

# VESSELS OF THE HAND

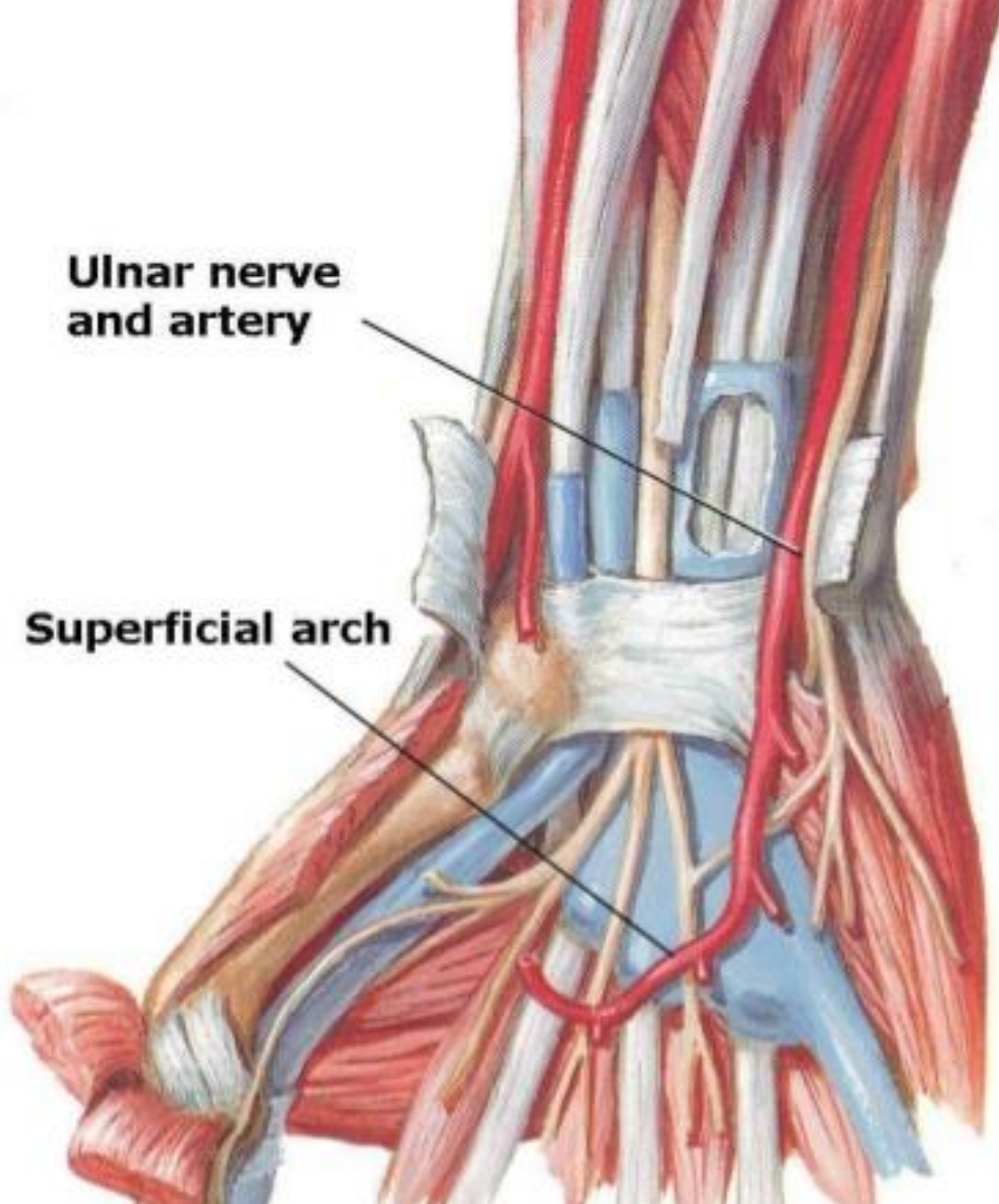
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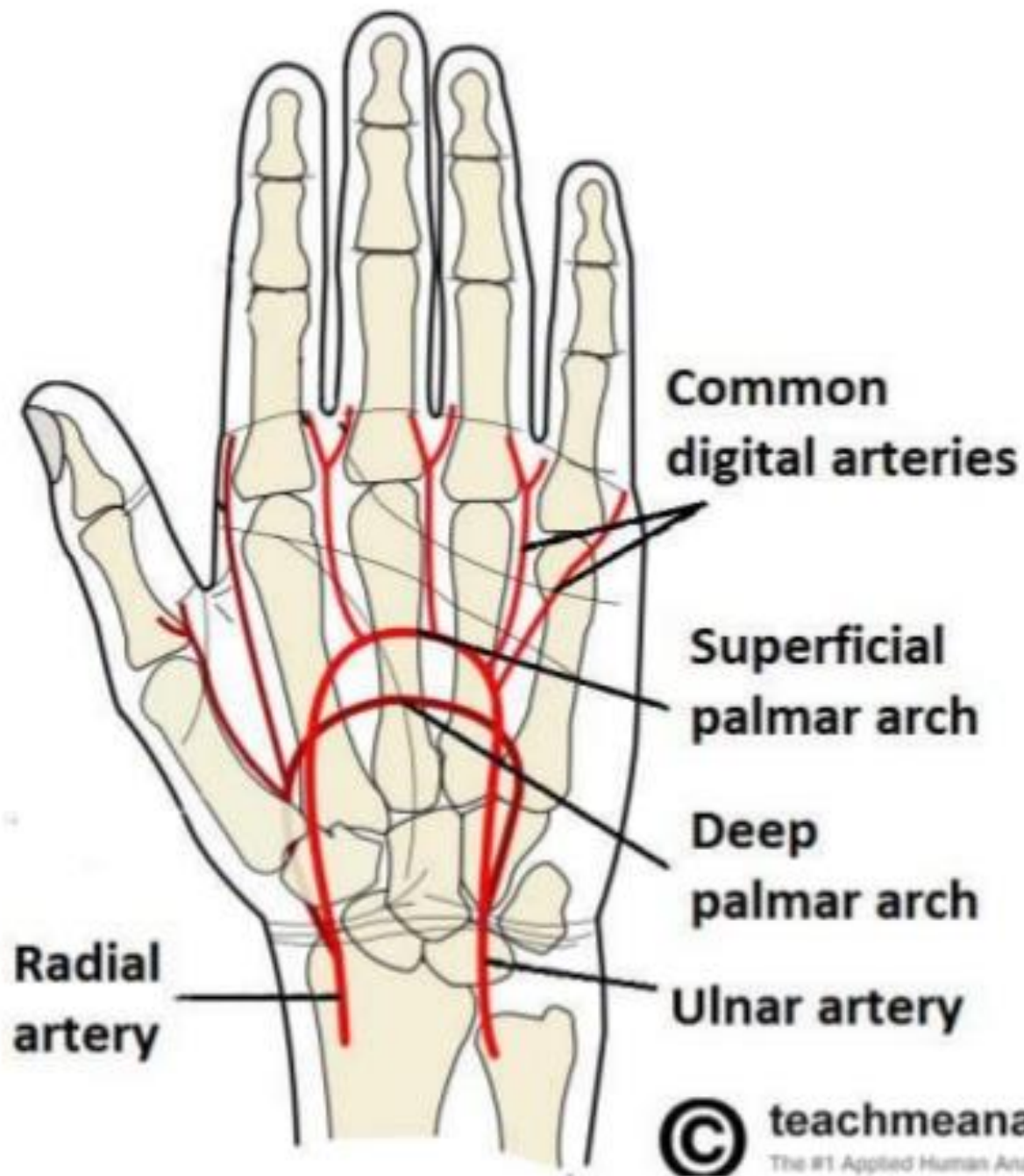
## In the Hand

- In the hand, the ulnar and radial arteries interconnect to form two **arches**, from which branches to the digits emerge.
- **Radial artery** – contributes mainly to supply of the **thumb** and the lateral side of the **index** finger
- **Ulnar artery** – contributes mainly to the supply of the rest of the digits, and the medial side of the index finger

**Ulnar nerve  
and artery**

**Superficial arch**





**teachmeanatomy**

The #1 Applied Human Anatomy Site on the Web.

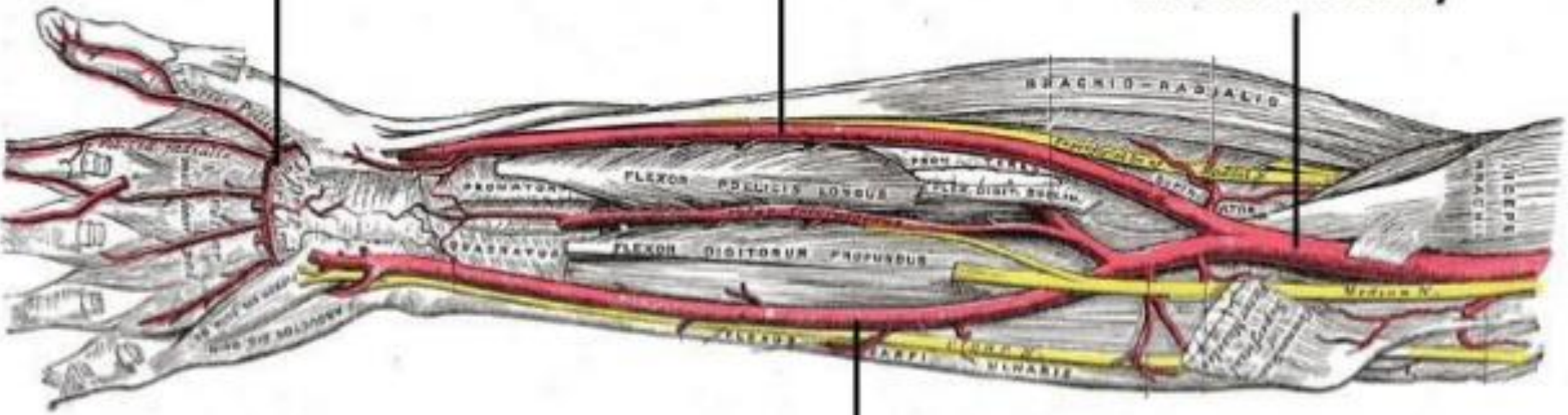
# The ulnar artery

- **BEGINNING**
- Opposite the neck of the **radius**, around 1 cm below the bend of the elbow.
- **END**
- It ends into superficial and deep branches in the palm.

**Deep Palmar Arch**

**Radial Artery**

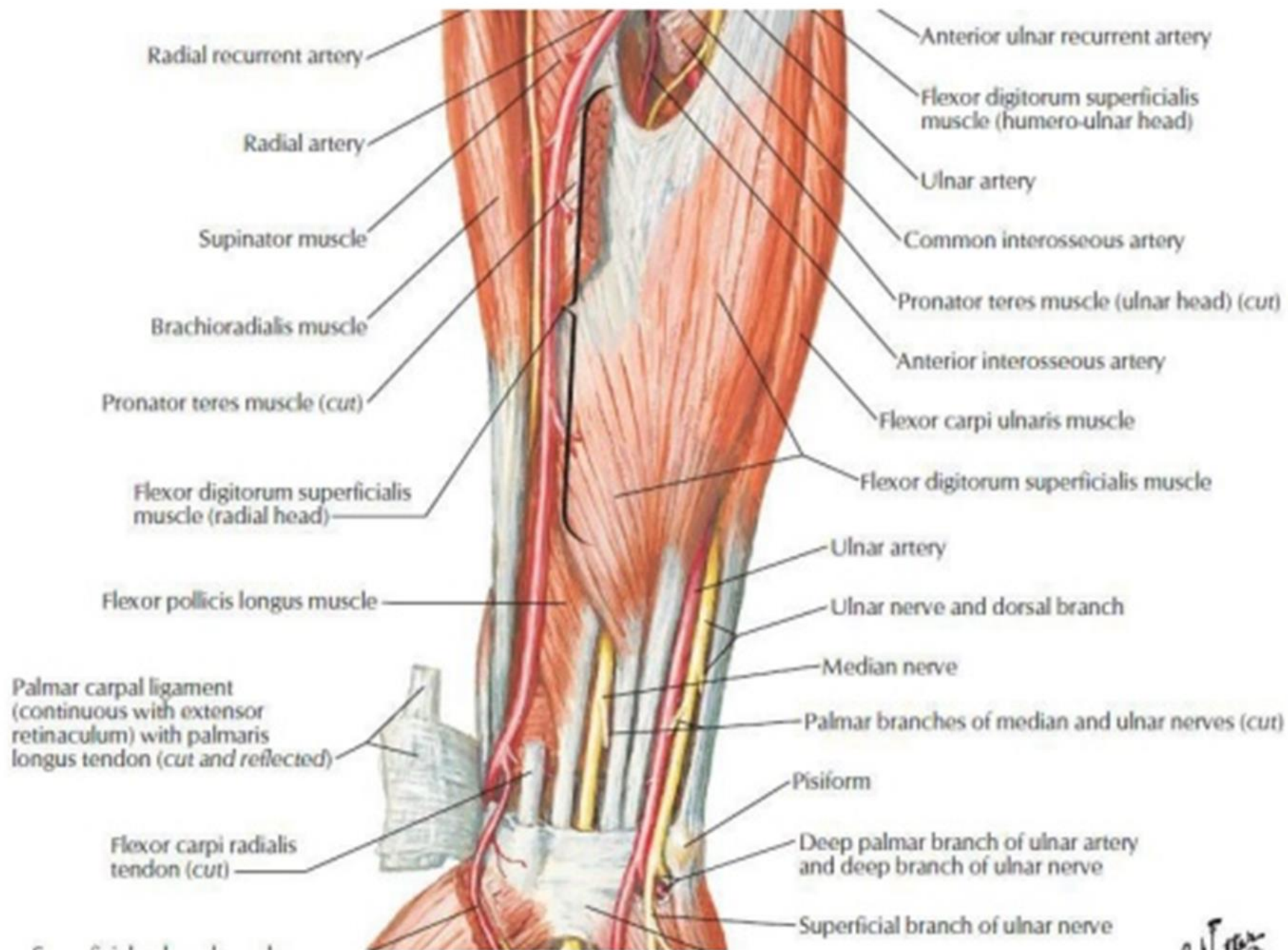
**Brachial Artery**



**Ulnar Artery**

# The ulnar artery

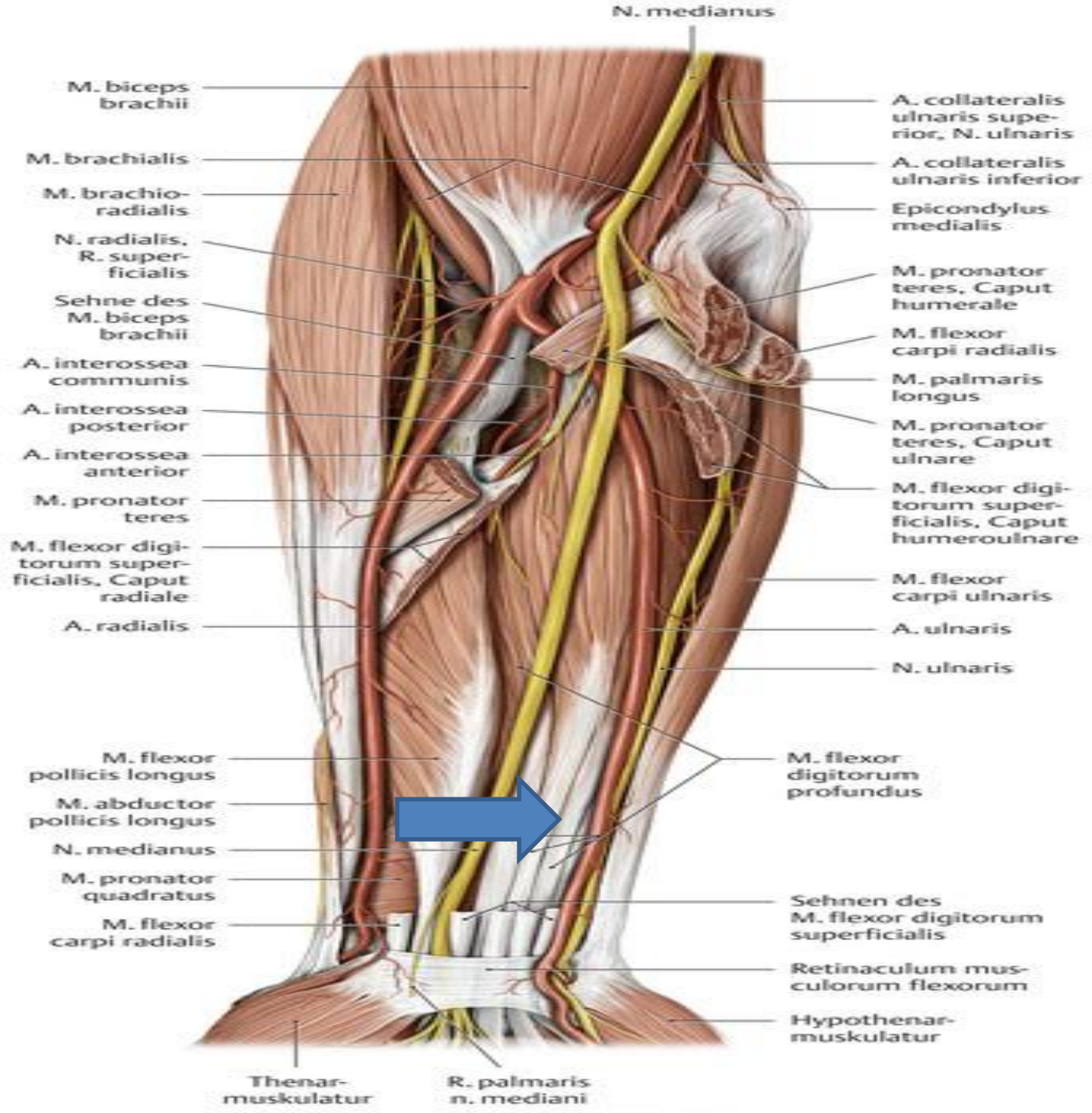
- **COURSE**
- In upper 1/3 rd of forearm, It runs downwards and the medial side obliquely.
- In lower 2/3 rd , it runs The course is vertical.
- It goes into the palm by passing in front of **flexor retinaculum** lateral to the **ulnar nerve** and the pisiform bone.
- The superficial branch is the continuation of the artery as superficial palmar arch.





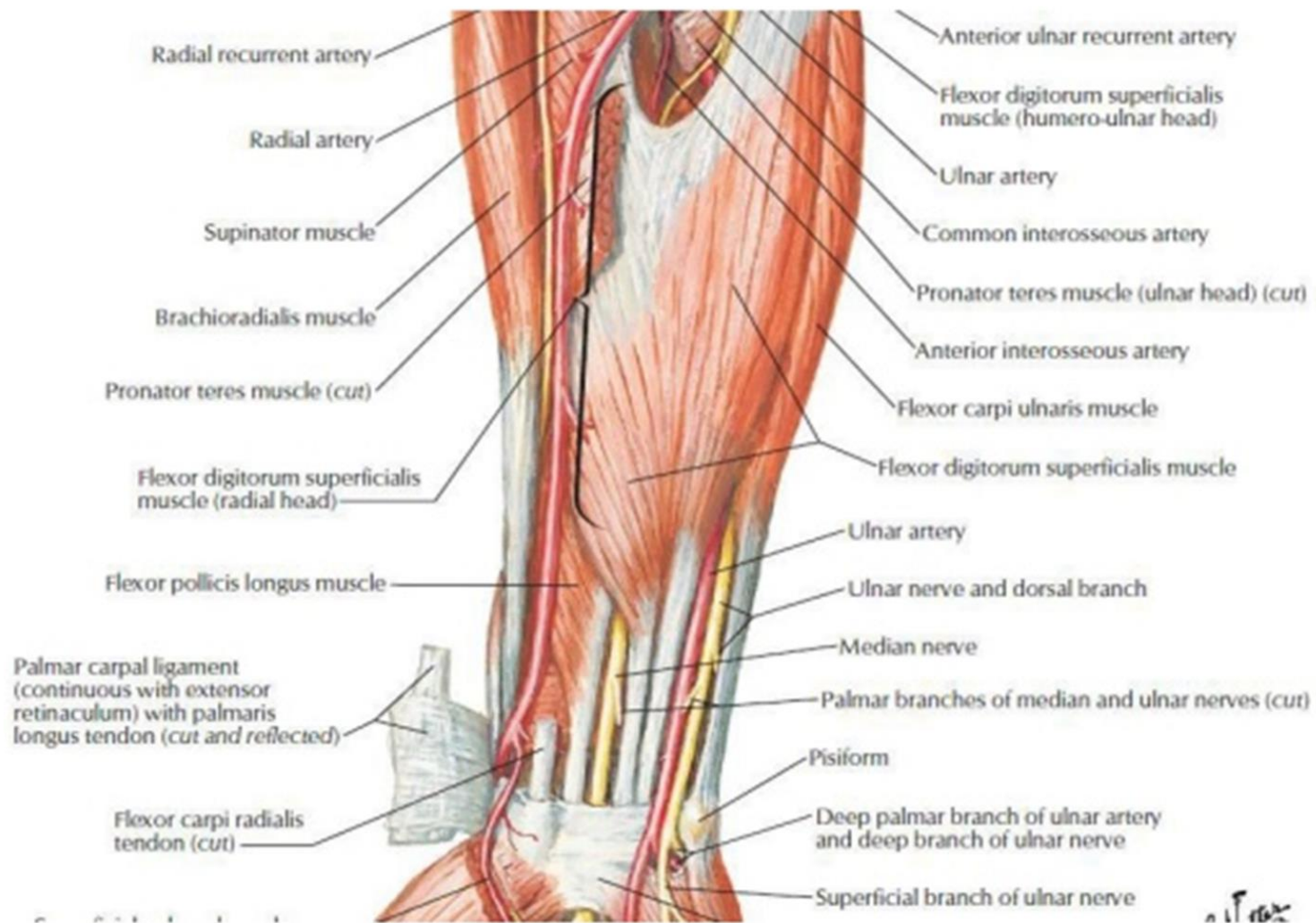
# The ulnar artery

- It lies on 3 structures throughout its course.
  - a) In the cubital fossa:
    - it lie on brachialis.
  - b) In the wrist:
    - it lies on flexor retinaculum .
  - c) Between these two structures:
    - it lies on flexor digitorum profundus.



# The ulnar artery

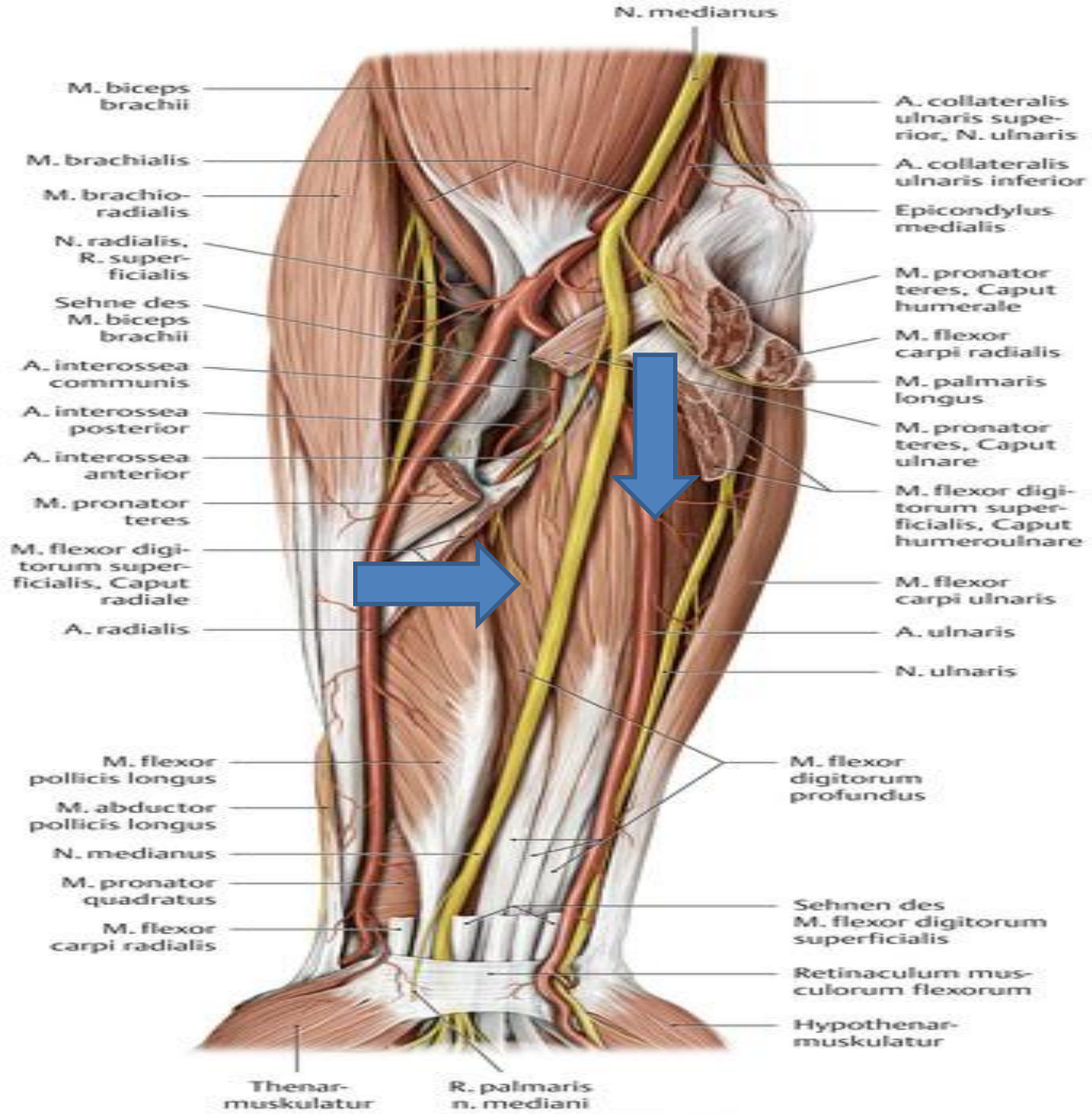
- In the **upper & oblique part**, it is located deep to the muscles which arise from medial epicondyle (common flexor origin).
- In the **lower & vertical part**, it is overlapped by flexor carpi ulnaris.
  - It ends up being superficial and is located between the tendons of flexor carpi ulnaris and flexor digitorum superficialis.



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# The ulnar artery

- Two nerves in the forearm:
- The **median nerve** is located medial to the artery in cubital fossa which passes between two heads of pronator teres then crosses in front of the artery.
- The **ulnar nerve** is has 3 relations with ulnar artery.
  - At elbow: they are separated by a wide space.
  - In upper  $1/3^{\text{rd}}$  of forearm the artery runs obliquely to come nearer to the nerve.
  - In lower  $1/3^{\text{rd}}$  nerve lies on medial side of artery.



# The ulnar artery

- **Anterior:**
- The upper part of the ulnar artery is covered up by superficial muscles of the forearm, viz.
  - Pronator teres.
  - **Flexor carpi radialis.**
  - **Palmaris longus.**
  - Flexor digitorum superficialis.
- The lower part of the ulnar artery is covered merely by the skin and superficial and deep fasciae.

## The ulnar artery

- **Posterior:**
- Only the origin of ulnar artery is located on **brachialis**, while in the remaining whole part of its course it is located on flexor digitorum profundus.

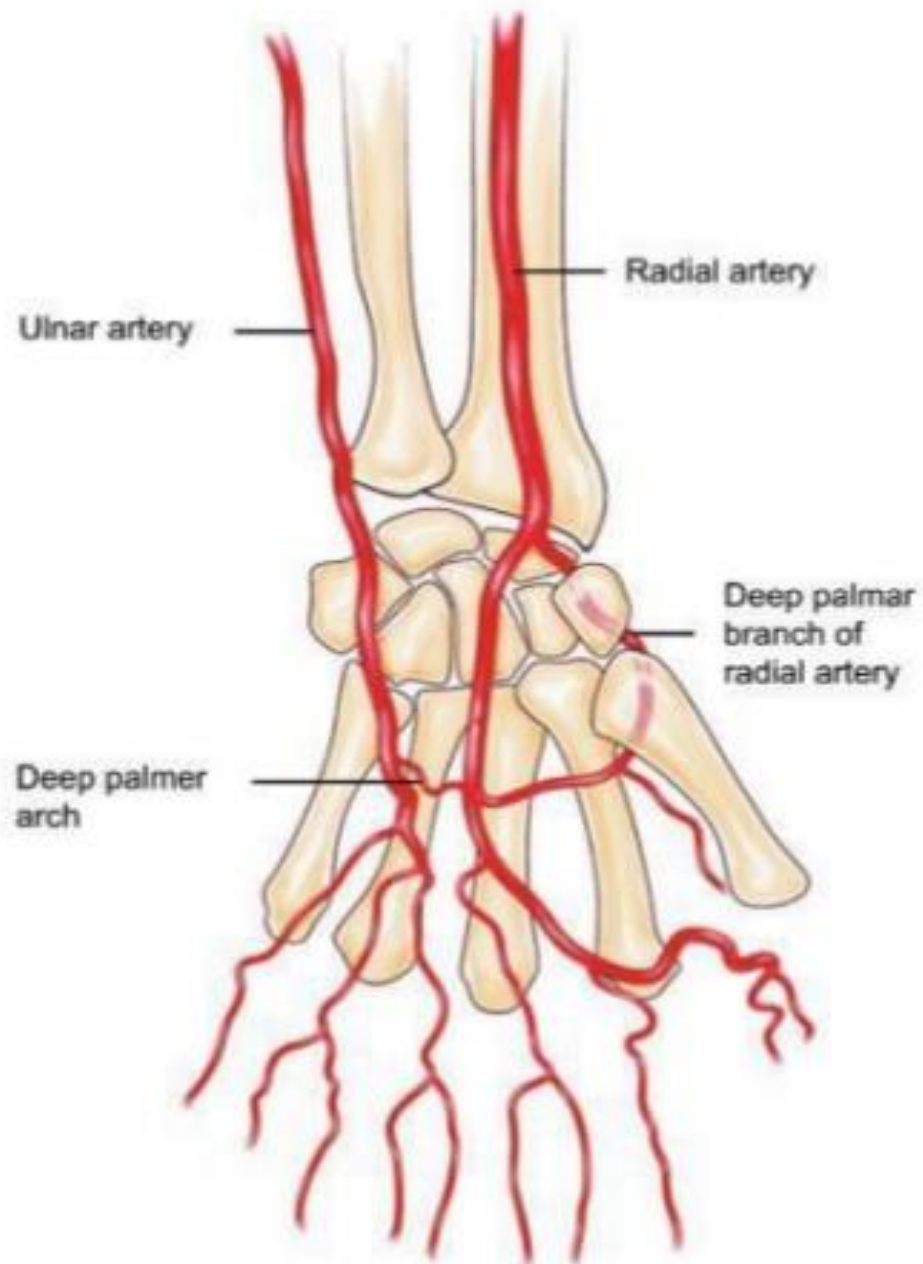




# The ulnar artery

## BRANCHES

1. **Muscular branches** to neighboring muscles.
2. **Anterior and posterior ulnar collateral (recurrent) arteries**, which join the arterial anastomosis (with branches of brachial artery) around the elbow joint.
3. **Common interosseous artery**, which stems from the upper part of the ulnar artery and after a very short course at the upper border of interosseous membrane, it splits into
  - anterior (larger) and posterior interosseous (smaller) arteries.
4. **Anterior and posterior ulnar carpal branches**, which join the formation of anterior and posterior carpal arches.
5. **Terminal branches** are two, the larger superficial branch continues as the superficial palmar arch, while the smaller deep branch takes part in the **deep palmar arch**.



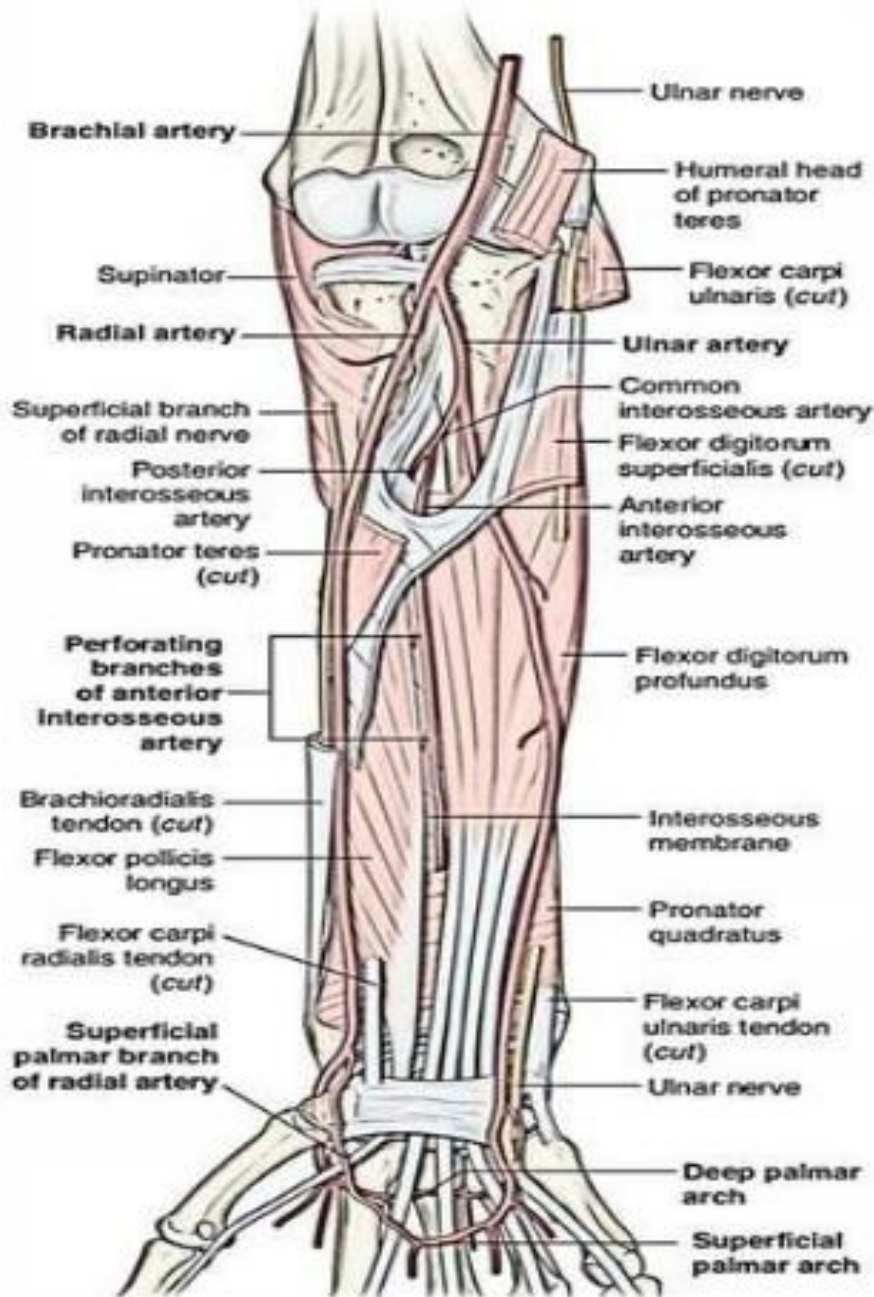
# **RADIAL ARTERY**

Smaller of the two of the terminal  
branches of brachial artery

# RADIAL ARTERY

- It is the main artery in the human forearm.
- The smaller of the two terminal branches of brachial artery.
- It starts from the brachial artery at roughly the neck of the radius in cubital fossa and runs along the lateral aspect of the forearm.
- It ends in the palm by becoming the “deep palmar arch”

# RADIAL ARTERY



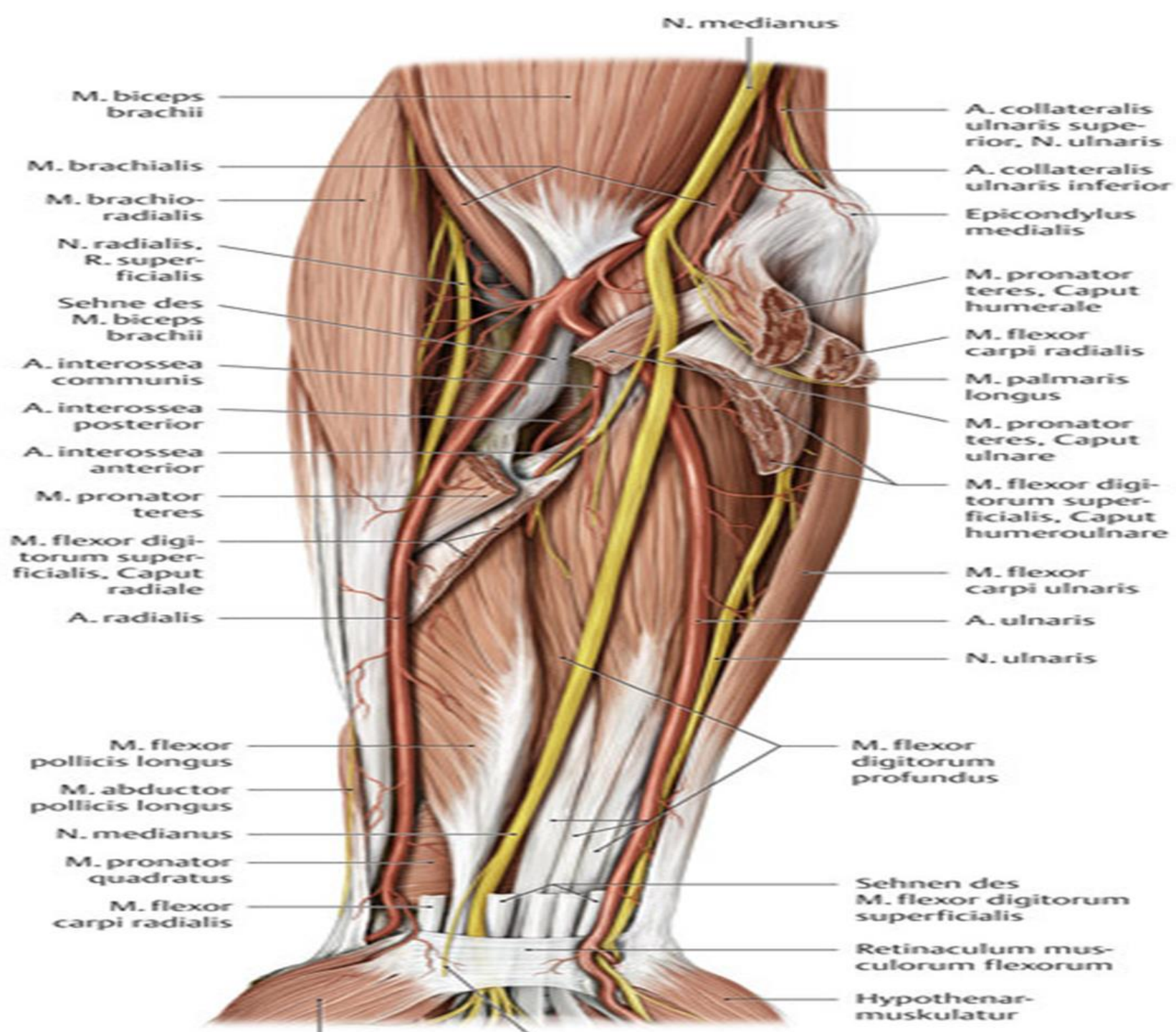
# RADIAL ARTERY

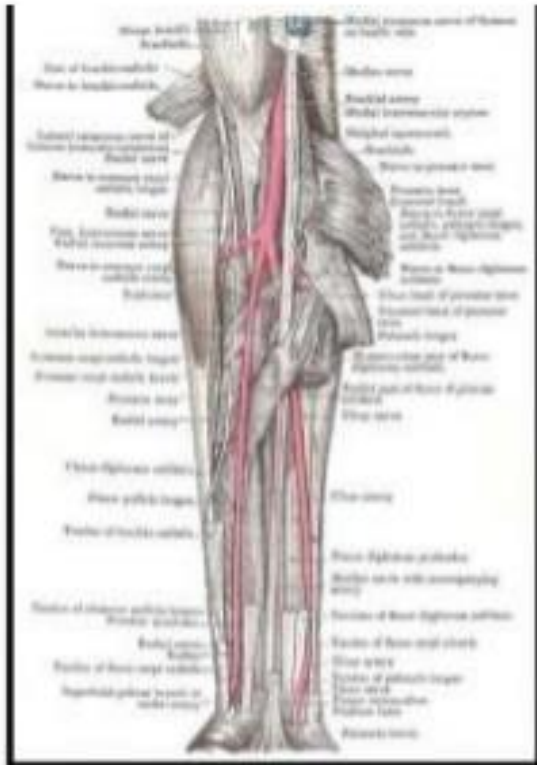
- It descends in the lateral part of the front of the forearm.
- It lies on muscles which are attached to front of the radius.
- At the lower end of the radius it leaves the front of forearm & turns backwards round the lateral border of the wrist, below the styloid process of the radius.
- Here pulsation can be felt in the anatomical snuff box.

## RADIAL ARTERY

- Its **upper part** lies between brachioradialis (laterally) & pronator teres (medially) overlapped by brachioradialis.
- **In middle third** of the forearm: Only one nerve related to artery is the radial nerve that lies along lateral side of artery.
- **Lower down**, the radial artery becomes superficial & lies between brachioradialis (laterally) and flexor carpi radialis (medially)







# Radial artery

Smaller lateral branch of brachial artery in cubital fossa.

Runs through the anatomical snuffbox on the surface of scaphoid and trapezium enters palm by passing between two heads of first dorsal interosseous muscle divides into princeps pollicis and deep palmar branch.

**Radial recurrent artery**

**Superficial palmar branch**

Anastomoses with superficial branch of ulnar artery to complete the superficial palmar arterial arch.

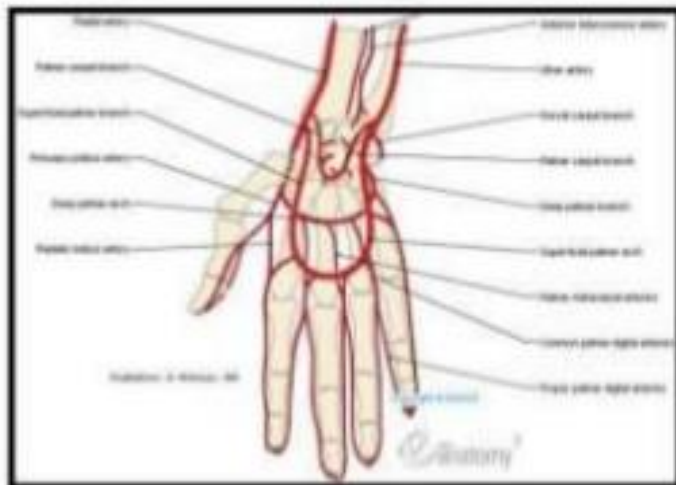
**Princeps pollicis artery**

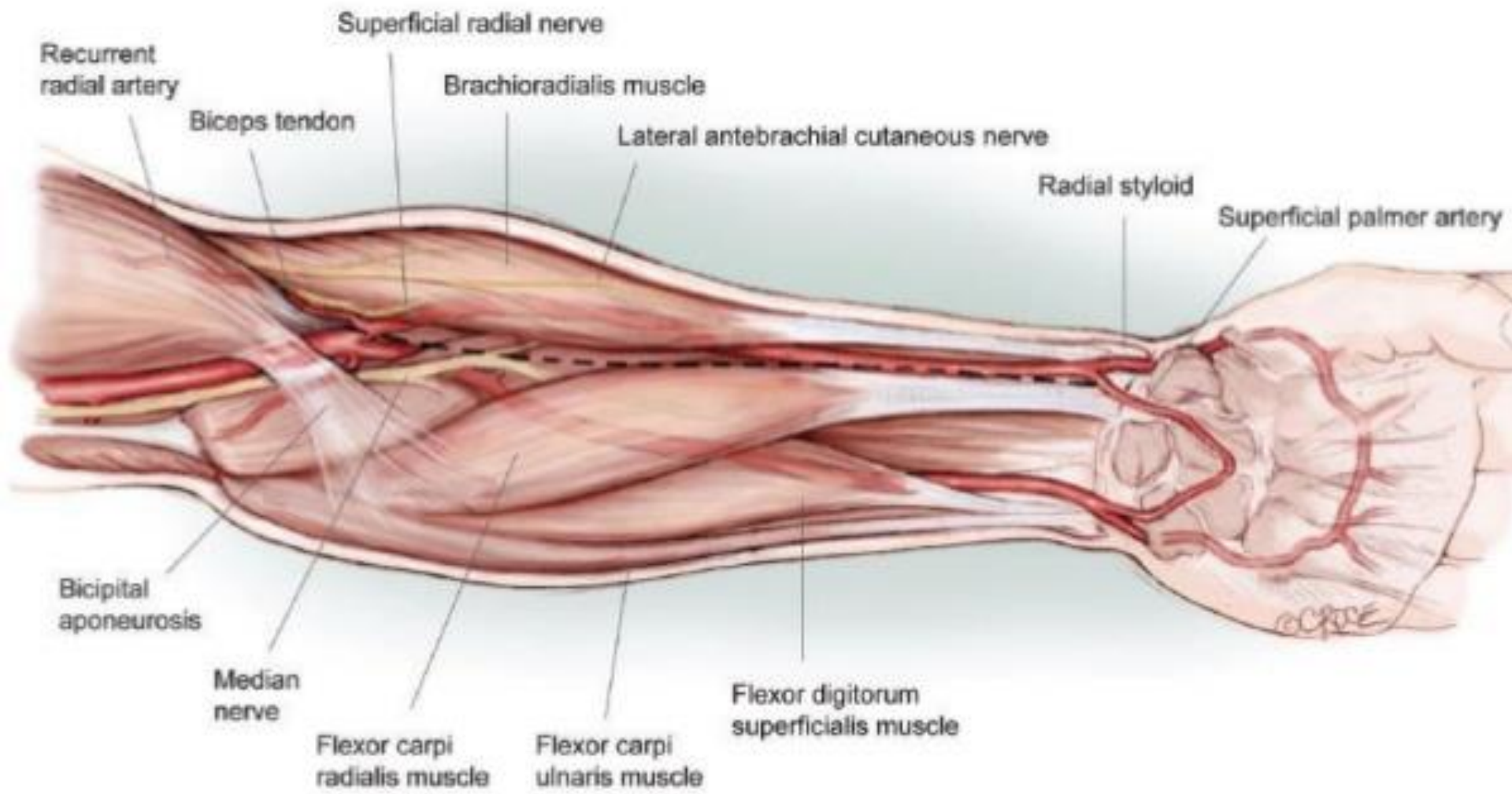
Divides into two proper digital arteries for each side of thumb.

**Radialis indicis artery**

**Deep palmar Arch**

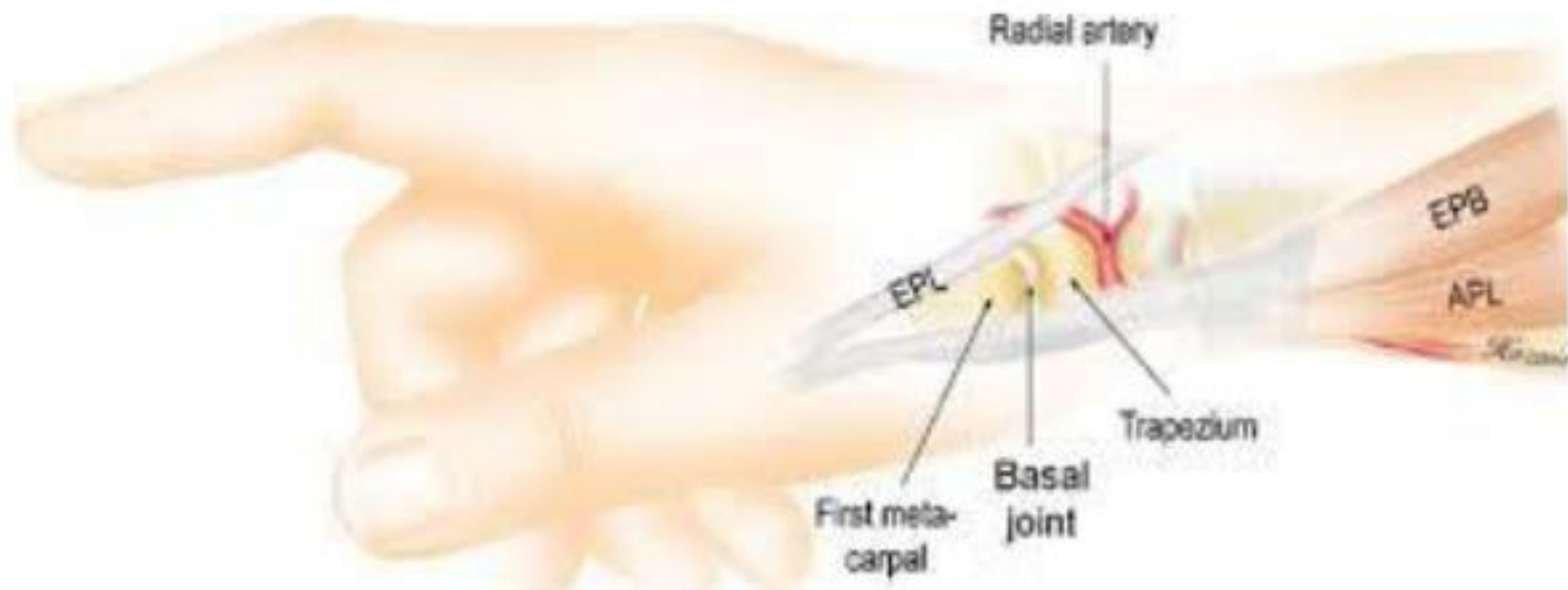
Is formed by main termination of radial artery and is usually completed by deep palmar branch of ulnar artery.





# RADIAL ARTERY

- The radial artery leaves the forearm by winding around the lateral aspect of the wrist to reach the anatomical snuff-box on the posterior surface of the hand.

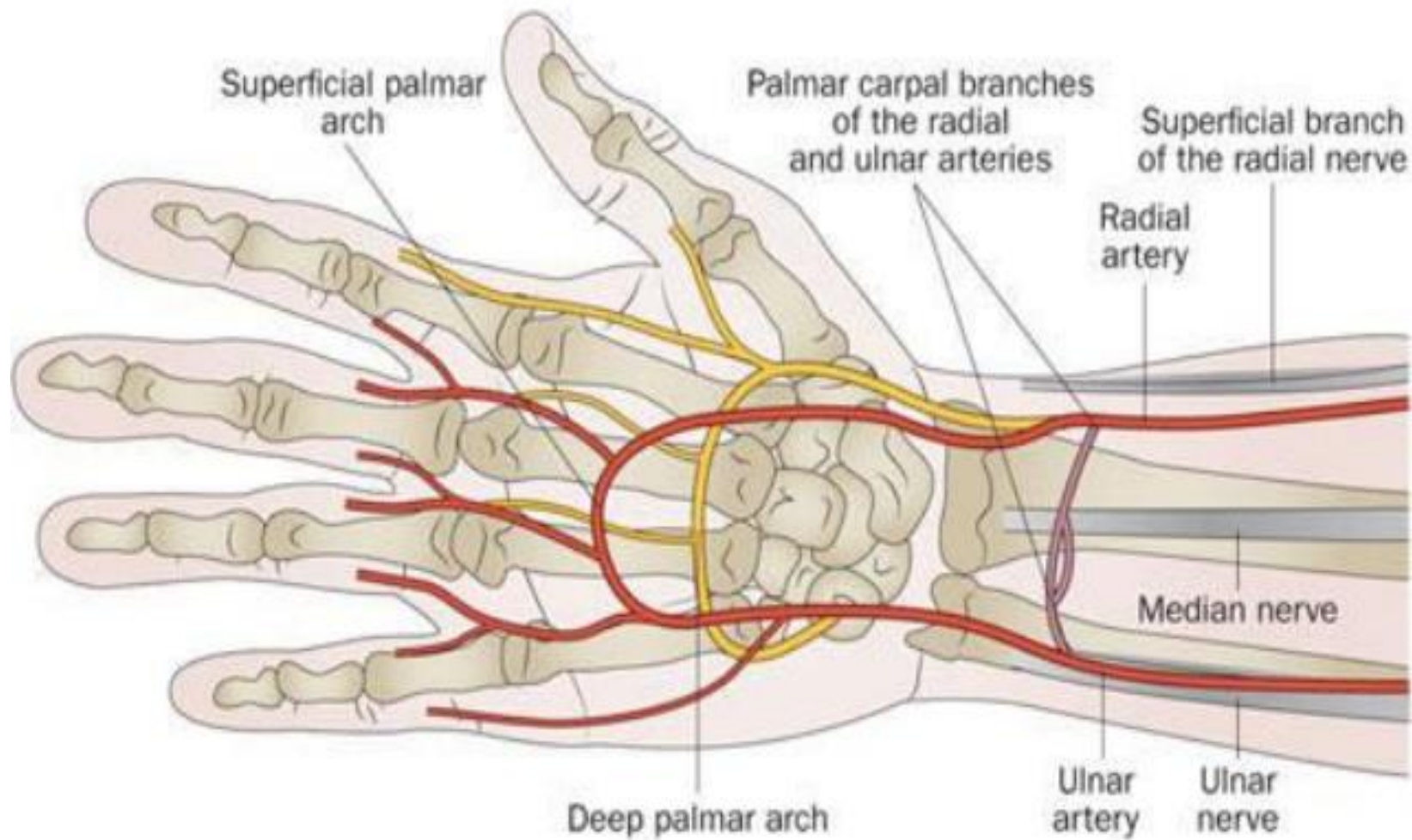


# RADIAL ARTERY

- Relations in hand:
- The radial artery lies first between 1<sup>st</sup> dorsal interosseous & adductor pollicis. Here it gives two branches:
  - Radialis indicis artery.
  - Princeps pollicis artery.
- After that the radial artery passes through adductor pollicis to become the deep palmar arch.

# RADIAL ARTERY

- ANTERIOR
- The upper part of the radial artery is overlapped by brachioradialis.
- Its lower part is covered only by the skin, and superficial and deep fasciae.



# RADIAL ARTERY

- **POSTERIOR**
- The radial artery from above to downward is located on the following structures:
  - Biceps tendon.
  - Supinator.
  - Pronator teres.
  - Flexor digitorum superficialis.
- These structures together create **the bed of the radial artery.**
- The radial artery is quite superficial as compared to the **ulnar artery**.



# RADIAL ARTERY

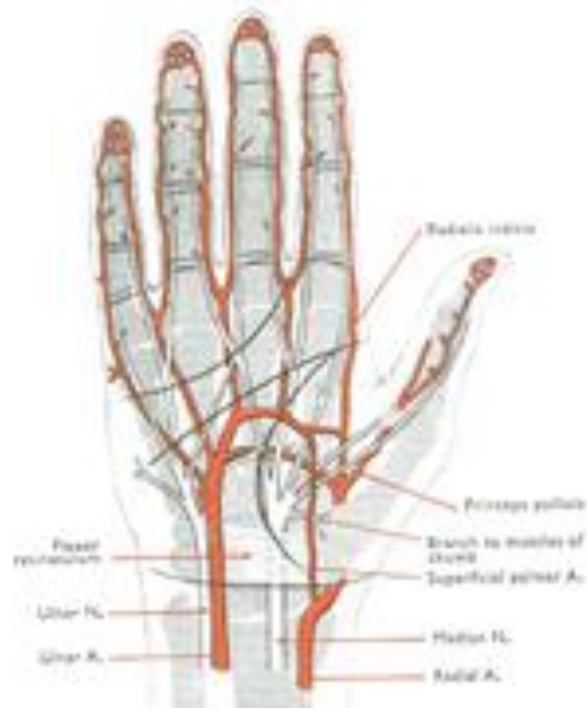
- **CLINICAL SIGNIFICANCE**
- Evaluation of radial pulse: It is felt on the radial side of the front of wrist where the radial artery is located on the anterior surface of the distal end of radius, and covered only by the skin and fascia
- Volkmann's ischemic contracture (ischemic compartment syndrome): The sudden complete occlusion (example, because of tight plaster cast) or laceration (because of supracondylar fracture of the [humerus](#)) of the brachial artery can cause paralysis of flexor muscles of the forearm because of ischemia for a few hours.

# Clinical Relevance

- **Fractures of the Scaphoid**
- In the anatomical snuffbox, the **scaphoid** and the **radius** articulate to form part of the wrist joint. In the event of a blow to the wrist (e.g falling on an outstretched hand), the scaphoid takes most of the force. If localised pain is reported in the anatomical snuffbox, a **fracture of the scaphoid** is the most likely cause.
- The scaphoid has a unique blood supply, which runs **distal to proximal**. A fracture of the scaphoid can disrupt the blood supply to the **proximal** portion – this is an emergency. Failure to revascularise the scaphoid can lead to avascular necrosis, and future arthritis for the patient.

# ARTERIAL ARCHES IN HAND

- SUPERFICIAL PALMAR ARCH
- DEEP PALMAR ARCH
- Formation
- Site
- Surface anatomy
- Branches



# Superficial palmar arterial arch

- The superficial palmar arterial arch is the primary extension of ulnar artery.
- It is superficial because it lies next to palmar aponeurosis.
- It is superficial palmar division of the ulnar artery away from flexor retinaculum.
- The convexity of arch is pointed towards the digits.
- The **ulnar artery** together with ulnar nerve gets into the hand at the medial side of the wrist.
- The vessel is located among the **palmaris brevis** as well as the **flexor retinaculum** and also lateral to the ulnar nerve along with the **pisiform bone**.

## Superficial palmar arterial arch

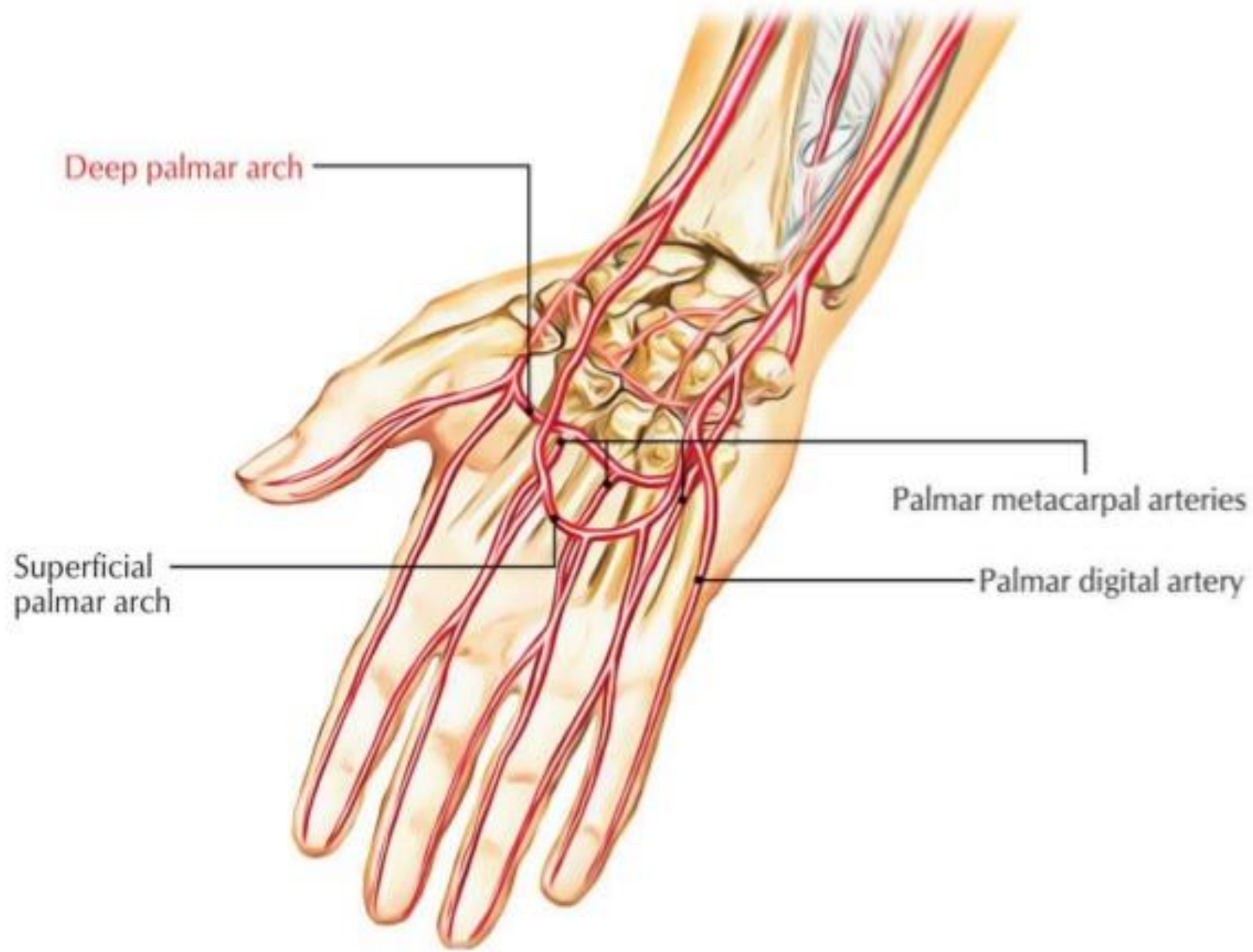
- The arch is terminated laterally through anastomosing along with one of the following divisions of the radial artery:
  - Superficial palmar division of the radial artery (most common).
  - Radialis indicis artery.
  - Princeps pollicis artery.

## CLINICAL SIGNIFICANCE

- **LACERATION (WOUNDS)**
- The lacerated injuries of palmar arterial arches generally cause excessive and uncontrollable bleeding. One of the most effective techniques is the compression of brachial artery in opposition to humerus in order to control the bleeding. Due to attachments of these arches together with the palmar as well as dorsal carpal arches, the ligation or clamping of the radial artery or ulnar artery or both of these proximal towards wrist cannot control the bleeding.

## DEEP PALMAR ARCH

- It is formed by the radial artery with the deep palmar division of the ulnar artery.
- It lies immediately distal to the bases of metacarpal bones (nearer to the wrist than superficial palmar arch).
- It is concave to the wrist and in this concavity lies the deep branch of the ulnar nerve.





# DEEP PALMAR ARCH RELATIONS

- **DEEP**

- Proximal portion of shafts of the metacarpals.
- Interosseous muscles.

- **SUPERFICIAL**

- Long flexor tendons of the fingers.
- Lumbricals.

# VEINS

Veins generally follow the deep arterial system as *venae comitantes*.

A superficial venous system also exists at the dorsum of the hand and contributes to the cephalic and basilic veins in the upper extremity.

