

VASCULAR ANATOMY OF THE UPPER LIMB

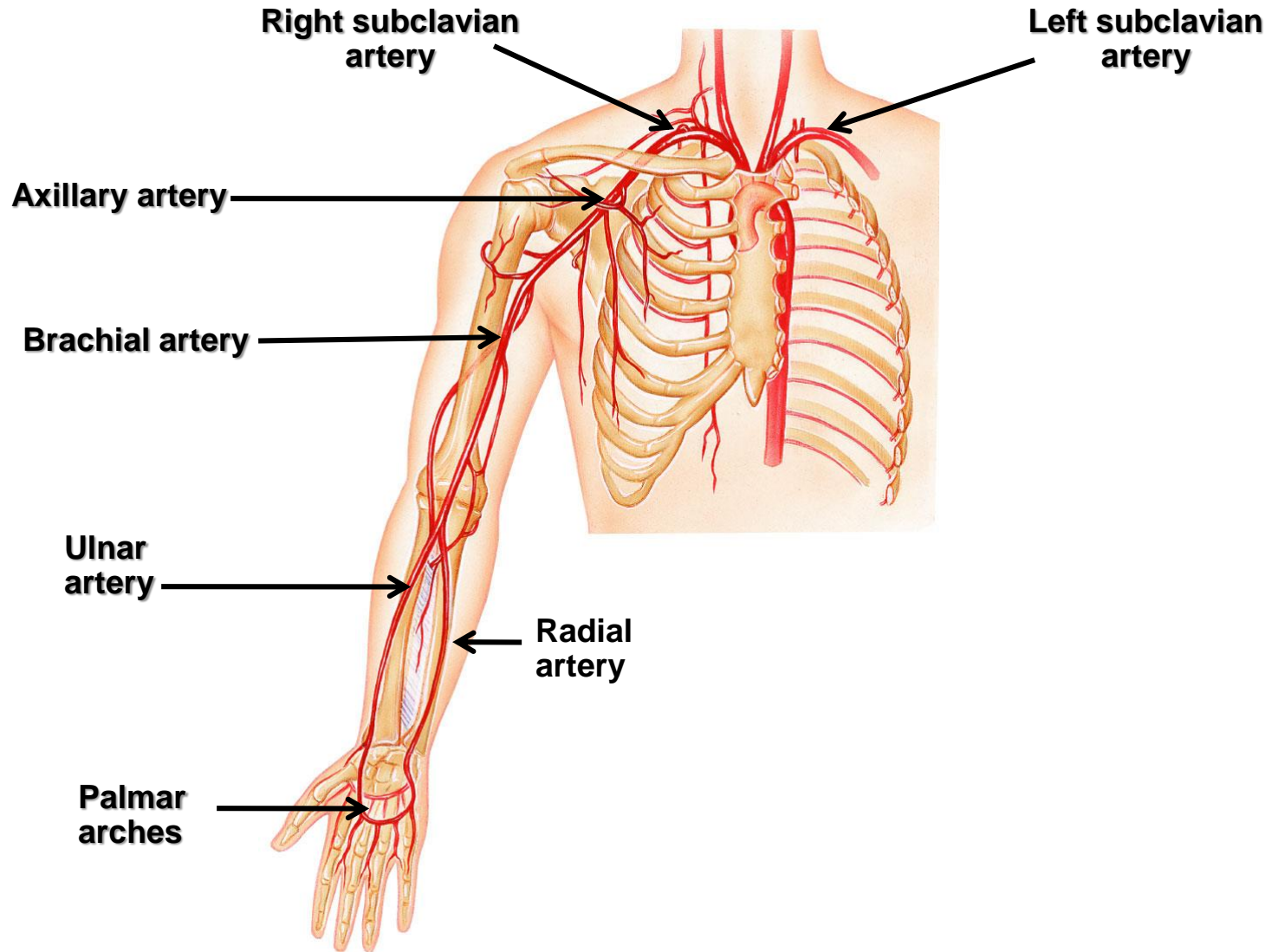
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Objectives

At the end of the lecture, the students should be able to :

- *Identify the origin of the vascular supply for the upper limb.*
- *Describe the main arteries and their branches of the arm, forearm & hand.*
- *Describe the vascular arches for the hand.*
- *Describe the superficial and deep veins of the upper limb*

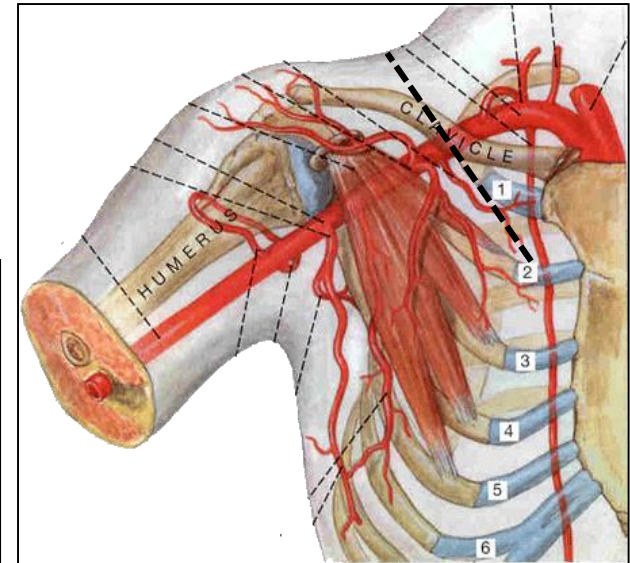
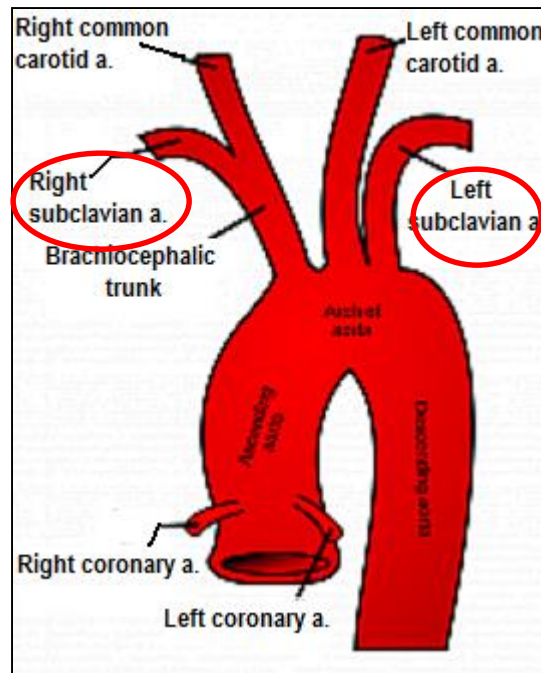
Arteries Of The Upper Limb



The Subclavian Artery

□ The **right** artery originates from the **brachiocephalic artery**.

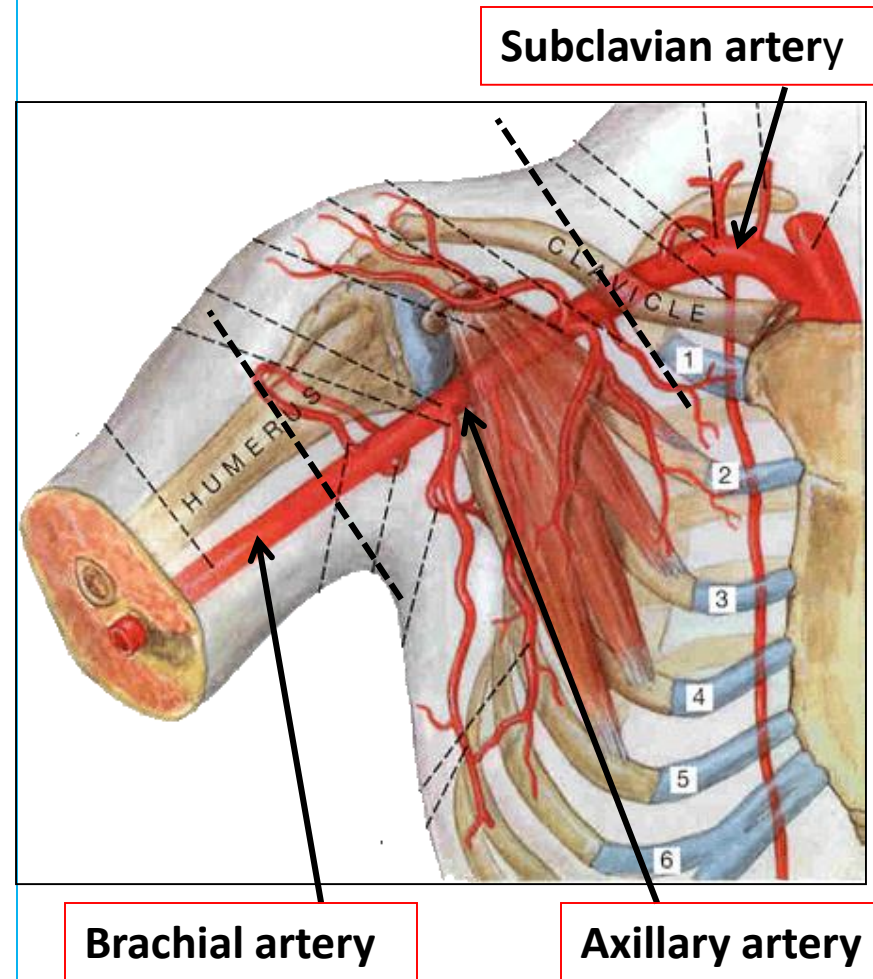
□ The **left** artery originates from the **arch of the aorta**.



Continues as **Axillary artery** at the lateral border of the 1st rib

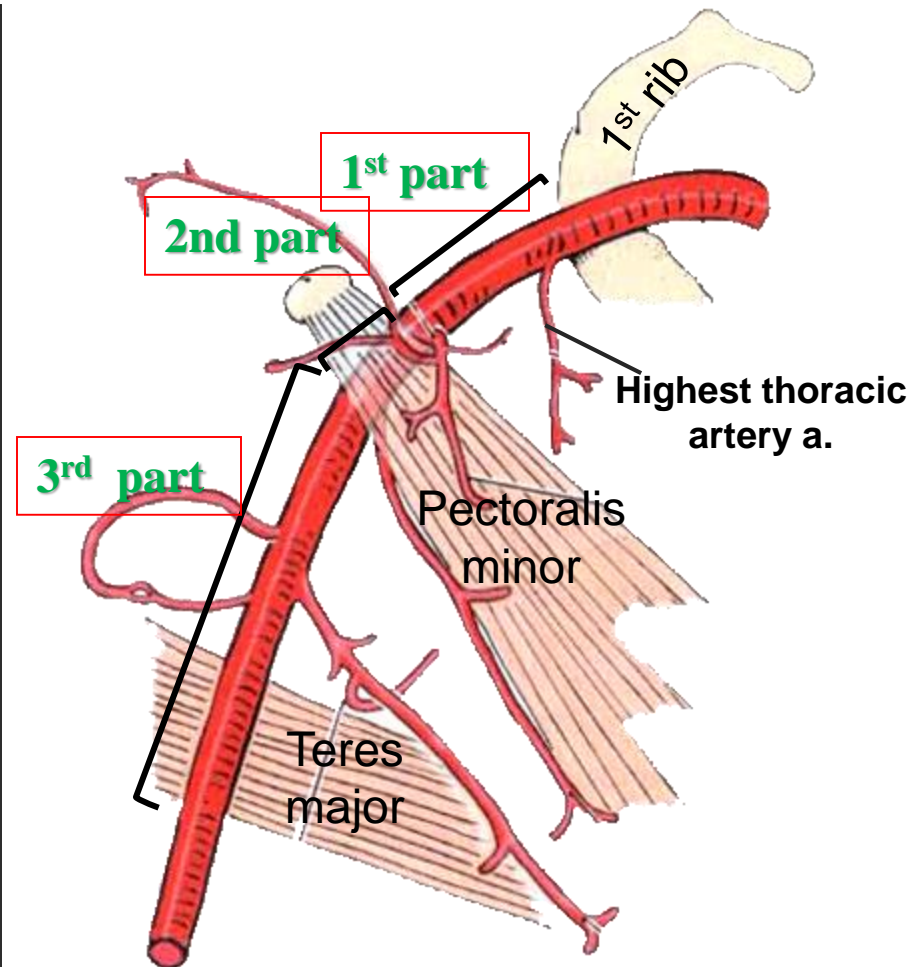
The Axillary Artery

- Begins at the lateral border of the 1st rib as continuation of the **subclavian artery**.
- Continues as **brachial artery** at lower border of teres major muscle.
- Is closely related to the cords of **brachial plexus** and their branches
- Is enclosed within the **axillary sheath**.
- Is crossed anteriorly by the **pectoralis minor** muscle, and is divided into three parts; **1st, 2nd & 3rd**.



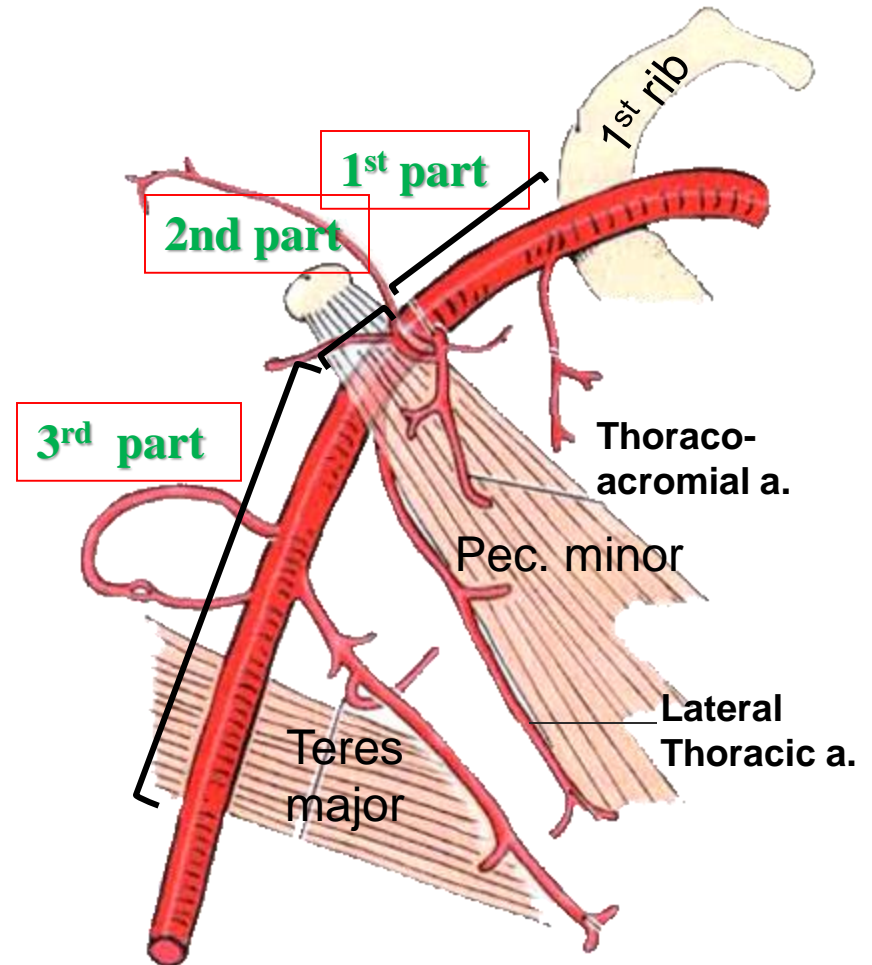
The 1st part of the axillary artery

- Extends from the **lateral border of 1st rib** to **upper border of the pectoralis minor muscle**.
- Related:
 - **Anteriorly:** to the pectoralis major muscle
 - **Laterally:** to the cords of the brachial plexus.
- ONE branch: **Highest thoracic artery**



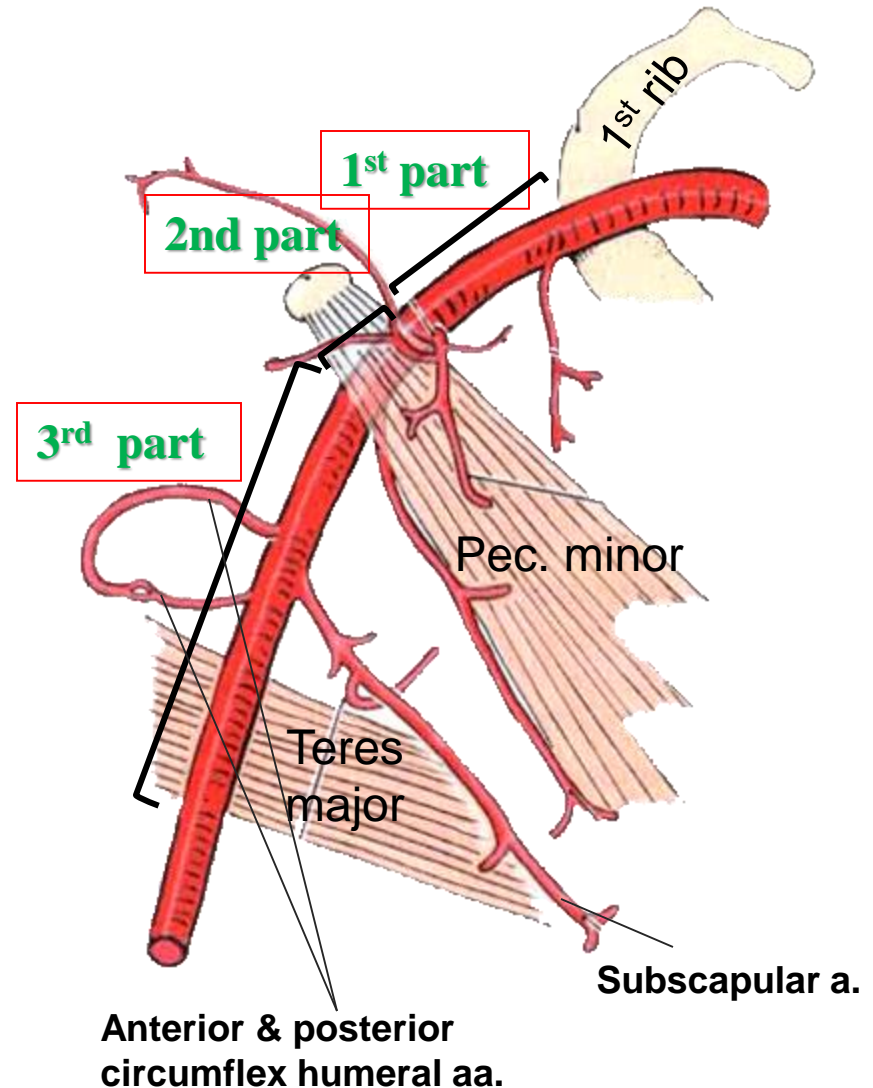
The 2nd part of the axillary artery

- Lies **behind the pectoralis minor muscle.**
- It is related medially, laterally, and posteriorly to the corresponding **cord** of the brachial plexus.
- TWO branches:
 - **Thoracoacromial.**
 - **Lateral thoracic.**



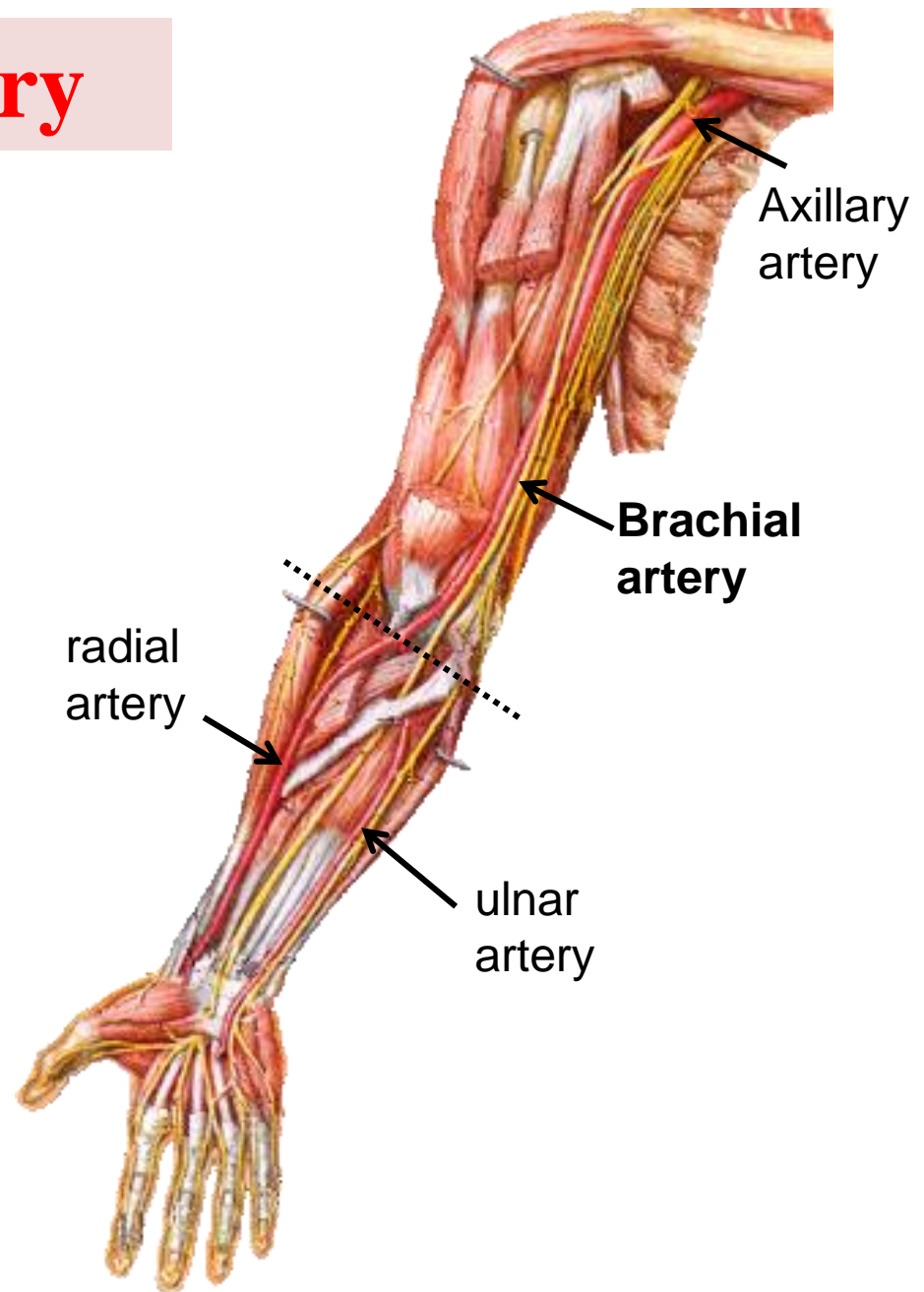
The 3rd part of the axillary artery

- Extends from the **lower border of pectoralis minor muscle** to the **lower border teres major muscle**.
- Related medially, laterally, and posteriorly, to the **branches** of the cords of the brachial plexus
- Gives **THREE** Branches:
 - **Subscapular,**
 - **Anterior circumflex humeral**
 - **Posterior circumflex humeral.**



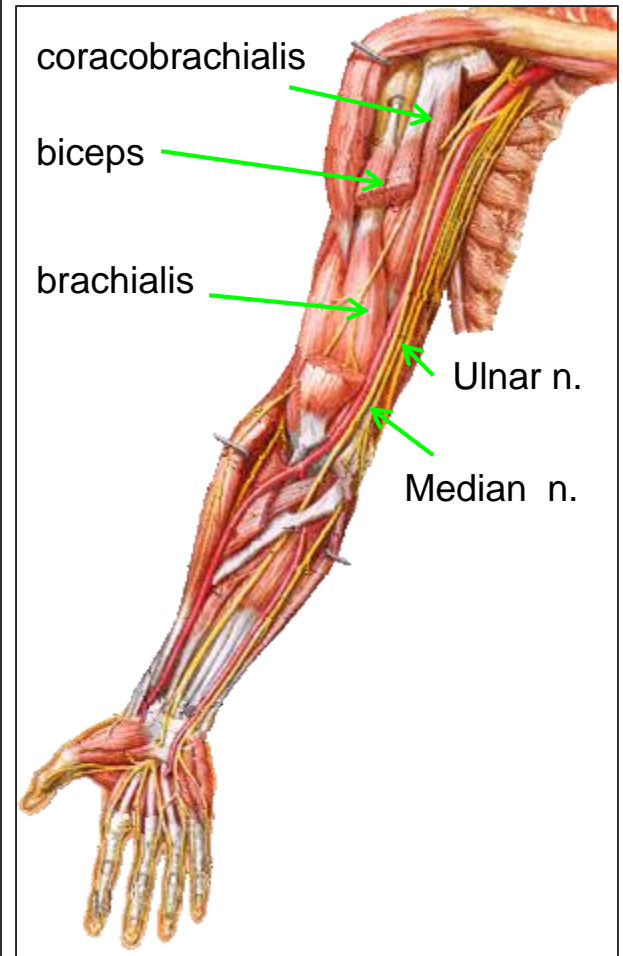
The Brachial Artery

- Is a continuation of the **axillary artery** at the lower border of teres major muscle.
- Provides main arterial supply for the arm.
- **Terminates** opposite neck of radius by dividing into **radial & ulnar arteries.**



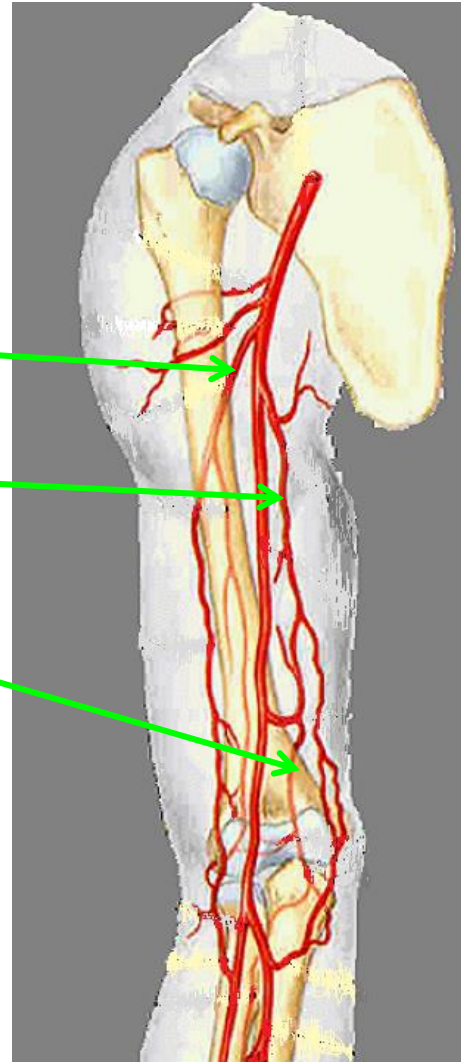
Brachial Artery: Relations

- **Anteriorly:** crossed from above downward by medial cutaneous nerve of the forearm, median nerve, and bicipital aponeurosis.
- **Posteriorly:** triceps, coracobrachialis and brachialis.
- **Medially:** basilic vein, ulnar and median nerves.
- **Laterally:** coracobrachialis and biceps muscles.



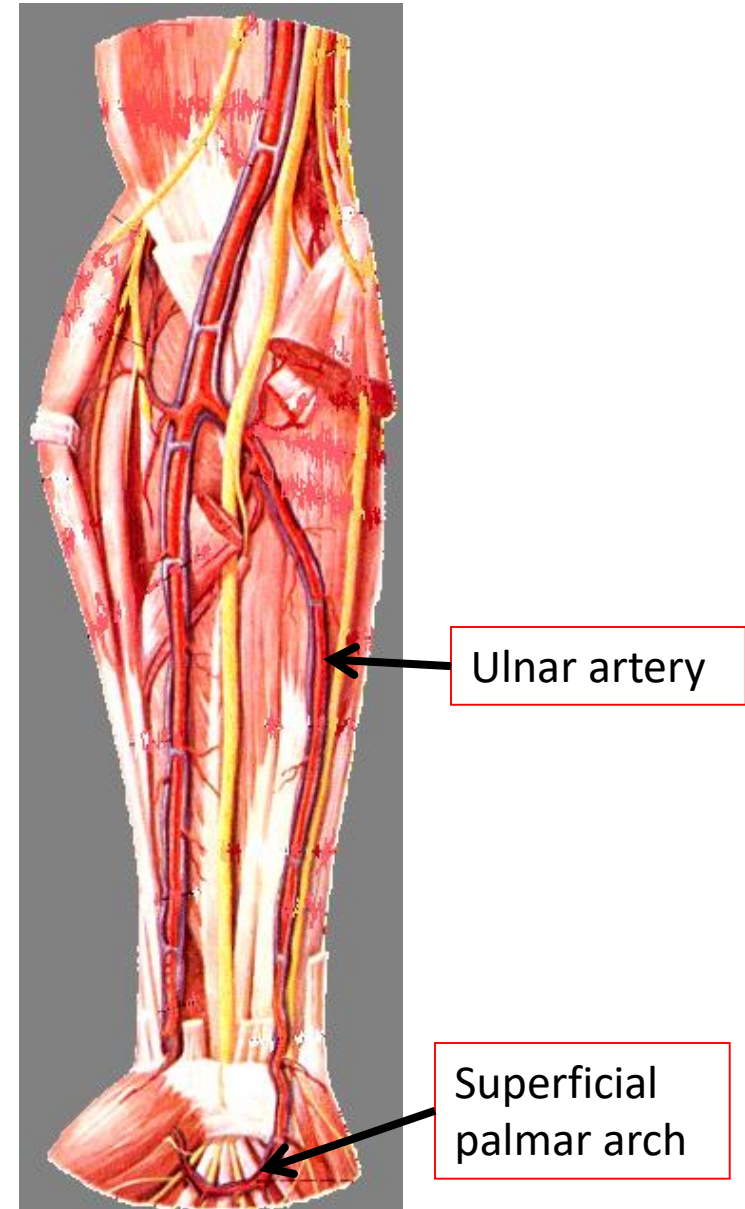
Brachial Artery: Branches

- Muscular.
- Nutrient to humerus.
- Profunda brachii
- Superior ulnar collateral.
- Inferior ulnar collateral.



The Ulnar Artery

- The **larger** of the two terminal branches of the **brachial artery**.
- Begins in the cubital fossa at the level of **neck of radius**.
- Descends through the **anterior compartment** of the forearm.
- Enters the palm, **in front of the flexor retinaculum**, with the ulnar nerve.
- **Ends** by forming the **superficial palmar arch**, by anastomosing with superficial palmar branch of radial artery.



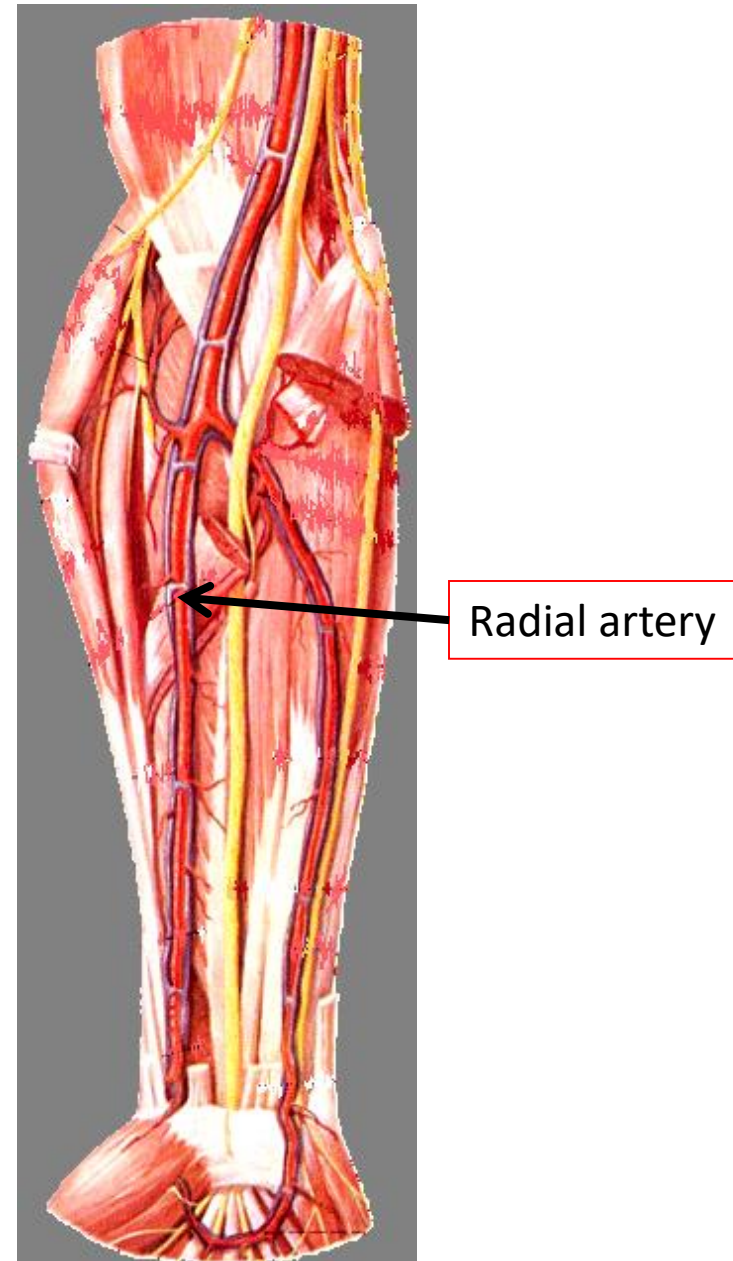
Ulnar Artery: Branches



- Muscular .
- Recurrent branch for anastomosis around the elbow joint.
- Common interosseous artery, which gives anterior and posterior interosseous arteries.
- Branch to anastomoses around the wrist joint.

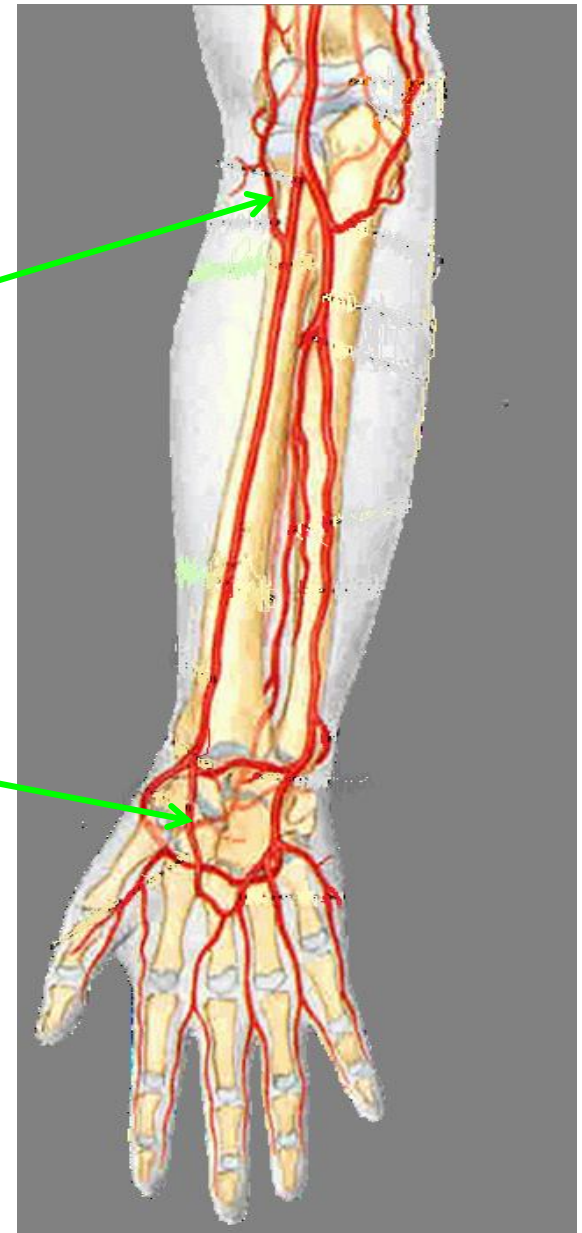
The Radial Artery

- The **smaller** of the two terminal branches of the **brachial artery**.
- Begins in the cubital fossa at the level of **neck of radius**.
- Descends downward and laterally.
- Leaves the forearm by **winding** around the lateral aspect of the wrist to reach the **dorsum** of the hand.



Radial Artery: Branches

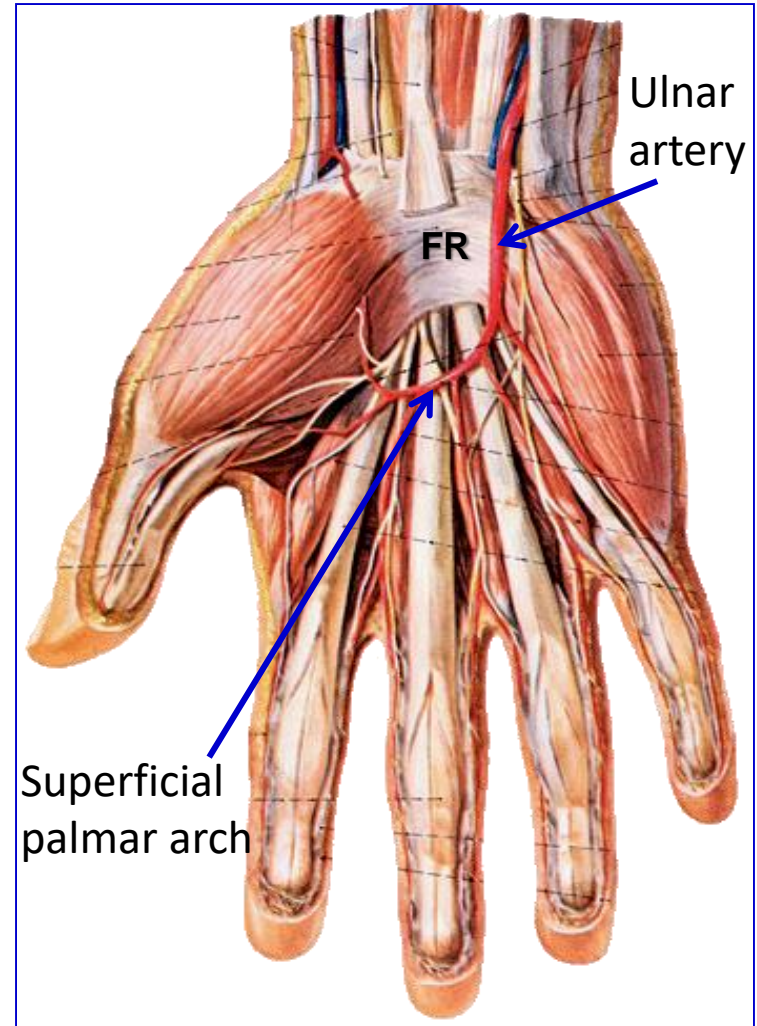
- Muscular
- Recurrent branch for anastomosis around the elbow joint.
- Superficial palmar branch, joins the ulnar artery to form the superficial palmar arch.



Arteries of the Palm

➤ Ulnar artery:

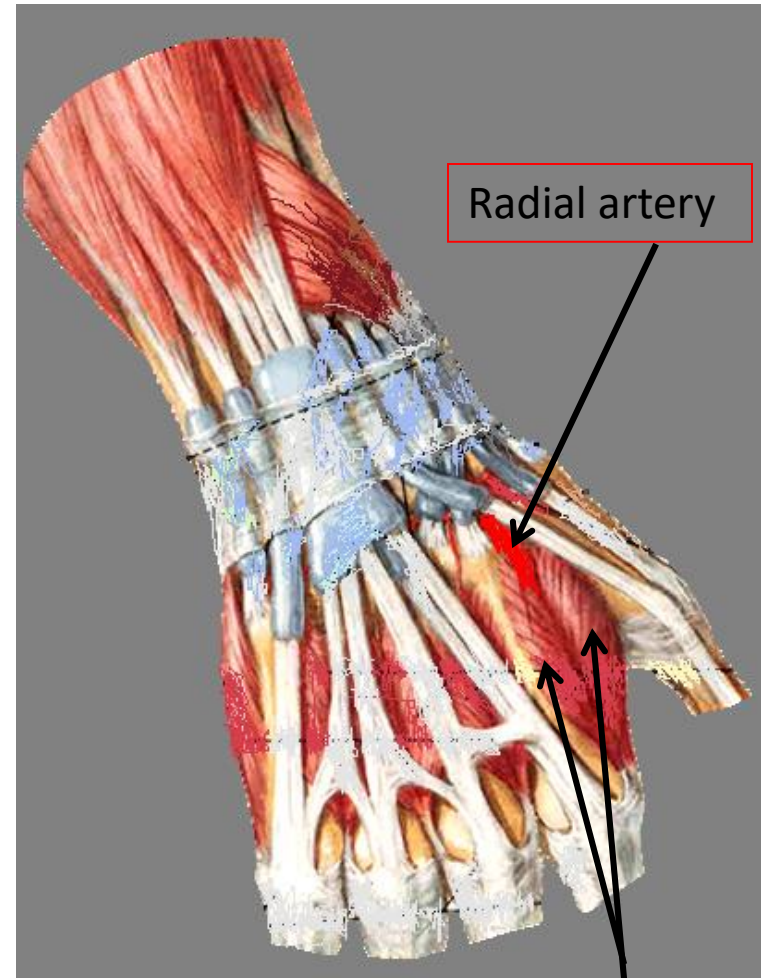
- Enters the hand:
 - anterior to the flexor retinaculum,
 - on the lateral side of the ulnar nerve and pisiform bone.
- Gives a deep branch.
- Continue as the superficial palmar arch.



Arteries of the Palm

➤ Radial artery;

- Leaves dorsum of the hand by **turning forward** between the proximal ends of the **1st and 2nd metacarpal** bones and two heads of the **1st dorsal interosseous** muscle.
- On entering the palm it continues as **deep palmar arch**.
- It gives; arteria **radialis indicis** and arteria **princeps policis**.

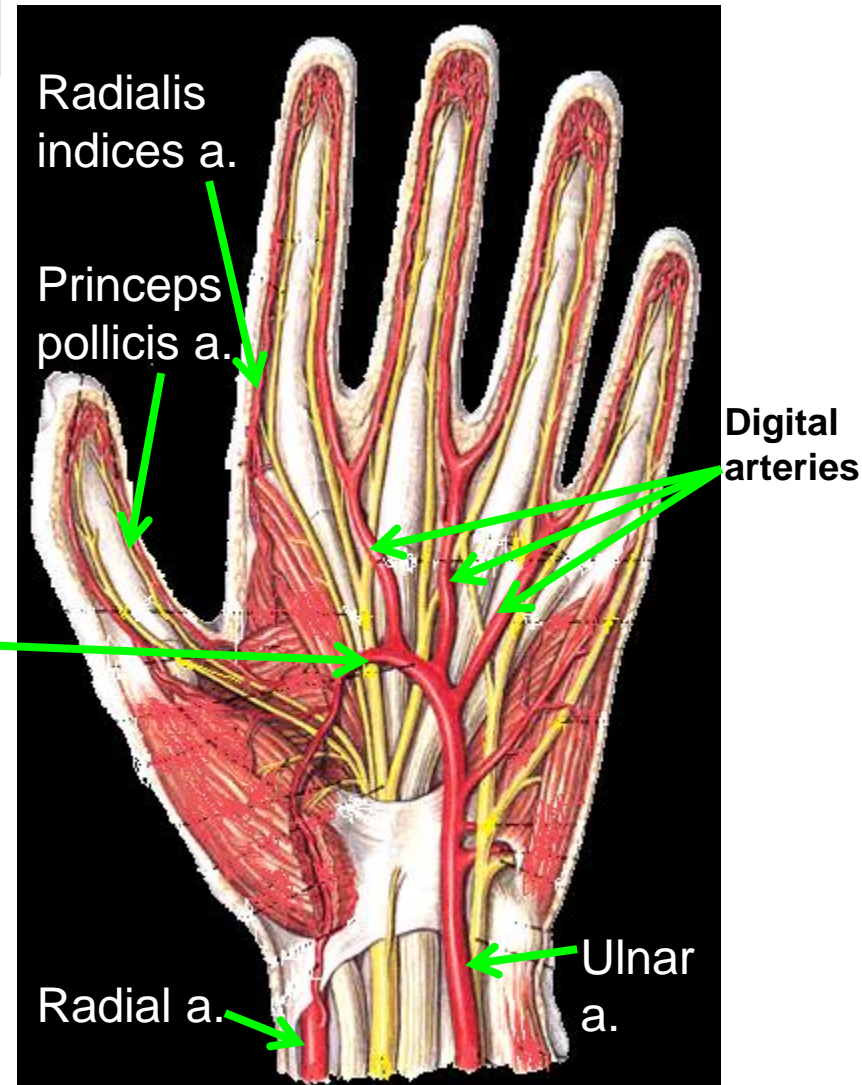


Radial artery

1st dorsal interosseous muscle

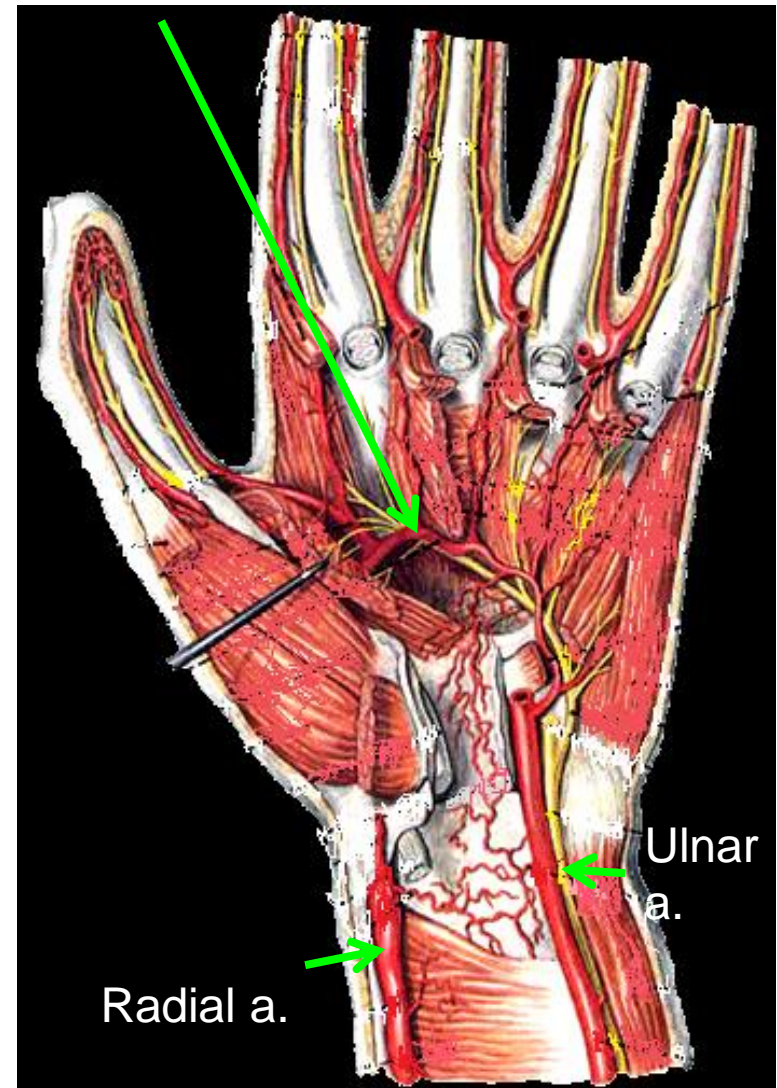
The Superficial Palmar Arch

- Is the direct continuation of the **ulnar artery**, as it curves laterally behind the palmar aponeurosis.
- Is completed by **branch from the radial artery**.
- Lies approximately at the level of the **distal border of the extended thumb**.
- Gives: **digital arteries** from its convexity to supply the fingers.

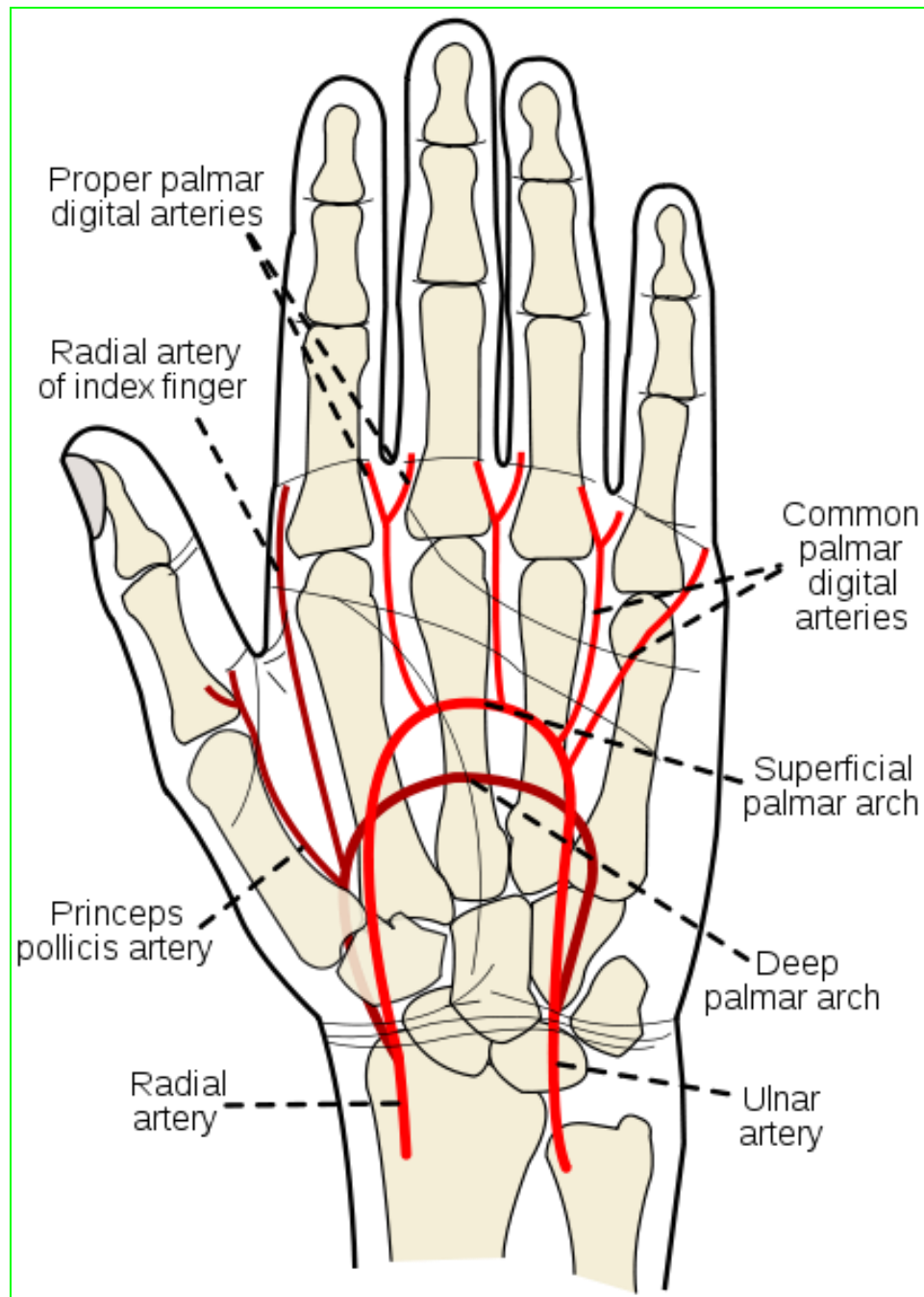


- Is a continuation of the **radial artery** as it curves medially beneath long flexor tendons , in front of the metacarpal bones and interosseous muscles.
- Is completed on the medial side by **deep branch of ulnar artery**.
- Lies at a level of the **proximal border of extended thumb**.
- It sends branches:
 - **superiorly** to share in anastomosis around the wrist joint &
 - **inferiorly** to join branches of the superficial palmar arch.

The Deep Palmar Arch

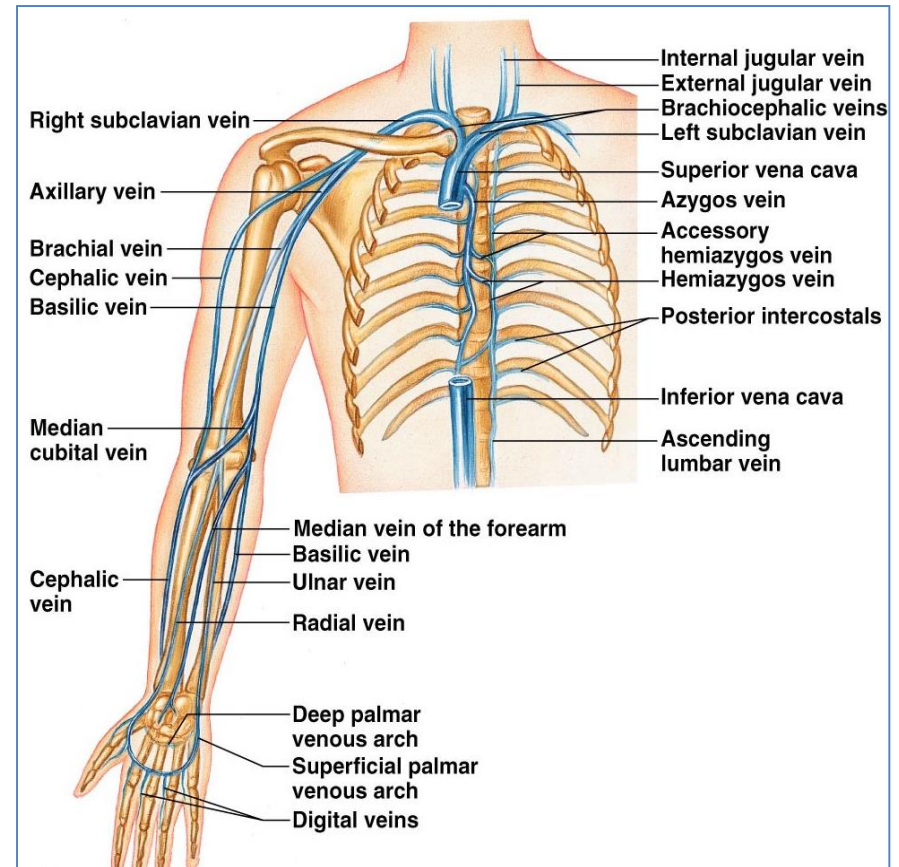


The superficial palmar arch is more distal than the deep palmar arch.



Veins of the Upper Limb

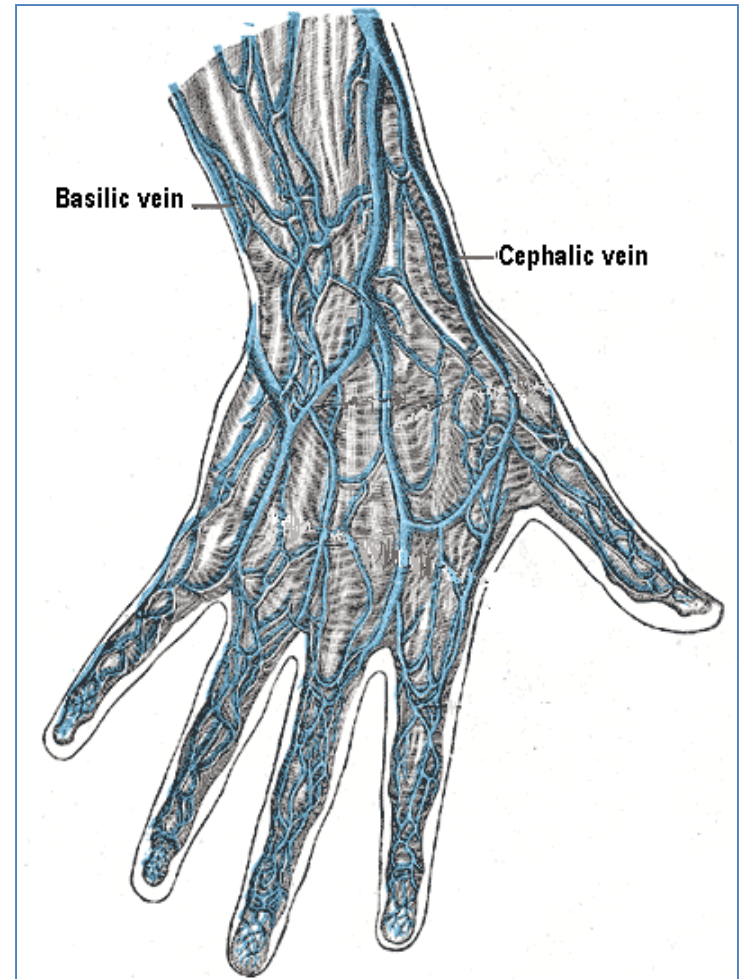
- The veins of the upper limb are divided into two sets: **Superficial** and **Deep**
- The two sets anastomose frequently with each other.
- The **superficial veins** are placed immediately beneath the skin, in the superficial fascia.
- The **deep veins** accompany the arteries, and constitute the *venæ comitantes* of those vessels



Superficial Veins of the Upper Limb

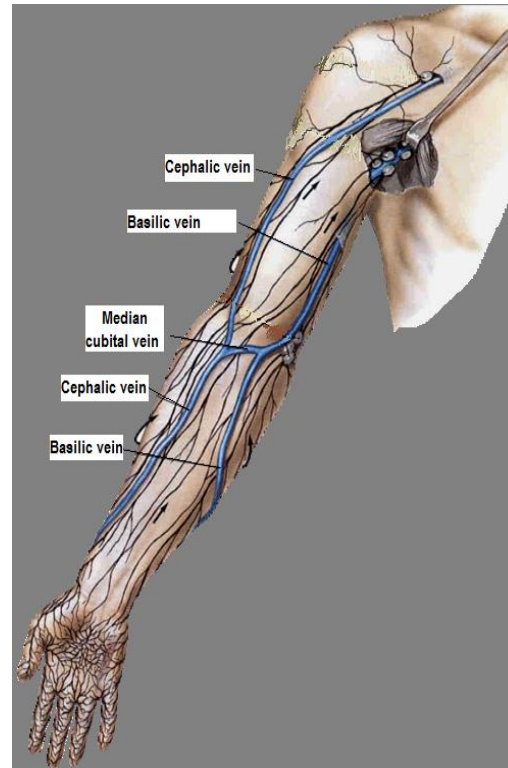
Dorsal Venous Arch (network)

- The dorsal digital veins drain into dorsal metacarpal veins, which unite to form a **dorsal venous arch or network**.
- Dorsal venous network lies on the dorsum of the hand, **in the subcutaneous tissue, proximal to the metacarpophalangeal joints**
- Drains into the **cephalic** vein laterally, and **basilic** vein medially



Cephalic Vein

- Arises from the **lateral end** of the dorsal venous arch of hand.
- Ascends on **radial side** of the forearm to the elbow and continues up the arm in the **deltopectoral groove**.
- Pierces **clavipectoral fascia** to drain into the **axillary vein**.



Basilic Vein

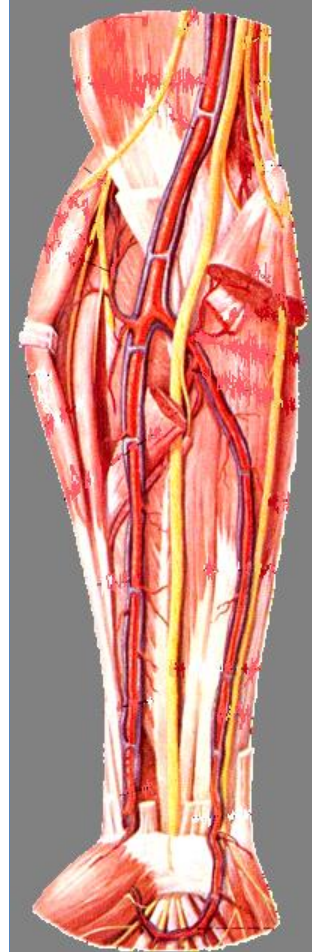
- Arises from the **medial side** of the dorsal venous arch of hand.
- Ascends on the **ulnar side** of forearm to the elbow, in the middle of the arm, it pierces the **deep fascia** and joins the **brachial vein or axillary vein**.

Median Cubital Vein

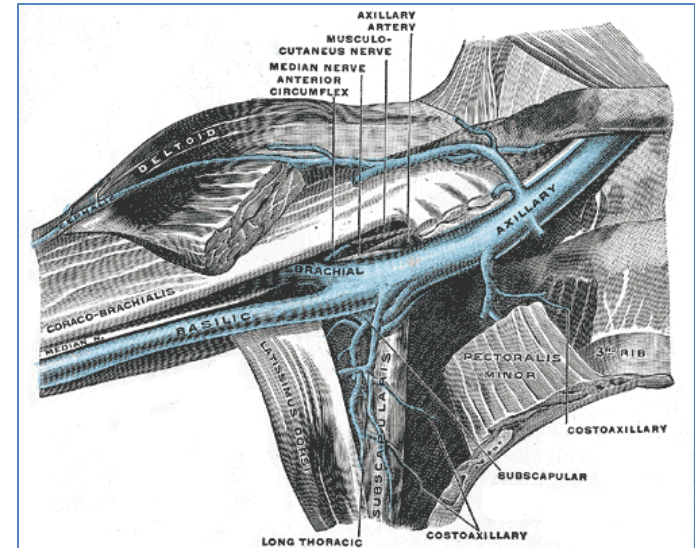
- Links cephalic vein and basilic vein in the cubital fossa.
- Is a frequent site for venipuncture.

Deep Veins of the Upper Limb

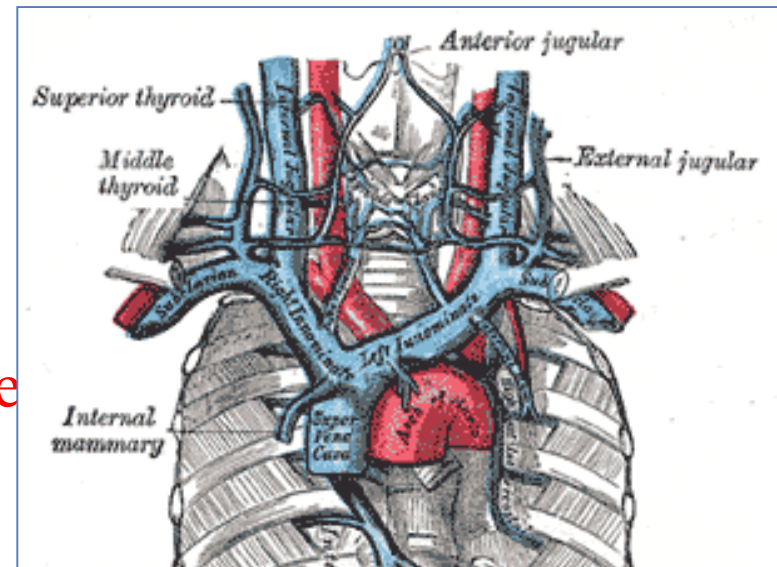
- Accompany the arteries of the same region and bear similar names.
- **Venae comitantes**: They are generally arranged in pairs, and are situated one on either side of the corresponding artery, and connected at intervals by short transverse branches.
- The superficial and deep palmar arterial arches are each accompanied by a pair of venæ comitantes which constitute the **superficial** and **deep palmar venous arches**, and receive the veins corresponding to the branches of the arterial arches.
- The **deep veins of the forearm** are the venæ comitantes of the radial and ulnar veins.
- The **brachial veins** are placed one on either side of the brachial artery.



- The **axillary vein**:
 - Begins at the **lower border of the Teres major**, as the continuation of the basilic vein.
 - Ends at the **outer border of the first rib** as the subclavian vein.
 - Receives the **brachial veins** and, close to its termination, the **cephalic vein**.



- The **subclavian vein**:
 - Is the continuation of the axillary vein.
 - Extends from the **outer border of the first rib to the sternal end of the clavicle**, where it unites with the internal jugular to form the **brachiocephalic (innominate) vein**.



THANK YOU