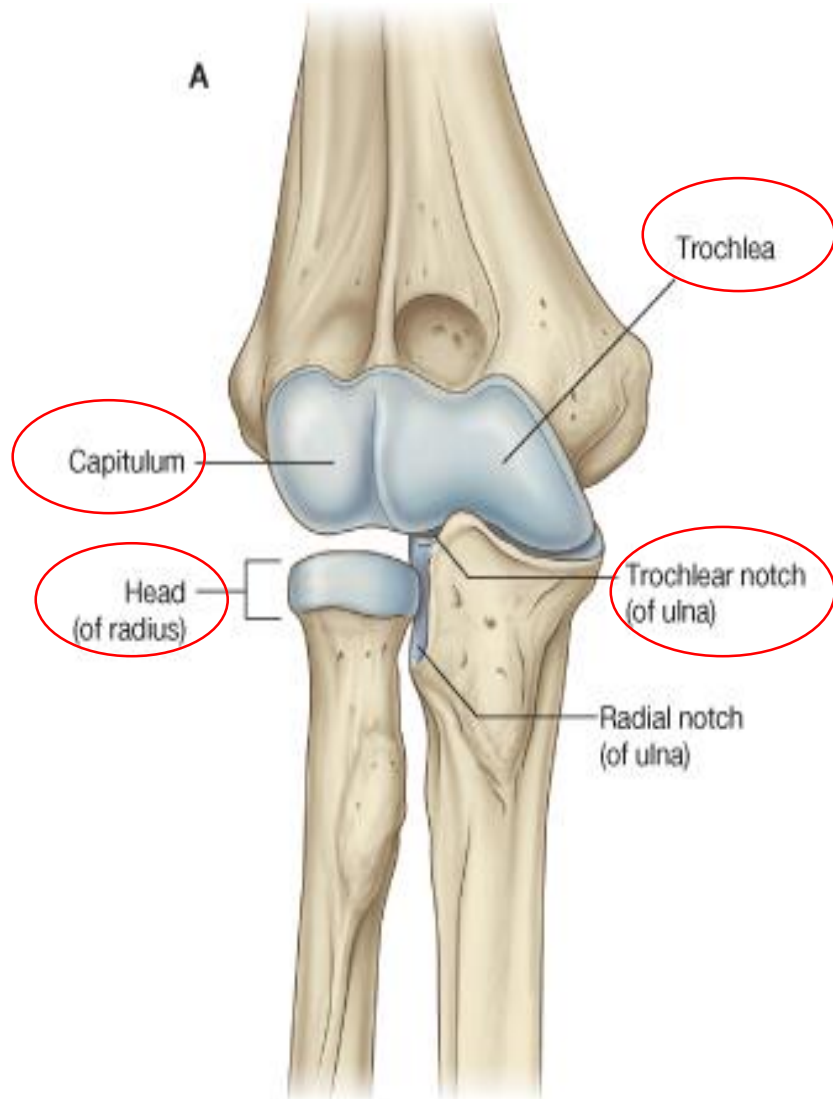


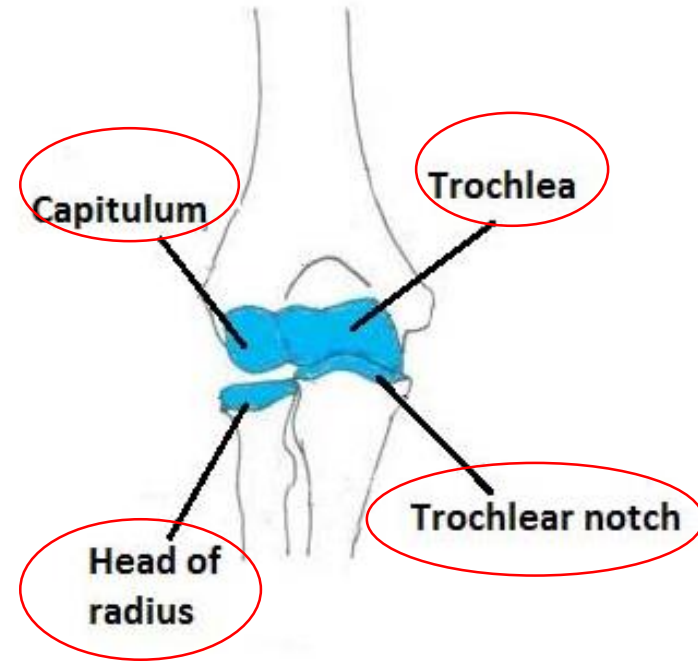
# THE JOINTS

Dr. Amja Shatarat, dept.of Anatomy, School of Medicine, The  
Uni. of Jordan

# 1- Type: Synovial hinge joint



Anterior:



## 2- Articulation:

**A-Between the trochlea and capitulum of the humerus and**

**B-The trochlear notch of the ulna and the head of the radius**

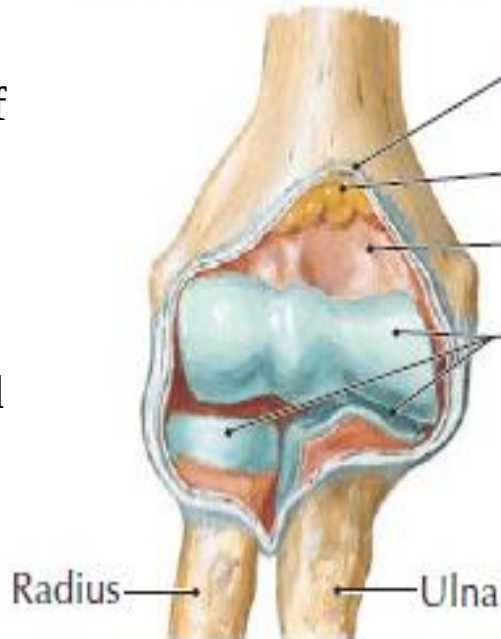
**3-The articular surfaces are covered with hyaline cartilage.**

#### 4-Capsule:

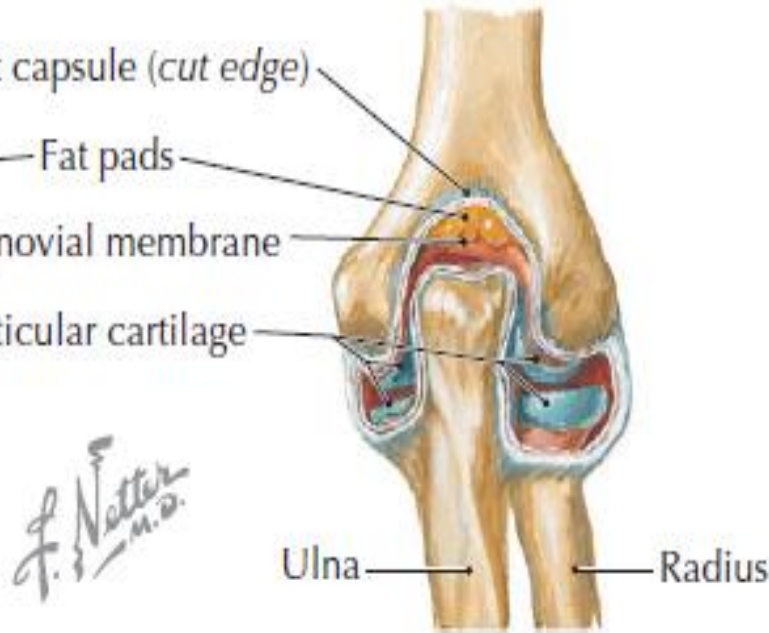
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**Anteriorly, it is attached above to the humerus** along the upper margins of the coronoid and radial fossae and to the front of the medial and lateral epicondyles and below to the margin of the coronoid process of the ulna and to **the anular ligament**, which surrounds the head of the radius.

Opened joint: anterior view



Opened joint: posterior view



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**Posteriorly, it is attached above to the margins of the olecranon fossa of the humerus and below to the upper margin and sides of the olecranon process of the ulna and to the anular ligament.**

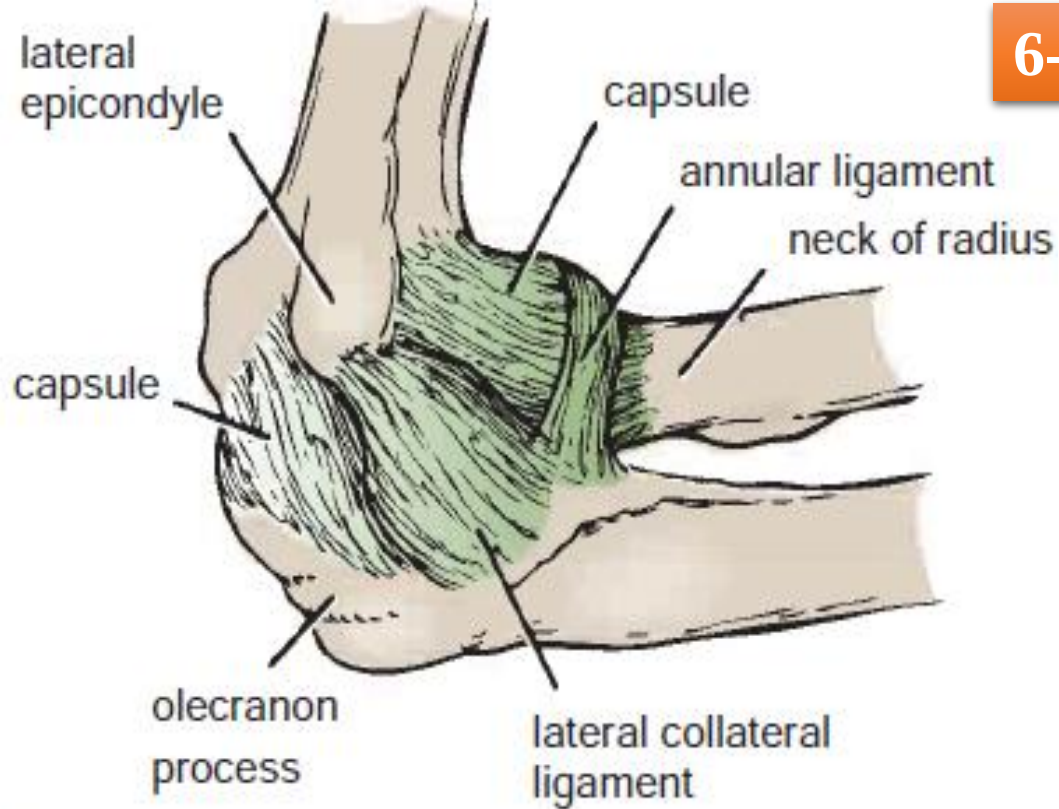
important

**5-Synovial membrane:** This lines the capsule and covers fatty pads in the floors of the coronoid, radial, and olecranon fossae; it is continuous **below with the synovial membrane of the proximal radioulnar joint.**

## 6-Ligaments:

a. The medial ligament is also triangular and

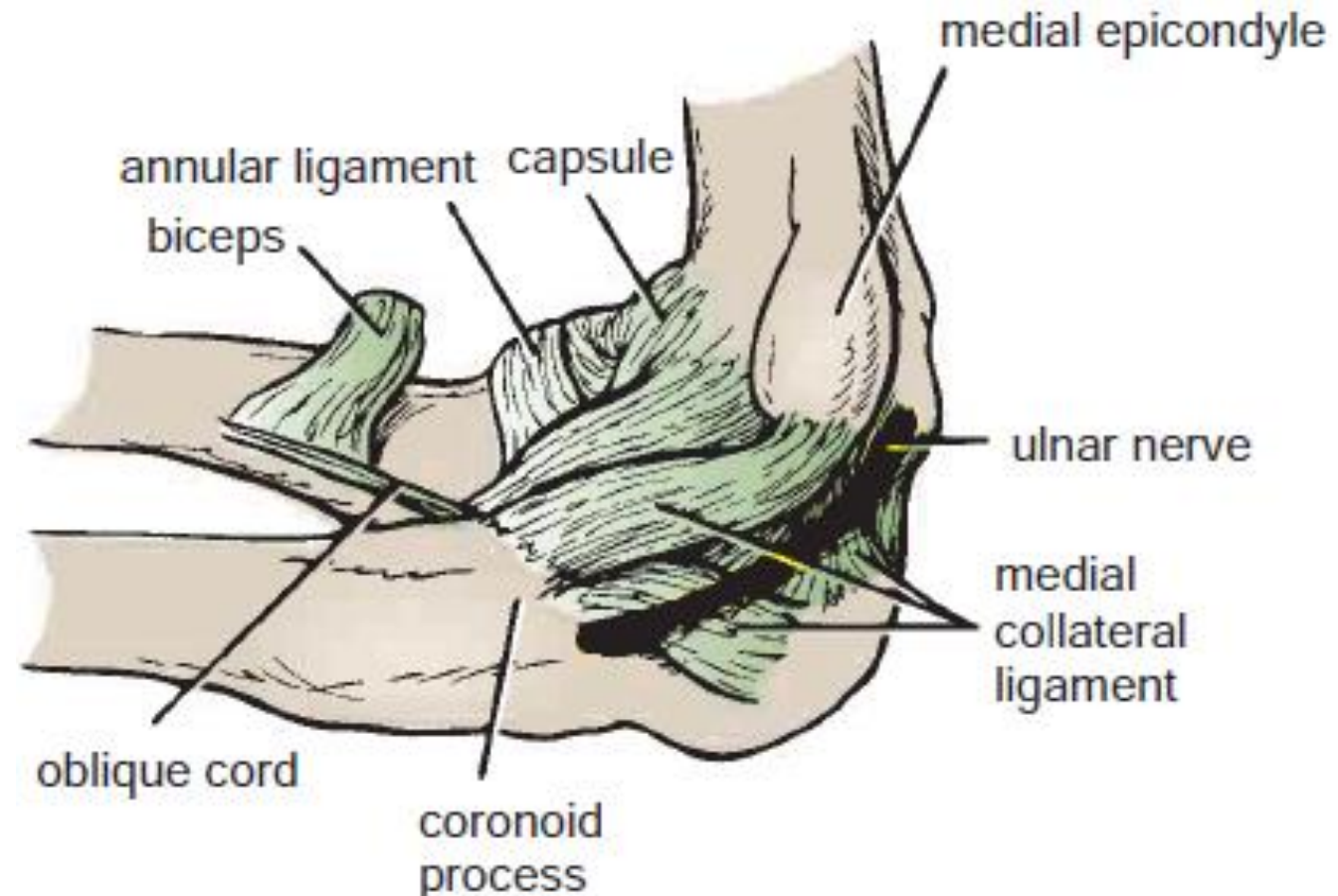
The medial ligament is also triangular and consists principally of three strong bands: which connects different parts of the medial side of the humerus (medial epicondyle) and different parts of the upper end of the ulna.



A

**b. The lateral ligament:**

**is triangular** and is attached by its apex to the lateral epicondyle of the humerus and by its base to the upper margin of the annular ligament.



## 7-Important Relations

### ■ ■ Anteriorly:

The brachialis, the tendon of the biceps, the median nerve, and the brachial artery

### ■ ■ Posteriorly:

The triceps muscle, a small bursa intervening

### ■ ■ ■ Laterally:

The common extensor tendon and the supinator.

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### Important : Medially

The ulnar nerve passes behind the medial epicondyle and crosses the medial ligament of the joint.

### ❑ Blood Supply of the Elbow Joint

The articular arteries are derived from the anastomosis around the elbow, which are formed by collateral branches of the brachial and recurrent branches of the ulnar and radial arteries.

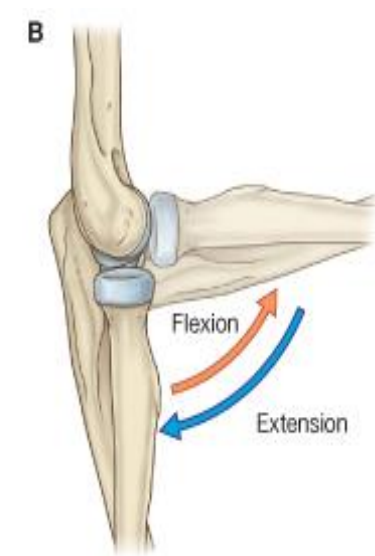
❑ **Nerve supply:** Branches from the median, ulnar, musculocutaneous, and radial nerves

## 8-Movements

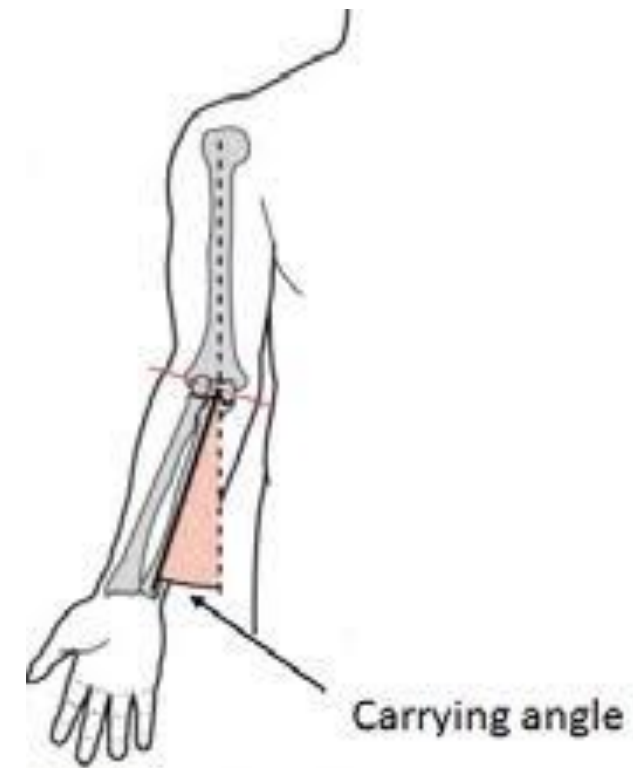
### The elbow joint is capable of flexion and extension.

- **Flexion** is limited by the anterior surfaces of the forearm and arm coming into contact.
  - Is performed by the brachialis, biceps brachii, brachioradialis, and pronator teres muscles.
- 
- **Extension** is checked by the tension of the anterior ligament and the brachialis muscle.
  - Is performed by the triceps and anconeus muscles.

It should be noted that the long axis of the extended forearm lies at an angle to the long axis of the arm. This angle, which opens laterally, is called the **carrying angle** and is about  $170^\circ$  in the male and  $167^\circ$  in the female. The angle disappears when the elbow joint is fully flexed.



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## 9-Clinical notes

### 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; it also has strong medial and lateral ligaments.

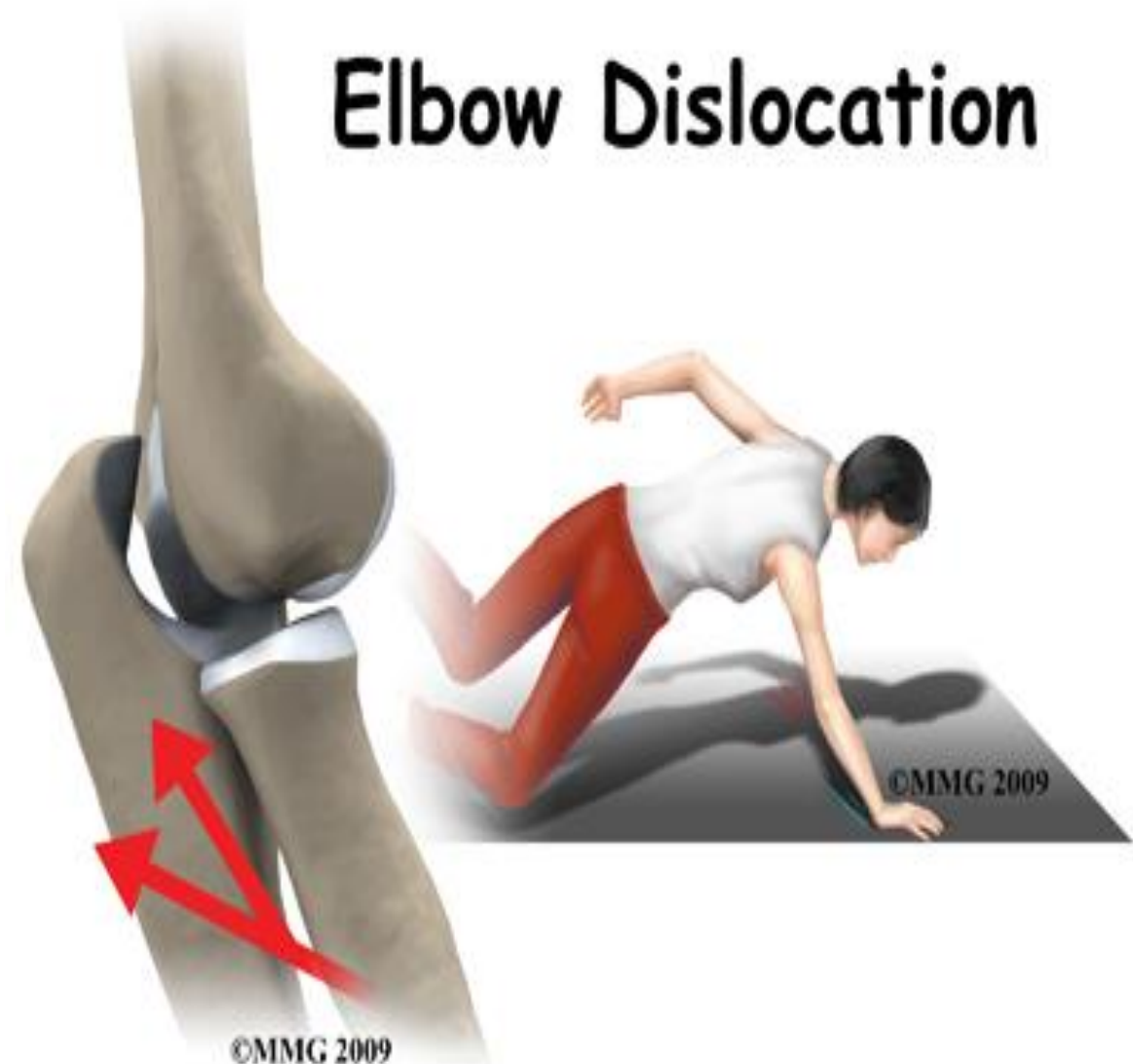
### ➤ Dislocations of the Elbow Joint

➤ Elbow dislocations are common, and **most are posterior**.

➤ Posterior dislocation usually follows falling on the outstretched hand.

➤ Posterior dislocations of the joint are common in children because the parts of the bones that stabilize the joint are **incompletely developed**.

## Elbow Dislocation



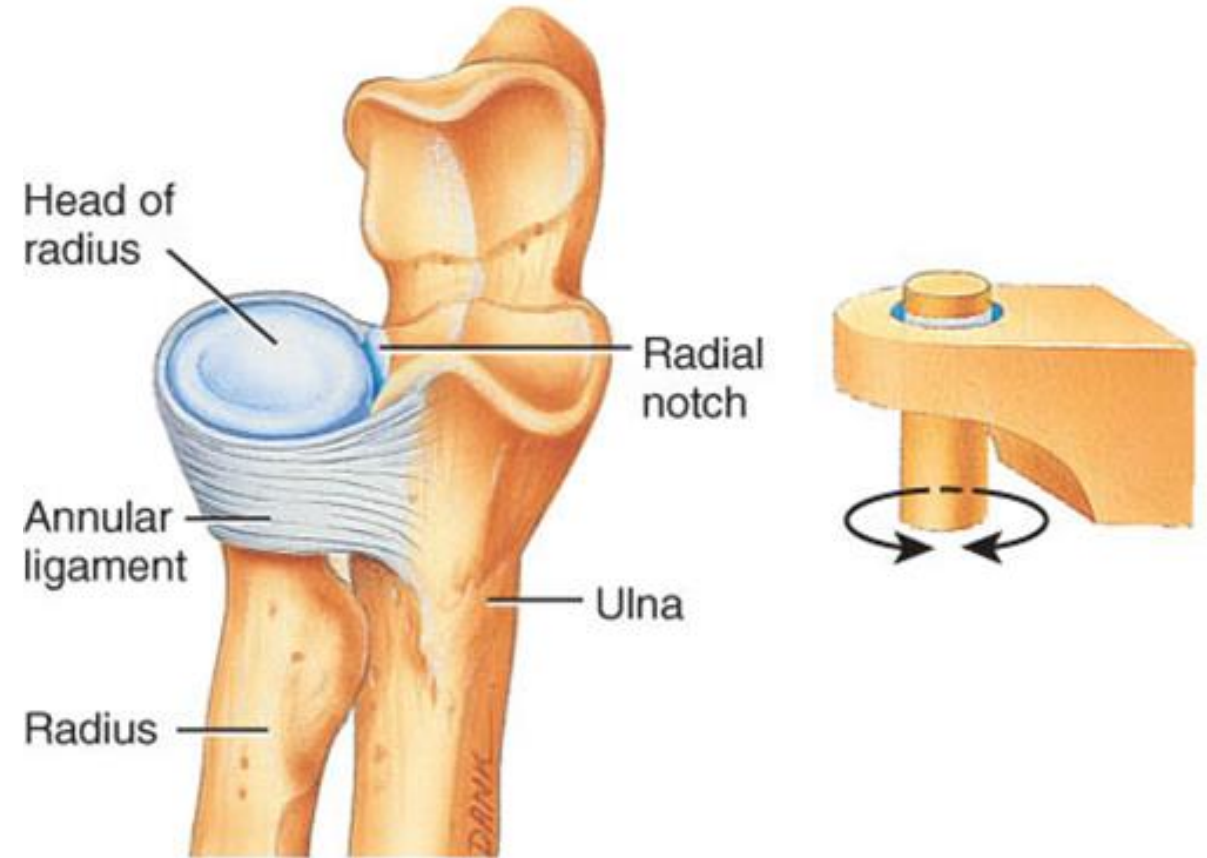
# Proximal Radioulnar Joint

## ❑ **Articulation:**

Between the circumference of the head of the radius and the annular ligament and the radial notch on the ulna.

## ❑ **Type:** Synovial pivot joint.

❑ **Capsule:** The capsule encloses the joint and is continuous with that of the elbow joint.



(c) Pivot joint between head of radius and radial notch of ulna

# Proximal Radioulnar Joint

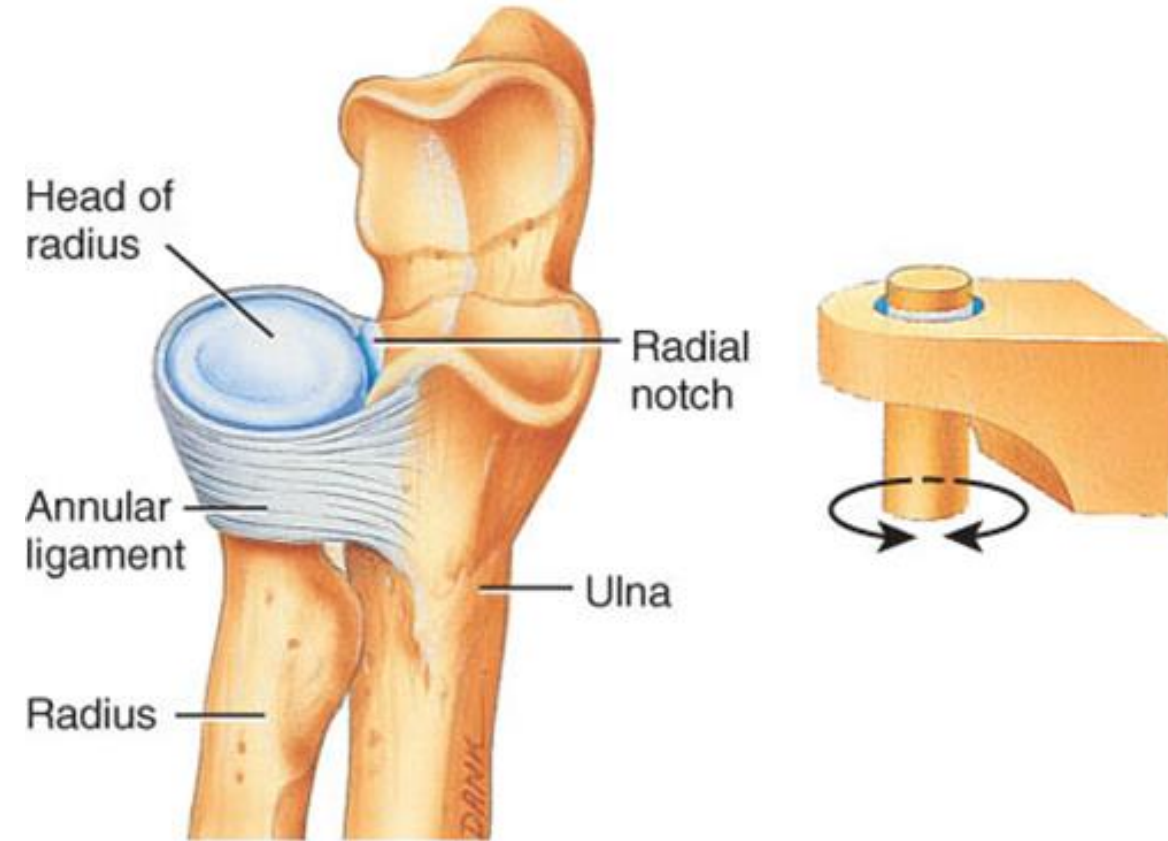
❑ **Synovial membrane:** is continuous **above** with that of the elbow joint.

❑ **Ligament:** important

➤ **The anular ligament is attached to the anterior and posterior margins of the radial notch on the ulna and forms a collar around the head of the radius**

➤ **It is continuous above with the capsule of the elbow joint.**

➤ **It is not attached to the radius.**



(c) Pivot joint between head of radius and radial notch of ulna

### ***Movements***

Pronation and supination of the forearm

### **□ Nerve supply:**

Branches of the median, ulnar, musculocutaneous, and radial nerves

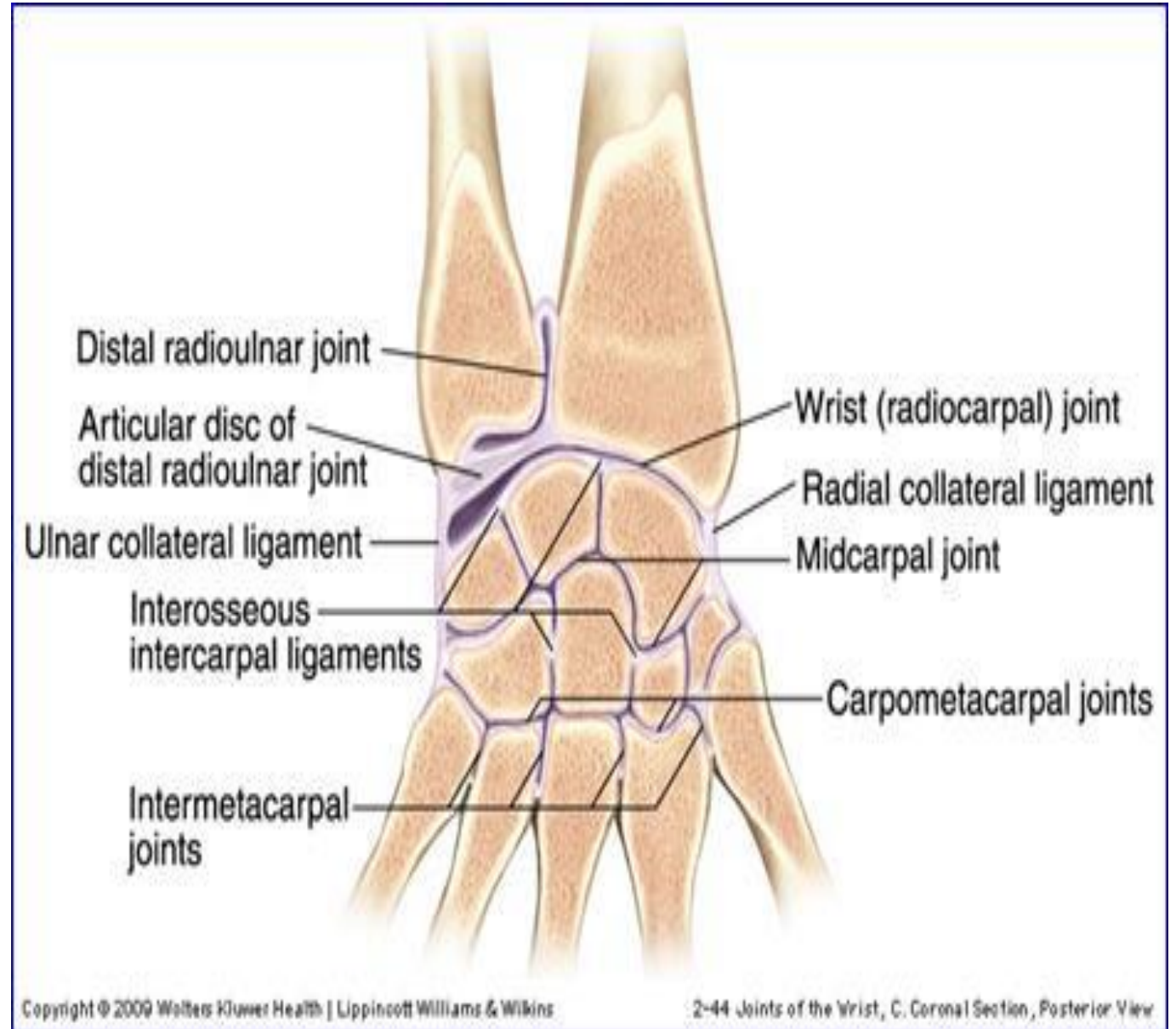


# Distal Radioulnar Joint

## ❑ Articulation:

**Between the rounded head of the ulna and the ulnar notch on the radius.**

## ❑ Type: Synovial pivot joint



## Movements

1. **Pronation** is performed by the pronator teres and the pronator quadratus.
1. **Supination** is performed by the biceps brachii and the supinator.
- ☐ Supination is the more powerful of the two movements because of the strength of the biceps muscle.

☐ **Nerve supply:** Anterior interosseous nerve and the deep branch of the radial nerve.

## Radioulnar Joint Disease

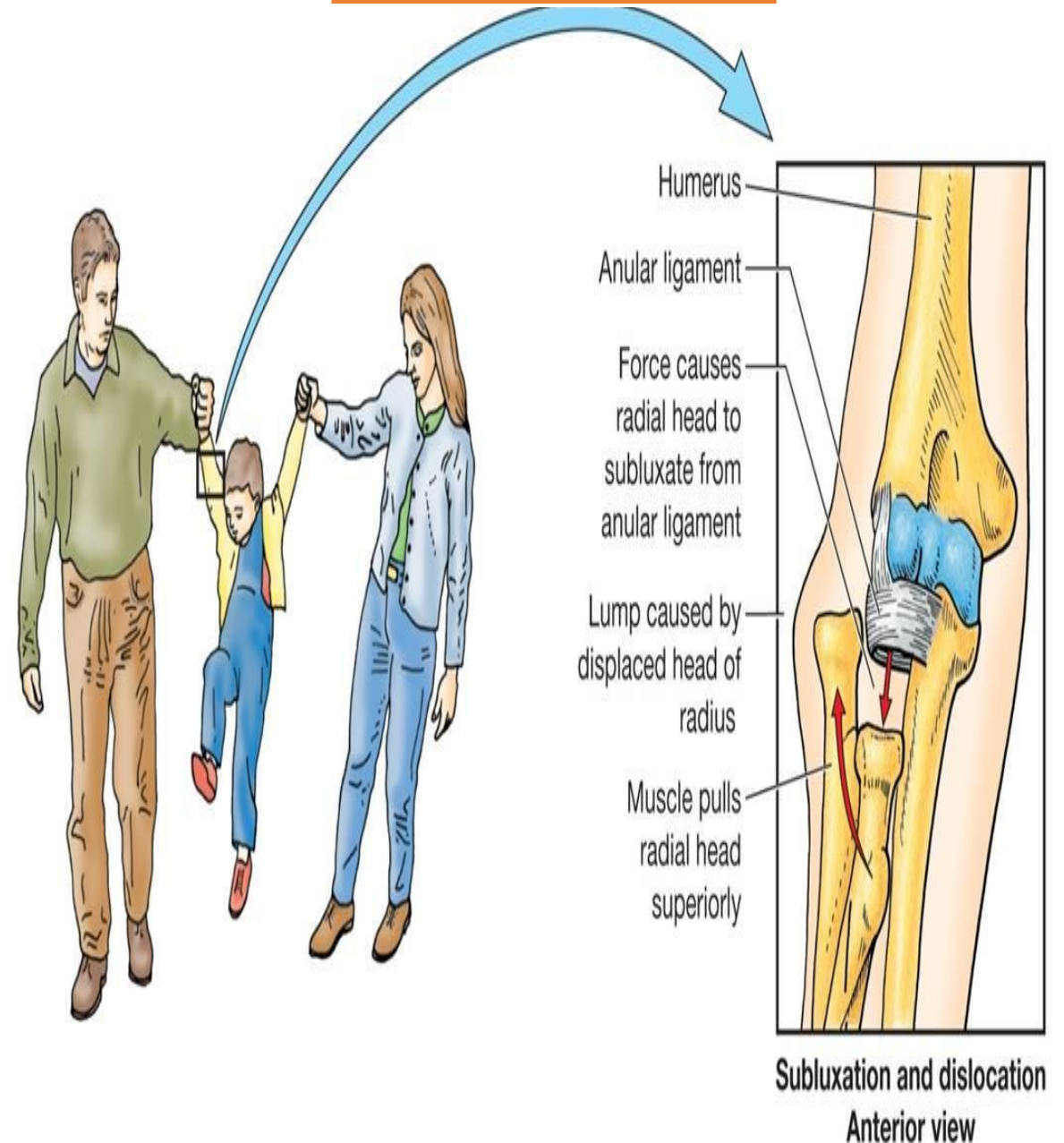
❑ The proximal radioulnar joint communicates with the elbow joint, whereas the distal radioulnar joint **does not** communicate with the wrist joint.

❑ this means that infection of the elbow joint invariably involves the proximal radioulnar joint.

❑ The strength of the proximal radioulnar joint depends on the integrity of the strong anular ligament.

❑ Rupture of this ligament occurs in cases of anterior dislocation of the head of the radius on the capitulum of the humerus.

❑ In young children, in whom the head of the radius is still small and undeveloped, a sudden jerk on the arm can pull the radial head down through the anular ligament.



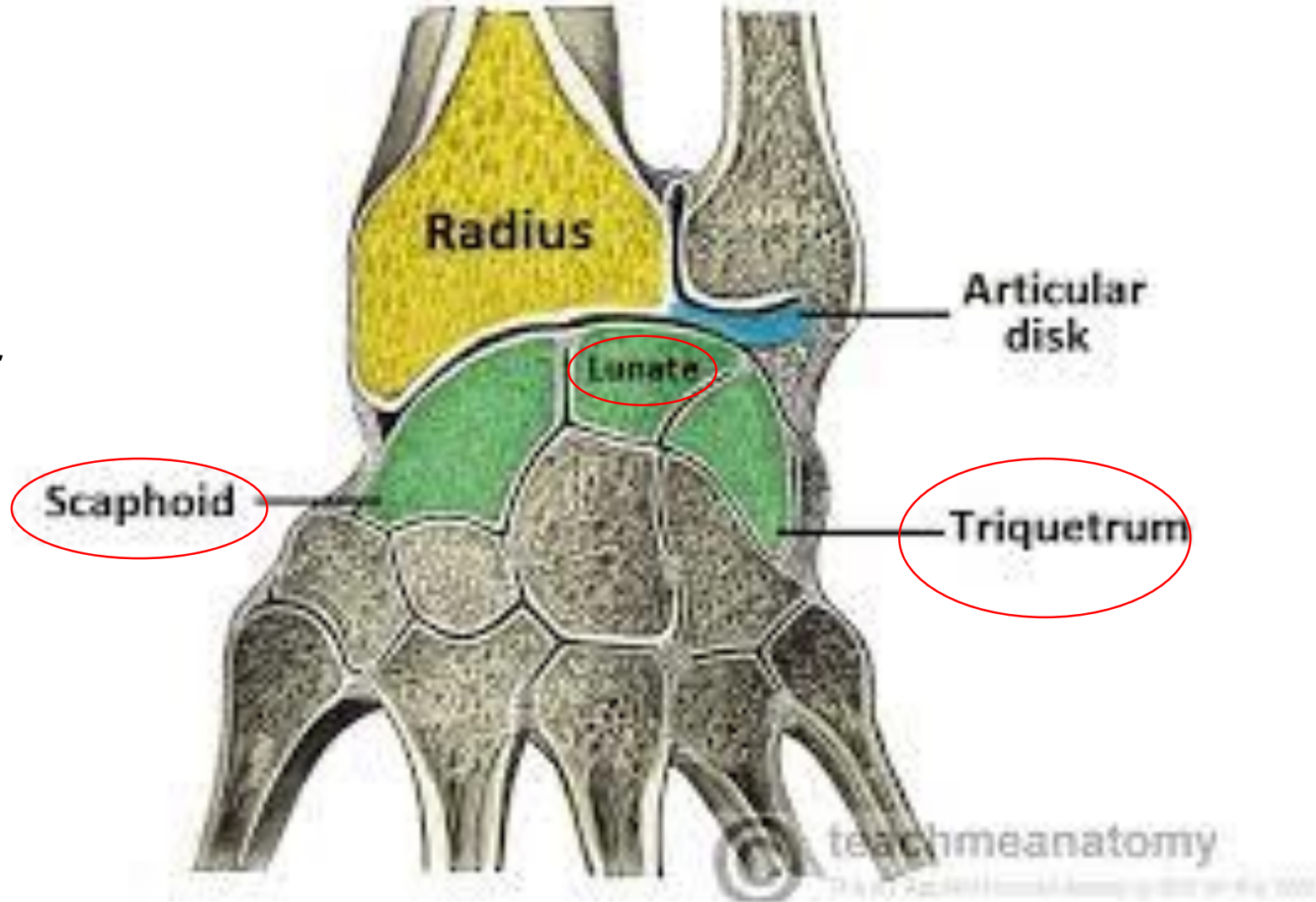
# Wrist Joint (Radiocarpal Joint)

## ❑ Articulation:

Between the distal end of the radius and the articular disc above and the scaphoid, lunate, and triquetral bones below

**The proximal articular surface forms an ellipsoid concave surface, which is adapted to the distal ellipsoid convex surface.**

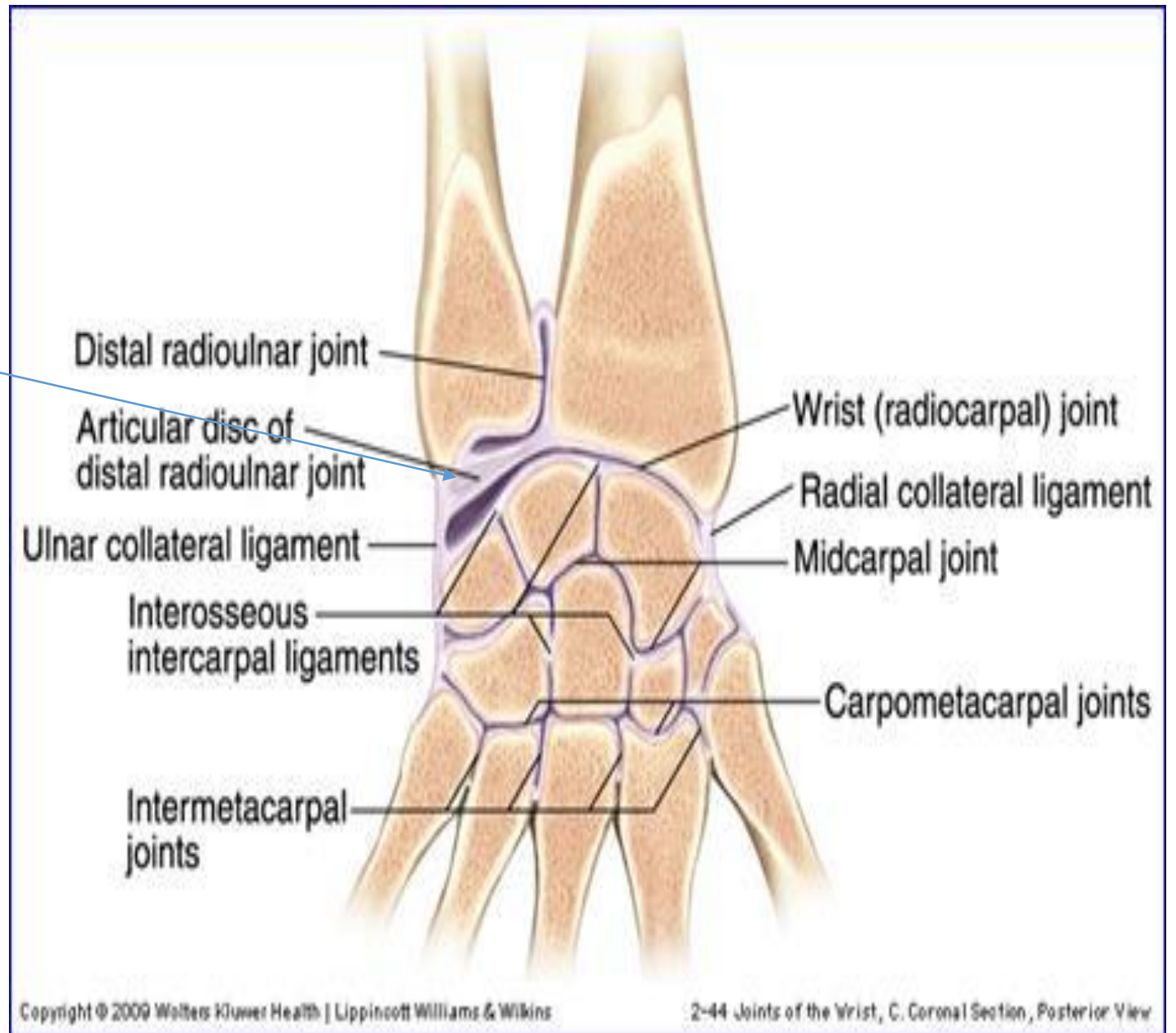
❑ **Type:** Synovial ellipsoid joint



❑ **Articular disc:** is triangular and composed of fibrocartilage.

➤ It is attached by its apex to the lateral side of the base of the styloid process of the ulna and by its base to the lower border of the ulnar notch of the radius

➤ It shuts off the distal radioulnar joint from the wrist and strongly unites the radius to the ulna.



# Wrist Joint (Radiocarpal Join

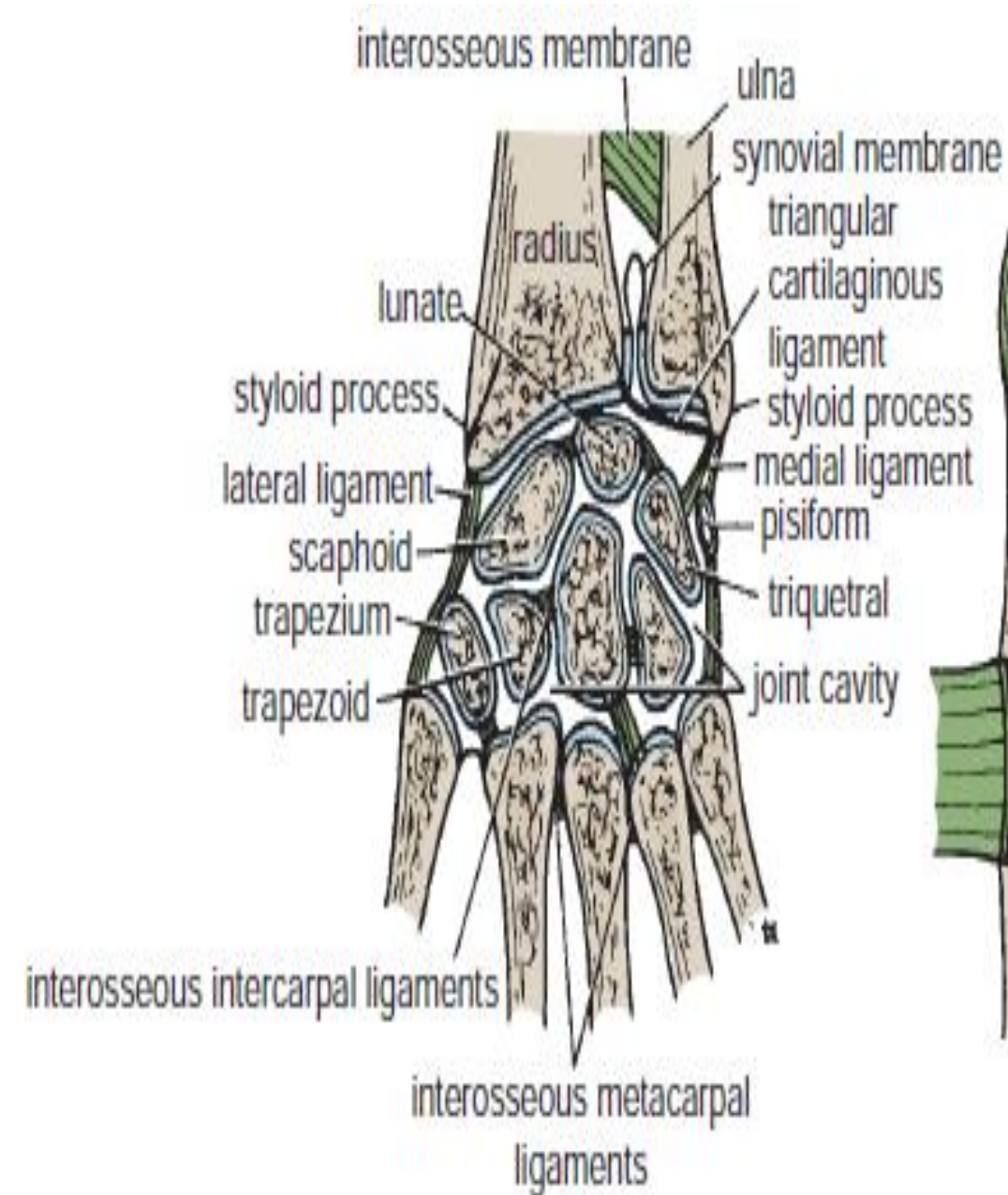
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## ❑ Capsule:

**encloses the joint** and is attached above to the distal ends of the radius and ulna and below to the proximal row of carpal bones.

## ❑ Synovial membrane: lines the capsule and is attached to the margins of the articular surfaces.

The joint cavity does not communicate with that of the distal radioulnar joint or with the joint cavities of the intercarpal joints.



# Ligaments

Read only

## 1. Anterior and posterior ligaments

strengthen the capsule.

2. **The medial ligament is attached** to the styloid process of the ulna and to the triquetral bone

3. **The lateral ligament is attached** to the styloid process of the radius and to the scaphoid bone.

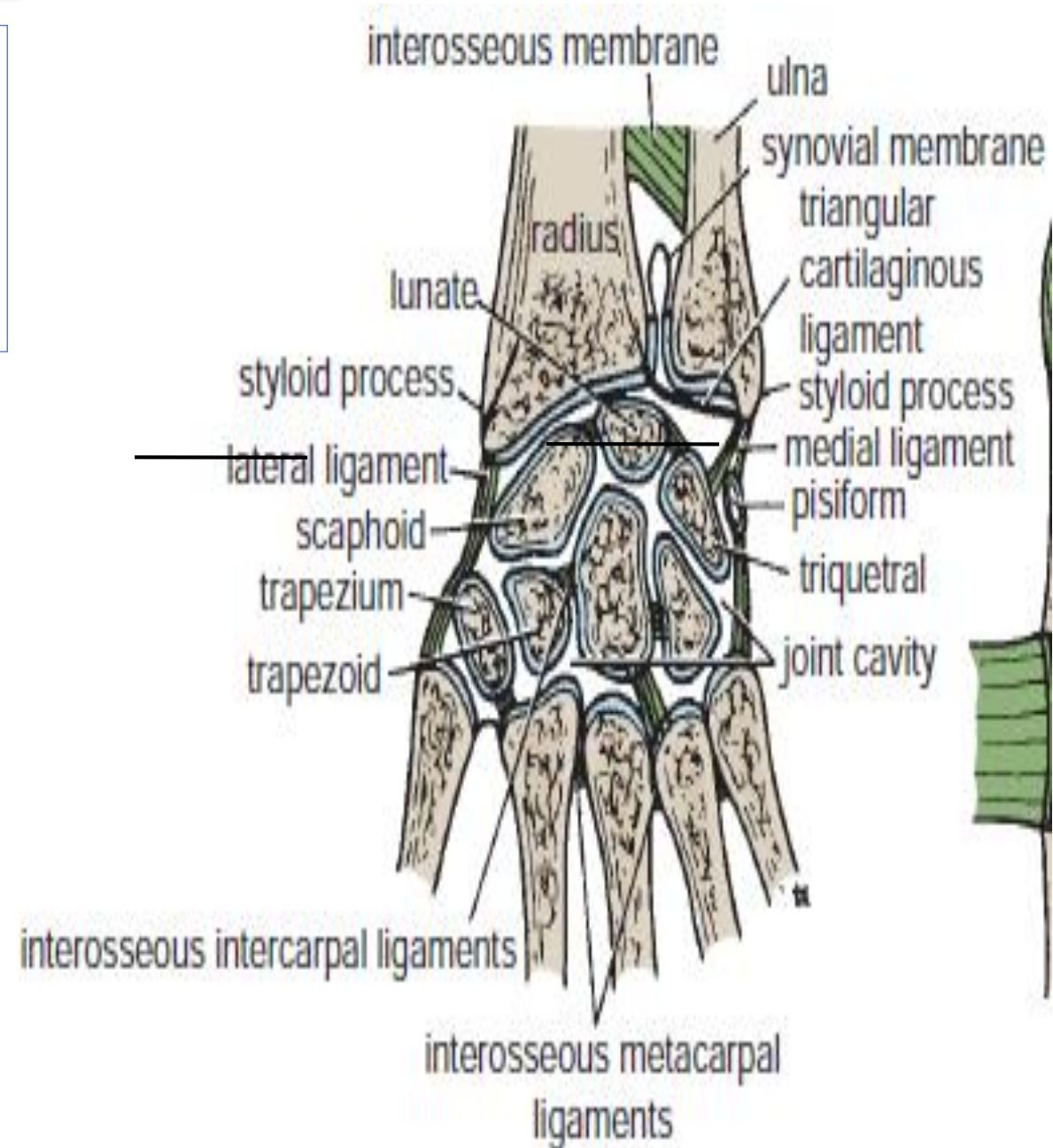
## Movements

1. flexion, extension, abduction, adduction
2. Rotation is **not** possible because the articular surfaces are ellipsoid shaped.
3. The lack of rotation is compensated for by the movements of pronation and supination of the forearm.

## ❑ Blood Supply :

The articular arteries are derived from the dorsal and palmar **carpal arterial arches**.

❑ **Nerve supply:** Anterior interosseous nerve and the deep branch of the radial nerve



# Joints of the Hand and Finger

## 1- Intercarpal Joints

### ❑ Articulation:

1. Between **the individual bones of the proximal** row of the carpus;
  2. between **the individual bones of the distal** row of the carpus;
- and finally, **the midcarpal joint, between the proximal and distal rows of carpal bones**

❑ **Type:** Synovial plane joints

❑ **Capsule:** The capsule surrounds each joint.

❑ **Ligaments:** The bones are united by strong anterior, posterior, and interosseous ligaments

### Movements

A small amount of gliding movement is possible.



## 2- Carpometacarpal Joint of the Thumb

❑ **Articulation:** Between the trapezium and the **saddleshaped** base of the first metacarpal bone.

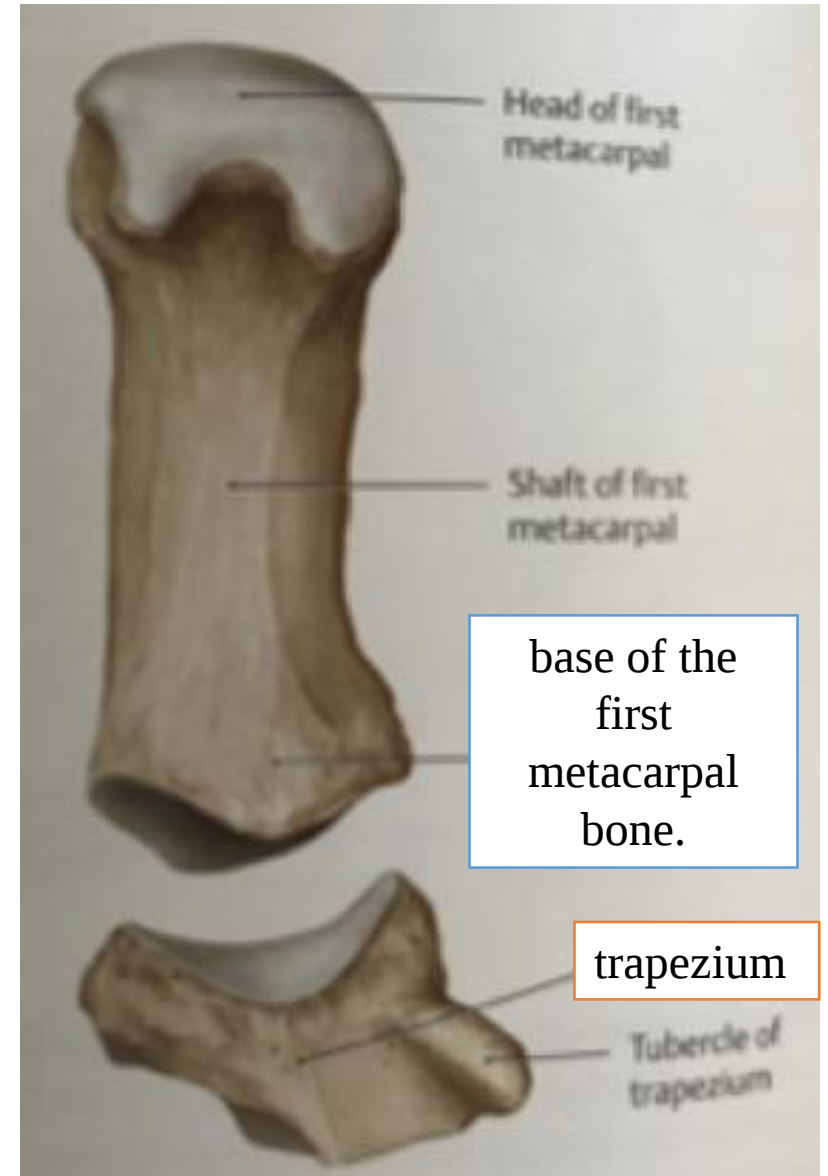
❑ **Type:** Synovial saddle-shaped joint.

❑ **Capsule:** The capsule surrounds the joint.

❑ **Synovial membrane:** This lines the capsule and forms a separate joint cavity.

### - Movements

Flexion, Extension, Abduction, Adduction, Rotation is possible





Abduction

Adduction

Extension

Flexion

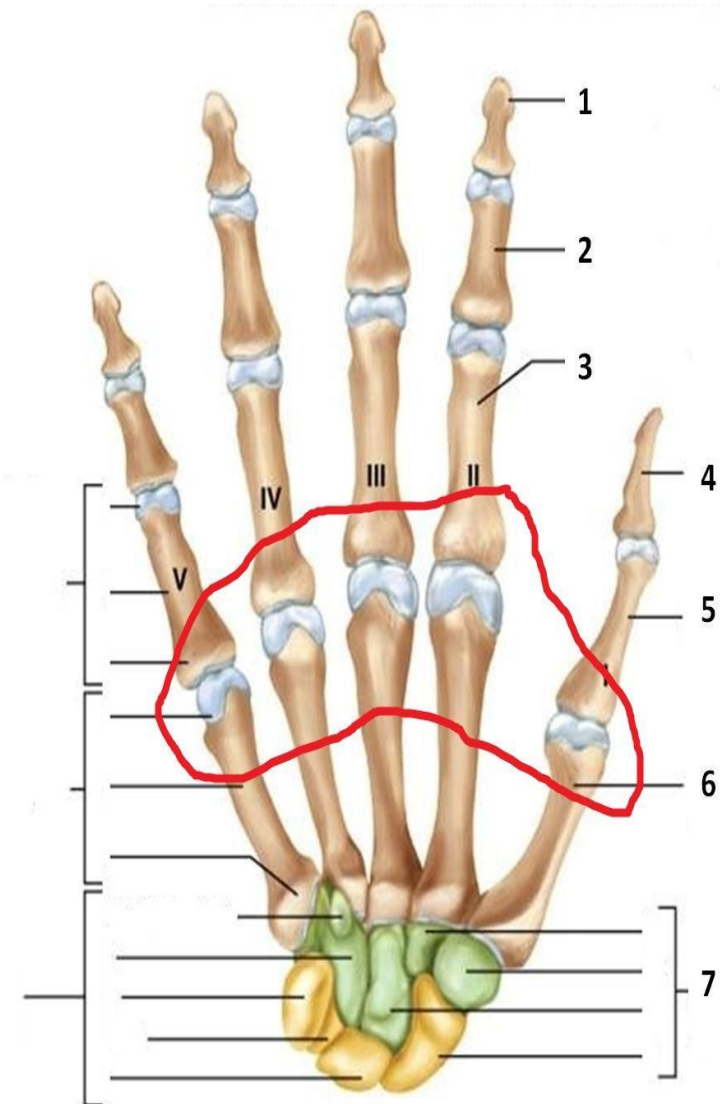
Opposition

Reposition

### 3- Metacarpophalangeal Joints

❑ **Articulation:**  
**Between the heads of the metacarpal bones and the bases of the proximal phalanges**

❑ **Type:** Synovial condyloid joints



(a) Anterior view

## 4- Interphalangeal Joints

Interphalangeal joints are synovial hinge joints that have a structure similar to that of the metacarpophalangeal joints

