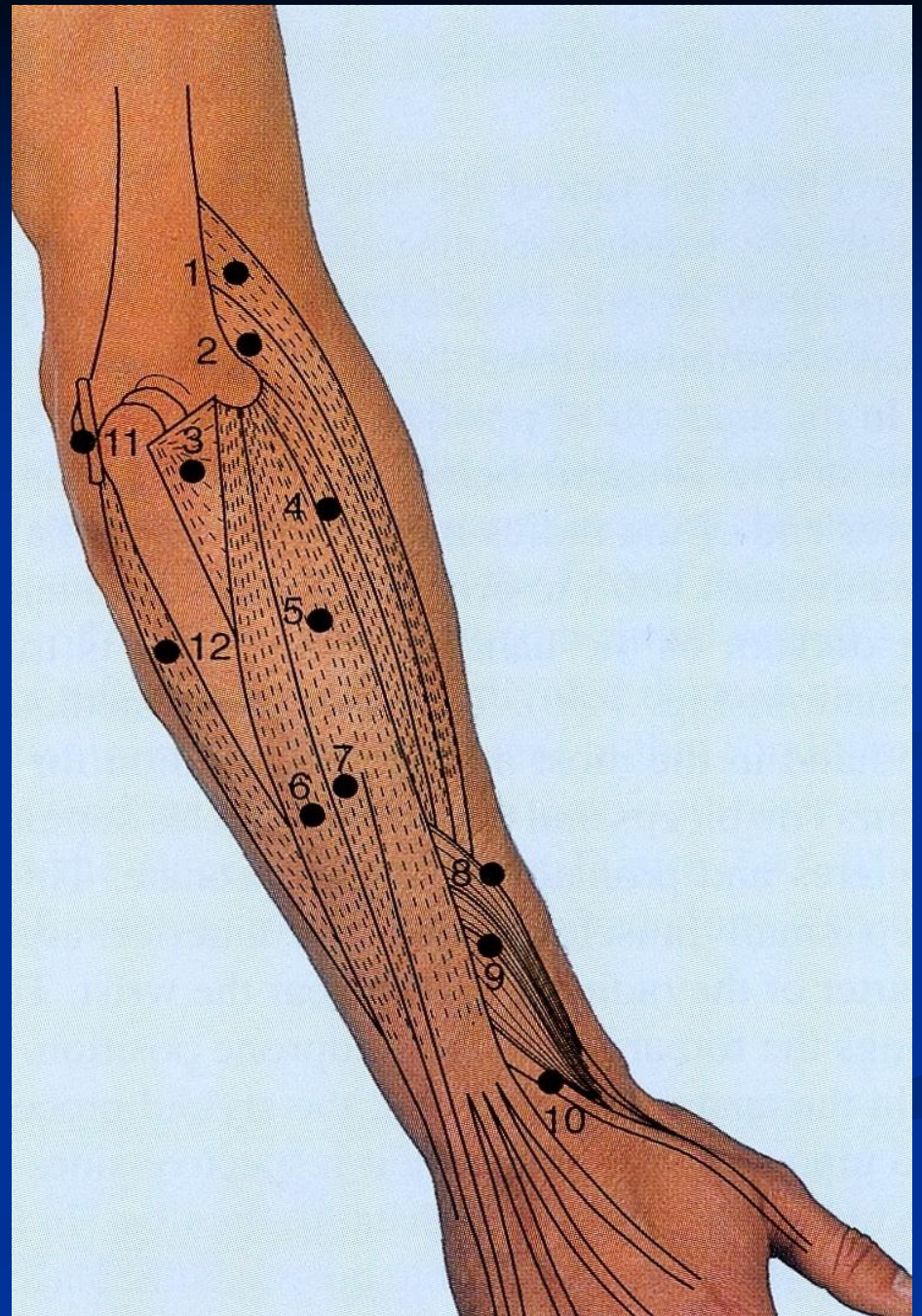


FOREARM

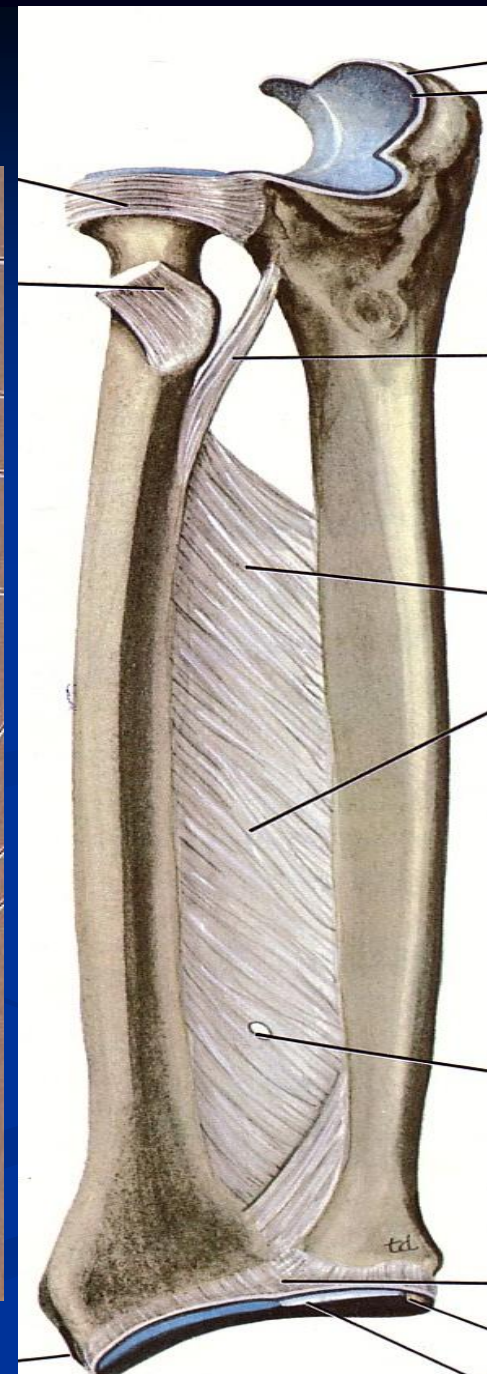
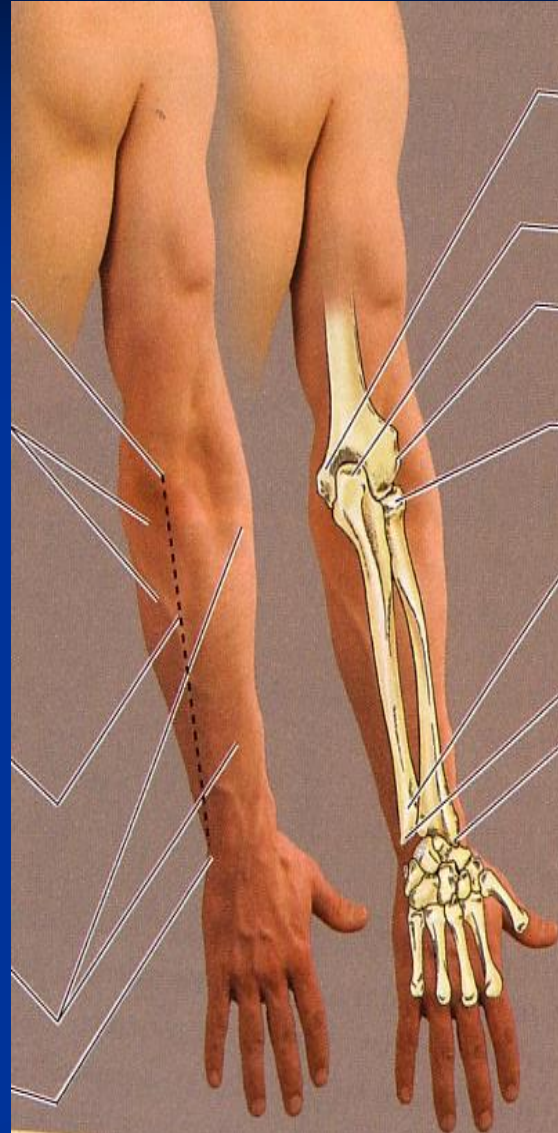


Prof. Saeed Abuel Makarem

Objectives

- **By the end of the lecture, you should be able to:**
- Describe the arrangement of the muscles of the anterior and posterior compartments of the forearm.
- Describe the, origin, insertion, action nerve supply of these muscles.
- Describe the effect of injury of the muscle or its nerve supply.

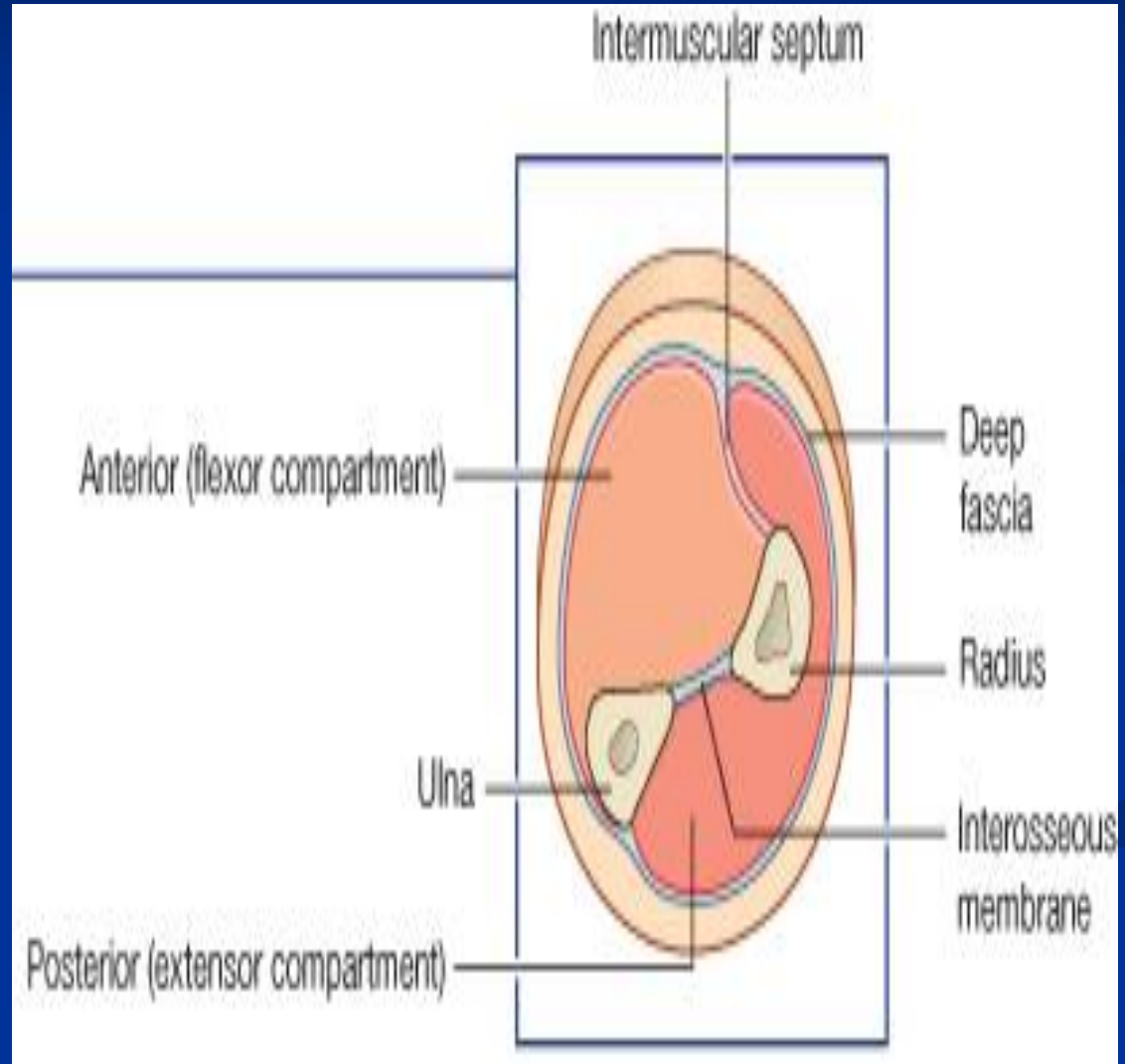
- **The forearm** extends from elbow to wrist.
- It possesses two bones: radius laterally & Ulna medially.
- The two bones are connected to each other by interosseous membrane.
- This membrane allows movement of **Pronation** and **Supination** while the two bones are connected together.
- Also it gives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



The forearm is enclosed in a sheath of deep fascia, which is attached to the posterior border of ulna, (it encircle the forearm completely and return again to the posterior border of the ulna).

This fascial sheath, together with the interosseous membrane and fibrous intermuscular septa, divides the forearm into anterior and posterior compartments, each having its own muscles, nerves and blood supply.

Fascial Compartments of the Forearm



These muscles: are (8)

- They act on the elbow & wrist joints and the fingers.
- They form fleshy masses in the proximal part and become tendinous in the distal part of the forearm.
- They are arranged in three groups:

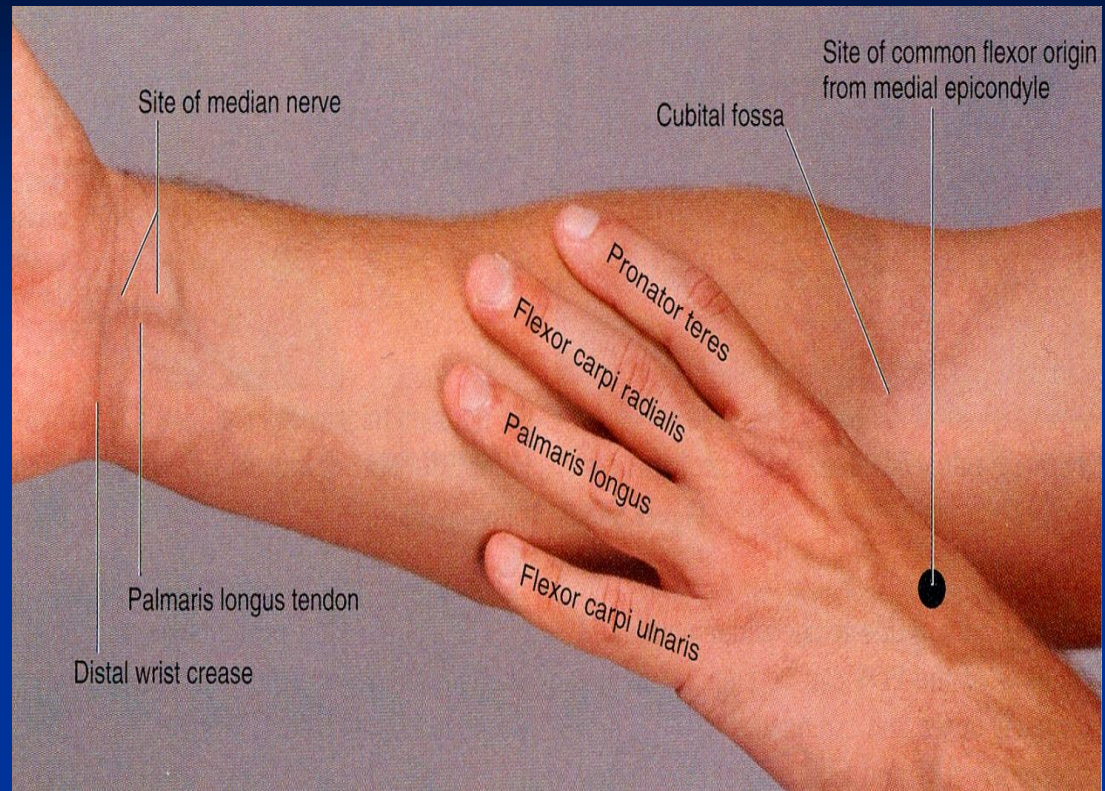
I-Superficial: 4 muscles.

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

II-Intermediate: 1 muscle.

- Flexor digitorum superficialis.

Anterior compartment -FLEXOR GROUP

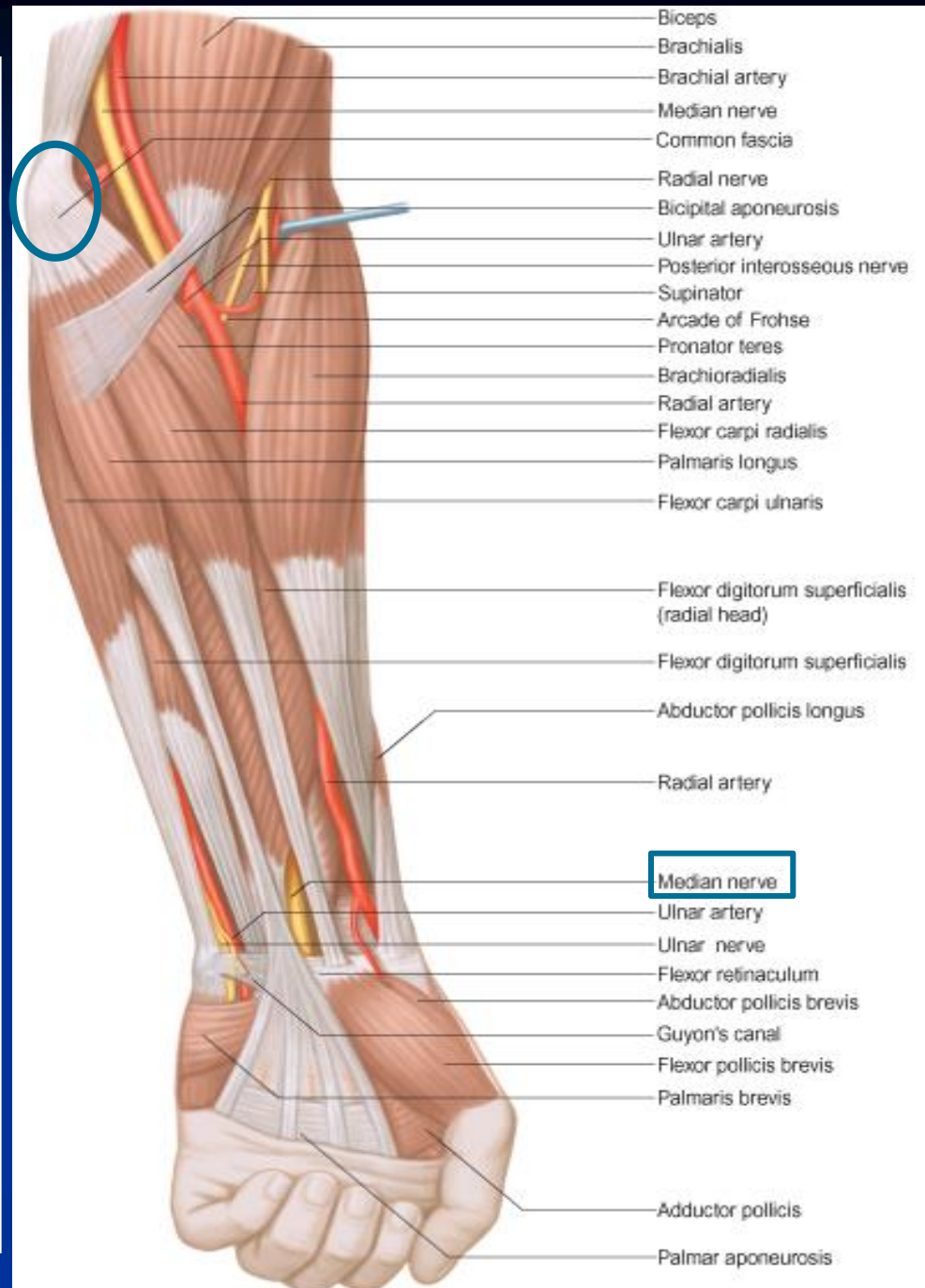


III- Deep: 3 muscles.

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

Superficial Flexors

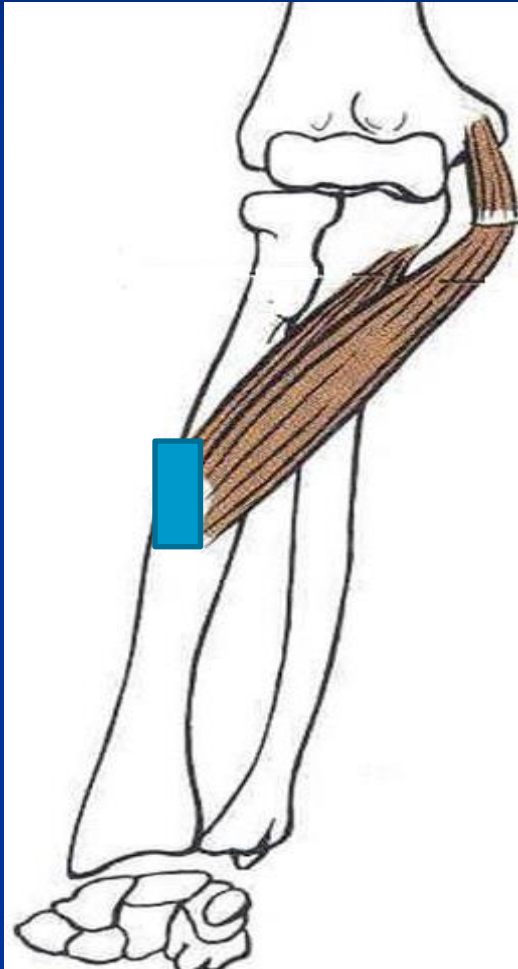
- They arise - more or less- from the common flexor origin (front of **medial epicondyle**).
- All are supplied by **median** nerve except one, flexor carpi ulnaris, (FCU) which is supplied by the ulnar nerve.
- All cross the wrist joint except one, pronator teres, (PT).



■ **Pronator teres**

Insertion: middle of lat. surface of radius.

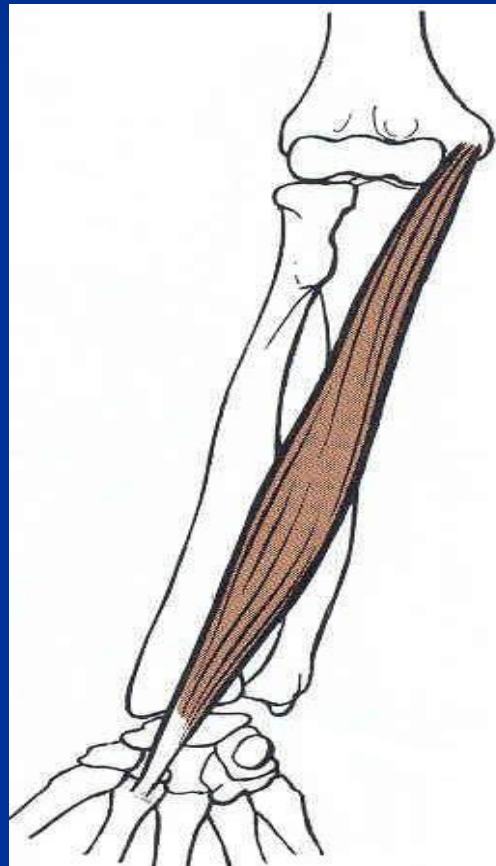
- **Action:** pronation & flexion of forearm.



■ **Flexor Carpi Radialis**

- **Insertion:** Base of 2nd metacarpal bone.

- **Action:** Flexion & abduction of the wrist.

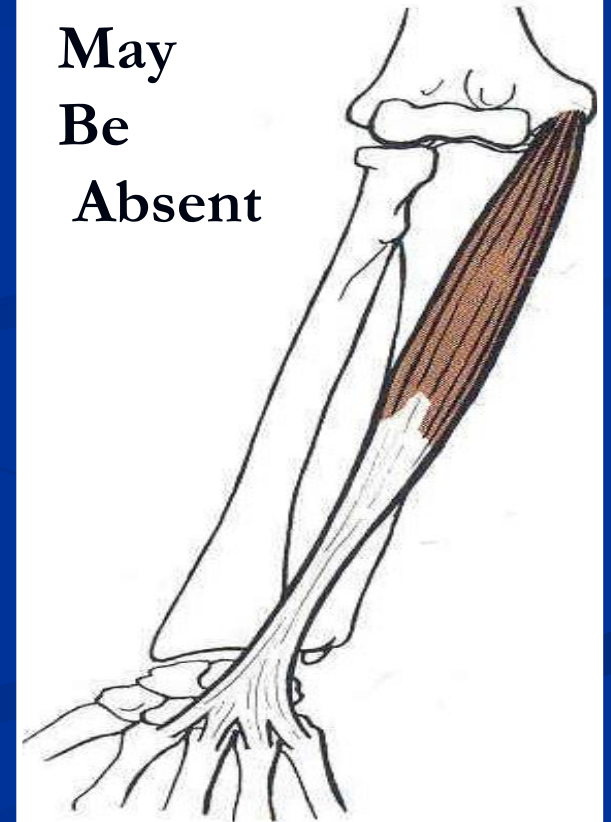


■ **Palmaris Longus**

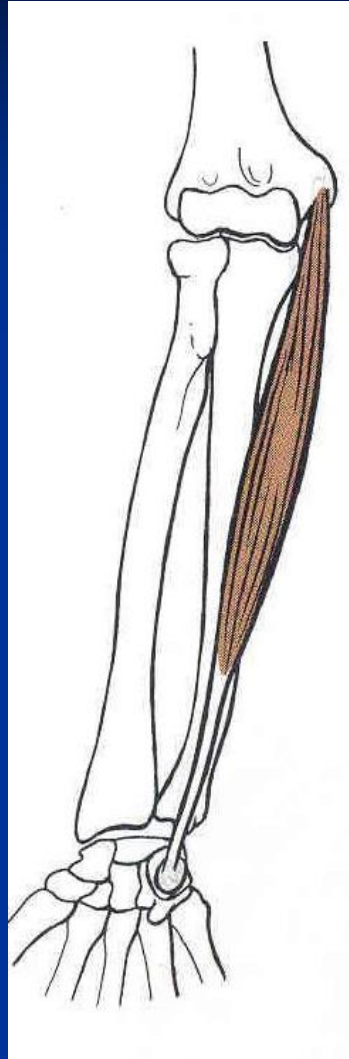
Insertion: into the flexor retinaculum and the palmer aponeurosis.

- **Action:** Flexes hand, (wrist) & tightens the palmer aponeurosis.

May
Be
Absent



- **Flexor Carpi Ulnaris**
- Insertion:
- Pisiform,
- Hook of hamate
- Base of 5th metacarpal bone.
- Action:
- Flexion and adduction of the hand (wrist).



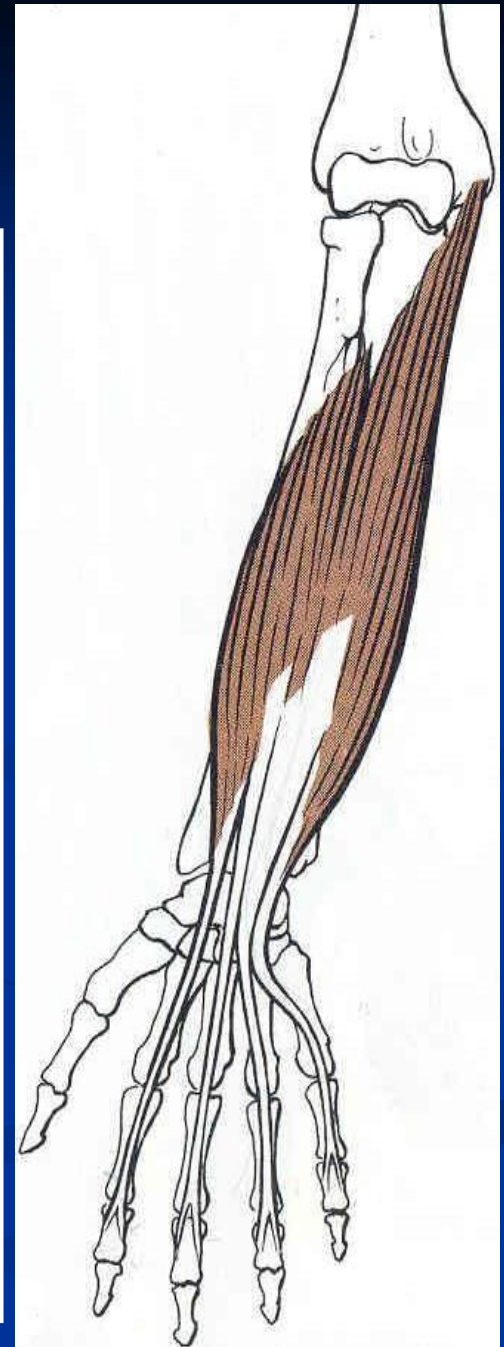
- **Flexor Digitorum Superficialis**

- Insertion:

- Base of middle phalanges of the medial 4 fingers.

- Action:

- Flexes middle & proximal phalanges of the medial 4 fingers,
 - Flexion of the hand (wrist).



Origin of the Deep Flexors (3 muscles)

■ Front of radius:

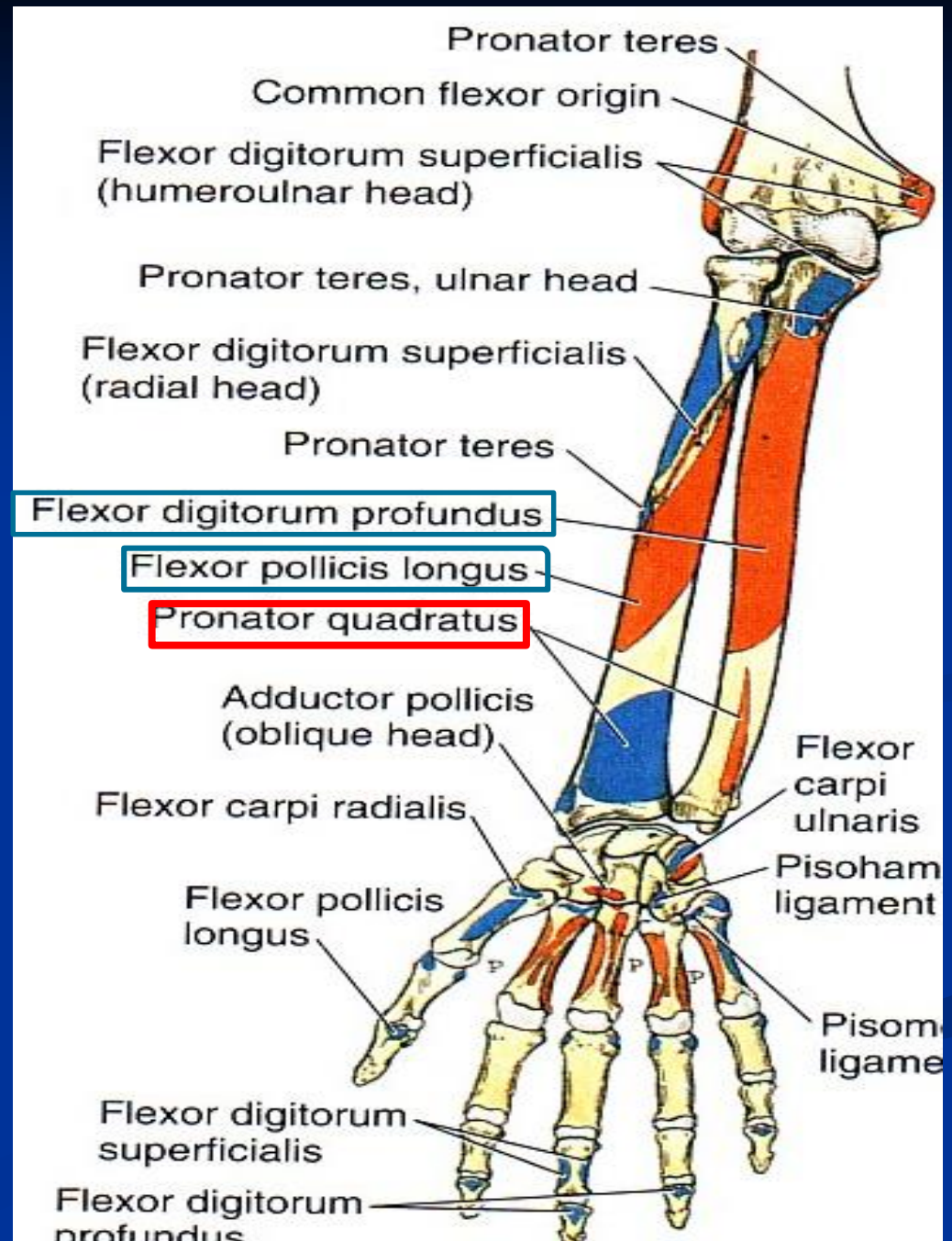
Flexor pollicis longus.

■ Front of ulna:

Flexor Digitorum profundus.

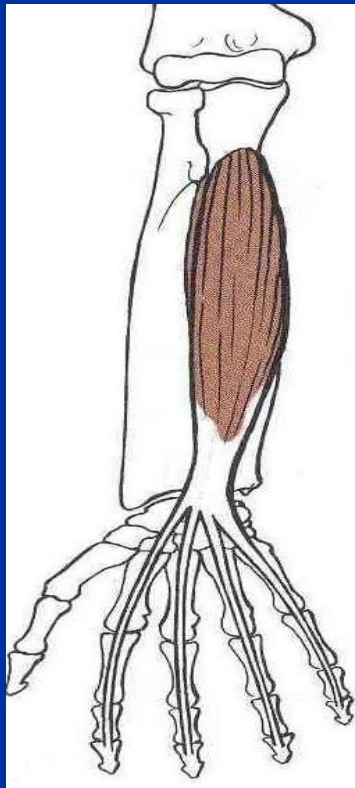
■ Front of lower 4th of ulna .

Pronator Quadratus.



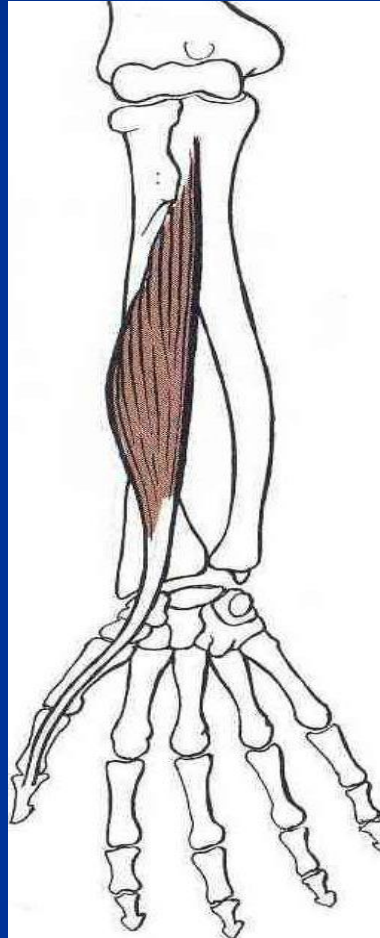
■ Flexor Digitorum Profundus

- **Insertion:** bases of distal phalanges of the medial four digits.
- **Action:** Flexes distal phalanges of medial four digits.



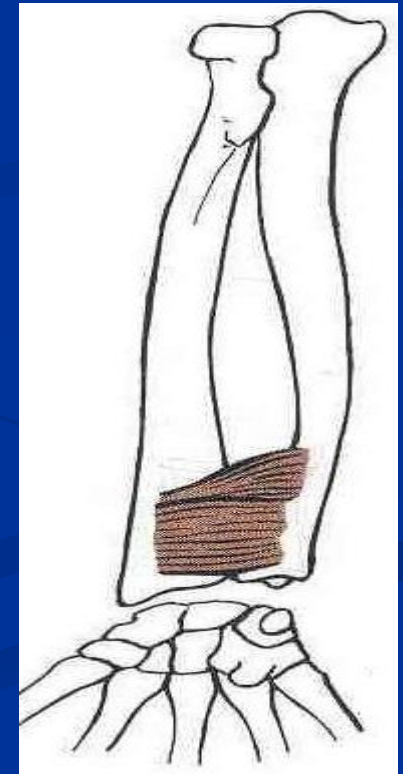
■ Flexor Pollicis Longus

- **Insertion:** Base of distal phalanx of thumb.
- **Action:** flexes all joints of the thumb.



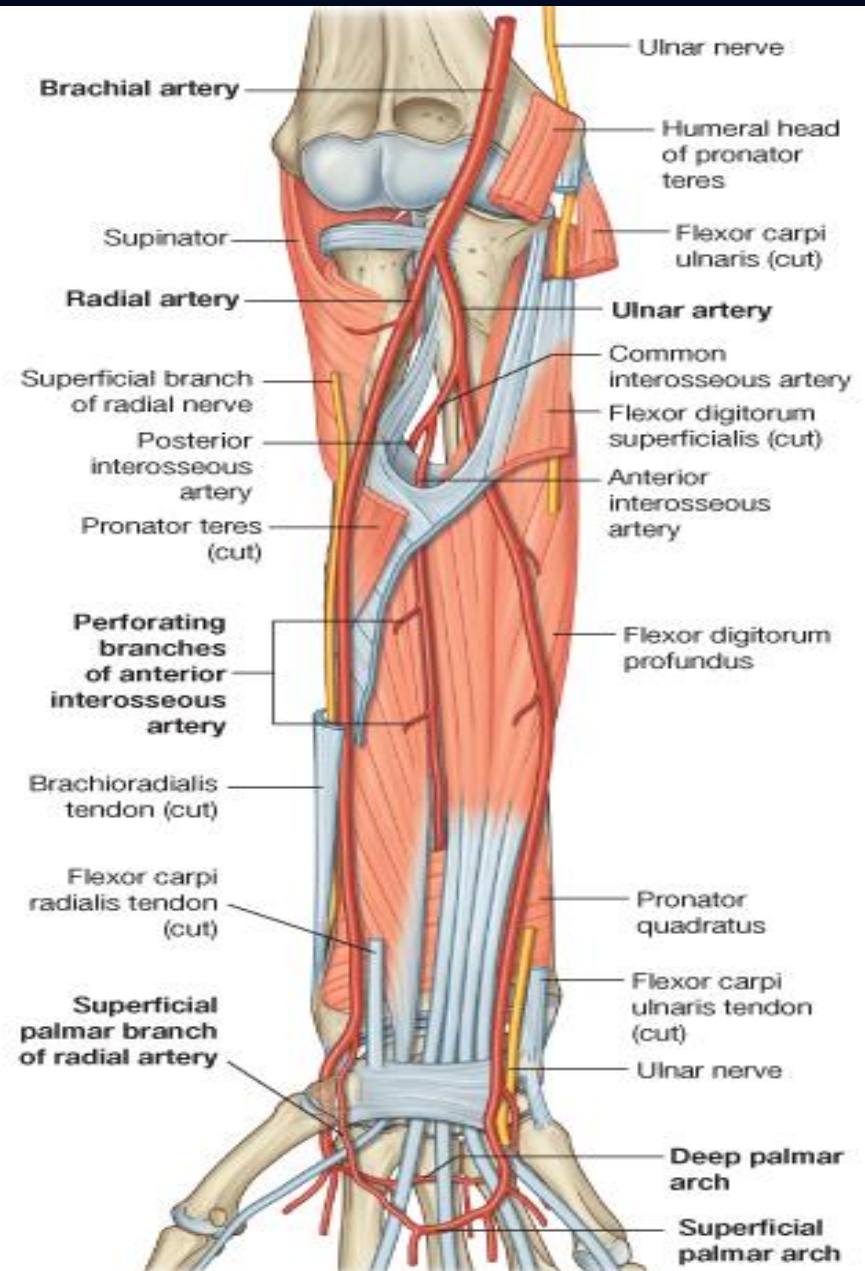
■ Pronator Quadratus

- **Insertion:** distal 1/4th of anterior surface of radius.
- **Action:** pronates the forearm (primover).
- Hold the 2 bones together .



Nerve supply of the deep flexors

All are supplied by the **anterior interosseous nerve** (branch of the **median nerve**), Except the medial half of the flexor digitorum profundus which is supplied by **the ulnar nerve**.



Supination and pronation

It occurs in the superior and inferior radioulnar joints; (Pivot Uniaxial Synovial Joint.)

Muscles produce supination

Biceps brachii.

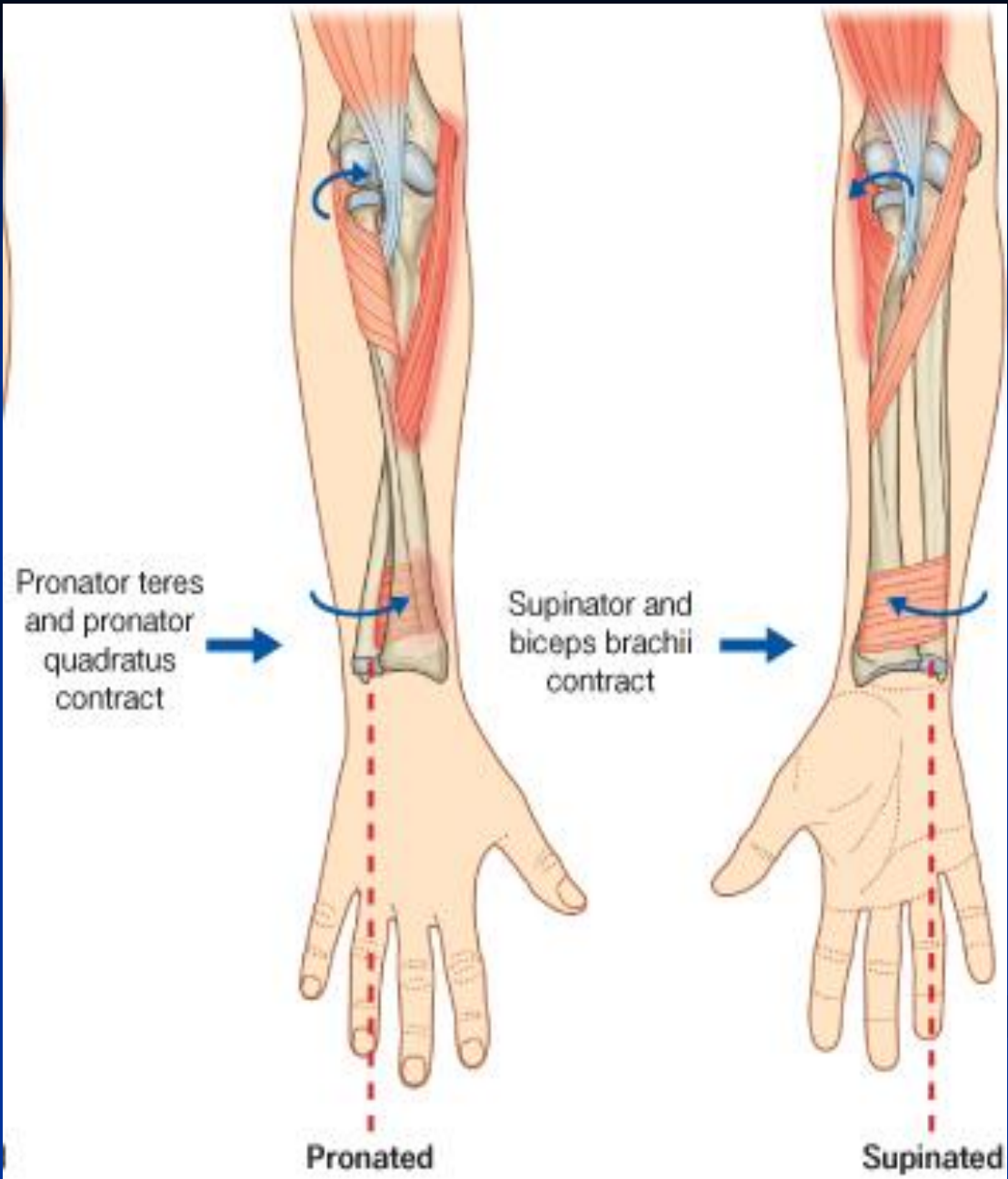
Supinator.

Muscles produce pronation

Pronator teres.

Pronator quadratus.

NB. Brachioradialis put the forearm in midprone-supine position, (initiates pronation and supination).



Posterior compartment: 3 groups

Superficial group 5 muscles:

- Extensor carpi radialis brevis.
- Extensor digitorum. **وبس**
- Extensor digiti minimi.
- Extensor carpi ulnaris.
- Anconeus.

Origin: all arise from the Common Extensor Origin. (front of the lateral epicondyle), except anconeus from back of lateral epicondyle.

Lateral group 2 muscles:

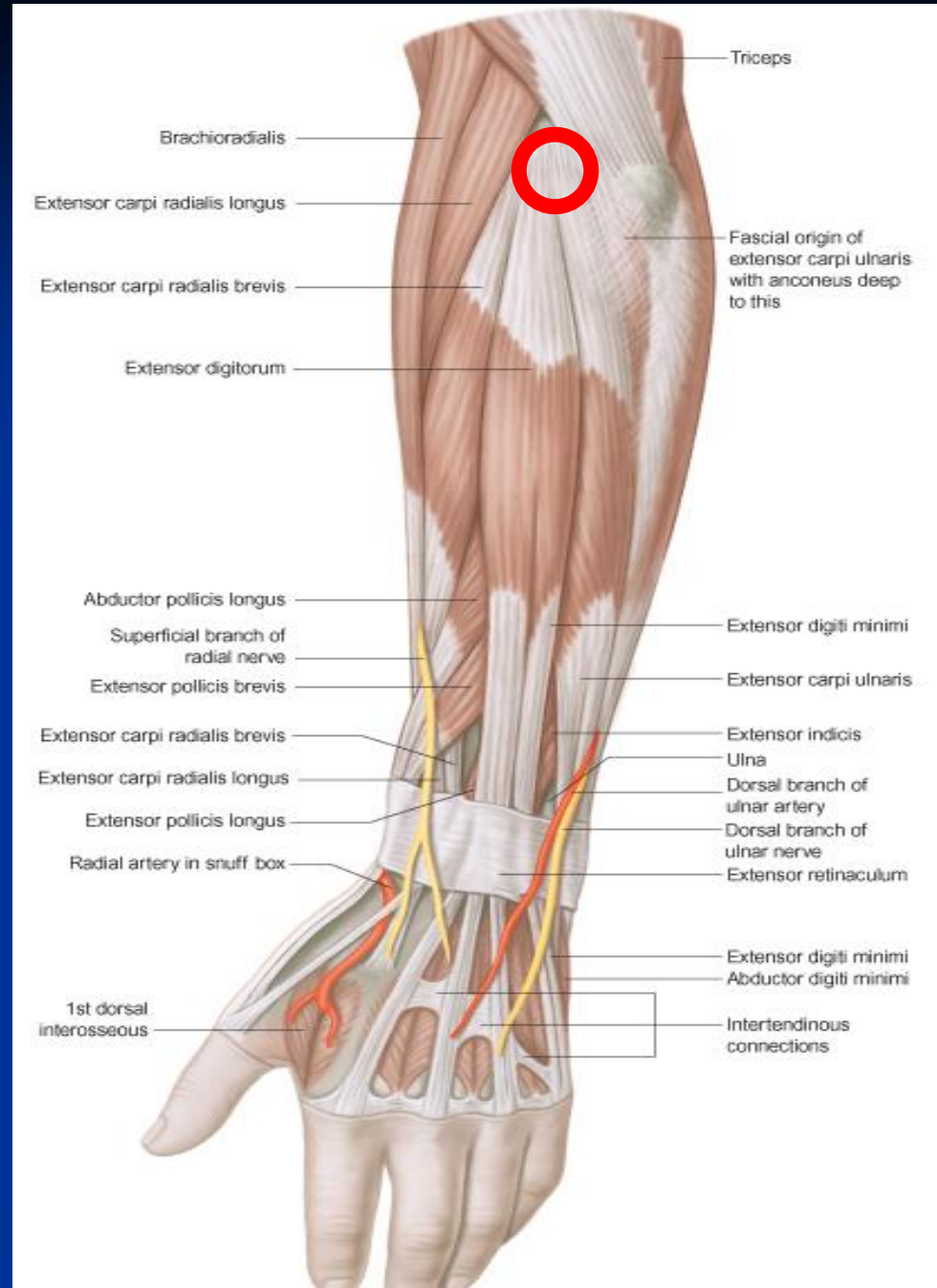
- ❖ Brachioradialis.
- ❖ Extensor carpi radialis longus.
(The 2 muscles originate from the *lateral supracondylar ridge*).

Deep group: 5 (3 to thumb + 1 to index + Supinator).

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

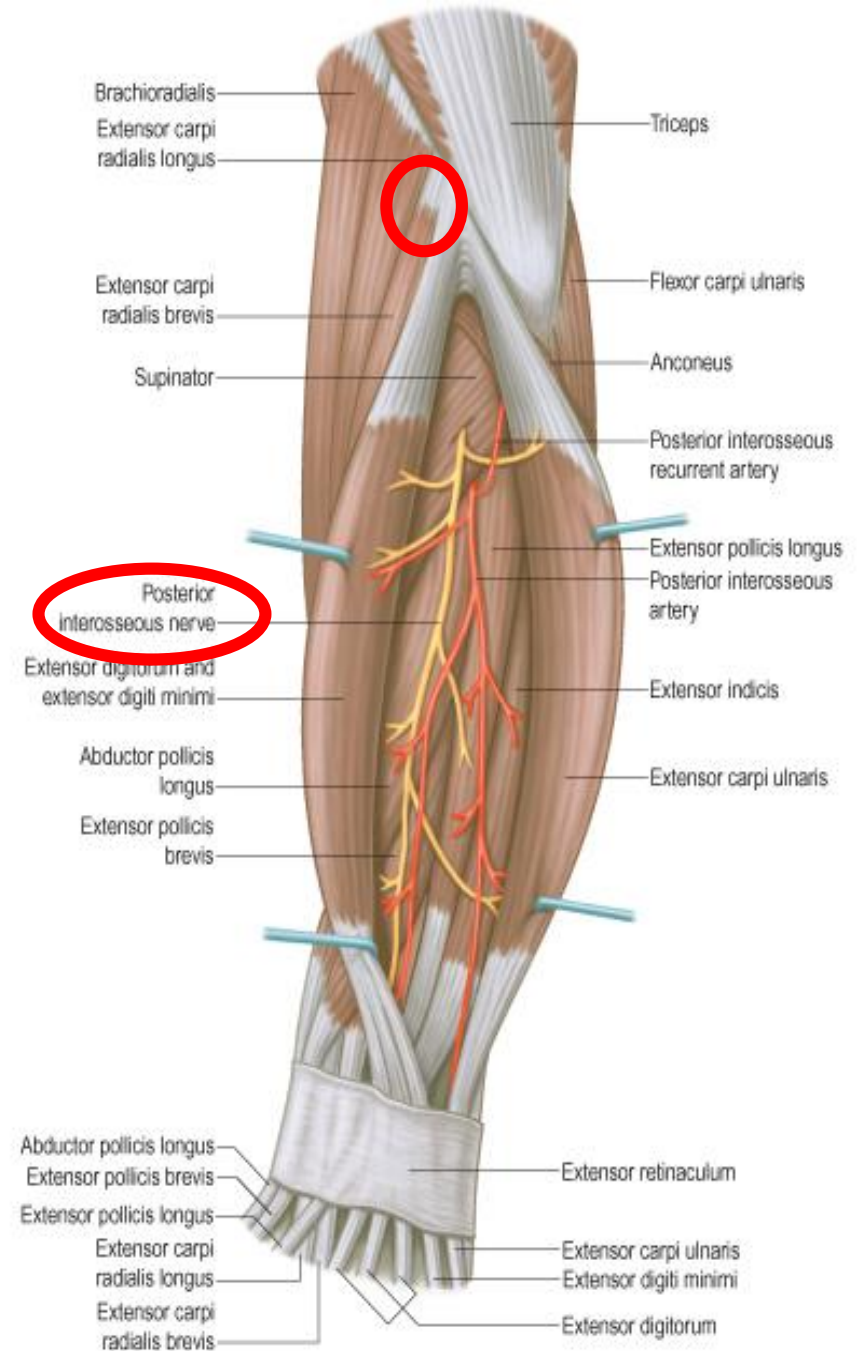
Posterior compartment

- I- Superficial group:
- **7 muscles** (from lateral to medial) they are:
- Brachioradialis, (BR).
- Extensor carpi radialis longus, (ECRL).
- Extensor carpi radialis brevis, (ECRB).
- Extensor digitorum, (ED). **وبس**
- 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**, 3 (BR, EXRL & anconeus).
- All cross the wrist **EXCEPT**, 2, (brachioradialis & anconeus).
- All supplied by deep branch of radial nerve, (posterior interosseous nerve). **EXCEPT** **ABE**
- **A, Anconeus.**
- **B, Brachioradialis.**
- **E, Extensor carpi radialis longus.**
- **These 3 muscles are supplied by the radial nerve itself.**



■ **Brachioradialis**

■ Origin:

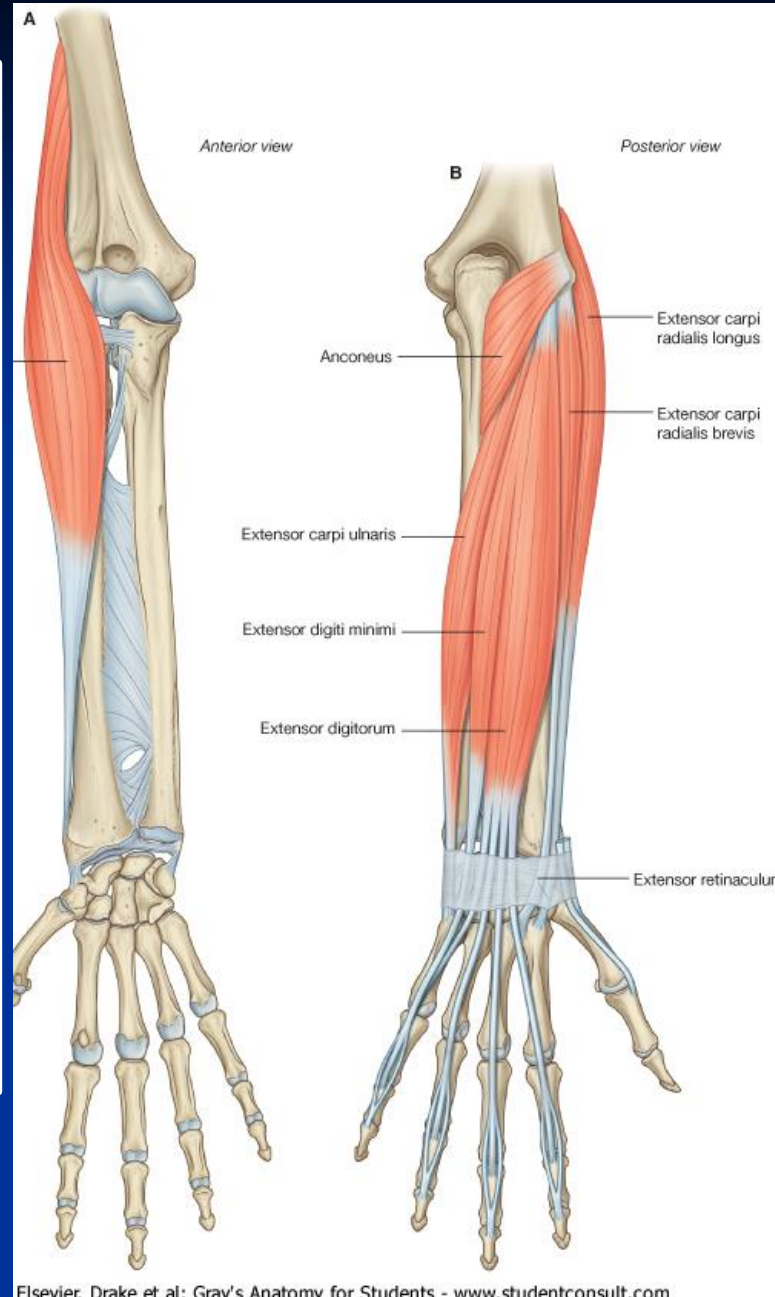
- Lateral supracondylar ridge of humerus.

■ Insertion:

- Base of styloid process of radius.

■ Action:

- Flexes forearm; (elbow).
- Rotates forearm to the midprone – supine position.



Elsevier. Drake et al: Gray's Anatomy for Students - www.studentconsult.com

■ **Extensor Carpi Radialis longus**

■ Origin:

- Lateral supracondylar ridge of humerus.

■ Insertion:

- Posterior surface of base of second metacarpal bone.

■ Action:

- Extends and abducts the hand at wrist joint.

INSERTION

Extensor carpi radialis brevis:

base of 3rd metacarpal bone.

Extensor digitorum:

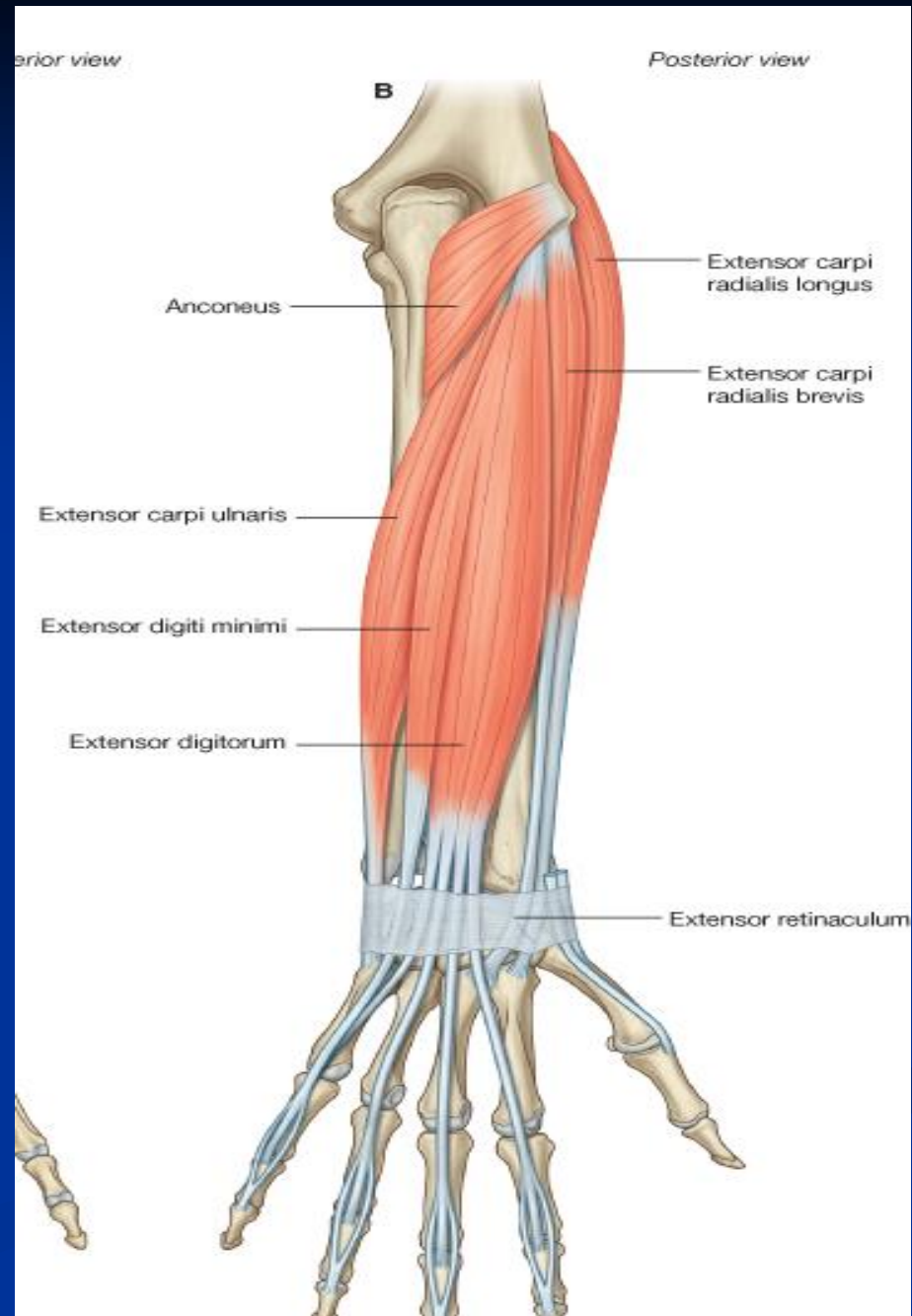
Extensor expansion of the medial 4 fingers.

Extensor digiti minimi:

Extensor expansion of the little finger.

Extensor carpi ulnaris:

Base of the 5th metacarpal bone.



II- Deep group:

5 muscles, (3 to thumb+1 to index & Supinator).

1- Abductor pollicis longus, (APL).

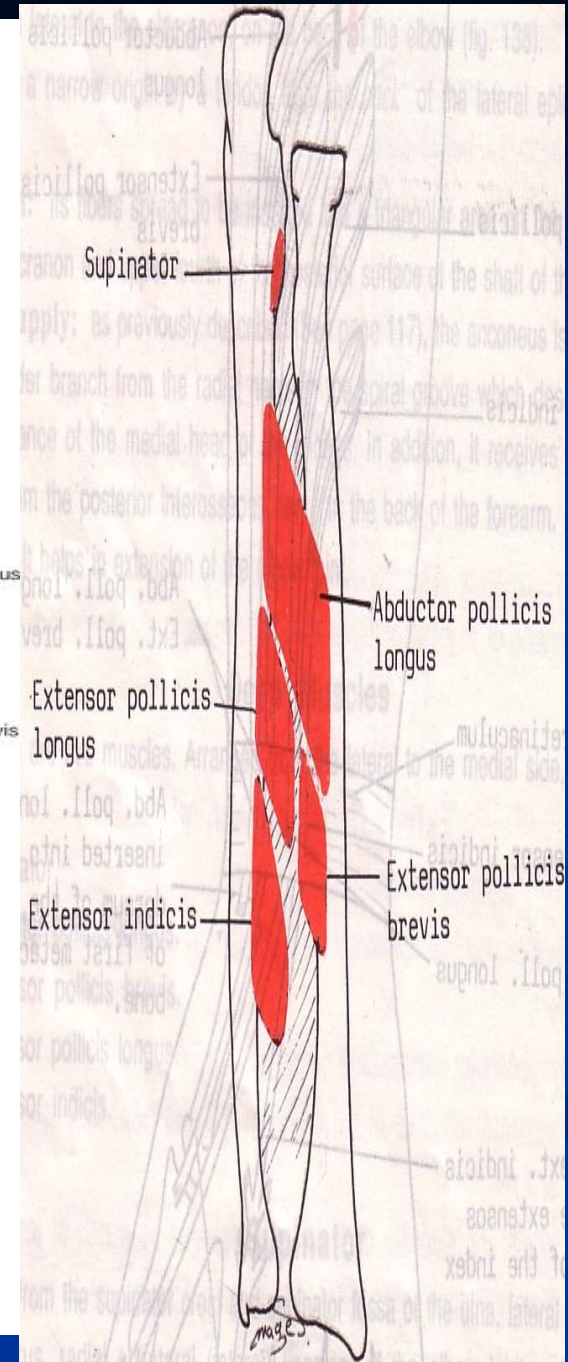
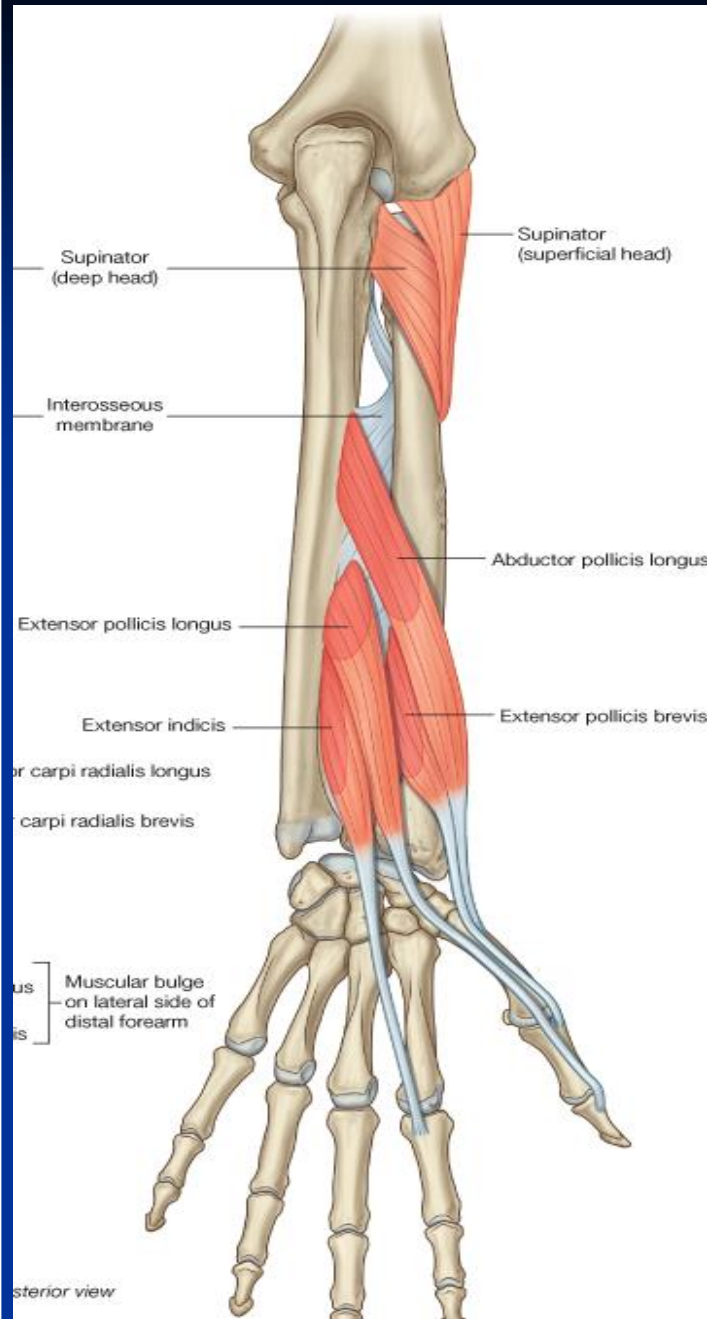
2- Extensor pollicis brevis, (EPB).

3- Extensor pollicis longus, (EPL).

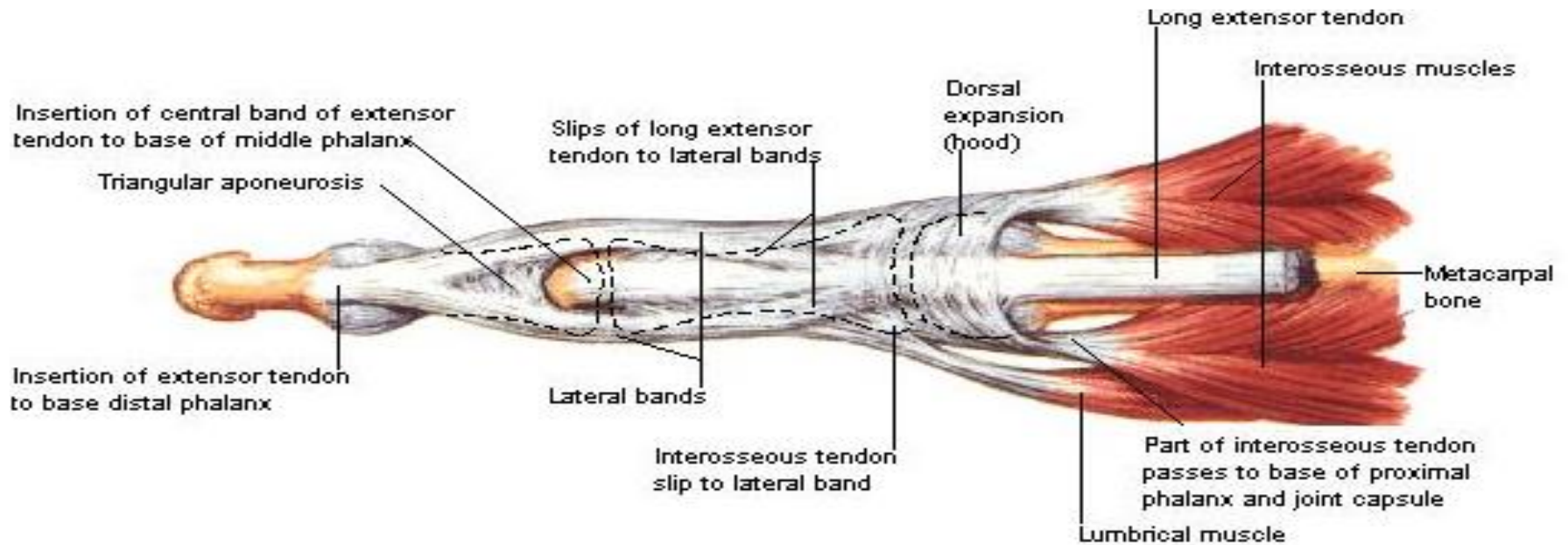
4- Extensor indicis (EI).

5- Supinator.

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



Dorsal Extensor Expansion



It is formed by the union of tendons of: Extensor digitorum, Extensor indicis, extensor digiti minimi, palmar interossei, dorsal interossei and lumbricals muscles.

All these tendons unite to form one tendon above the proximal phalanges of medial 4 fingers then it divides into 3 slips, a median one attached to the middle phalanges and 2 lateral attached to the terminal phalanges.

**THANK YOU
AND
GOOD LUCK**