Main Menu

1 The Elbow and Radioulnar Joints

click here

Bones

Ulna is much larger proximally than radius

Radius is much larger distally than ulna

Scapula and humerus serve as proximal attachments for muscles that flex & extend the elbow

Ulna and radius serve as distal attachments for these same muscles

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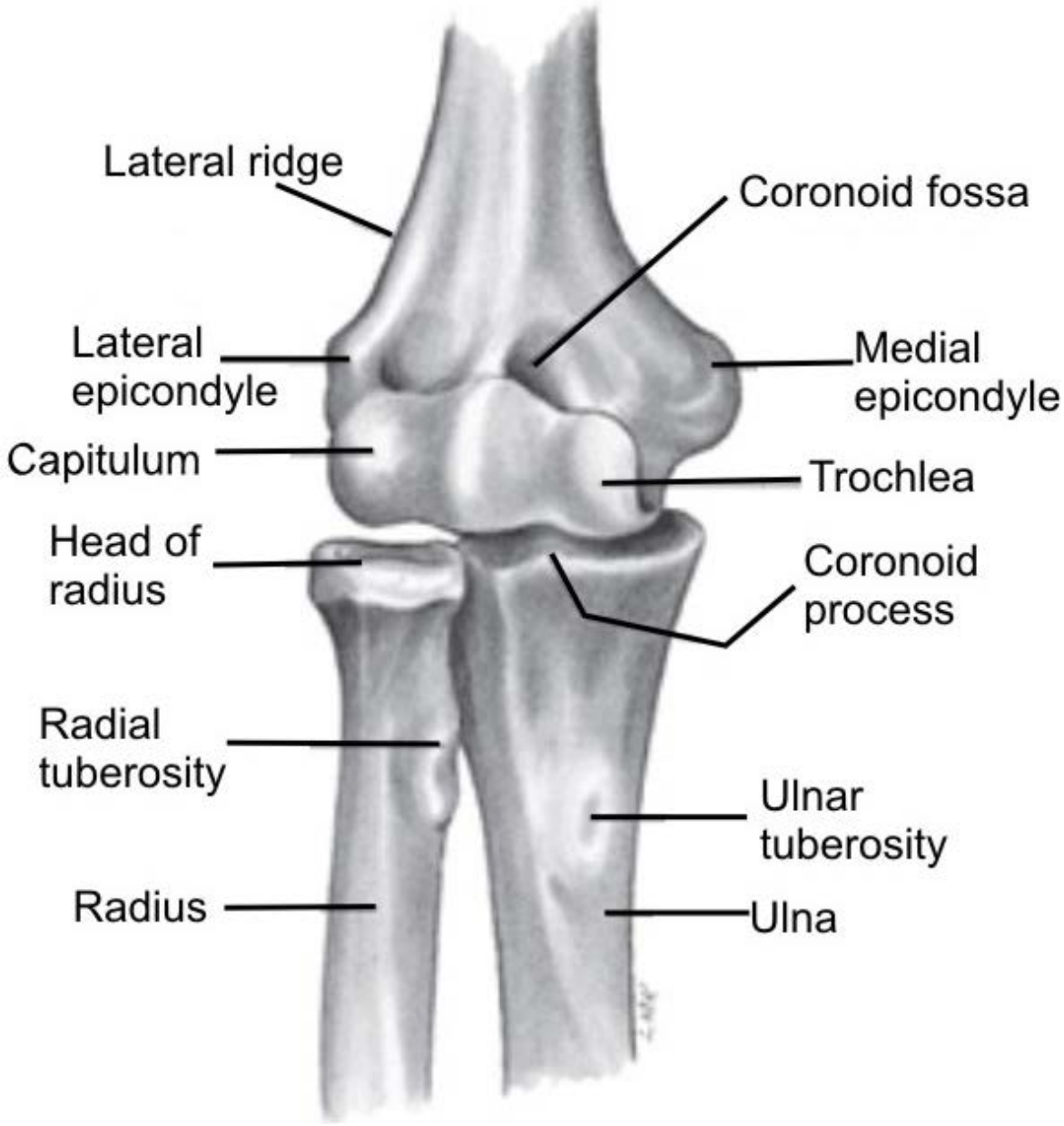
Bones



Bones

Ulna is much larger proximally than radius

Radius is much larger distally than ulna

Scapula and humerus serve as proximal attachments for muscles that flex & extend the elbow

Ulna and radius serve as distal attachments for these same muscles

Scapula, humerus, and ulna serve as proximal attachments for muscles that pronate and supinate the radioulnar joints

Distal attachments of radioulnar joint muscles are located on radius

Bony Landmarks
medial condyloid ridge
olecranon process
coranoid process
radial tuberosity

Bony Landmarks for Wrist and Hand Muscles
medial epicondyle
lateral epicondyle
lateral supracondylar ridge

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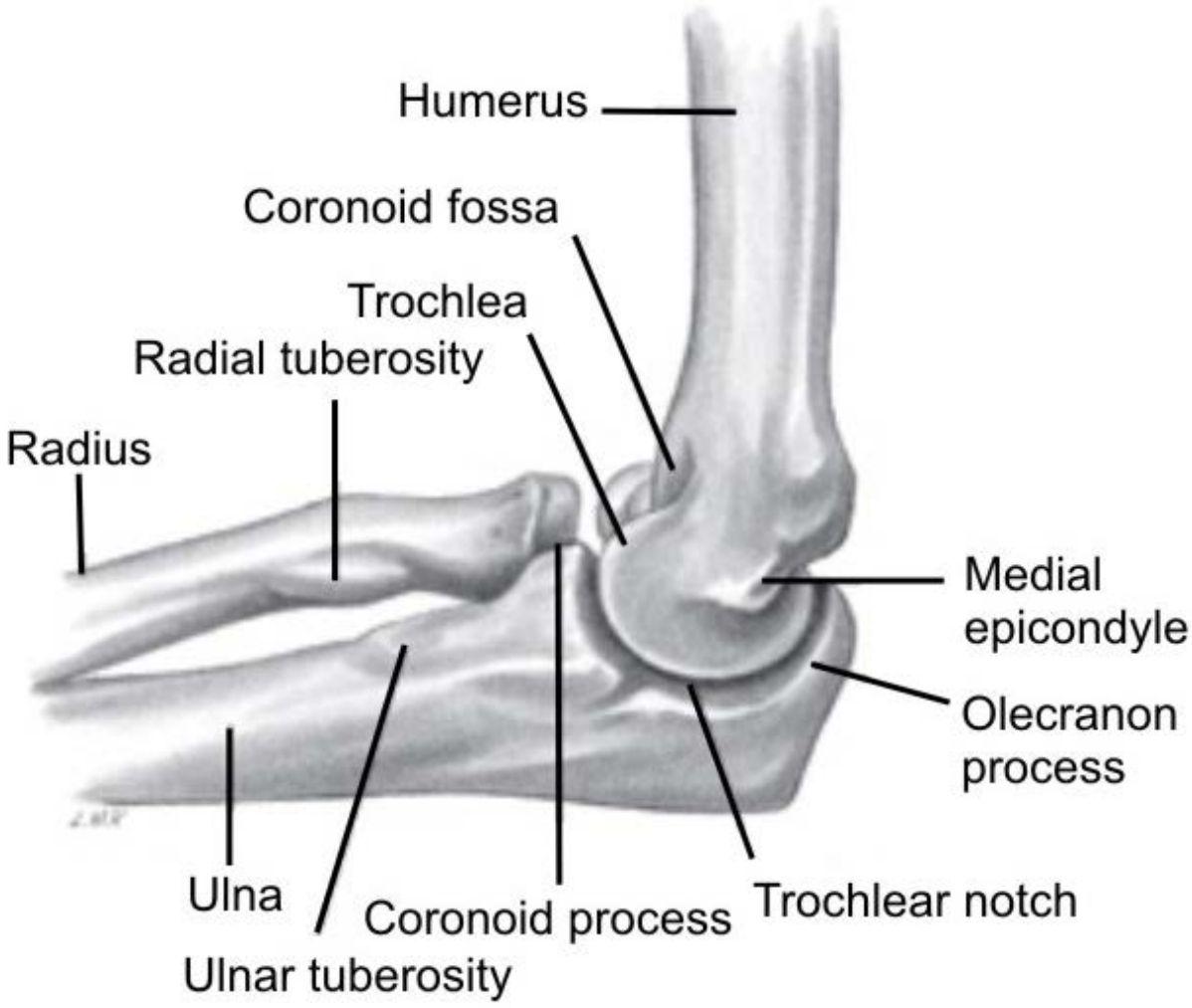
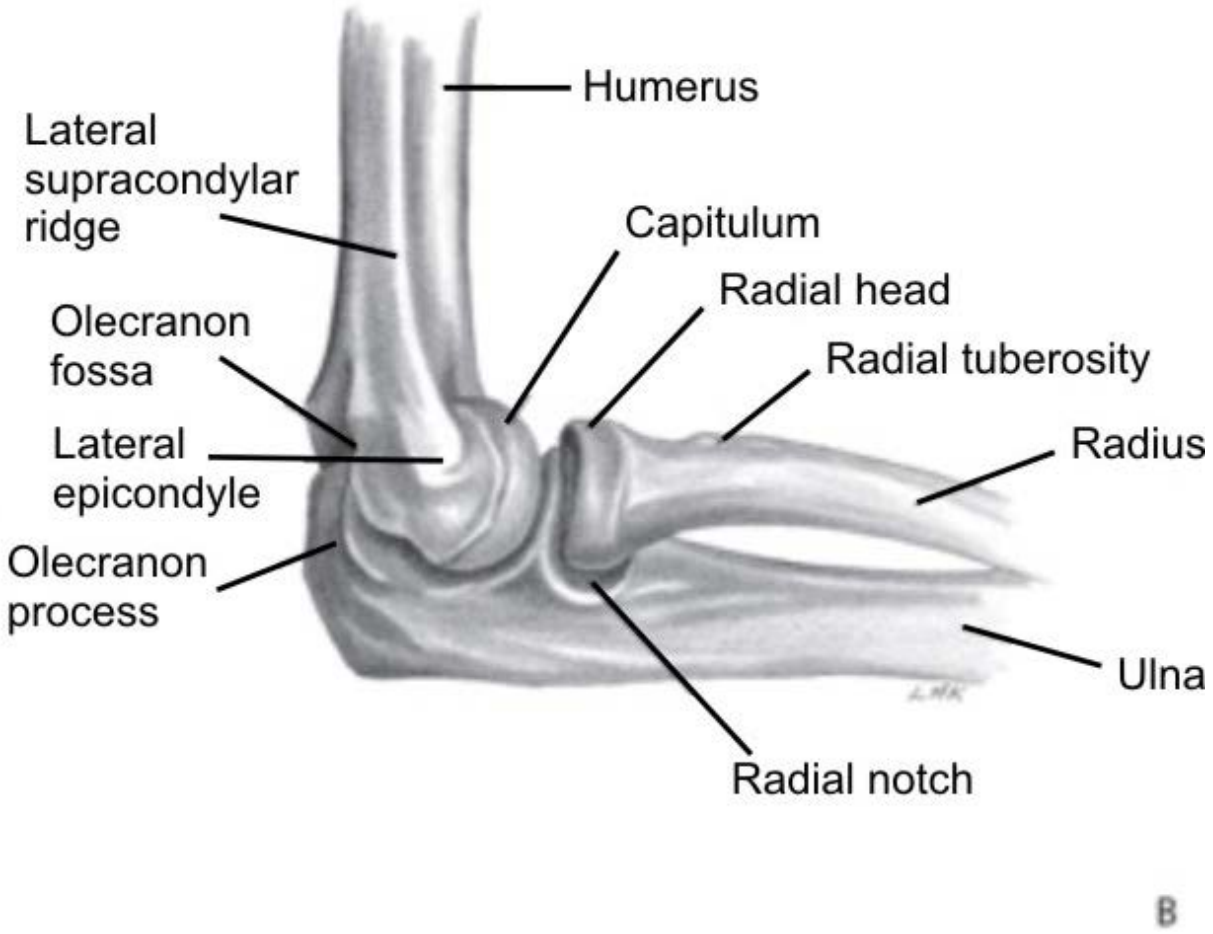
Bones



Bones



Joints

Ginglymus or hinge-type joint

Allows only flexion and extension

2 interrelated joints

- humeroulnar joint
- radiohumeral joints

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Elbow Motions

Primarily involves movement between articular surfaces of humerus and ulna

- specifically humeral trochlear fitting into ulna trochlear notch
- radial head has a relatively small amount of contact with capitulum of humerus

As elbow reaches full extension, olecranon process is received by olecranon fossa

increased joint stability when fully extended

As elbow flexes 20 degrees or more, its bony stability is unlocked, allowing for more side-to-side laxity

Stability in flexion is more dependent on the lateral (radial collateral ligament) and the medial or (ulnar collateral ligament)

Ulnar collateral ligament is critical in providing medial support to prevent elbow from abducting when stressed in physical activity

- Many contact sports and throwing activities place stress on medial aspect of joint, resulting in injury

Radial collateral ligament provides lateral stability & is rarely injured

Annular ligament provides a sling effect around radial head for stability

Elbow moves from 0 degrees of extension to 145 to 150 degrees of flexion

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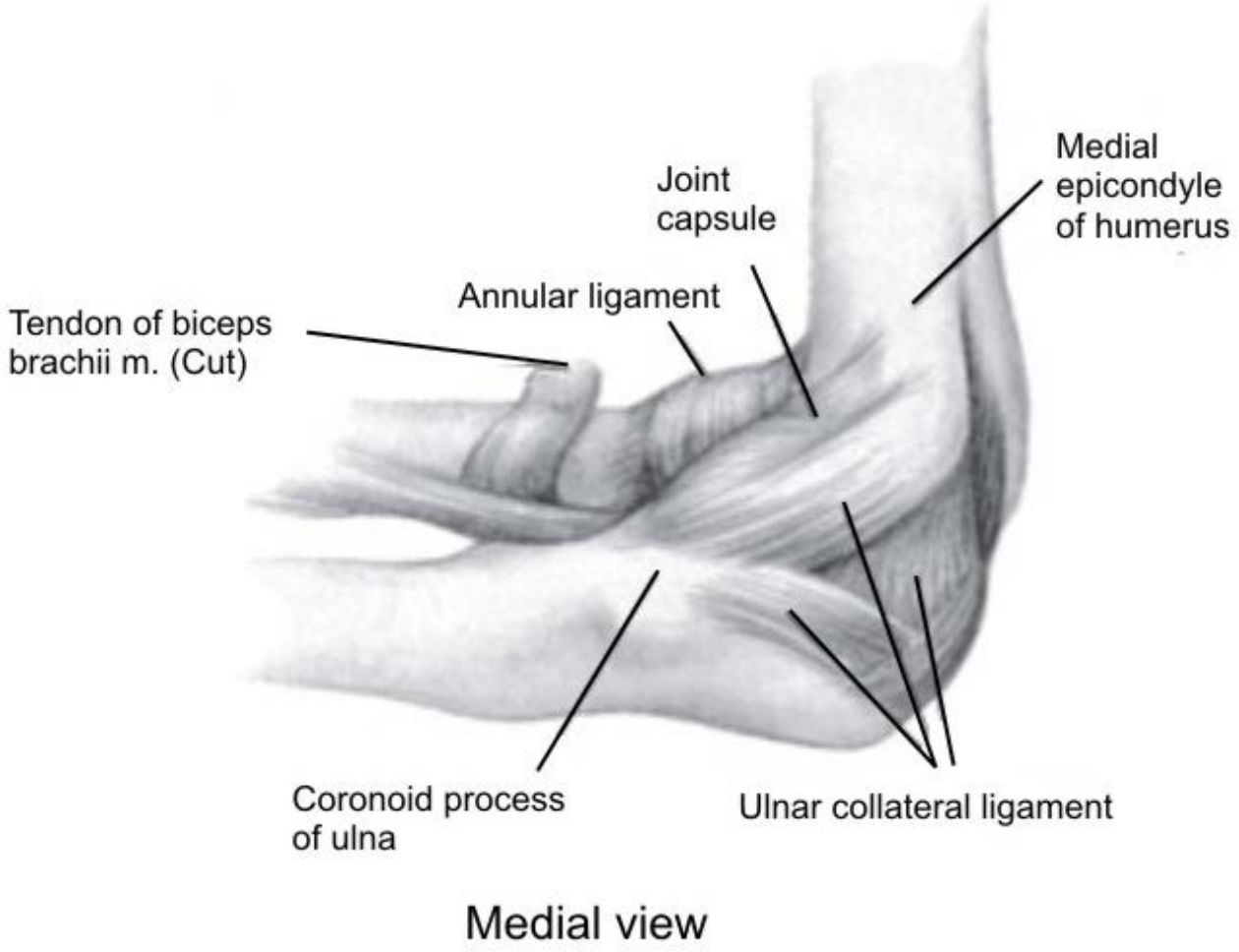
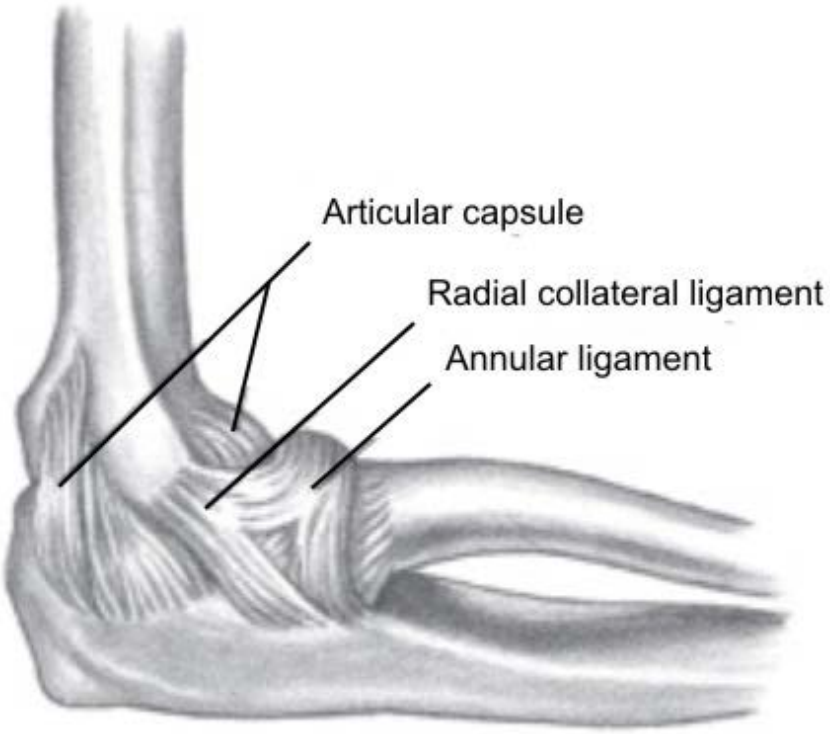
Joints

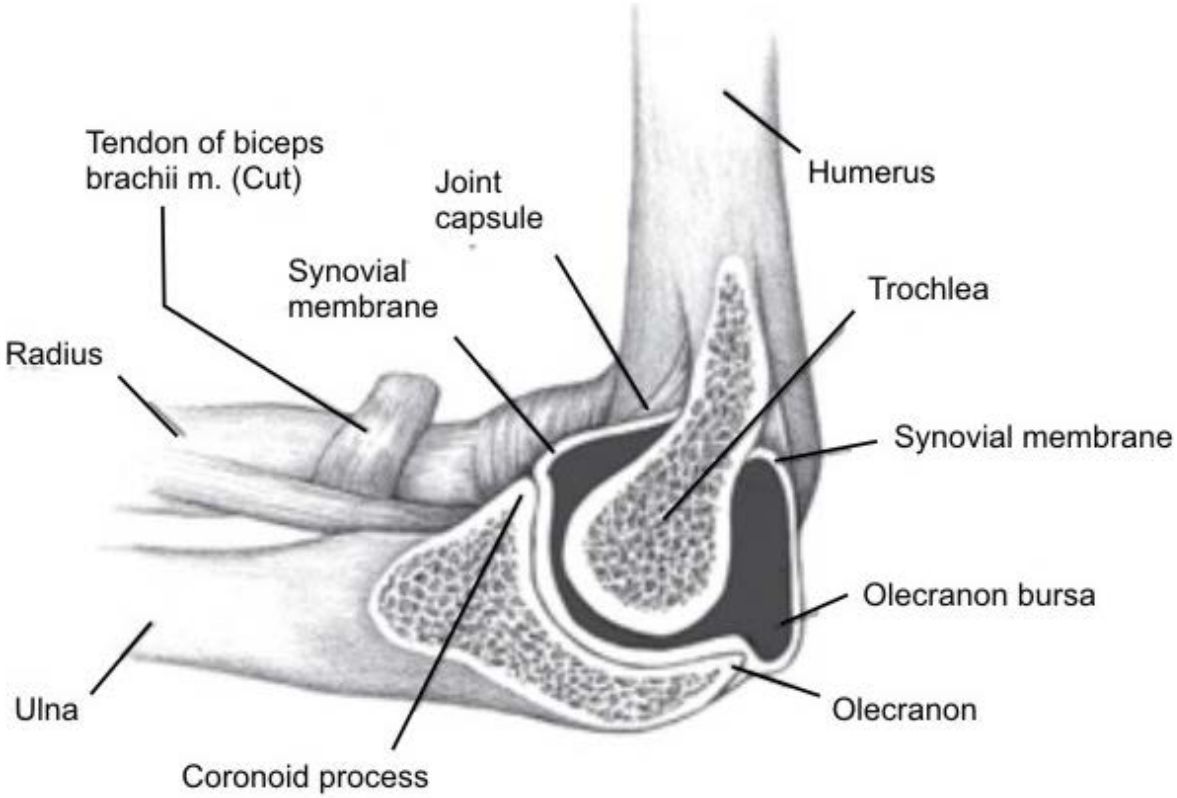


Medial view

Joints



Lateral view



Sagittal view

Radioulnar Joint

Trochoid or pivot-type joint

Radial head rotates around at proximal ulna

Distal radius rotates around distal ulna

Annular ligament maintains radial head in its joint

Joint between shafts of radius and ulna held tightly together between proximal and distal articulations by an interosseus membrane (syndesmosis)

- substantial rotary motion between the bones

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Synergy between Glenohumeral, Elbow, and Radioulnar Joint Muscles

As the radioulnar joint goes through its ROM, glenohumeral & elbow muscles contract to stabilize or assist in the effectiveness of movement at the radioulnar joints

> Ex. when tightening a screw with a screwdriver which involves radioulnar supination, we tend to externally rotate and flex the glenohumeral and elbow joints, respectfully

Conversely, when loosening a tight screw with pronation, we tend to internally rotate & extend the elbow & glenohumeral joints, respectfully

> we depend on both the agonists and antagonists in the surrounding joints to assist in an appropriate amount of stabilization and assistance with the required task

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Movement

Flexion

movement of forearm to shoulder by bending the elbow to decrease its angle

Extension

movement of forearm away from shoulder by straightening the elbow to increase its angle

Pronation

internal rotary movement of radius on ulna that results in hand moving from palm-up to palm-down position

Supination

external rotary movement of radius on ulna that results in hand moving from palm-down to palm-up position

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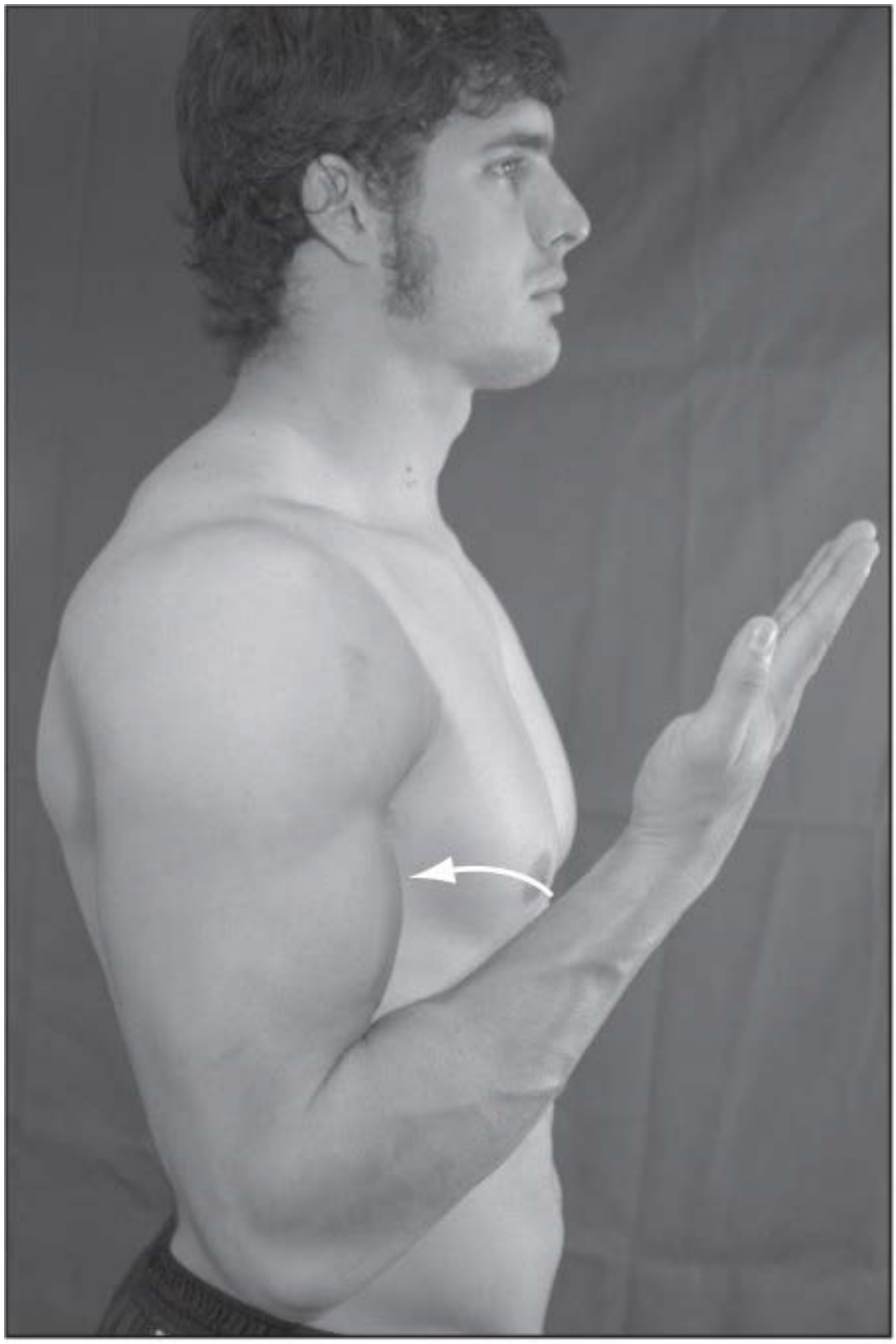
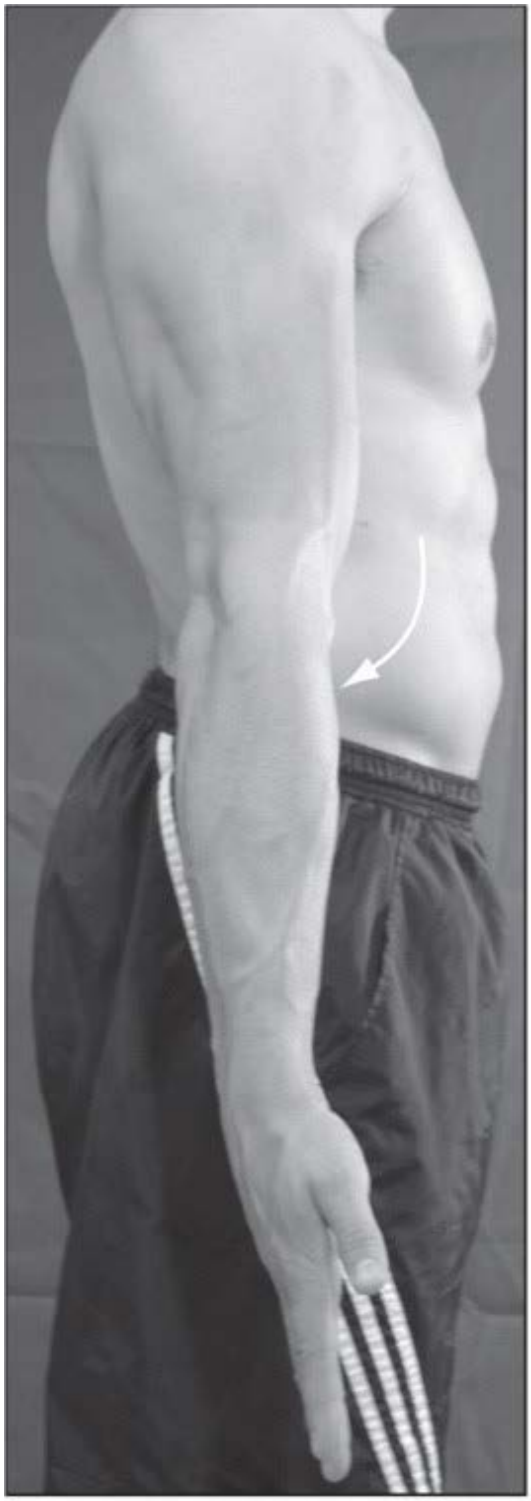
Movement



Flexion

Movement

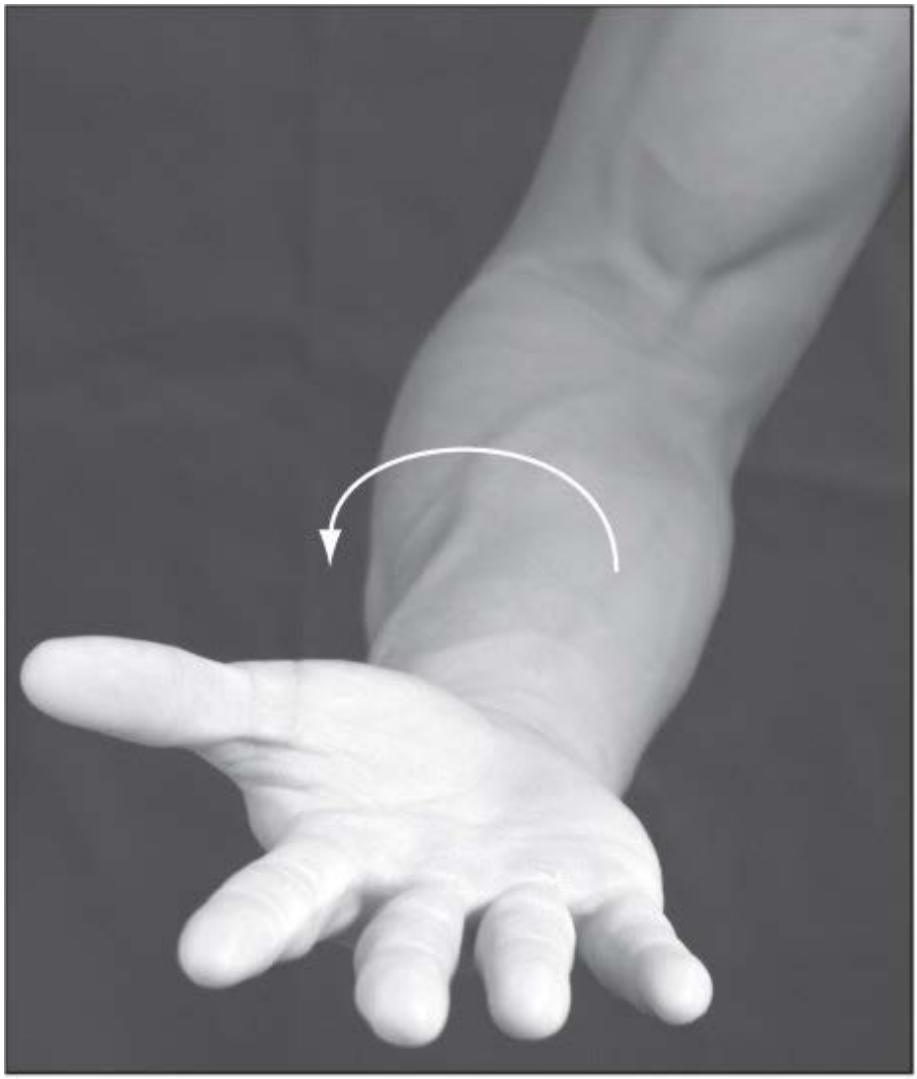


Extension B

Movement

Pronation

Movement



Supination

Muscles

Anterior

Primarily flexion and pronation

- Biceps brachii
- Brachialis
- Brachioradialis
- Pronator teres
- Pronator quadratus

Posterior

Primarily extension and supination

- Triceps brachii
- Anconeus
- Supinator

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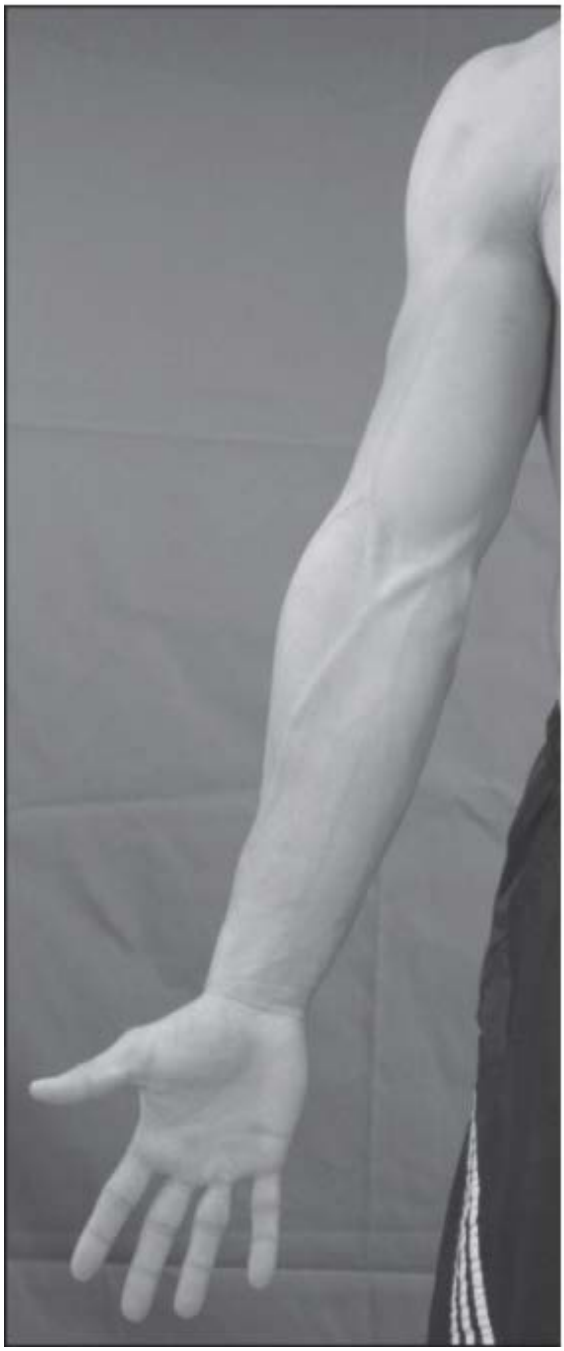
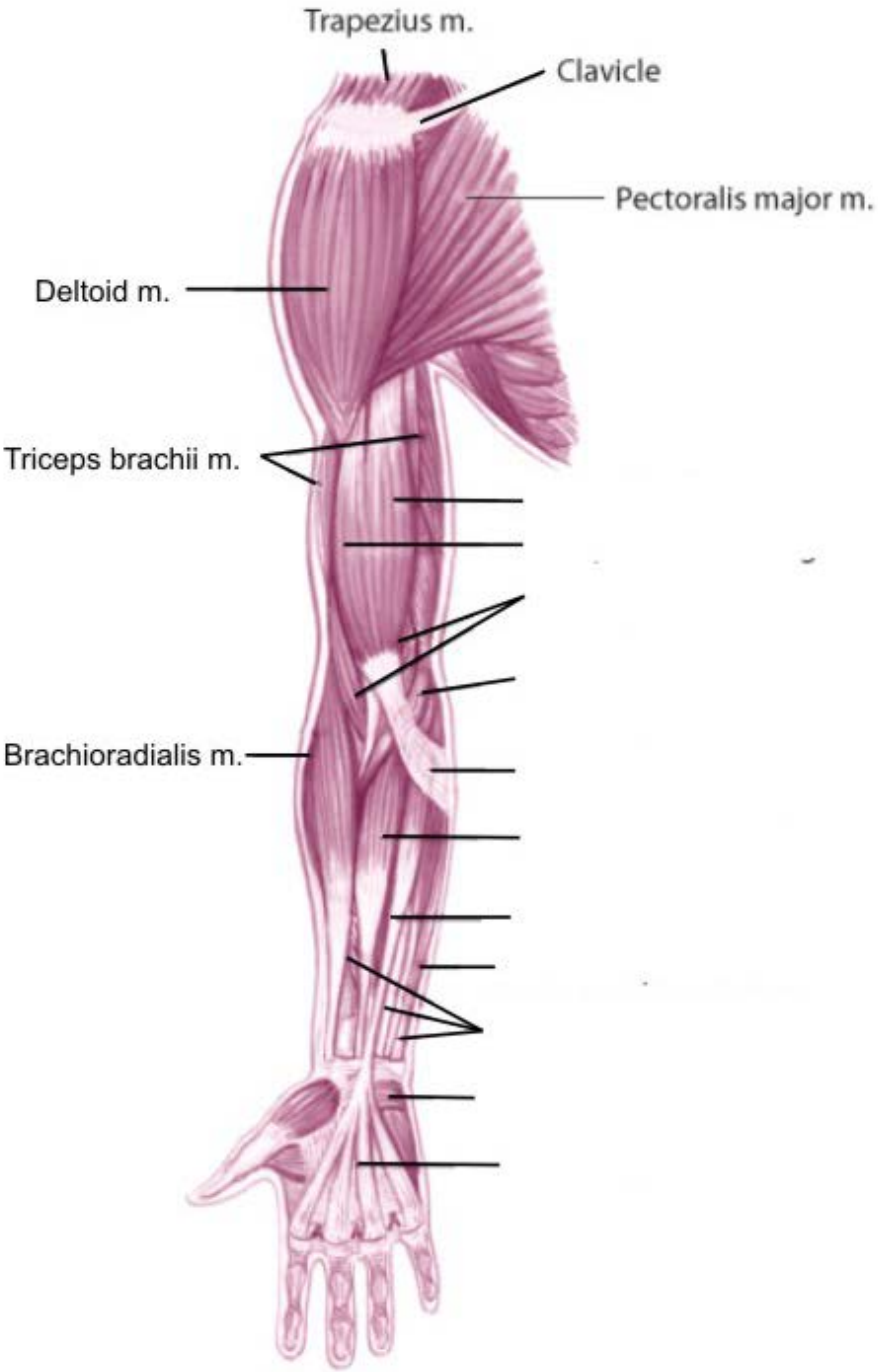
Anterior Muscles





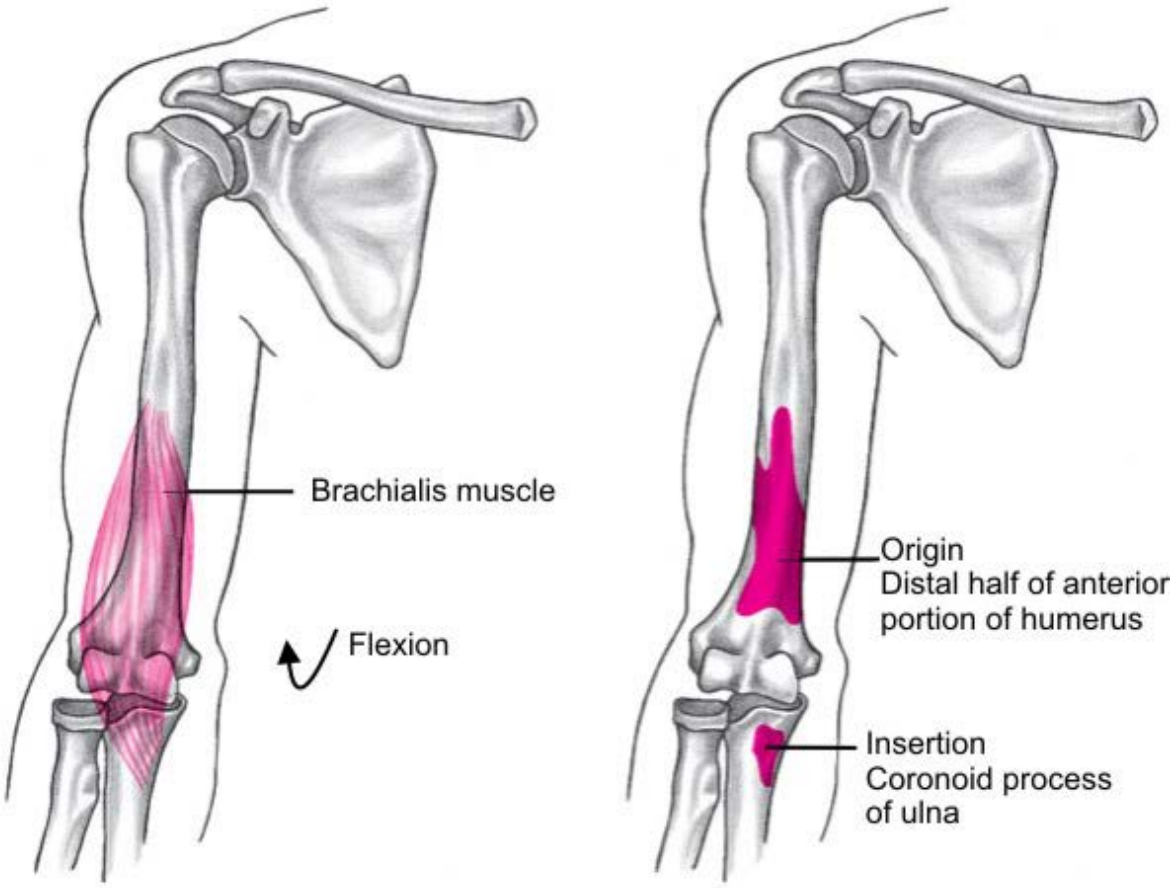
Biceps Brachii Muscle

Flexion of elbow

Supination of forearm

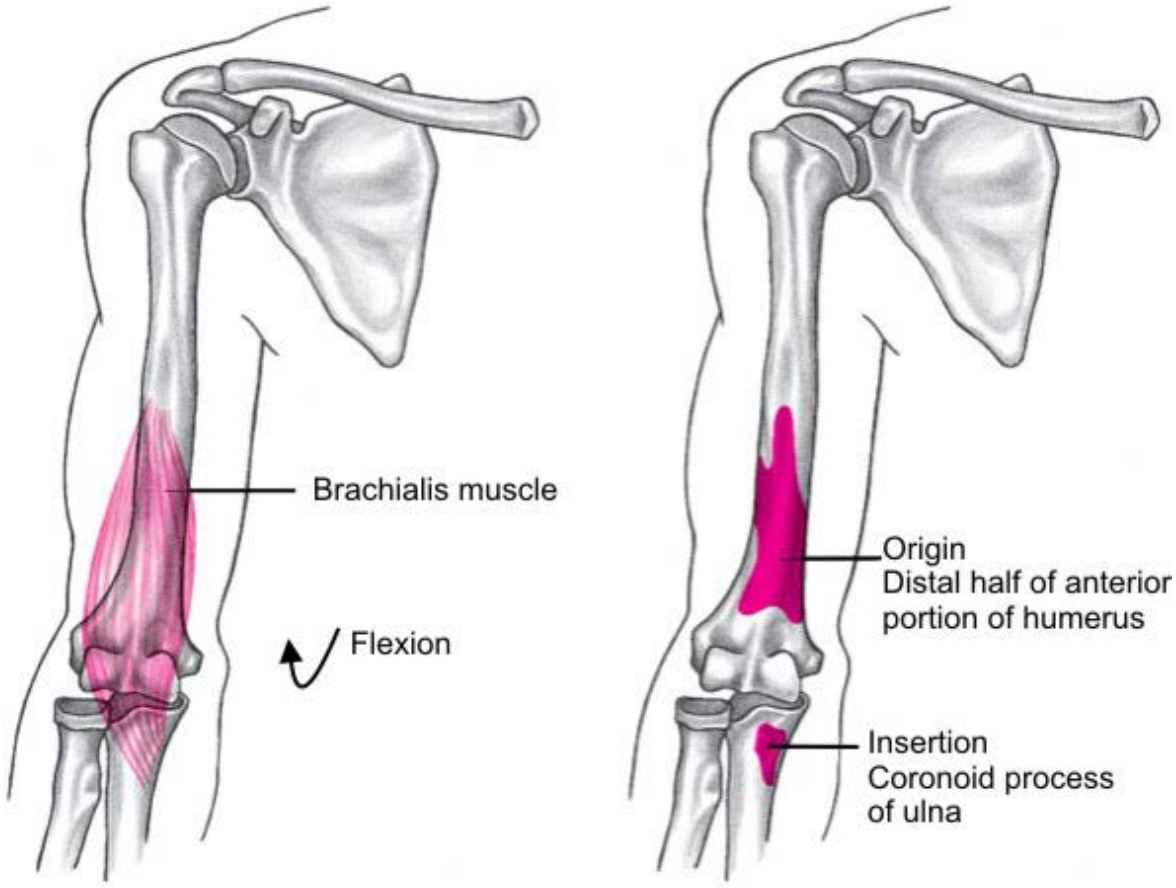
Weak flexion of shoulder joint

Weak abduction of shoulder joint when externally rotated



Brachialis Muscle

True Flexion of muscle

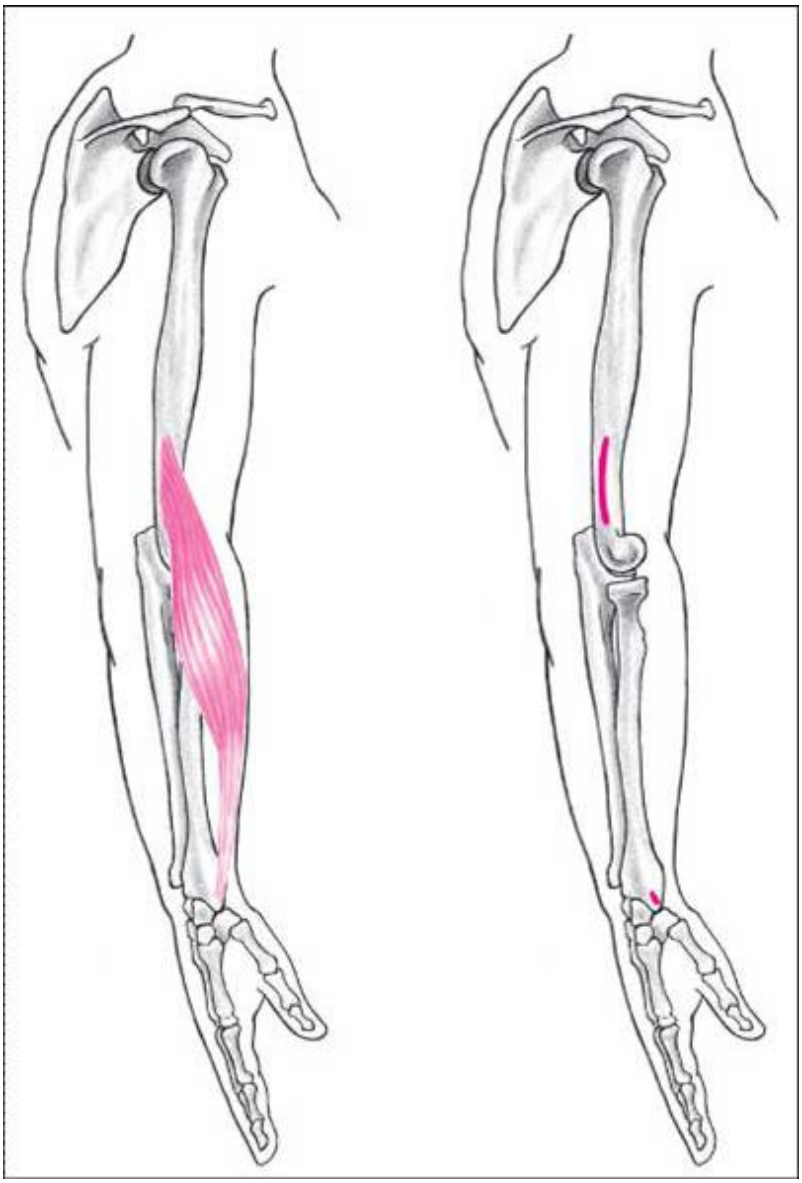


Brachioradialis Muscle

Flexion of muscle

Pronation from supinated position to neutral

Supination from pronated position to neutral



Triceps Brachii Muscle

All heads:

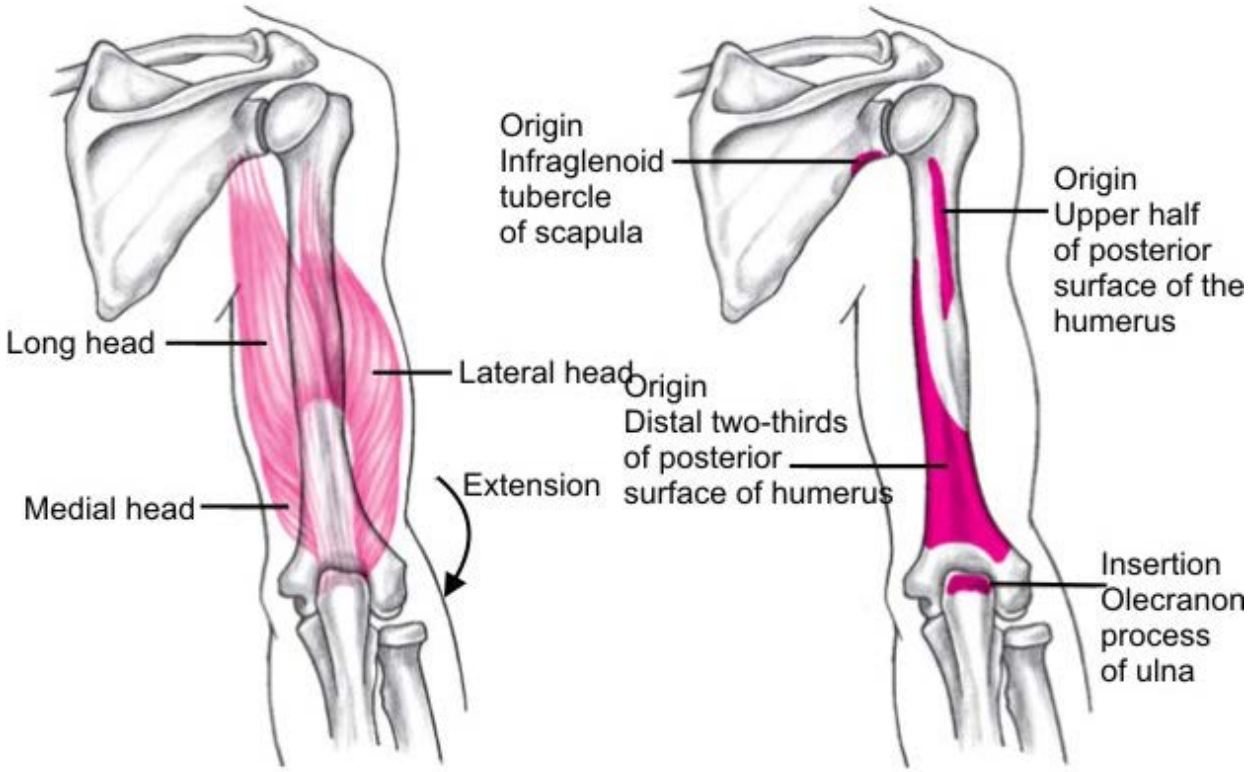
extension of elbow

Long head:

extension of shoulder joint;

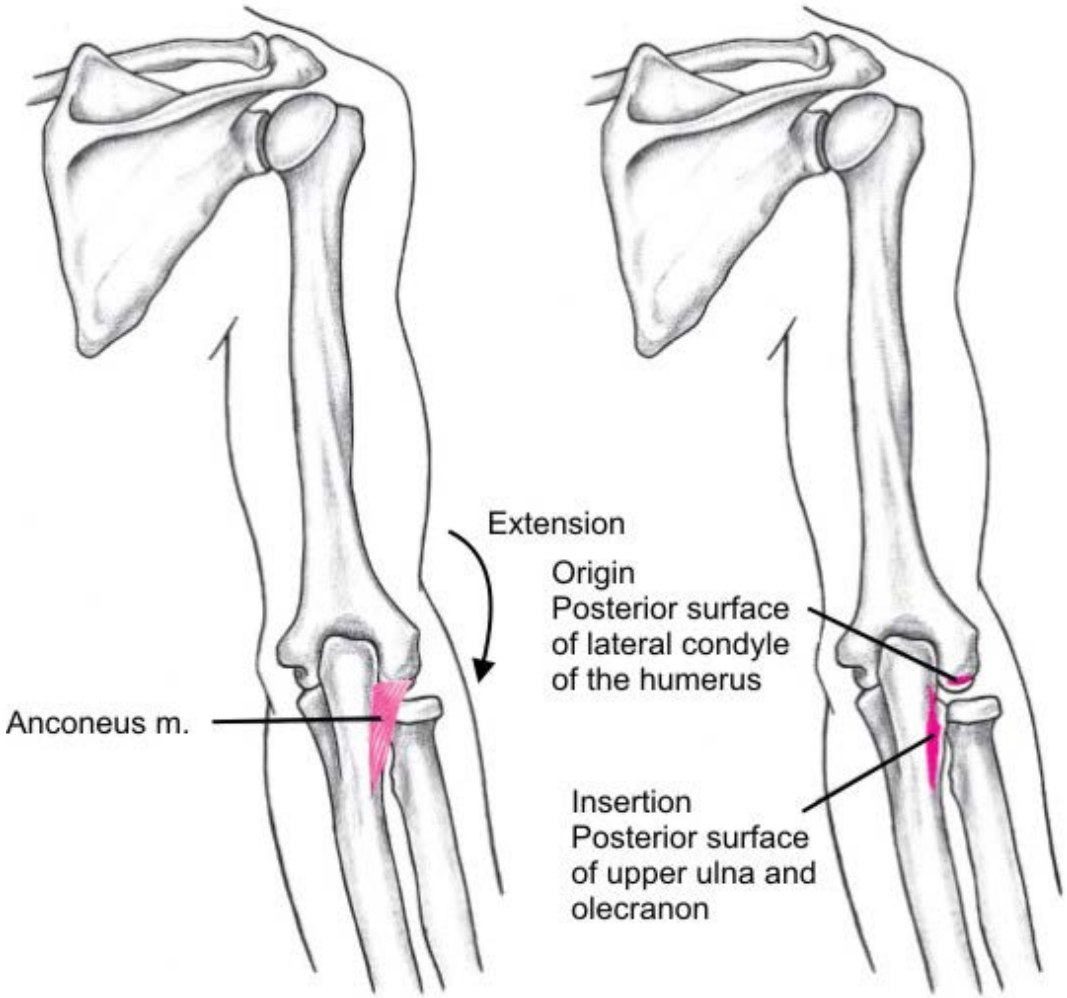
adduction of shoulder joint

horizontal abduction



Anconeus Muscle

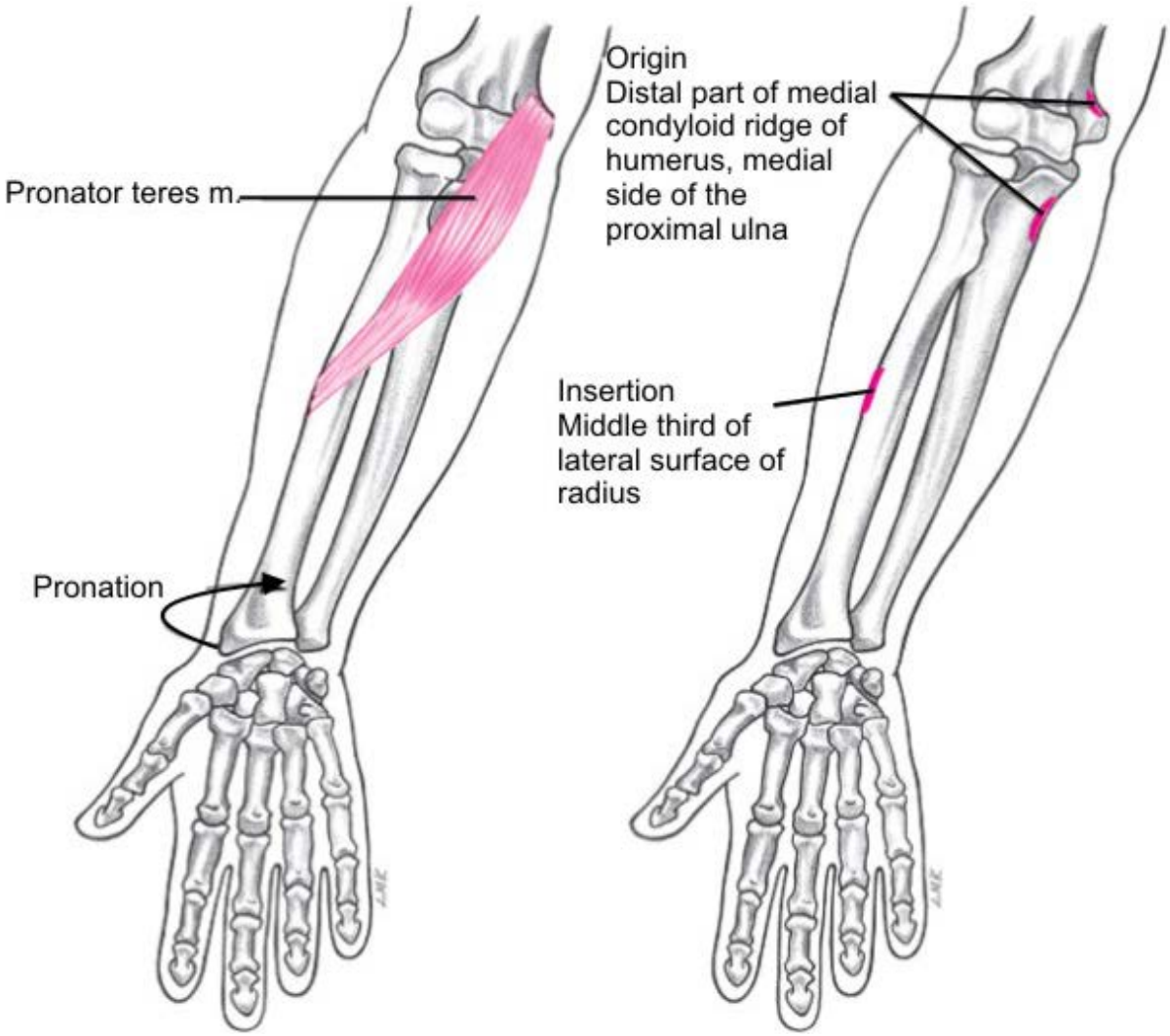
Extension of elbow



Pronator Teres Muscle

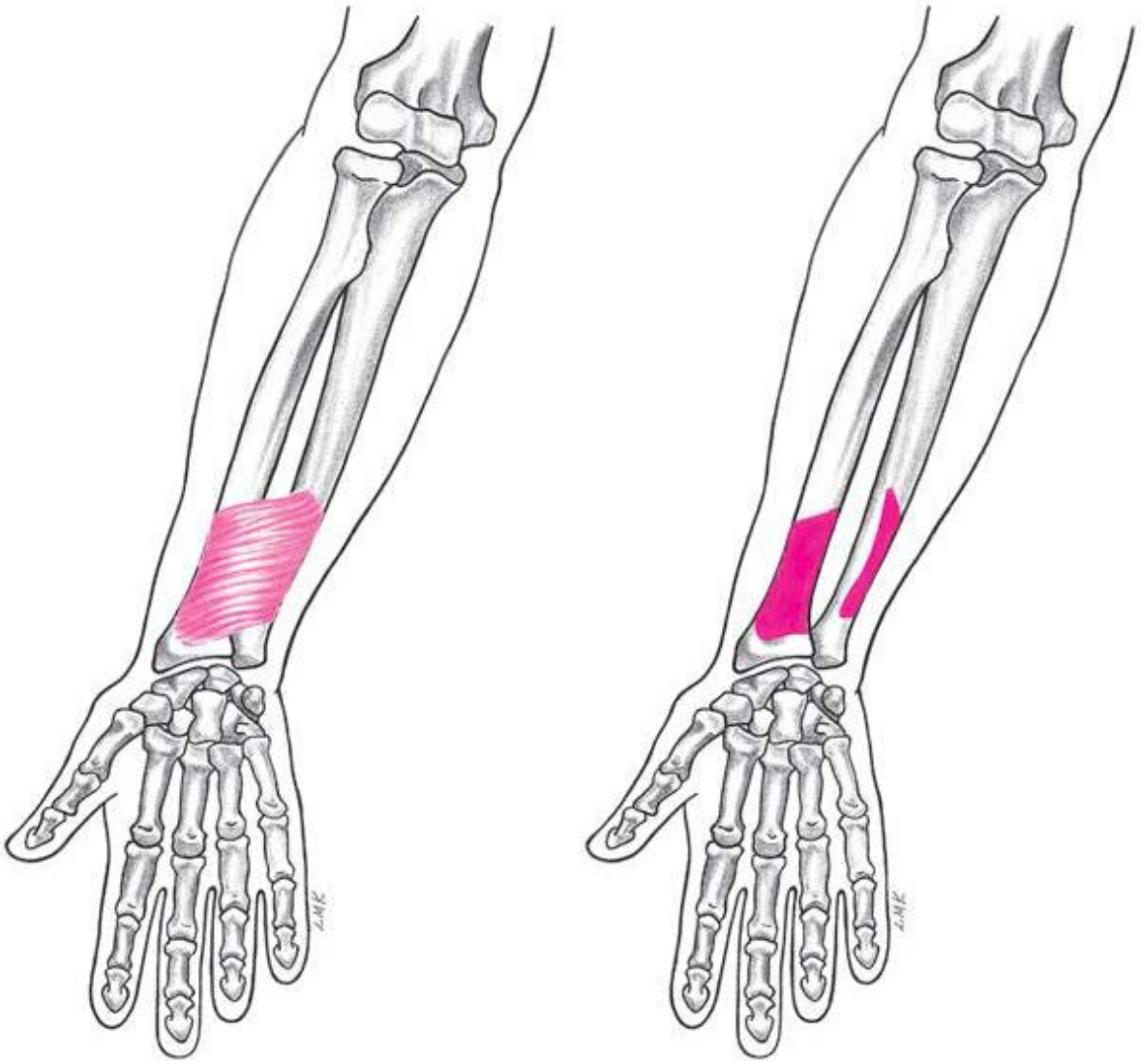
Pronation of Forearm

Weak Flexion of Elbow



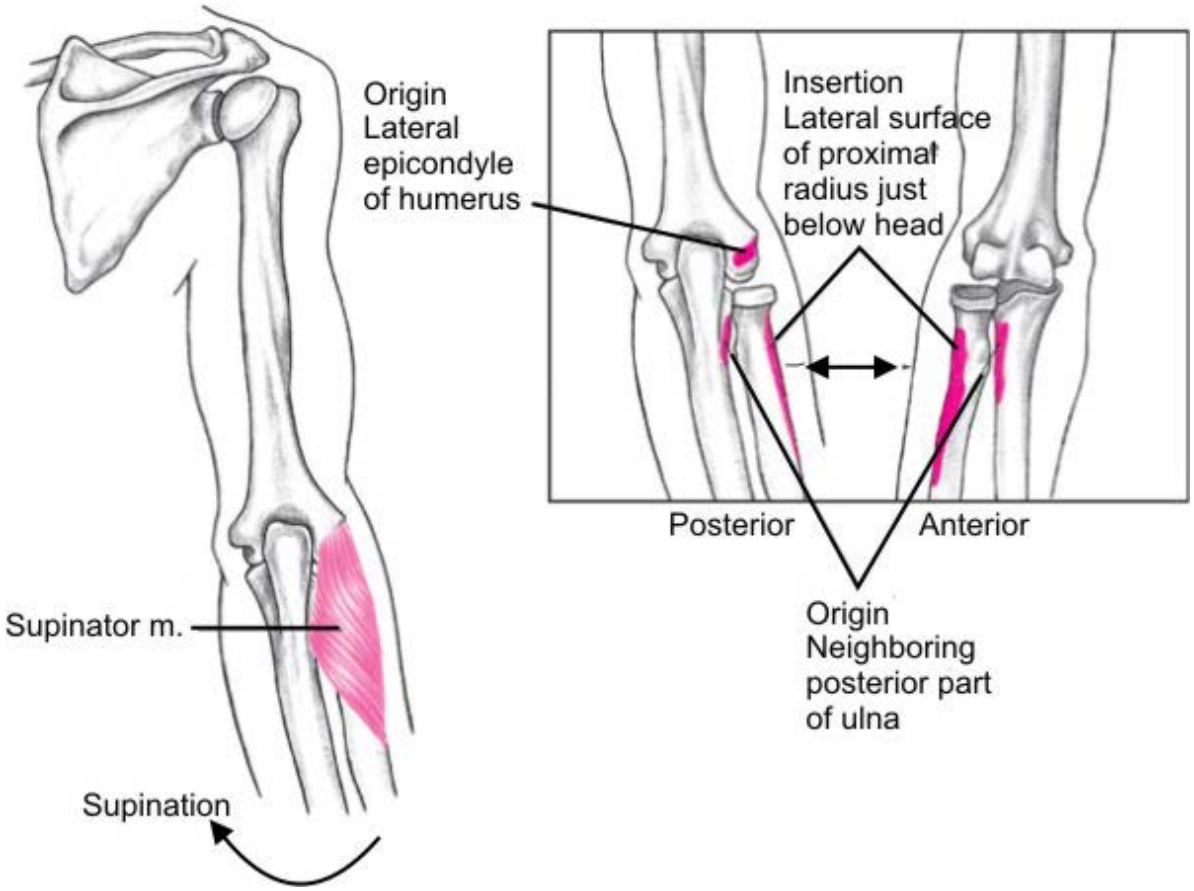
Pronator Quadratus Muscle

Pronation of Forearm



Supinator Muscle

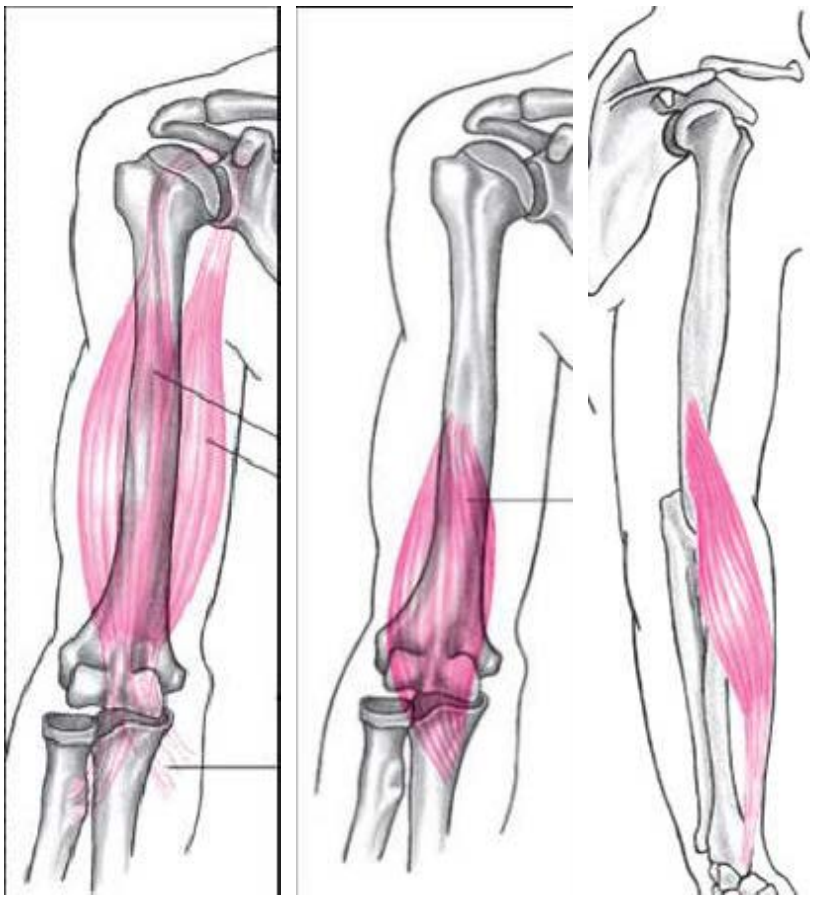
Supination of Forearm



Elbow Flexion

Agonists

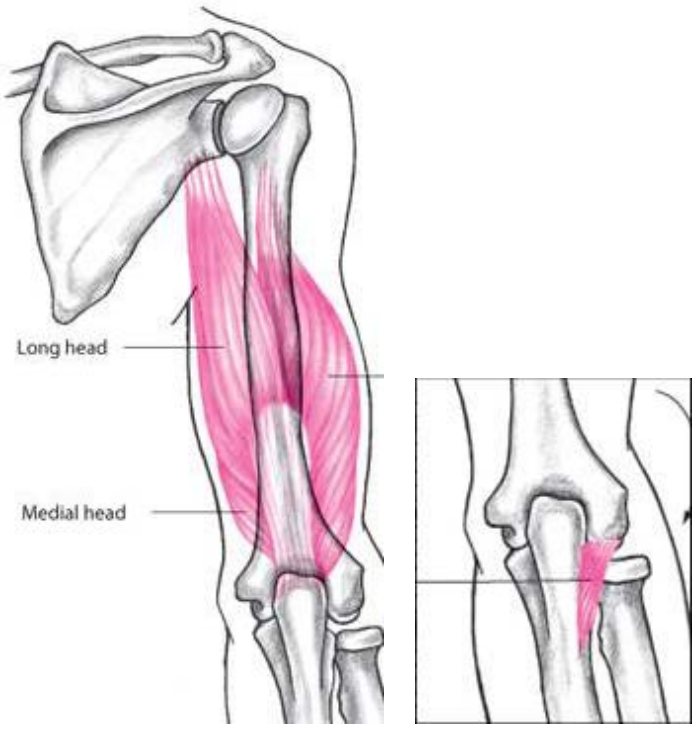
- Biceps brachii
- Brachialis
- Brachioradialis



Elbow Extension

Agonists

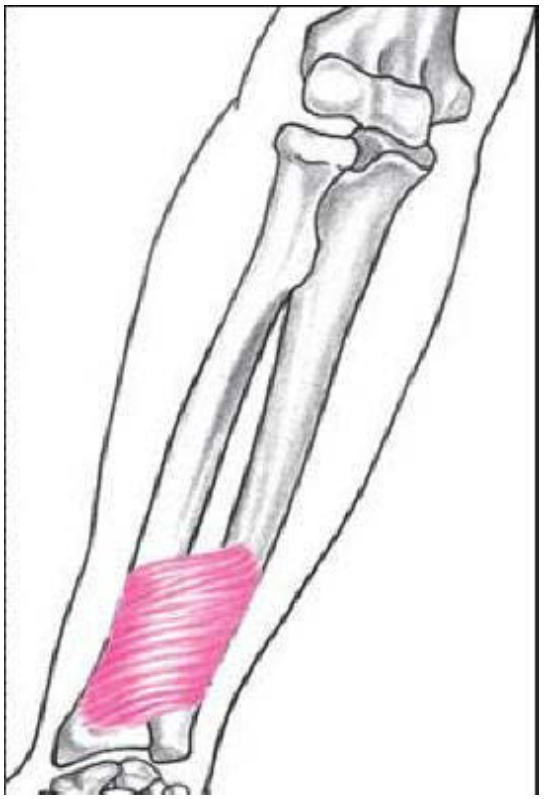
Triceps Brachii: Anconeus



Radioulnar Pronation

Agonists

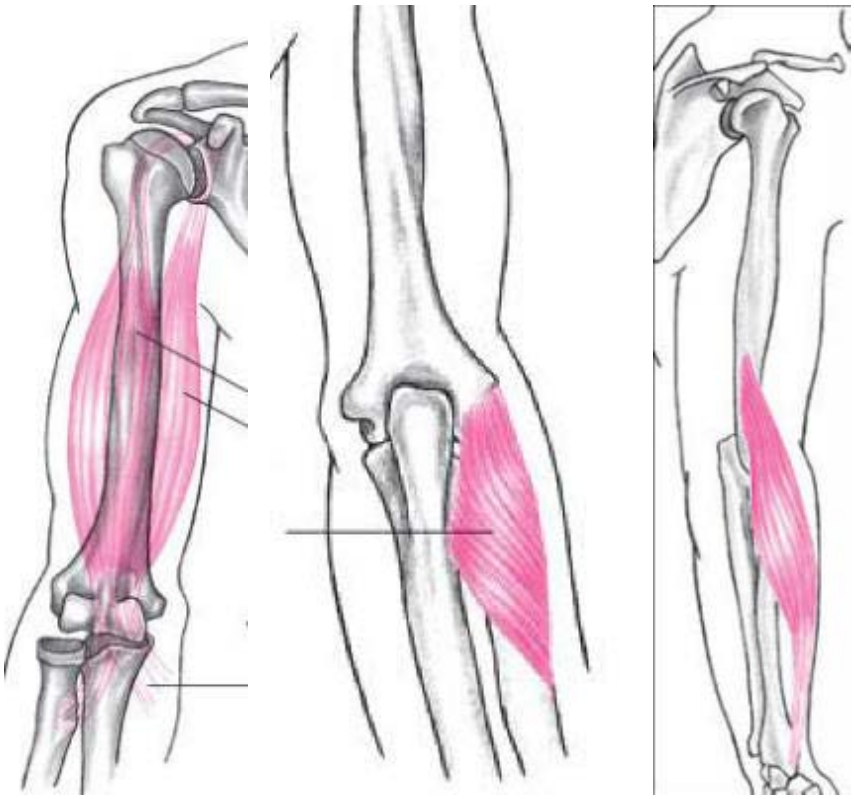
- Pronator teres
- Pronator quadratus
- Brachioradialis



Radioulnar Supination

Agonists

- Biceps brachii
- Supinator muscle
- Brachioradialis



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