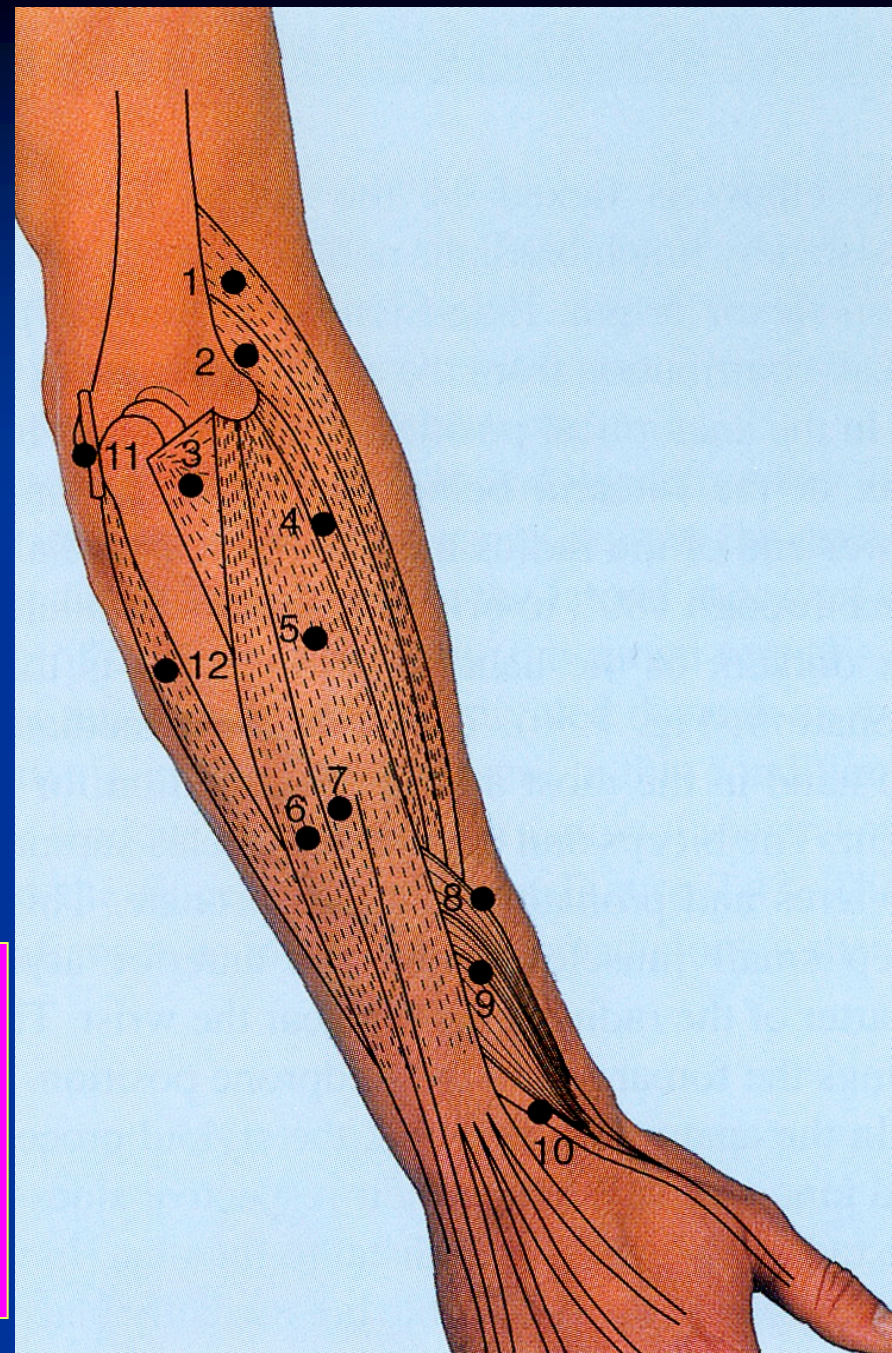


# FOREARM

*By :*

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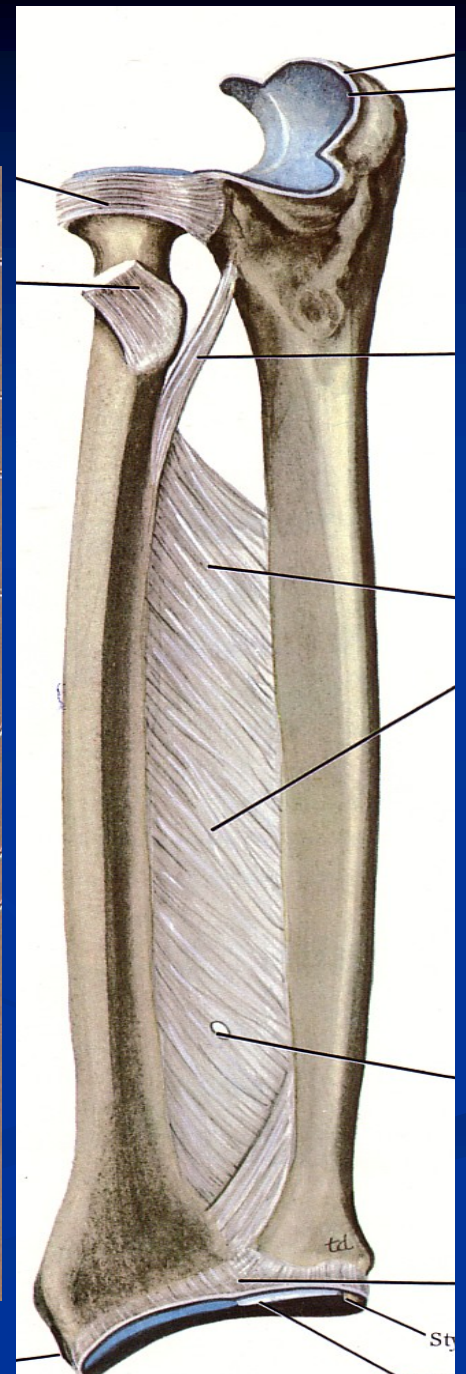
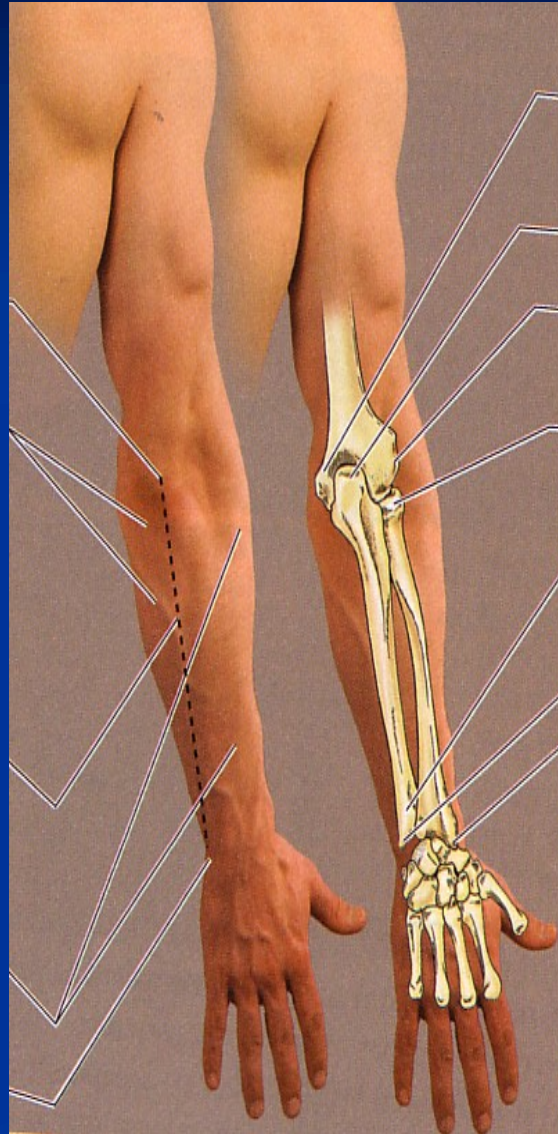


# OBJECTIVES

- At the end of this lecture, the student should be able to :
- List the **names of the Flexors Group** of Forearm (superficial & deep muscles).
- Identify the **common flexor origin** of **flexor muscles** and their **innervation & movements**.
- Identify **supination & pronation** and list the **muscles** produced these 2 movements.
- List the **names of the Extensor Group** of Forearm (superficial & deep muscles).
- Identify the **common extensor origin** of **extensor muscles** and their **innervation & movements**.

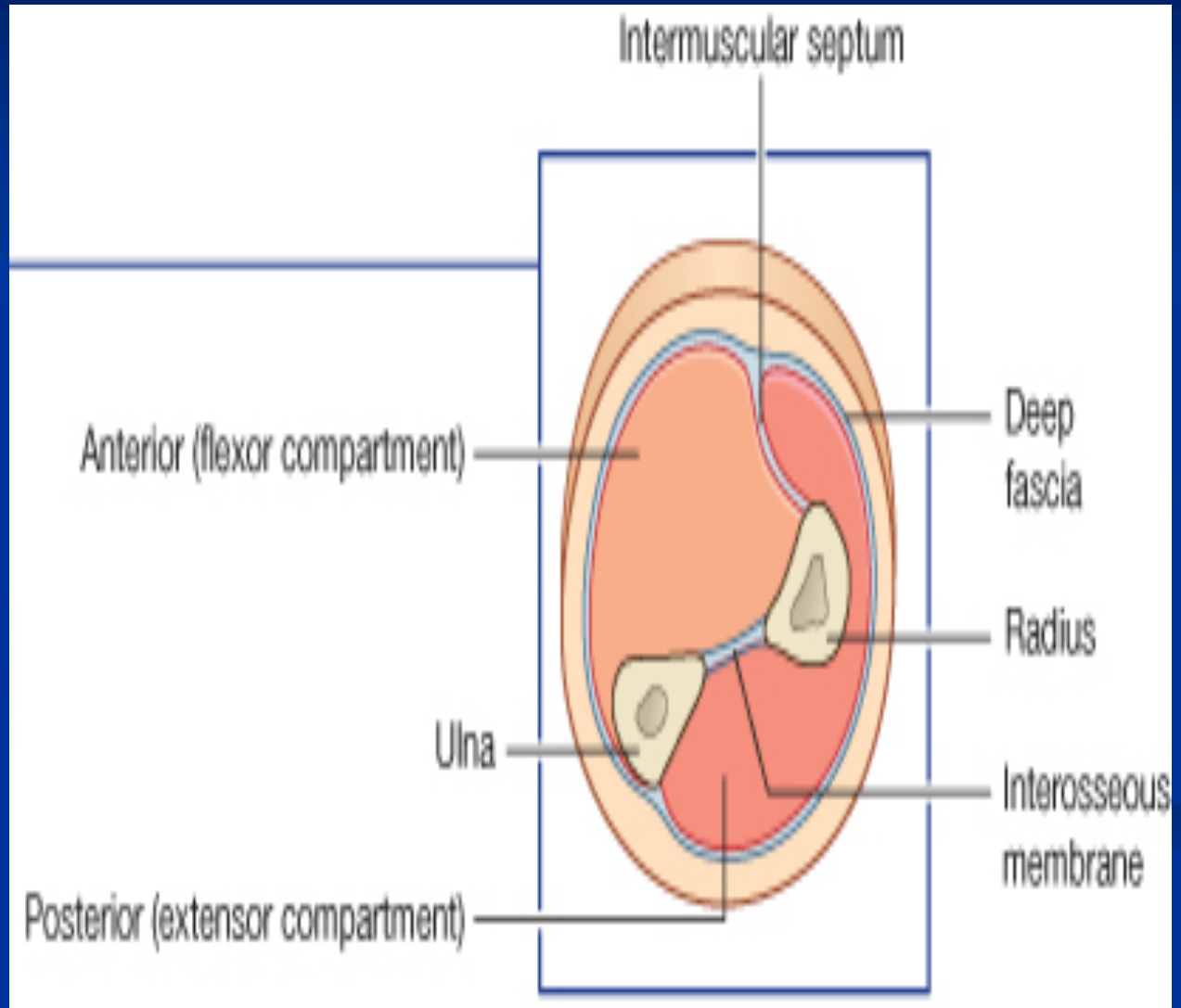


- **The forearm** extends from elbow to wrist.
- It possesses two bones **radius** laterally & **Ulna** medially.
- The two bones are connected together by the **interosseous membrane**.
- This membrane allows movement of **Pronation** and **Supination** while the two bones are connected together.
- Also it gives origin for the deep muscles.



- **The forearm** is enclosed in a **sheath of deep fascia**, which is attached to the posterior border of the ulna.
- This **fascial sheath**, together with the **interosseous membrane & fibrous intermuscular septa**, divides the forearm into compartments, each having its own **muscles, nerves, and blood supply**.

## Fascial Compartments of the Forearm

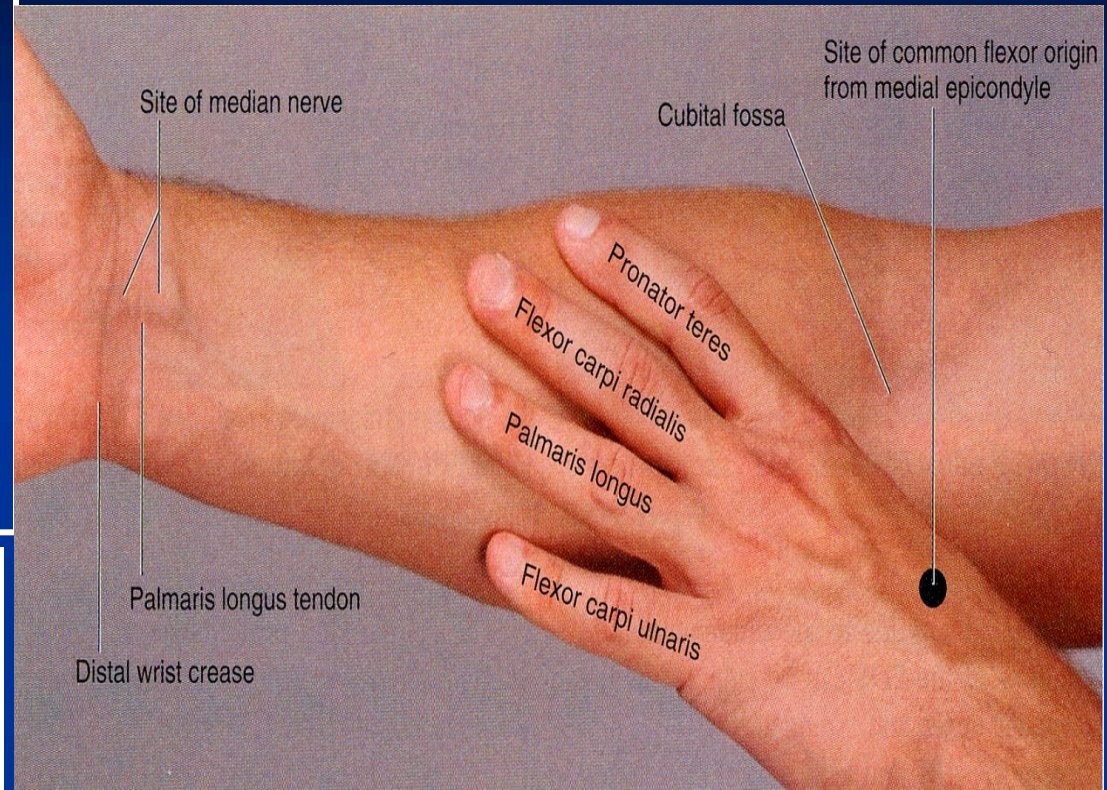




# FLEXOR GROUP

## These muscles: 8

- Act on the elbow & wrist joints and those of the fingers.
- Form **fleshy masses** in the proximal part and become **tendinous** in the distal part of the forearm.
- Arranged in three groups:



## **I-Superficial: 4**

- **Pronator teres**
- **Flexor carpi radialis**
- **Palmaris longus**
- **Flexor carpi ulnaris**

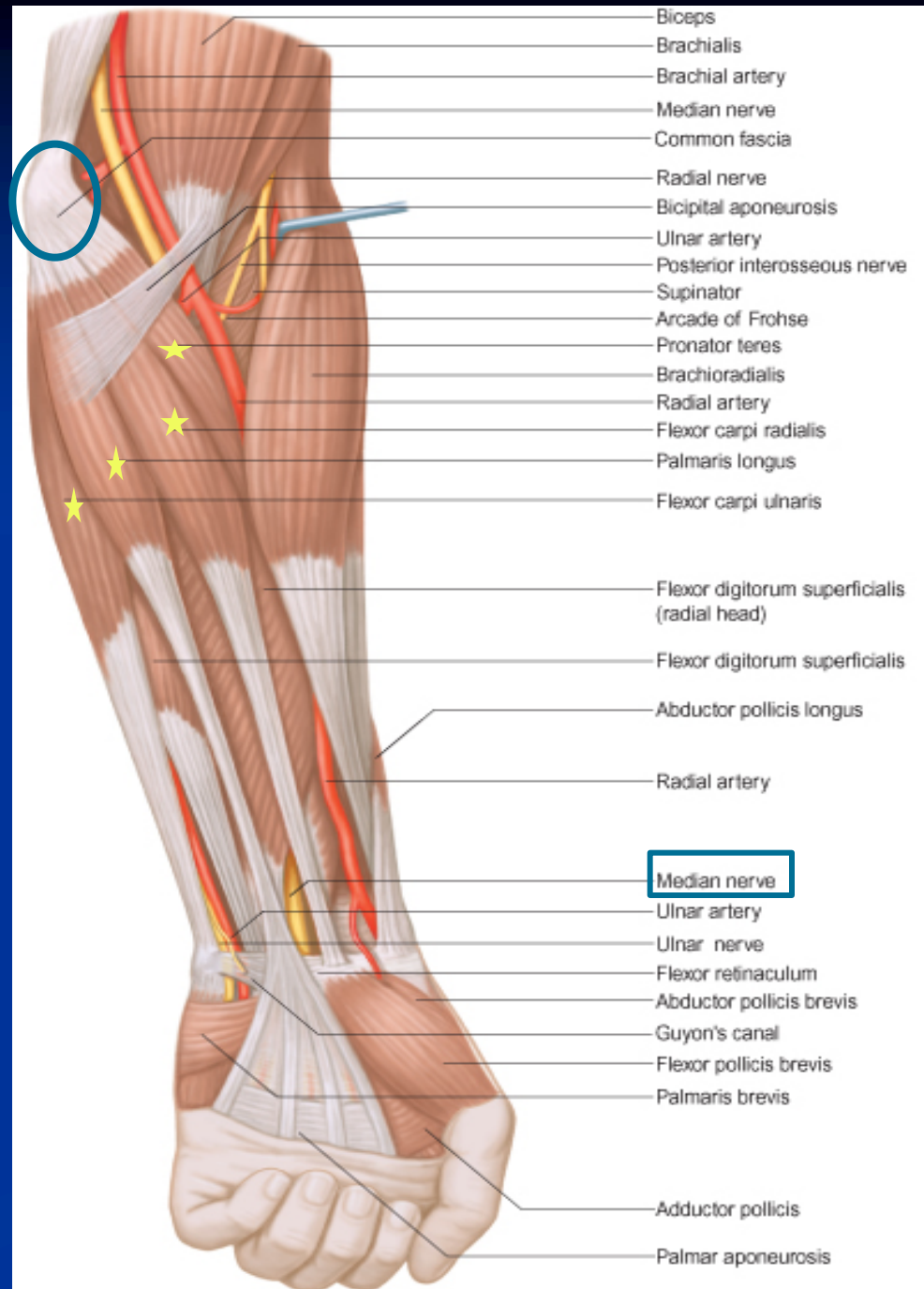
## **II-Intermediate: 1**

- **Flexor digitorum superficialis**

## **III- Deep: 3**

- **Flexor digitorum profundus**
- **Flexor pollicis longus**
- **Pronator quadratus**

- **Superficial Flexors:**
- **They arise** - more or less- **from the common flexor origin** (front of medial epicondyle).
- **All are supplied by median nerve** except one, **flexor carpi ulnaris, FCU (ulnar).**
- **All cross the wrist joint** except one, **pronator teres, (PT).**

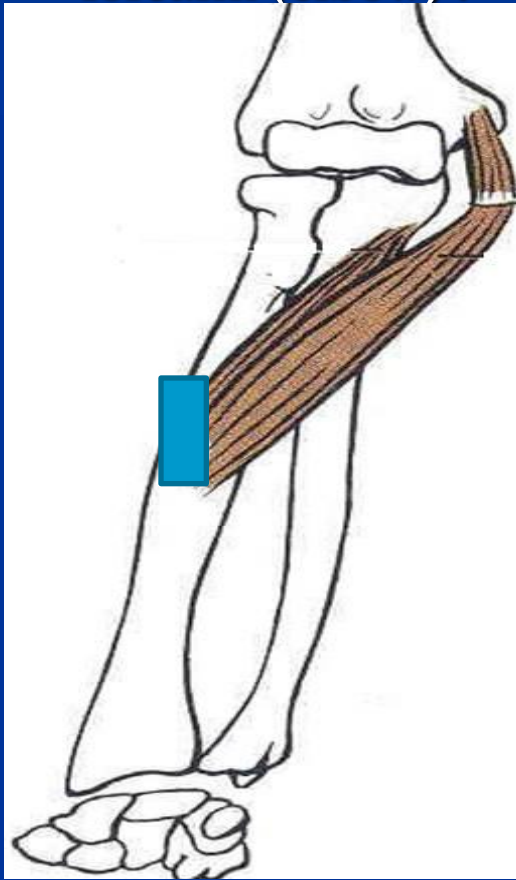




## ■ **Pronator teres**

**Insertion:** middle of lateral surface of radius

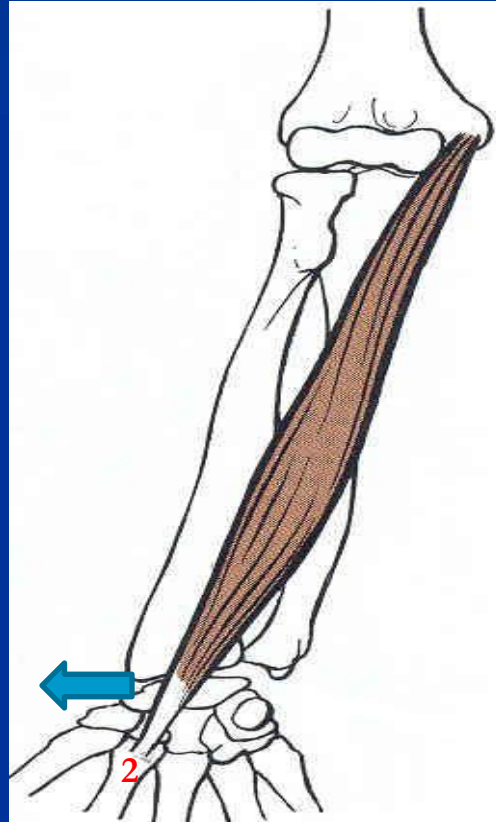
- **Action:** pronation & flexion of forearm (elbow) .



## ■ **Flexor Carpi Radialis**

- **Insertion:** Base of 2<sup>nd</sup> metacarpal bone

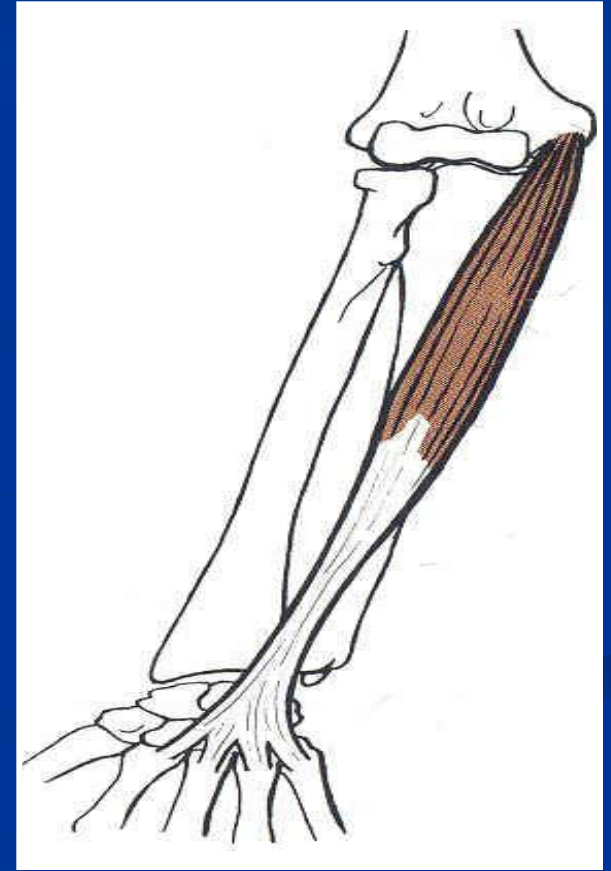
- **Action:** Flexion & abduction of the hand



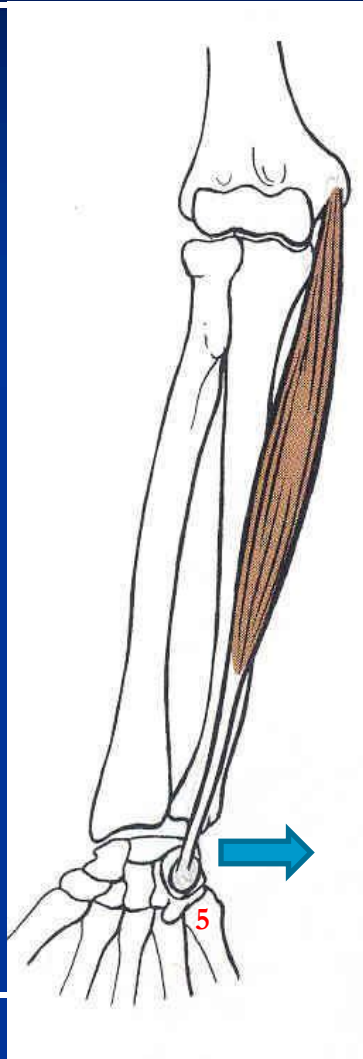
## ■ **Palmaris Longus**

**Insertion:** into the flexor retinaculum & palmar aponeurosis.

**Action:** Flexes hand & tightens palmar aponeurosis

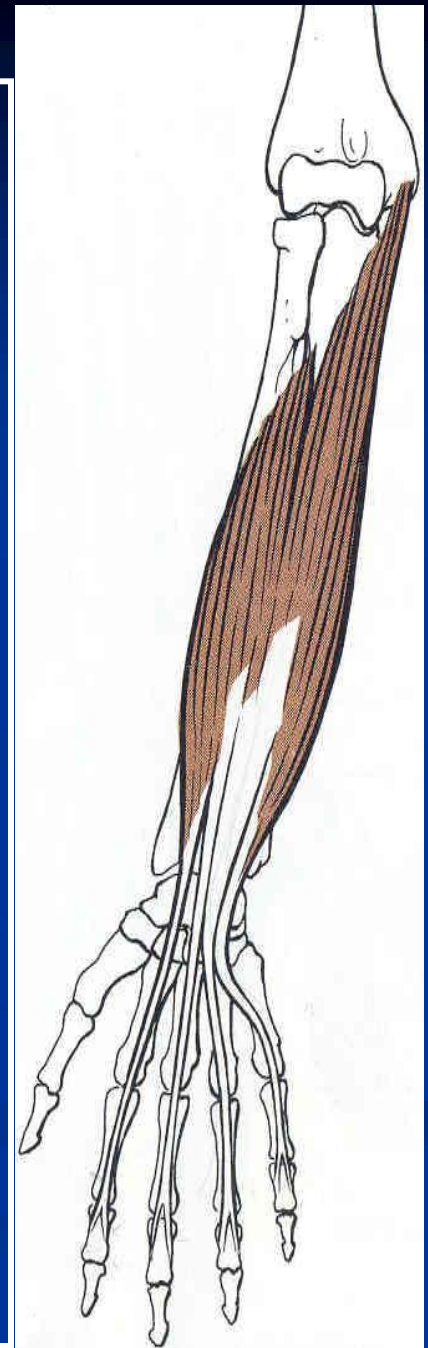


- **Flexor Carpi Ulnaris**
- **Insertion:**
- Pisiform,
- hook of hamate
- 5<sup>th</sup> metacarpal bone
- **Action:**
- Flexion and adduction of the hand.



## ■ **Flexor Digitorum Superficialis**

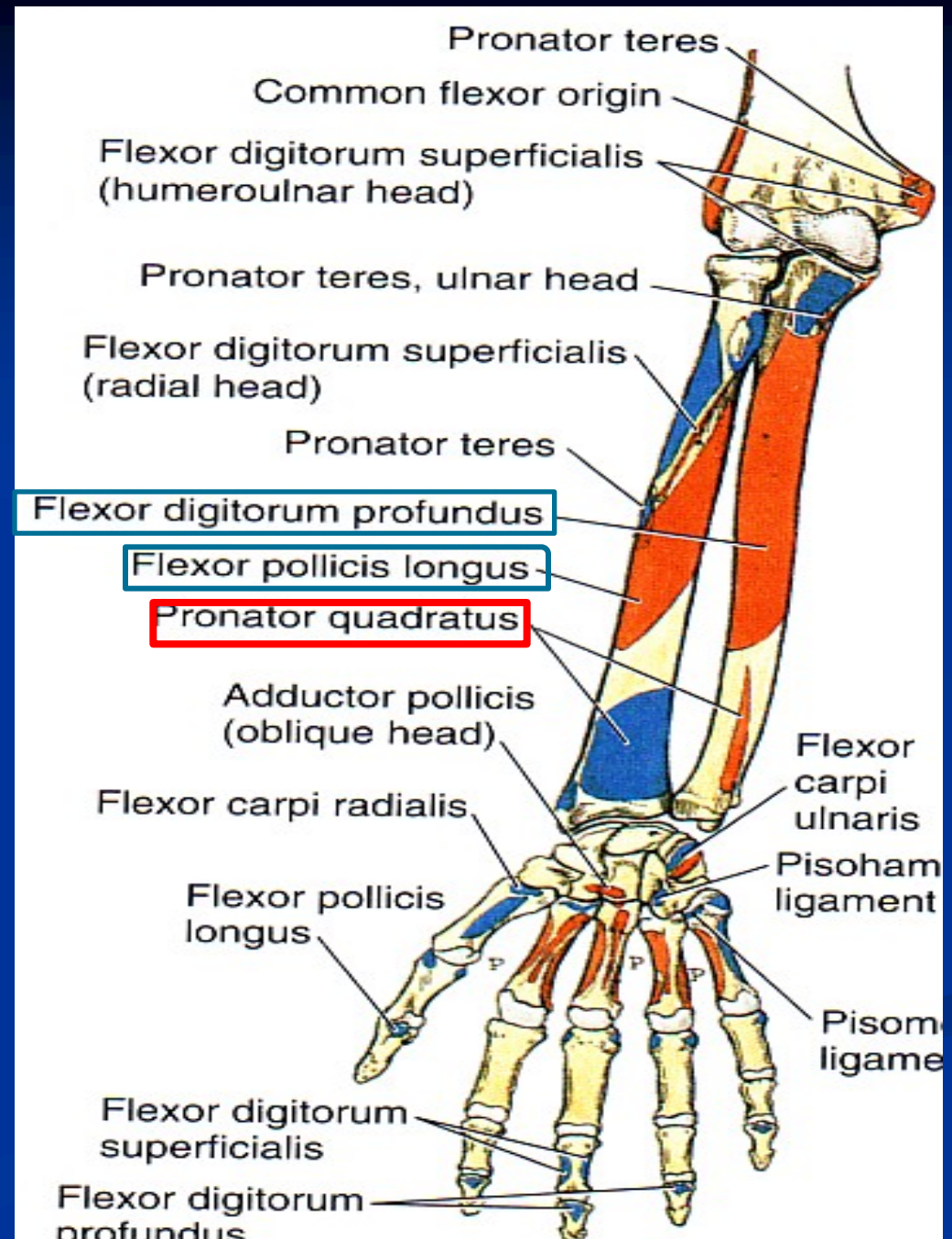
- **Origin:**
- Common flexor origin,
- Coronoid process of ulna;
- Anterior surface of radius
- **Insertion:**
- base of middle phalanges of medial 4 fingers.
- **Action:**
- Flexes middle and proximal phalanges of medial 4 fingers, and the hand



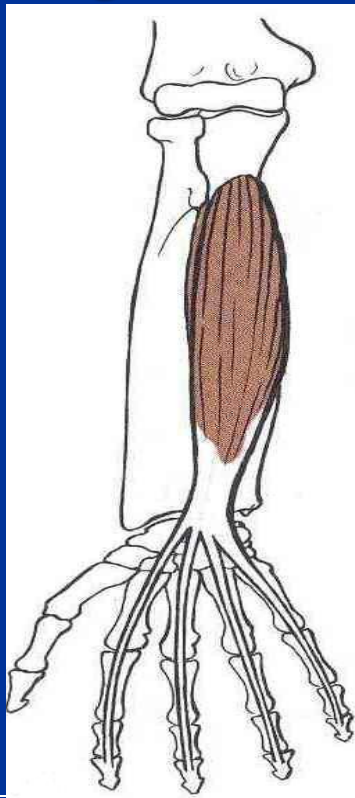


## Deep Flexors

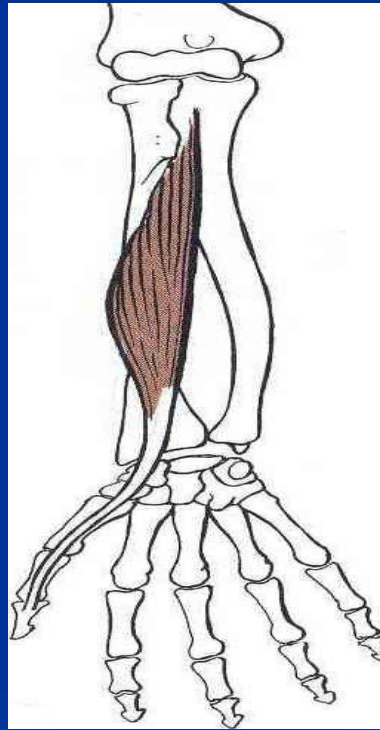
- One above ulna:  
Flexor Digitorum profundus
- One above radius:  
Flexor pollicis longus
- One above the 2 bones:  
Pronator Quadratus.



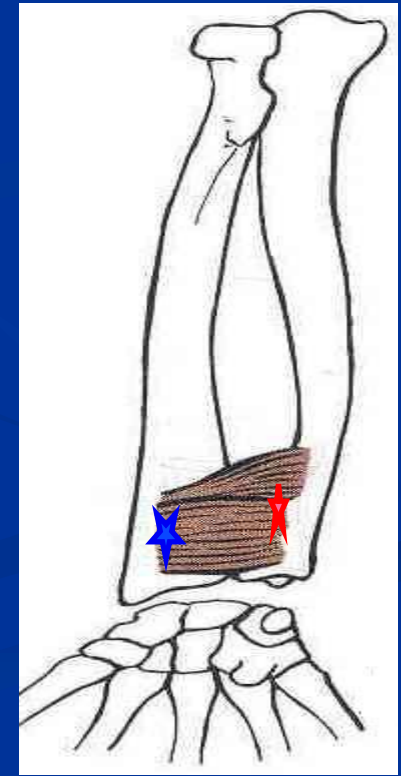
- **Flexor Digitorum Profundus**
- **Insertion:** bases of distal phalanges of medial 4 digits
- **Action:** Flexes distal phalanges of medial 4 digits.



- **Flexor Pollicis Longus**
- **Insertion:** Base of distal phalanx of thumb
- **Action:** flexes interphalangeal, metacarpophalangeal & carpometacarpal joints of thumb.



- **Pronator Quadratus**
  - **Insertion:** distal fourth of ant. surface of radius
  - **Action:** pronates forearm (prime mover), helps to hold the bones together.





# Supination and pronation

It occurs in the superior  
and inferior radioulnar  
joints;

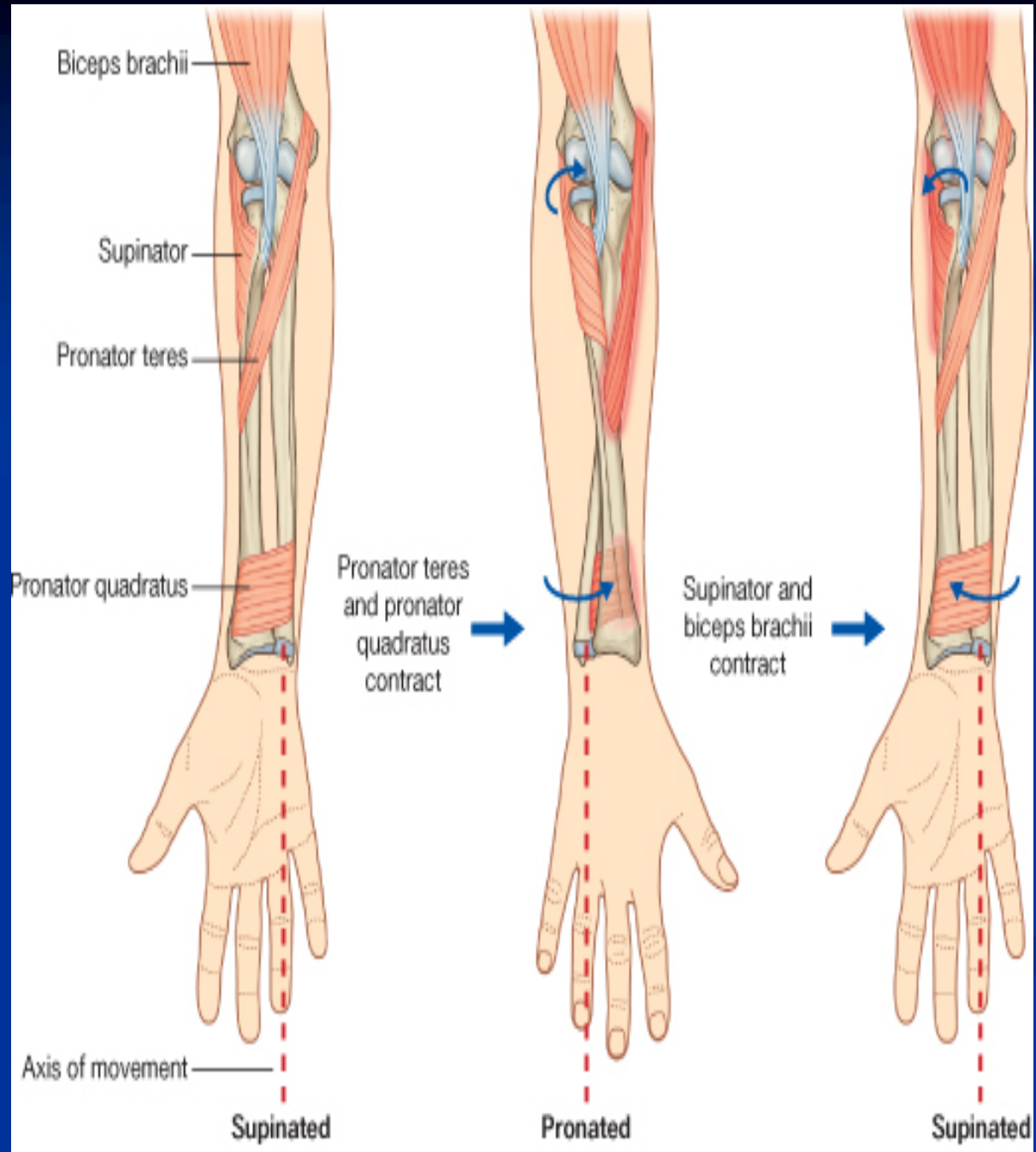
## Muscles produce supination

- Biceps brachii.
- Supinator.

## Muscles produce pronation

- Pronator teres.
- Pronator quadratus.

NB. **Brachioradialis** put  
the forearm in **midprone-**  
**position**.



# Posterior compartment: 3 groups

## Superficial Lateral group (2)

- ❖ Brachioradialis
- ❖ Extensor carpi radialis longus

## Superficial group (5)

- Extensor carpi radialis brevis
- Extensor digitorum
- Extensor digiti minimi
- Extensor carpi ulnaris
- Anconeus

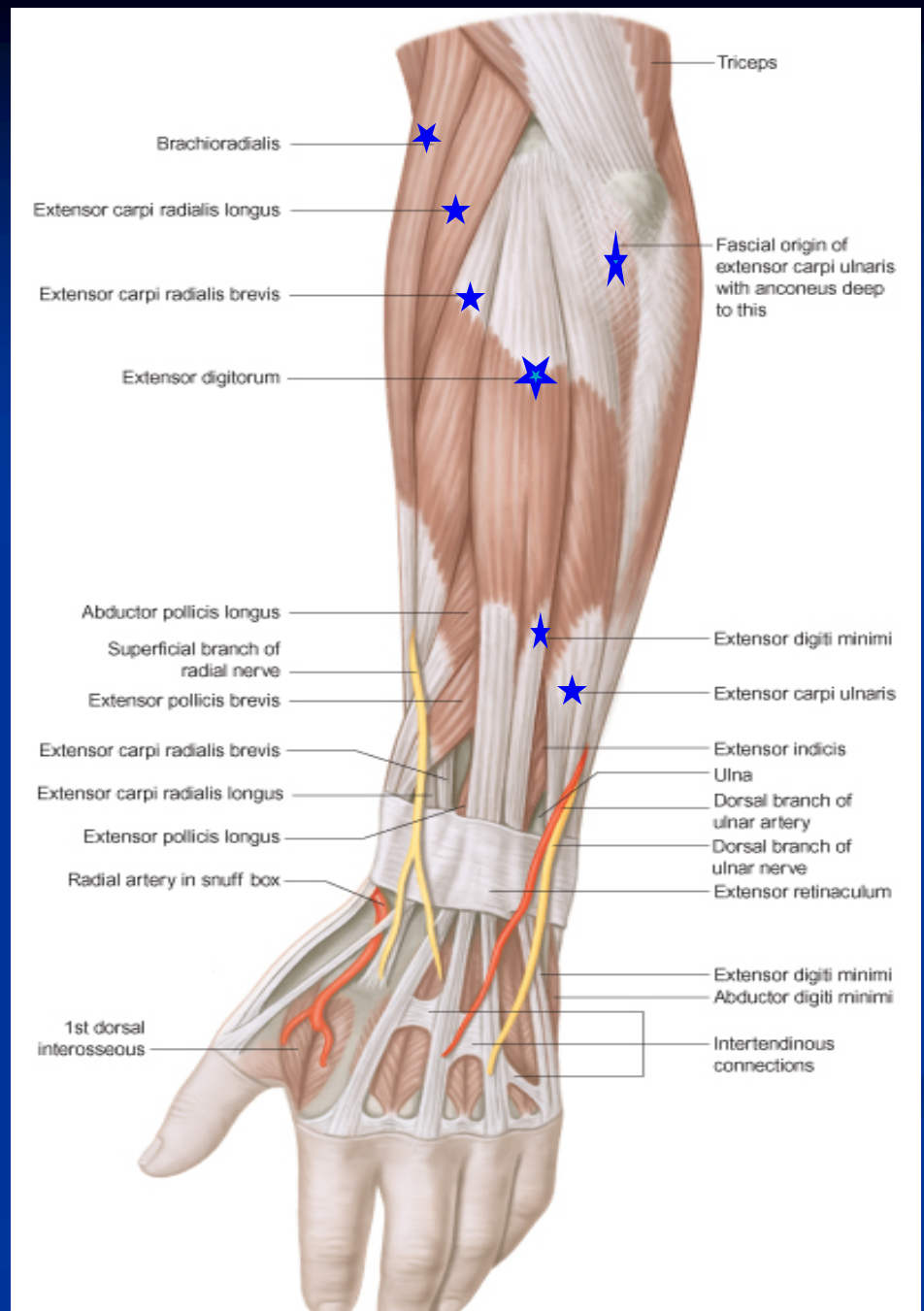
**Common Extensor Origin .**  
(front of lateral epicondyle).

## Deep group (5)

- (3 to thumb+ 1 to index + supinator).
- Supinator.
  - Abductor pollicis longus.
  - Extensor pollicis brevis.
  - Extensor pollicis longus.
  - Extensor indices.

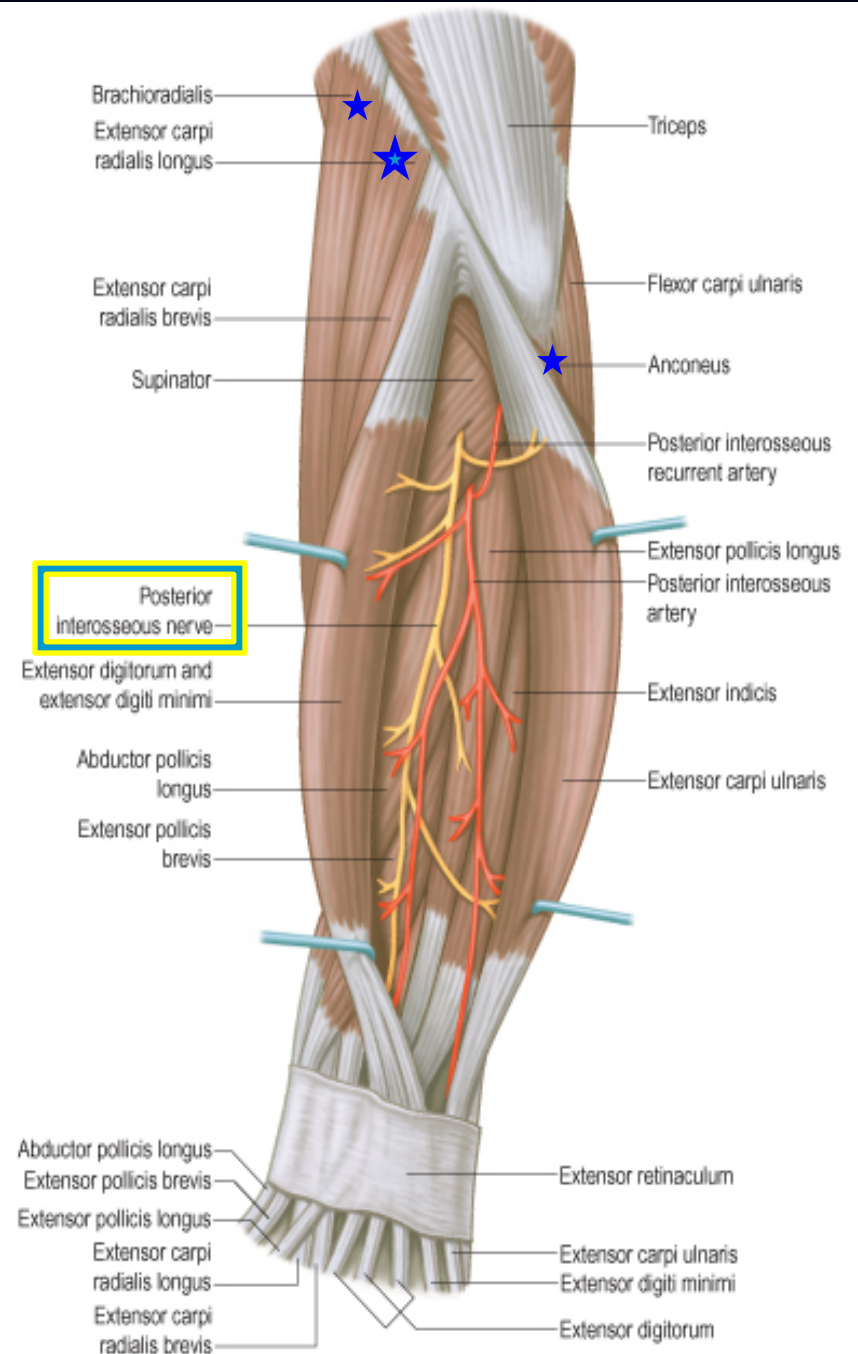


- **Posterior compartment:**
- **Superficial group:**
- **7 muscles** ( from lateral to medial ) :
- Brachioradialis, (BR).
- Extensor carpi radialis longus, (ECRL).
- Extensor carpi radialis brevis, (ECRB).
- Extensor digitorum, (ED).
- Extensor digiti minimi, (EDM).
- Extensor carpi ulnaris, (ECU).
- Anconeus. (An).



# Superficial extensors

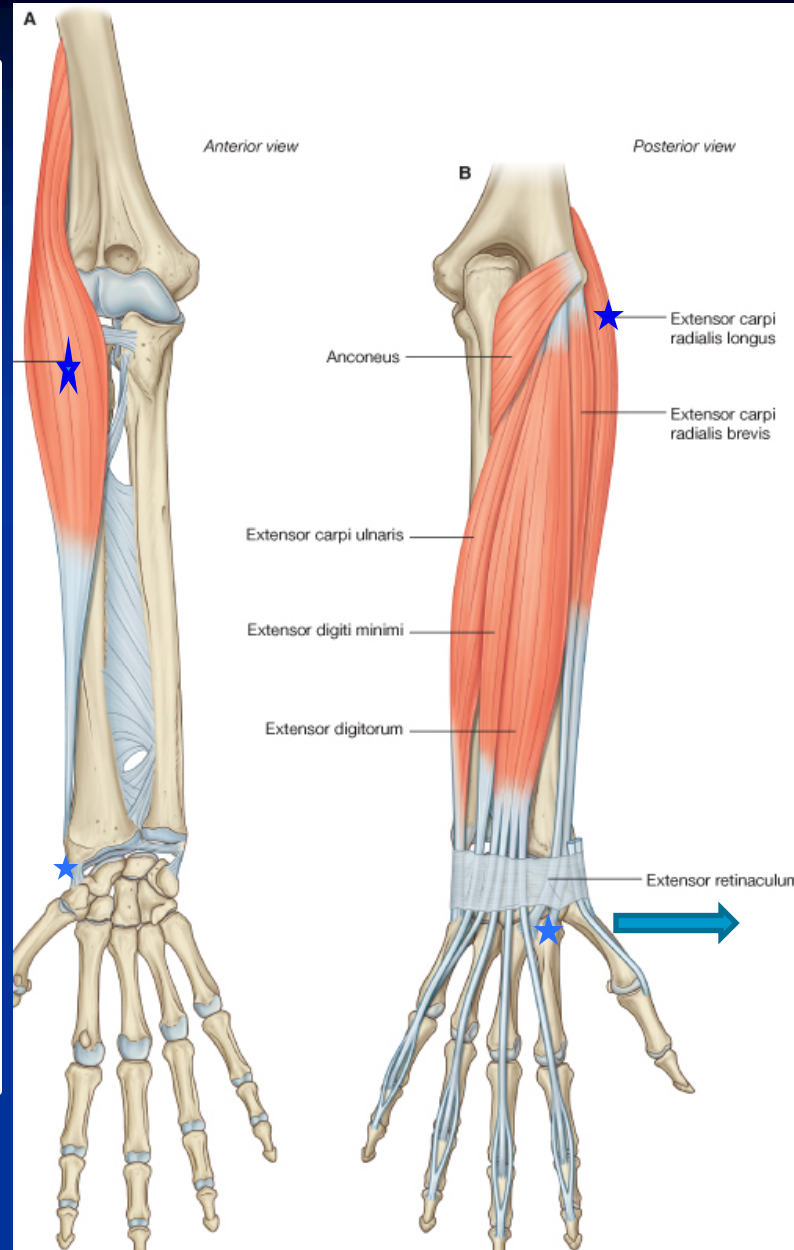
- All arises from the **common extensor origin**, (front of lateral epicondyle of the humerus), **EXCEPT 2 (BR & ECRL)**.
- All cross the wrist **EXCEPT**, one, **brachioradialis**.
- All supplied by deep branch of radial nerve, **EXCEPT ABE**
- **A, anconeus**
- **B, Brachioradialis**
- **E, Extensor carpi radialis longus**
- **These 3 muscles are supplied by the radial nerve itself**





## ■ **Brachioradialis**

- **Origin:**
- Lateral supracondylar ridge of humerus
- **Insertion:**
- Base of styloid process of radius
- **Action:**
- Flexes forearm; (elbow).
- Rotates forearm to the **midprone position**



## ■ **Extensor Carpi radialis longus**

- **Origin:**
- Lateral supracondylar ridge of humerus
- **Insertion:**
- Posterior surface of base of 2<sup>nd</sup> metacarpal bone
- **Action:**
- **Extends and abducts hand** at wrist joint

# INSERTION

## Extensor carpi radialis brevis:

base of 3<sup>rd</sup> metacarpal bone.

## Extensor digitorum:

Extensor expansion of the medial 4 fingers.

## Extensor digiti minimi:

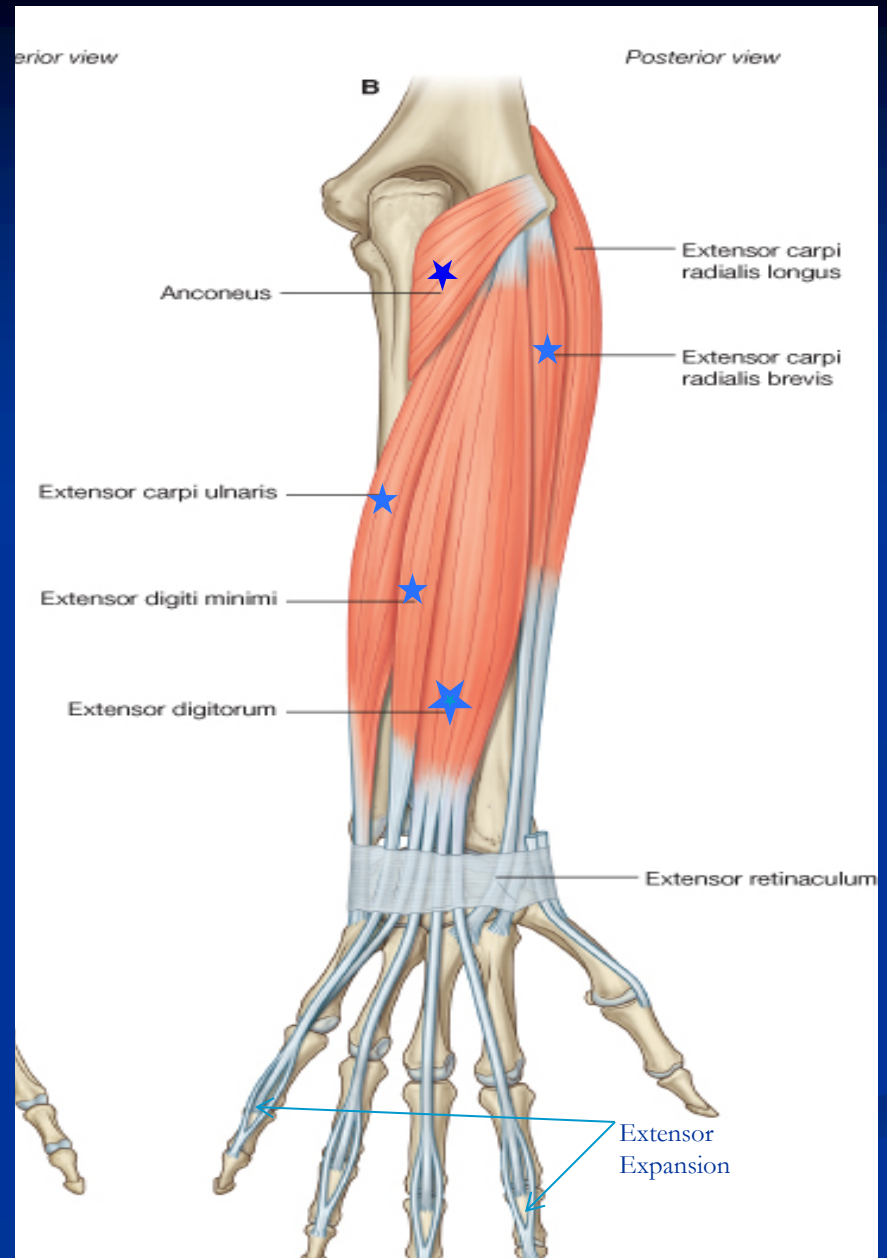
Extensor expansion of the little finger.

## Extensor carpi ulnaris:

Base of the 5<sup>th</sup> metacarpal bone.

## Anconeus :

Upper back of shaft of ulna.



## II- Deep group:

### **5 muscles**

**1- Abductor pollicis longus, (APL).**

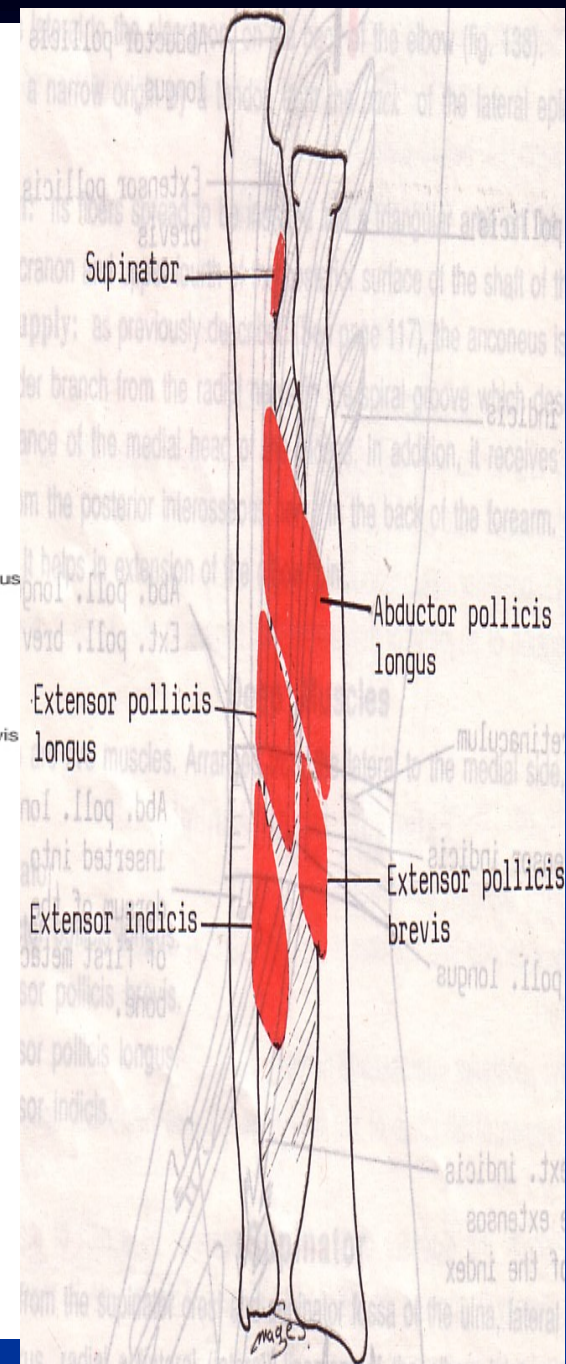
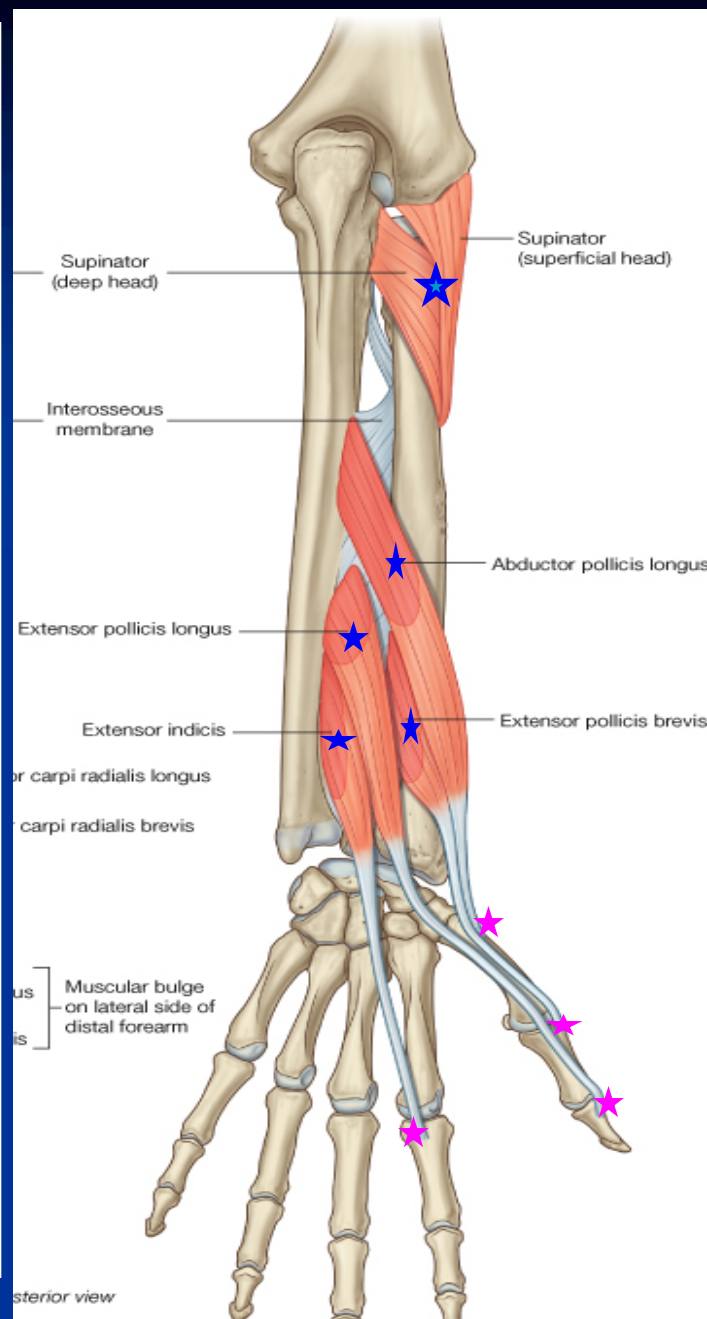
**2- Extensor pollicis brevis, (EPB).**

**3- Extensor pollicis longus, (EPL).**

**4- Extensor indicis (EI).**

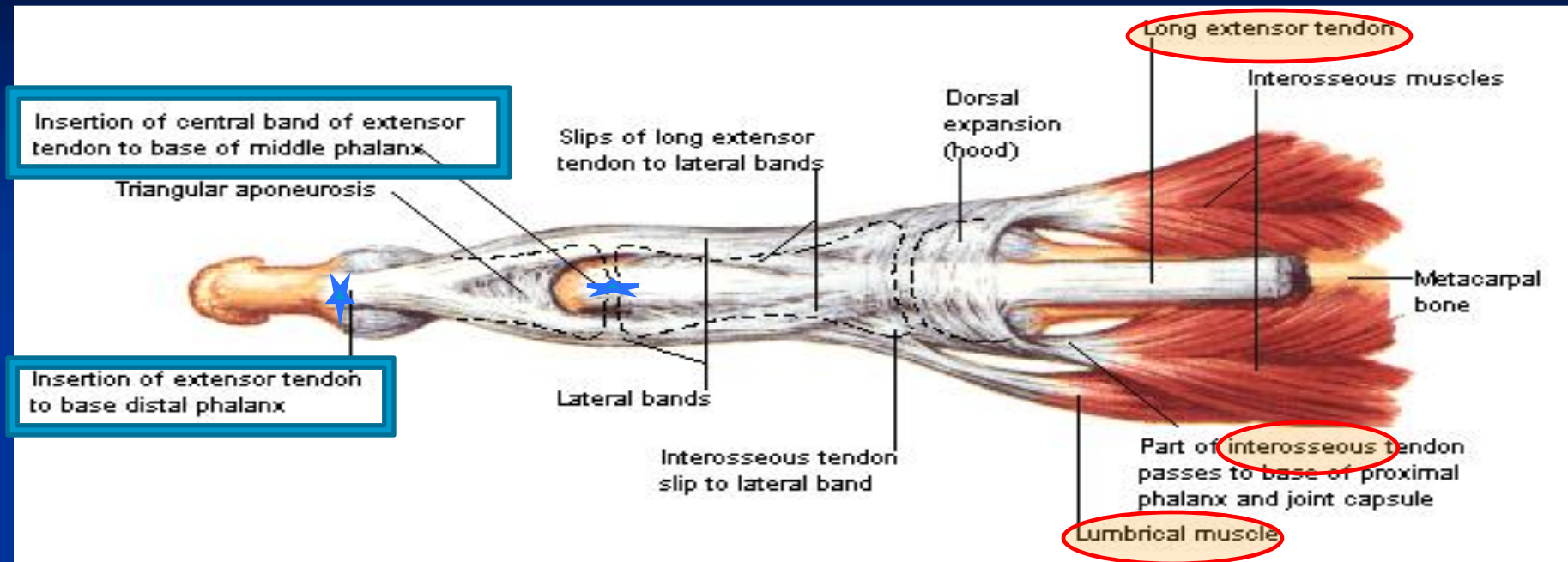
**5- Supinator.**

**• All back muscles of forearm are supplied by posterior interosseous nerve except, **ABE** by Radial nerve.**





# Dorsal Extensor Expansion



- It is formed on the dorsum of medial 4 fingers by : the union of the tendons of : **Extensor digitorum, Extensor digiti minimi, Extensor indicis**, palmar and dorsal **interossei** and **lumbricals** muscles.
- All these tendons unite to form one tendon which divides into 3 slips, a median one attached to middle phalanges and 2 lateral attached to the terminal phalanges.

**THANK YOU**

**1. Which one of the following muscles contributes as powerful supinator of forearm?**

- a. Palmaris longus.
- b. Pronator teres.
- c. Biceps brachii. ←
- d. Supinator..

**2. Which muscle is supplied by median nerve ?**

- a. Anconeus.
- b. Brachioradialis.
- c. Extensor carpi radialis longus.
- d. Flexor digitorum superficialis. ←

**3. Which muscle is related to common flexor origin ?**

- a. Flexor digitorum profundus.
- b. Flexor pollicis longus.
- c. Pronator quadratus.
- d. Pronator teres. ←