

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

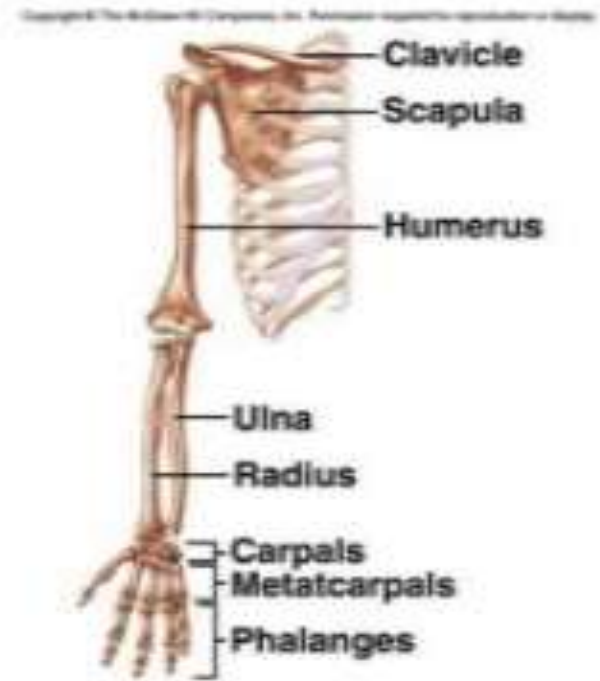


بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**DR. NAMMER**  
**PhD ANATOMY, HISTOLOGY**  
**AND EMBRYOLOGY**

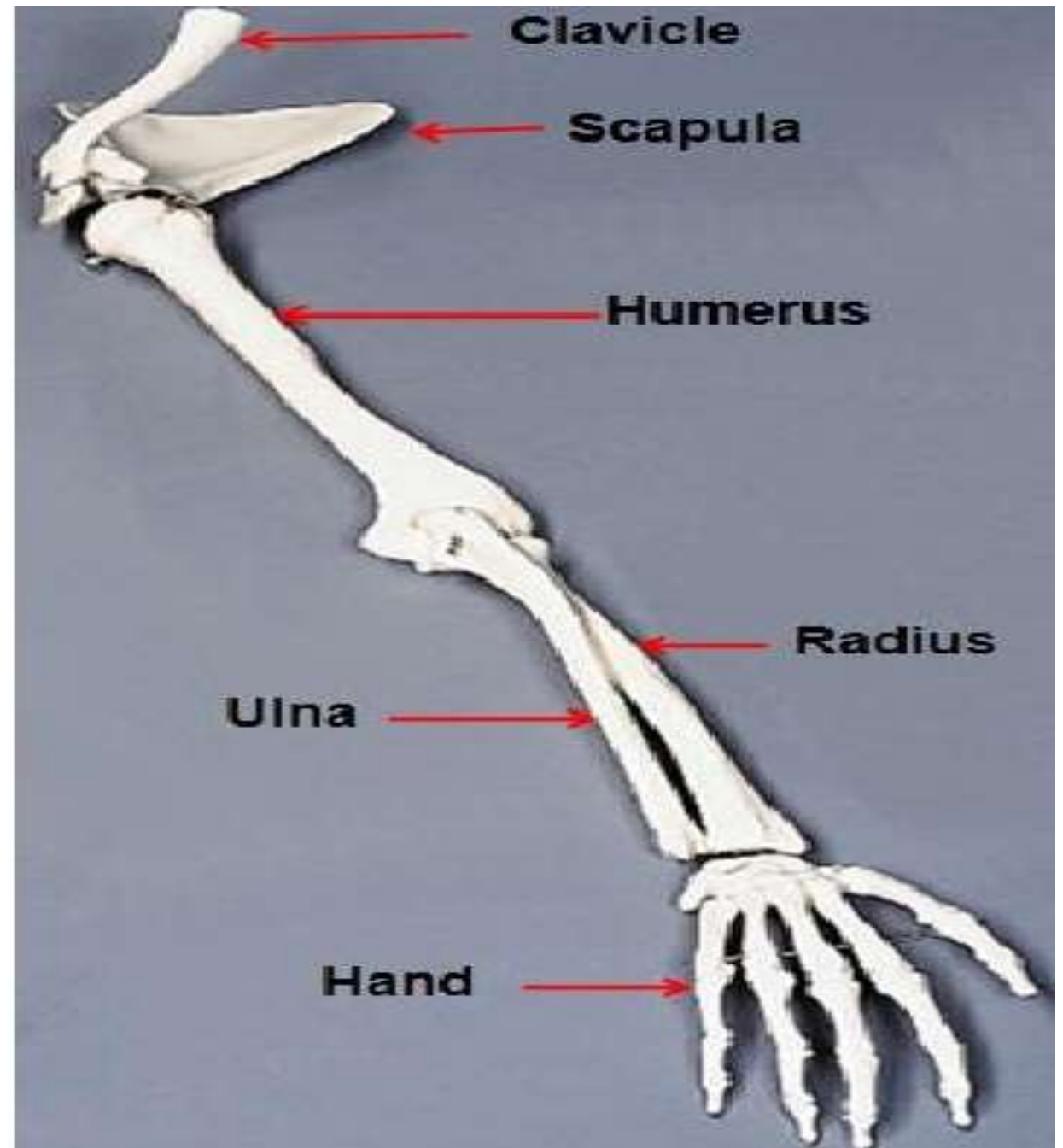
# Bones Of The Upper Limbs

- **Clavicle (collar bone)**
- **Scapula (shoulder bone)**
- **Humerus bone**
- **Ulna Bone**
- **Radius Bone**
- **Bones of Hand**



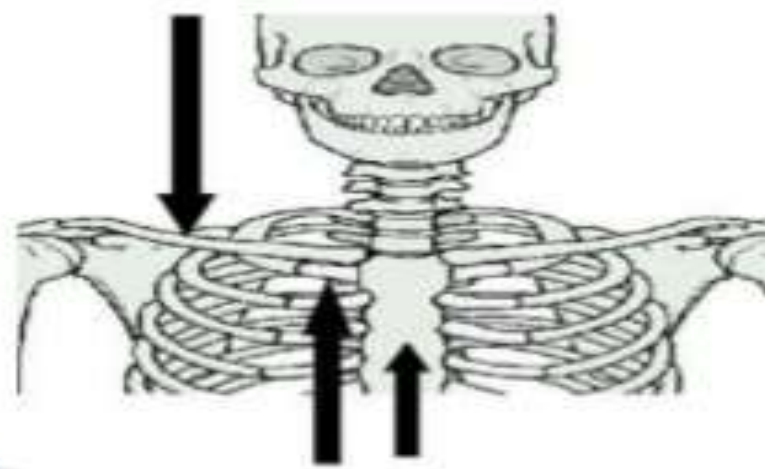
# **BONES OF UPPER LIMB**

- Bones of shoulder girdle:  
Include: Clavicle & scapula
- Bone of the arm: Humerus.
- Bones of forearm: Radius (lateral) & ulna (Medial).
- Bones of the hand:
  - Carpals (8)
  - Metacarpal Bones (5)
  - Phalanges (14)



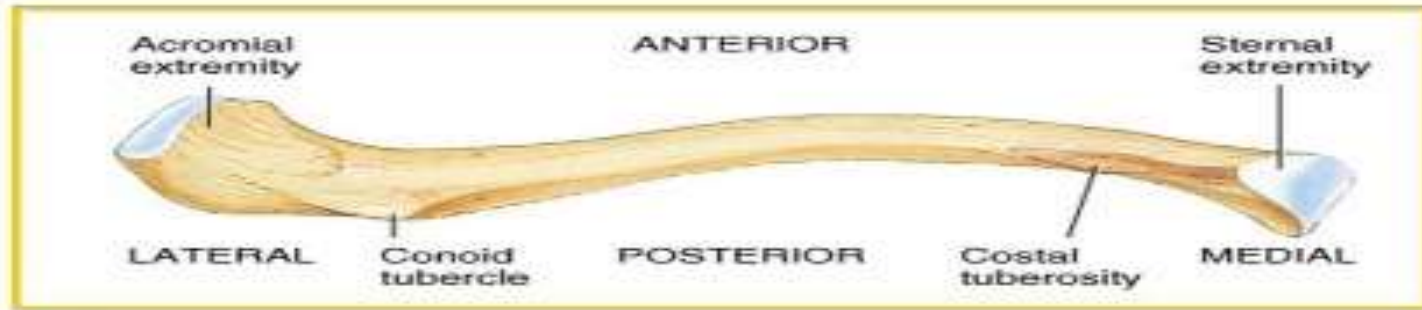
# 1)Clavicle (collar bone)

- └ The clavicle is an S-shaped long bone
- └ Lies horizontally across the root of the neck just beneath the skin
- └ Medially it articulates with the sternum and 1<sup>st</sup> costal cartilage
- └ Laterally with the acromion process of the scapula
- └ Provides the only bony link b/w the upper limb & the axial skeleton

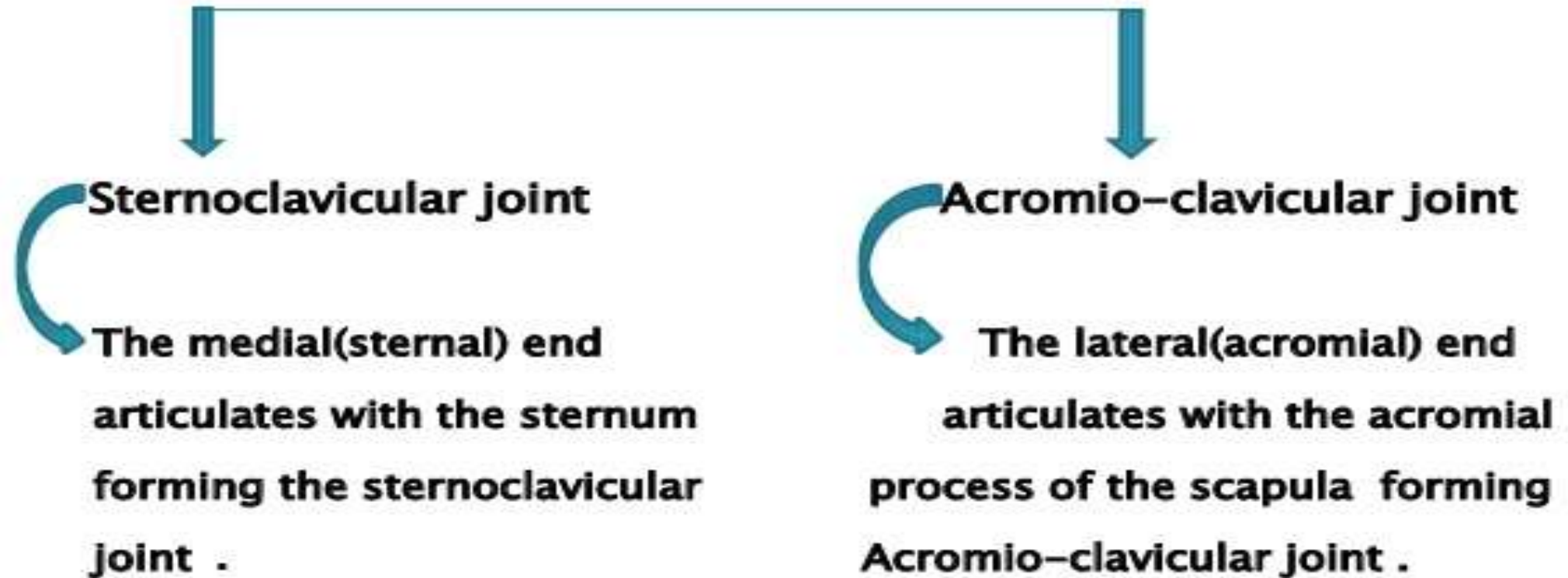


# Functions of Clavicle Bone

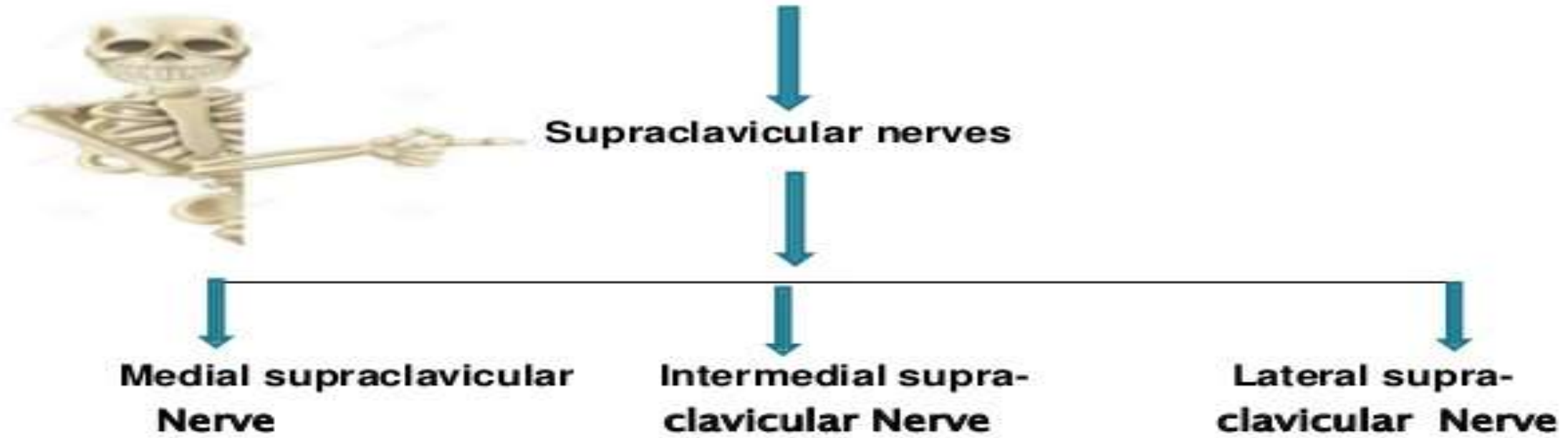
- One of the main functions of the collarbone is to hold the arms freely and supported, away from the trunk.
- **Protects** the underlying neurovascular structures supplying the upper limb.
- **Transmits force** from the upper limb to the axial skeleton.



# Joints of Clavicle



# Nerves of the Clavicle





**i)Medial supraclavicular Nerve :**

Cross obliquely over the external jugular vein and the clavicular & supply the skin as far as middle line.

**ii)Intermedial supraclavicular Nerve :**


Cross the clavicle & supply over the skin over the pectoralis major .

**iii)Lateral supraclavicular Nerve :**

Pass obliquely across the outer surface of the trapezius and the acromion & supply the skin of the upper and posterior part of the shoulder.



## 2) Scapula (shoulder bone)

- ❖ The scapula is a flat triangular bone
  - ❖ Lies on the posterior chest wall b/w the 2<sup>nd</sup> & 7<sup>th</sup> ribs
  - ❖ In its posterior surface the spine of the scapula projects back word
  - ❖ The coracoid process projects upward and forward above the glenoid cavity & provides attachment for muscles & ligaments
  - ❖ Medial to the base of the coracoid process is the suprascapular notch
  - ❖ The anterior surface of the scapula is concave & form the shallow subscapular fossa
- 

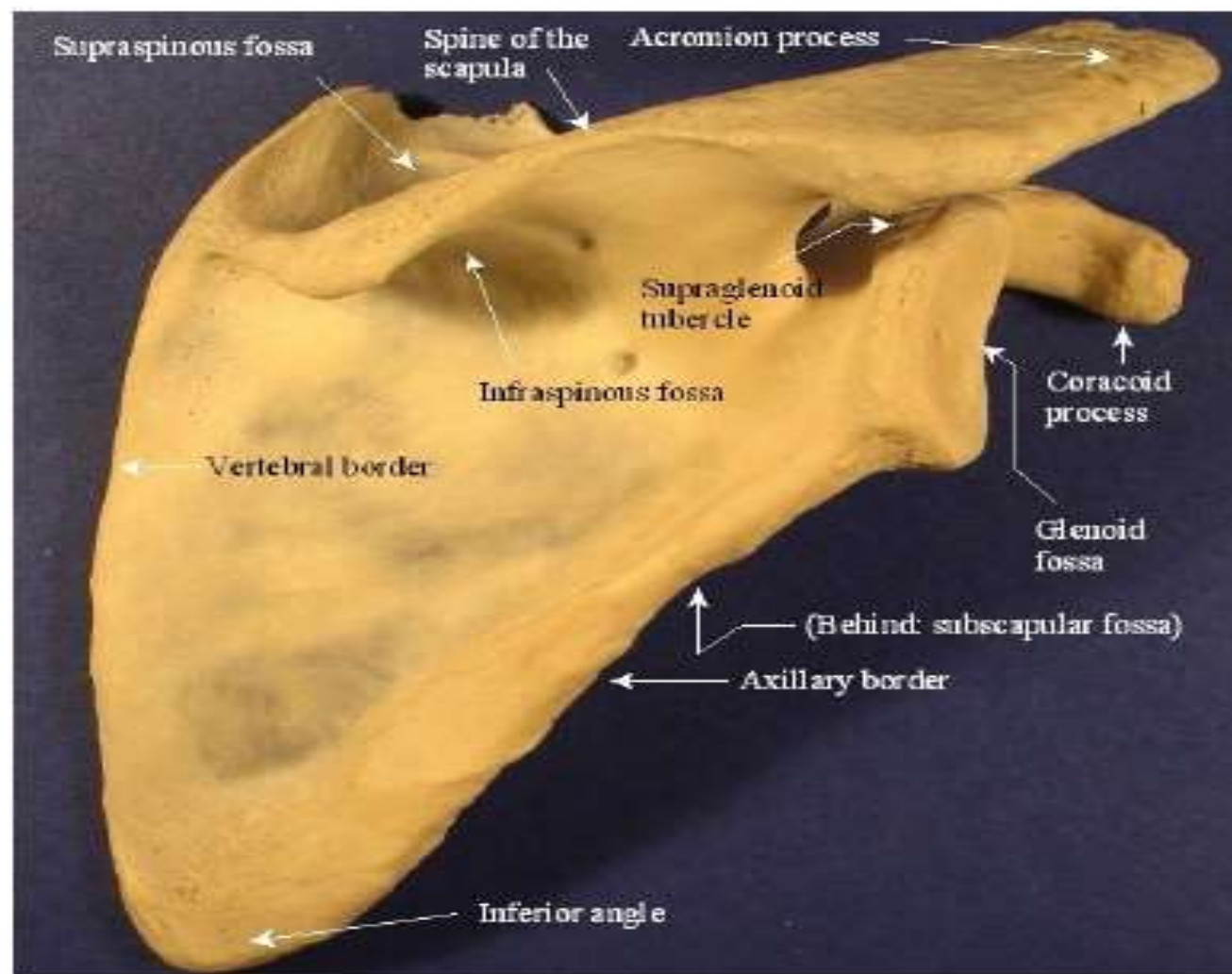
# THE SCAPULA

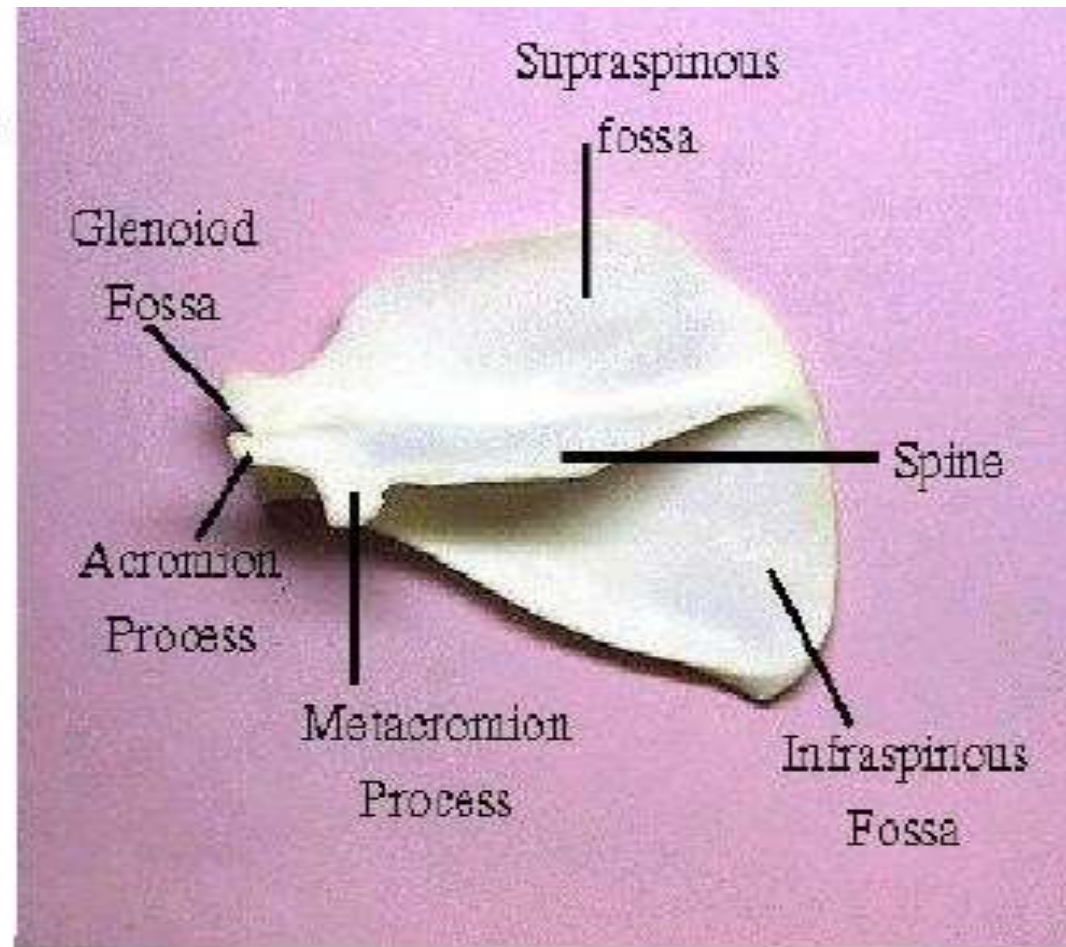
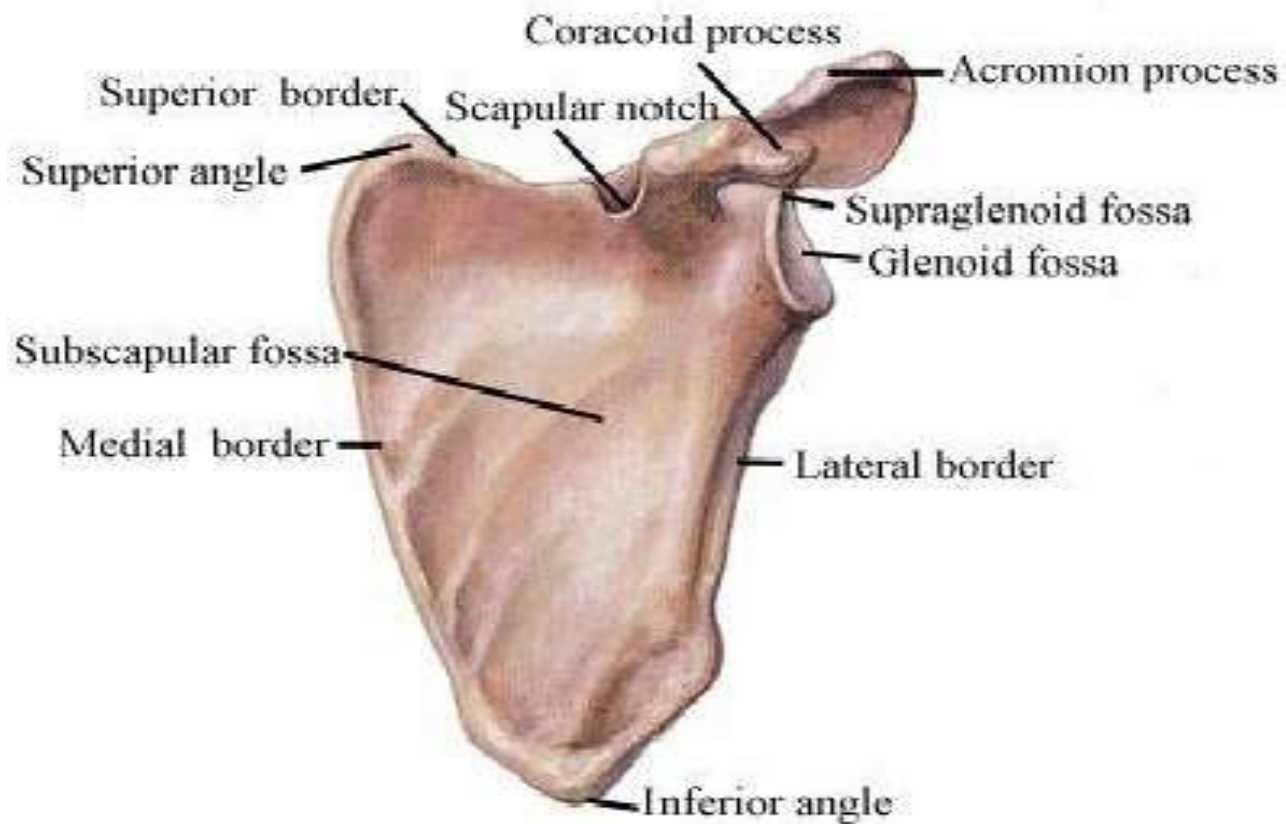
It is a flat triangular bone with:

- 2 surfaces; anterior & posterior.
- 3 borders: Upper, medial & lateral.
- 3 Angles: Superior, inferior & lateral.
- The lateral angle contains the glenoid cavity.
- 3 processes: Coracoid, acromial & spine of the scapula.
- 3 fossae; Subscapular fossa in the anterior surface, Supraspinous & infraspinous fossae on the posterior surface.

It shares in 2 joints:

- Shoulder joint: Between the glenoid cavity & the head of humerus.
- Acromioclavicular joint: Between the acromial process & the lateral end of the clavicle.

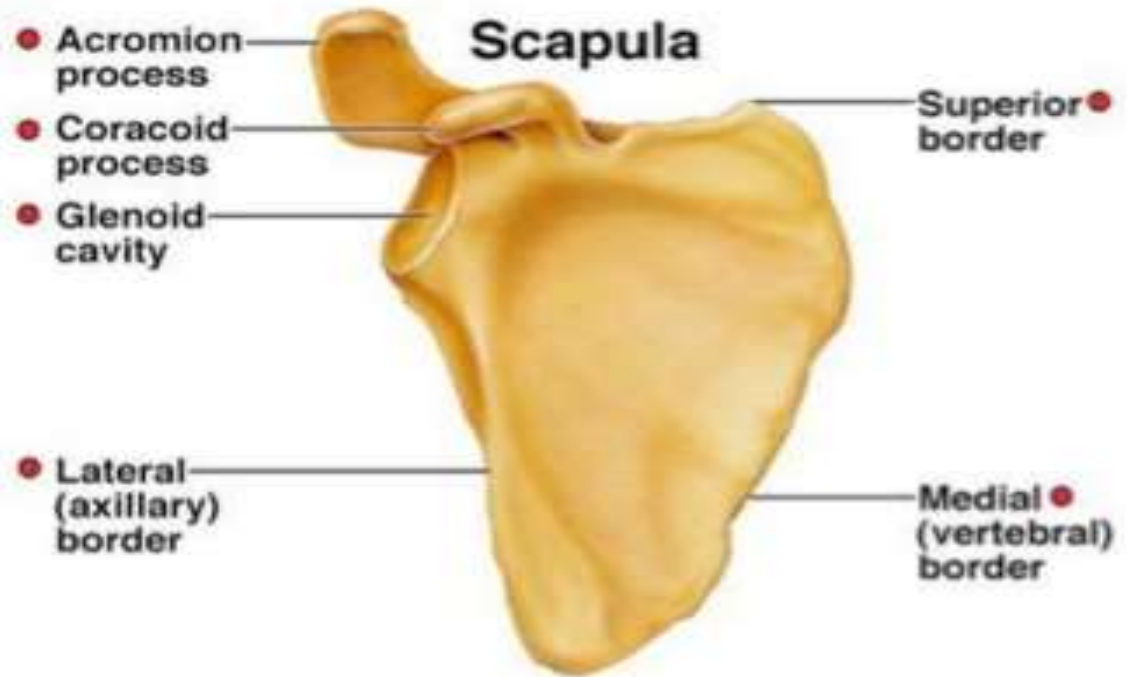




Dorsal

- ▮ The primary function of the scapula is to attach the upper arm to the thorax, or trunk of the body. This connection stabilizes the arm and provides for arm movement at the shoulder

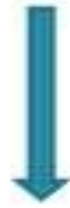




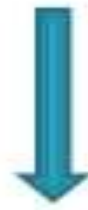
# Artery of the Scapula



**Dorsal scapula Artery**

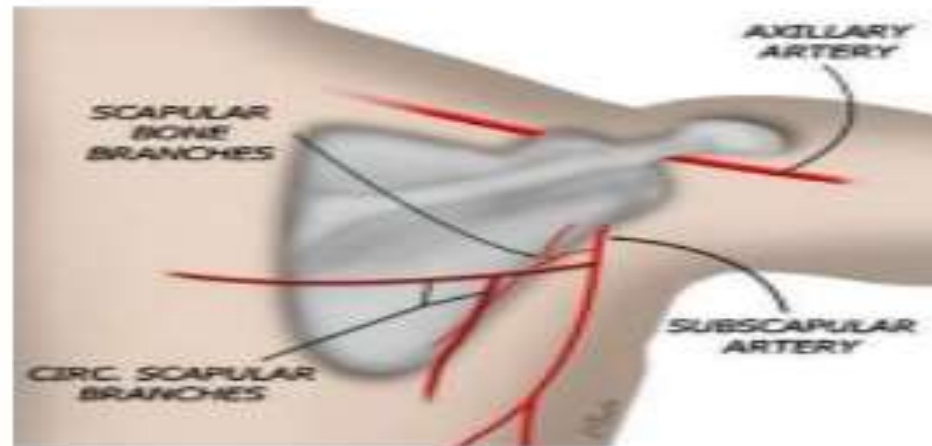


**Suprascapula Artery**

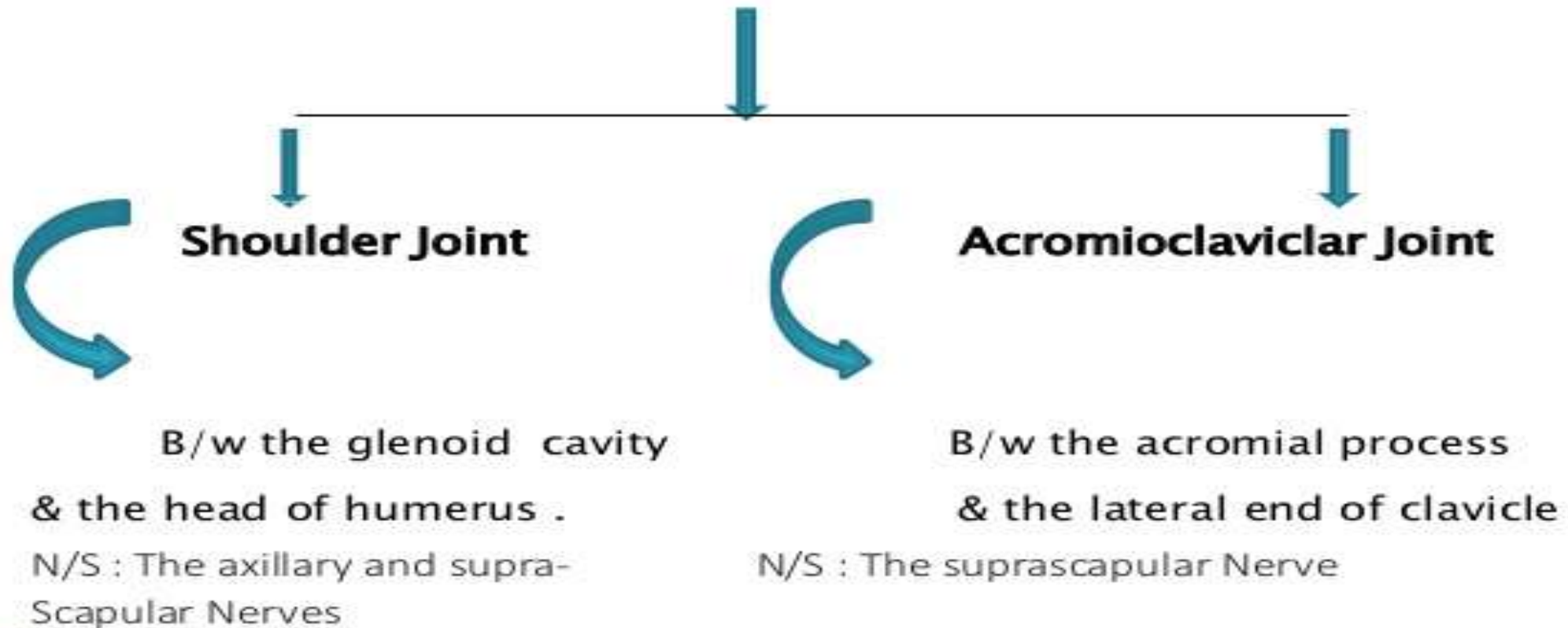


**Branches of the subscapula**

**Artery**



# Joints of the Scapula





### 3) Humerus Bone

- ❖ Articulate with the scapula at the shoulder joint & with the radius & ulna at the elbow joint.
- ❖ It is a long bone with 2 ends (Upper & Lower) & a shaft .



- ┌ The upper end consist of : Head, neck lesser & greater tuberosity(tubercle) separated by the bicipital groove .
- ┌ Lower end contain 2 epicondyles (lateral, medial), 2 process (trochlea & capitulum), and 3 fossae.



## Humerus



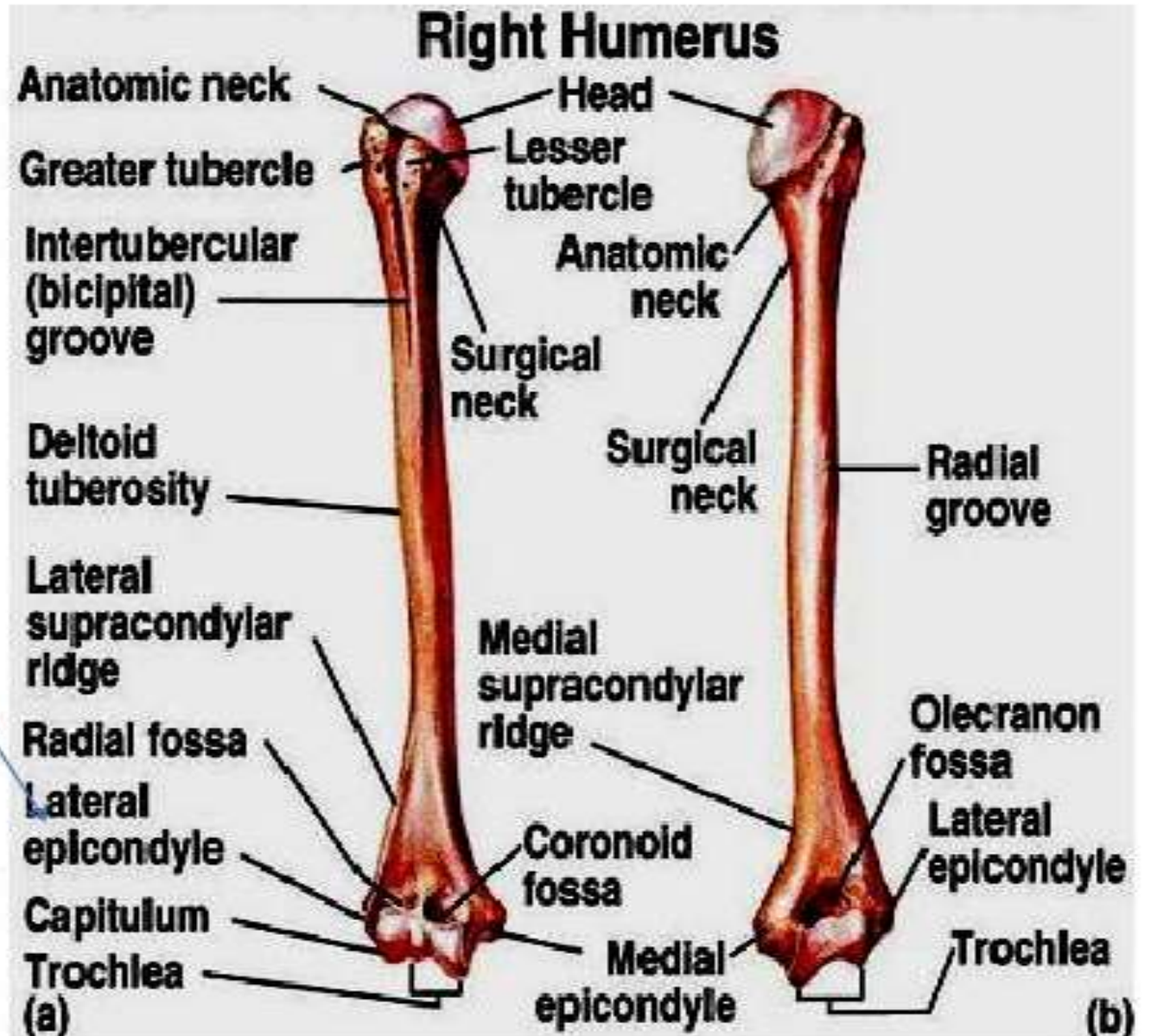
# THE HUMERUS

It is a long bone with 2 ends (upper & lower) & a shaft.

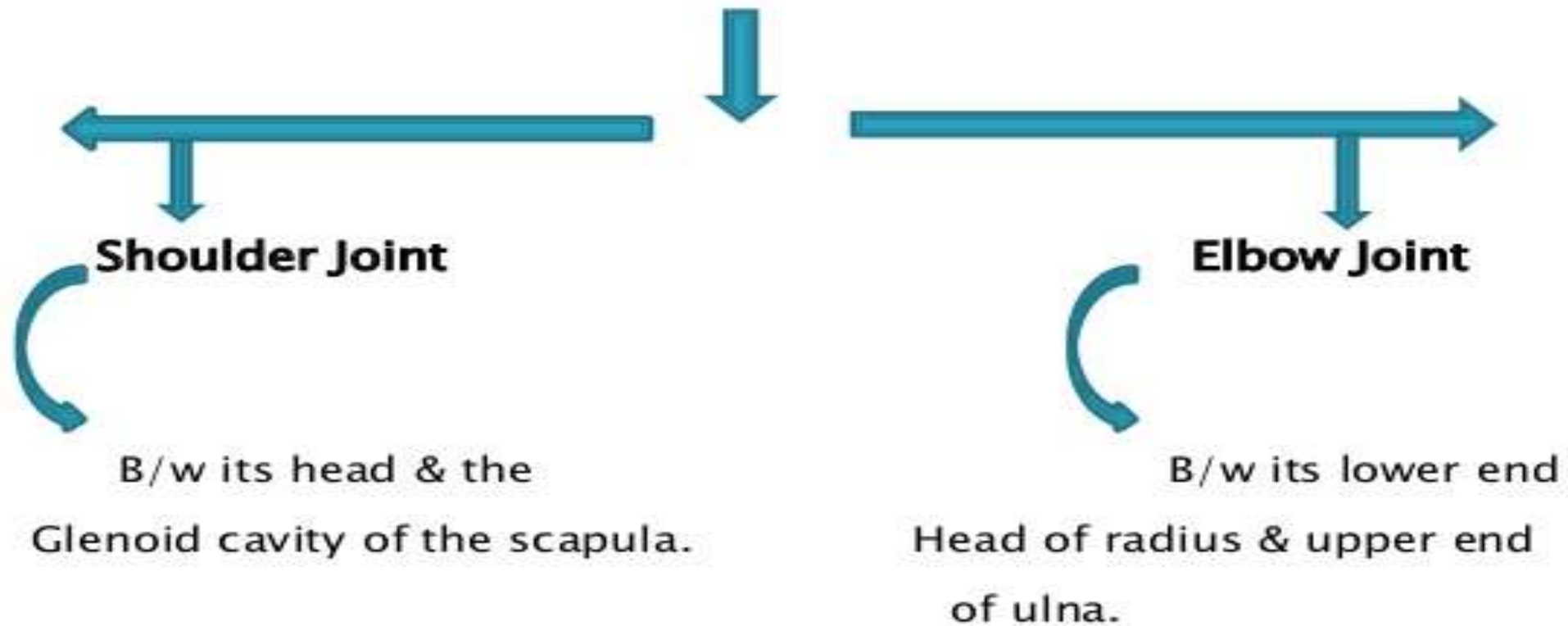
- The upper end consists of; Head, neck (anatomical & surgical), lesser tuberosity & greater tuberosity (tubercle) separated by the bicipital (intertubercular) groove .
- The shaft is cylindrical above & prismatic below (with 3 borders & 3 surfaces). It contains radial (spiral) groove in the middle 1/3 of the posterior surface.
- The lower end contains 2 epicondyles (lateral & medial), 2 processes (trochlea & capitulum) & 3 fossae.

It shares in 2 joints:

- Shoulder joint: Between its head & the glenoid cavity of the scapula.
- Elbow joint: Between its lower end head of radius & upper end of ulna.



# Joints of the Humerus



# Nerve of Humerus

## i) Axillary Nerve :

The **axillary nerve** or the circumflex **nerve** is a **nerve** of the human body, that originates from the brachial plexus (upper trunk, posterior division, posterior cord) at the level of the **axilla (armpit)** and carries **nerve** fibers from C5 and C6.

## ii) Musculocutaneous nerve :

The **musculocutaneous nerve** arises from the lateral cord of the brachial plexus, opposite the lower border of the pectoralis major, its fibers being derived from C5, C6 and C7



## 4) Radius Bone

- ❖ Radius is the lateral bone of the forearm
- ❖ The proximal end articulates with the humerus at the elbow joint
- ❖ At the proximal end of the radius is the small circular head
- ❖ The upper surface of the head is concave
- ❖ Below the head, the bone is constricted to form the neck
- ❖ Below the neck is the bicipital tuberosity for the insertion of the biceps muscle



- ❖ Its distal end articulates with the scaphoid and lunate bones of the hand at the wrist joint
- ❖ At the distal end of the radius is the styloid process, this projects distally from its lateral margin



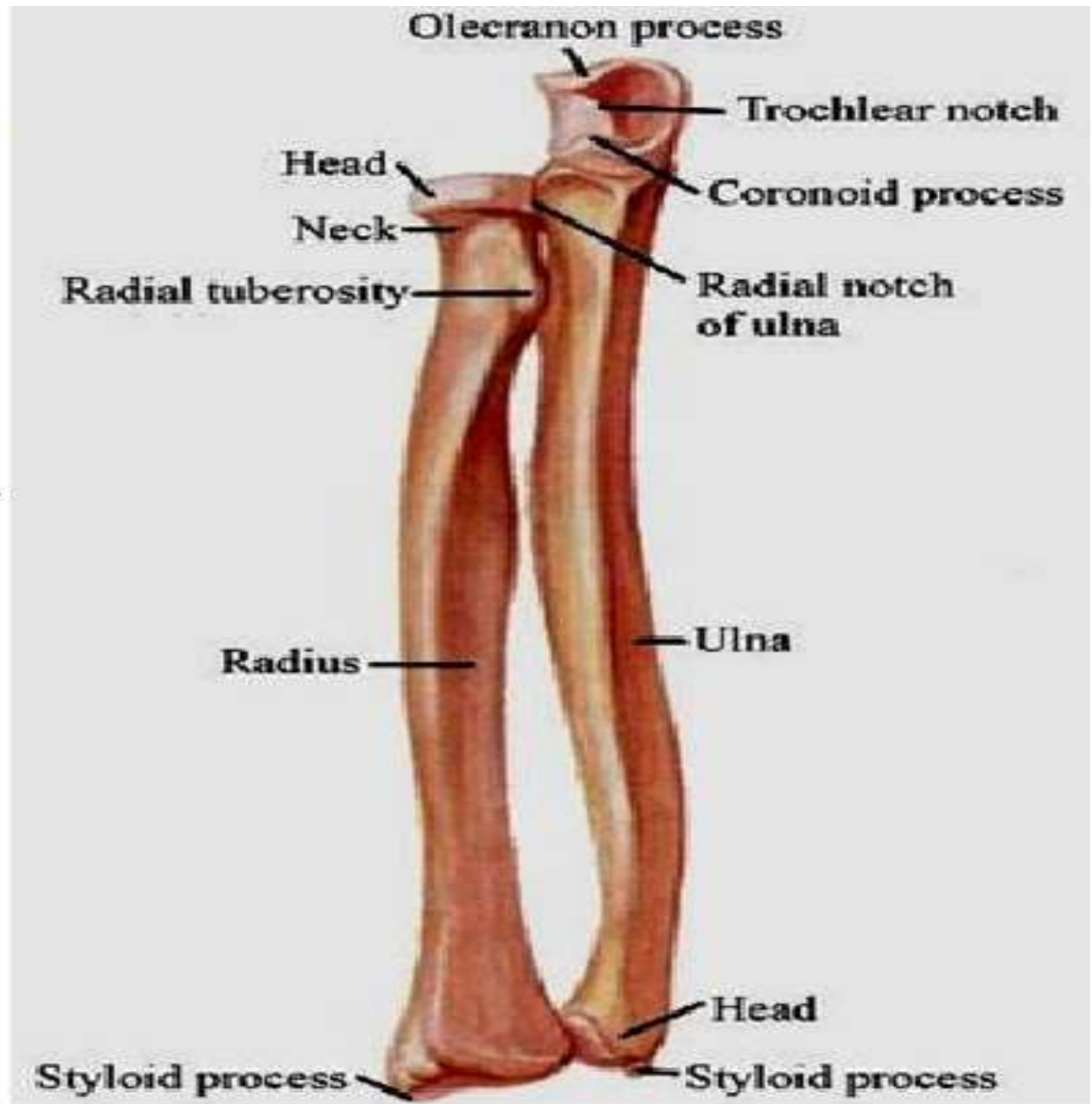


# THE RADIUS

- It is a long bone with 2 ends & a shaft.
- The upper end consists of head, neck & radial tuberosity.
- The shaft has 3 surfaces (anterior, posterior & lateral) separated by 3 borders (anterior, posterior & medial).
- The medial (interosseous) border is sharp.
- The lower end has 5 surfaces; anterior (smooth), posterior (with grooves) lateral, medial, inferior & one process (styloid process).

It shares in 4 joints:

- Elbow joint.
- Superior & inferior radioulnar joints.
- Wrist joint.



# Joints of Radius Bone

## Four Joints

### i) Elbow Joint :

**Elbow joint** is the synovial hinge **joint** between the humerus in the upper arm and the radius and ulna in the forearm which allows the hand to be moved towards and away from the body.

### ii) Superior radioulnar Joint :

The **proximal radioulnar** articulation (**superior radioulnar joint**) is a synovial trochoid or pivot **joint** between the circumference of the head of the radius and the ring formed by the radial notch of the ulna and the annular ligament.



# Joints of Radius Bone

## iii) Inferior radioulnar joint :

The distal **radioulnar** articulation (**inferior radioulnar joint**) is a **joint** between the two bones in the forearm; the radius and ulna. It is one of two **joints** between the radius and ulna, the other being the proximal **radioulnar** articulation.

## iv) Wrist Joint :

It is actually a collection of multiple bones and **joints**. The bones comprising the **wrist** include the distal ends of the radius and ulna, 8 carpal bones, and the proximal portions of the 5 metacarpal bones.



# Artery & Vein & Nerve of the Radius Bone

## ❖ Radial Artery :

The radial artery arises from the bifurcation of the brachial artery in the cubital fossa. It runs distally on the anterior part of the forearm. There, it serves as a landmark for the division between the anterior and posterior compartments of the forearm, with the posterior compartment beginning just lateral to the artery. The artery winds laterally around the wrist, passing through the anatomical snuff box and between the heads of the first dorsal interosseous muscle. It passes anteriorly between the heads of the adductor pollicis, and becomes the deep palmar arch, which joins with the deep branch of the ulnar artery.



### ❖ Radial Vein :

the radial veins are venae comitantes that accompany the radial artery through the back of the hand and the lateral aspect of the forearm. They join the ulnar veins to form the brachial veins.

### ❖ Radial Nerve :

The radial nerve is a nerve in the human body that supplies the upper limb. It supplies the medial, lateral, and long heads of the triceps brachii muscle of the arm, as well as all 12 muscles in the posterior osteofascial compartment of the forearm and the associated joints and overlying skin.

It originates from the brachial plexus, carrying fibers from the ventral roots of spinal nerves C5, C6, C8 & T1.



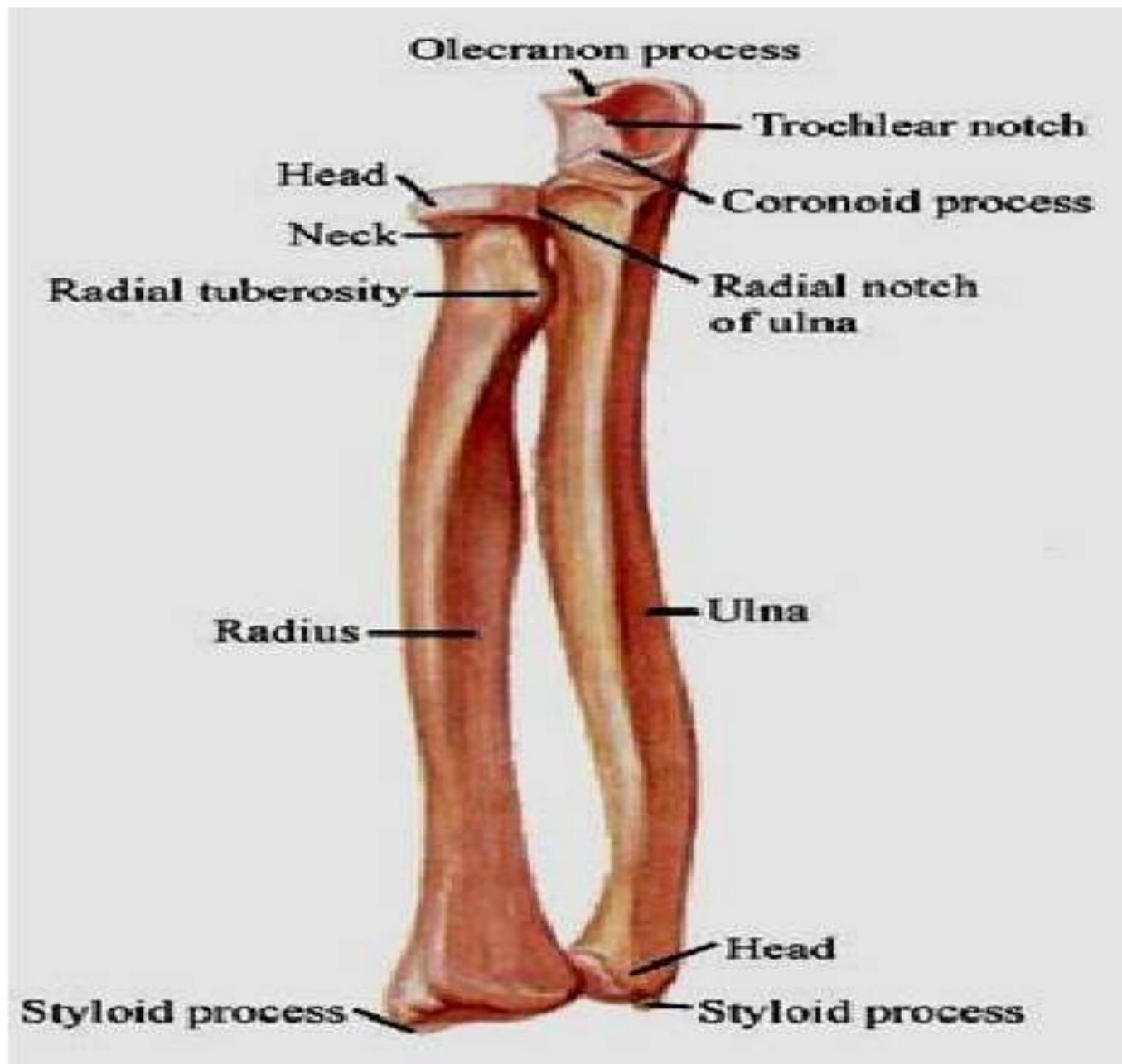
## 5)Ulna Bone

- ❖ The ulna is one of two bones that make up the forearm
- ❖ It is long bone with 2 ends & a shaft
- ❖ The upper end consists of 2 processes( olecranon & coronoid processes ) & trochlear notch
- ❖ The shaft has 3 surface (Separated by 3 borders)
- ❖ Anterior , posterior , & lateral
- ❖ Movement of the ulna is essential to such everyday functions as throwing a ball and driving a car.

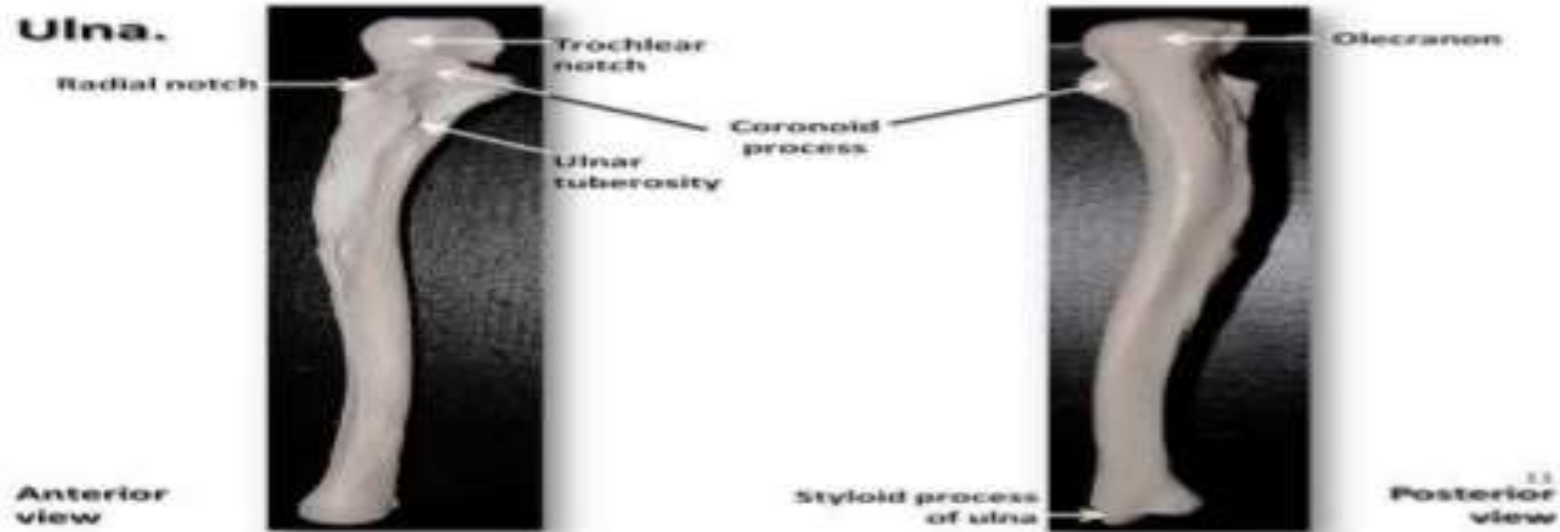


# THE ULNA

- It is a long bone with 2 ends & a shaft.
- The upper end consists of 2 processes (olecranon & coronoid processes) & trochlear notch.
- The shaft has 3 surfaces (separated by 3 borders) (anterior, posterior & lateral).
- The lateral (interosseous) border is sharp.
- The lower end consists of head & styloid process.
- It shares in 3 joints:
  - Elbow joint.
  - Superior & inferior radioulnar joints.



- Functionally, the ulna provides muscle attachment sites for over a dozen muscles in the upper arm and forearm.





# Artery, Vein, Nerve of the Ulna Bone

## ❖ Ulnar Artery :

The ulnar artery is the main blood vessel, with oxygenated blood, of the medial aspect of the forearm. It arises from the brachial artery and terminates in the superficial palmar arch, which joins with the superficial branch of the radial artery. It is palpable on the anterior and medial aspect of the wrist.

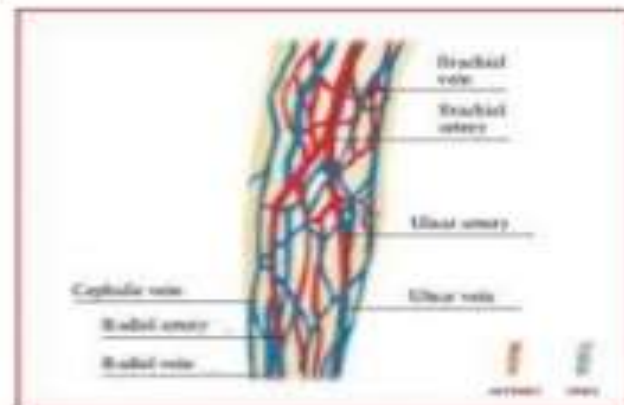
## ❖ Ulnar Vein :

The ulnar veins are venae comitantes for the ulnar artery. They mostly drain the medial aspect of the forearm. They arise in the hand and terminate when they join the radial veins to form the brachial veins.

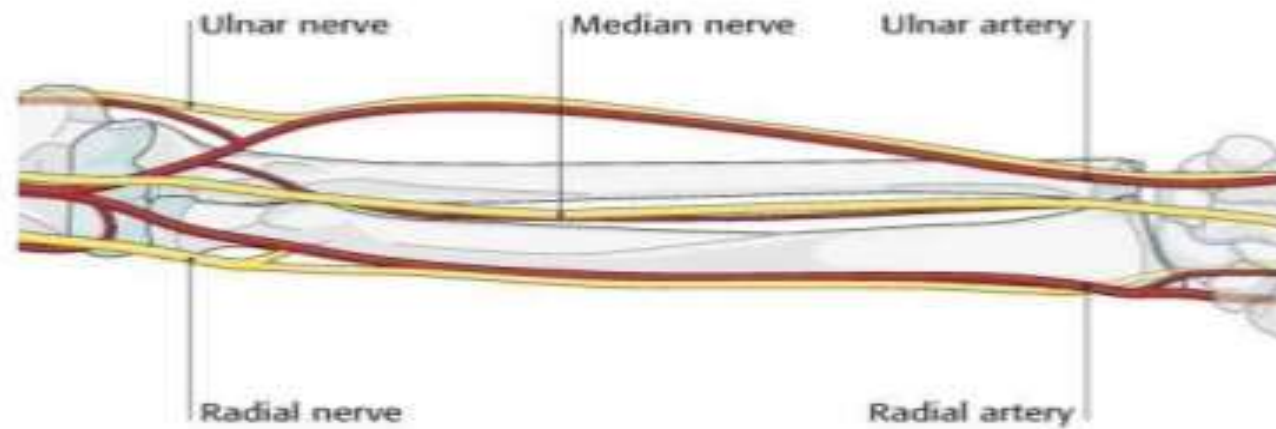


## ❖ Ulnar Nerve :

the ulnar nerve is a nerve which runs near the ulna bone. The ulnar collateral ligament of elbow joint is in relation with the ulnar nerve. The nerve is the largest unprotected nerve in the human body (meaning unprotected by muscle or bone), so injury is common. This nerve is directly connected to the little finger, and the adjacent half of the ring finger, supplying the palmar side of these fingers, including both front and back of the tips, perhaps as far back as the fingernail beds.



# Artery & Nerves of Radius & Ulna



# Joints of the Ulna Bone

Three Joints



Elbow Joint



Superior radioulnar  
joint



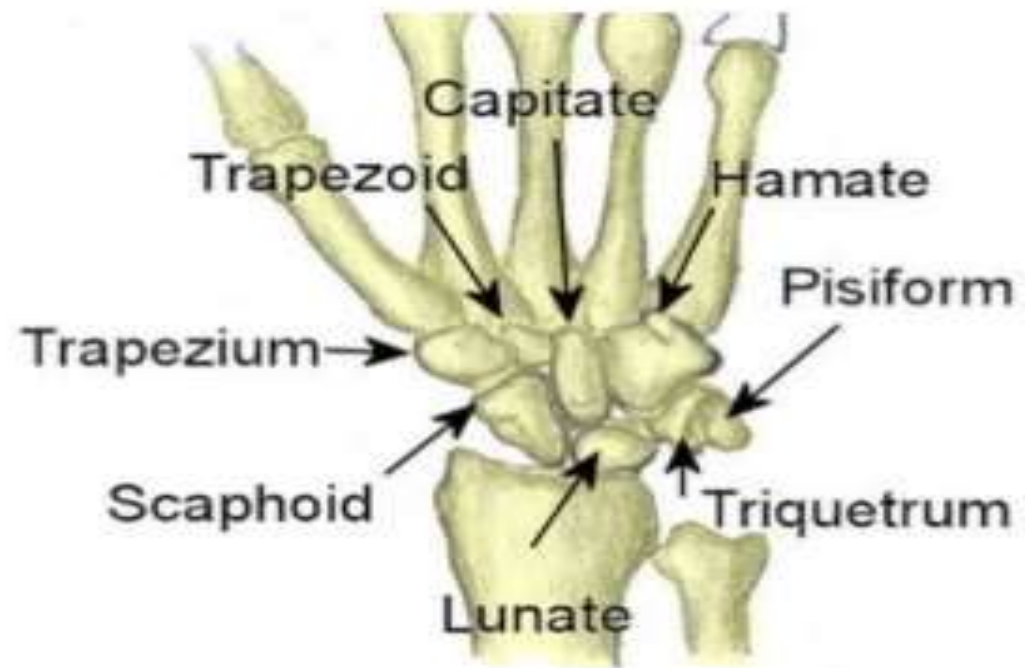
Inferior Radioulnar  
joint



## 6) Bones of the Hand

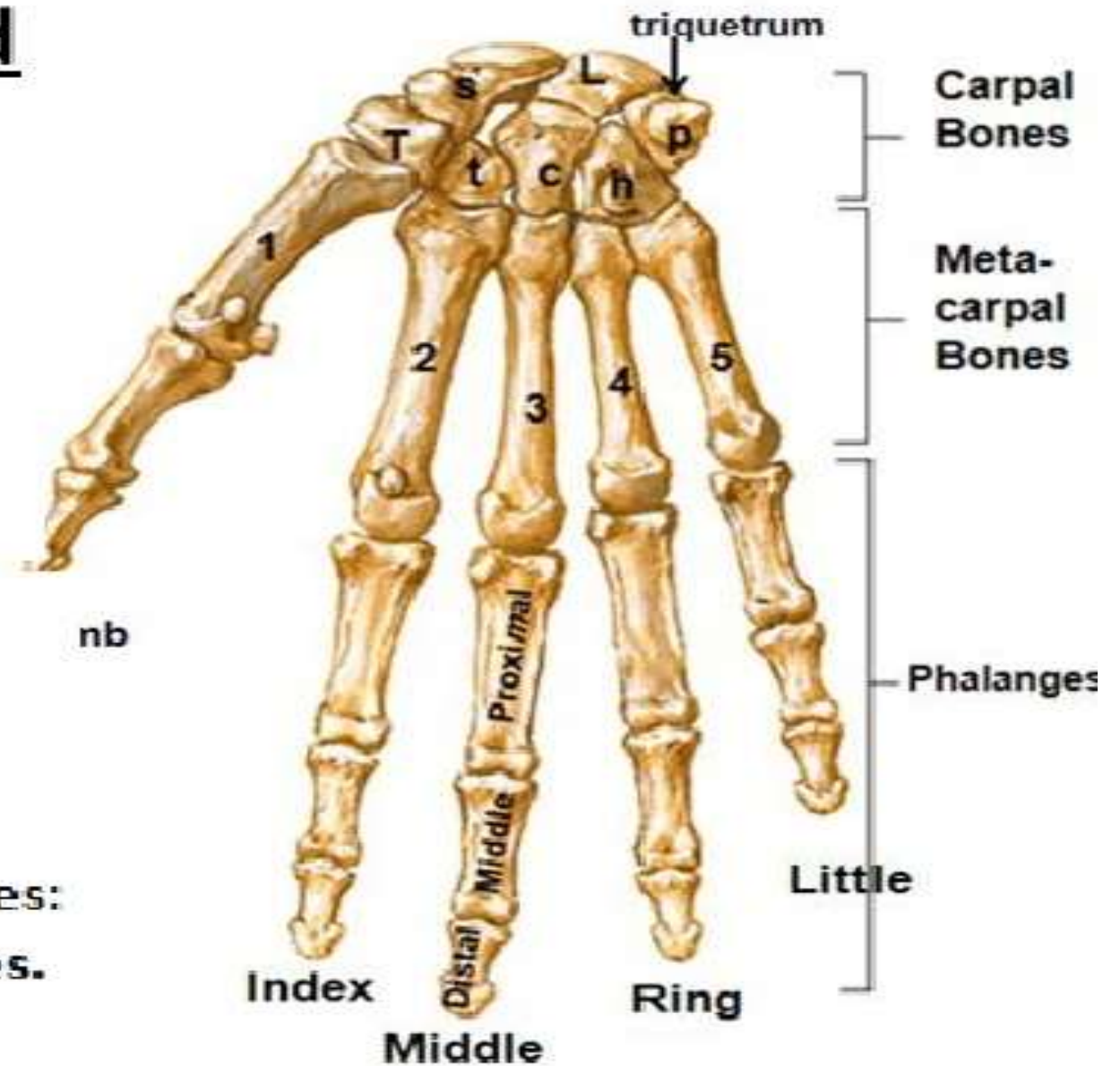
- ❖ There are eight carpal bones, made up of two rows (Proximal & distal row)
- ❖ Proximal row (scaphoid, lunate, triquetrum, pisiform)
- ❖ Distal row (Trapezium, trapezoid, capitate, hamate)
- ❖ The 8 carpal bones form the flexor-retinaculum “carpal tunnel” which transmits the median nerve & the flexor tendons of the fingers.
- ❖ 5 metacarpal bones
- ❖ 14 phalanges :
  - The thumb contains only 2 phalanges (Proximal & distal)
  - All other fingers contain 3 phalanges (Proximal, middle, distal)





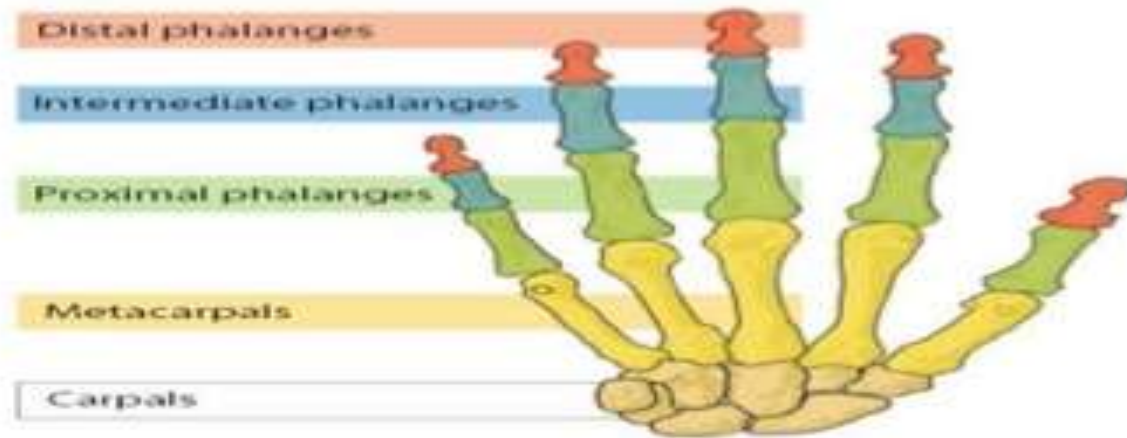
# Bones of the Hand

- 1) **8 carpal bones:**
  - Proximal row (scaphoid (s), lunate (L), triquetrum & pisiform (p)).
  - Distal row: Trapezium (T), trapezoid (t), capitate (c) & hamate (h).
  - The 8 carpal bones form with the flexor retinaculum "carpal tunnel" which transmits the median nerve & the flexor tendons of the fingers.
- 2) **5 metacarpal bones.**
- 3) **14 phalanges:**
  - The thumb contains only 2 phalanges: proximal & distal.
  - All other fingers contain 3 phalanges: proximal, middle & distal phalanges.



# The Metacarpals and Phalanges

- There are five metacarpal bones, each of which has a base, a shaft, and a head .
- The first metacarpal bone of the thumb is the shortest and most mobile. It does not lie in the same plane as the others but occupies a more anterior position.
- There are three phalanges for each of the fingers but only two for the thumb





# Joints of the hand

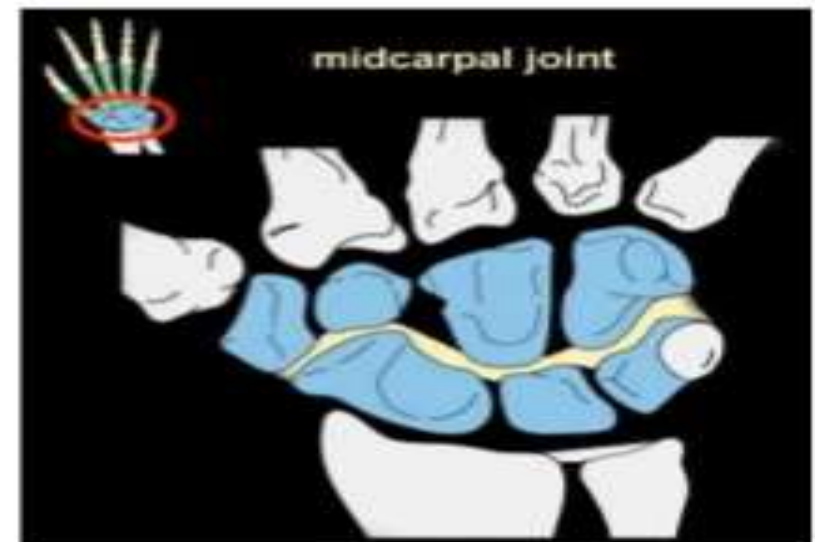
## 5 Joints

### i) **Wrist Joint :**

It is actually a collection of multiple bones and **joints**. The bones comprising the **wrist** include the distal ends of the radius and ulna, 8 carpal bones, and the proximal portions of the 5 metacarpal bones.

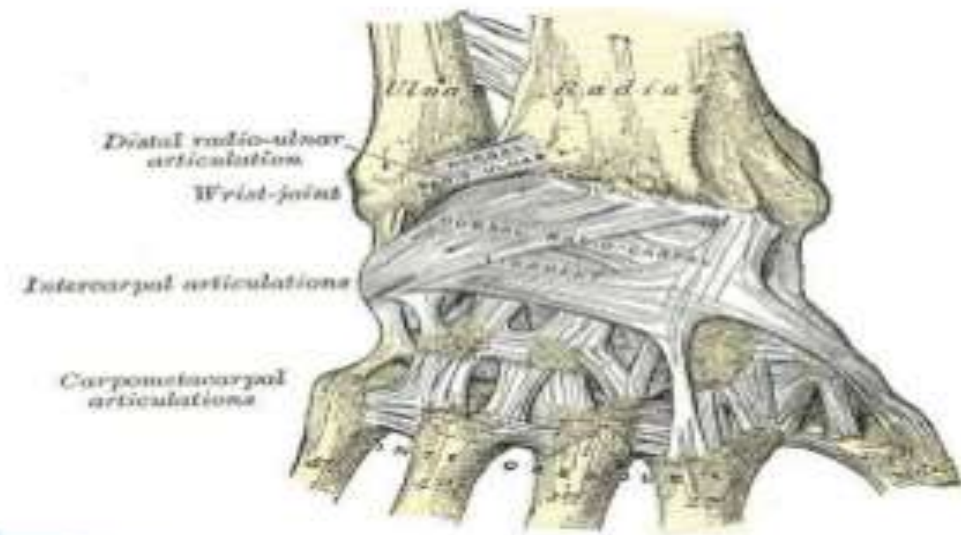
### ii) **Midcarpal Joint :**

The midcarpal joint is formed by the scaphoid, lunate, and triquetral bones in the proximal row, and the trapezium, trapezoid, capitate, and hamate bones in the distal row. The distal pole of the scaphoid articulates with two trapezoidal bones as a gliding type of joint.



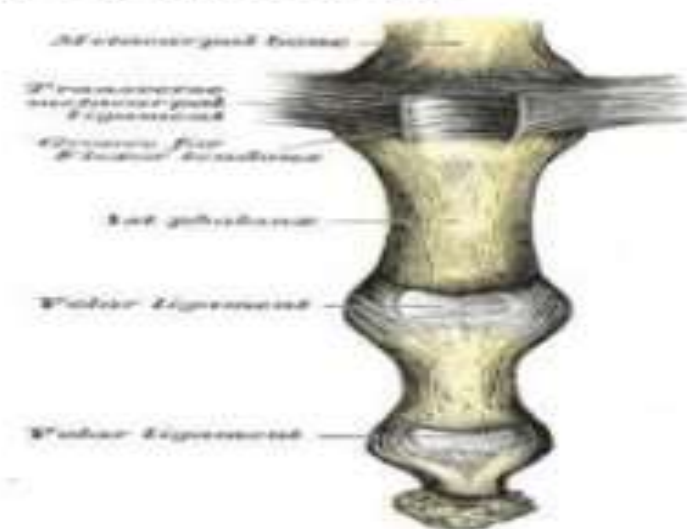
### iii) Carpo–metacarpal joint :

The carpometacarpal (CMC) joints are five joints in the wrist that articulate the distal row of carpal bones and the proximal bases of the five metacarpal bones. The CMC of the thumb or the first CMC, also known as the trapeziometacarpal joint (TMC).



#### iv) Metacarpo-phalangeal joints :

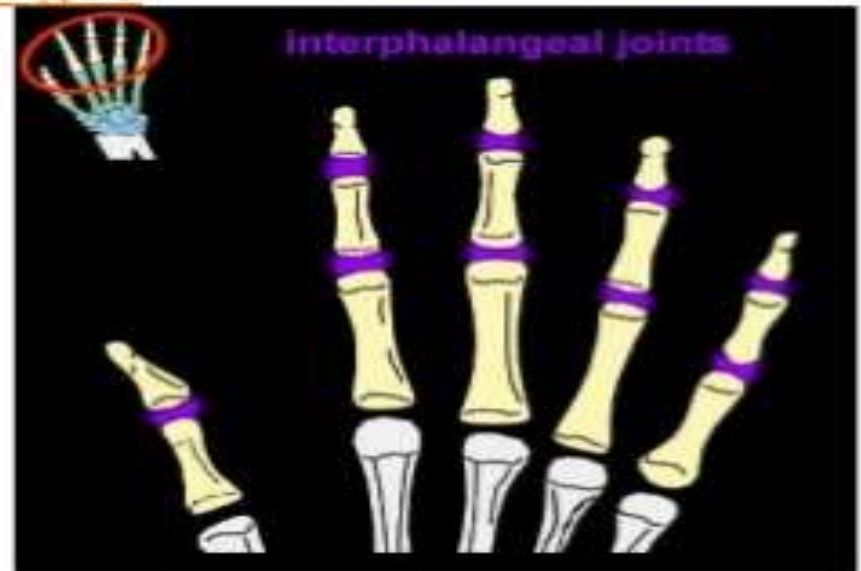
The metacarpophalangeal joints (MCP) refer to the joints between the metacarpal bones and the phalanges of the fingers. These are of the condyloid (Condyloid joint) kind, formed by the reception of the rounded heads of the metacarpal bones into shallow cavities on the proximal ends of the first phalanges, with the exception of that of the thumb, which is a ginglymus (Hinge joint).



## v) Inter-phalangeal Joints :

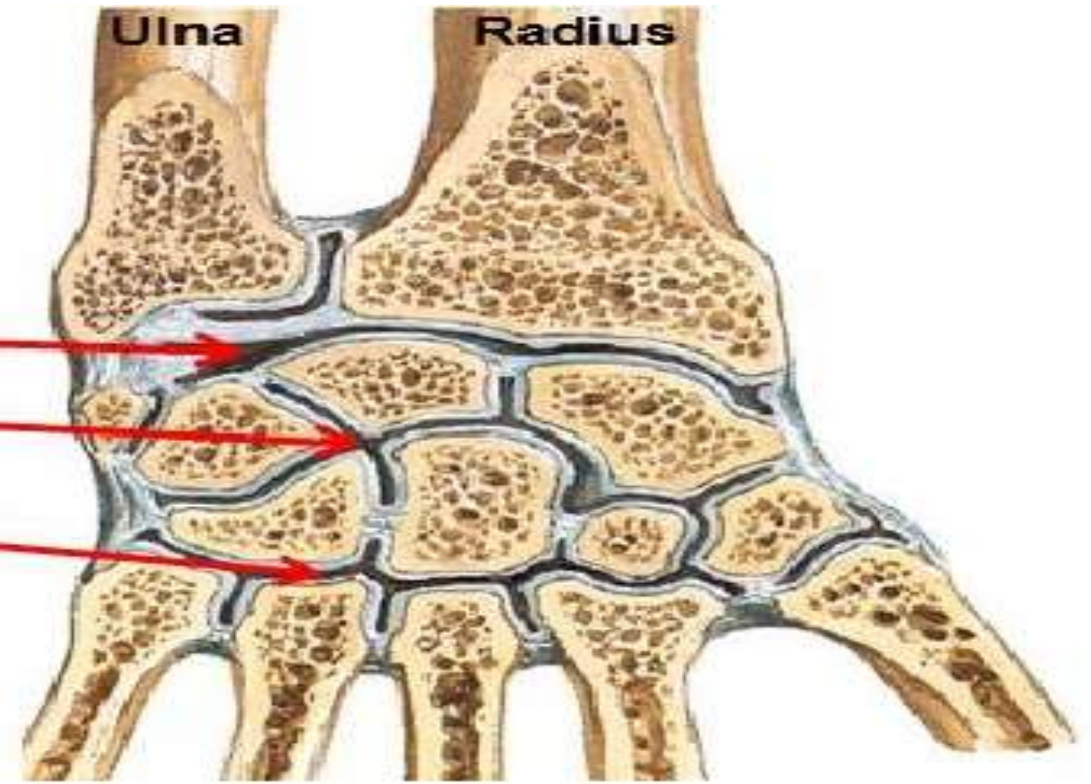
The interphalangeal articulations of the hand are the hinge joints between the phalanges of the hand (i.e. the finger bones)

- ❖ "Proximal interphalangeal joints" those between the first (also called proximal) and second (intermediate) **phalanges**
- ❖ "Distal interphalangeal joints" those between the second and third (distal) phalanges

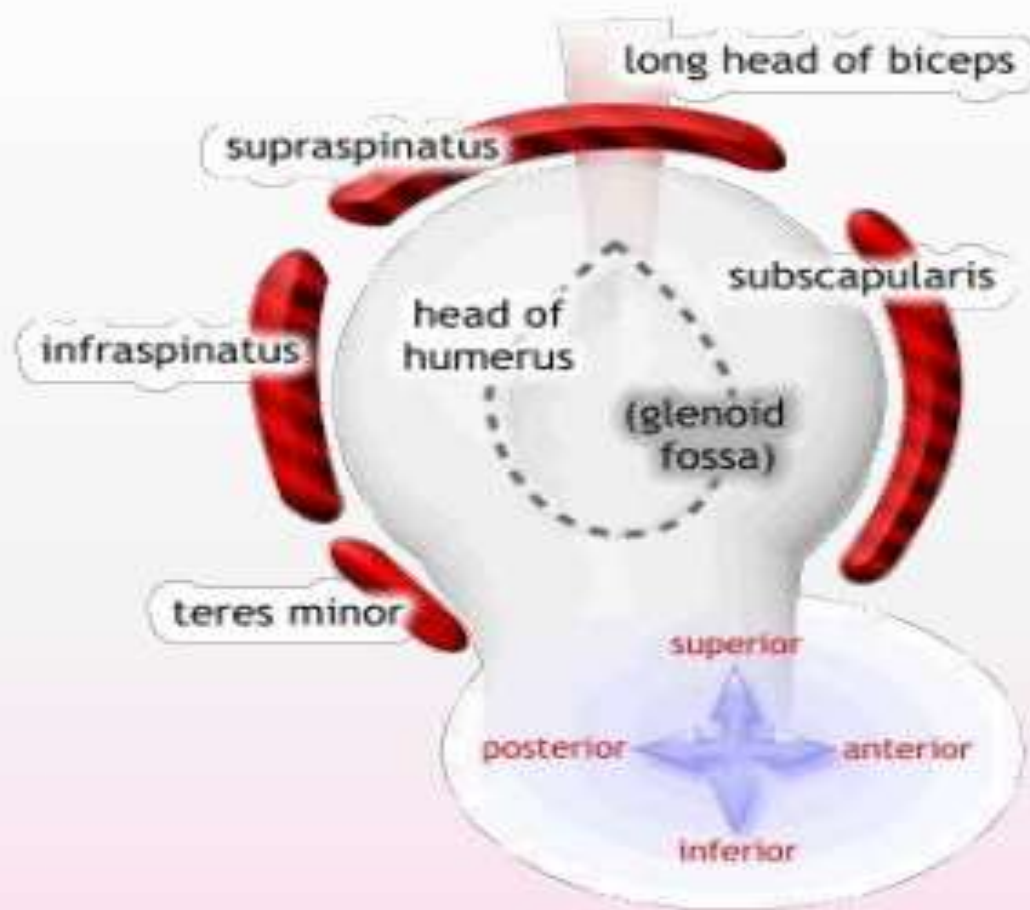


# Joints of the hand

- 1) Wrist (radio-carpal) joint.
- 2) Midcarpal joint.
- 3) Carpo-metacarpal joint.
- 4) Metacarpo-phalangeal joints.
- 5) Inter - phalangeal joints (proximal & distal).



# ROTATOR CUFF



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