

FOREARM AND CARPAL TUNNEL

Prof. AO Ihunwo, PhD

School of Anatomical Sciences

Constituents of the Forearm

- Bones
 - Radius and Ulna
- Muscles
 - Flexors (anterior compartment)
 - Extensors (posterior compartment)
- Blood vessels
 - Ulnar and Radial
- Nerves

Anterior (Flexor) Compartment

Muscles - Superficial Group:

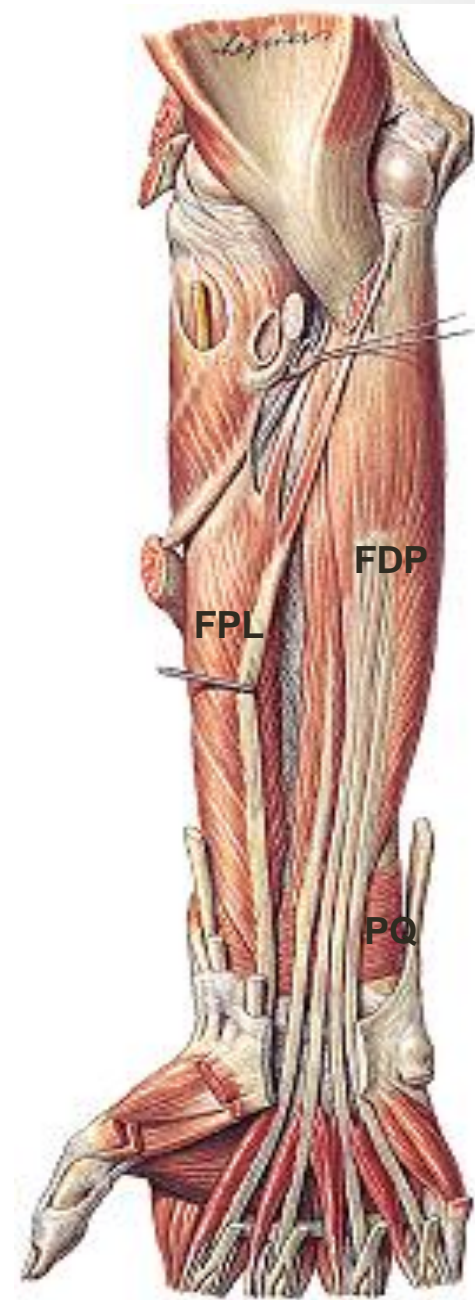
- Cross elbow joint.
- Possess a common origin (anterior surface of medial epicondyle of humerus).
- Lateral to medial
 - Pronator teres (1)
 - Flexor Carpi Radialis (FCR) 2
 - Flexor Digitorum Superficialis (FDS) 3
 - Palmaris longus 4
 - Flexor Carpi Ulnaris (FCU) 5
- **Nerve supply** – Median nerve except FCU (ulnar nerve)



Flexor Compartment..

Deep Group:

- Do not have a common origin.
- Do not cross elbow joint.
- Flexor Digitorum Profundus (FDP)
 - most powerful & bulkiest muscles.
 - Median nerve to lateral half & ulnar nerve to medial half
- Flexor Pollicis Longus (FPL)
 median nerve
- Pronator quadratus
 • median nerve



Actions of muscles in flexor compartment

- Pronators of forearm
 - Pronator teres and Pronator Quadratus
- Supinator of forearm
 - Supinator
- Flexors of wrist
 - FCR (+ abduction), FCU (+ adduction) at wrist
- Flexors of fingers
 - FDS (middle phalanges) and FDP (distal phalanges)
- Flexors of thumb
 - FPL

Posterior (Extensor) Compartment

Muscles – Divided into 3 groups based on origin

Group A: Lateral supracondylar ridge of humerus.

- Brachioradialis & ECRL.
 - **Nerve Supply** – Radial nerve

Group B: Lateral epicondyle

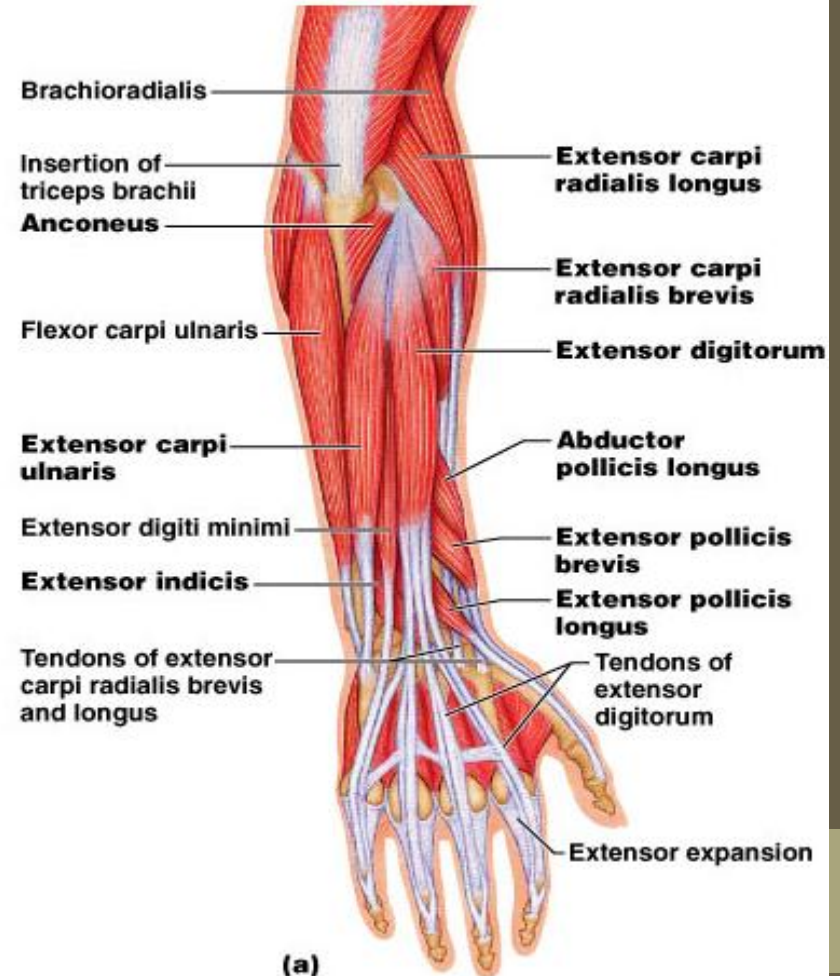
- ECRB, ED, ECU, Anconeus, Supinator & EDM.
 - **Nerve Supply** – Posterior interosseous nerve (radial nerve)

Group C: Radius, ulna & interosseous membrane

- AbPL, EPL, EPB.
 - **Nerve Supply** – Posterior interosseous nerve (radial nerve).

Extensor Compartment...

- Extensors of wrist
 - ECRL, ECRB, ECU
- Extensors of fingers
 - ED, EId, EDM
- Extensors of thumb
 - EPL
 - EPB
- Abductor of thumb
 - AbPL



Nerves of Forearm

- Median
 - Ulnar &
 - Radial Nerves
-
- Review their origin and distribution from the cords of the brachial plexus

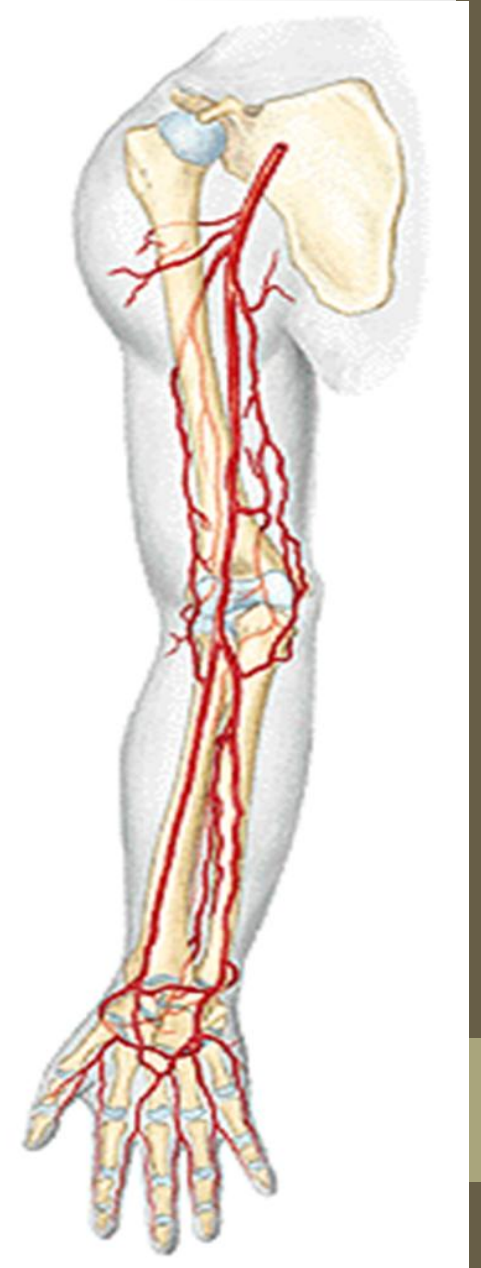


Arteries of the forearm

- Ulnar artery is main artery of forearm
- Radial artery is for the hand.

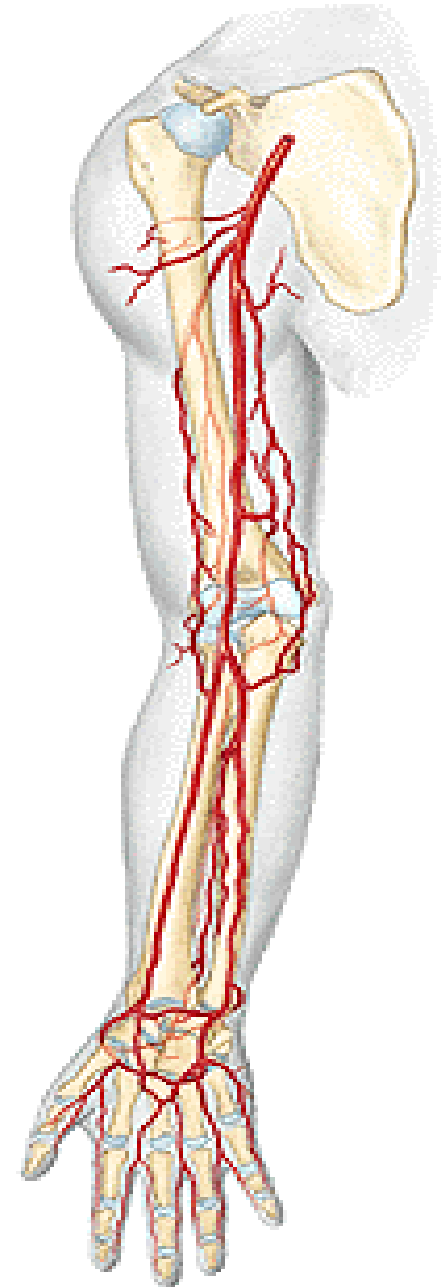
Ulnar artery

- Origin: Brachial artery in cubital fossa



Branches – Ulnar artery

- Common interosseous - divides into ant. & post. interosseous arteries, & interosseous recurrent
- Muscular
- Anterior ulnar recurrent – inferior ulnar collateral
- Posterior ulnar recurrent – superior ulnar collateral
- At wrist – palmar carpal & dorsal carpal
- In Palm – superficial palmar arch & deep palmar branch



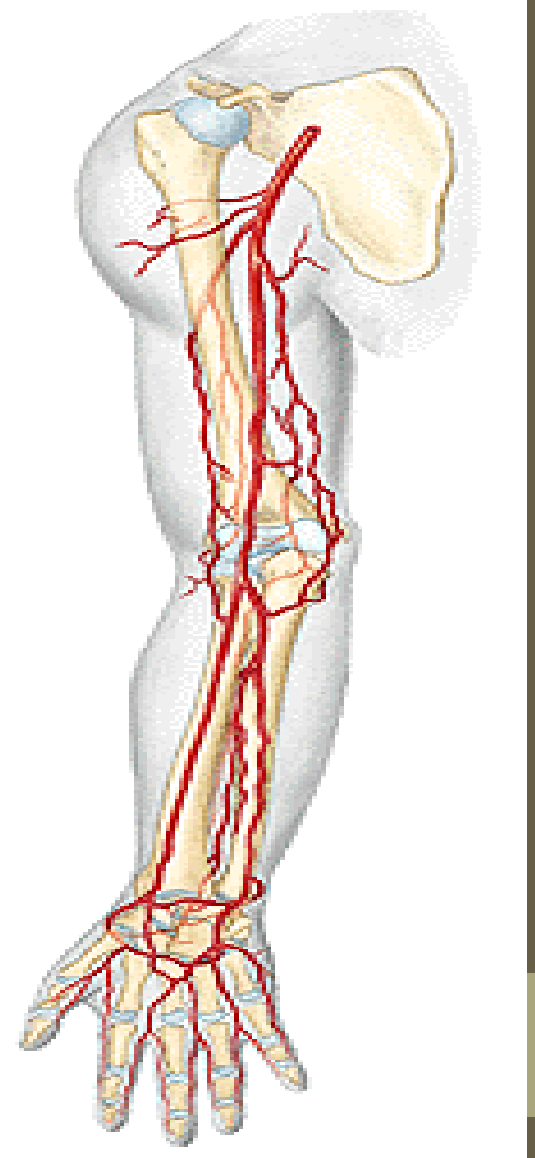
Radial Artery

Origin:

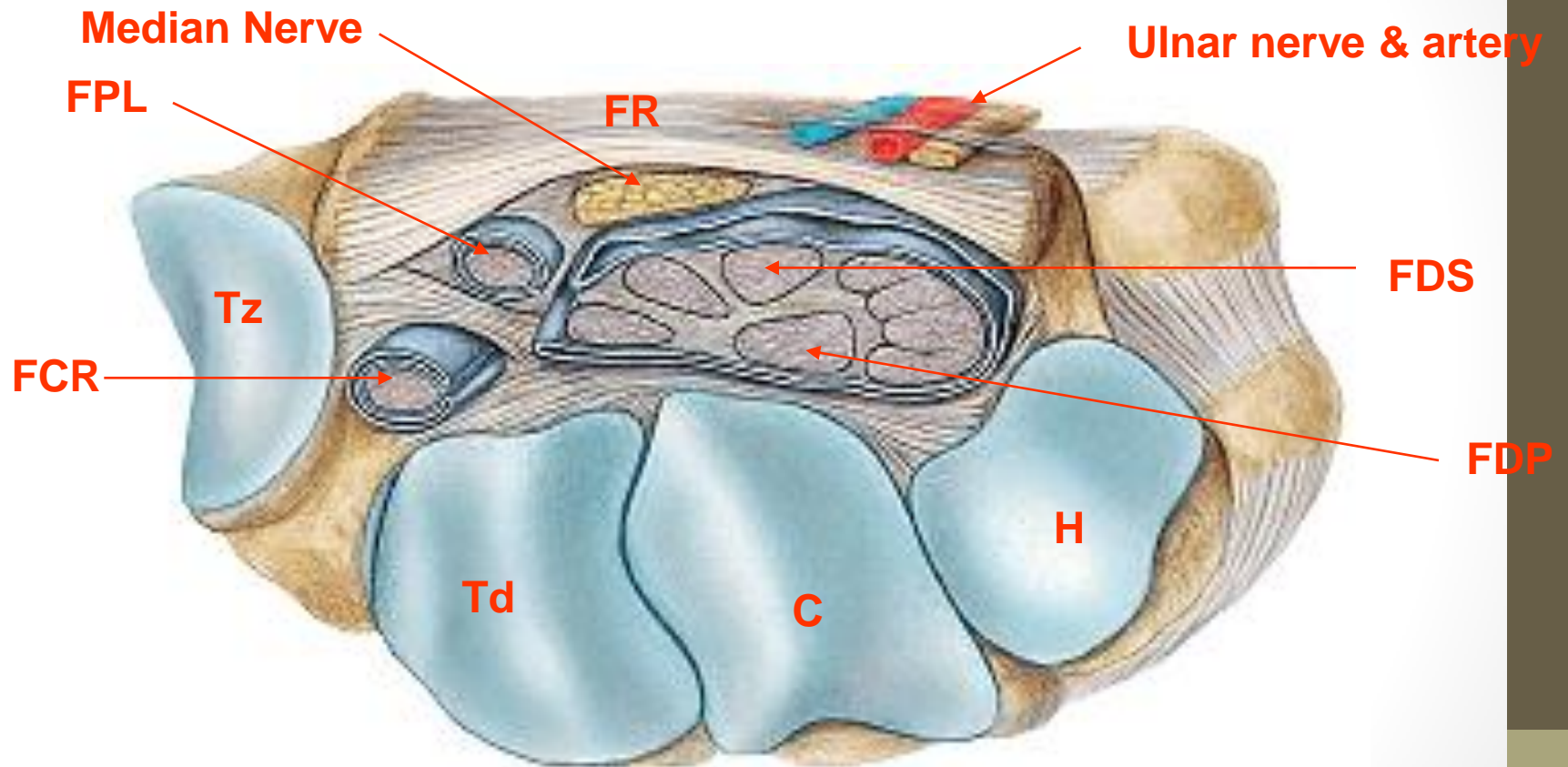
- Brachial artery in cubital fossa

Branches:

- Muscular
- Radial recurrent
- Superficial palmar
- At wrist – palmar carpal, dorsal carpal, dorsal metacarpal
- In Palm – Arteria princeps pollicis & arteria radialis indicis



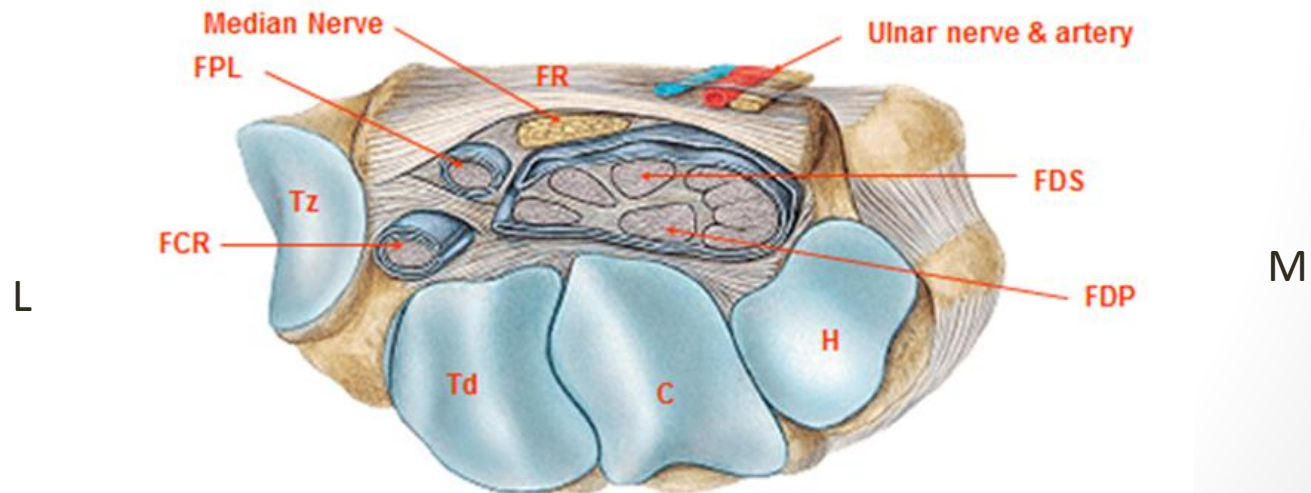
Carpal Tunnel



Carpal Tunnel...Boundaries

- Roof (Anterior) – Flexor retinaculum attached to:
 - pisiform & hook of hamate medially;
 - scaphoid & trapezium laterally
- Posterior: - Carpal bones

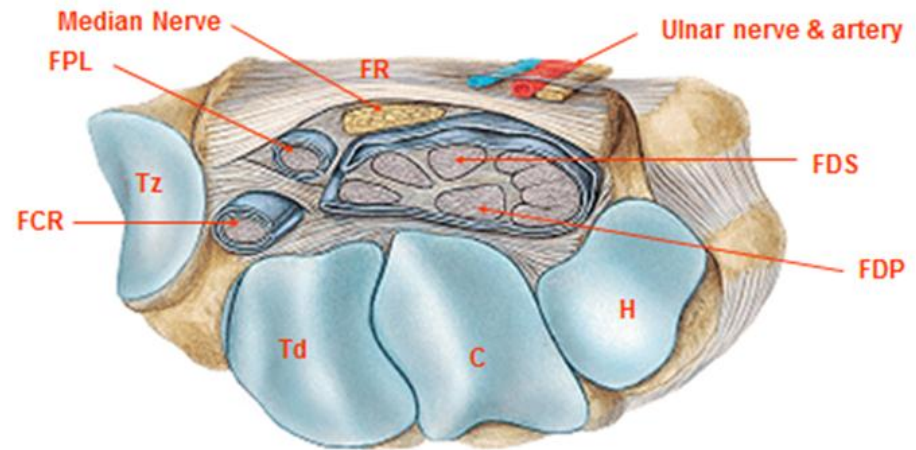
Carpal Tunnel



Contents or Structures transmitted

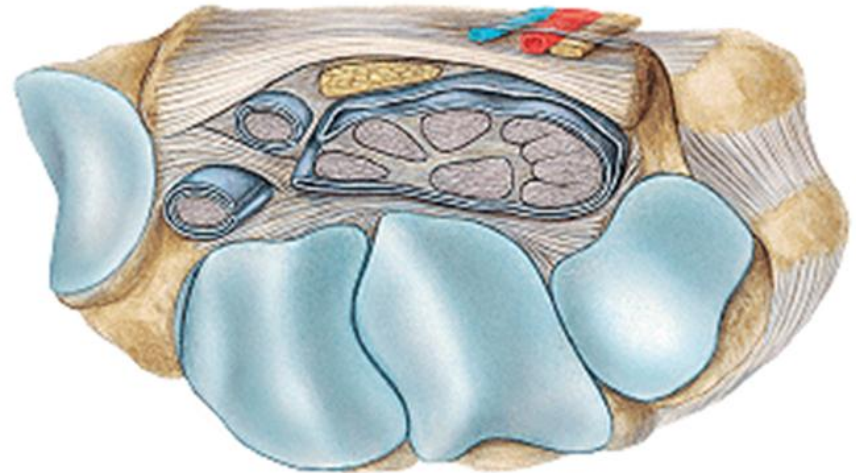
- Flexor Pollicis Longus
- Flexor Carpi Radialis
- Median Nerve
- Anterior interosseous artery
- Tendons of FDS & FDP
- Ulnar and radial bursae
- **Carpal tunnel syndrome**
 - From pressure on median nerve at this site affecting the distal distribution of the nerve

Carpal Tunnel



Ulnar canal (Guyon Tunnel)

- Boundaries
 - ❖ Hook of hamate
 - ❖ Flexor reticulum
- Content
 - ❖ Ulnar artery, vein and nerve
- Ulnar canal syndrome
 - ❖ No radial deviation
 - ❖ Hypoesthesia medial 1½ fingers
 - ❖ Weakness of intrinsic mm of hand
 - ❖ Flexion of 4th & 5th digits intact



Anatomical Snuff box

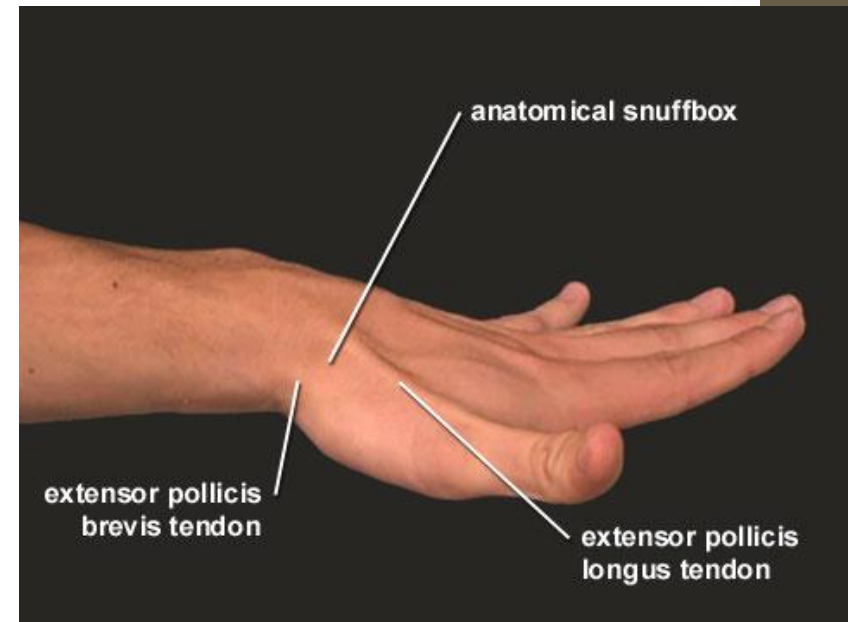
Space at radial side of wrist & visible with full extension of thumb.

Boundaries

- Ulnar side - EPL
- Radial side - AbPL & EPB
- Deep – Scaphoid bone

Contents

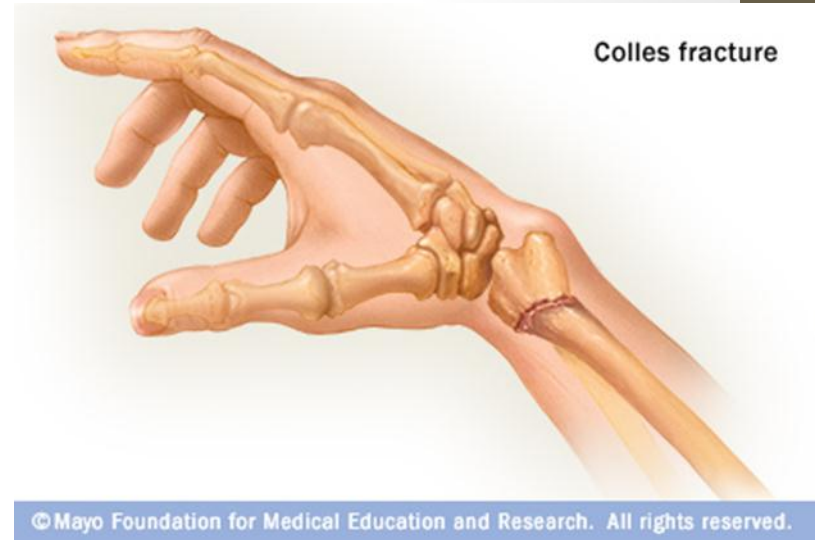
- Deep - radial artery
- Crossing superficially is superficial branch of radial nerve
- Beginning of cephalic vein



Applied Anatomy

- **Colle's fracture**

- Most common fracture of the forearm
- Complete transverse fracture of the distal 2 cm of radius
- Distal segment projects posteriorly.



http://upload.wikimedia.org/wikipedia/commons/a/af/Colles_Fractuur.jpg



http://24.media.tumblr.com/66d1d745eee6d8de9f4493375ffd2d0d/tumblr_mgj0i5YRdx1rq3lp6o1_1280.jpg

Questions

- Write short note on the origin and branches of the ulnar (*or radial*) artery
- Write short note on the carpal tunnel and its syndrome
- What are the distinguish features between the carpal tunnel and the ulnar (Guyon) tunnel
- What are the boundaries and contents of the anatomical snuff box.