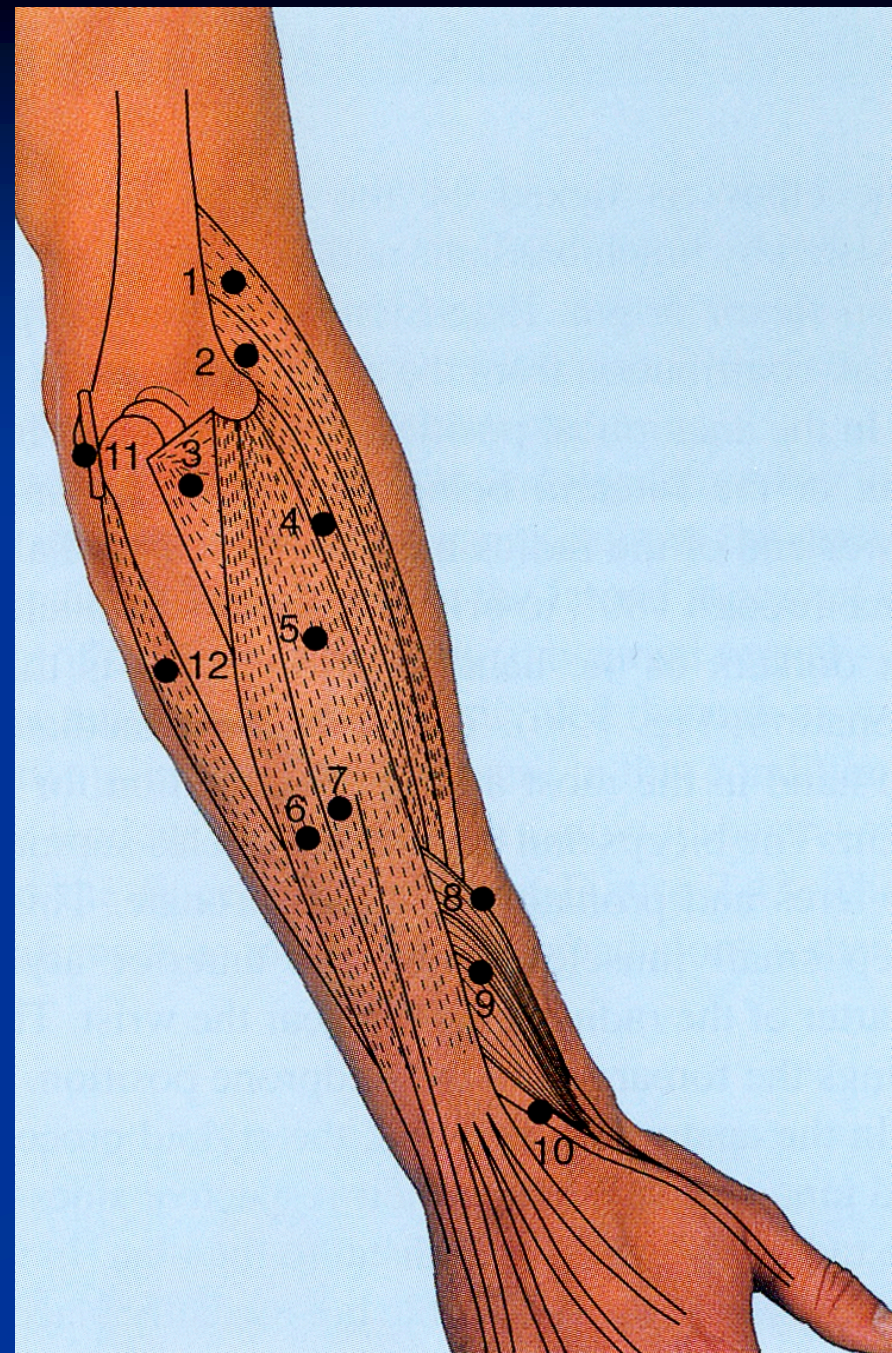


# FOREARM



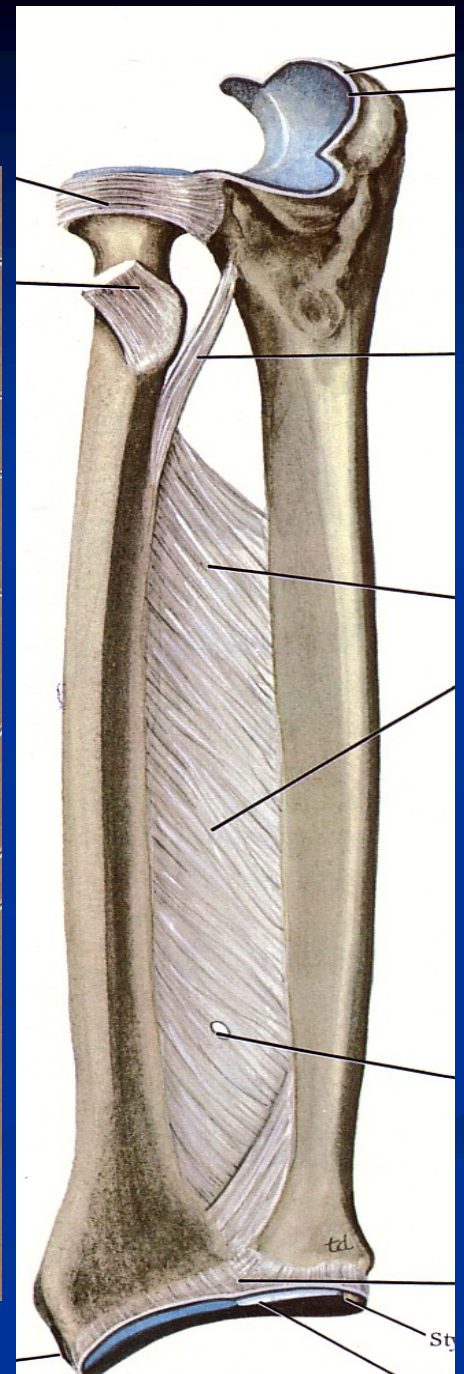
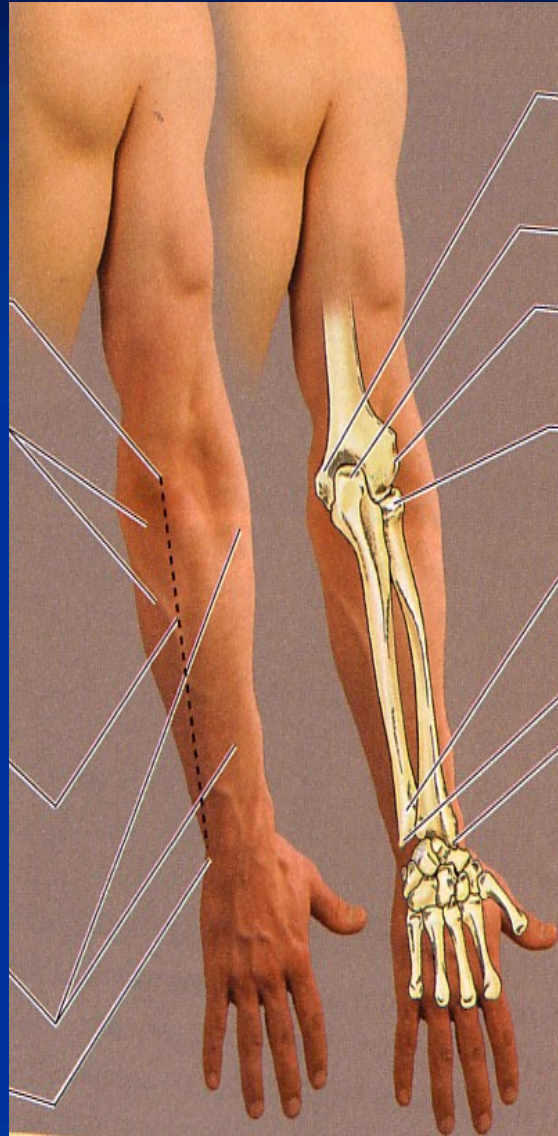
BY DR .SANAA ALSHAARAWY

# 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**.

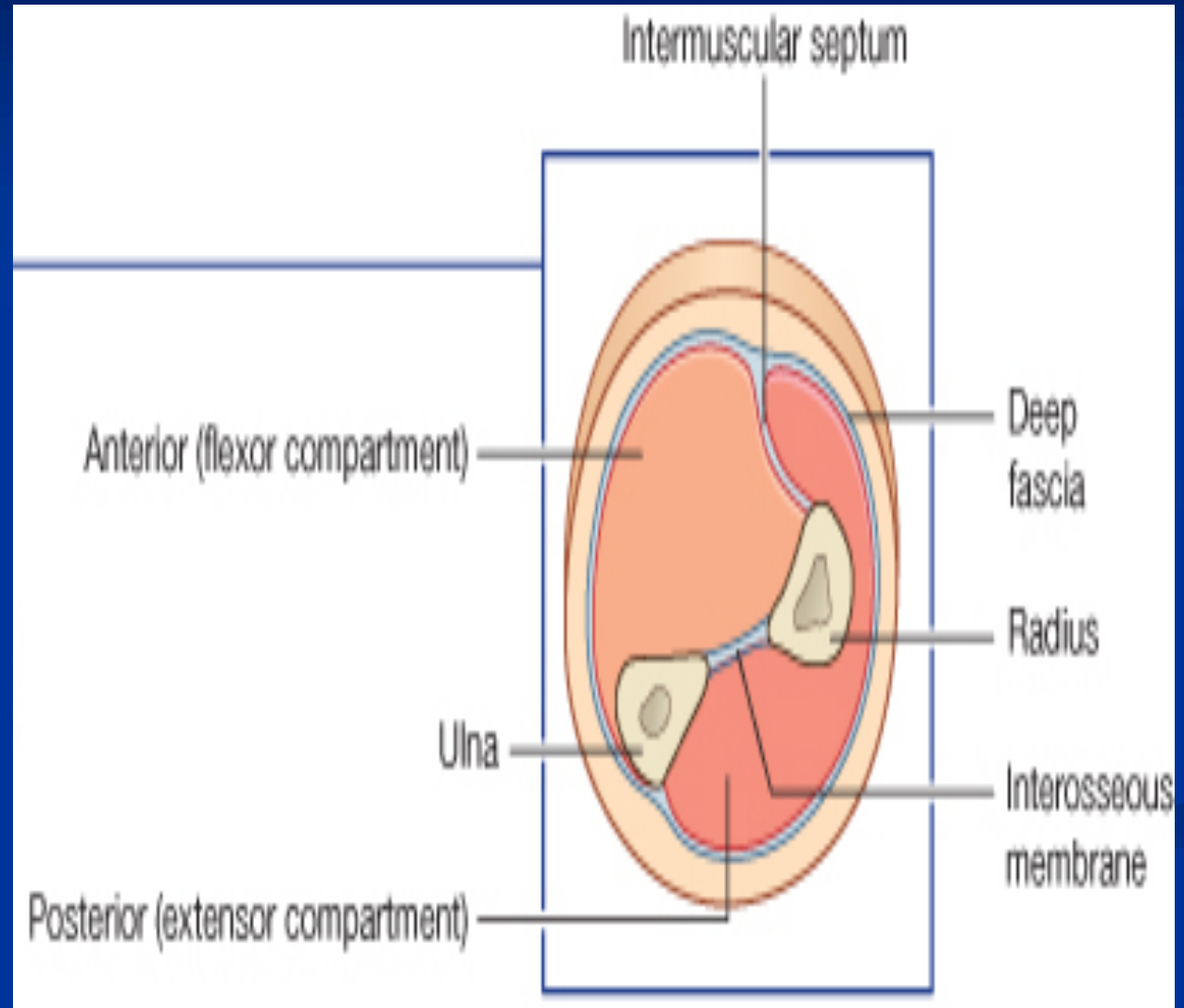


- **The forearm** extends from elbow to wrist.
- It possesses two bones **radius** laterally & **Ulna** medially.
- The two bones are connected together by the **interosseous membrane**.
- This membrane allows movement of **Pronation** and **Supination** while the two bones are connected together.
-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

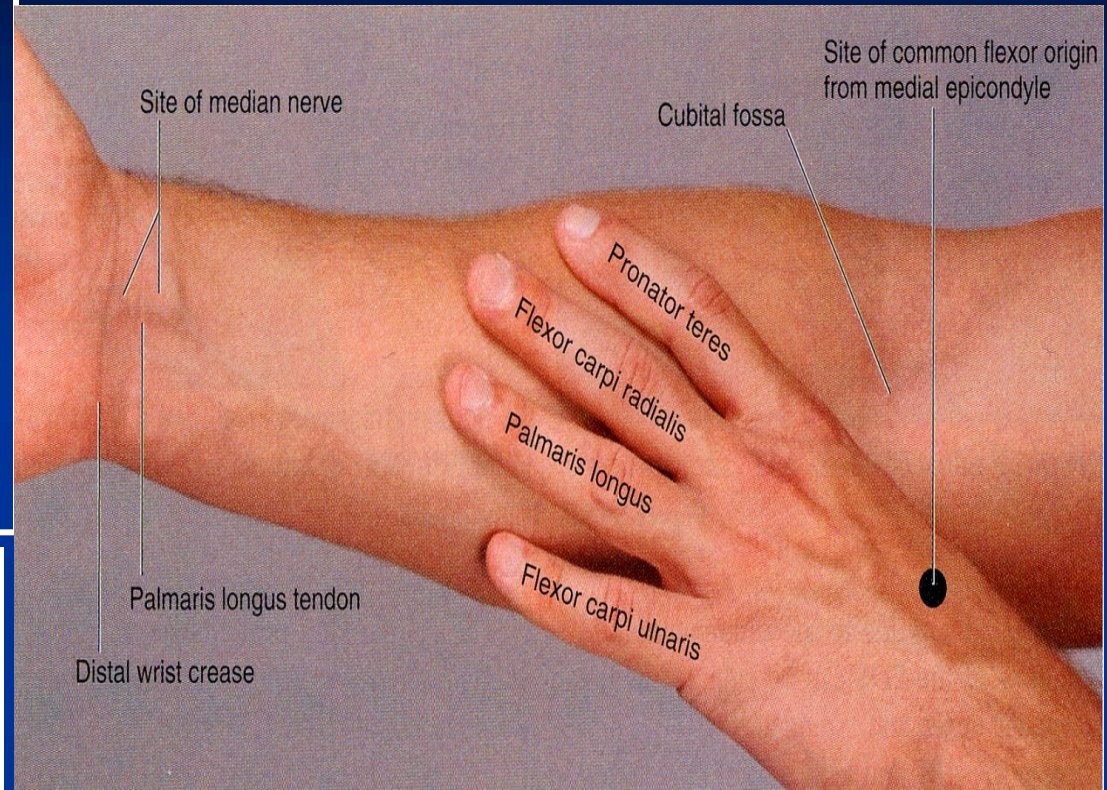




# FLEXOR GROUP

## 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**

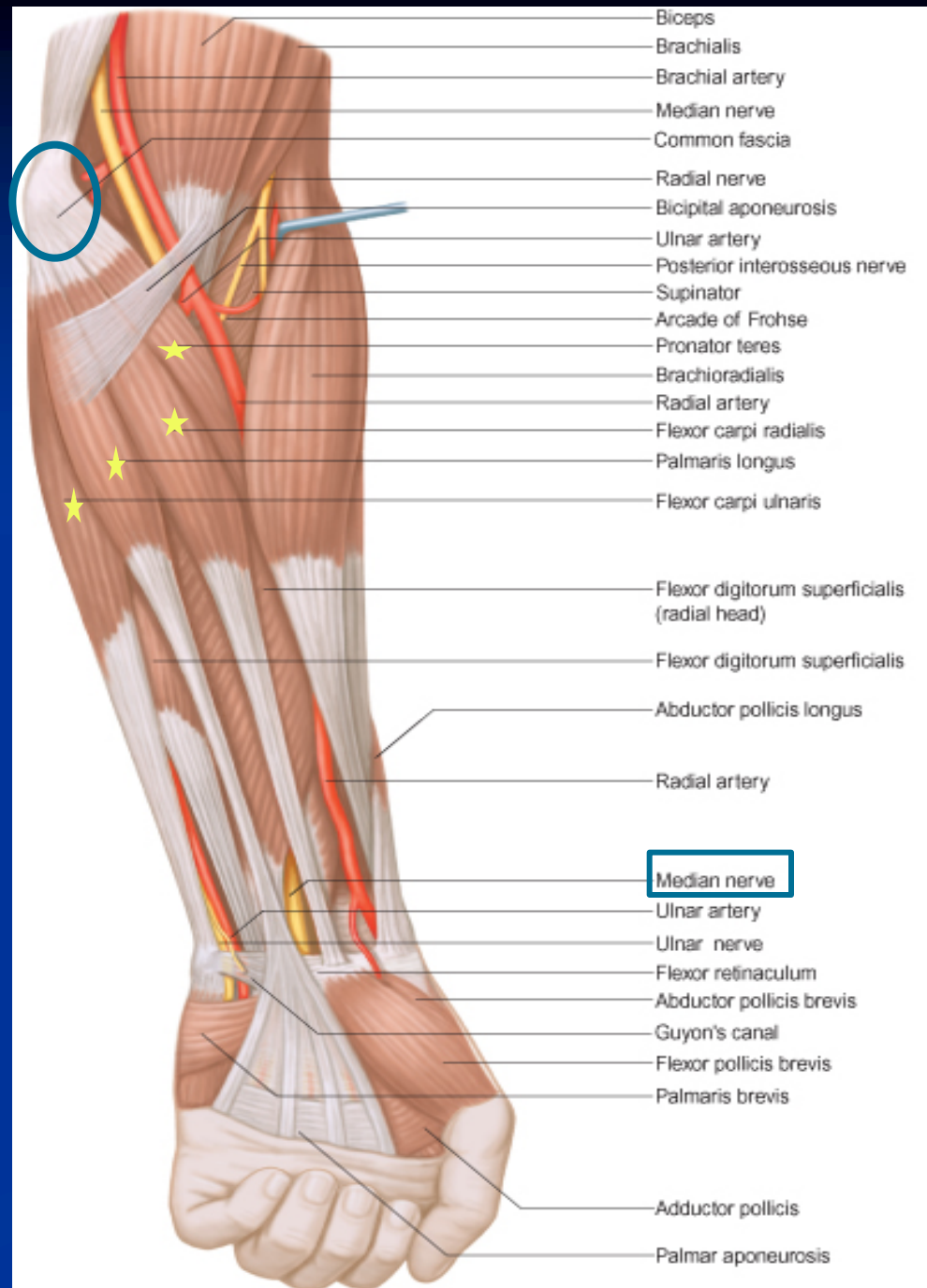
## **II-Intermediate: 1**

- **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).****

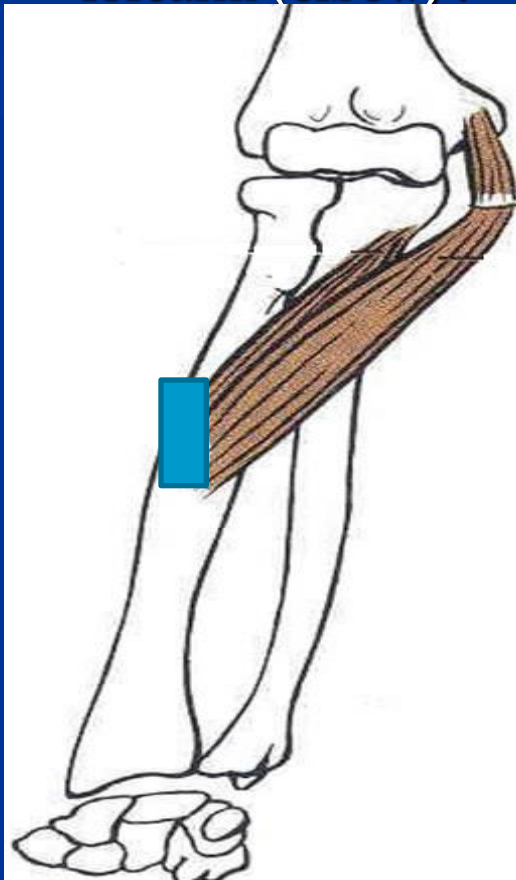




## ■ Pronator teres

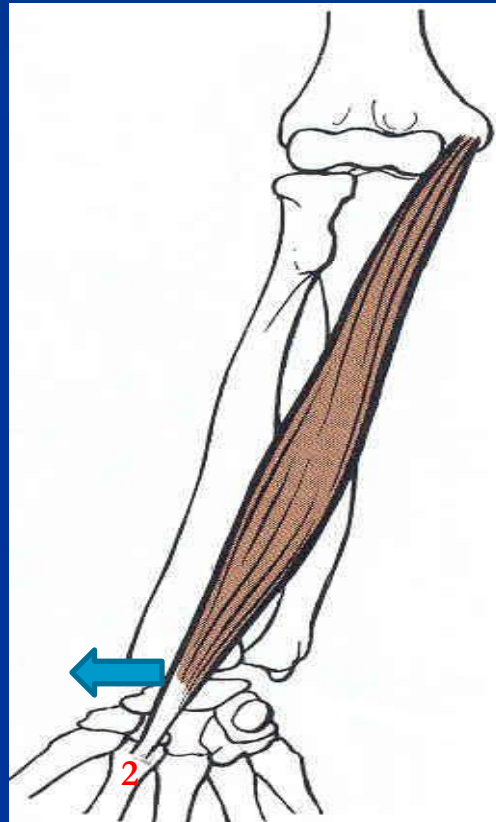
Insertion: middle of lateral surface of radius

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



## ■ Flexor Carpi Radialis

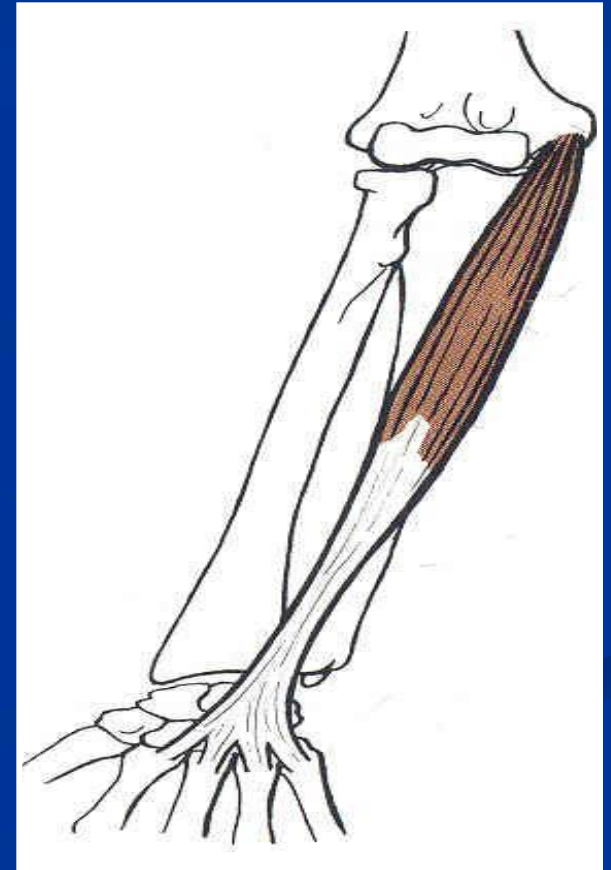
- Insertion: Base of 2<sup>nd</sup> metacarpal bone
- Action: Flexion & abduction of the hand



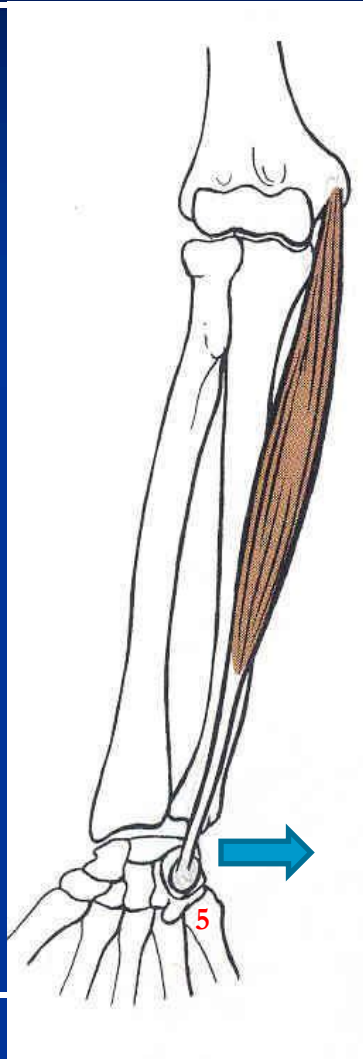
## ■ Palmaris Longus

Insertion: into the flexor retinaculum & palmar aponeurosis.

Action: Flexes hand & tightens palmar aponeurosis

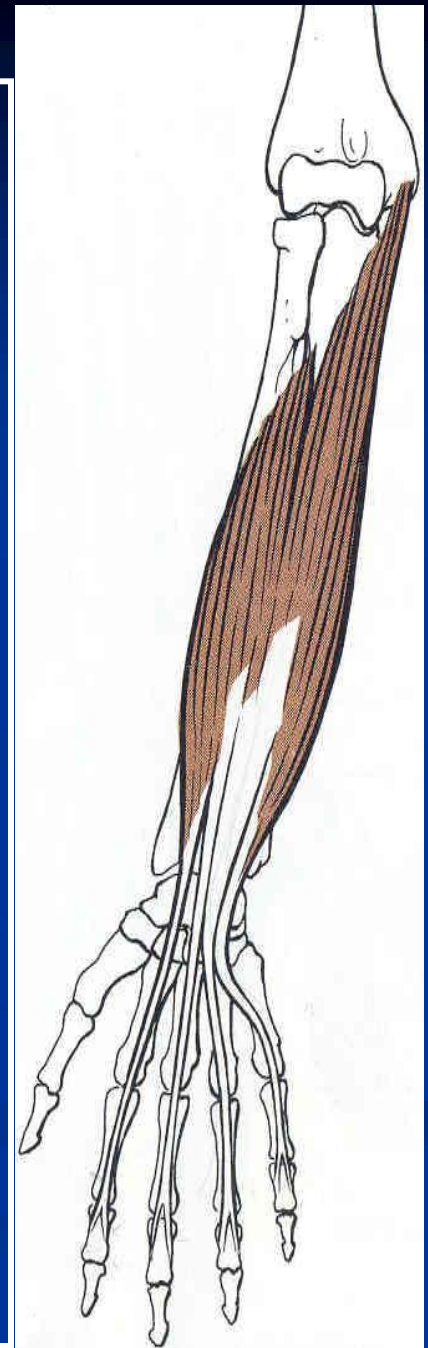


- **Flexor Carpi Ulnaris**
- **Insertion:**
- Pisiform,
- hook of hamate
- 5<sup>th</sup> metacarpal bone
- **Action:**
- Flexion and **adduction** of the hand.



## ■ **Flexor Digitorum Superficialis**

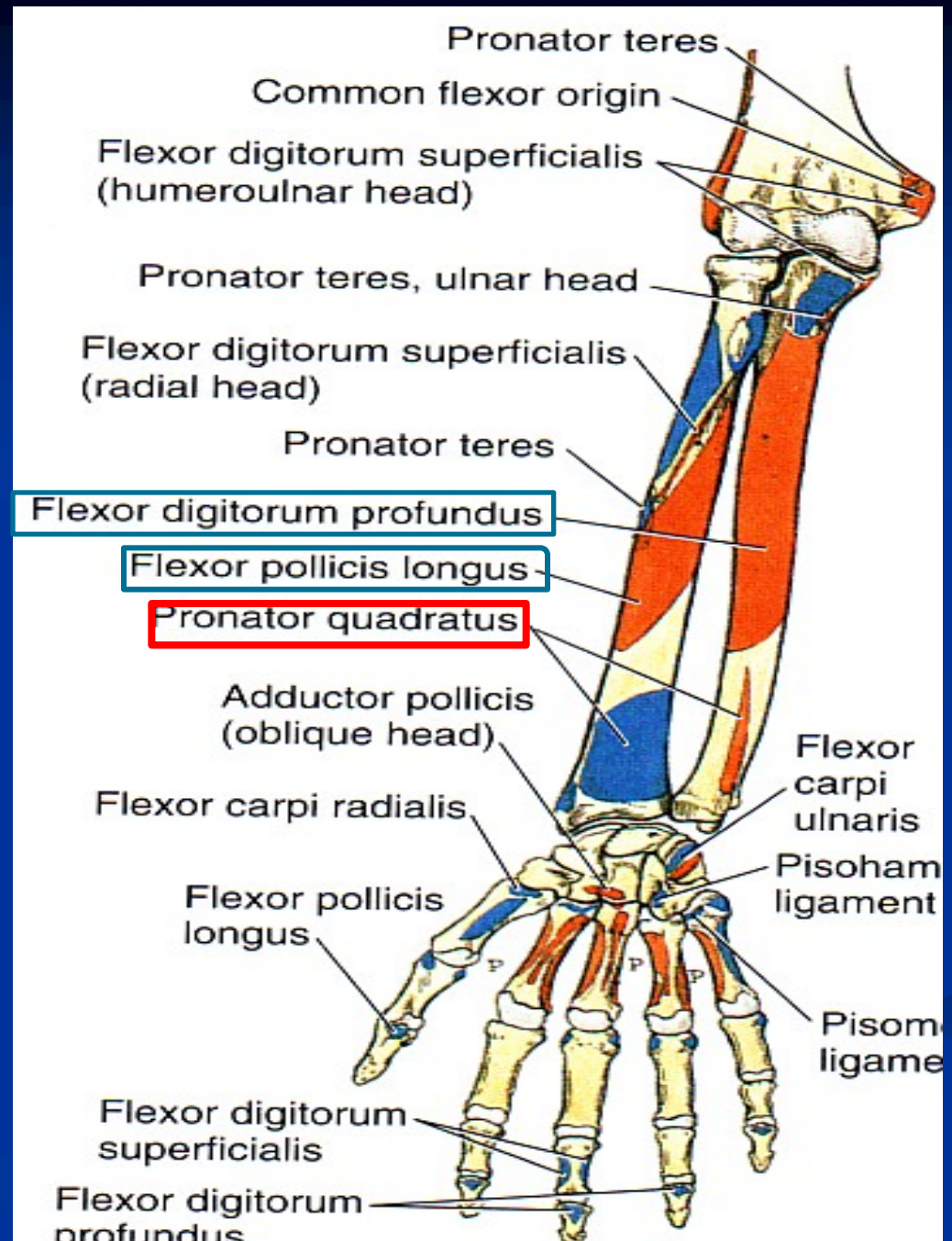
- **Origin:**
- Common flexor origin,
- Coronoid process of ulna;
- Anterior surface of radius
- **Insertion:**
- base of middle phalanges of medial 4 fingers.
- **Action:**
- Flexes middle and proximal phalanges of medial 4 fingers, and the hand



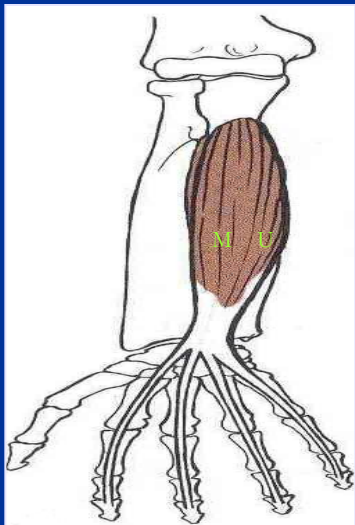


## Deep Flexors

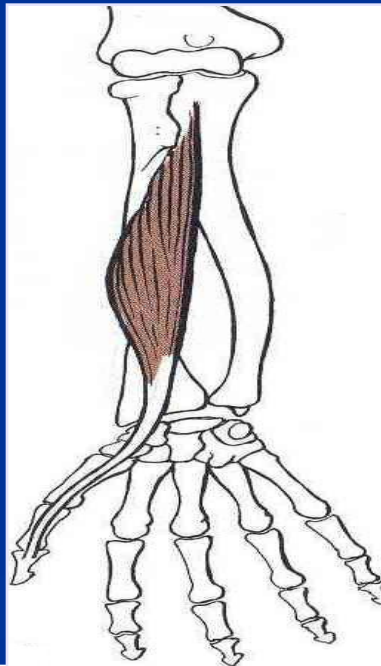
- One above ulna:  
Flexor Digitorum profundus
- One above radius:  
Flexor pollicis longus
- One above the 2 bones:  
Pronator Quadratus.



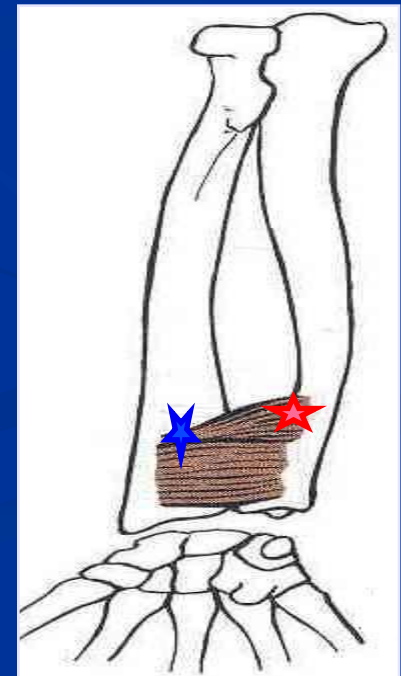
- **Flexor Digitorum Profundus**
- **Insertion:** bases of distal phalanges of medial 4 digits
- **Action:** Flexes distal phalanges of medial 4 digits.
- **N.Supply :**  
Medial 1/2 : by ulnar N.
- Lateral 1/2 : by anterior interosseous nerve (branch of median N.)



- **Flexor Pollicis Longus**
- **Insertion:** Base of distal phalanx of thumb
- **Action:** flexes interphalangeal, metacarpophalangeal & carpometacarpal joints of thumb.
- **N.supply :** anterior interosseous nerve (branch of median N.)



- **Pronator Quadratus**
  - **Insertion:** distal fourth of ant. surface of radius
  - **Action:** pronates forearm (prime mover), helps to hold the bones together.
  - **N.supply :** anterior interosseous nerve (branch of median N.)





# Supination and pronation

It occurs in the superior and inferior radioulnar joints;

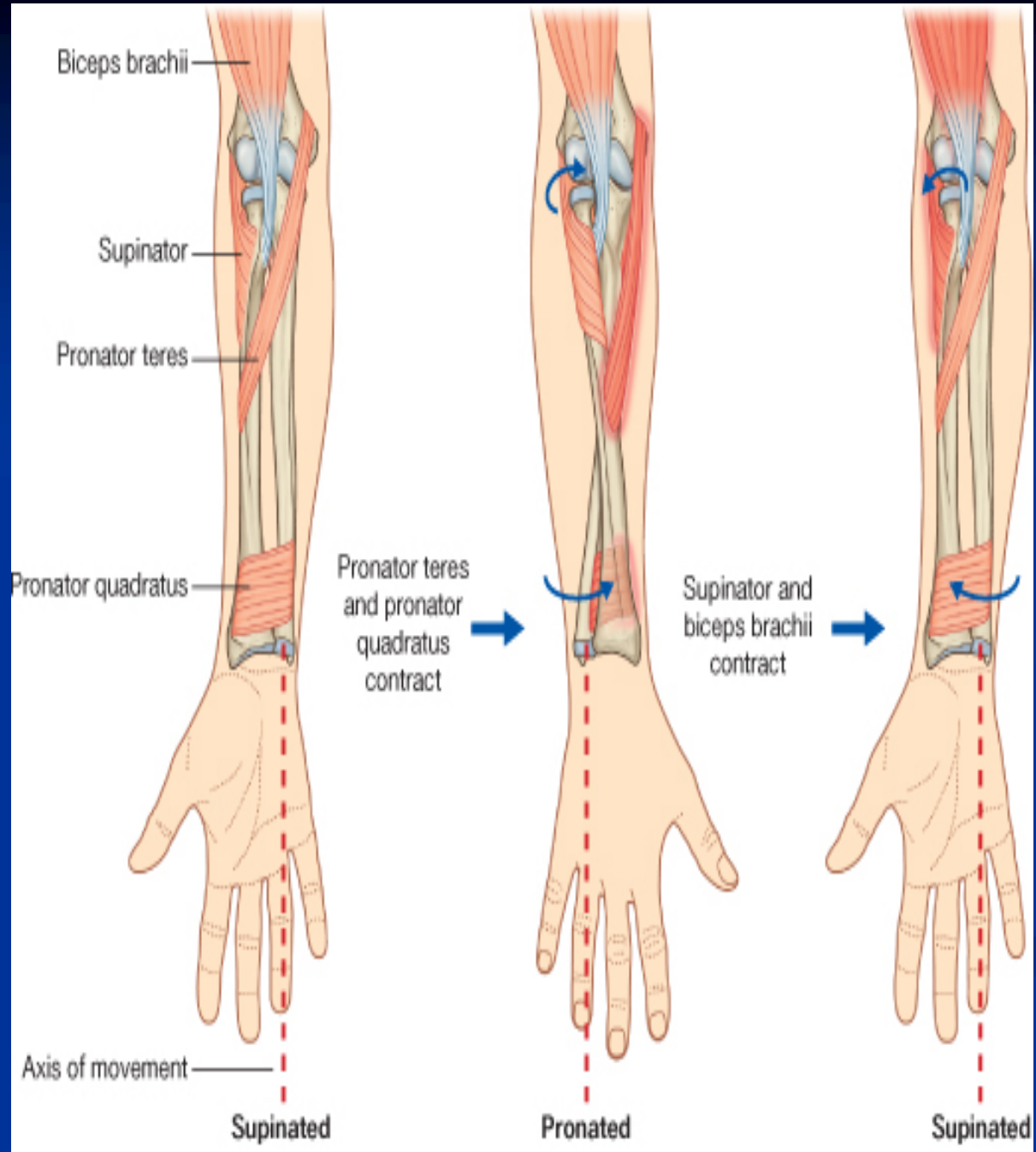
## Muscles produce supination

- Biceps brachii.
- Supinator.

## Muscles produce pronation

- Pronator teres.
- Pronator quadratus.

NB. **Brachioradialis** put the forearm in **midpron-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).

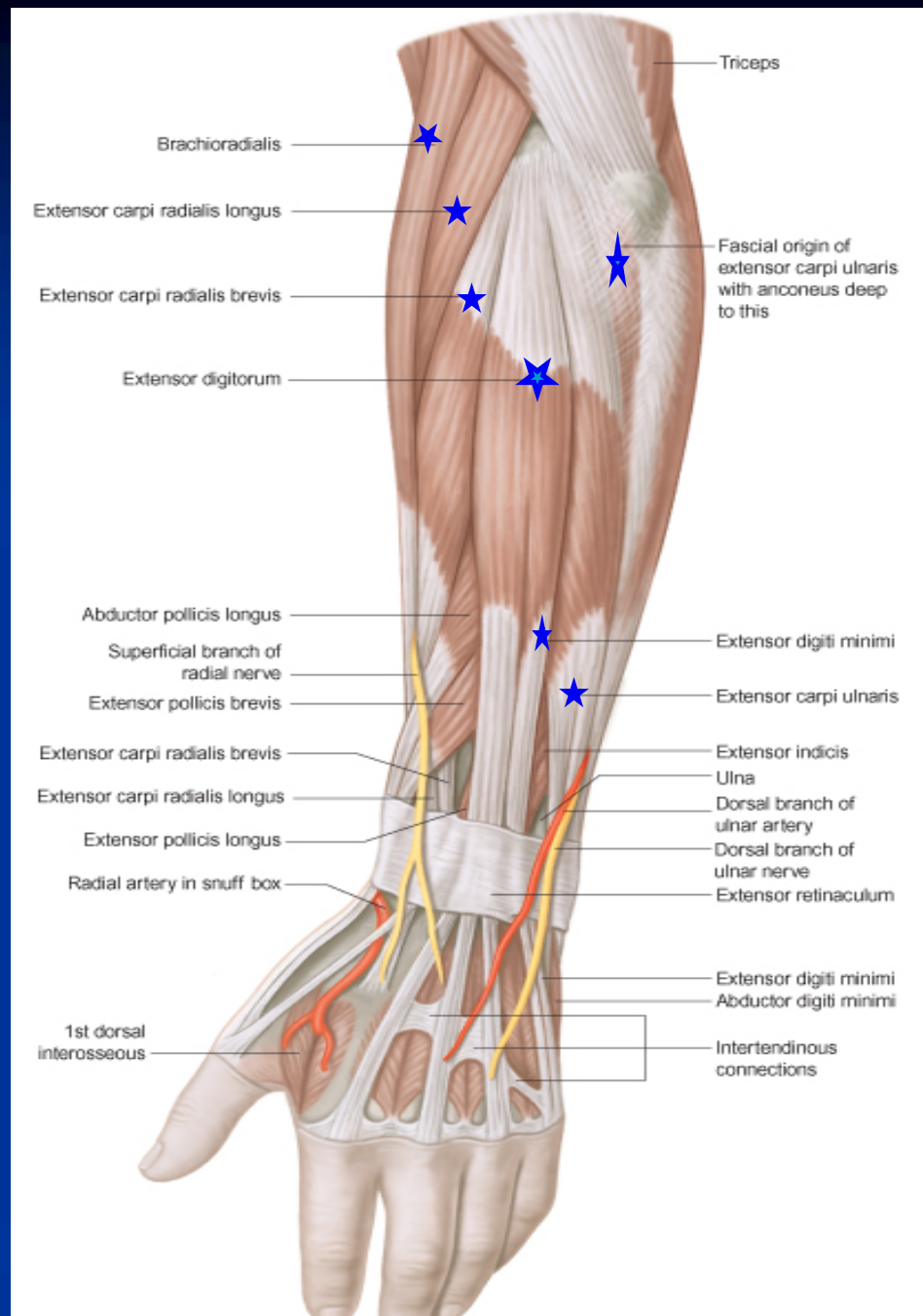
## Deep group (5)

(3 to thumb + 1 to index +  
supinator).

- Supinator.
- Abductor pollicis longus.
- Extensor pollicis brevis.
- Extensor pollicis longus.
- Extensor indices.

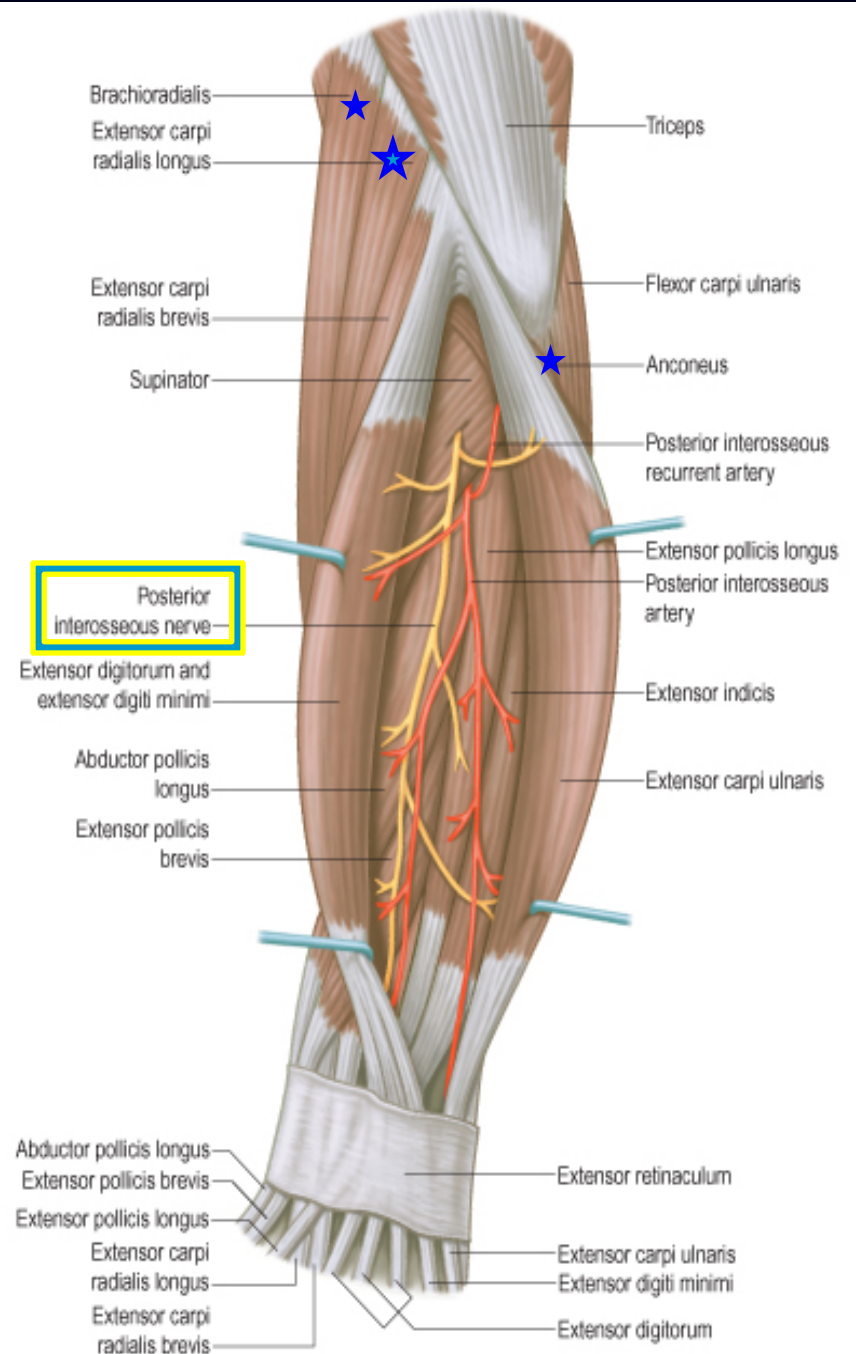


- **Posterior compartment:**
- **Superficial group:**
- **7 muscles** ( from lateral to medial ) :
- Brachioradialis, (BR).
- Extensor carpi radialis longus, (ECRL).
- Extensor carpi radialis brevis, (ECRB).
- Extensor digitorum, (ED).
- Extensor digiti minimi, (EDM).
- Extensor carpi ulnaris, (ECU).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

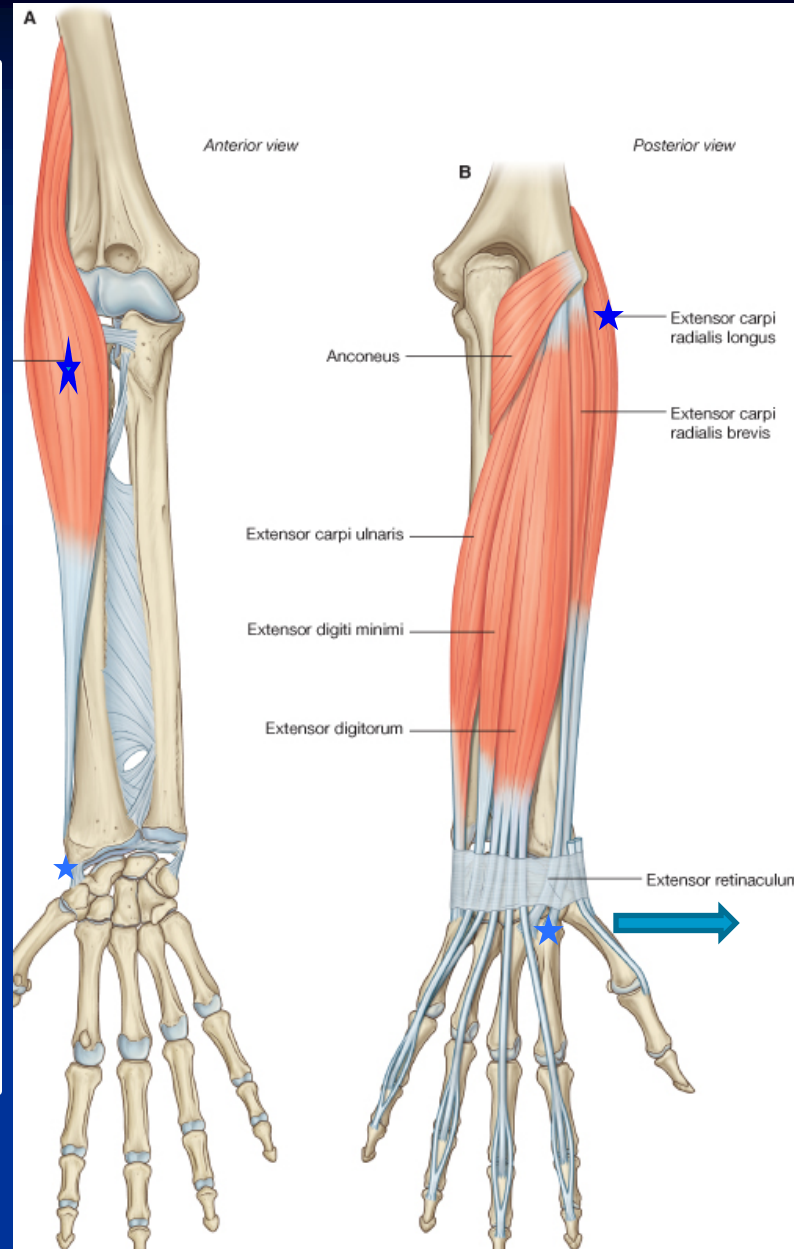
### ■ **Insertion:**

■ 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:

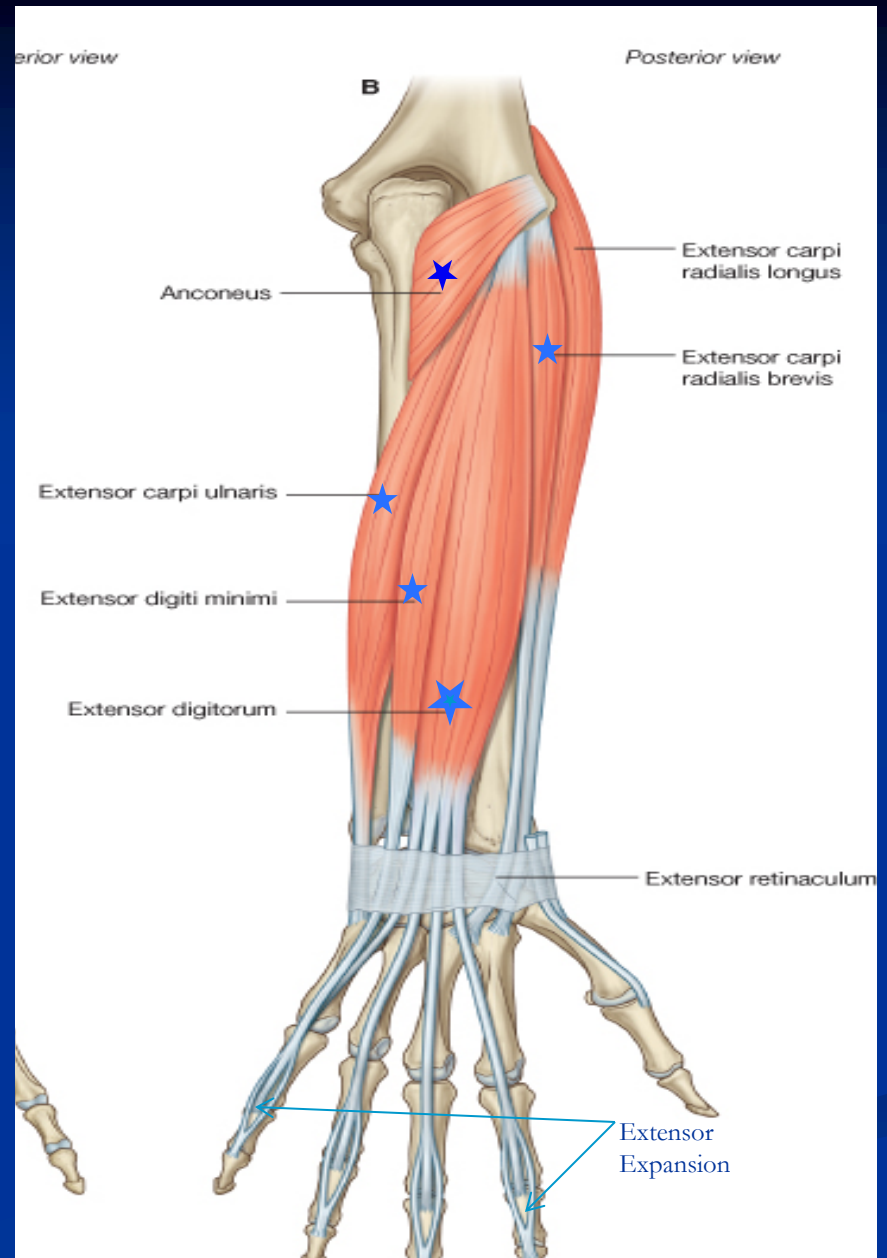
Extensor expansion of the little finger.

## 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).

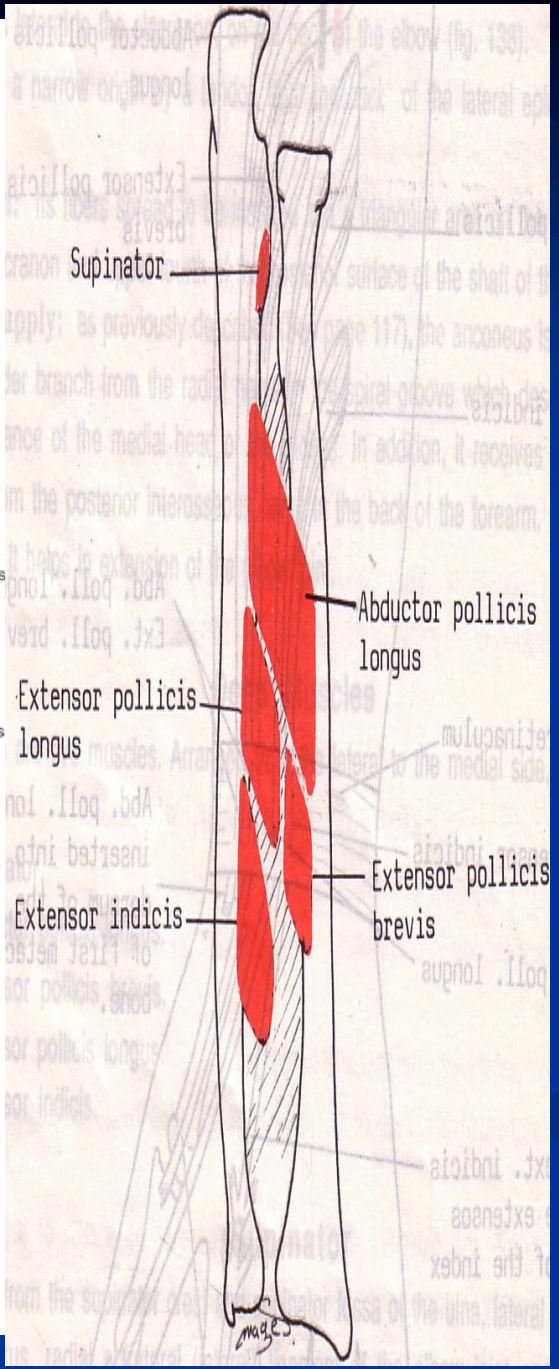
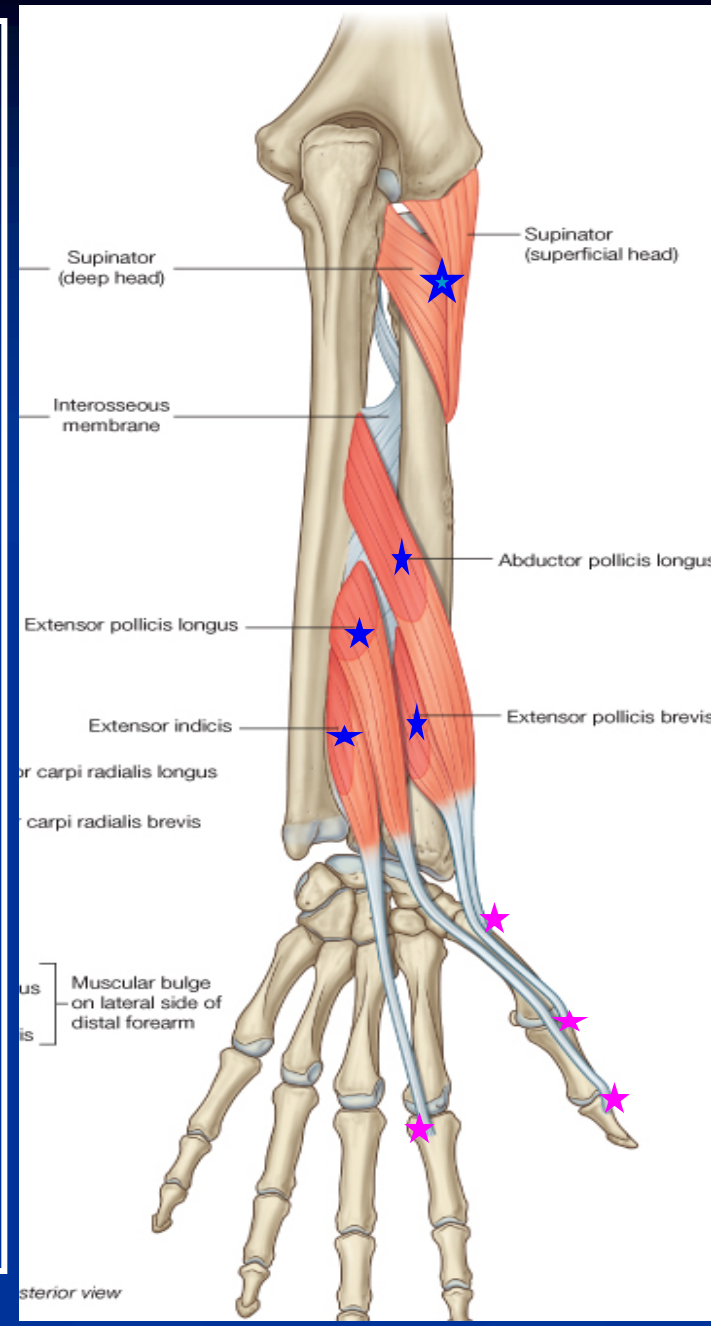
2- Extensor pollicis brevis, (EPB).

3- Extensor pollicis longus, (EPL).

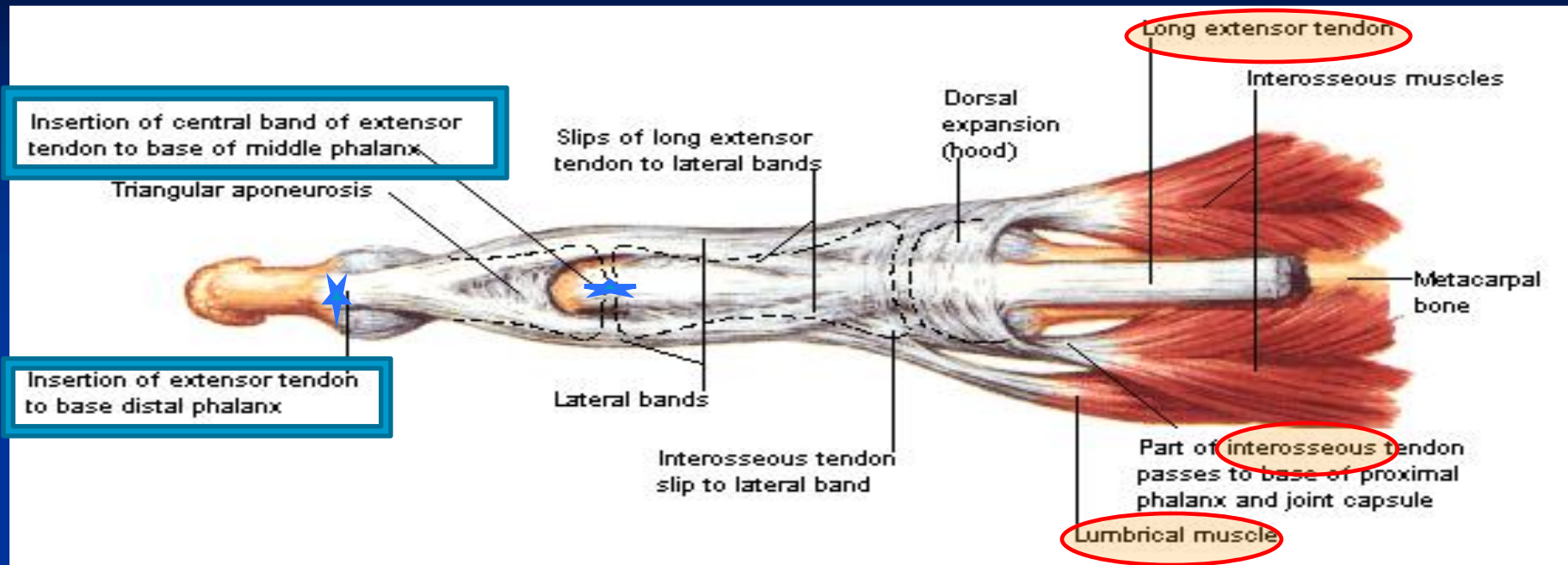
4- Extensor indicis (EI).

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 long extensor tendons : **Extensor digitorum, Extensor digiti minimi, Extensor indicis** with palmar & dorsal **interossei** & **lumbricals** muscles.
- All these tendons unite to form one tendon (dorsal Extensor 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.