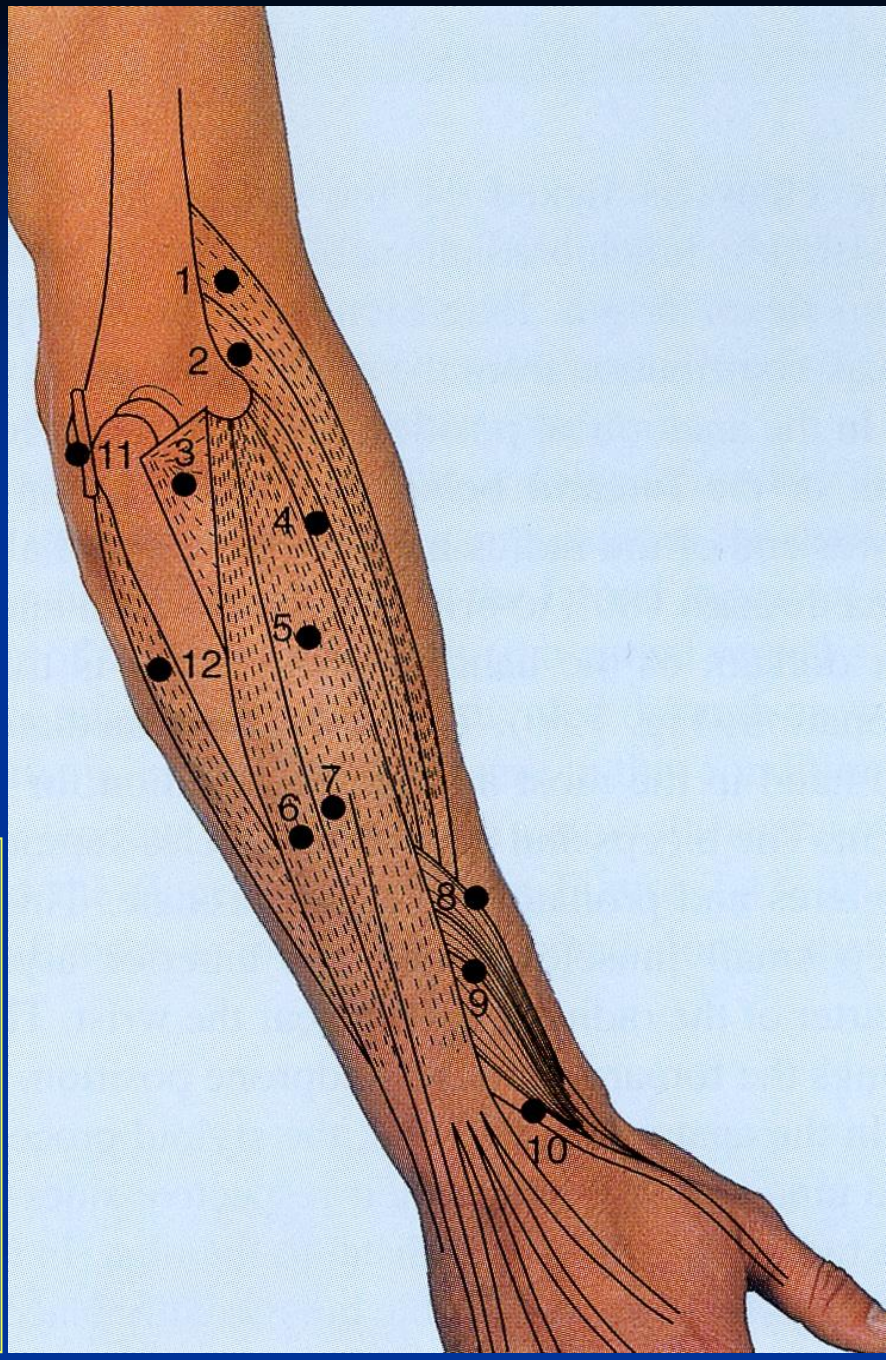
FOREARM



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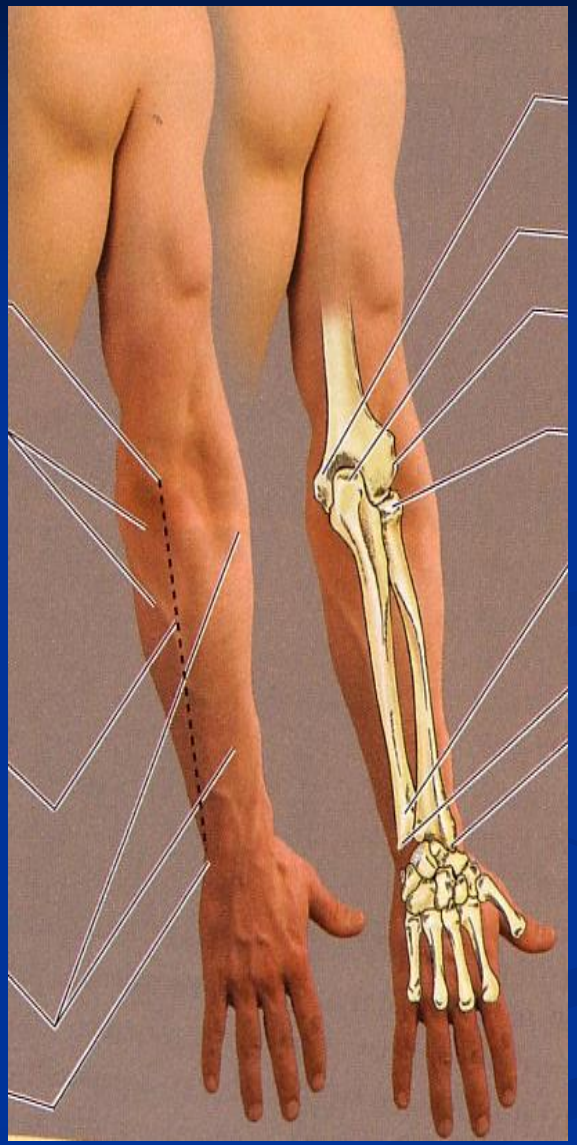
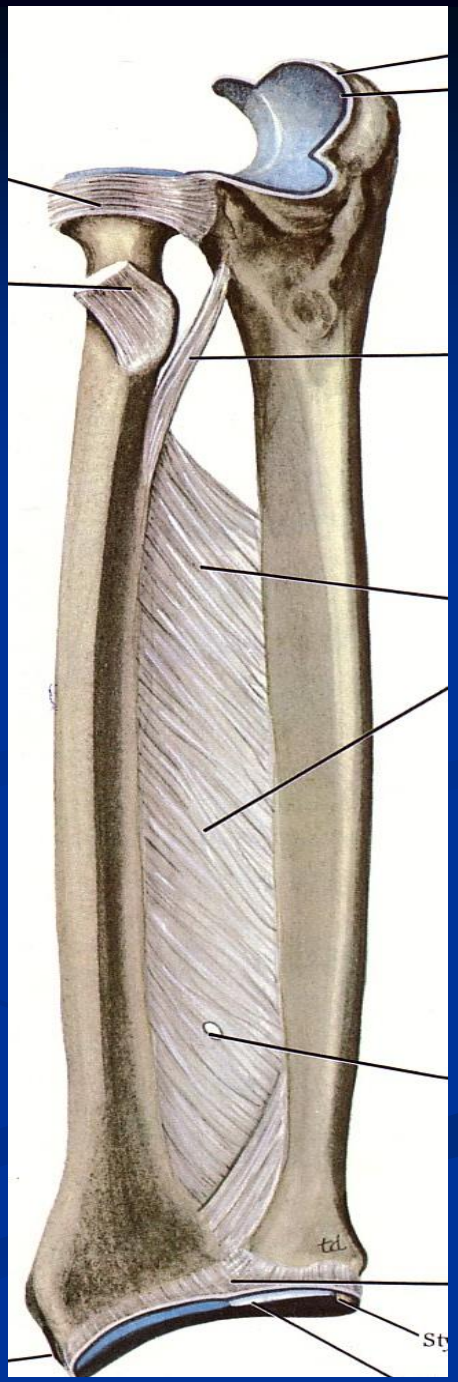
OBJECTIVES

- At the end of this lecture, the student should 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 & poronation 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 musles and their innervation & movements.

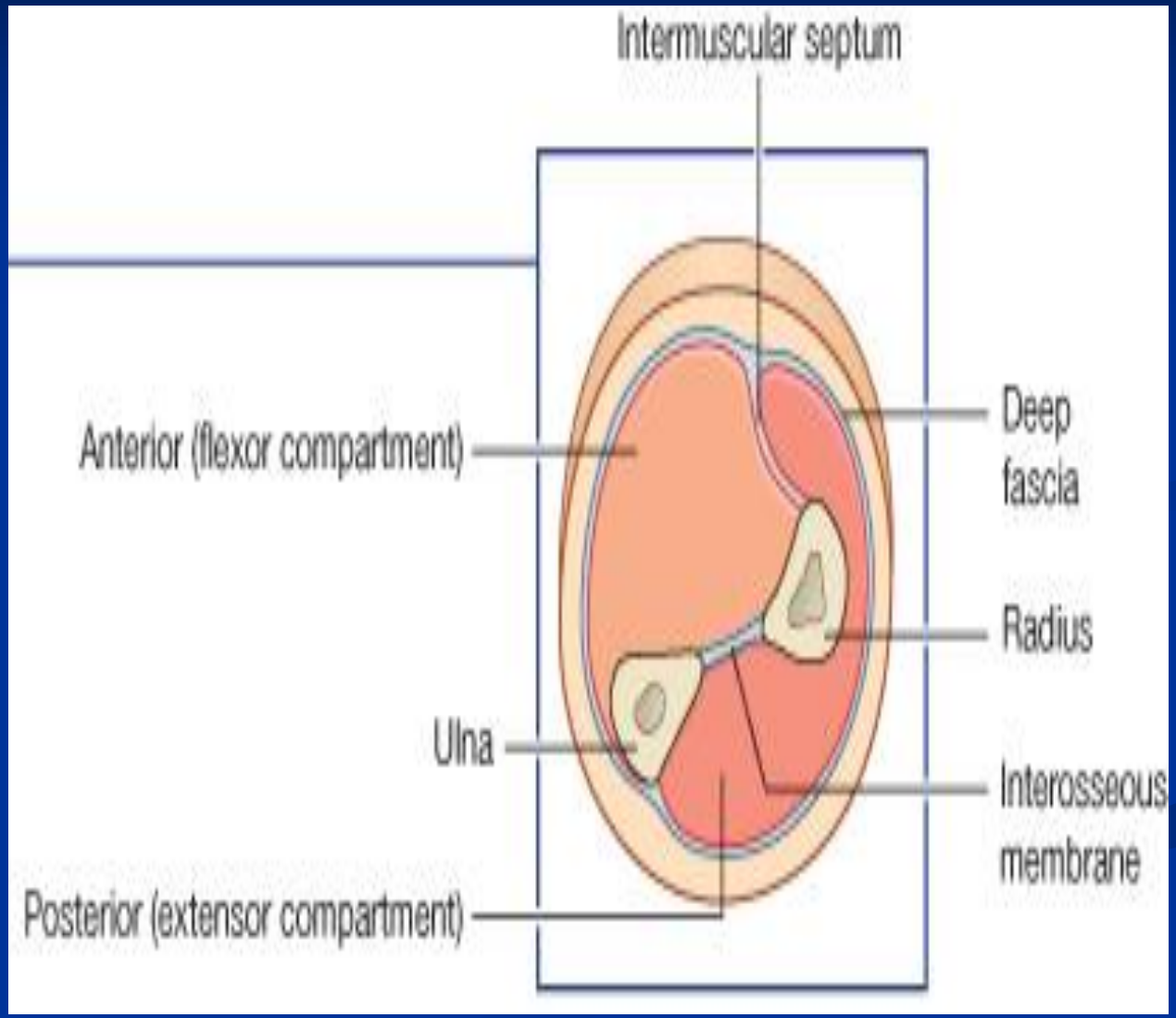
- **The forearm** extends from elbow to wrist.
- It posses two bones radius laterally & Ulna medially.
- The two bones are connected together by the interosseous membrane.
- This membrane allows movement of **Pronation** and **Supination** while the two bones are connected together.
- Also it gives origin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





Fascial Compartments of the Forearm

- 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 several compartments, each having its own muscles, nerves, and blood supply.

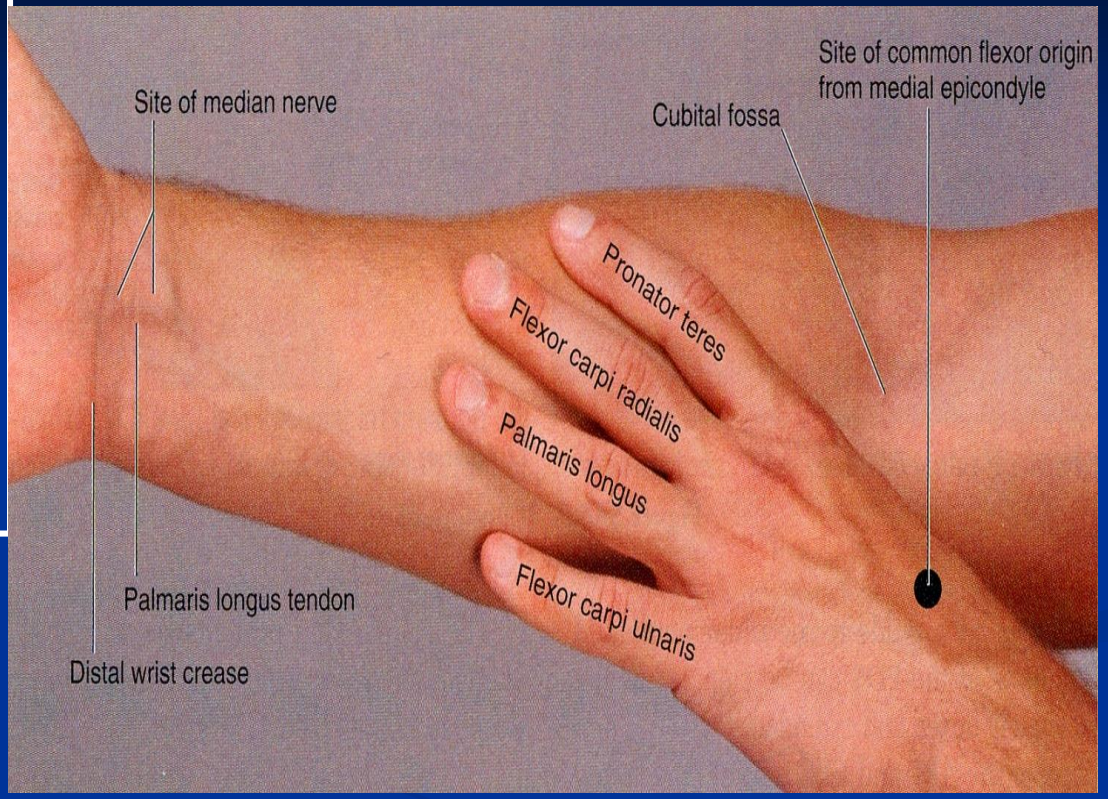


FLEXOR GROUP

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

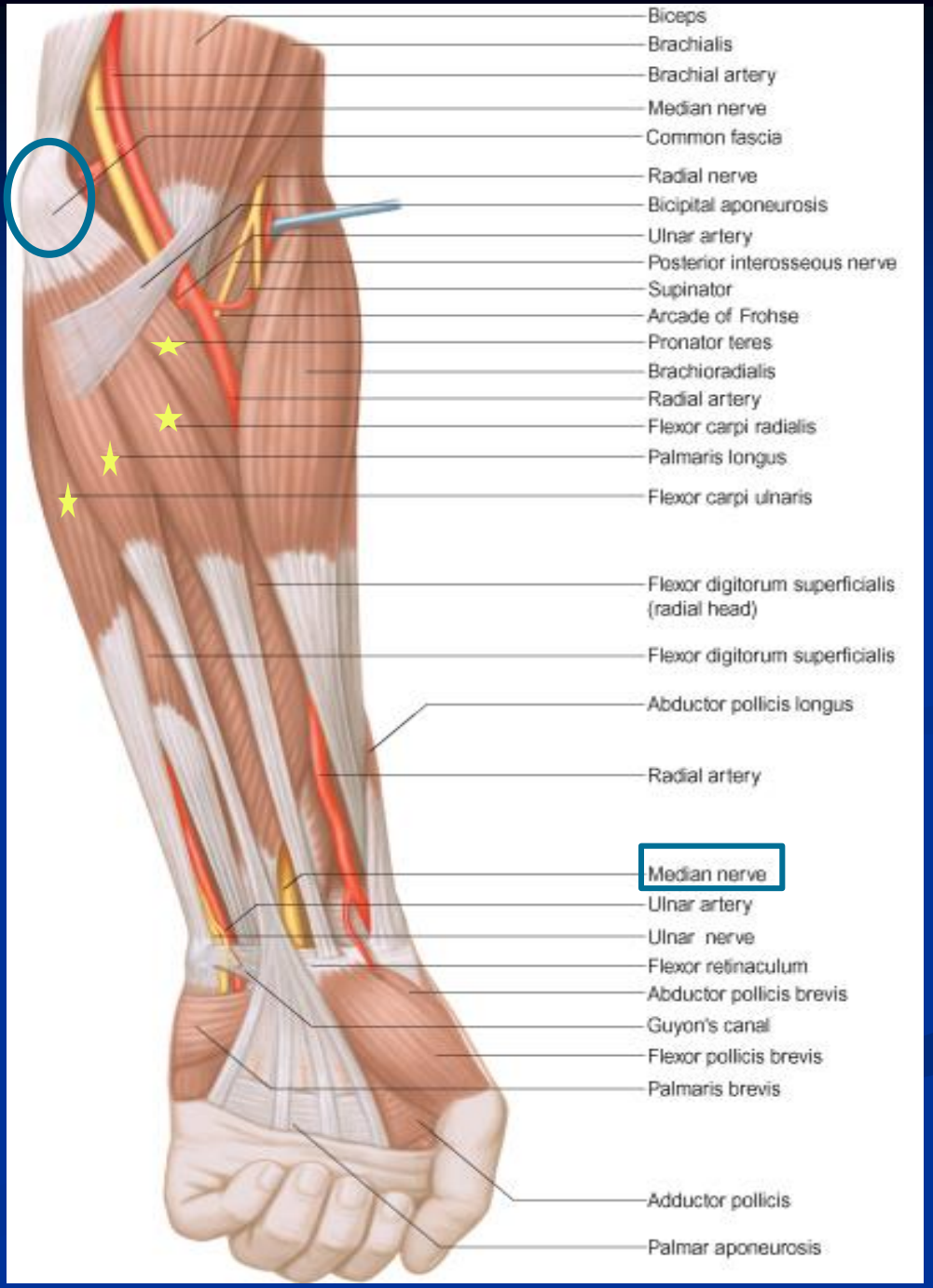
II-Intermediate: 1

- Flexor digitorum superficialis

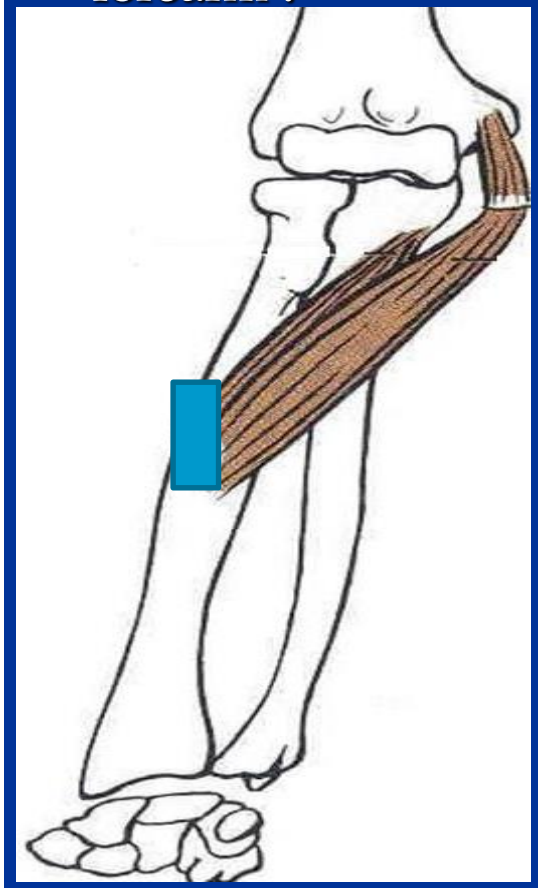
III- Deep: 3

- Flexor digitorum profundus
- Flexor pollicis longus
- Pronator quadratus

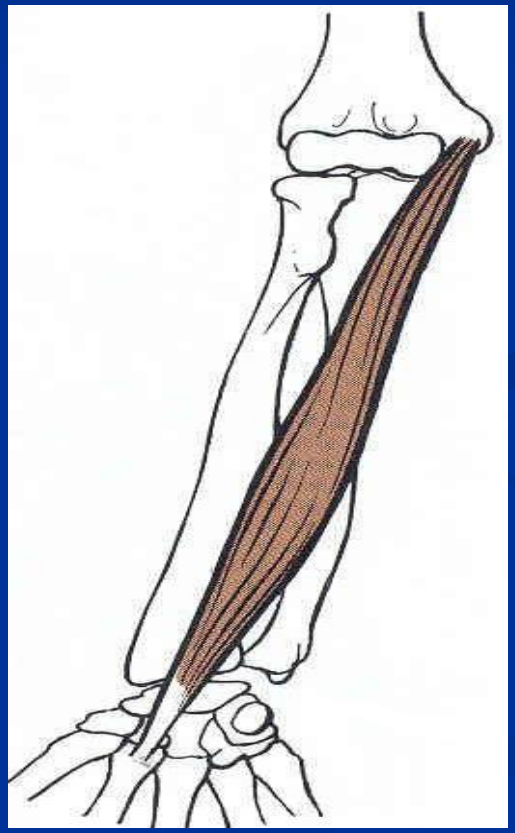
- **Superficial Flexors:**
- They arise - more or less- from the common flexor origin (front of medial epicondyle).
- All are supplied by median nerve except one, flexor carpi ulnaris, FCU (ulnar).
- All cross the wrist joint except one, pronator teres, (PT).



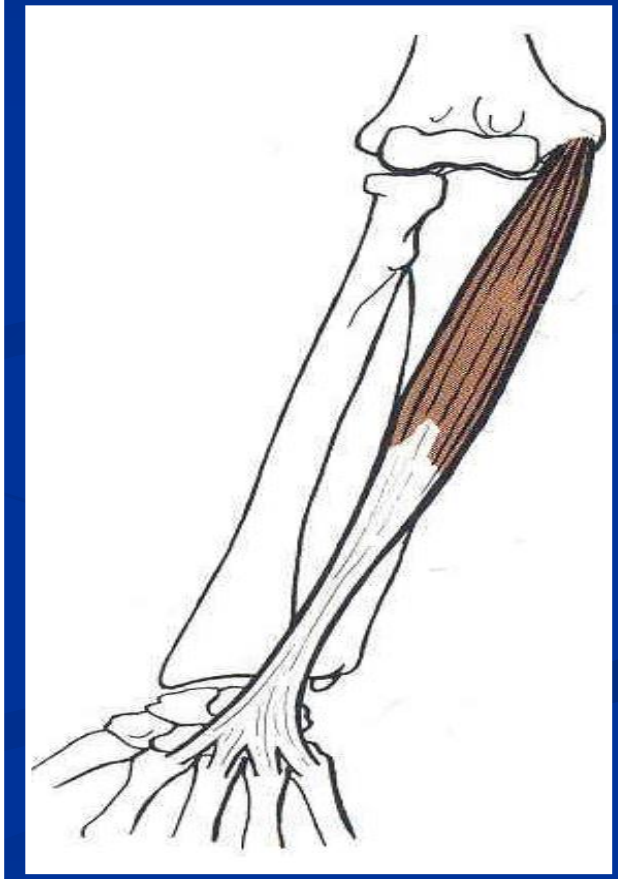
- **Pronator teres**
  - **Insertion:** middle of lateral surface of radius
  - **Action:** pronation & flexion of forearm .



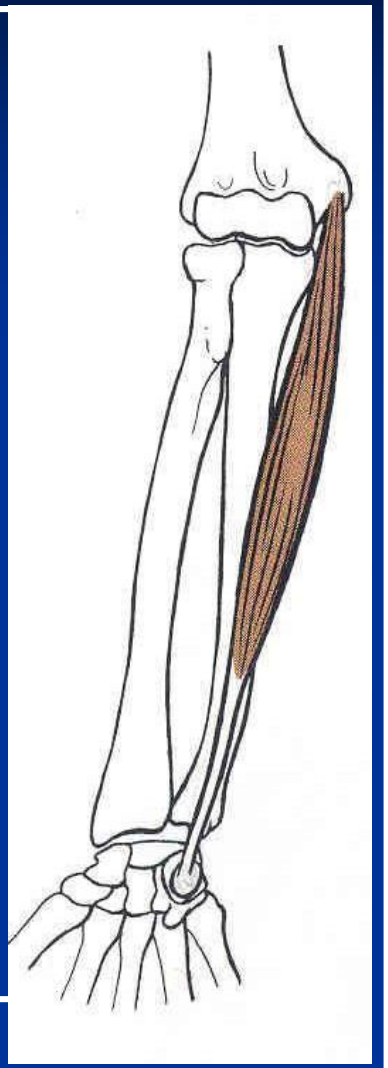
- **Flexor Carpi Radialis**
  - **Insertion:** Base of 2nd metacarpal bone
  - **Action**: Flexion & abduction of the hand



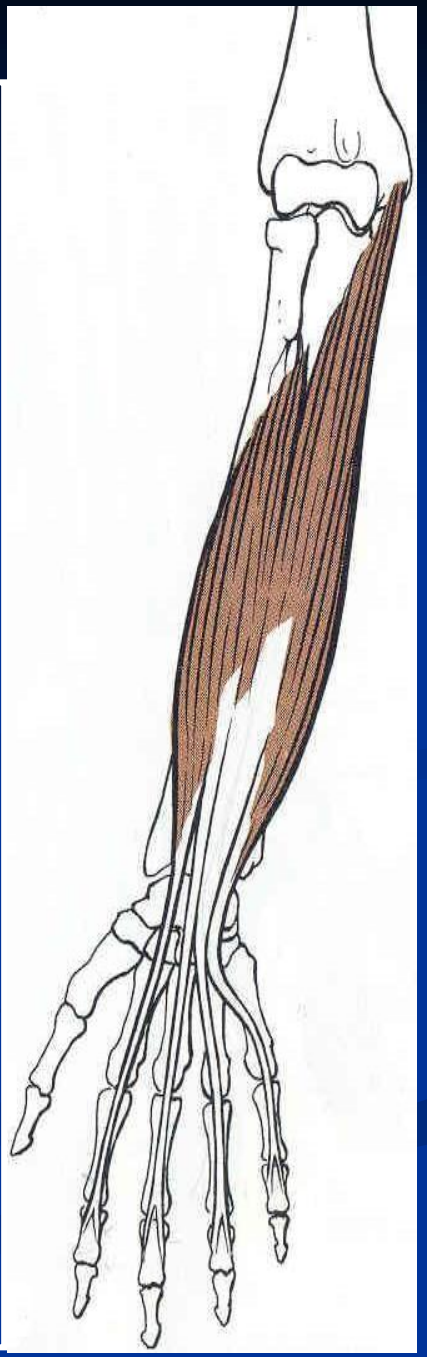
- **Palmaris Longus**
  - **Insertion:** into the flexor retinaculum & palmar aponeurosis.
  - **Action:** Flexes hand & tightens palmer aponeurosis



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



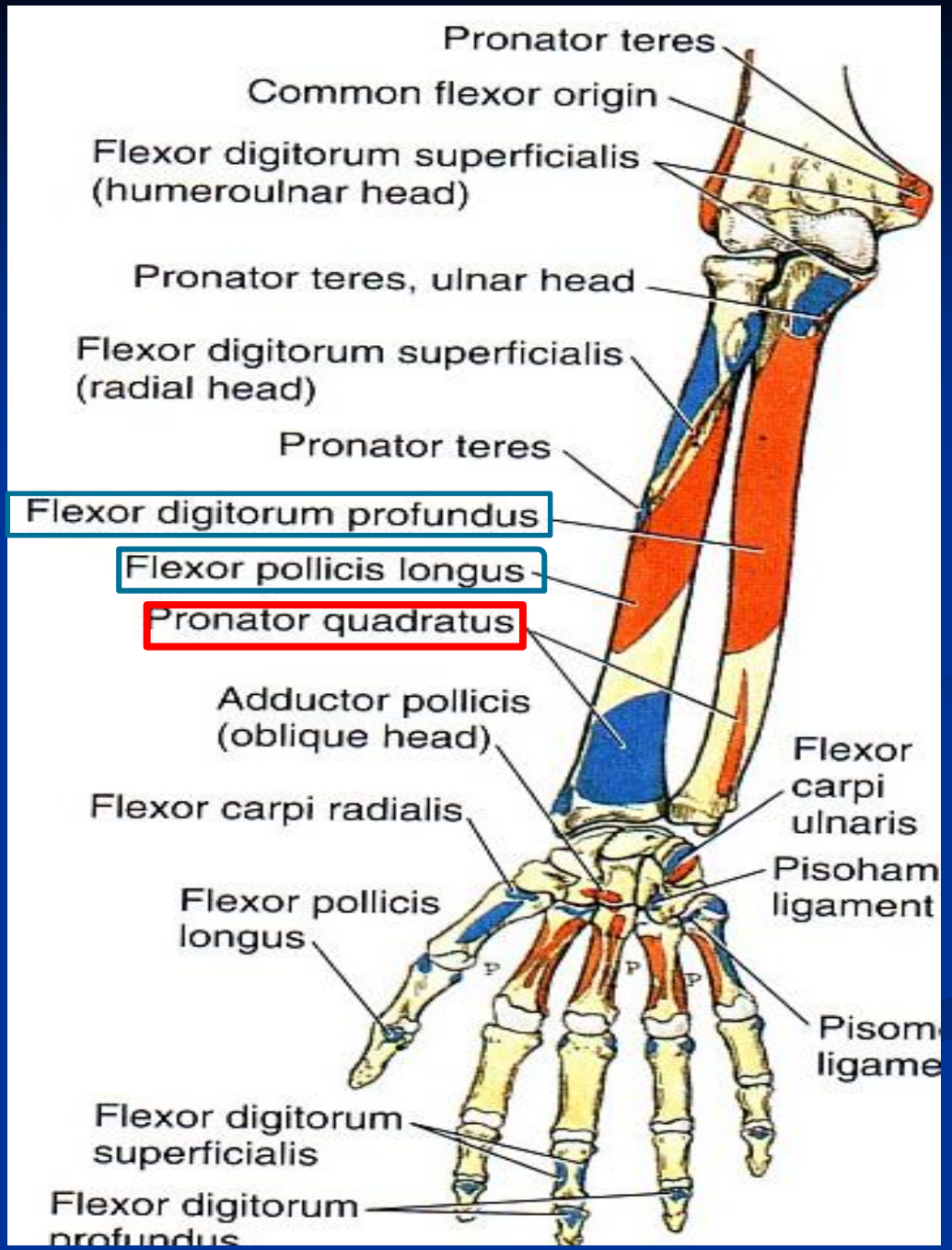
- Flexor Digitorum Superficialis
  - Origin:
  - Common flexor origin,
  - Coronoid process of ulna;
  - Anterior surface of radius
  - Insertion:
  - base of middle phalanges of medial 4 fingers.
  - Action:
  - Flexes middle and proximal phalanges of medial 4 fingers, and the hand



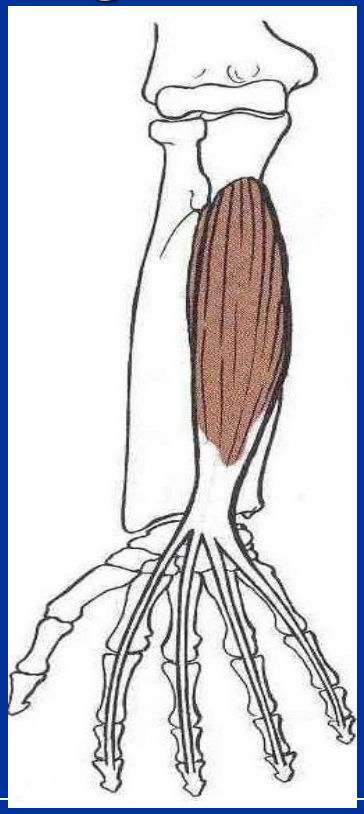
Deep Flexors

- **One above ulna**: Flexor Digitorum profundus
- **One above radius**: Flexor pollicis longus
- **One above the 2 bones:**

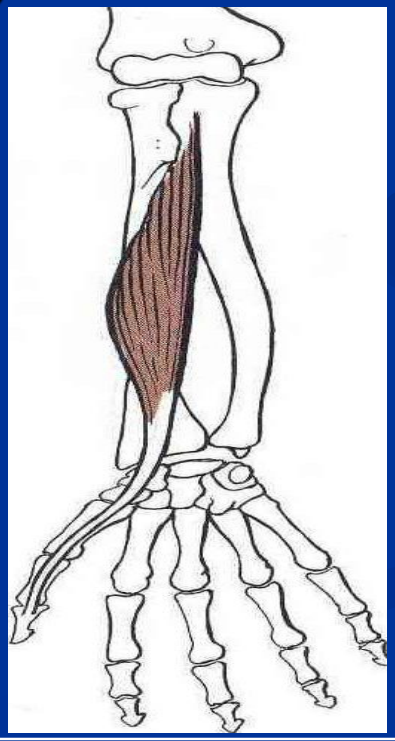
Pronator Quadratus.



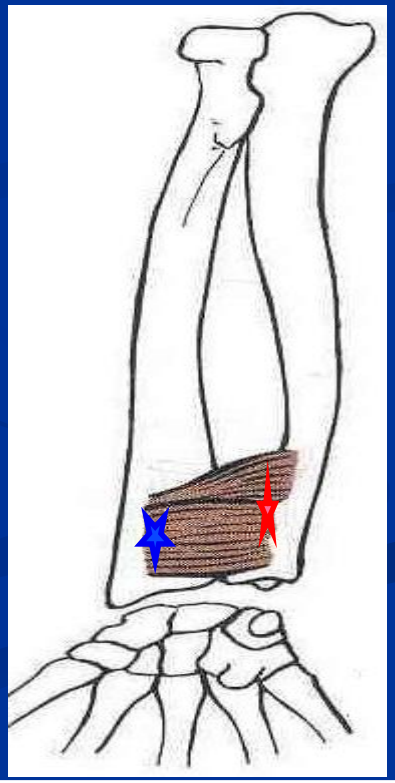
- **Flexor Digitorum Profundus**
- **Insertion**: bases of distal phalanges of medial 4 digits
- **Action**: Flexes distal phalanges of medial 4 digits.



- **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;

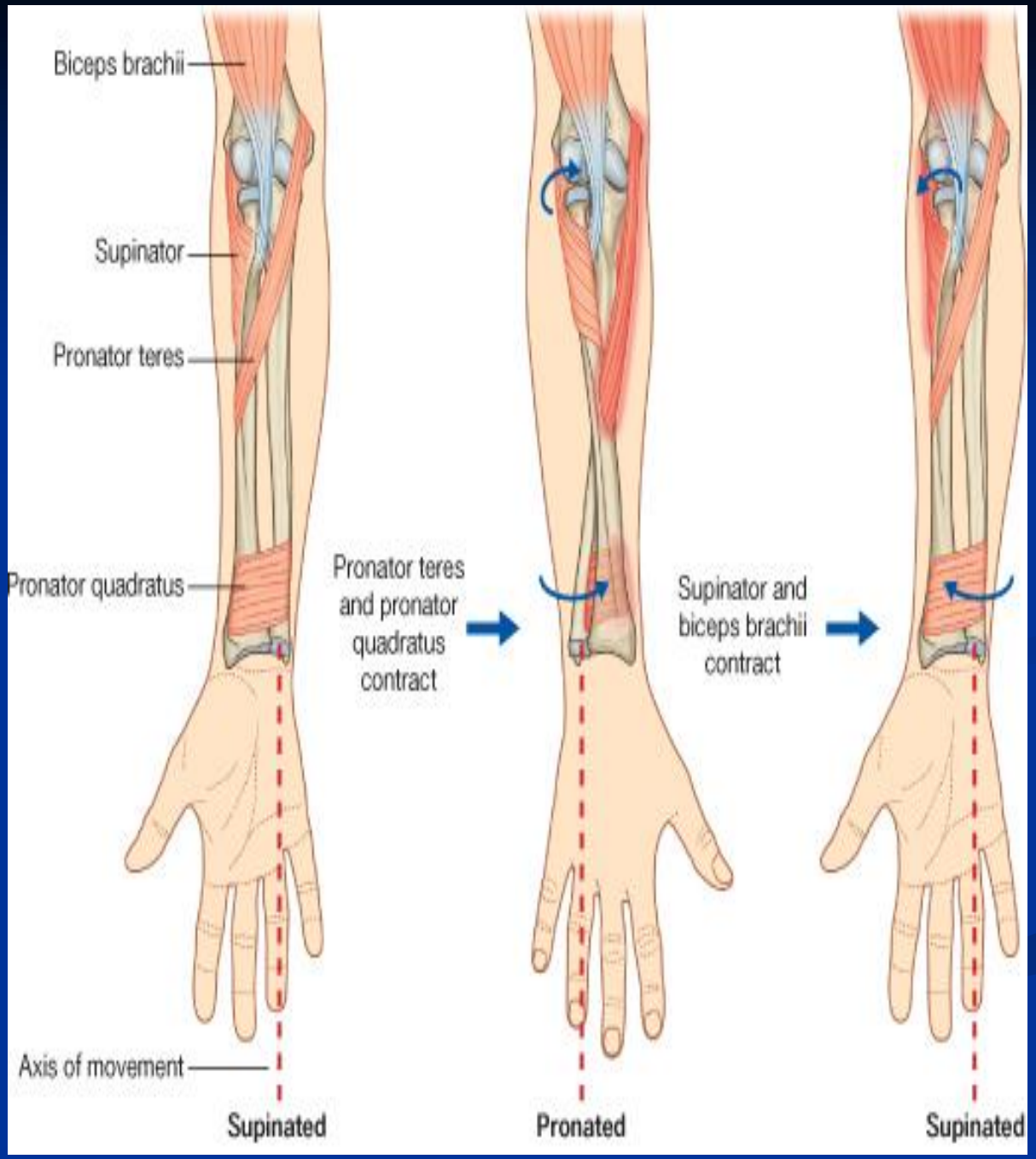
Muscles produce supination

- 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

Common Extensor Origin . (front of lateral epicondyle).

Superficial group (5)

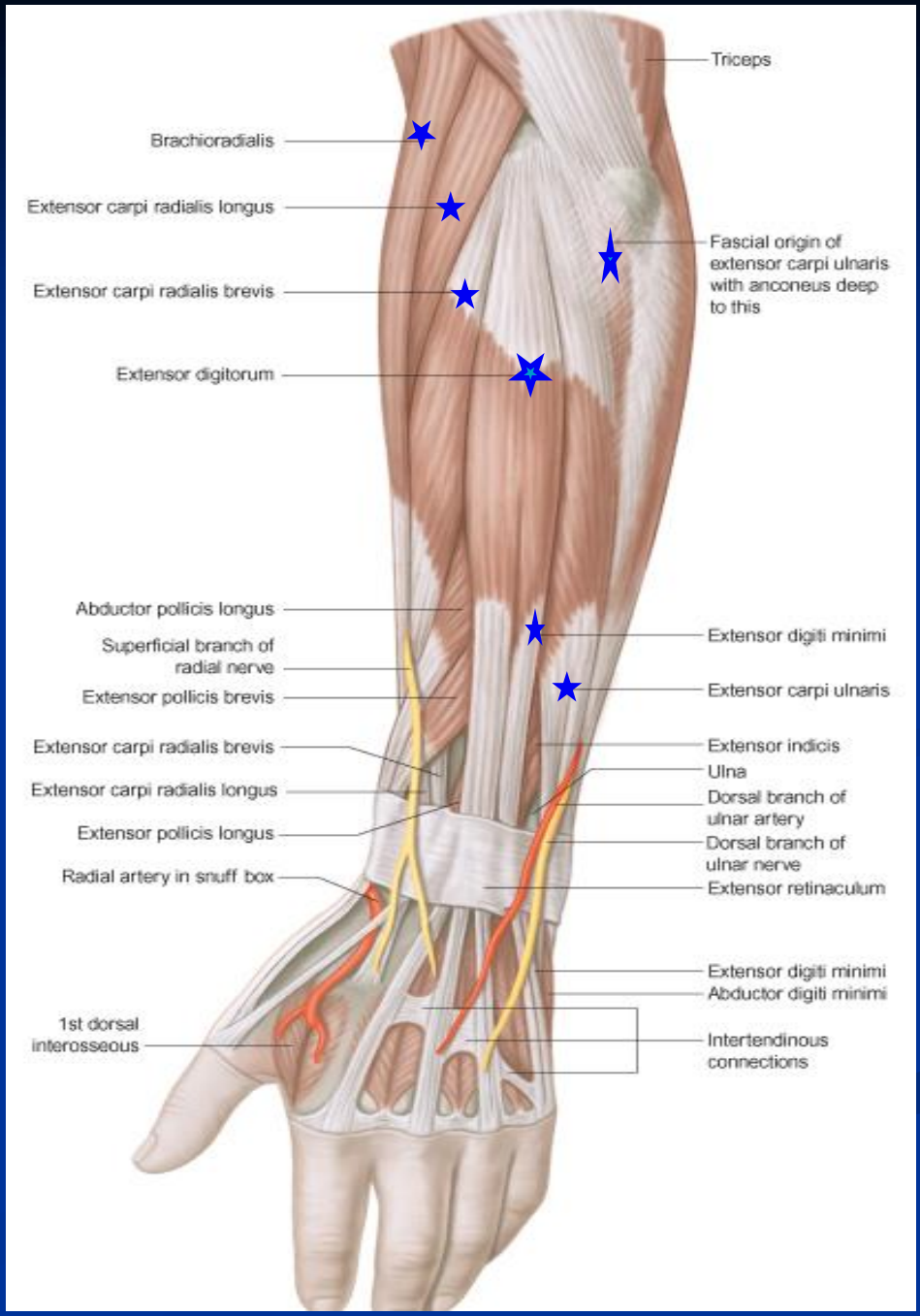
- Extensor carpi radialis brevis
- Extensor digitorum
- Extensor digiti minimi
- Extensor carpi ulnaris
- Anconeus

Deep group (5)

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

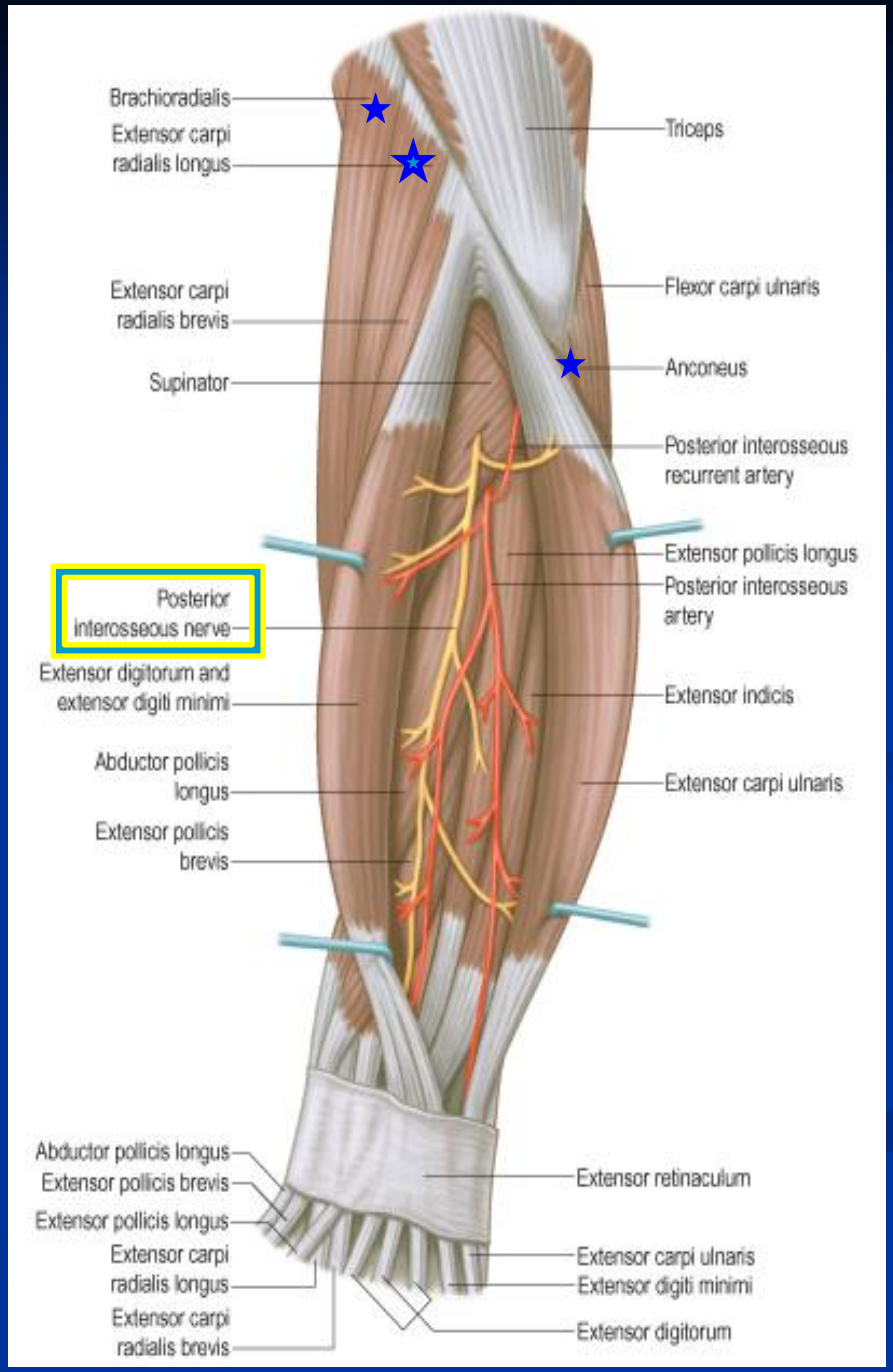
- Supinator.
- Abductor pollicis longus.
- Extensor pollicis brevis.
- Extensor pollicis longus.
- Extensor indices.

- **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).

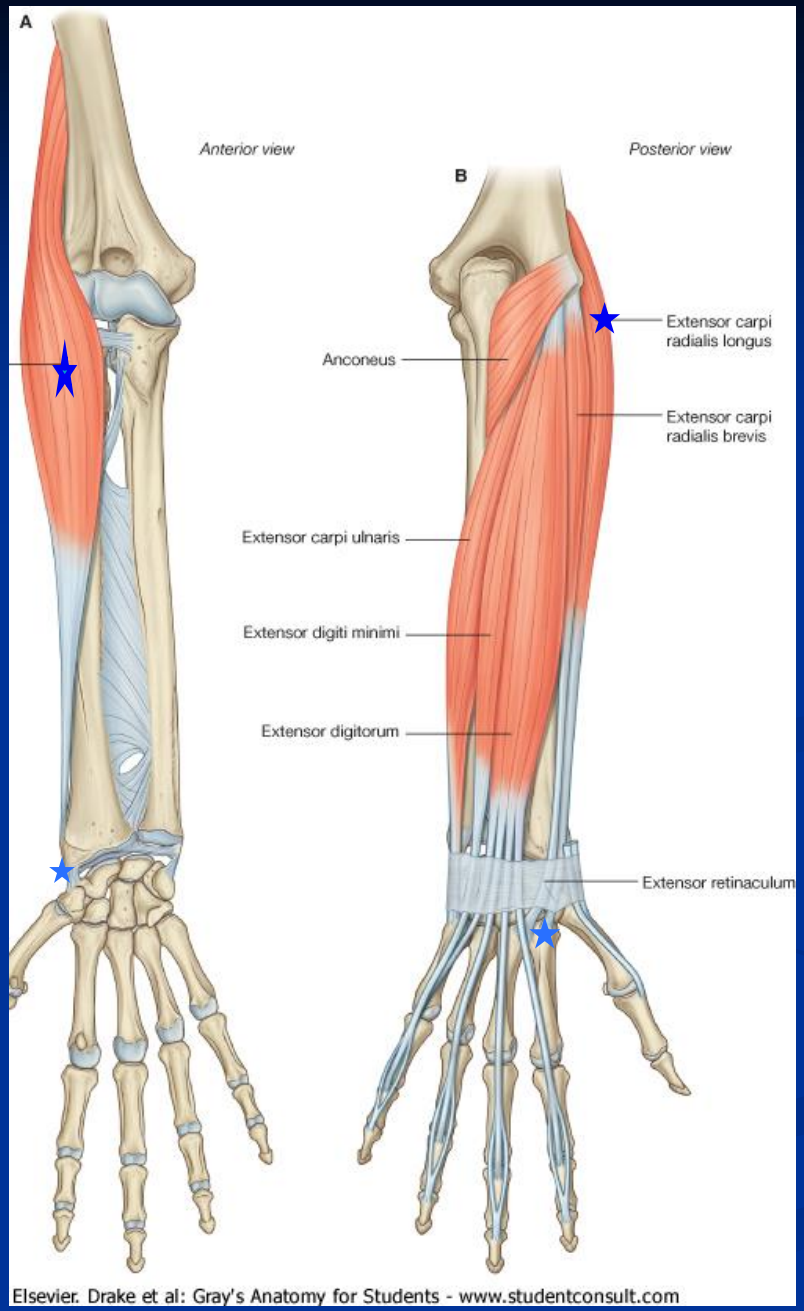


Superficial extensors

- 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 2nd metacarpal bone
- **Action:**
- Extends and abducts hand at wrist joint

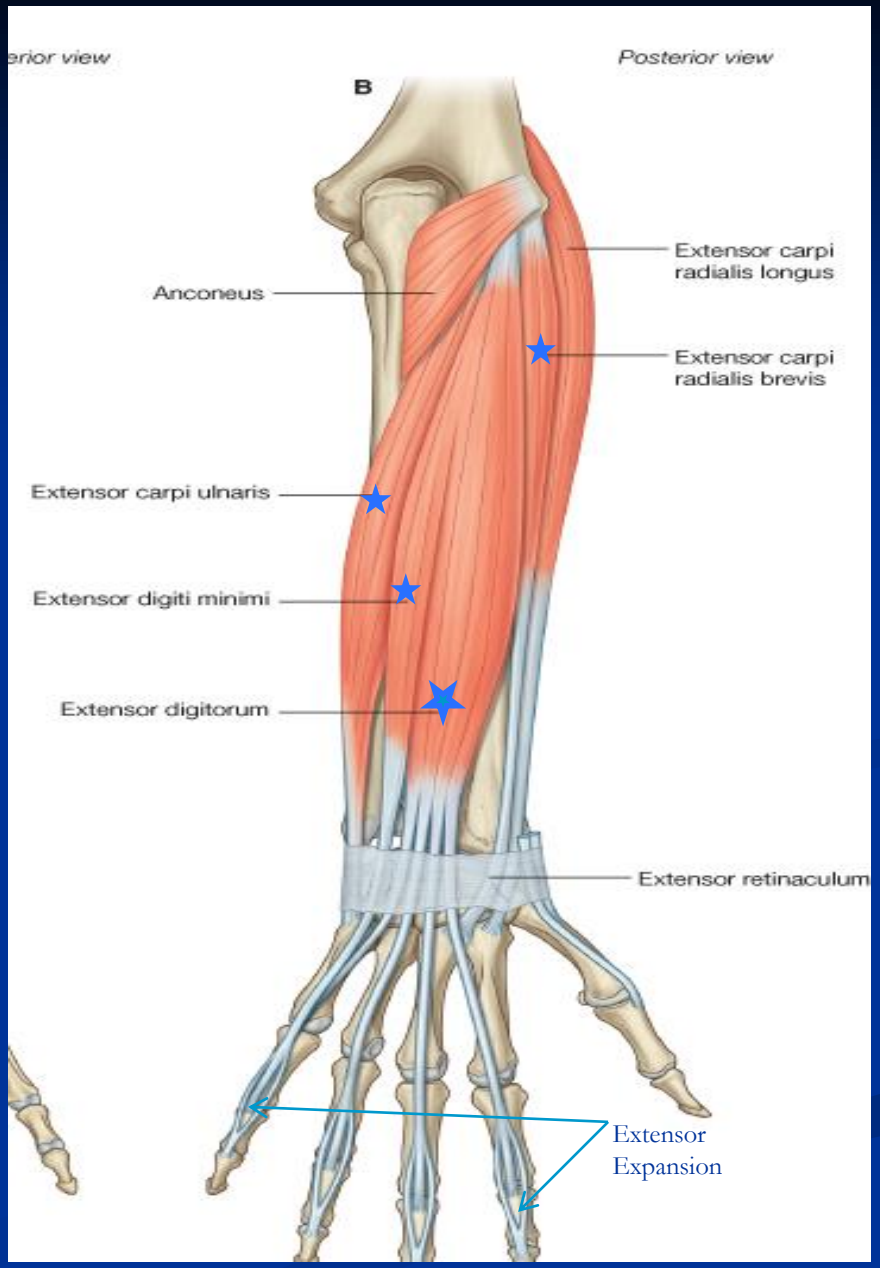
INSERTION

Extensor carpi radialis brevis: base of 3rd 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 5th metacarpal bone.



II- Deep group:

5 muscles

1- Abductor pollicis longus, (APL).

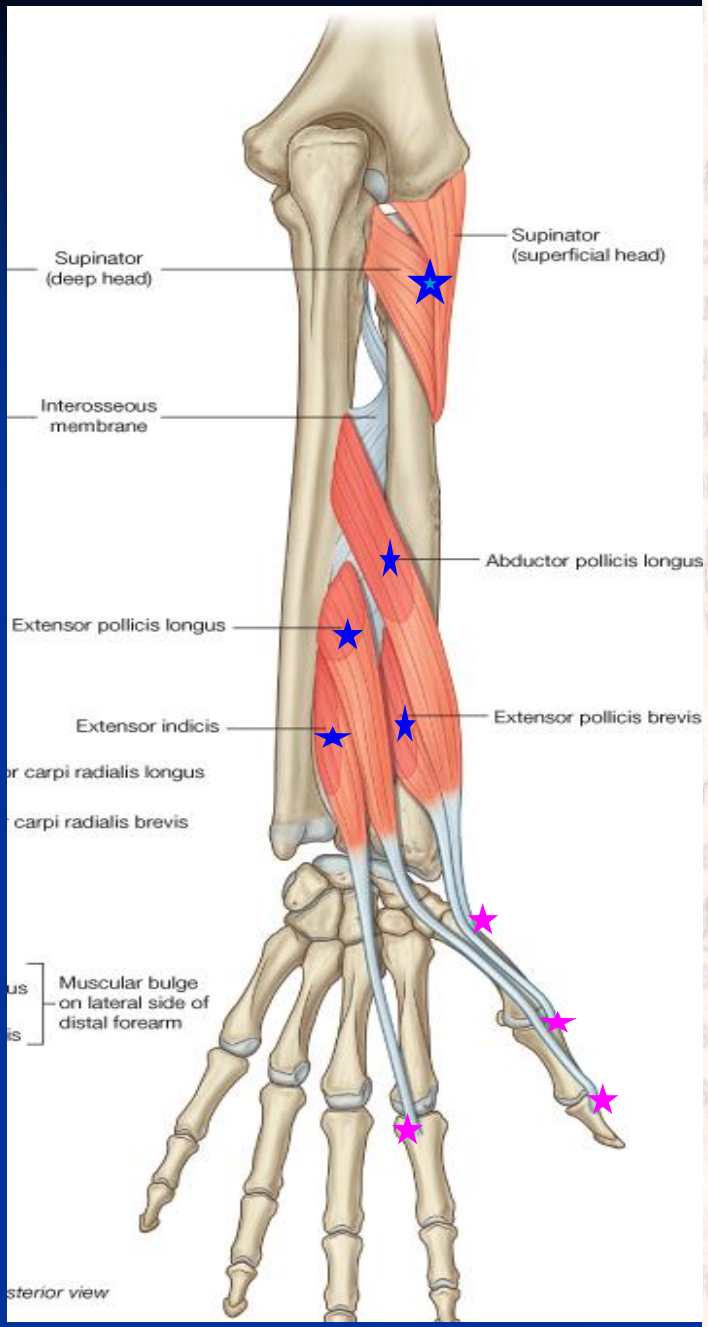
2- Extensor pollicis brevis, (EPB).

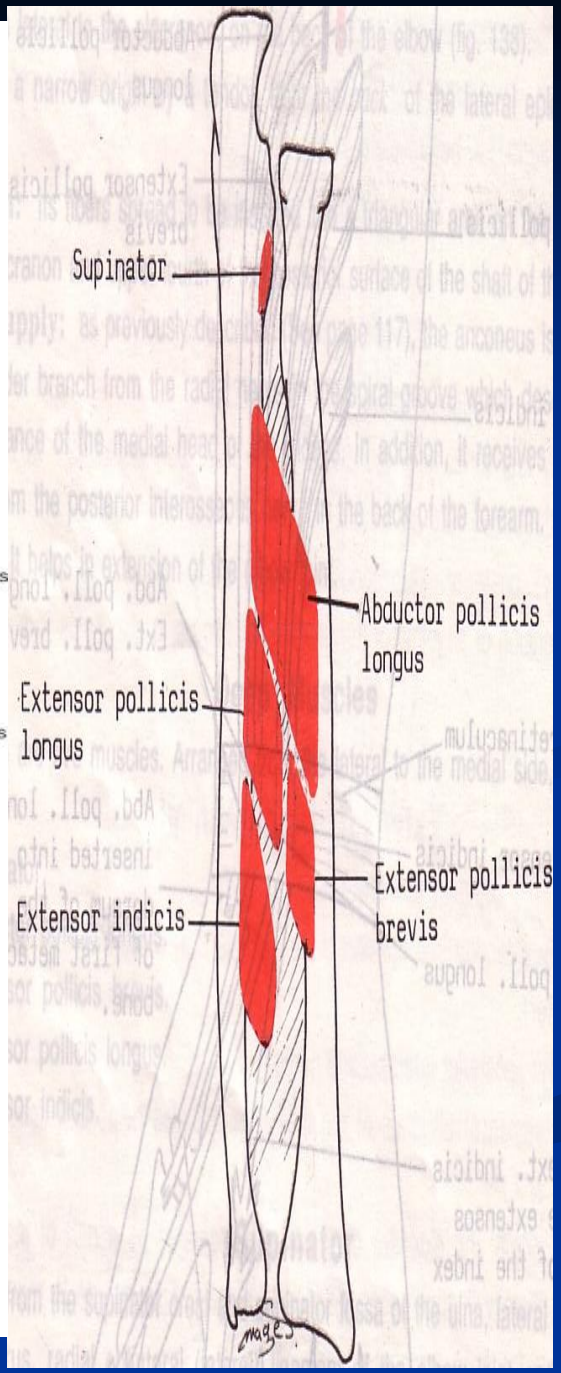
3- Extensor pollicis longus, (EPL).

4- Extensor indicis (EI).

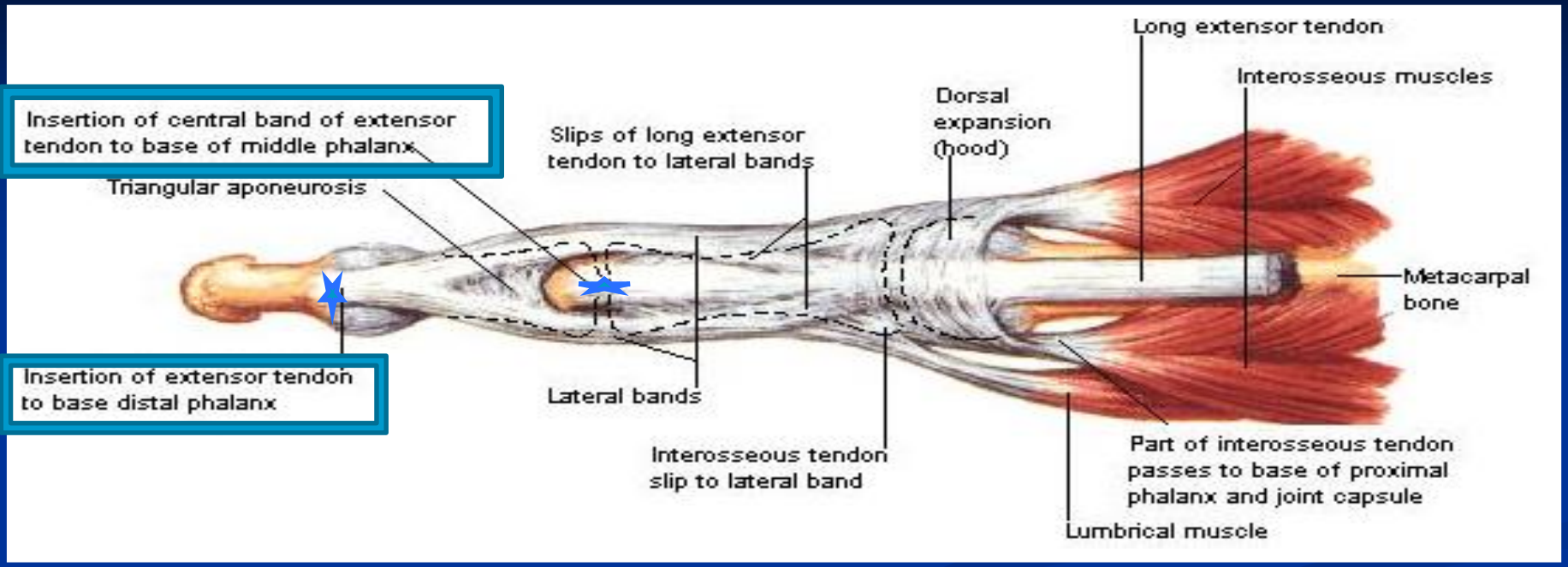
5- Supinator.

- **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.