HAND & WRIST

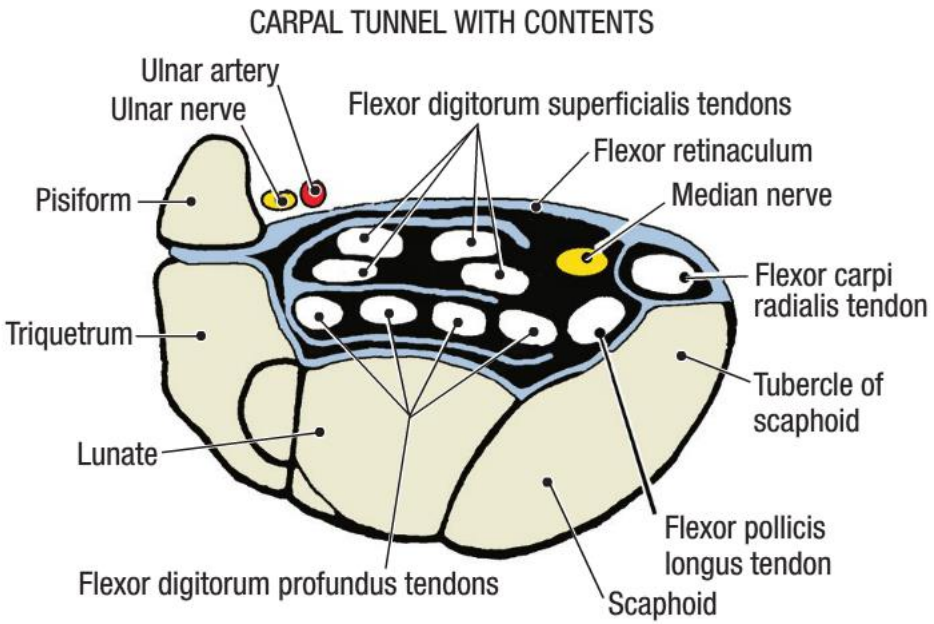
Dr. Saeed Vohra

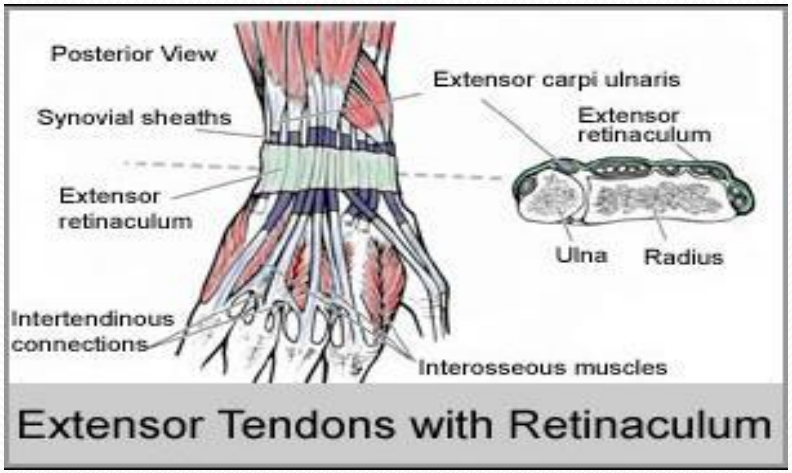
Dr. Jamila El-Medany

OBJECTIVES

- **At the end of the lecture, students should be able to:**
- **Describe the anatomy of the deep fascia of the wrist & hand (flexor & extensor retinaculae & palmar aponeurosis).**
- **List the structures passing superficial & deep to flexor retinaculum.**
- **Describe the anatomy of the insertion of long flexor & extensor tendons.**
- **Describe the anatomy of the small muscles of the hand (origin, insertion action & nerve supply)**

Retinacula





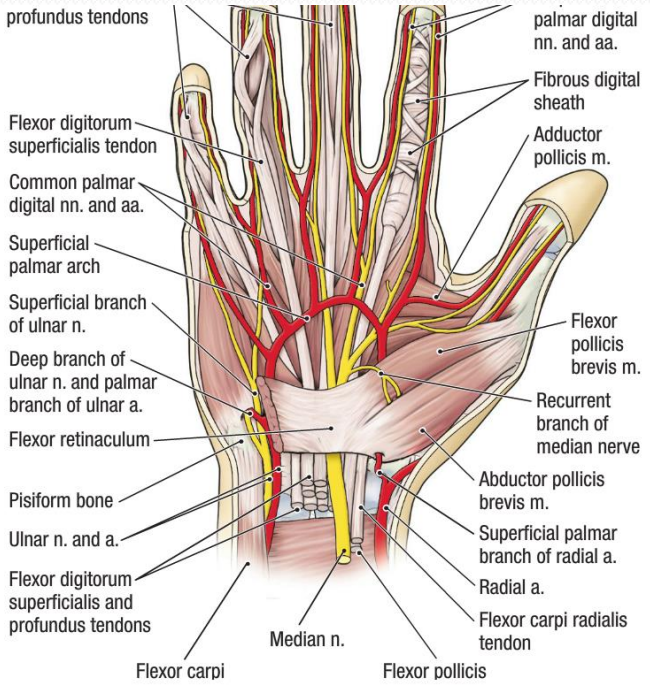
Extensor Tendons with Retinaculum

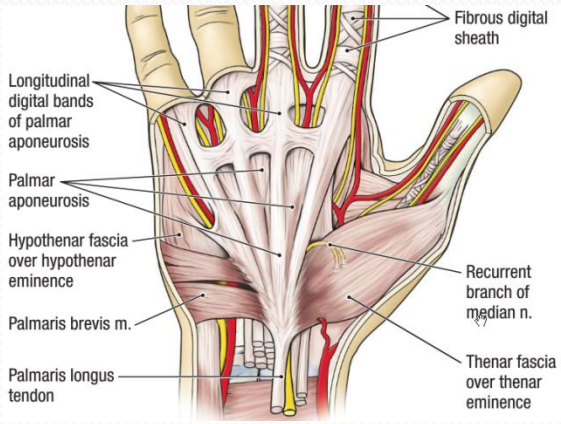
- ***Flexor & Extensor Retinaculum***
  - ***Bands of Deep Fascia at the Wrist***
- ***Function:***
  - *Hold the long flexor and extensor tendons in position at the wrist.*
- ***Attachments:***
  - ***Medially:*** ***Both retinacula attached to Pisiform & Hook of Hamate.***
  - ***Laterally:***
  - ***Flexor Retinaculum to Tubercle of Scaphoid & Trapezium.***
  - ***Extensor Retinaculum to Distal end of Radius***

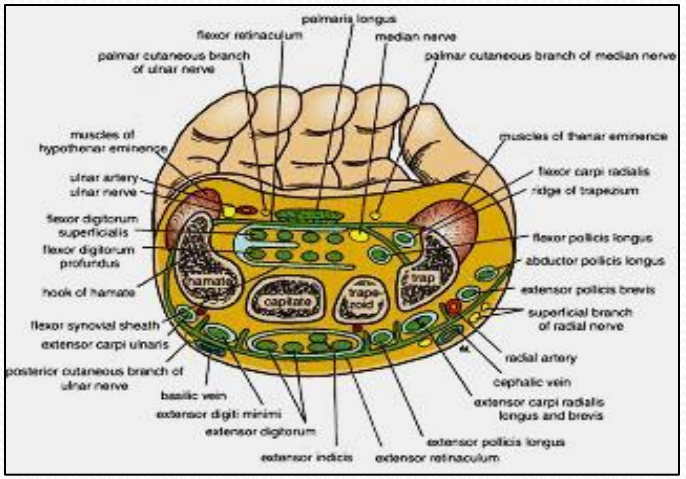
Structures Superficial to Flexor Retinaculum

From Medial to Lateral

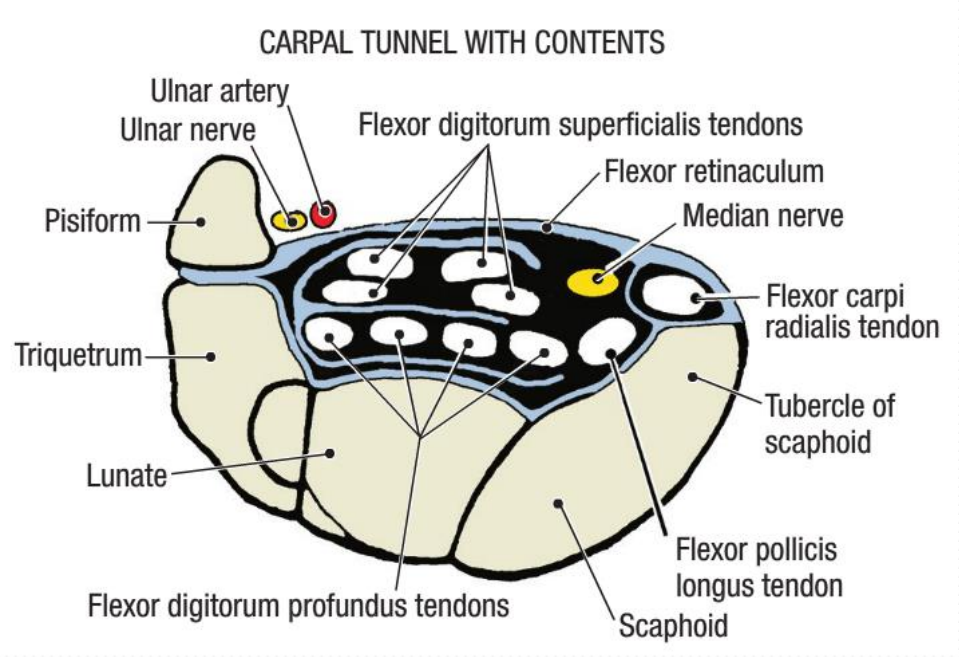
1. *Tendon of Flexor carpi ulnaris.*
2. *Ulnar nerve.*
3. *Ulnar artery.*
4. *Palmar cutaneous branch of ulnar nerve.*
5. *Palmaris longus tendon.*
6. *Palmar cutaneous branch of median nerve.*







Carpal Tunnel



Formed from Concave anterior surface of the Carpus covered by Flexor Retinaculum

Contents

From Medial to Lateral

- Tendons of flexor digitorum superficialis & profundus
- Median nerve
- Flexor Pollicis Longus
- Flexor carpi radialis

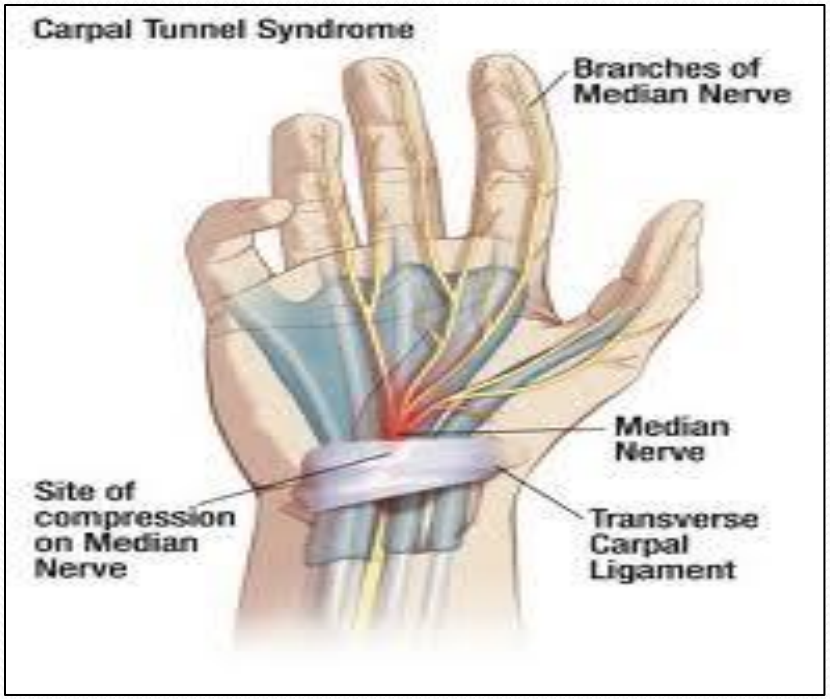
Causes :

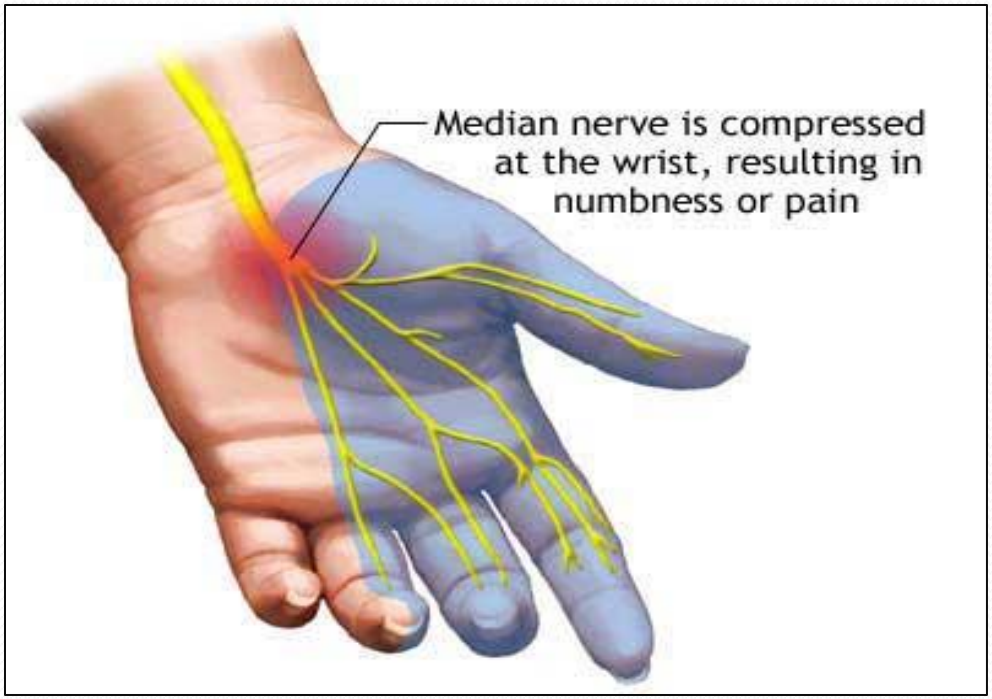
- *Compression of the median nerve within the carpal tunnel*

Manifestations:

- *Burning pain (pins and needles) in the lateral three and half fingers.*
- *No paresthesia over the thenar eminence?*

Carpal Tunnel



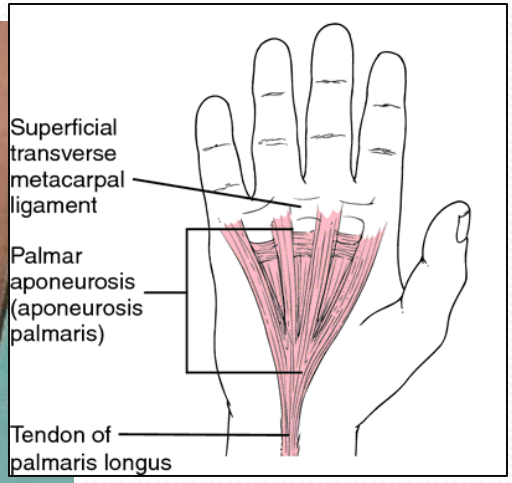


Carpal Tunnel

Manifestations:

- ***Weakness or atrophy of the thenar muscles (Ape Hand).***
- ***Inability to Oppose the thumb.***

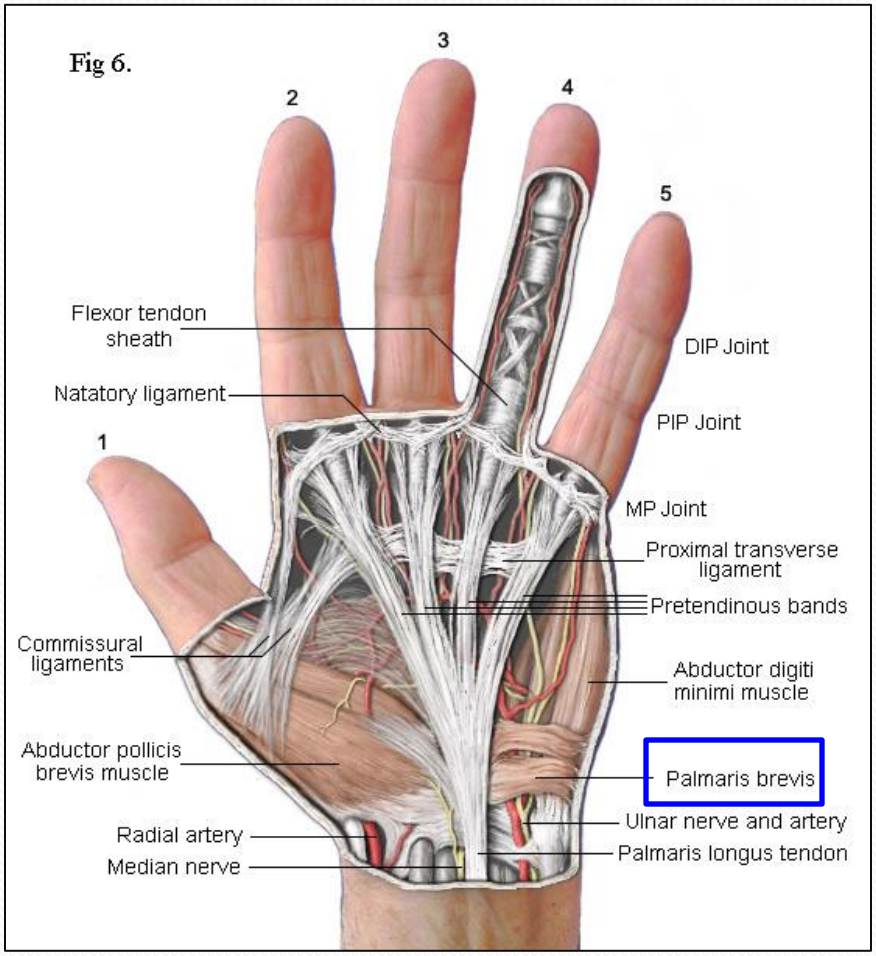
Palmar Aponeurosis



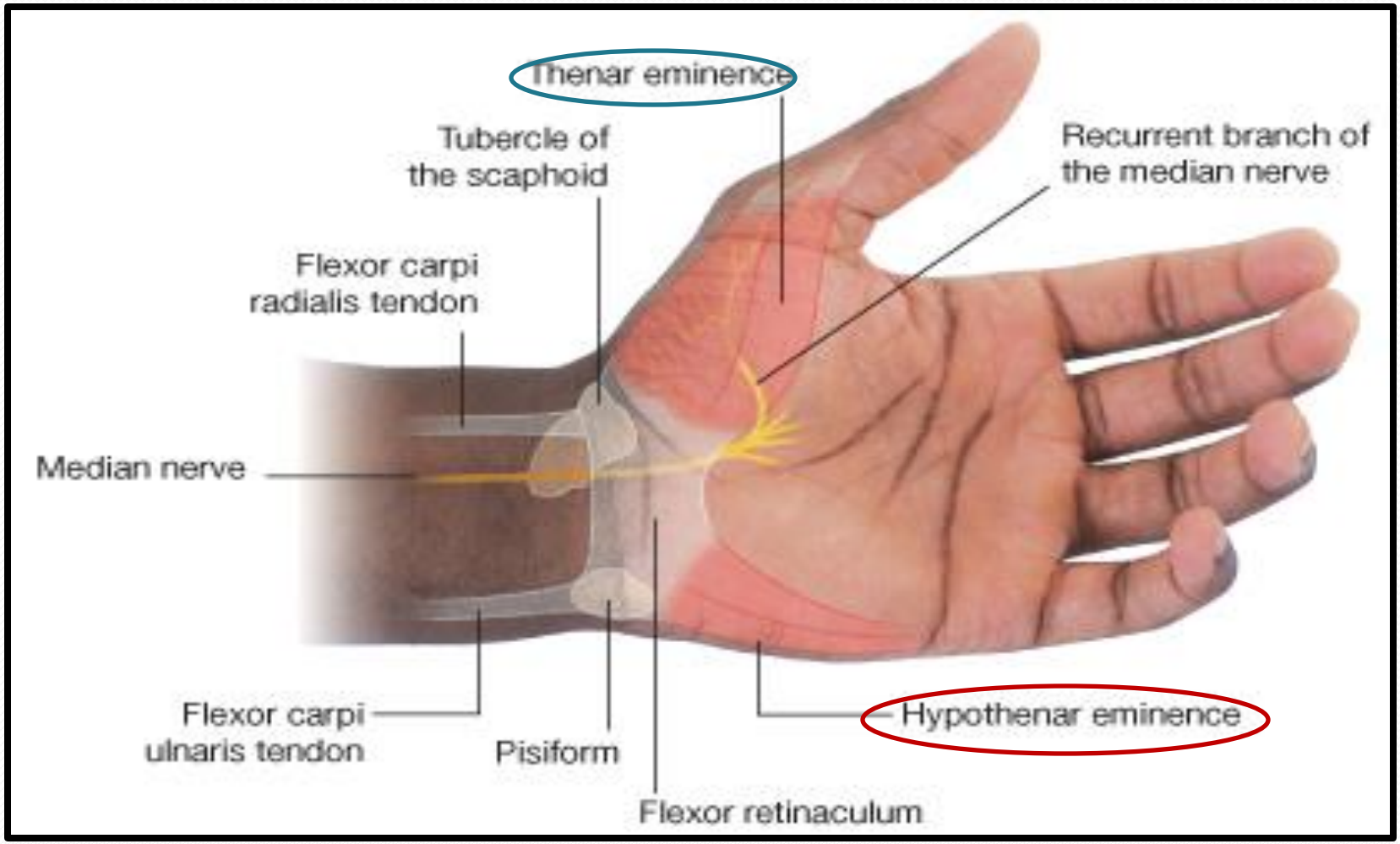
- **Thickened deep fascia of the Palm.**
- Triangular in shape , occupies the central area of the palm.
- **Apex:**
  - **attached to the distal border of flexor retinaculum and receives the insertion of palmaris longus tendon.**
- **Base:**
  - **divides at the bases of the fingers into four slips that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

Palmaris Brevis

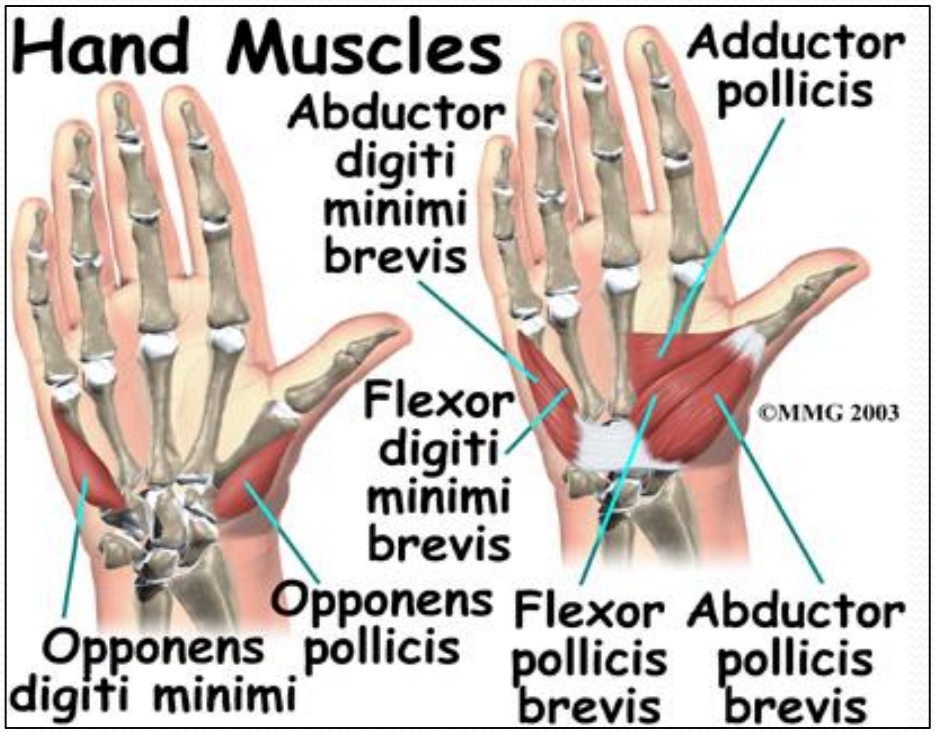
Origin	Insertion	NS	Action
FR and PA.	*Skin of Palm*	***UN Sup. Branch***	***Corrugation of skin to improve grip***



Short Muscles of Thumb & Little Finger



Hypothenar Eminence (3)

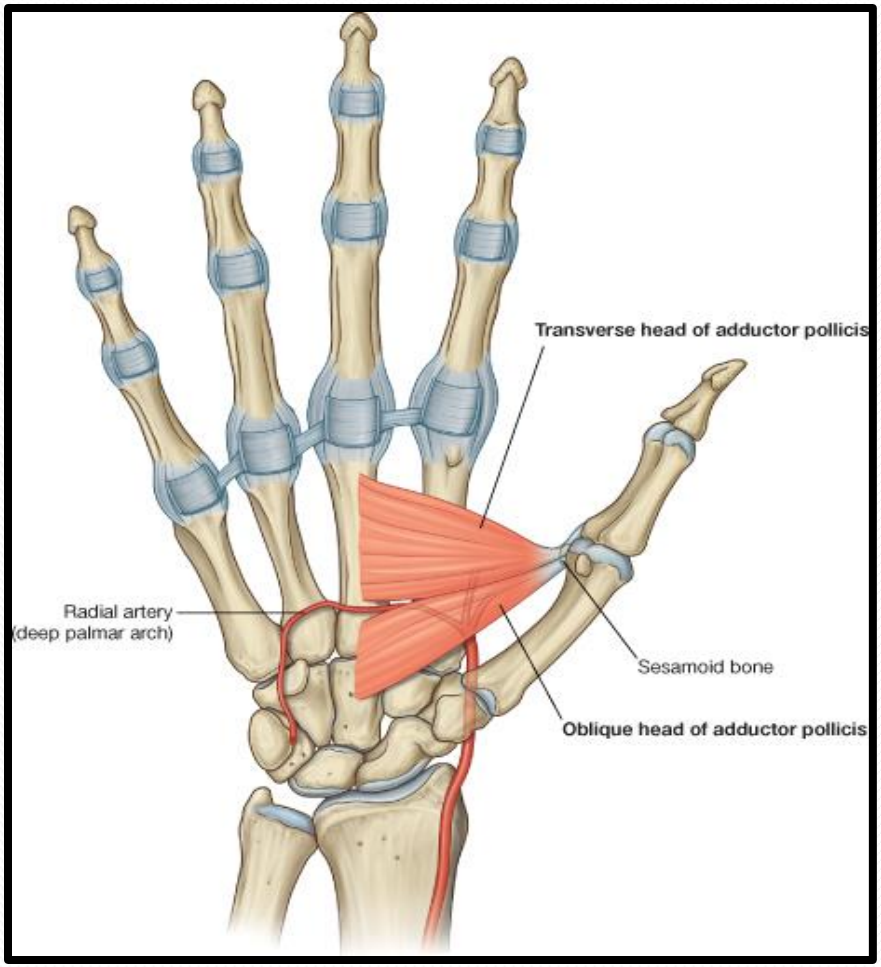


	Origin	*Insertion*	NS	ACT
Ab Dig Min	Pisiform	Base of Proxph	Deep branch of Ulnar	AB
Flx Dig Min	FR	*With AB DIG MIN*	Deep branch of Ulnar	FLX
Opp Dig Min	Palmar surface of 5th metacarpal		Deep branch of Ulnar	*Pulls the 5th metac forward (Cup the palm)*

Thenar Eminence (3)

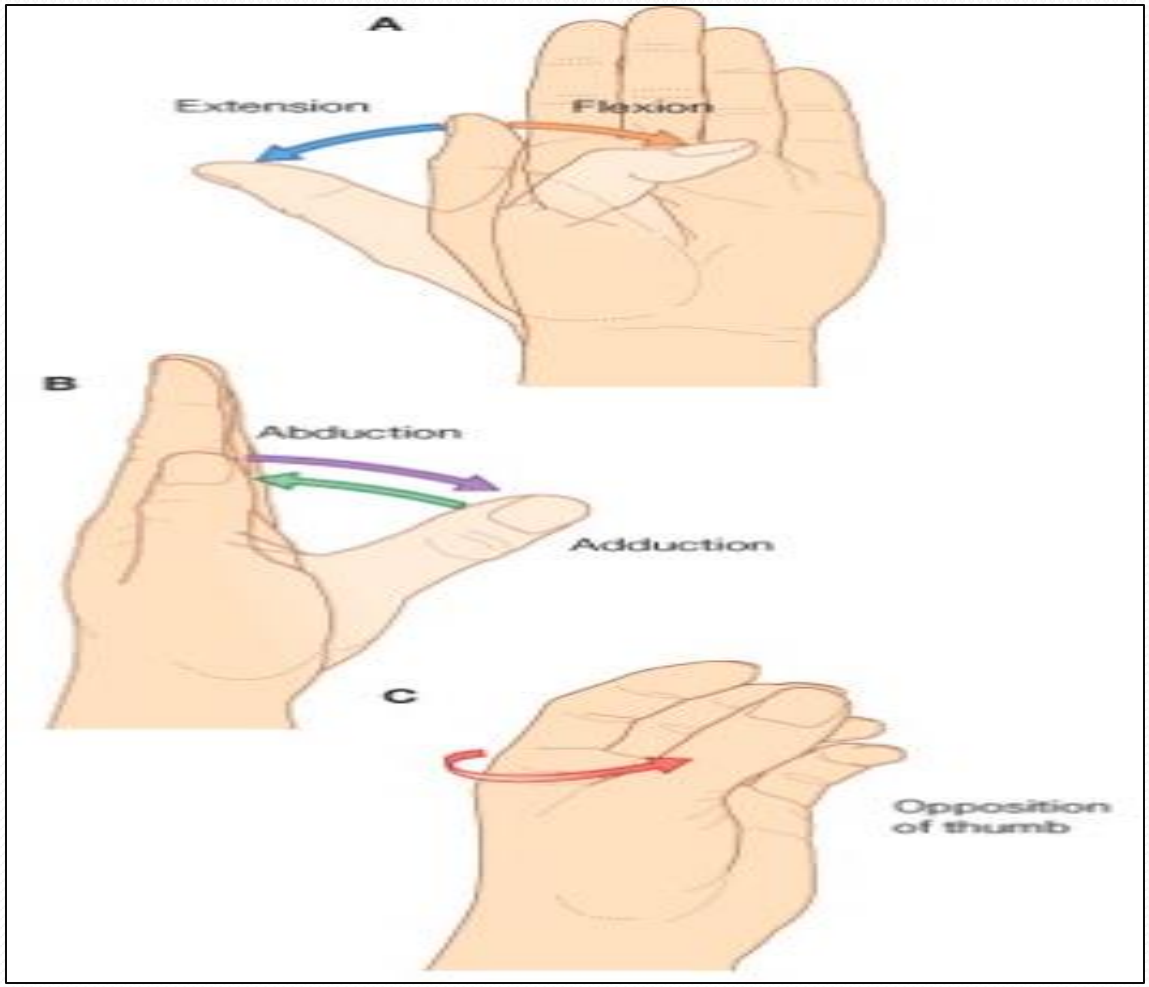
	Origin	Insertion	NS	ACT
AB Poll Brev	FR Scaphd & Trapez	(Base of Prox ph)	Median	AB
Flex Poll Brev	FR	With AB Poll Brev	Median	FLX
Opp Poll	FR	1ST Met (Lat)	Median	opposition

Adductor Pollicis



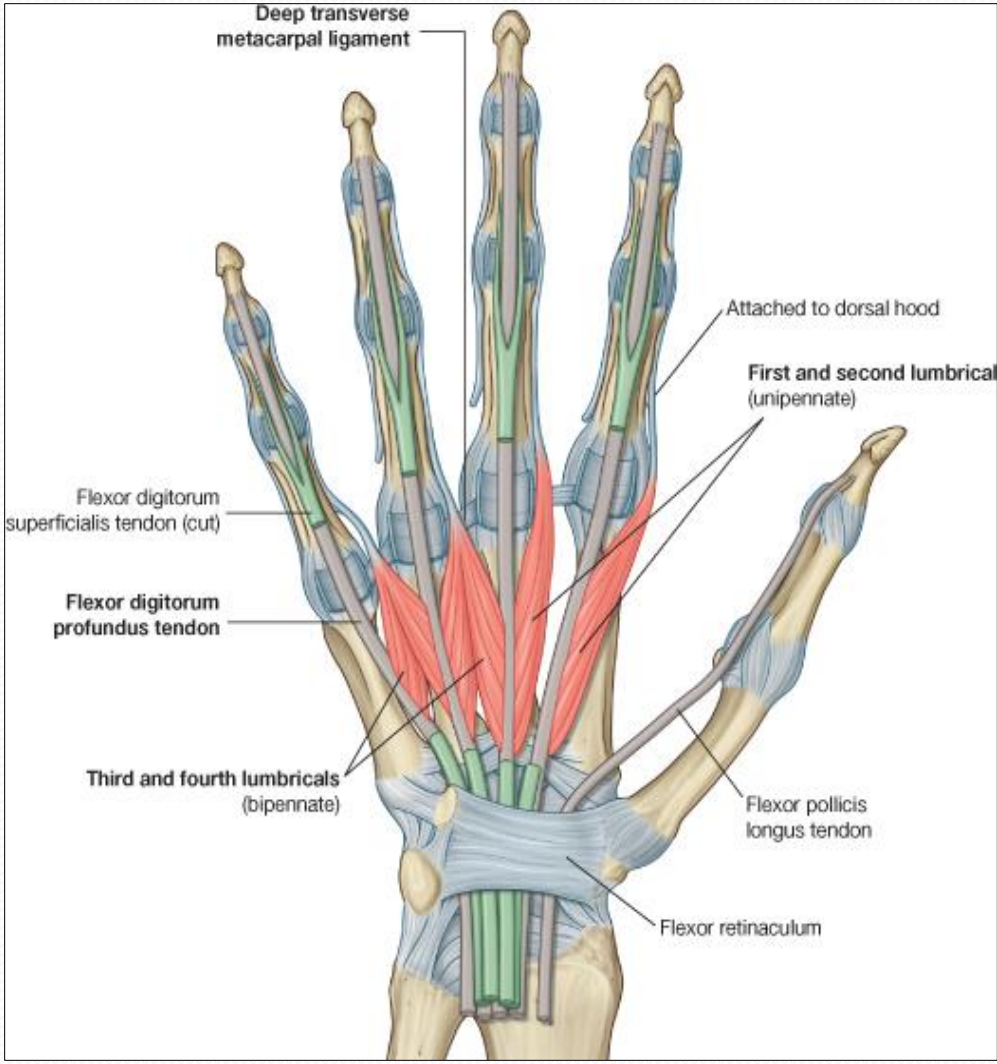
Origin	Insertion	Action	NS
Oblique H: *ant. bases of* 2^{nd} *&* 3^{rd} *meta* ***Trans H:*** 3^{rd} *meta*	***Med****. of base of prox.ph of thumb*	***Add***	**Deep branch of** ***Ulnar***

Movements of Thumb

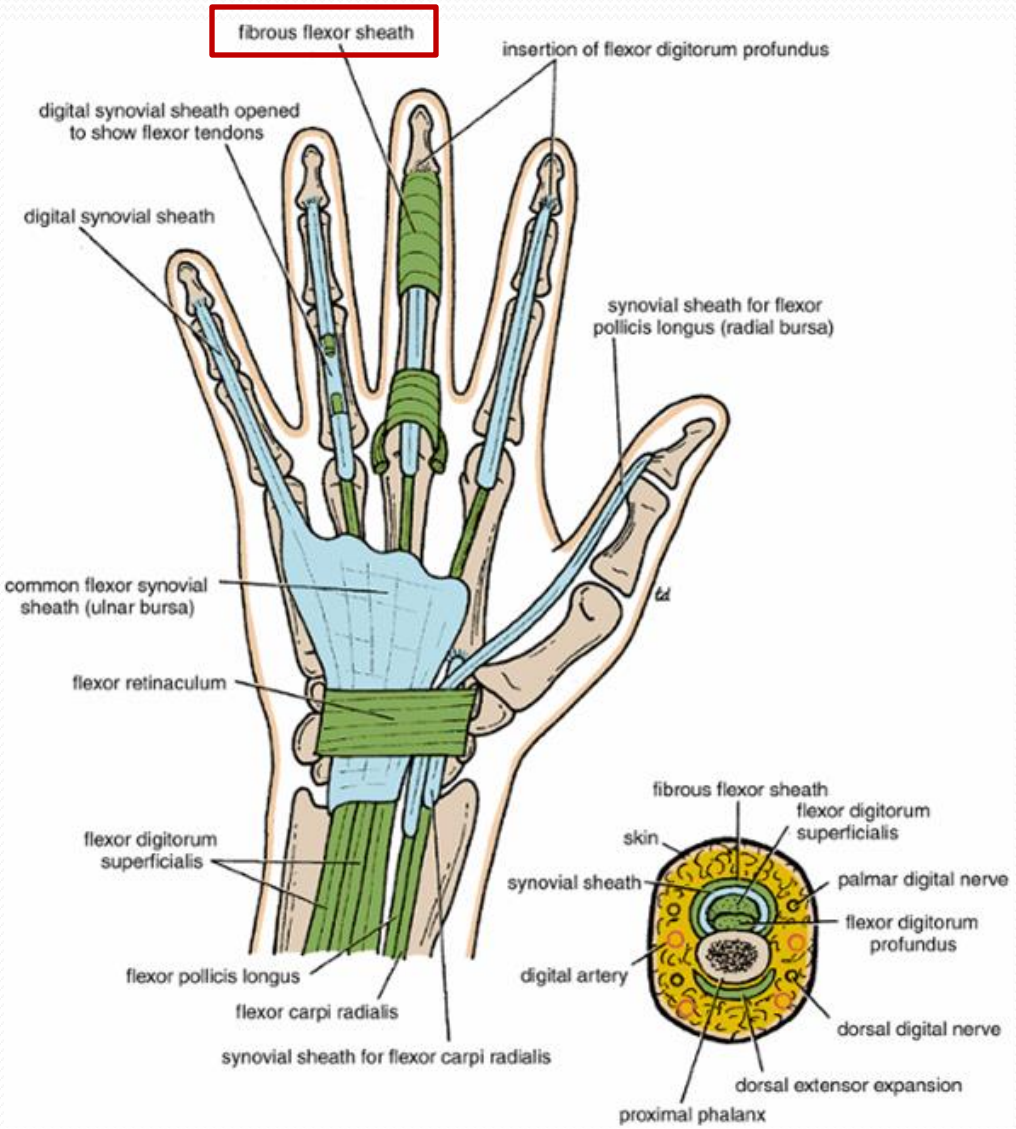


Insertion of
Flexor Dig Superficialis & Profundus

- ***Flexor dig superficialis***
- *Each tendon:*
  - ***Divides*** *into two halves pass around the Profundus Tendon.*
  - *The two halves* ***Meet*** *on the posterior aspect of Profundus tendon (partial decussation of fibers).*
  - ***Reunion*** *of the two halves.*
  - ***Further Division into two slips*** *attached to the* ***Borders of Middle Phalanx.***
- ***Flexor dig Profundus***
  - *Inserted into the* ***Base of the Distal Phalanx.***



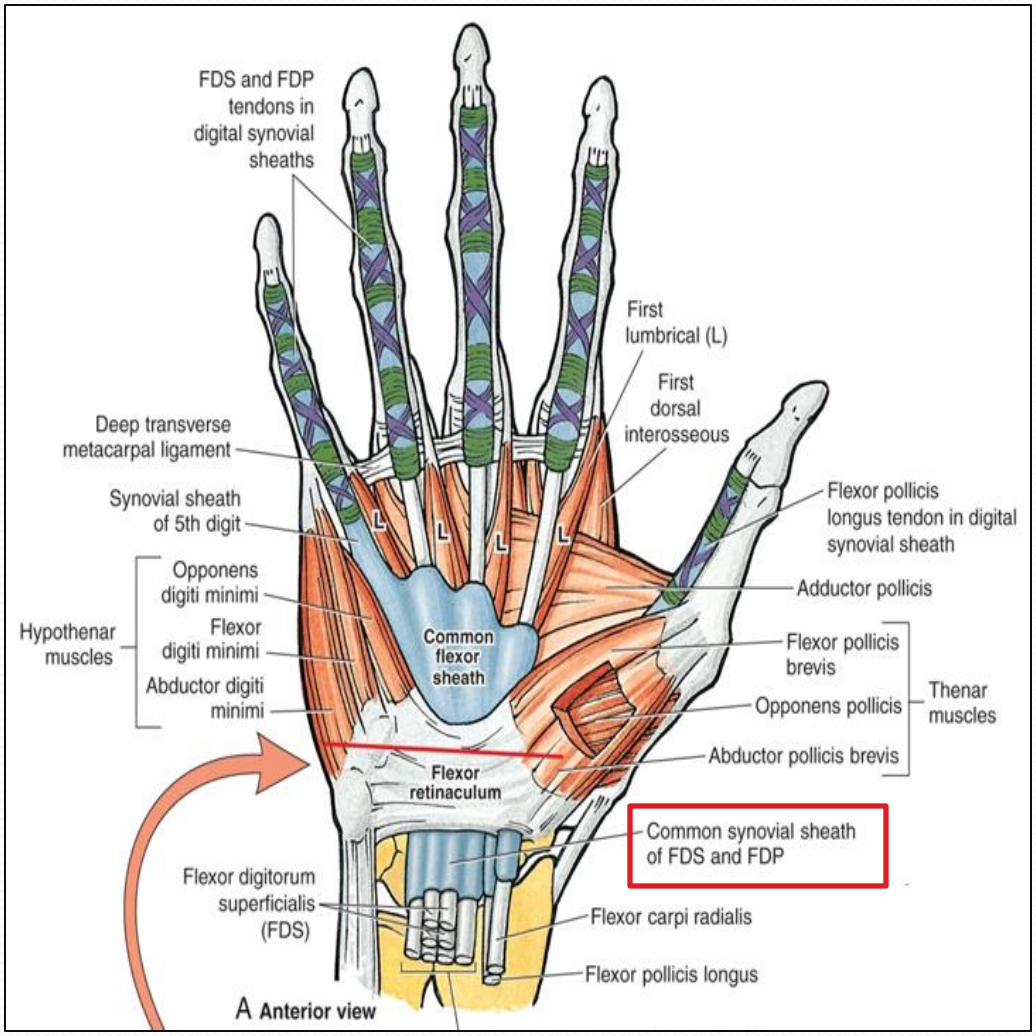
Fibrous Flexor (Digital) Sheath



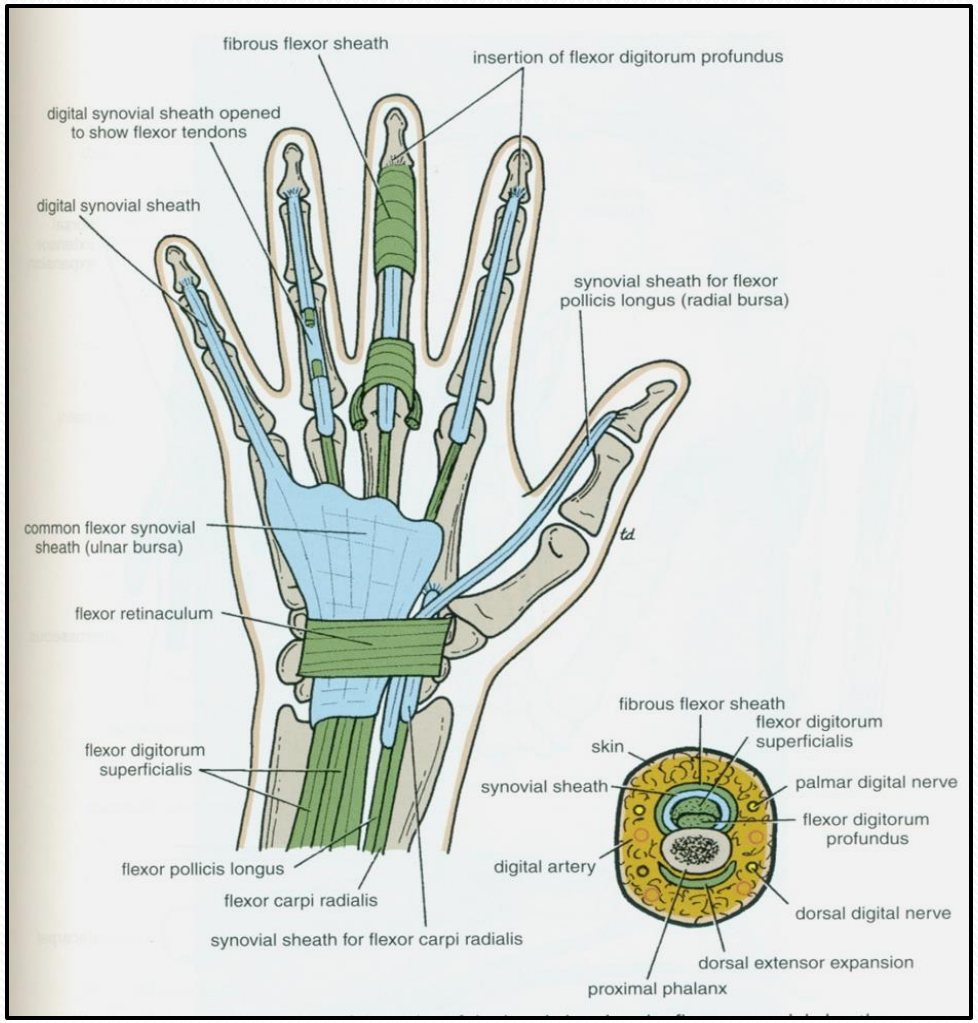
- **A Strong Fibrous Sheath,** which covers the anterior surface of the fingers and attached to the sides of the phalanges.
- Its Proximal end is opened
- Its Distal end is closed
- The Sheath with the anterior surfaces of the phalanges & the interphalangeal joints form an *Osteofibrous blind Tunnel* for the long flexor tendons of the fingers.

Synovial Flexor Sheaths

- ***Common Synovial* sheath (*Ulnar Bursa*)**
  - **Contains** tendons of Flexor Digitorum Superficialis & Profundus
  - The ***Medial*** part of the sheath extends distally (without interruption) on the tendons of the ***little finger.***
  - The ***Lateral part*** of the sheath **stops** on the middle of the palm.
  - The distal ends of the long flexor tendons to***(Index, Middle & Ring)*** fingers acquire ***Digital Synovila Sheaths.***

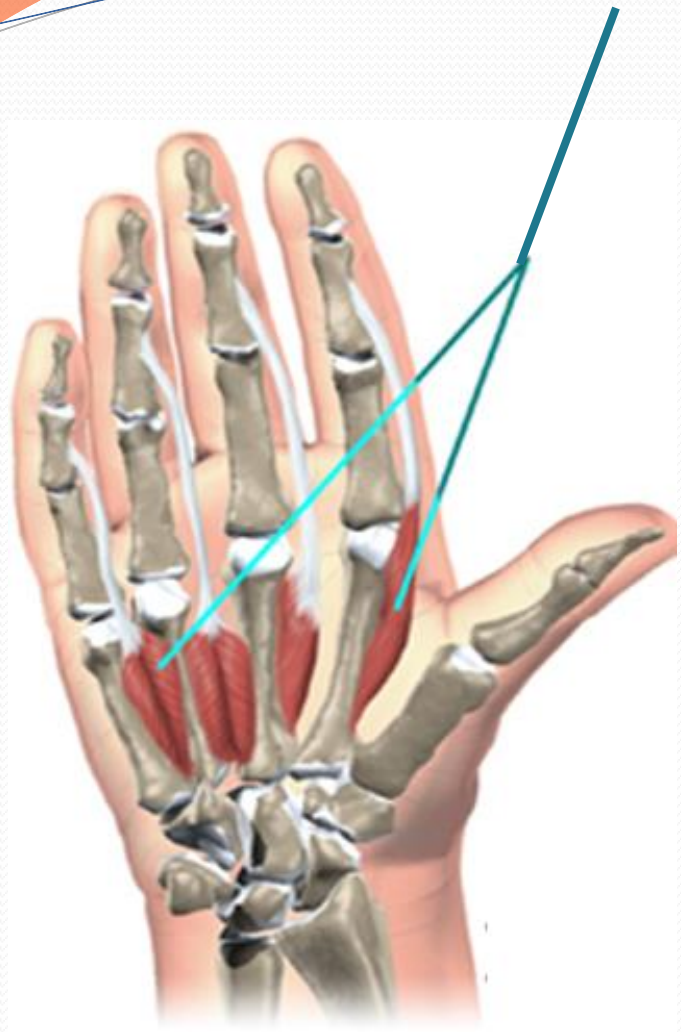


Synovial Flexor Sheaths

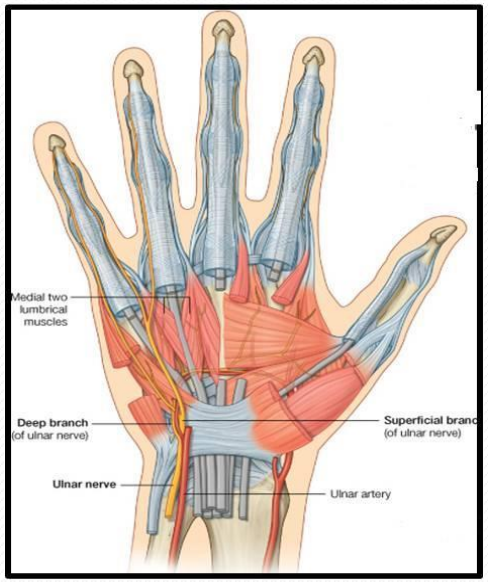


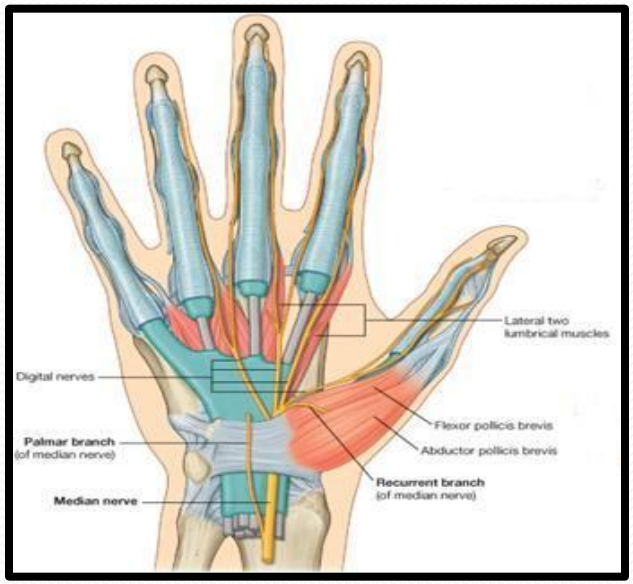
- ***Flexor Pollicis Longus*** tendon has its own synovial sheath (***Radial Bursa)***
- ***Function of Synovial Sheaths:***
- ***They allow the long tendons to move smoothly with a minimum of friction beneath the flexor retinaculum and the fibrous flexor sheaths.***

Lumbrical Muscles (4)



Origin	*Insertion*	NS
Tendons of Flex.dig. profundus	**EXT. EXP** of medial four fingers	**1ST & 2ND (Lateral two) Median N. 3RD & 4TH Ulnar N (Deep branch)**

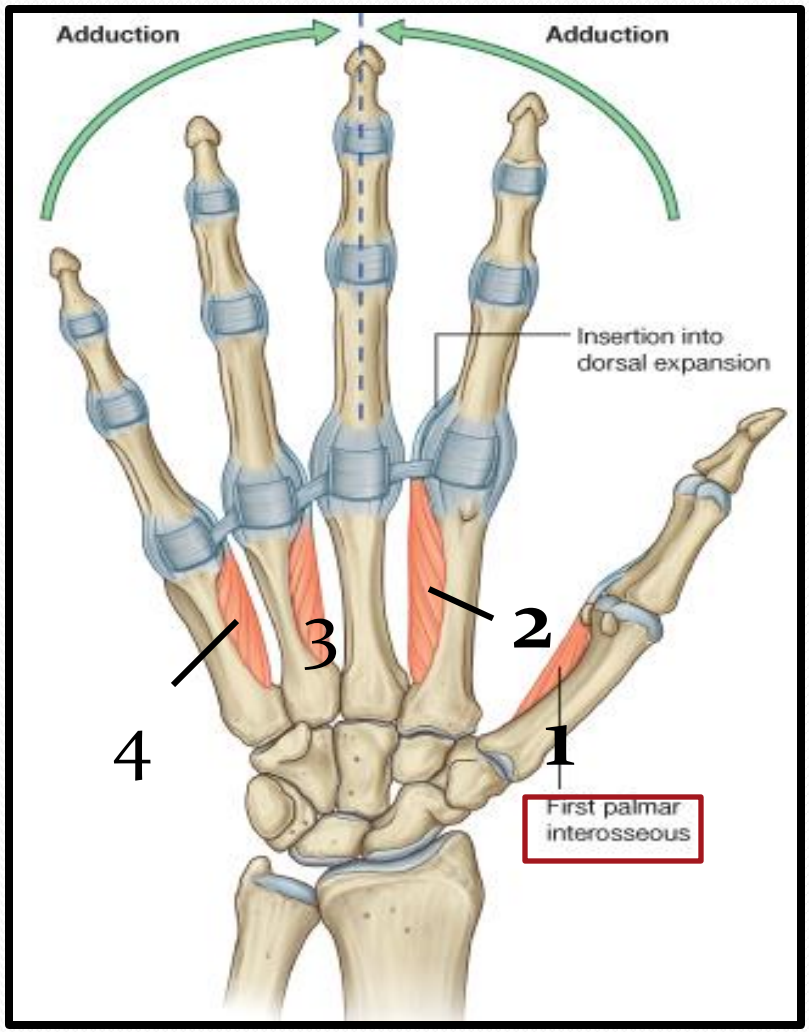




Action:

Flex metacarpophalangeal joints and extend interphalangeal joints of fingers except thumb

Palmar Interossei (4)

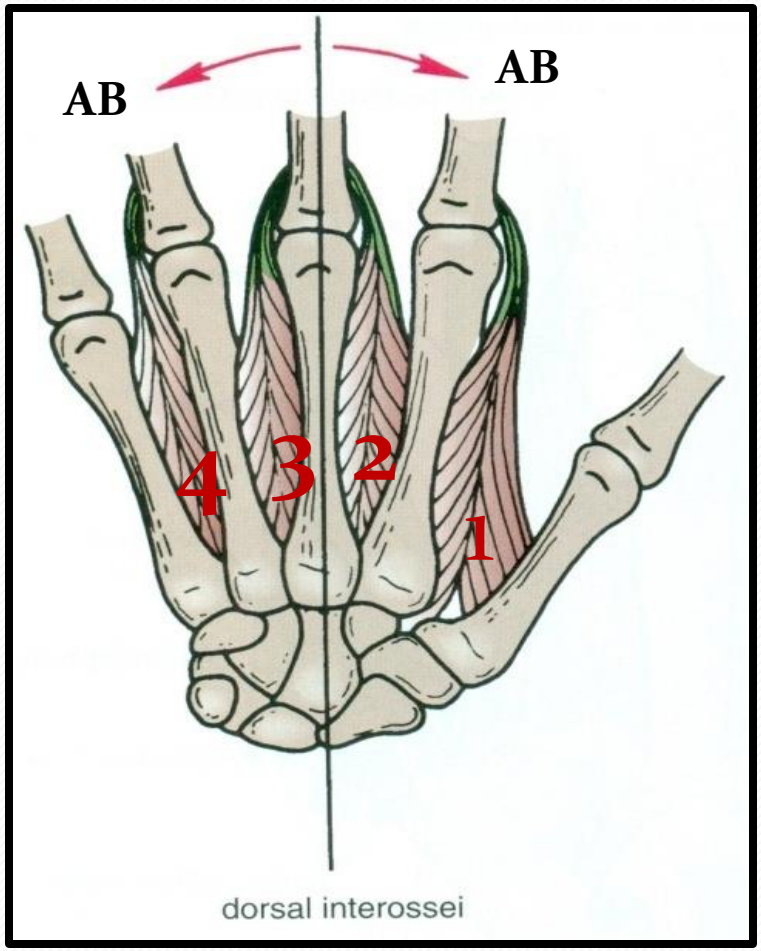


Origin	*Insertion*	NS
First: Base of 1st metacarpal. **Other three:** Ant. surface of shafts of 2nd , 4rd & 5th metacarpals.	Proximal phalanges of thumb, index, ring, & little fingers and extensor expansion of each finger	Deep branch of Ulnar Nerve

Action:

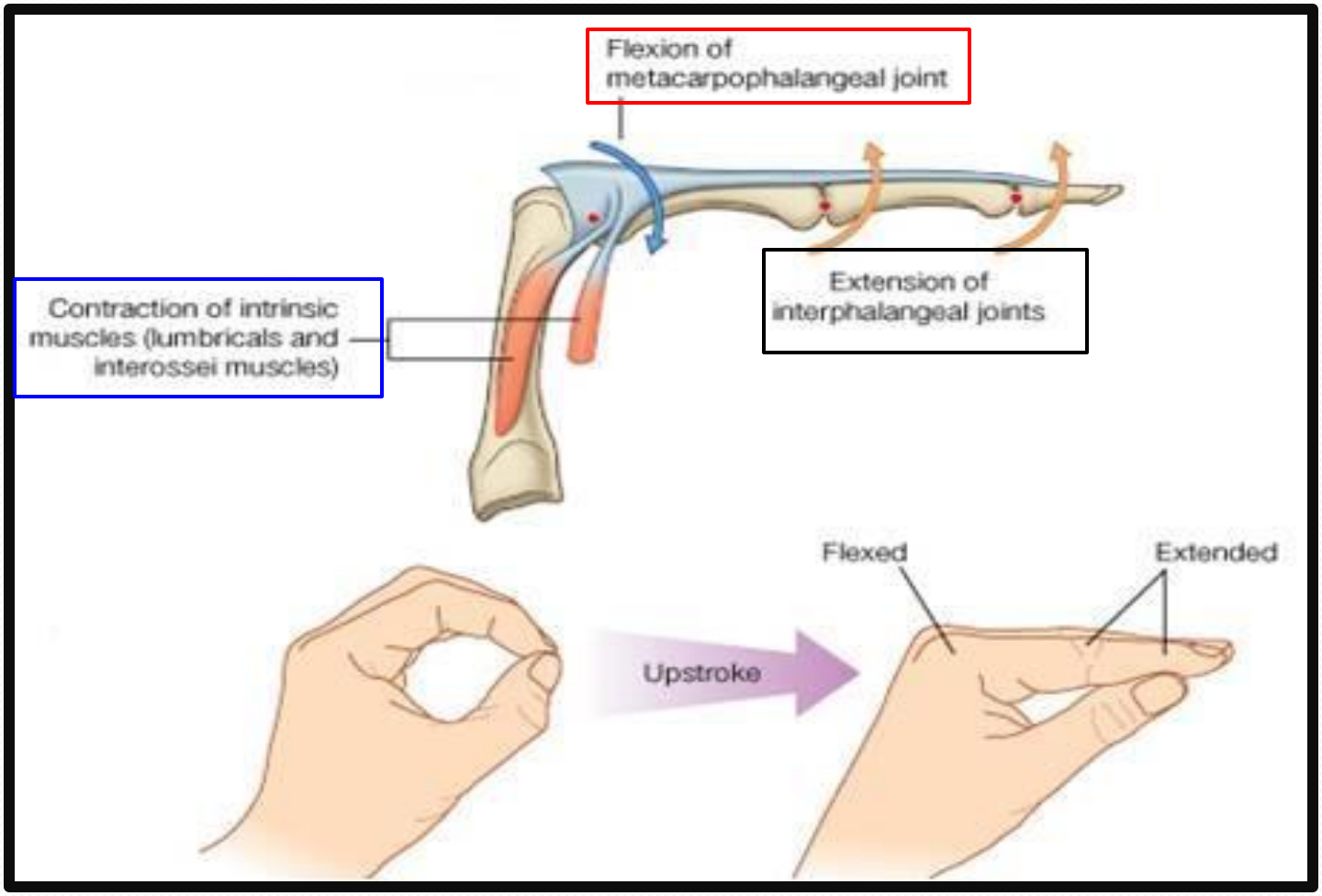
Adduct fingers toward center of third finger

Dorsal Interossei (4)

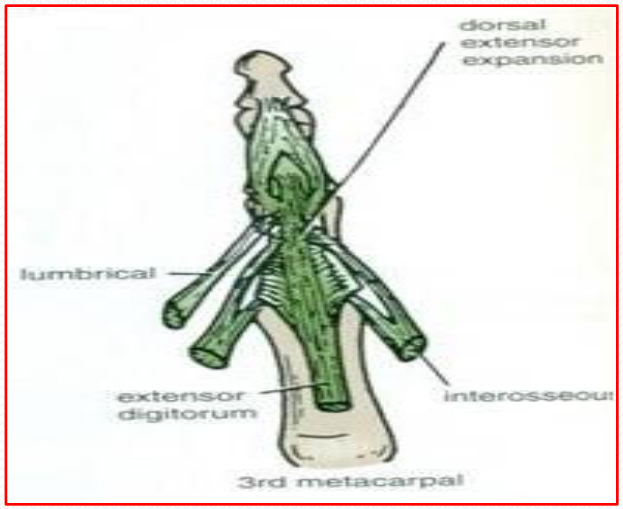


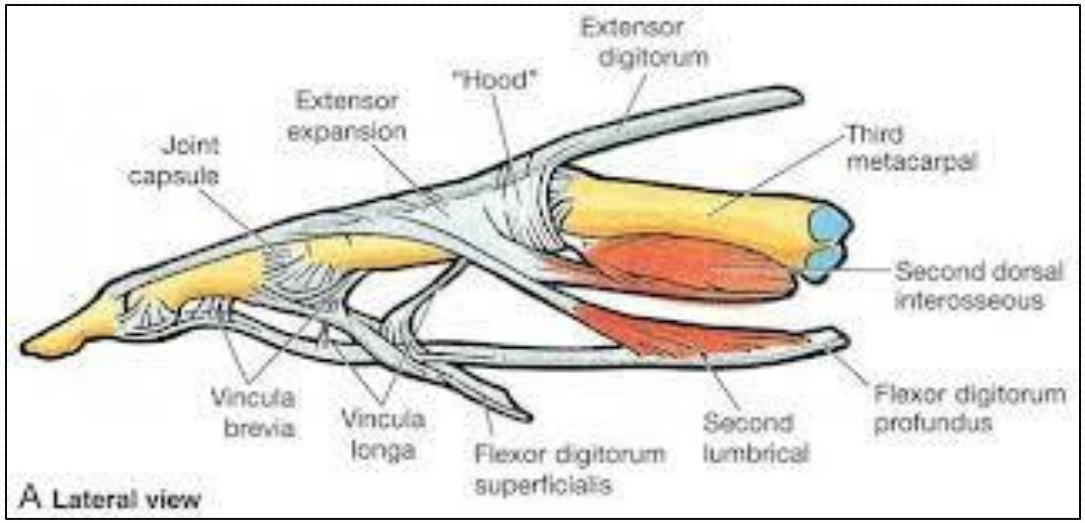
Origin	Insertion	Action
Contiguous sides of shafts of Metacarpals	Proximal Phalang of index, ring ,mid finger & extensor expansion	Abduct fingers away from center of the 3rd finger

Action of Lumbricals & Interossei



Extensor Expansion





- *Formed from the expansion of the tendons of extensor dig. at the* ***PIJ,*** *the expansion*
- ***The tendon splits into three parts:***
  - ***One Central:*** *inserted into the* ***base*** *of* ***Middle phalanx****.*
  - ***Two laterals****: inserted into the* ***base of the Distal phalanx.***
- ***The Expansion Receives the insertions of:***
  - *Corresponding* ***Interosseous*** ***muscle (on each side).***
  - ***Lumbrical muscle (on the lateral side).***

Thank You