

## Contents of the Lateral Fascial Compartment of the Forearm

The lateral fascial compartment may be regarded as part of the posterior fascial compartment.

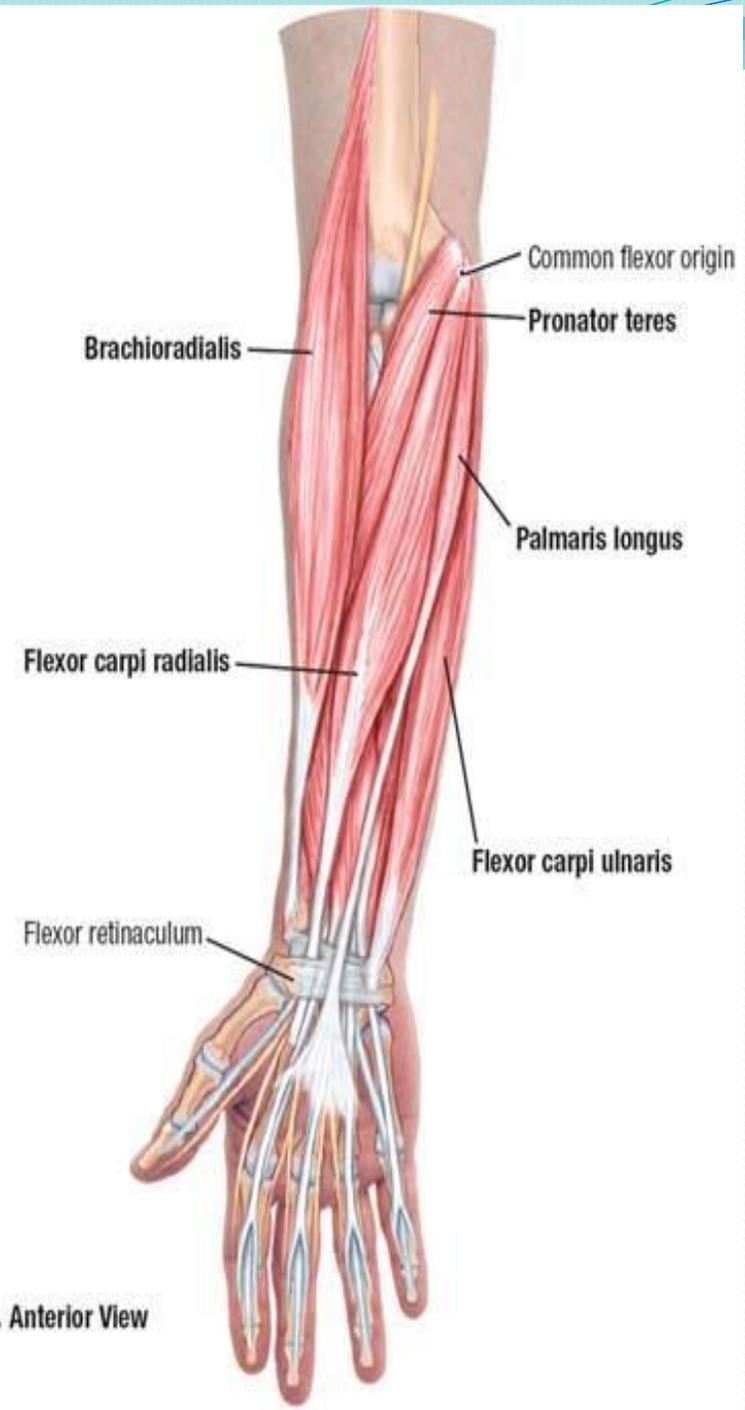
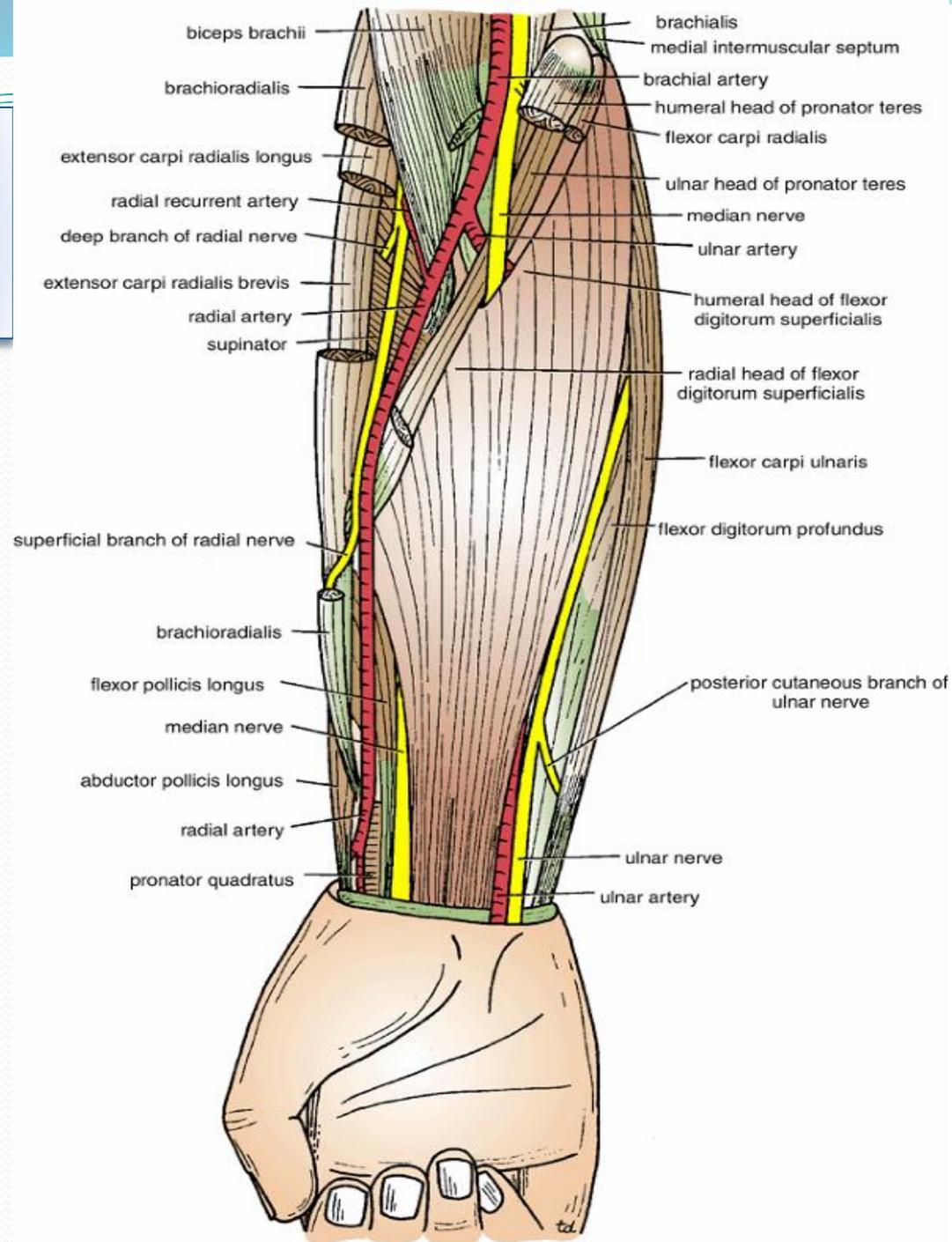
- **Muscles:** Brachioradialis and extensor carpi radialis longus
- **Blood supply:** Radial and brachial arteries
- **Nerve supply to the muscles:** Radial nerve

**Table 9-7 Muscles of the Lateral Fascial Compartment of the Forearm**

<b>Muscle</b>	<b>Origin</b>	<b>Insertion</b>	<b>Nerve Supply</b>	<b>Nerve Roots</b>	<b>Action</b>
Brachioradialis	Lateral supracondylar ridge of humerus	Base of styloid process of radius	Radial nerve	<b>C5, 6, 7</b>	Flexes forearm at a ridge of humerus elbow joint; rotates forearm to the midprone position
Extensor carpi radialis longus	Lateral supracondylar ridge of humerus	Posterior surface of base of second metacarpal bone	Radial nerve	<b>C6, 7</b>	Extends and abducts hand at wrist joint

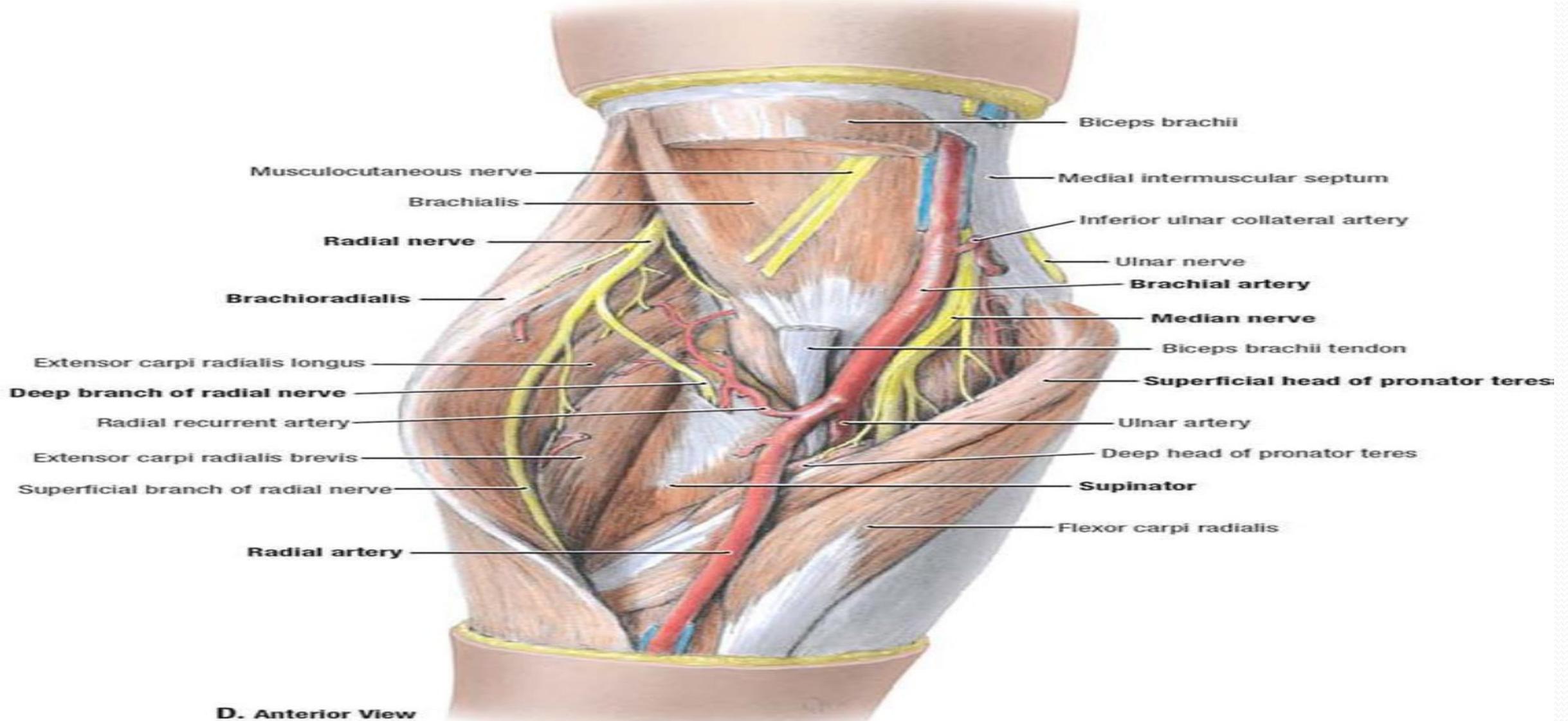
<sup>a</sup> The predominant nerve root supply is indicated by boldface type.

# Muscles of the Lateral Fascial Compartment of the Forearm



# Arteries of the Lateral Compartment of the Forearm

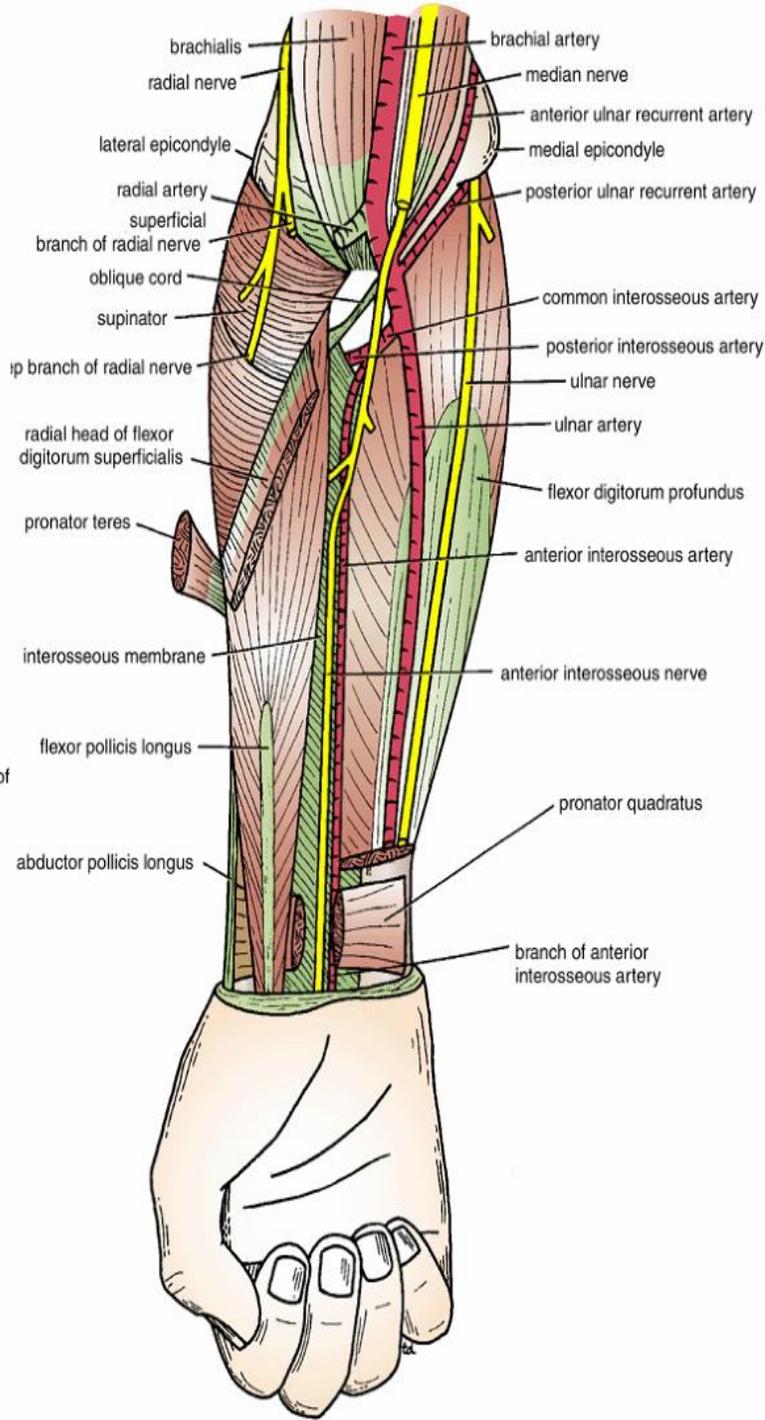
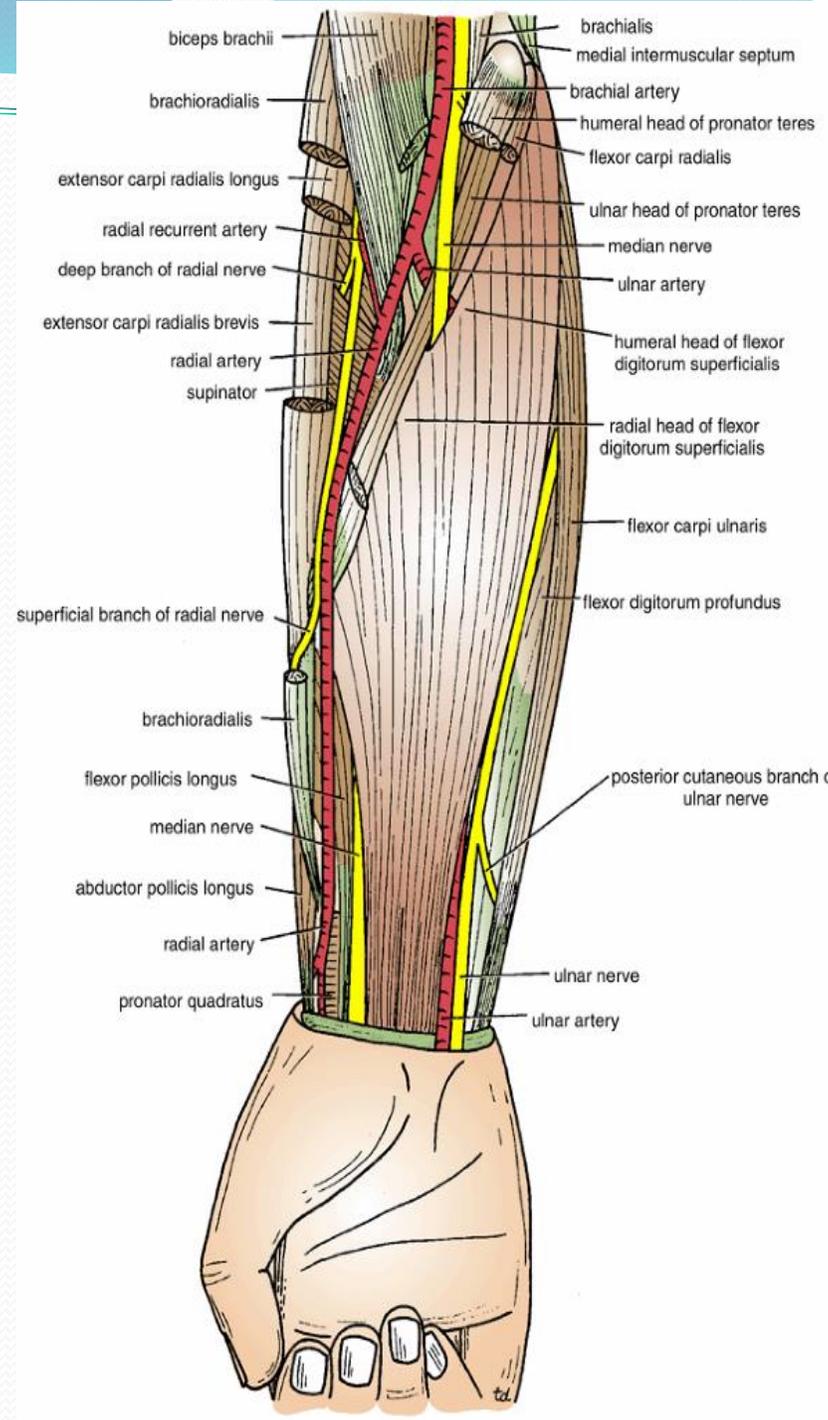
- The arterial supply is derived from branches of the **radial** and **brachial** arteries.



# Nerve of the Lateral Compartment of the Forearm

## Radial Nerve

- The **radial nerve** pierces the **lateral intermuscular septum** in the lower part of the arm and passes forward into the cubital fossa.
- It then passes downward in front of the **lateral epicondyle** of the humerus, lying between the brachialis on the medial side and the brachioradialis and extensor carpi radialis longus on the lateral side.
- At the level of the lateral epicondyle, it divides into **superficial** and **deep** branches.



# Branches of Radial Nerve

## Muscular branches

- to the brachioradialis, to the extensor carpi radialis longus, and a small branch to the lateral part of the brachialis muscle.

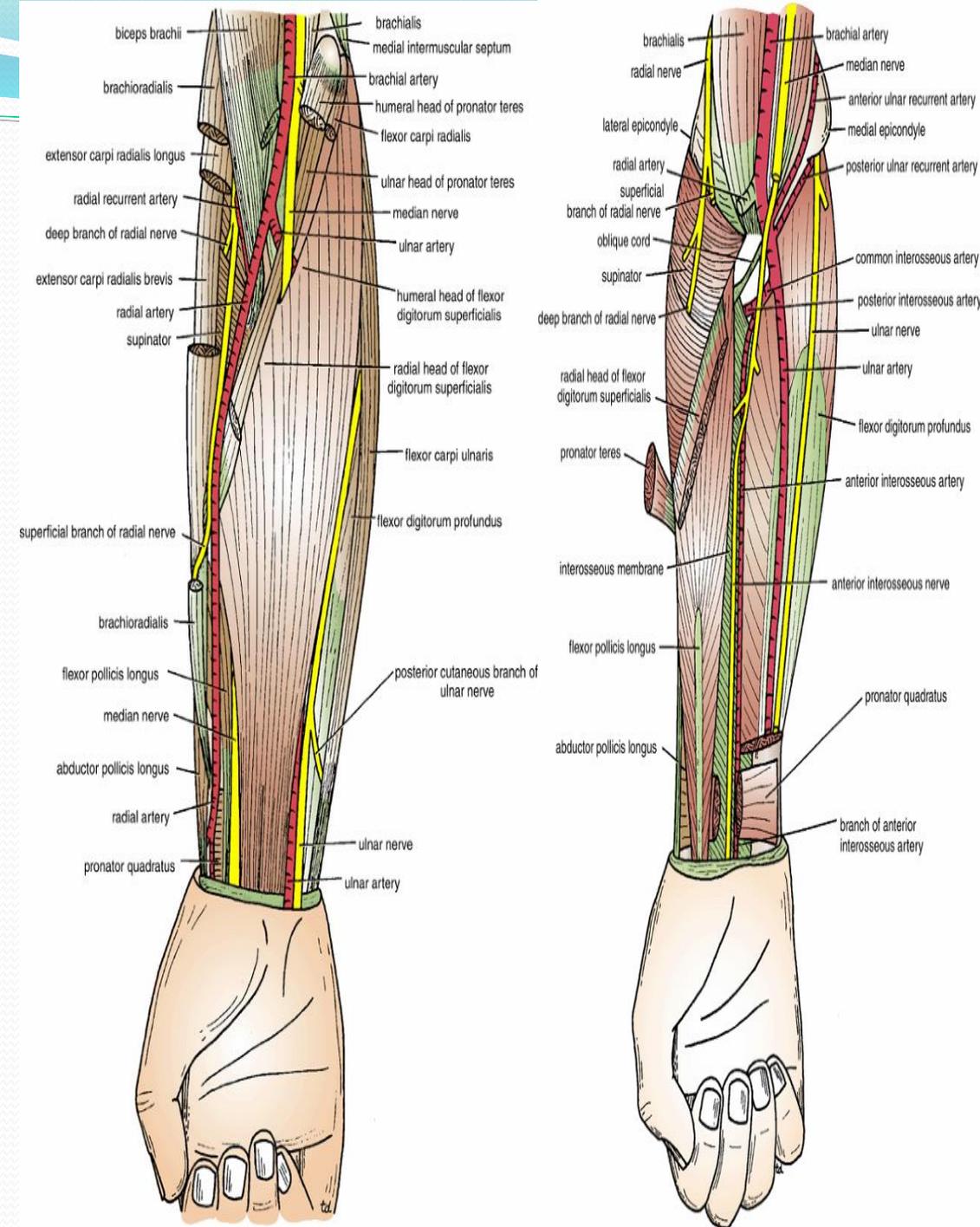
## Articular branches to the elbow joint

### Deep branch of the radial nerve.

- This winds around the neck of the radius, within the supinator muscle and enters the posterior compartment of the forearm

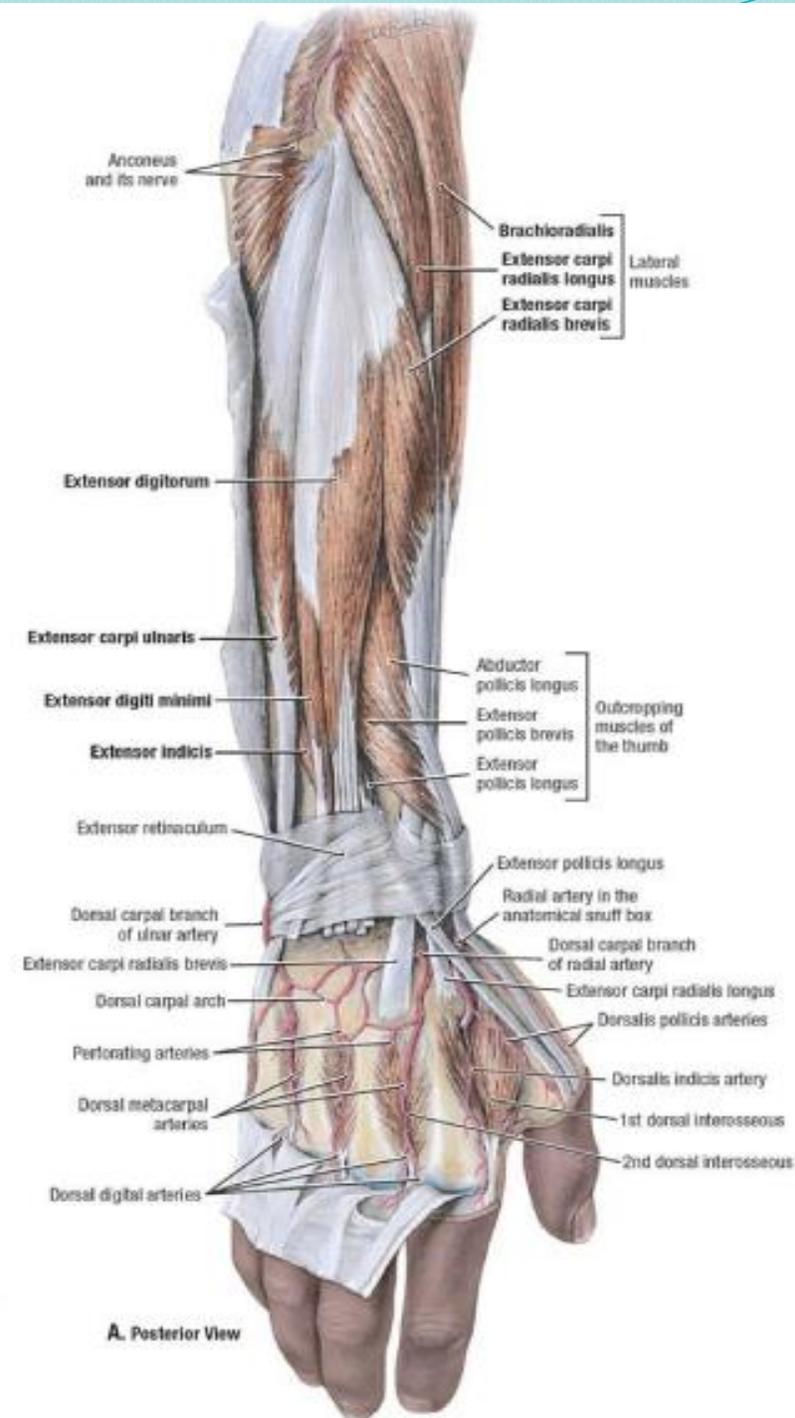
### Superficial branch of the radial nerve

- is the direct continuation of the nerve. It runs down under cover of the brachioradialis muscle on the lateral side of the radial artery.
- In the distal part of the forearm, it leaves the artery and passes backward under the tendon of the brachioradialis.
- It reaches the posterior surface of the wrist, where it divides into terminal branches that supply the skin on the lateral two thirds of the posterior surface of the hand and the posterior surface over the proximal phalanges of the lateral three and a half fingers.

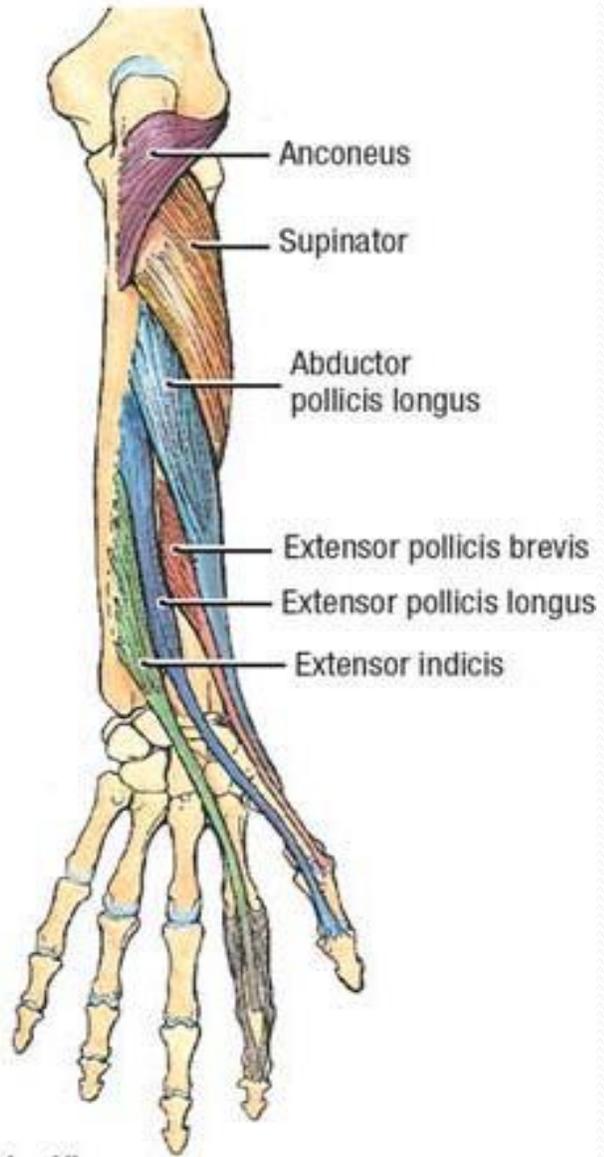


## Contents of the Posterior Fascial Compartment of the Forearm

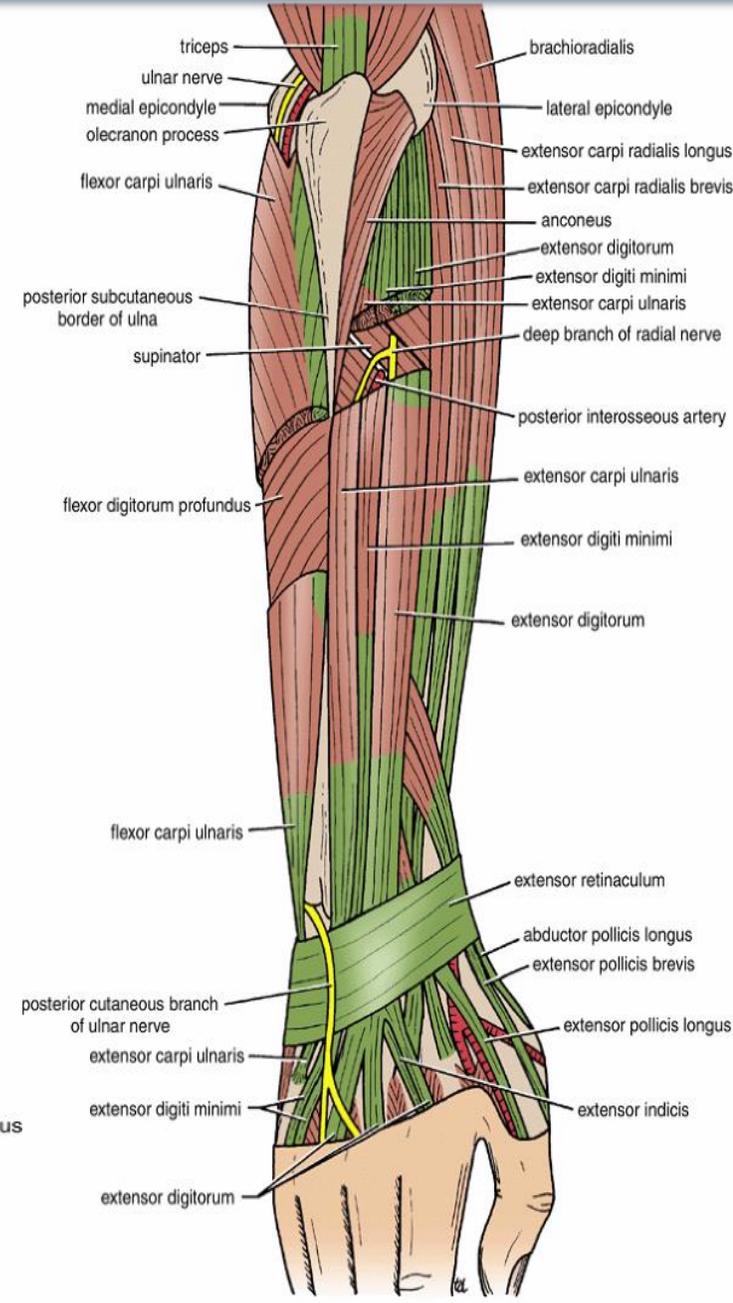
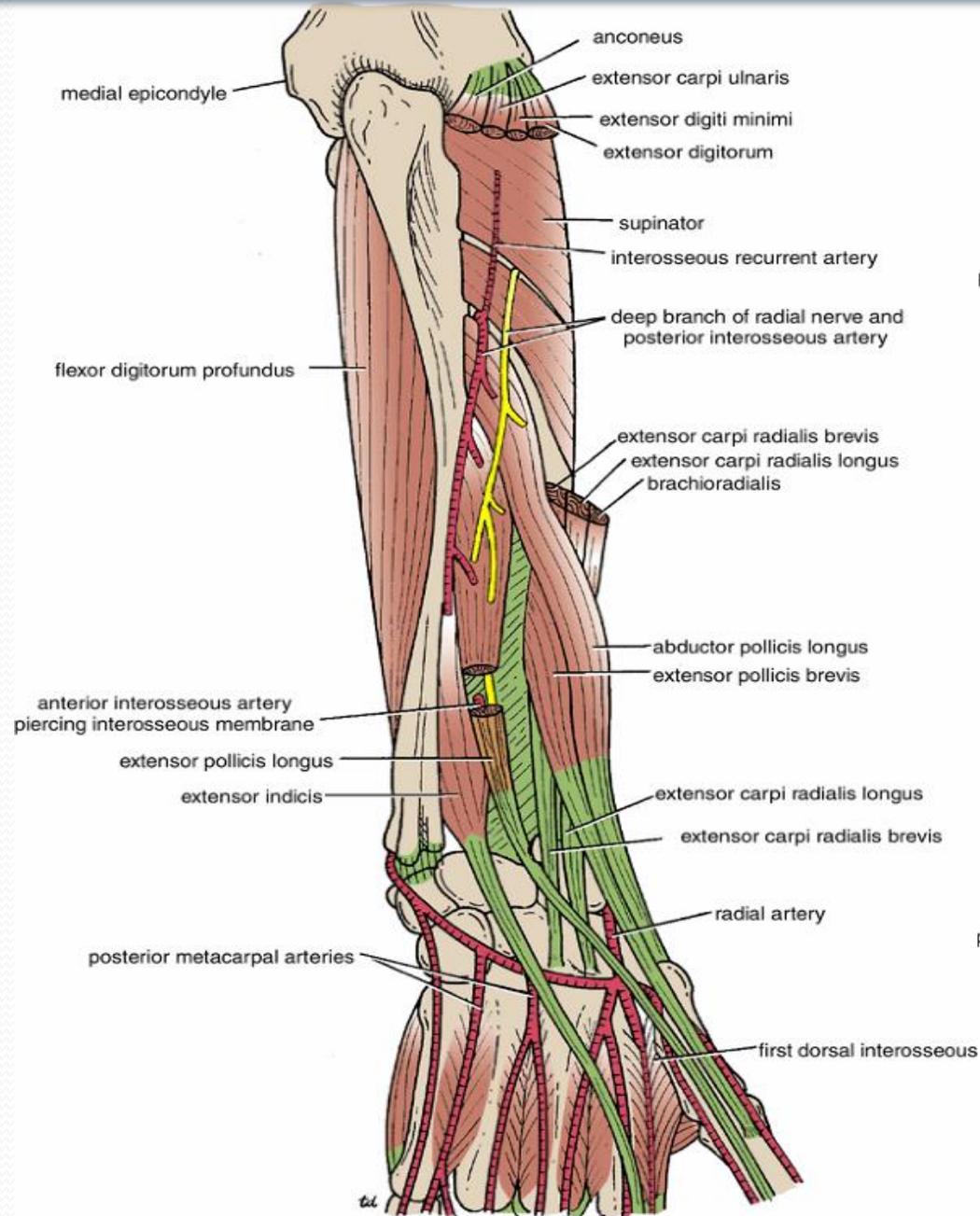
- **Muscles:** The **superficial group** includes the extensor carpi radialis brevis, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris, and anconeus. These muscles possess a common tendon of origin, which is attached to the lateral epicondyle of the humerus. The **deep group** includes the supinator, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, and extensor indicis.
- **Blood supply:** Posterior and anterior interosseous arteries
- **Nerve supply to the muscles:** Deep branch of the radial nerve



# Muscles of the Posterior Fascial Compartment of the Forearm



**B. Posterior View**



# Muscles of the Posterior Fascial Compartment of the Forearm

Muscle	Origin	Insertion	Nerve Supply	Nerve Roots <sup>a</sup>	Action
Extensor carpi radialis brevis	Lateral epicondyle of humerus	Posterior surface of base of third metacarpal bone	Deep branch of radial nerve	<b>C7, 8</b>	Extends and abducts hand at wrist joint
Extensor digitorum	Lateral epicondyle of humerus	Middle and distal phalanges of medial four fingers	Deep branch of radial nerve	<b>C7, 8</b>	Extends fingers and hand (see text for details)
Extensor digiti minimi	Lateral epicondyle of humerus	Extensor expansion of little finger	Deep branch of radial nerve	<b>C7, 8</b>	Extends metacarpal phalangeal joint of little finger
Extensor carpi ulnaris	Lateral epicondyle of humerus	Base of fifth metacarpal bone	Deep branch of radial nerve	<b>C7, 8</b>	Extends and adducts hand at wrist joint
Anconeus	Lateral epicondyle of humerus	Lateral surface of olecranon process of ulna	Radial nerve	<b>C7, 8; T1</b>	Extends elbow joint
Supinator	Lateral epicondyle of humerus, annular ligament of proximal radioulnar joint, and ulna	Neck and shaft of radius	Deep branch of radial nerve	<b>C5, 6</b>	Supination of forearm
Abductor pollicis longus	Posterior surface of shafts of radius and ulna	Base of first metacarpal bone	Deep branch of radial nerve	<b>C7, 8</b>	Abducts and extends thumb
Extensor pollicis brevis	Posterior surface of shaft of radius	Base of proximal phalanx of thumb	Deep branch of radial nerve	<b>C7, 8</b>	Extends metacarpophalangeal joints of thumb
Extensor pollicis longus	Posterior surface of shaft of ulna	Base of distal phalanx of thumb	Deep branch of radial nerve	<b>C7, 8</b>	Extends distal phalanx of thumb
Extensor indicis	Posterior surface of shaft of ulna	Extensor expansion of index finger	Deep branch of radial nerve	<b>C7, 8</b>	Extends metacarpophalangeal joint of index finger

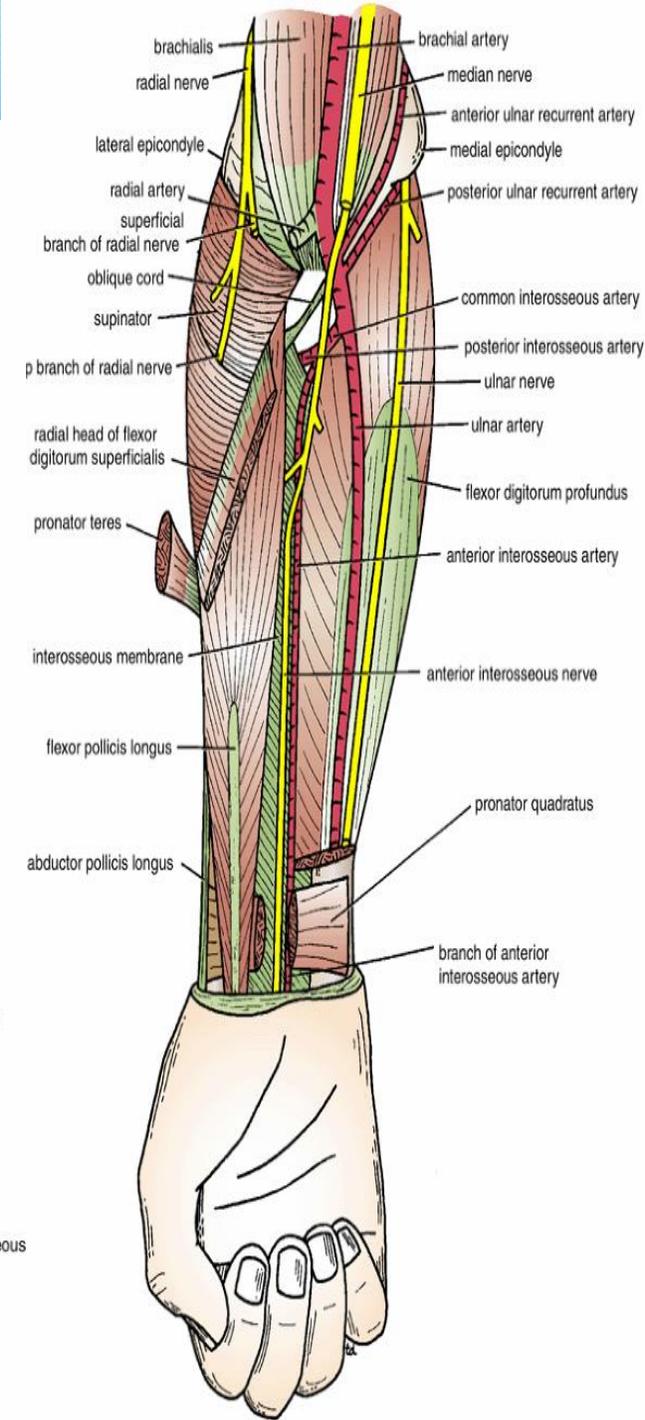
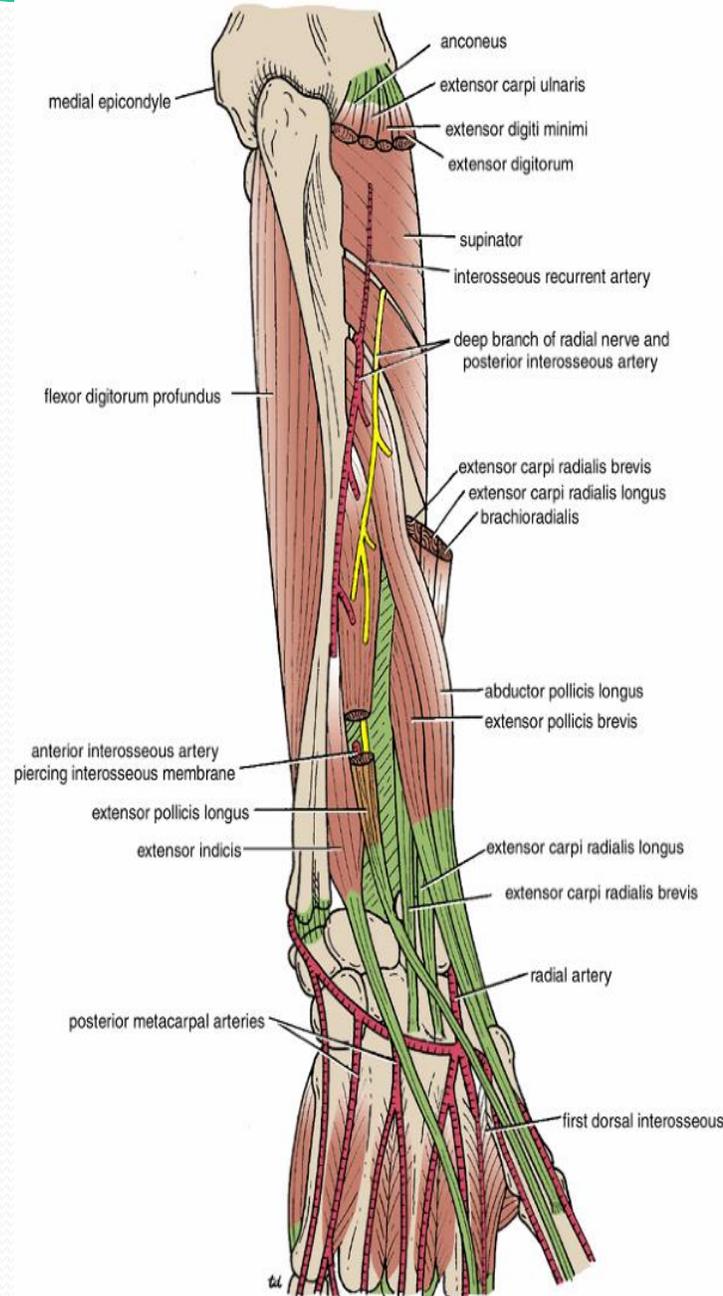
<sup>a</sup> The predominant nerve root supply is indicated by boldface type.

# Deep Branch of the Radial Nerve

- The **deep branch** arises from the **radial nerve** in front of the lateral epicondyle of the humerus in the cubital fossa.
- It pierces the supinator and winds around the lateral aspect of the neck of the radius in the substance of the muscle to reach the posterior compartment of the forearm.
- The nerve descends in the interval between the superficial and deep groups of muscles.
- It eventually reaches the posterior surface of the wrist joint.

## Branches

- **Muscular branches** to the extensor carpi radialis brevis, supinator, Ext. digitorum, Ext. digiti minimi, Ext. carpi ulnaris. Abductor pollicis longus, ext. pollicis brevis, ext. pollicis longus and Ext. indicis
- **Articular branches** to the wrist carpal joints.



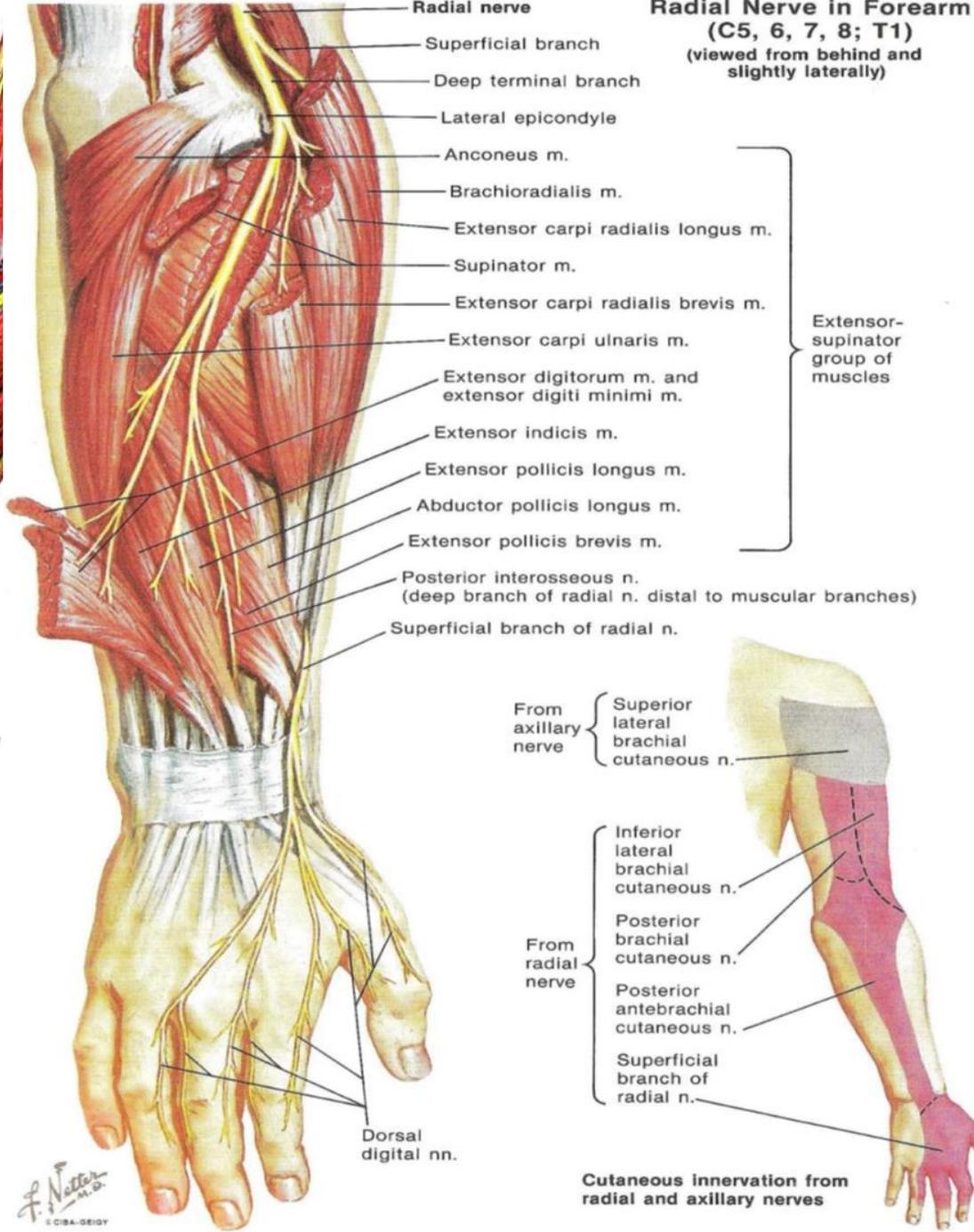
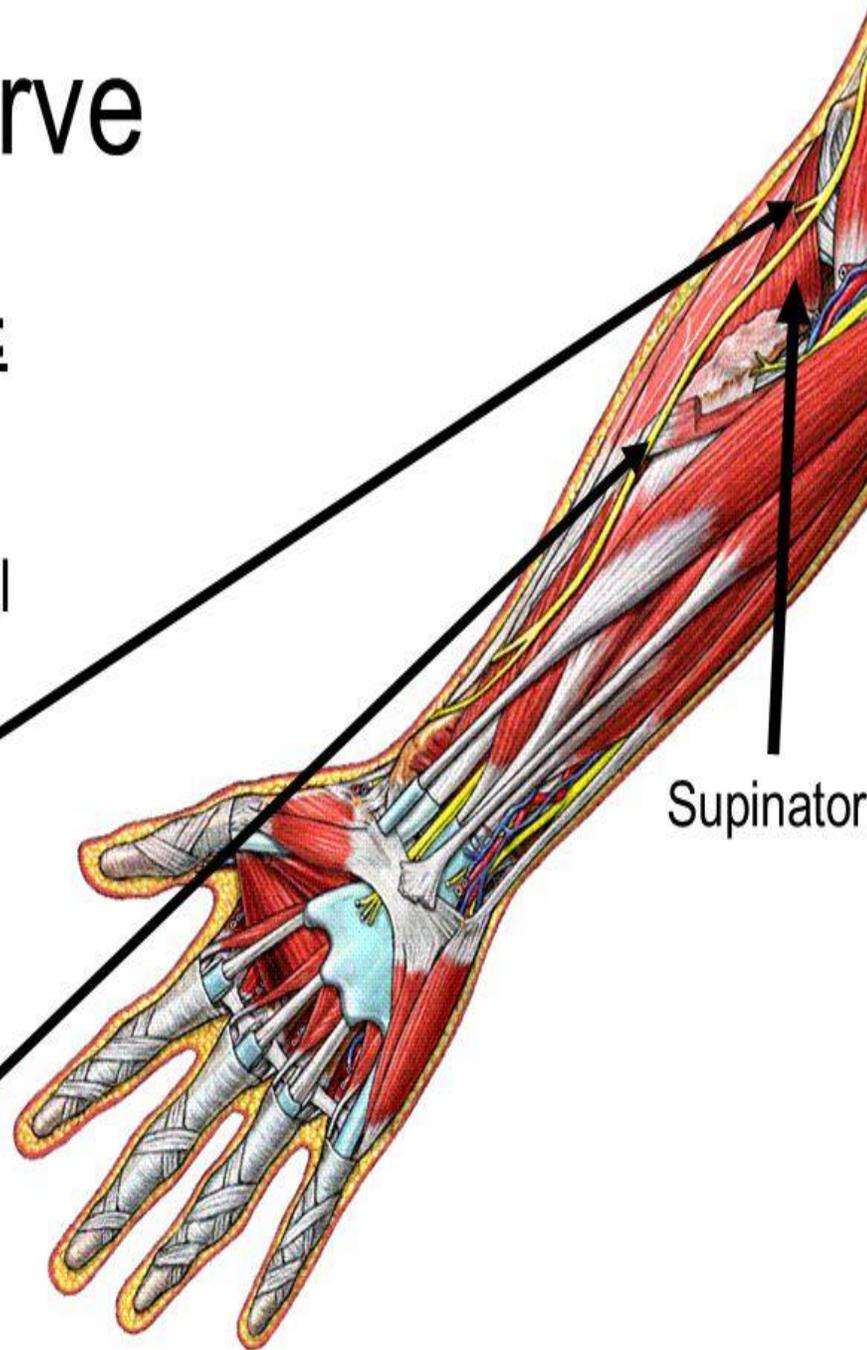
# Radial Nerve

C5,6,7,8,T1

## Course & Relations:

### Forearm

In front of the lateral epicondyle it gives the posterior interosseous & continues downwards as the superficial radial nerve.



**Radial Nerve in Forearm**  
(C5, 6, 7, 8; T1)  
(viewed from behind and slightly laterally)

Extensor-supinator group of muscles

From axillary nerve

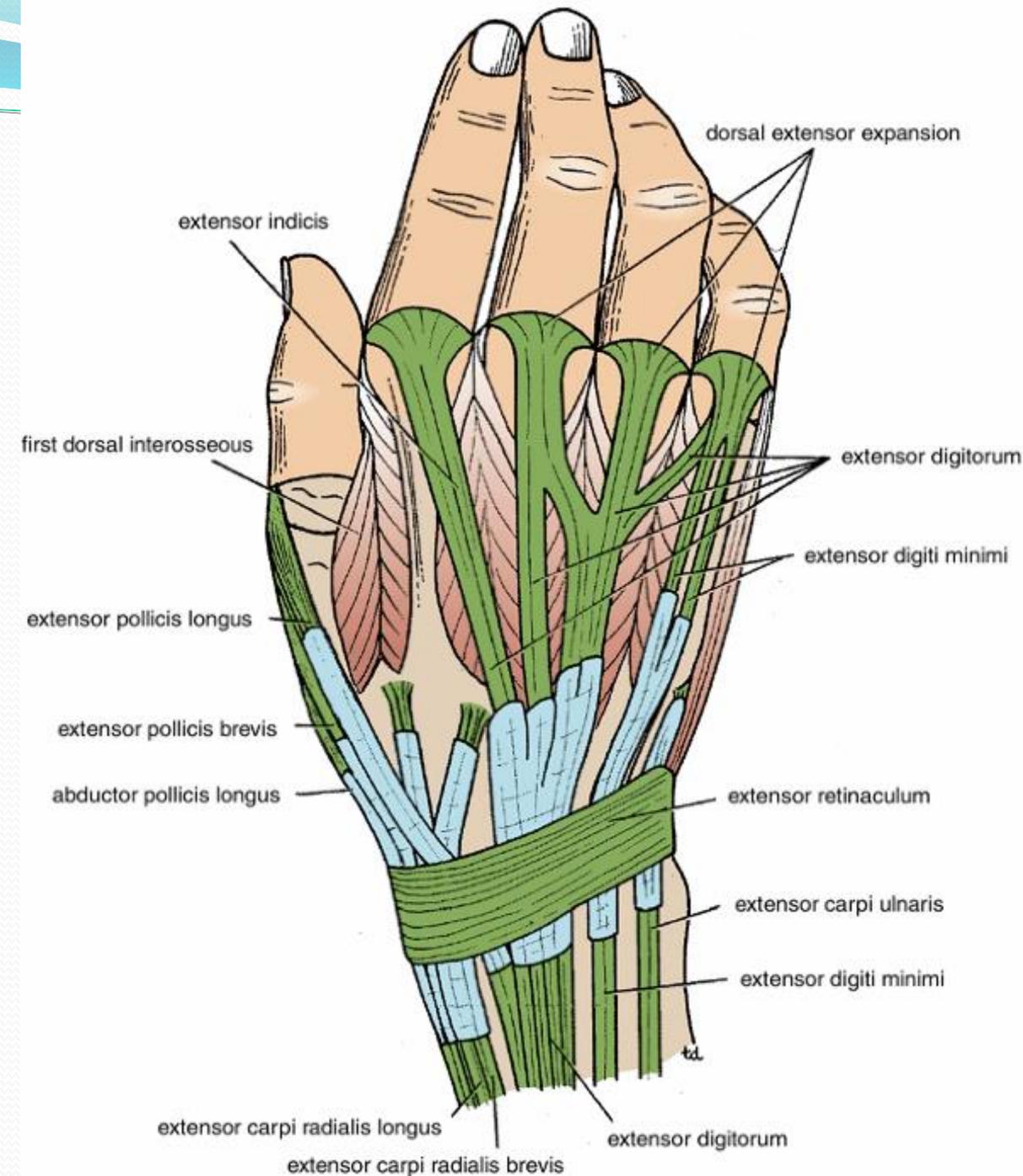
From radial nerve

Cutaneous innervation from radial and axillary nerves

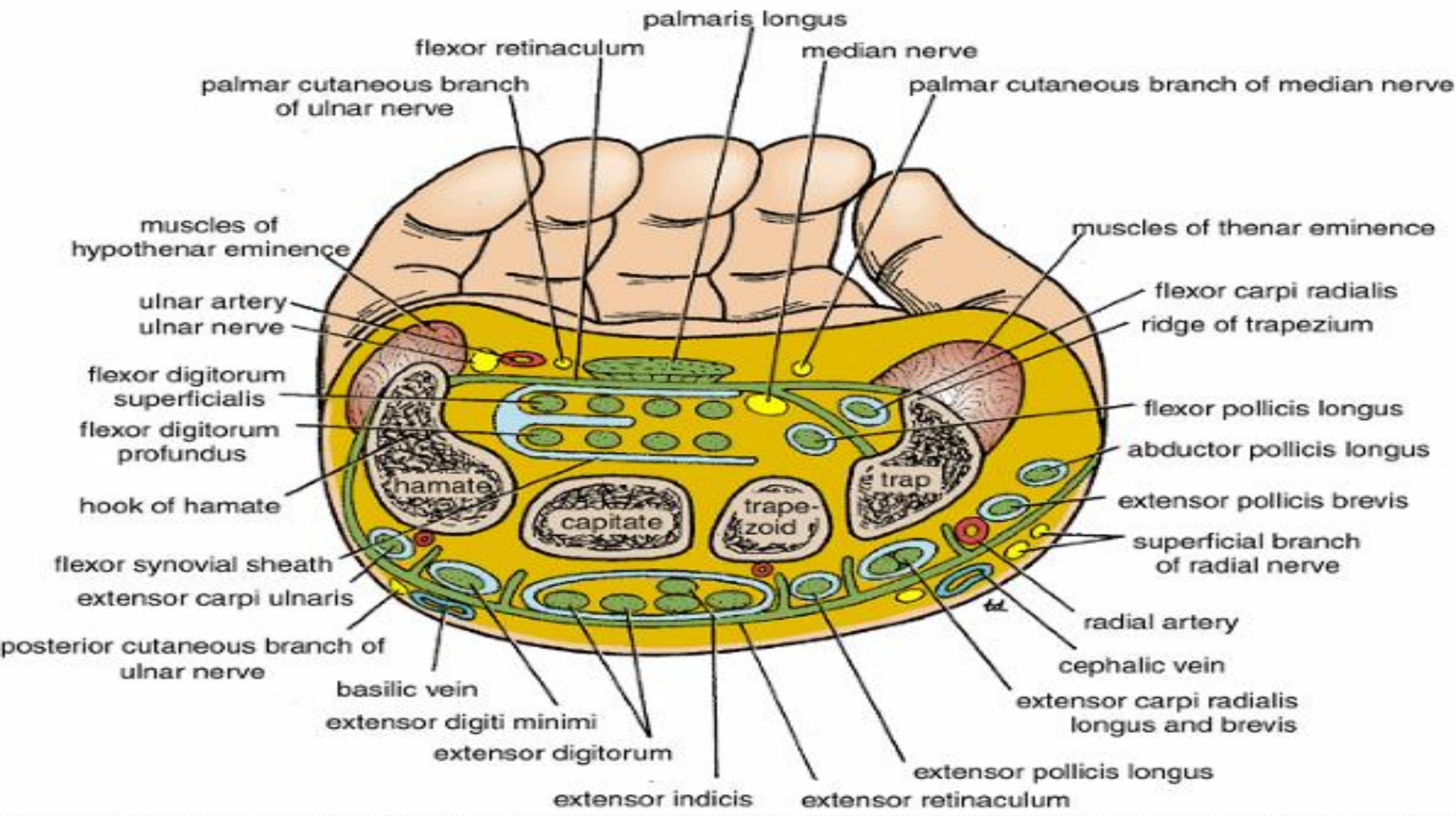
F. Netter M.D.  
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# Extensor Retinaculum

- The extensor retinaculum is a thickening of deep fascia that stretches across the back of the wrist and holds the long extensor tendons in position.
- It converts the grooves on the posterior surface of the distal ends of the radius and ulna into six separate tunnels for the passage of the long extensor tendons.
- Each tunnel is lined with a synovial sheath, which extends above and below the retinaculum on the tendons.
- The tunnels are separated from one another by fibrous septa that pass from the deep surface of the retinaculum to the bones.
- The retinaculum is attached medially to the pisiform bone and the hook of the hamate and laterally to the distal end of the radius.
- The upper and lower borders of the retinaculum are continuous with the deep fascia of the forearm and hand, respectively.

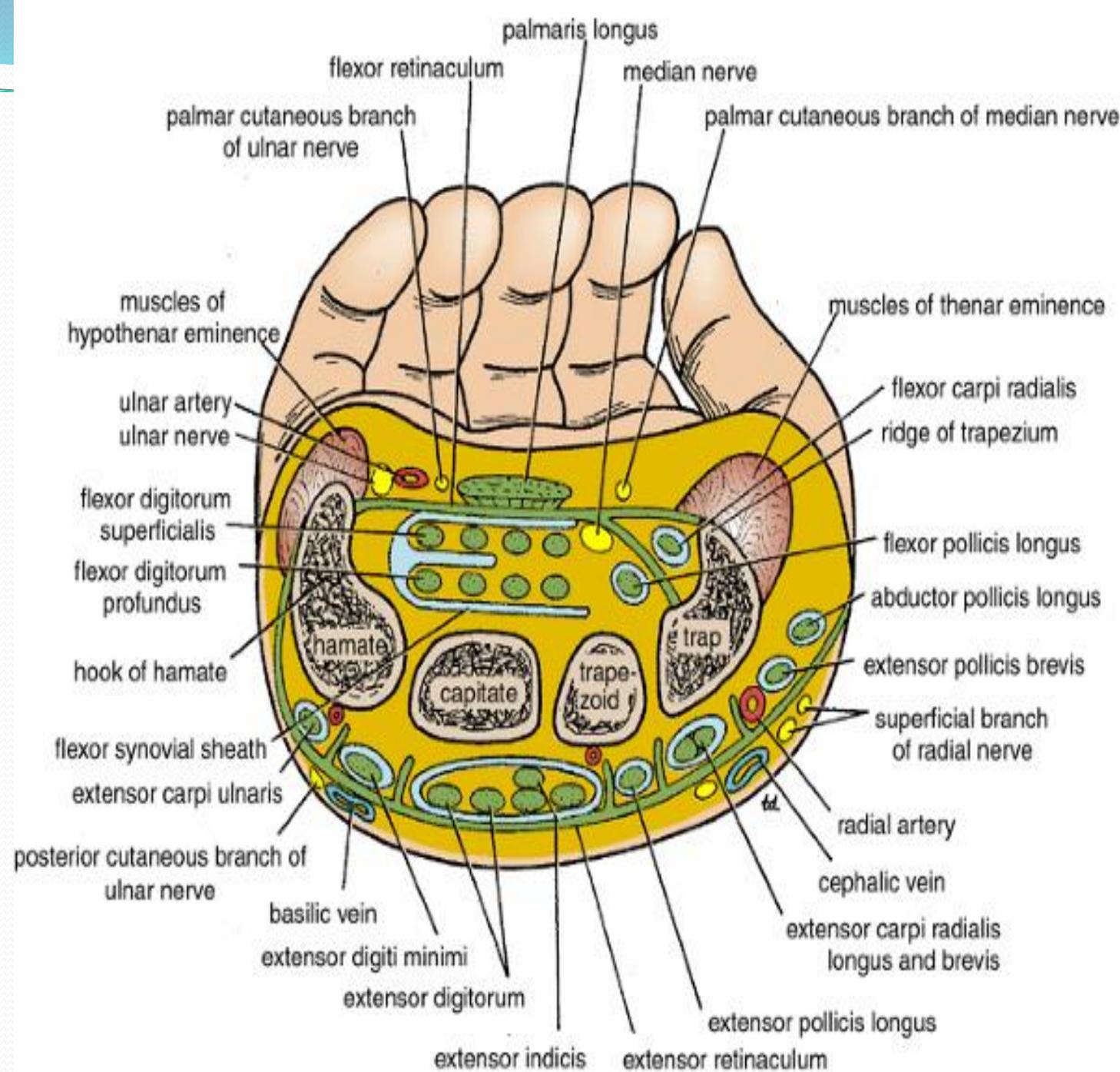


- **Structures passing posterior (superficial) to the extensor retinaculum; from medial to lateral: Dorsal cutaneous branch of the ulnar nerve → Basilic vein → Cephalic vein → Superficial branch of the radial nerve**
- **Structures passing anterior (deep) to the extensor retinaculum; from medial to lateral: Extensor carpi ulnaris tendon → Extensor digiti minimi tendon → Extensor digitorum and extensor indicis tendons (in a common sheath) → extensor pollicis longus tendon → Extensor carpi radialis longus and extensor carpi radialis brevis tendons (in a common sheath) → Tendons of abductor pollicis longus & extensor pollicis brevis and the radial artery.**



# The Region of the Wrist

- Before learning the anatomy of the hand, it is essential that a student have a sound knowledge of the arrangement of the tendons, arteries, and nerves in the region of the wrist joint.
- From a clinical standpoint, the wrist is a common site for injury.
- In a transverse section through the wrist, identify the structures from medial to lateral.
- At the same time, examine your own wrist and identify as many of the structures as possible.



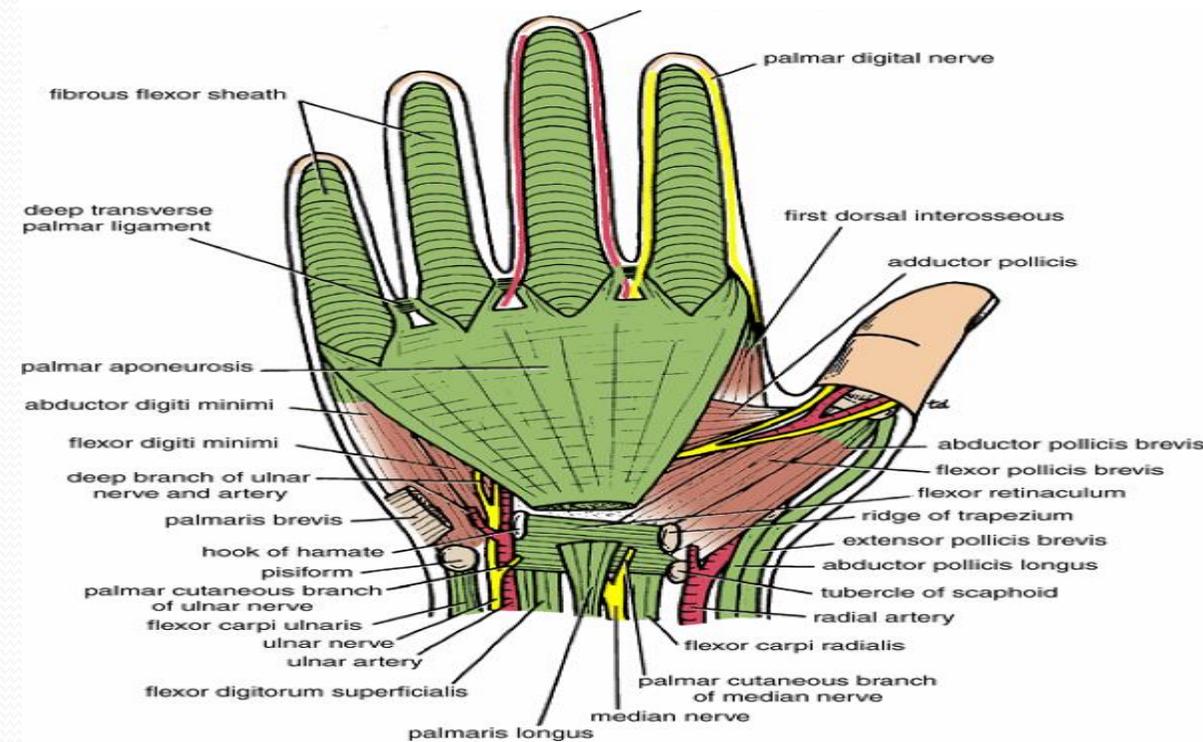
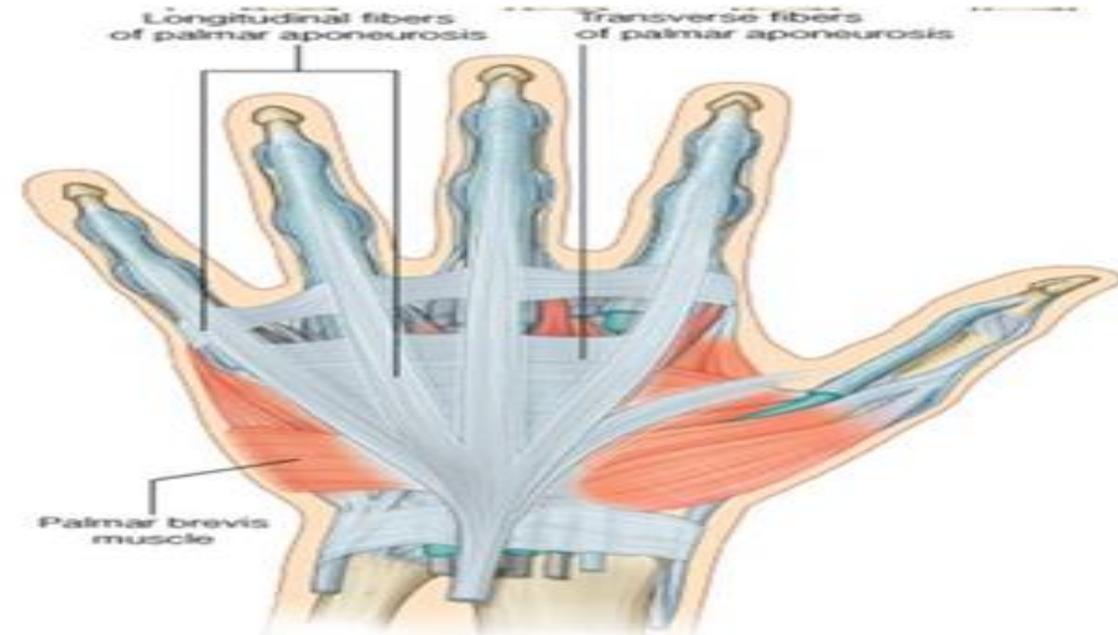
# The Palm of the Hand

## Skin

- The skin of the palm of the hand is thick and hairless.
- It is bound down to the underlying deep fascia by numerous fibrous bands.
- Sweat glands are present in large numbers.

The **palmaris brevis** is a small muscle that arises from the flexor retinaculum and palmar aponeurosis and is inserted into the skin of the palm. It is supplied by the superficial branch of the ulnar nerve. Its function is to corrugate the skin at the base of the hypothenar eminence and so improve the grip of the palm in holding a rounded object

- The **sensory nerve** supply to the skin of the palm is derived from the **palmar cutaneous branch of the median nerve**, which crosses in front of the flexor retinaculum and supplies the lateral part of the palm and the **palmar cutaneous branch of the ulnar nerve**; the latter nerve also crosses in front of the flexor retinaculum and supplies the medial part of the palm.
- The skin over the base of the thenar eminence is supplied by the **lateral cutaneous nerve of the forearm** or the **superficial branch of the radial nerve**.



# Muscles of hand

## • Lateral group – thenar (4)

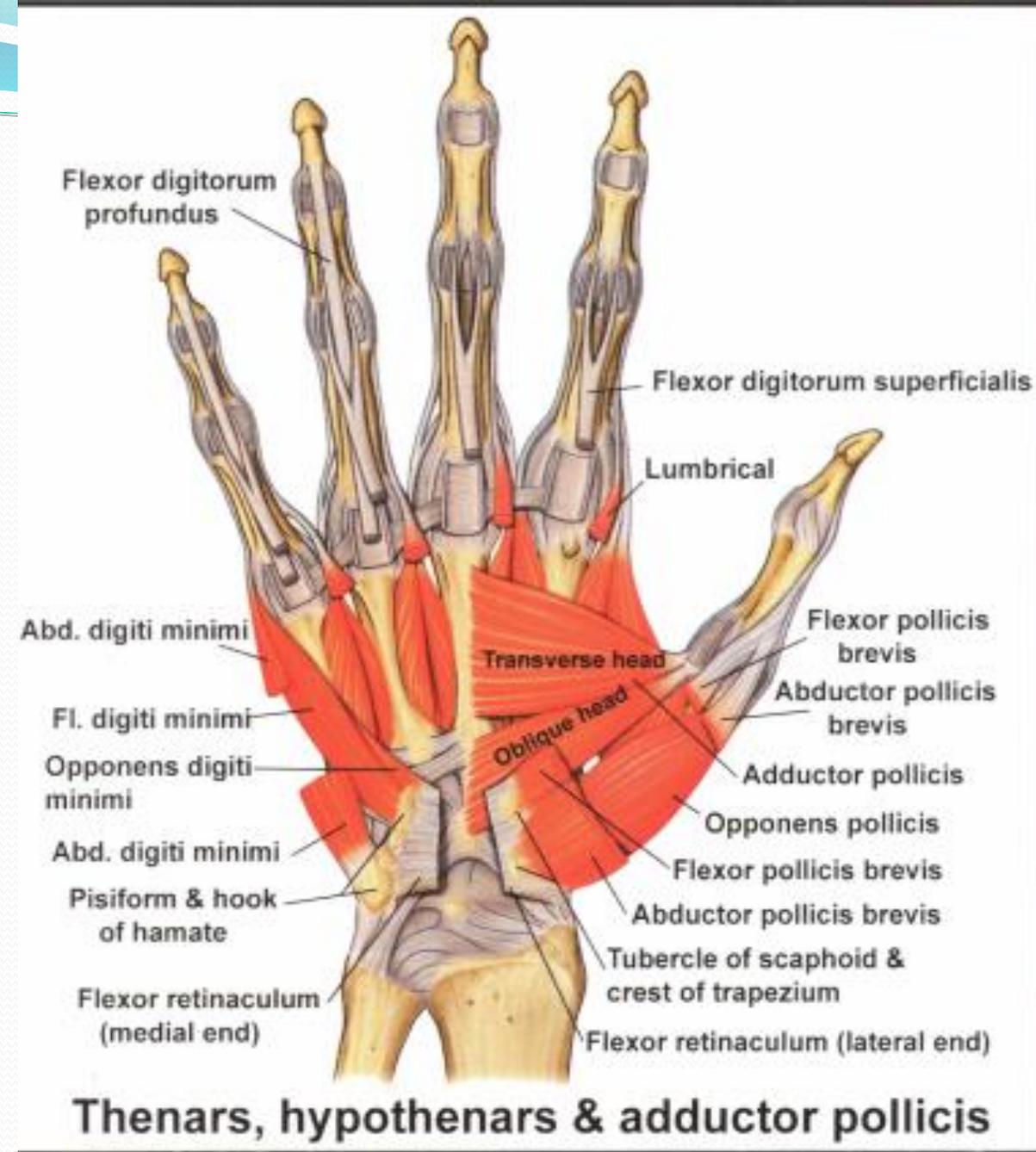
- Abductor pollicis brevis
- Flexor pollicis brevis
- Opponens pollicis
- Adductor pollicis

## • Action: flex, abduct, adduct and oppose thumb

## • Medial group – hypothenar (3)

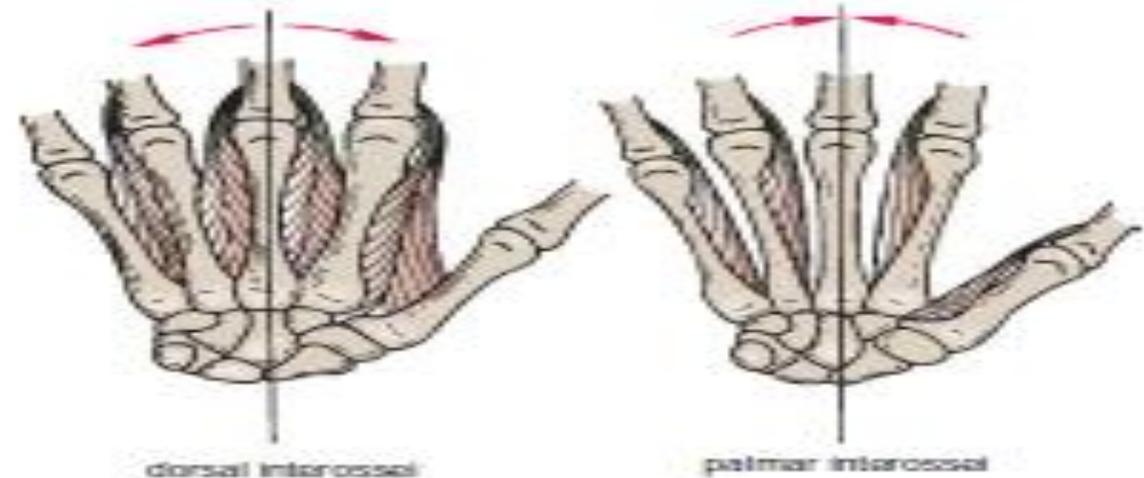
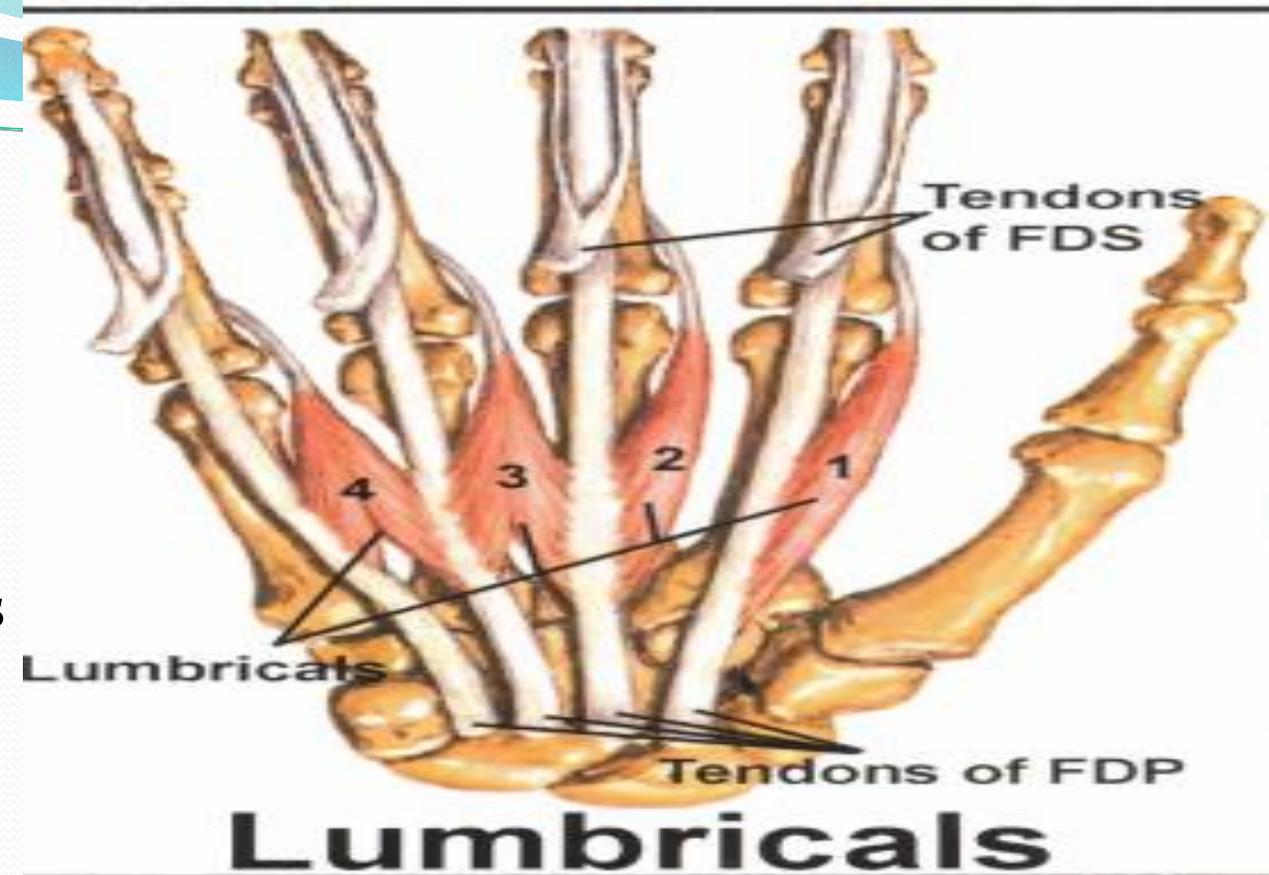
- Abductor digiti minimi
- Flexor digiti minimi brevis
- Opponens digiti minimi

## • Action: flex, abduct, and oppose little finger

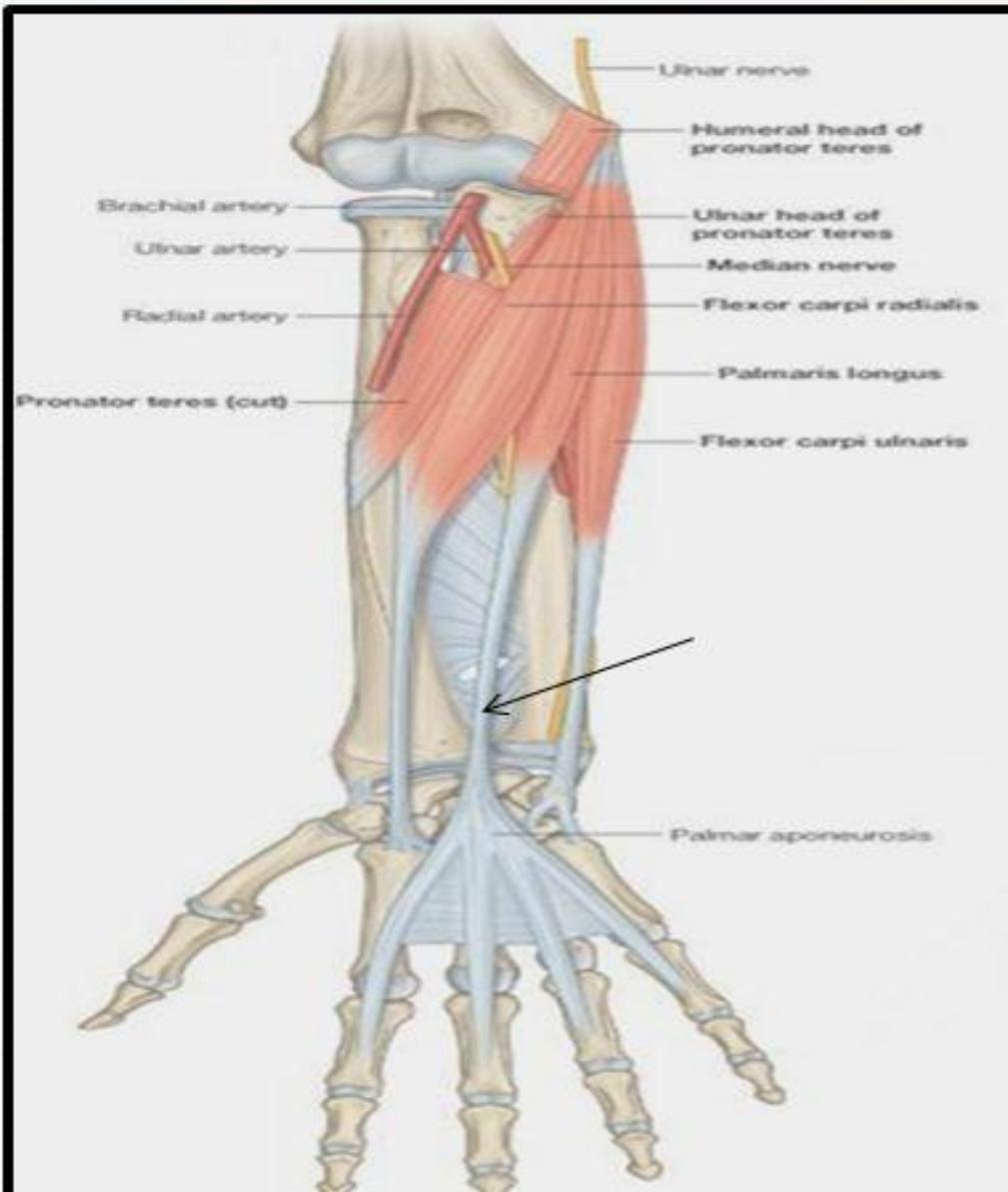


# Intermedial group

- **Lumbricales (4)** – flex fingers at MP joints; extend fingers at IP joints
- **Palmar interossei (4)** – adduct fingers towards middle finger at MP joints
- **Dorsal interossei (4)** – abduct fingers away from middle finger at MP joints



# Palmar Aponeurosis



- **Thickened deep fascia of the Palm.**
- Triangular in shape , occupies the central area of the palm.
- **Apex:** attached to the distal border of flexor retinaculum and receives the insertion of palmaris longus tendon.
- **Base :** divides at the bases of the fingers into four slips that pass into the fingers.
- **Functions:**
  1. Firmly attached to the overlying skin and improves the grip.
  2. Protects the underlying tendons, vessels & nerves.
  3. Gives origin to palmaris brevis.

# Artery of Hand

## Ulnar artery

### Course & relations:

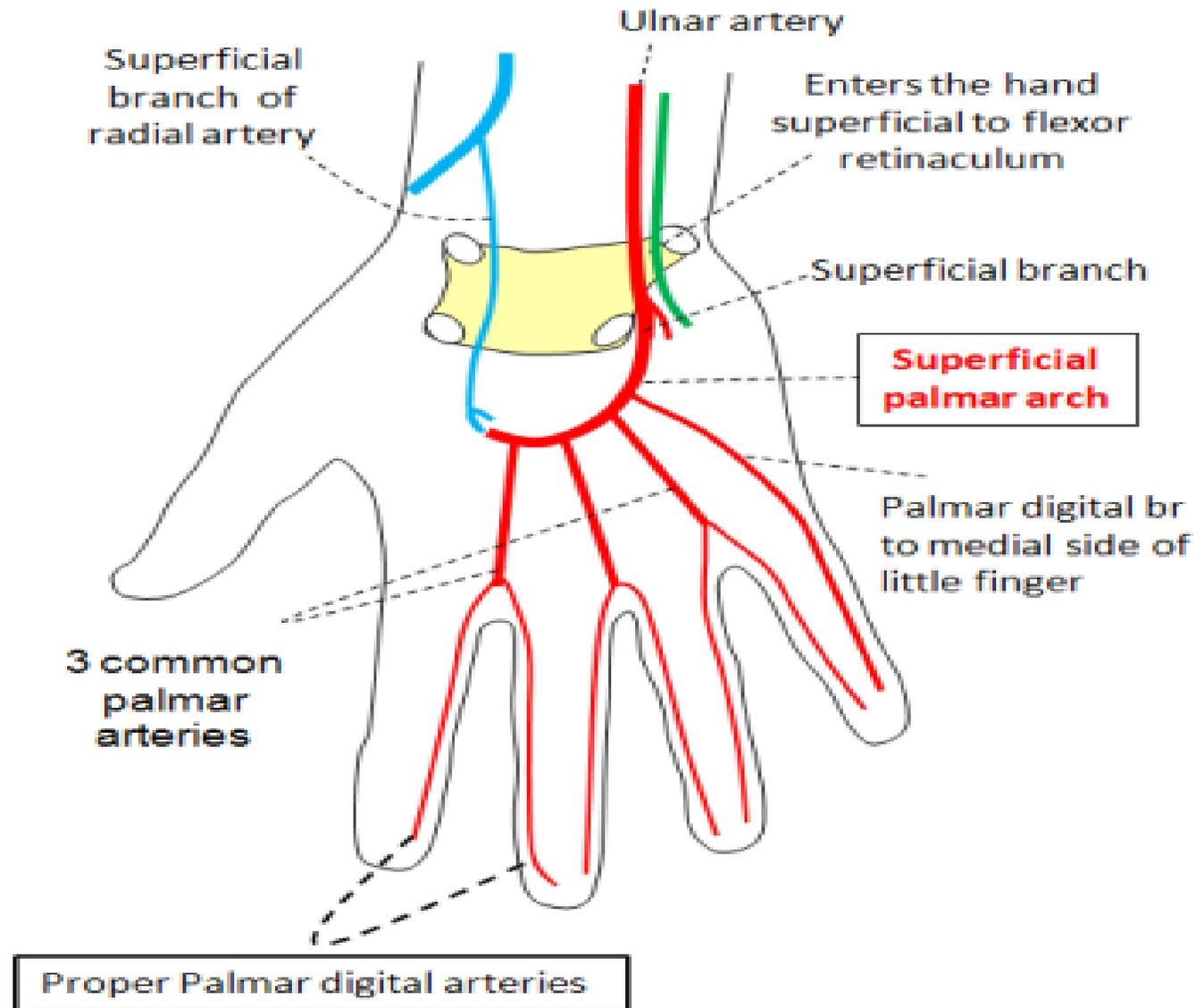
The ulnar artery enters the hand in front of the flexor retinaculum, lateral to the pisiform bone & ulnar nerve. It passes between the pisiform & hook of hamate. It divides into superficial & deep branches. The superficial branch curves laterally to form the superficial palmar arch.

### The superficial palmar arch

- It lies deep to the palmar aponeurosis & superficial to the long flexor tendons & the cutaneous nerves.
- It is formed mainly by ulnar artery & completed by the superficial branch of radial artery.
- Its surface anatomy lies at the level of the distal border of fully extended thumb.

### Branches:

- **3 common palmar arteries**, which divide at the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> clefts into proper palmar digital arteries.
- **Palmar digital artery** to the medial side of little finger.



## Radial artery

### Course & relations:

It curves laterally crossing the styloid process of radius, scaphoid & trapezium in the floor of the anatomical snuff box. It enters the palm between the 2 heads of the 1<sup>st</sup> dorsal interosseous muscle. Then it passes between the 2 heads of adductor pollicis forming the deep palmar arch.

### Branches:

**1<sup>st</sup> dorsal metacarpal** to the back of the 1<sup>st</sup> cleft before it passes between the 2 heads of 1<sup>st</sup> dorsal interosseous muscle.

**Principis pollicis** – 2 branches to the palmar side of the thumb after leaving the 1<sup>st</sup> dorsal interosseous.

**Radialis indicis** to the radial side of the index finger after leaving the 1<sup>st</sup> dorsal interosseous.

## The Deep Palmar Arch

It lies deep to the long flexor tendons after the radial artery leaves the adductor pollicis.

It is formed mainly by the radial artery and completed by the deep branch of ulnar artery.

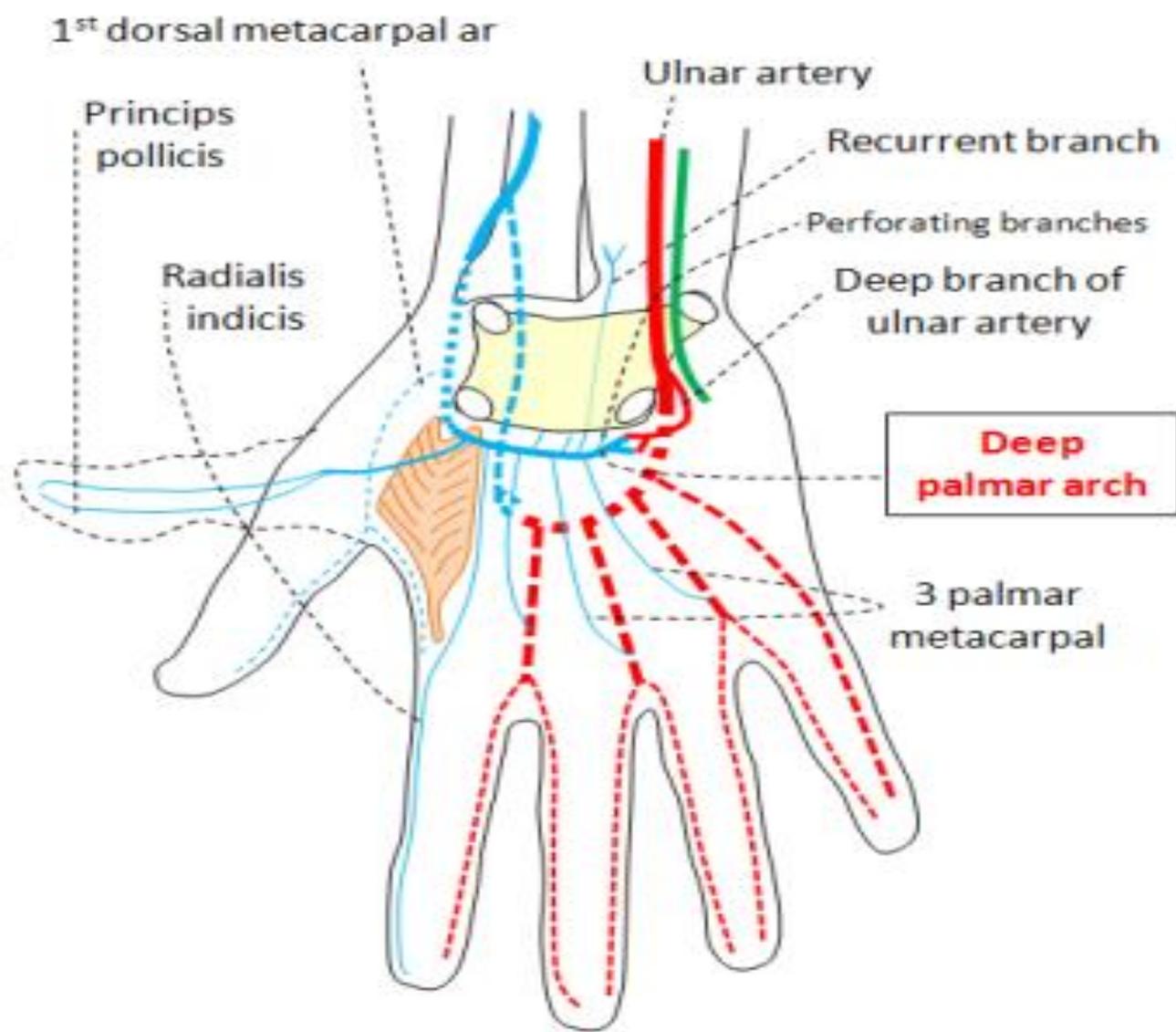
Its surface anatomy lies at the proximal border of the extended thumb, one finger breadth higher than the superficial arch.

### Branches:

**3 Palmar metacarpal arteries** to the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> clefts, they end by anastomosing with the common palmar arteries of the superficial arch.

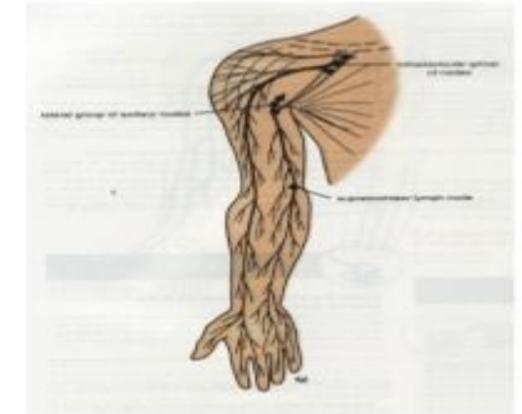
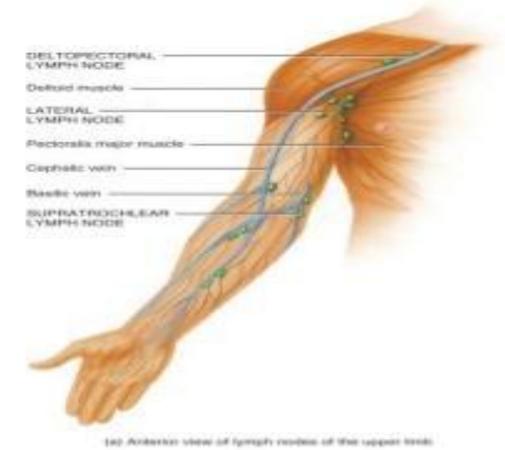
**Recurrent branch** – to join the palmar carpal arch.

**Perforating branches** which join the dorsal carpal arch



# Lymph Drainage of the Palm

- From the lateral side of the arm follow the cephalic vein to the infraclavicular group of nodes
- From the medial side follow the basilic vein to the lateral group of axillary nodes
- Deep lymphatic vessels draining the muscles and deep structures of the arm drain into the lateral group of axillary lymph nodes



## Sensory nerve supply of palm:

### 1. Palmar cutaneous branch of median n.

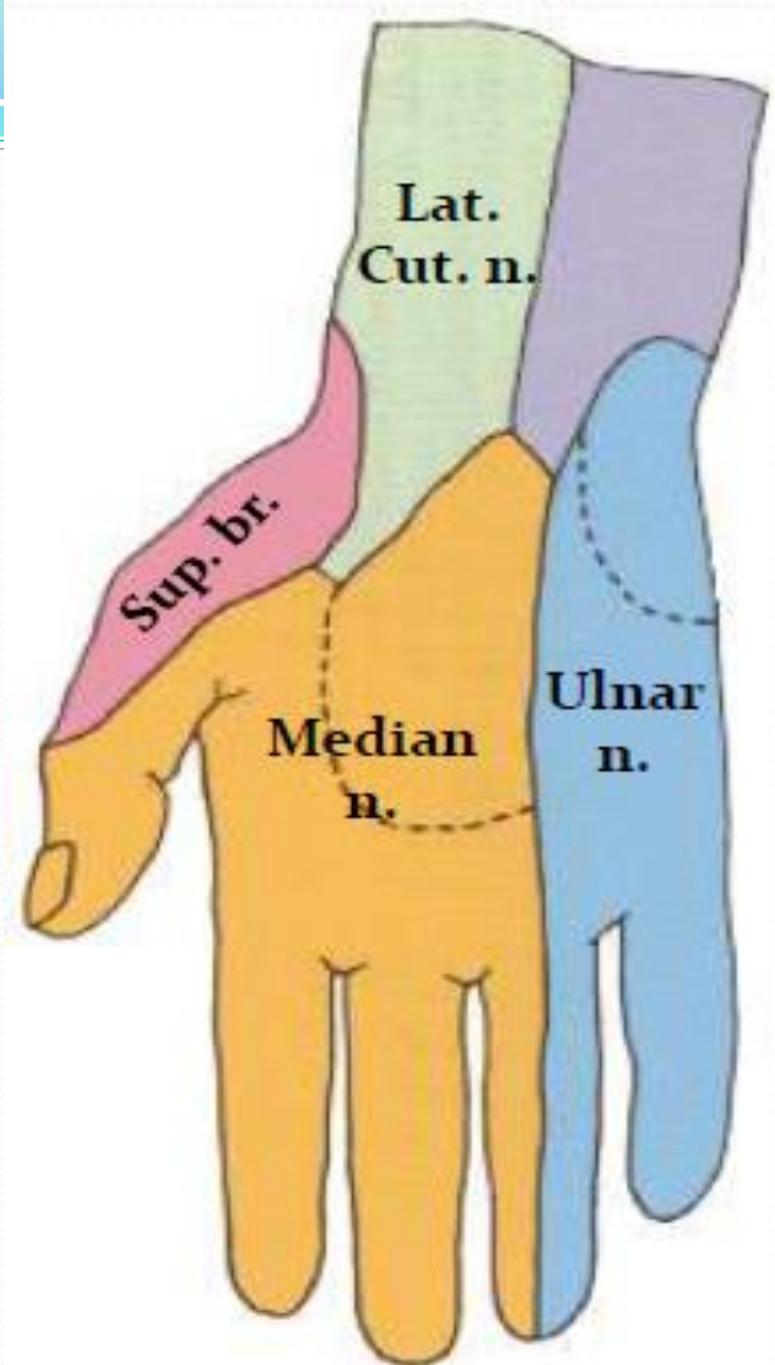
supplies the lateral part of the palm.

### 2. Palmar cutaneous branch of ulnar n.

supplies med. part of palm.

### 3. Skin over base of thenar eminence is supplied by **lat. cutaneous n. of forearm**

or **superficial branch** of radial n.



## Nerves of the palm:

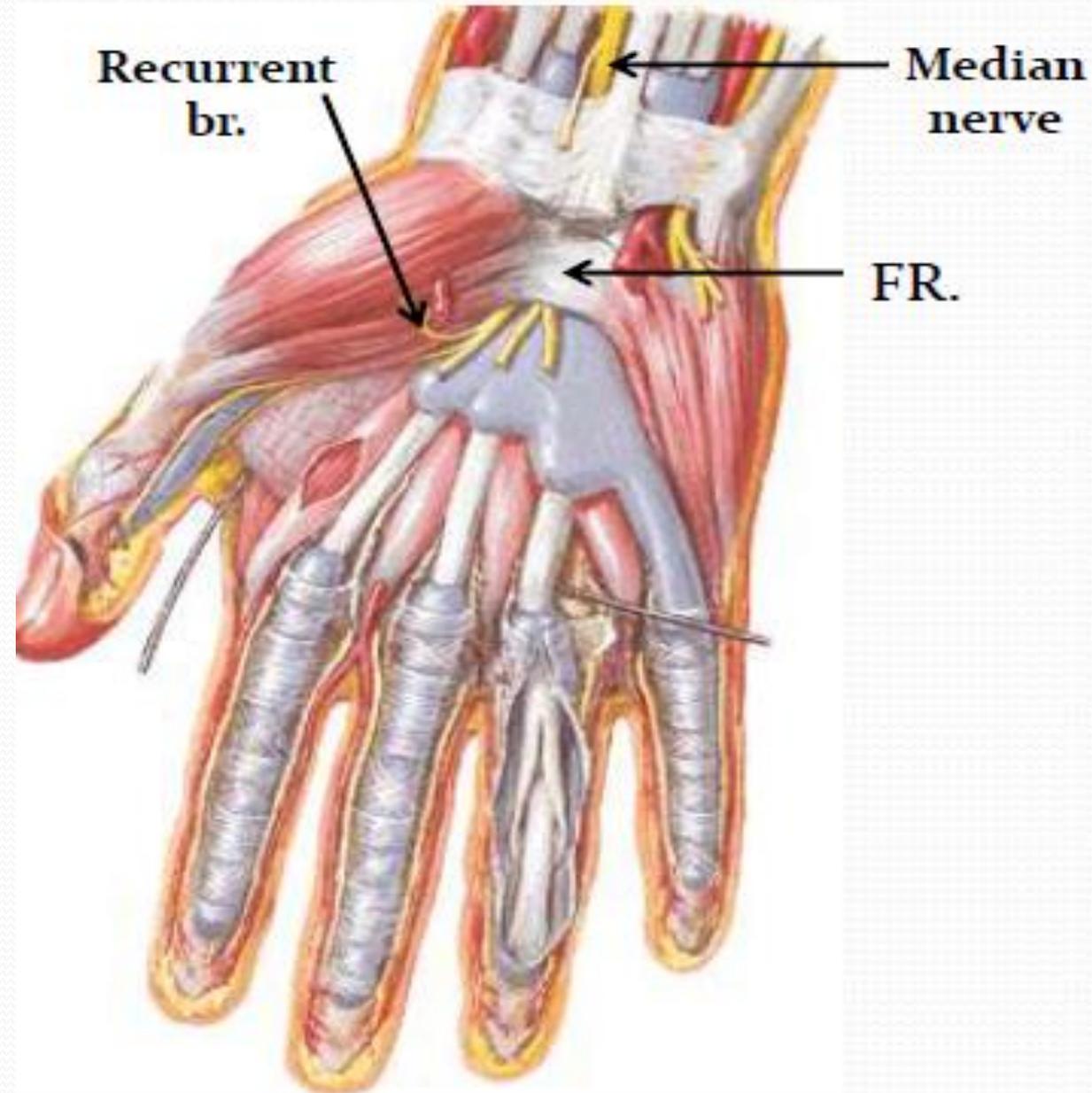
**Median n.** enters the palm by passing **behind FR**. It divides into lat. & med. branches.

**The muscular br.** takes a **recurrent course around lower border of FR**. it supplies muscles of thenar eminence & 1st lumbrical muscle

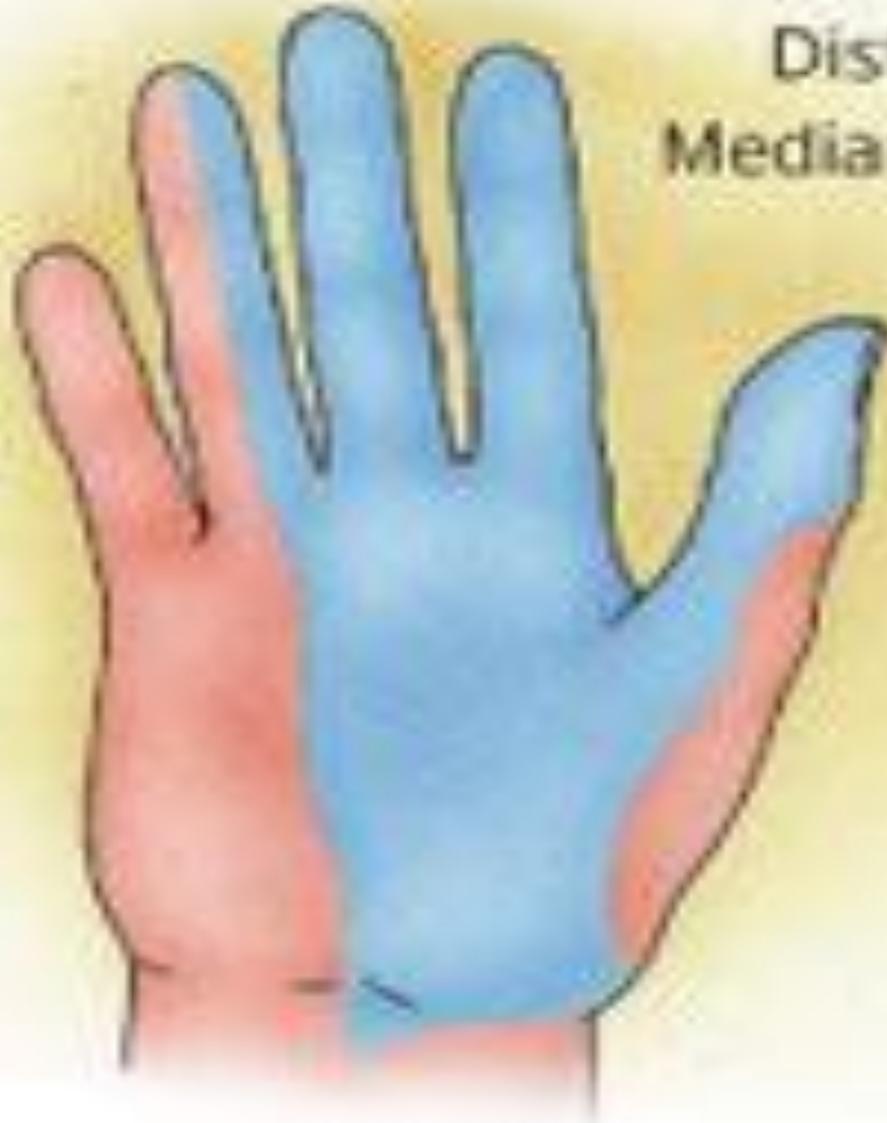
**Cutaneous branches** supply **palmar aspect of lat. 3.5 fingers** & distal half of dorsal aspect of each finger.

One of these branches also supplies 2nd lumbrical muscle.

**Palmar cutaneous branch** of median n. given off in front of forearm crosses **ant.** to FR. & supplies skin over Lat. part of palm.



# Palmar surface of hand



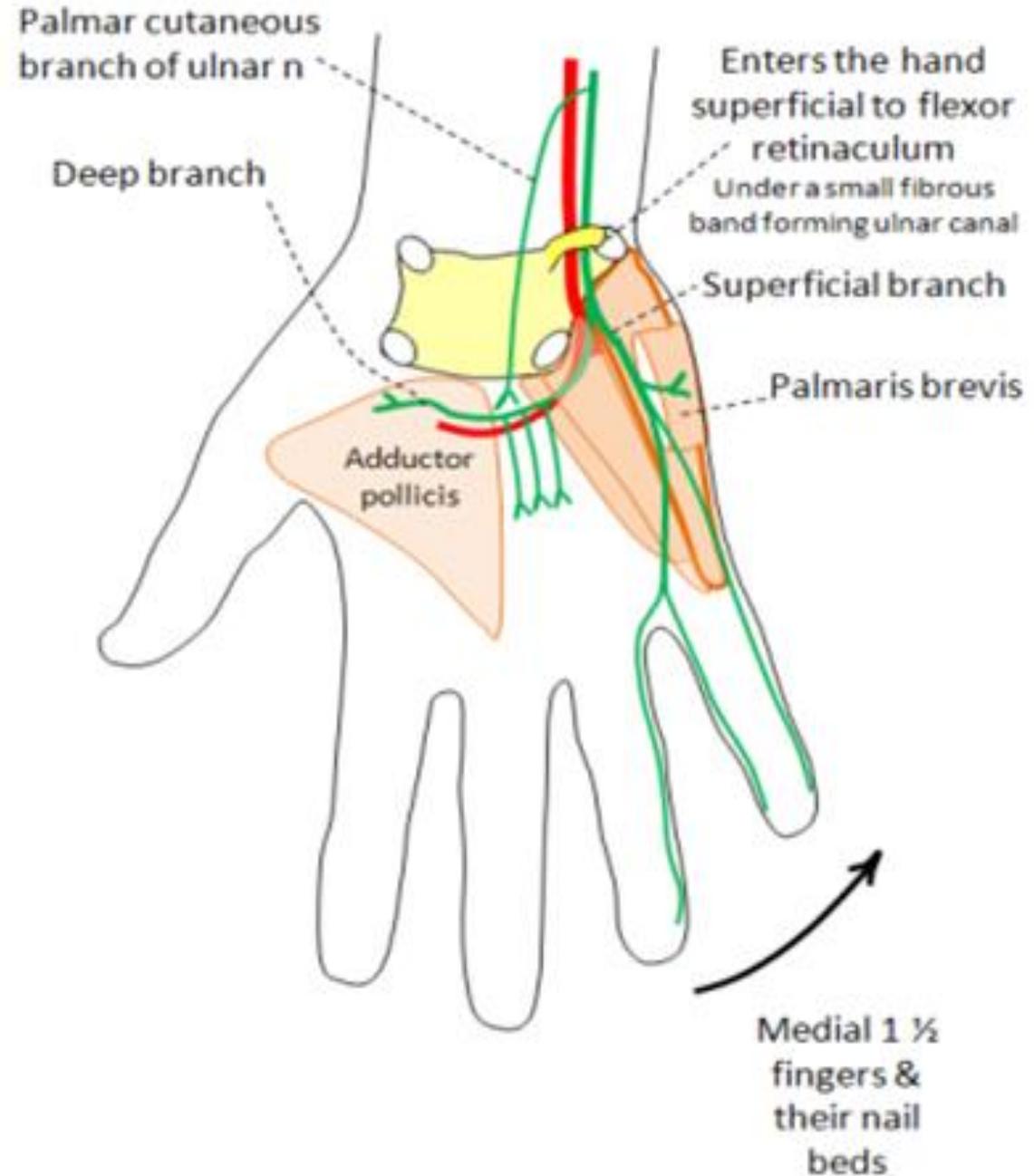
Distribution of  
Median Nerve (blue)

# Dorsal surface of hand



figure

**Ulnar n.** enters the palm **anterior to FR.** alongside lat. border of pisiform. As it crosses FR., it divides into a **superficial** & a **deep** terminal branch. **Superficial br.** descends into palm, lying in subcutaneous tissue between pisiform & hook of hamate. It gives off: **Muscular br.** to palmaris brevis & **cutaneous branches** to palmar aspect of med. side of little finger & adjacent sides of little & ring fingers. It also supplies distal half of dorsal aspect of each finger.



**Deep branch** runs backward **between abductor & flexor digiti minimi**. It pierces opponens digiti minimi, winds around lower border of hook of hamate, & passes laterally within **concavity of deep palmar arch**. The nerve lies behind long flexor tendons & in front of metacarpal bones.

It gives **muscular br.** to muscles of hypothenar eminence. It supplies all **palmar & dorsal interossei, 3rd & 4th lumbricals,** & both heads of **adductor pollicis**. **Palmar cutaneous branch** of ulnar n. given off in front of forearm crosses **ant.** to FR. & supplies skin over med. part of palm.



# Branches of radial nerve in the hand

## Distribution of the two terminal branches-

**Superficial br.-** Cutaneous to the lateral 2/3 of dorsum of hand & lateral 3 ½ fingers till middle phalanges.

**Deep br.-** supplies 2 muscles ant.

1. Ext. Carpi Radialis brevis.
2. Supinator.

Supplies 3 superficial muscles

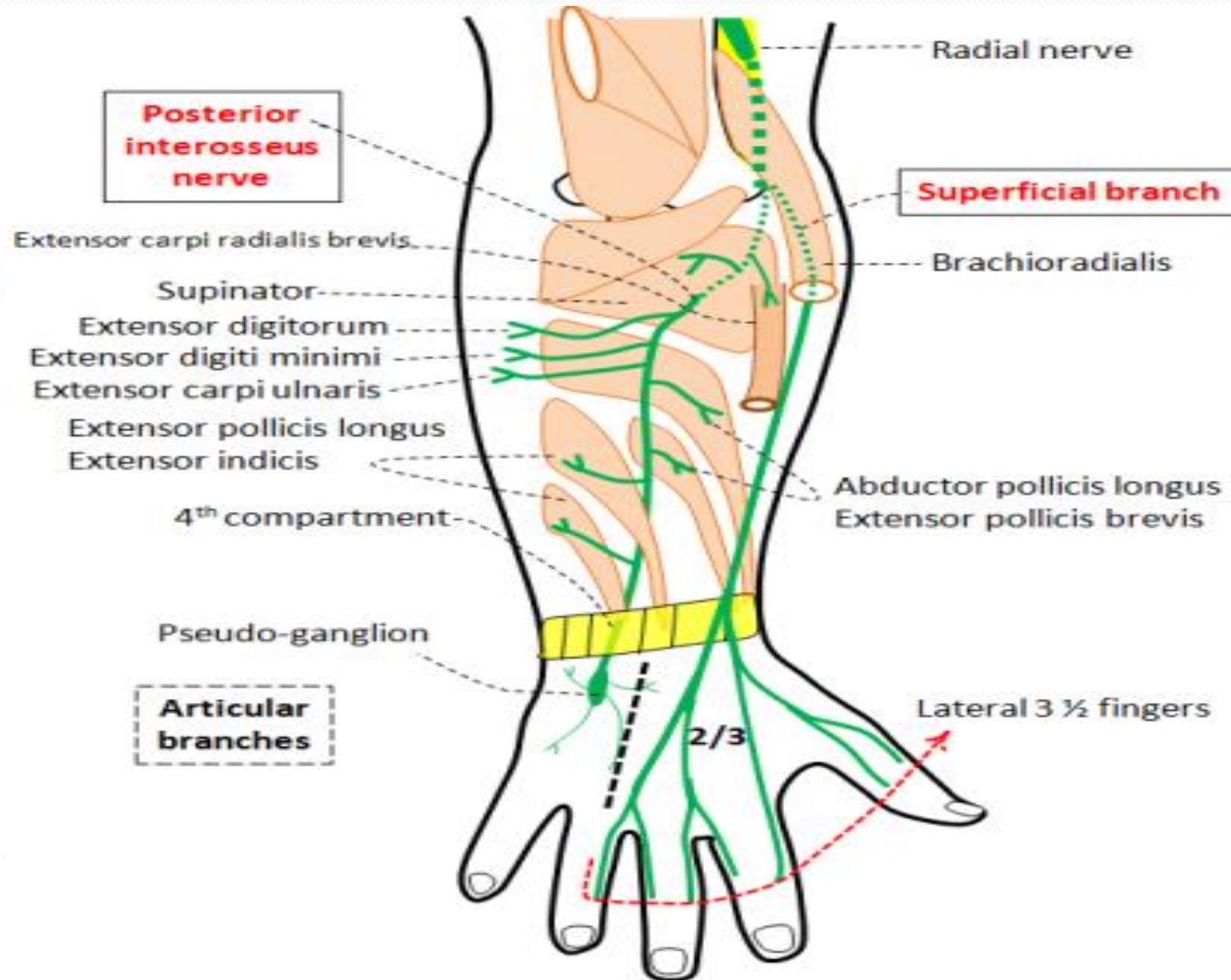
1. Extensor digitorum.
2. Extensor digiti minimi.
3. Extensor carpi ulnaris.

4 muscles from the deep group-

1. Abductor pollicis longus.
2. Extensor pollicis brevis.
3. Extensor pollicis longus.
4. Extensor indicis.

**Articular to-**

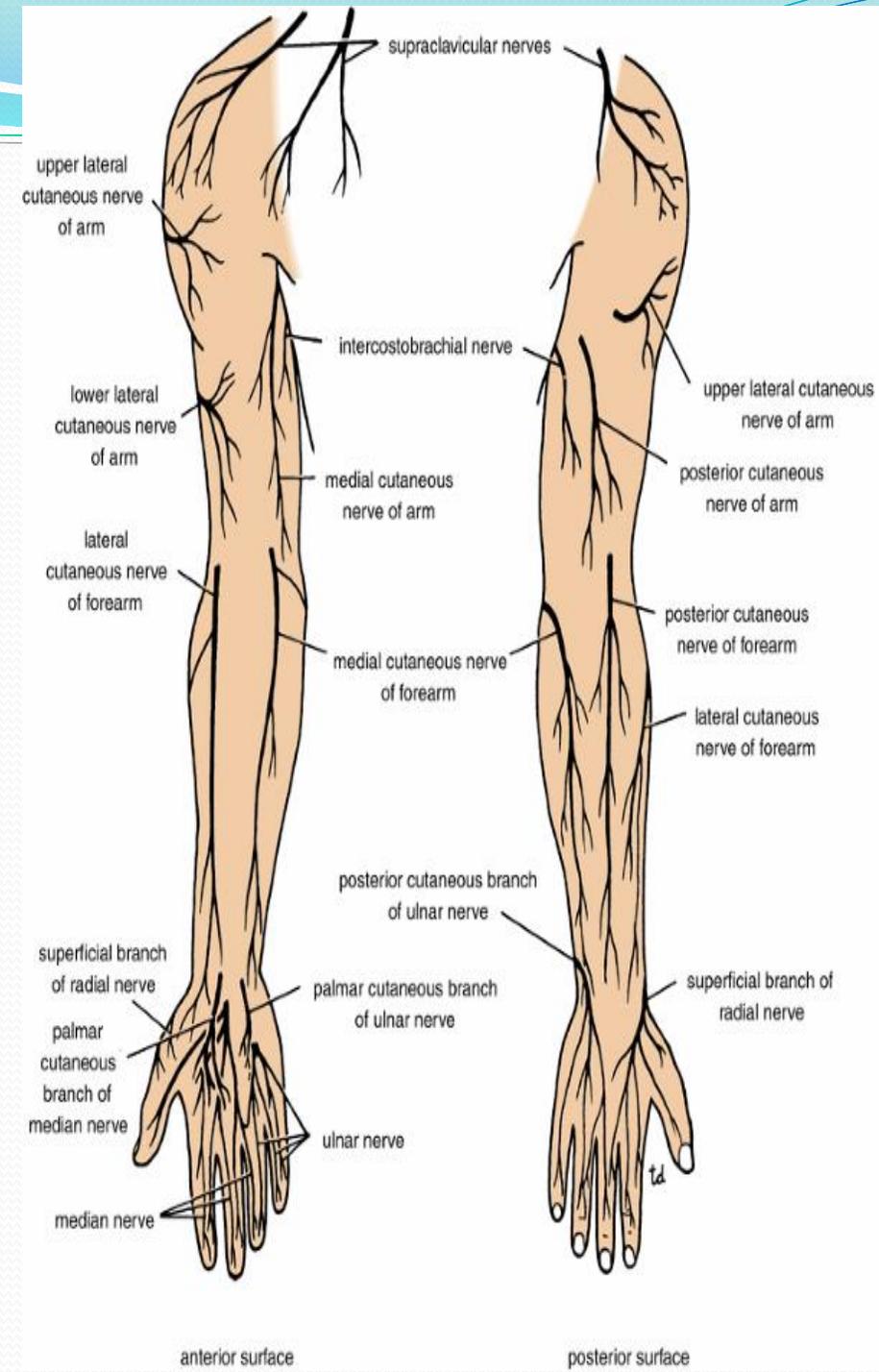
1. elbow j.
2. superior & inferior radioulnar j.
3. Wrist j.
4. intercarpal j.
5. Other small j.



# Dorsum of the Hand

The skin on the dorsum of the hand is thin, hairy, and freely mobile on the underlying tendons and bone

- The sensory nerve supply to the skin on the dorsum of the hand is derived from the superficial branch of the radial nerve and the posterior cutaneous branch of the ulnar
- **The superficial branches of the radial nerve** winds around the radius deep to the brachioradialis tendon, descends over the extensor retinaculum, and supplies the lateral two third of dorsum of the hand. It divides into several dorsal digital nerves that supply the thumb, the index and middle fingers, and the lateral side of ring finger. The area of skin on the back of the hand and fingers supplied the radial nerve is subject to variation. Frequently, a dorsal digital nerve, a branch of the ulnar nerve, also supplies the lateral side of the ring finger.
- **The posterior cutaneous branch of the ulnar nerve** winds around the ulna deep to the flexor carpi ulnaris tendon, descends over exte.retinaculum, and supplies the medial third of the dorsum of the hand. It is divided into several dorsal digital nerves & supply the medial side of the ring and the sides of the little fingers, these branches not extend far beyond the proximal phalanx. The remainder of the dorsum of each fingers receives its nerve supply from palmar digital nerves

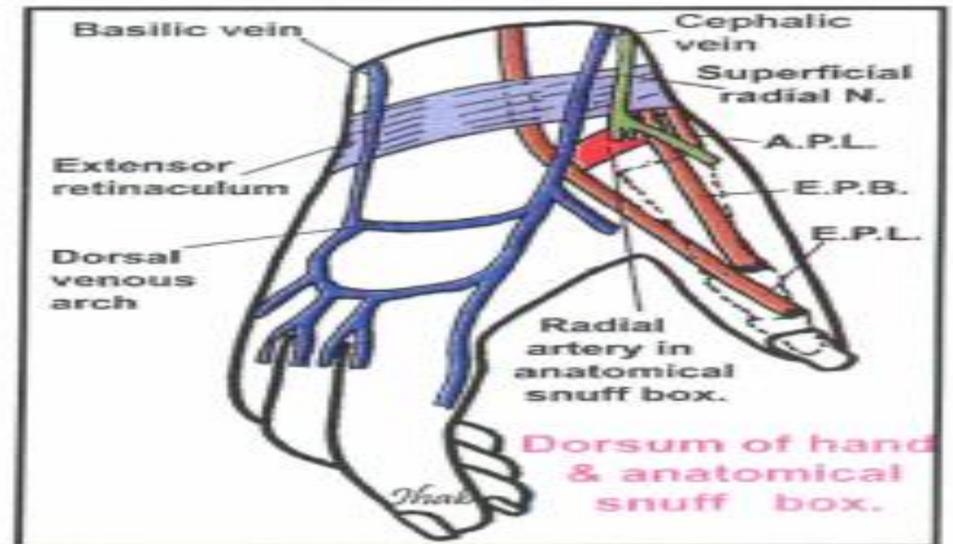
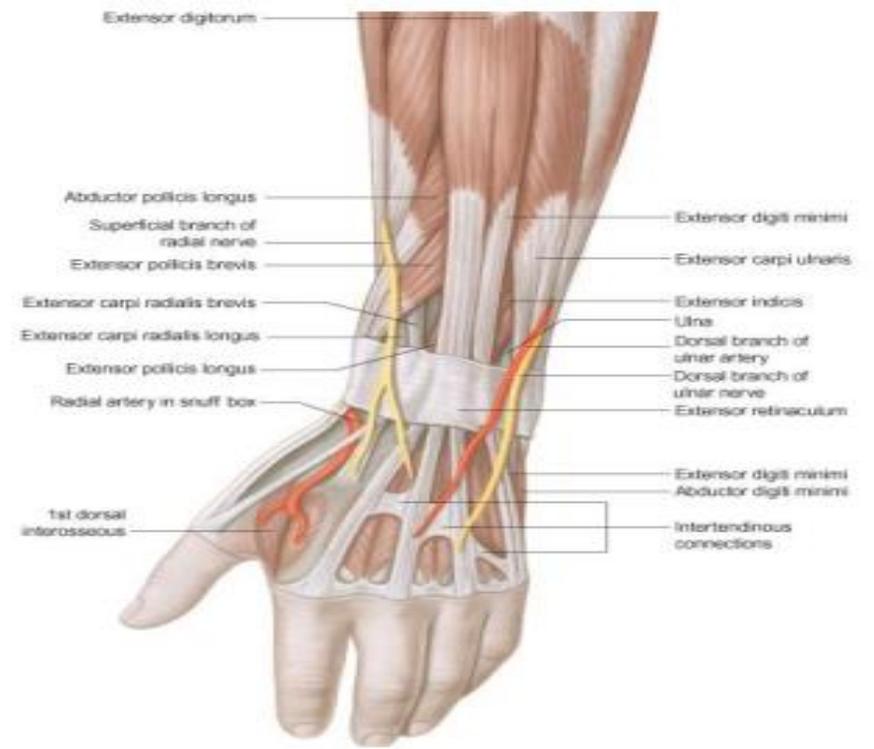
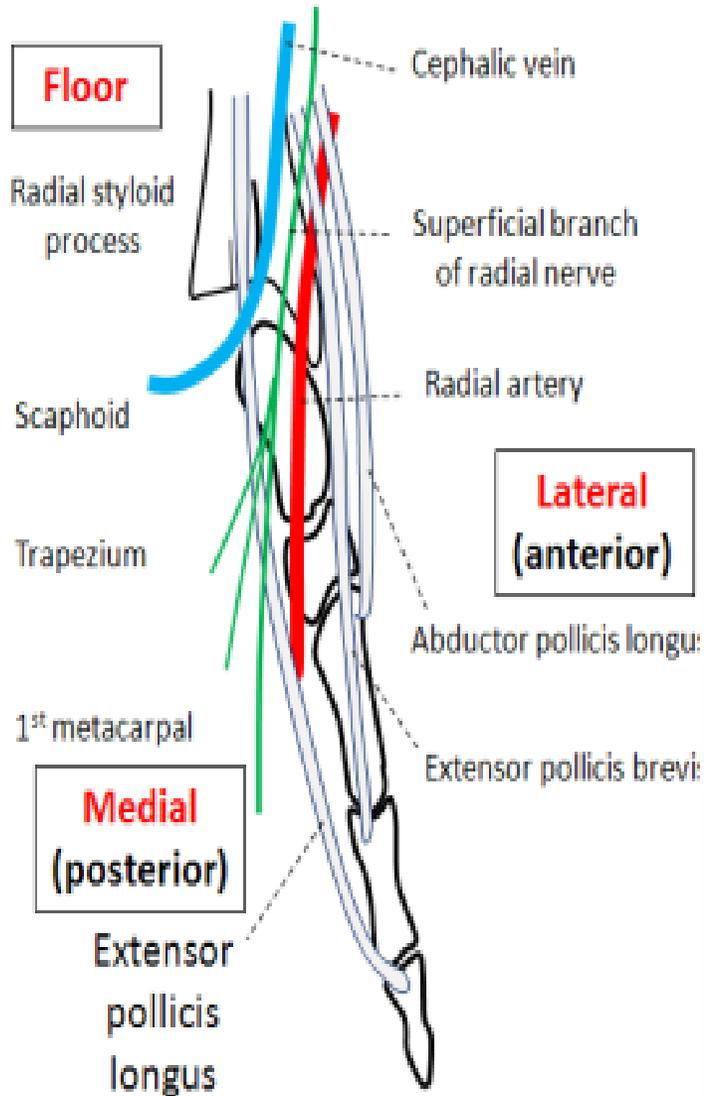


# 1. Anatomical snuff pox

It is a triangular skin depression on the lateral part of the wrist joint.

- ❑ **Medial boundary** – tendon of extensor pollicis longus.
- ❑ **Lateral boundary** – tendons of abductor pollicis longus & extensor pollicis brevis.
- ❑ **Roof** – skin & fascia.
- ❑ **Floor** – styloid process of radius, scaphoid (trapezium & base of 1<sup>st</sup> metatarsal bone).
- ❑ **Contents** – radial artery, cephalic vein, and superficial branch of radial nerve.

**Contents**



Thank You & Good Luck

