

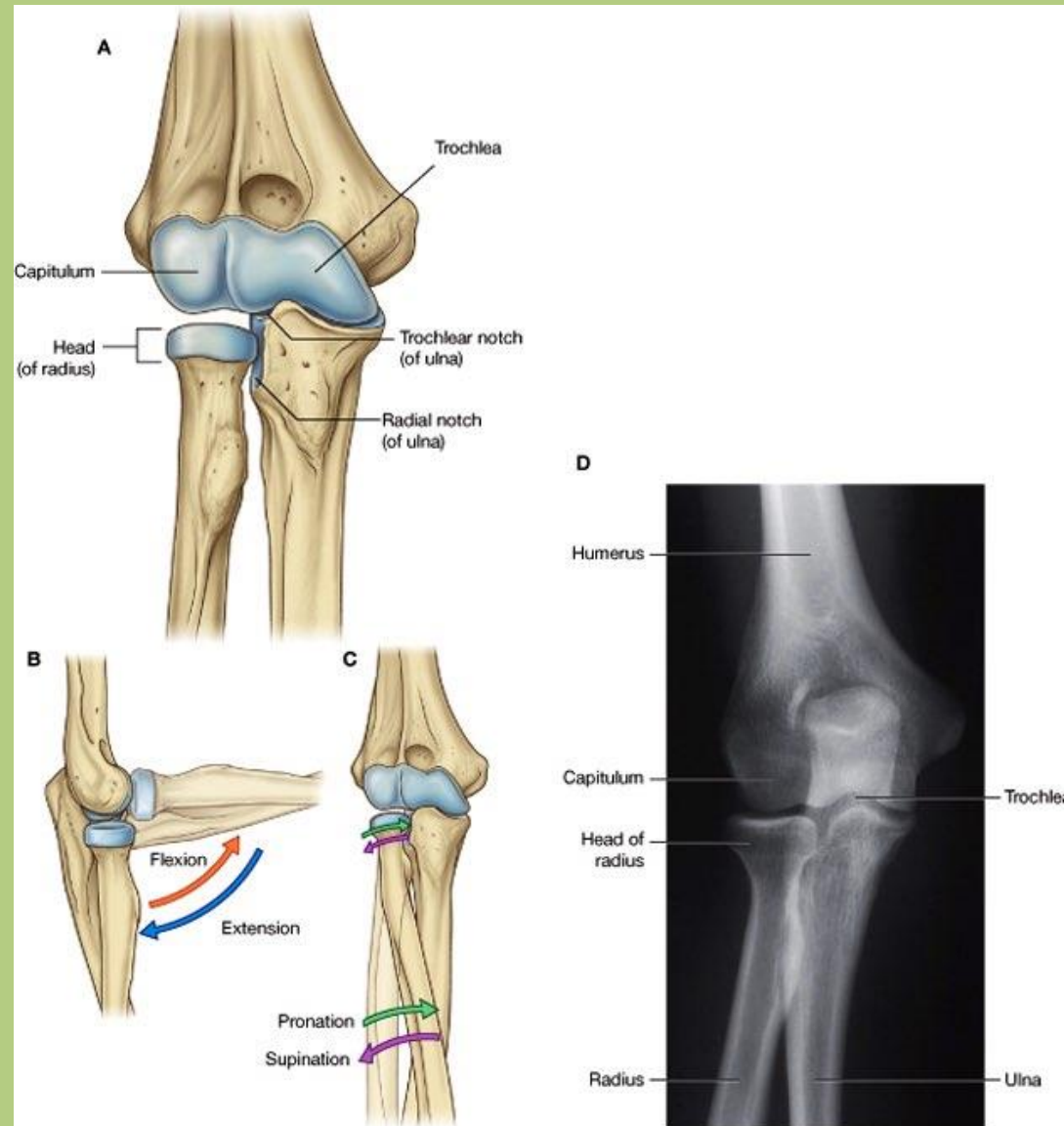


Joints and muscles of the upper limb

Sándor Katz M.D., Ph.D.

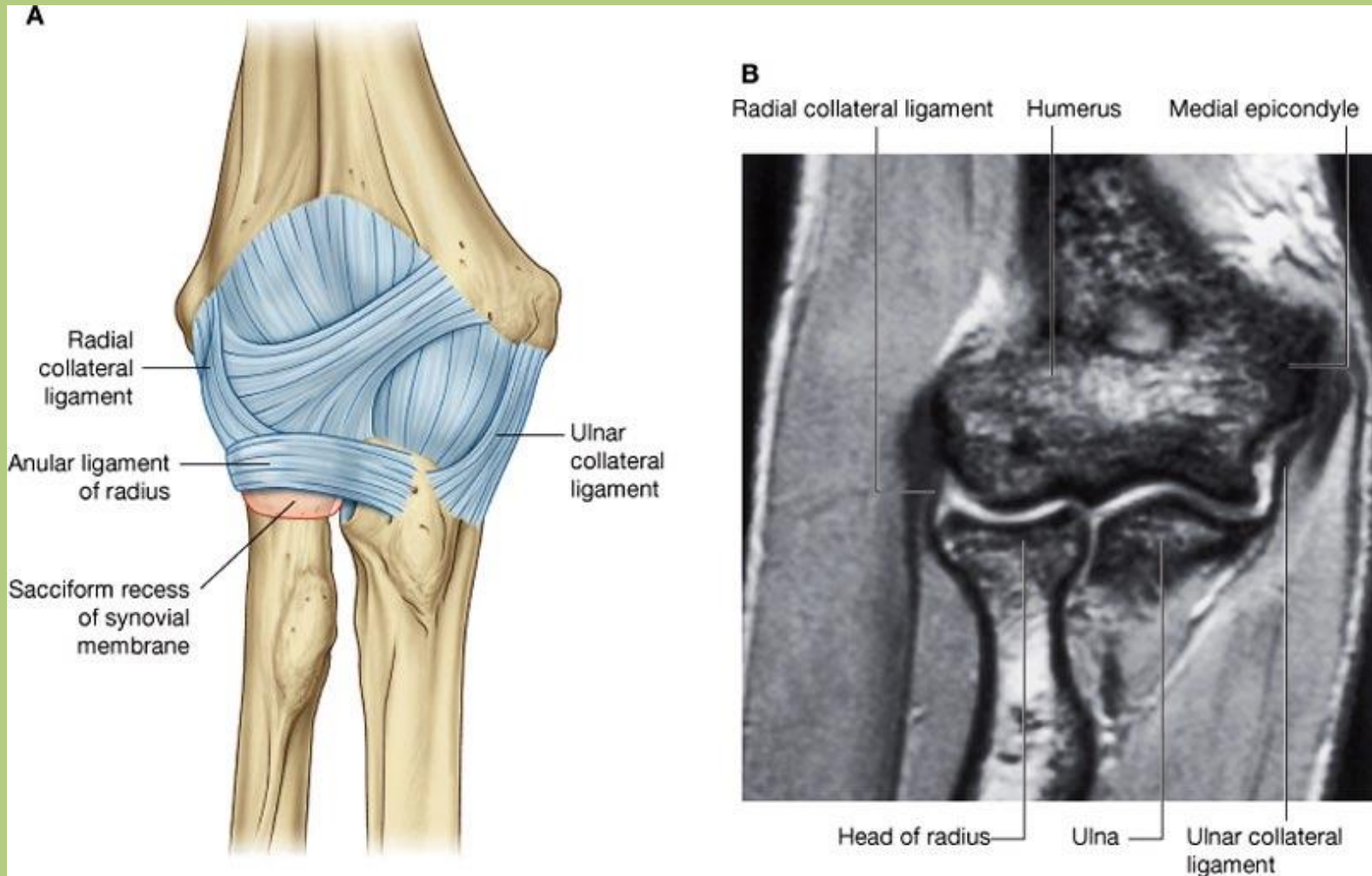
Elbow joint

- **Type:** hinge and pivot (trochoginglimus)
- **Articular surfaces:**
 - 1. humeroulnar joint: trochlea - trochlear notch: **hinge type**
 - 2. humeroradial joint: capitulum - head of radius: functionally **restricted ball-and-socket type**
 - 3. proximal radioulnar joint: head of radius - radial notch: **pivot type**
 - 4. distal radioulnar joint: head of ulna - ulnar notch: **pivot type**



Elbow joint

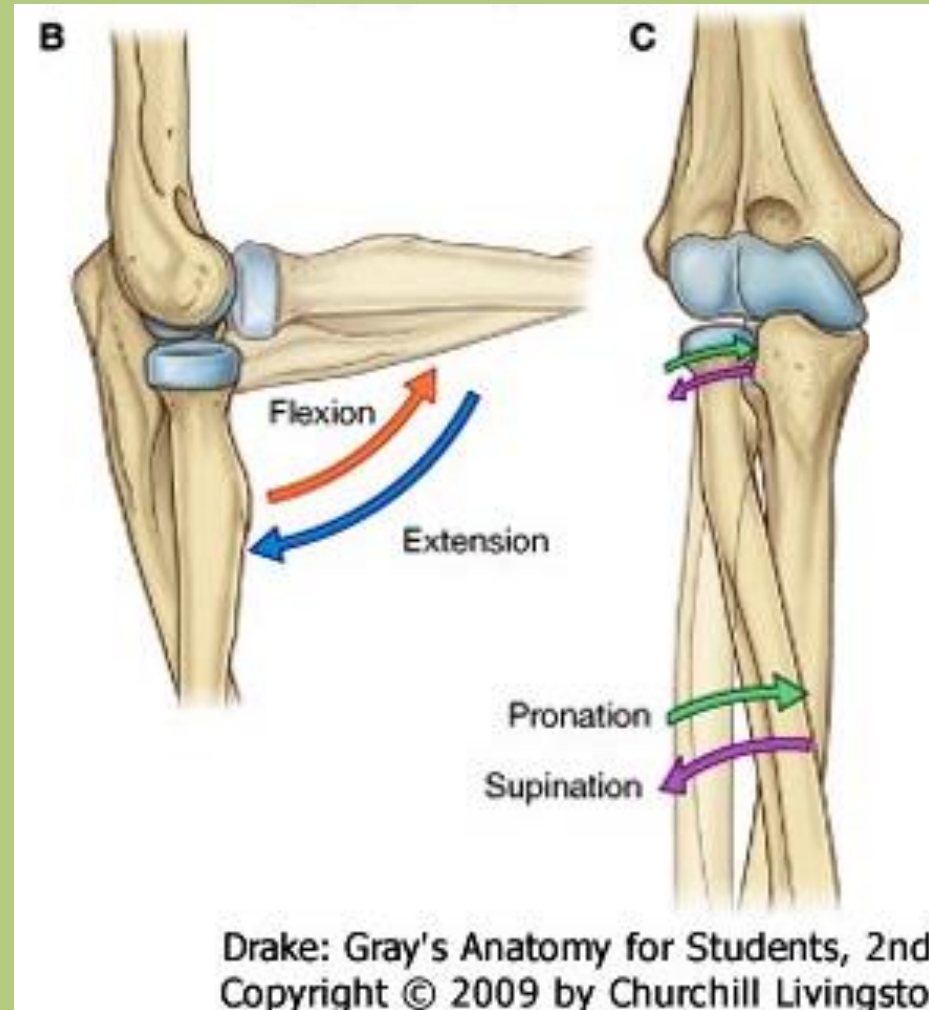
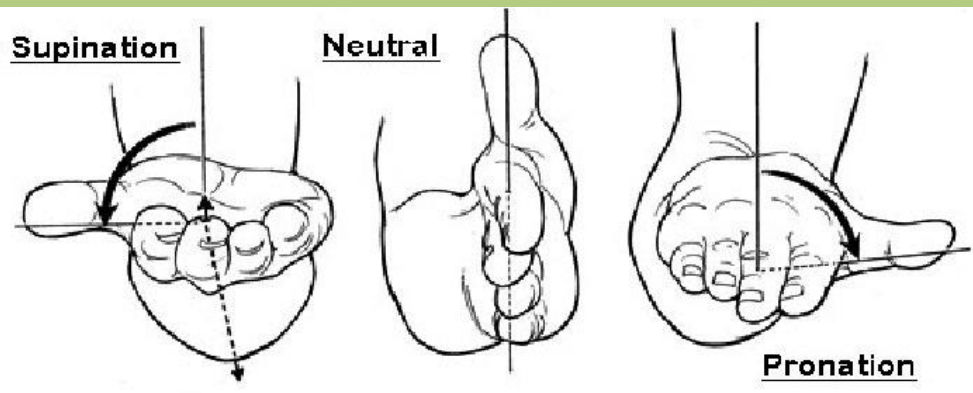
- **Ligaments:**
- ulnar and radial collateral ligaments
- annular ligament



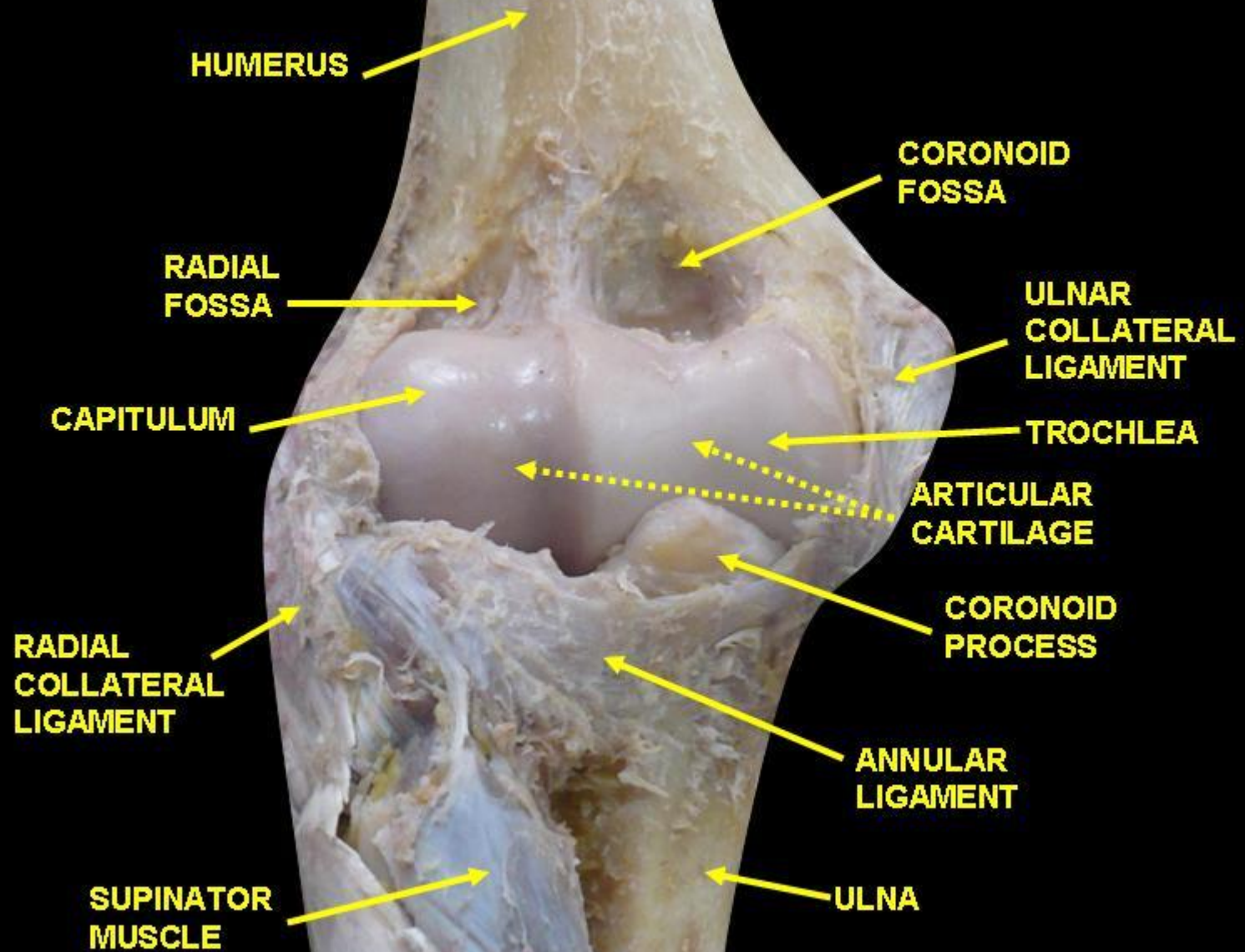
Elbow joint

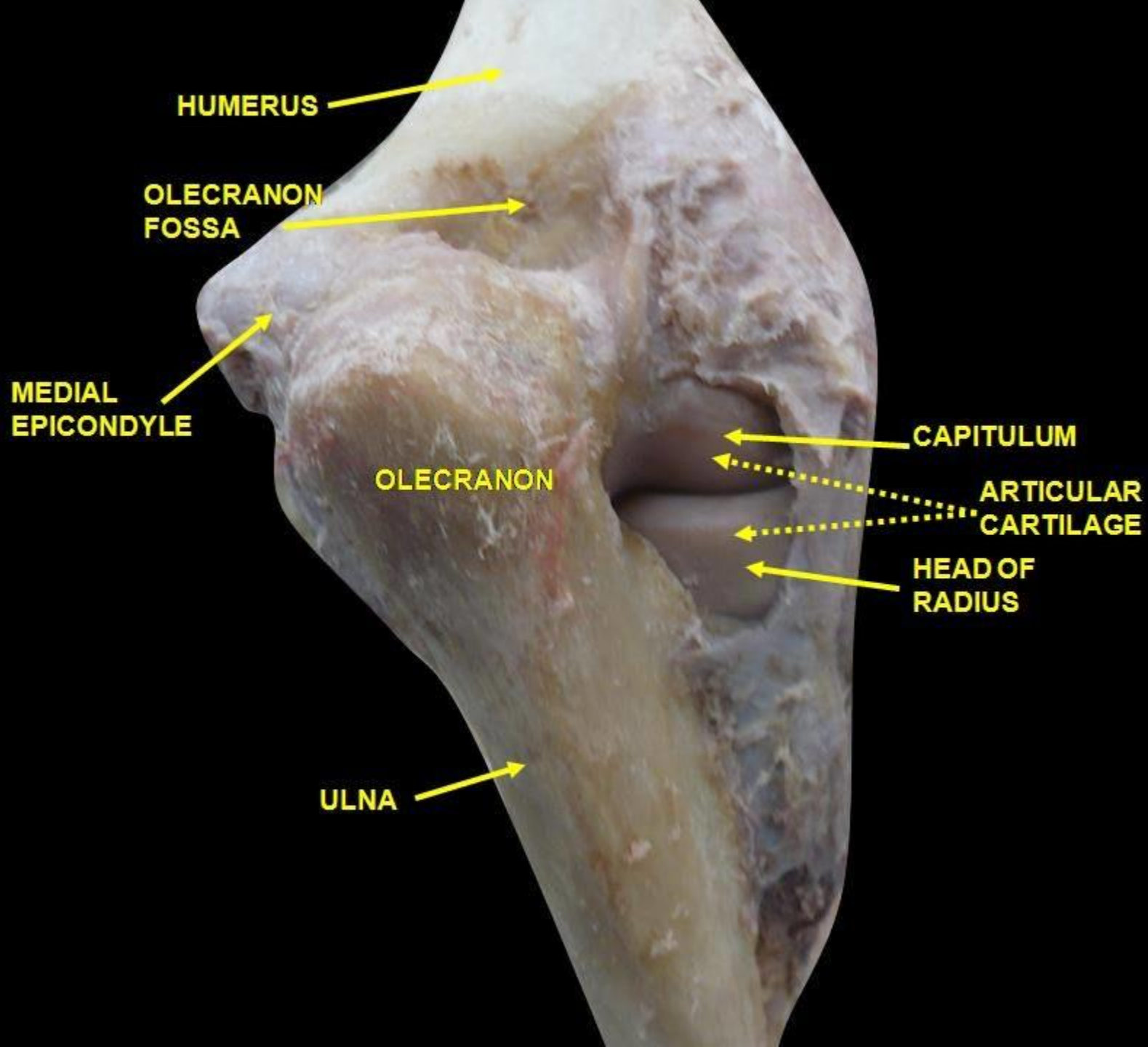
- **Movements:**

- flexion: 120-140°
- extension: 5°
- (rotation) pronation-supination: 80°-80°



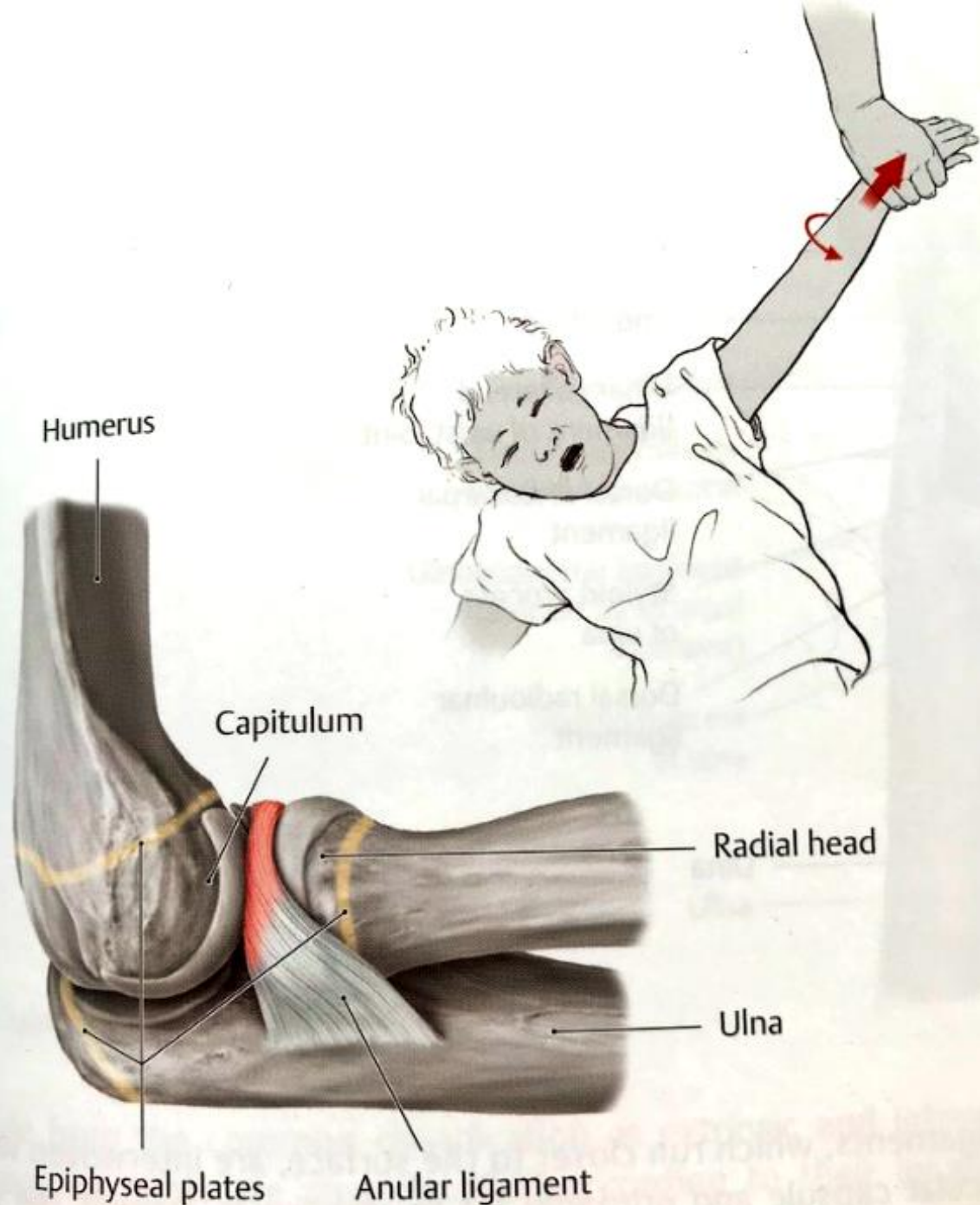
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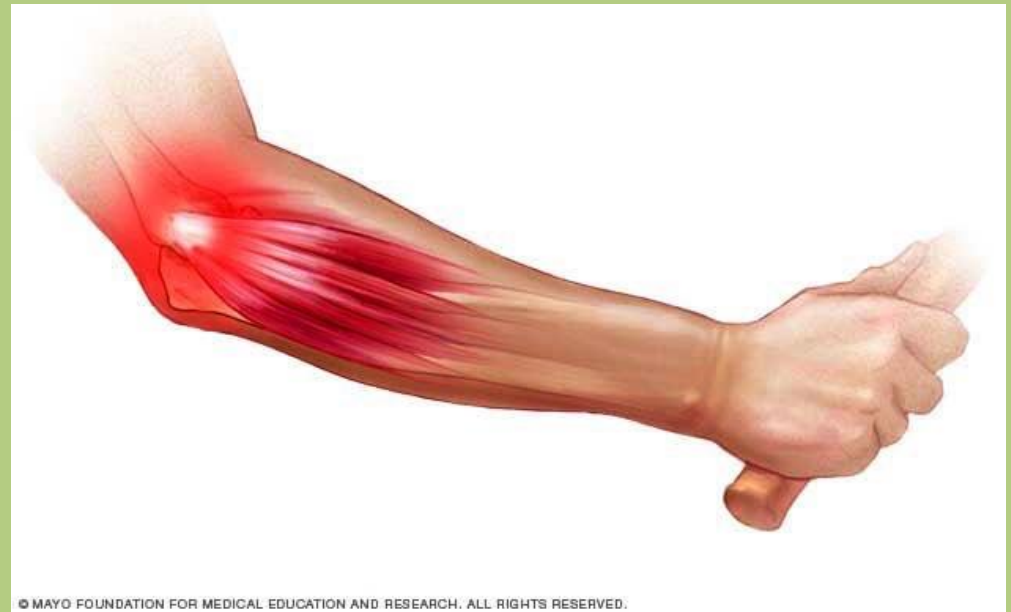
Nursemaid's (pulled) elbow

- The radial head slips under the angular ligament (**radial head subluxation**).
- The anular ligament gets stuck between the radius and the capitulum, the elbow joint is locked in a slightly bent position.
- Very common injury in children (5- to 7-year-old)
- With increasing age, ligaments become stronger, reducing the risk of injuries.
- Treatment: reduction maneuver



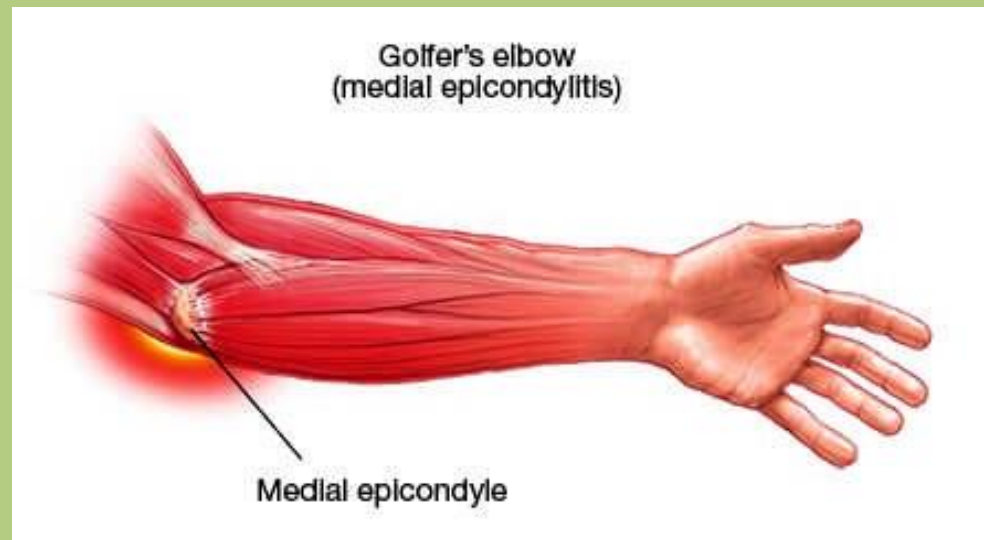
Tennis elbow (lateral epicondylitis)

- It occurs when tendons are overloaded, usually by repetitive motions of the arm and wrist.
- Risk factors: **Age:** usually between the ages of 30 and 50. **Occupation:** plumbers, painters, carpenters, butchers and cooks. **Certain sports:** racket sports
- **Treatment:** it often gets better on its own. Physiotherapy helps a lot. Severe cases may require surgery.



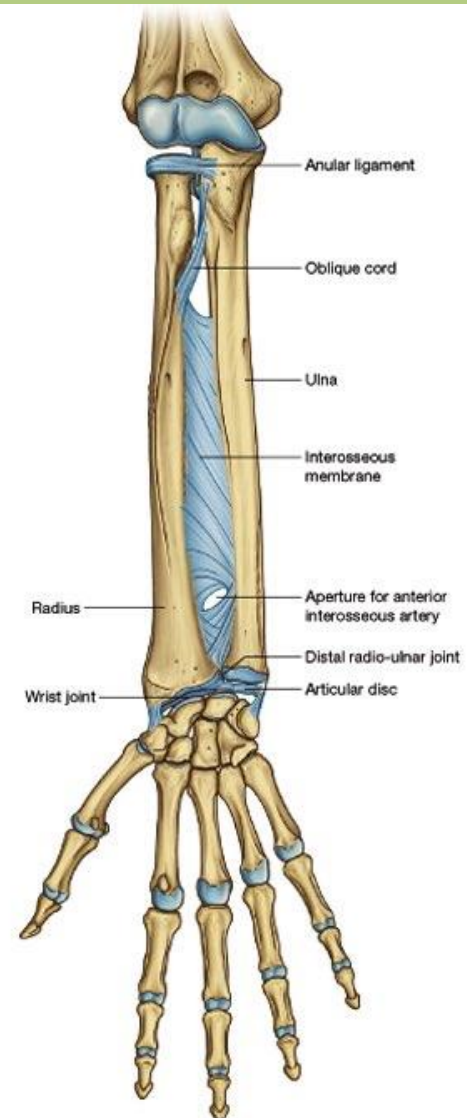
Golfer's elbow (medial epicondylitis)

- Repetitive and forceful gripping and twisting activities can damage the tendons at the elbow.
- **Causes:** overuse of muscles, improper technique during lifting, throwing.
- **Prevention:** preventative elbow muscle stretching and strengthening exercises.



Wrist (radiocarpal) joint

- **Type:** ellipsoid
- **Articular surfaces:** scaphoid, lunate and triquetrum – carpal articular surface
- **Articular disc** (under the ulnar head)



Wrist (radiocarpal) joint

- **Ligaments:**

1. medial and lateral carpal collateral ligaments
2. palmar radiocarpal and palmar ulnocarpal ligaments
3. dorsal radiocarpal ligament

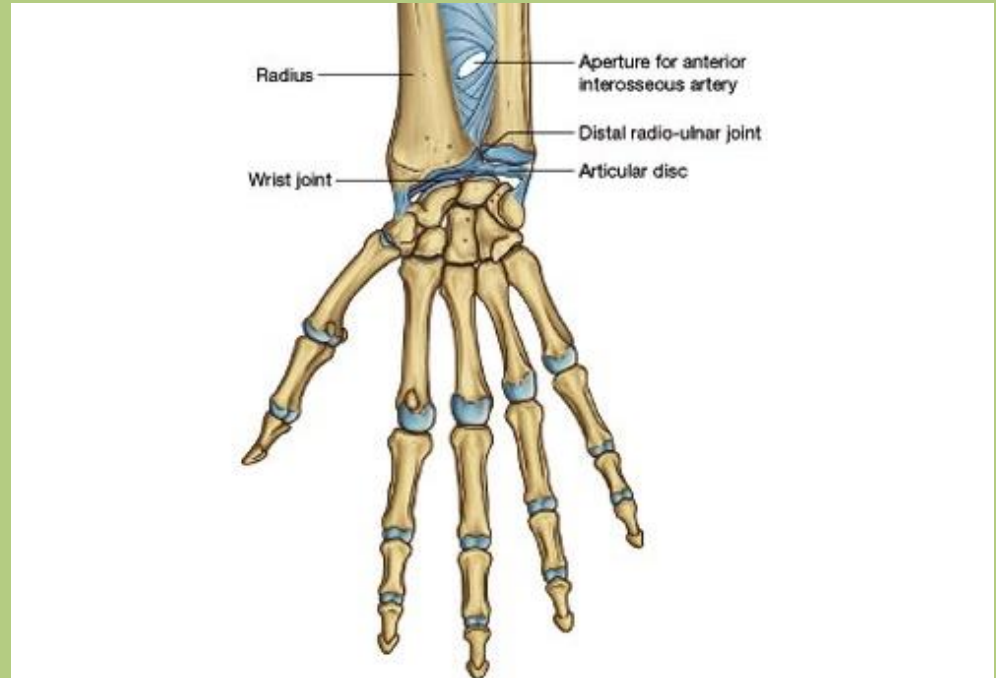
- **Movements:**

Palmarflexion 80°

Dorsiflexion 60°

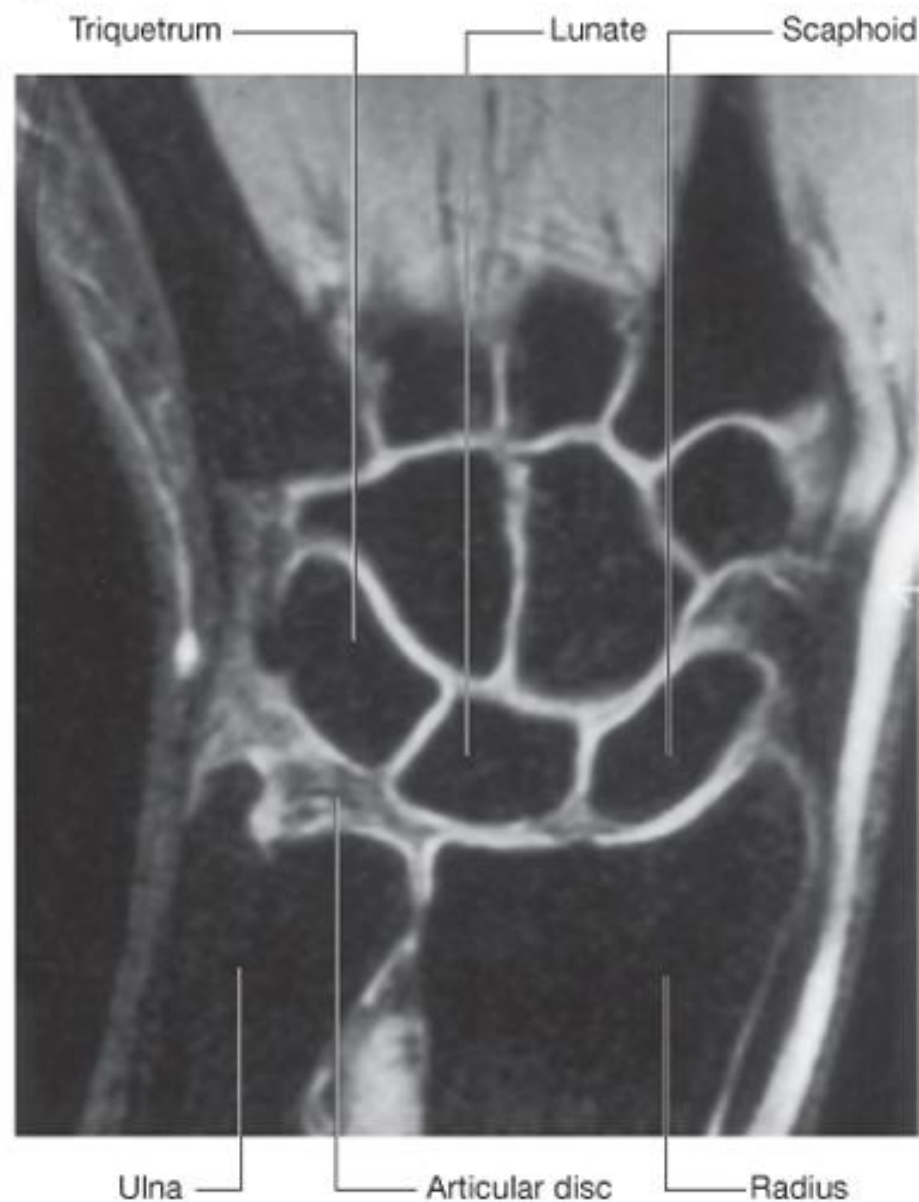
Ulnar abduction 40°

Radial abduction 15°



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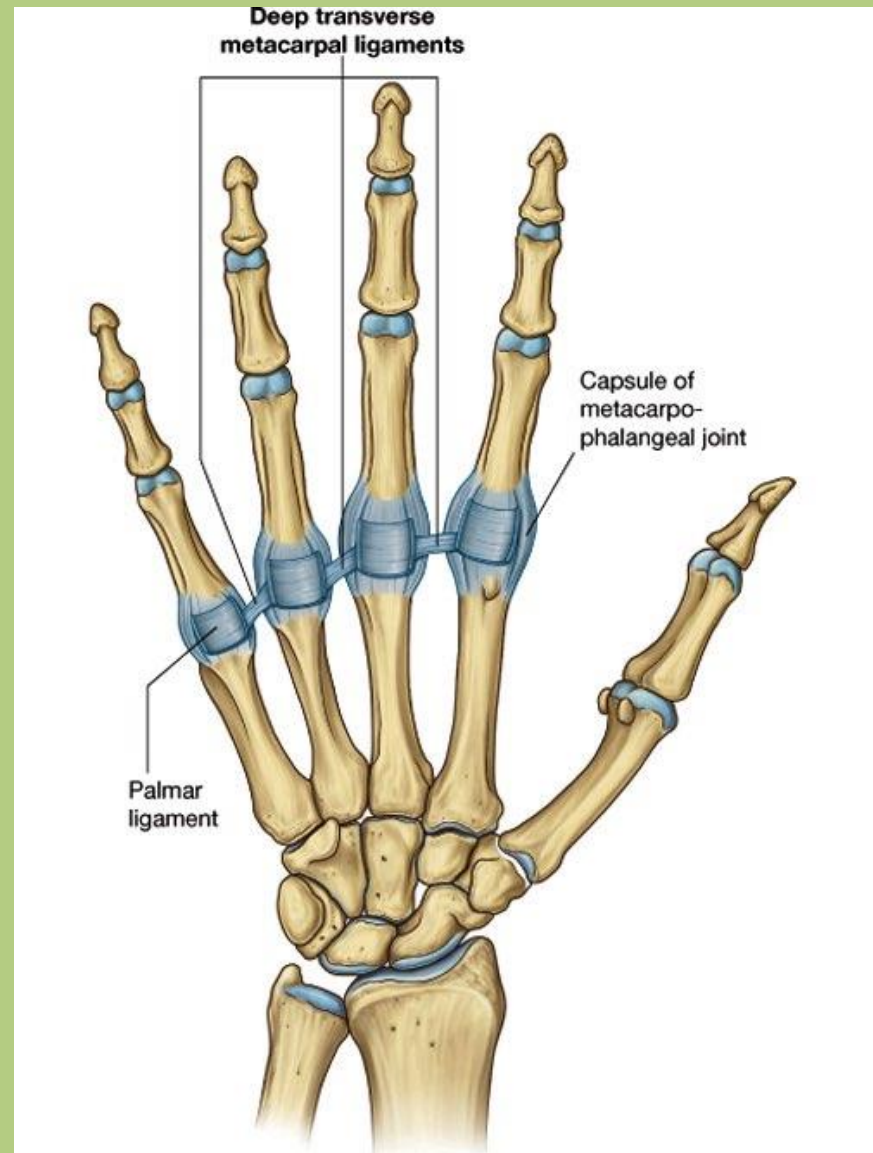
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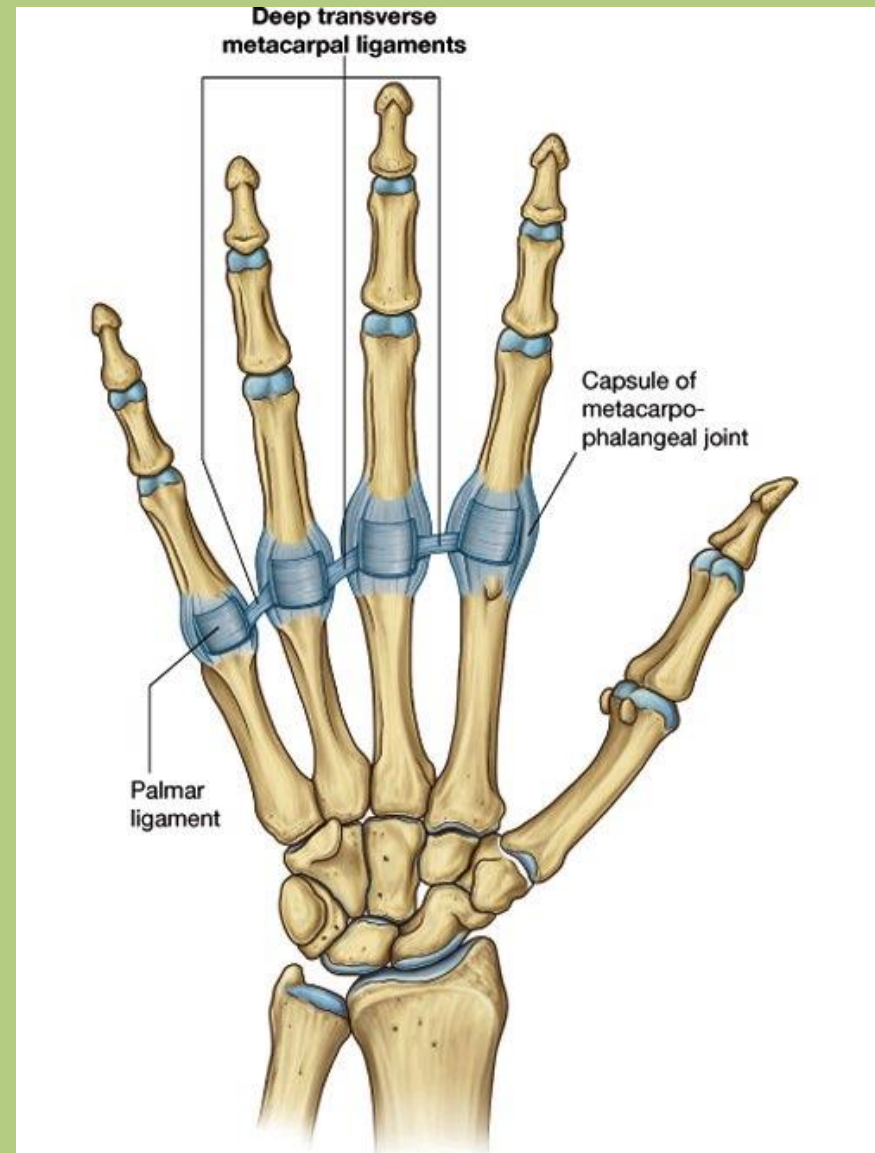
Intercarpal joint

- **Type:**
amphiarthrosis
- **Articular surfaces:**
proximal and distal rows of carpal bones
- Many short ligaments
- Common articular cavity



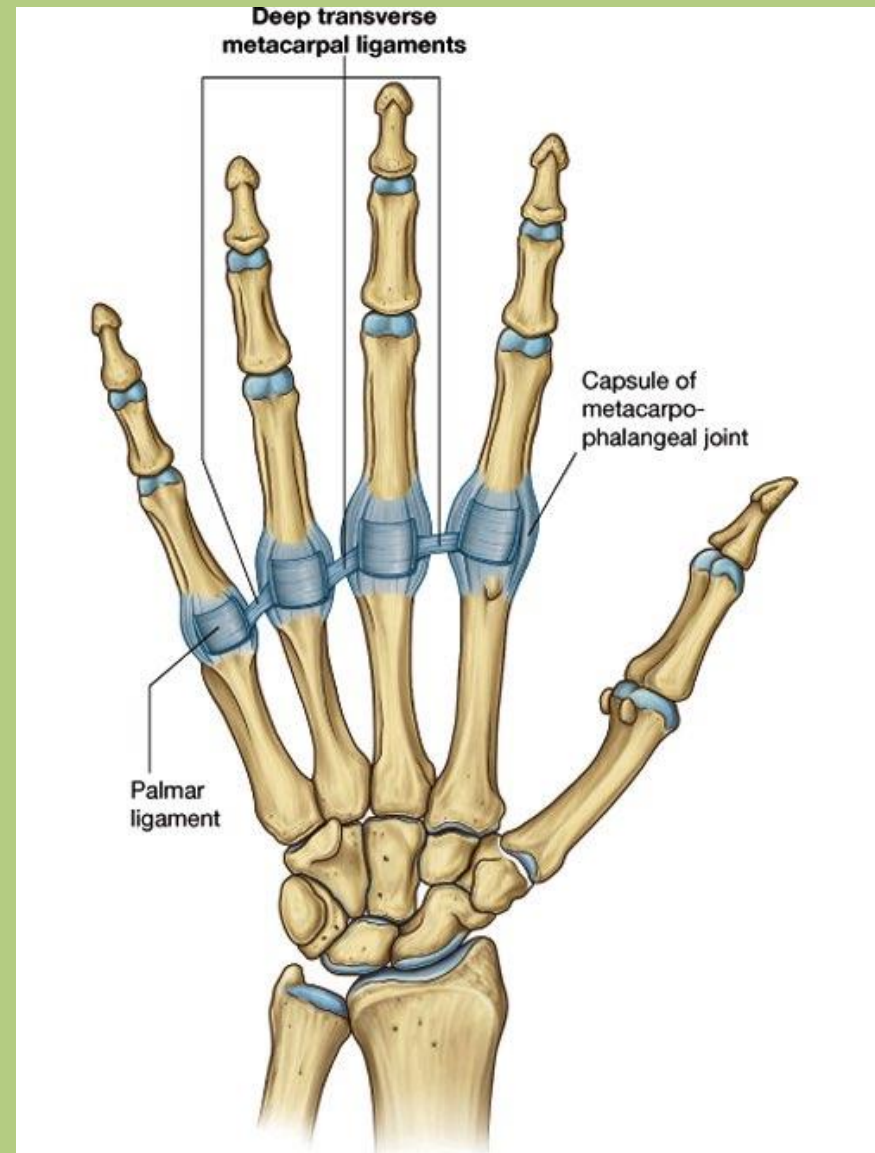
II-V. carpometacarpal joints

- **Type:** amphiarthroses
- **Articular surfaces:**
distal row of carpal bones
- bases of the II-V.
metacarpals
- Palmar and dorsal
carpometacarpal
ligaments and metacarpal
ligaments



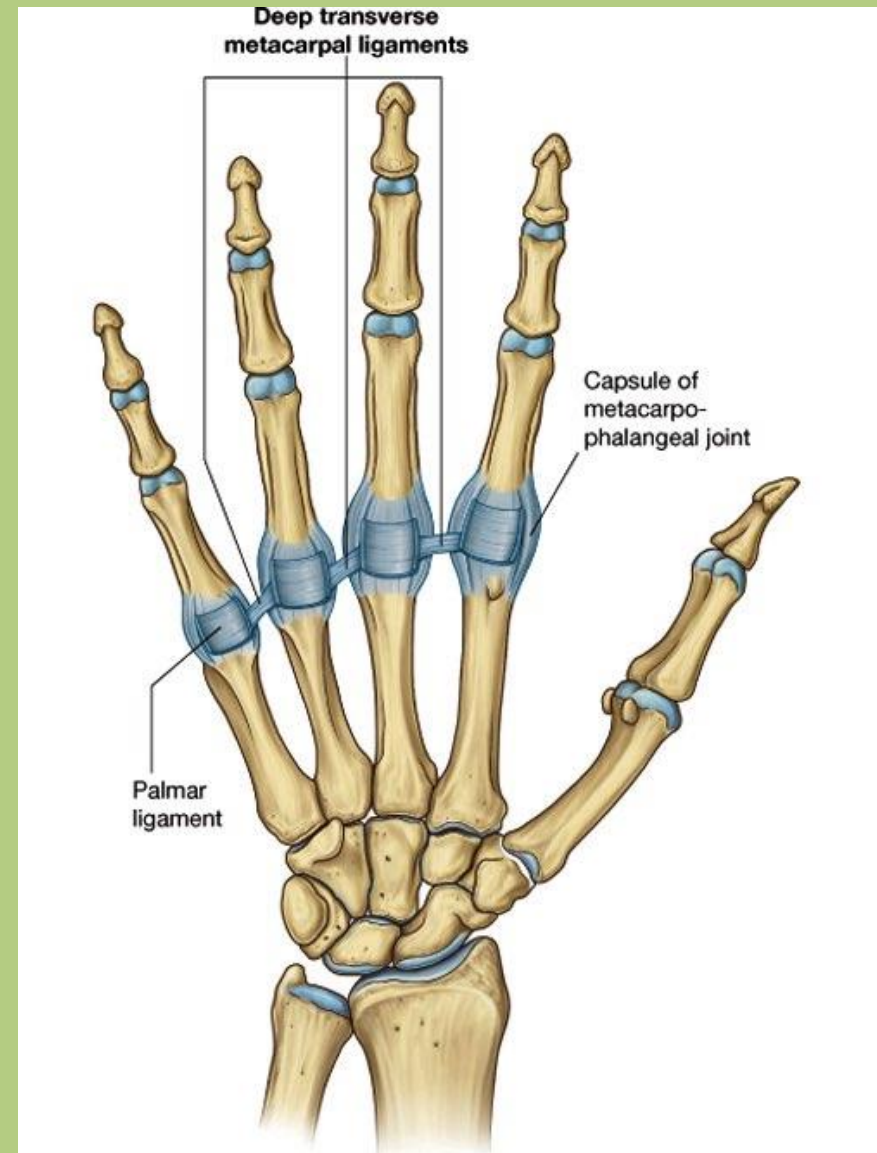
I. carpometacarpal joint

- **Type:** saddle
- **Articular surfaces:**
trapezium - base of the I. metacarpal
- **NO ligaments**
- **Movements:** opposition-
reposition, abduction-
adduction



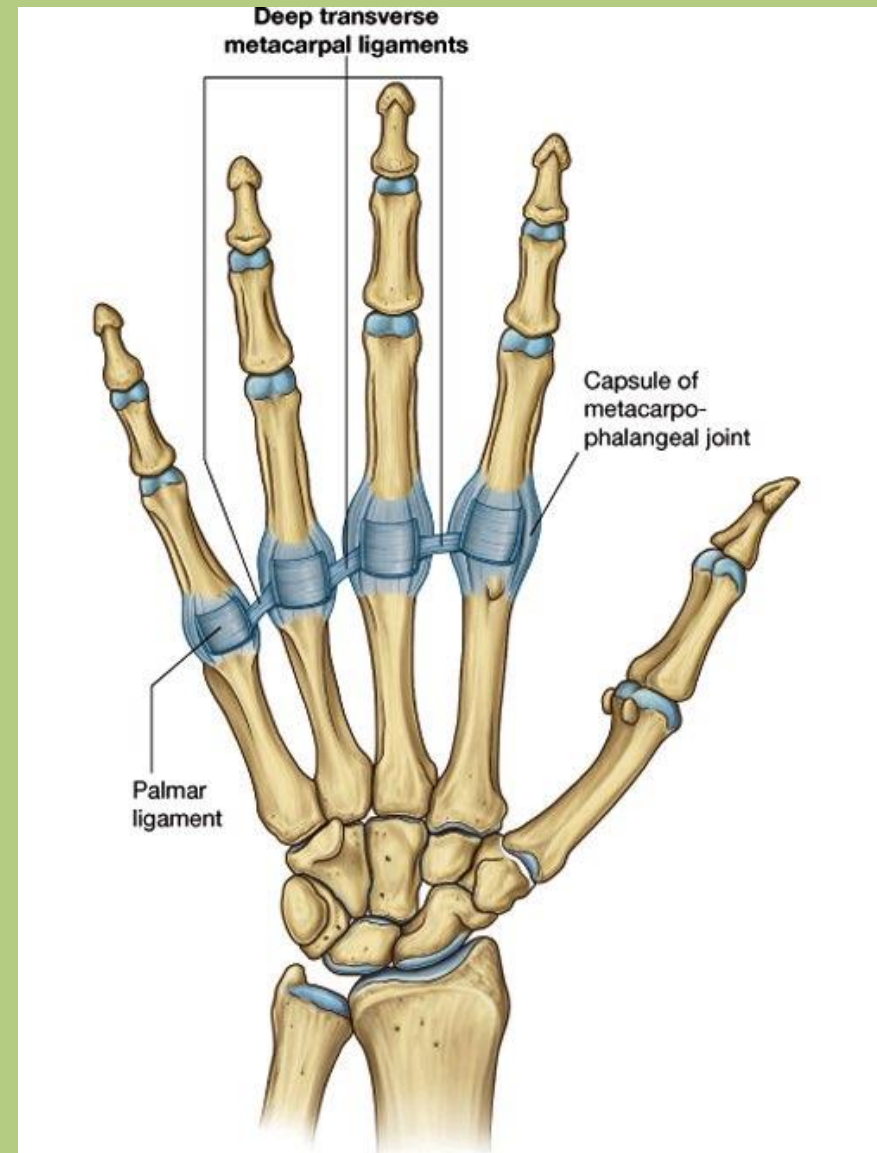
II-V. metacarpophalangeal joints

- **Type:** restricted ball-and-socket
- **Articular surfaces:** heads of metacarpals - bases of the proximal phalanges
- **Deep transverse metacarpal and palmar ligaments**
- **Movements:** flexion-extension, abduction-adduction



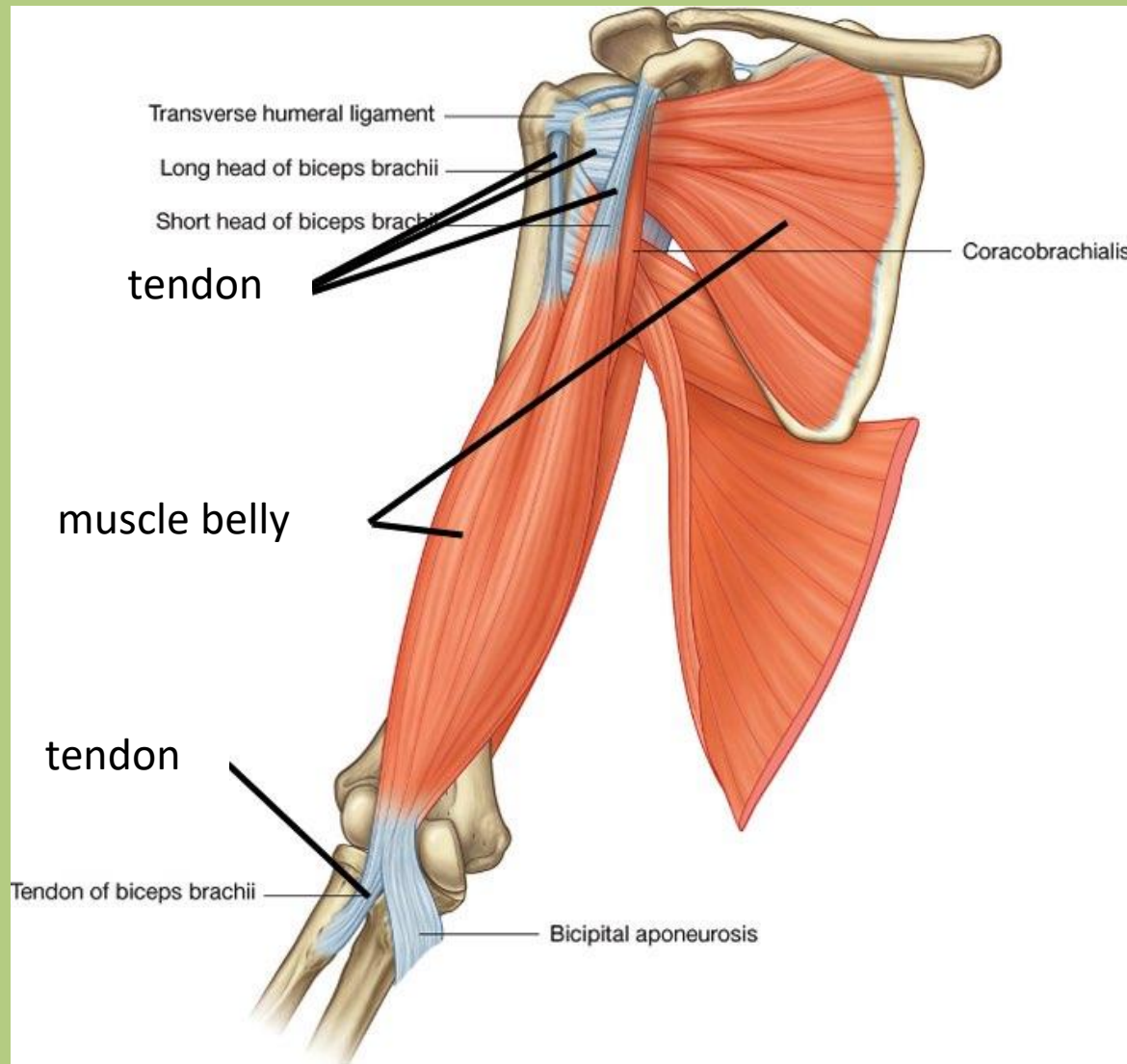
I. metacarpophalangeal and interphalangeal joints

- **Type:** hinge
- **Articular surfaces:** heads and bases of the phalanges
- **Collateral ligaments**
- **Movements:** flexion-extension



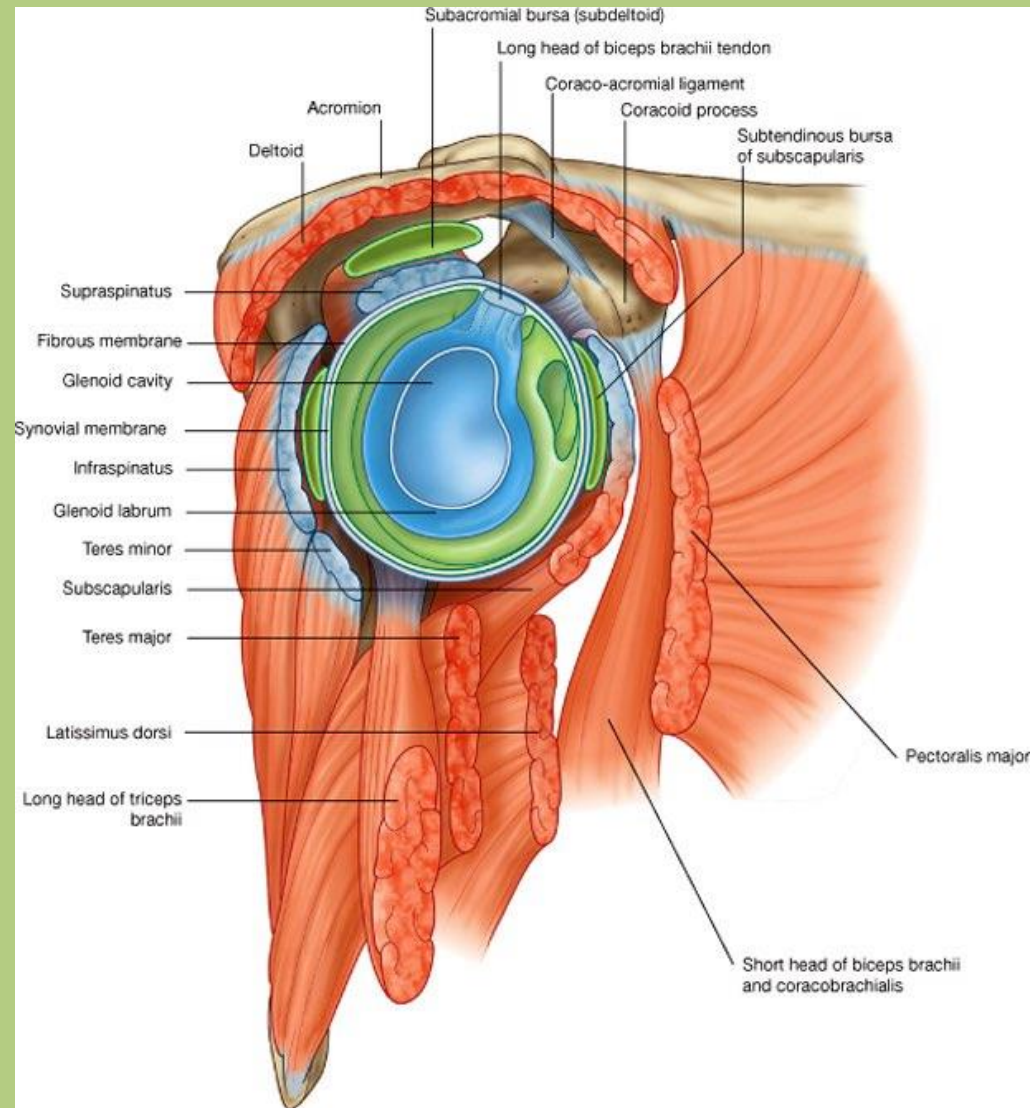
General myology

- origin
- muscle belly
- tendon
- insertion
- fascia



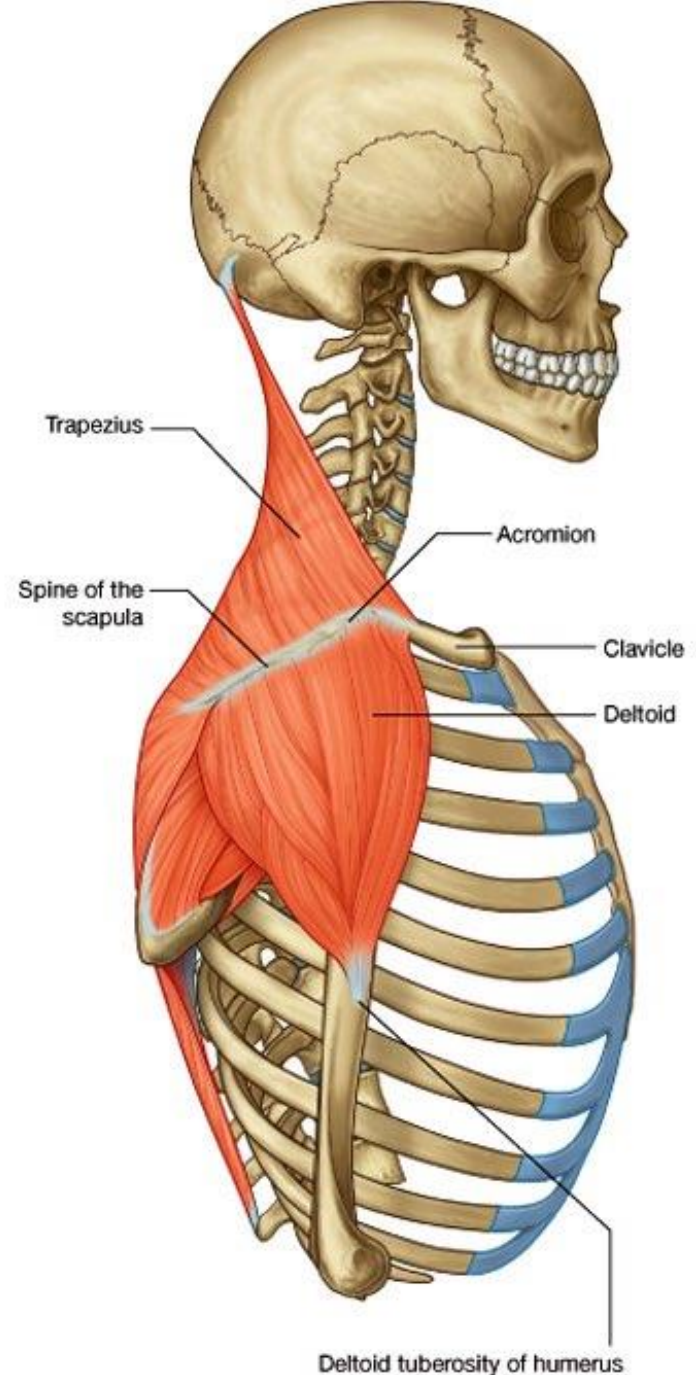
Muscles of the upper limb

- **Rotator cuff**



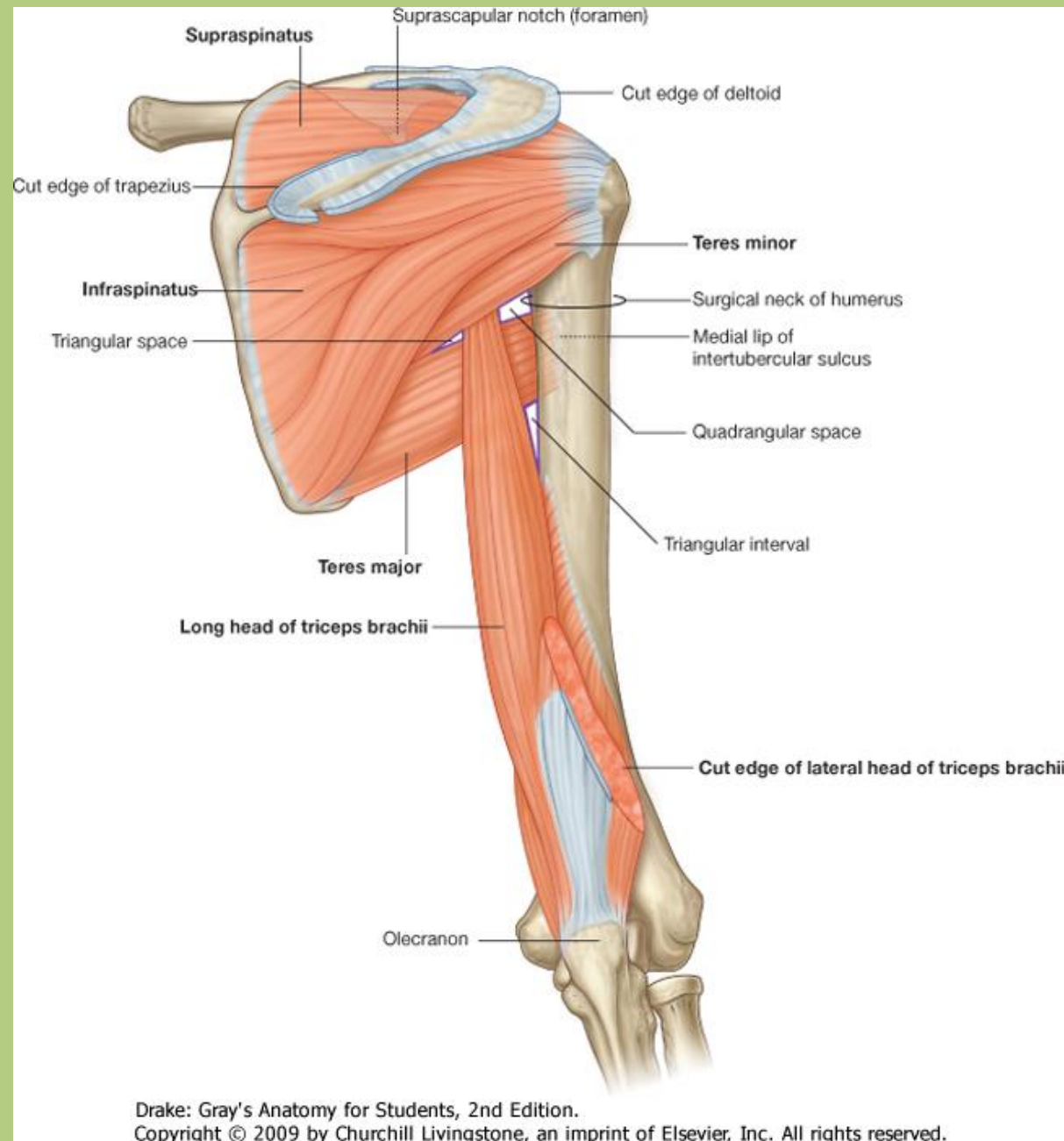
Deltoid

- **Origin:** 1. lateral part of the clavicle, 2. acromion, 3. spine of scapula
- **Insertion:** deltoid tuberosity
- **Action:** abduction, medial and lateral rotations, carries the weight of the arm
- **Innervation:** axillary nerve



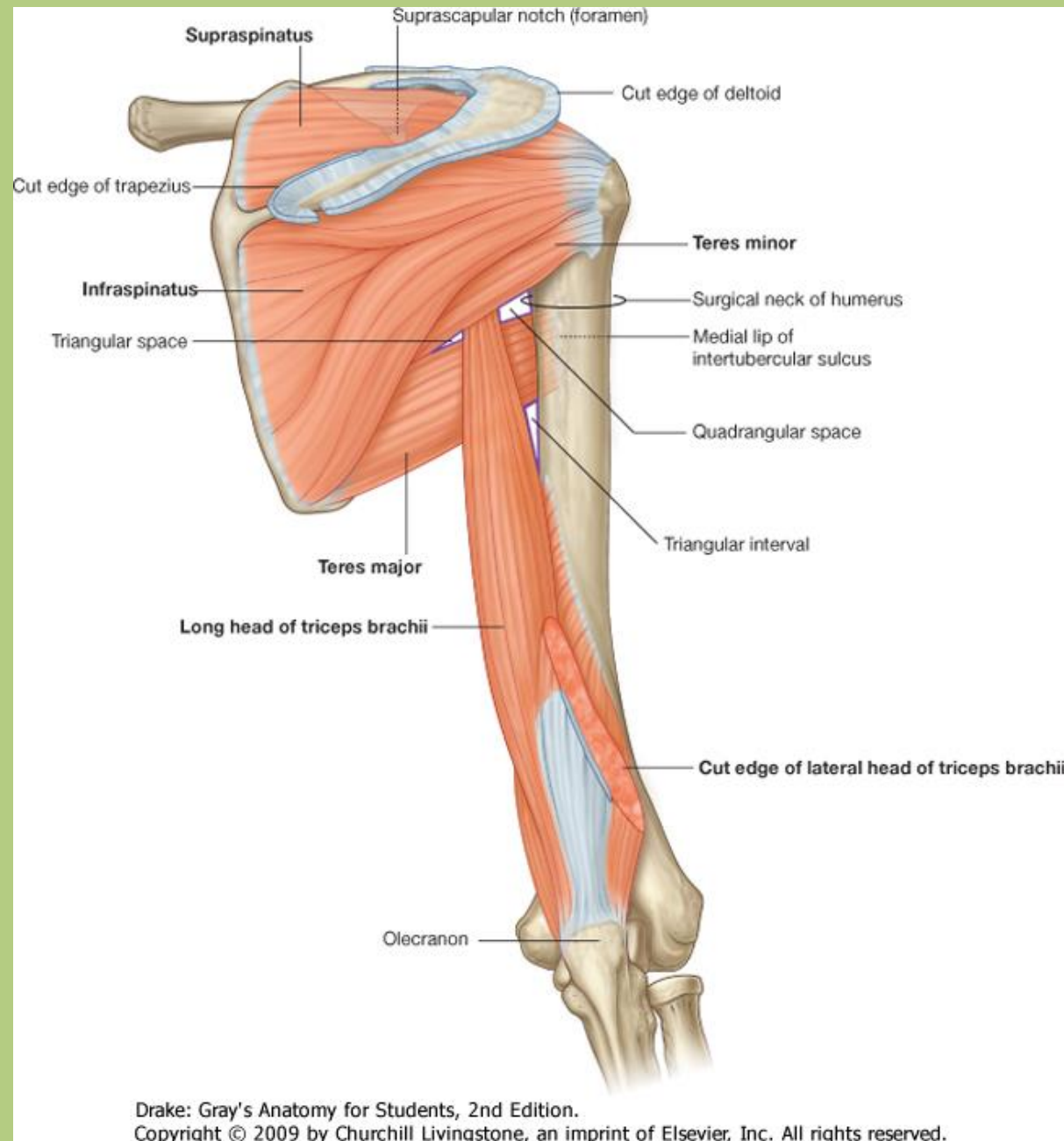
Supraspinatus

- **Rotator cuff muscle**
- **Origin:**
supraspinous fossa
- **Insertion:** superior facet of the greater tubercle
- **Action:** abduction, lateral rotation
- **Innervation:**
suprascapular nerve



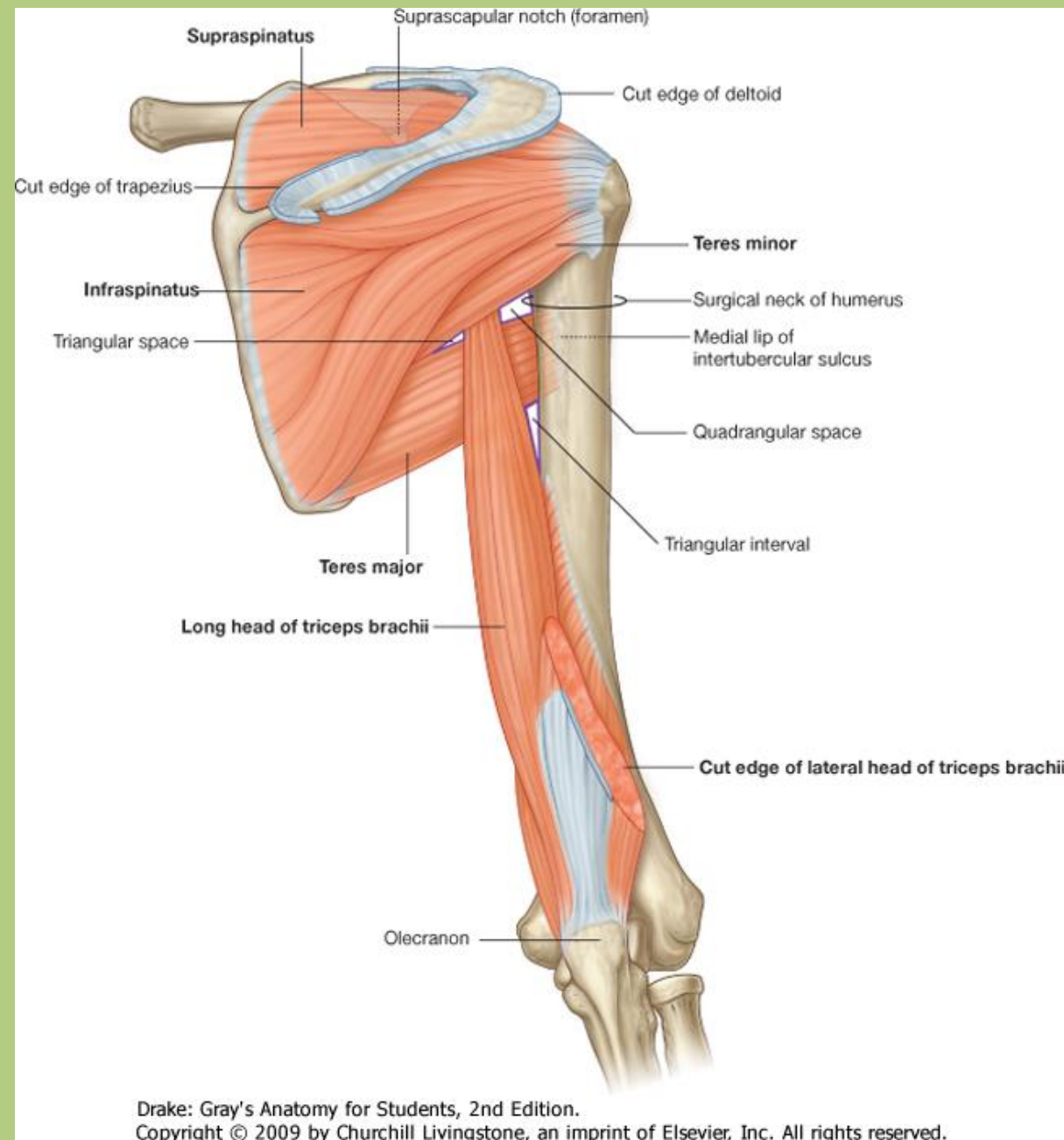
Infraspinatus

- **Rotator cuff muscle**
- **Origin:** infraspinous fossa
- **Insertion:** middle facet of the greater tubercle
- **Action:** adduction, lateral rotation
- **Innervation:** suprascapular nerve



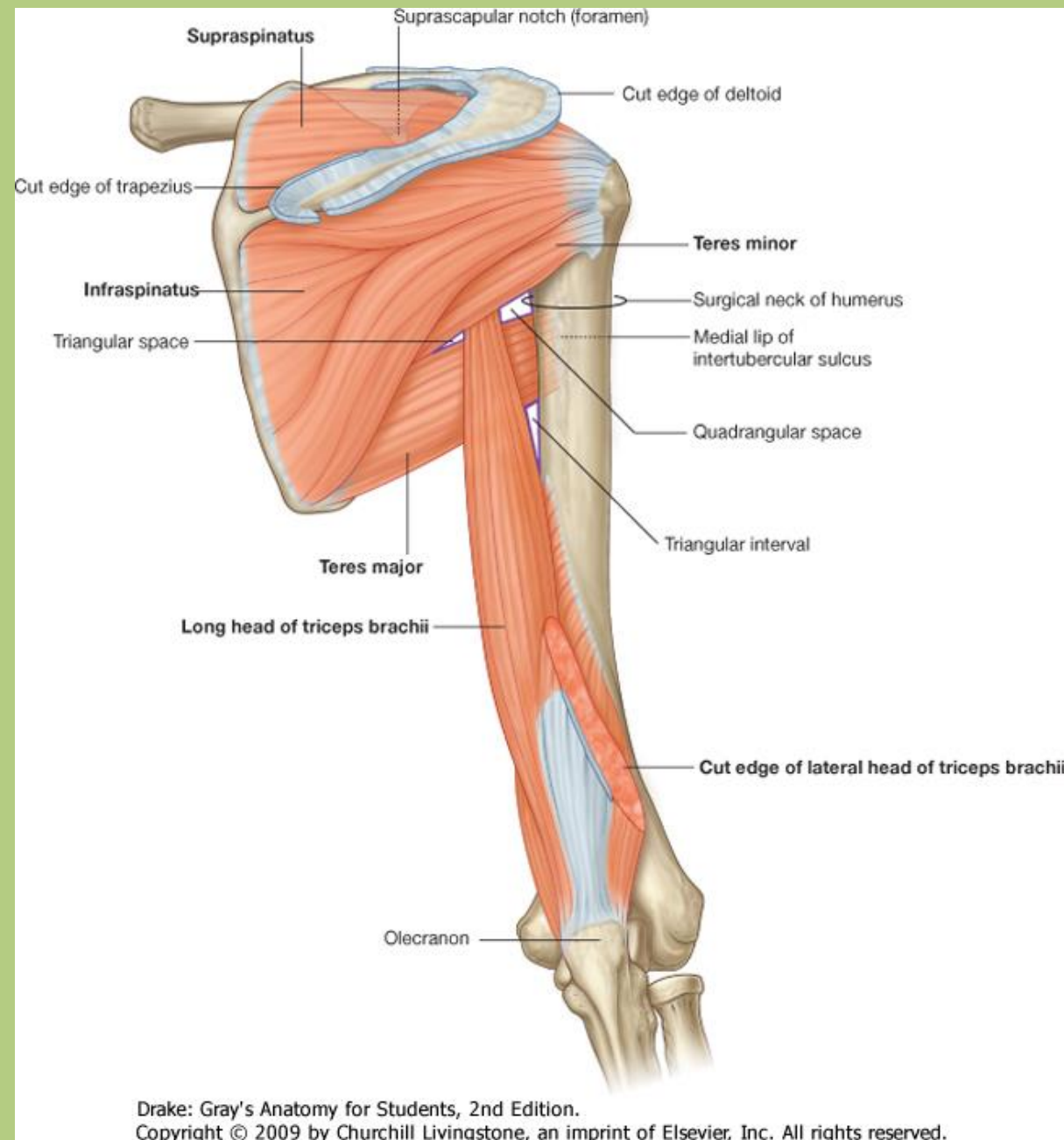
Teres minor

- **Rotator cuff muscle**
- **Origin:** lateral border of scapula
- **Insertion:** inferior facet of the greater tubercle
- **Action:** adduction, lateral rotation
- **Innervation:** axillary nerve



Teres major

- **Origin:** inferior angle of the scapula
- **Insertion:** crest of the lesser tubercle
- **Action:** adduction, medial rotation
- **Innervation:** subscapular nerve



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Spine of scapula

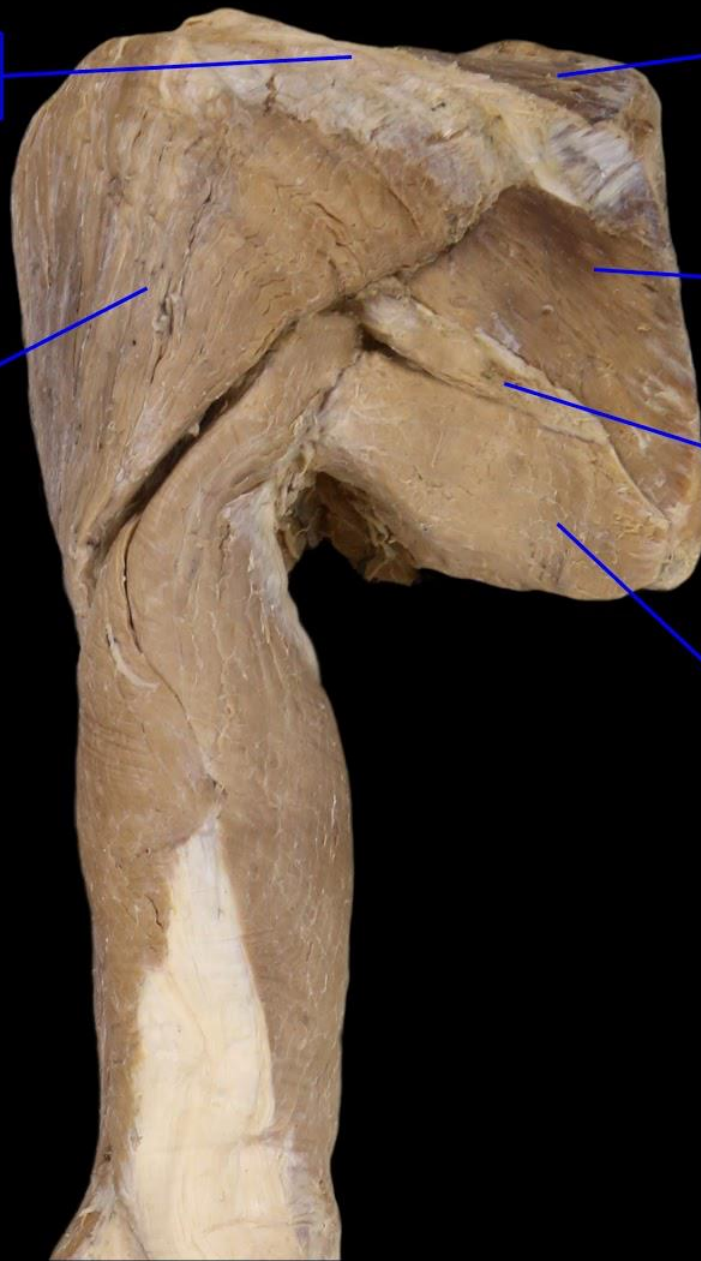
Supraspinatus m.

Deltoid m.

Infraspinatus m.

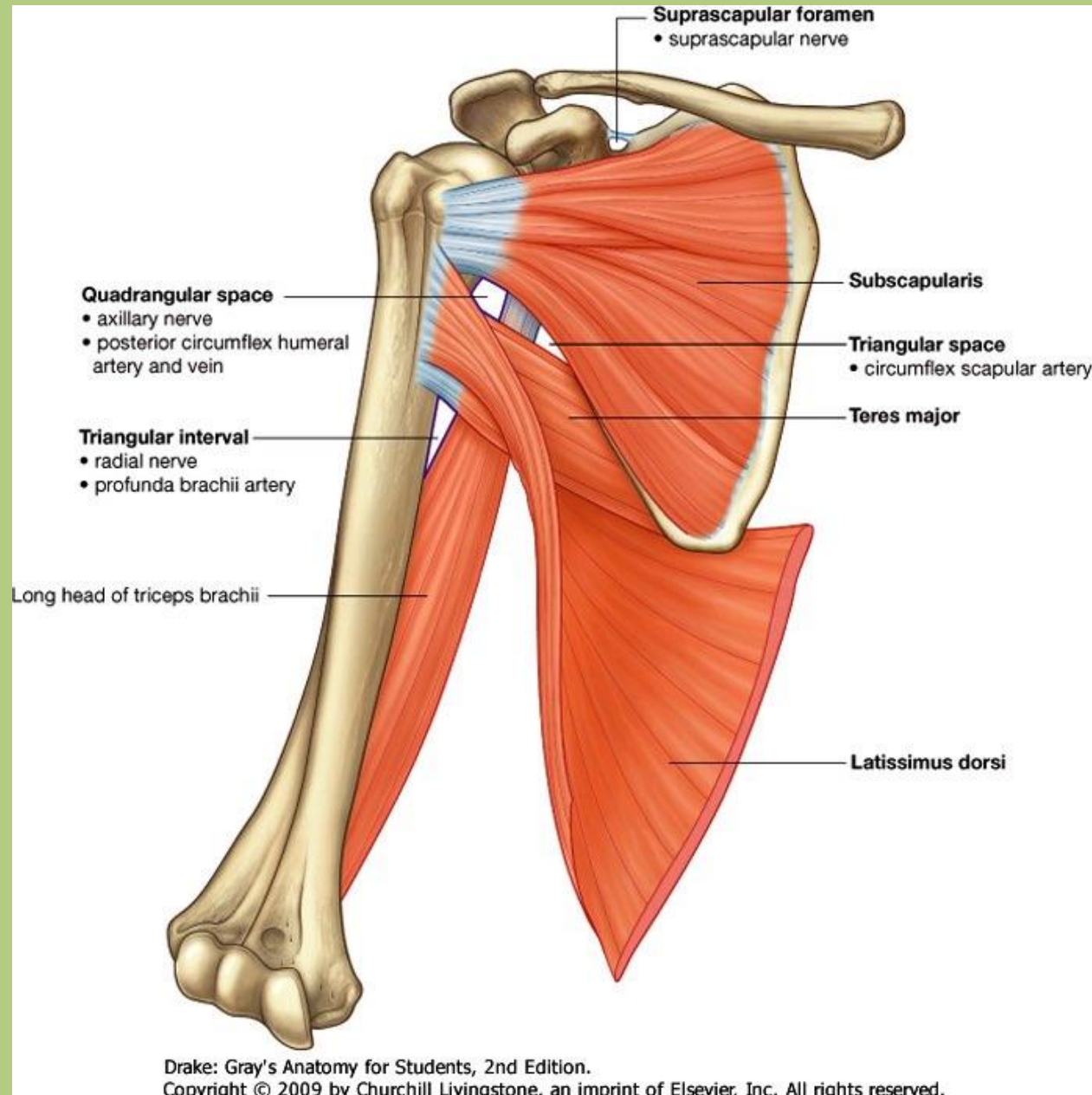
Teres minor m.

Teres major m.



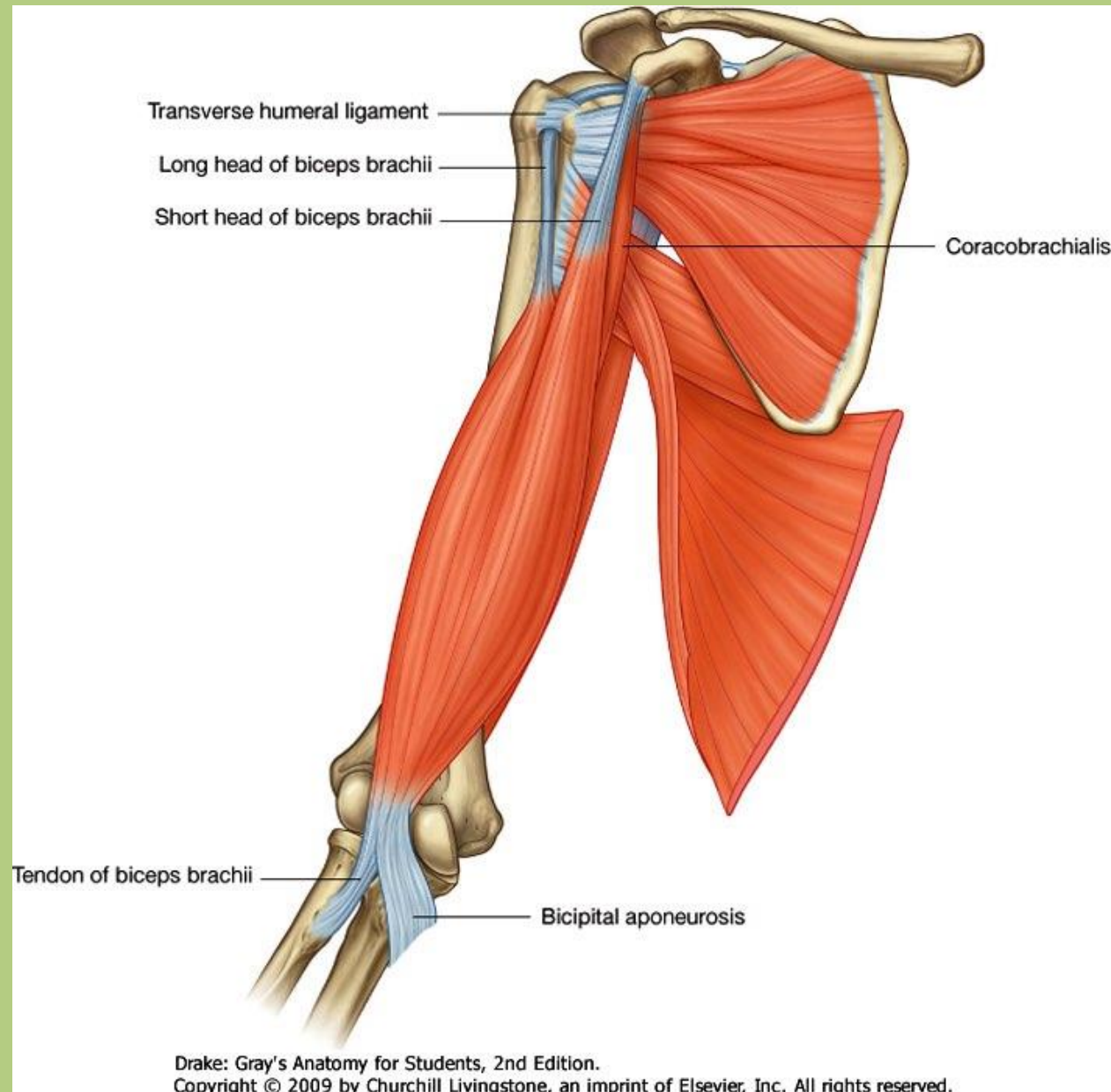
Subscapularis

- **Rotator cuff muscle**
- **Origin:** subscapular fossa
- **Insertion:** lesser tubercle
- **Action:** adduction, medial rotation
- **Innervation:** subscapular nerve



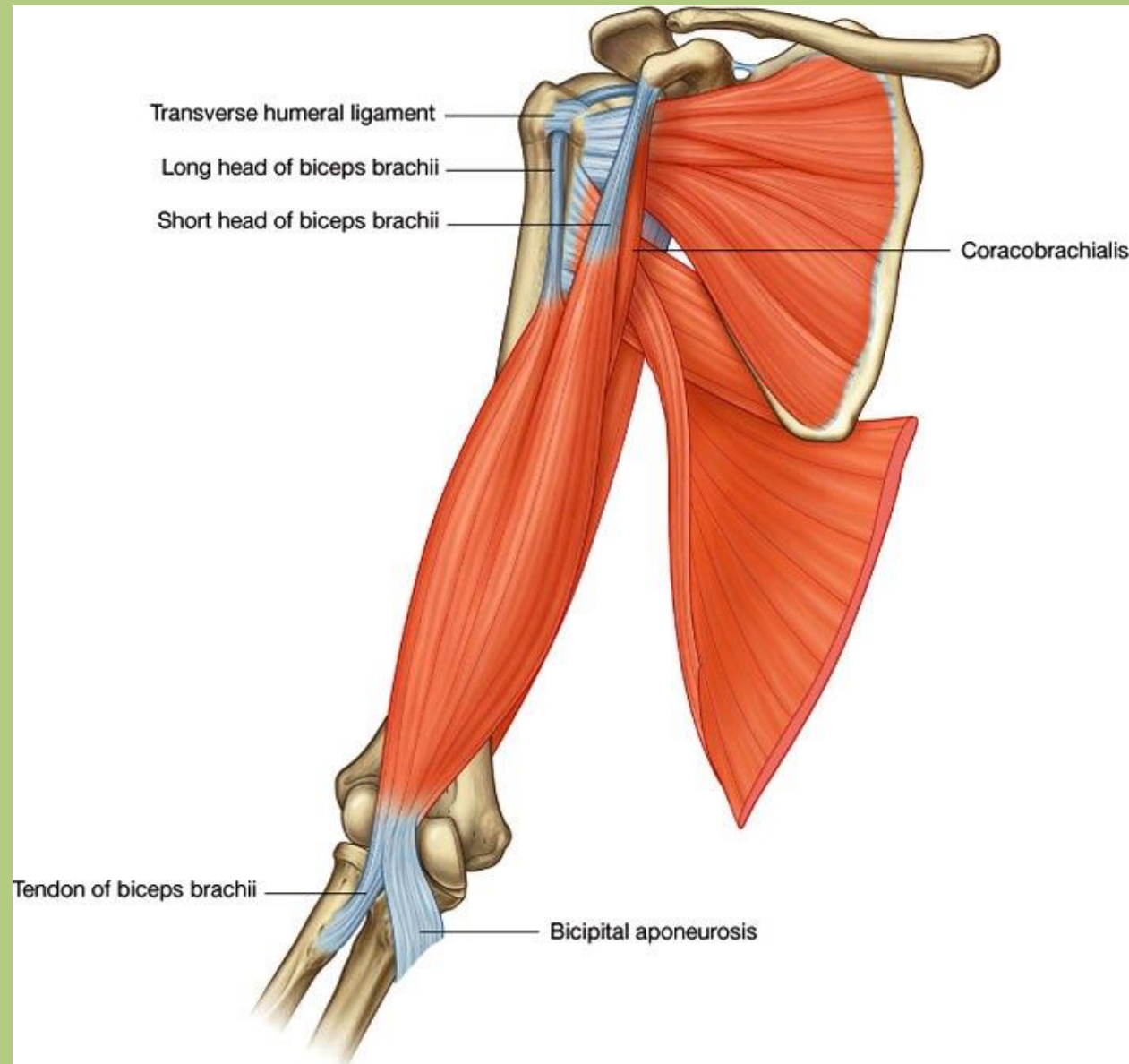
Biceps brachii

- **Origin:** *long head:* supraglenoid tubercle; *short head:* coracoid process
- **Insertion:** radial tuberosity
- **Action:** Shoulder joint: anteversion and medial rotation, carries the weight of the arm. Elbow joint: flexion and supination.
- **Innervation:** musculocutaneous nerve



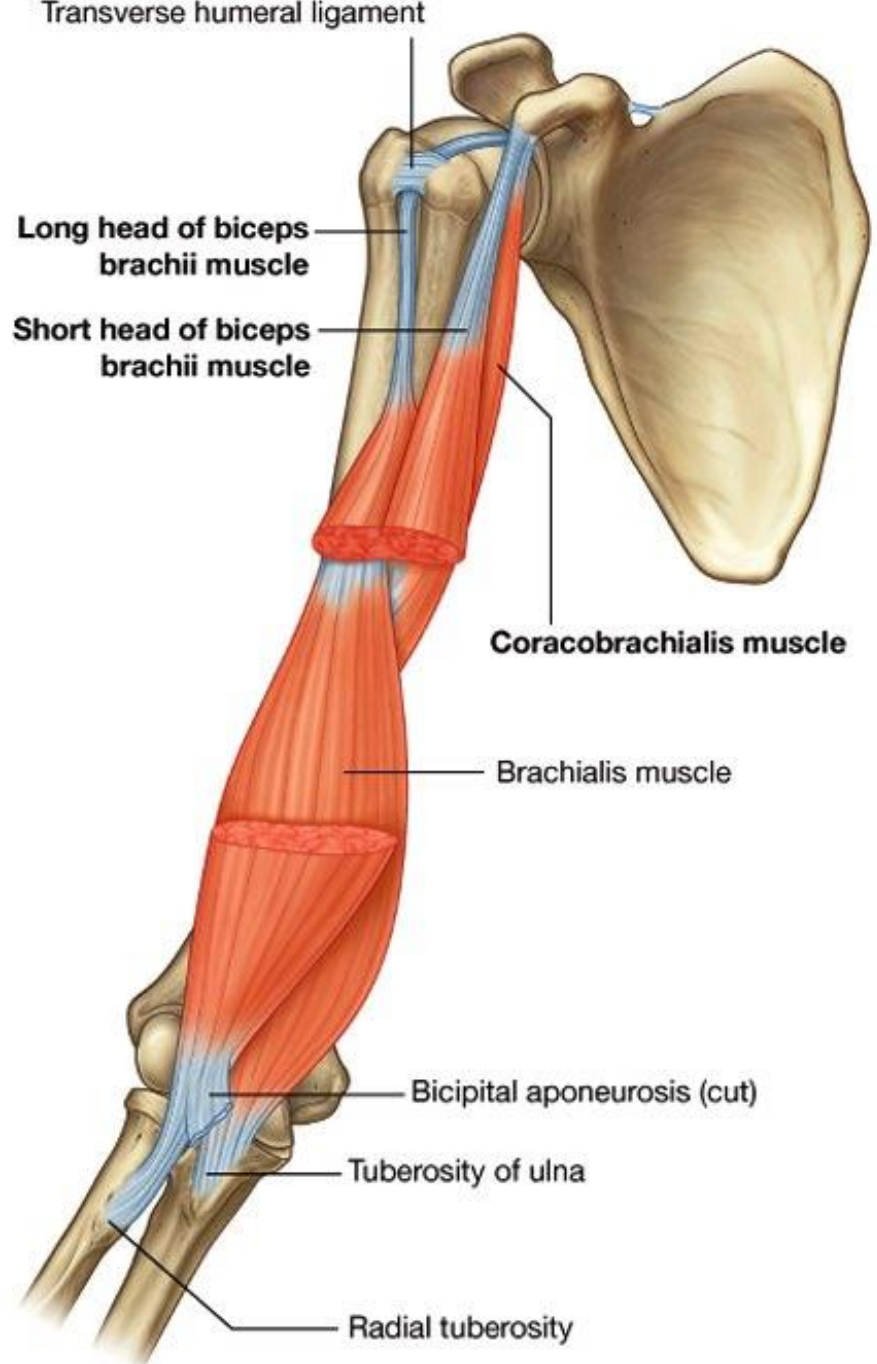
Coracobrachialis

- **Origin:** coracoid process
- **Insertion:** anterior surface of humerus
- **Action:** anteversion, adduction
- **Innervation:** musculocutaneous nerve



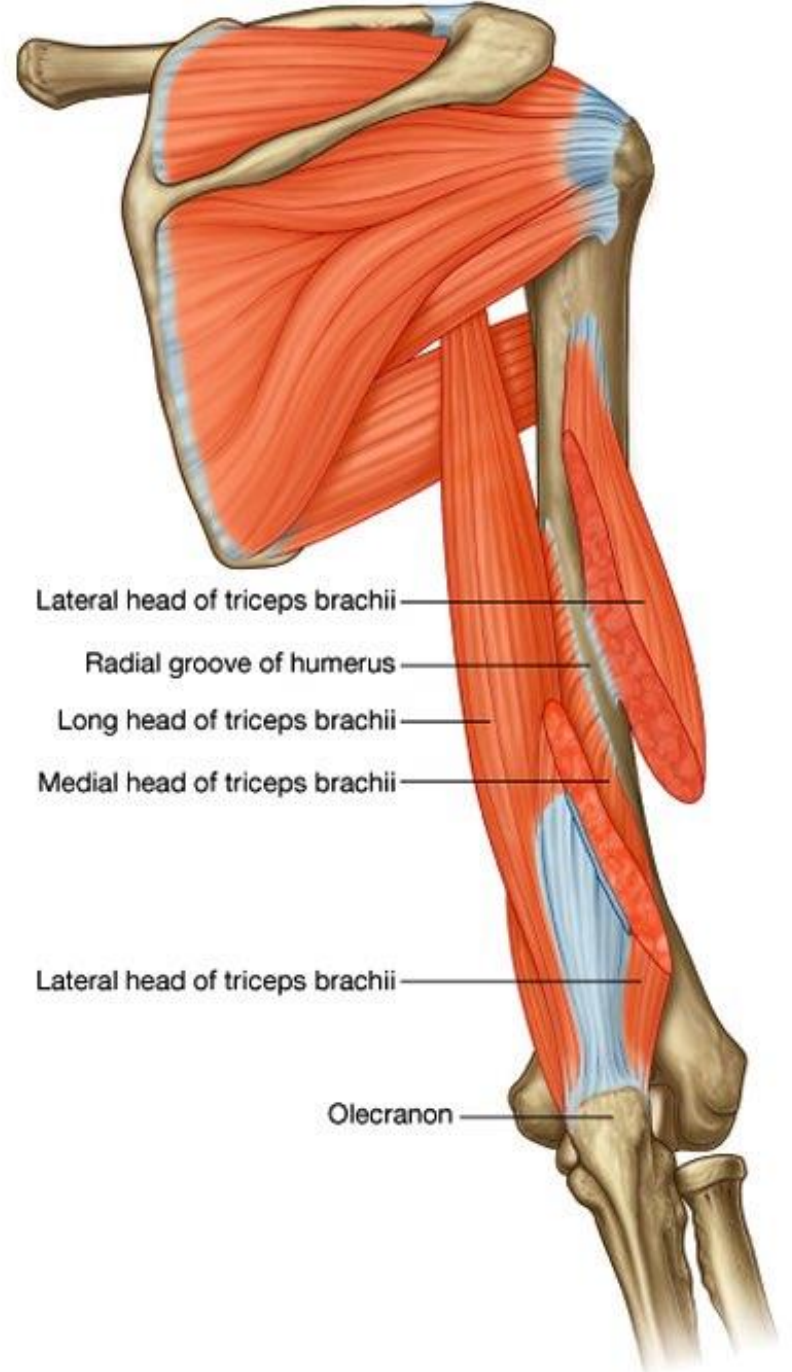
Brachialis

- **Origin:** anterior surface of humerus
- **Insertion:** ulnar tuberosity
- **Action:** flexion of elbow joint
- **Innervation:** musculocutaneous nerve



Triceps brachii

- **Origin:** *long head:* infraglenoid tubercle; *lateral head:* proximal to the groove for radial nerve; *medial head:* distal to the groove for radial nerve
- **Insertion:** olecranon
- **Action:** Shoulder joint: adduction.
Elbow joint: extension
- **Innervation:** radial nerve



Thank you for your
attention.

References:

Gray's Anatomy for Students

Thieme: Atlas of Anatomy, General Anatomy and Musculoskeletal System

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