



Joints of Upper Limb

DR. AHMED SALMAN
ASSOCIATE PROFESSOR OF ANATOMY

The Shoulder Girdle

It is formed of the clavicle (anteriorly) and scapula (posteriorly) and surrounds the upper part of the side of the chest.

The 2 bones articulate at the **acromioclavicular joint**.

The shoulder girdle is connected to the axial skeleton via:

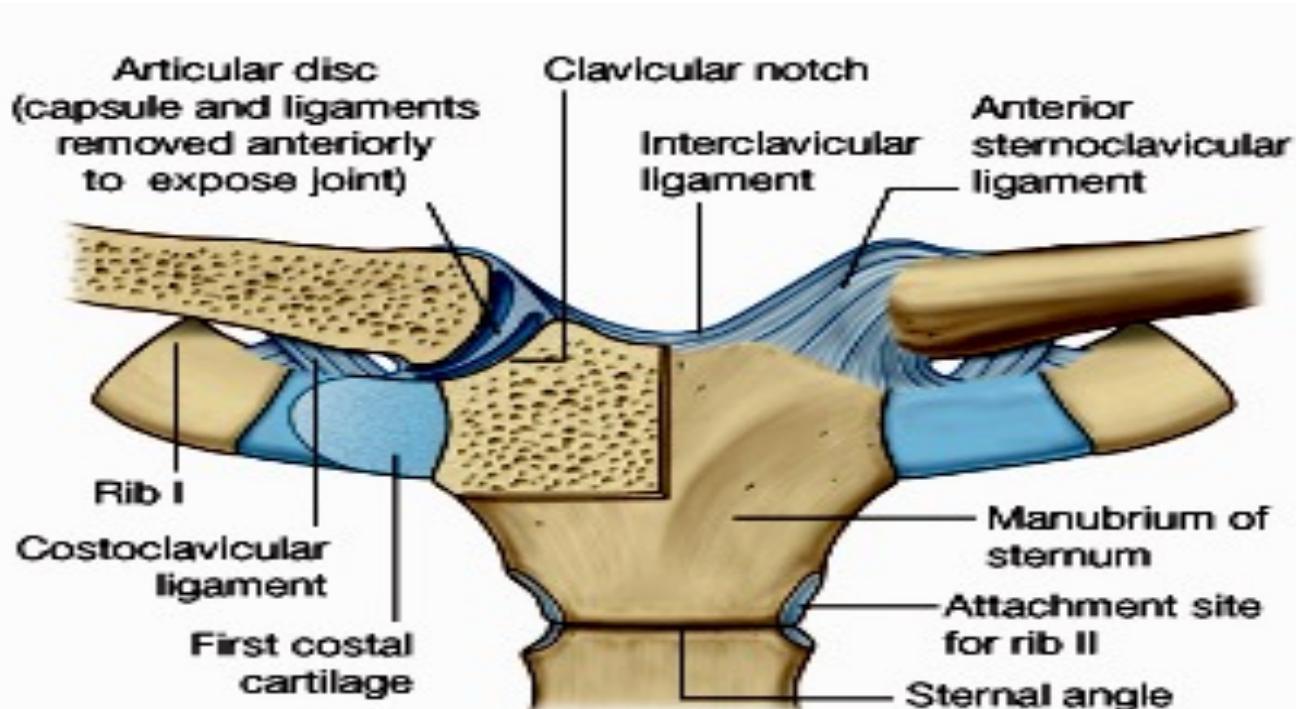
- Sternoclavicular joint (**anteriorly**).
- Muscles of the back (**posteriorly**).

Function: It suspends the upper limb from the axial skeleton and increases its range of movement.

Sternoclavicular joint

Type : It is synovial joint (modified saddle joint)

Articular surfaces: the **medial end of the clavicle** and the **clavicular notch** of the **manubrium of sternum** together with a small part of the **first costal cartilage**.

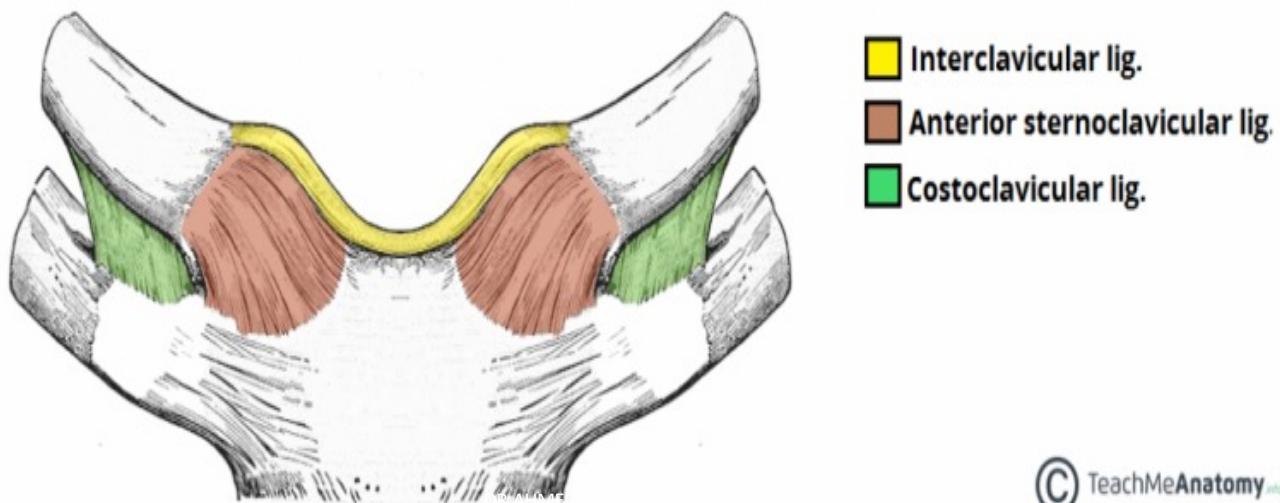


Ligaments:

1. Anterior sternoclavicular ligament .
2. Posterior sternoclavicular ligament .

3. Interclavicular ligament: connects the sternal ends of the 2 clavicles above the upper border of the manubrium.

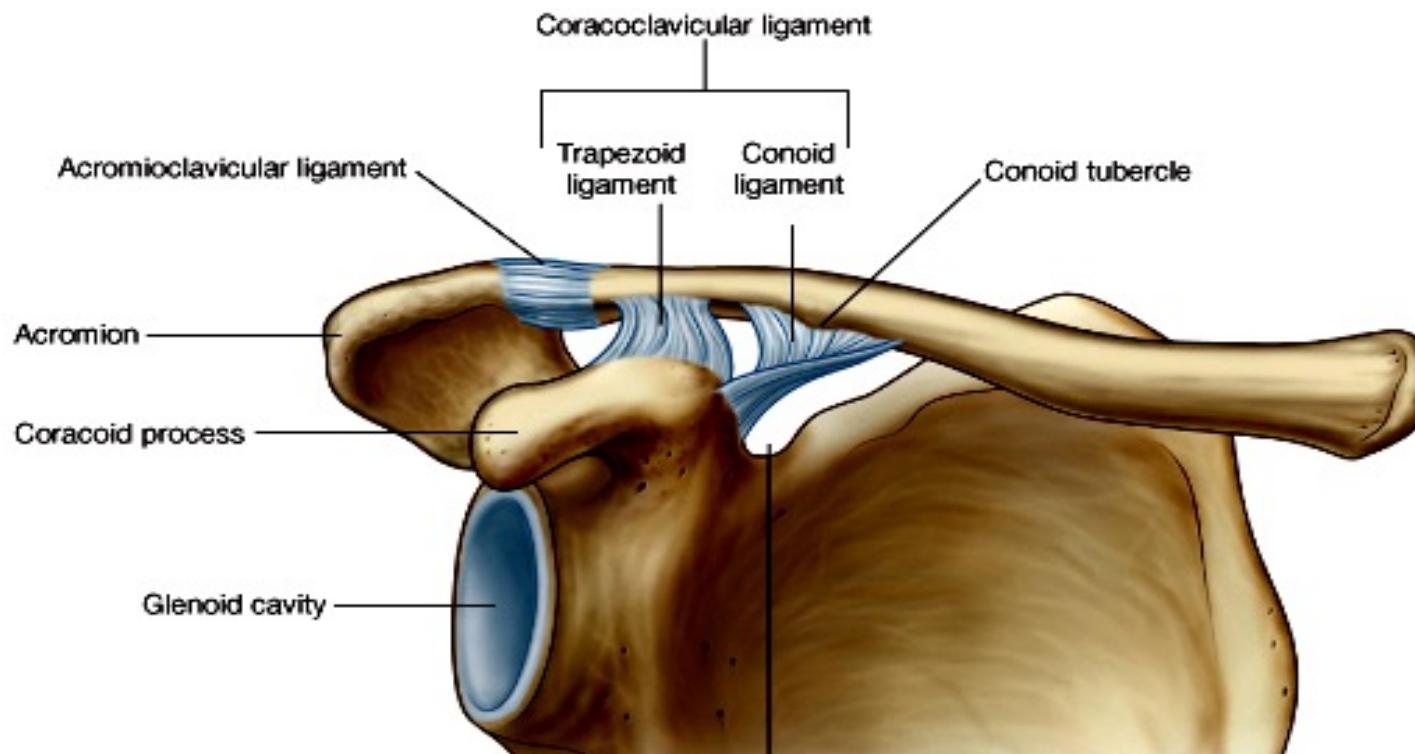
4. Costoclavicular ligament: extends from the 1st costochondral junction to the inferior surface of the clavicle near its medial end (it is the main stabilizing factor).



Acromioclavicular joint

Type: It is a plane synovial joint

Articular surfaces: Medial border of acromion and lateral end of the clavicle.



Ligaments:

1. **Acromioclavicular ligament** covers the upper aspect of the joint.
2. **Coracoclavicular ligament**: has 2 parts:
 - a. **Trapezoid part** (thin quadrangular): extends from the **coracoid process** to the trapezoid ridge of the clavicle.
 - b. **Conoid part** (thick cone-like): extends from the **coracoid process** to conoid tubercle of the clavicle.

Coracoacromial ligament:

The ligament together with the acromion and the coracoid process forms the **coracoacromial arch**

The ligament is separated from the capsule of the shoulder joint by the **subacromial bursa**.

Movements at the joints of the shoulder girdle:

Slight gliding and rotation occur at the 2 joints of the shoulder girdle.

Movements of the scapula

Elevation:

- a. Upper fibers of trapezius.
- B. Levator scapulae.

Depression:

- a. Lower fibers of trapezius.
- b. Pectoralis minor.

Protraction (forward movements):

- a. Serratus anterior.
- b. Pectoralis minor

Retraction (backward movement):

- a. Rhomboids minor and major
- b. Middle fibers of trapezius

Shoulder separation

READ ONLY

It happen as a result of Acromioclavicular Dislocation

The acromion being push below the lateral end of the clavicle, tearing the coracoclavicular ligament.



DR.AHMED SALMAN

Shoulder (Glenohumeral) Joint

Type : It is Synovial ball-and-socket joint

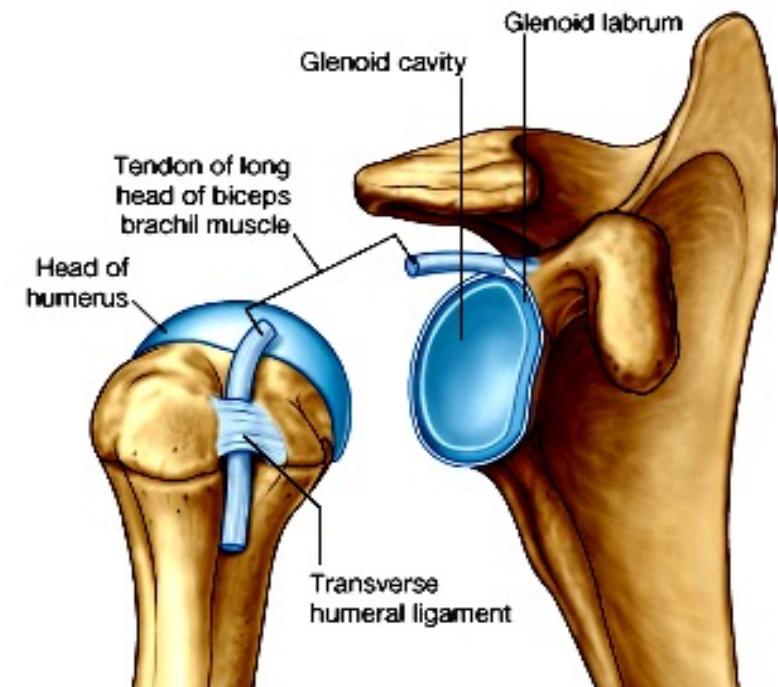
Articular surfaces: The head of the humerus and the glenoid cavity of the scapula. The glenoid cavity is deepened by the presence of a fibrocartilaginous rim called the glenoid labrum.

Fibrous capsule :

Attachments:

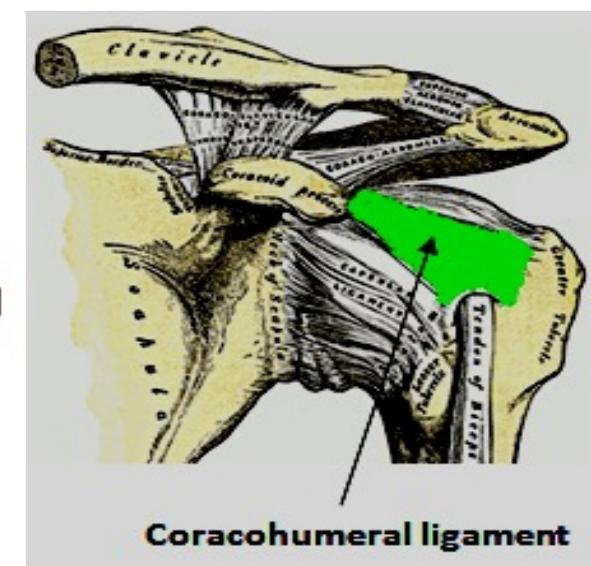
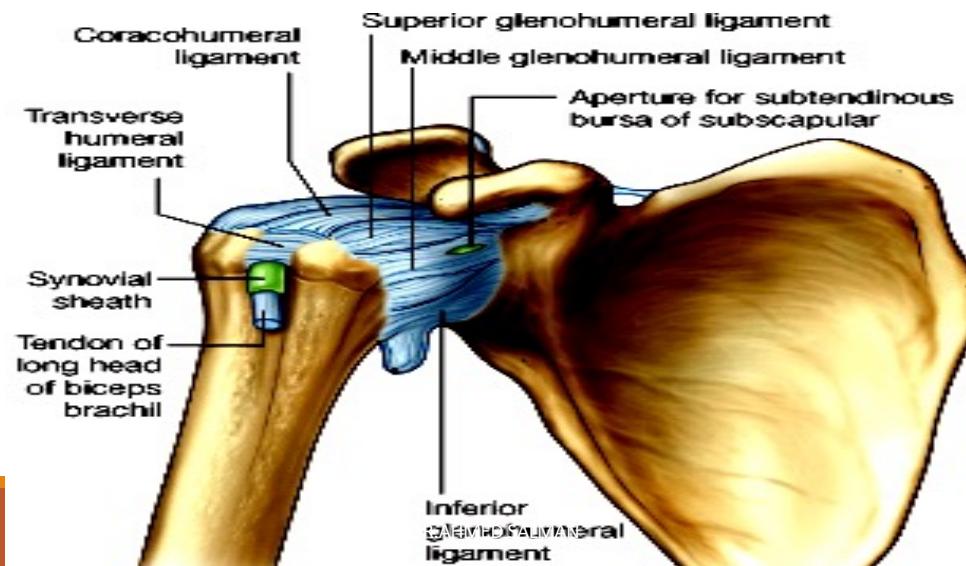
Medially: to the margin of the glenoid cavity

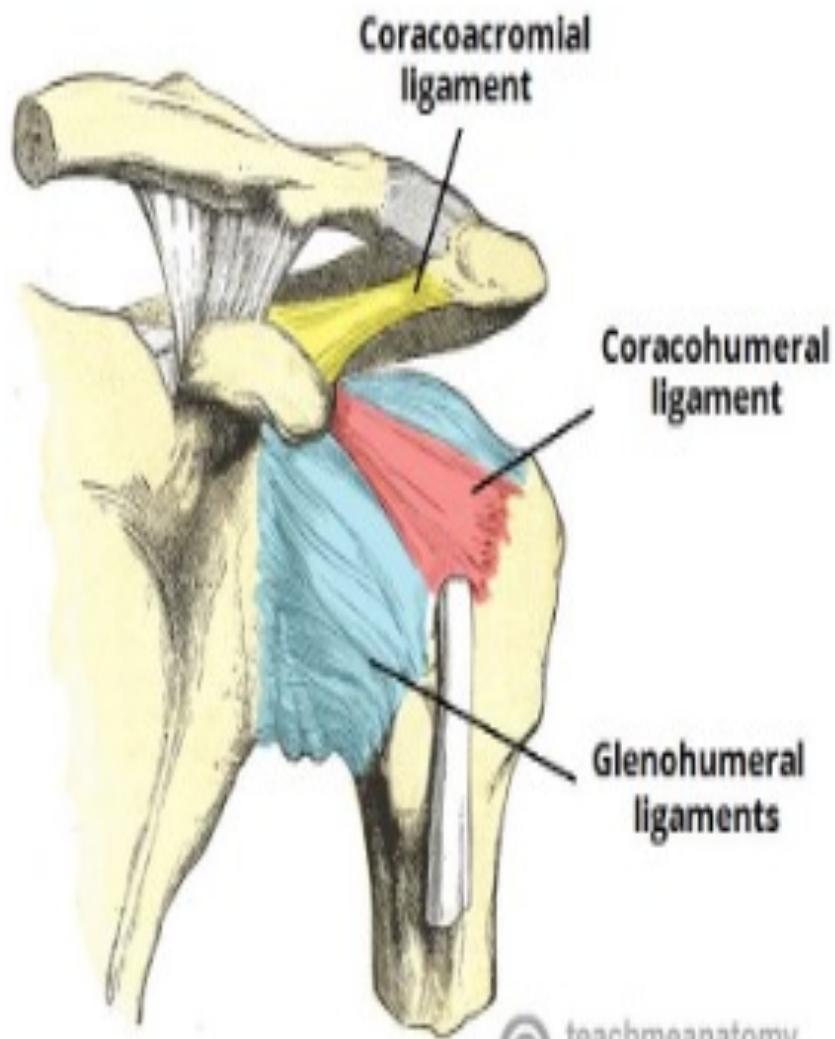
Laterally: to the anatomical neck of the humerus



Ligaments:

- 1-Superior, middle, and inferior **Glenohumeral** ligaments strengthen the front of the capsule.
- 2-**Coracohumeral ligament** extends from the coracoid process to the greater tuberosity of the humerus.
- 3-The **transverse humeral** extends between the greater & lesser tuberosities.
- 4-The **coracoacromial** ligament extends between the coracoid process and the acromion. It protects the superior aspect of the joint





Coracoacromial ligament



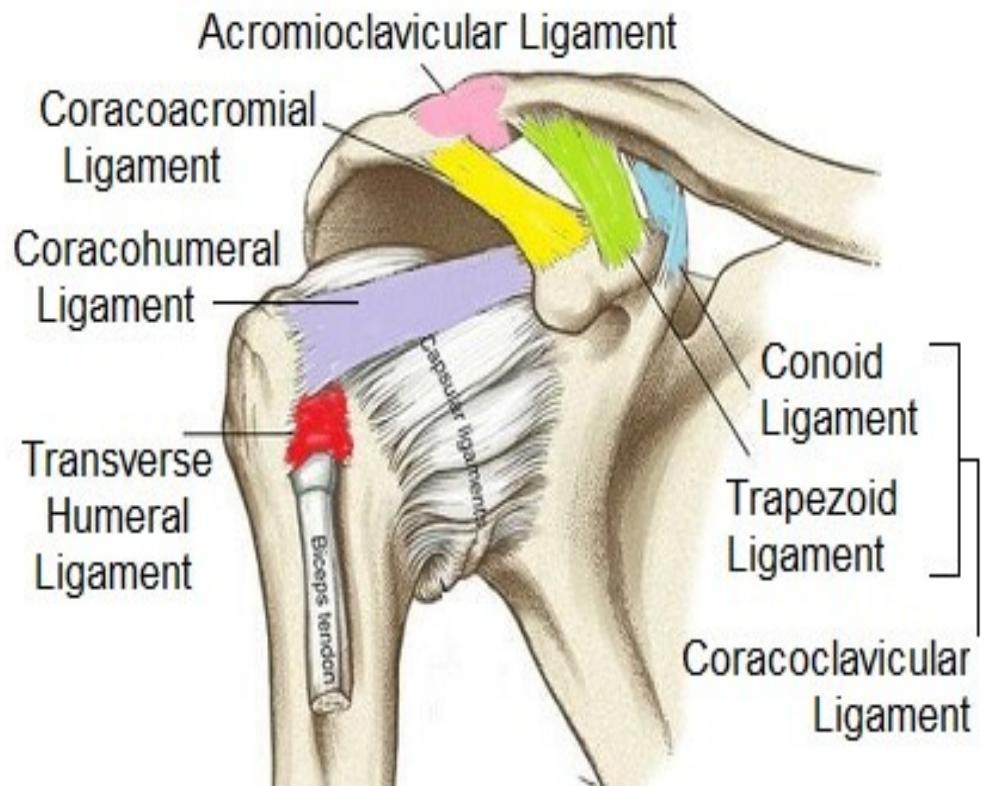
READ ONLY

Arterial blood supply:

1. Suprascapular artery.
2. Anterior circumflex humeral artery.
3. Posterior circumflex humeral artery.

Nerve supply:

1. Suprascapular nerve.
2. Axillary nerve.
3. Lateral pectoral nerve.



MOVEMENTS:

Flexion: by the anterior fibers of the deltoid, pectoralis major, biceps, and coracobrachialis

Extension: by the posterior fibers of the deltoid, latissimus dorsi

Abduction: The middle fibers of the deltoid, assisted by the supraspinatus

Adduction: by the pectoralis major, latissimus dorsi, and teres major.

Lateral rotation: by infraspinatus, the teres minor, and the posterior fibers of the deltoid

Medial rotation: by the subscapularis, the latissimus dorsi, the teres major, pectoralis major and the anterior fibers of the deltoid muscle.

Circumduction: This is a combination of the above movements

Causes of weakness of shoulder joint

- 1-Wide range of movement
- 2-Large size of head with shallow glenoid cavity
- 3-Lax capsule
- 4- Opening in the capsule

Factors strength shoulder joint

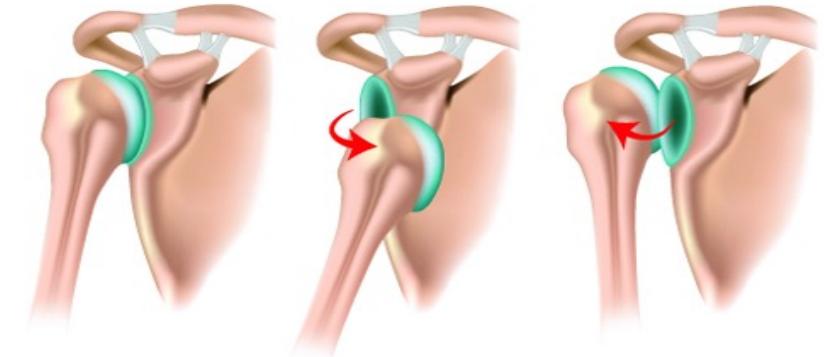
- 1- Coracoacromial arch
- 2-Rotator cuff muscles
- 3- Glenoid labrum

Clinical note:

Dislocation of the shoulder joint occurs commonly downwards at the least supported part. This may injury the axillary nerve that runs close to the surgical neck of the humerus.



Shoulder Dislocation



Normal
anatomy

Anterior
dislocation

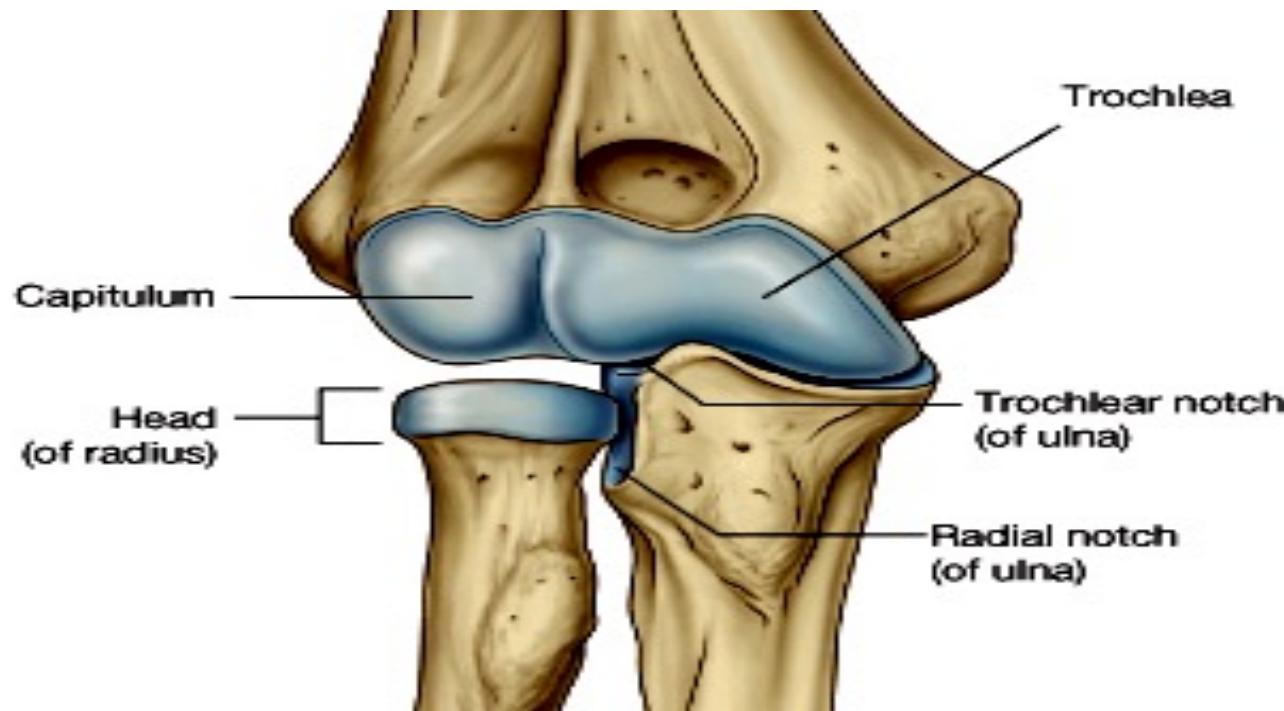
Posterior
dislocation

ELBOW JOINT

Type: Synovial hinge joint

Articular surfaces:

- The trochlea of the humerus with the trochlear notch of the ulna
- Capitulum of the humerus with the head of the radius.



Fibrous capsule:

Attachments:

READ ONLY

Proximal (upper) attachment:

- To the front of the humerus above the coronoid and radial fossae.
- To the back of the humerus above the olecranon fossa. (The 3 fossae are intracapsular).
- Medially: to the margin of the trochlea.
- Laterally and posteriorly: to the margin of the capitulum (the roots of the lateral and medial epicondyles are **extracapsular**).

Distal (lower) attachment:

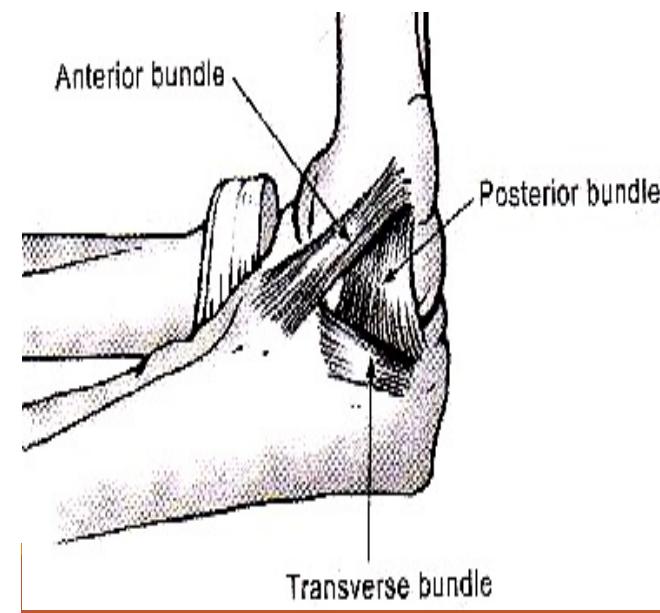
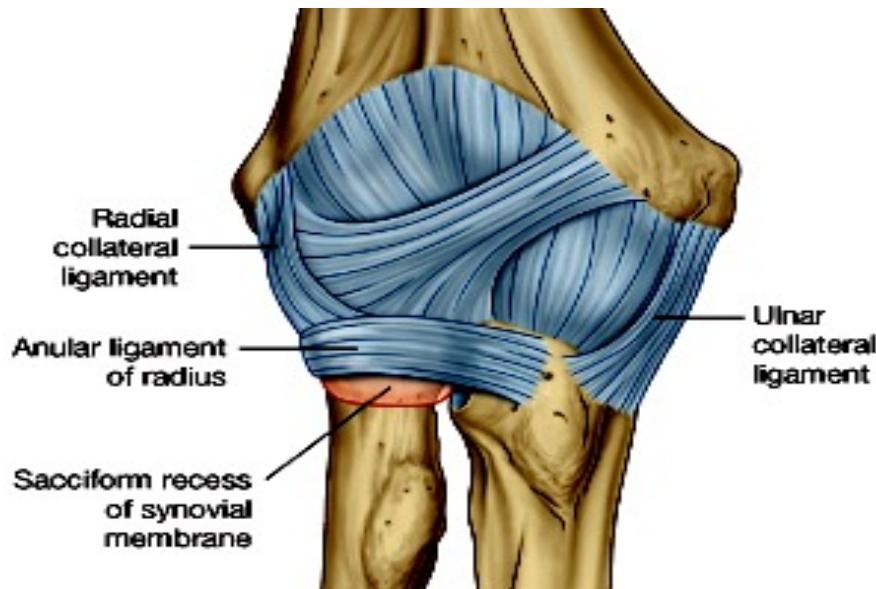
- Anteriorly: to coronoid process and annular ligament.
- Medially and posteriorly: to the margins of the coronoid and olecranon processes.
- Laterally and posteriorly: to the annular ligament.

Note: From the above mentioned attachments, it is clear that the capsule of the elbow joint is continuous with that of the superior radioulnar joint laterally.

Ligaments:

- **Lateral (radial) collateral** :from the lateral epicondyle of the humerus to the annular ligament.
- **Medial (ulnar) collateral** ligament consists of Anterior, Posterior & Transverse bands

It extends from the medial epicondyle of humerus to the coronoid & olecranon processes of ulna.



Arterial blood supply: from the anastomosis around the elbow.

READ ONLY

Nerve supply:

- Main supply: from the musculocutaneous, radial and ulnar nerves.
- Contributions: from the median and anterior interosseous nerves.

Movements:

- **Flexion:** brachialis (main flexor), biceps brachii (flexor of supinated forearm) and brachioradialis (with forearm in midprone position).
- **Extension:** By Triceps & anconeus muscles

Stability of Elbow Joint

- The elbow joint is stable because of the wrench-shaped articular surface of the olecranon and the pulley-shaped trochlea of the humerus.
- Strong Ligament



Arthrocentesis of the Elbow Joint

When the joint is distended with fluid, the posterior aspect of the joint becomes swollen as posterior walls of the capsule are weak.

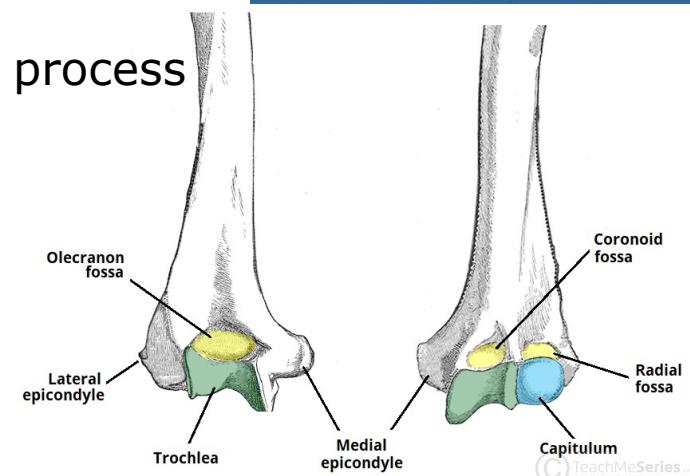
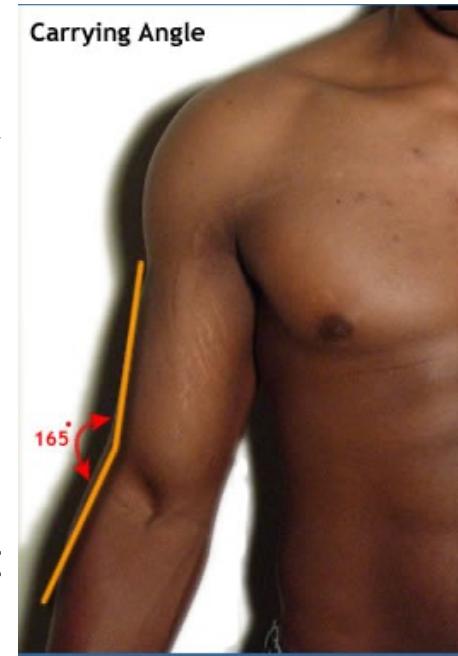
Aspiration of joint fluid can easily be performed through the back of the joint



DR.AHMED SALMAN

The carrying angle:

- It is the angle between the long axis of the arm and that of the fully extended and supinated forearm.
- It is directed laterally measuring about 165° .
- It allows for holding objects in the hand in full extension of the elbow
- **It is caused by**
 - The medial edge of the trochlea of the humerus which projects about $1/2\text{cm}$ below the lateral edge
 - The obliquity of the superior articular surface of the coronoid process
- The angle **disappears** when the extended forearm
- is pronated or fully flexed.





Cubitus varus



Normal



Cubitus valgus

Carrying angle

Superior (Proximal) Radioulnar Joint

Type : It is a synovial pivot joint

Articular surfaces: the head of the radius ,the radial notch on the ulna and the annular ligament

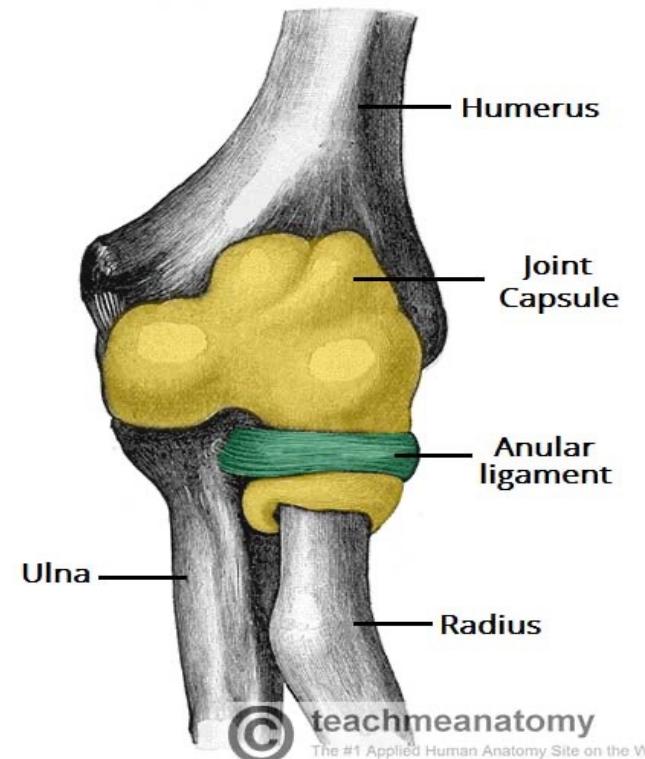
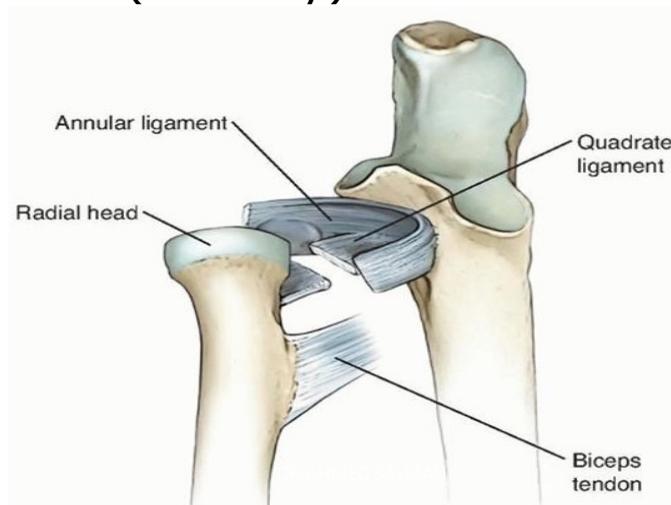
Ligament:

1. Annular ligament:

Is attached to the anterior and posterior margins of the radial notch of ulna and forms a collar around the head of the radius

2. Quadrature ligament:

Extends from the lower margin of the radial notch of the ulna (medially) to the neck of the radius (laterally).



Inferior (Distal) Radioulnar Joint

Type : Synovial pivot joint

Articular surfaces: the head of the ulna and the ulnar notch of the radius

Articular disc : It is a triangular fibro cartilaginous disc , It separates the inferior radioulnar joint from the wrist joint

Movements of superior and inferior radioulnar joints:

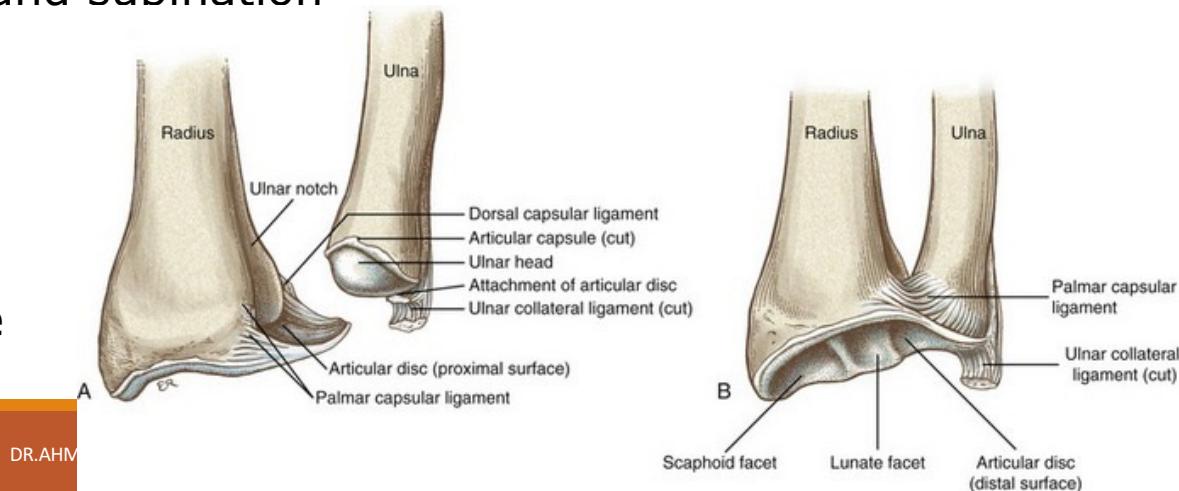
- **Pronation:** by the pronator teres and the pronator quadratus.
- **Supination:** by the biceps brachii and the supinator.
- Brachioradialis initiates both pronation and subination

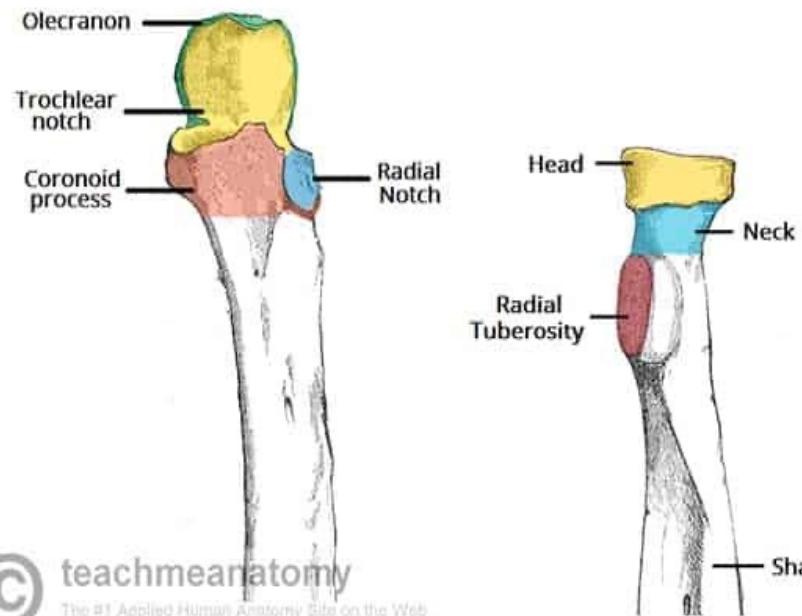
The middle radio-ulnar joint

Type : Syndesmosis

Composed of

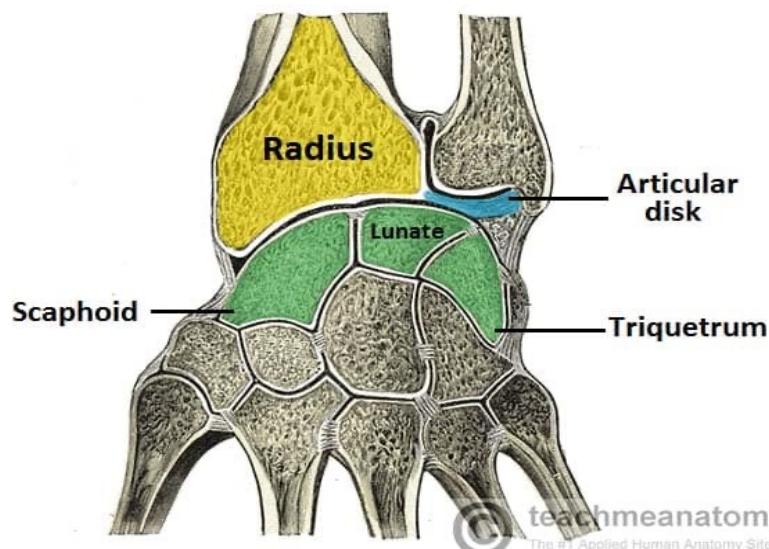
- 1-Oblique cord
- 2-Interosseous membrane





© teachmeanatomy

The #1 Applied Human Anatomy Site on the Web



teachmeanatomy

The #1 Applied Human Anatomy Site on the Web

Radioulnar Joints

Superior radio-ulnar joint



DR.AHMED SALMAN

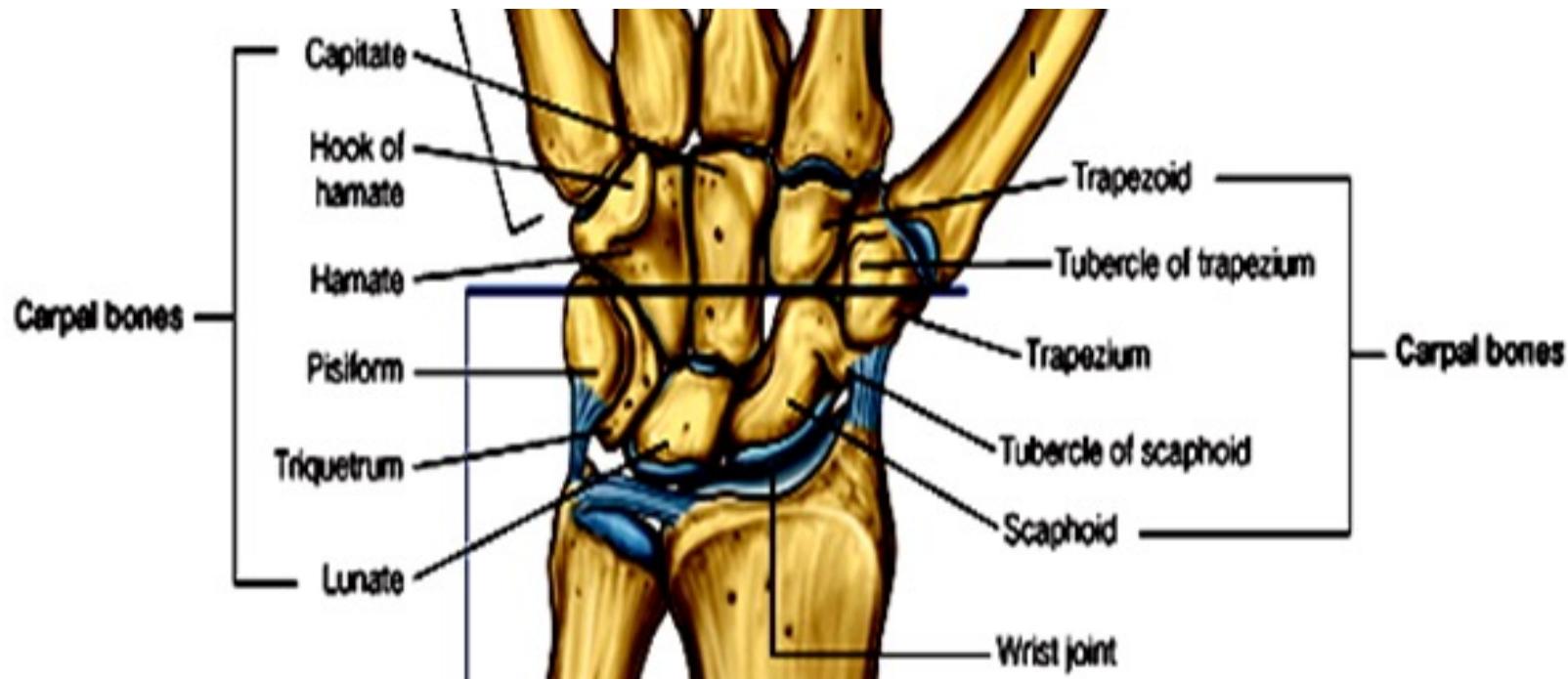
Wrist Joint (Radiocarpal Joint)

Type : Synovial ellipsoid joint

Articular surfaces:

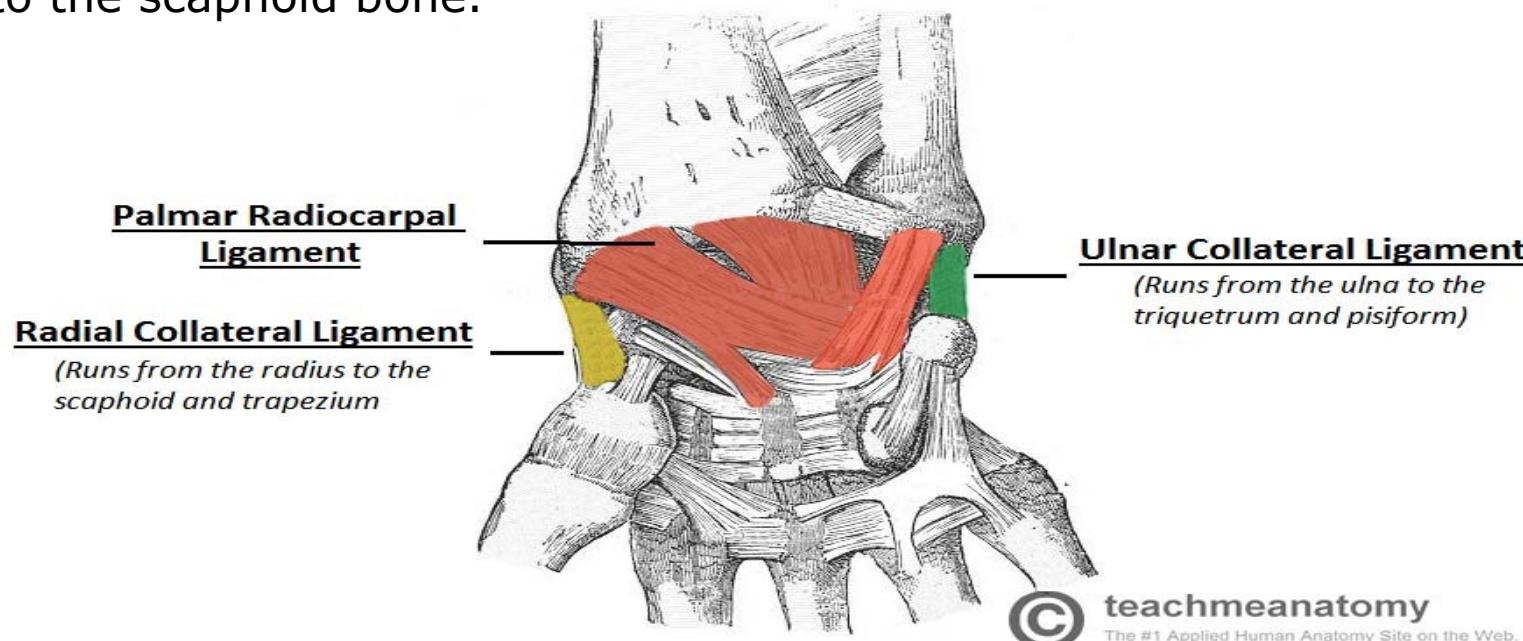
Above : the distal end of the radius and the articular disc of inferior Radioulnar Joint

Below : the scaphoid, lunate, and triquetral bones.



Ligaments:

- **Anterior and posterior radiocarpal** ligaments strengthen the capsule.
- **Medial (ulnar) collateral ligament** is attached to the styloid process of the ulna and to the triquetral bone.
- **Lateral (radial) collateral ligament** is attached to the styloid process of the radius and to the scaphoid bone.



teachmeanatomy

The #1 Applied Human Anatomy Site on the Web.

Movements:

Flexion: flexor carpi radialis, flexor carpi ulnar and palmaris longus ,flexor digitorum superficialis, flexor digitorum profundus and flexor pollicis longus.

Extension: extensor carpi radialis longus, extensor carpi radialis brevis and extensor carpi ulnaris ,extensor digitorum, extensor digiti minimi, extensor indicis and extensor pollicis longus.

Abduction: flexor carpi radialis, extensors carpi radialis longus and brevis.

Adduction: flexor carpi ulnaris and extensor carpi ulnaris.

The range of adduction is greater than abduction because of the shortness of the styloid process of the ulna (being proximal than that of the radius).



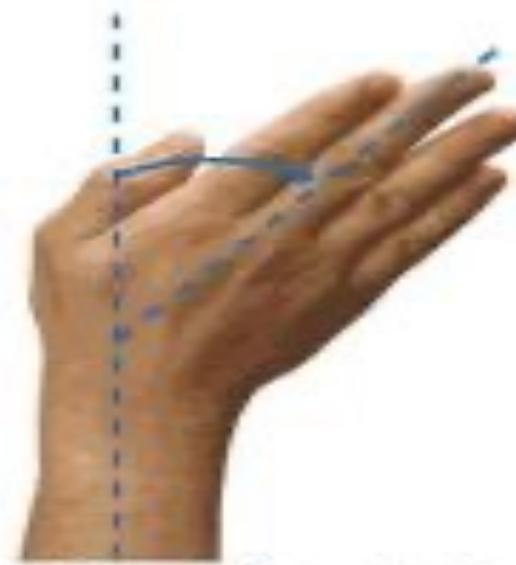
Flexion



Extension



Radial Deviation



Ulnar Deviation



Pronation



Supination

Carpometacarpal joint of the thumb

Type :synovial saddle joint

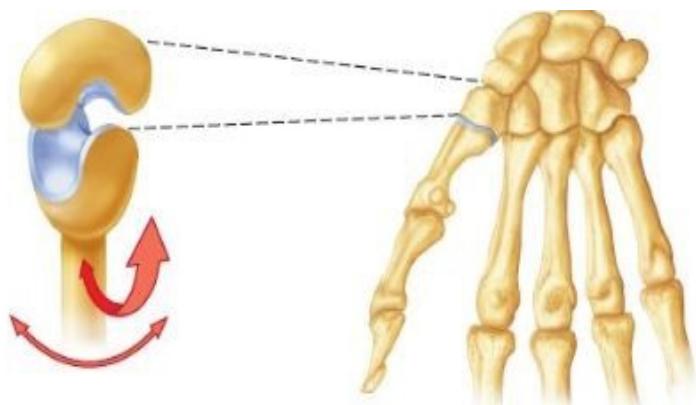
Articular surfaces: between 1st metacarpal and the trapezium.

Movements :flexion, extension, abduction, adduction and opposition

Metacarpophalangeal joints of medial four fingers

Type: ellipsoid synovial

Articular surfaces: the heads of the metacarpal bones and the proximal phalanges.



e Saddle joint (carpometacarpal joint of thumb)

R.AHMED SALMAN



thank
you