

## Study Guide: The Thumb

<https://lifesciencedb.jp/bp3d/?shorten=vOf0f8e8fyWHXTby8nXfGbgqW>

### Muscles of the Thumb

#### Intrinsic Muscles

<u>Muscle</u>	<u>Action</u>	<u>Origin</u>	<u>Insertion</u>	<u>Blood Supply</u>	<u>Nerve</u>	<u>Antagonist</u>
Opponens pollicis	Opposes the thumb	Trapezium	1st, 2nd and 3rd metacarpal bones, trapezoid and capitate	Superficial palmar arch	median nerve	none
Abductor pollicis brevis	Abducts the thumb and helps with opposition	Scaphoid and trapezium	proximal phalanx	Superficial palmar arch	median nerve	Adductor pollicis muscle
Flexor pollicis brevis	Flexion of thumb	trapezium	proximal phalanx	Superficial palmar arch	median nerve and ulnar nerve	Extensor pollicis longus and brevis
Adductor pollicis	Adduction of thumb	third metacarpal	proximal phalanx and ulnar sesamoid	deep palmar arch	ulnar nerve	abductor pollicis longus and brevis

#### Extrinsic Muscles

<u>Muscle</u>	<u>Action</u>	<u>Origin</u>	<u>Insertion</u>	<u>Blood Supply</u>	<u>Nerve</u>	<u>Antagonist</u>
Flexor pollicis longus	Flexion of thumb (unique to humans)	Radius	Distal phalanx	Anterior interosseous artery	Anterior interosseous nerve	Extensor pollicis longus and brevis
Extensor pollicis longus	Extension of thumb	Ulna	Distal phalanx	Posterior interosseous artery	Posterior interosseous nerve	Flexor pollicis longus and brevis
Extensor pollicis brevis	Extension of thumb	Radius	Proximal phalanx	Posterior interosseous artery	Posterior interosseous nerve	Flexor pollicis longus and brevis
Abductor pollicis longus	Abduction and extension of thumb	Ulna and radius	1st metacarpal	Posterior interosseous artery	Posterior interosseous nerve	Adductor pollicis

Flexor pollicis longus - flexes the thumb and unique to humans. Origin: radius. Insertion: base of distal phalanx. Artery: Anterior interosseous artery. Nerve: Anterior interosseous nerve.

Antagonist: Extensor pollicis longus and brevis muscles

Extensor pollicis longus - extension of thumb. Origin: ulna. Insertion: distal phalanx. Artery: posterior interosseous artery. Nerve: posterior interosseous nerve - branch of radial nerve.

Antagonist: Flexor pollicis longus and brevis muscles

Extensor pollicis brevis - extension of thumb. Origin: radius. Insertion: proximal phalanx. Artery: posterior interosseous artery. Nerve: posterior interosseous nerve. Antagonist: Flexor pollicis longus and brevis muscles

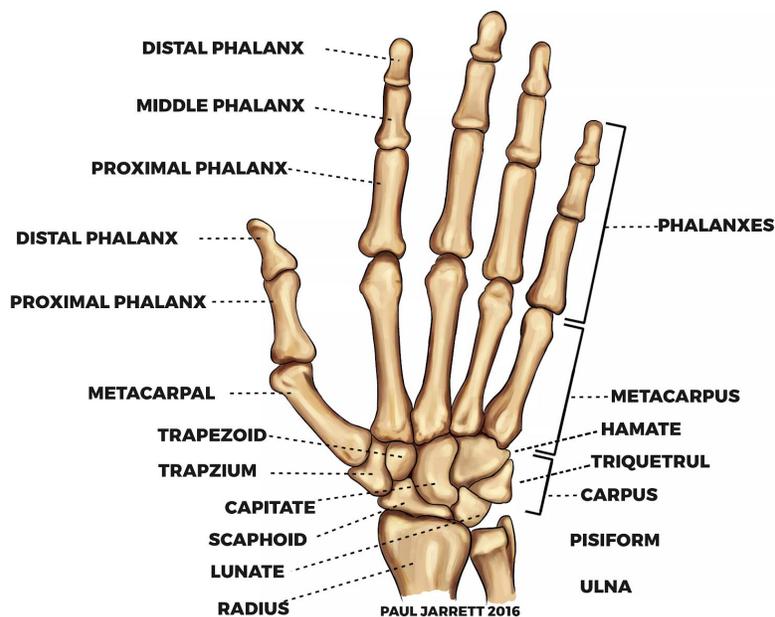
Abductor pollicis longus - abduction and extension of thumb. Origin: ulna and radius. Insertion: 1st metacarpal. Artery: Posterior interosseous artery. Nerve: posterior interosseous nerve.

Antagonist: Adductor pollicis muscle

### **Bony Structures:**

(Capitate, Distal phalanx of thumb, Hamate, Lunate, Metacarpal I, Pisiform, Proximal phalanx of thumb, Scaphoid, Trapezium, Trapezoid, Triquetrum)

- There are 8 carpal bones in each hand. The Trapezoid, Trapezium, Capitate, Scaphoid, Lunate, Hamate, Triquetrum, and Pisiform.
- Each phalange is made up of phalanxes. The thumb is made up of two, the distal and proximal phalanx.
  - Distal - situated away from the center of the body
  - Proximal - situated nearer to the center of the body
- Each phalange and metacarpal bone is numbered I to V starting from the thumb.
  - Ex. Metacarpal I is the metacarpal bone of the thumb. Metacarpal V is the metacarpal bone of the pinky finger.



## **Blood Supply:**

**Brachial artery:** The brachial artery is the major blood vessel of the upper arm. It is the continuation of the axillary artery. It continues down the ventral surface of the arm until it reaches the cubital fossa at the elbow.

**Posterior interosseous artery-** The posterior interosseous artery runs down the posterior portion of the forearm and supplies the Extensor digiti minimi, extensor pollicis longus, extensor pollicis brevis, extensor digitorum, extensor indicis, and the abductor pollicis longus.

**Anterior interosseous artery:** The anterior interosseous artery runs down the palmar side of the forearm and supplies the flexor pollicis longus, flexor digitorum profundus, and the pronator quadratus.

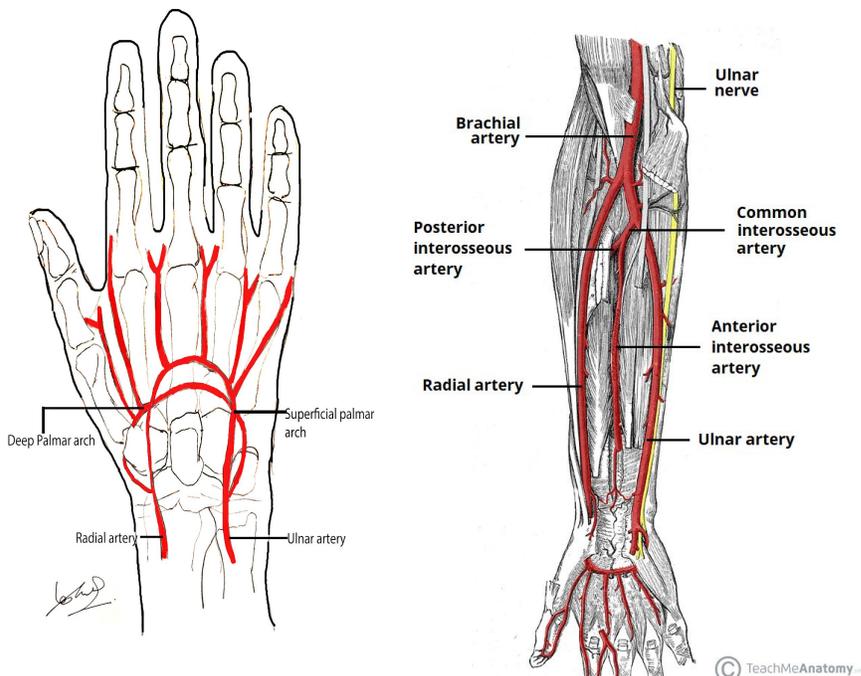
**Radial artery:** The radial artery lies superficially in front of the distal end of the radius. It is one of the main arteries of the forearm and its branches help to supply most of the forearm and hand.

**Deep palmar arch:** The deep palmar arch is one of the arterial networks found in the hand. It is a continuation of the radial artery. It runs over the metacarpal bones and splits off into many branches supplying the hand.

**Princeps pollicis:** The Princeps pollicis is a branch of the radial artery and is also known as the first palmar metacarpal artery. The Princeps pollicis directly supplies the thumb. It can be identified on the image of the arteries in the hand branching from the deep palmar arch up into the thumb area.

**Ulnar artery:** The Ulnar artery is another main artery of the forearm and hand. It lies on the anterior medial side of the forearm. Its branches help to supply the forearm and hand.

**Superficial palmar arch:** The superficial palmar arch is formed by the ulnar artery and passes through the hand over the metacarpals. It mainly supplies phalanges II to IV and half of phalange V.



## Nerves:

**Median Nerve:** (C8, T1) The median nerve innervates the palmar side of the index finger, thumb, middle finger, and half of the ring finger. The Median nerve is the main nerve of the flexor side of the forearm. The muscles it innervates are; opponens pollicis, Abductor pollicis brevis, and Flexor pollicis brevis.

**Anterior Interosseous Nerve:** The anterior interosseous nerve is a branch of the median nerve that supplies the deep muscles of the anterior part of the forearm. It innervates the flexor pollicis longus.

**Radial Nerve:** (C5-C8,T1) The radial nerve is one of the main nerves of the forearm and innervates the posterior portion of the upper arm and forearm.

**Superficial Radial Nerve:** The superficial branch of the radial nerve provides sensory innervation to most of the back of the hand. It lies slightly lateral to the radial artery and beneath the brachioradialis.

**Posterior Interosseous Nerve:** The Posterior interosseous nerve is the continuation of the deep branch of the radial nerve. It innervates the extensor pollicis brevis, extensor pollicis longus, and the abductor pollicis longus.

**Ulnar Nerve:** (C8,T1) The ulnar nerve starts in the neck and descends down the medial part of the upper arm into the wrist and fingers. It provides sensation to the forearm, the fourth and fifth phalange, and innervates the flexor muscles of the hand.

## **Ligaments:**

- **Ulnar Collateral Ligament** - keeps your thumb stable so that you can pinch and grasp things. It runs along the metacarpophalangeal (MCP) joint of the thumb. Origin: head of the metacarpal Insertion: medial aspect and base of the proximal phalanx of the thumb.

## **Tendons:**

- **Abductor pollicis longus:** Moves the thumb away from the palm to form an open hand. Origin: Upper posterior surface of ulna and middle third of posterior surface of radius. Insertion: Over tendons of radial extensors and brachioradialis to base of 1st metacarpal and trapezium.
- **Flexor pollicis longus:** This tendon helps you bend the thumb. Origin: Anterior surface of radius and adjacent interosseous membrane. Insertion: Base of distal phalanx of thumb.
- **Extensor pollicis brevis:** This tendon travels along the back of the thumb and helps straighten the thumb. Origin: Lower third of posterior shaft of radius and adjacent interosseous membrane. Insertion: Over tendons of radial extensors and brachioradialis to the base of proximal phalanx of thumb.
- **Extensor pollicis longus:** The main function is the extension of the thumb at the metacarpophalangeal and interphalangeal joints. Origin: middle third of the posterior surface of ulna. Insertion: Posterior aspect of base of distal phalanx of thumb

## Joints

- **Interphalangeal (IP) joint-** hinge type synovial joints between adjacent phalanges. There is one of these in the thumb and it provides flexion towards the palm of the hand.
- **Metacarpophalangeal (MCP) Joint-** It is a hinge and allows only a flexion movement. It is the intermediate joint of the thumb. Its main purpose is to ensure the stability of the grips between the thumb
- **Carpometacarpal (basal) joint-** This is a saddle joint that forms where the ends of the metacarpal bone at the base of the thumb and the trapezium bone in the wrist meet.