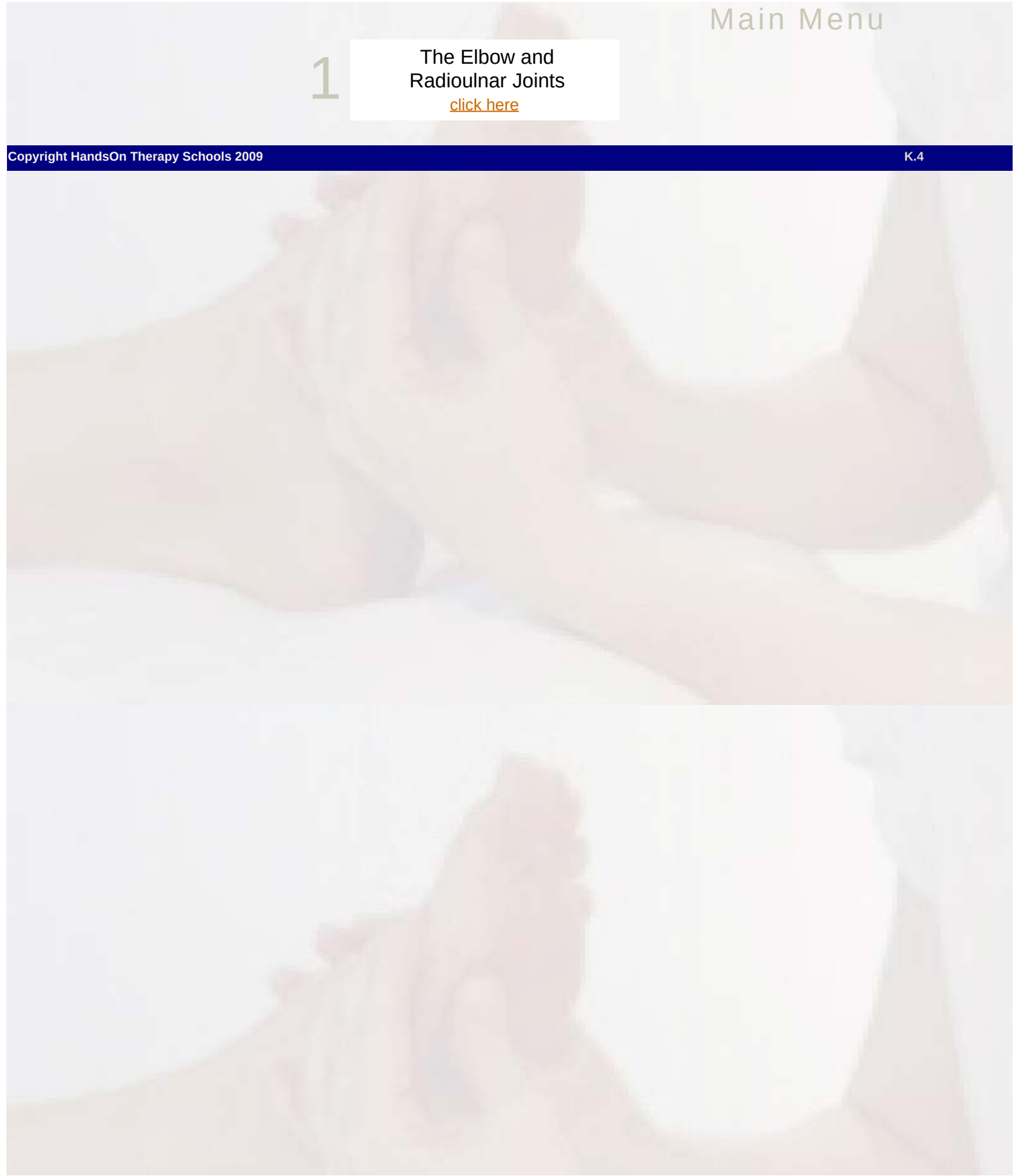




1

The Elbow and Radioulnar Joints

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Main Menu

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K.4

Bones

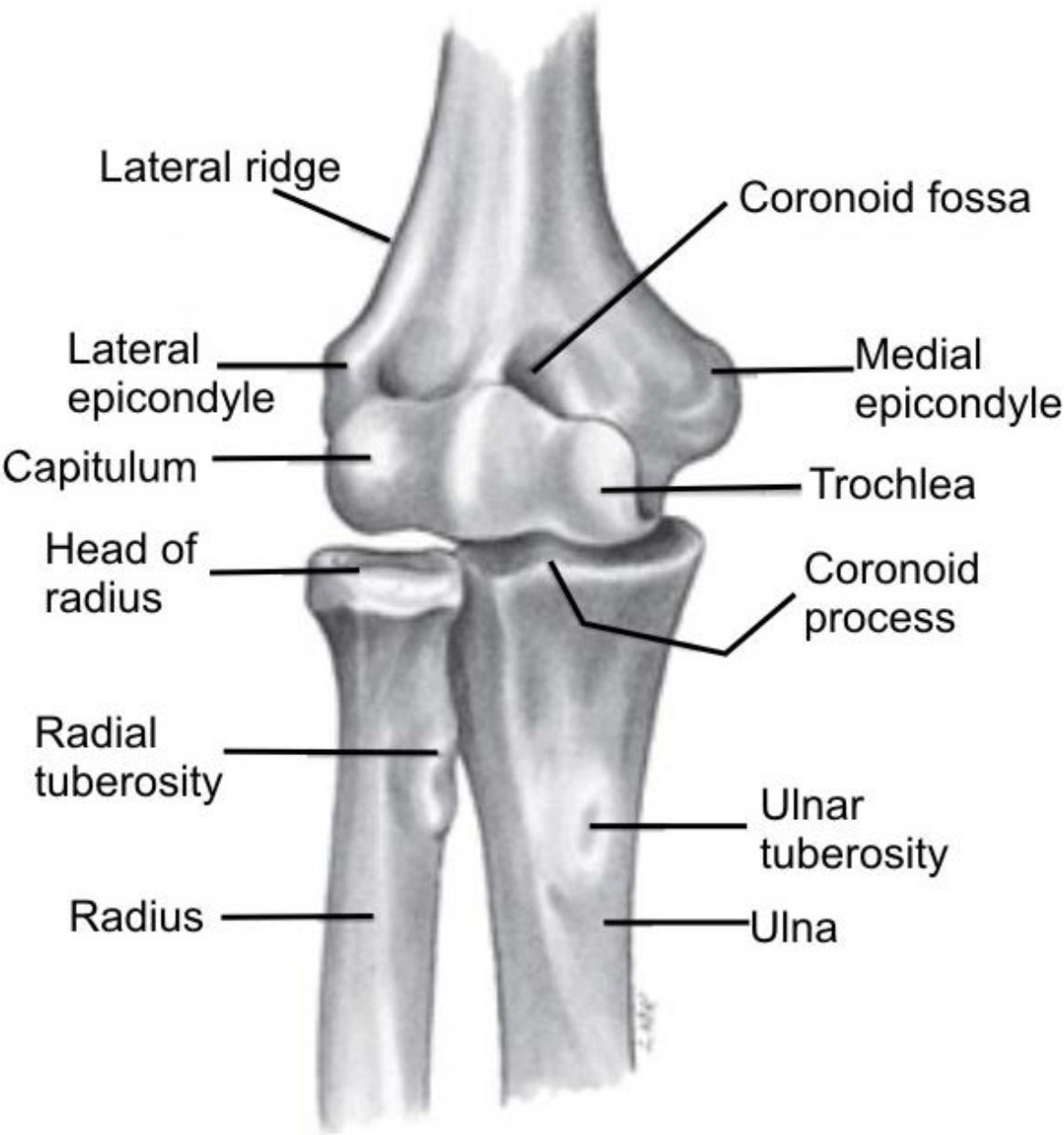
- Ulna is much larger proximally than radius
- Radius is much larger distally than ulna
- Scapula and humerus serve as proximal attachments for muscles that flex & extend the elbow
- Ulna and radius serve as distal attachments for these same muscles

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Bones



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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

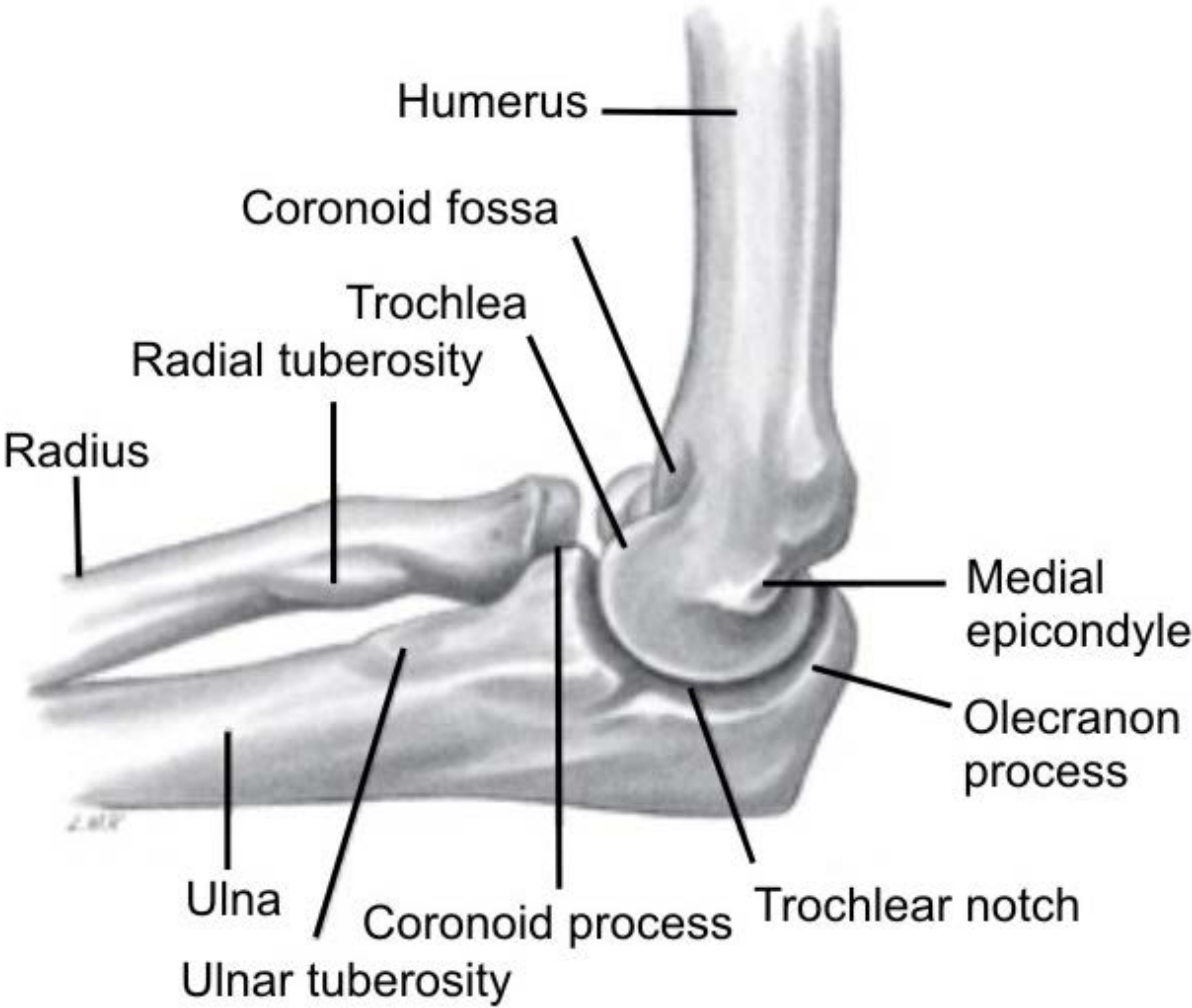
Bony Landmarks

- medial condyloid ridge
- olecranon process
- coranoid process
- radial tuberosity

Bony Landmarks for Wrist and Hand Muscles

- medial epicondyle
- lateral epicondyle
- lateral supracondylar ridge

Bones

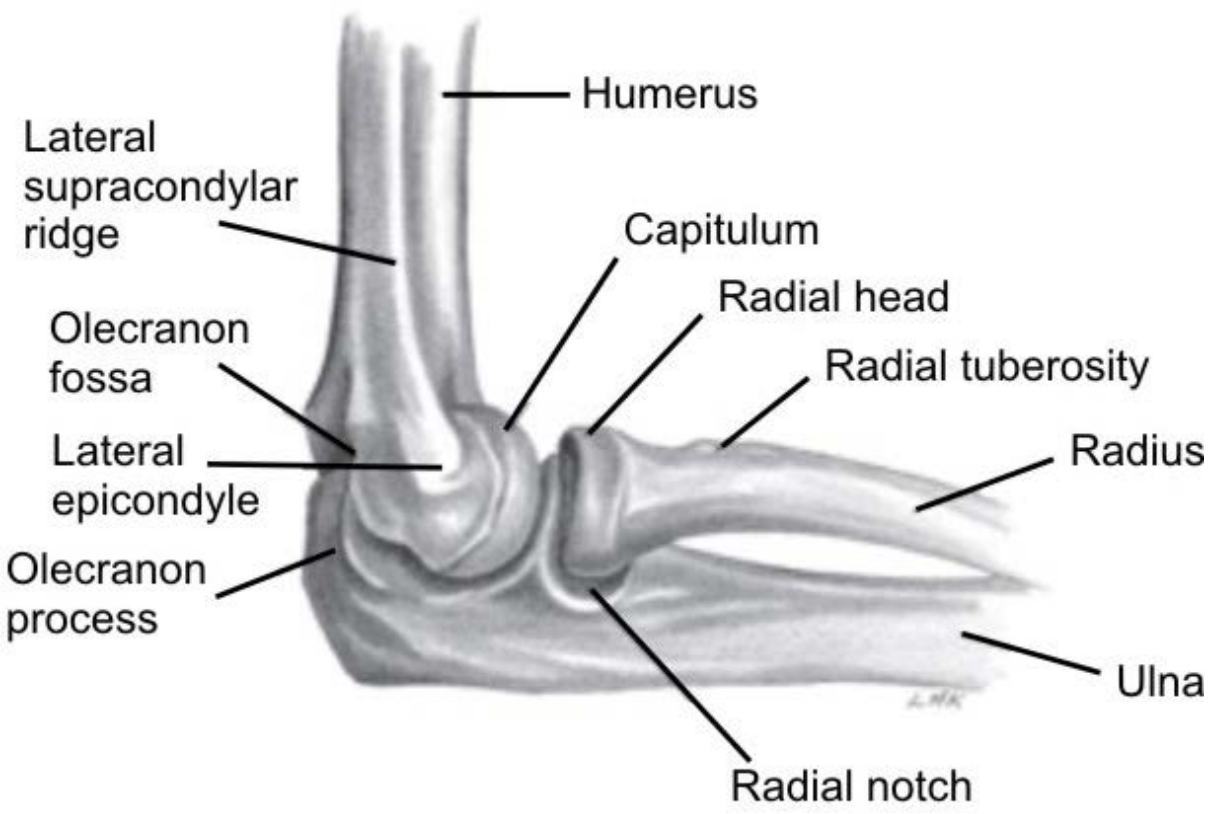


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Bones

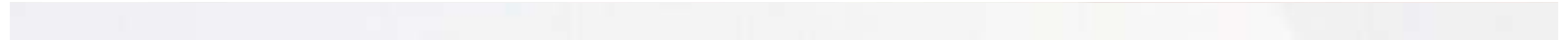


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Joints

Ginglymus or hinge-type joint

Allows only flexion and extension

2 interrelated joints

 humeroulnar joint

 radiohumeral joints



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

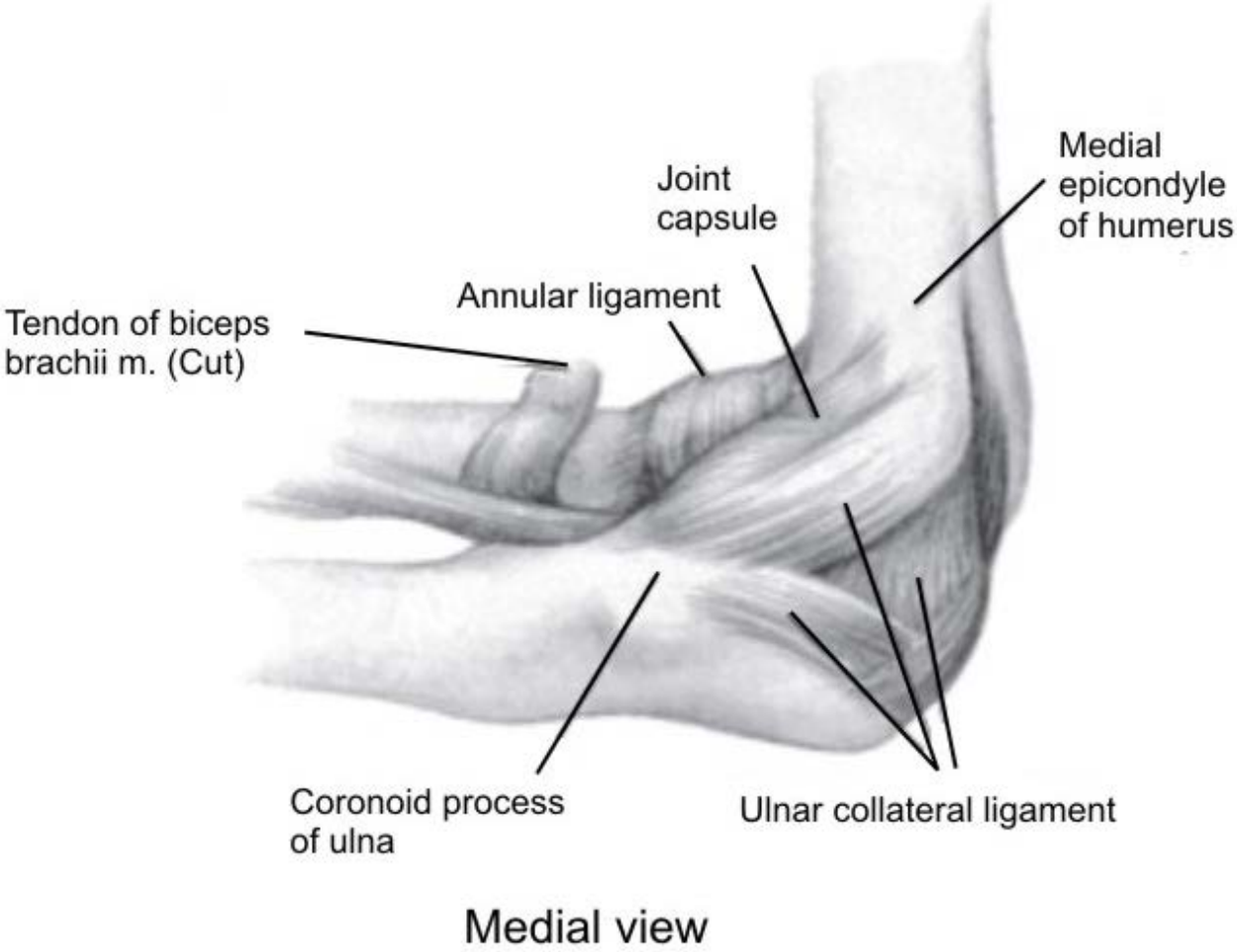
Annular ligament provides a sling effect around radial head for stability

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

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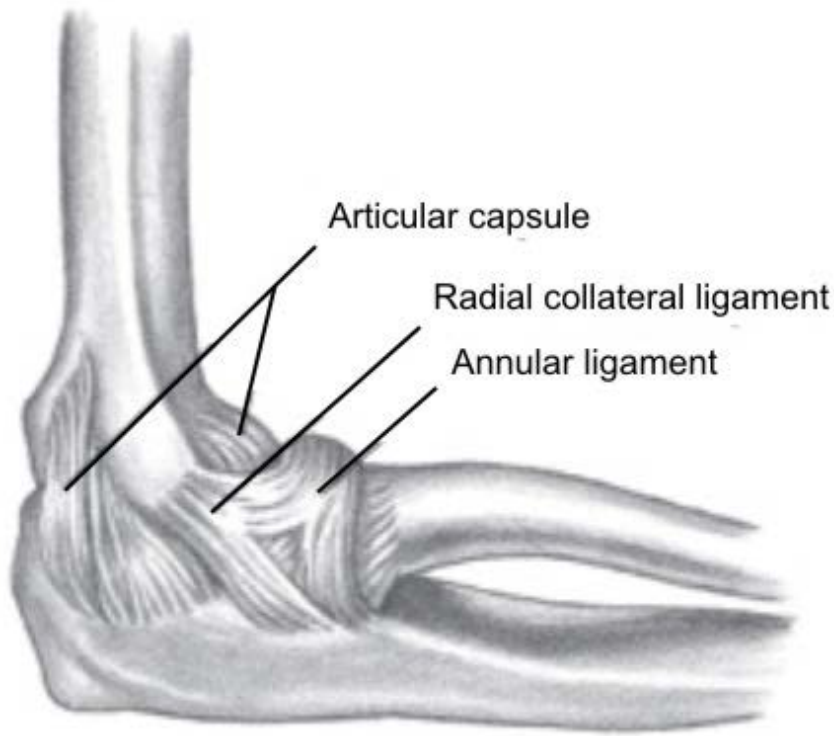
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Joints



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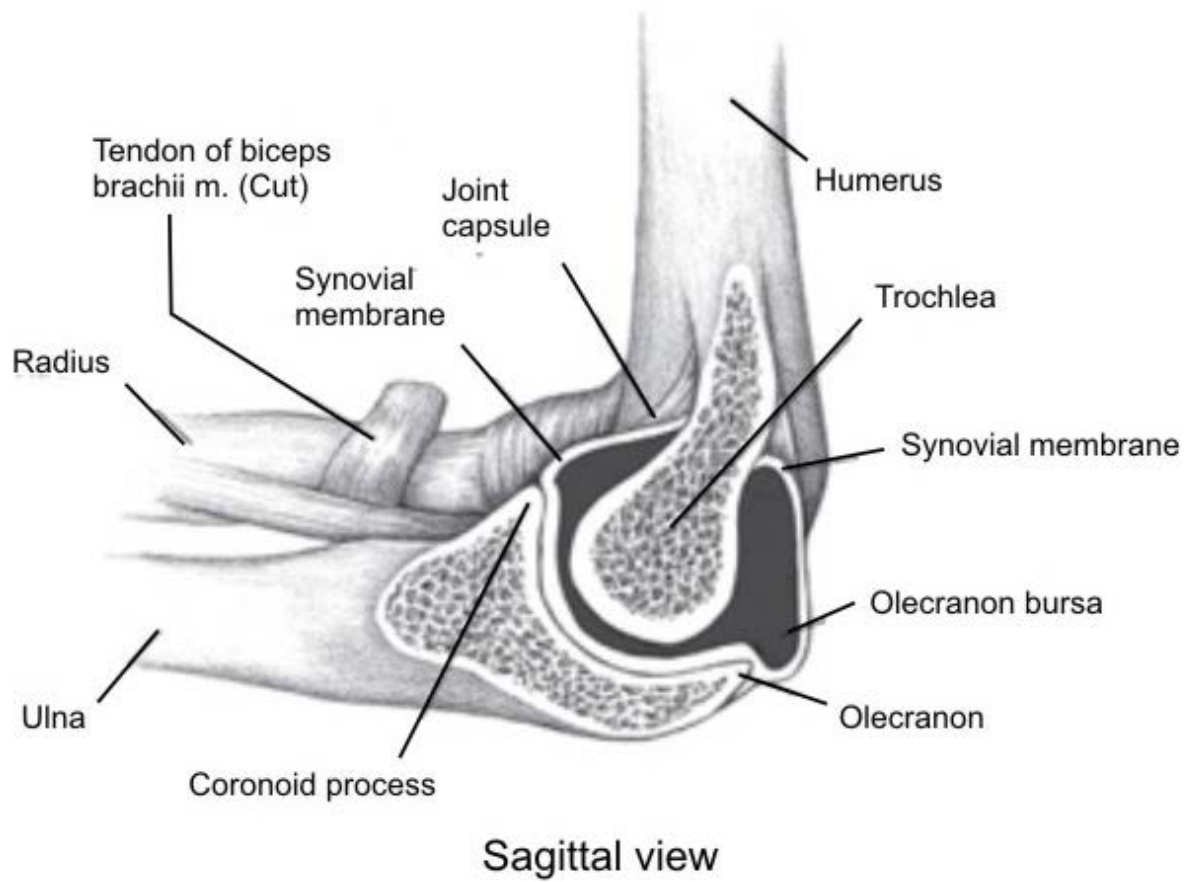
Joints



Lateral view

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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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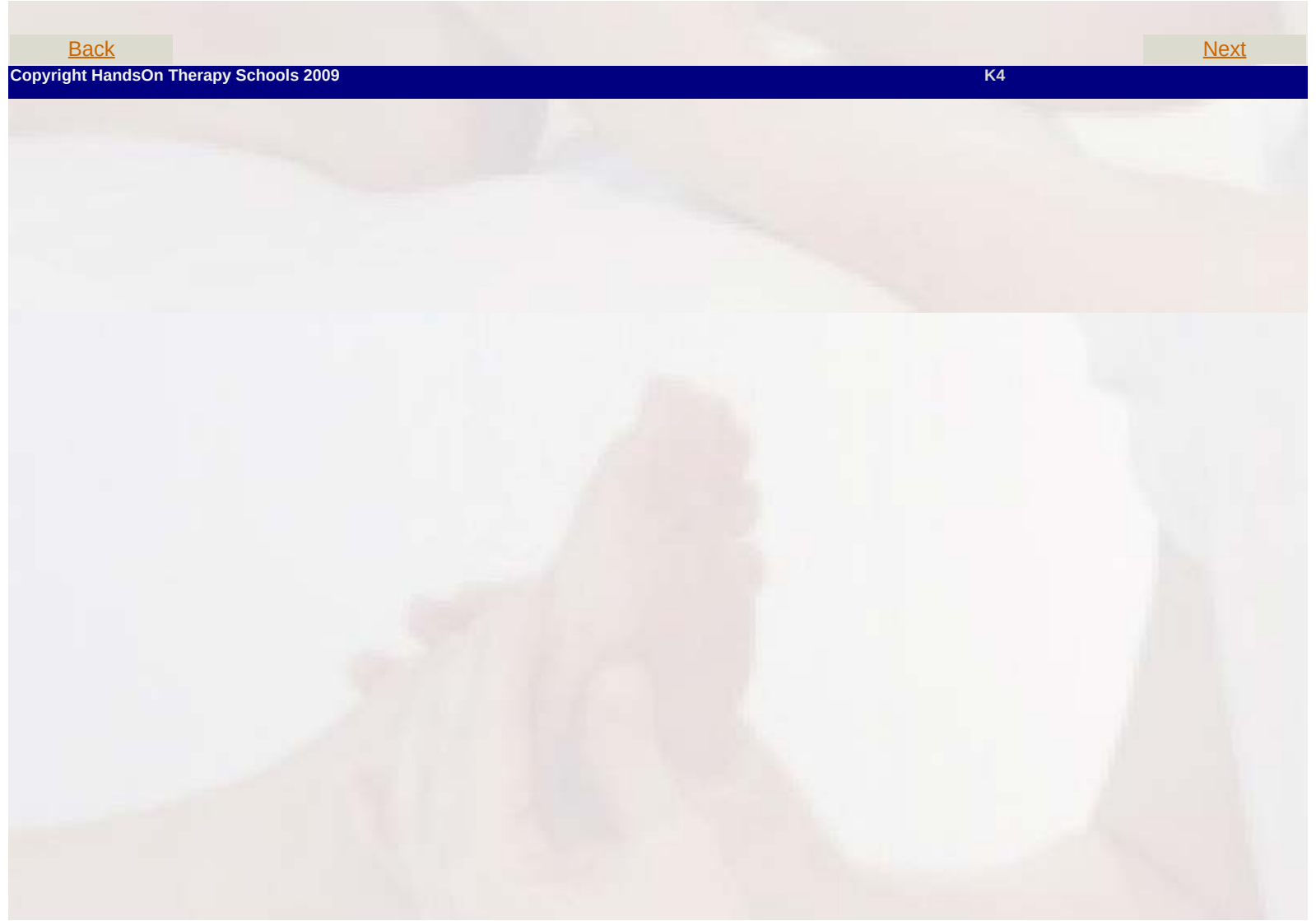
Synergy between Glenohumeral, Elbow, and Radioulnar Joint Muscles

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



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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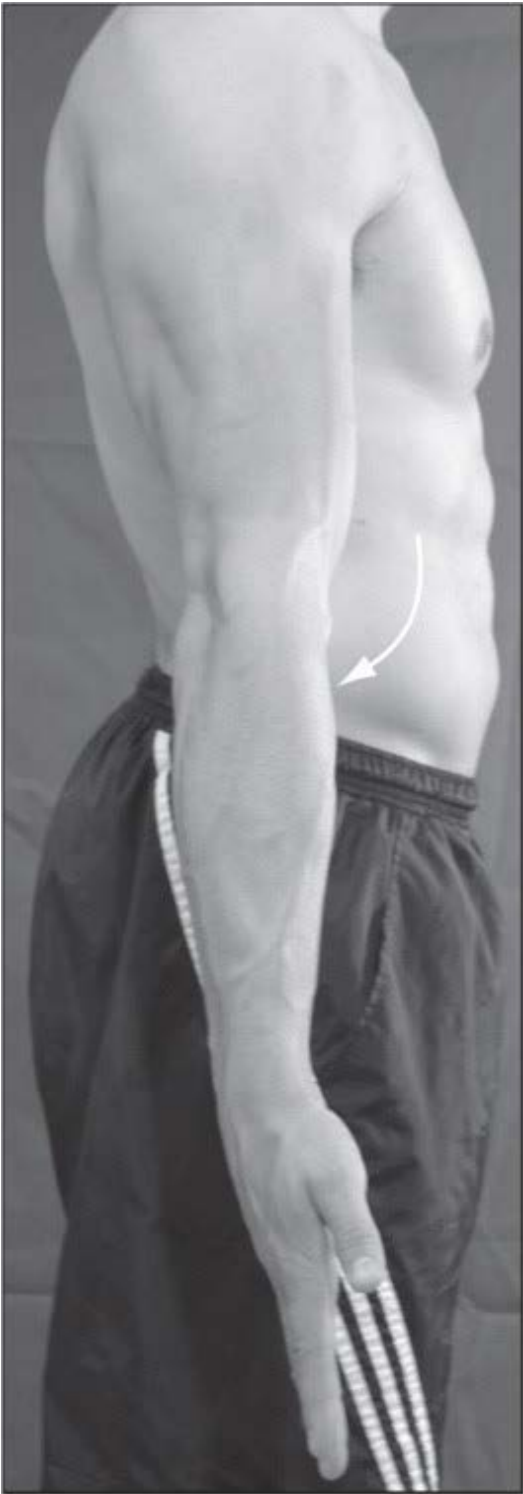
Movement



Flexion

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Movement



Extension B

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Movement



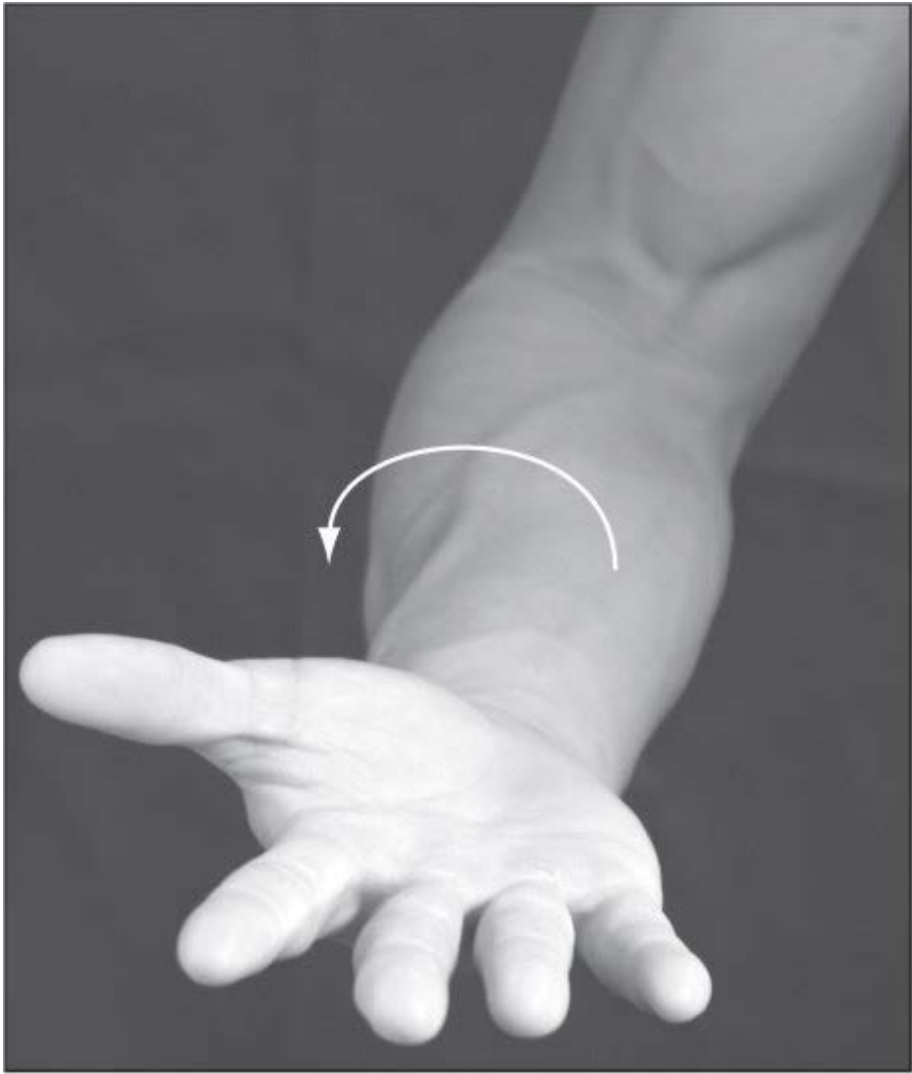
Pronation

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Movement



Supination

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Muscles

Anterior

Primarily flexion and pronation

Biceps brachii

Brachialis

Brachioradialis

Pronator teres

Pronator quadratus

Posterior

Primarily extension and supination

Triceps brachii

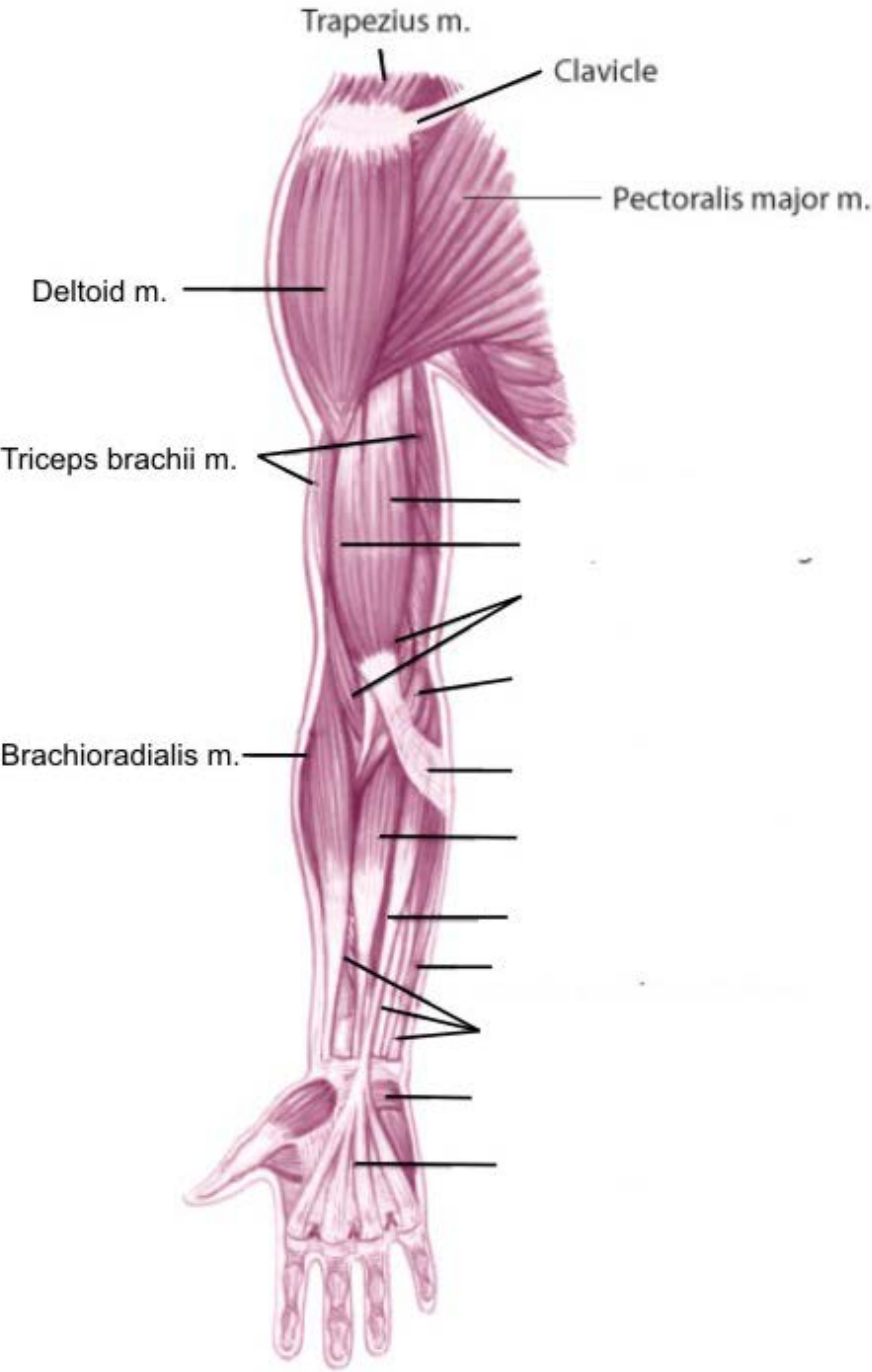
Anconeus

Supinator

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Anterior Muscles



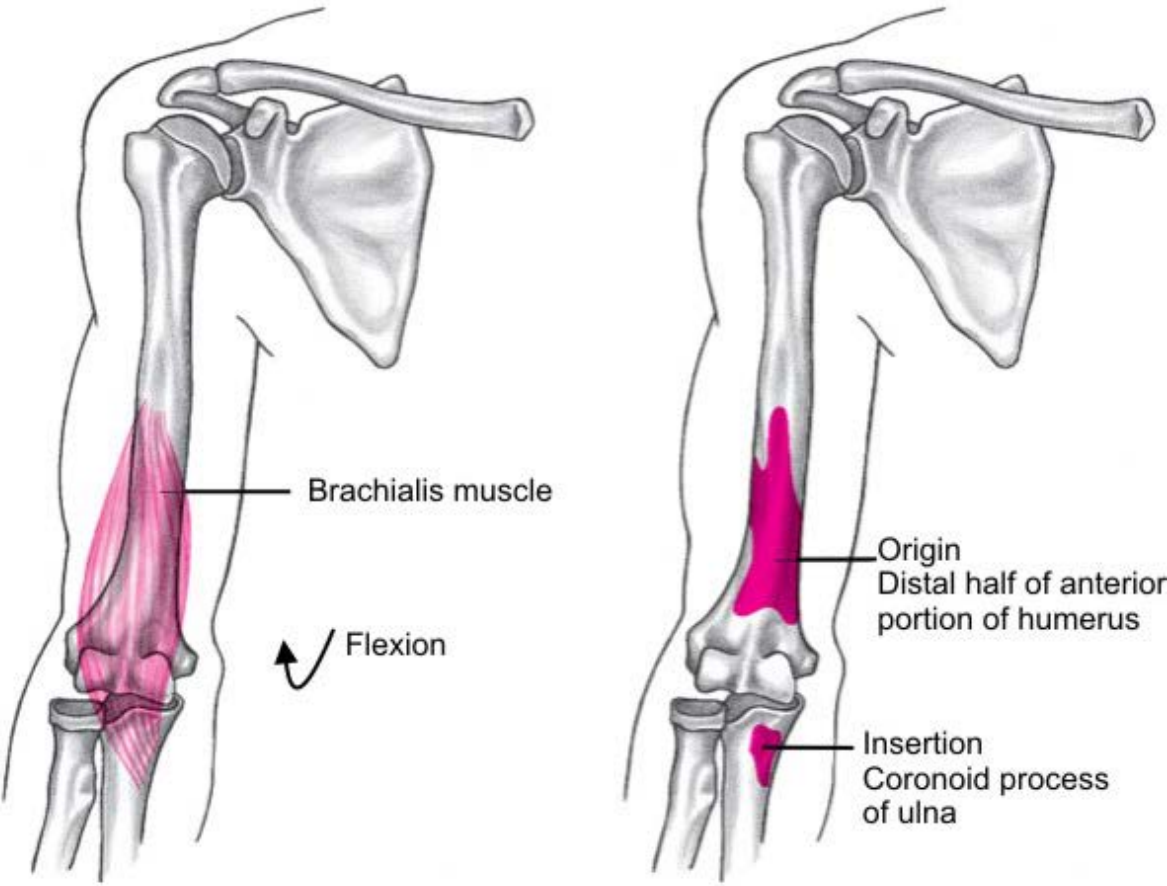
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Biceps Brachii Muscle

- Flexion of elbow
- Supination of forearm
- Weak flexion of shoulder joint
- Weak abduction of shoulder joint when externally rotated



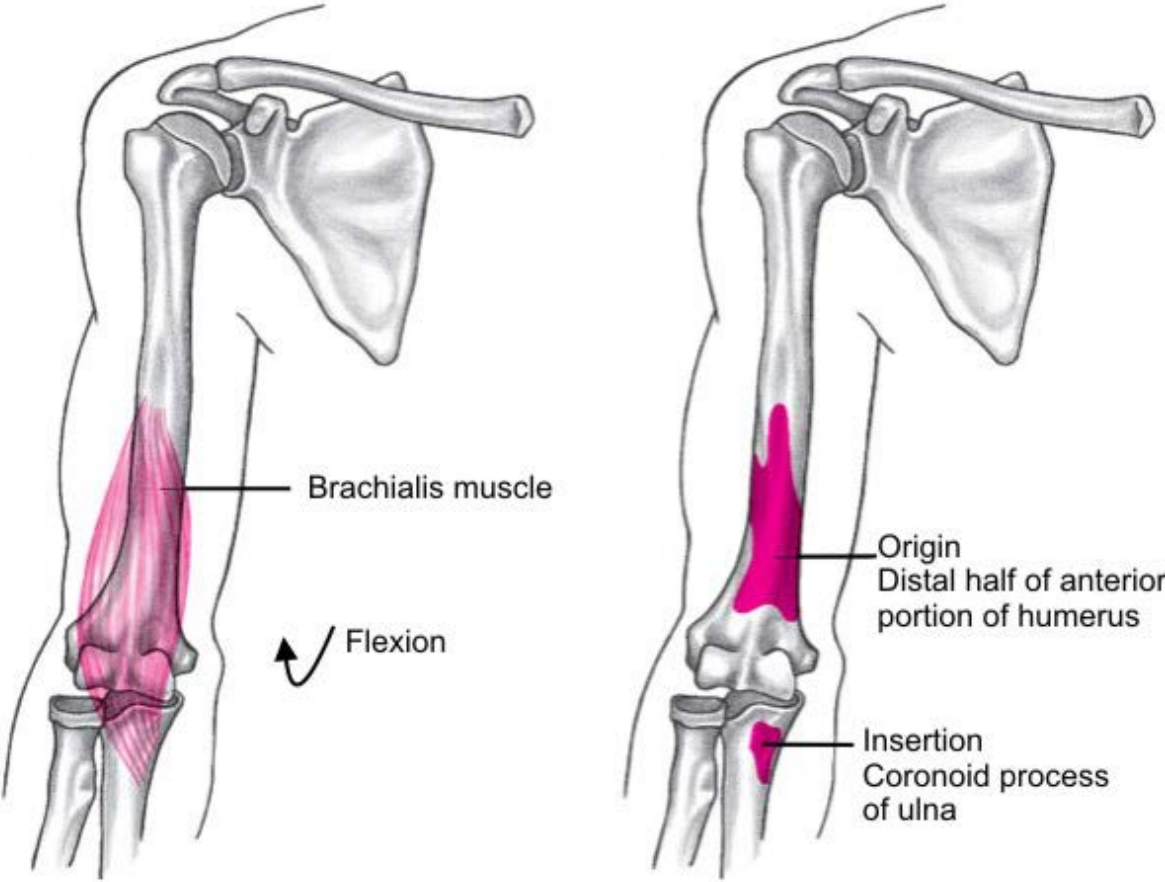
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Brachialis Muscle

True Flexion of muscle



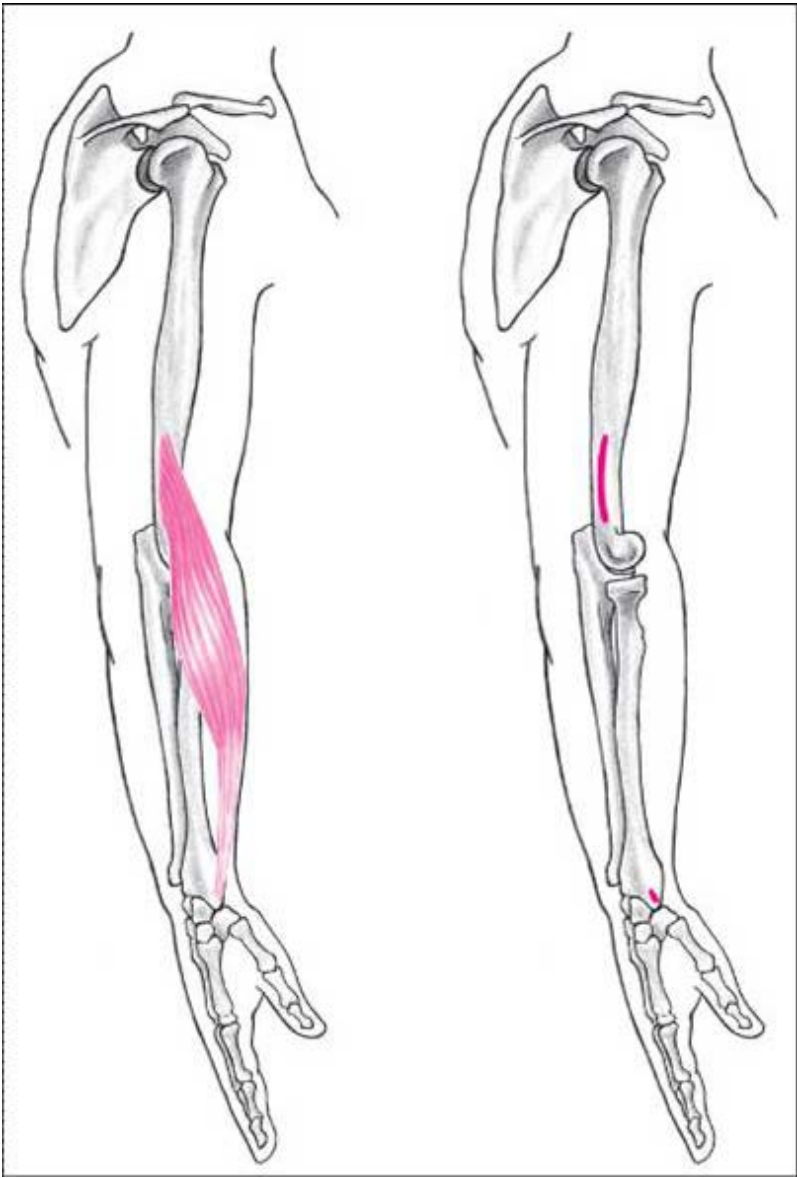
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Brachioradialis Muscle

Flexion of muscle
Pronation from supinated position to neutral
Supination from pronated position to neutral



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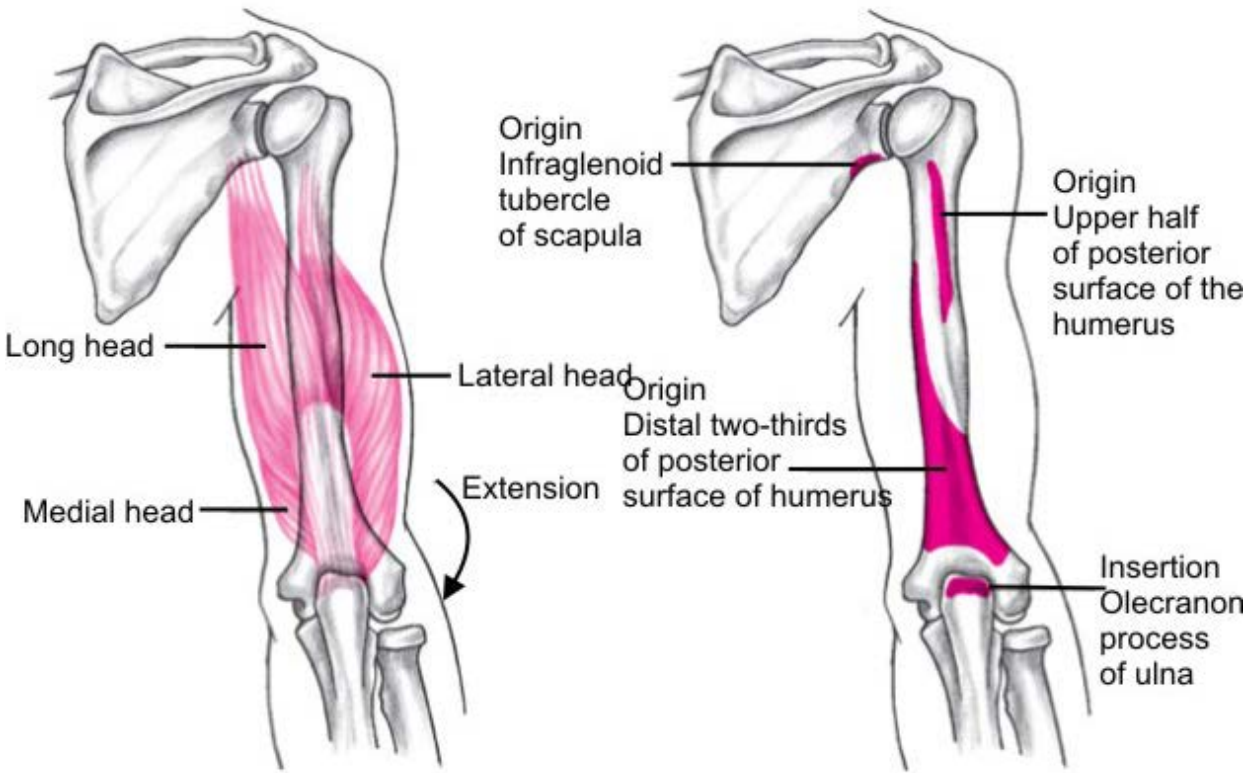
Triceps Brachii Muscle

All heads:

extension of elbow

Long head:

extension of shoulder joint;
adduction of shoulder joint
horizontal abduction



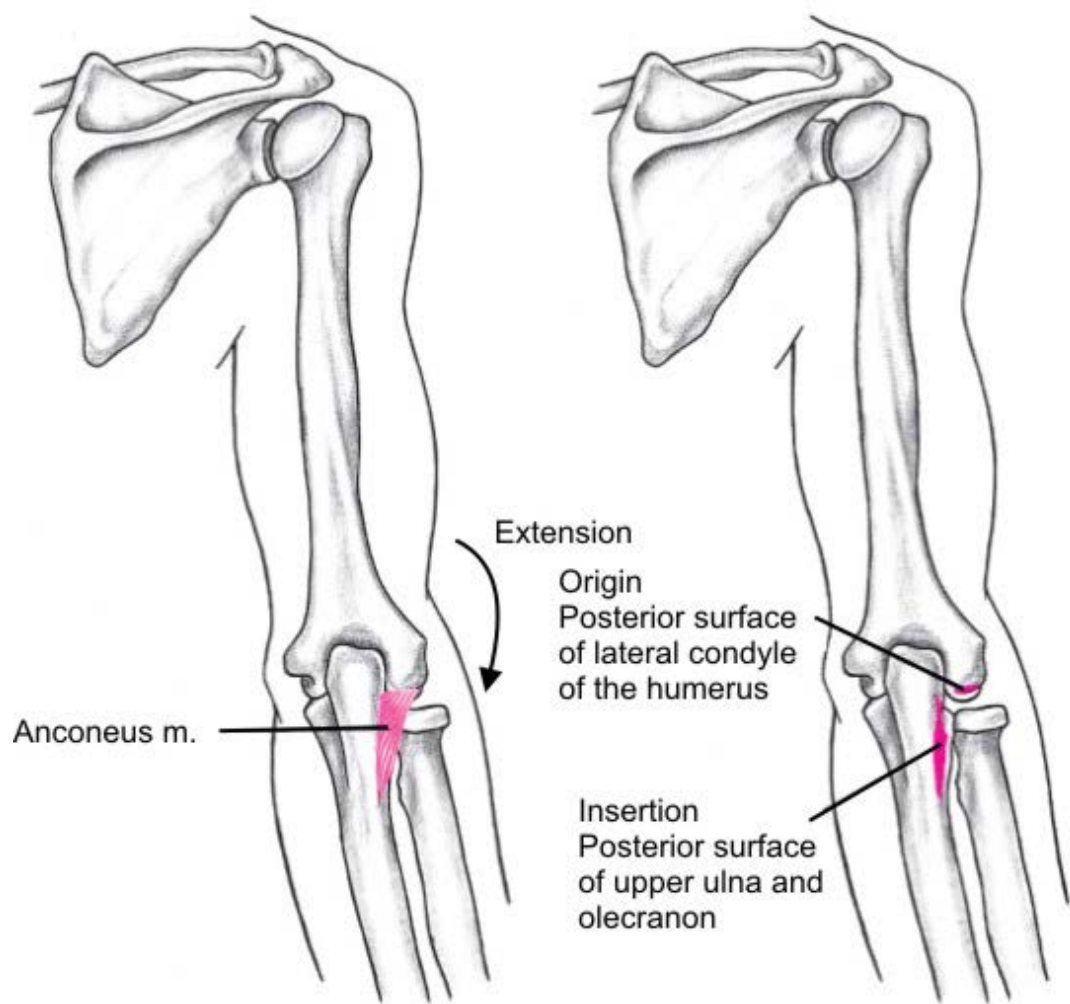
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Anconeus Muscle

Extension of elbow



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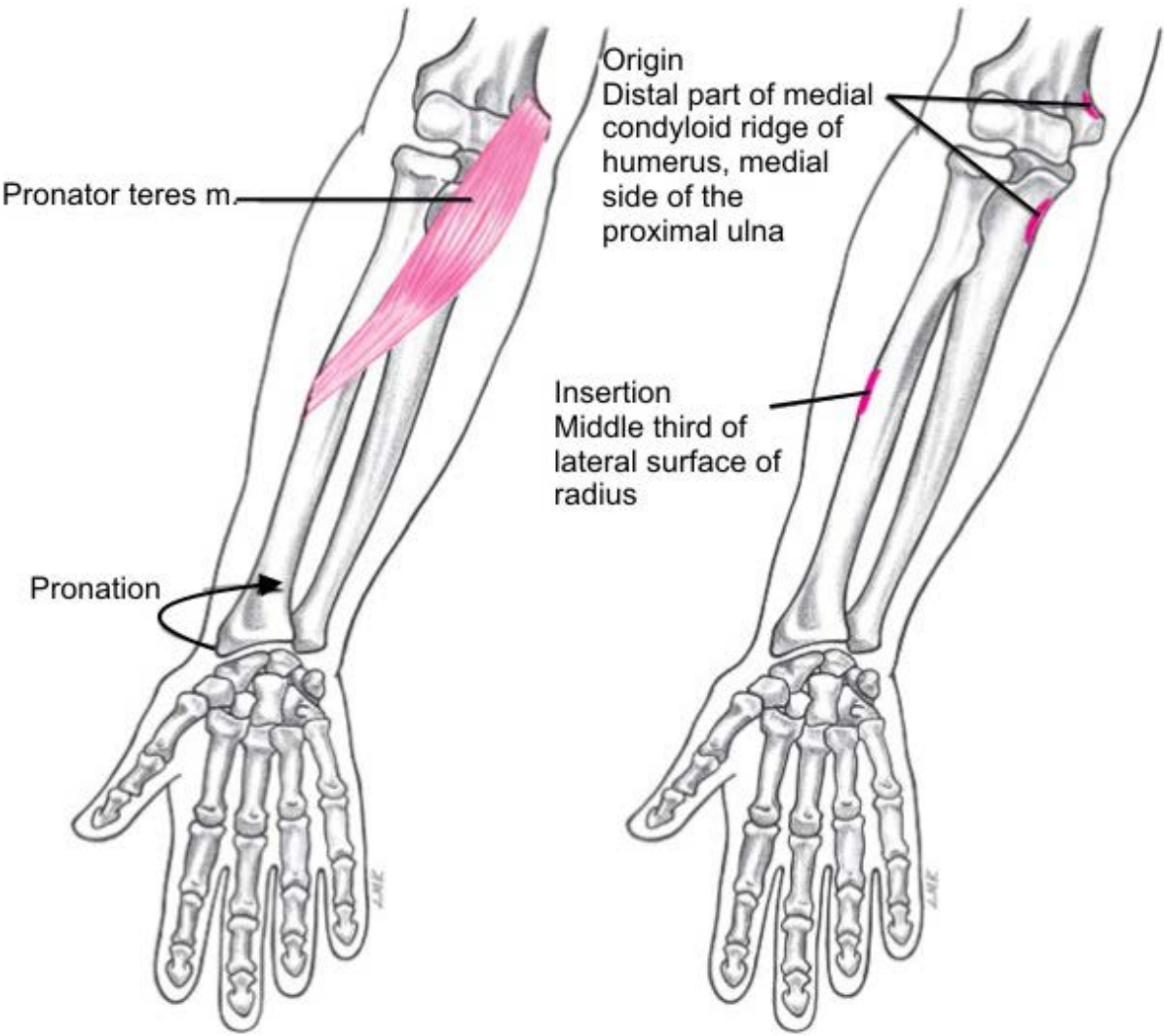
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Pronator Teres Muscle

Pronation of Forearm

Weak Flexion of Elbow



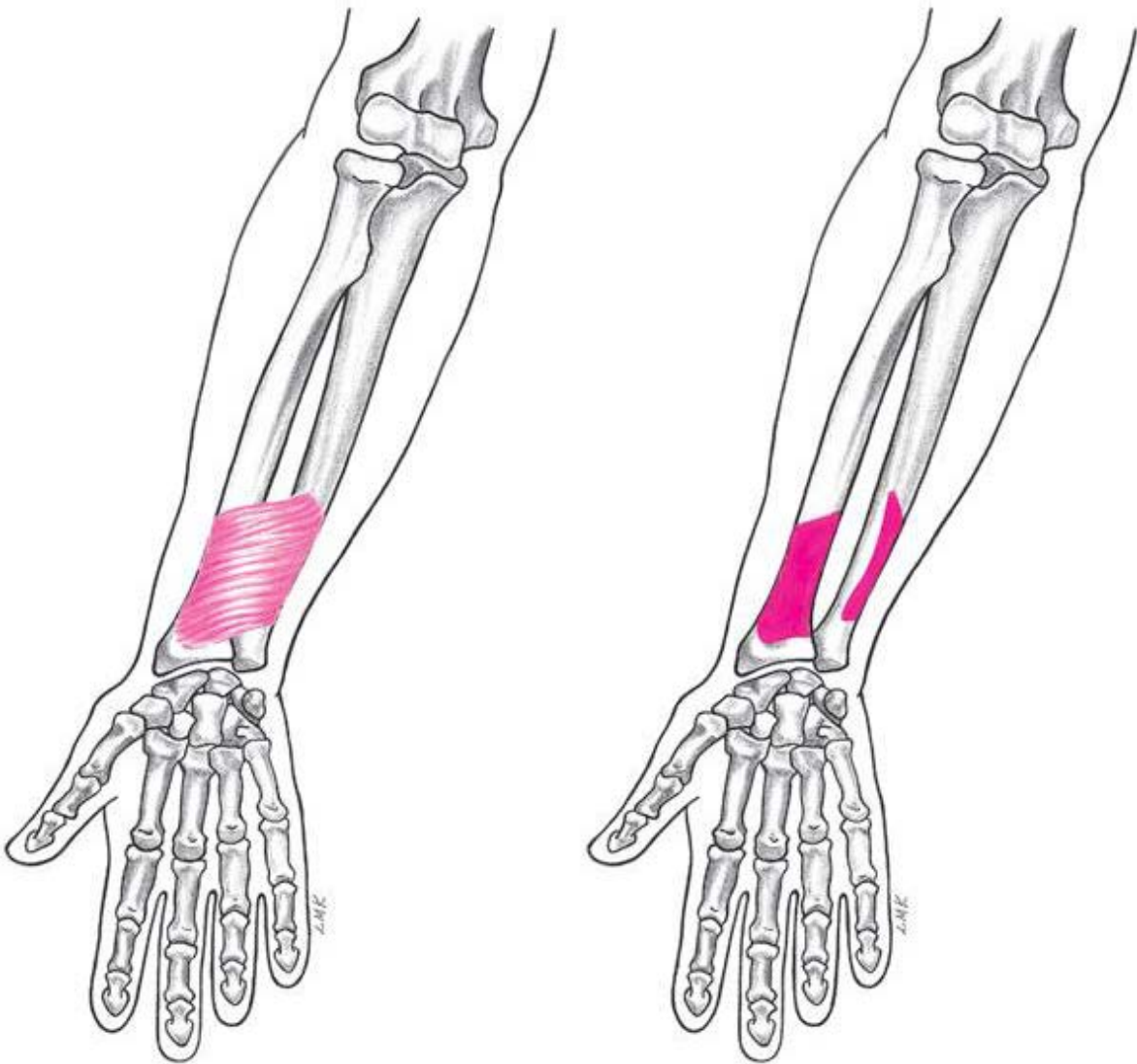
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Pronator Quadratus Muscle

Pronation of Forearm



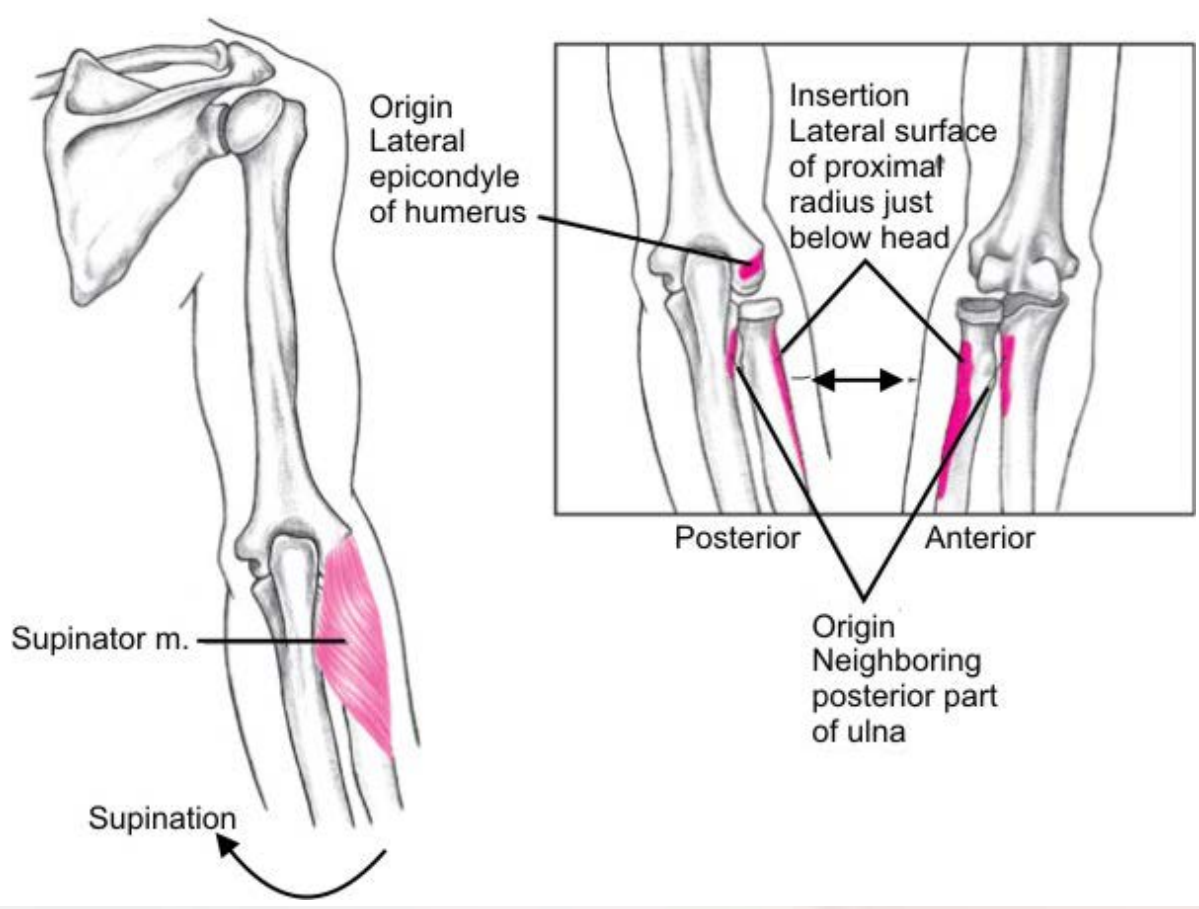
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Supinator Muscle

Supination of Forearm



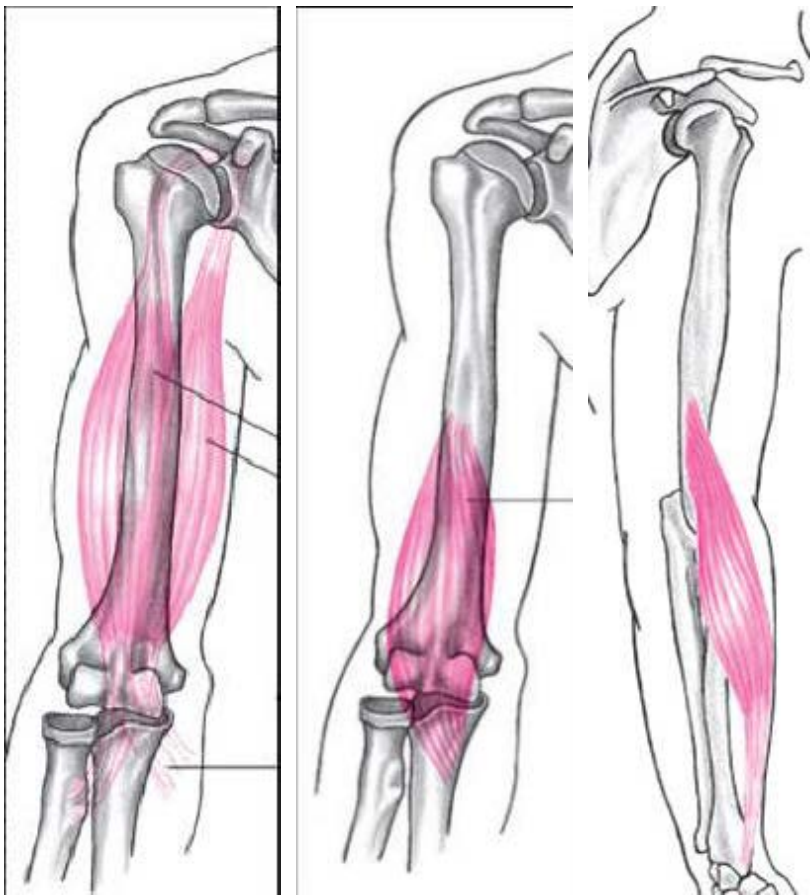
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Elbow Flexion

Agonists

- Biceps brachii
- Brachialis
- Brachioradialis



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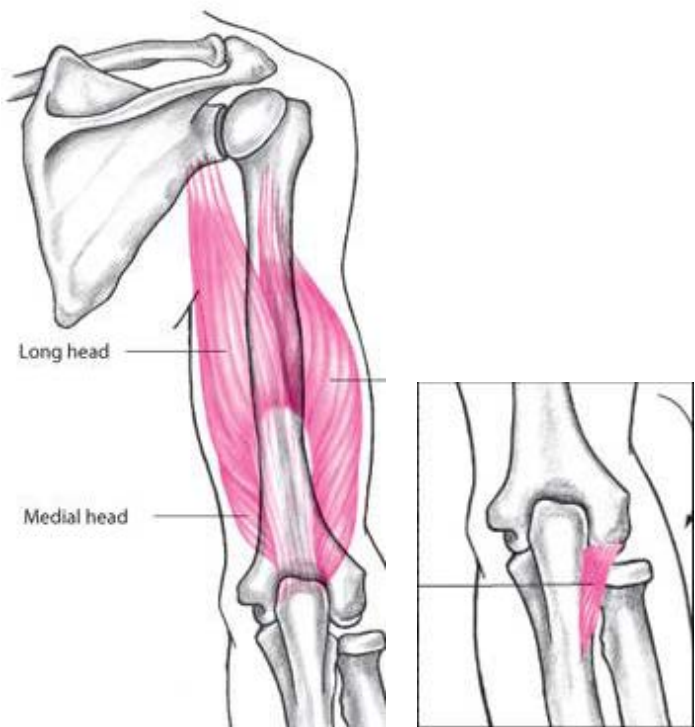
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Elbow Extension

Agonists

Triceps Brachii: Anconeus



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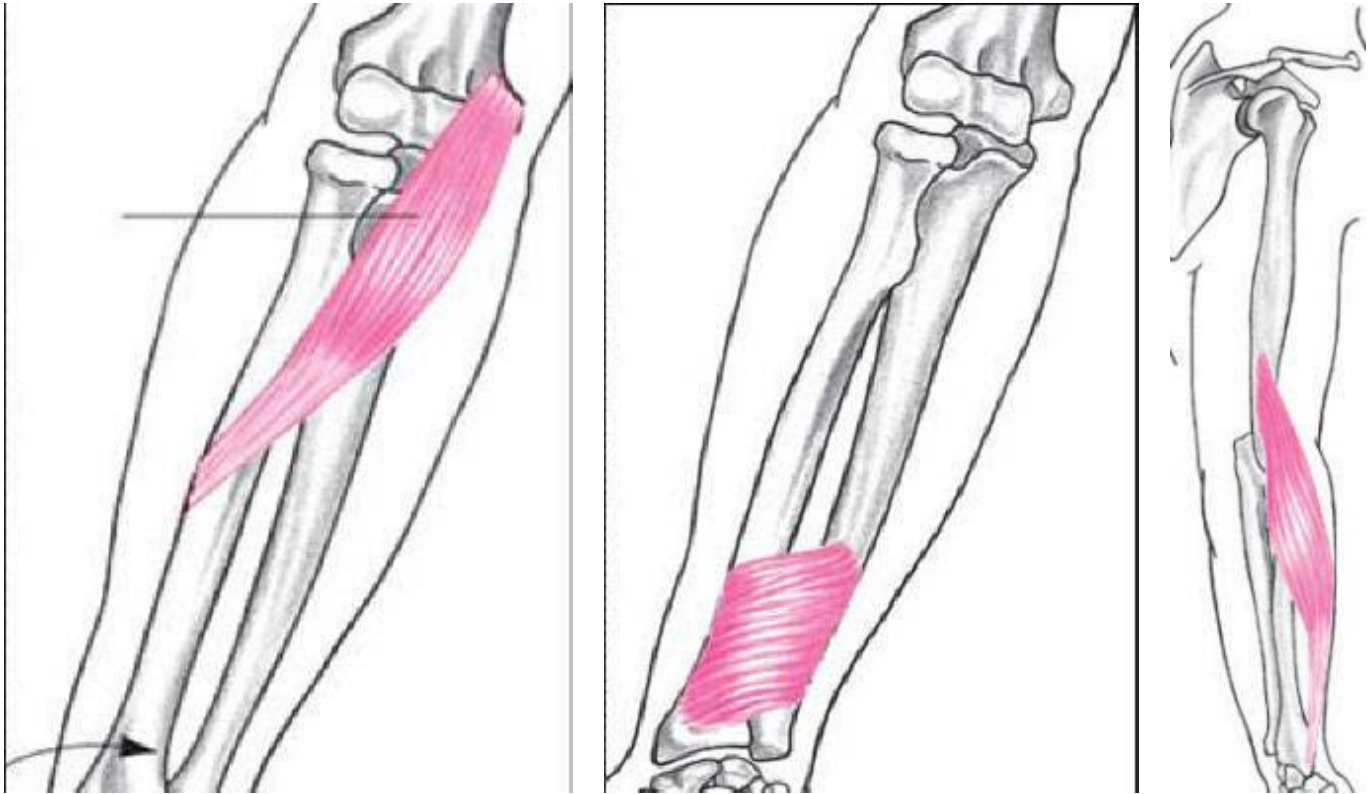
Radioulnar Pronation

Agonists

Pronator teres

Pronator quadratus

Brachioradialis



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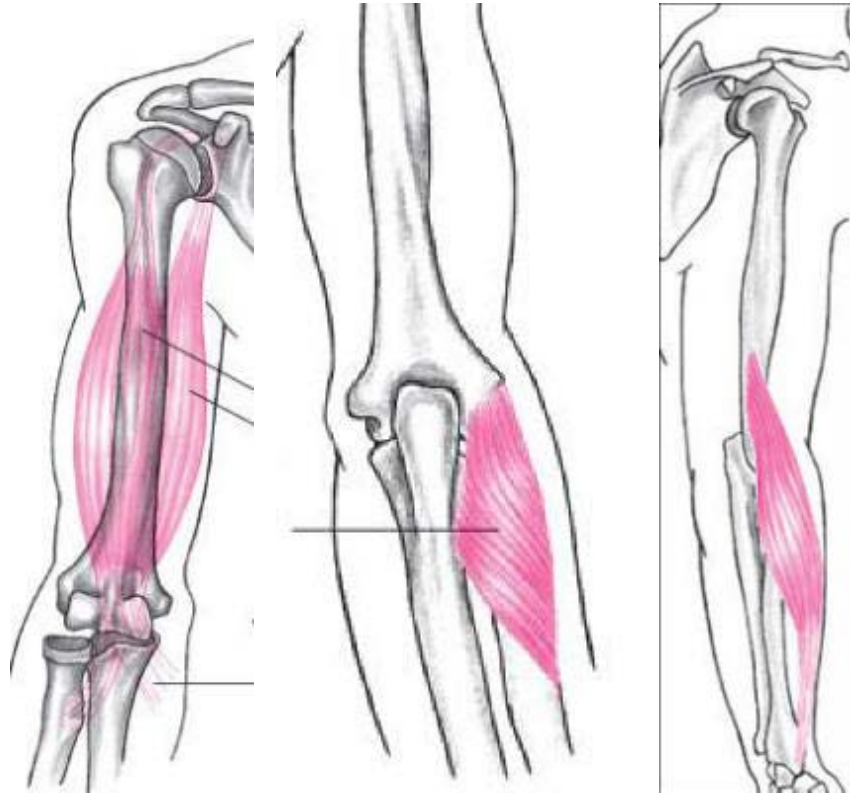
Radioulnar Supination

Agonists

Biceps brachii

Supinator muscle

Brachioradialis



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