

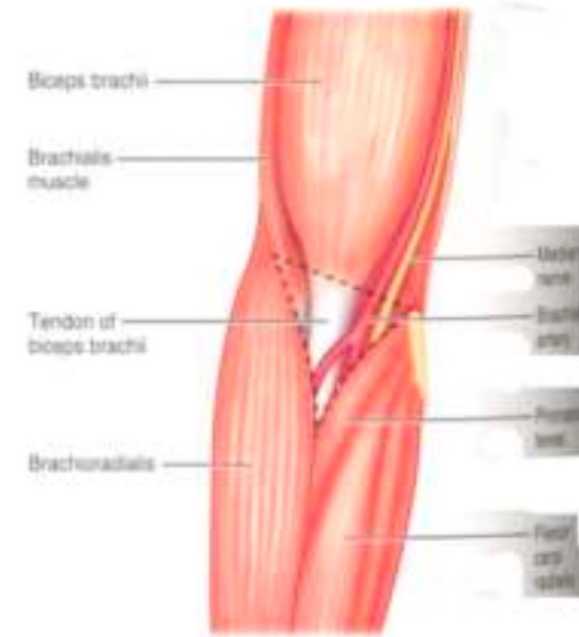
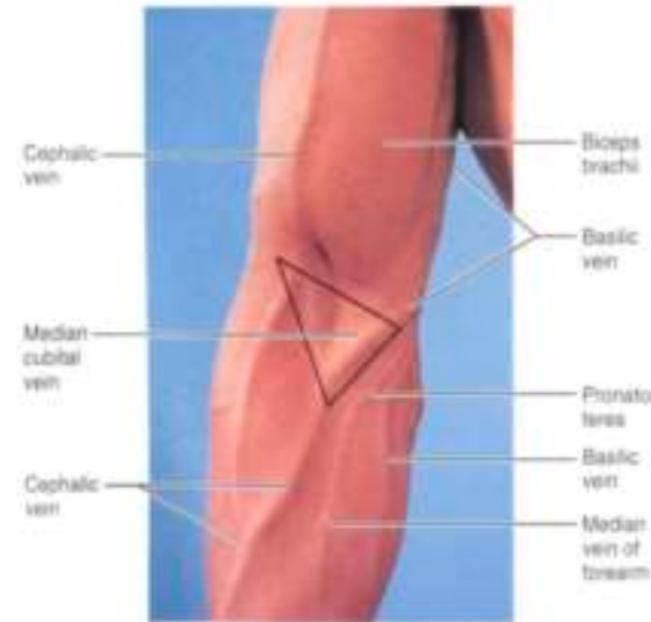
# Elbow and Wrist Anatomy

Dr. Gary Mumaugh



# Surface Anatomy of Upper Limb

- Medial Epicondyle
- Lateral Epicondyle
- Olecranon Process
- Cubital Fossa
  - Anterior surface elbow
  - Contents
    - Brachial Artery
    - Median Nerve
  - Boundaries
    - Medial = Pronator teres
    - Lateral = Brachioradialis
    - Superior = Line between epicondyles



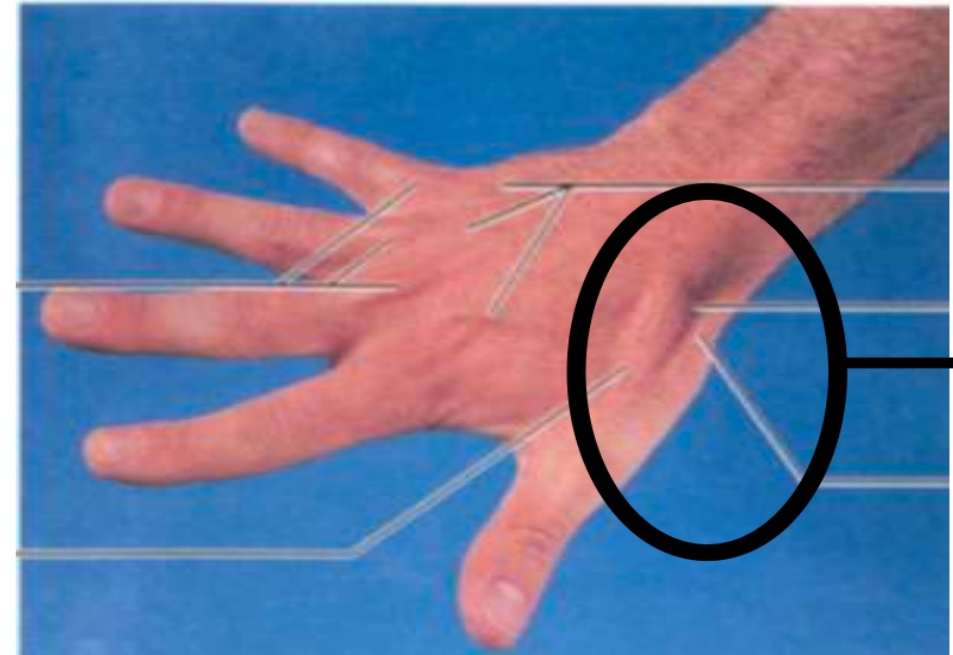
# Surface Anatomy of Upper Limb

## Carpal Tunnel

- Carpals concave anteriorly
- Carpal ligament covers it
- Contains: Median nerve ,long tendons

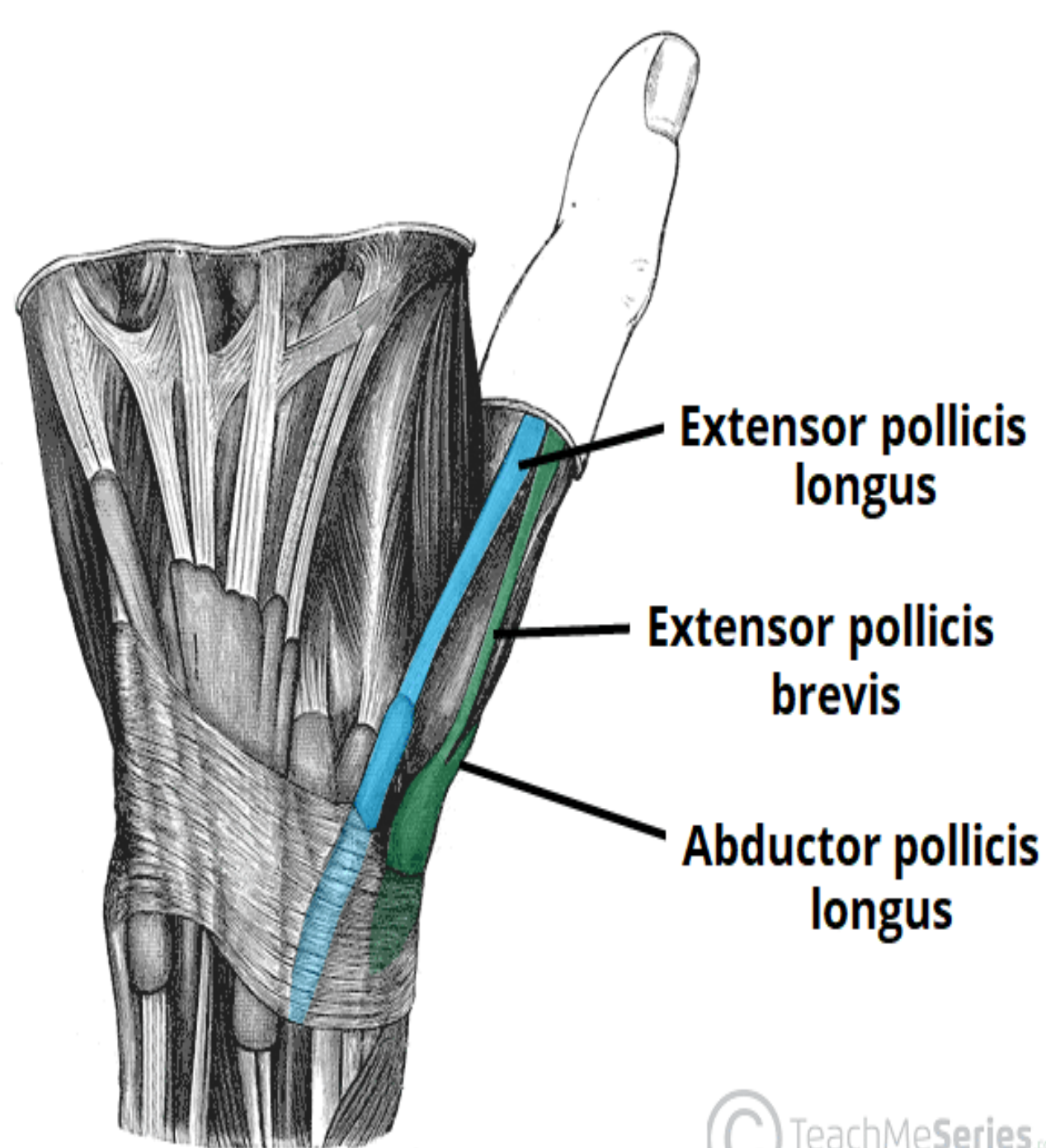
## Anatomical Snuff box

- Lateral = E. pollicis brevis
- Medial = E. pollicis longus
- Floor = scaphoid, styloid of radius
- Contains Radial Artery (pulse)



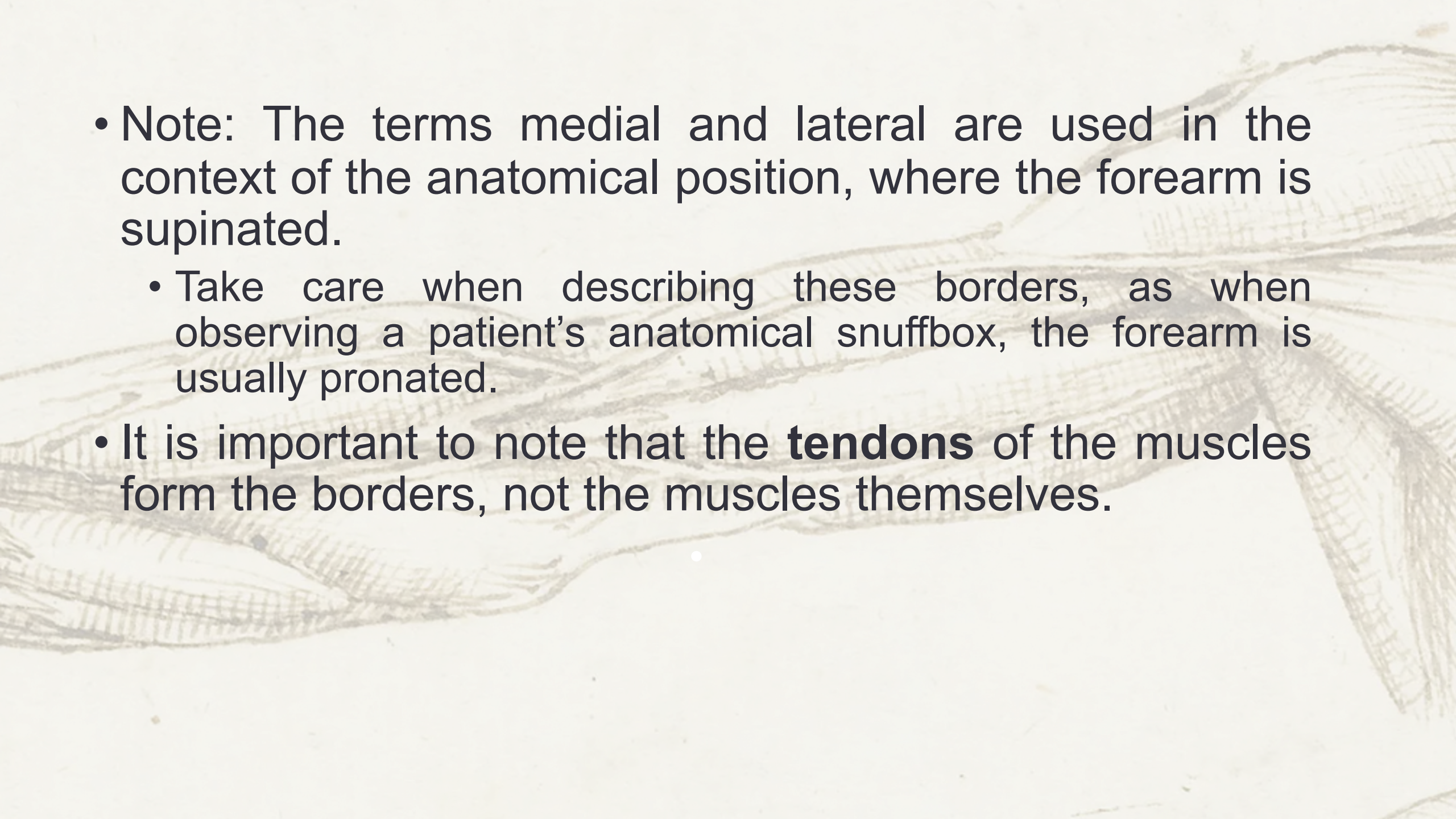
# Anatomical Snuffbox

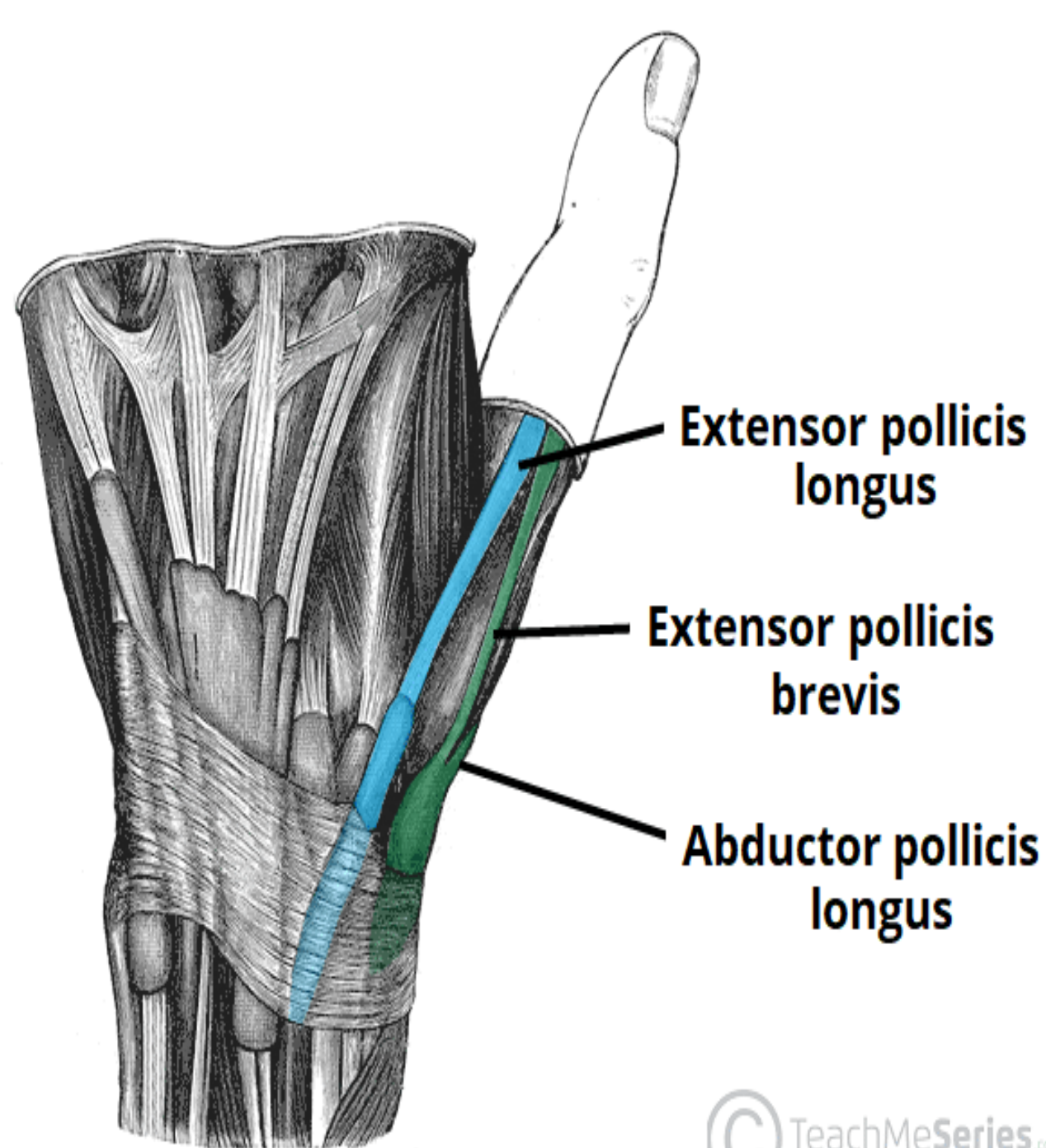
- The **anatomical snuffbox** (also known as the radial fossa), is a triangular depression found on the lateral aspect of the dorsum of the hand.
- It is located at the level of the carpal bones, and best seen when the thumb is extended.
- In the past, this depression was used to hold snuff (ground tobacco) before inhaling via the nose – hence it was given the name ‘snuffbox’.



# Borders of radial fossa (snuffbox)

- As the snuffbox is triangularly shaped, it has three borders, a floor, and a roof:
- **Ulnar (medial) border:** Tendon of the extensor pollicis longus.
- **Radial (lateral) border:** Tendons of the extensor pollicis brevis and abductor pollicis longus.
- **Proximal border:** Styloid process of the radius.
- **Floor:** Carpal bones; scaphoid and trapezium.
- **Roof:** Skin.

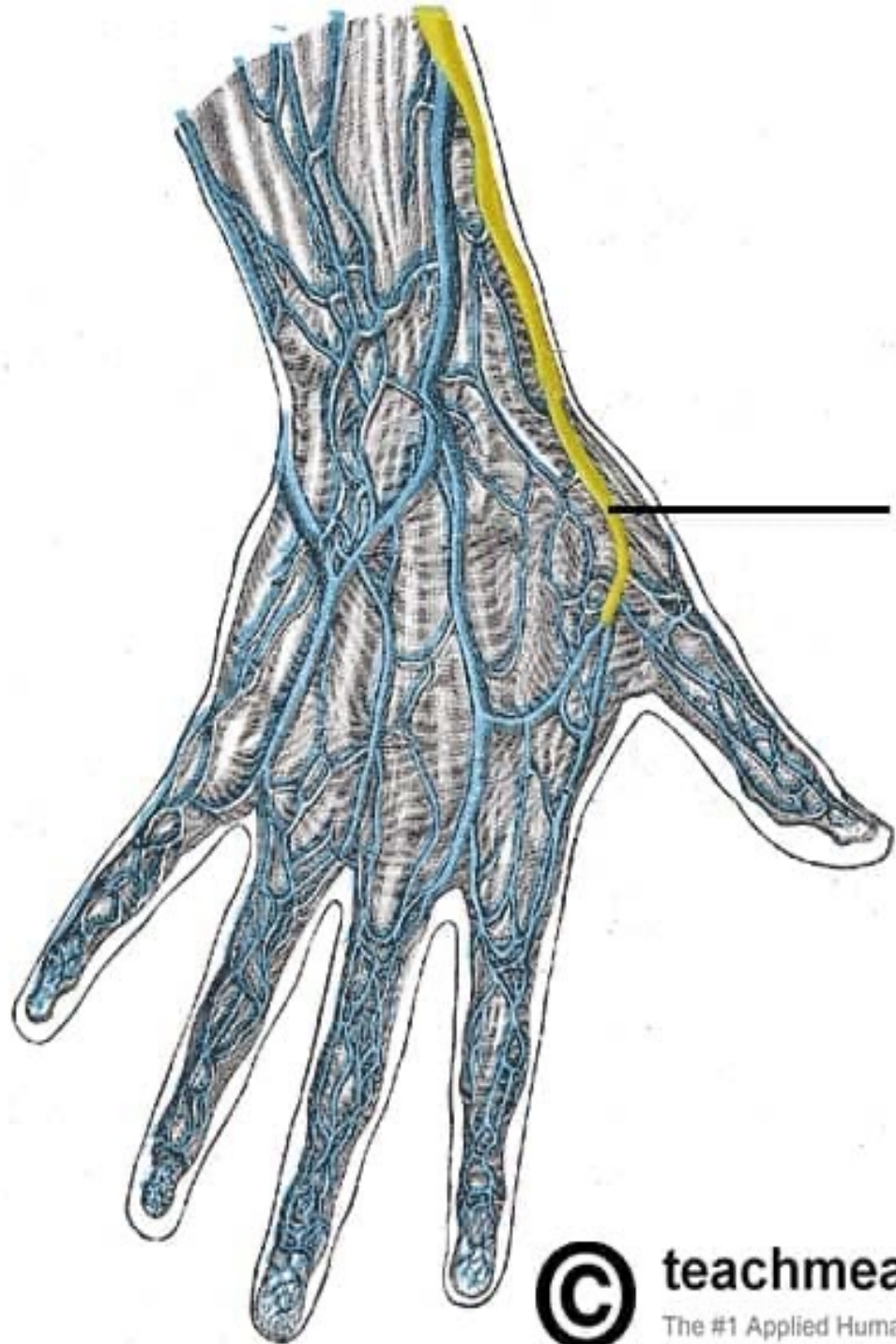
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- Note: The terms medial and lateral are used in the context of the anatomical position, where the forearm is supinated.
    - Take care when describing these borders, as when observing a patient's anatomical snuffbox, the forearm is usually pronated.
  - It is important to note that the **tendons** of the muscles form the borders, not the muscles themselves.





# Contents of radial fossa

- The main contents of the **anatomical snuffbox** are the radial artery, a branch of the radial nerve, and the cephalic vein:
- **Radial artery** – crosses the floor of the anatomical snuffbox, then turns medially and travels between the heads of the adductor pollicis muscle.
- **Superficial branch of the radial nerve** – found in the skin and subcutaneous tissue of the anatomical snuffbox.
  - It innervates the dorsal surface of the lateral three and half digits, and the associated area on the back of the hand.
- **Cephalic vein** – arises from the dorsal venous network of the hand and crosses the anatomical snuffbox to travel up the anterolateral aspect of the forearm.



## Cephalic vein

Superficial palmar arch

Deep palmar arch

Ulna

Ulnar nerve

Ulnar artery

Radius

Radial artery

Cephalic vein

Tendon of flexor carpi radialis

Median nerve

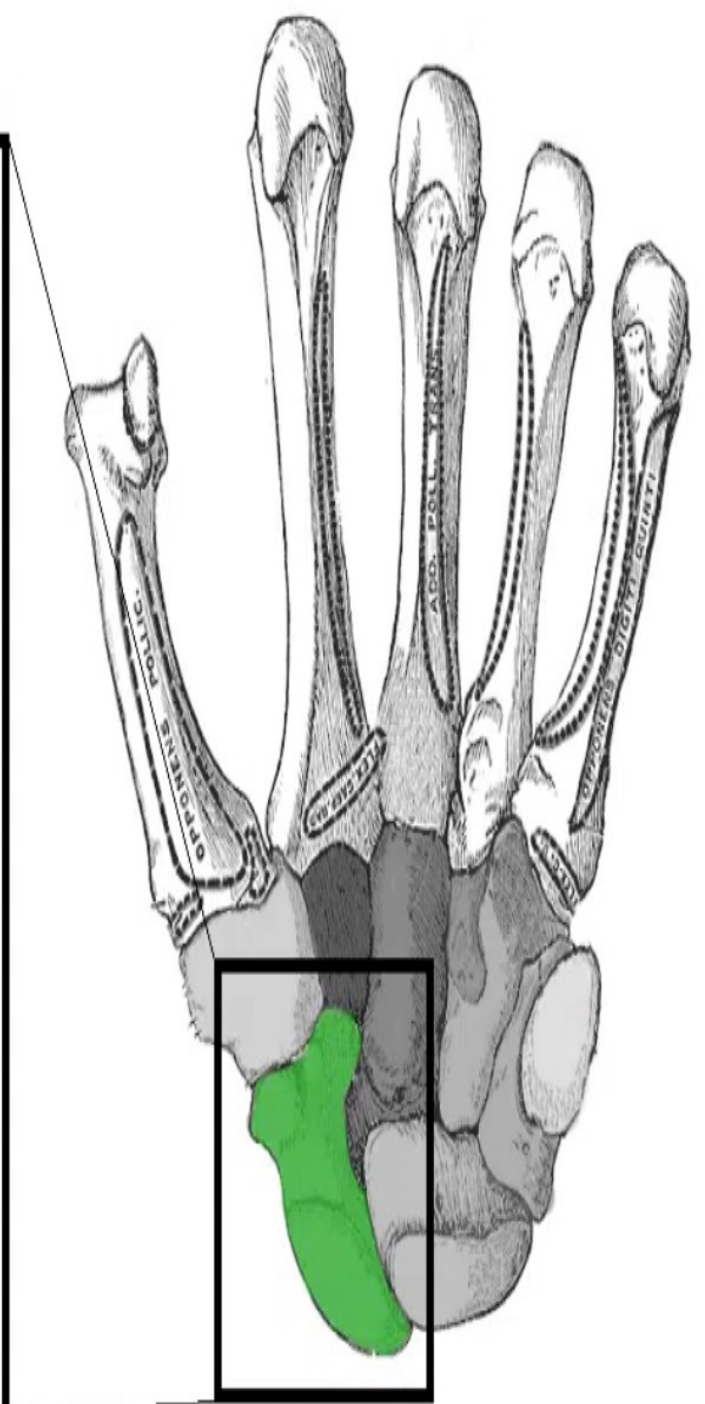
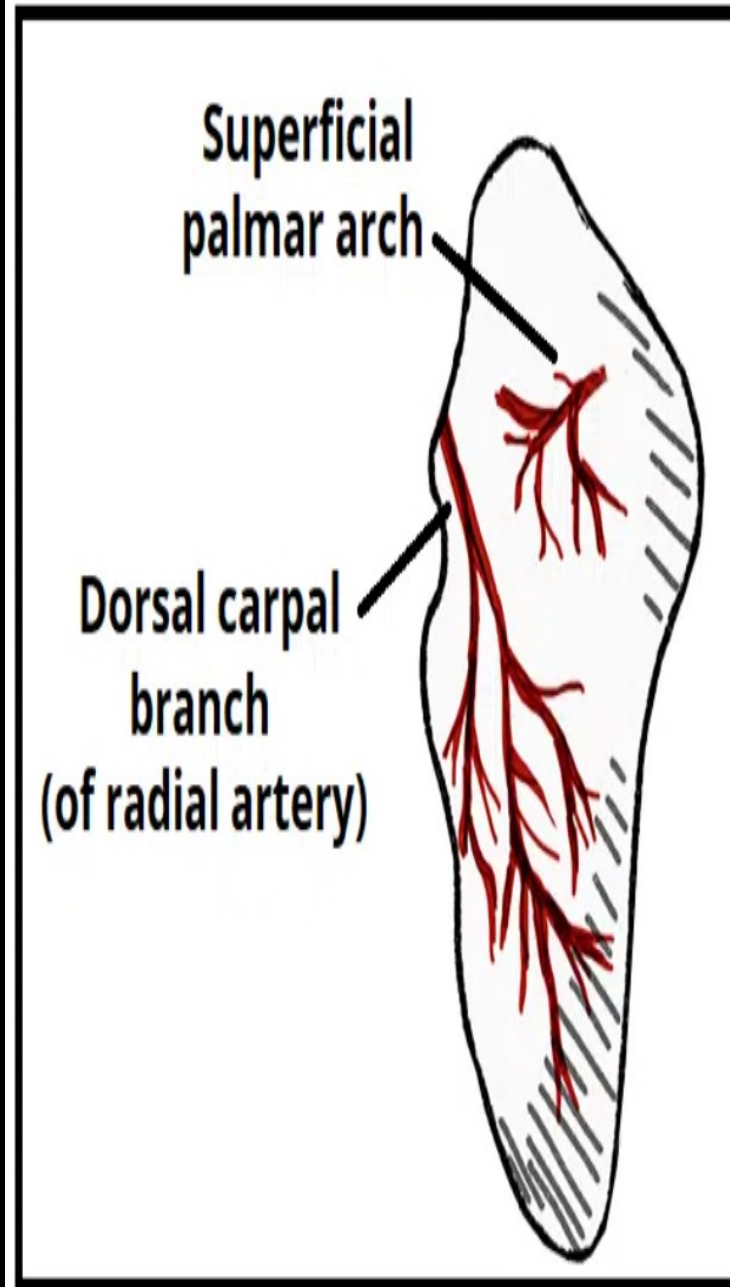


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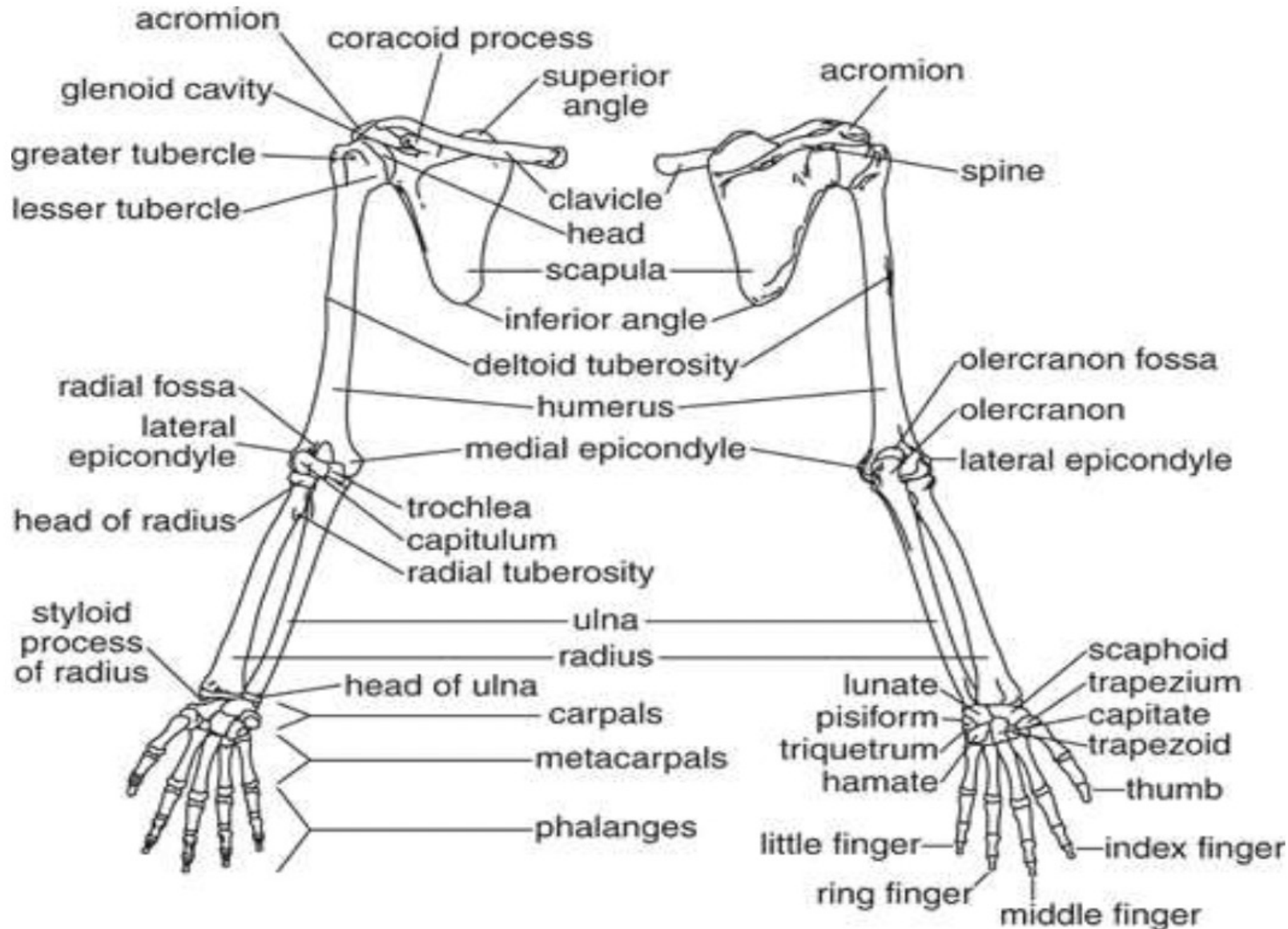
The #1 Applied Human Anatomy Site on the Web.

# Clinical Relevance: Scaphoid Fracture

- The scaphoid bone of the hand is the most commonly fractured carpal bone – typically by falling on an outstretched hand (FOOSH).
- In a fracture of the scaphoid, the characteristic clinical feature is pain and tenderness in the **anatomical snuffbox**.
- The scaphoid is at particular risk of **avascular necrosis**.
- Patients with a missed scaphoid fracture are likely to develop **osteoarthritis** of the wrist in later life.



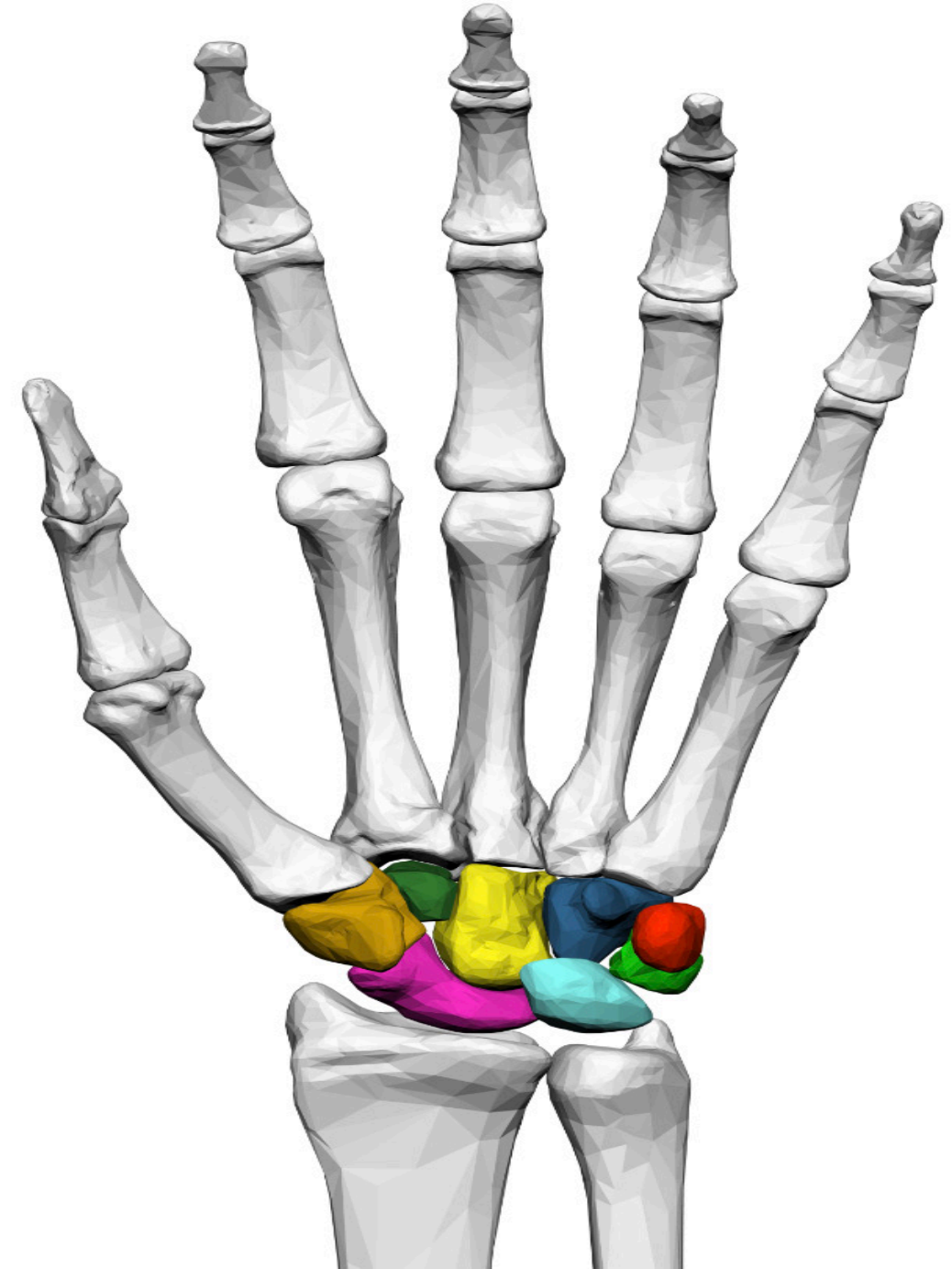
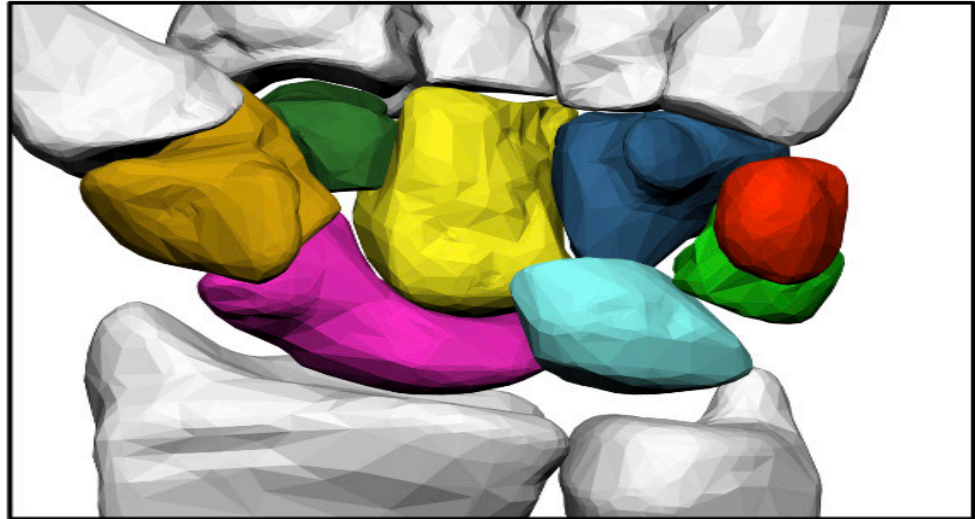
# Upper Limb Skeleton



- Clavicle
- Scapula
- Humerus
- Radius
- Ulna
- Carpals- Proximal  
Distal
- Metacarpals
- Phalanges

# Carpal Bones

- Scaphoid
- Lunate
- Triquetrum
- Pisiform
- Trapezium
- Trapezoid
- Capitate
- Hamate



- **She** – **S**caploid
- **Looks**- **L**unate
- **Too** - **T**riquetral
- **Pretty** - **P**isiform
- **Try** – **T**rapezium
- **To** - **T**rapezoid
- **Catch** - **C**apitate
- **Her** - **H**ammate

Lateral to medial proximal row

Lateral to medial distal row

**S**caploid

**L**unate

**T**riquetrum

**P**isiform

**T**rapezium

**T**rapezoid

**C**apitate

**H**amate



**SOME  
LOVERS  
TRY  
POSITION  
THAT  
THEY  
CAN'T  
HANDLE**



# MUSCLES OF FOREARM

## *Anterior Compartment:*

### SUPERFICIAL:

- 1. Pronator Teres
- 2. Flexor Carpi Ulnaris
- 3. Palmaris Longus
- 4. Flexor Carpi Radialis
- 5. Flexor Digitorum Superficialis (sublimus)

### DEEP:

- 1. Flexor Digitorum Profundus
- 2. Flexor Pollicis Longus
- 3. Pronator Quadratus

**Common Flexor Group:** Superficial muscles

**Origin:** Medial epicondyle of humerus

# MUSCLES OF FOREARM

## *POSTERIOR COMPARTMENT*

### **SUPERFICIAL:**

- 1. Anconeus
- 2. Brachioradialis
- 3. Extensor Carpi Radialis Longus
- 4. Extensor Carpi Radialis Brevis
- 5. Extensor Digitorum
- 6. Extensor. Digiti Minimi
- 7. Extensor. Carpi Ulnaris

### **DEEP:**

- 1. Abductor Pollicis Longus
- 2. Extensor. Pollicis Brevis
- 3. Extensor. Pollicis Brevis
- 4. Extensor. Indicis
- 5. Supinator

# PRONATOR TERES

## **Insertion:**

midway long the lateral surface of the radius

## **Action:**

pronation,  
flexion of forearm

## **N.Supply:**

Median.N (C6,c7)





# FLEXOR CARPI RADIALIS

## Insertion:

base of the 2<sup>nd</sup> mc bone and slip to the base of the 3<sup>rd</sup> MC bone

## Action:

flexion and abduction of wrist

## N.Supply:

Median.N (c6,c7)



# PALMARIS LONGUS

## **INSERTION:**

Anterior aspect of the distal flexor retinaculum and palmar aponeurosis

## **ACTION:**

Flexion of the wrist and

Tightens the palmar Aponeurosis

## **N. SUPPLY:**

Median. N (c6,c7)



# FLEXOR CARPI ULNARIS

## ORIGIN:

Humoral head: med epicondyle

Ulnar head: med. margin of the olecranon, posterior border of the ulna

## INSERTION:

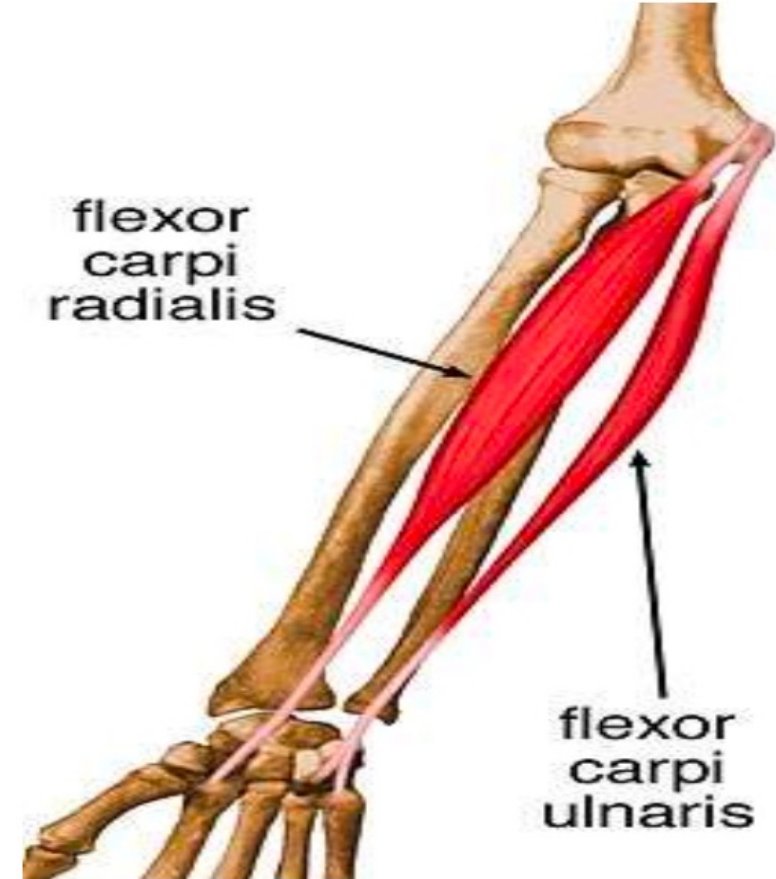
pisiform, hook of hamate, base of the 5<sup>th</sup> MC & flexor retinaculum

## ACTION:

flexes and adducts the hand

## N.SUPPLY:

Ulnar.N (C7,C8)



# FLEXOR CARPI ULNARIS





# FLX.DIGITORUM SUPERFICIALIS

## ORIGIN:

**Humeroulnar head:** med.epicondyle of the humerus, coronoid process

**Radial head:** sup.half of anterior aspect of the radius

## INSERTION :

bodies of the Middle phalanges of the medial 4 digits

## ACTION:

flexion.of all joints it crosses

## N.SUPPLY :

Median .N (C7,C8,T1)



# FLX. DIGITORUM PROFUNDUS

## ORIGIN:

prox.3/4 of the medial and anterior aspect of the ulna and from interosseous membrane.

## INSERTION:

base of the distal phalanges of the medial 4 digits

## ACTION:

Flexion of DIP,PIP,MP, wrist

## N.SUPPLY:

Medial-ulnar.N (C8,t1)

Lateral-AIN Of Median.N (C8,t1)



# FLEXOR POLLICIS LONGUS

## ORIGIN:

upper 3/4 of anterior surface of radius

## INSERTION:

base of distal phalanx of the thumb

## ACTION:

flexion of proximal & distal phalanx of the thumb

## N.SUPPLY:

AIN (C7,C8,T1)



# PRONATOR QUADRATUS

## ORIGIN:

lower 1/4<sup>th</sup> of anterior surface of ulna

## INSERTION:

lower 1/4<sup>th</sup> of anterior surface of radius

## ACTION :

pronation

## N.SUPPLY:

AIN (C8,T1)



# ANCONEUS

## **ORIGIN:**

posterior surface of the lat.epicondyle

## **INSERTION:**

lateral surface of olecranon, body of ulna

## **ACTION:**

extension of forearm

## **N.SUPPLY:**

radial.n



# BRACHIORADIALIS

## ORIGIN:

prox. 2/3<sup>rd</sup> of lat. supracondylar ridge of humerus,  
lateral intermuscular septum

## INSERTION:

lat. aspect of distal radius just prox. to the styloid  
process

## ACTION:

acc. flexor of elbow

## N. SUPPLY:

Radial. N (C5, C6)



# EXT.CARPI RADIALIS LONGUS

## ORIGIN:

lat.supracondylar ridge of humerus

## INSERTION:

base of the 2<sup>nd</sup> MC bone

## ACTION:

extends and abducts the hand

## N.SUPPLY:

Radial .N (C6,C7)



# EXTENSOR CARPI RADIALIS BREVIS

## ORIGIN:

lat.epicondyle of the humerus

## INSERTION:

base of the 3<sup>rd</sup> MC bone

## ACTION:

extends and abducts the wrist

## N.SUPPLY:

deep br.of radial .N(c7c8)





# EXTENSOR DIGITORUM

## ORIGIN:

lat epicondyle of the humerus

## INSERTION:

Extensor Expansions Of The Medial 4 digits

## ACTION:

extension at MCP, IP joints, ext of wrist when the fingers are extended

## N.SUPPLY:

PIN (c7,c8)



# EXTENSOR DIGITI MINIMI

## **ORIGIN:**

lat epicondyle of the humerus

## **INSERTION:**

extensor expansion of the 5<sup>th</sup> digit

## **ACTION:**

ext.of 5<sup>th</sup> digit at MC, PIP, ext of wrist when little finger in extension

## **N.SUPPLY:**

PIN (c7,c8)

# EXT. CARPI ULNARIS

## ORIGIN:

2 heads:

lat epicondyle of humerus,

Posterior border of ulna

## INSERTION:

medial side of the base of the 5<sup>th</sup> MC

## ACTION:

extends and adducts the hand

## N.SUPPLY:

PIN (c7c8)



# SUPINATOR

## ORIGIN:

lat epicondyle of humerus, radial collateral lig, annular lig, supinator fossa, crest of ulna

## INSERTION:

lateral, posterior, anterior surface of prox 1/3<sup>rd</sup> of radius

## ACTION:

supination

## N. Supply:

deep Br. Of Radial. N (C5, c6)



# MOVEMENTS OF FOREARM MUSCLES

- Flexion
- Extension
- Adduction
- Abduction

## AT RADIO ULNAR JOINT

- Supination
- pronation

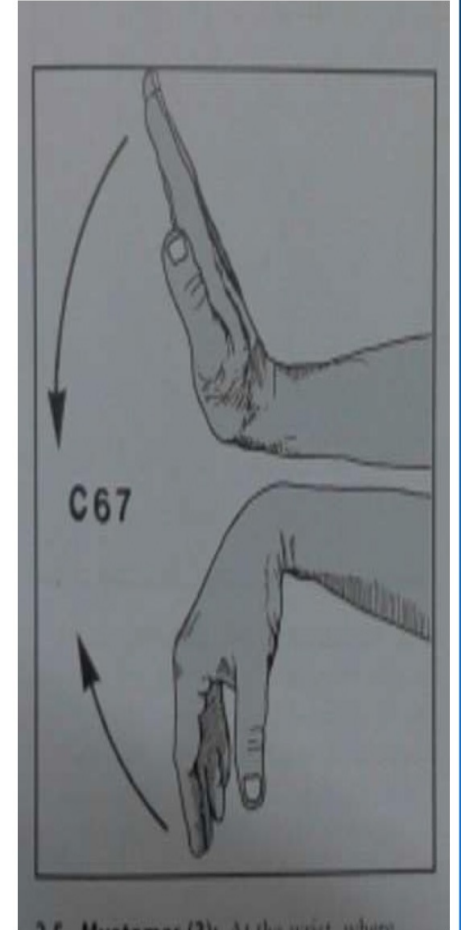
# FLEXION

- Pronator teres
- Flx.carpi radialis
- Flx.carpi ulnaris
- Flx.digitorum superficialis
- Flx. Digitorum profundus
- Palmaris longus
- brachioradialis



# EXTENSION

- Anconeus
- Ext.Carpi Radialis Longus
- Ext.Carpi Radialis Brevis
- Ext.Digitorum
- Ext.Indicis
- Ext.Carpi Ulnaris
- Ext. Digiti Minimi
- Abductor Pollicis Longus



## **ADDUCTION**

- flexor carpi ulnaris
- extensor carpi ulnaris

## **PRONATION**

- pronator teres
- pronator quadratus

## **ABDUCTION**

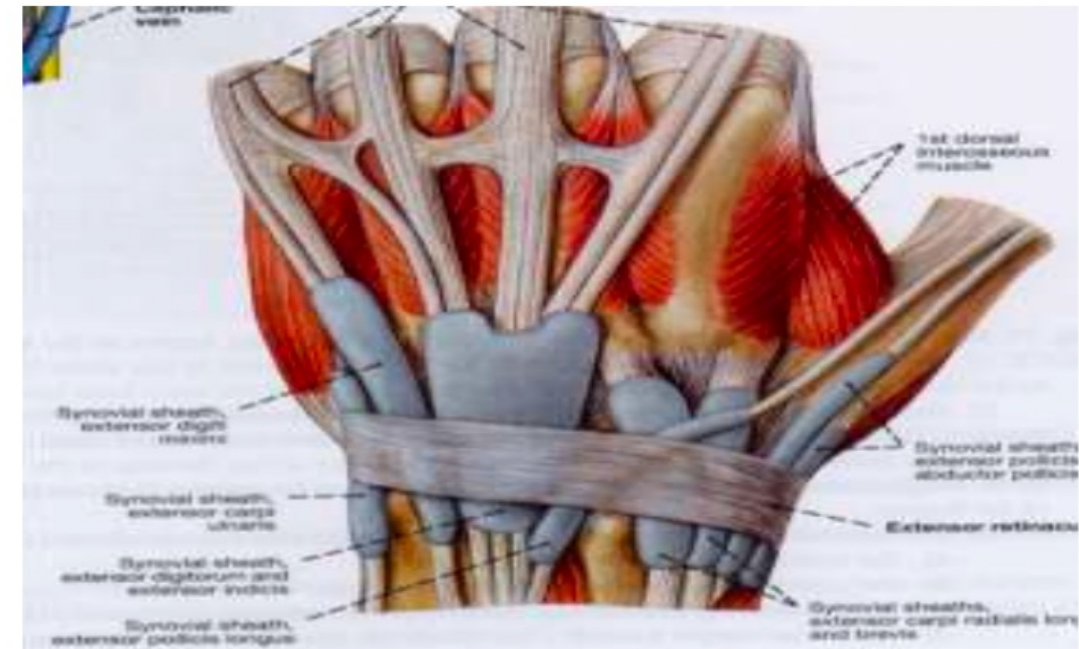
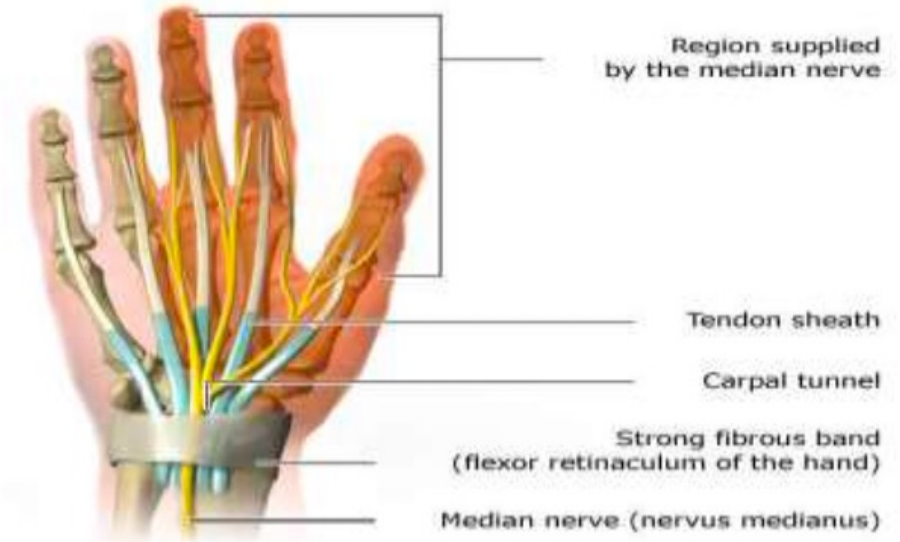
- flx.carpi radialis
- ext.carpi radialis longus
- ext.carpi radialis brevis
- abductor pollicis longus

## **SUPINATION**

- biceps
- supinator

# RETINACULUM IN HAND

- **Flexor retinaculum:** thick band made of dense white fibrous tissue which stretch across the anterior surface of the carpal bones.
- Form a tunnel known as **carpal tunnel**.
- Median nerve & tendons of muscles Through the tunnel .
- **Extensor retinaculum:** It is a thickening of deep fascia between the lower ends of radius & ulna .





# MUSCLES OF THE HAND

**Thenar muscles:** abductor pollicis brevis  
flexor pollicis brevis  
opponens pollicis  
Adductor pollicis

**Hypothenar muscles-**  
palmaris brevis  
abductor digiti minimi  
flexor digiti minimi  
opponens digiti minimi

Lumbricals -4

Palmar interossei-4

Dorsal interossei-4

All these Muscles responsible for fine movements of fingers.

