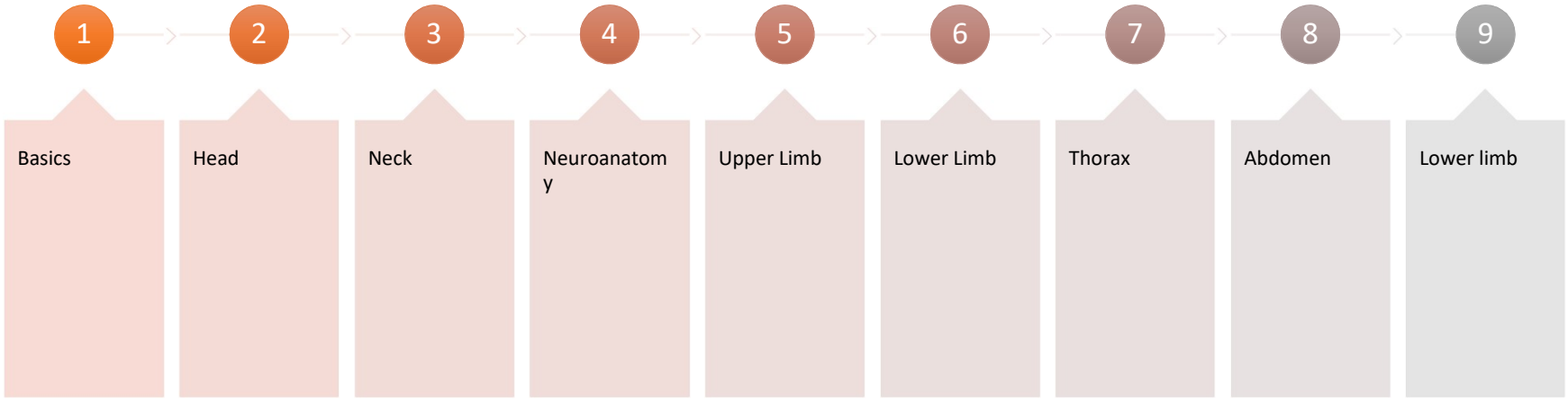
ANATOMY

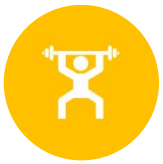
Major Topics



Upper Limb

AREAS

BONES



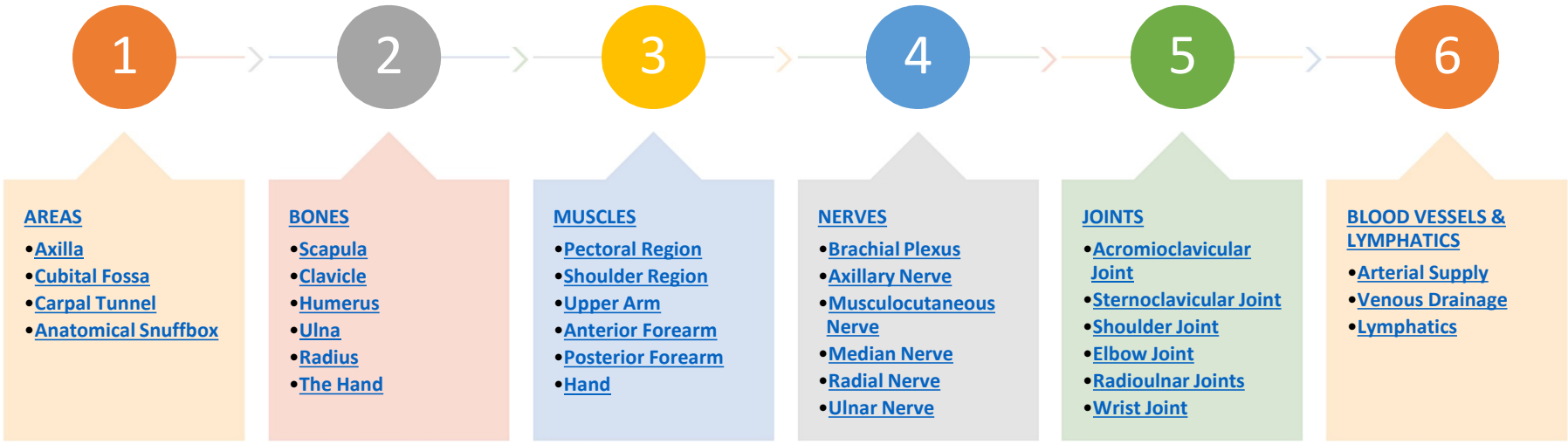
MUSCLES

NERVES

JOINTS

BLOOD VESSELS & LYMPHATICS

Upper Limb


1
2
3
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6
AREAS
•Axilla
•Cubital Fossa
•Carpal Tunnel
•Anatomical Snuffbox
BONES
•Scapula
•Clavicle
•Humerus
•Ulna
•Radius
•The Hand
MUSCLES
•Pectoral Region
•Shoulder Region
•Upper Arm
•Anterior Forearm
•Posterior Forearm
•Hand
NERVES
•Brachial Plexus
•Axillary Nerve
•Musculocutaneous Nerve
•Median Nerve
•Radial Nerve
•Ulnar Nerve
JOINTS
•Acromioclavicular Joint
•Sternoclavicular Joint
•Shoulder Joint
•Elbow Joint
•Radioulnar Joints
•Wrist Joint
BLOOD VESSELS & LYMPHATICS
•Arterial Supply
•Venous Drainage
•Lymphatics

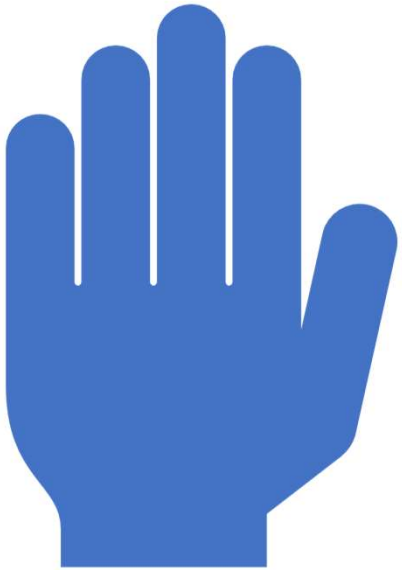
Upper limb

Muscle of Upper Limb

Upper Limb

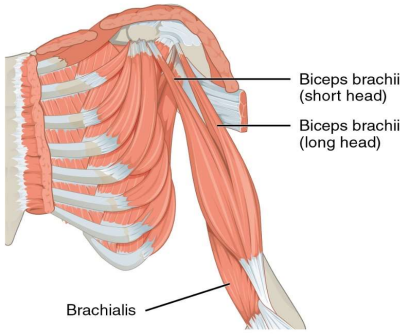
Muscles

- **PECTORAL REGION**
- **SHOULDER REGION**
- **UPPER ARM**
- **ANTERIOR FOREARM**
- **POSTERIOR FOREARM**
- **HAND**

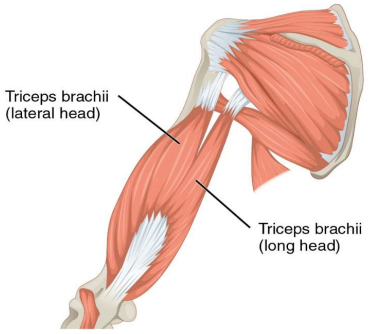


Upper Limb

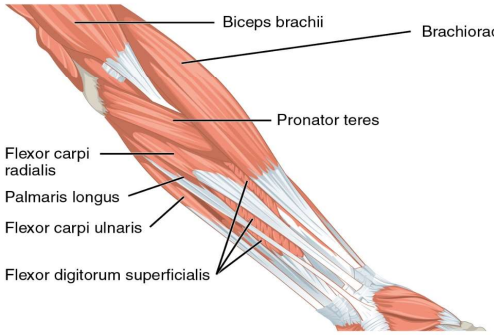
Muscles



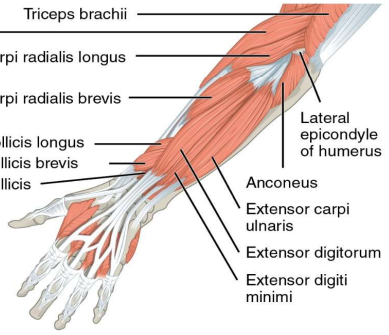
Left upper arm muscles (anterior lateral view)



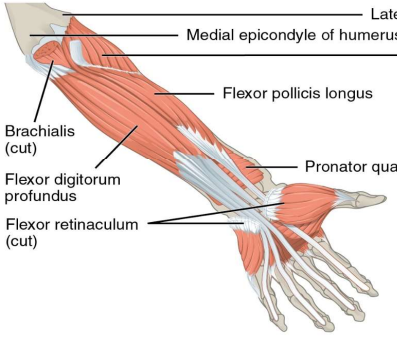
Left upper arm muscles (posterior view)



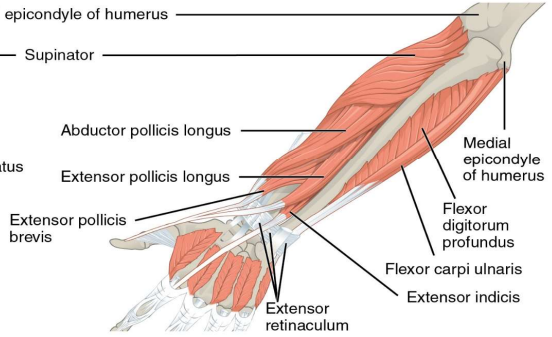
Left forearm superficial muscles (palmar view)



Left forearm superficial muscles (dorsal view)



Left forearm deep muscles (palmar view)

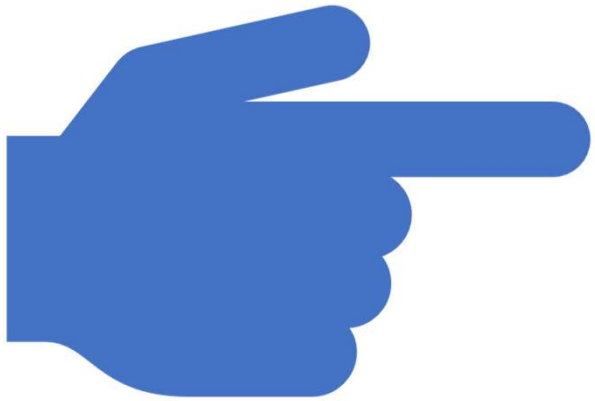


Left forearm deep muscles (dorsal view)

Upper Limb Muscle

Pectoral Region

- Pectoralis major
- Pectoralis minor
- Serratus anterior
- Subclavius

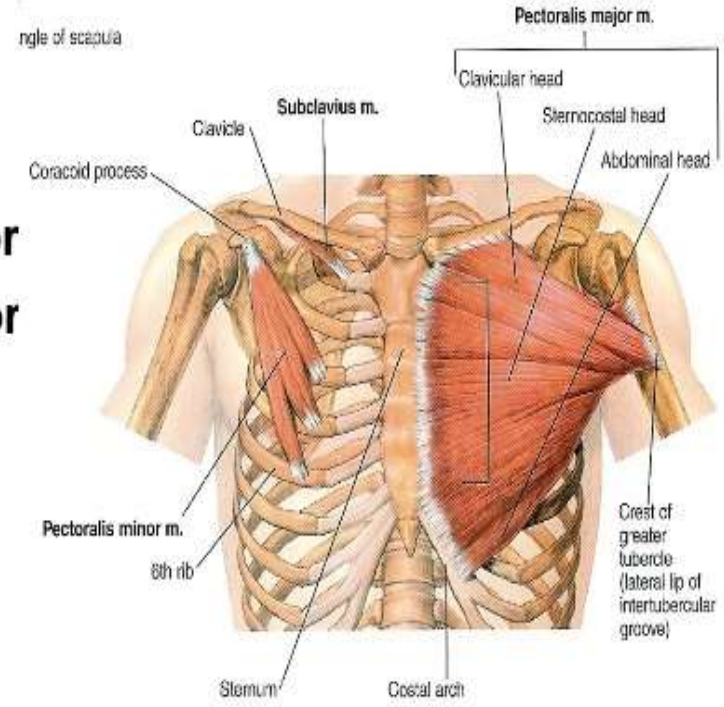


Upper Limb Muscle

Pectoral Region

MUSCLES OF THE PECRORAL REGION

- 1. Pectoralis major
- 2. Pectoralis minor
- 3. subclavius



Pectoralis Major

Attachments: The distal attachment of both heads is into the intertubercular sulcus of the humerus.

- Clavicular head – originates from the anterior surface of the medial clavicle.
- Sternocostal head – originates from the anterior surface of the sternum, the superior six costal cartilages and the aponeurosis of the external oblique muscle.

Function: Adducts and medially rotates the upper limb and draws the scapula anteroinferiorly. The clavicular head also acts individually to flex the upper limb.

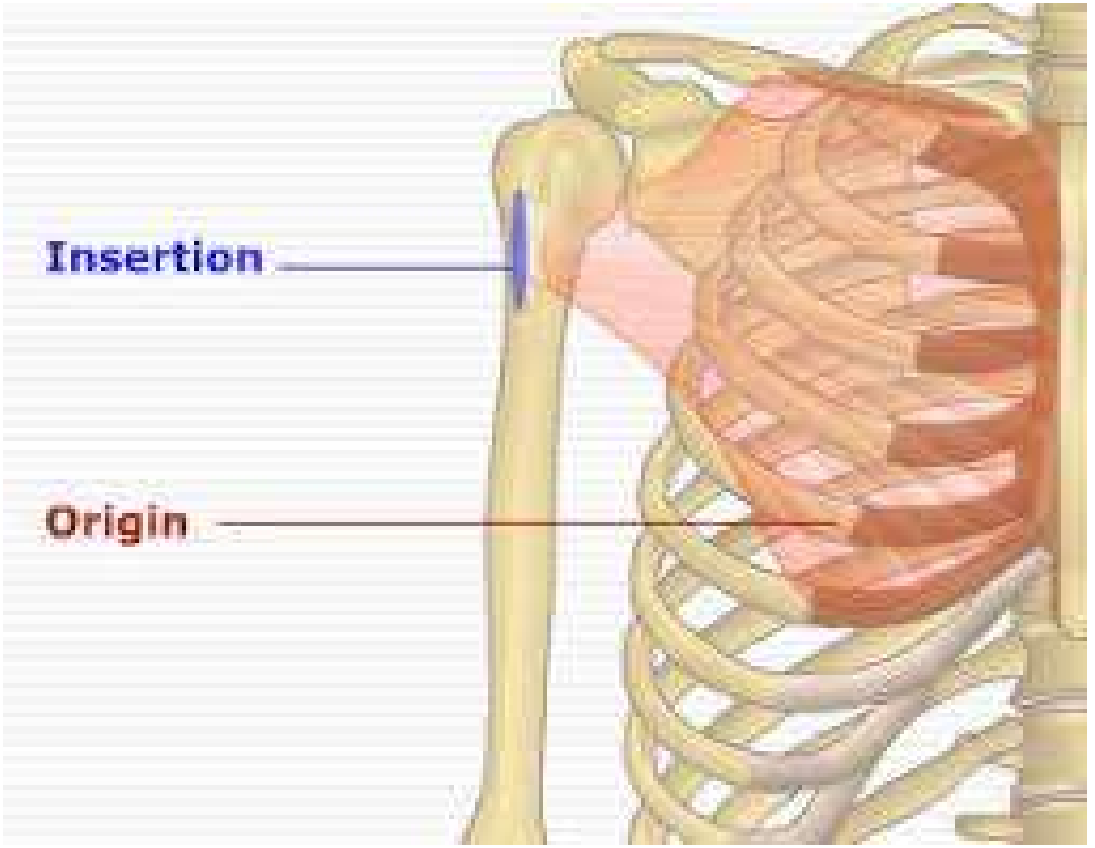
Innervation: Lateral and medial pectoral nerves C5, C6, C6.

Upper limb

Pectoralis Major

Pectoralis Major

Attachment



Pectoralis Minor

The pectoralis minor lies underneath its larger counterpart muscle, pectoralis major. Both of these muscles form part of the anterior wall of the axilla region.

Attachments: Originates from the 3rd-5th ribs, and inserts into the coracoid process of the scapula.

Function: Stabilises the scapula by drawing it anteroinferiorly against the thoracic wall.

Innervation: Medial pectoral nerve C5 C6 C7

Pectoralis Minor

Attachment

Serratus Anterior

The serratus anterior is located more laterally in the chest wall, and forms the medial border of the axilla region.

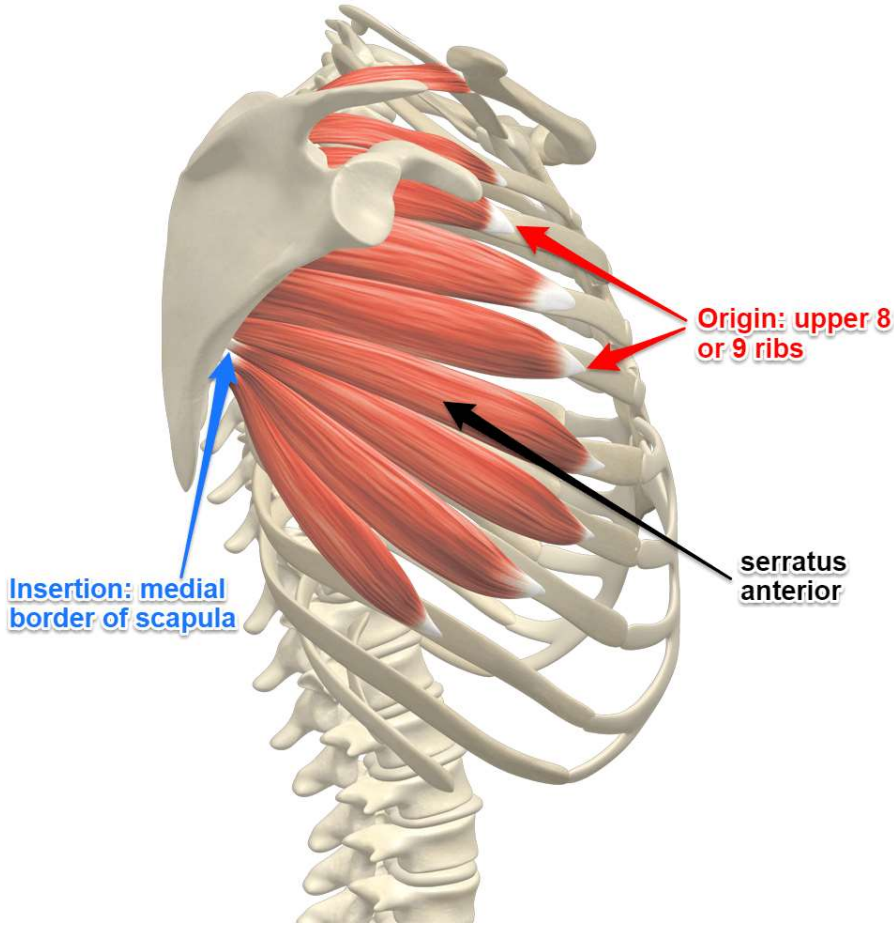
Attachments: The muscle consists of several strips, which originate from the lateral aspects of ribs 1-8. They attach to the costal (rib facing) surface of the medial border of the scapula.

Function: Rotates the scapula, allowing the arm to be raised over 90 degrees. It also holds the scapula against the ribcage.

Innervation: Long thoracic nerve. C5 C6 C7

Serratus Anterior

Attachment



Subclavius

The subclavius is small muscle, which is located directly underneath the clavicle, running horizontally. It affords some minor protection to the underlying neurovascular structures (e.g in cases of clavicular fracture or other trauma).

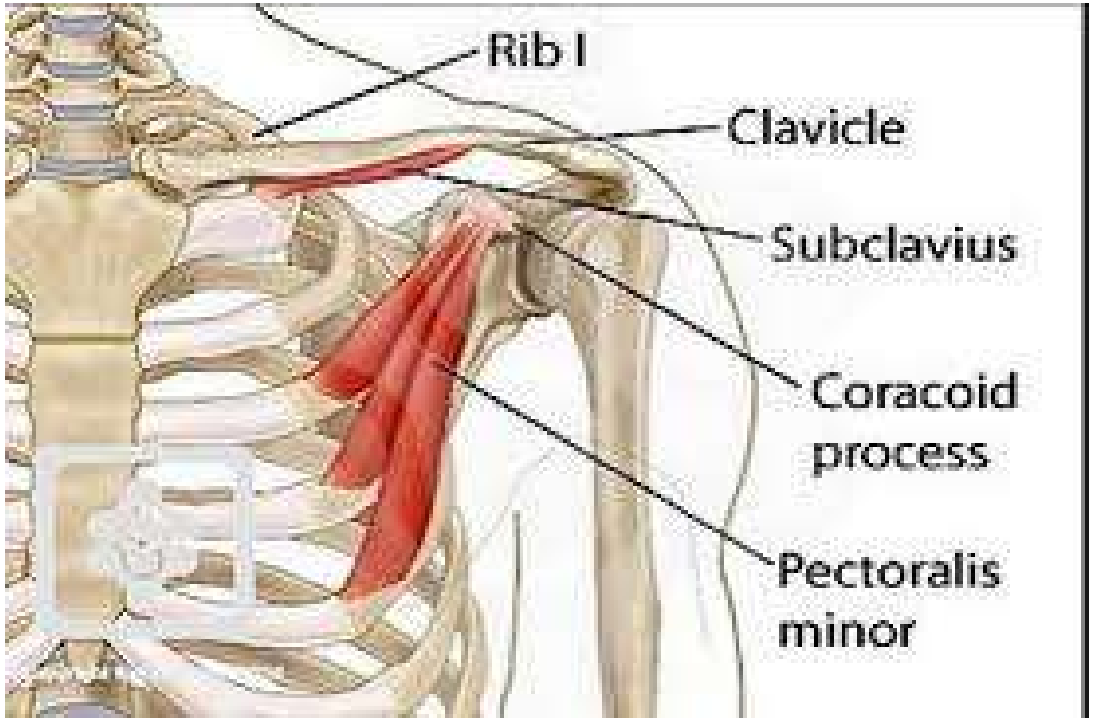
Attachments: Originates from the junction of the 1st rib and its costal cartilage, inserting into the inferior surface of the middle third of the clavicle.

Function: Anchors and depresses the clavicle.

Innervation: Nerve to subclavius.

Subclavius

Attachment



Clinical Relevance

Winging of the Scapula

- One of the actions of the **serratus anterior** is to ‘hold’ the scapula against the ribcage. If the long thoracic nerve is damaged (and the serratus anterior therefore paralysed), a specific clinical sign is produced.
- In cases such as this, the scapula is no longer held against the ribcage – and protrudes out of the back. It is said to have a **‘winged’** appearance.
- Long thoracic nerve palsy is thought to most commonly occur from **traction injuries**, where the upper limb is stretched violently

Clinical Relevance

Winging Of Scapula

Upper Limb

Muscle of the Upper Limb

Shoulder Region

Muscle Of Upper limb

Shoulder Region

- **Extrinsic** – originate from the torso, and attach to the bones of the shoulder (clavicle, scapula or humerus).
- **Intrinsic** – originate from the scapula and/or clavicle, and attach to the humerus.

Muscle of the Upper Limb

Extrinsic Muscle

- The extrinsic muscles of the shoulder originate from the trunk, and attach to the bones of the shoulder – the clavicle, scapula or humerus. They are located in the back, and are also known as the superficial back muscles.
- The muscles are organised into two layers – **a superficial layer and a deep layer.**

Muscle Of Shoulder

Extrinsic Muscle

Superficial Muscle

- Trapezius
- Latissimus Dorsi

Trapezius

The trapezius is a broad, flat and triangular muscle. The muscles on each side form a trapezoid shape. It is the most superficial of all the back muscles.

Attachments:

Originates from the skull, nuchal ligament and the spinous processes of C7-T12. The fibres attach to the clavicle, acromion and the scapula spine.

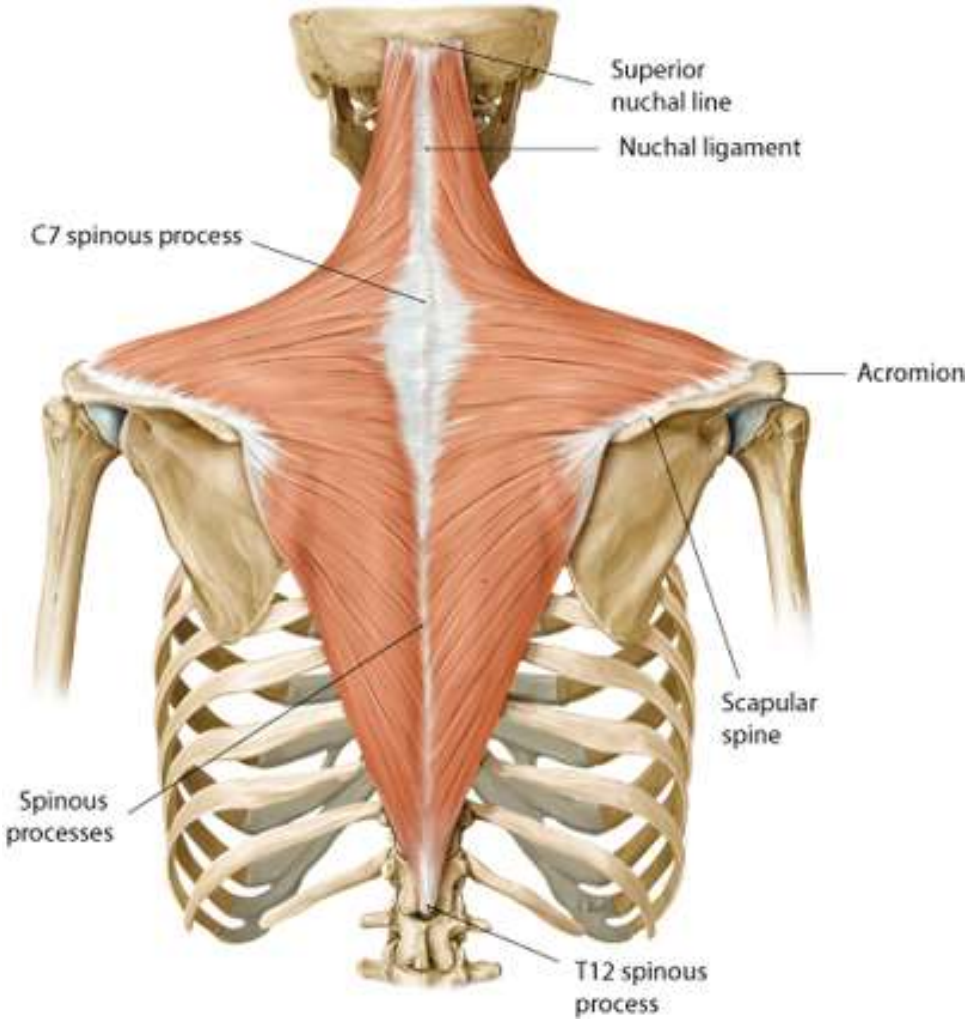
Innervation:

Motor innervation is from the accessory nerve. It also receives proprioceptor fibres from C3 and C4 spinal nerves.

Actions:

The upper fibres of the trapezius elevate the scapula and rotates it during abduction of the arm. The middle fibres retract the scapula and the lower fibres pull the scapula inferiorly.

Trapezius


Superior nuchal line
Nuchal ligament
C7 spinous process
Acromion
Scapular spine
Spinous processes
T12 spinous process

Trapezius

Trapezius

Clinical Relevance

- The most common cause of Accessory Nerve damage is **iatrogenic** (i.e. due to a medical procedure). In particular, operations such as cervical lymph node biopsy or cannulation of the internal jugular vein can cause trauma to the nerve.
- To test the accessory nerve, trapezius function can be assessed. This can be done by asking the patient to shrug his/her shoulders.

Latissimus Dorsi

The latissimus dorsi originates from the lower part of the back, where it covers a wide area.

Attachments

Has a broad origin – arising from the spinous processes of T6-T12, iliac crest, thoracolumbar fascia and the inferior three ribs. The fibres converge into a tendon that attaches to the intertubercular sulcus of the humerus.

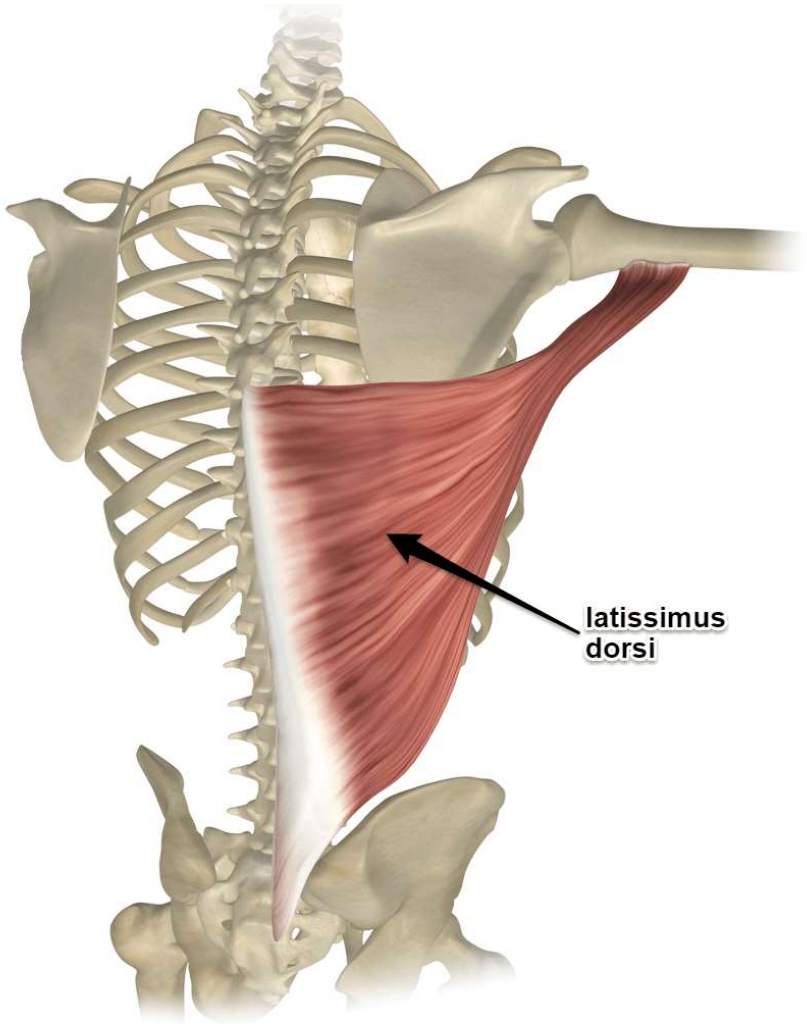
Innervation

Thoracodorsal nerve.

Actions

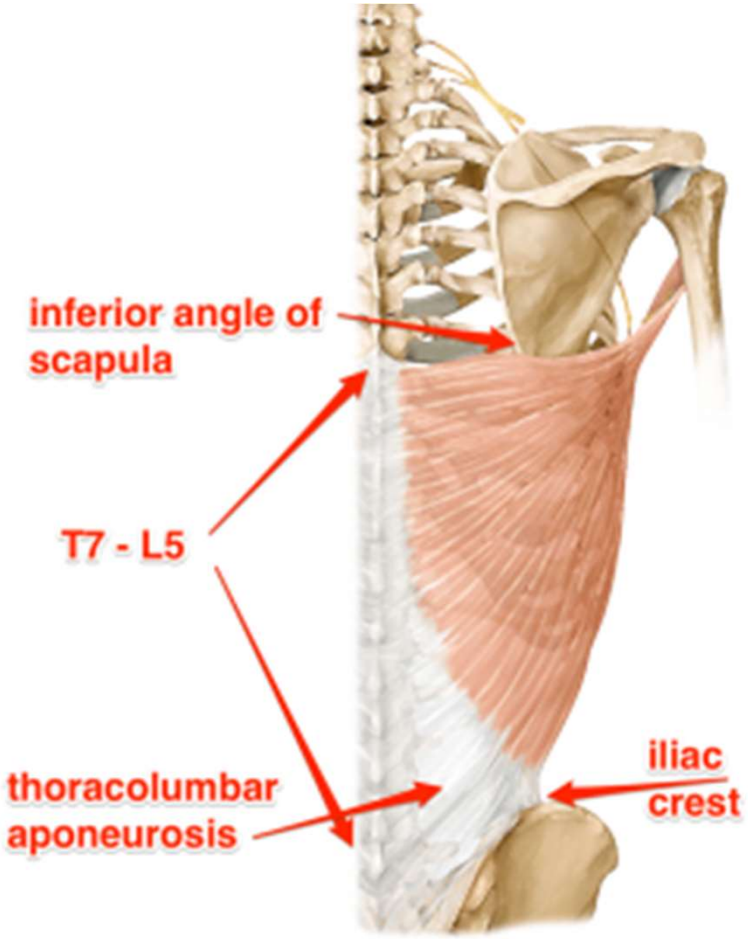
Extends, adducts and medially rotates the upper limb.

Latissimus Dorsi



Shoulder Muscle

Upper lImb



Extrinsic Muscle of Upper limb

Deep Muscle

Levator Scapulae

Rhomboids Major

Rhomboids Minor

Levator Scapulae

The levator scapulae is a small strap-like muscle. It begins in the neck, and descends to attach to the scapula.

Attachments

Originates from the transverse processes of the C1-C4 vertebrae and attaches to the medial border of the scapula.

Innervation

Dorsal scapular nerve.

Actions

Elevates the scapula.

Rhomboid Major

Rhomboid Major

Attachments

Originates from the spinous processes of T2-T5 vertebrae. Attaches to the medial border of the scapula, between the scapula spine and inferior angle.

Innervation

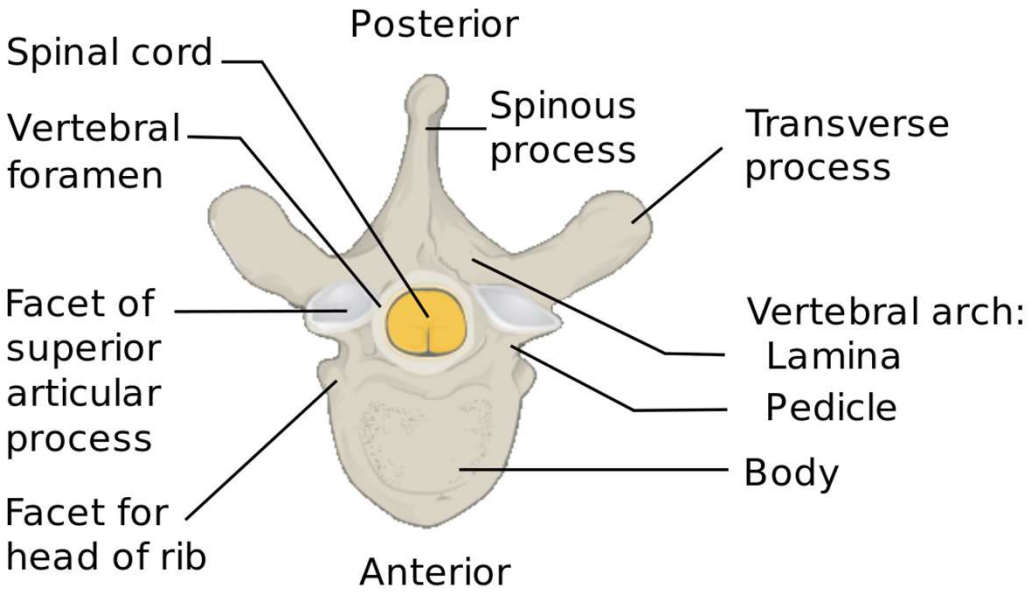
Dorsal scapular nerve.

Actions

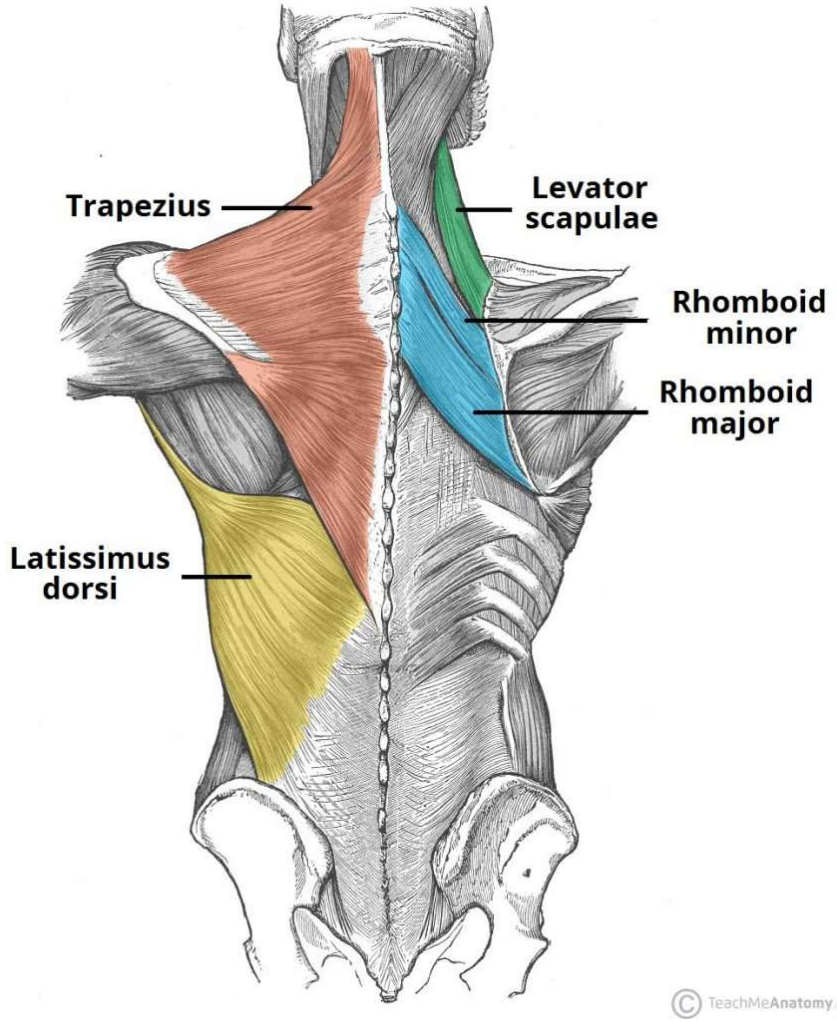
Retracts and rotates the scapula

Muscle of Shoulder Region

Parts of Vertebrae



Rhomboids Major



Rhomboids Minor

Rhomboid Minor

Attachments

Originates from the spinous processes of C7-T1 vertebrae. Attaches to the medial border of the scapula, at the level of the spine of scapula.

Innervation

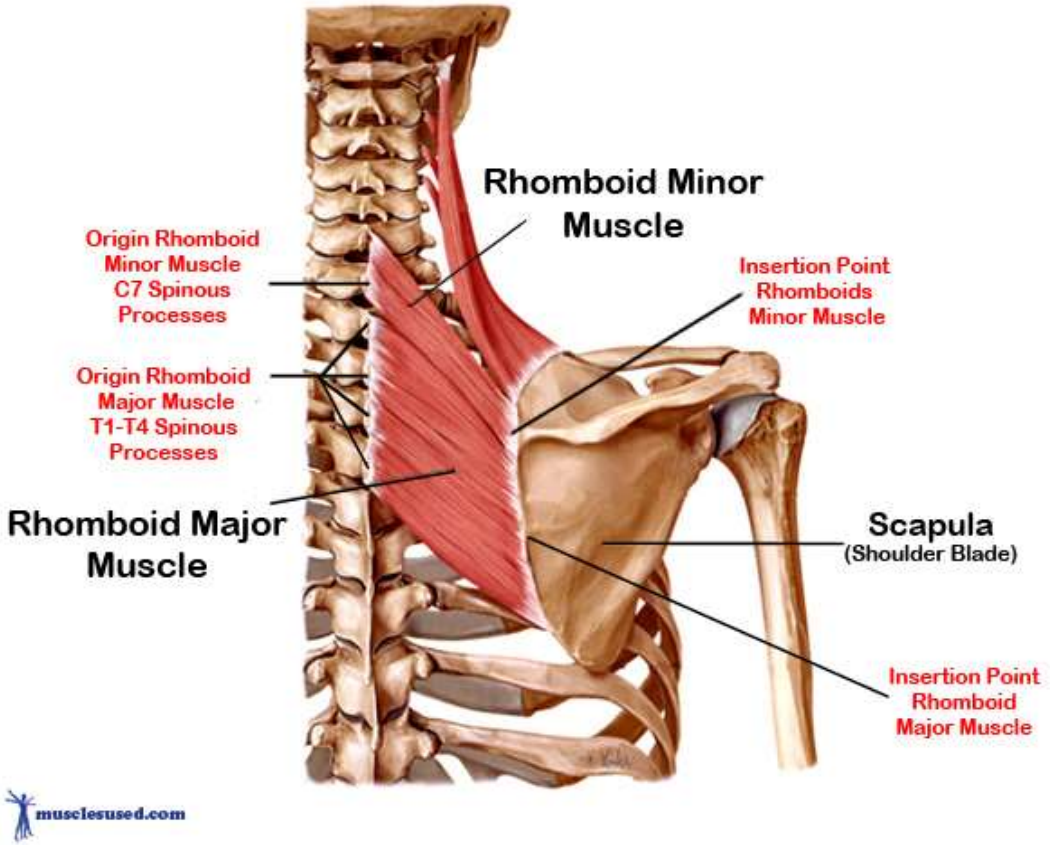
Dorsal scapular nerve.

Actions

Retracts and rotates the scapula

Muscle of Shoulder Region

Rhomboids Major and Minor



Muscle of Shoulder Region

Extrinsic

Originate from the torso, and attach to the bones of the shoulder (clavicle, scapula or humerus).

Intrinsic

Originate from the scapula and/or clavicle, and attach to the humerus.

Shoulder Muscle

Intrinsic Muscle

The deltoid,

Teres major, and

& Four rotator cuff muscles

Supraspinatus

Infraspinatus,

Subscapularis and

Teres minor

Shoulder Muscle

Deltoid

The deltoid muscle is shaped like the Greek letter delta – Δ. It can be divided into an anterior, middle and posterior part.

Attachments

Originates from the scapula and clavicle, and attaches to the deltoid tuberosity on the lateral surface of the humerus.

Innervation

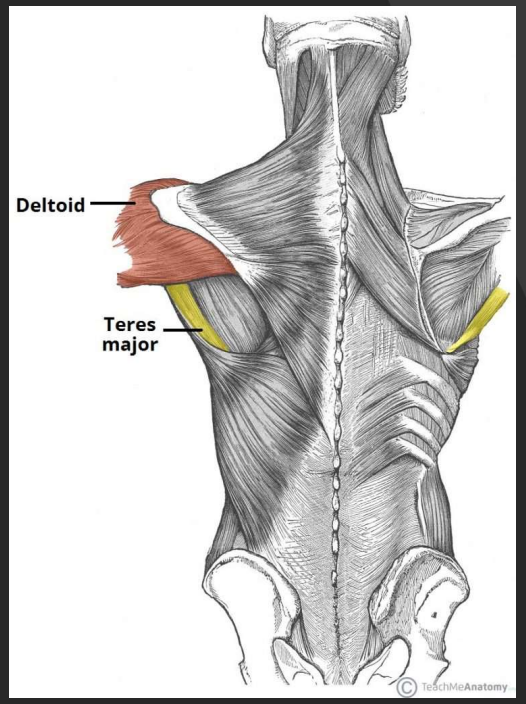
Axillary nerve.

Actions:

- Anterior fibres – flexion and medial rotation.
- Posterior fibres – extension and lateral rotation.
- Middle fibres – the major abductor of the arm (takes over from the supraspinatus, which abducts the first 15 degrees).

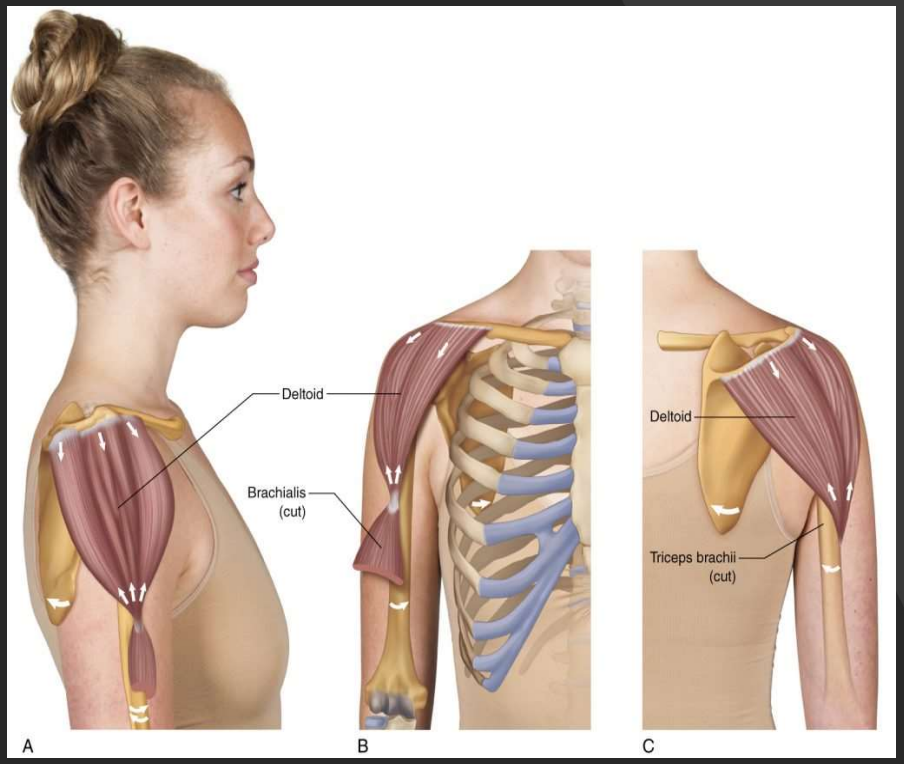
Muscle of Shoulder Region

Deltoid



Muscle of Shoulder Region

Deltoid



Shoulder Region

Deltoid

Muscle of Shoulder Region

Teres Major

The teres major forms the inferior border of the quadrangular space – the ‘gap’ that the axillary nerve and posterior circumflex humeral artery pass through to reach the posterior scapula region.

Attachments

Originates from the posterior surface of the inferior angle of the scapula. It attaches to the medial lip of the intertubercular groove of the humerus.

Innervation

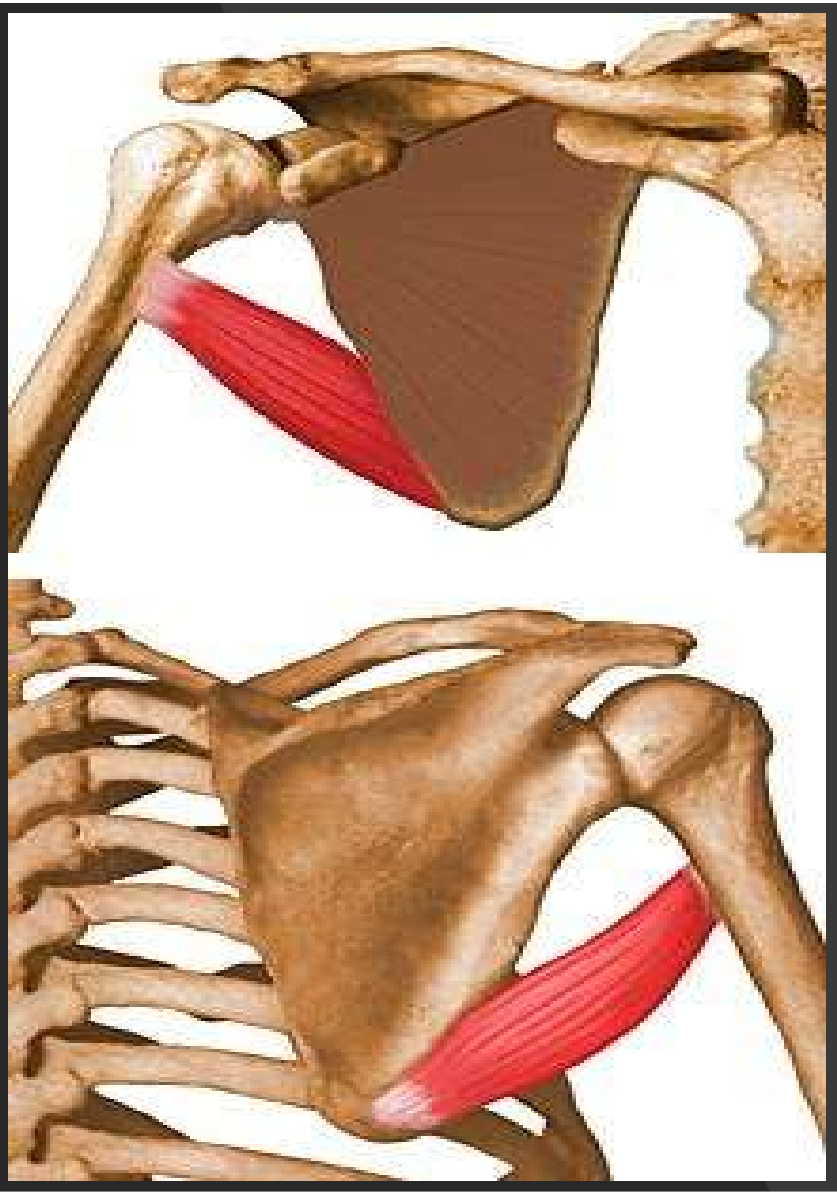
Lower subscapular nerve.

Actions

Adducts at the shoulder and medially rotates the arm.

Muscle of Shoulder Region

Teres Major



Muscle Of Shoulder Region

Rotator Cuff Muscle ‘SITS’

The rotator cuff muscles are a group of four muscles that originate from the scapula and attach to the humeral head. Collectively, the resting tone of these muscles acts to ‘pull’ the humeral head into the glenoid fossa. This gives the glenohumeral joint a lot of additional stability.

Supraspinatus

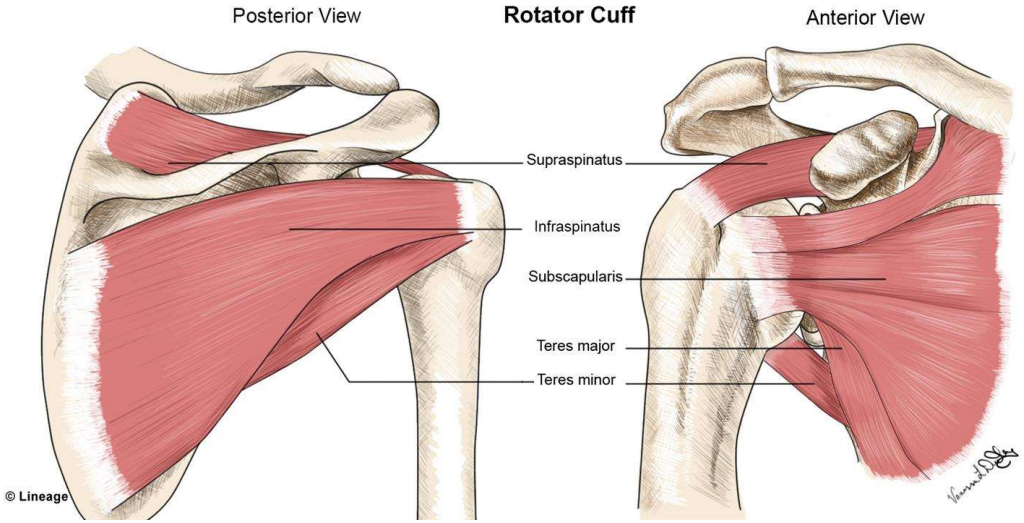
Infraspinatus

Subscapularis

Teres Minor

Muscle of Shoulder

Rotator Cuff



Muscle of Shoulder

Supraspinatus

Attachments

Originates from the supraspinous fossa of the scapula, attaches to the greater tubercle of the humerus.

Innervation

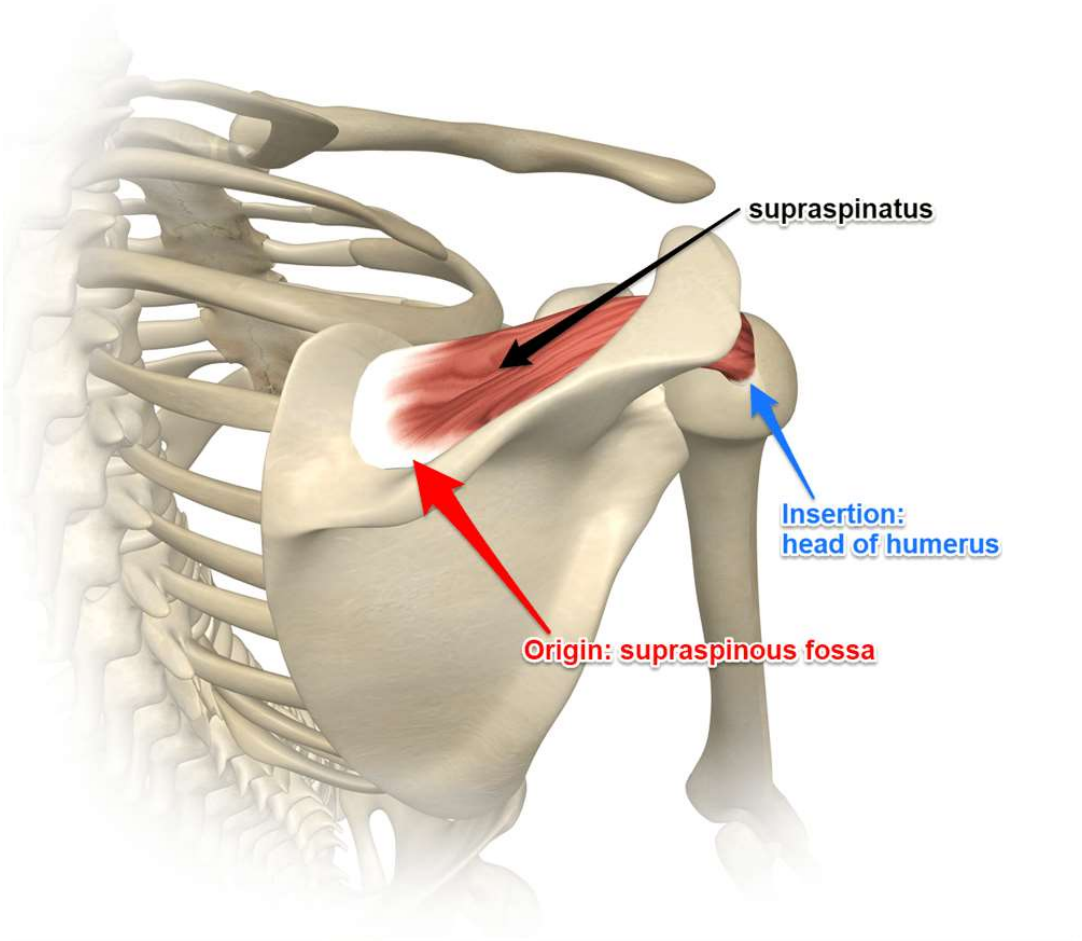
Suprascapular nerve.

Actions

Abducts the arm 0-15^{o}, and assists deltoid for 15-90^{o}

Muscle of Shoulder

Supraspinatus



Muscle of Shoulder Region

Infraspinatus

Attachments

Originates from the infraspinous fossa of the scapula, attaches to the greater tubercle of the humerus.

Innervation

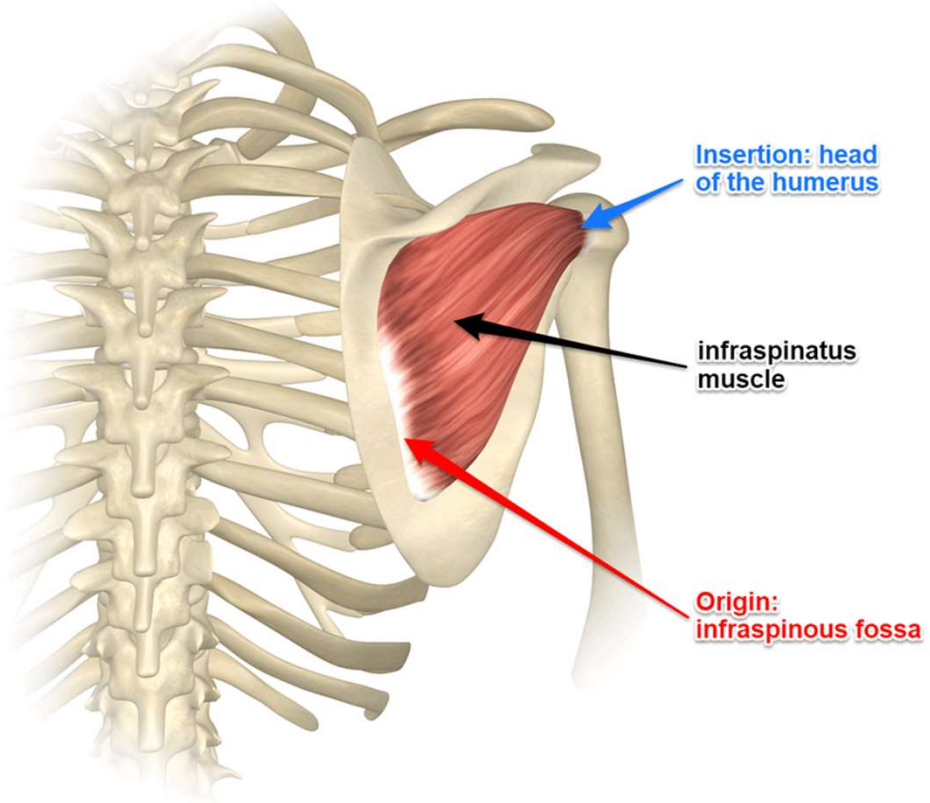
Suprascapular nerve.

Actions

Laterally rotates the arm.

Muscle of Shoulder

Infraspinatus



Muscle of Shoulder

Subscapularis

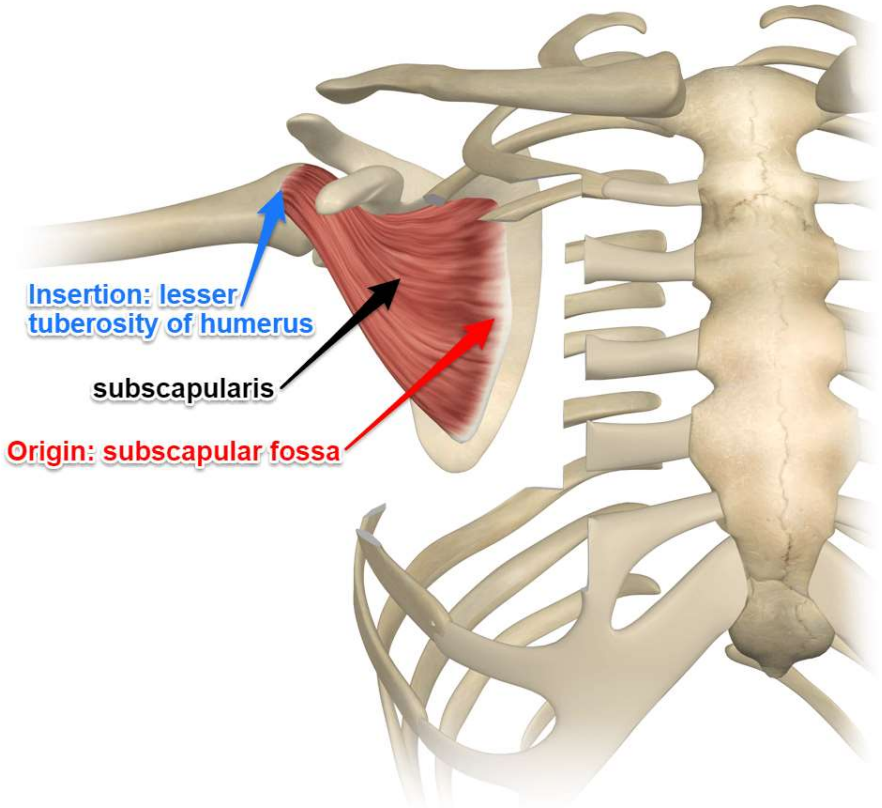
Attachments: Originates from the subscapular fossa, on the costal surface of the scapula. It attaches to the lesser tubercle of the humerus.

Innervation: Upper and lower subscapular nerves.

Actions: Medially rotates the arm.

Muscle of Shoulder

Subscpularis



Muscle of Shoulder

Teres Minor

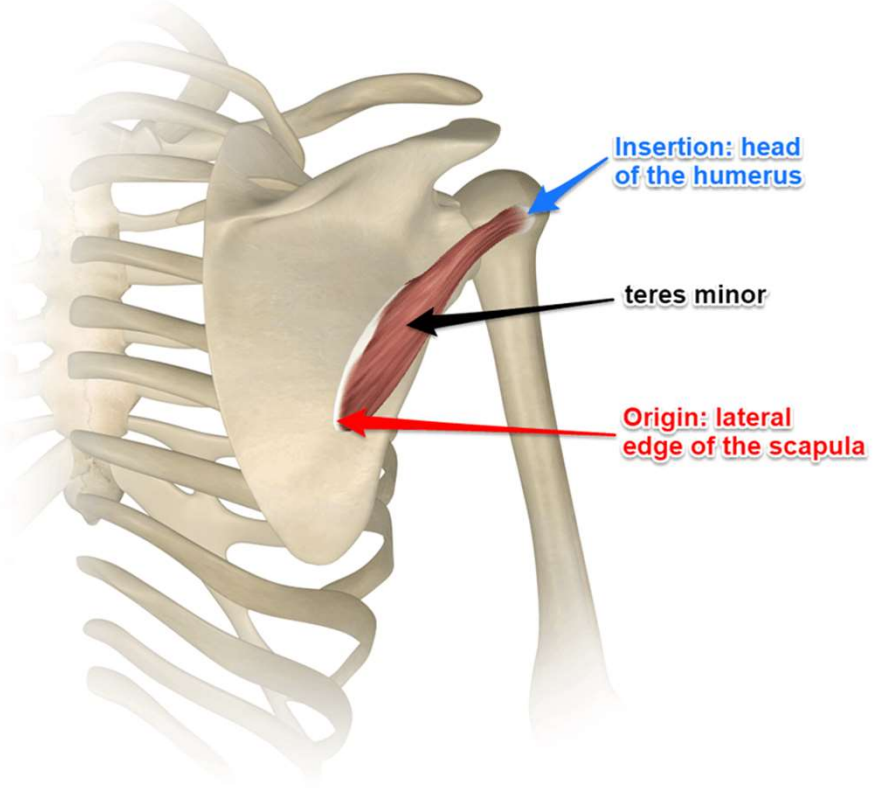
Attachments: Originates from the posterior surface of the scapula, adjacent to its lateral border. It attaches to the greater tubercle of the humerus.

Innervation: Axillary nerve.

Actions: Laterally rotates the arm

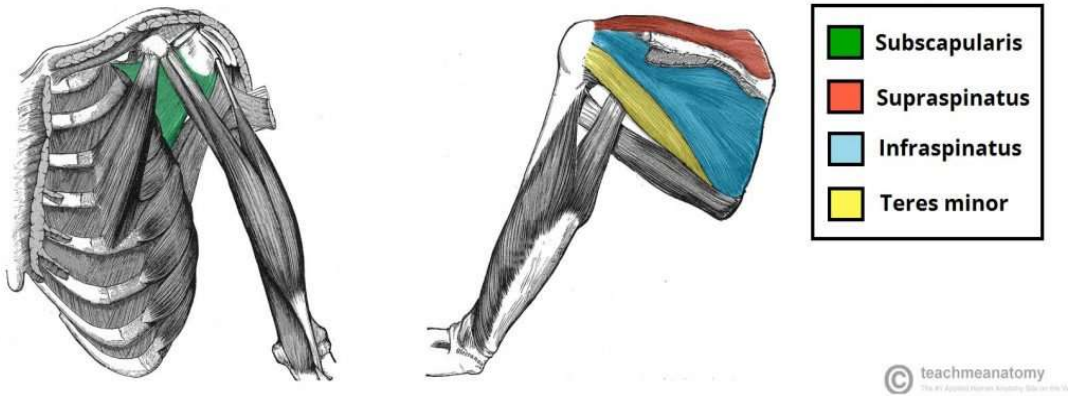
Muscle of Shoulder

Teres Minor



Muscles of Shoulder

SITS



Muscles of Shoulder

Clinical Relevance

Rotator cuff tendonitis refers to **inflammation** of the tendons of the rotator cuff muscles. This usually occurs secondary to repetitive use of the shoulder joint.

The muscle most commonly affected is the **supraspinatus**. During abduction, it ‘rubs’ against the Coraco-acromial arch. Over time, this causes inflammation and degenerative changes in the tendon itself.

Conservative treatment of rotator cuff tendonitis involves rest, analgesia, and physiotherapy. In more severe cases, steroid injections and surgery can be considered.

Upper Limb

Muscle of Upper Arm

1 Anterior Compartment

- 1.1 Biceps Brachii
- 1.2 Coracobrachialis
- 1.3 Brachialis
- 1.4 Clinical Relevance: Rupture of the Biceps Tendon

2 Posterior Compartment

- 2.1 Triceps Brachii

3 Prosection Images

Muscle of Upper Arm

Biceps Brachii

As the tendon of biceps brachii enters the forearm, a connective tissue sheet is given off – the **Bicipital aponeurosis**. This forms the roof of the cubital fossa and blends with the deep fascia of the anterior forearm.

Attachments

Long head originates from the supraglenoid tubercle of the scapula, and the short head originates from the coracoid process of the scapula. Both heads insert distally into the radial tuberosity and the fascia of the forearm via the bicipital aponeurosis.

Function

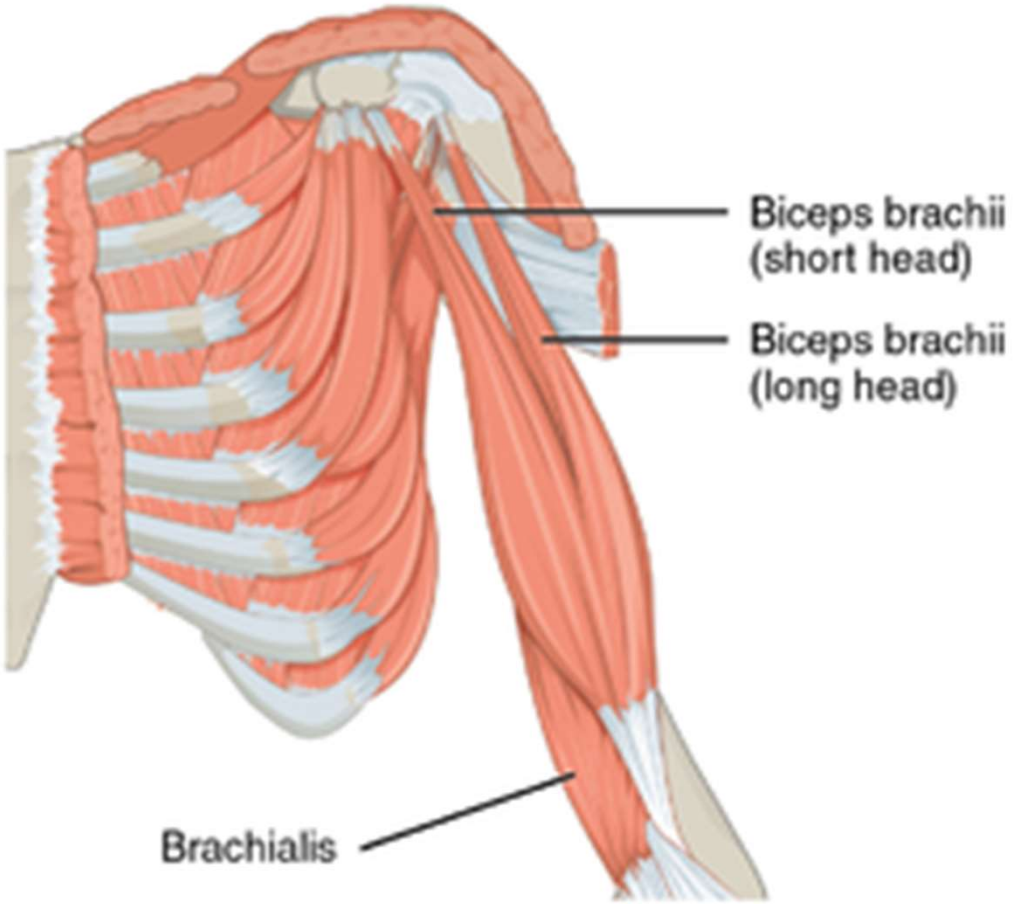
Supination of the forearm. It also flexes the arm at the elbow and at the shoulder.

Innervation

Musculocutaneous nerve. The bicep tendon reflex tests spinal cord segment C6

Muscle of Arm

Biceps Brachii



Muscle of Arm

Coracobrachialis

The coracobrachialis muscle lies deep to the biceps brachii in the arm.

Attachments

Originates from the coracoid process of the scapula. The muscle passes through the axilla, and attaches the medial side of the humeral shaft, at the level of the deltoid tubercle.

Function

Flexion of the arm at the shoulder, and weak adduction.

Innervation

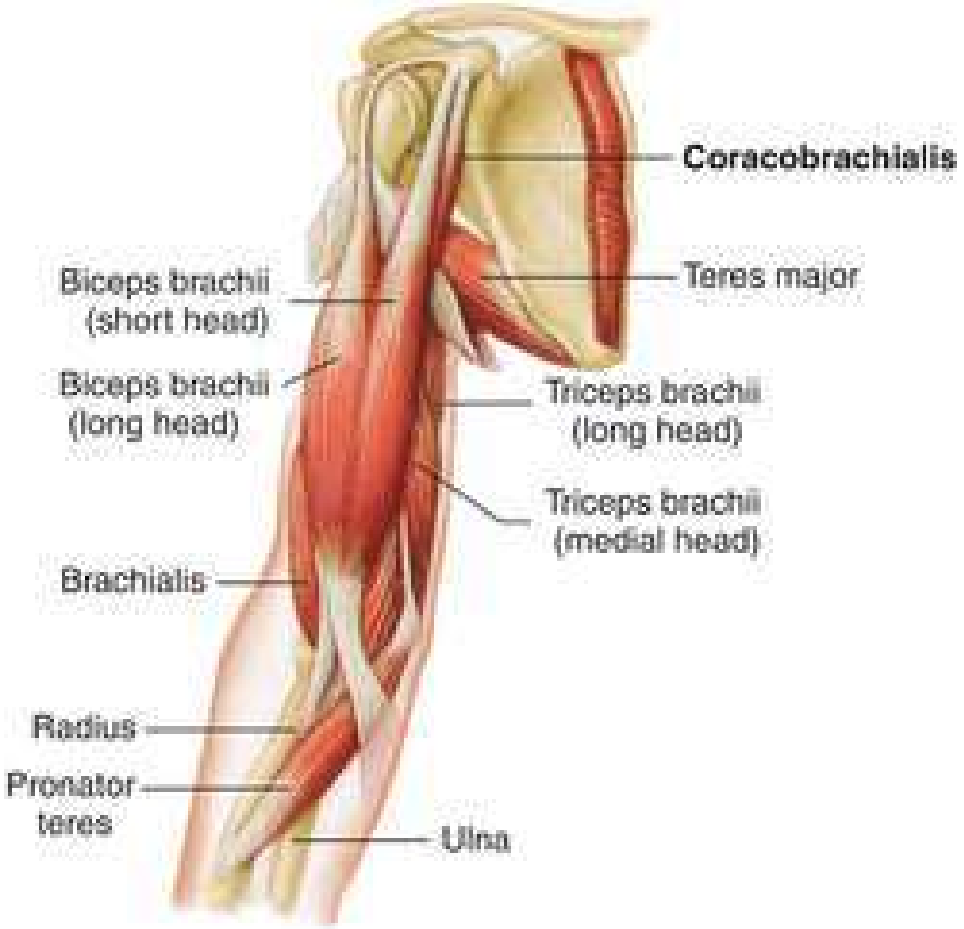
Musculocutaneous nerve.

Muscle of Arm

Coracobrachialis

Muscle of Arm

Coracobrachialis



Muscle of Arm

Brachialis

The brachialis muscle lies deep to the biceps brachii, and is found more distally than the other muscles of the arm. It forms the floor of the cubital fossa.

Attachments

Originates from the medial and lateral surfaces of the humeral shaft and inserts into the ulna tuberosity, just distal to the elbow joint.

Function

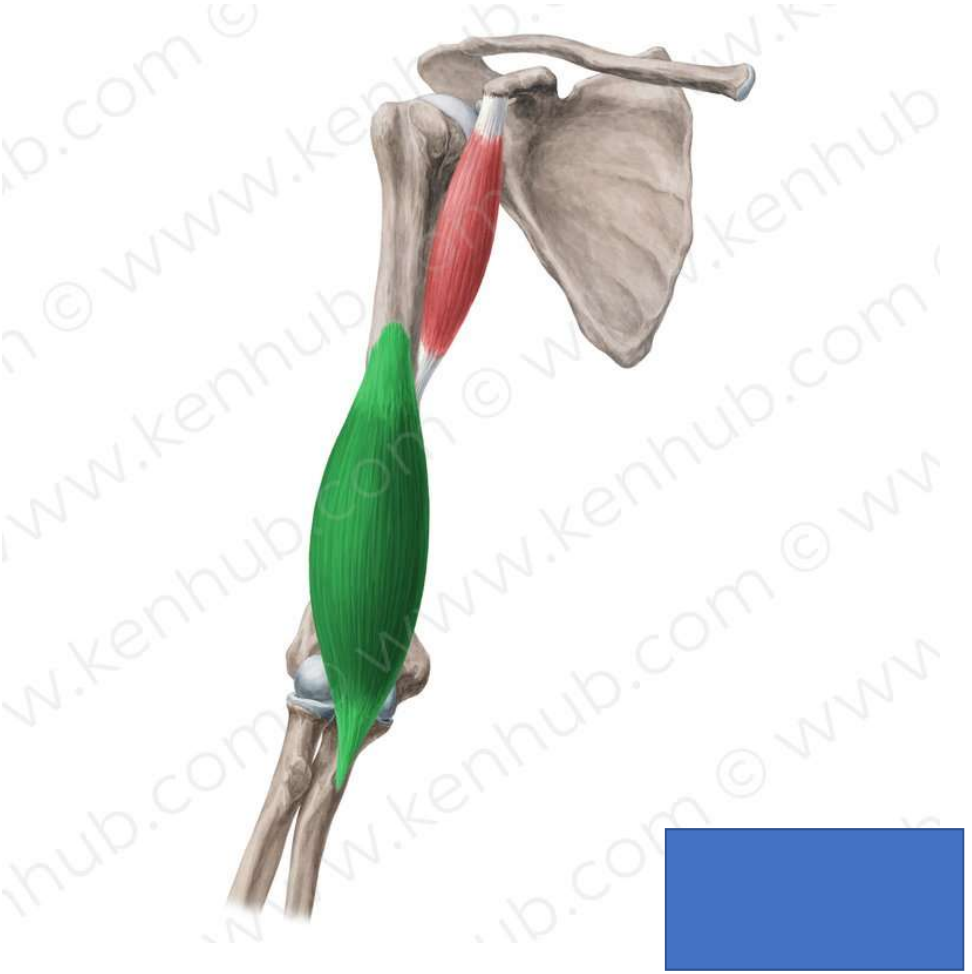
Flexion at the elbow.

Innervation

Musculocutaneous Nerve, with contributions from the radial nerve.

Muscle of Arm

Brachialis



Muscle of Arm

Clinical Relevance

Rupture of the Biceps Tendon

A complete rupture of any tendon in the body is rare. However, the **long head** of the biceps brachii is one of the more common tendons to rupture.

This produces a characteristic sign on flexing the elbow – a bulge where the muscle belly is, called the **'Popeye Sign'**. The patient would not notice much weakness in the upper limb due to the action of the brachialis and supinator muscles.

Muscle of Arm

Clinical Relevance

Popeyes's Sign

Muscle of the Arm

Popeyes Sign

Muscle of Arm

Triceps Brachii

Attachments: Long head – originates from the infraglenoid tubercle. Lateral head – originates from the humerus, superior to the radial groove. Medial head – originates from the humerus, inferior to the radial groove. Distally, the heads converge onto one tendon and insert into the olecranon of the ulna.

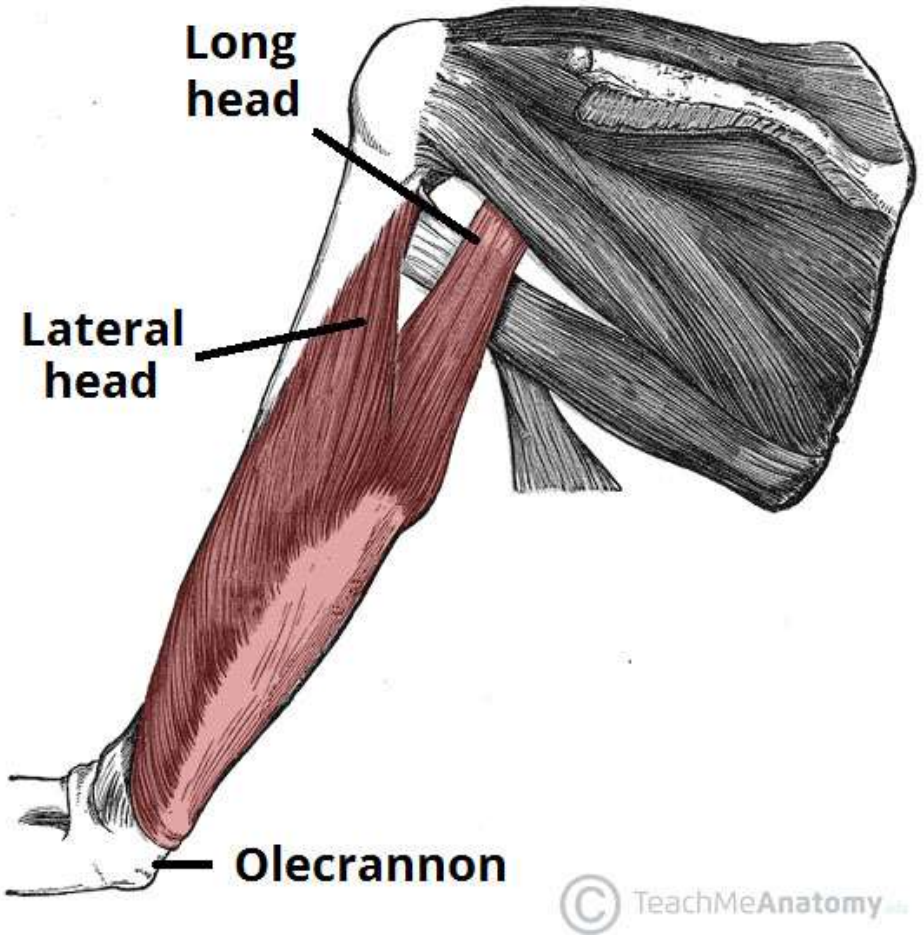
Function: Extension of the arm at the elbow.

Innervation: Radial nerve. A tap on the triceps tendon tests spinal segment C7.

- *Note: In some individuals, the long head of the triceps brachii is innervated by the axillary nerve*

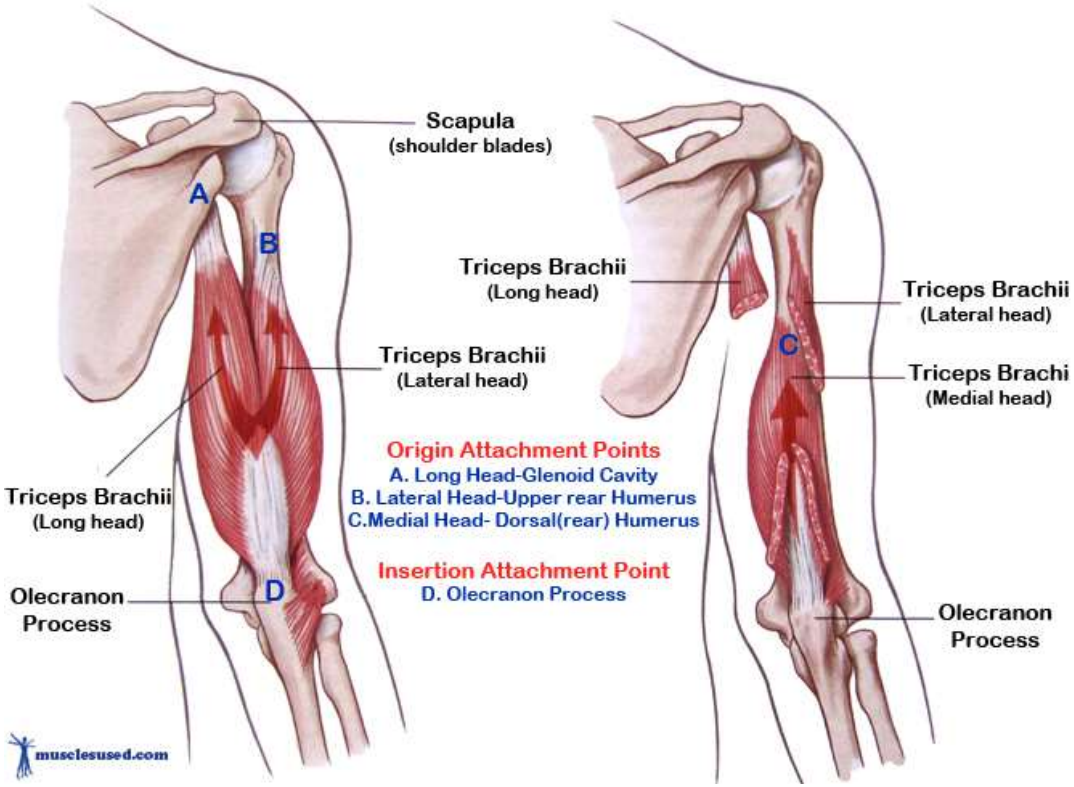
Muscle of the arm

Triceps Brachii



Muscle of Arm

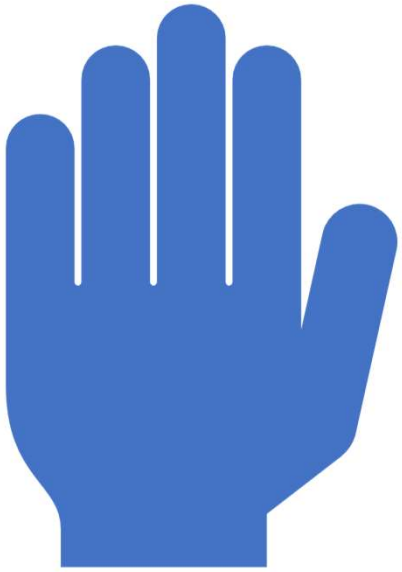
Triceps Brachii



Upper Limb

Muscles

- **PECTORAL REGION**
- **SHOULDER REGION**
- **UPPER ARM**
- **ANTERIOR FOREARM**
- **POSTERIOR FOREARM**
- **HAND**



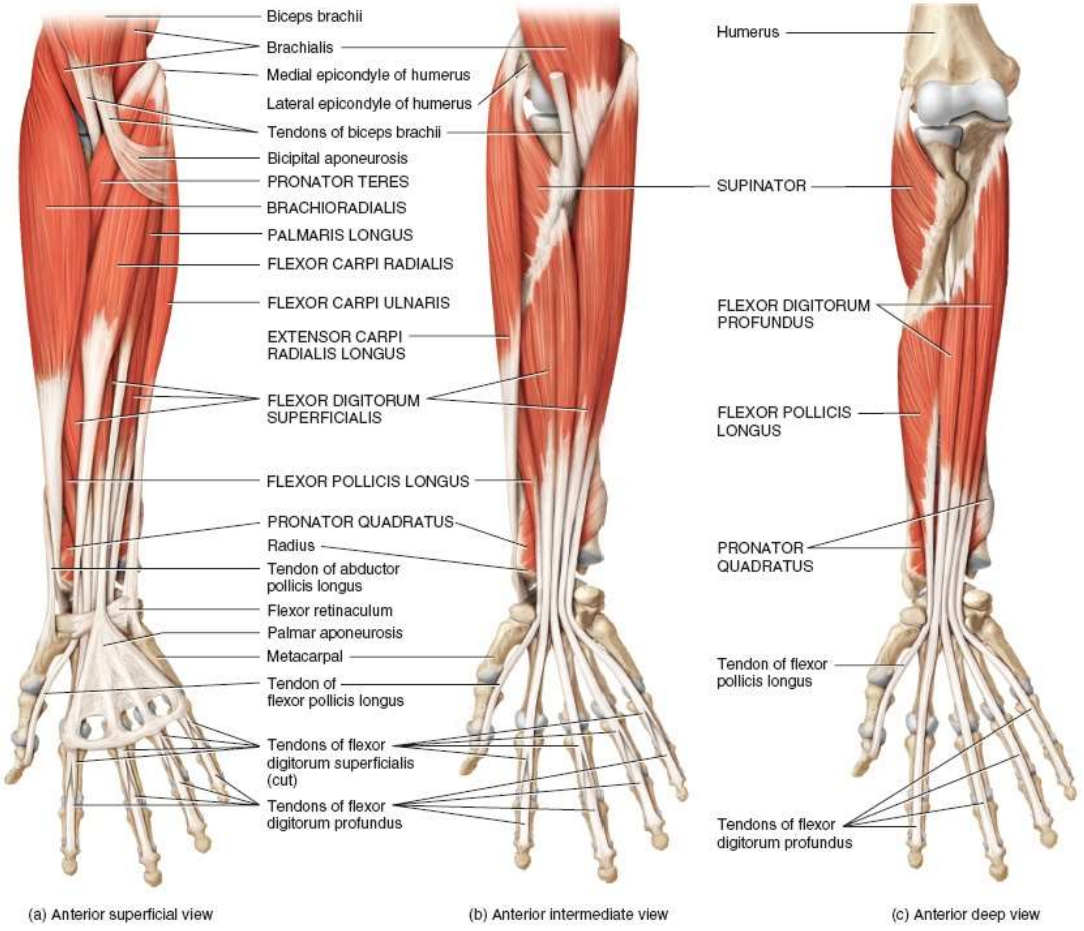
Muscle of Upper limb

Anterior Forearm

- 1 Superficial Compartment
- 2 Intermediate Compartment
- 3 Deep Compartment

Muscle of Forearm

Superficial Muscles



Forearm Muscle

Sperficial Compartment

Flexor Carpi Ulnaris,

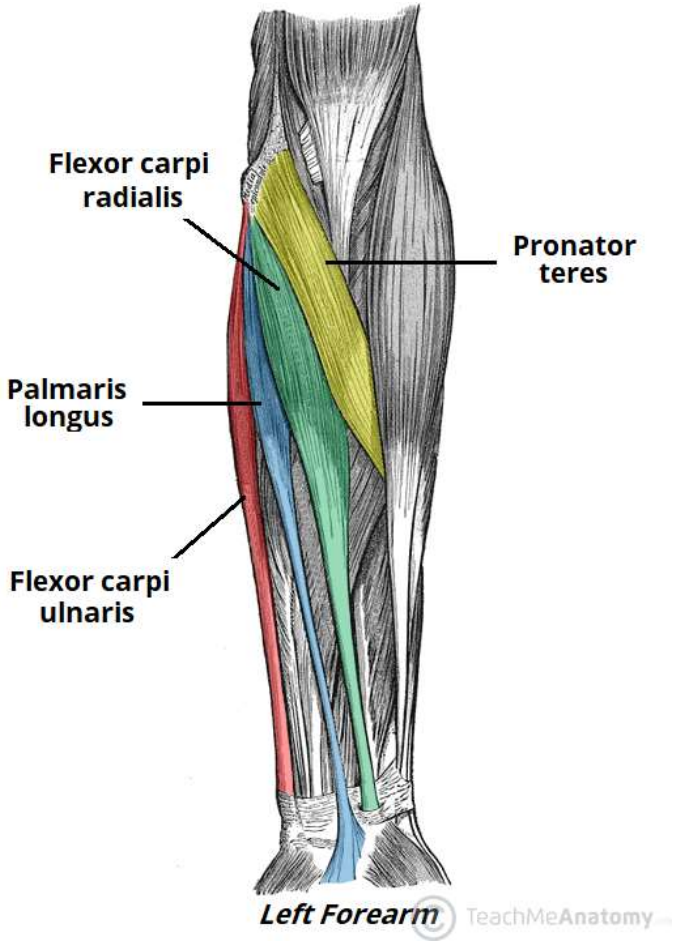
Palmaris Longus,

Flexor Carpi Radialis and

Pronator teres.

Muscle of Anterior Forearm

Superficial compartment



Muscle of Forearm

Flexor Carpi Ulnaris

Attachments

Originates from the medial epicondyle with the other superficial flexors. It also has a long origin from the Ulna. It passes into the wrist, and attaches to the pisiform carpal bone.

Actions

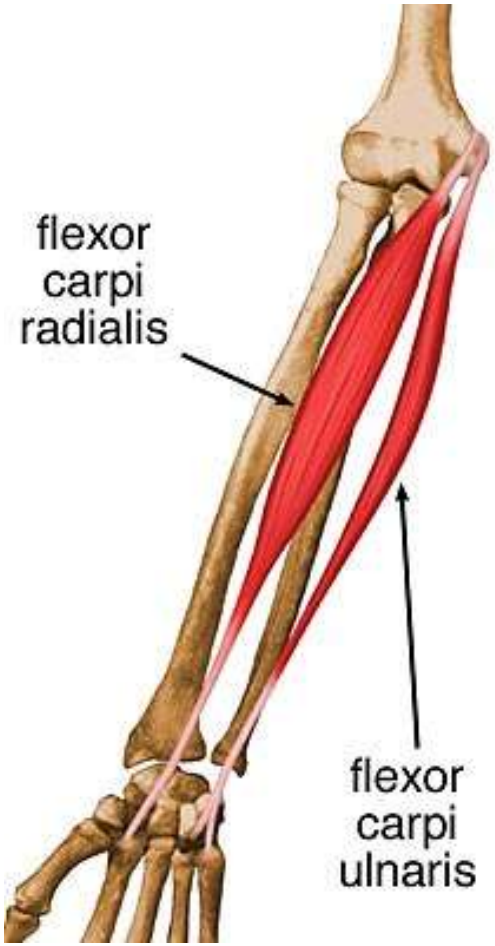
Flexion and adduction at the wrist.

Innervation

Ulnar nerve.

Muscle of Forearm

Flexi Carpi Ulnaris



Muscle of Forearm

Palmaris Longus

This muscle is absent in about 15% of the population.

Dissection Tip: Just distal to the wrist, if you reflect back the palmaris longus, you will find the median nerve immediately underneath it

Attachments

Originates from the medial epicondyle, attaches to the flexor retinaculum of the wrist.

Actions

Flexion at the wrist.

Innervation

Median nerve.

Muscle of Forearm

Palmaris Longus

Muscle of Anterior Forearm

Flexor Carpi Radialis

Attachments

Originates from the medial epicondyle, attaches to the base of metacarpals II and III.

Actions

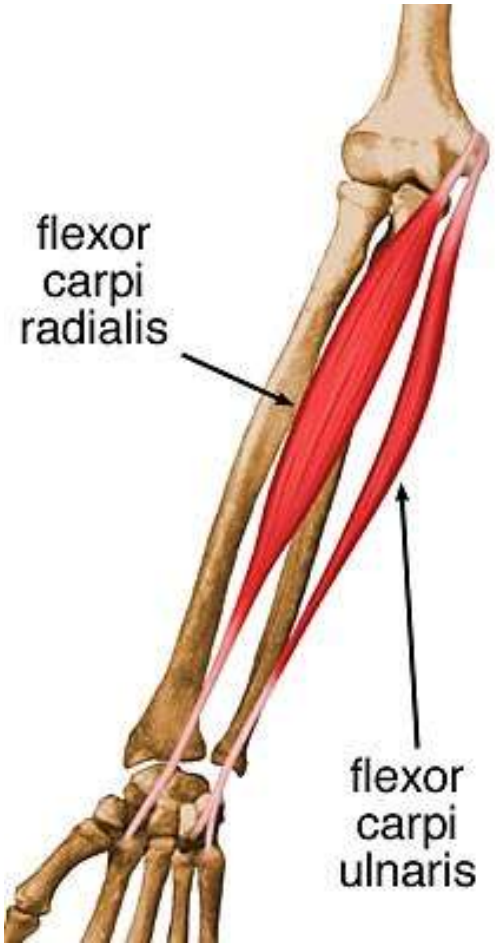
Flexion and abduction at the wrist.

Innervation

Median nerve.

Muscle of Forearm

Flexor Carpi Radialis



Muscle of Forearm

Pronator Teres

The lateral border of the pronator teres forms the medial border of the cubital fossa, an anatomical triangle located over the elbow.

Attachments

It has two origins, one from the medial epicondyle, and the other from the coronoid process of the ulna. It attaches laterally to the mid-shaft of the radius.

Actions

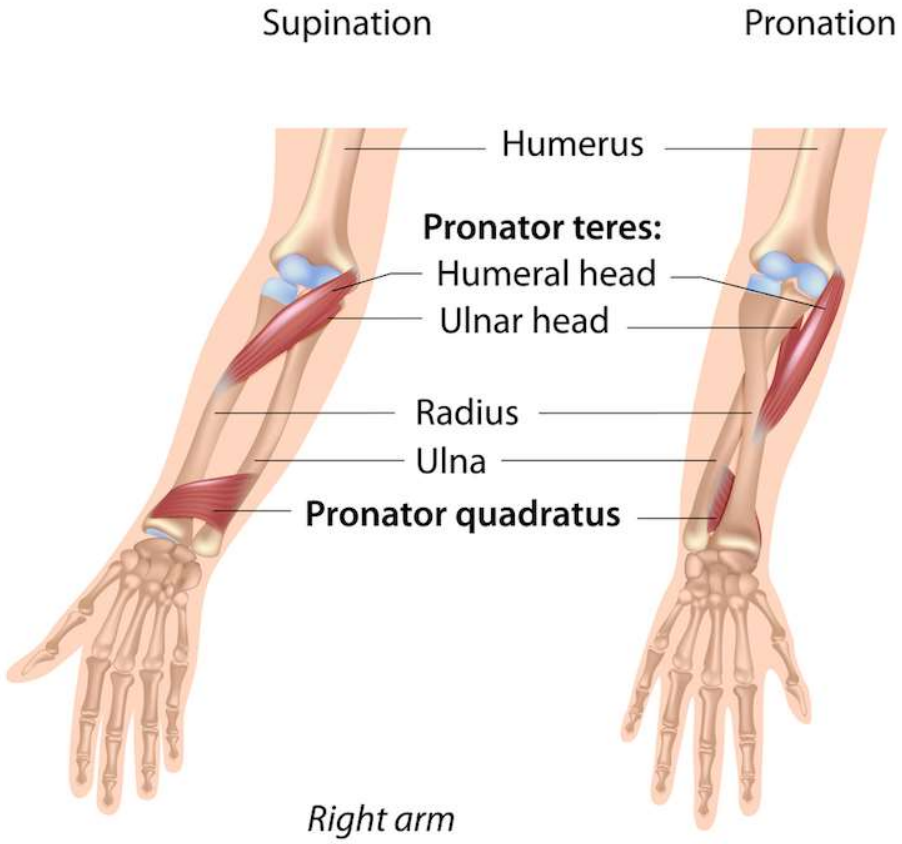
Pronation of the forearm.

Innervation

Median nerve.

Muscle of Forearm

Pronator Teres



Muscle of Forearm

Intermediate Compartment

- Flexor Digitorum Superficialis

Muscle of Forearm

Flexor Digitorum Superficialis

The muscle is a good anatomical landmark in the forearm – the median nerve and **ulnar artery** pass between its two heads, and then travel posteriorly.

Attachments

It has two heads – one originates from the medial epicondyle of the humerus, the other from the radius. The muscle splits into four tendons at the wrist, which travel through the carpal tunnel, and attaches to the middle phalanges of the four fingers.

Actions

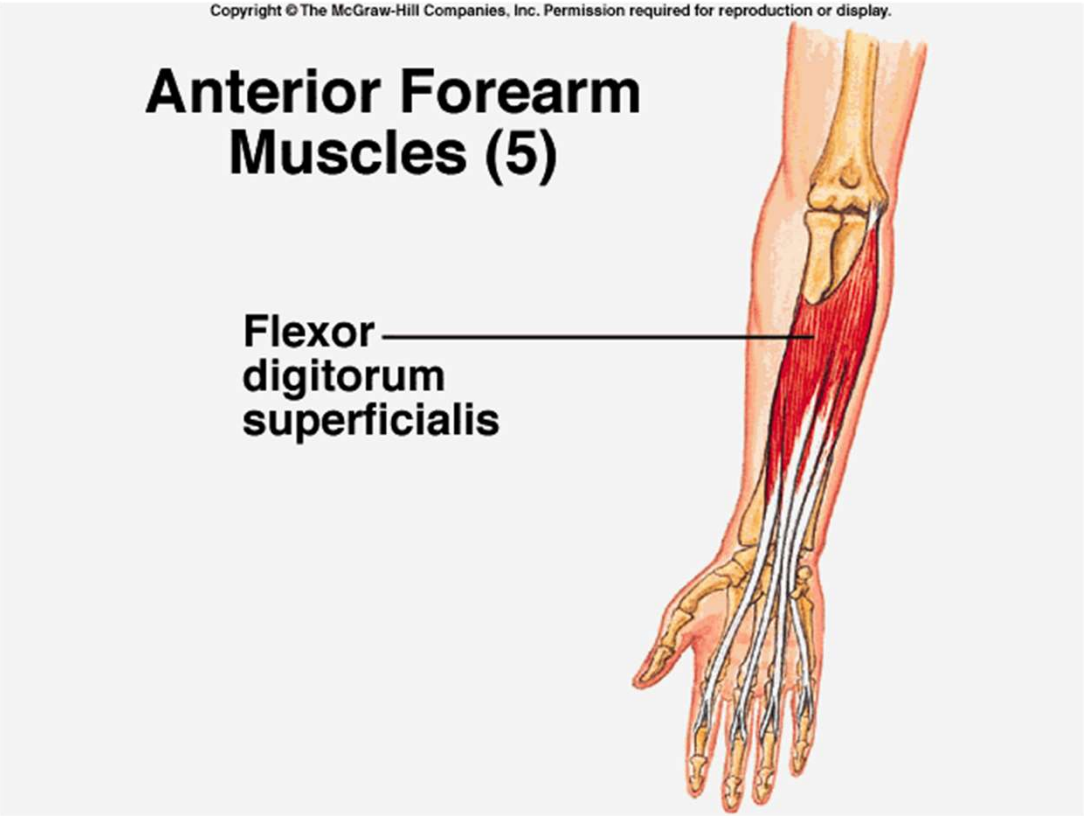
Flexes the metacarpophalangeal joints and proximal interphalangeal joints at the 4 fingers, and flexes at the wrist.

Innervation

Median nerve.

Muscle of Forearm

Flexor Digitorum Superficialis



Muscle of Anterior Forearm

Deep Compartment

- Flexor Digitorum Profundus
- Flexor Pollicis Longus
- Pronator Qaudratus

Muscle of Anterior Forearm

Flexor Digitorum Profundus

Attachments

Originates from the ulna and associated interosseous membrane. At the wrist, it splits into four tendons, that pass through the carpal tunnel and attach to the distal phalanges of the four fingers.

Actions

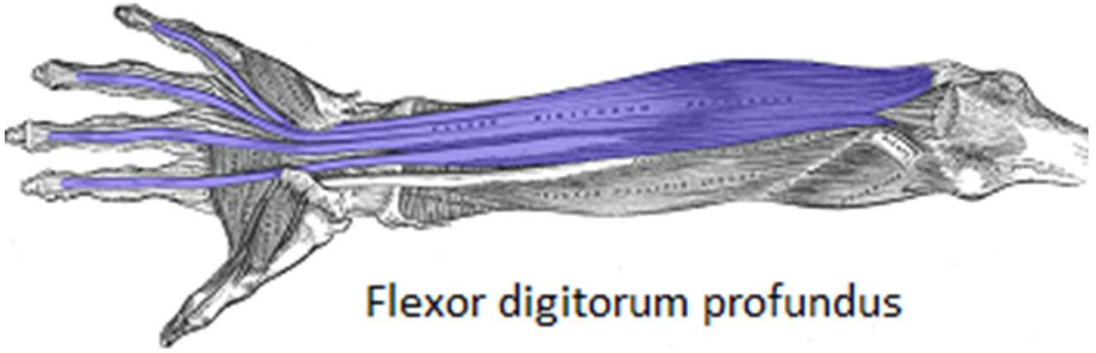
It is the only muscle that can flex the distal interphalangeal joints of the fingers. It also flexes at metacarpophalangeal joints and at the wrist.

Innervation

The medial half (acts on the little and ring fingers) is innervated by the ulnar nerve. The lateral half (acts on the middle and index fingers) is innervated by the anterior interosseous branch of the median nerve.

Muscle of Anterior Forearm

Flexor Digitorum Profundus

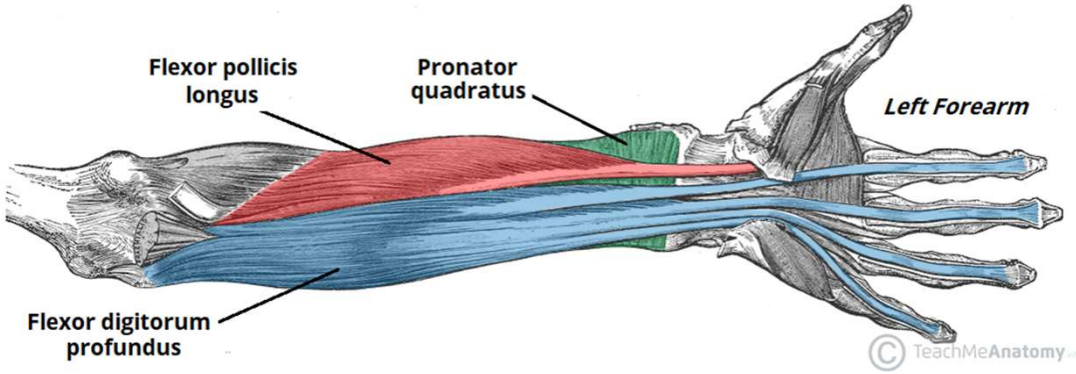


Flexor digitorum profundus

Palm side of forearm/hand

Muscle of Forearm

Deep Muscle



Muscle of Forearm

Flexor Pollicis Longus

This muscle lies laterally to the FDP.

Attachments

Originates from the anterior surface of the radius, and surrounding interosseous membrane. Attaches to the base of the distal phalanx of the thumb.

Actions

Flexes the interphalangeal joint and metacarpophalangeal joint of the thumb.

Innervation

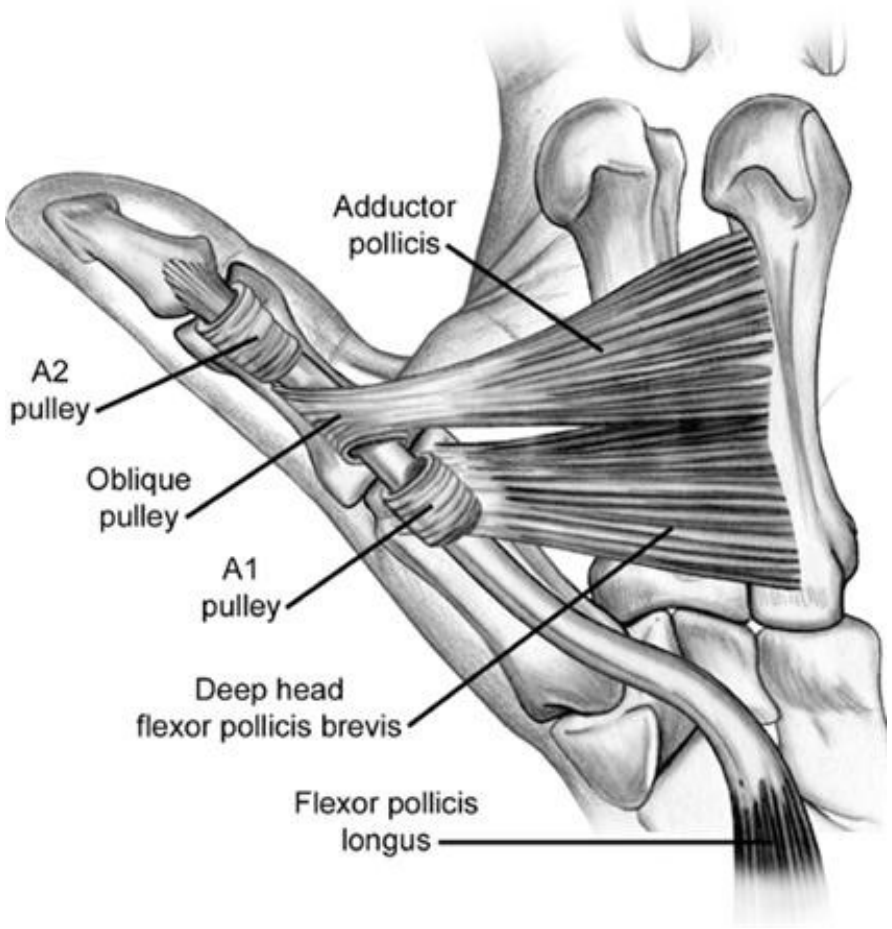
Median nerve (anterior interosseous branch).

Muscle of Forearm

Flexor Pollicis Longus

Muscle of Anterior Forearm

Flexor Pollicis Longus



Muscle of Anterior Forearm

Pronator Quadratus

A square shaped muscle, found deep to the tendons of the FDP and FPL.

Attachments

Originates from the anterior surface of the ulna, and attaches to the anterior surface of the radius.

Actions

Pronates the forearm.

Innervation

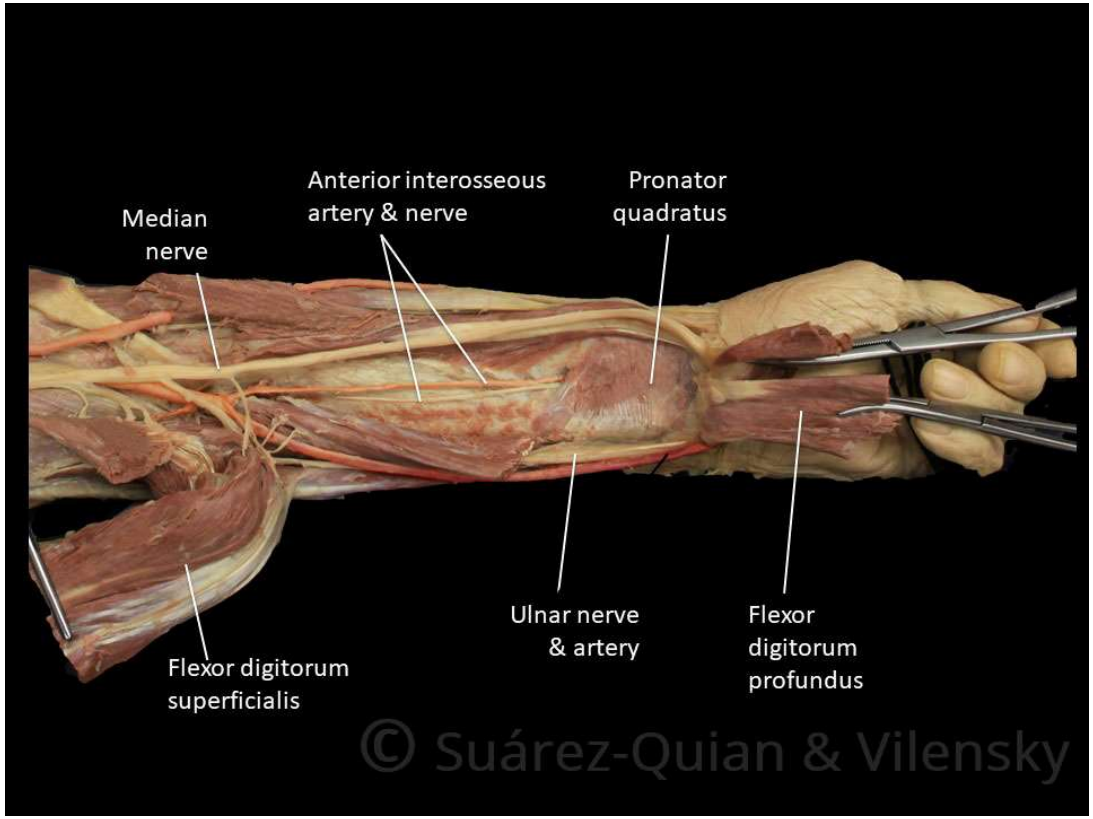
Median nerve (anterior interosseous branch).

Muscle of Forearm

Pronator Quadratus

Muscle of anterior forearm

Pronator Quadratus



Muscle of Anterior Forearm

Clinical Relevance

Medial Epicondylitis

‘Golfer’s Elbow’

Upper Limb

Muscle Of Forearm

Posterior Compartment

1 Superficial Muscles

- 1.1 Clinical Relevance: Lateral Epicondylitis

2 Deep Muscles

3 Clinical Relevance: Wrist Drop

Muscle of Posterior Forearm

Superficial

The superficial layer of the posterior forearm contains seven muscles. Four of these muscles –

- Extensor Carpi Radialis Brevis,
- Extensor Digitorum,
- Extensor Carpi Ulnaris and
- Extensor Digiti Minimi

share a common tendinous origin at the lateral epicondyle.

Muscle of Posterior Forearm

Brachioradialis

The brachioradialis is a paradoxical muscle. Its origin and innervation are characteristic of an extensor muscle, but it is actually a flexor at the elbow.

The muscle is most visible when the forearm is half pronated, and flexing at the elbow against resistance.

In the distal forearm, the radial artery and nerve are sandwiched between the brachioradialis and the deep flexor muscles.

Attachments

Originates from the proximal aspect of the lateral supracondylar ridge of humerus, and attaches to the distal end of the radius, just before the radial styloid process.

Actions

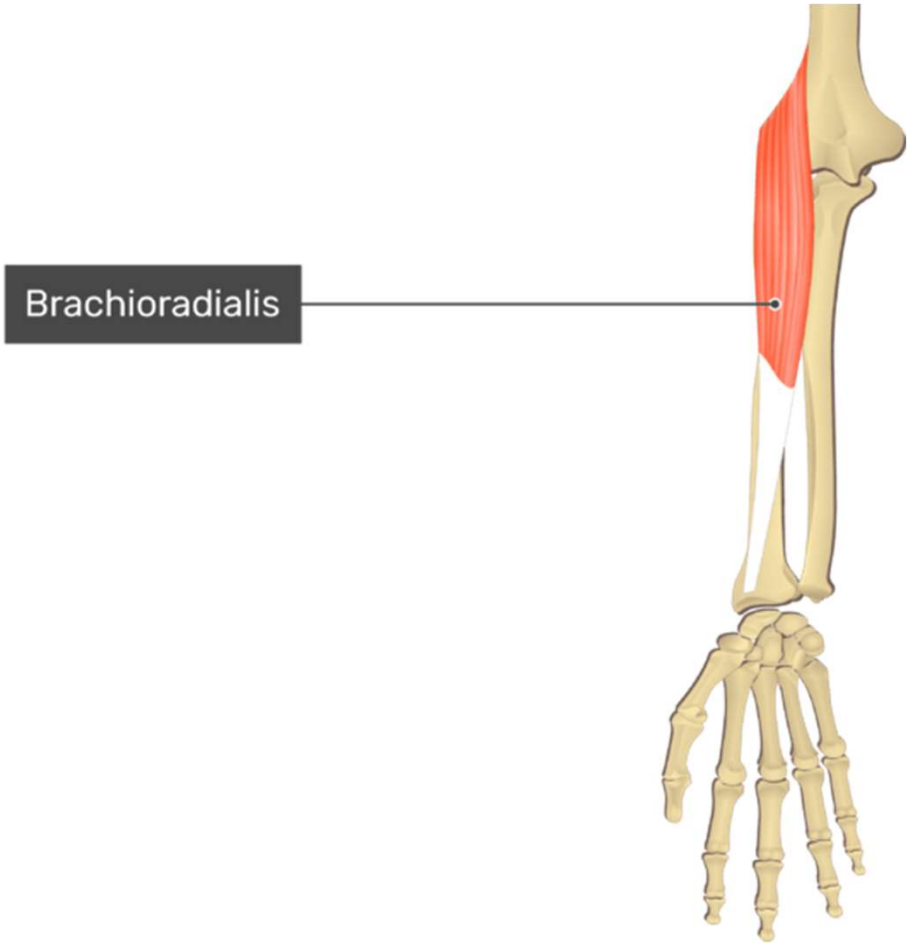
Flexes at the elbow.

Innervation

Radial nerve.

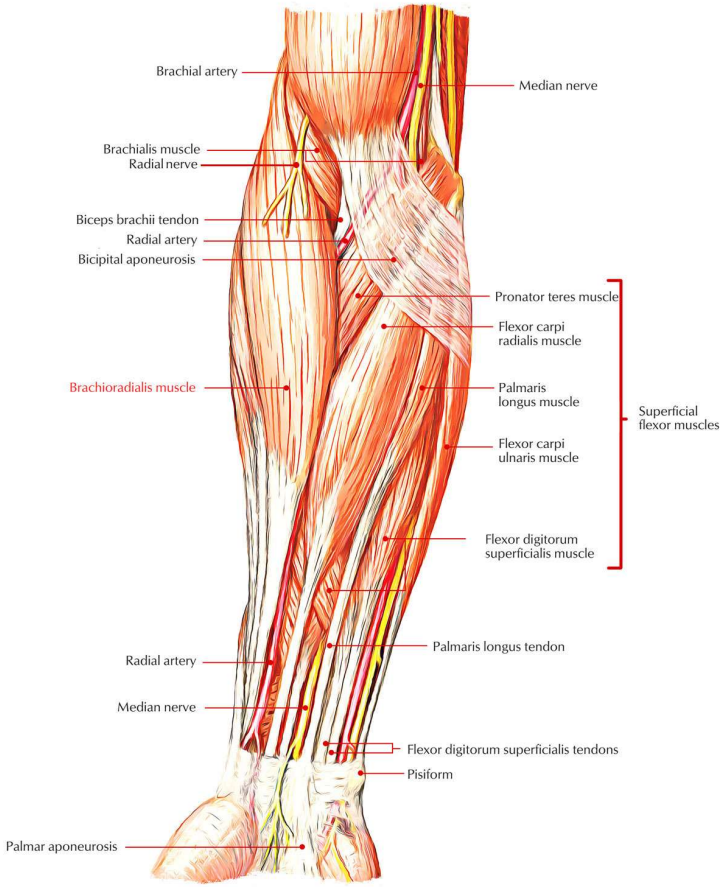
Muscle of posterior forearm

Brachioradialis



Muscle of anterior forearm

Brachioradialis



Muscle of Posterior Forearm

Extensor Carpi Radialis Longus and Brevis

The extensor carpi radialis muscles are situated on the lateral aspect of the posterior forearm. Due to their position, they are able to produce abduction as well as extension at the wrist.

Attachments

The ECRL originates from the supracondylar ridge, while the ECRB originates from the lateral epicondyle. Their tendons attach to metacarpal bones II and III.

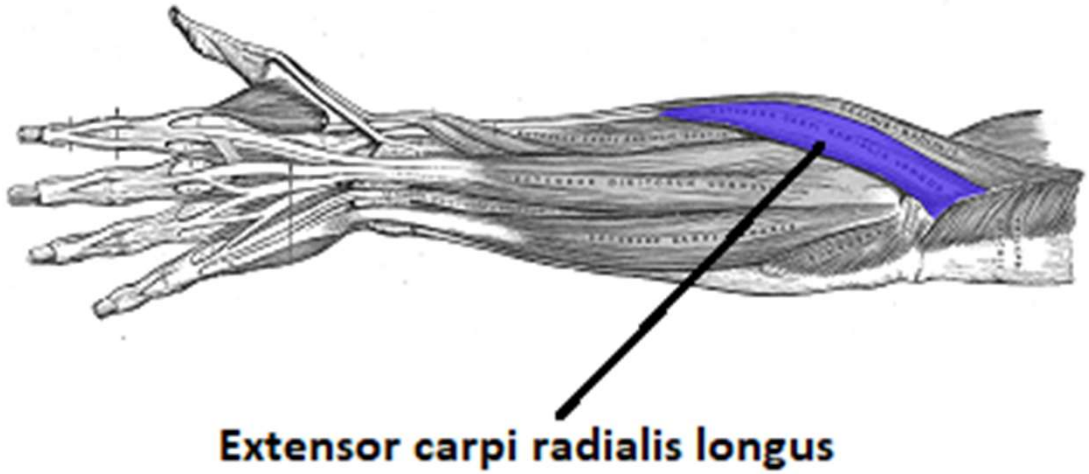
Actions

Extends and abducts the wrist.

Innervation

Radial nerve.

Extensor Carpi Radialis Longus



Muscle of posterior forearm

Extensor Digitorum

The extensor digitorum is the main extensor of the fingers. To test the function of the muscle, the forearm is pronated, and the fingers extended against resistance.

Attachments

Originates from the lateral epicondyle. The tendon continues into in the distal part of the forearm, where it splits into four, and inserts into the extensor hood of each finger.

Actions

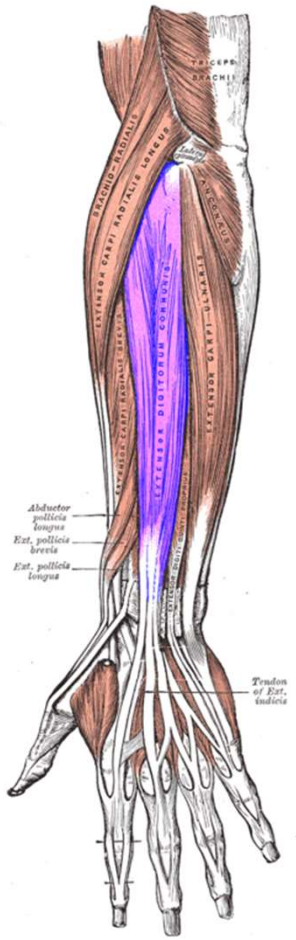
Extends medial four fingers at the MCP and IP joints.

Innervation

Radial nerve (deep branch).

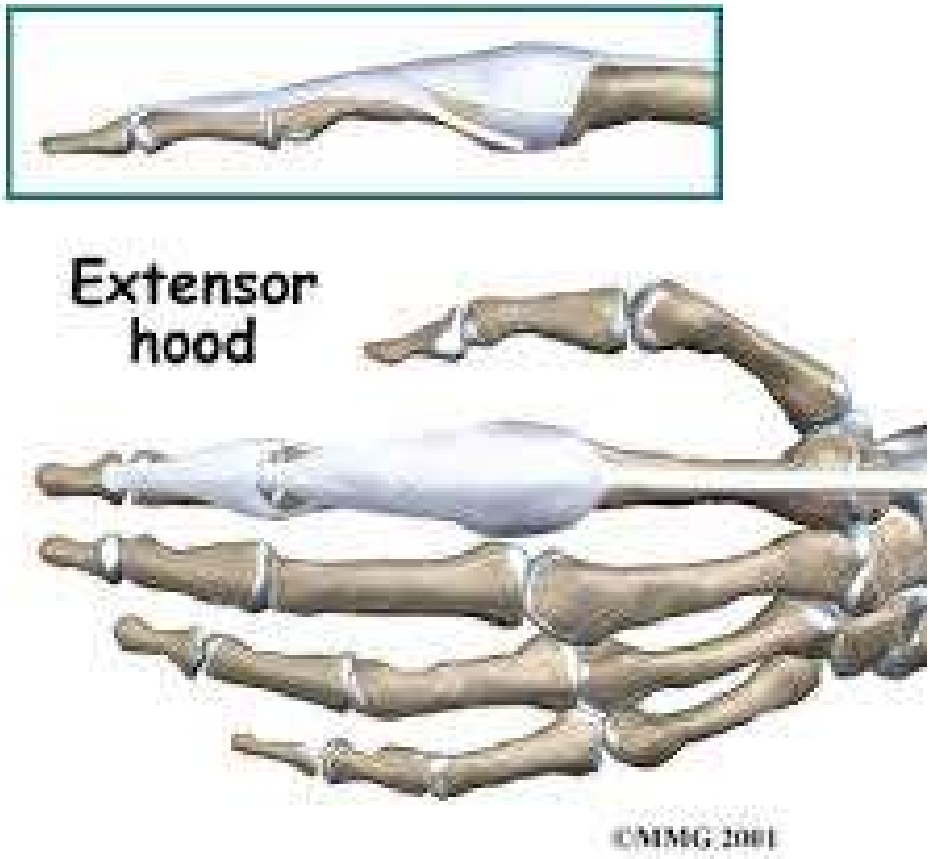
Muscle Of Posterior Forearm

Extensor Digitorum



Muscle of Posterior forearm

Extensor Digitorum



Muscle of Posterior forearm

Extensor Digiti Minimi

The Extensor Digiti Minimi is thought to originate from the extensor digitorum muscle. In some people, these two muscles are fused together. Anatomically, the Extensor Digiti Minimi lies medially to the extensor digitorum.

Attachments

Originates from the lateral epicondyle of the humerus. It attaches, with the extensor digitorum tendon, into the extensor hood of the little finger.

Actions

Extends the little finger, and contributes to extension at the wrist.

Innervation

Radial nerve (deep branch).

Muscle of Posterior Forearm

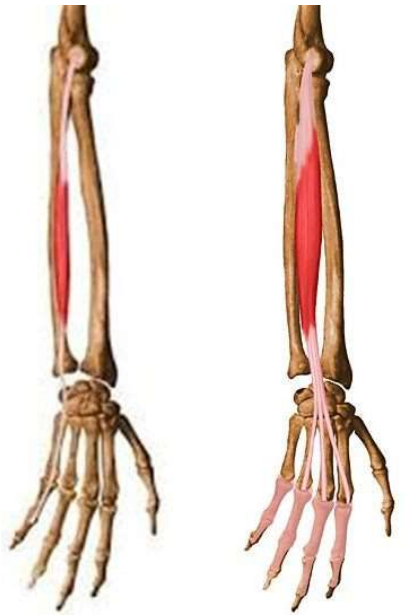
Extensor Digiti Minimi

Extensor digiti minimi

N: Posterior interosseous nerve (C7-C8)
O: Lateral epicondyle
I: Extensor tendons of 5th finger

Extensor digitorum

N: Posterior interosseous nerve (C7-C8)
O: Lateral epicondyle
I: Extensor tendons of medial 4 fingers at distal digits



Muscle of posterior forearm

Extensor Carpi Ulnaris

The Extensor Carpi Ulnaris is located on the medial aspect of the posterior forearm. Due to its position, it is able to produce adduction as well as extension at the wrist.

Attachments

Originates from the lateral epicondyle of the humerus, and attaches to the base of metacarpal V.

Actions

Extension and adduction of wrist.

Innervation

Radial nerve (deep branch

Muscle of Posterior forearm

Anconeus

The Anconeus is situated medially and superiorly in the extensor compartment of the forearm. It is blended with the fibres of the triceps brachii, and the two muscles can be indistinguishable.

Attachments

Originates from the lateral epicondyle, and attaches to the posterior and lateral part of the olecranon.

Actions

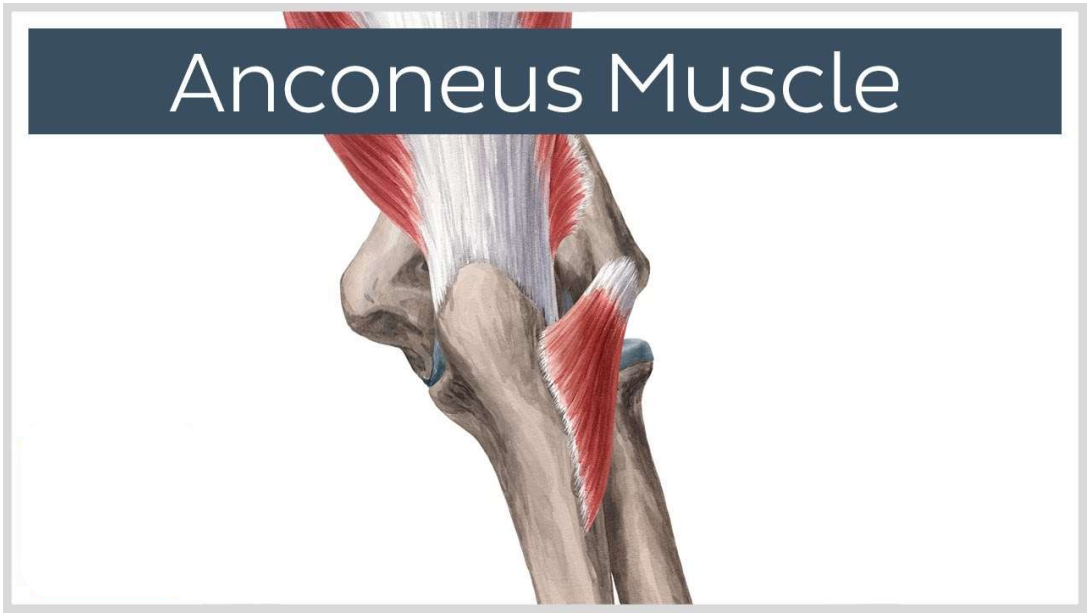
Extends and stabilises the elbow joint. Abducts the ulna during pronation of the forearm.

Innervation

Radial nerve

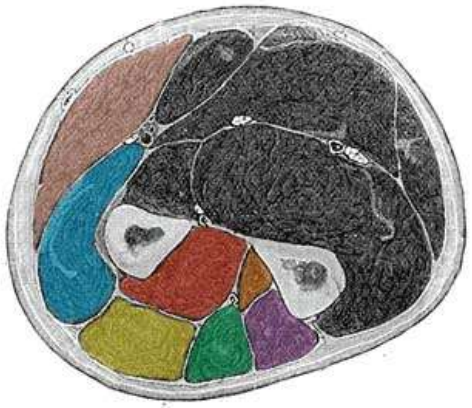
Muscle of Posterior forearm

Anconeus



Muscle of posterior forearm

Extensor Group



Muscle of posterior forearm

Deep Muscle

- Supinator
- Abductor Pollicis Longus
- Extensor Pollicis Brevis
- Extensor Pollicis Longus
- Extensor Indicis Proprius

With the exception of the supinator, these muscles act on the thumb and the index finger

Muscle of posterior forearm

Supinator

The supinator lies in the floor of the cubital fossa. It has two heads, which the deep branch of the radial nerve passes between.

Attachments

It has two heads of origin. One originates from the lateral epicondyle of the humerus, the other from the posterior surface of the ulna. They insert together into the posterior surface of the radius.

Actions

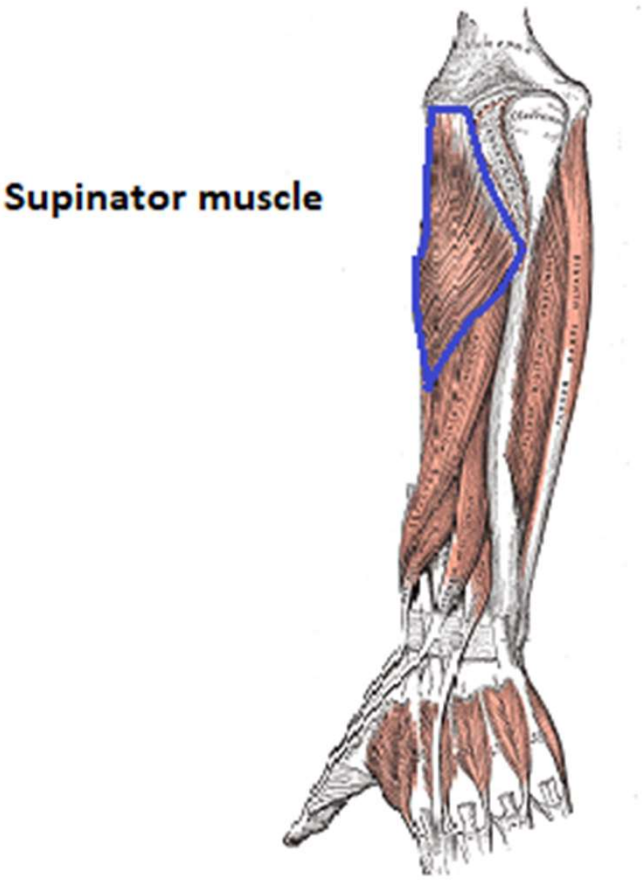
Supinates the forearm.

Innervation

Radial nerve (deep branch)

Muscle of posterior forearm

Supinartor



Muscle of posterior forearm

Abductor Pollicis Longus

The abductor pollicis longus is situated immediately distal to the supinator muscle. In the hand, its tendon contributes to the lateral border of the anatomical snuffbox.

Attachments

Originates from the interosseous membrane and the adjacent posterior surfaces of the radius and ulna. It attaches to the lateral side of the base of metacarpal I.

Actions

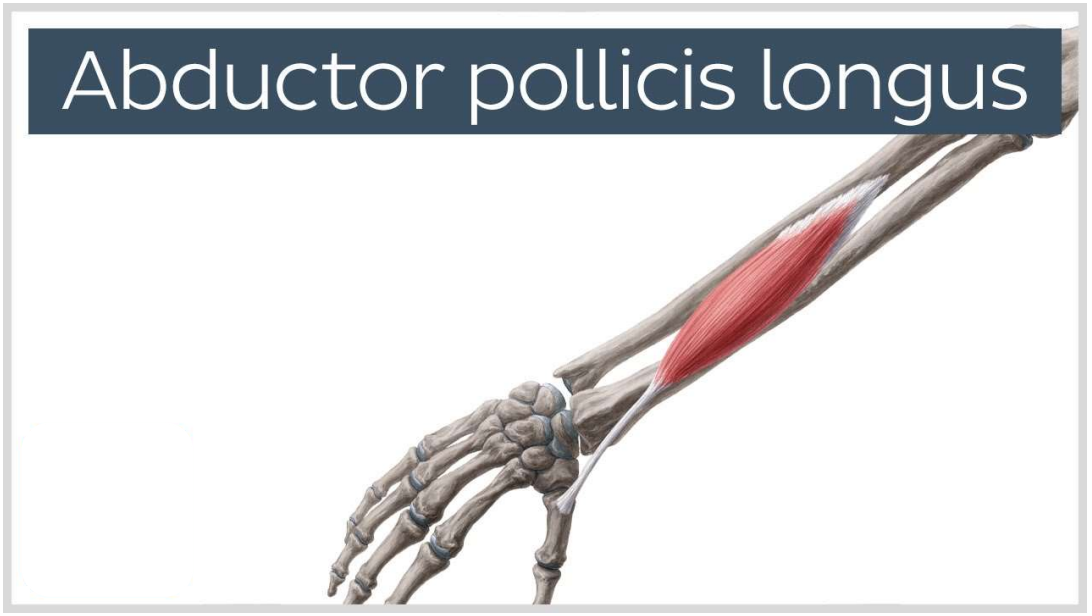
Abducts the thumb.

Innervation

Radial nerve (posterior interosseous branch).

Muscle of posterior forearm

Abductor Pollicis Longus



Muscle of posterior forearm

Extensor Pollicis Brevis

The extensor pollicis brevis can be found medially and deep to the abductor pollicis longus. In the hand, its tendon contributes to the lateral border of the anatomical snuffbox.

Attachments

Originates from the posterior surface of the radius and interosseous membrane. It attaches to the base of the proximal phalanx of the thumb.

Actions

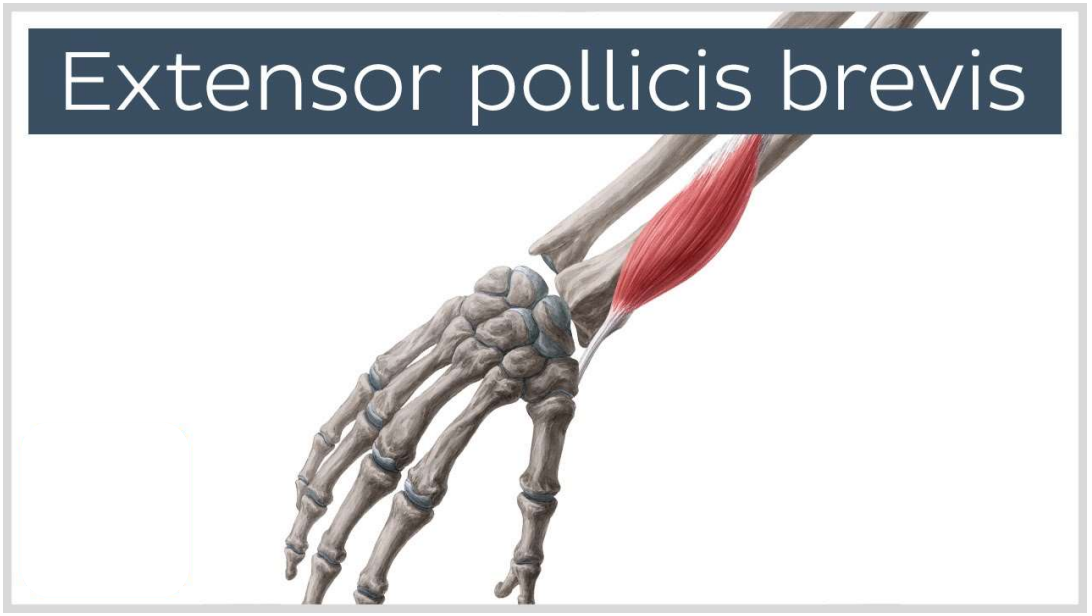
Extends at the metacarpophalangeal and carpometacarpal joints of the thumb.

Innervation

Radial nerve (posterior interosseous branch).

Muscle of Posterior Forearm

Abductor Pollicis Brevis



Muscle of posterior forearm

Extensor Pollicis Longus

The extensor pollicis longus muscle has a larger muscle belly than the EPB. Its tendon travels medially to the dorsal tubercle at the wrist, using the tubercle as a ‘pulley’ to increase the force exerted.

The tendon of the extensor pollicis longus forms the medial border of the anatomical snuffbox in the hand.

Attachments

Originates from the posterior surface of the ulna and interosseous membrane. It attaches to the distal phalanx of the thumb.

Actions

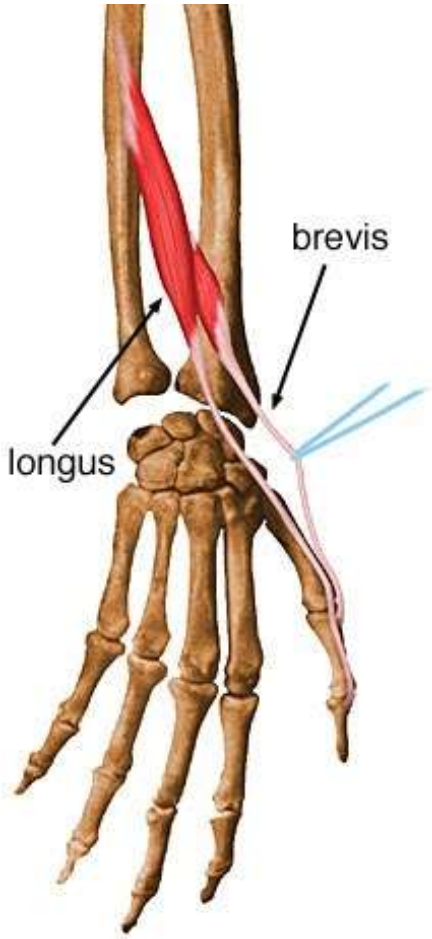
Extends all joints of the thumb: carpometacarpal, metacarpophalangeal and interphalangeal.

Innervation

Radial nerve (posterior interosseous branch)

Muscle of posterior forearm

Extensor Pollicis Longus



Muscle of Posterior forearm

Extensor Indicis Proprius

This muscle allows the index finger to be independent of the other fingers during extension.

Attachments

Originates from the posterior surface of the ulna and interosseous membrane, distal to the extensor pollicis longus. Attaches to the extensor hood of the index finger.

Actions

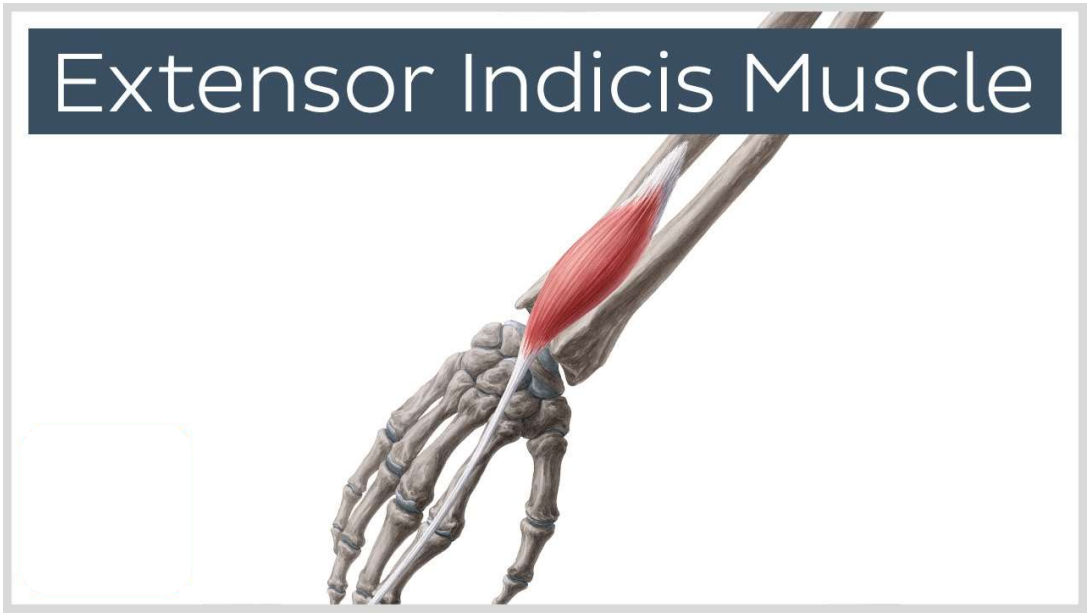
Extends the index finger.

Innervation

Radial nerve (posterior interosseous branch).

Muscle of posterior forearm

Extensor Indicis proprius



Muscle of Posterior Forearm

Clinical Relevance

Wrist drop is a sign of **radial nerve** injury that has occurred proximal to the elbow.

There are two common characteristic sites of damage:

- **Axilla** – injured via humeral dislocations or fractures of the proximal humerus.
- **Radial groove of the humerus** – injured via a humeral shaft fracture.

The radial nerve innervates all muscles in the extensor compartment of the forearm. In the event of a radial nerve lesion, these muscles are **paralysed**. The muscles that flex the wrist are innervated by the **median nerve**, and thus are unaffected. The tone of the flexor muscles produces unopposed flexion at the wrist joint – wrist drop

Muscle of Posterior Forearm

Clinical relevance

Wrist Drop

Upper Limb Muscle

Muscle of Hand

Muscles of Hand

Muscles acting on the hand can be divided into two groups: Extrinsic and Intrinsic muscles.

- The **extrinsic muscles** are located in the anterior and posterior compartments of the forearm. They control crude movements and produce a forceful grip.
- The **intrinsic muscles** of the hand are located within the hand itself. They are responsible for the fine motor functions of the hand.

Muscles of Hand

1 Thenar Muscles

2 Hypothenar Muscles

3 Lumbricals

4 Interossei

5 Adductor Pollicis

6 Palamaris Brevis

Muscle of Hand

Thenar Muscles

The thenar muscles are three short muscles located at the base of the thumb. The muscle bellies produce a bulge, known as the **thenar eminence**

The **Median nerve** innervates all the thenar muscles

- Opponens pollicis
- Abductor pollicis Brevis
- Flexor pollicis Brevis

Muscles of hand

Opponens Pollicis

The Opponens pollicis is the largest of the thenar muscles, and lies underneath the other two.

Attachments

Originates from the tubercle of the Trapezium, and the associated flexor retinaculum. It inserts into the lateral margin of the metacarpal of the thumb (i.e. the first metacarpal).

Actions

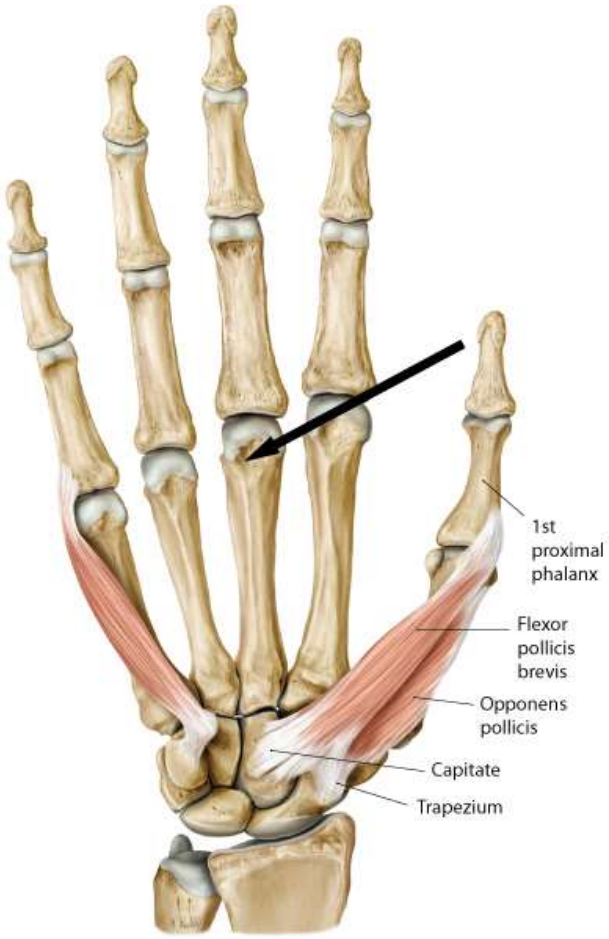
Opposes the thumb, by medially rotating and flexing the metacarpal on the trapezium.

Innervation

Median nerve.

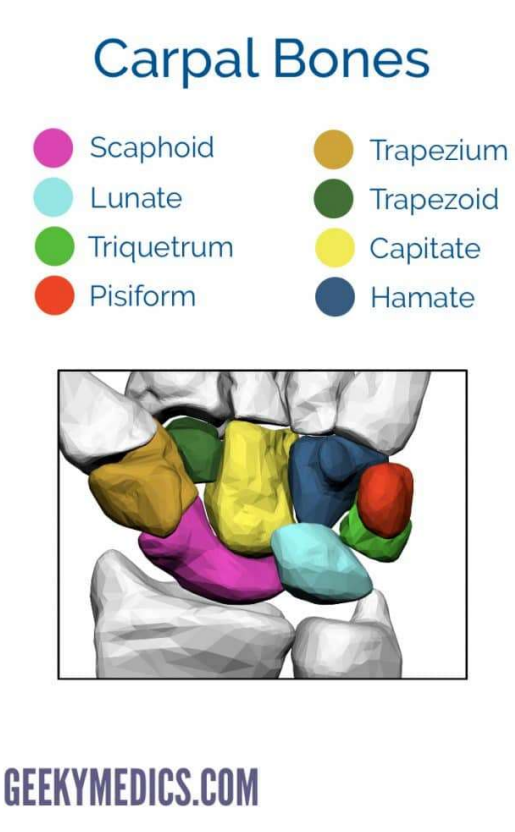
Muscles of Hand

Opponens Pollicis



Muscles of Hand

Carpel Bones



Muscles of Hand

Abductor Pollicis Brevis

This muscle is found anteriorly to the Opponens pollicis and proximal to the flexor pollicis brevis.

Attachments

Originates from the Tubercles of the Scaphoid and trapezium, and from the associated flexor retinaculum. Attaches to lateral side of proximal phalanx of the thumb.

Actions

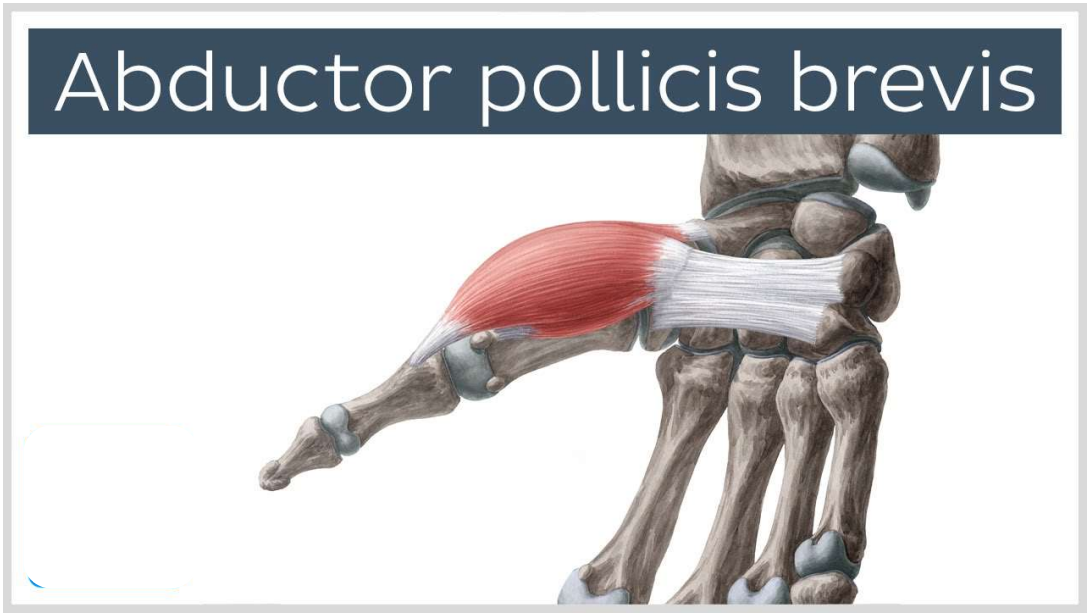
Abducts the thumb.

Innervation

Median nerve.

Muscles of Hand

Abductor Pollicis Brevis



Muscles of the Hand

Flexor Pollicis Brevis

The most distal of the thenar muscles.

Attachments: Originates from the tubercle of the trapezium and from the associated flexor retinaculum. Attaches to the base of the proximal phalanx of the thumb.

Actions: Flexes the metacarpophalangeal (MCP) joint of the thumb.

Innervation:

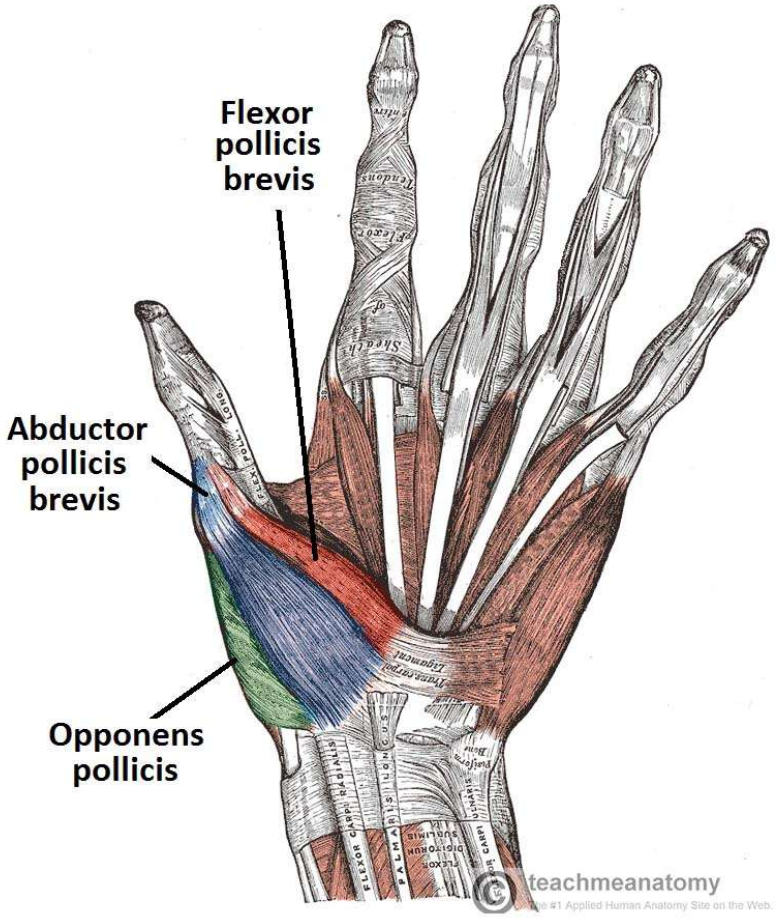
Median nerve. The deep head is innervated by the deep branch of the Ulnar nerve.

Muscles of Hand

Flexor Pollicis Brevis

Muscles of Hand

Thenar Muscles



Muscles of Hand

Hypothenar Muscles

Opponens Digit Minimi

Abductor Digit Minimi

Flexor Digit Minimi Brevis

Muscles of the Hand

Hypothenar Muscles

The hypothenar muscles produce the **hypothenar eminence** – a muscular protrusion on the medial side of the palm, at the base of the little finger. These muscles are similar to the thenar muscles in both name and organisation.

The Ulnar nerve innervates the muscles of the hypothenar eminence

Muscles of the Hand

Opponens Digiti Minimi

The Opponens Digit Minimi lies deep to the other hypothenar muscles.

Attachments

Originates from the Hook of Hamate and associated flexor retinaculum, inserts into the medial margin of metacarpal V.

Actions

It rotates the metacarpal of the little finger towards the palm, producing opposition.

Innervation

Ulnar nerve.

Muscles of the Hand

Opponenes Digit Minimi

Muscles of Hand

Abductor Digiti Minimi

The most superficial of the hypothenar muscles.

Attachments

Originates from the Pisiform and the tendon of the Flexor Carpi Ulnaris. It attaches to the base of the proximal phalanx of the little finger.

Actions

Abducts the little finger.

Innervation

Ulnar nerve.

Muscles of Hand

Abductor Digiti Minimi

Muscles of the Hand

Flexor Digiti Minimi Brevis

This muscles lies laterally to the Abductor Digiti Minimi.

Attachments

Originates from the hook of hamate and adjacent flexor retinaculum, and inserts into the base of the proximal phalanx of the little finger.

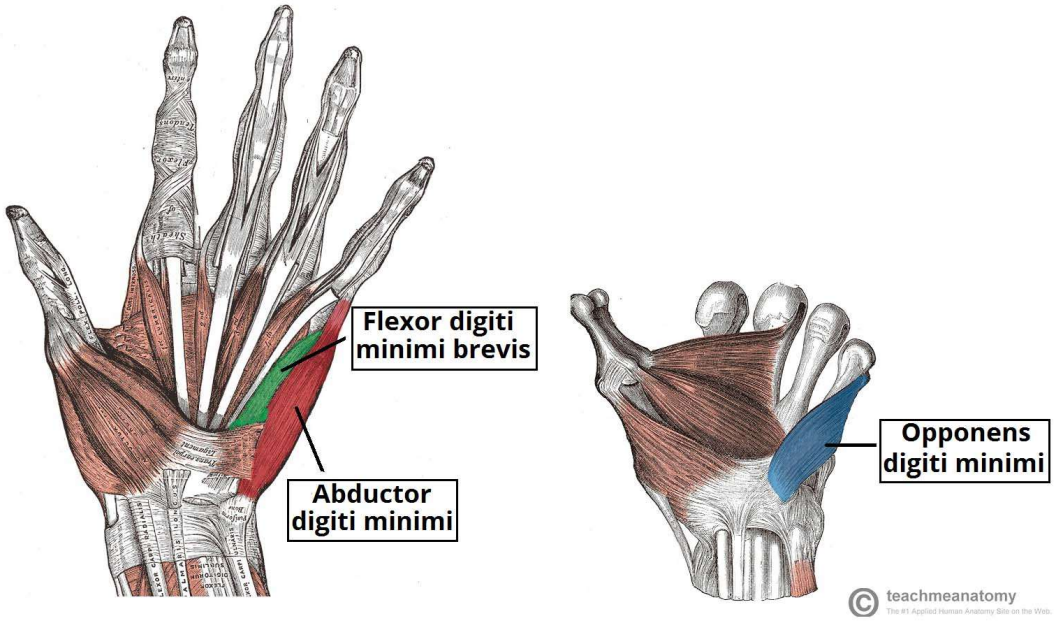
Actions

Flexes the MCP joint of the little finger.

Innervation

Ulnar nerve.

Hypothenar Muscles



Muscles of Hand

Lumbricals

- These are four lumbricals in the hand, each associated with a finger. They are very crucial to finger movement, linking the extensor tendons to the flexor tendons.
- Denerveration of these muscles is the basis for the ulnar claw and hand of benediction.

Muscles of Hand

Lumbricles

Attachments

Each lumbrical originates from a tendon of the Flexor Digitorum Profundus. They pass dorsally and laterally around each finger, and inserts into the extensor hood.

Actions

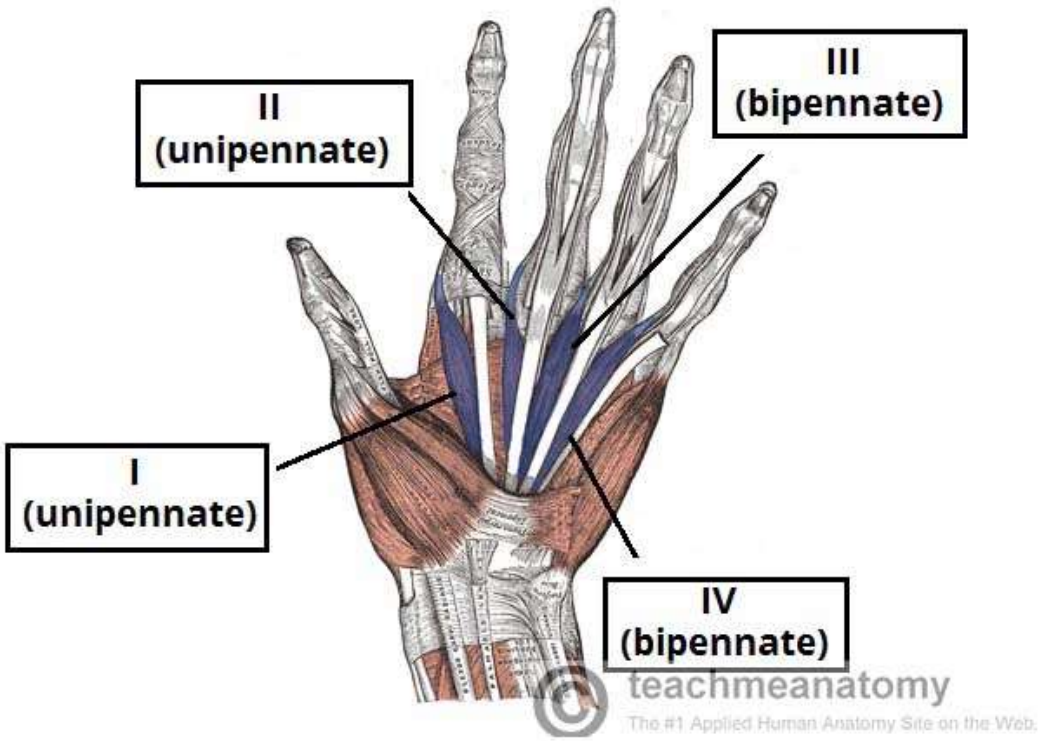
The flex at the MCP joint, and extend at the interphalangeal (IP) joints of each finger.

Innervation

The lateral two lumbricals (of the index and middle fingers) are innervated by the Median nerve. The medial two lumbricals (of the little and ring fingers) are innervated by the Ulnar nerve.

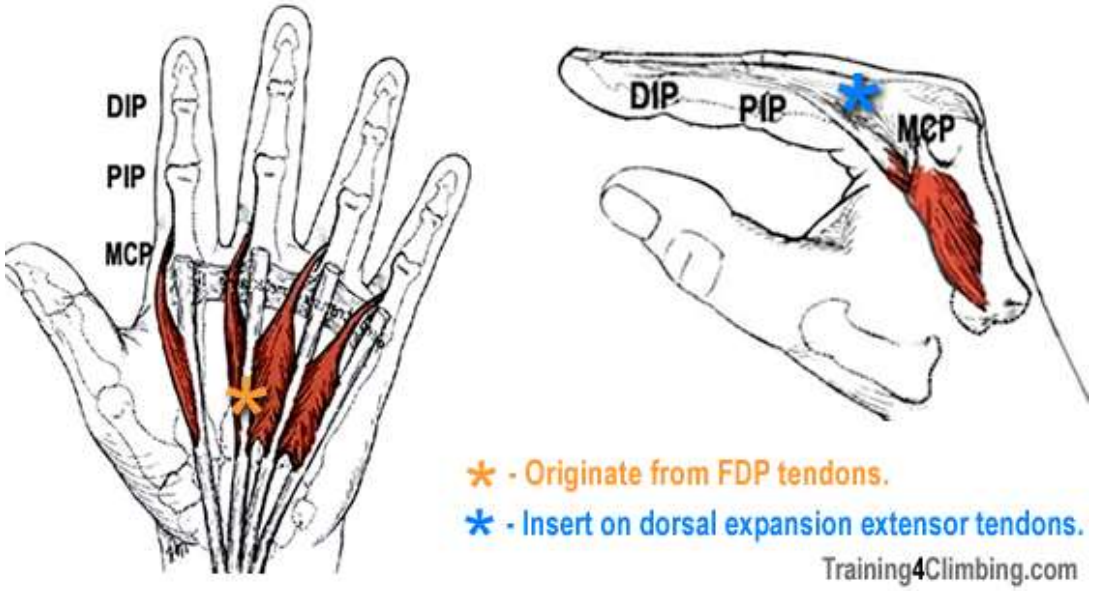
Muscles of Hand

Lumbricals



Muscles of Hand

Lumbricles



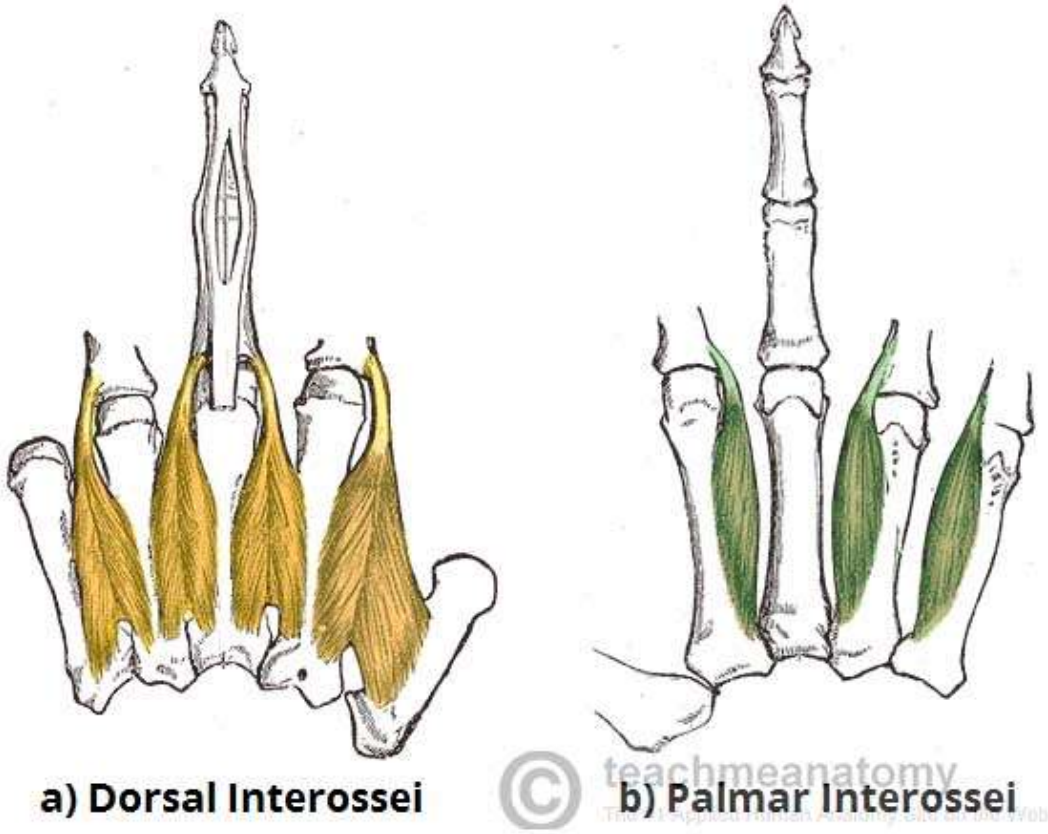
Muscles of the Hand

Interossei

- The interossei muscles are located between the metacarpals. They can be divided into two groups: the dorsal and palmar interossei.
- In addition to their actions of abduction (dorsal interossei) and adduction (palmar interossei) of the fingers, the interossei also assist the lumbricals in flexion and MCP joints and extension at the IP joints

Muscles of Hand

Interossei



Muscle of the Hand

Dorsal Interossei

The most superficial of all dorsal muscles, these can be palpated on the dorsum of the hand. There are four dorsal interossei muscles.

Attachments

Each interossei originates from the lateral and medial surfaces of the metacarpals. They attach into the extensor hood and proximal phalanx of each finger.

Actions

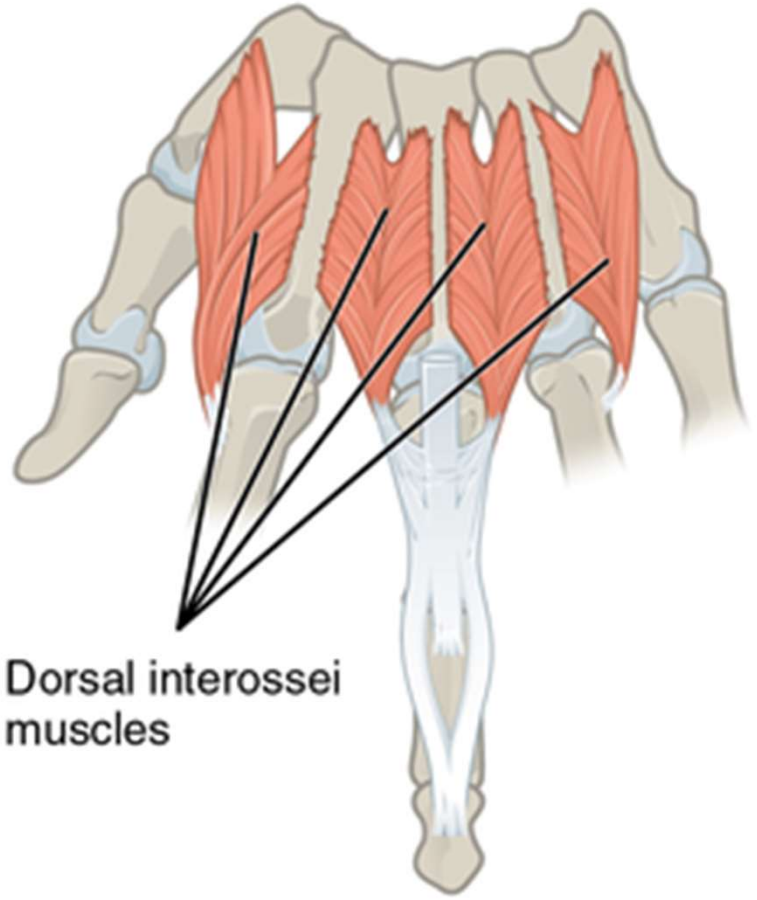
Abduct the fingers at the MCP joint.

Innervation

Ulnar nerve.

Muscles of hand

Dorsal Interossei



Muscles of the Hand

Palmar Interossei

These are located anteriorly on the hand. There are three palmar interossei muscles – although some texts report a fourth muscle at the base of the proximal phalanx of the thumb.

Attachments

Each interossei originates from a medial or lateral surface of a metacarpal, and attaches into the extensor hood and proximal phalanx of same finger.

Actions

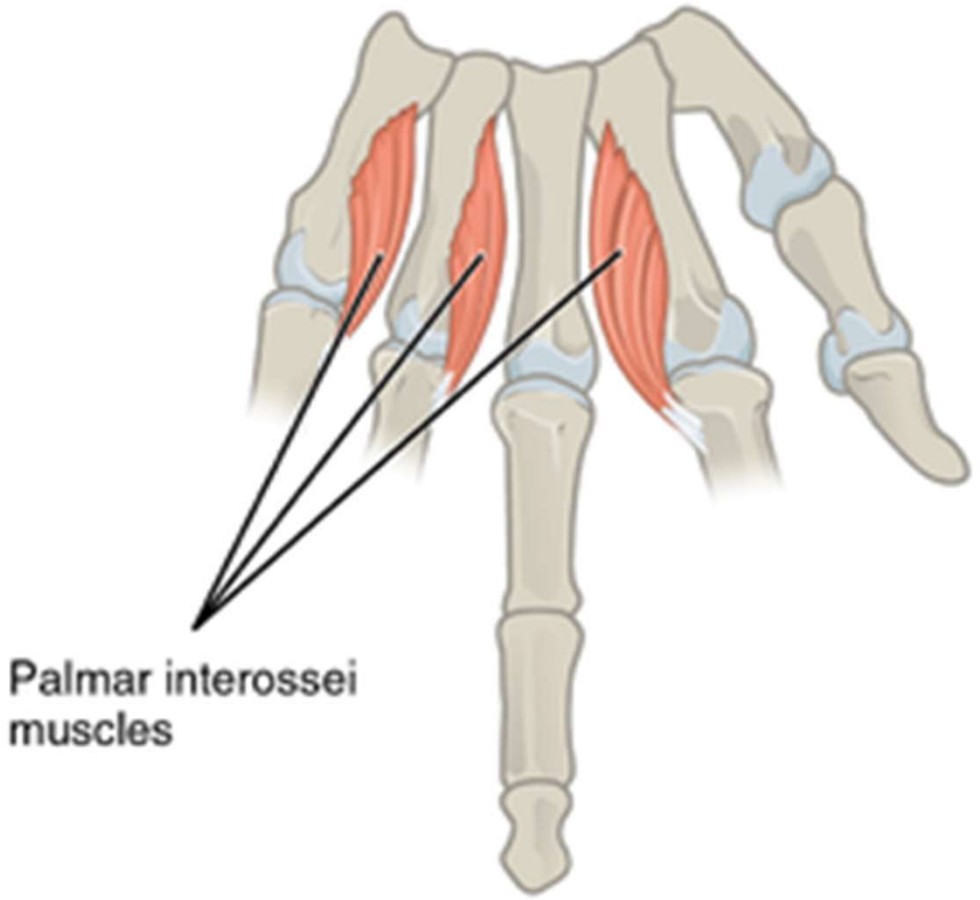
Adducts the fingers at the MCP joint.

Innervation

Ulnar nerve

Muscles of Hand

Palmer Interossei



Muscles of the Hand

Other Muscles in the Palm

Palmaris Brevis

Adductor Pollicis

Muscles of the Hand

Palmaris Brevis

This is a small, thin muscle, found very superficially in the subcutaneous tissue of the hypothenar eminence.

Attachments

Originates from the palmar aponeurosis and flexor retinaculum, attaches to the dermis of the skin on the medial margin of the hand.

Actions

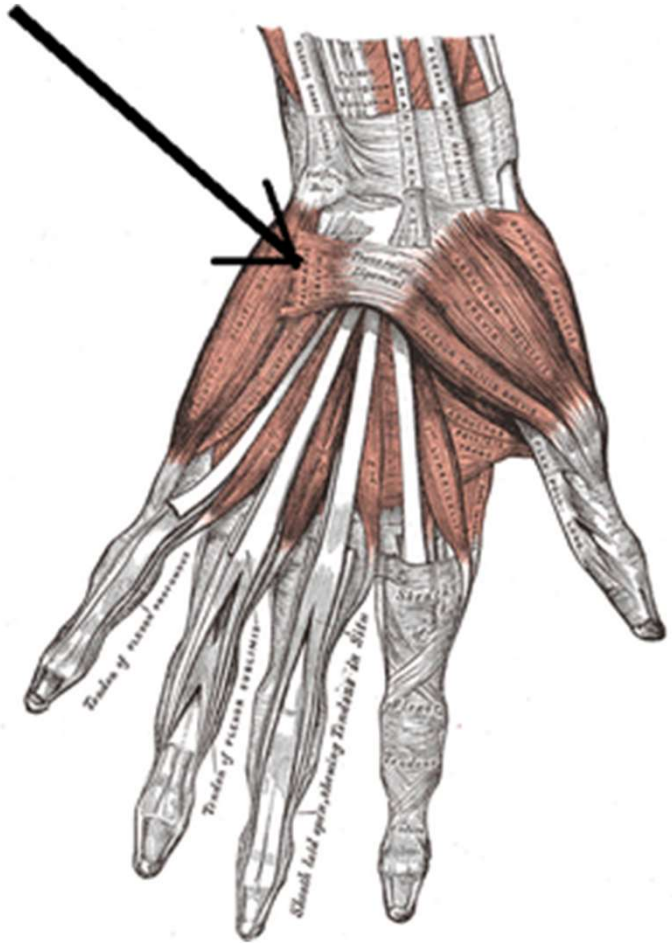
Wrinkles the skin of the hypothenar eminence and deepens the curvature of the hand, improving grip.

Innervation

Ulnar nerve

Muscles of Hand

Palmaris Brevis



Muscles of the Hand

Adductor Pollicis

This is large triangular muscle with two heads. The radial artery passes anteriorly through the space between the two heads, forming the deep palmar arch.

Attachments

One head originates from metacarpal III. The other head originates from the Capitate and adjacent areas of metacarpals II and III. Both attach into the base of the proximal phalanx of the thumb.

Actions

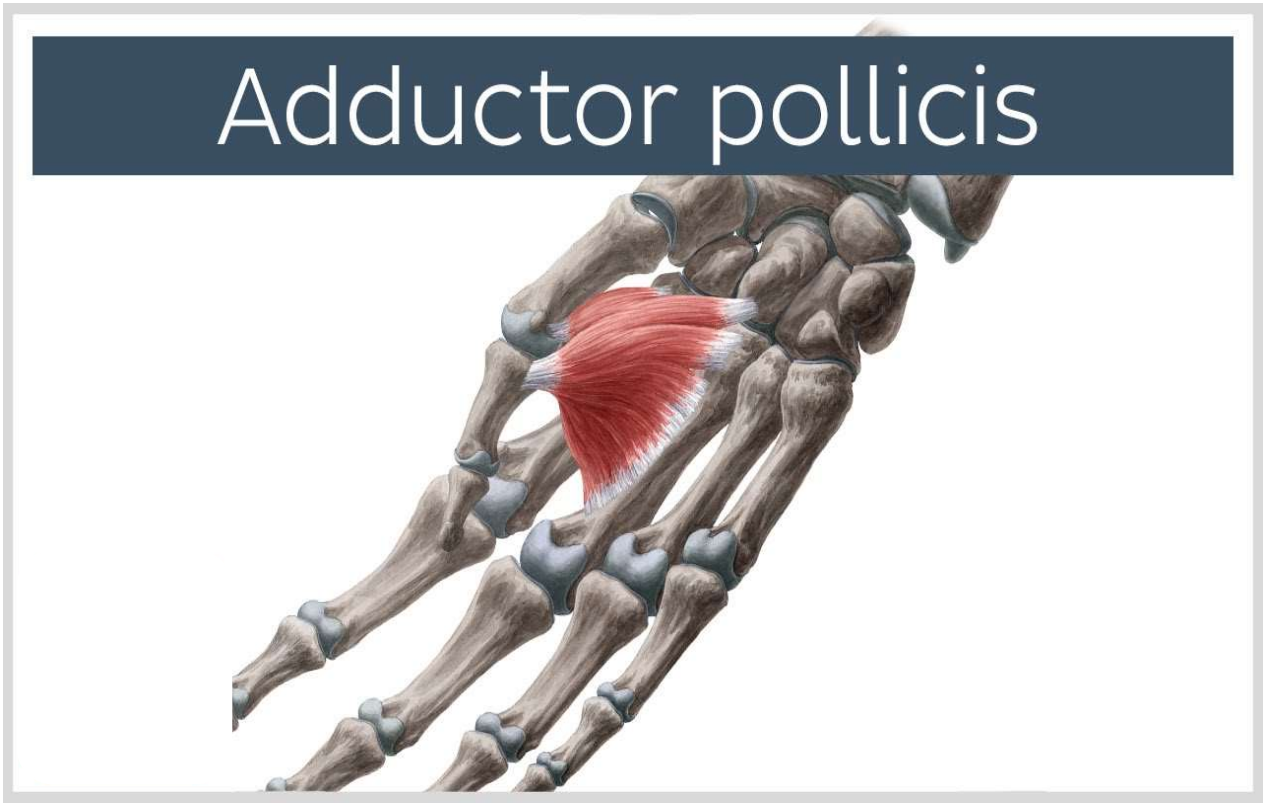
Adductor of the thumb.

Innervation

Ulnar nerve.

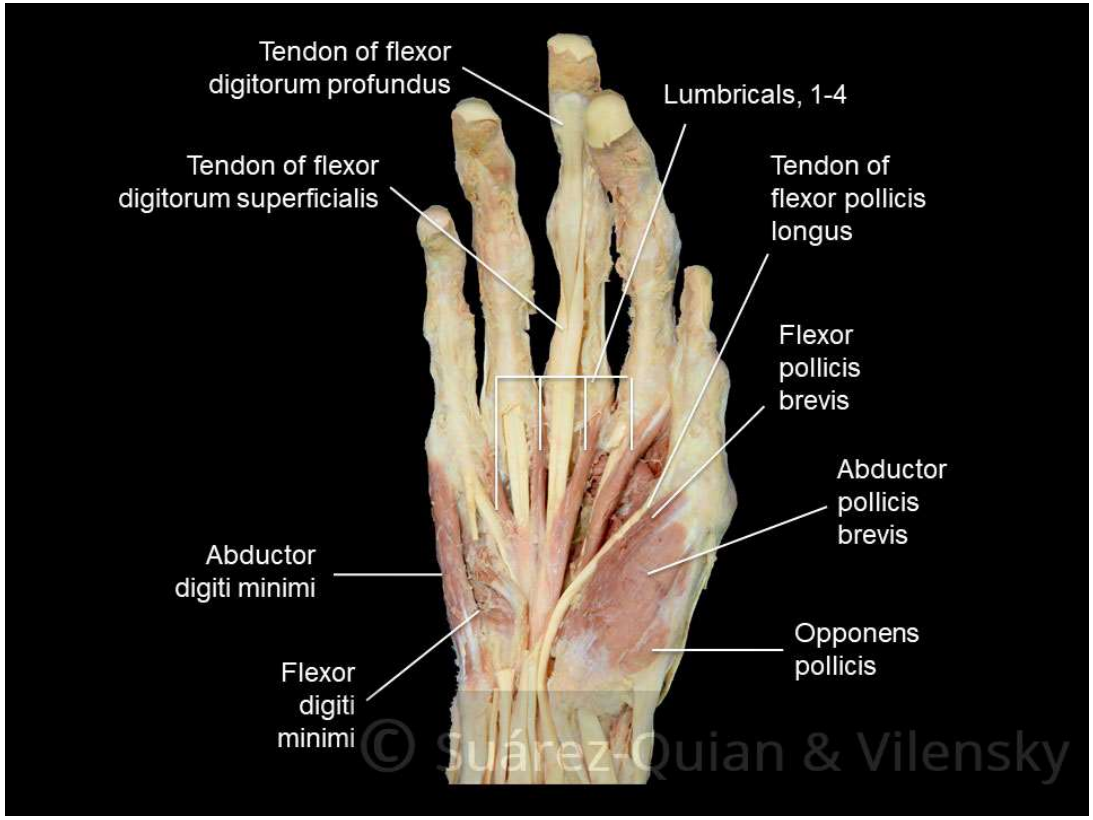
Muscles of Hand

Adductor Pollicis



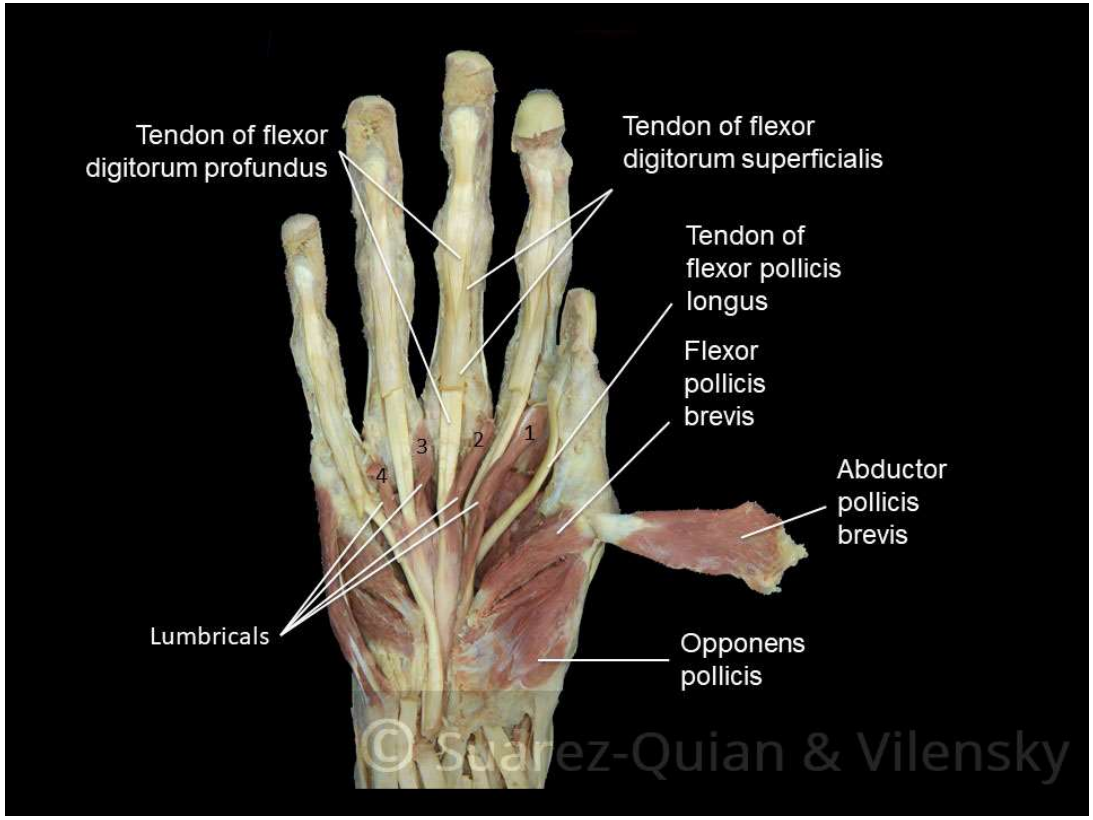
Muscles of the Hand

Prosection Images



Muscles of the Hand

Prospection Images



Muscles of the Hand

Prosection Images