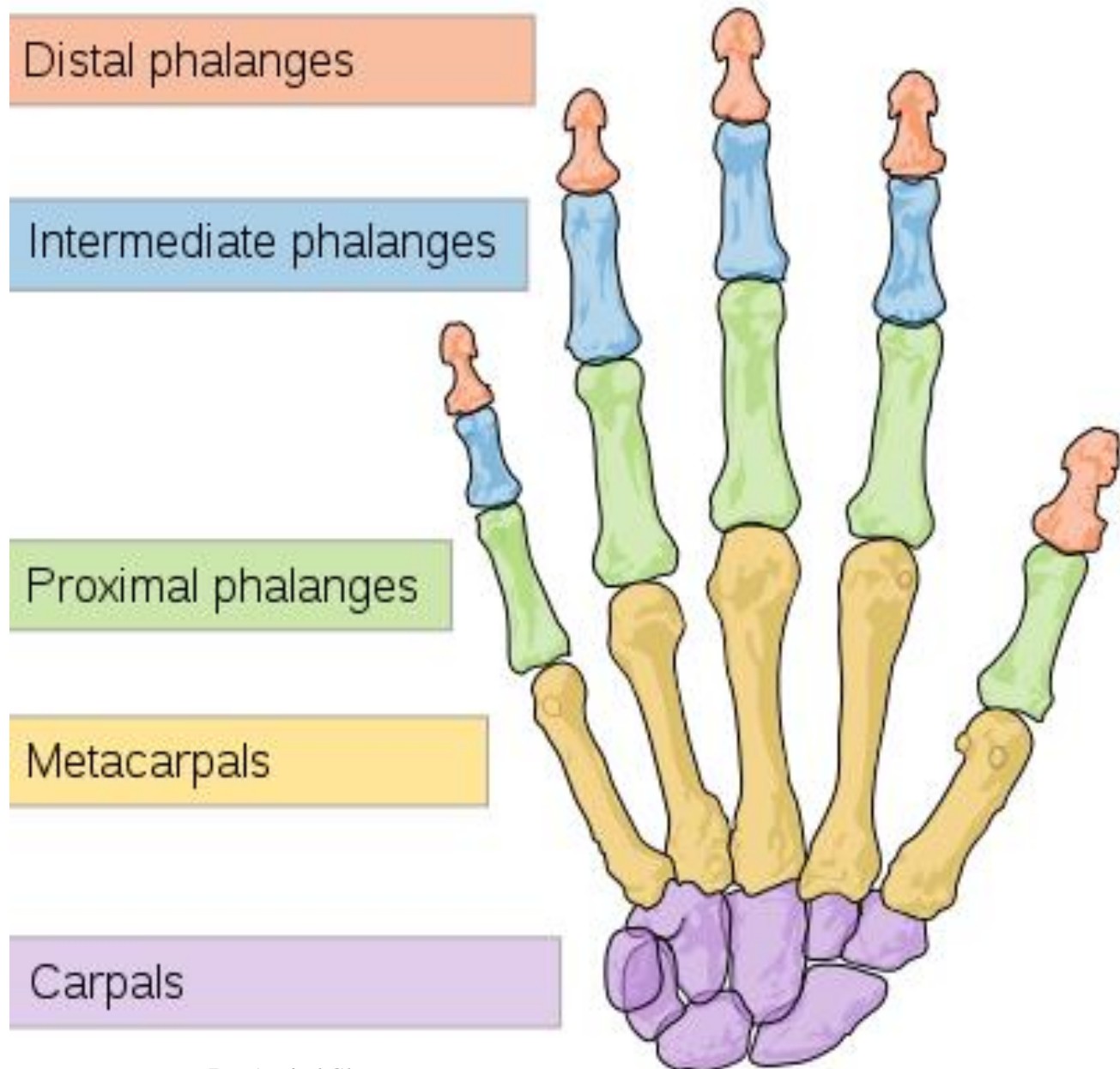


ANATOMY OF THE HAND

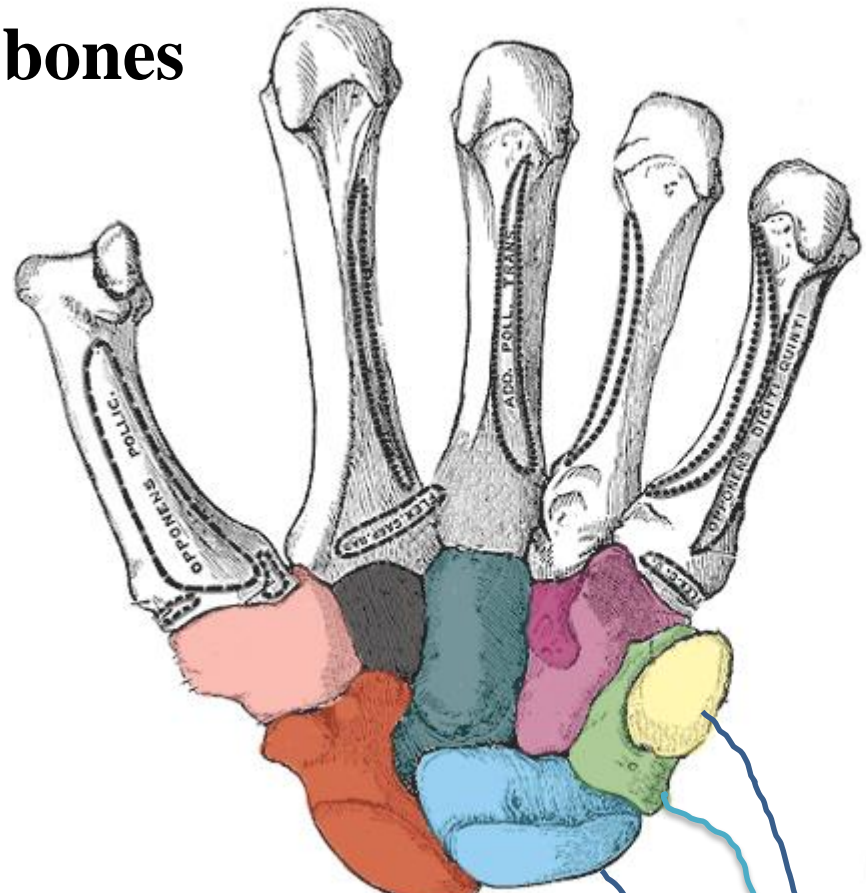
The skeleton of the hand

- Hand is composed by a bony framework :
- **8 carpals bones**
- **5 metacarpals**
- **14 phalanges**



A-Carpal bones

The are
Arranged into
two rows:
Proximal
Distal



	Scaphoid
	Lunate
	Triquetrum
	Pisiform
	Trapezium
	Trapezoid
	Capitate
	Hamate

Proximal row

From lateral to medial

- when viewed from anteriorly
- 1- Scaphoid, the boat-shaped
- 2- Lunate, 'crescent shape'
- 3- Triquetrum, the three-sided
- 4- Pisiform, the pea-shaped

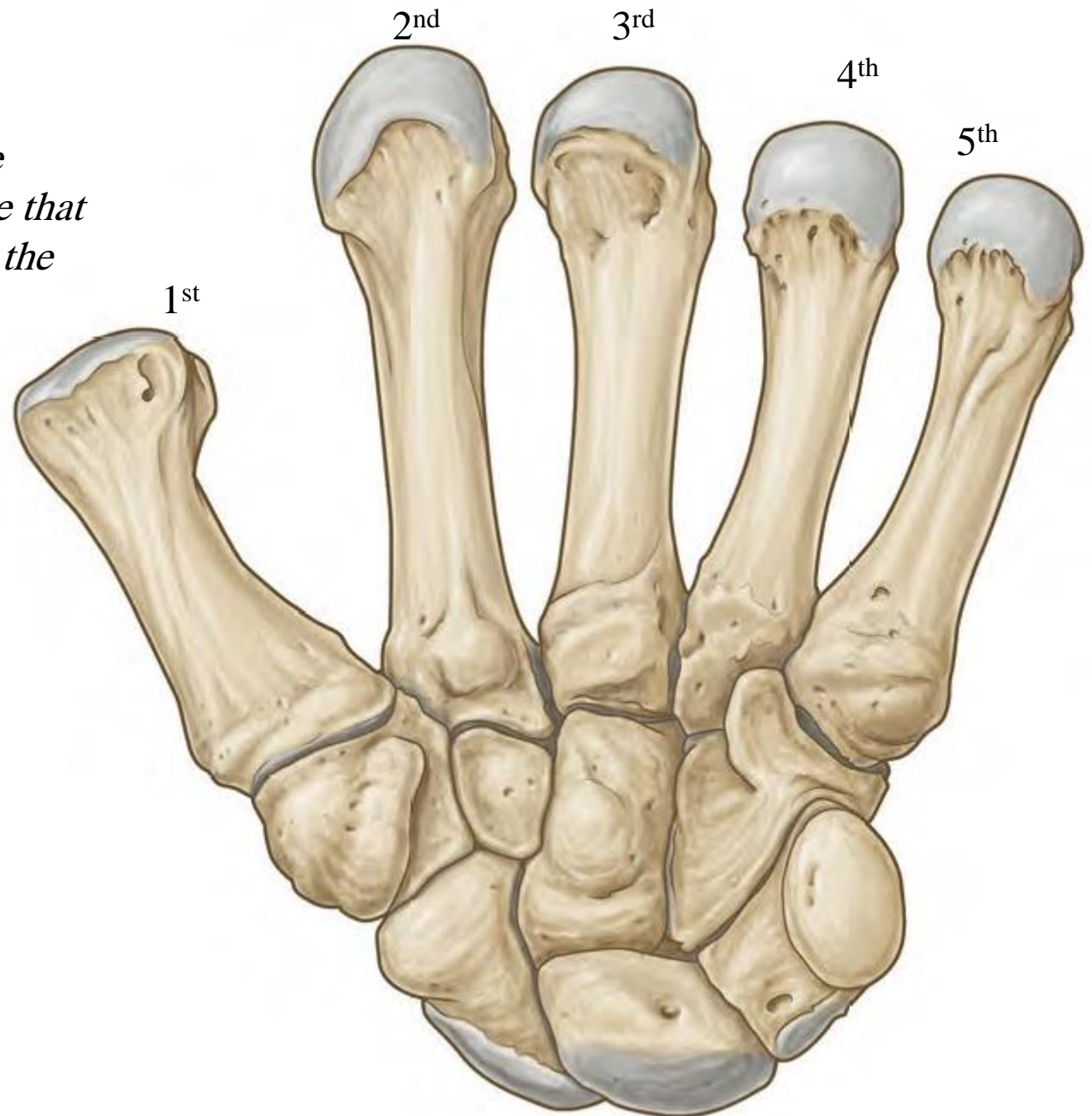
Distal row

- From lateral to medial and when viewed from anteriorly, consists of:
- 5- Trapezium the irregular four-sided
- 6- Trapezoid
- 7- Capitate, which has a head
- 8- Hamate, which has a hook

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B-Metacarpals

*They are 5 in number
Numbered 1-5; on the little
finger side is the fifth while that
on the side of the thumb is the
first*



C-Phalanges

- 14 bones
- They are the skeleton of the fingers

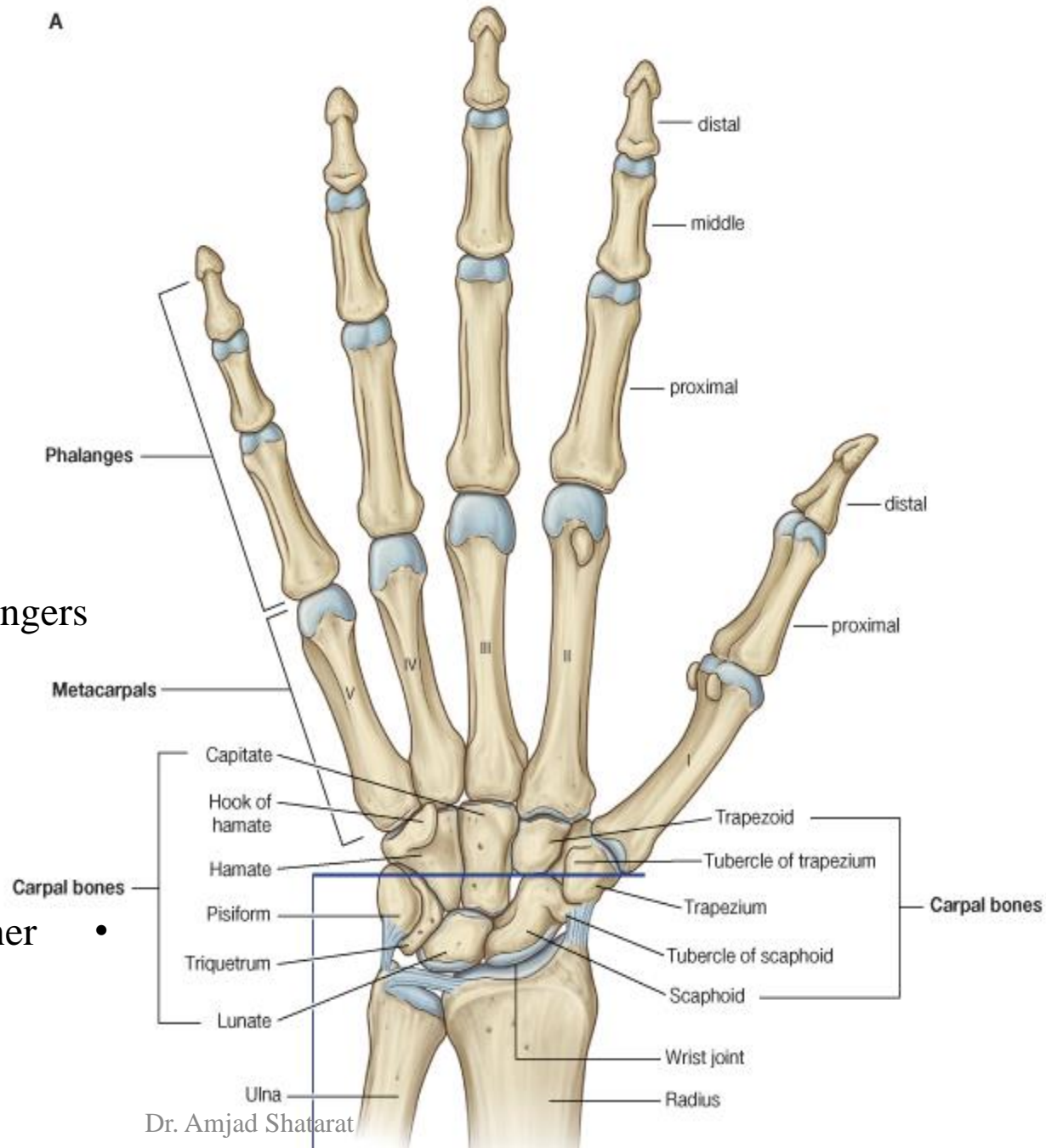
Each phalanx consist: •

Proximal base –

Intermediate shaft –

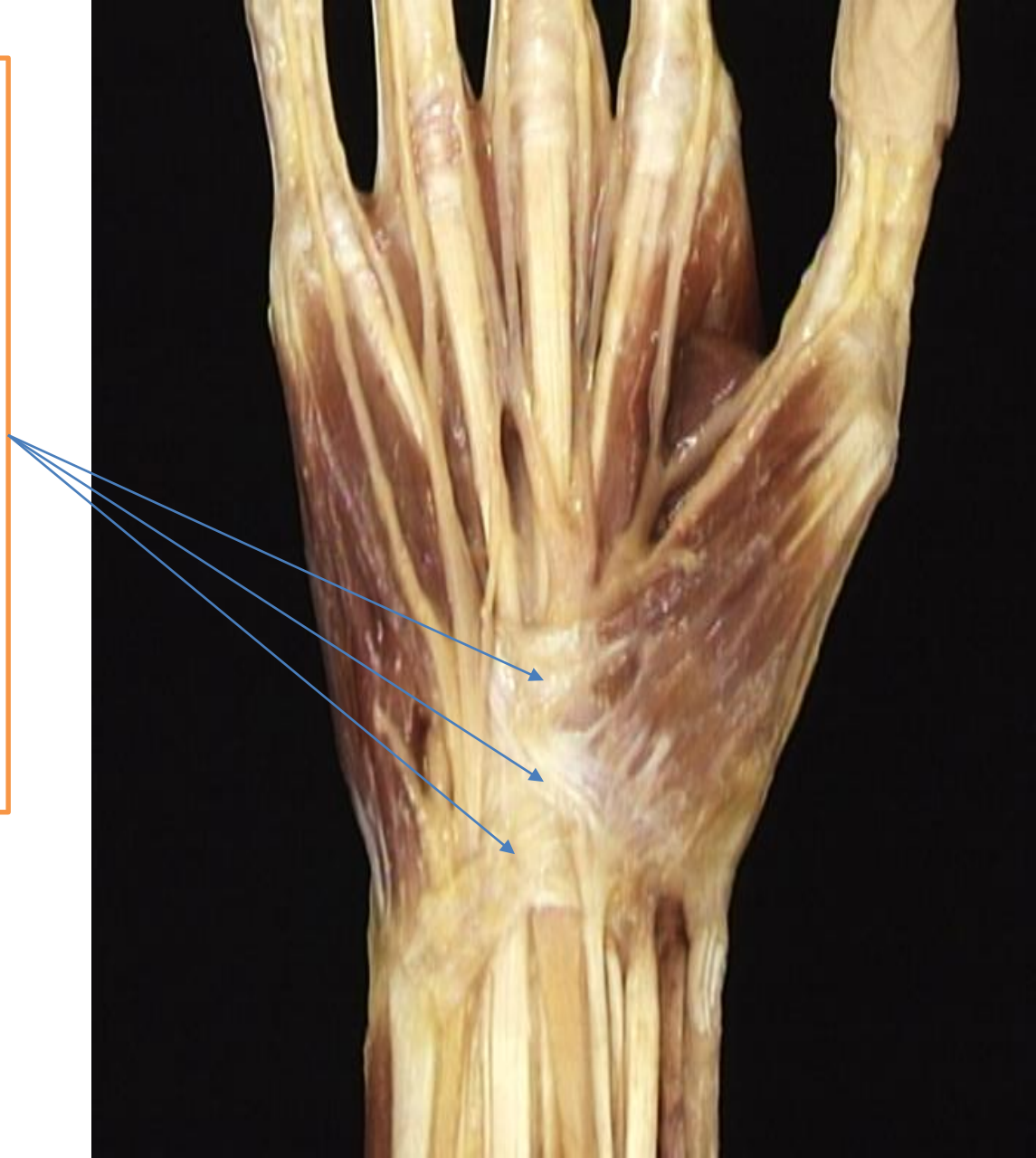
Distal head –

- 2 phalanges in thumb, 3 in the other fingers.



Flexor retinaculum

- The flexor retinaculum is a strong, fibrous band
- It crosses the front of the carpus and converts into **the carpal tunnel**
- It is attached medially to the pisiform and the hook of the hamate.
- Laterally, to scaphoid and trapezium

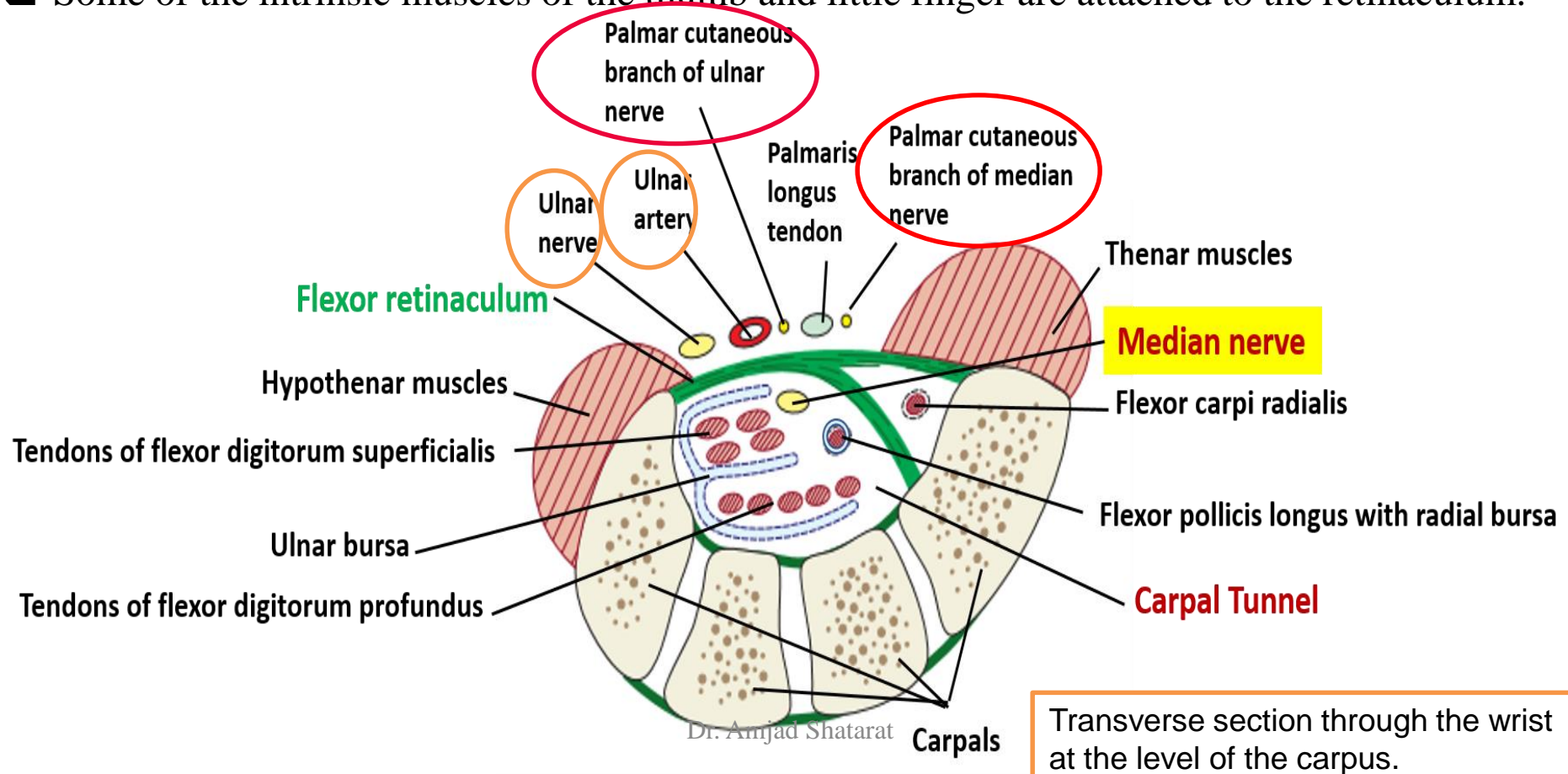


➤ The flexor retinaculum is crossed **superficially by:**

- The ulnar artery
- Ulnar nerve
- The palmar cutaneous branches of the median nerve
- The palmar cutaneous branch of the ulnar nerve

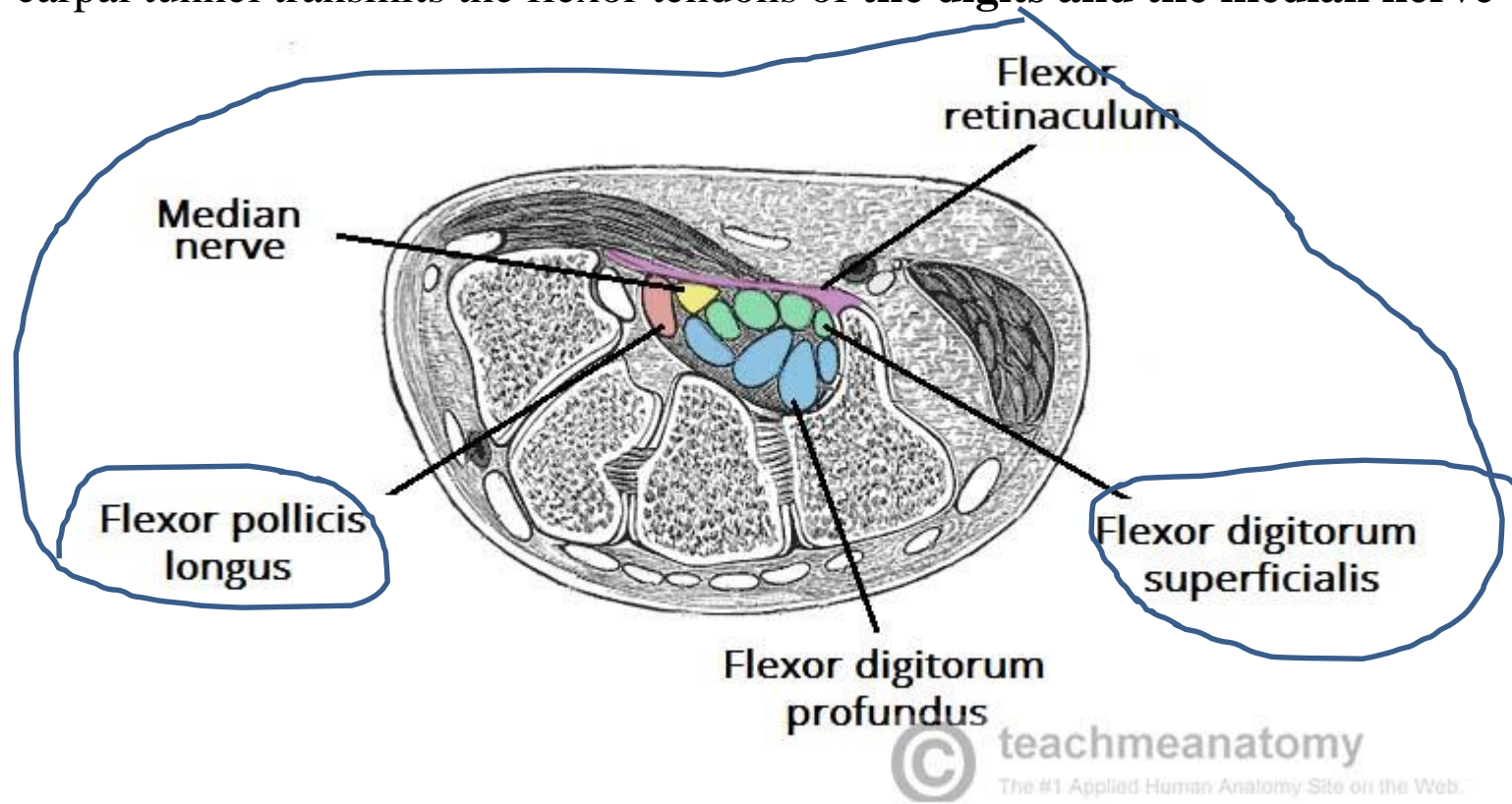
❖ The tendons of palmaris longus and flexor carpi ulnaris are partly attached to the anterior surface of the retinaculum.

□ Some of the intrinsic muscles of the thumb and little finger are attached to the retinaculum.



The carpal tunnel

- The carpal tunnel transmits the flexor tendons of **the digits and the median nerve**

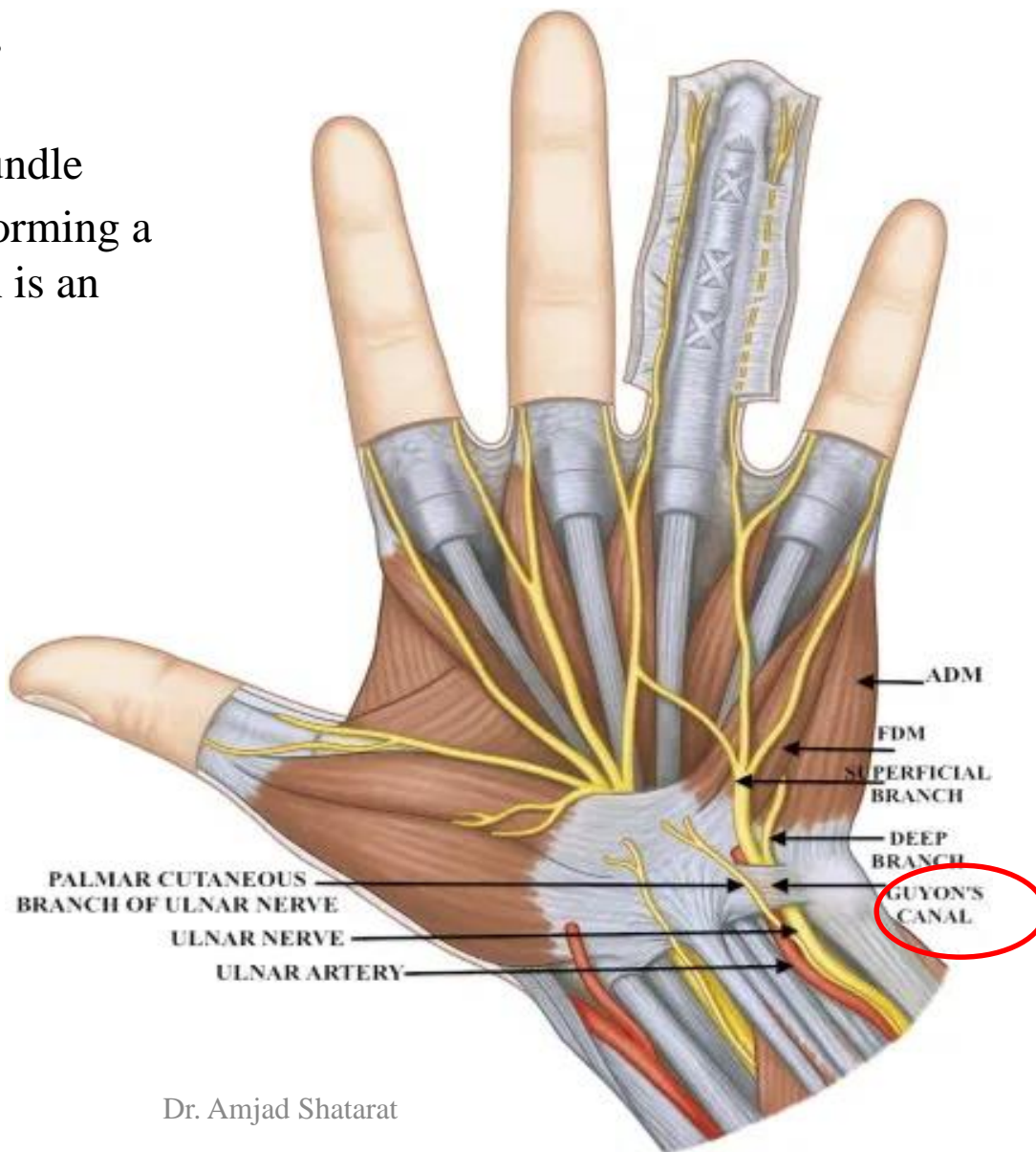


Guyon's canal

slender band of fascia of the wrist

bridges over **the ulnar**

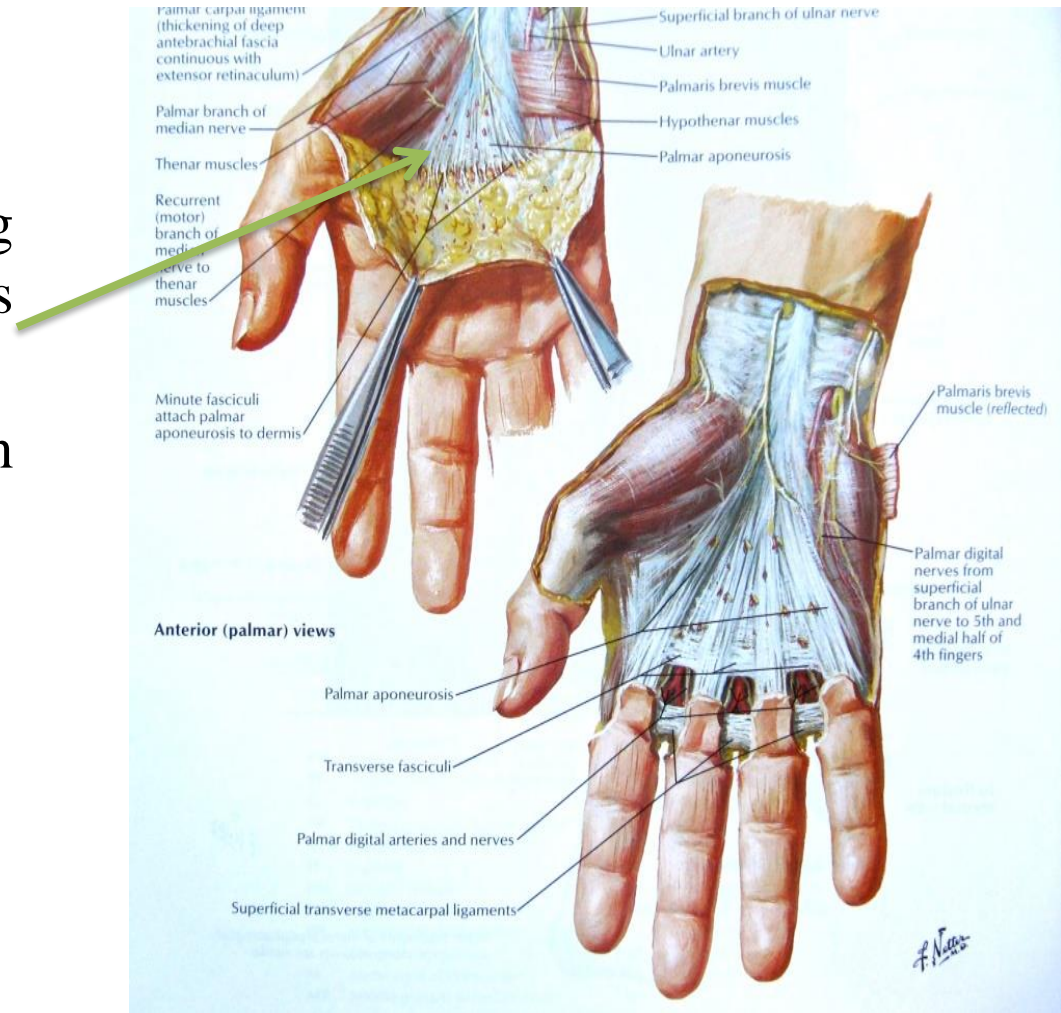
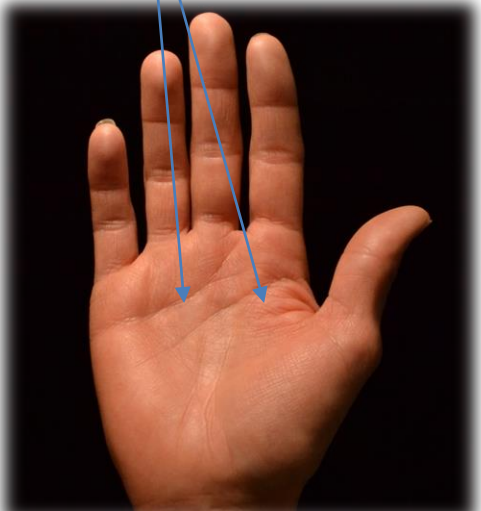
neurovascular bundle
and attaches to the pisiform, forming a
tunnel (**Guyon's canal**) which is an
occasional site of ulnar nerve
entrapment.



The Palm of the Hand

Skin:

- Thick and hairless.
- Bound down to the underlying deep fascia by numerous fibrous bands.
- Sweat glands are present in large numbers.
- many flexure creases at the sites of skin movement.



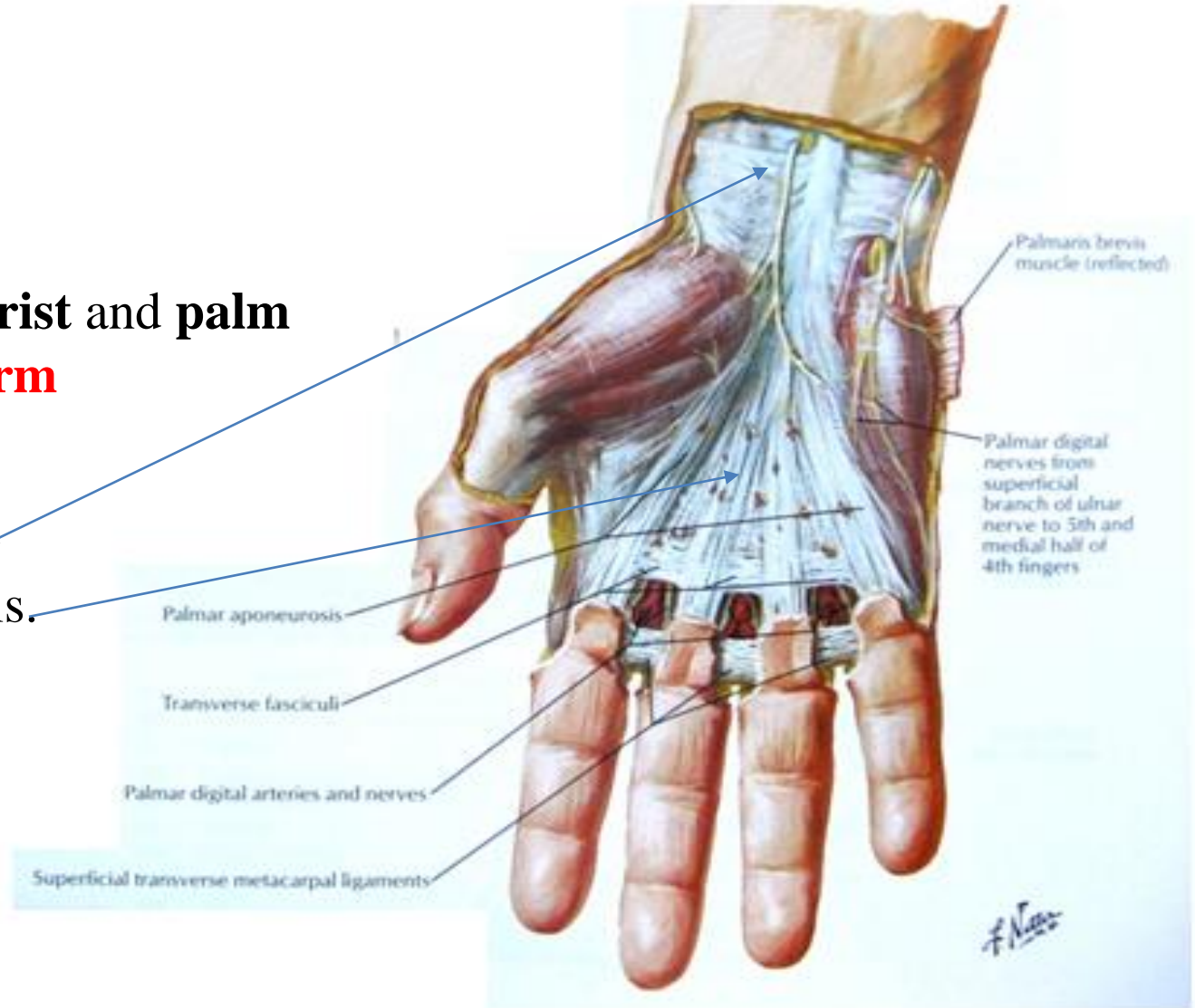
The skin over the dorsum of the hand is thin and mobile and this allows for flexion at the metacarpophalangeal and interphalangeal joints

The Palm of the Hand

- Deep Fascia

The deep fascia of **wrist** and **palm** is thickened to form

- 1) flexor retinaculum.
- 2) palmar aponeurosis.



THE PALMAR APONEUROSIS

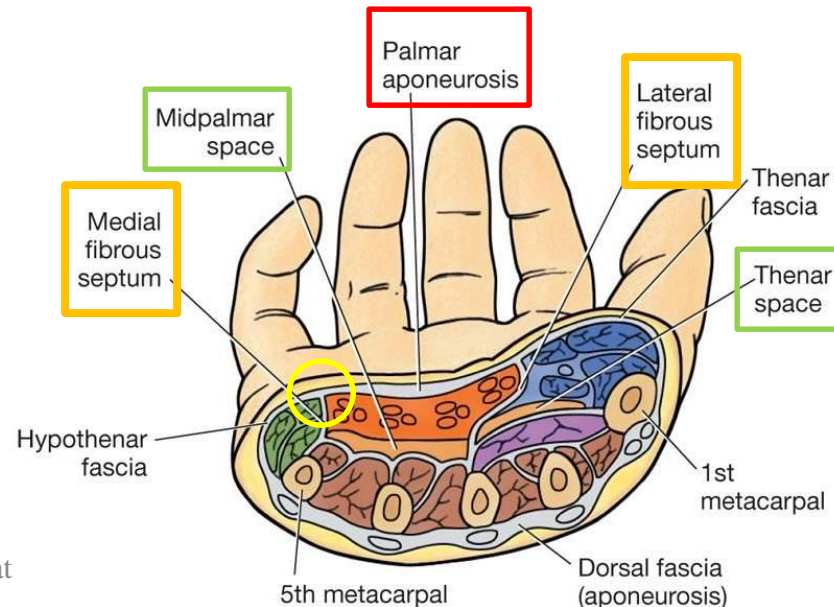
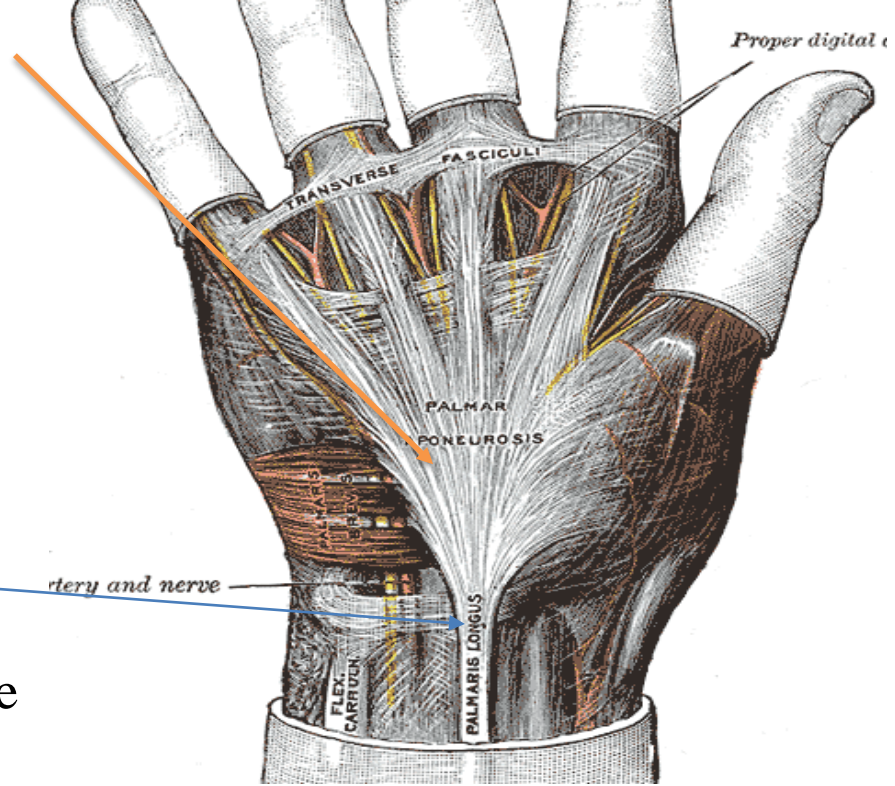
- Triangular in shape
- located in the central area of the palm

□ The apex

- attached to the distal of FR
- receives insertion palmaris longus

□ The medial and lateral borders are continuous with the thinner deep fascia covering the hypothenar and thenar muscles.

- Each borders give fibrous septa pass posteriorly into the palm and take part in the formation of the *Palmar Pascial Spaces*



THE PALMAR APONEUROSIS

Base divides at the bases of the fingers into four slips.

Each slip divides into two bands:

- **one passing superficially to the skin**
- the other **passing deeply** to the root of the finger; each deep band divides into two, which **diverge around flexor tendons and finally fuse with fibrous flexor sheath and deep transverse ligaments.**

Function of the palmar aponeurosis is to give firm attachment to the overlying skin and so improve the grip and to protect the underlying tendons



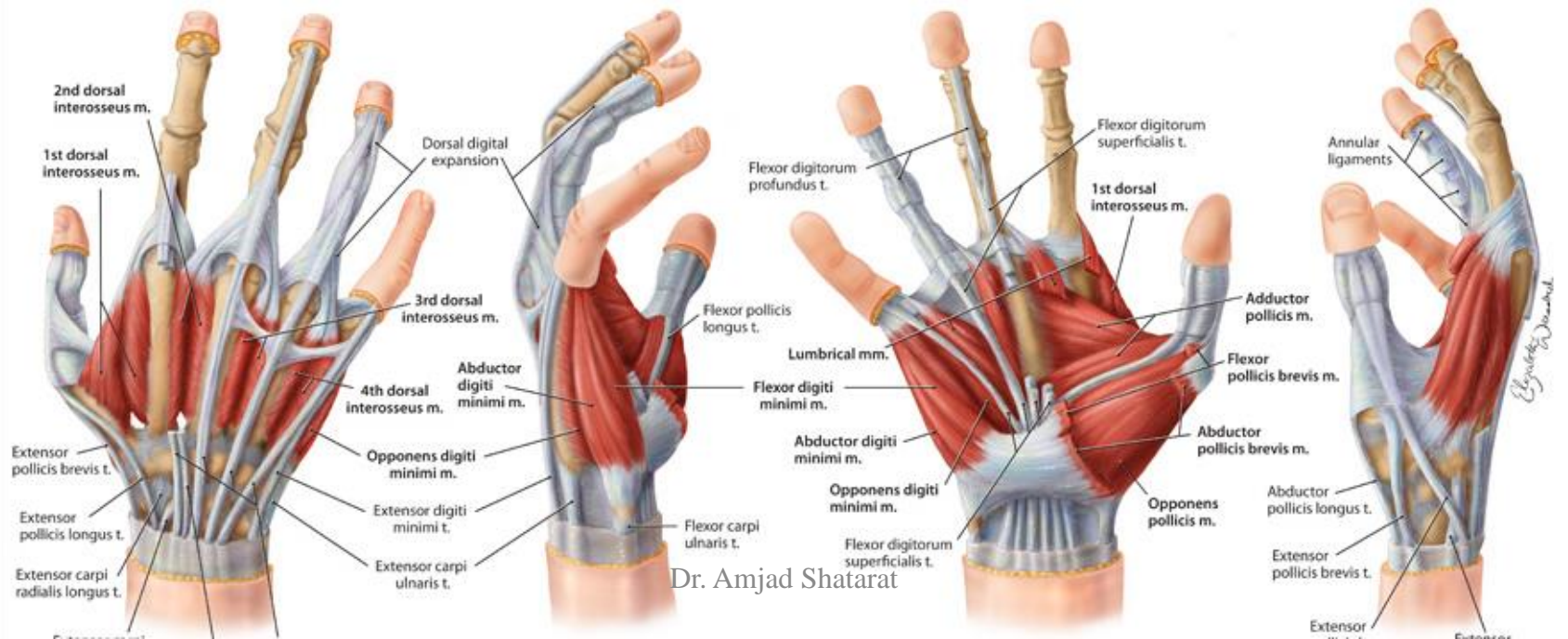
Small Muscles of the Hand

Four Lumbricals

Eight Interossei

Muscles of the thumb

Muscles of the little finger.



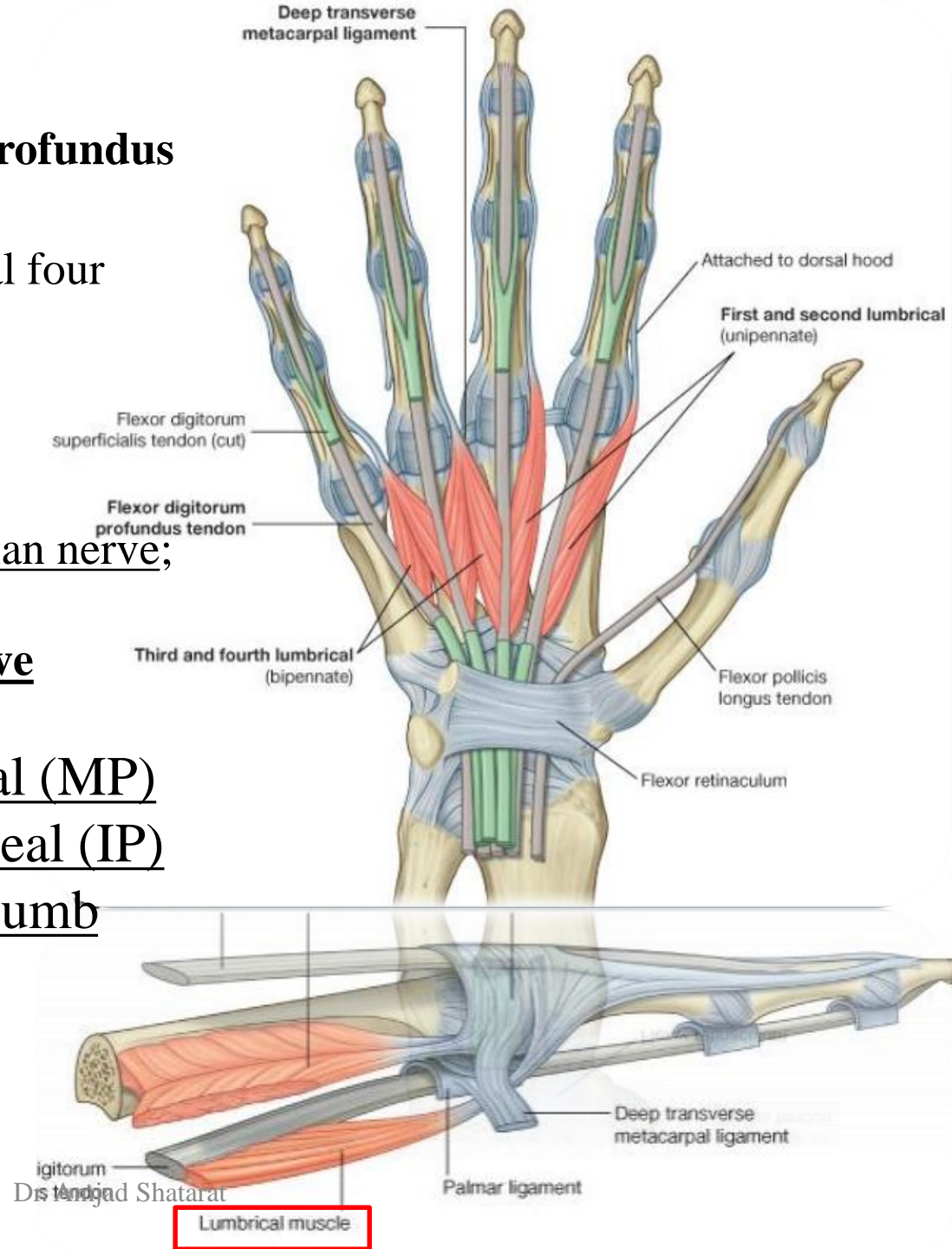
LUMBRICALS

O: Tendons of **flexor Digitorum profundus**

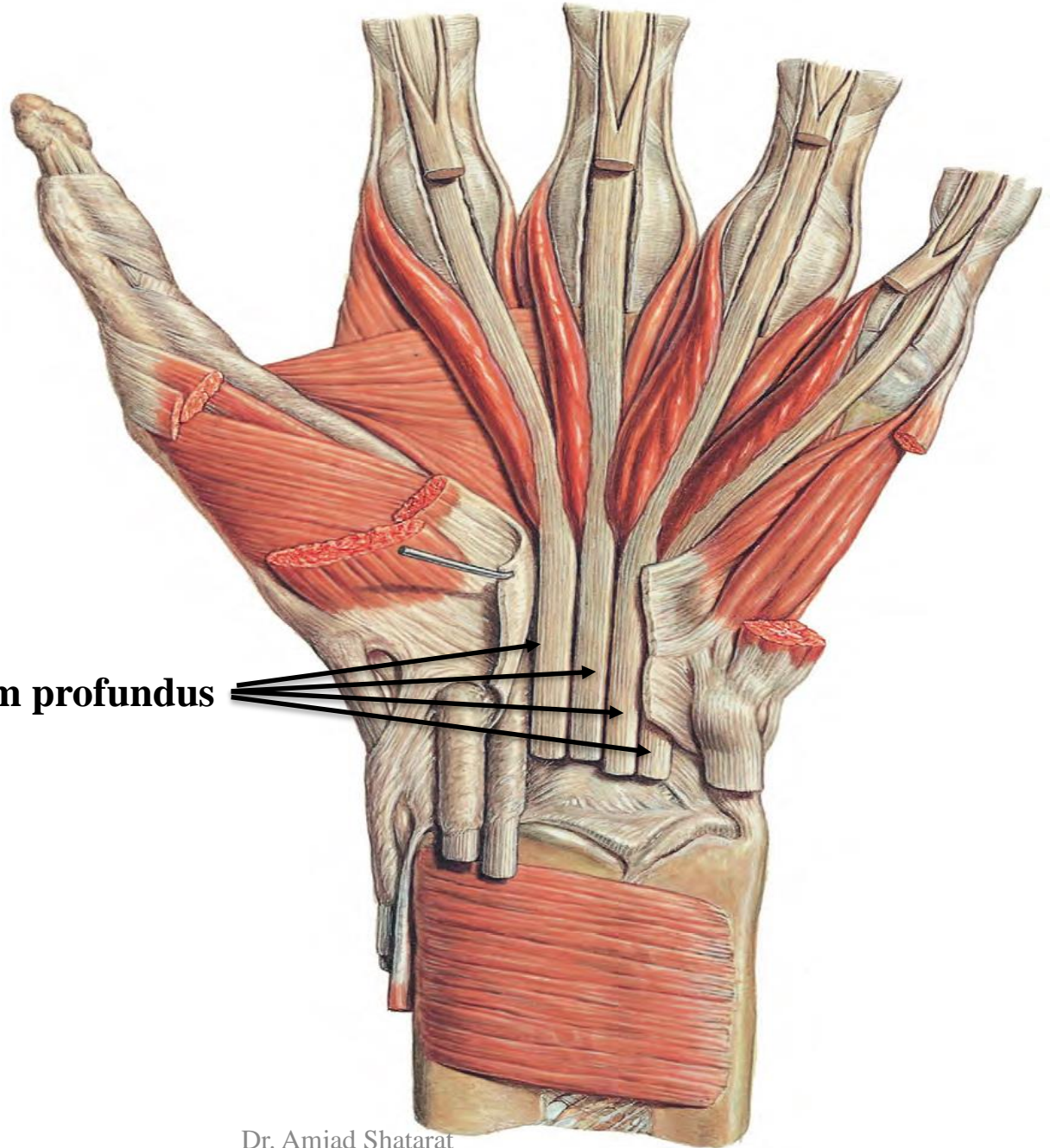
I: Extensor expansion of medial four fingers

N: **1st and 2nd**, (lateral two) median nerve;
3rd and 4th medial
deep branch of ulnar nerve

A: Flex metacarpophalangeal (MP)
joints & extend interphalangeal (IP)
joints of fingers except thumb



LUMBRICALS



Tendons of flexor Digitorum profundus

PALMAR INTEROSSEI

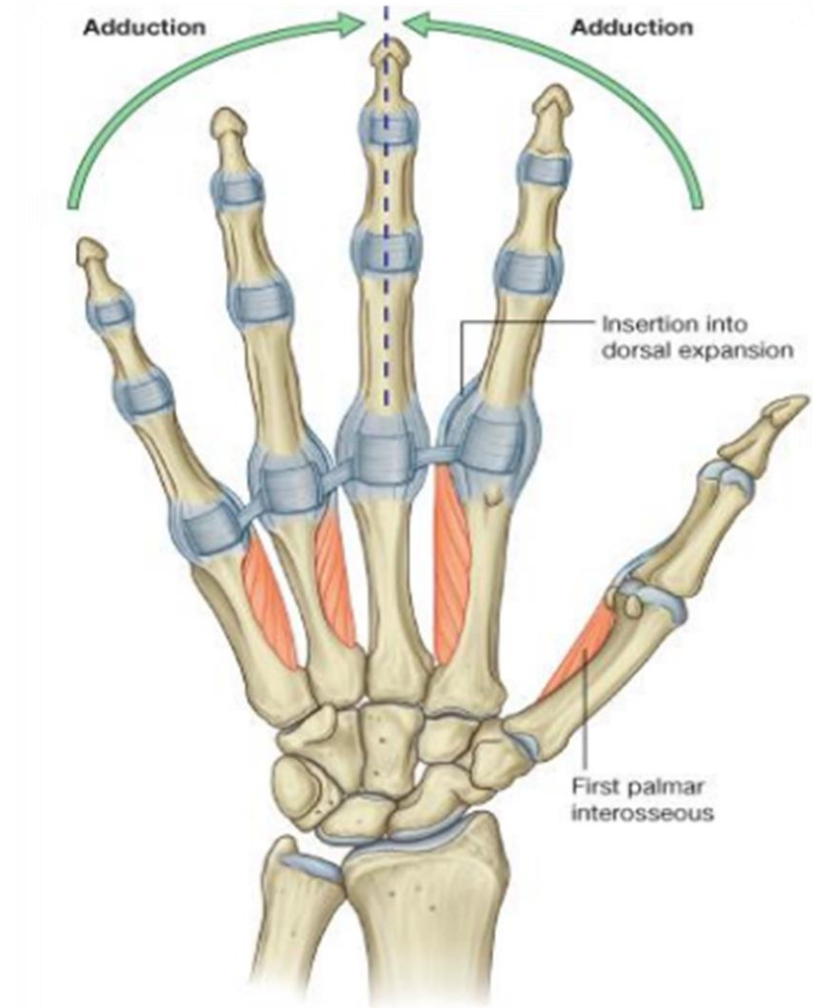
O:

-**First** arises from base of **1st metacarpal**
- remaining three from **anterior surface of shafts** of **2nd, 4th, and 5th metacarpals**

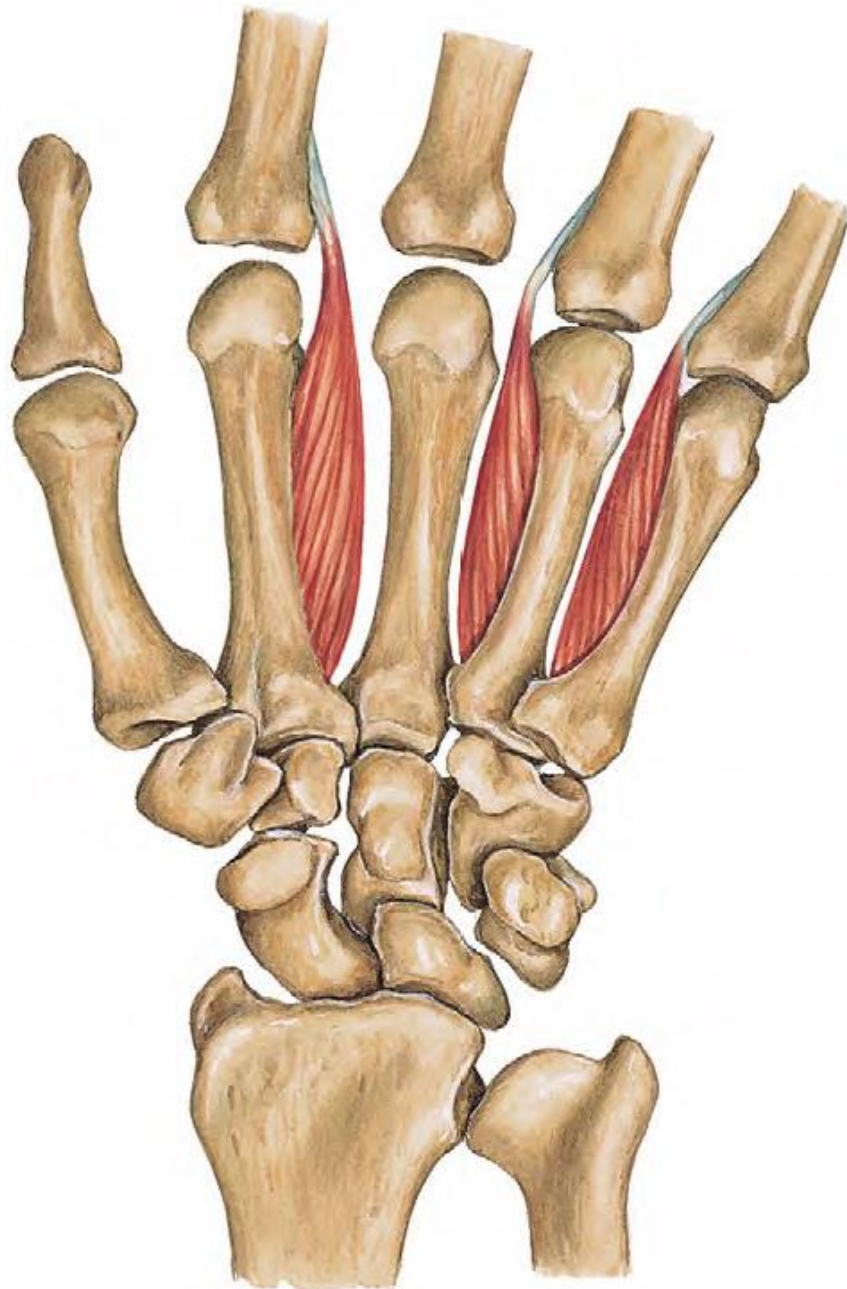
I: **Proximal phalanges** of thumb and index, ring, and little fingers **and dorsal extensor expansion** of each finger .

N: Deep branch of ulnar nerve

A: **Palmar interossei adduct** fingers toward center of third finger



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DORSAL INTEROSSEI

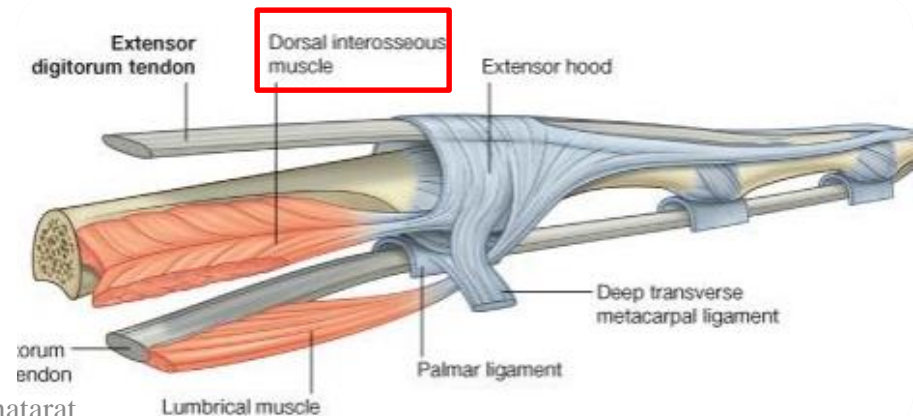
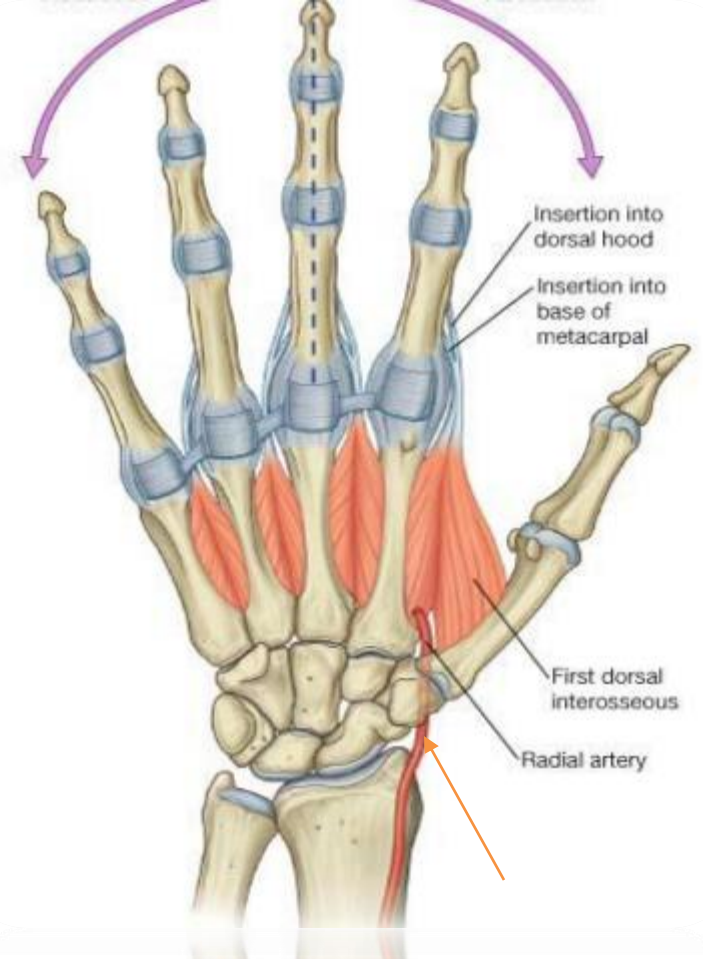
O: Contiguous sides of shafts of metacarpal bones

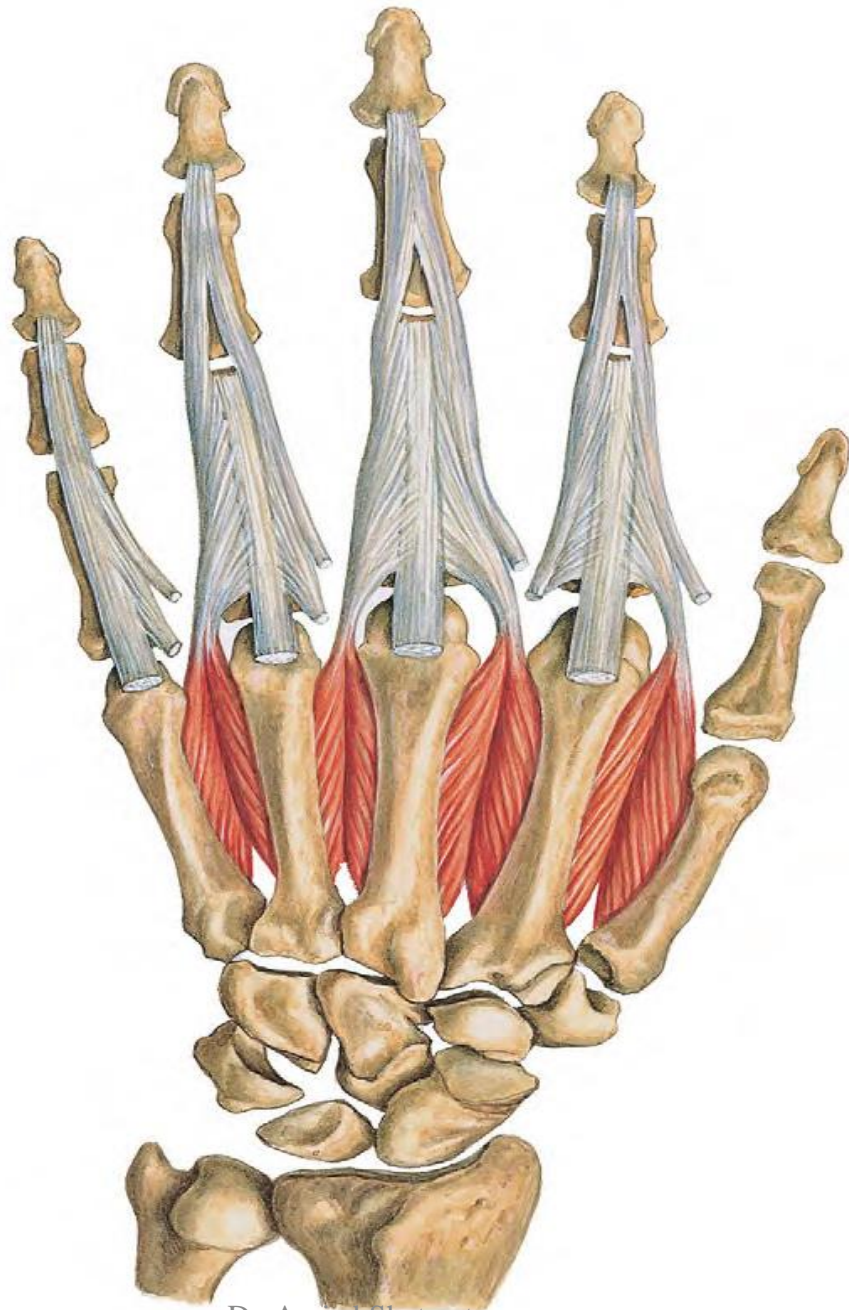
I: Proximal phalanges of index, middle, and ring fingers and dorsal extensor expansion

(1st : index \ 2nd , 3rd : middle \ 4th : ring)

N: Deep branch of ulnar nerve

A: abduct fingers from center of third finger.



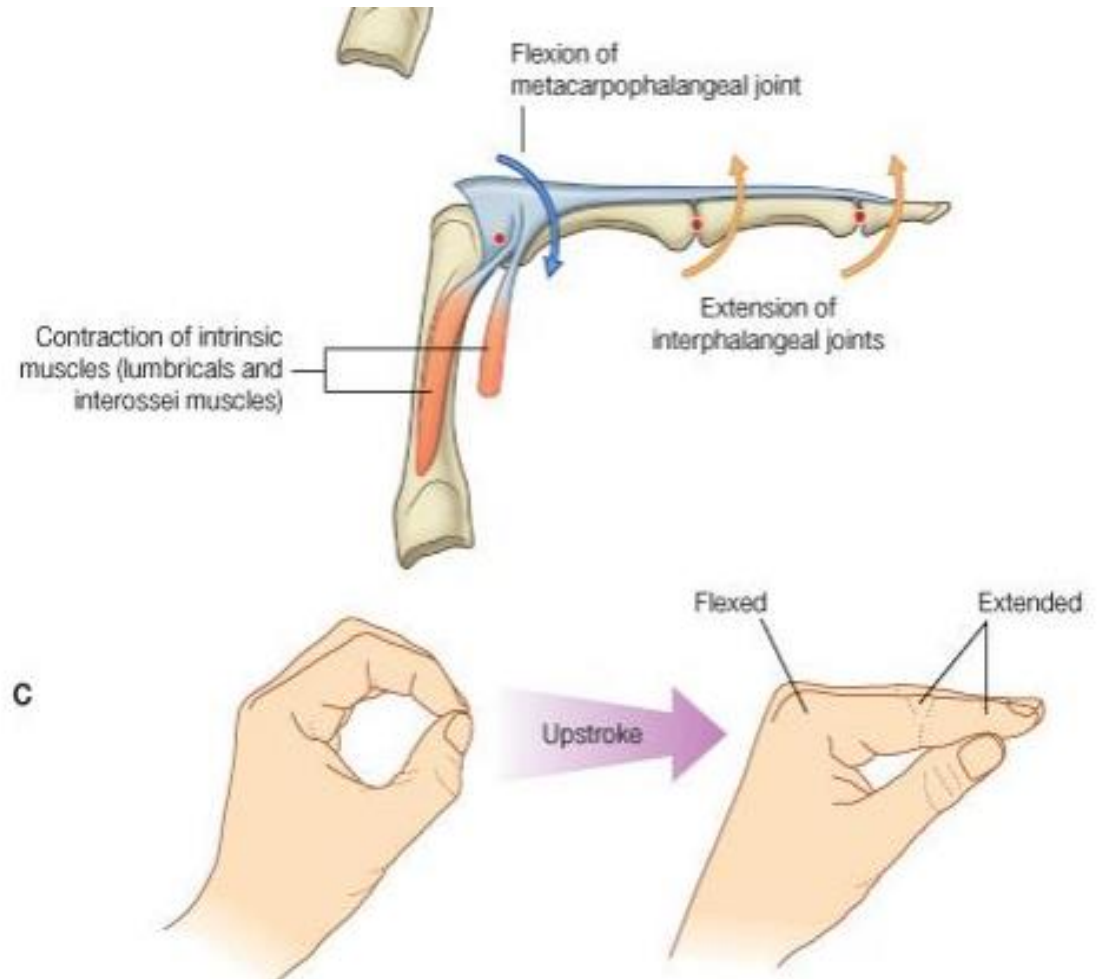


Dr. Amjad Shatarat

Both palmar and dorsal :

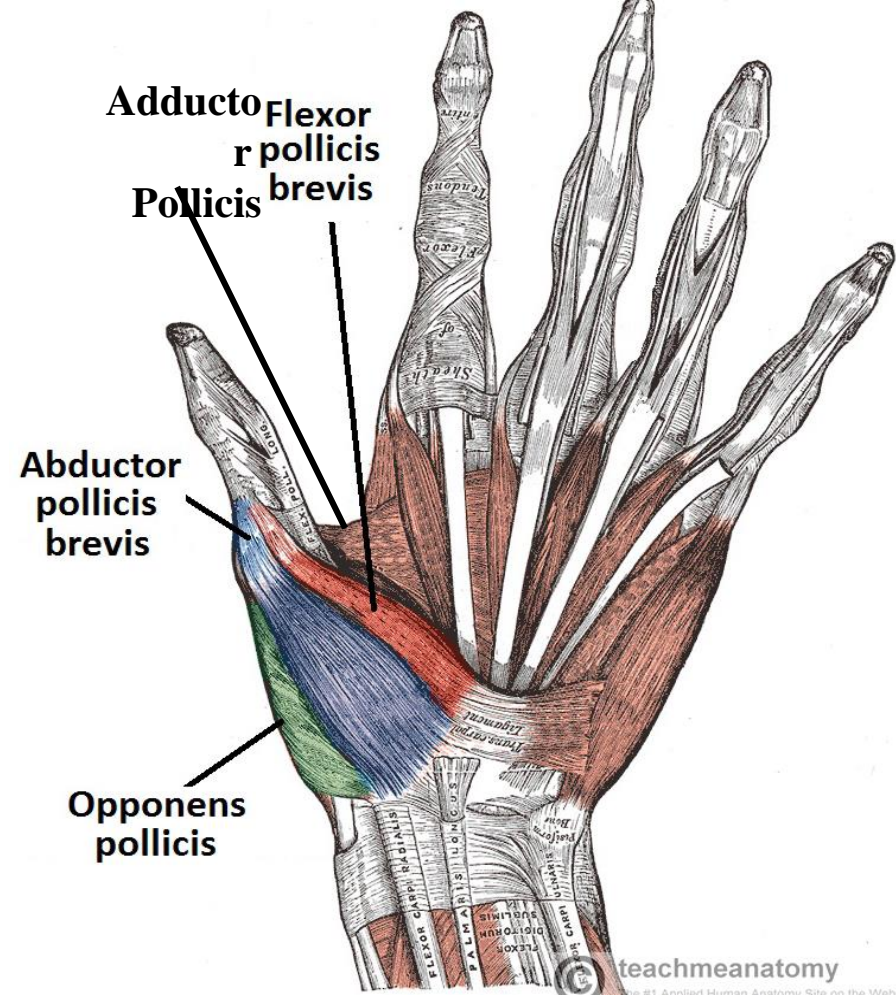
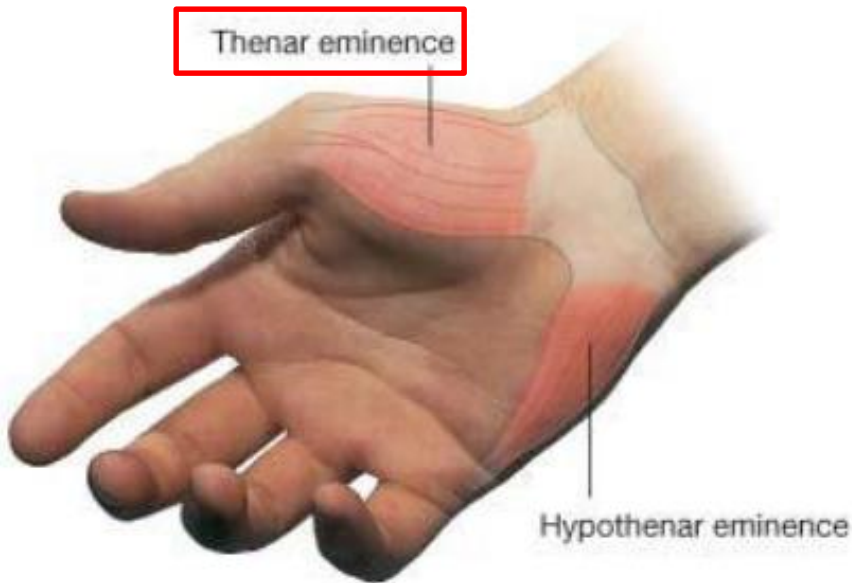
- Flex metacarpophalangeal joints
- Extend interphalangeal joints

Simultaneous flexion at the metacarpophalangeal joints and extension at the interphalangeal joints of a digit are essential for the fine movements of writing, drawing, threading a needle, etc. The Lumbricals and interossei have long been accepted as not only primary agents in flexing the metacarpophalangeal joints but also in extending the interphalangeal joints via their attachments to the dorsal digital expansions.



MUSCLES OF THE THUMB

- 1) Abductor Pollicis Brevis
- 2) Flexor Pollicis Brevis
- 3) Opponens Pollicis
- 4) Adductor Pollicis



- The first three of these muscles form the **Thenar Eminence**.

- All inserted in base of proximal phalanx

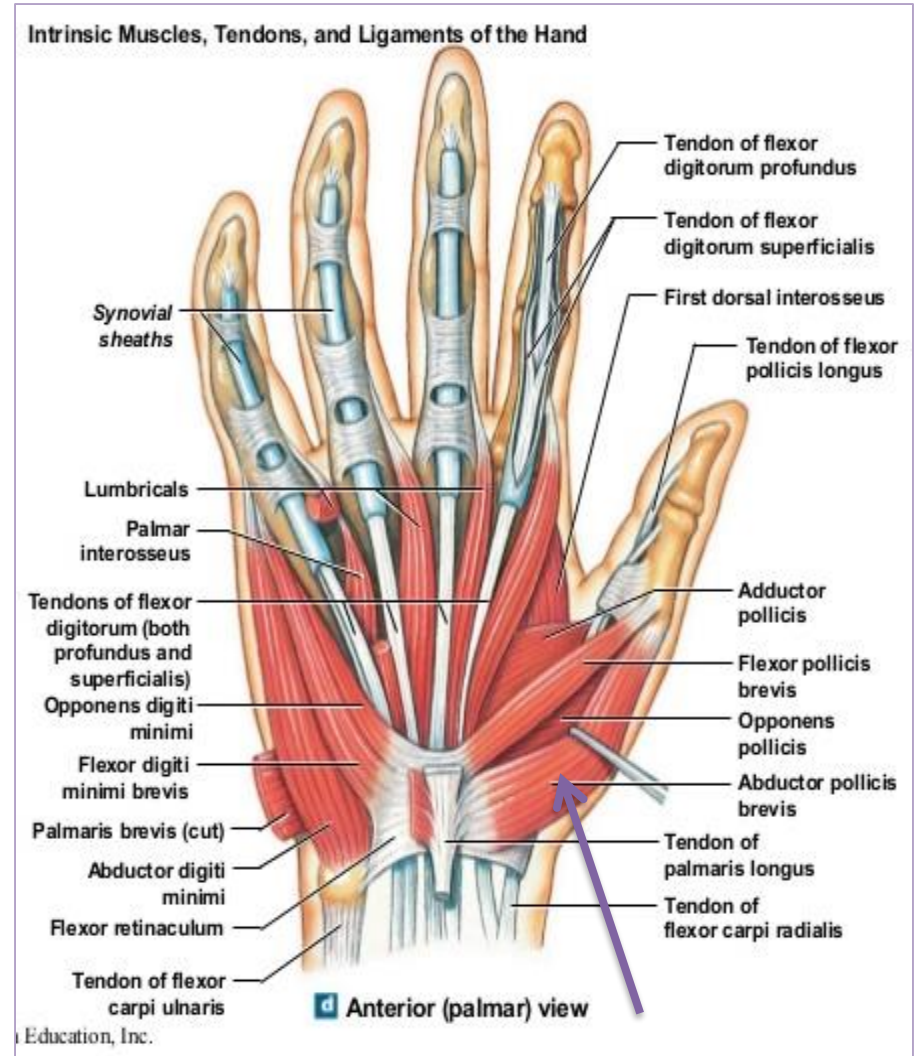
1) Abductor Pollicis Brevis

O: Scaphoid, trapezium,
flexor retinaculum

I: Base of proximal
phalanx of thumb

N: Median nerve

A: Abduction of thumb



2) Flexor pollicis brevis,

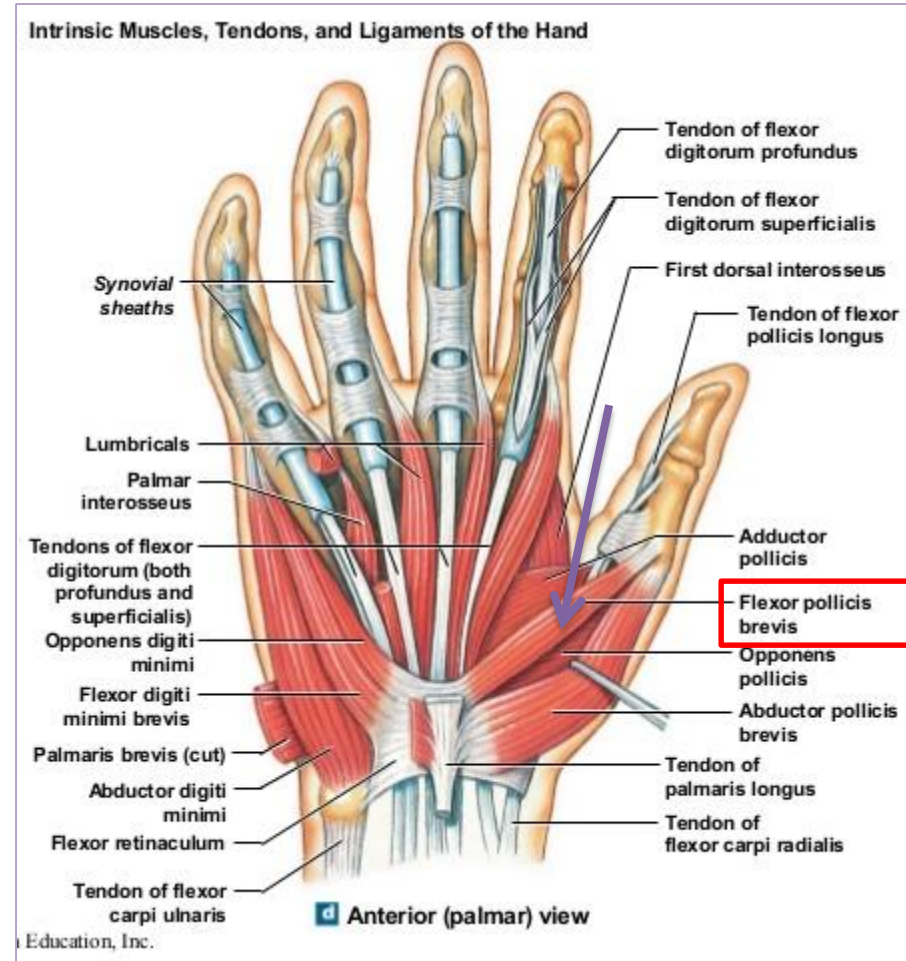
Read only **O:** Flexor retinaculum

I: Base of proximal phalanx of thumb

N: Median nerve

A: Flexes

metacarpophalangeal joint of thumb



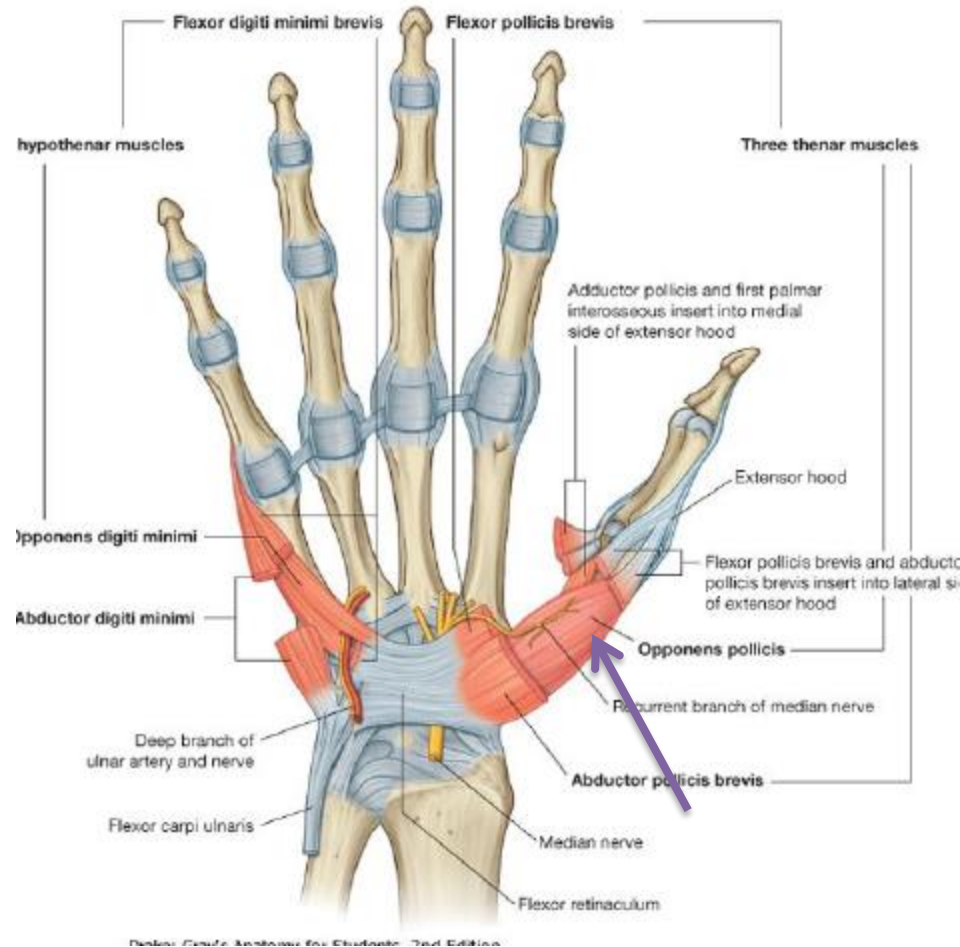
3) Opponens pollicis

Read only **O:** Flexor retinaculum

I: Shaft of metacarpal bone of thumb

N: Median nerve

A: Pulls thumb medially and forward across palm



4) Adductor pollicis

O:

Read only

- **Oblique head; 2nd and 3rd**
metacarpal bones;

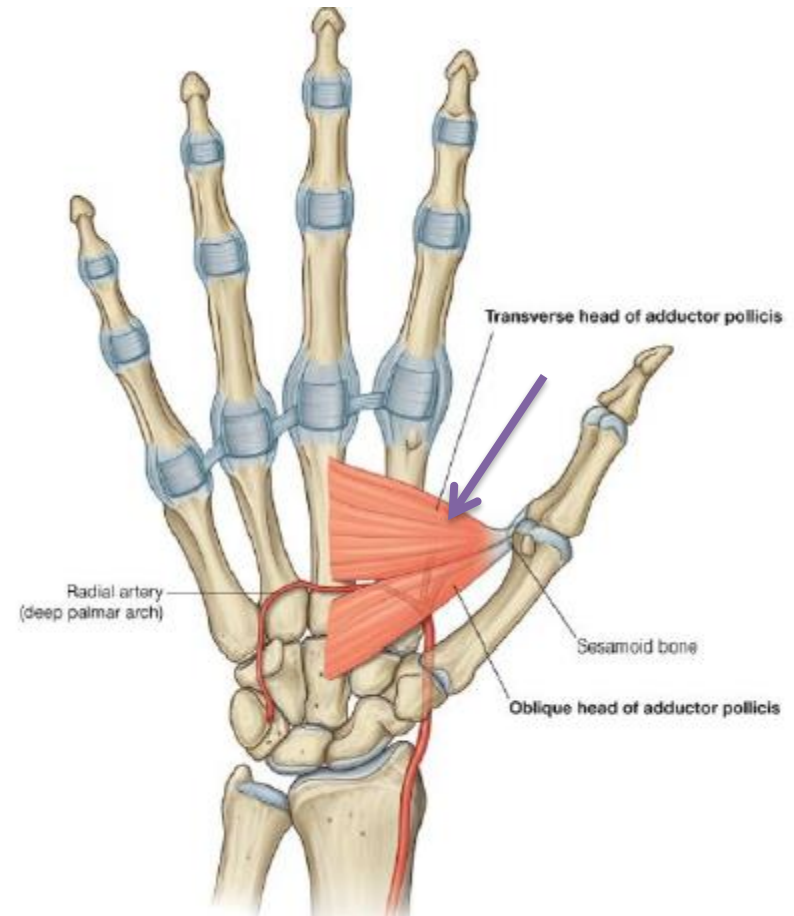
- **Transverse head; 3rd** metacarpal
bone

Read only

I: Base of proximal phalanx of
thumb

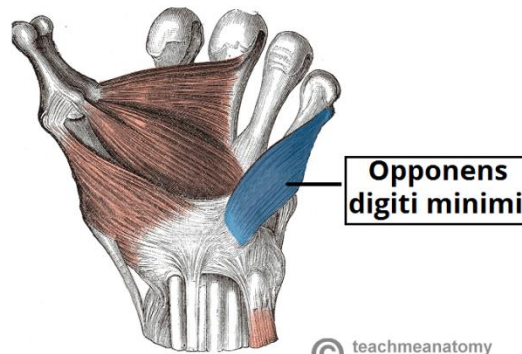
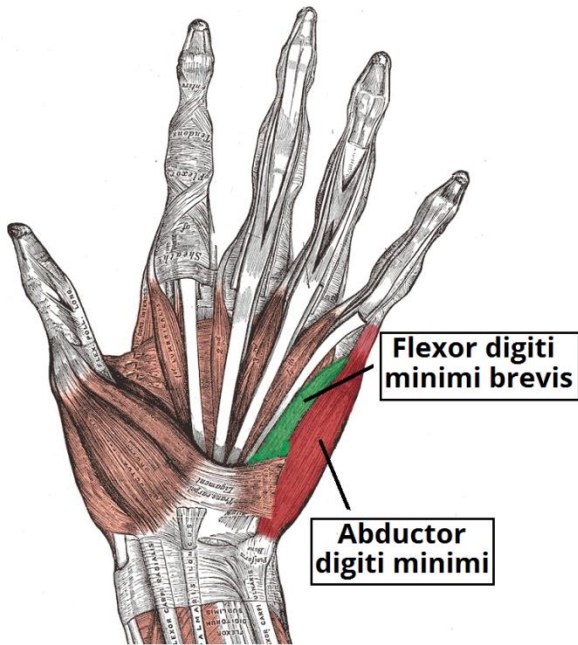
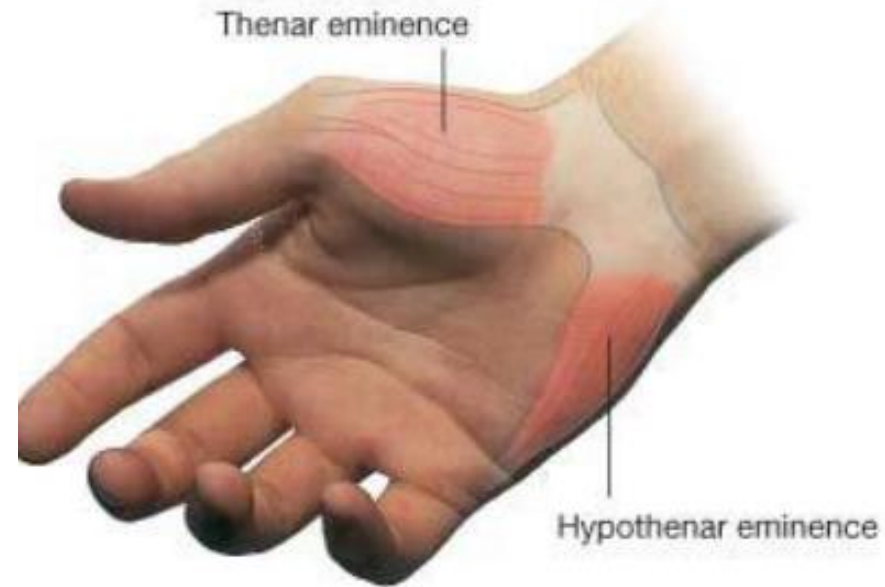
N: Deep branch of ulnar nerve

A: Adduction of thumb



MUSCLES OF THE LITTLE FINGER

- 1) Abductor digiti minimi
- 2) Flexor digiti minimi brevis
- 3) Opponens digiti minimi



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The #1 Applied Human Anatomy Site on the Web.

* Together form
**Hypothenar
Eminence**

1) Abductor Digiti Minimi

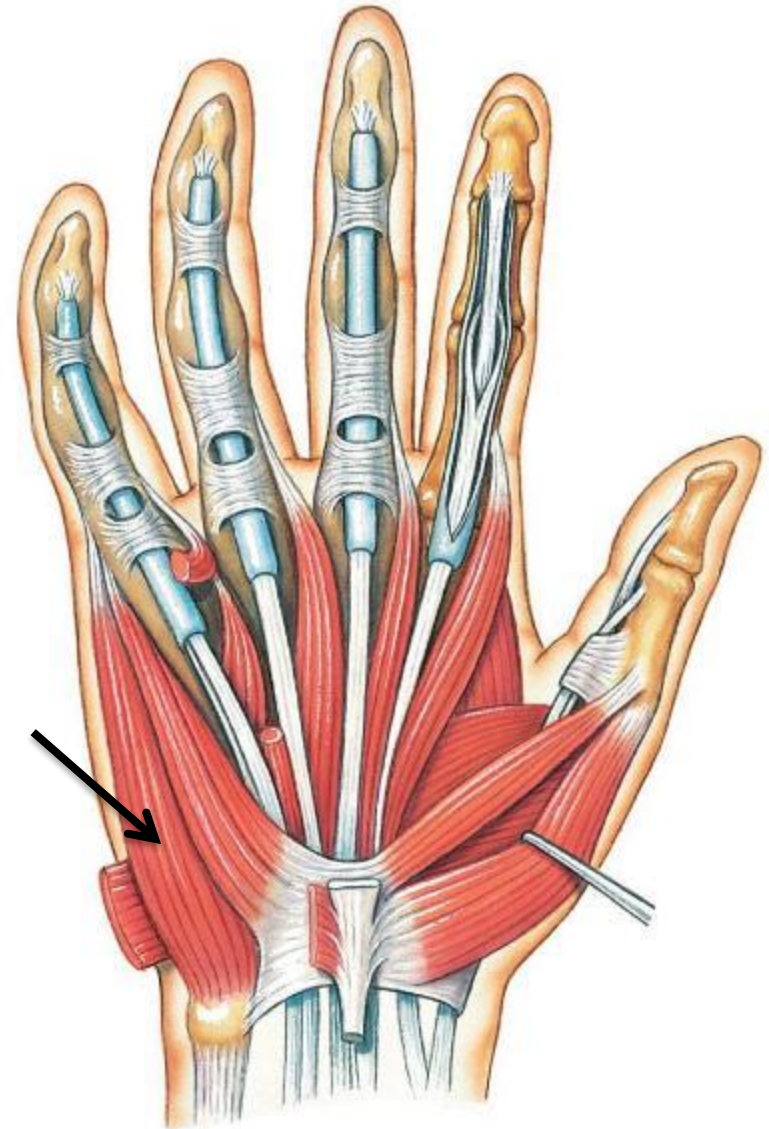
Read only

O: Pisiform bone

I: Base of proximal phalanx
of little finger

N: Deep branch of
ulnar nerve

A: **Abducts little finger**



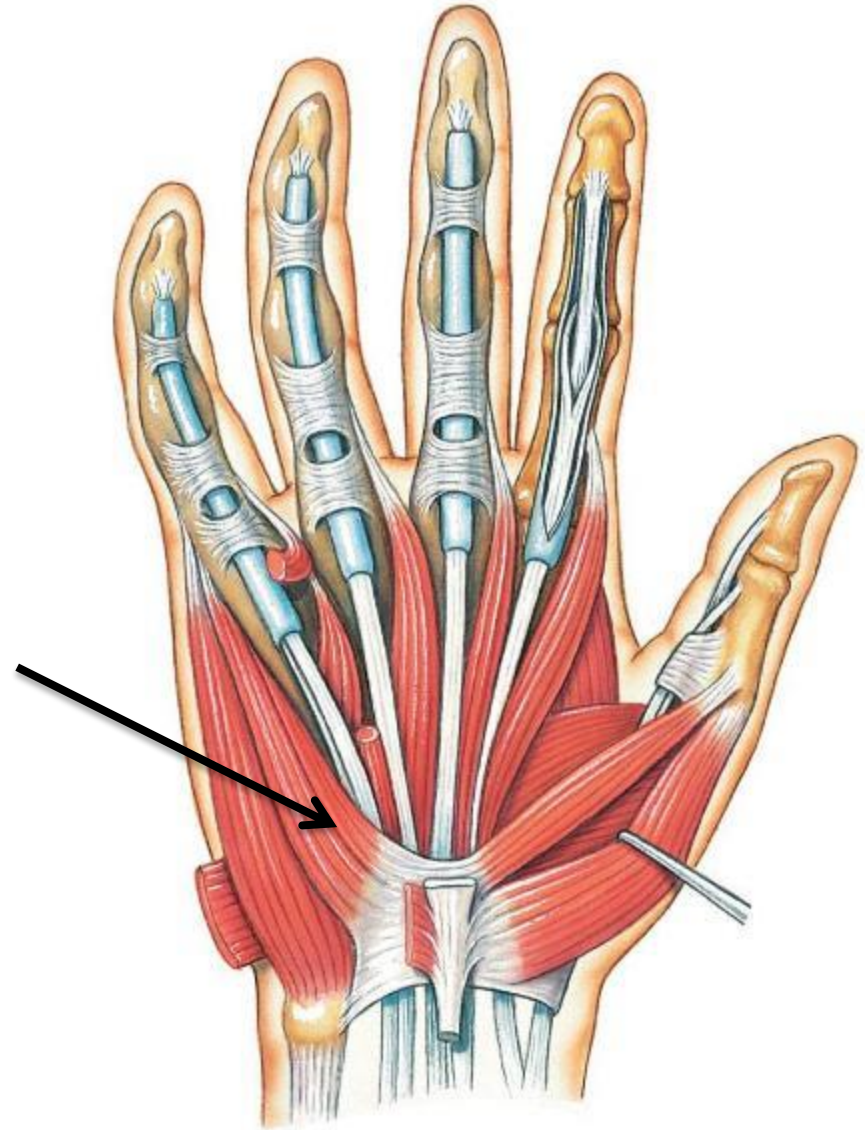
2) flexor Digiti Minimi Brevis

Read only **O:** Flexor retinaculum

I: Base of proximal phalanx of little finger

N: Deep branch of ulnar nerve

A: **Flexes** little finger



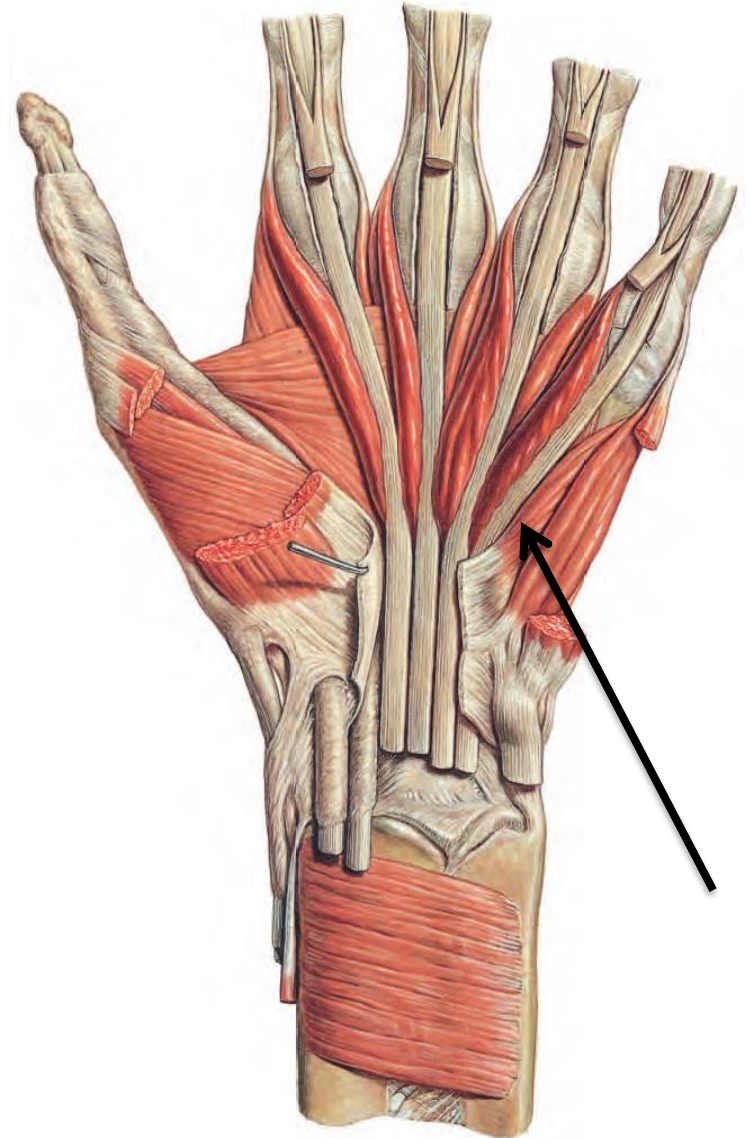
3) Opponens Digiti Minimi

Read only **O:** Flexor retinaculum

I: Medial border fifth metacarpal bone

N: Deep branch of ulnar nerve

A: Pulls 5th metacarpal forward as in cupping the palm



Palmaris Brevis

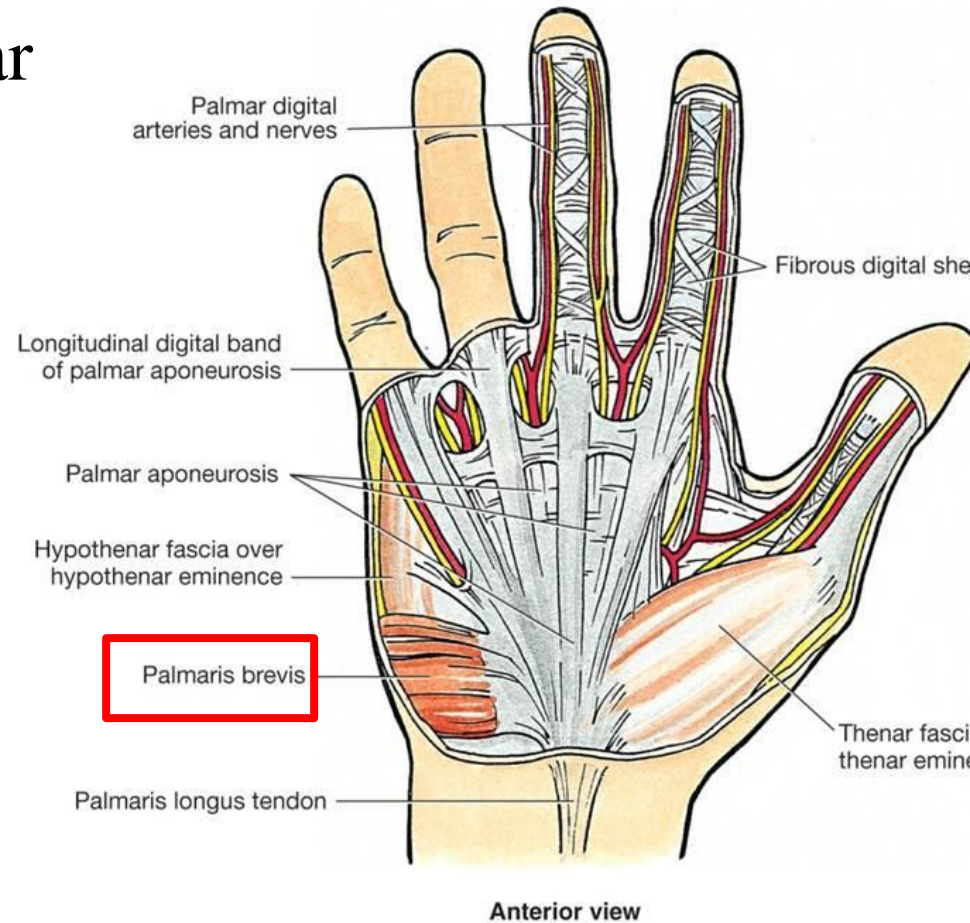
Read only

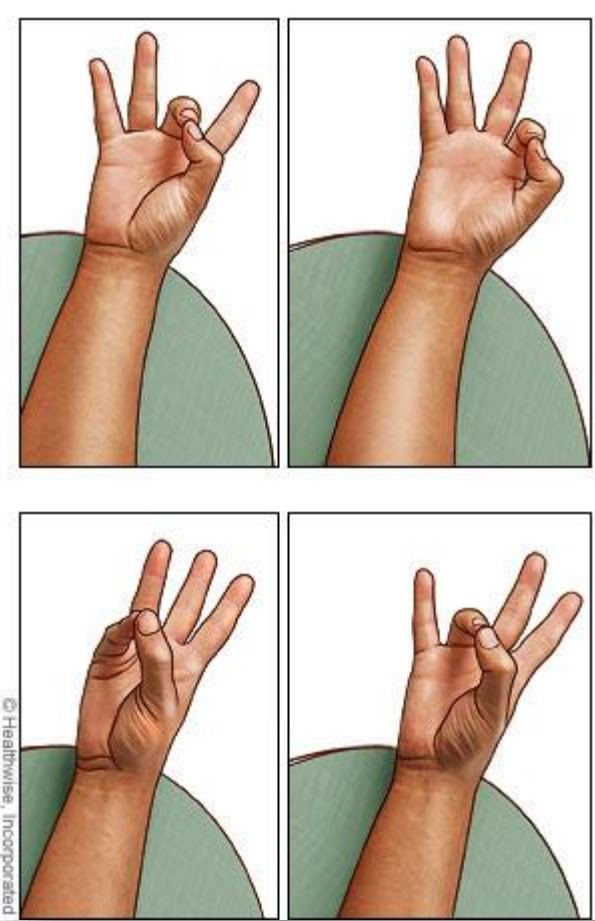
O: Flexor retinaculum, palmar aponeurosis

I: Skin of palm

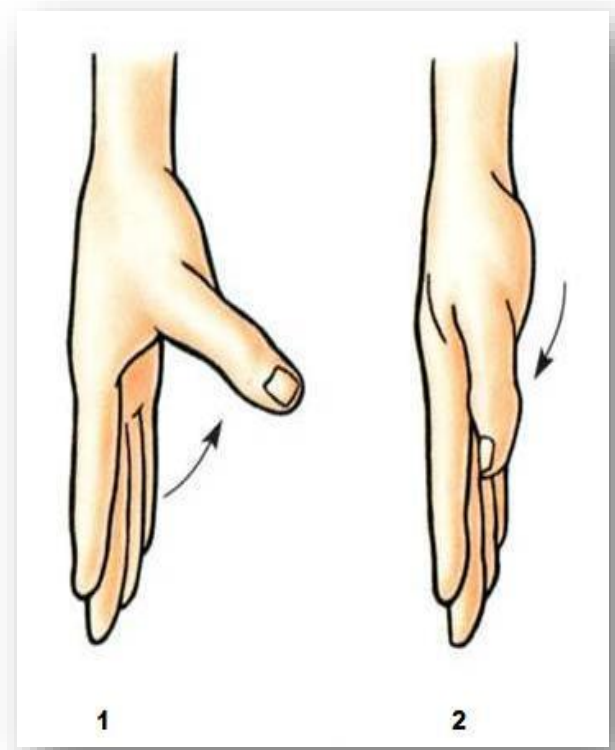
N: Superficial branch of ulnar nerve

A: Corrugates skin to improve grip of palm

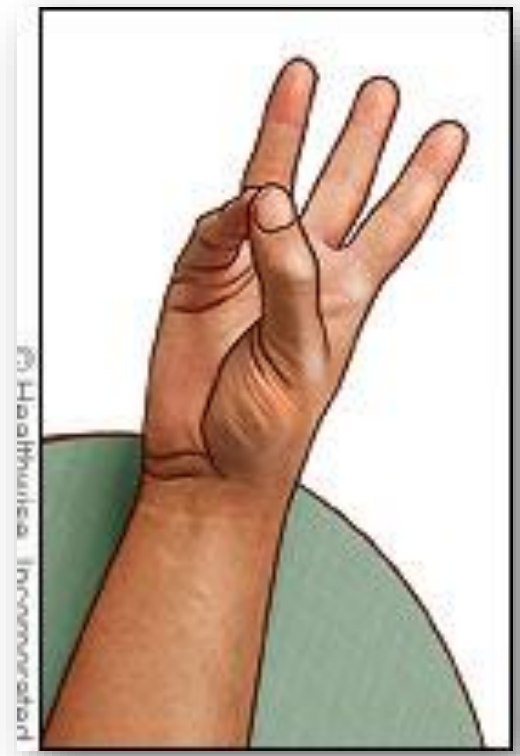




Opposition of the Thumb



Thumb abduction/adduction



Opposition of the Little Finger

Median nerve gives 5 muscles =
(thenar eminence (3 muscles) + 1st & 2nd
lumbrical

Ulnar nerve give 15 muscles =
-Superficial : one muscle (palmaris brevis)
-Deep : 14 muscle (hypothenar eminence (3
muscles) \ 8 muscles the palmar and dorsal
interossei, \ the 3rd and 4th lumbrical
muscles, adductor pollicis muscle.