



## Muscles of The Front of the forearm

By

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## Bones of the hand

Carpal bones

The **proximal row** is formed of 4 bones from lateral to medial:

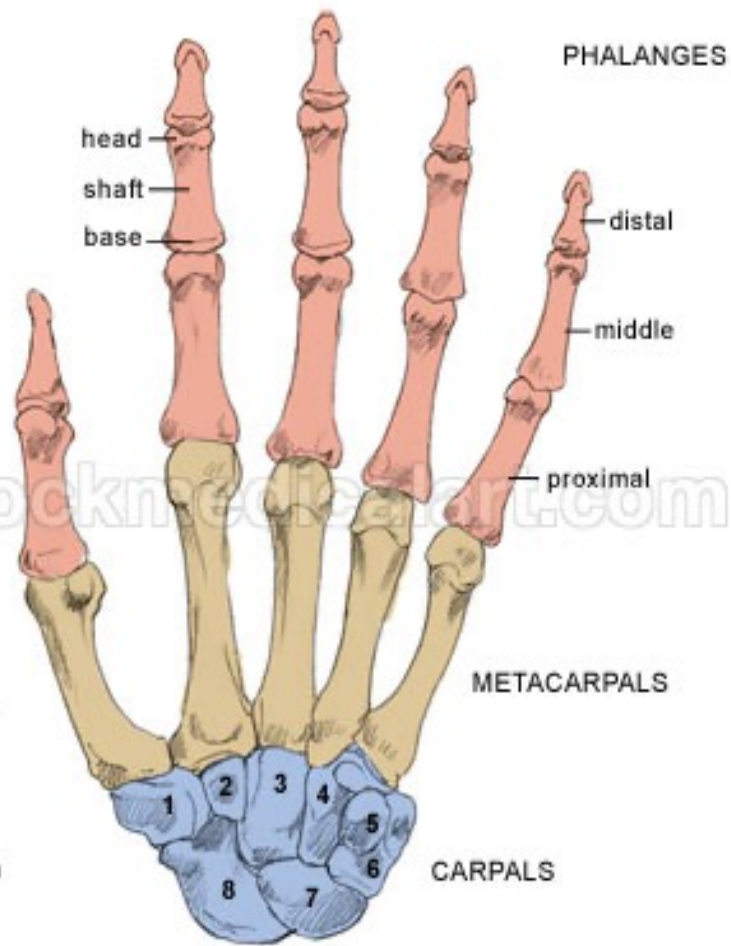
**Scaphoid** - lunate - triquetrum - **Pisiform.**

The **distal row** is formed of 4 bones from lateral to medial:

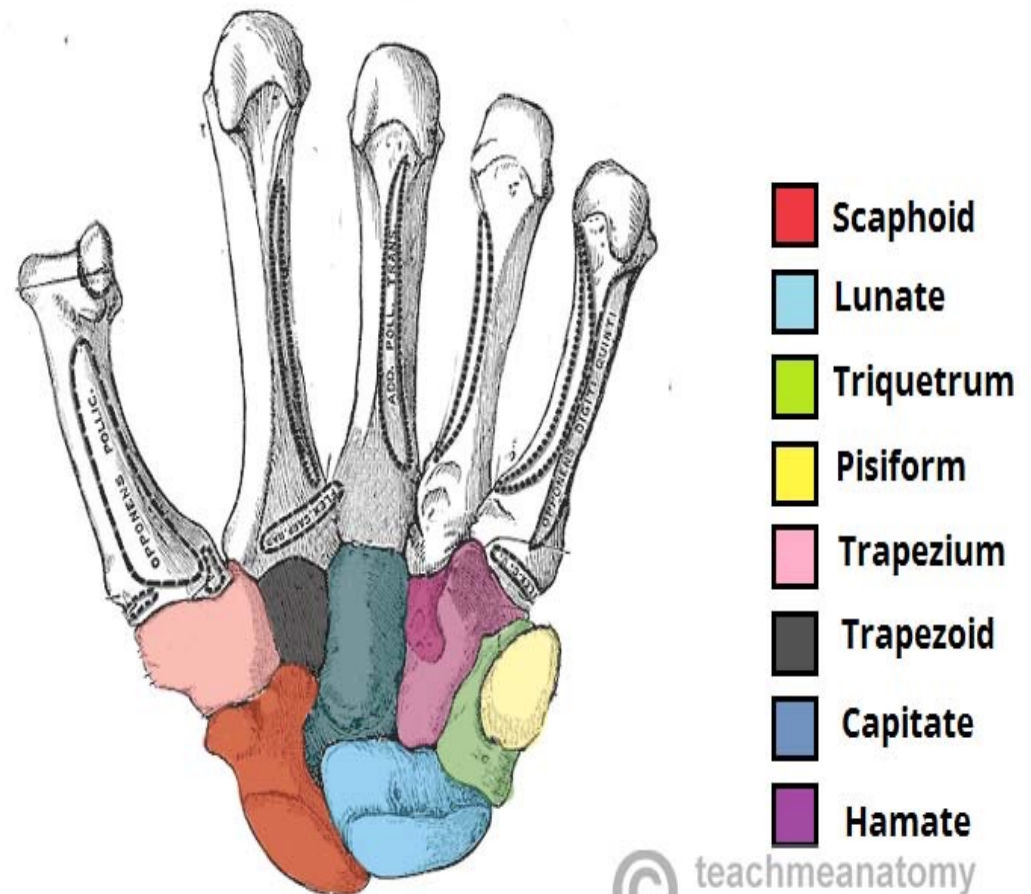
**Trapezium** - trapezoid - capitate - **Hamate**

5 Metecarpal

14 Phalanges



ANTERIOR VIEW (Palm)



## General Rules (Anterior compartment )

1- Pronation means medial rotation of the forearm by movement of radius at radioulnar joint.

**SO any muscle produce pronation is inserted into radius**

### 2- Origin

All superficial and intermediate muscles originate from the common flexor origin (*front of the medial epicondyle*). **EXCEPT** (**Pronator teres, flexor digitorum superficialis, flexor carpi ulnaris**) have an additional origin

### 3-Insertion

- ❖ Carpi means muscle attached to carpal or metacarpal bone
- ❖ Digitorum means insertion is into medial four fingers
- ❖ Pollicis is referred to the thumb

#### 4-Action

The function is mainly flexion / pronation

Radialis : Abduction of the hand

Ulnaris : Adduction of the hand

#### 5-Nerve Supply

All superficial and intermediate muscles are supplied by **Median nerve** and the deep group are supplied by a branch from median nerve ; **the Anterior interosseus nerve**

**EXCEPT** (**Flexor carpi ulnaris and medial half of Flexor digitorum Profundus**) are supplied by **Ulnar nerve**

## Muscles of Anterior compartment of the forearm

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graph TD; A[Muscles of Anterior compartment of the forearm] --> B[Superficial]; A --> C[Intermediate]; A --> D[Deep]; B --> B1[1- Pronator teres]; B --> B2[2- Flexor carpi radialis]; B --> B3[3- Palmaris longus]; B --> B4[4- Flexor carpi ulnaris]; C --> C1[1- Flexor digitorum superficialis]; D --> D1[1- Flexor digitorum Profundus]; D --> D2[2- Flexor pollicis longus]; D --> D3[3- Pronator Quadratus];
```

### **Superficial**

- 1- Pronator teres
- 2- Flexor carpi radialis
- 3- Palmaris longus
- 4- Flexor carpi ulnaris

### **Intermediate**

- 1- Flexor digitorum superficialis

### **Deep**

- 1- Flexor digitorum Profundus
- 2- Flexor pollicis longus
- 3- Pronator Quadratus

## Superficial Group

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- 1- Pronator teres
- 2- Flexor carpi radialis
- 3- Palmaris longus
- 4- Flexor carpi ulnaris

## Pronator teres

**Origin: It has 2 heads**

**Humeral head:**

Common flexor origin.

**Ulnar head:**

From coronoid process of the ulna.

**Insertion**

Lateral surface of the shaft of the radius.

**Nerve supply:**

Median Nerve.

**Action:**

1. Pronation of the forearm.
2. Assists in flexion of the elbow joint.

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**Know insertion ,nerve supply and action**





## Flexor carpi radialis

Know insertion ,nerve supply and action

### Origin:

Common flexor origin.

### Insertion

Bases of the 2nd and 3rd metacarpal bones.

### Nerve supply:

Median Nerve.

### Action:

- 1-Flexion of the wrist joint
- 2- Abduction of the hand



## Palmaris longus

### Origin:

Common flexor origin.

### Insertion

Palmar aponeurosis of the hand.

### Nerve supply:

Median Nerve.

### Action:

- 1-Flexion of the wrist joint.
- 2-A tensor of the palmar fascia.

Know nerve supply and action



Palmar aponeurosis



## Intermediate Group

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Flexor digitorum superficialis

## Flexor digitorum superficialis

**Origin: It has 2 heads**

**Know insertion ,nerve supply and action**

**Humero-ulnar head:** From common flexor origin and the coronoid process of the ulna . (origin of pronator teres)

**Radial head:** Anterior border of the radius

### **Insertion**

Has 4 tendons which is inserted into middle phalanx of the medial 4 fingers .

### **Nerve supply:**

Median Nerve.

### **Action:**

1-Flexion of the wrist.

2-Flexion of the metacarpophalangeal and proximal interphalangeal joints of the medial 4 fingers.



## Flexor carpi ulnaris

**Origin: It has 2 heads**

**Know insertion ,nerve supply and action**

**The common flexor origin. +**

**Ulnar head:** from the olecranon process of the ulna

**Insertion**

Pisiform bone and the base of the 5<sup>th</sup> metacarpal bone.

**Nerve supply:**

Ulnar Nerve.

**Action:**

1-Flexion of the wrist joint.

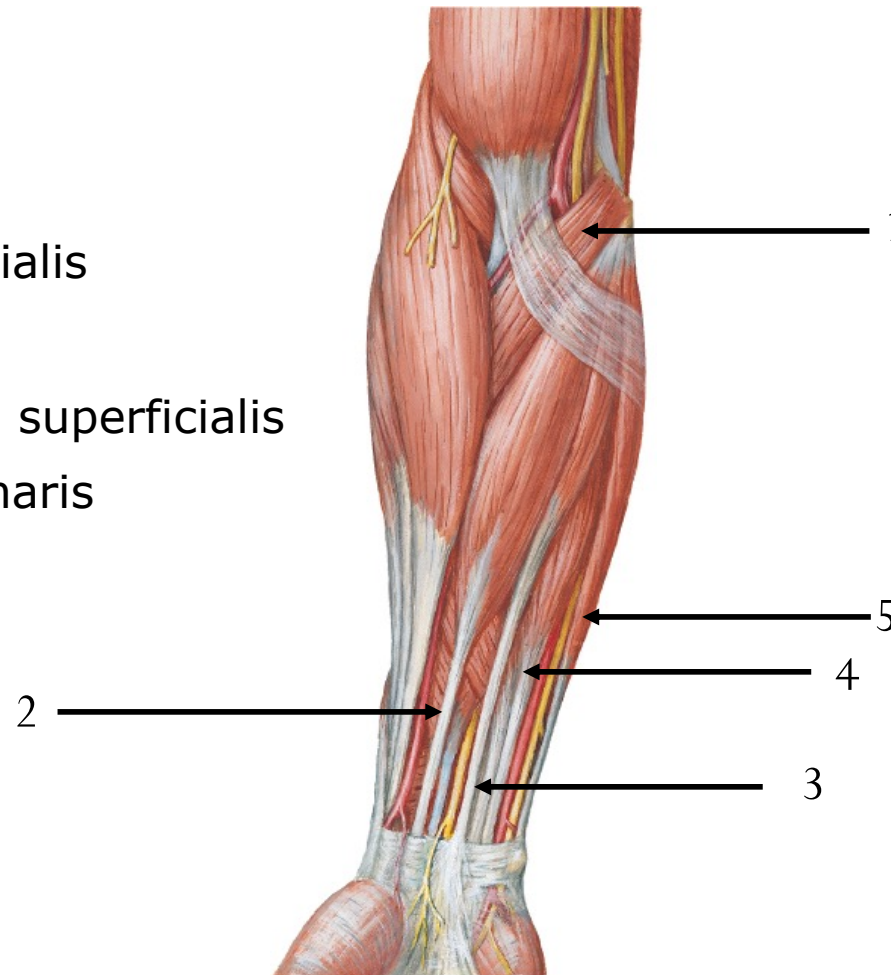
2-Adduction of the hand .



**Lateral**

**Medial**

- 1- Pronator teres
- 2-Flexor carpi radialis
- 3-Palmaris longus
- 4-Flexor digitorum superficialis
- 5- Flexor carpi ulnaris



## Deep Group

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- 1- Flexor digitorum profundus
- 2- Flexor pollicis longus
- 3- Pronator Quadratus

## Flexor digitorum Profundus

### Origin:

Anterior surfaces of the of the ulna

### Insertion

By 4 tendons which inserted into the bases of the distal phalanges of the medial 4 fingers

### Nerve supply:

- Its medial part by the ulnar nerve.
- Its lateral part by the anterior interosseous branch (of the median nerve).

### Action:

- 1.Flexion of the distal interphalangeal joints of the medial 4 fingers.
- 2.Assists in flexion of proximal interphalangeal joints of the medial 4 fingers and the wrist

(ORIGIN is READ ONLY)





## Flexor pollicis longus

### Origin:

Anterior surface of the radius.

### Insertion

Base of the terminal phalanx of the thumb

### Nerve supply:

Anterior interosseous branch of the median nerve.

### Action:

1. Flexion of the metacarpophalangeal and interphalangeal joints of the thumb.
2. Assists in flexion of the wrist joint

(ORIGIN is READ ONLY)



Terminal phalanx of the thumb



## Pronator Quadratus

### Origin:

Anterior surface of the ulna.

### Insertion

Anterior Surface of the Radius.

### Nerve supply:

Anterior interosseous branch (of the median nerve).

### Action:

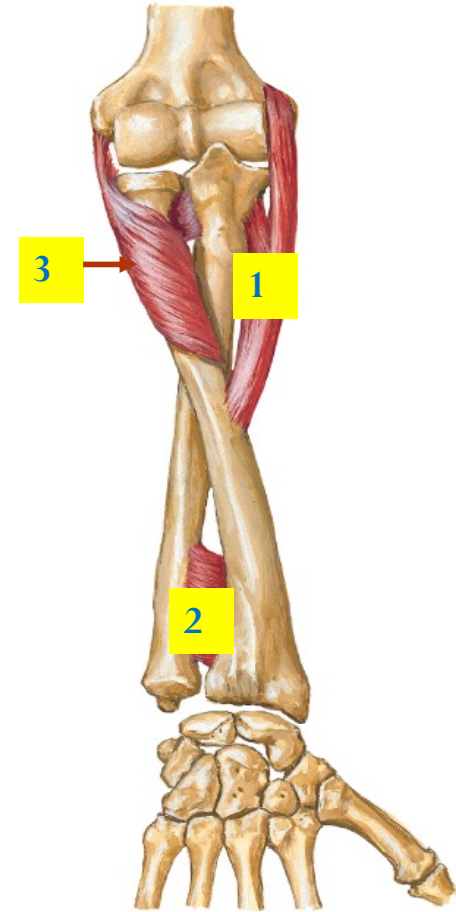
It is the main pronator of the forearm.



- 1- Pronator teres
- 2- Pronator quadratus
- 3- Supinator



**Supinated Forearm**



**Pronated Forearm**

## **Flexor Retinaculum**

It is a thickened strong fibrous crosses in front of the carpus and converts its anterior concavity into the carpal tunnel



## Flexor Retinaculum Attachment

Lateral		Medial
Scaphoid		Pisiform
Trapezium		Os of Hamate

## **Structure pass superficial to Flexor Retinaculum**

- 1- **U**lnar artery
- 2- **U**lnar nerve
- 3- **P**almar cutaneous branch of Ulnar nerve
- 4- **P**almar cutaneous branch of median nerve
- 5- **P**almaris longus

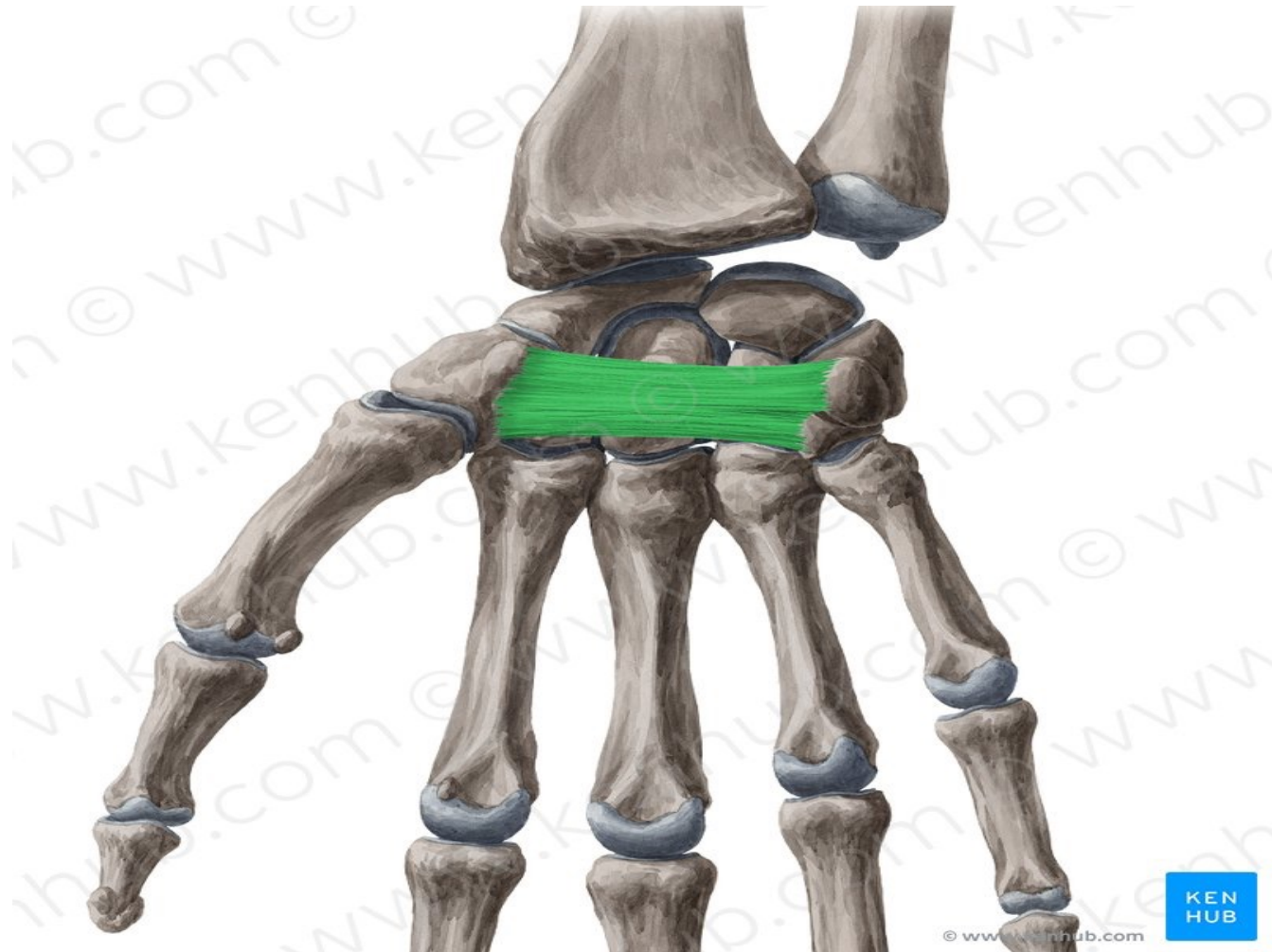
**2U 3P**

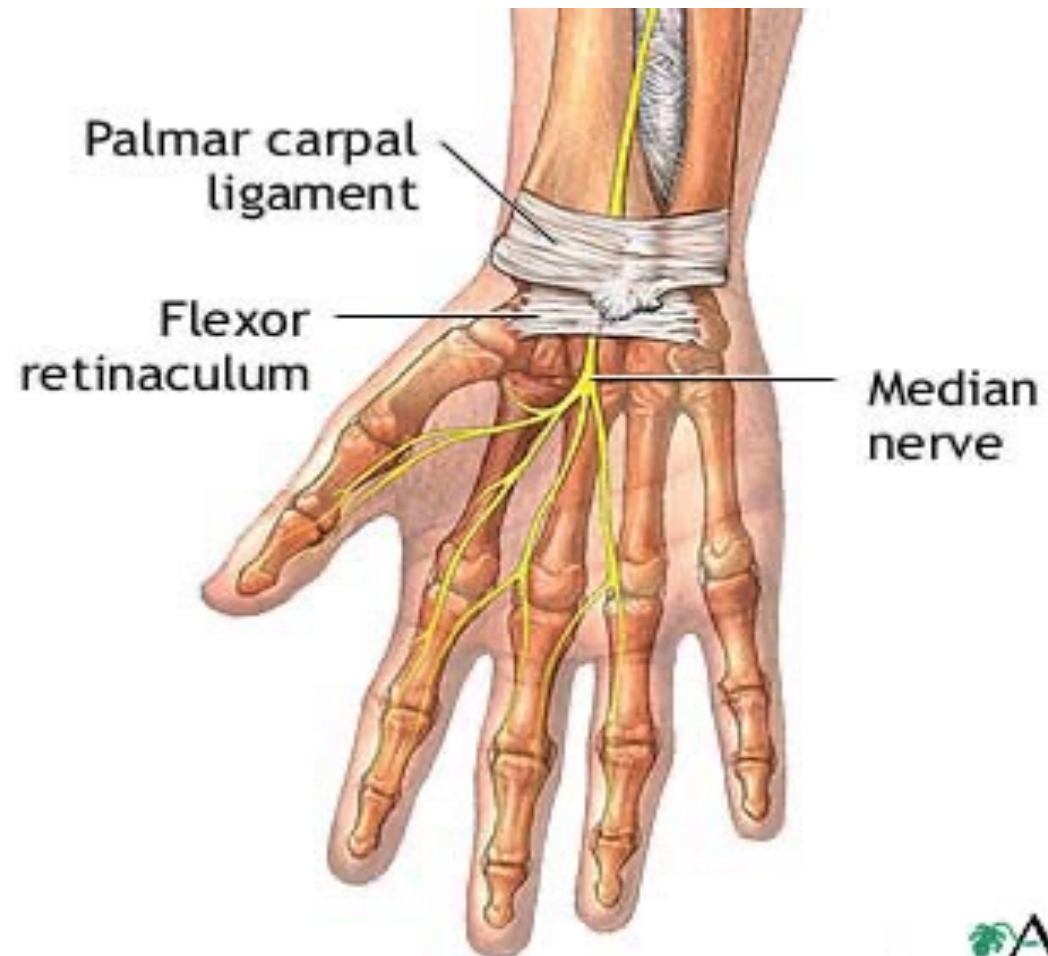
### Structures pass deep to the retinaculum

(through the carpal tunnel)

1. Tendons of flexor digitorum superficialis.
2. Tendons of flexor digitorum profundus.
3. Common synovial sheath for the tendons of flexor digitorum superficialis and profundus.
4. Tendon of flexor pollicis longus and its synovial sheath.
5. Median nerve.
6. Tendon of flexor carpi radialis in **a special compartment**







# Carpal Tunnel

## Boundaries

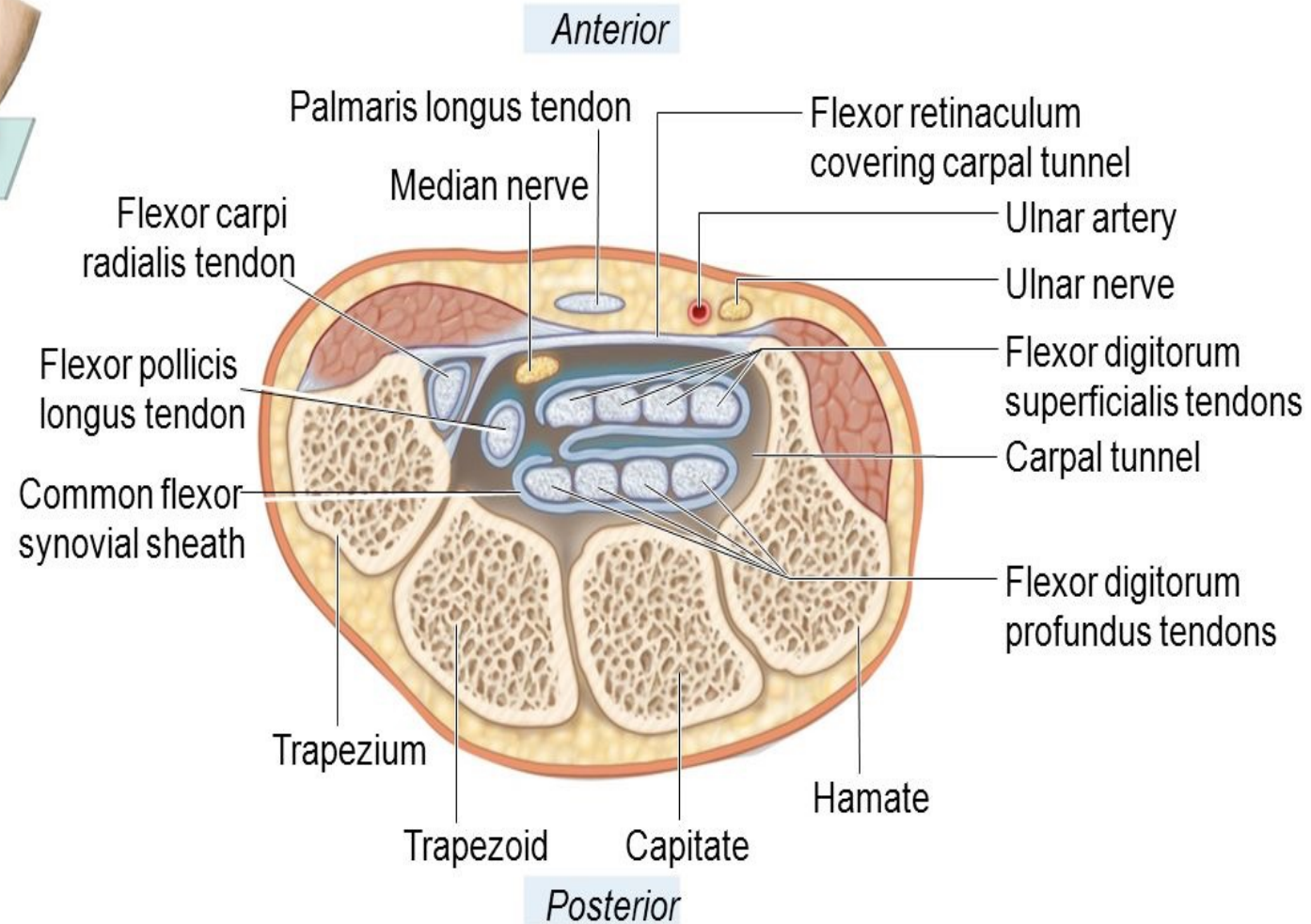
Carpals bone concavity anteriorly

Flexor retinaculum covers it

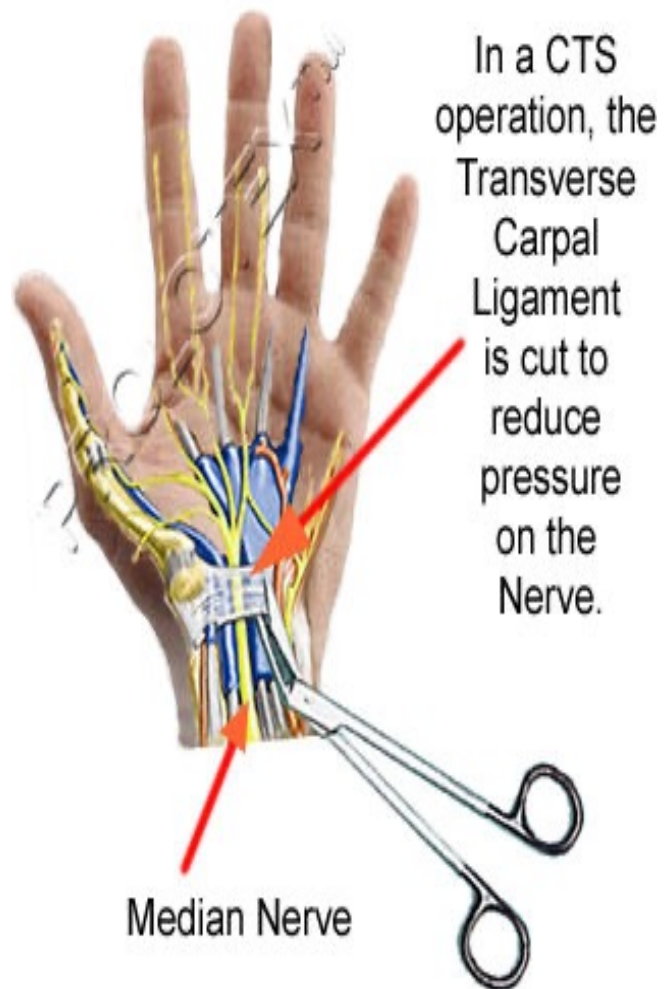
## Content :

1. Tendons of flexor digitorum superficialis.
2. Tendons of flexor digitorum profundus.
3. Common synovial sheath for the tendons of flexor digitorum superficialis and profundus.
4. Tendon of flexor pollicis longus and its synovial sheath.
5. Median nerve.
6. Tendon of flexor carpi radialis in **a special compartment**

View of  
cross  
section



Carpal tunnel, transverse section



ADAM.

Thank  
you