



MED437
KING SAUD UNIVERSITY



Hand and Wrist

Lecture 15

Please check our [Editing File](#).

هذا العمل لا يغني عن المصدر الأساسي للمذاكرة

{وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ}

Objectives

- Describe the anatomy of the **deep fascia** of the wrist & hand (flexor & extensor retinacula & 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)

- Text in **BLUE** was found only in the boys' slides
- Text in **PINK** was found only in the girls' slides
- **Text in RED is considered important**
- Text in **GREY** is considered extra notes

Retinacula

Retinaculum=single | Retinacula=plural

Flexor & Extensor Retinaculum:

Bands of Deep (thickening) Fascia at the Wrist

Function

Hold the long flexor and extensor tendons at the wrist in position.

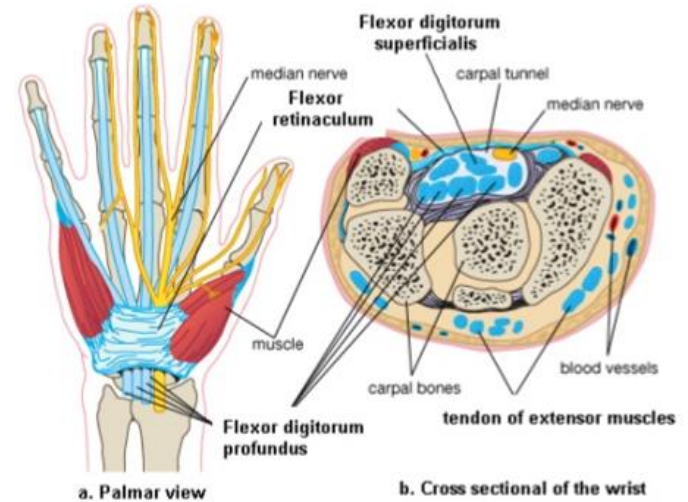
Attachment

Medially:

Both retinacula attached to **Pisiform & Hook of Hamate.**

Laterally:

- Flexor Retinaculum attached to **Tubercle of Scaphoid & Trapezium.**
- Extensor Retinaculum attached to **Distal end of Radius.**

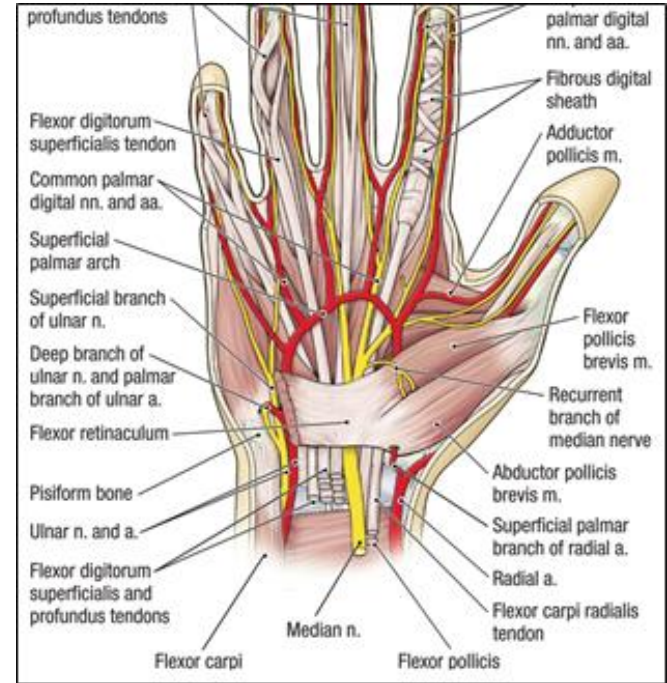


Structure superficial to flexor Retinaculum

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**.

Do NOT enter the carpal tunnel



Carpal Tunnel

*Paresthesia refers to a burning or prickling sensation that is usually felt in the hands, arms, legs, or feet, but can also occur in other parts of the body.

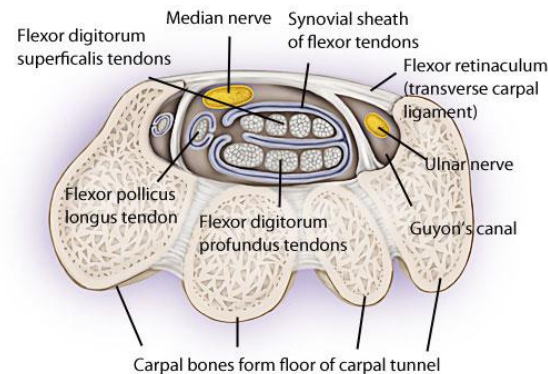
Form

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

Content

From Medial to Lateral

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

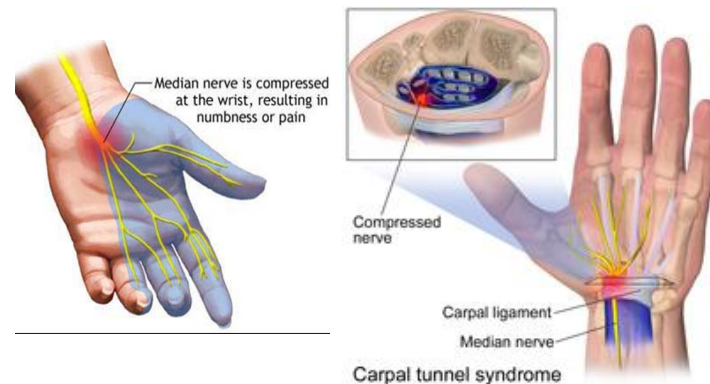


Carpal tunnel syndrome

Causes : Compression of the median nerve within the carpal tunnel.

Manifestations:

1. Burning pain (pins and needles) in the lateral three and half fingers.
2. **No paresthesia* over the thenar eminence**
"Because the palmar cutaneous of median nerve does not go under the tunnel"
3. Weakness or atrophy of the thenar muscles (**Blue Hand**).
4. Inability to **Oppose** the thumb.



Palmar Aponeurosis

- The **Thickened** deep fascia of the Palm.
- it is **Triangular** in shape , occupies the central area of the palm.

Apex

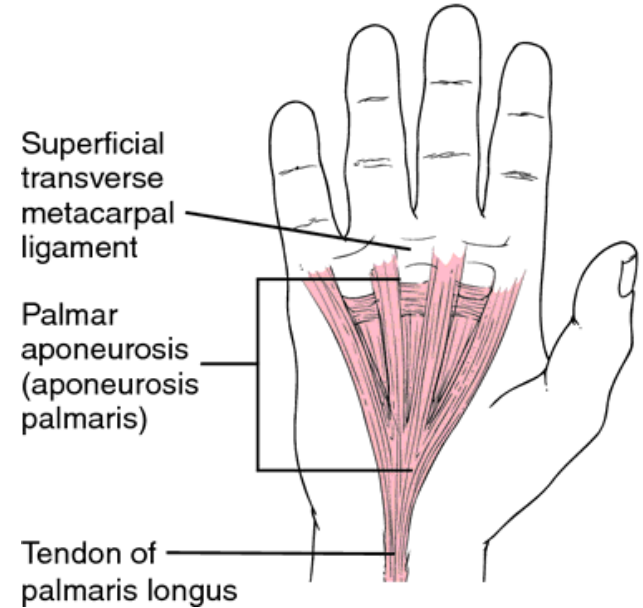
Attached to the **distal** border of flexor retinaculum and **receives** the insertion of palmaris longus tendon.

Base

Divides at the bases of the fingers into **four slips** that pass into the fingers

Functions

1. **Firmly attached** to the overlying skin and **improves** the grip.
2. Protects the underlying tendons, vessels & nerves.
3. Gives **origin** to palmaris brevis muscle.



Small muscles of the hand

Palmaris Brevis

Origin

Flexor retinaculum (FR) &
Palmar aponeurosis (PA)

Insertion

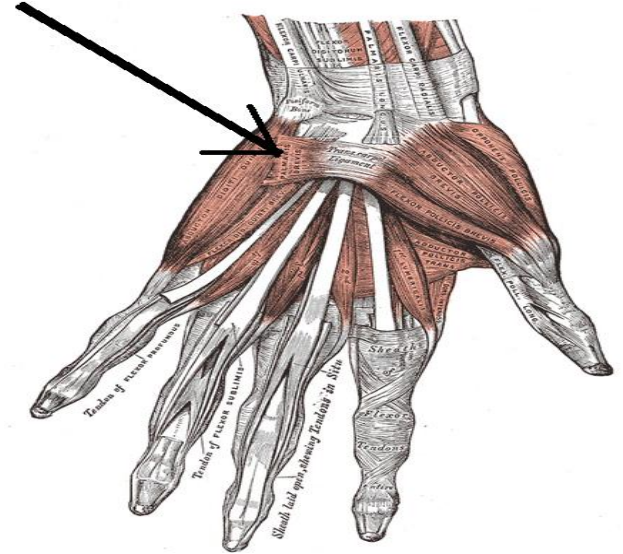
Skin of the palm.

Nerve supply

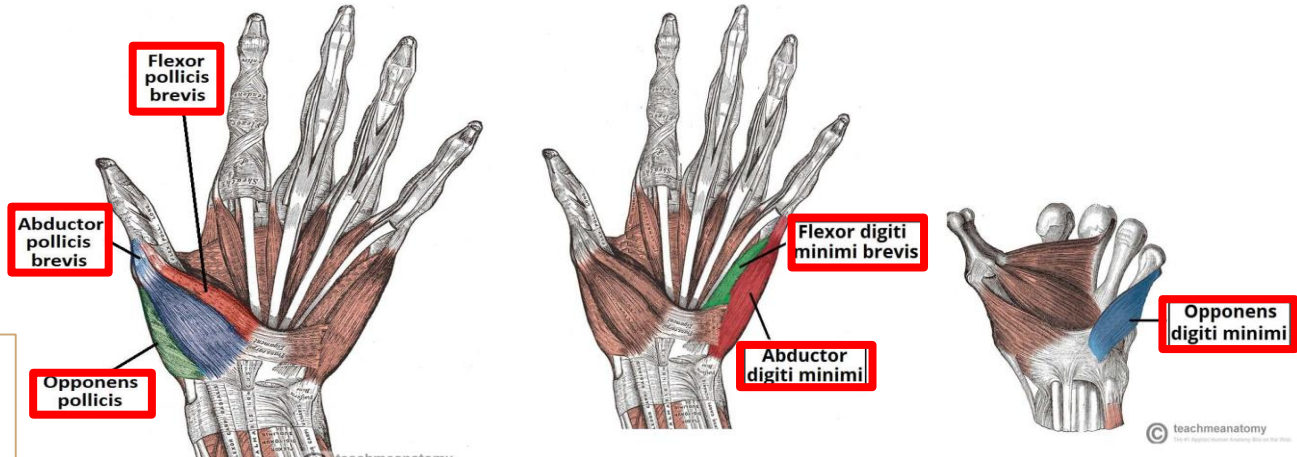
Ulnar nerve (superficial branch)

Action

Corrugation of skin to improve grip.



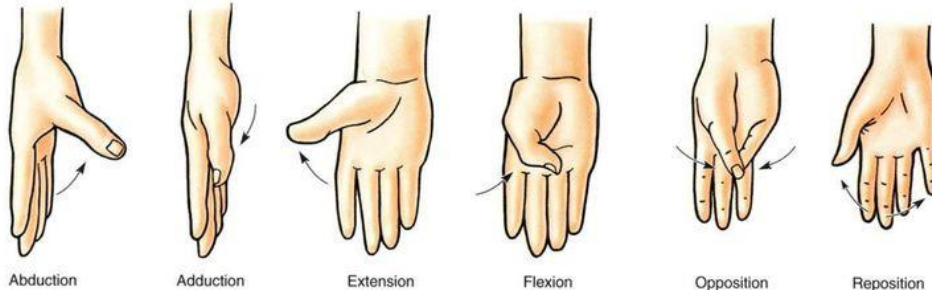
Short muscles of hand (thumb & little finger) + Movement of thumb



Team436

Can be remembered using the mnemonic, "A OF A OF A" for: (thenar muscles)

- ❖ Abductor pollicis brevis
 - ❖ Opponens pollicis
 - ❖ Flexor pollicis brevis
 - ❖ Adductor pollicis
- (Hypothenar muscles)
- ❖ Opponens digiti minimi
 - ❖ Flexor digiti minimi
 - ❖ Abductor digiti minimi



Small muscles of the hand

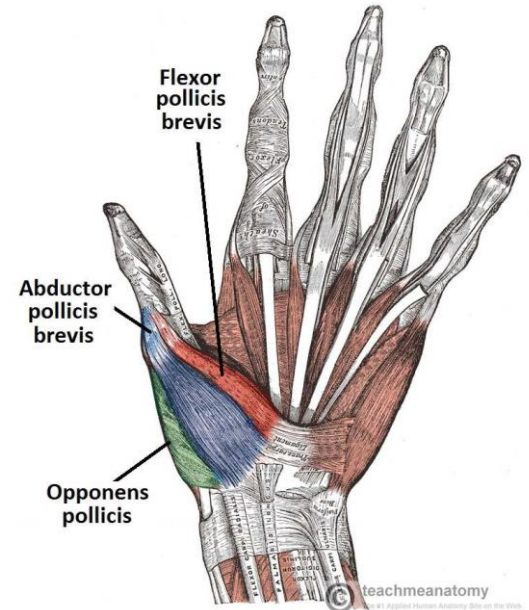
Hypothenar Eminence (3 muscles)

	Abductor Digiti minimi	Flexor Digiti Minimi	Opponens Digiti Minimi	
Origin	Pisiform	Flexor retinaculum	Flexor retinaculum	
Insertion	Base of proximal phalanx	Base of proximal phalanx	Palmer surface of 5th metacarpal	
Nerve supply	Deep branch of ulnar nerve	Deep branch of ulnar nerve	A Deep branch of ulnar nerve	
Action	Abduction of little finger	Flexion of little finger	Pulls the 5th metacarpal forward	

Small muscles of the hand

Thenar Eminence (3 muscles)

	Abductor Pollicis Brevis	Flexor Pollicis Brevis	Opponens Pollicis
Origin	Flexor retinaculum, Scaphoid and trapezium	Flexor retinaculum	Flexor retinaculum
Insertion	Base of proximal phalanx	Base of proximal phalanx	Lateral part of 1st metacarpal
Nerve supply	Supplied by median nerve	Supplied by median nerve	Supplied by median nerve
Action	Abduction of thumb	Flexion of thumb	Opposition of thumb



Small muscles of the hand

Adductor Pollicis

Not in the Thenar Eminence

origin

1. Oblique head: Anterior bases of 2nd & 3rd metacarpal.
2. Transverse head :3rd metacarpal.

insertion

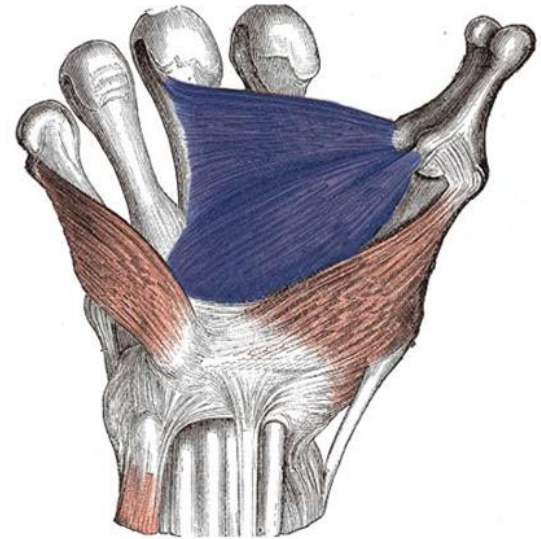
Medial side of base of proximal phalanx of thumb.

Nerve supply

Deep branch of Ulnar nerve

Action

Adduction

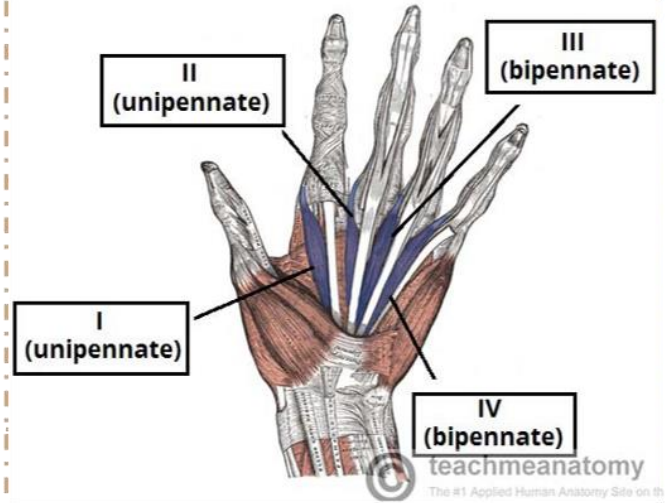


a) Adductor pollicis

Small muscles of the hand

Lumbrical Muscles (4 muscles)

origin	Tendons of flexor digitorum profundus
insertion	Extensor expansion of medial four fingers.
Nerve supply	<ul style="list-style-type: none">• Lateral two 1st & 2nd by the median nerve• Medial two 3rd & 4th by the deep branch of the ulnar nerve
Action	Flex metacarpophalangeal joints and extend interphalangeal joints of fingers Except thumb “Writing Position”



Small muscles of the hand

Palmar Interossei (extention+flexion) (4 muscles)

origin

- 1st: Base of 1st metacarpal.
- Other three: Anterior Surface of Shafts of 2nd, 4rd & 5th metacarpals.

insertion

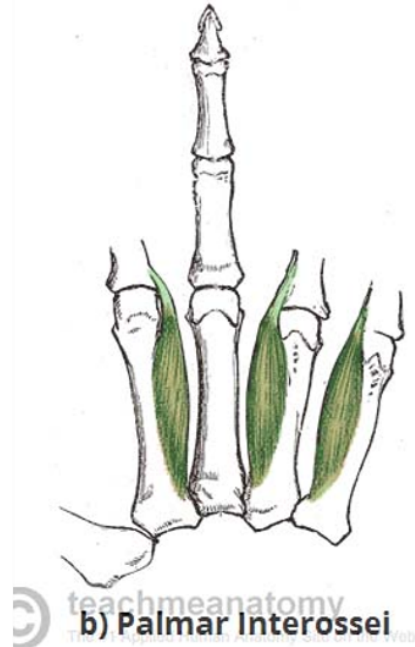
Proximal phalanges of thumb, index, ring, & little fingers and Extensor expansion.

Nerve supply

Deep branch of ulnar nerve

Action

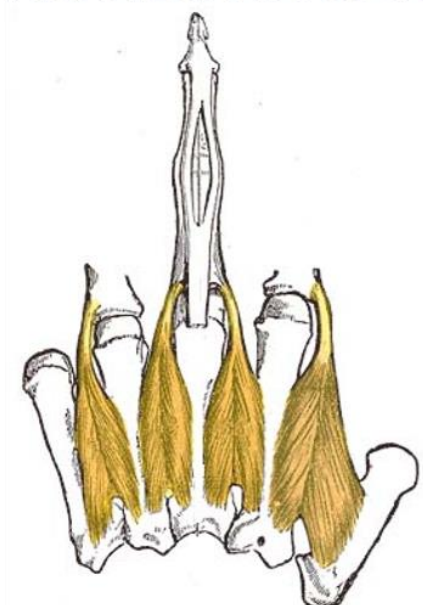
Adduction of fingers toward center of the 3rd one.



Small muscles of the hand

Dorsalis Interossei (4 muscles)

origin	Contiguous (Contiguous: adjacent, sharing a common border) sides of shafts of Metacarpals.
insertion	Proximal Phalanges of index, ring, middle finger & Extensors
Nerve supply	Deep branch of ulnar nerve .
Action	Abduction of fingers away from the center of the 3 rd finger.



a) Dorsal Interossei

Insertion of:

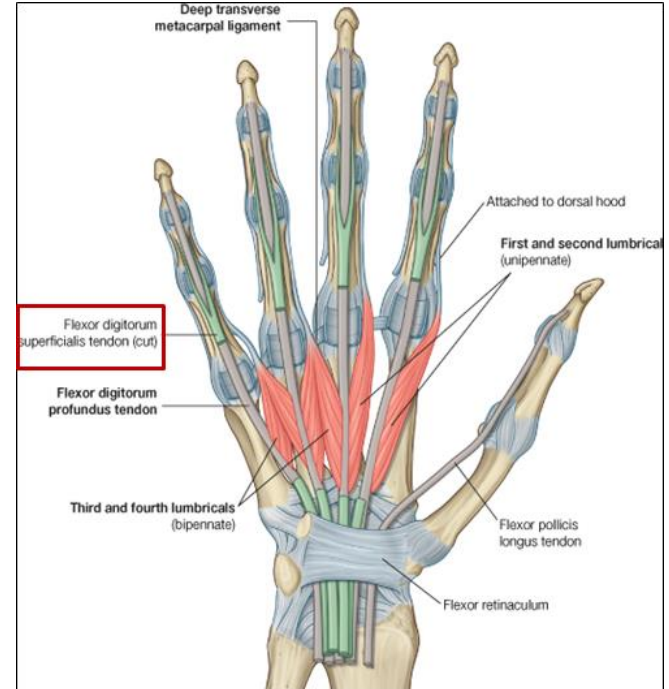
Flexor dig superficialis

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

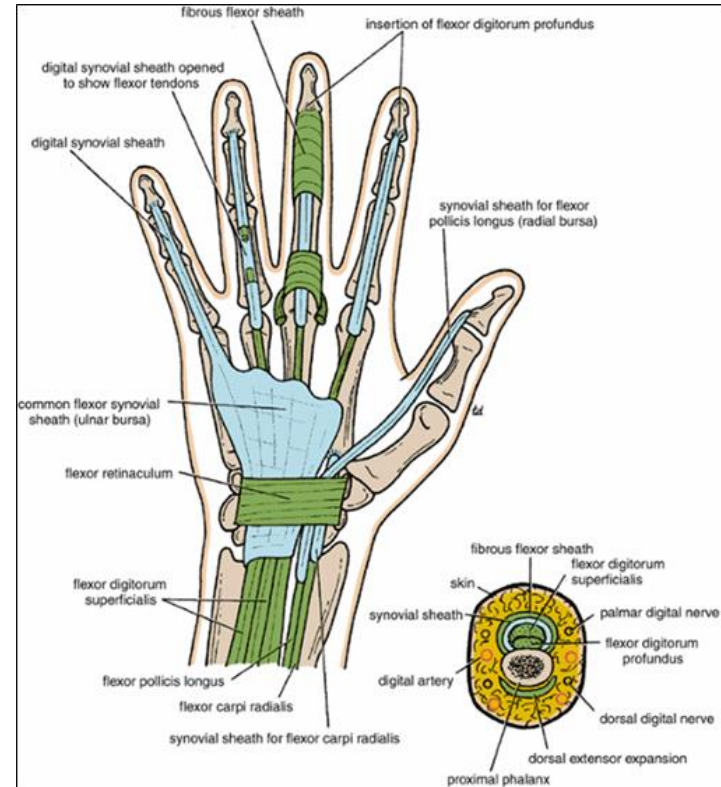
Inserted into the **Base** of the **Distal Phalanx**.



Green -> superficialis | Grey -> Profundus

Fibrous flexor (digital) sheath

- Fibrous Flexor is **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 surface of the phalanges and interphalangeal joints form **osteo-fibrous blind tunnel** for the long Flexor tendons of fingers.



Synovial flexor sheath



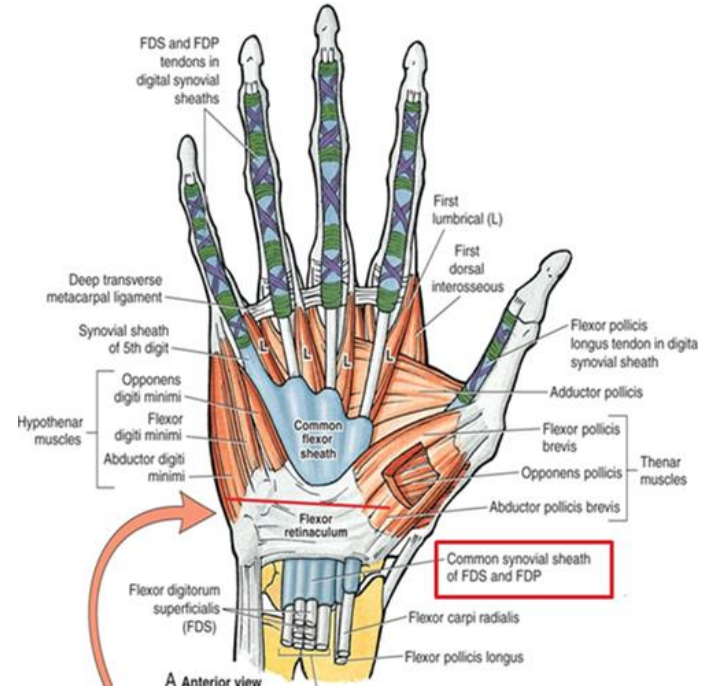
A- Common synovial sheath (**Ulnar bursa**)

- Contains tendons of Flexor digitorum superficialis and profundus.
- The **medial part** of the sheath extends distantly (without interruption) on the tendons of the little finger.
- The **lateral part** of the sheath stops on the middle of the palm. (doesn't cover the 3 middle fingers)
- The **distal ends** of the long Flexor tendons to - **index, middle and ring** - fingers acquire **digital synovial sheaths**.

B- Flexor Pollicis Longus Tendon has its own synovial sheath (**Radial bursa**)

Functions

They allow the long tendons to move smoothly with a **minimum of friction** beneath the Flexor retinaculum and the fibrous Flexor sheaths



Extensor Expansion

- Formed from the expansion of the tendons of extensor digitorum at the PIJ

(P = proximal - I = interphalangeal - J = joint)

- The tendon **splits** into **three** parts:

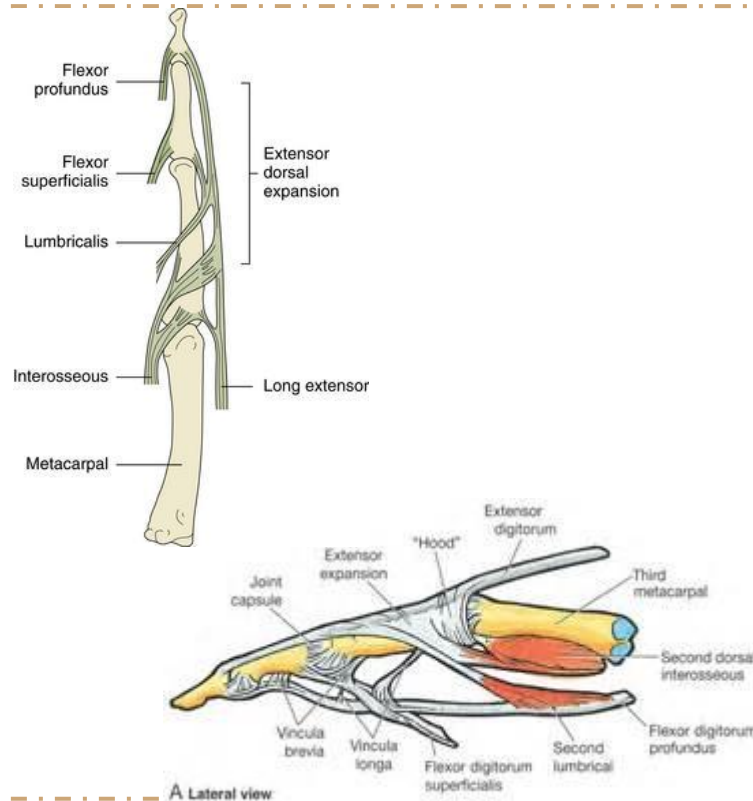
One Central: inserted into the **base** of **Middle phalanx**.

Two laterals: inserted into the **base** of the **Distal phalanx**.

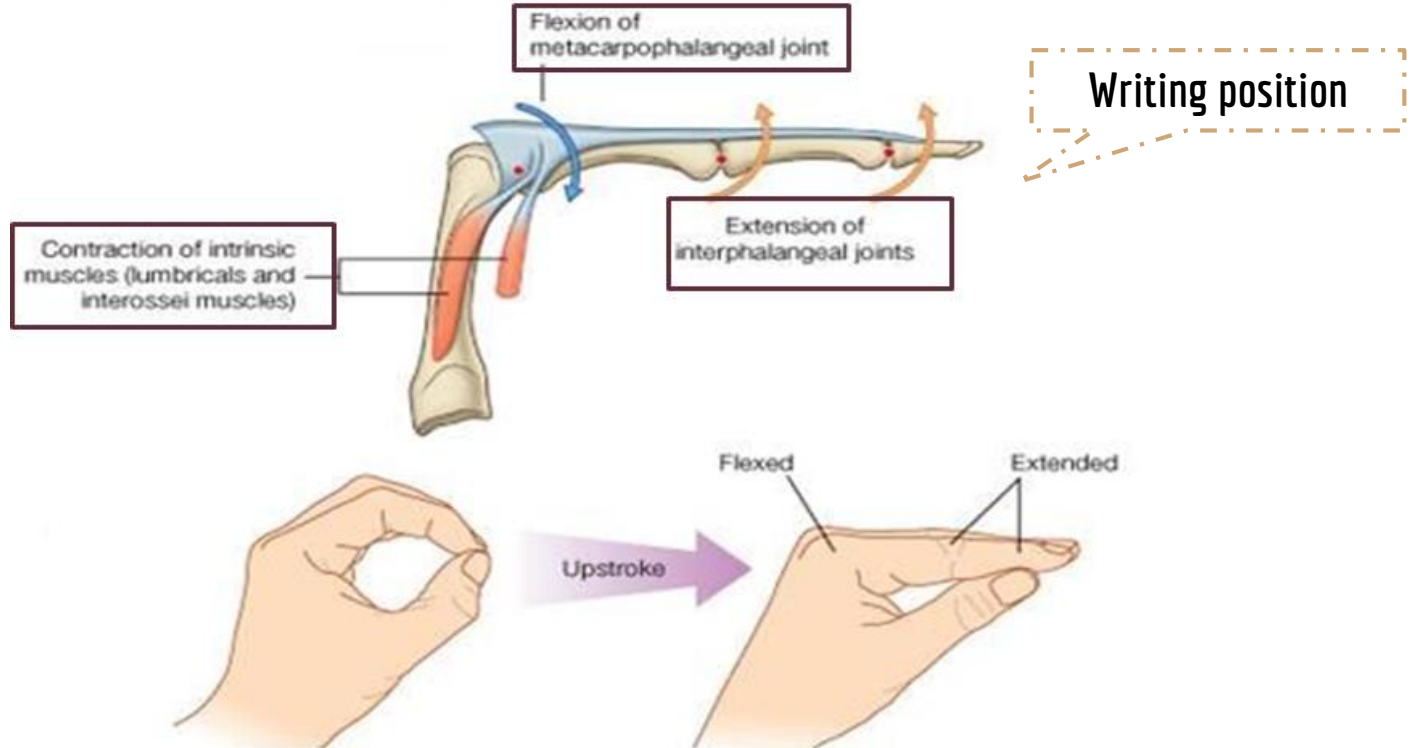
- The Expansion Receives the insertions of:

Corresponding **Interosseous** muscle (on each side).

Lumbrical muscle (on the lateral side).



Action of Lumbricals & Interossei



MCQs

(1) Which one of the following is Hypothenar Eminence _____ :

- A- abductor digiti minimi
- B- opponens digiti minimi
- C- both A & B

(2) Each tendon of flexor digiti superficialis divides into _____ around the profundus tendon :

- A- 2
- B- 3
- C- 4

(3) In Fibrous Flexor (Digital) Sheath the proximal end is _____ and the distal end is _____ :

- A- closed, opened
- B- opened, closed
- C- opened, opened

(4) Which one of the following is a symptom of Carpal Tunnel Syndrome _____ :

- A- burning pain
- B- weakness
- C- both A and B

(5) Retinacula bands of _____ Fascia at the Wrist :

- A- deep
- B- superficial
- C- both A and B

SAQ

(1) List the attachment Retinacula?

(2) A boy injured his median nerve and as a result there was a wasting in the thenar muscles. List the muscles affected and the action of each one?

(3) List the Structure superficial to flexor Retinaculum from medial to lateral?

Answers

(MCQs)

1-B

2-A

3-B

4-C

5-A

SAQ:

(1) **Medially:**

Both retinacula attached to **Pisiform & Hook of Hamate.**

Laterally:

- Flexor Retinaculum attached to **Tubercle of Scaphoid & Trapezium.**

- Extensor Retinaculum attached to **Distal end of Radius.**

(2) 1) abductor pollicis brevis (abduction)

2) flexor pollicis brevis (flexion)

3) opponens pollicis (opposition)

(3) 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.**

Team Members

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Alanoud Almansour
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AlFhadah abdullah alsaleem
Arwa Alzahrani
Dana Abdulaziz Alrasheed
Dimah Khalid Alaraifi
Ghada Alhaidari
Ghada Almuhanha
Ghaida Alsanad
Hadeel Khalid Awartani
Haifa Alessa
Khulood Alwehabi
Layan Hassan Alwatban
Lojain Azizalrahman
Lujain Tariq AlZaid

Maha Barakah
Majd Khalid AlBarrak
Norah Alharbi
Nouf Alotaibi
Noura Mohammed Alothaim
Rahaf Turki Alshammari
Reham Alhalabi
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Yazeed Aldossari
Muath Alhumood
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Abdulelah Aldossari
Abdulrahman Alduhayyim
Hamdan Aldossari
Abdullah Alqarni
Mohammed Alomar
Abdulrahman Aldawood
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