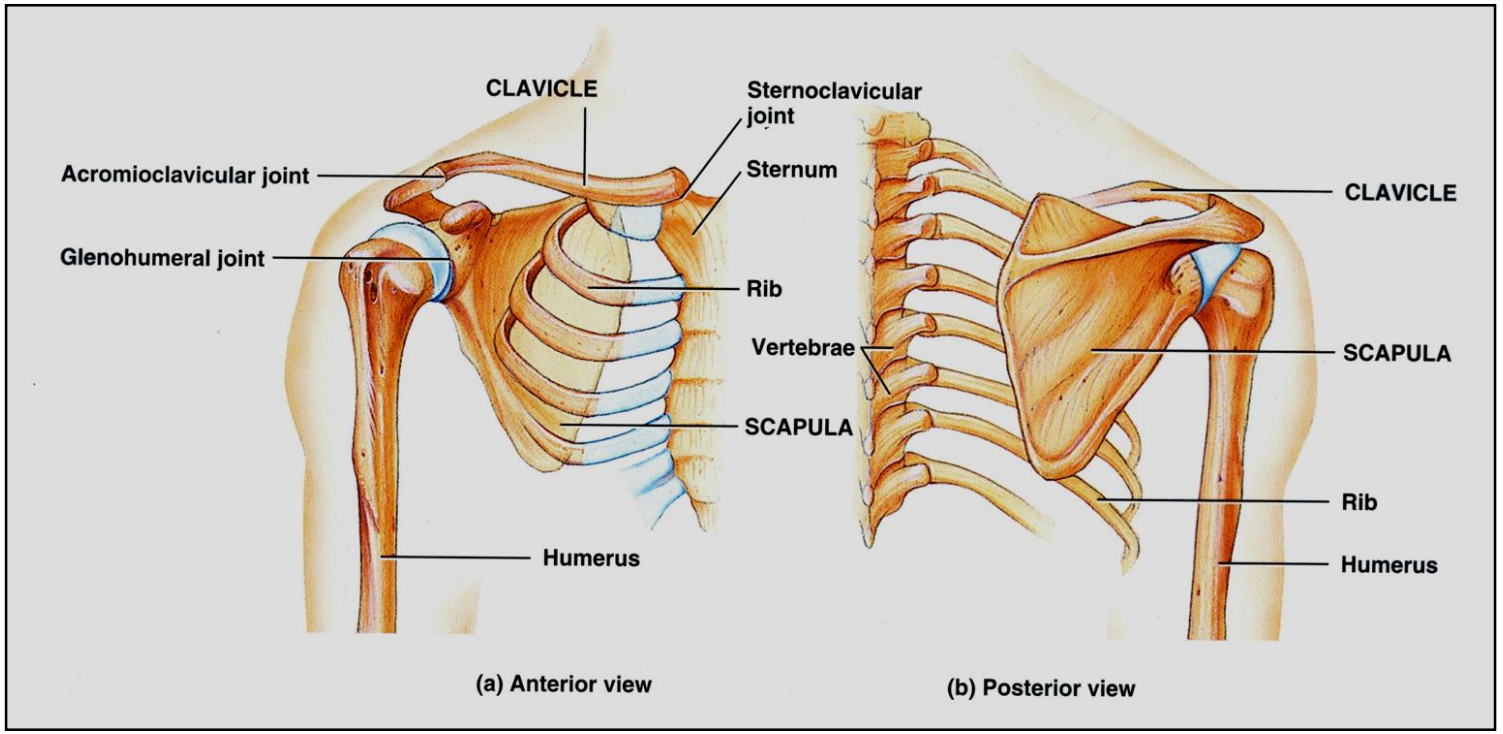
	The 2 ends	The shaft
1. Name:	epiphysis	diaphysis
2. Develops from:	2ry center of ossification	1ry center of ossification
3. Covered by:	Articular hyaline cartilage	Periosteum
4. Medullary (bone marrow) cavity:	Absent	Present
5. Formed of:	Spongy bone	Compact bone

Bones of Upper Limb

The Shoulder (Pectoral) Girdle

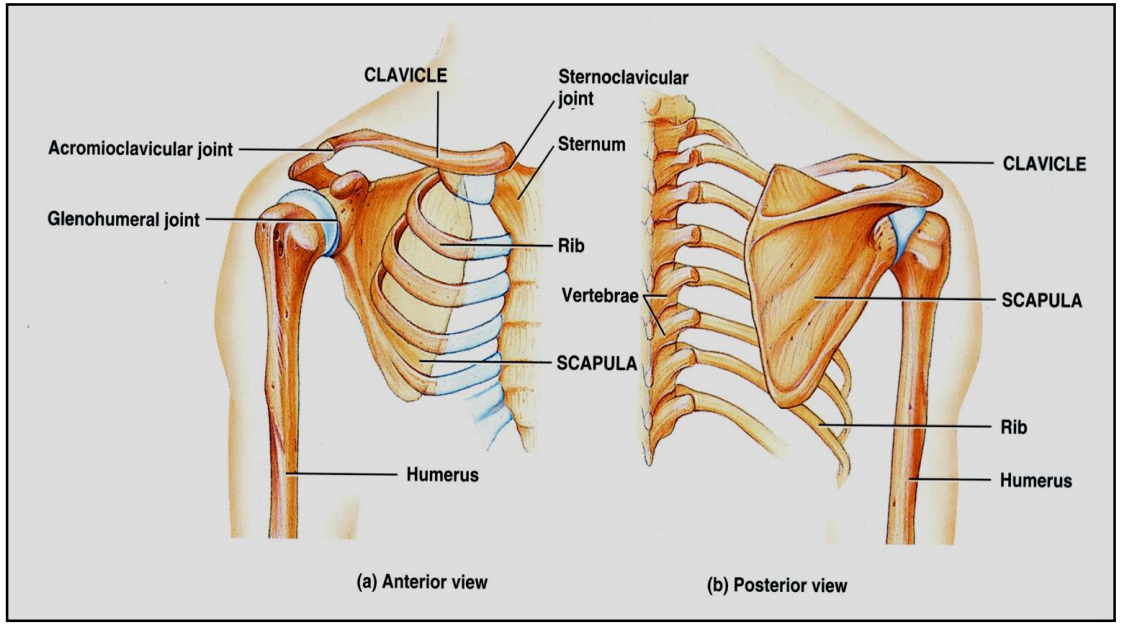
* It is formed by the bones that connect the axial skeleton (i.e. sternum) with the appendicular skeleton (i.e. Humerus or bone of arm).

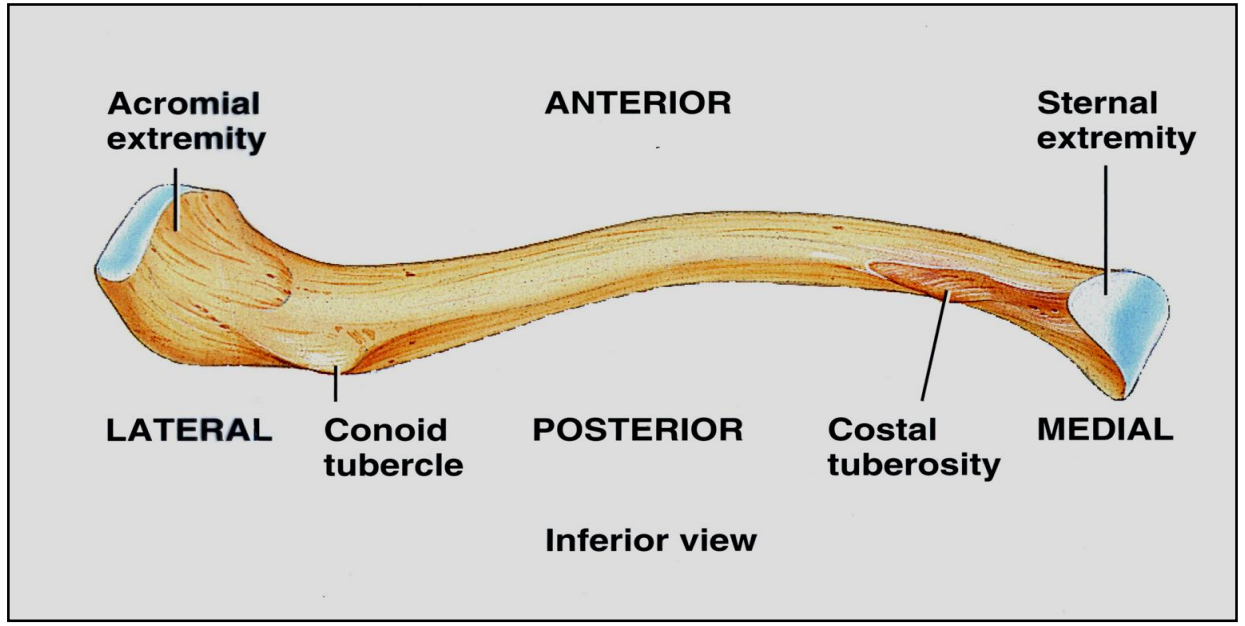
* It is formed of 2 bones: clavicle & scapula.



1. The Clavicle

* The clavicle is the anterior bone of pectoral girdle.
* It has two ends → medial and lateral.
* The medial end: is called the sternal end, it is rounded & articulates with manubrium part of sternum to form sterno-clavicular joint.
* The lateral end: is called acromial end, is broad and flat & articulates with the acromion process of scapula to form acromio-clavicular joint.



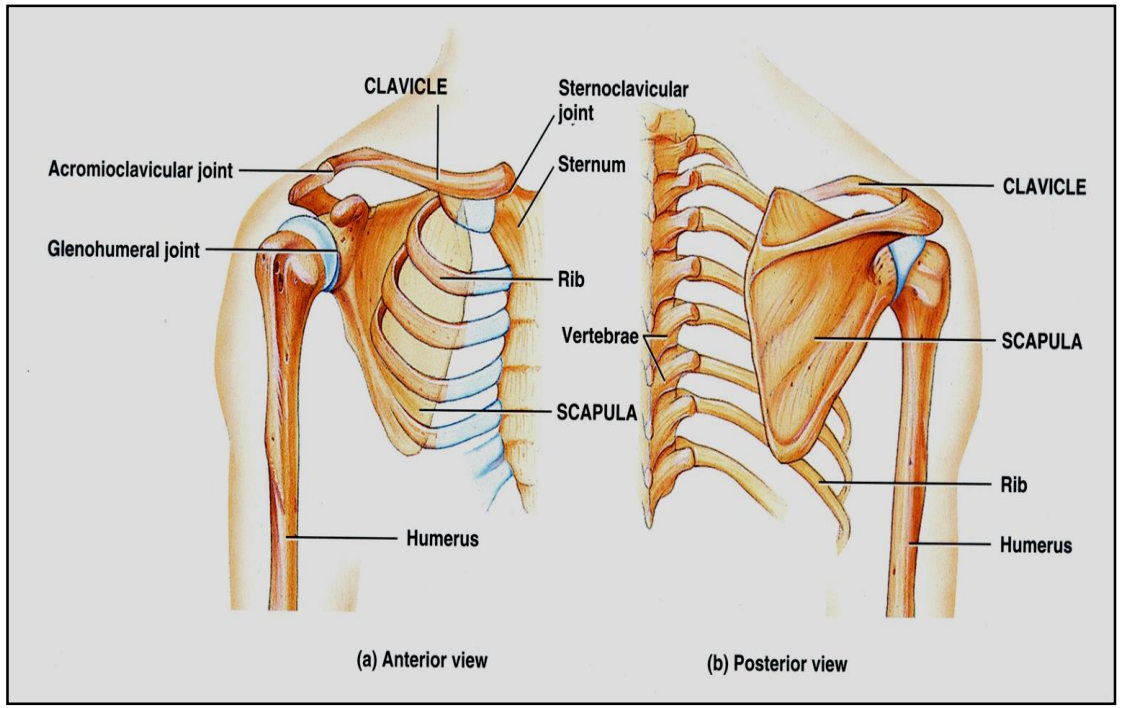


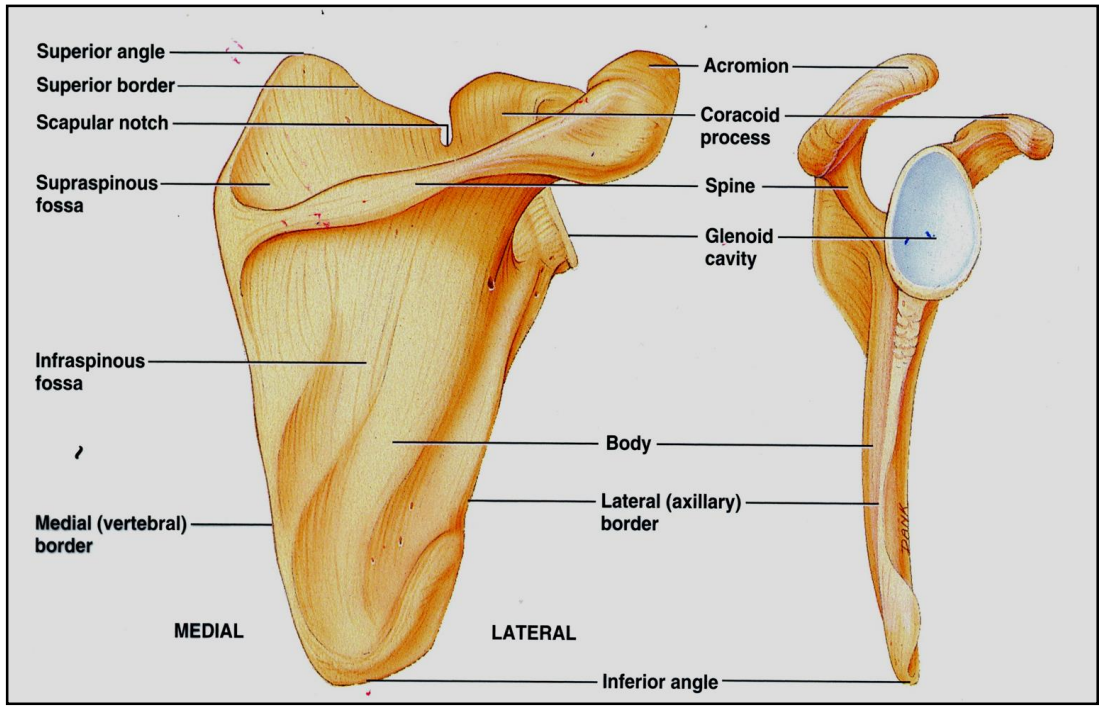
* The medial two-thirds of the clavicle is convex anteriorly, whereas the lateral one-third is concave anteriorly.

* The superior surface of the clavicle is smooth, whereas the inferior surface is rough.

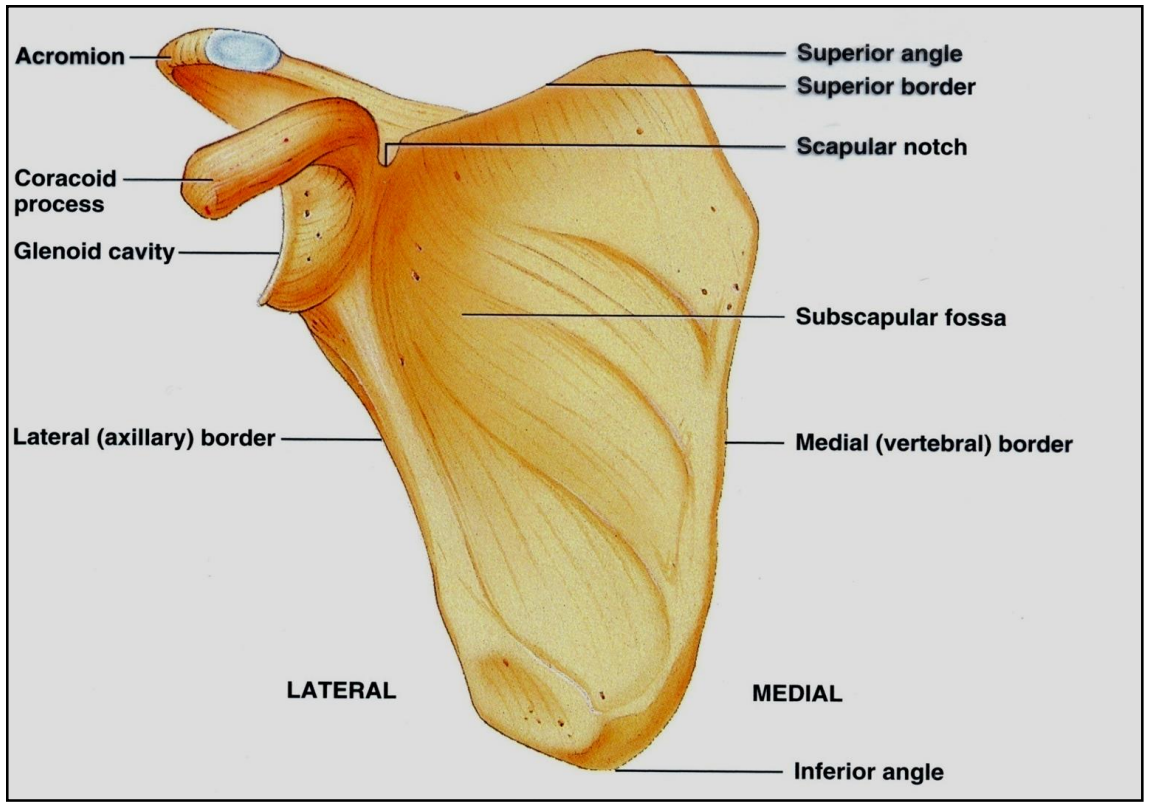
2. The Scapula

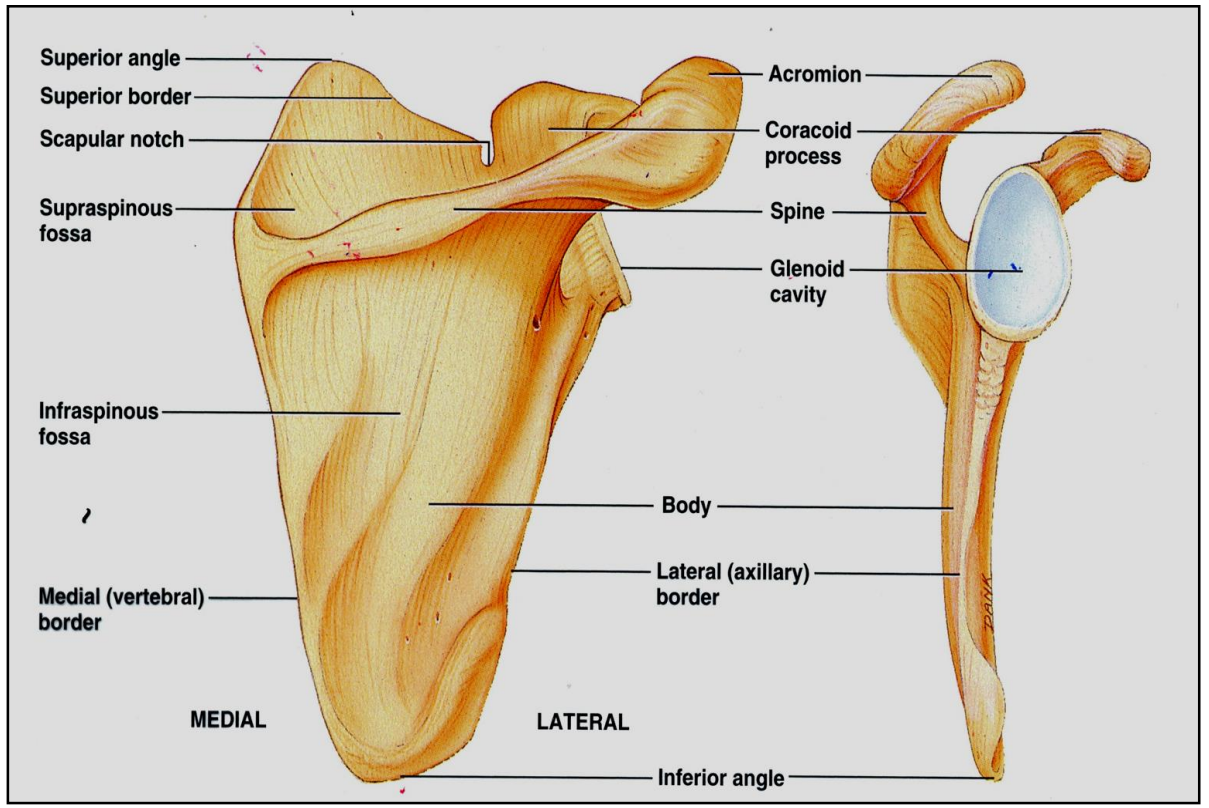
* The scapula is the posterior bone of pectoral girdle.
* It is a large, flattened, triangular bone.
* It lies on the posterior wall of thorax, overlapping the 2nd – 7th ribs.
* It has two surfaces: anterior (costal) and posterior.

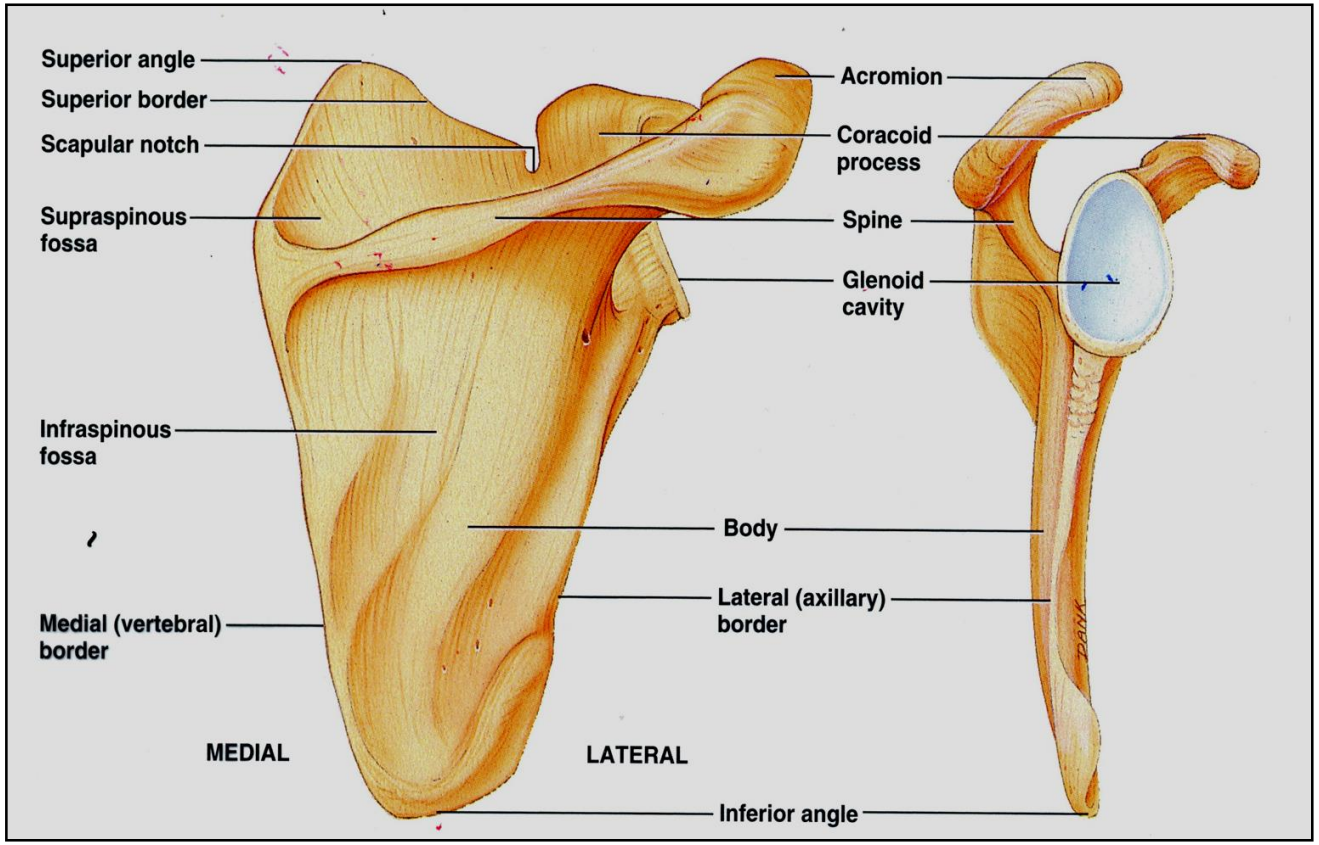




* It has three angles: superior, inferior & lateral.
* It has three processes: spine, acromion process & coracoid process.
* The costal (anterior) surface forms the subscapular fossa.

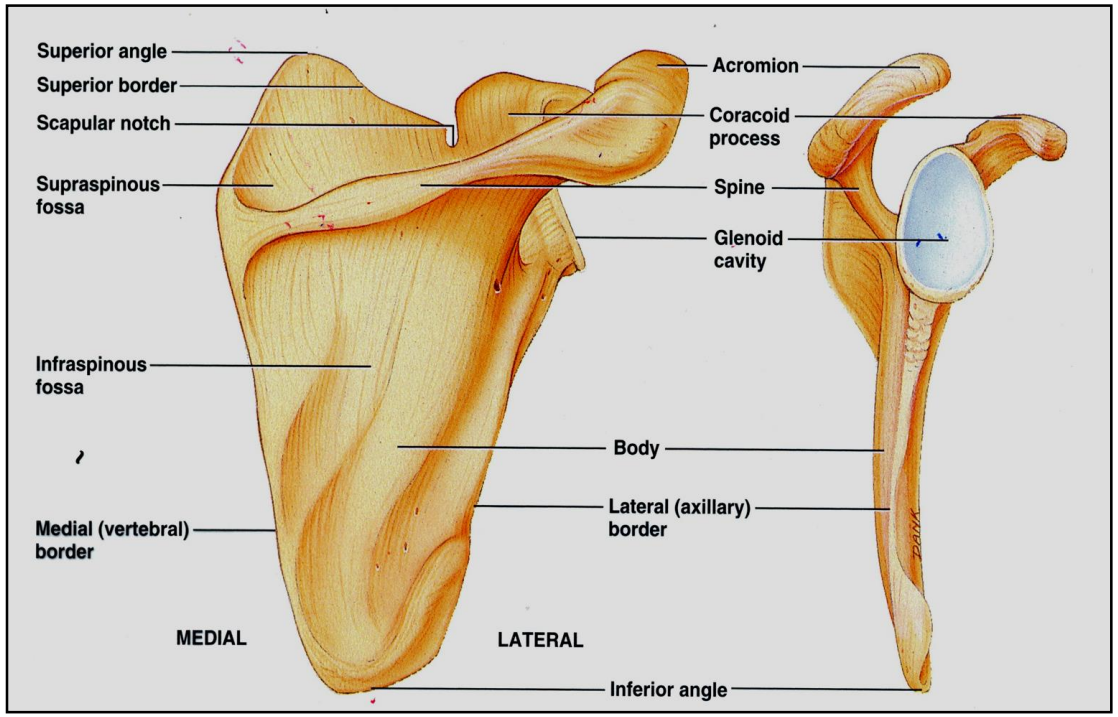


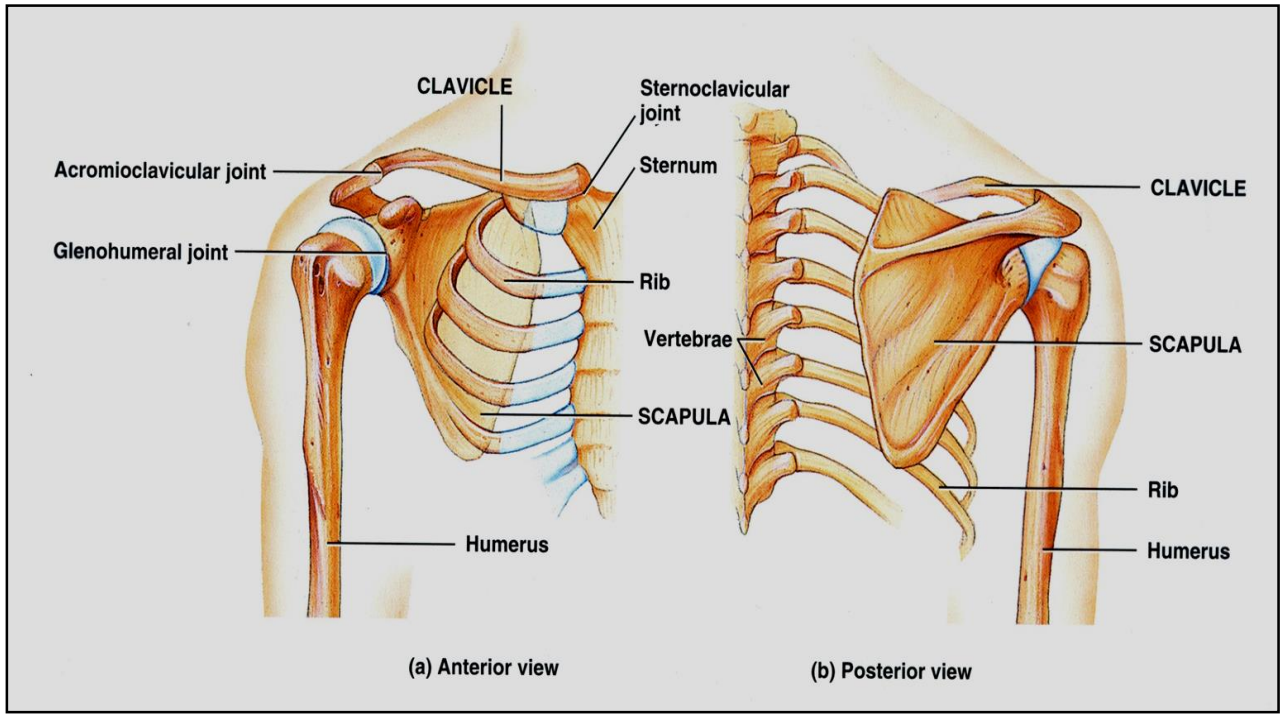




* The posterior surface is divided into a smaller upper area → the supraspinous fossa & a larger lower area → the infraspinous fossa, by a shelf-like projection, called the spine of the scapula.

* The lateral end of the spine projects as a flattened, expanded process called the acromion process.





* The coracoid process arises from lateral end of superior border.

* The lateral angle of the scapula presents the glenoid cavity for articulation with head of the humerus (in shoulder joint).

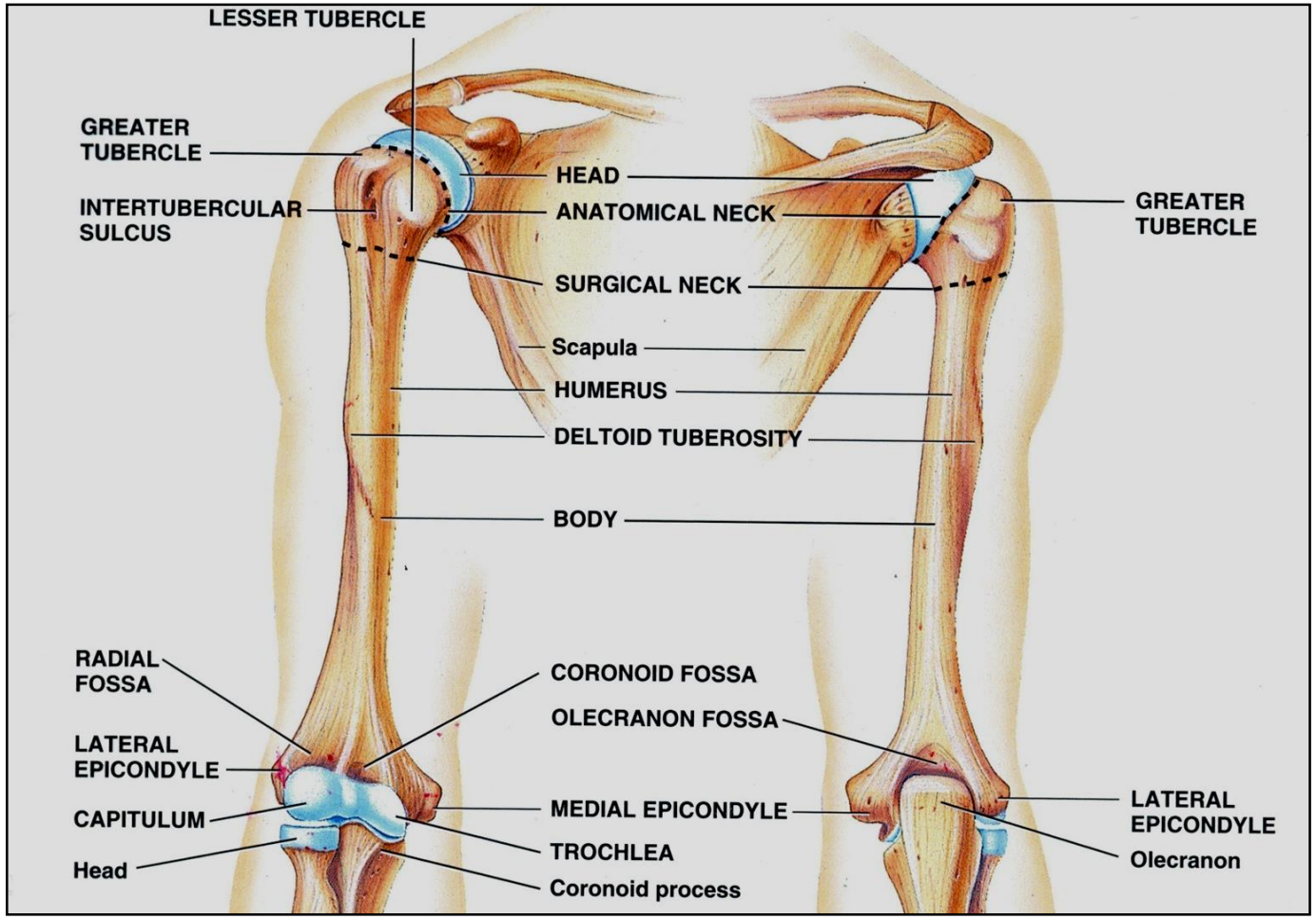
3. The Humerus

* This is the bone of the arm.

* It has an upper end, a shaft & a lower end.

A. The upper end: shows:

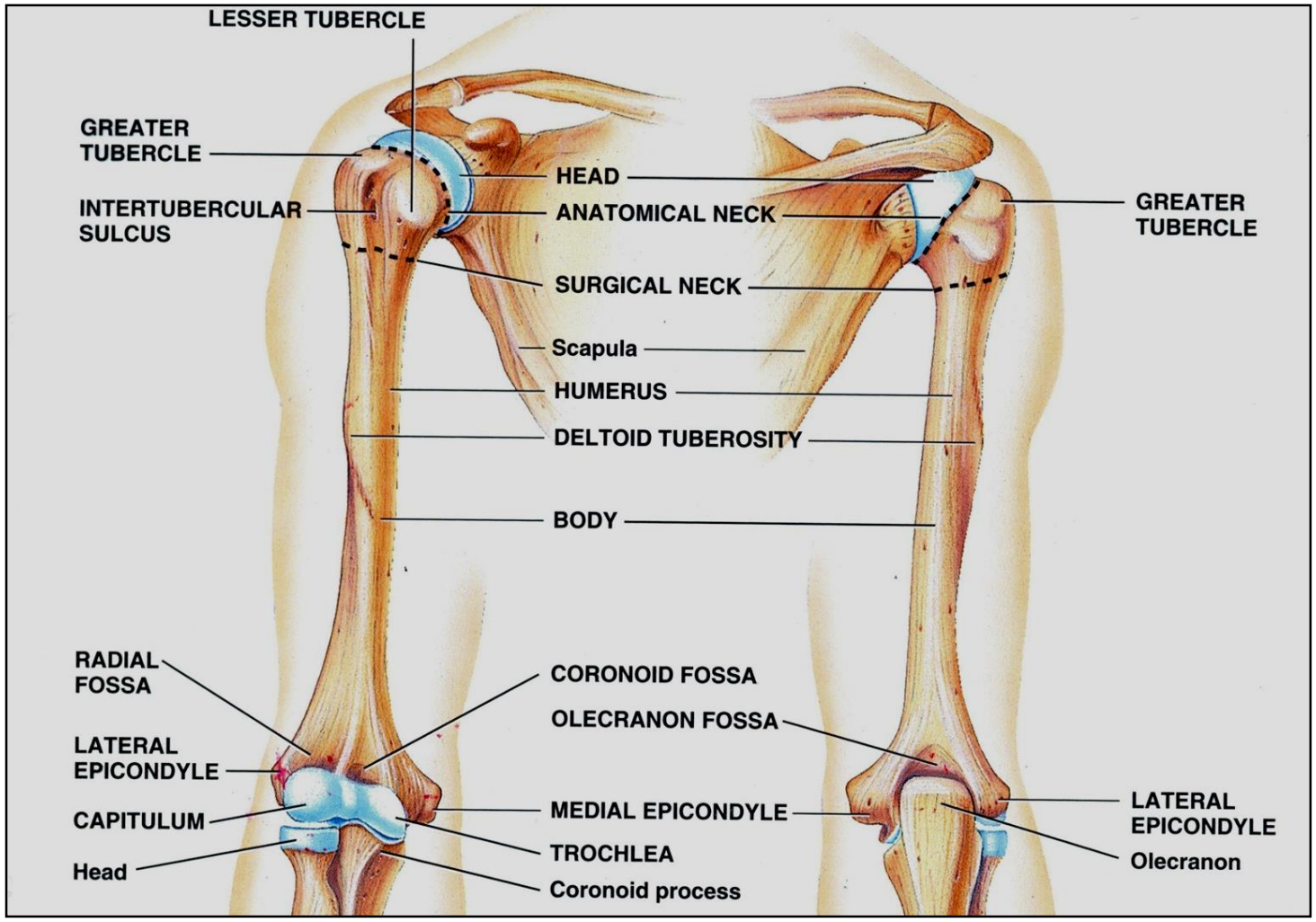
1. The head: which is less than half of a sphere. It articulates with the glenoid cavity of scapula to form shoulder (glenohumeral) joint.



2. The greater tuberosity (tubercle) → which is a lateral projection.

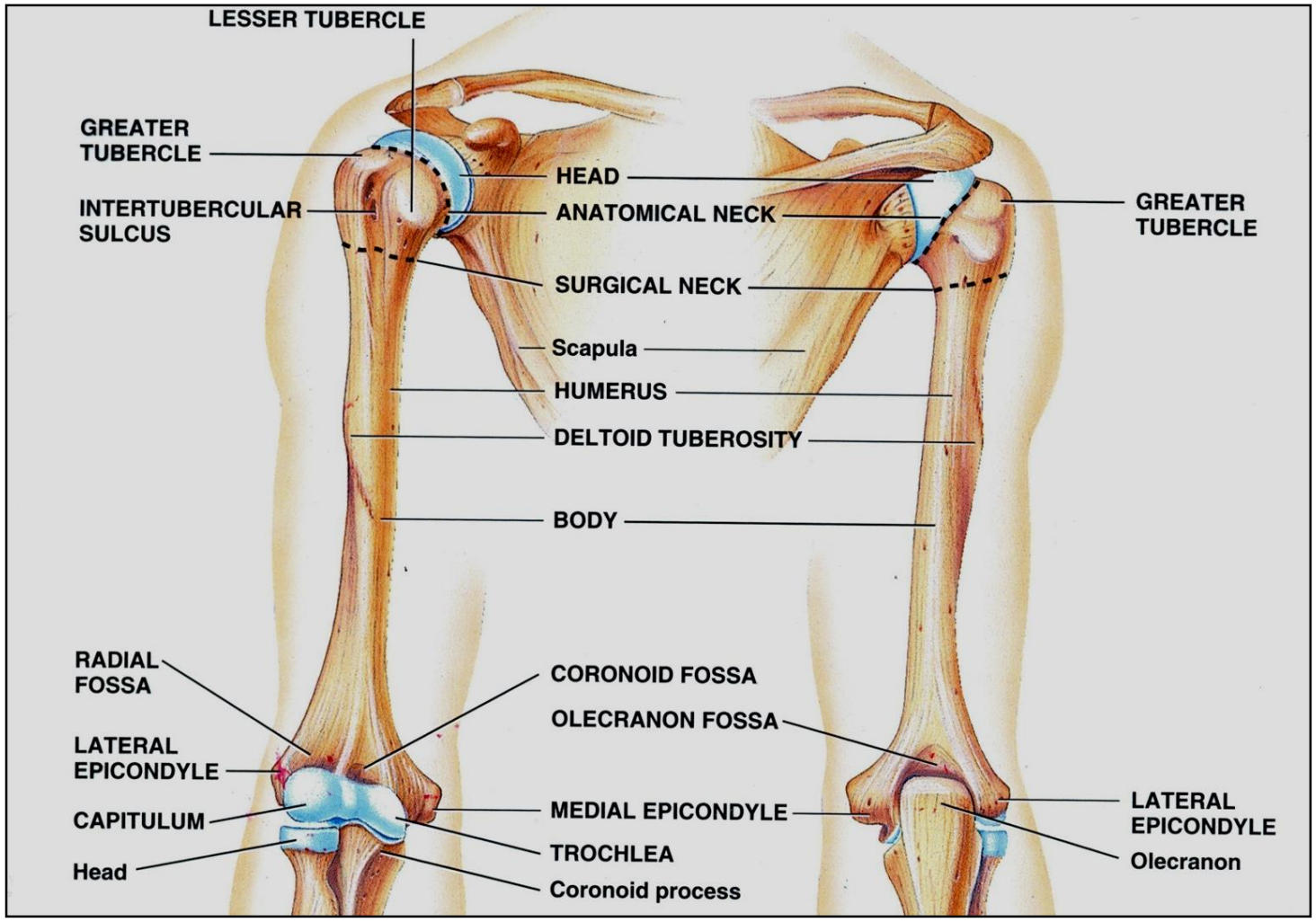
3. The lesser tuberosity (tubercle) → which is an anterior projection.

4. The bicipital groove (inter-tubercular sulcus) → separates the 2 tuberosities.



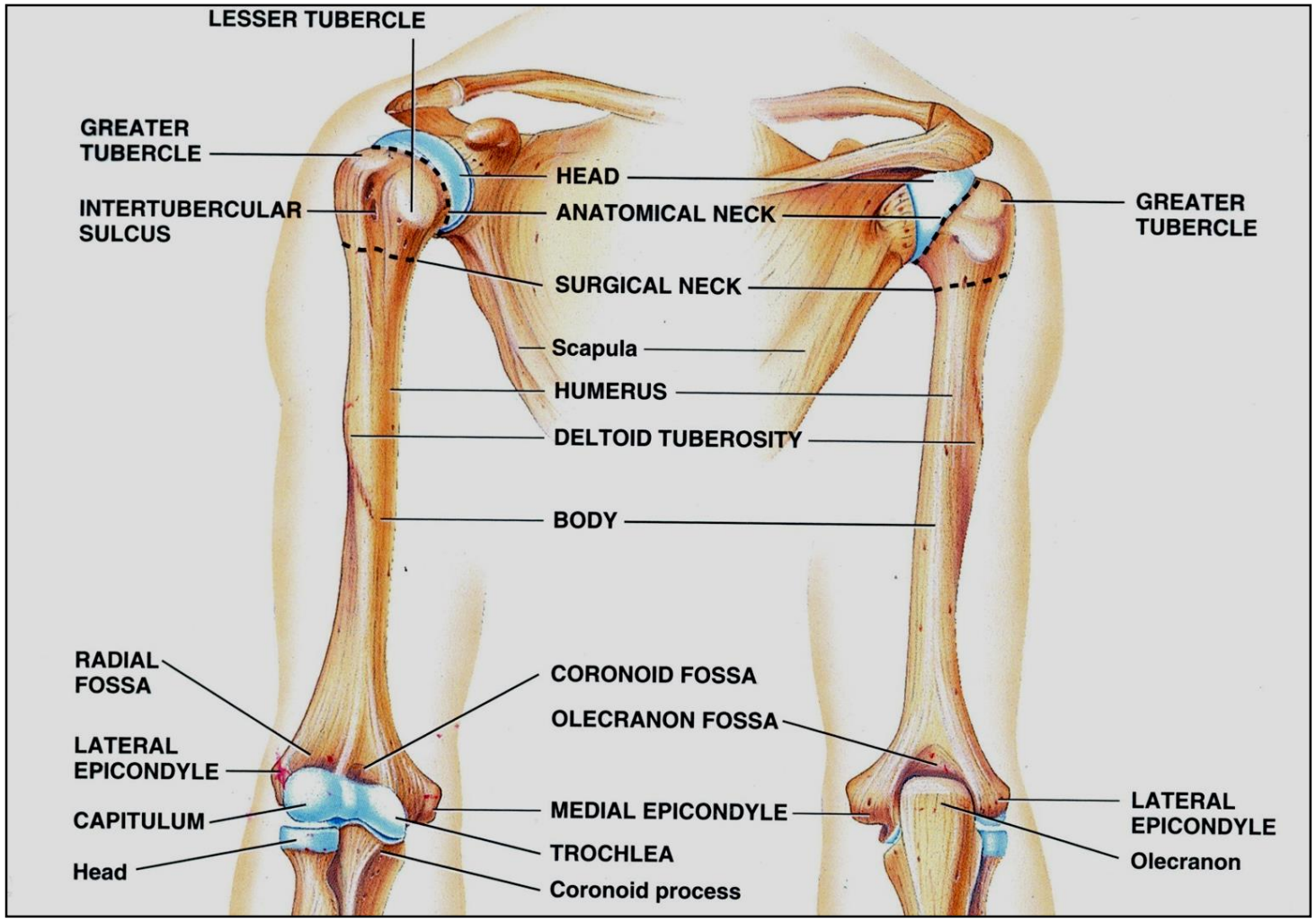
5. The anatomical neck → **is the margin of the head that separates it from the tuberosities.**

6. The surgical neck → **is the constriction that separates the upper end from the shaft.**



B. Shaft (body):

Laterally → it presents about its middle a rough area called the deltoid tuberosity.



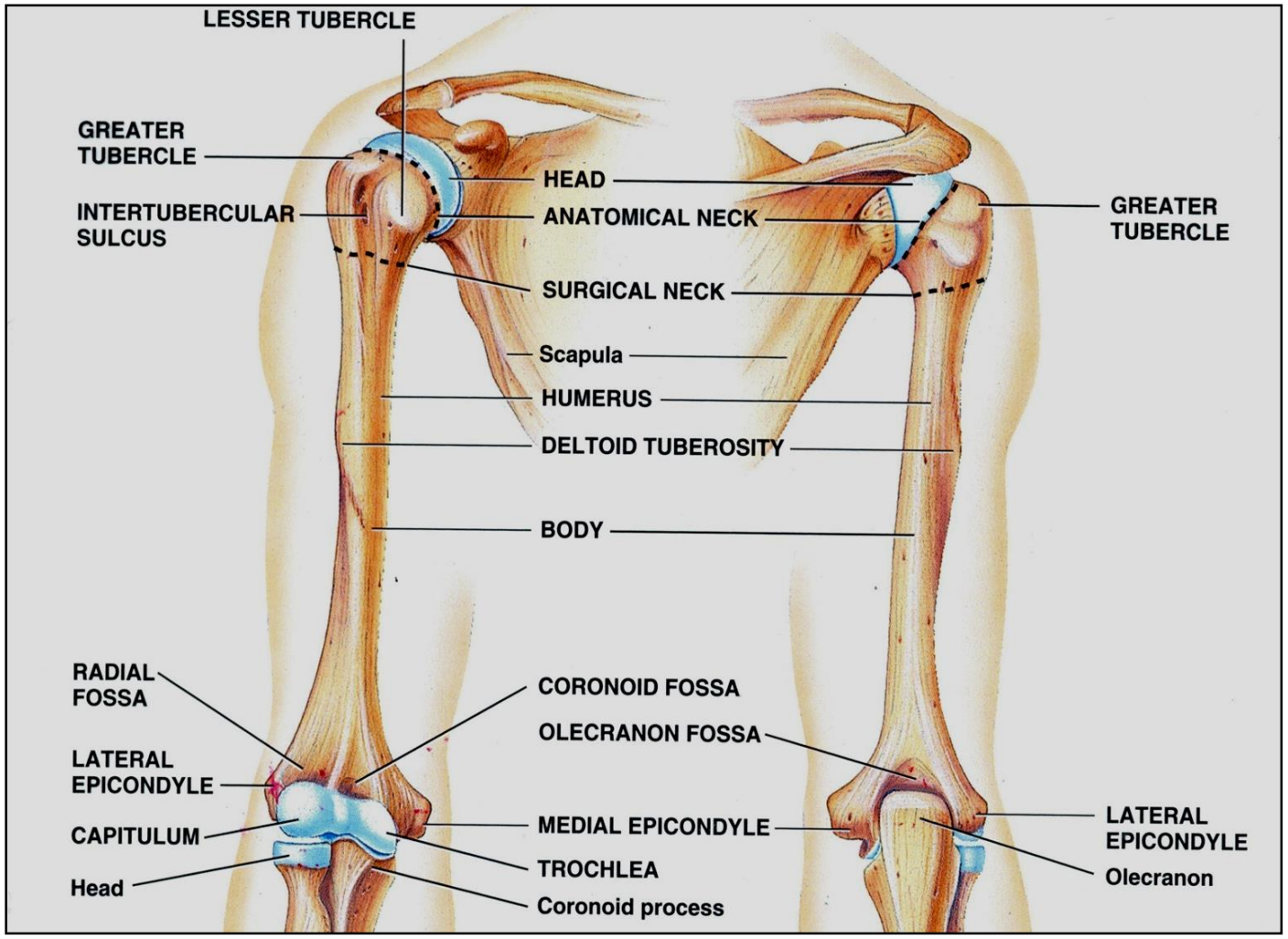
C. The Lower end: shows:

1. Two articular surfaces:

a. The capitrulum → a convex surface laterally. It articulates with the radius in humero-radial articulation.

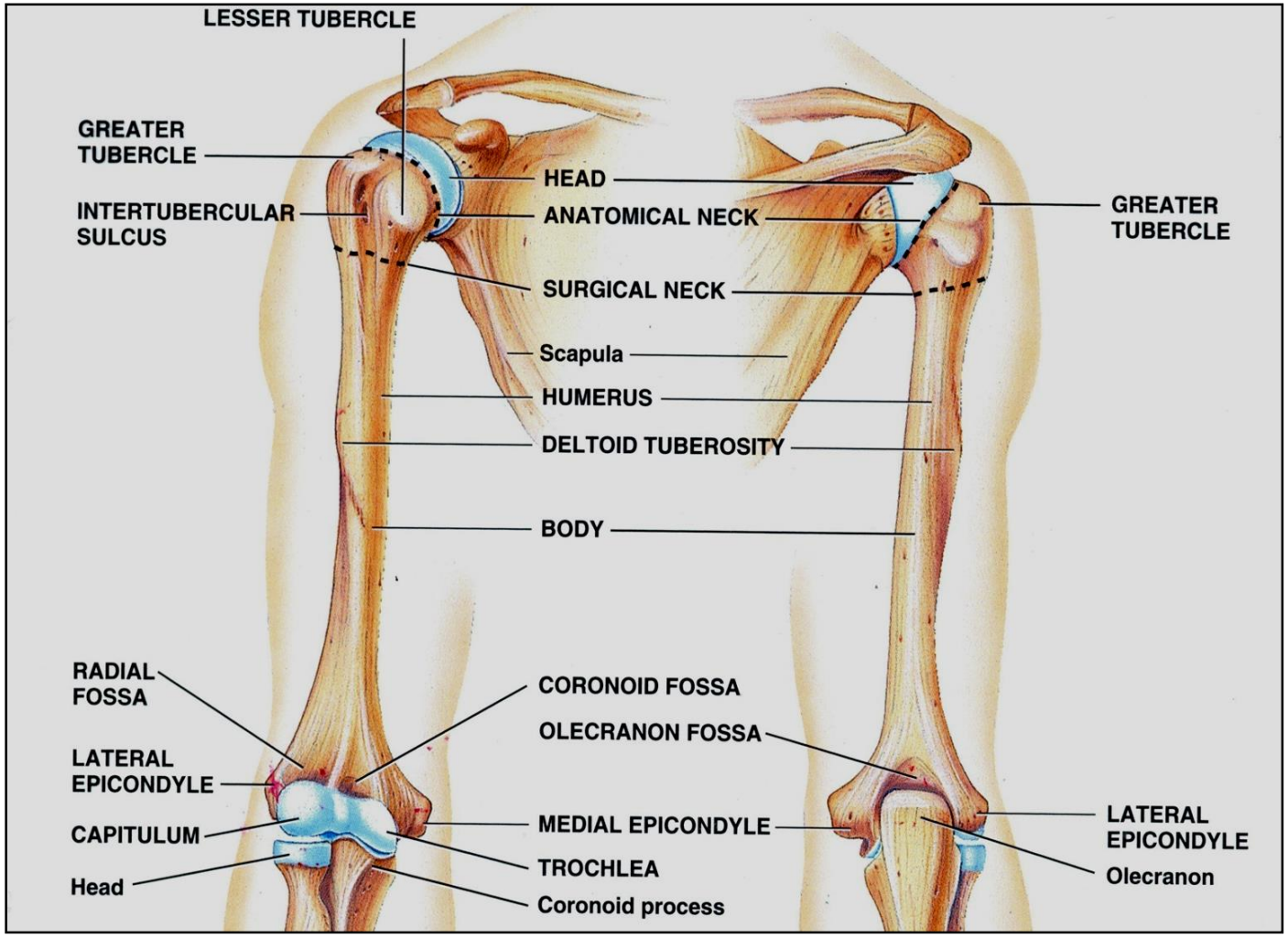
b. The trochlea → a pulley-shaped surface medially. It articulates with the ulna in humero-ulnar articulation.

*** Both the humero-radial & humero-ulnar articulations form the elbow joint.**



2. Two non-articular side projections → the medial & lateral epicondyles.

* The medial epicondyle is more prominent and wider than the lateral, and is crossed on its posterior surface by ulnar nerve.

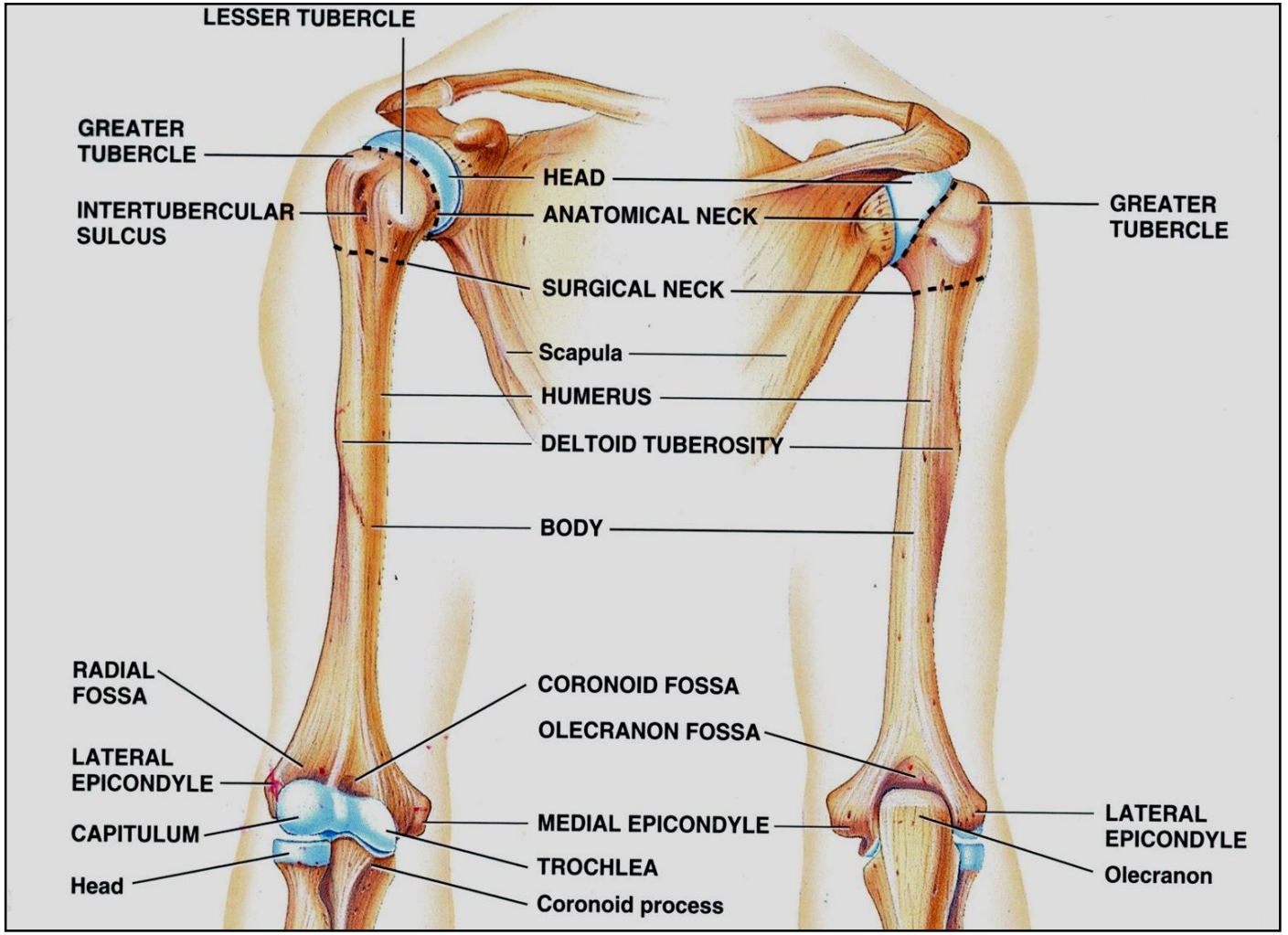


3. Three depressed fossae:

a. **Radial fossa →** above capitulum anteriorly.

b. **Coronoid fossa →** above trochlea anteriorly.

c. **Olecranon fossa →** above trochlea posteriorly.



4. The Radius

* This is the lateral bone of the forearm.

* It has an upper end, a shaft & a lower end.

A. The upper end: shows:

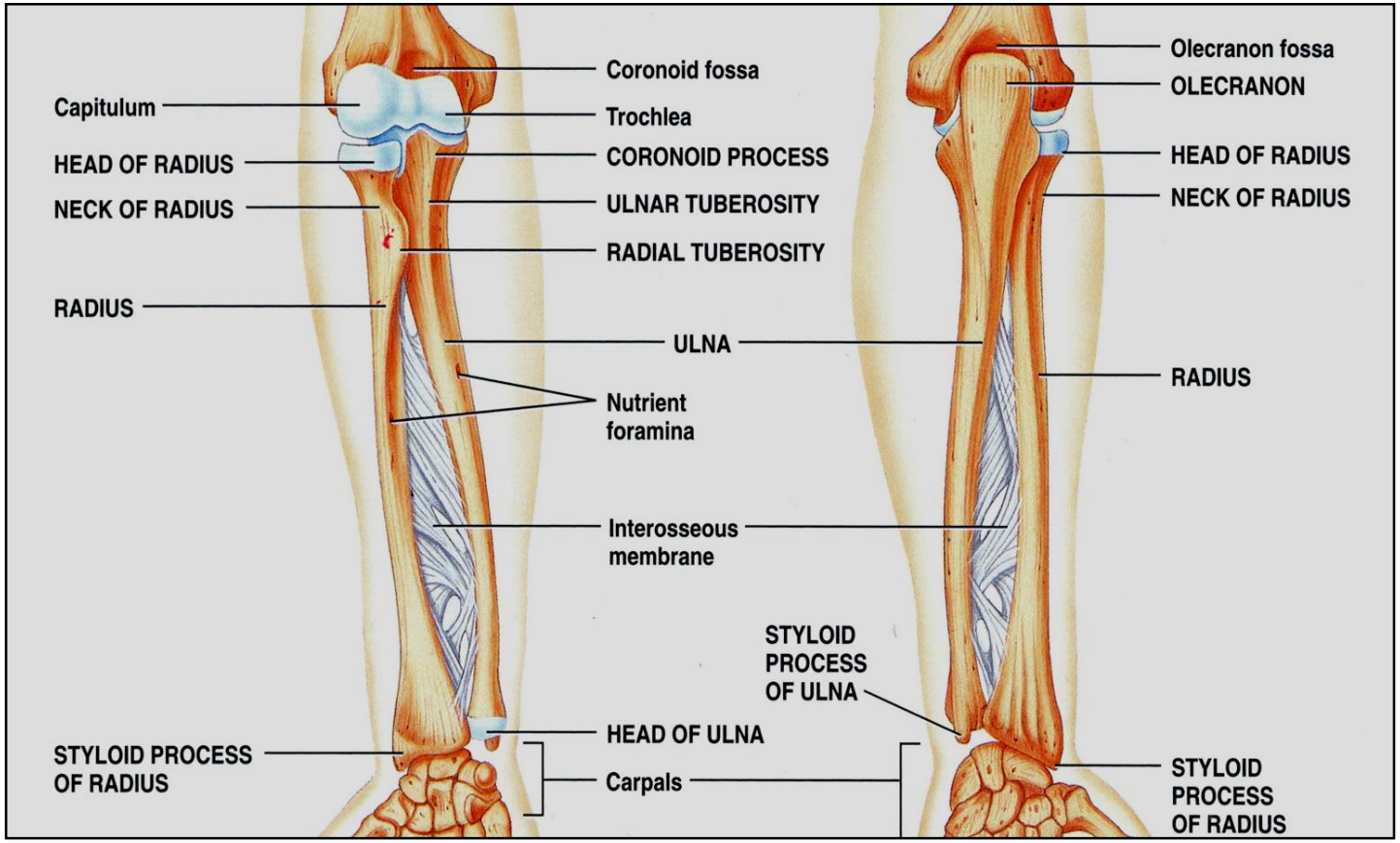
1. The head:

* Disc-shaped.

* It articulates superiorly with the capitalum of the humerus.

2. Neck.

3. Radial tuberosity: a projection on ulnar side of shaft below the neck.



B. Shaft (body):

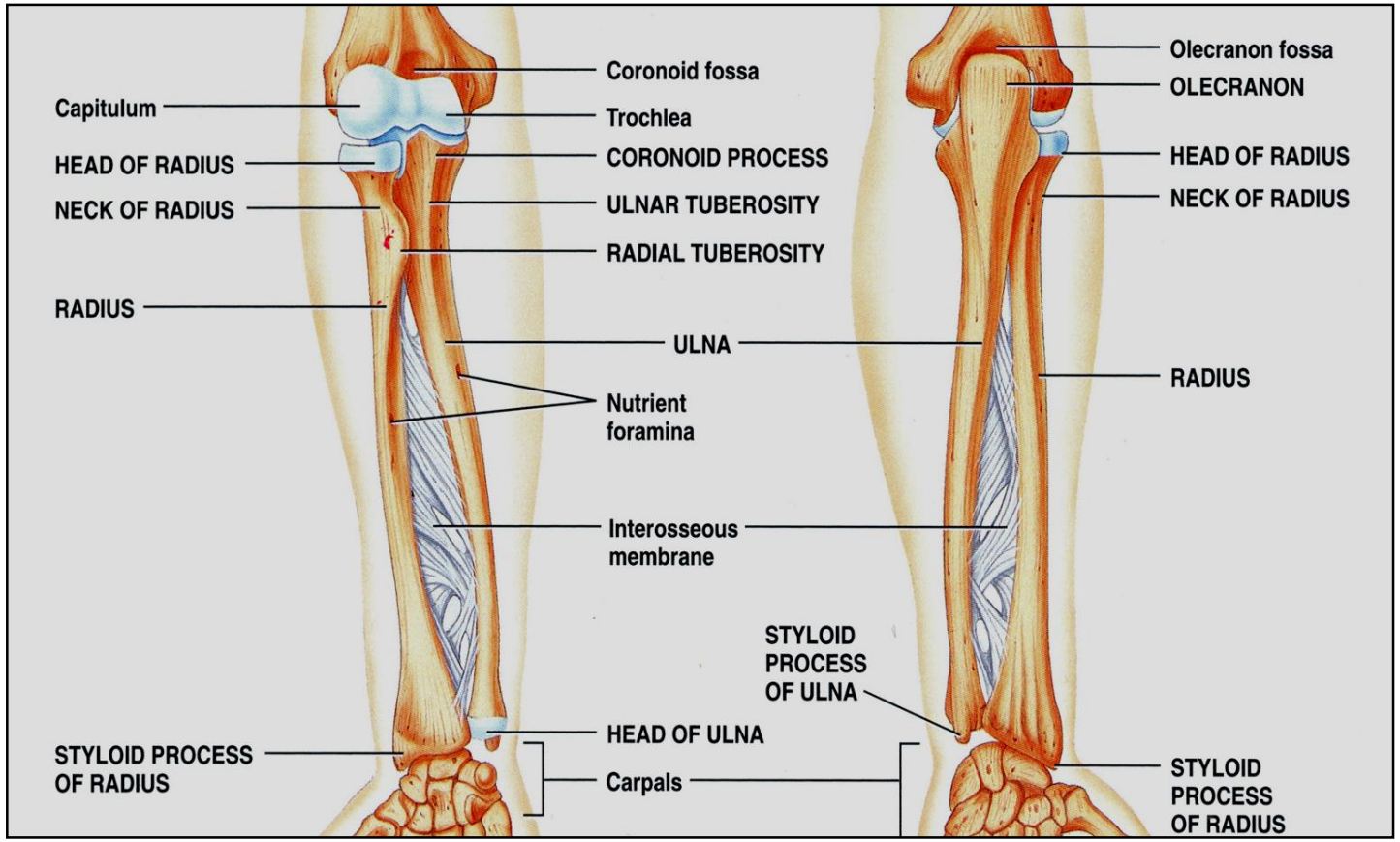
* Has a sharp medial border, the interosseous border, to which the interosseous membrane is attached.

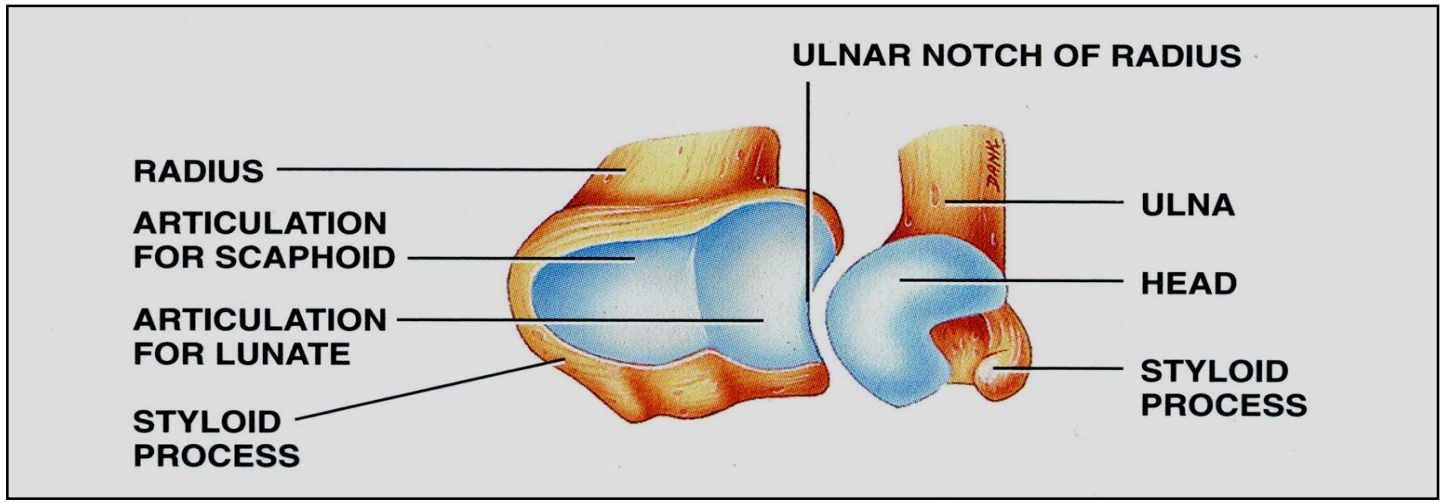
C. Lower end: shows:

1. The medial surface of lower end presents the ulnar notch, for articulation with head of ulna to form inferior radio-ulnar joint.

2. Styloid process.

3. The inferior surface of the lower end articulates with scaphoid bone (laterally) and the lunate bone (medially).





5. The Ulna

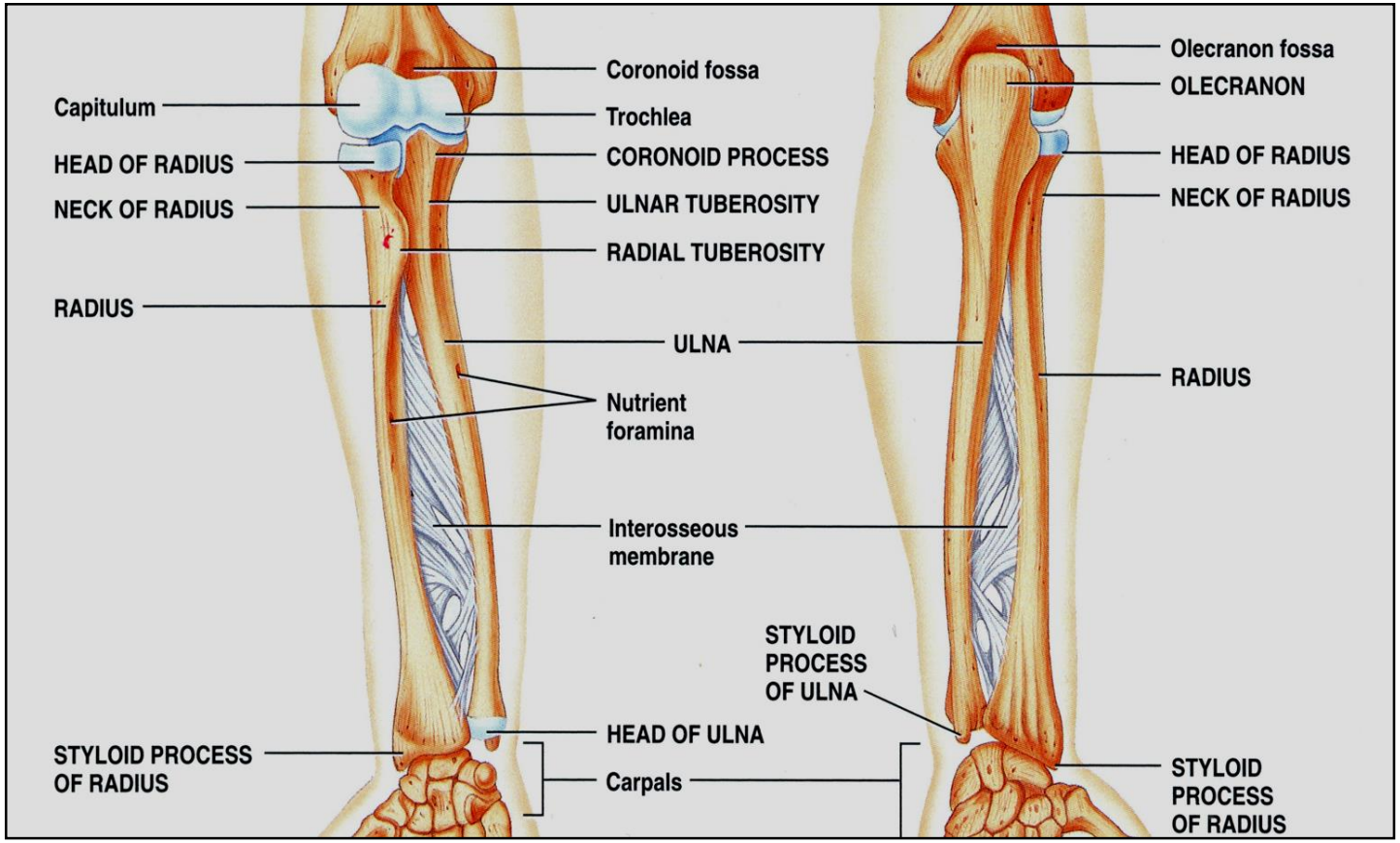
* This is the medial bone of the forearm.

* It has an upper end, a shaft & a lower end.

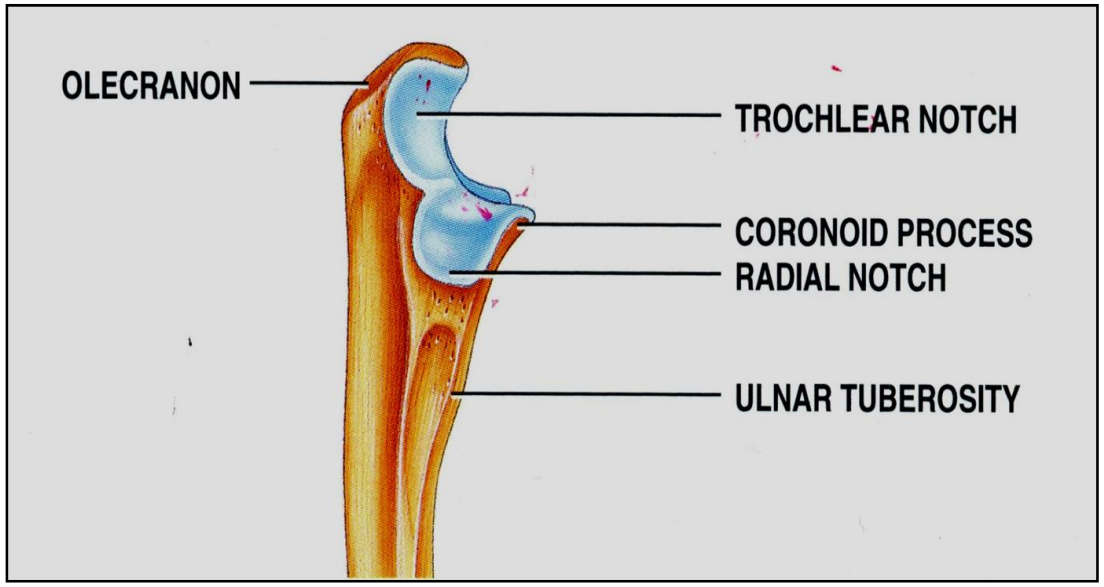
A. The upper end: shows:

1. The trochlear notch:

* A semilunar concavity that lies in the anterior aspect of the upper end of the bone.
* Articulates with the trochlea of the humerus.



2. The olecranon process
→ which forms the prominence of elbow.
3. The coronoid process.
4. The lateral surface of coronoid process presents the shallow **radial notch**, for articulation with head of radius to form **superior radio-ulnar joint.**

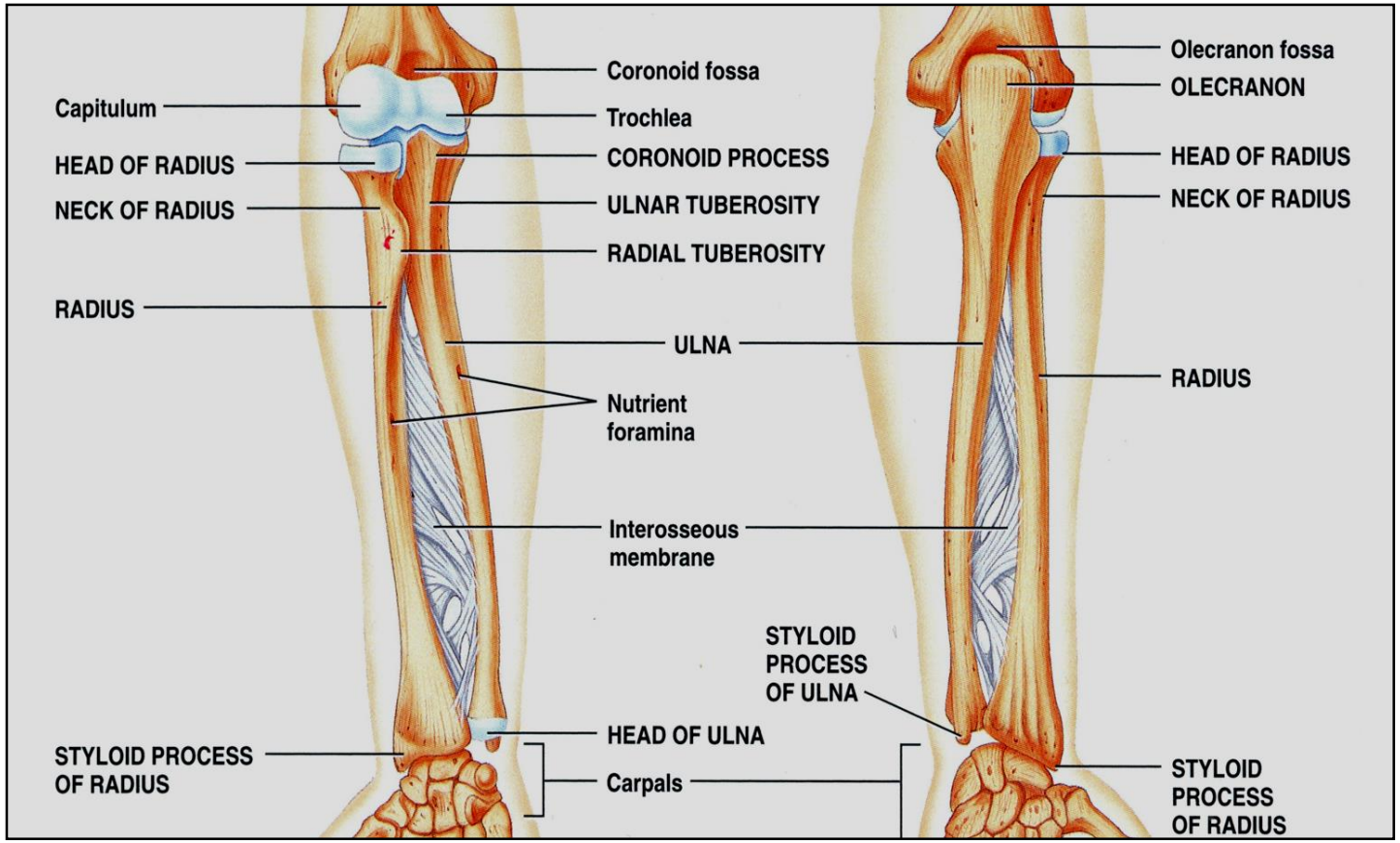


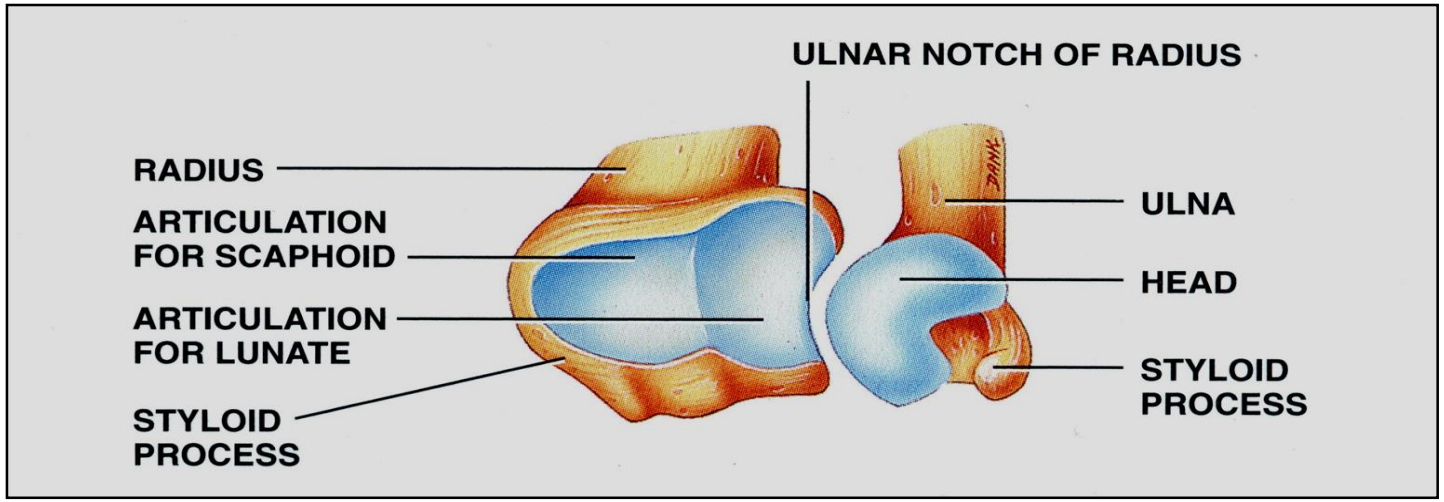
B. Shaft (body):

* Has a sharp lateral border, the interosseous border, to which the interosseous membrane is attached.

C. Lower end:

* shows head and styloid process of ulna.





6. Bones of Hand

A. The Carpal Bones (Carpus):

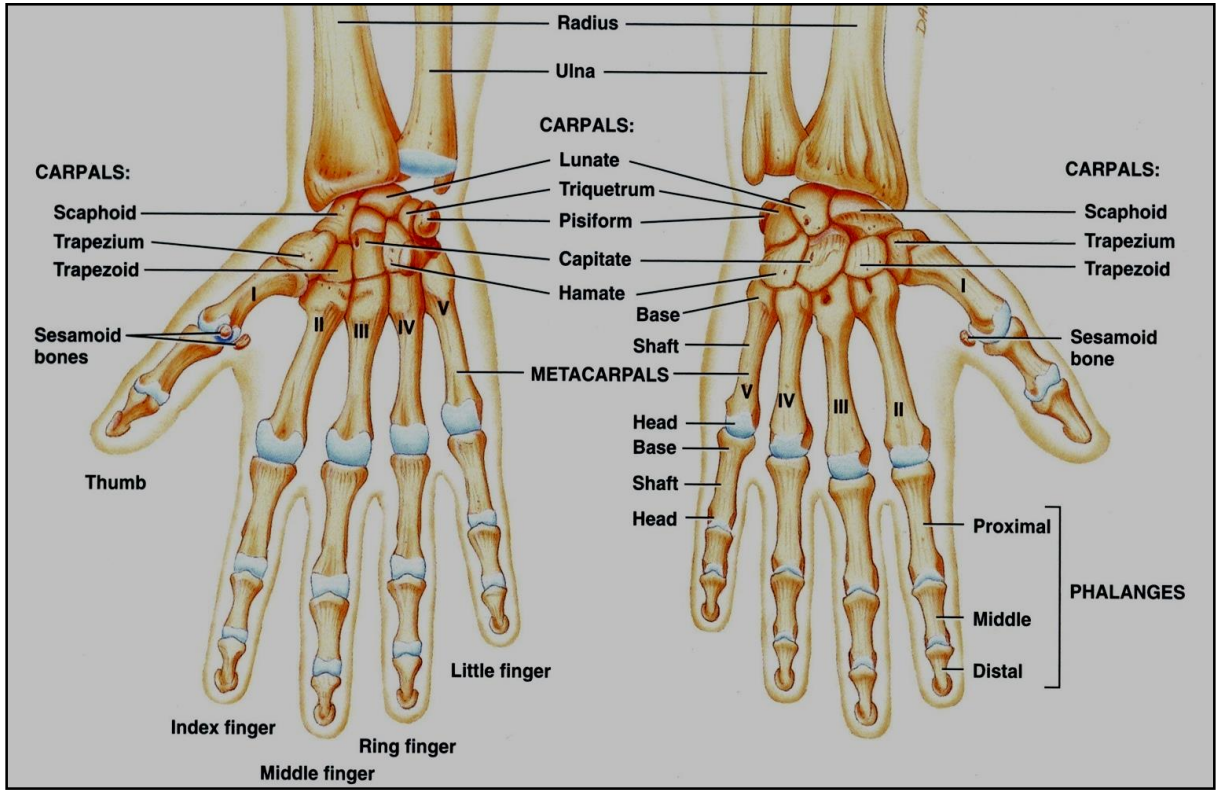
* The carpal bones are eight bones which are arranged in a proximal and a distal row, and are held firmly together by ligaments.

A. Proximal row:

* Is formed by the following bones (from lateral to medial): scaphoid, lunate, triquteral, and pisiform.

B. Distal row:

* Is formed by the following bones (from lateral to medial): trapezium, trapezoid, capitate, and hamate.



B. The Metacarpal Bones:

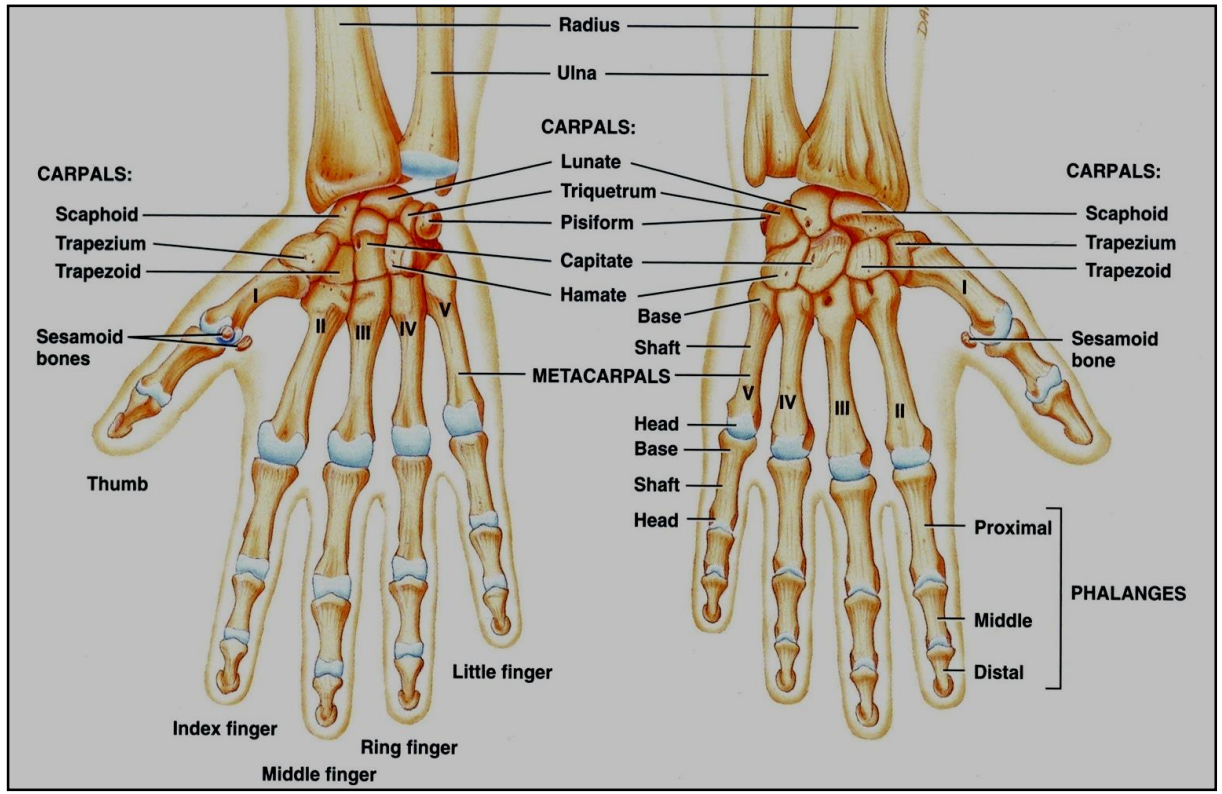
* There are five metacarpal bones; the 1st one is that of the thumb.

* Each metacarpal has: a proximal base, a body, and a distal head.

C. The Phalanges:

* There are two phalanges in the thumb and three in each of the medial four digits.

* Each phalanx has: a proximal base, a body, and a distal head.

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