

“Perfection is not attainable, but if we chase perfection we can catch excellence.”

-Vince Lombardi

Musculoskeletal Block  
**ANATOMY**  
team 435



C O L O R C O D E S

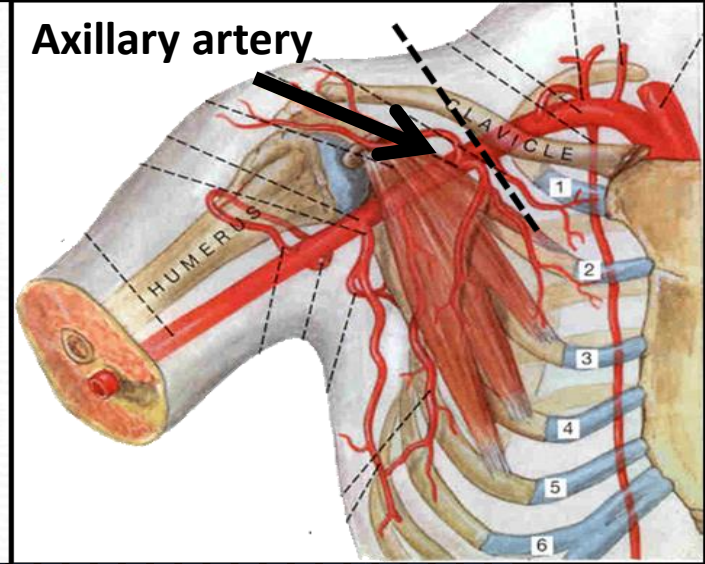
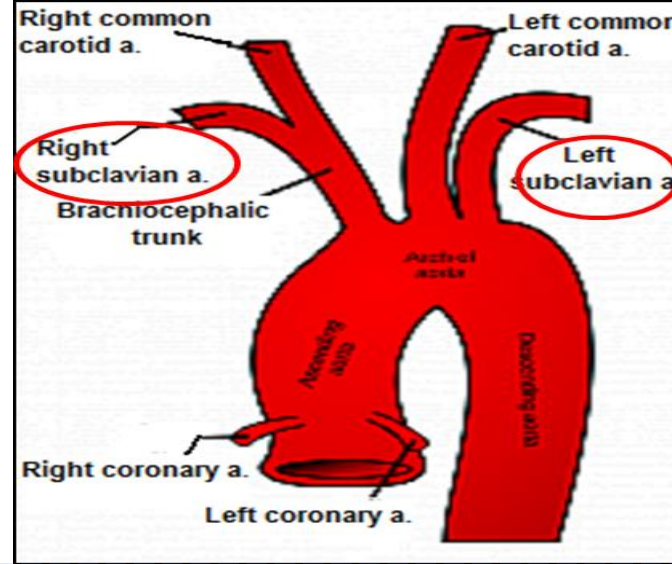
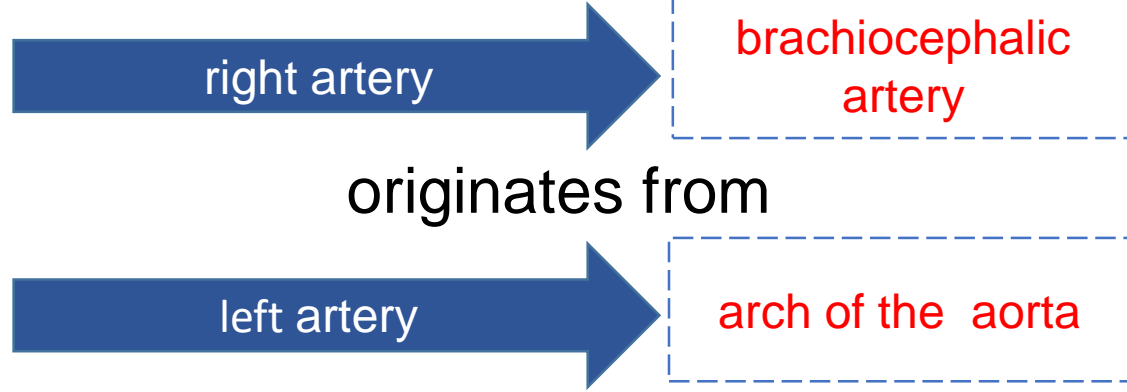
- IMPORTANT NOTES
- EXTRA NOTES
- DEFINITION

# 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*

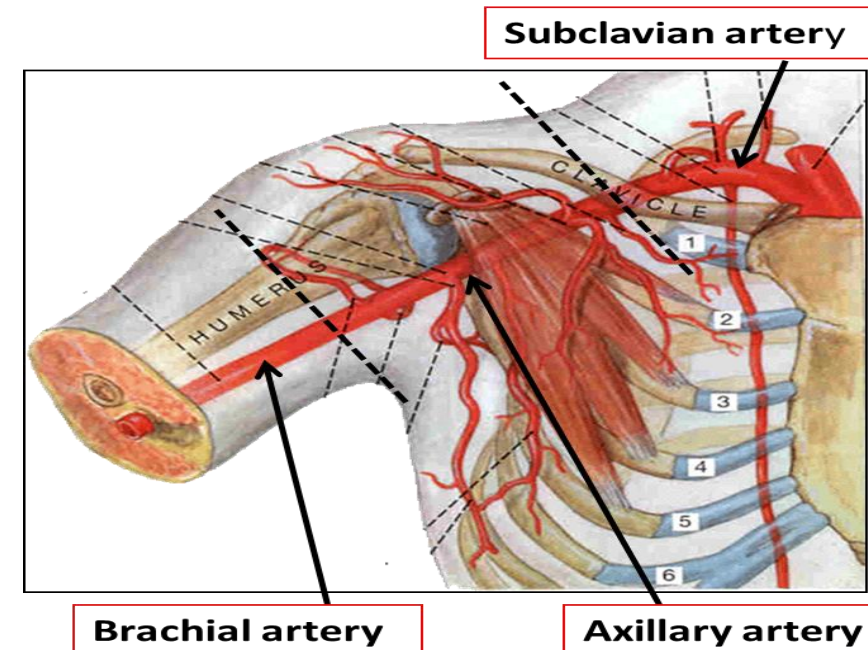
# Subclavian Artery



Continues as **Axillary artery** at the lateral border of the 1<sup>st</sup> rib

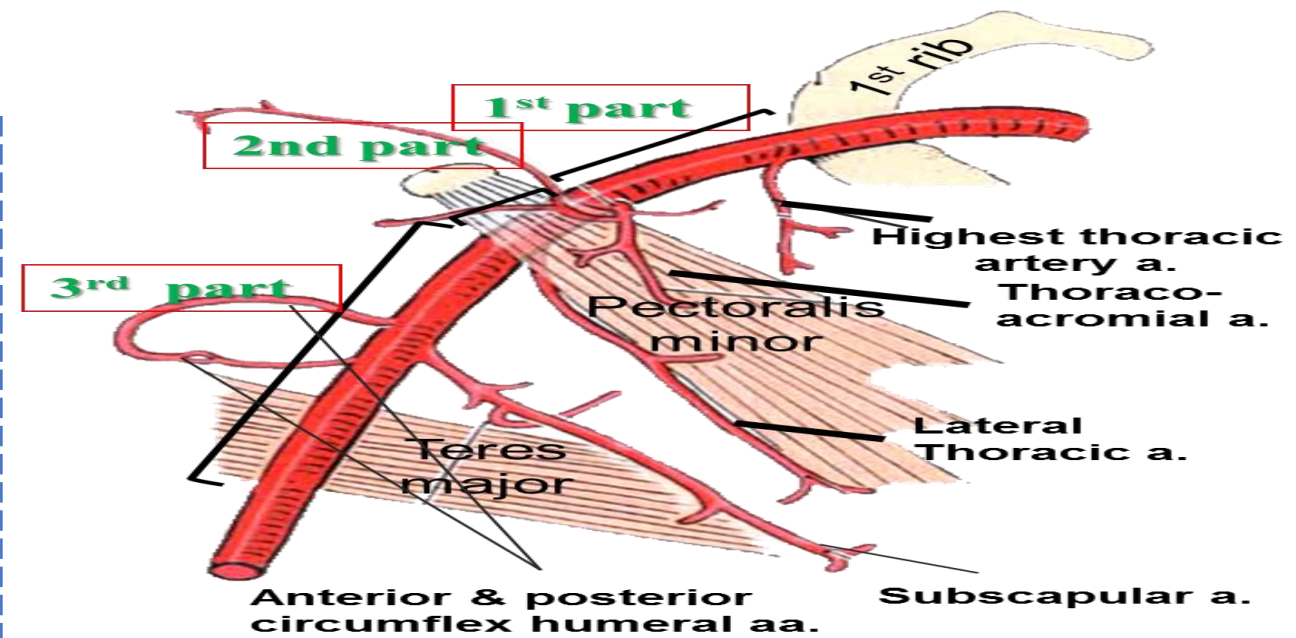
# Axillary Artery

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



# The 1st part of the axillary artery

- Extends from the **lateral border of 1<sup>st</sup> rib** to upper border of the pectoralis minor muscle.
- Related:
  - **Anteriorly** : to the pectoralis major muscle
  - **Laterally** : to the cords of the brachial plexus.
- It gives 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.
- It gives; 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
- It gives; THREE Branches:
  - **Subscapular**,
  - **Anterior circumflex humeral**
  - **Posterior circumflex humeral**.

# Anastomosis around shoulder joint (SCABULA)

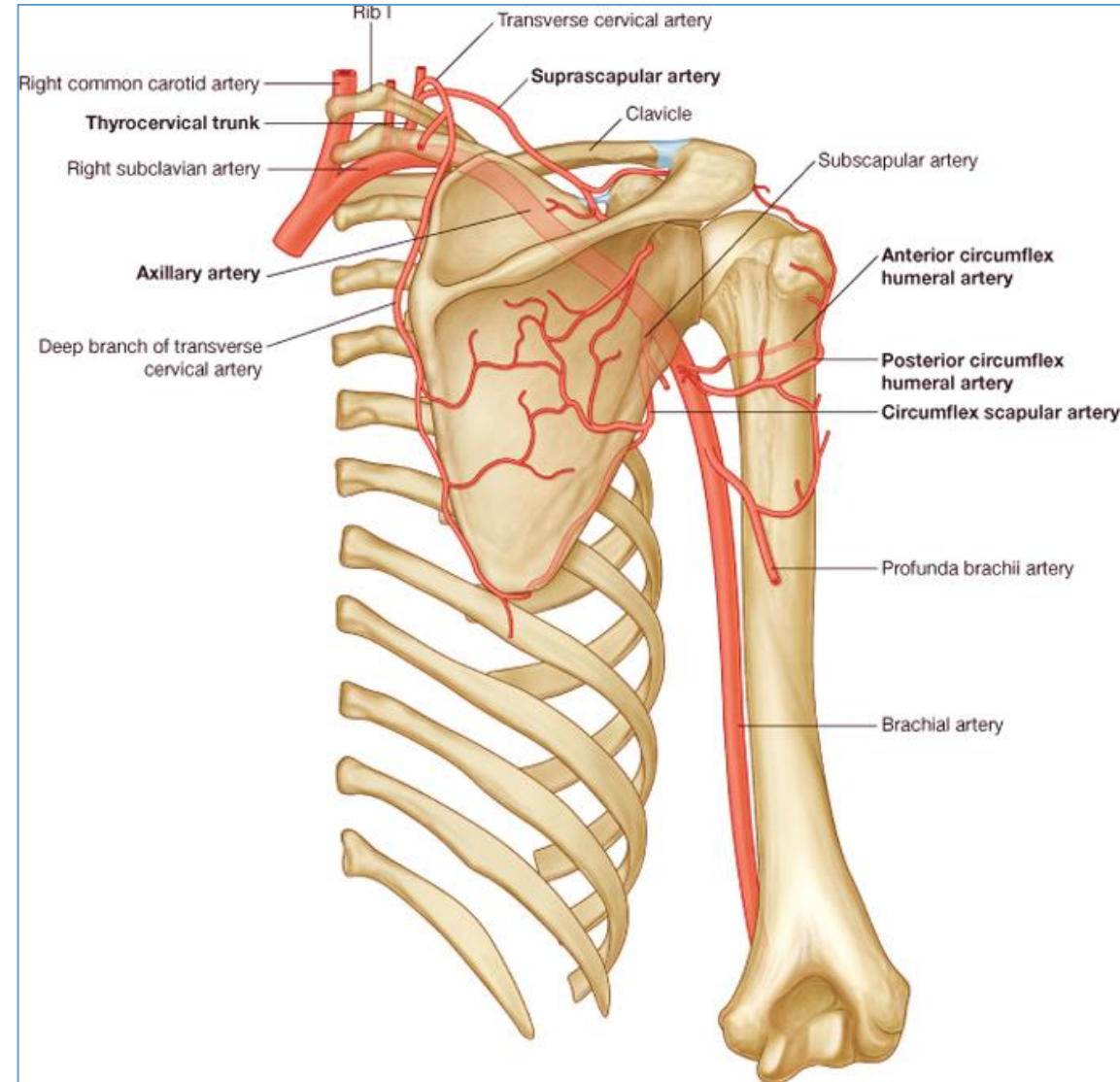
▪ Anastomosis occurs between branches of the **Subclavian and Axillary arteries:**

▪ **Branches from Subclavian Artery:**

- Suprascapular artery .
- Superficial cervical artery
- Transverse cervical artery

▪ **Branches from Axillary Artery:**

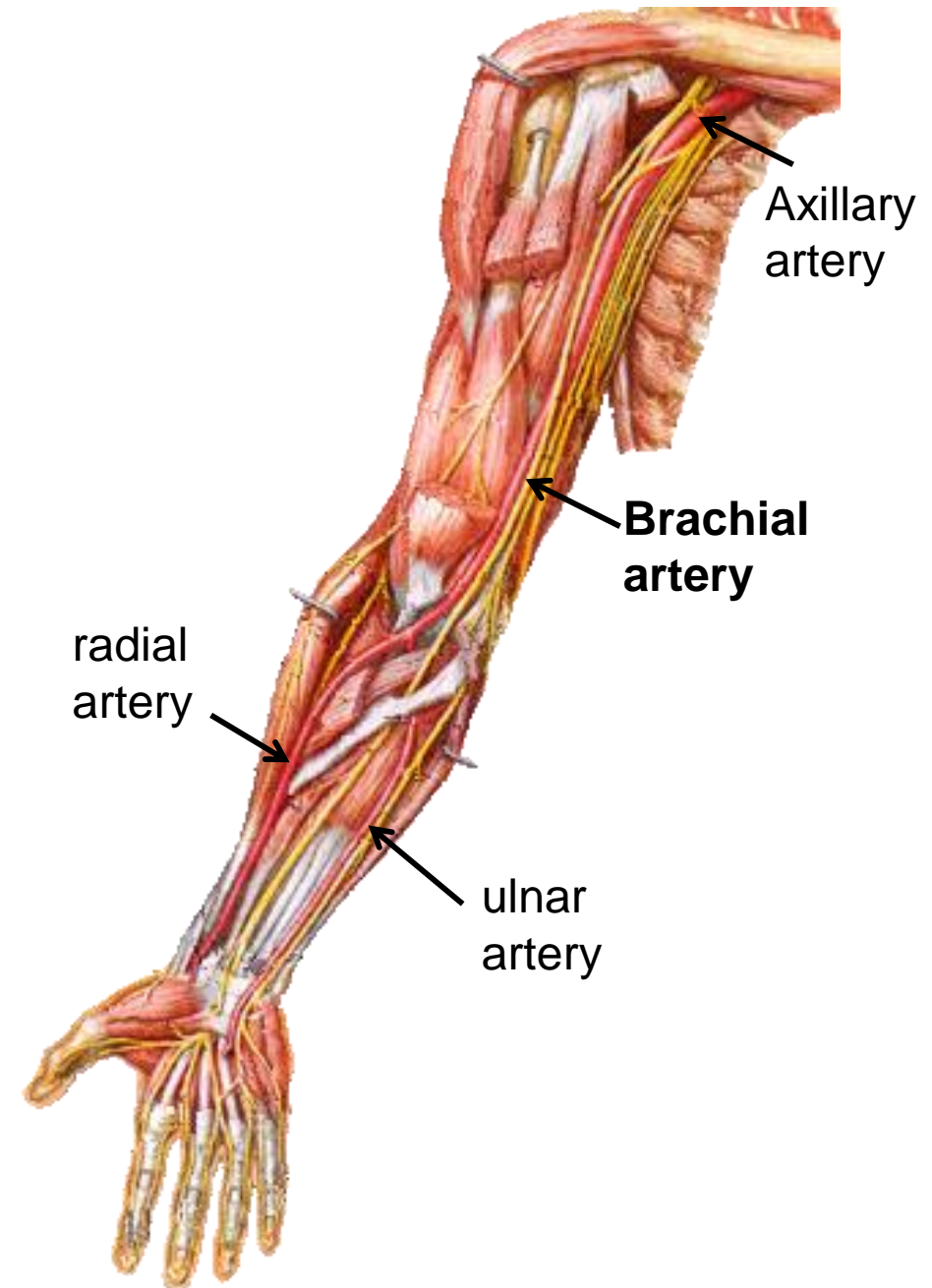
- Subscapular artery
- Anterior circumflex humeral artery
- Posterior circumflex humeral artery



**Anastomosis**: هو عندما يشترك وعائين او اكثر ليكونوا شبكة من الاوعية الصغيرة (تشبيهه في الصورة المجاورة)

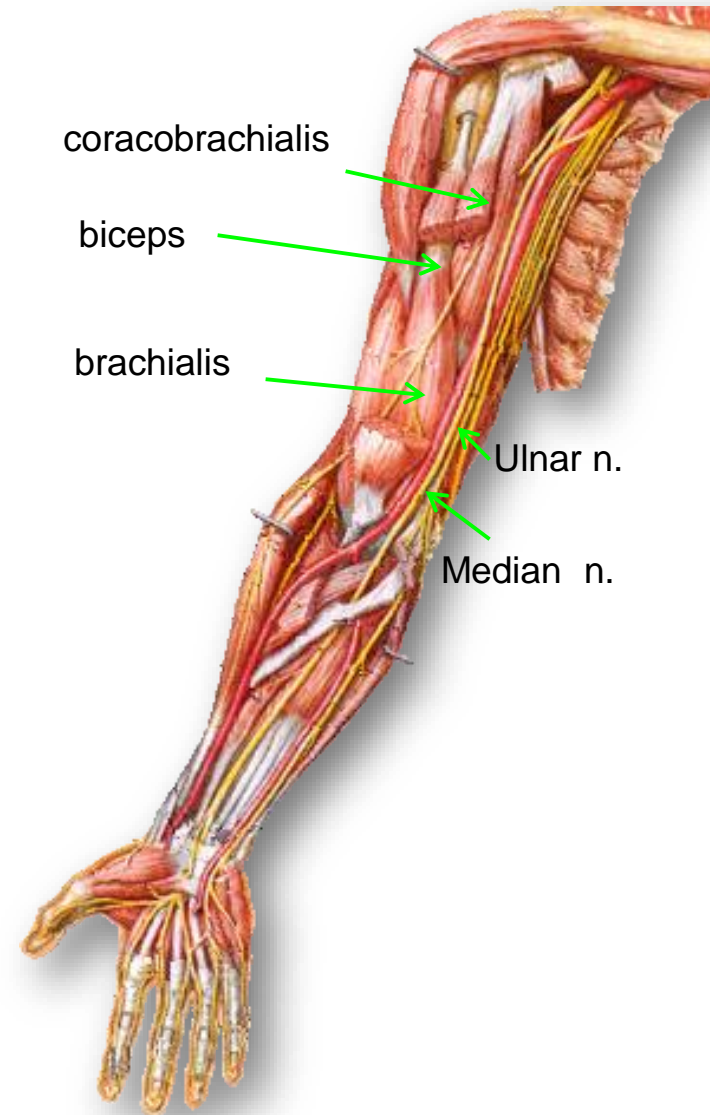
# The Brachial Artery

- 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** where it divides into **radial & ulnar arteries**.



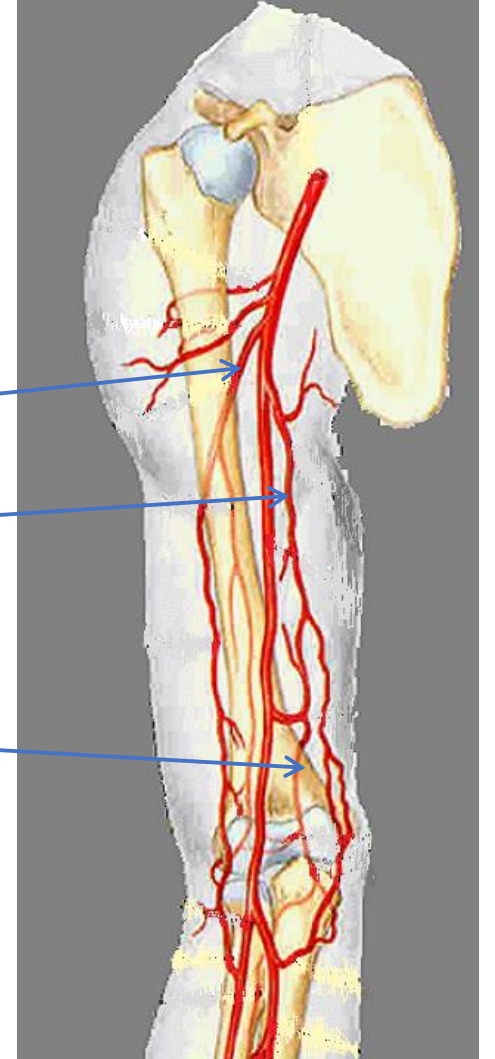
# Brachial Artery Relations

- **Anteriorly:** crossed from above 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.



# Branches of the Brachial Artery

- Muscular
- Nutrient to humerus.
- Profunda brachii (Deep brachial)
- Superior ulnar collateral.
- Inferior ulnar collateral.

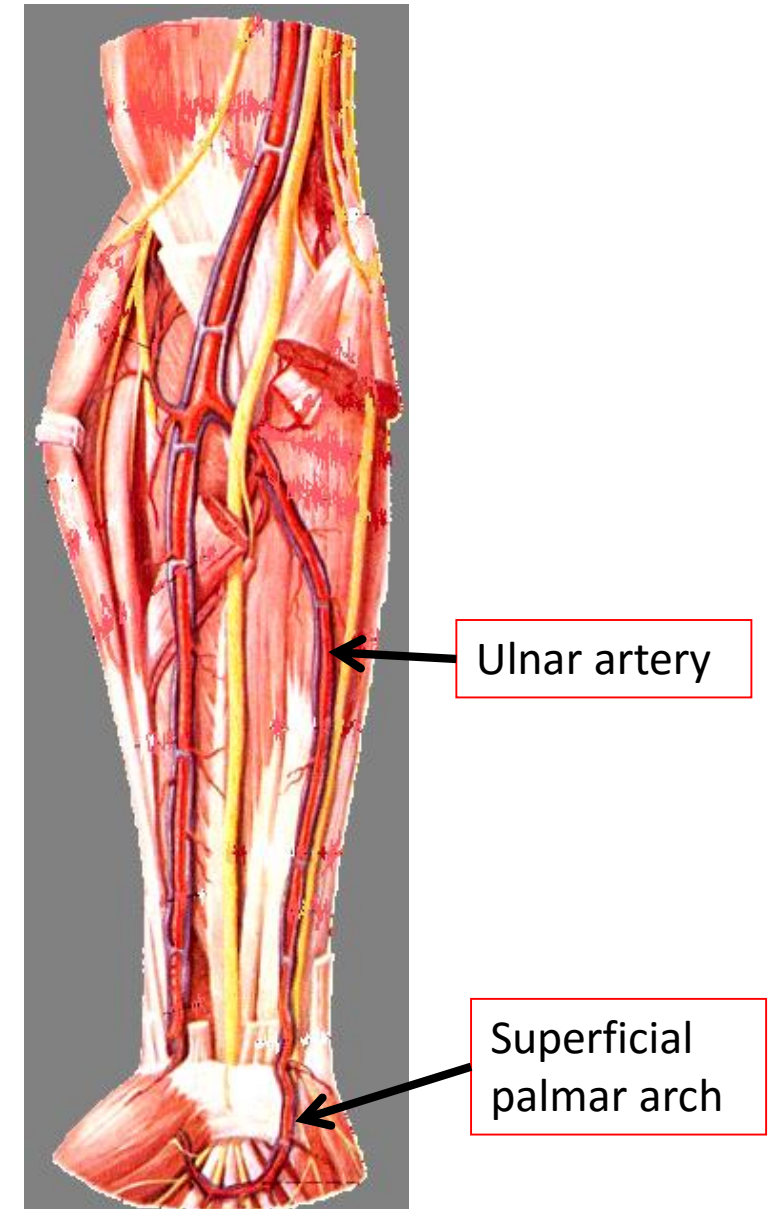


الـ Ulnar و الـ Radial يتفرعون على نهاية الـ Brachial ويقسمونه الى قسمين.



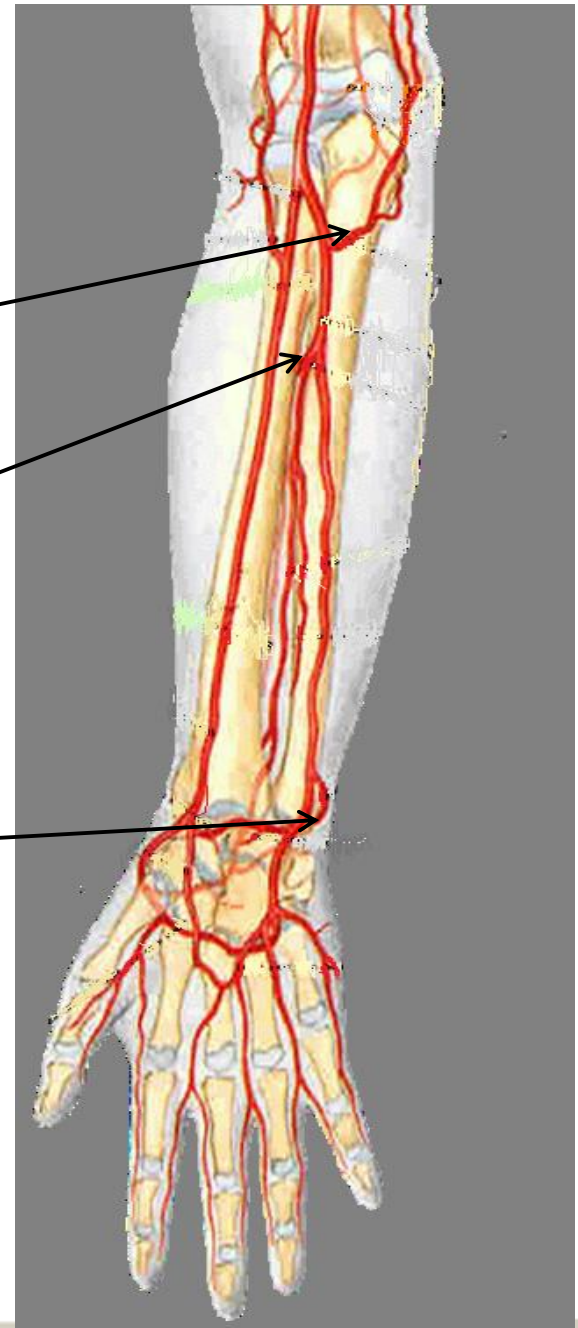
# The Ulnar Artery

- 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

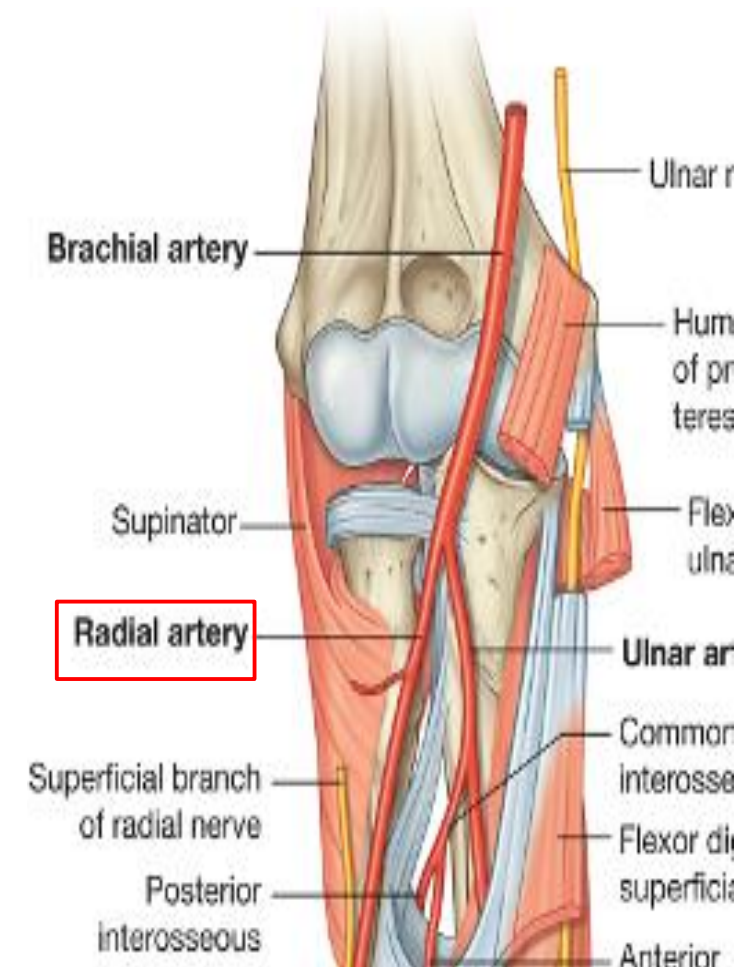
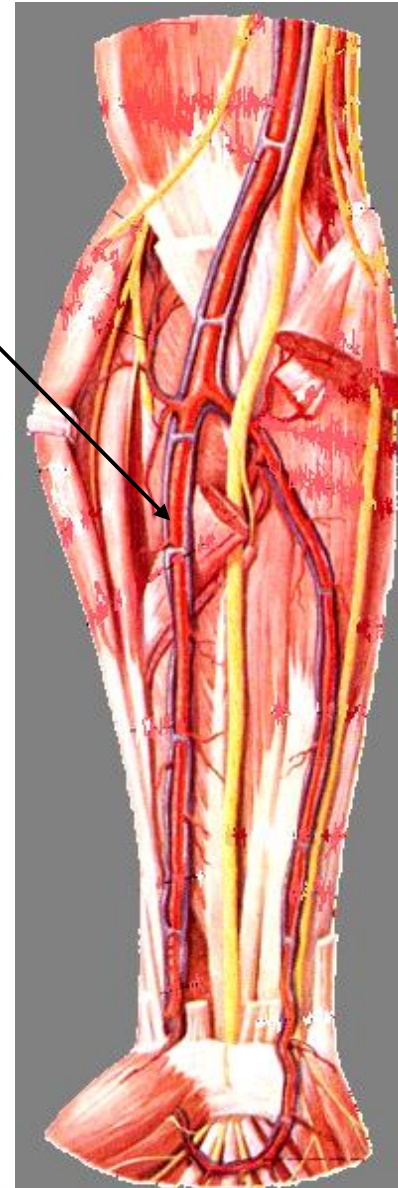
- Muscular .
- Recurrent branch for anastomosis around the elbow joint.
- Common interosseous artery, which gives anterior and posterior interosseous arteries.
- Branch to anastomoses around the wrist joint.



# 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

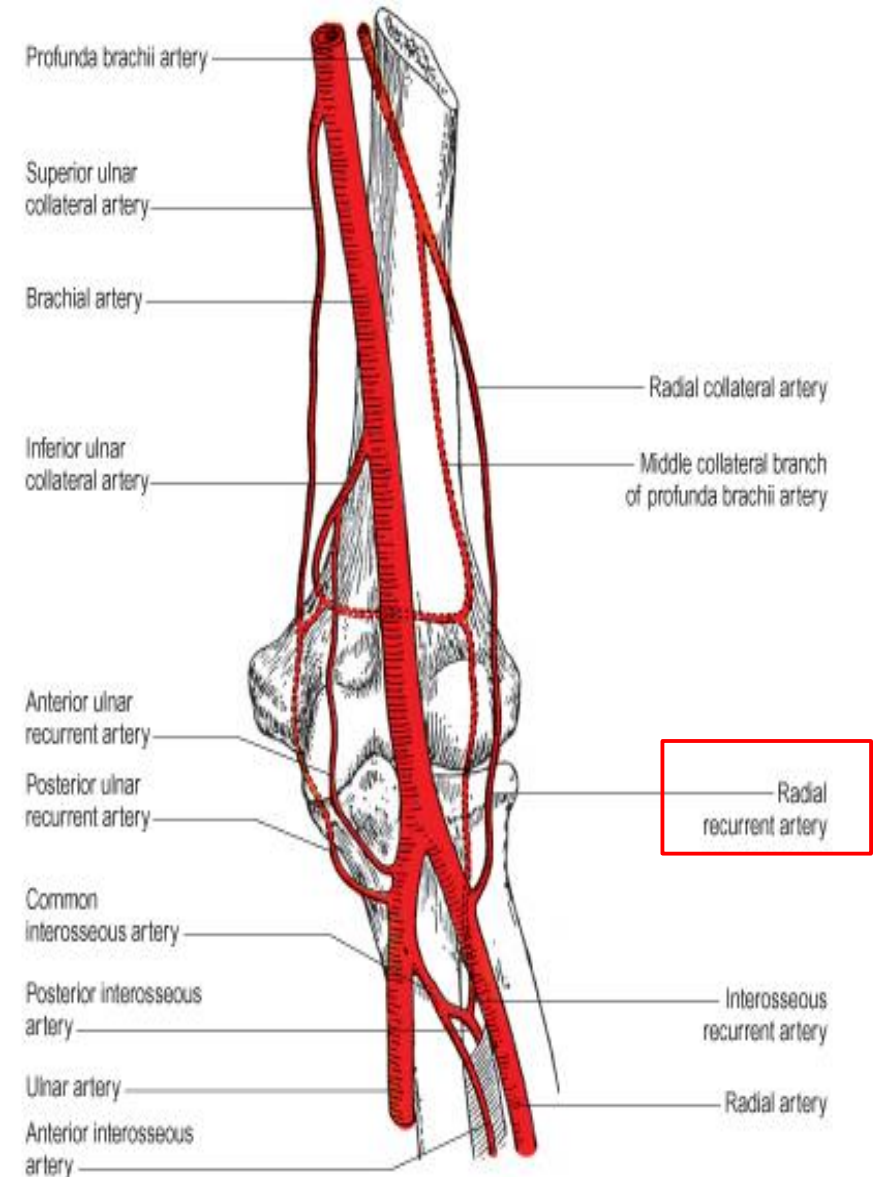
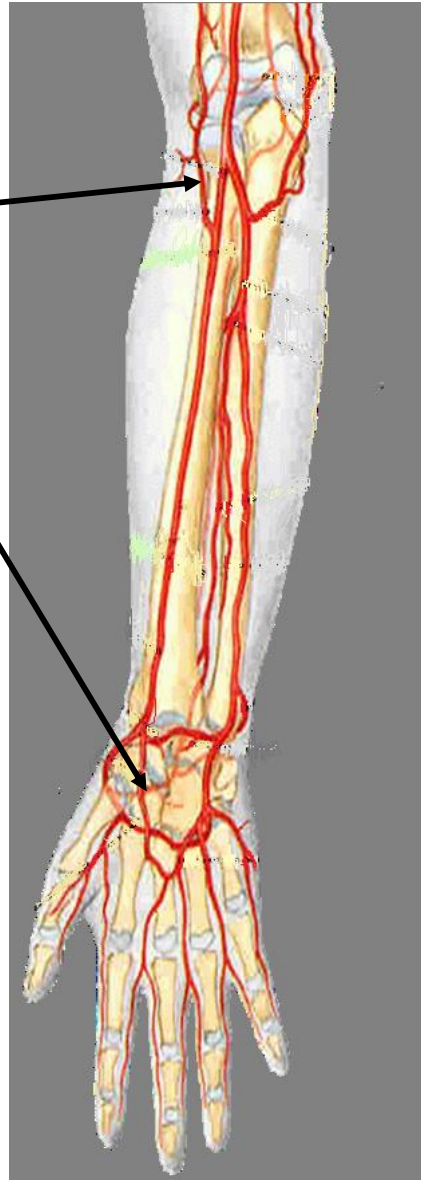
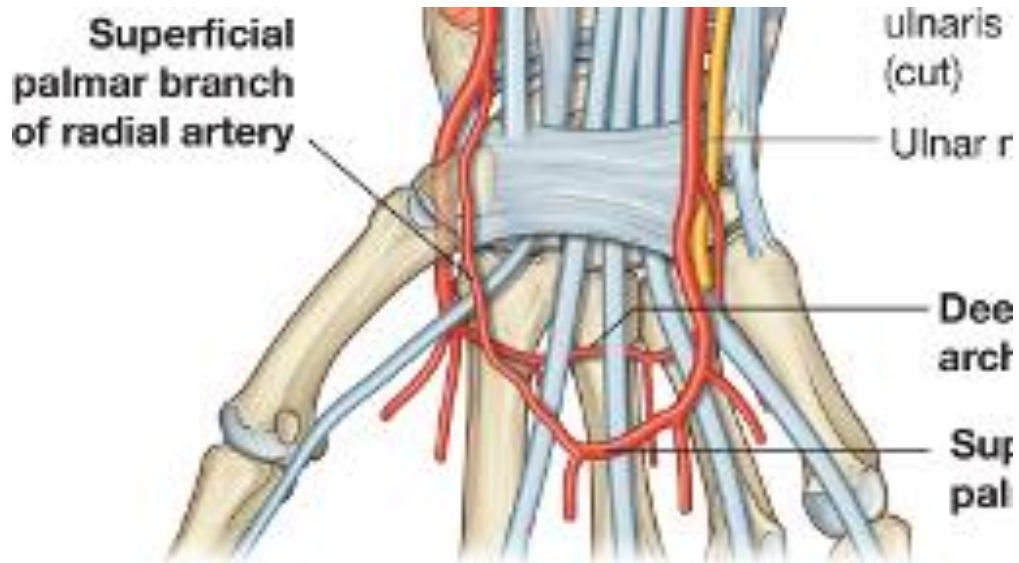


Winding: يلتف

Dorsum: ظهر (ظهر اليد)

# RADIAL ARTERY BRANCHES

- **Muscular branches**.
- **Recurrent branch** (for anastomosis around the elbow joint).
- **Superficial palmar** branch which joins the ulnar artery to form the superficial palmar arch.



# Anastomosis around elbow joint

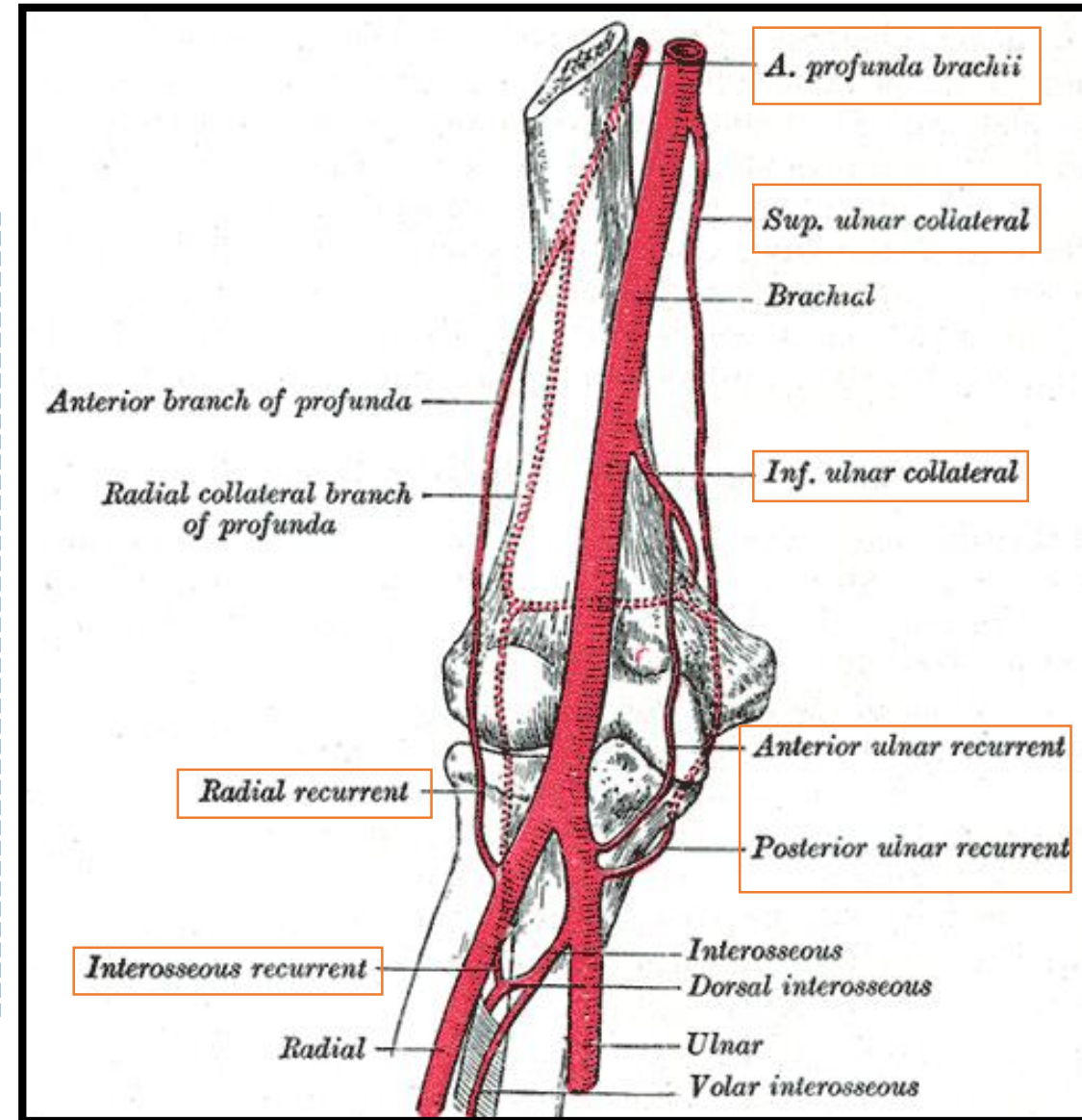
Anastomosis occurs between branches of **Brachial, Radial and Ulnar arteries.**

❖ Branches from **Brachial Artery:**

1. Profunda Brachii artery
2. Superior ulnar collateral artery
3. Inferior ulnar collateral artery

❖ Branches from **Ulnar and Radial Arteries:**

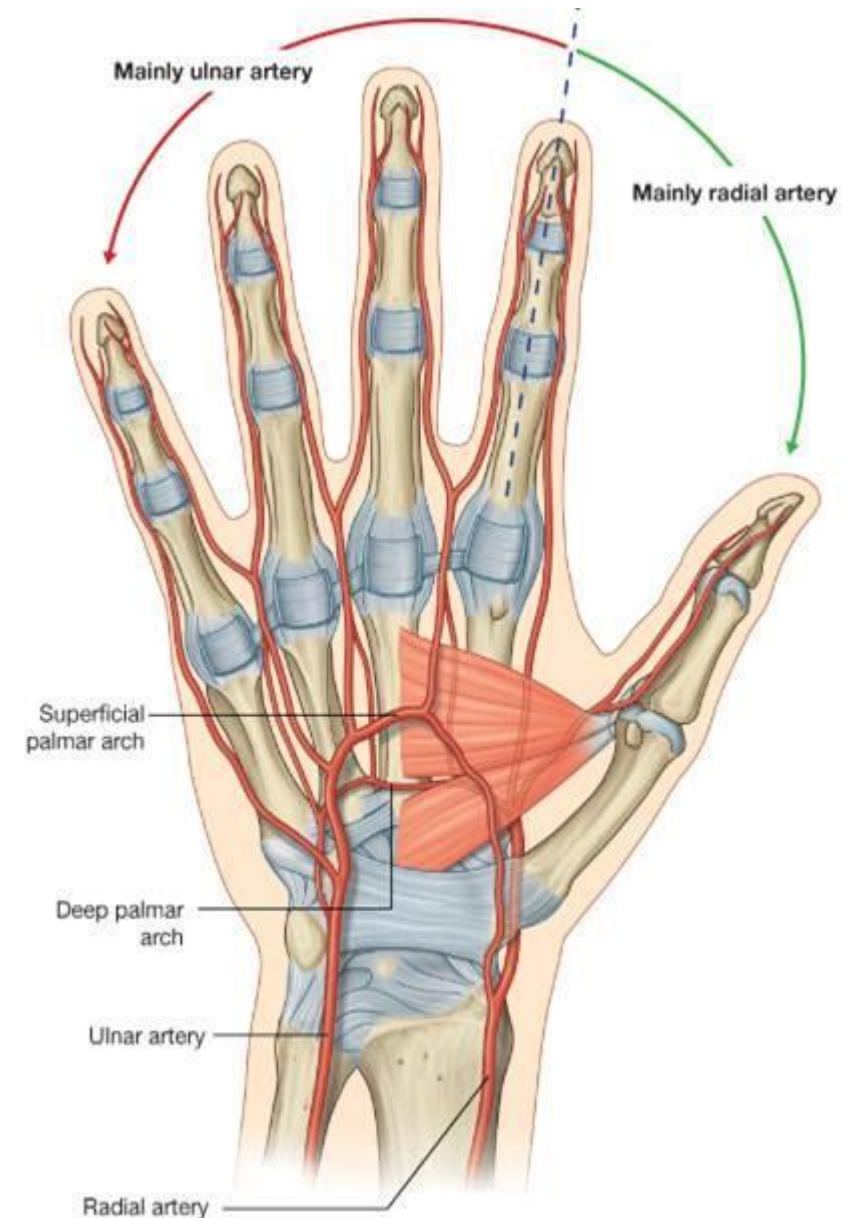
1. Radial & ulnar recurrent arteries
2. Posterior interosseous recurrent artery



# ARTERIES OF THE PALM

## □ Ulnar artery:

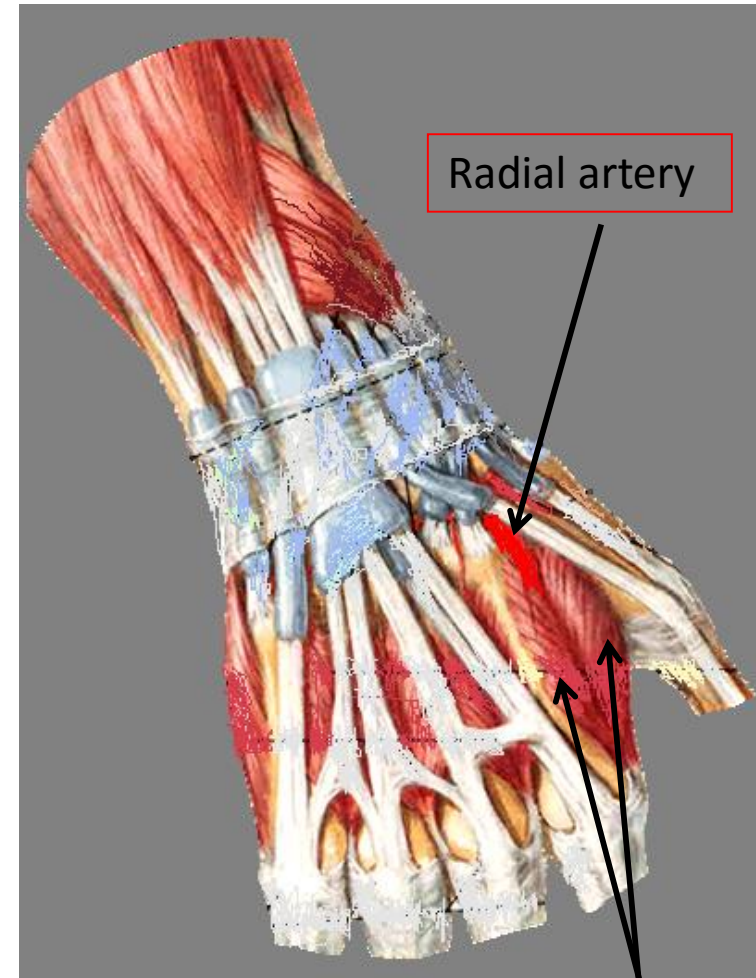
- Enters the hand:
  - anterior to the flexor retinaculum.
  - on the lateral side of the ulnar nerve and pisiform bone.
- Gives a **deep branch**.
- Continue as the **superficial palmar arch**.



# ARTERIES OF THE PALM

## ❑ Radial artery:

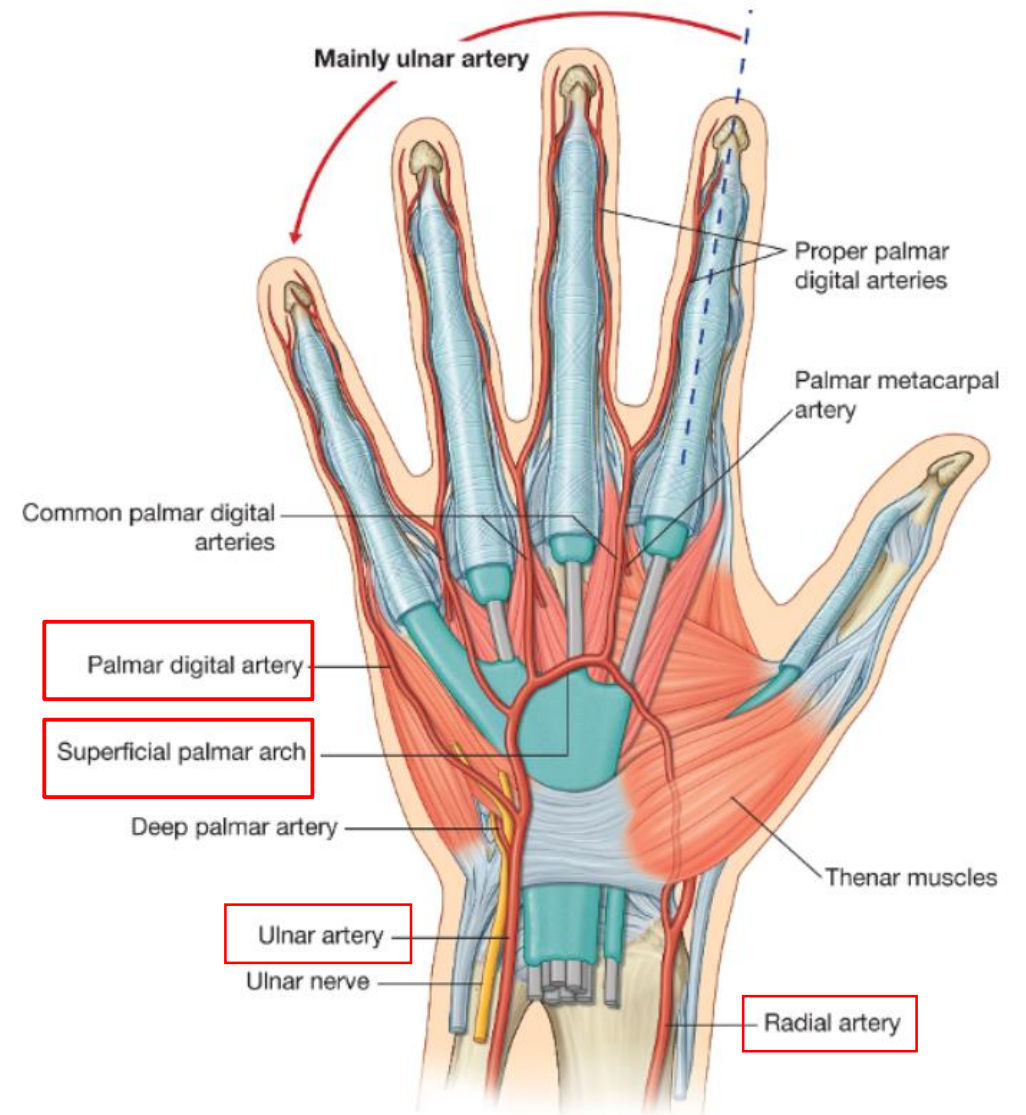
- Leaves dorsum of the hand by **turning forward** between the proximal ends of **1<sup>st</sup> and 2<sup>nd</sup> metacarpal** bones and **two heads of 1<sup>st</sup> dorsal interosseous muscle**.
- On entering the palm it continues as **deep palmar arch**.
- It gives; arteria **radialis indicis**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



1<sup>st</sup> dorsal interosseous muscle

# THE SUPERFICIAL PALMAR ARCH

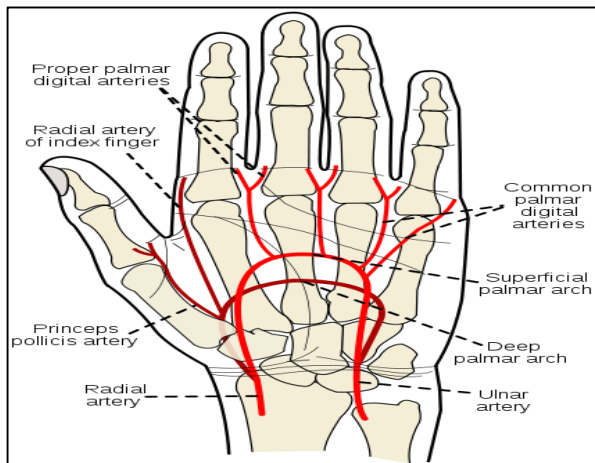
- Is the direct continuation of the **ulnar artery**, as it curves laterally behind the palmar aponeurosis.
- Is completed by **branch from the radial artery**.
- Lies approximately at the level of the **distal border of the extended thumb**.
- Gives: **digital arteries** from its convexity to supply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



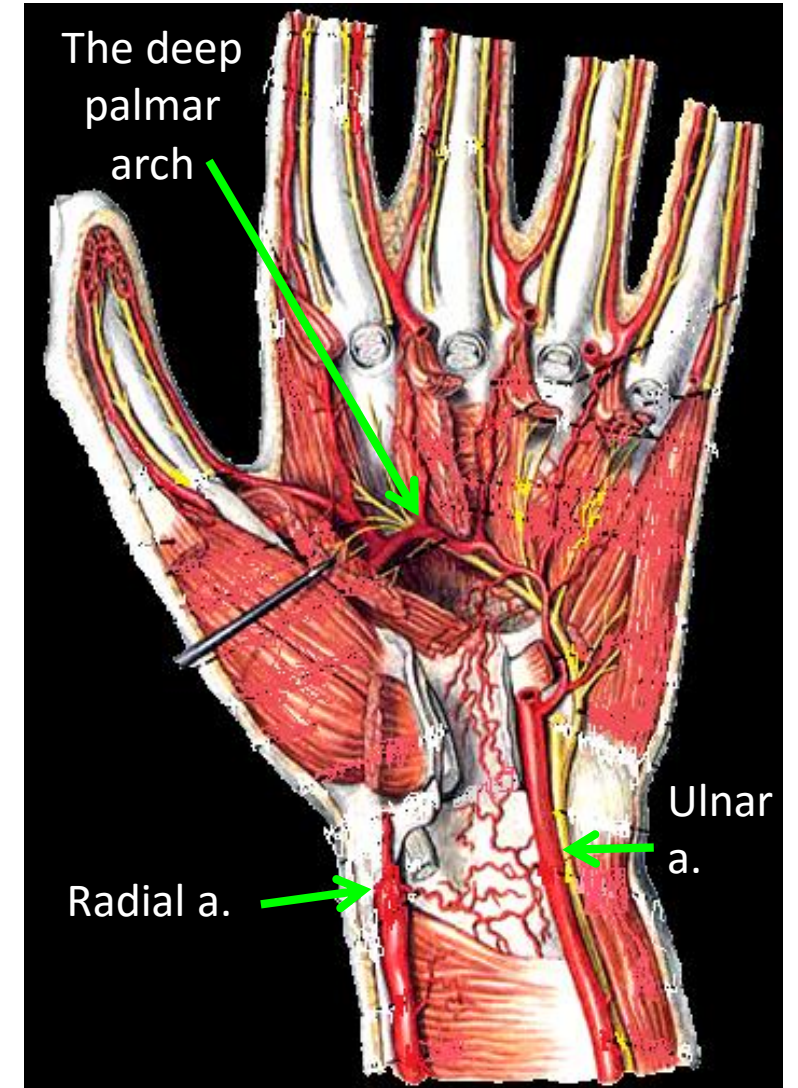


# The Deep Palmar Arch

- ❖ 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 branches out:
  - ❖ **Superiorly** to anastomose around the wrist joint
  - ❖ **Inferiorly** to join branches of the superficial palmar arch.



**The superficial palmar arch is distal to the deep palmar arch.**



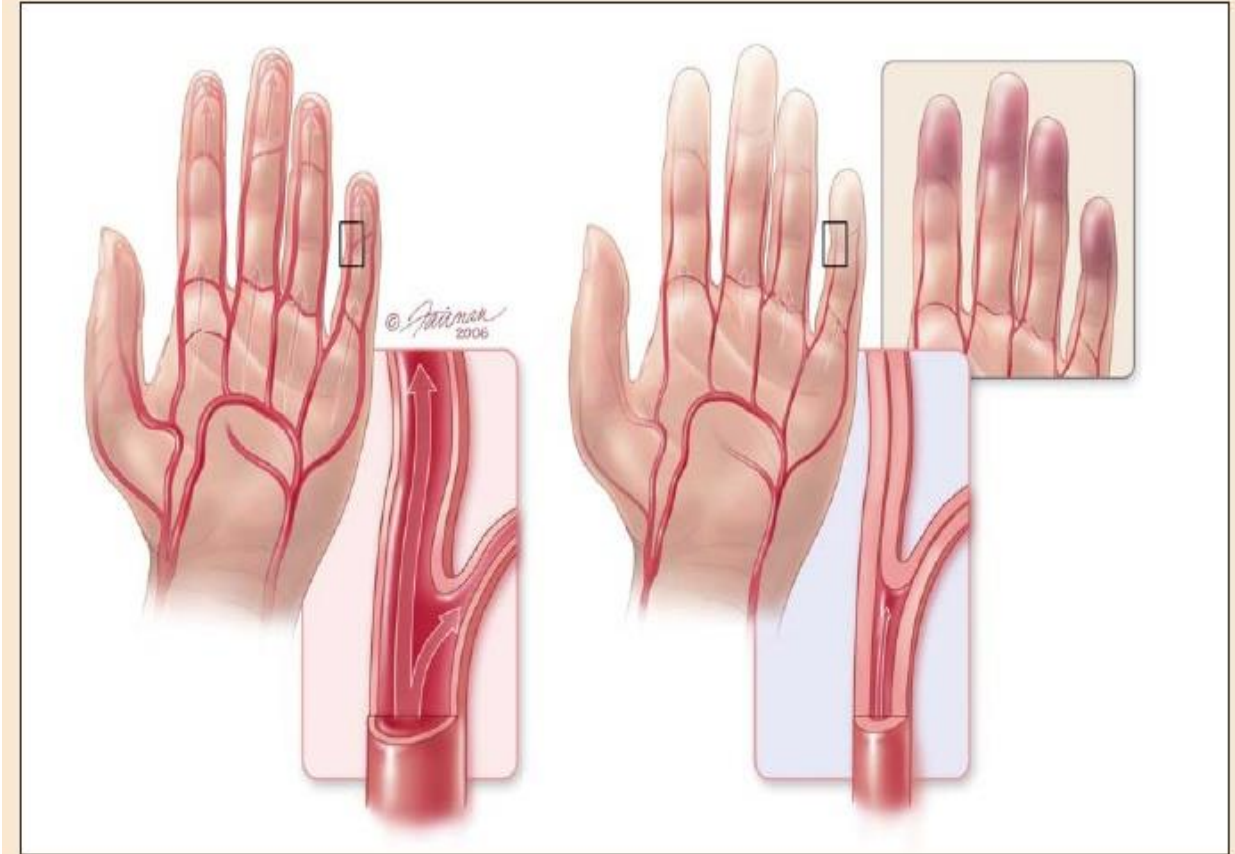
# ARTERIAL INNERVATION AND RAYNAUD'S DISEASE

**Raynaud's disease** is a **vasospastic disease** involves **digital arteries**. It may require **cervicodorsal** **perganglionic sympathectomy** to prevent **necrosis of the fingers**



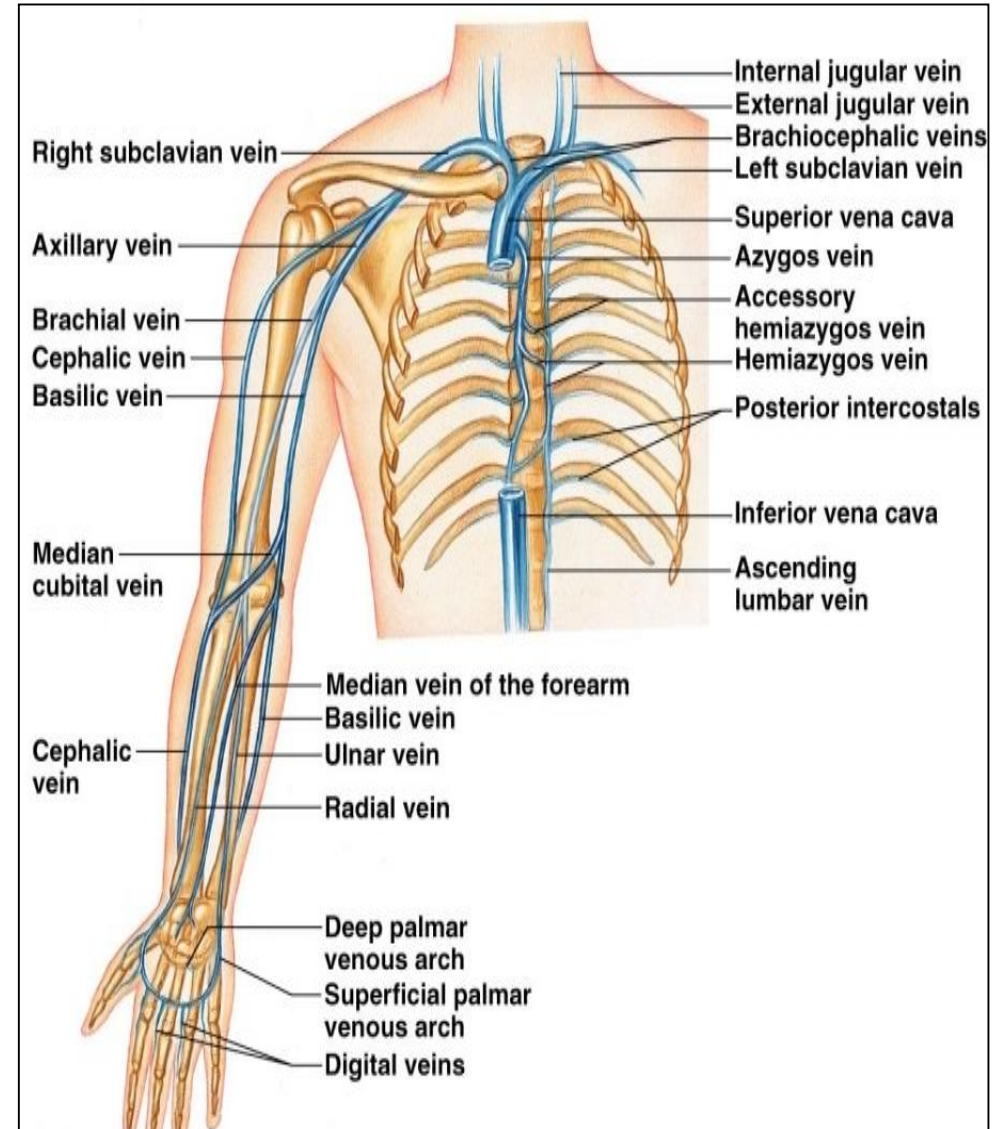
FIGURE 1

Vascular changes that occur during acute Raynaud's disease



# Veins of the Upper Limb

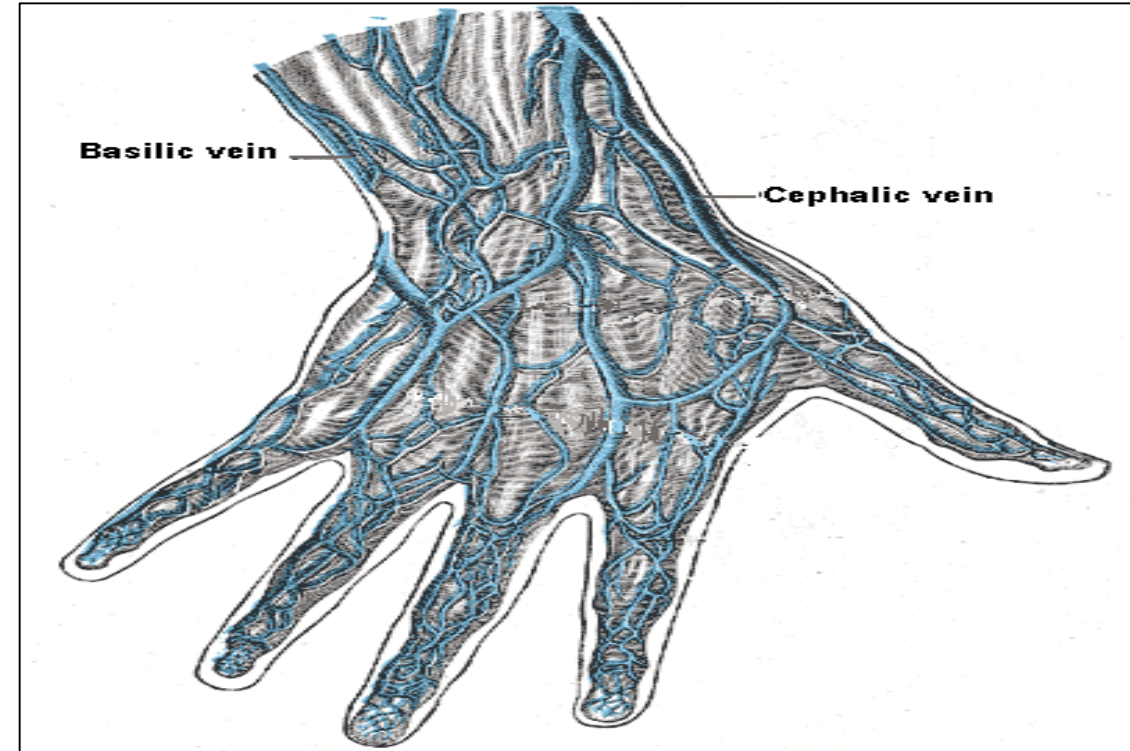
- The veins of the upper limb are divided into two sets: **Superficial** and **Deep**
- Both sets anastomose frequently with each other.
- The **superficial veins** are placed immediately beneath the skin, in the superficial fascia.
- The **deep veins** accompany the arteries, and constitute the **vena 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)**.
- The Dorsal venous network lies on the dorsum of the hand, in the **subcutaneous tissue**, proximally to the **metacarpophalangeal joints**.
- Drains into the **cephalic** vein laterally, and **basilic** vein medially



## Cephalic Vein

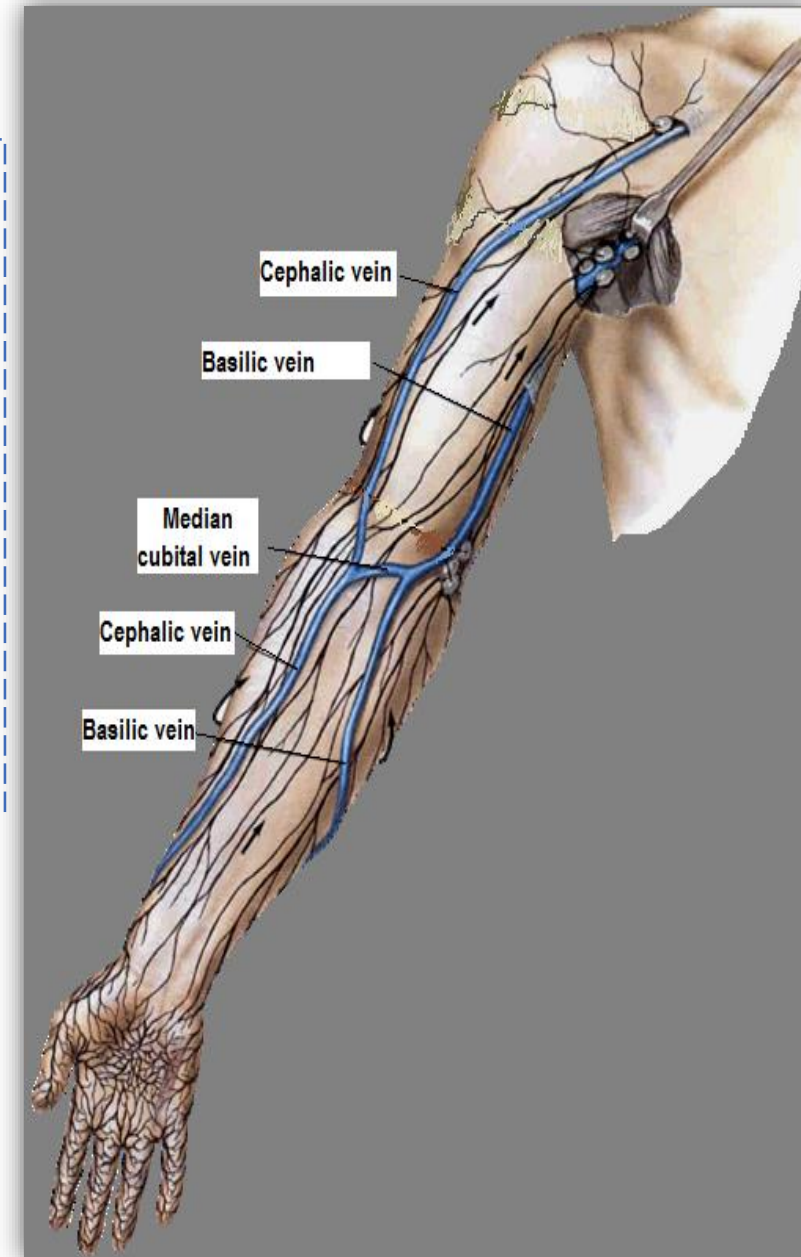
- ❖ Arises from the **lateral end** of the dorsal venous arch of the hand.
- ❖ Ascends on **radial side** of the forearm to the elbow and continues up the arm in the **deltopectoral groove**.
- ❖ Pierces **clavipectoral fascia** and drains into the **axillary vein**.

## 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** and continues as **axillary vein**.

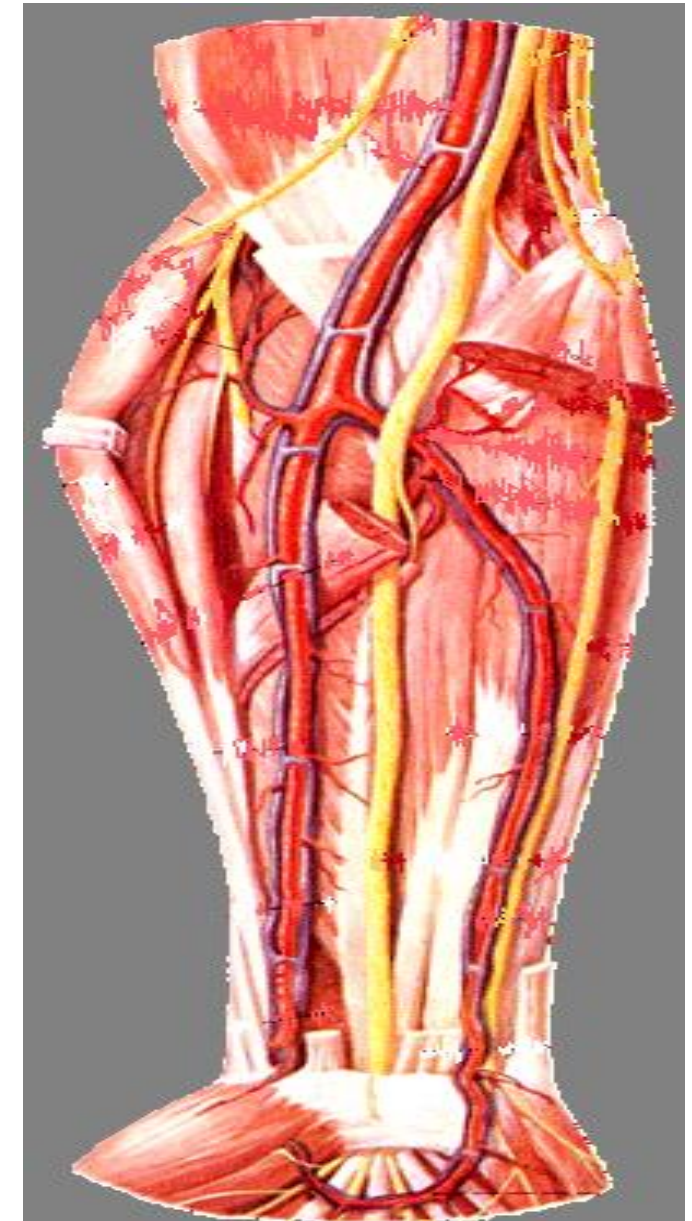
## Median Cubital Vein

- Links cephalic vein and basilic vein in the cubital fossa.
- Frequent site for venipuncture.



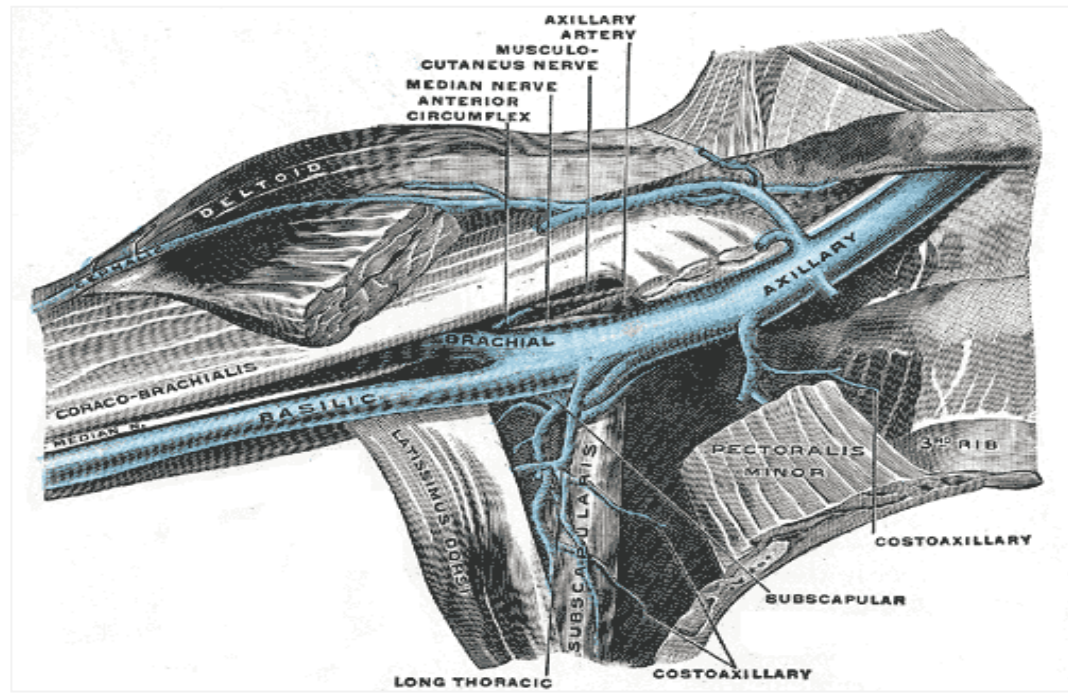
# Deep Veins of the Upper Limb

- ❖ Accompany the arteries of the same region and bear similar names.
- ❖ **venae comitantes (accompanying veins)** are generally arranged in pairs, 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 venae 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 venae comitantes of the radial and ulnar arteries. (2 veins on either side of the radial or ulnar arteries)
- ❖ The **brachial veins** are placed one on either side of the brachial artery.



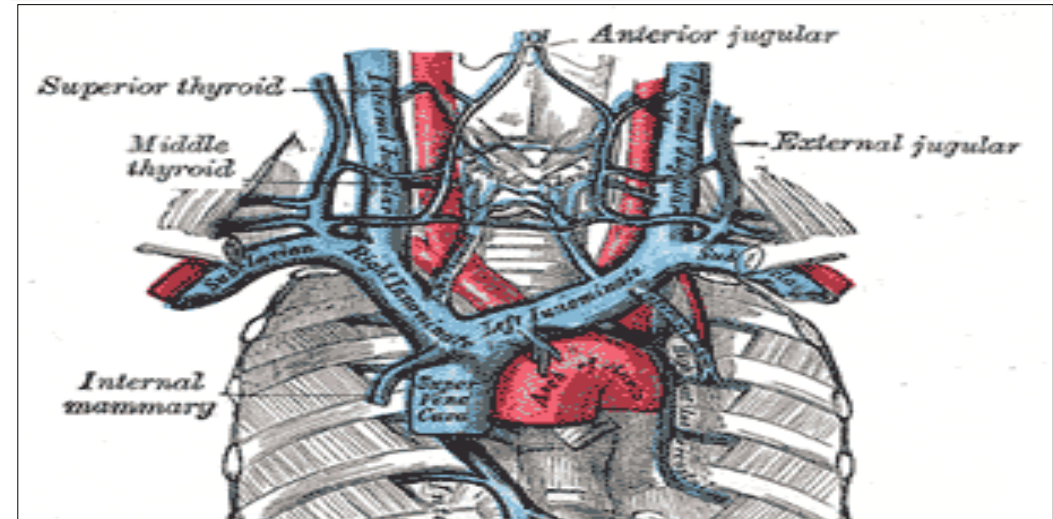
## The axillary vein:

- 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**.



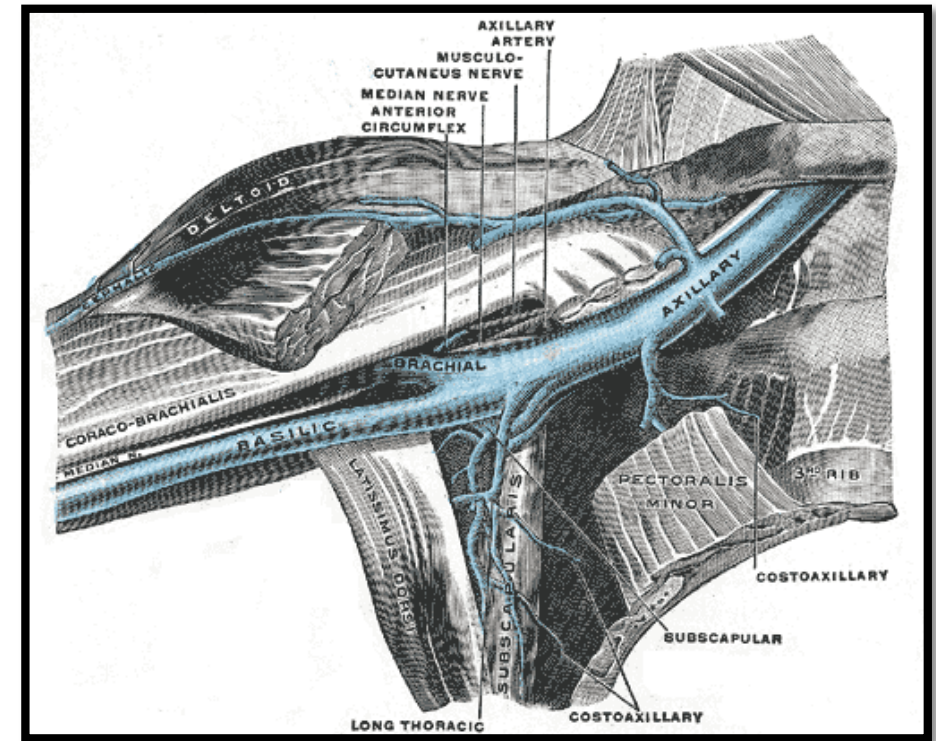
## The subclavian vein:

- 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**.



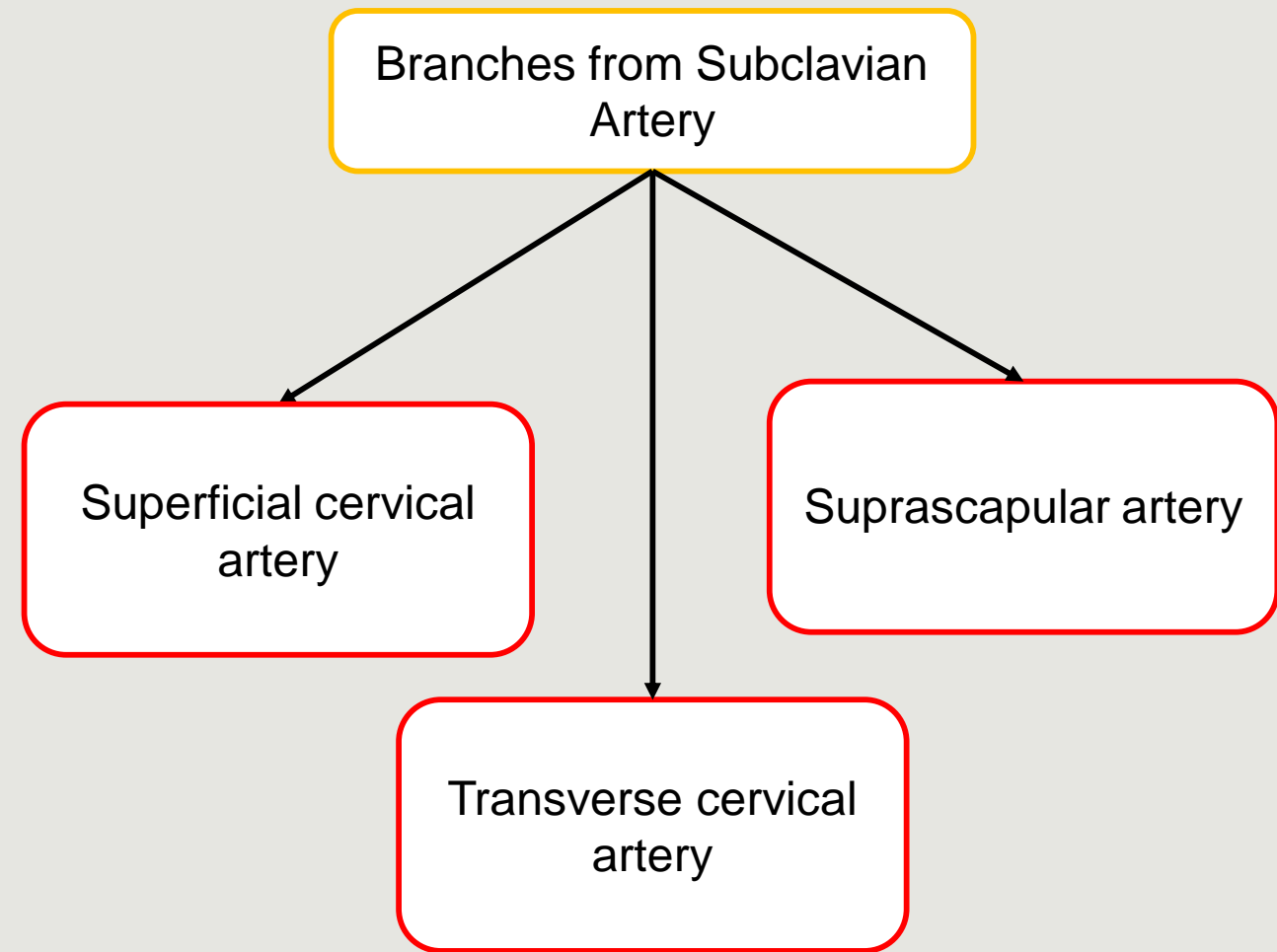
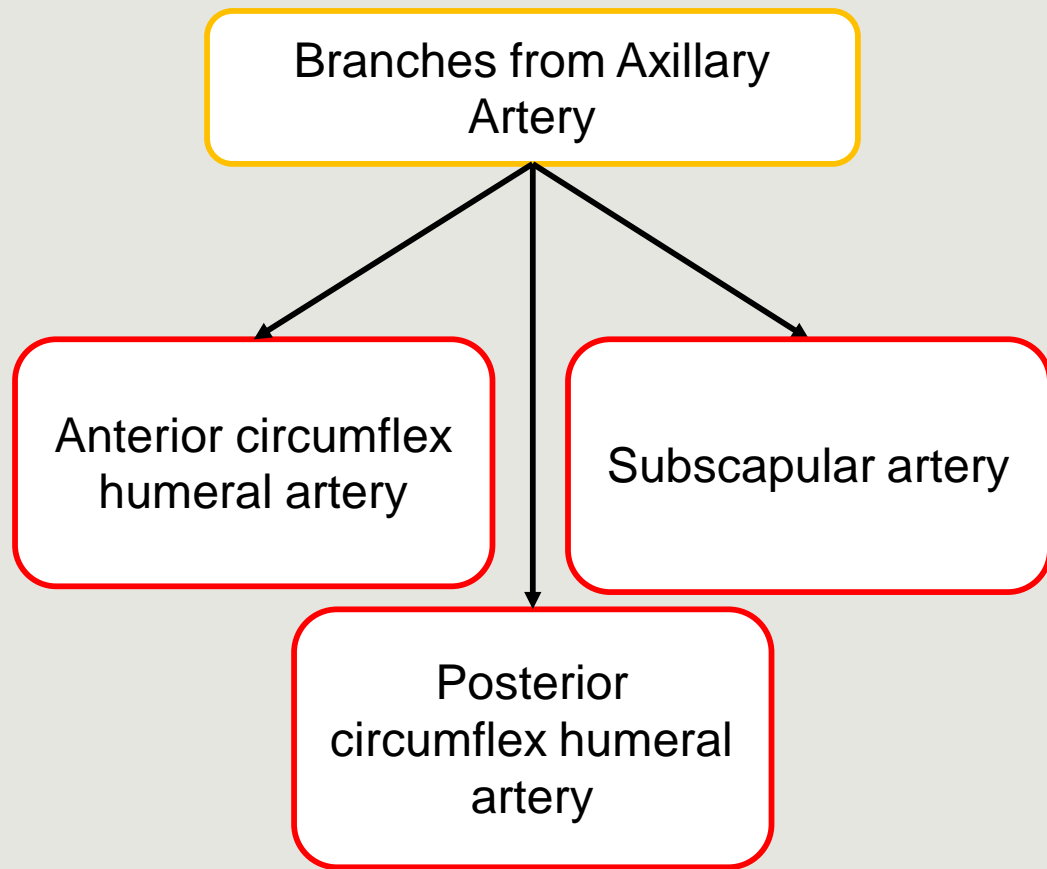
# Anatomy of basilic and cephalic vein catheterization

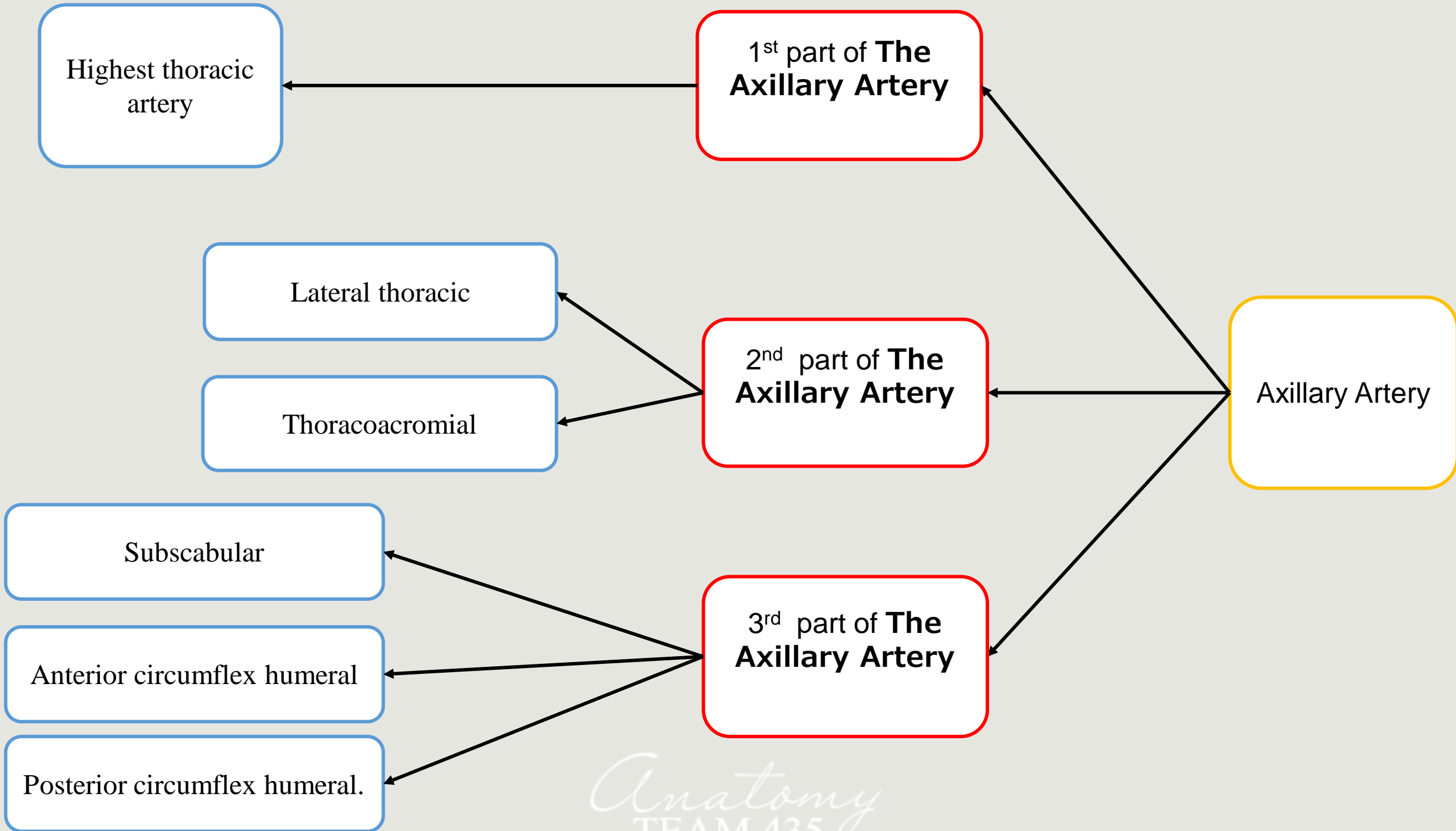
- The **basilic vein** is the vein of choice for central venous catheterization.
- From the cubital fossa until reaching the axillary vein it increases in diameter and lies in direct line with the axillary vein.
- The **cephalic vein** does not increase in size as it ascends in the arm, and frequently divides into small branches.
- And it joins the axillary vein at right angle, so it is difficult to maneuver the catheter around this angle.





Anastomosis occurs between branches of **Subclavian and Axillary arteries** :







**Video: arteries of upper limb**

**Link:**

<https://www.youtube.com/watch?v=2ufqU0pm800>

[https://www.youtube.com/watch?v=IRjF5wl\\_IqU](https://www.youtube.com/watch?v=IRjF5wl_IqU)

**Video: superficial veins of upper limb**

**Link:**

<https://www.youtube.com/watch?v=Ck4muKt9Wzs>



**Application : Netter Atlas**

**Application: Essential anatomy 5  
you can have it for free, ask**

[https://twitter.com/Med\\_435](https://twitter.com/Med_435)



**Quiz:**

<https://www.onlineexambuilder.com/vascular-anatomy-of-upper-limb/exam-51358>

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