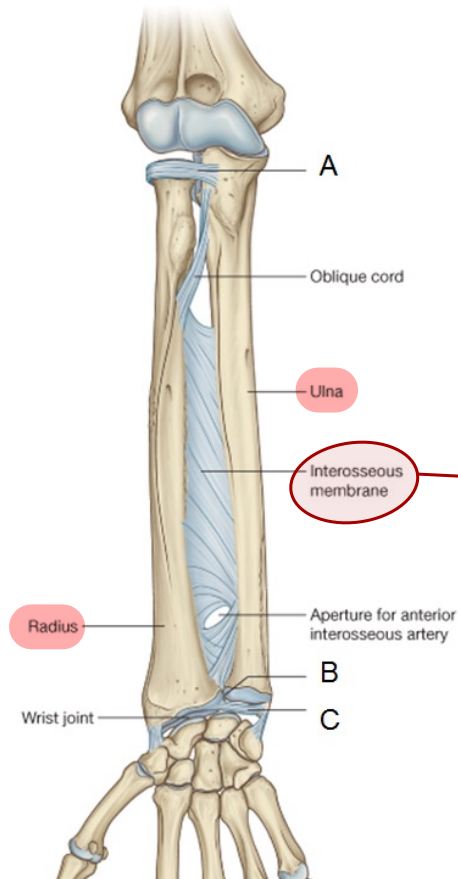




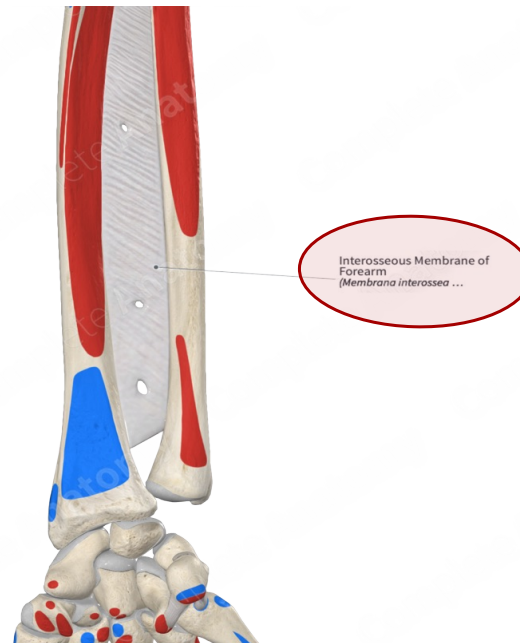
اللَّهُمَّ صَلِّ وَسَلِّمْ وَبَارِكْ عَلَى نَبِيِّنَا مُحَمَّدٍ

The Forearm

Between the elbow joint and the wrist joint



The ulna medially
with the radius
laterally with the
interosseous
membrane Divide the
forearm into 2
compartment
[anterior + posterior]



Contents of the Anterior Fascial Compartment of the Forearm

- **Muscles:** A superficial group, consisting of the pronator teres, the flexor carpi radialis, the palmaris longus, and the flexor carpi ulnaris

Pronation for the forearm and hand

- an intermediate group consisting of the flexor digitorum superficialis

Flexion for the thumb

Flexion for the 4 digit

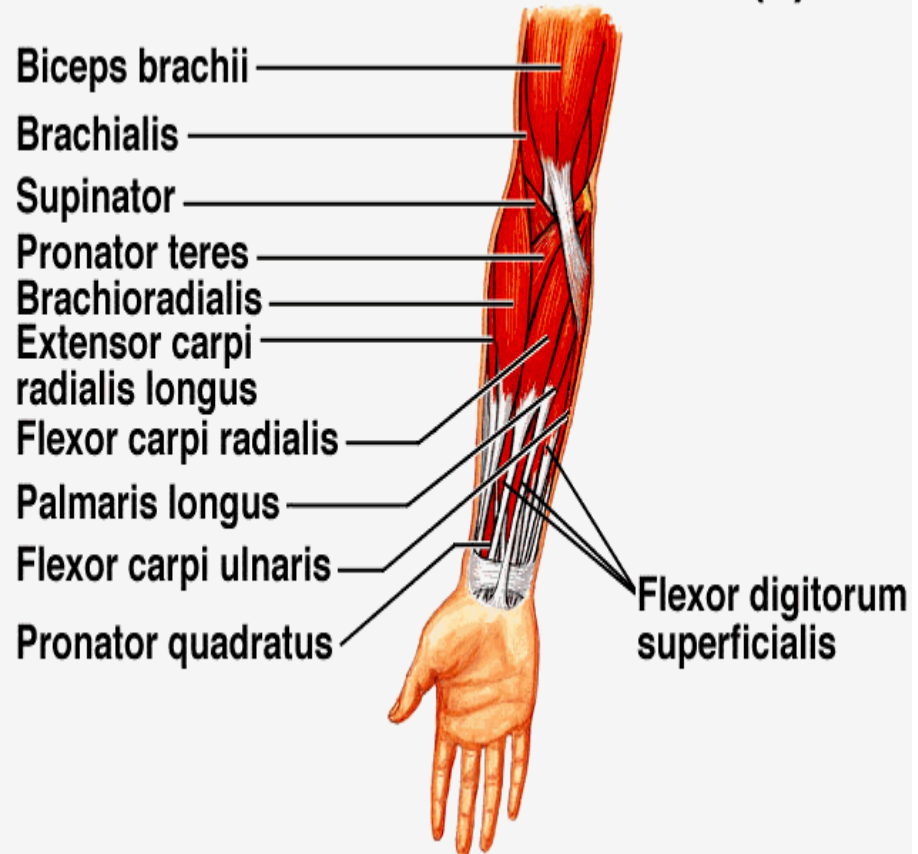
- and a deep group consisting of the flexor pollicis longus, the flexor digitorum profundus and the pronator quadratus

Pronation for the forearm and hand

- Blood supply to the muscles: Ulnar and radial arteries
- Nerve supply to the muscles: All the muscles are supplied by the median nerve and its branches
- except the flexor carpi ulnaris and the medial part of the flexor digitorum profundus, which are supplied by the ulnar nerve

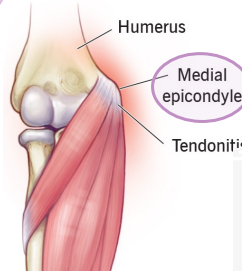
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Anterior Forearm Muscles (1)



Superficial group

- the superficial group of muscles possesses a common tendon of origin, which is attached to the medial epicondyle of the humerus.

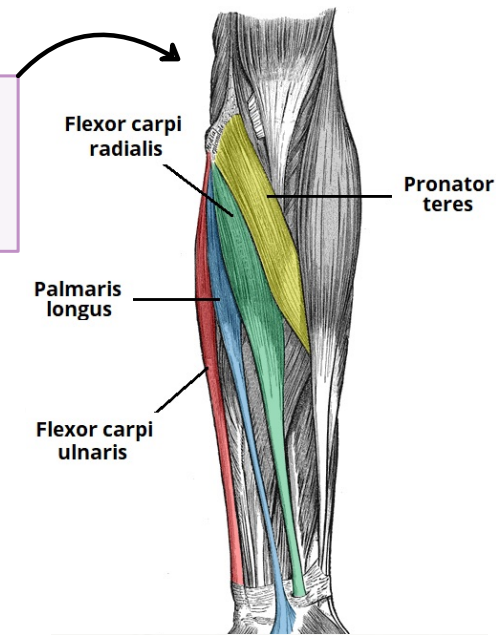


- Pronator Teres** 2 origin
- Humeral head: Medial epicondyle of humerus
- Ulnar head: Medial border of coronoid process of ulna

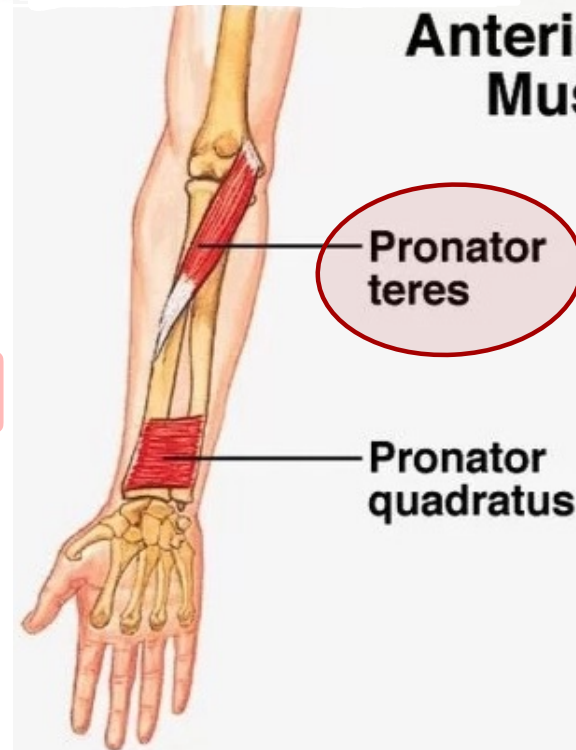
- Insertion** Lateral aspect of shaft of radius
- It's origin from the lateral + medial cord [passes through the tow origin of P.T and also supply it]

- Nerve Supply** Median nerve C6, 7
- In the Cubital fossa

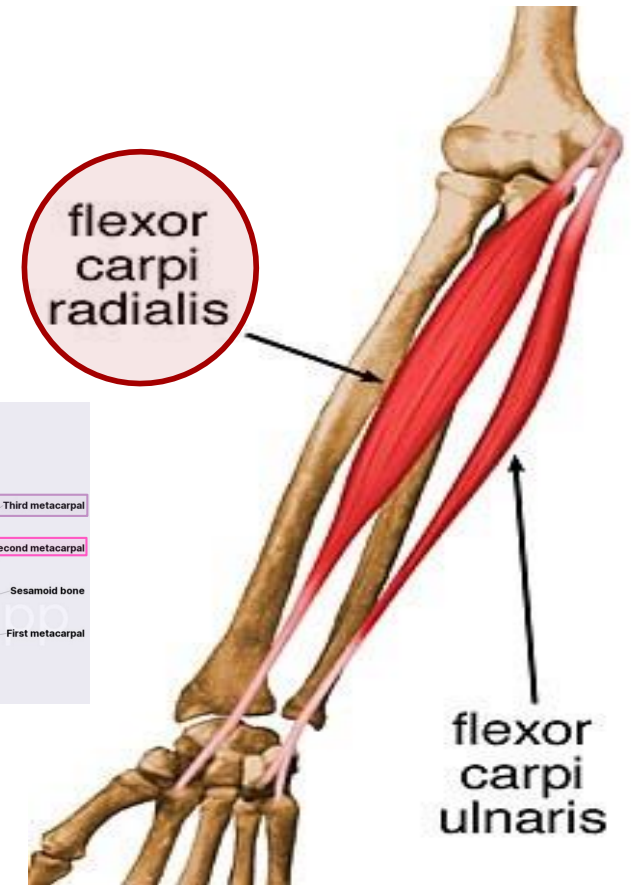
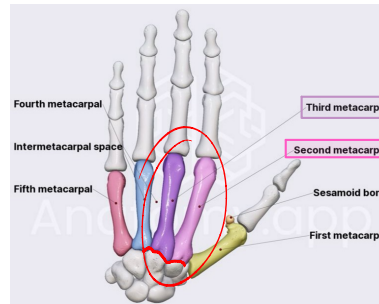
- Action** Pronation and flexion of forearm



Anterior Forearm Muscles (3)



- Flexor carpi radialis
- Origin : Medial epicondyle of humerus Common origin [tendon]
- Insertion: Bases of second and third metacarpal bones
- Nerve supply: Median nerve C6, 7
- Action: Flexes and abducts hand at wrist joint



Radialis = abduction for the wrist joint
Ulnaris = adduction for the wrist joint

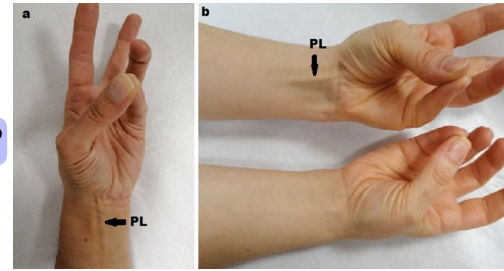


Not all people have it !!

Do you have it ?



Palmaris longus



- **Origin** : Medial epicondyle of humerus

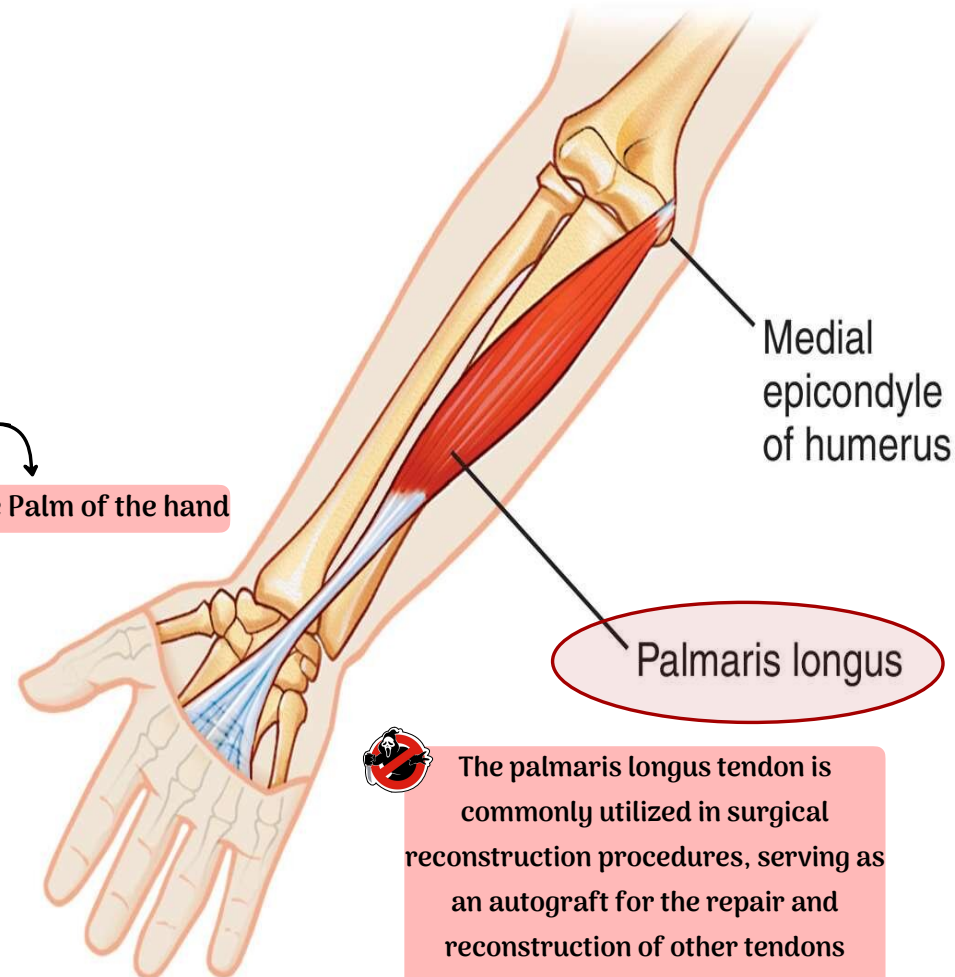
- **Insertion**: Flexor retinaculum and palmar aponeurosis

Deep fascia anterior to the wrist joint [fixation of the tendon]

Fibrous sheath on the Palm of the hand

- **Nerve supply**: Median nerve C7, 8

- **Action**: Flexes hand



The palmaris longus tendon is commonly utilized in surgical reconstruction procedures, serving as an autograft for the repair and reconstruction of other tendons [tendon of the thumb]

- **Flexor Carpi Ulnaris**

- **Origin:** Humeral head Medial epicondyle of humerus
- Ulnar head Medial aspect of olecranon process and posterior border of ulna

- **Insertion:** Pisiform bone, hook of the hamate, base at fifth metacarpal bone

- **Nerve supply:** Ulnar nerve C8; T1

↳ A branch from the medial cord of brachial plexus

- **Action:** Flexes and adducts hand at wrist joint

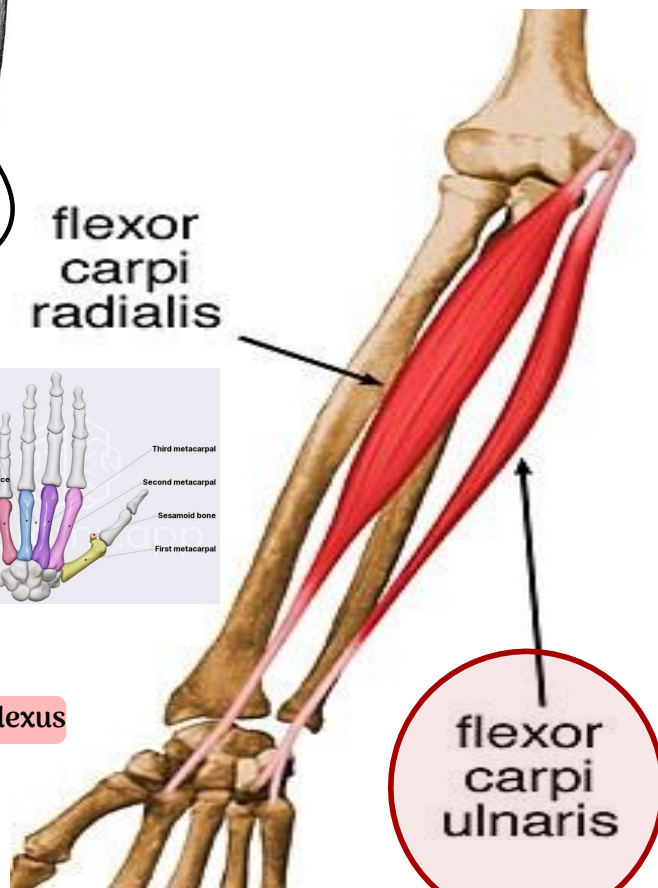
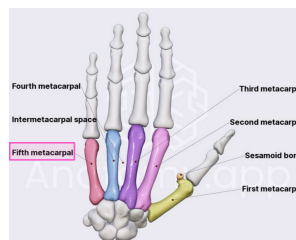


Lateral:



- Olecranon
- Coronoid Process
- Trochlear Notch
- Radial Notch

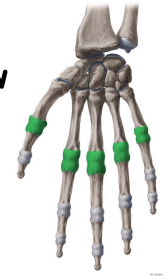
flexor carpi radialis



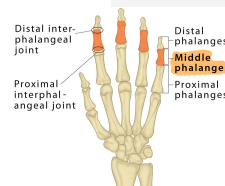
أي tendon بيمر من قدام مفصل بيعمله flexion

F.D.S Give 4 Tendons :

- Flexion for the 4 digit
- Flexion for the metacarpo-phalangeal joint
- Flexion for the wrist joint



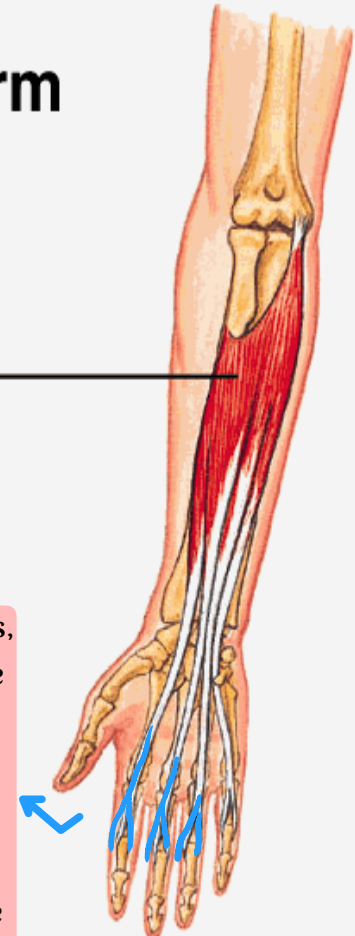
- **Flexor Digitorum Superficialis**
- **Origin :** Humeroulnar head Medial epicondyle of humerus; medial border of coronoid process of ulna
- **Radial head** Oblique line on anterior surface of shaft of radius
- **Insertion:** Middle phalanx of medial four fingers
- **Nerve supply:** Median nerve C7, 8; T1
- **Action:** Flexes middle phalanx of fingers and assists in flexing proximal phalanx and hand



Anterior Forearm Muscles (5)

Flexor digitorum superficialis

The insertion consists of two slips, each attaching to the sides of the middle phalanges. This arrangement allows the long tendon of the flexor digitorum profundus to pass through the split and insert at the base of the distal phalanges.

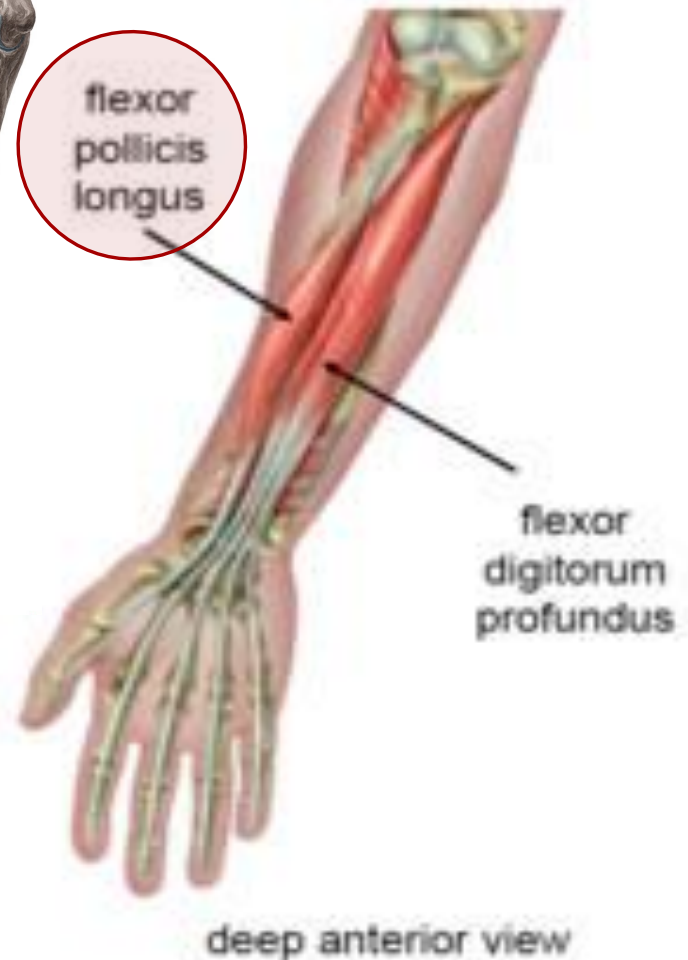
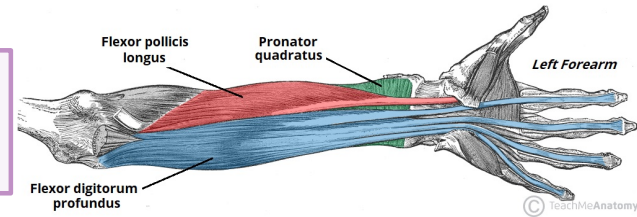
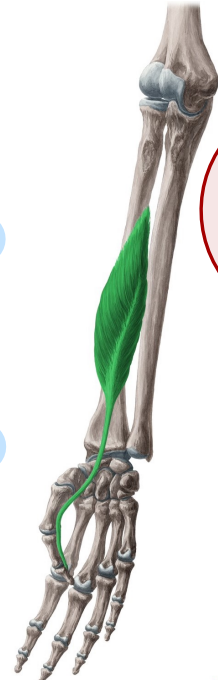


Deep group

Thump

- Flexor pollicis longus
- **Origin**: Anterior surface of shaft of radius
- **Insertion**: Distal phalanx of thumb
- **Nerve supply**: Anterior interosseous branch of median nerve **C8; T1**
- **Action**: Flexes distal phalanx of thumb

passes through the anterior surface of the interosseous membrane



- Flexor digitorum profundus

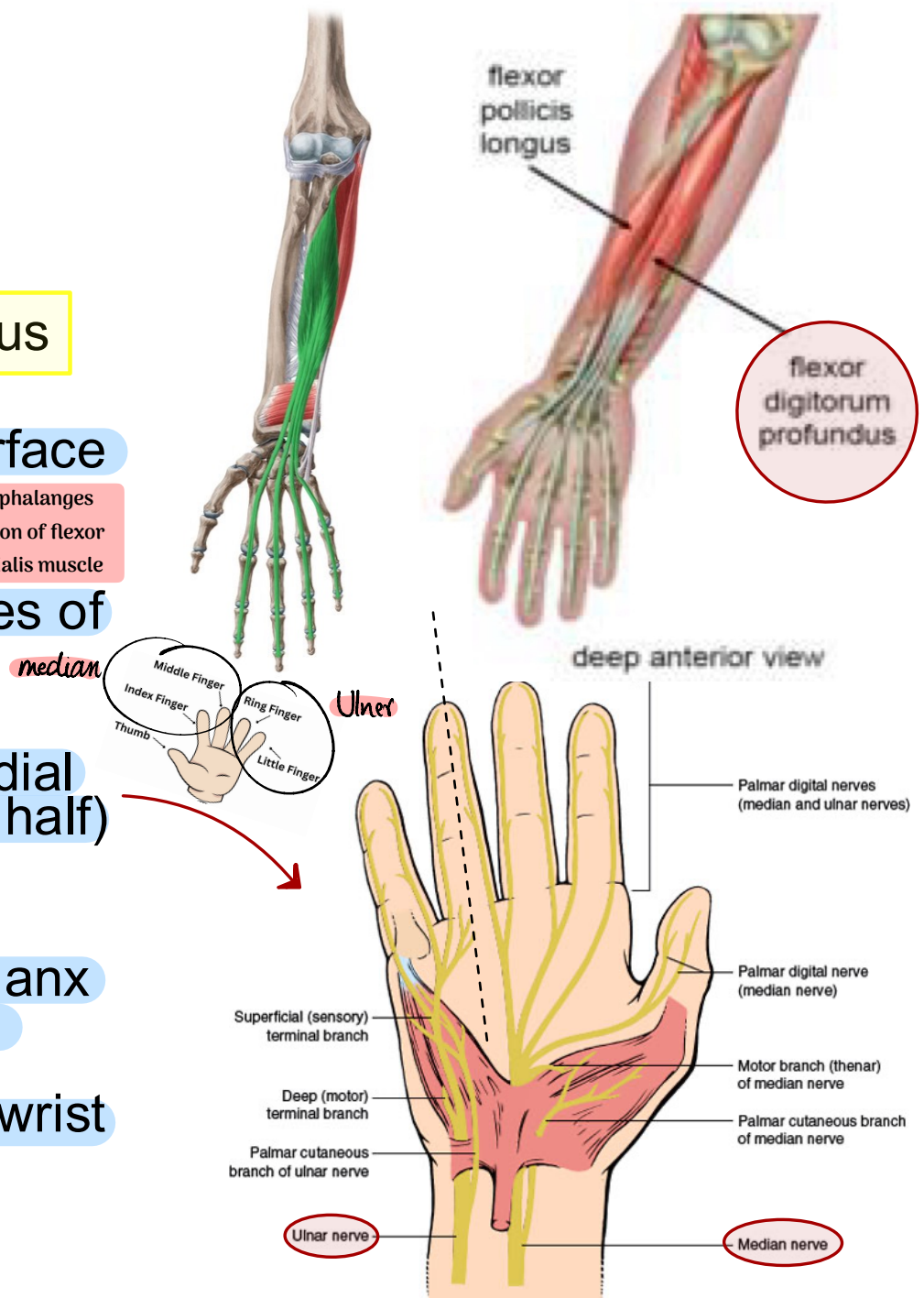
- Origin:** Anteromedial surface of shaft of ulna

The base of distal phalanges between the insertion of flexor digitorum superficialis muscle

- Insertion:** Distal phalanges of medial four fingers

- Nerve supply:** Ulnar (medial half) and median (lateral half) nerves **C8; T1**

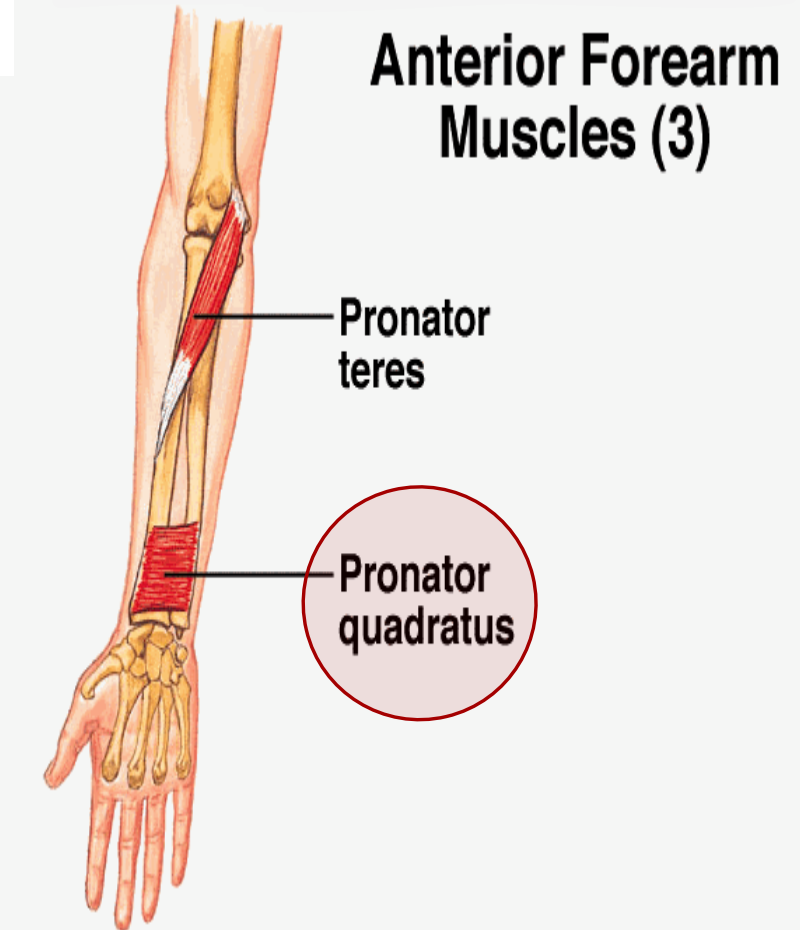
- Action:** Flexes distal phalanx of fingers; then assists in flexion of middle and proximal phalanges and wrist



- Pronator quadratus

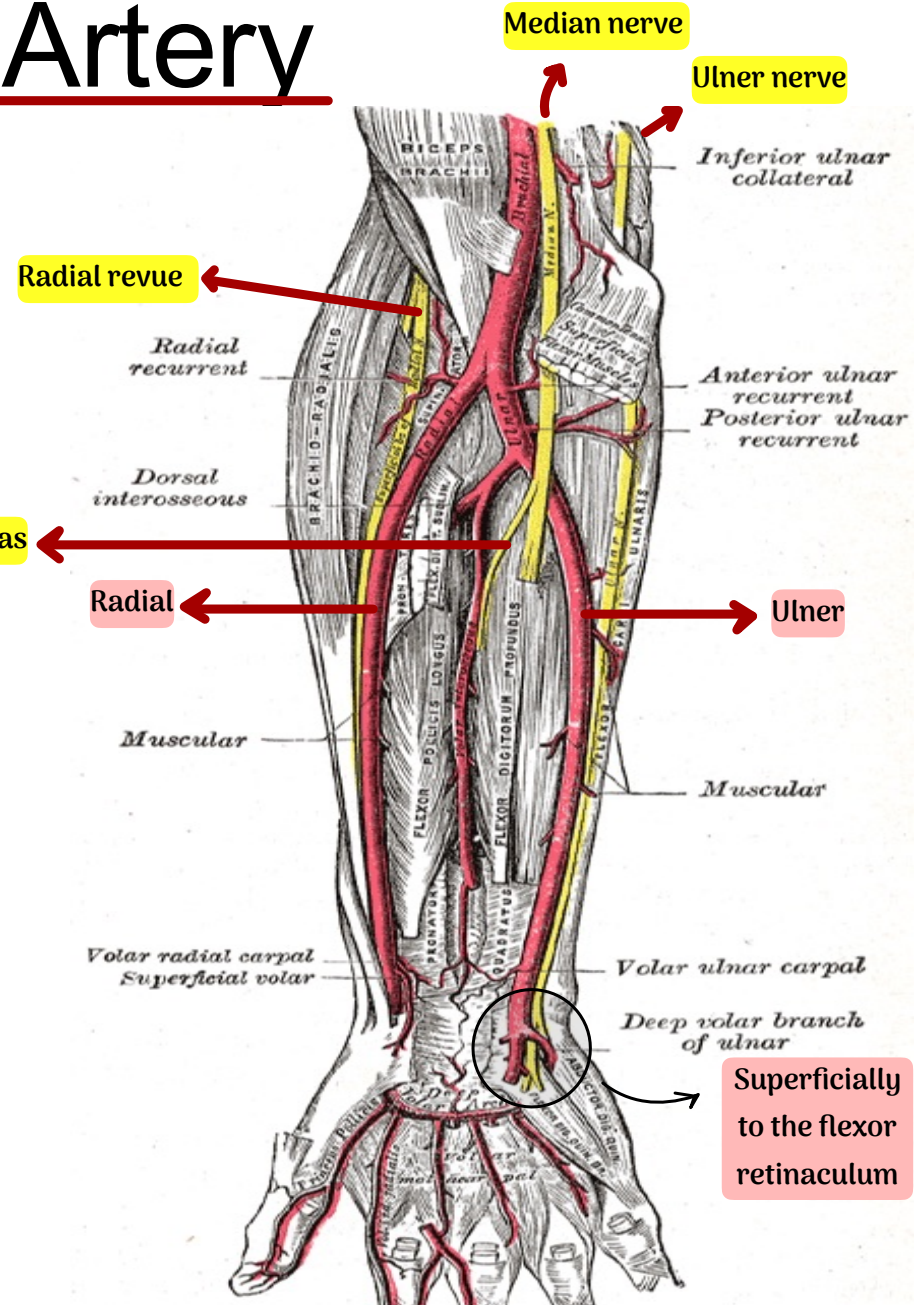


- **Origin**: Anterior surface of shaft of ulna
- **Insertion**: Anterior surface of shaft of radius
- **Nerve supply**: Anterior interosseous branch of median nerve **C8; T1**
- **Action**: Pronates forearm

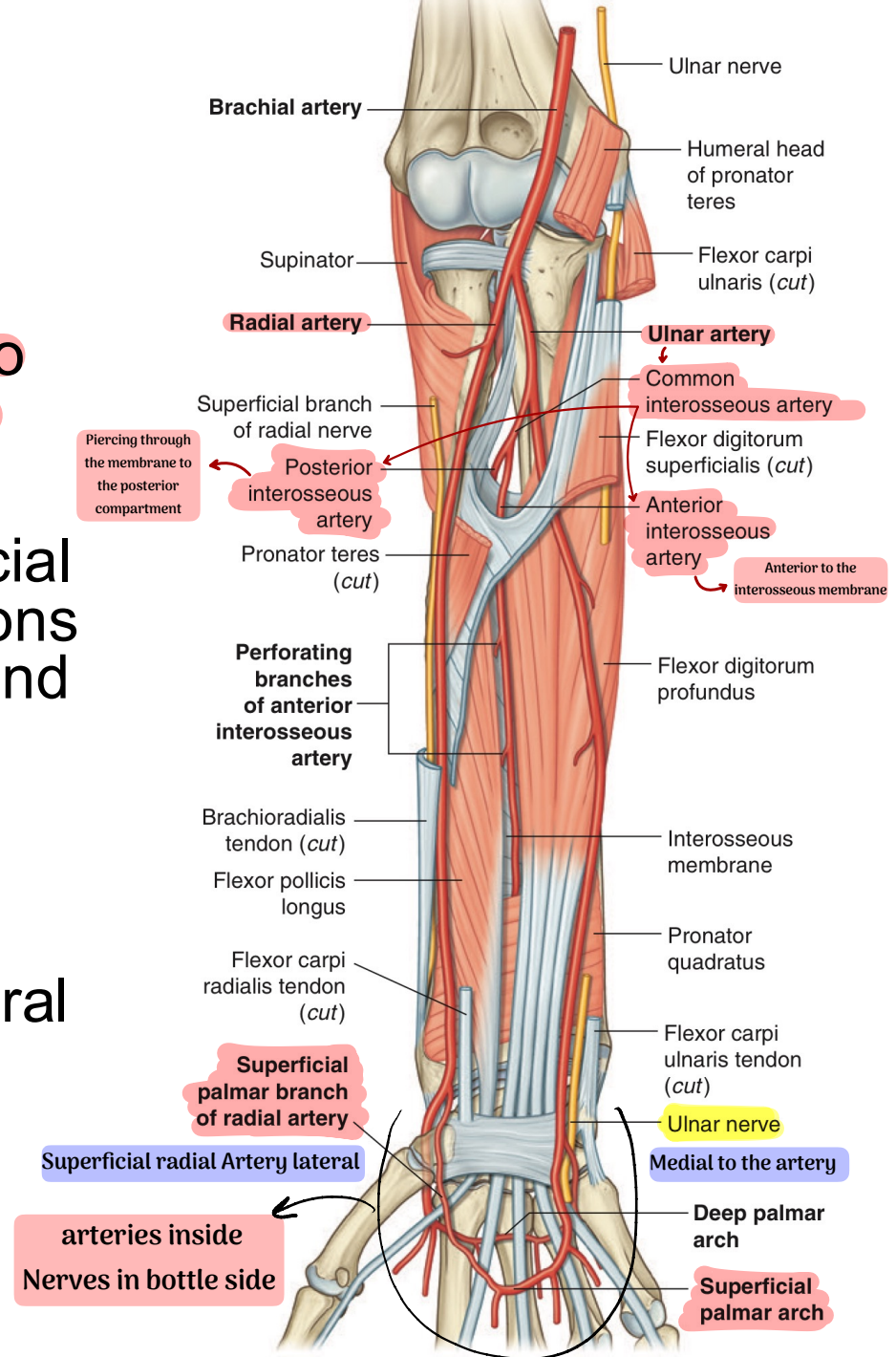


Ulnar Artery

- The ulnar artery is the larger of the two terminal branches of the brachial artery
- It begins in the cubital fossa at the level of the neck of the radius
- descends through the anterior compartment of the forearm and enters the palm in front of the flexor retinaculum in company with the ulnar nerve On the pisiform bone
- It ends by forming the superficial palmar arch, often anastomosing with the superficial palmar branch of the radial artery



- the ulnar artery lies deep to most of the flexor muscles
- Below, it becomes superficial and lies between the tendons of the flexor carpi ulnaris and the tendons of the flexor digitorum superficialis
- In front of the flexor retinaculum, it lies just lateral to the pisiform bone and is covered only by skin and fascia (site for taking ulnar pulse).



Branches

1. Muscular branches to neighboring muscles

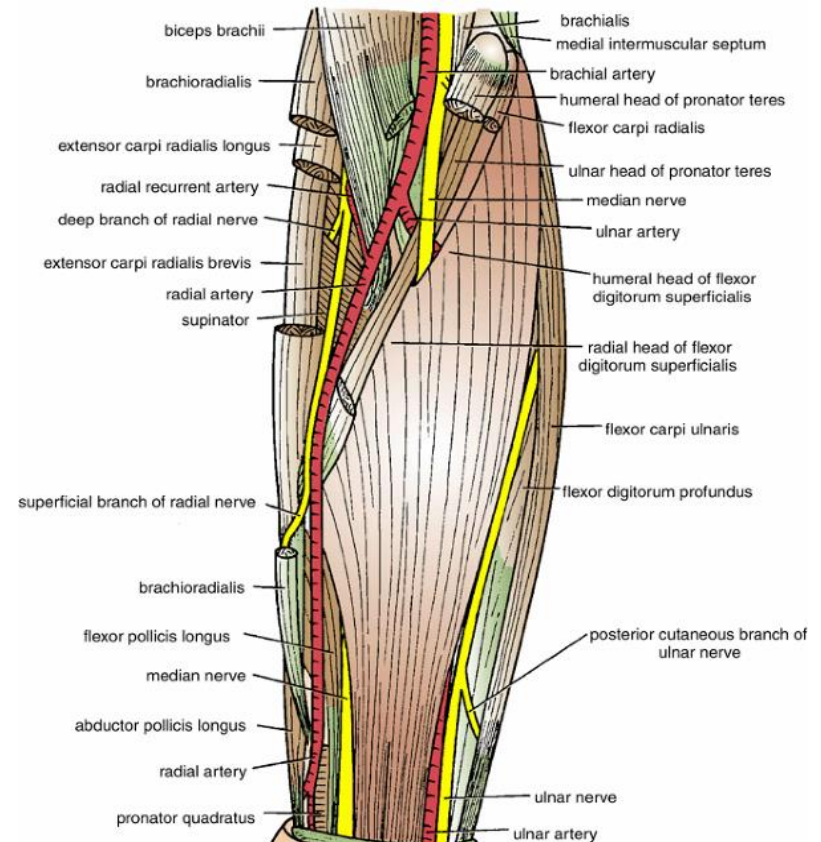
→ راجعة عشان تلتقي مع Branches of Brachial Artery

2. Recurrent branches that take part in the arterial anastomosis around the elbow joint

3. Branches that take part in the arterial anastomosis around the wrist joint

4. The common interosseous artery, which arises from the upper part of the ulnar artery and after a brief course divides into the anterior and posterior interosseous arteries

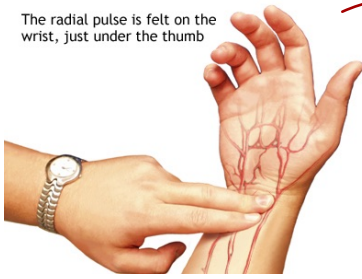
It ends by forming the superficial palmar arch, often anastomosing with the superficial palmar branch of the radial artery



Each digit is supplied by paired digital arteries, with one artery running along the medial side and another along the lateral side. These arteries form an anastomotic network at the fingertip, ensuring adequate blood supply to the distal phalanx and surrounding tissues.

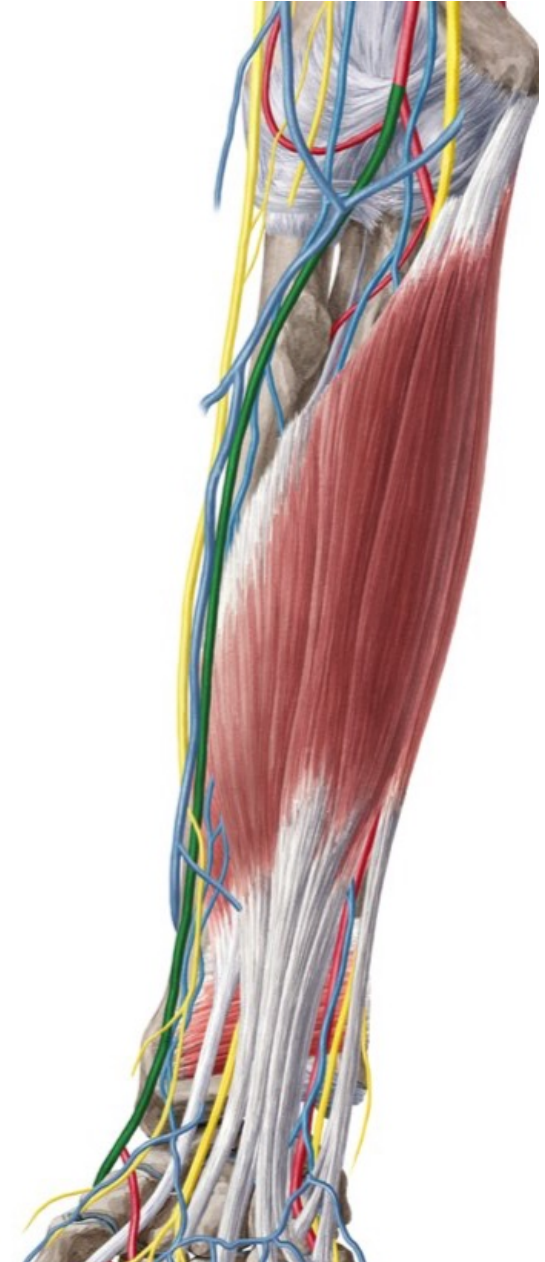


The radial pulse is felt on the wrist, just under the thumb



Radial Artery

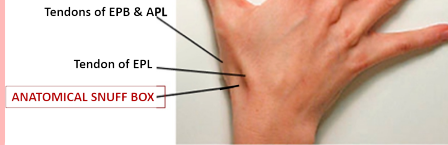
- [illegible]



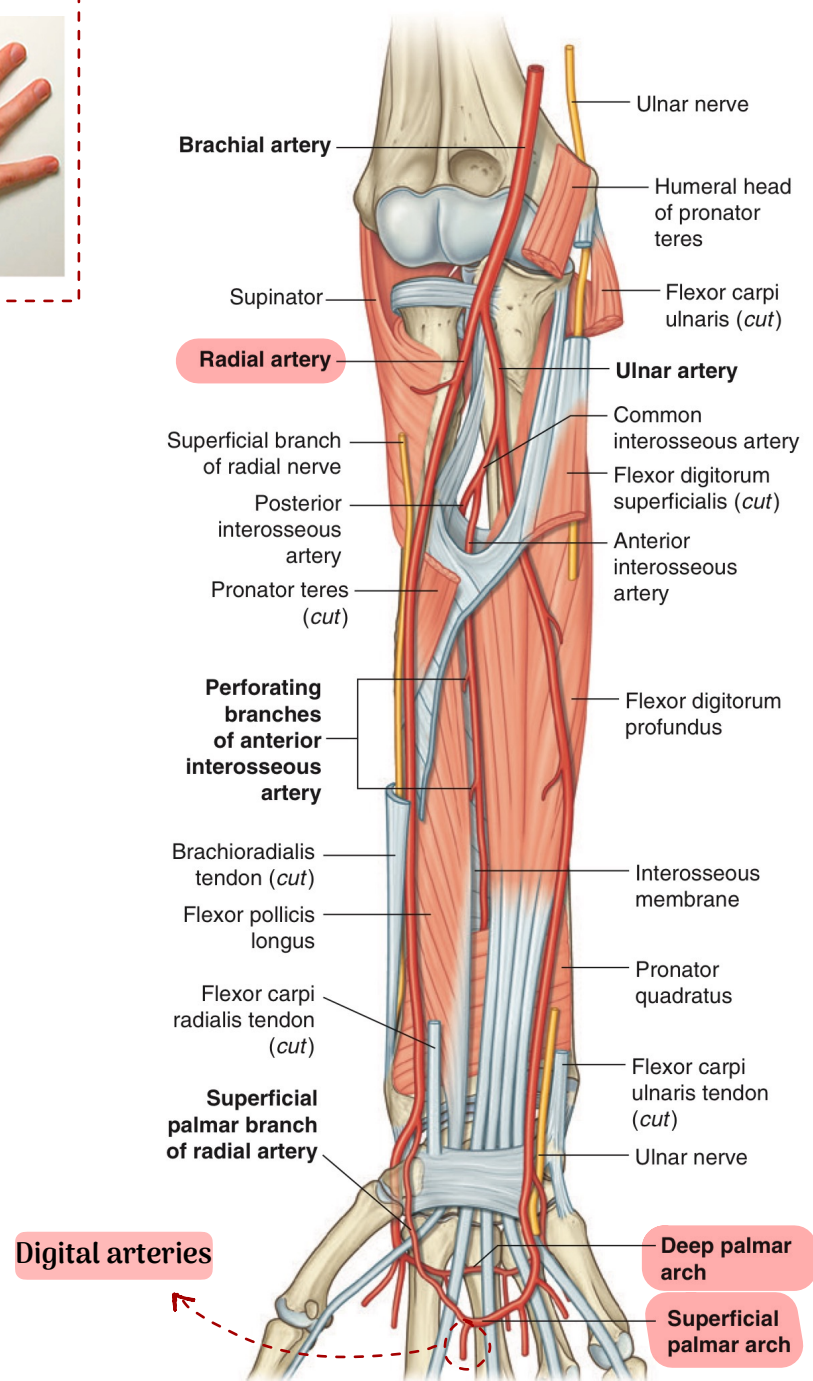
The radial artery descend to the floor of snuff box to give the [deep Palmar arch] which it's more proximal than the Superficial

مين رح يكمله ؟

deep branch from Ulnar Artery

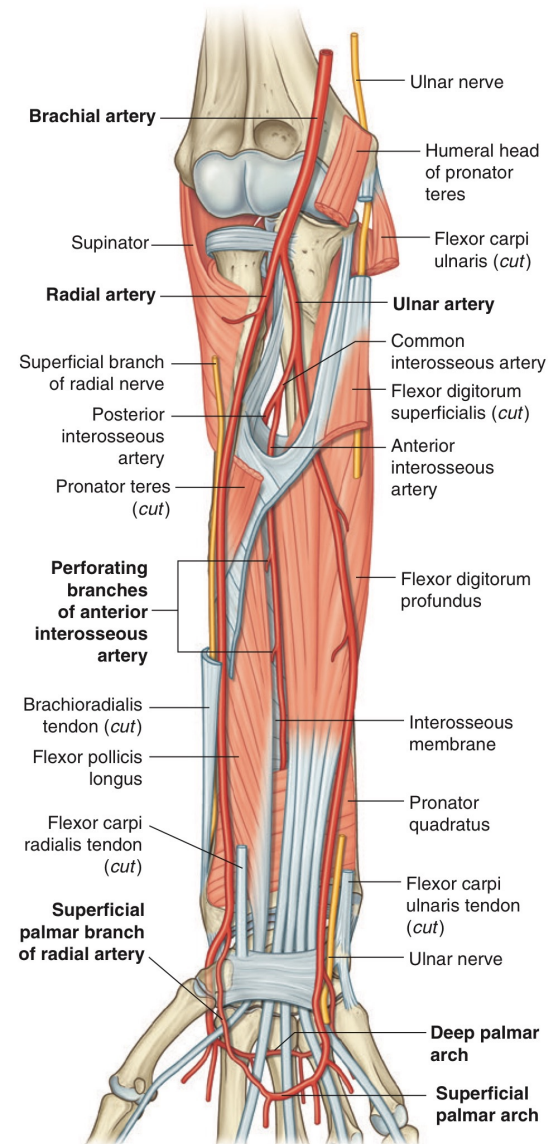


- In the distal part of the forearm, the radial artery lies on the anterior surface of the radius and is covered only by skin and fascia
- Here, the artery has the tendon of brachioradialis on its lateral side and the tendon of flexor carpi radialis on its medial side (site for taking the radial pulse).
- The radial artery leaves the forearm by winding around the lateral aspect of the wrist to reach the posterior surface of the hand



Branches in the Forearm

1. Muscular branches to neighboring muscles
2. Recurrent branch, which takes part in the arterial anastomosis around the elbow joint + Wrist joint
3. Superficial palmar branch, which arises just above the wrist enters the palm of the hand, and frequently joins the ulnar artery to form the superficial palmar arch



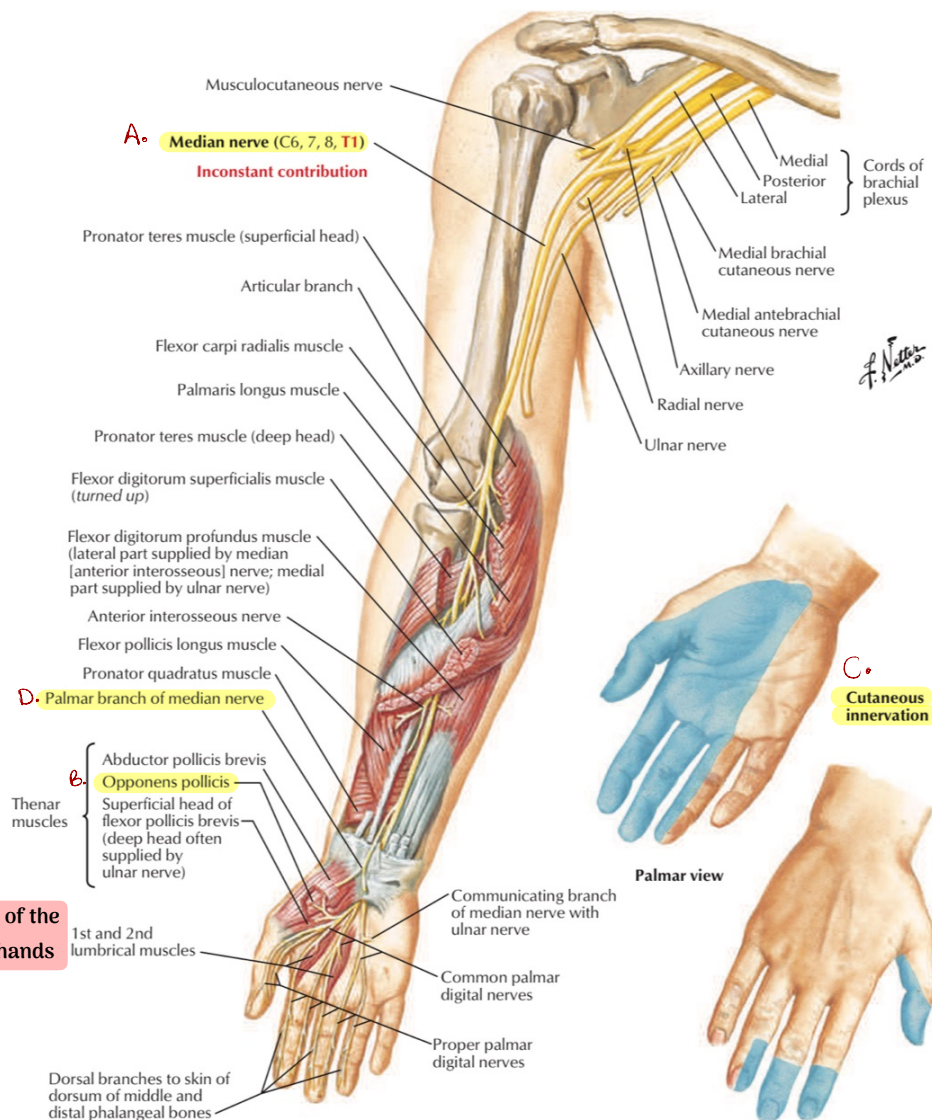


Surgeons may sometimes misidentify the median nerve as the palmaris longus tendon during surgical procedures. Accidental transection of the median nerve instead of the tendon can lead to significant motor and sensory deficits, including paralysis of multiple forearm and hand muscles, as well as loss of sensation in the affected regions.

It's origin from the lateral + medial cord as roots

Median Nerve

- The median nerve leaves the cubital fossa by passing between the two heads of the pronator teres
- It continues downward ^{1.} behind the flexor digitorum superficialis and rests ^{2.} posteriorly on the flexor digitorum profundus
- At the wrist, the median nerve emerges from the lateral border of the flexor digitorum superficialis muscle and lies behind the tendon of the palmaris longus
Then it enter through the carpal tunnel [a groove in front of the carpal bones and wrist joint] finally it end in the palm of hands
- It enters the palm by passing behind the flexor retinaculum



Median nerve injury results in "Ape Hand" deformity, characterized by:

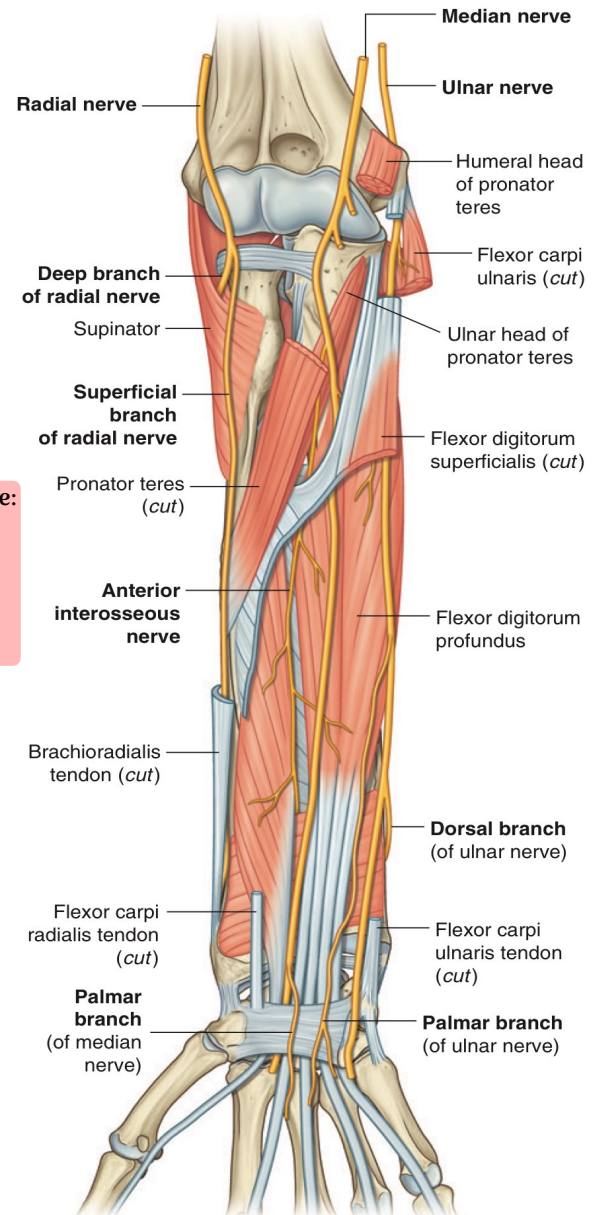
- Extension instead of flexion at the wrist joint, due to the loss of median nerve-innervated wrist flexors, while the ulnar nerve-innervated flexor carpi ulnaris remains functional.
- Adduction instead of abduction of the wrist, as the flexor carpi radialis (median nerve) is impaired, allowing the unopposed action of the flexor carpi ulnaris (ulnar nerve).

- Loss of thumb abduction

Loss of sensory sensation from the lateral 2\3 of the palms



Branches



1. Muscular branches in the cubital fossa to the pronator teres, the flexor carpi radialis, the palmaris longus, and the flexor digitorum superficialis

2. Articular branches to the elbow joint

nerve supply **اي نيرف بيمر من joint بيعطي**

supply the deep muscle:
1\2 Flexor digitorum profundus + Flexor pollicis longus + Pronator quadratus

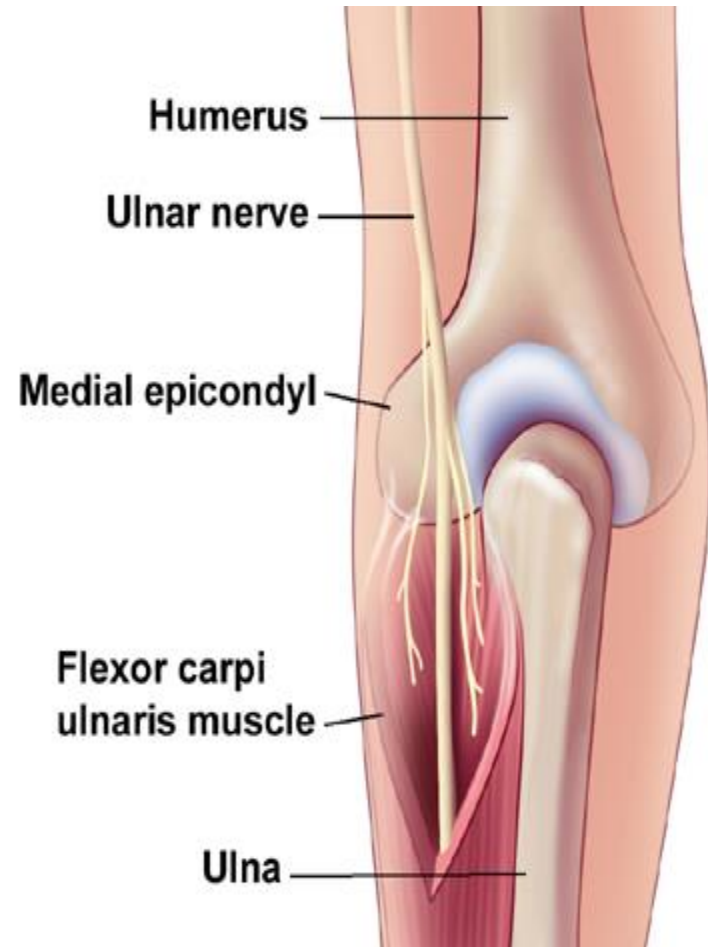
3. Anterior interosseous nerve

4. Palmar cutaneous branch. This arises in the lower part of the forearm and is distributed to the skin over the lateral part of the palm ^{Sensory}

Ulnar Nerve

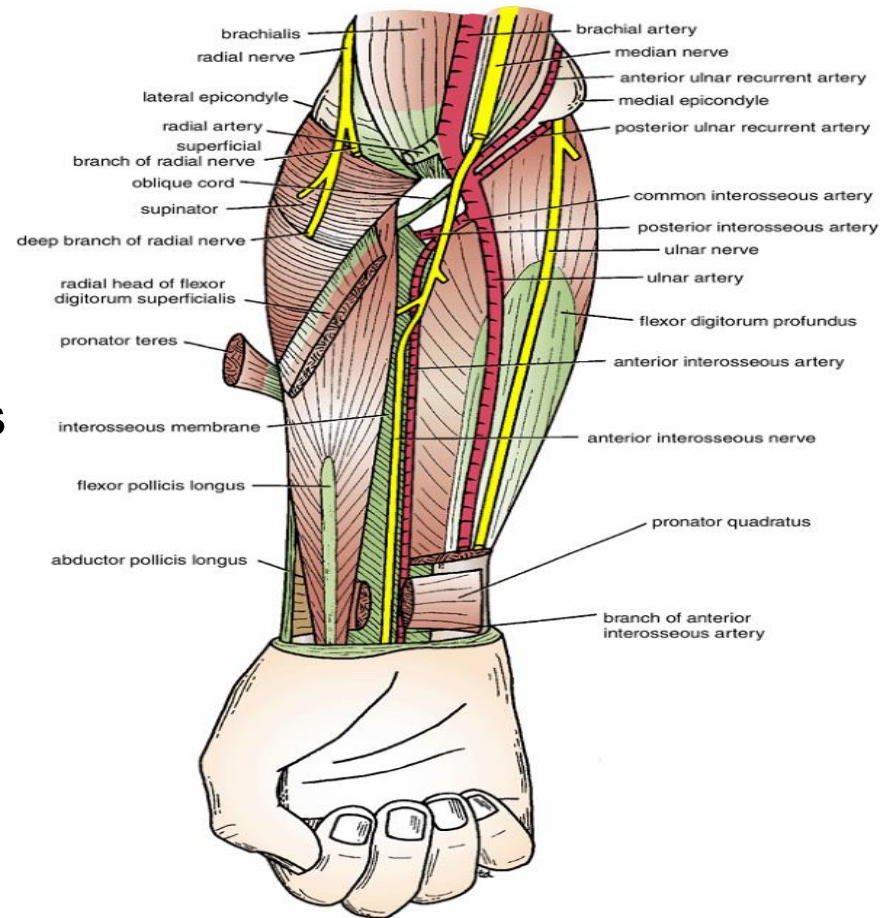
A branch from the medial cord of brachial plexus

- passes from behind the medial epicondyle of the humerus, crosses the medial ligament of the elbow joint, and enters the front of the forearm by passing between the two heads of the flexor carpi ulnaris
- runs down the forearm between the flexor carpi ulnaris and the flexor digitorum profundus muscles. In the distal two thirds of the forearm, the ulnar artery lies on the lateral side of the ulnar nerve
- At the wrist, the ulnar nerve becomes superficial and lies between the tendons of the flexor carpi ulnaris and flexor digitorum superficialis muscles
- The ulnar nerve enters the palm of the hand by passing in front of the flexor retinaculum and lateral to the pisiform bone; here it has the ulnar artery lateral to it



Branches

1. Muscular branches to the flexor carpi ulnaris and to the medial half of the flexor digitorum profundus
2. Articular branches to the elbow joint
3. The palmar cutaneous branch is a small branch that arises in the middle of the forearm
 - Palmar branch to the medial 1/3 of the palm
 - Dorsal branch to the Dorsum of the hand 1/3
4. The dorsal posterior cutaneous branch is distributed on the posterior surface of the hand and fingers



What are the structure that passes superficial to the flexor retinaculum ??

[6 structure] 3 ulnar (Artery + Vein + Nerve) , 3 Palmar (Palmar branch of Ulnar nerve + Palmar branch of median nerve + Palmaris longus tendon .

Deep to the flexor retinaculum??? Tendons of flexor Carpi Ulnaris + the 4 tendons of Flexor digitorum superficialis + flexor digitorum profundus .

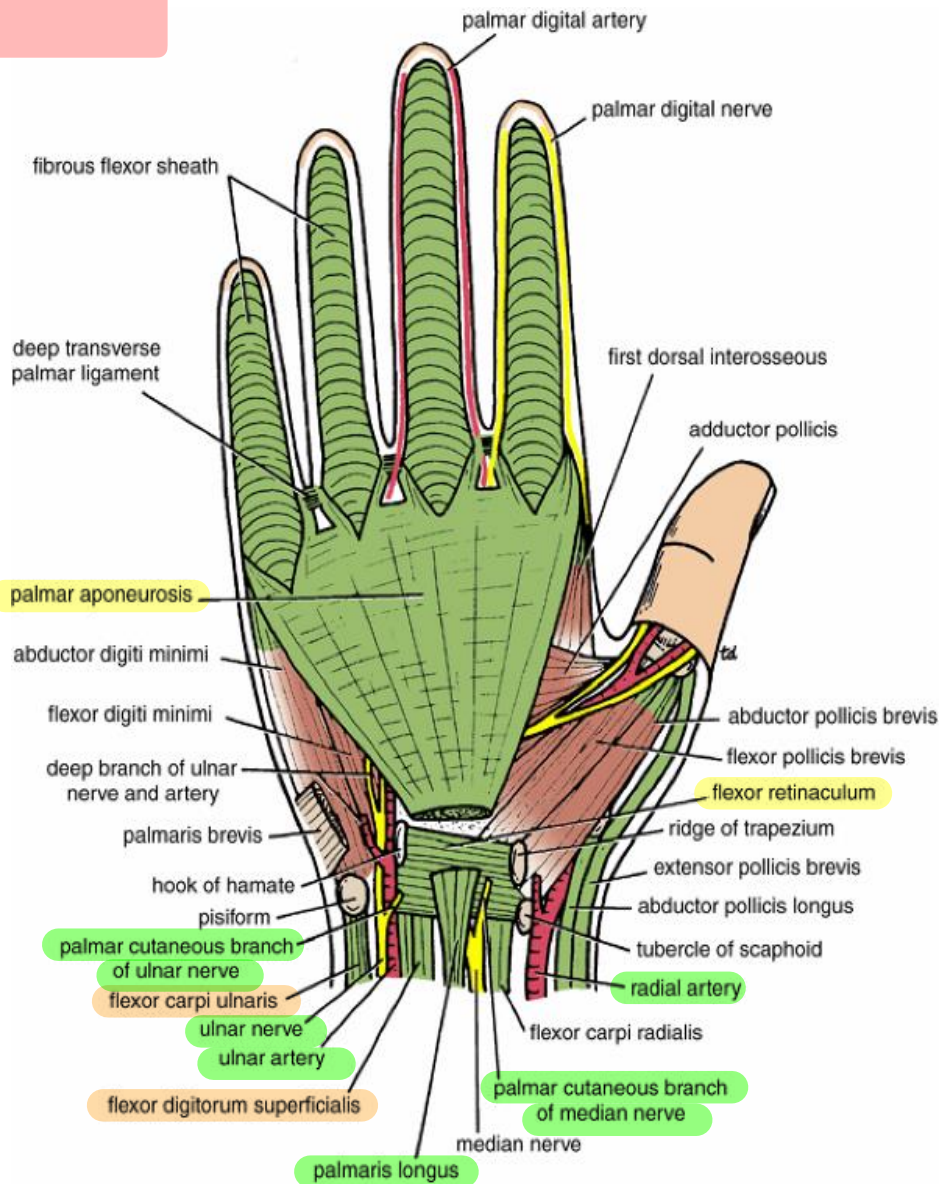
Lateral : flexor pollicis longus + flexor carpi radialis .

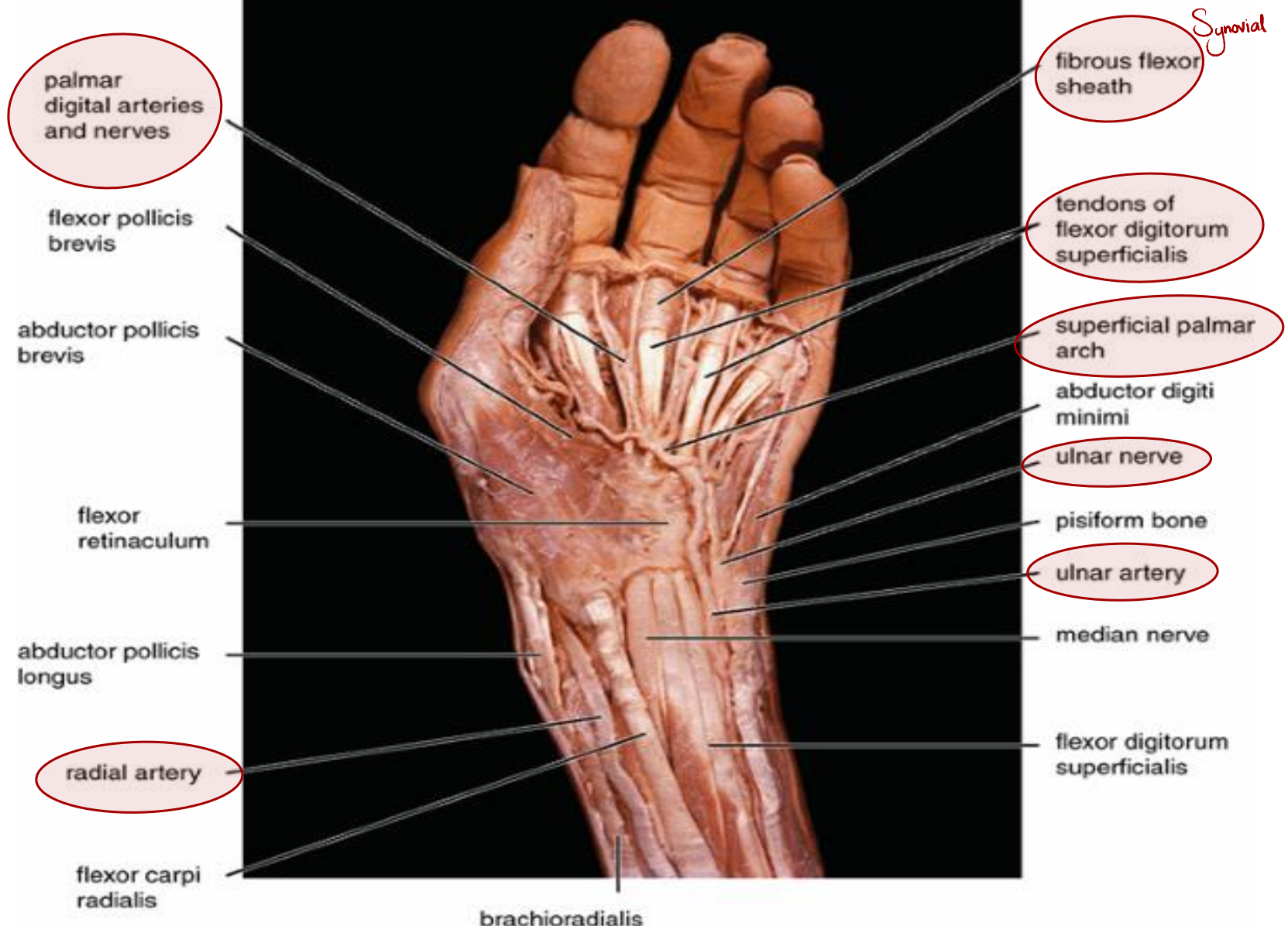
Flexor Retinaculum

- The flexor retinaculum is a thickening of deep fascia that holds the long flexor tendons in position at the wrist

A fibrous connective tissue

- It stretches across the front of the wrist and converts into an osteofascial tunnel, the carpal tunnel,
- for the passage of the median nerve and the flexor tendons of the thumb and fingers
- It is attached medially to the pisiform bone and the hook of the hamate and laterally to the tubercle of the scaphoid and the trapezium bones
- The upper border of the retinaculum corresponds to the distal transverse skin crease in front of the wrist and is continuous with the deep fascia of the forearm. The lower border is attached to the palmar aponeurosis





Thank You

Done by Joud Al zubaidi

