

# Upper limbs

## **L7**

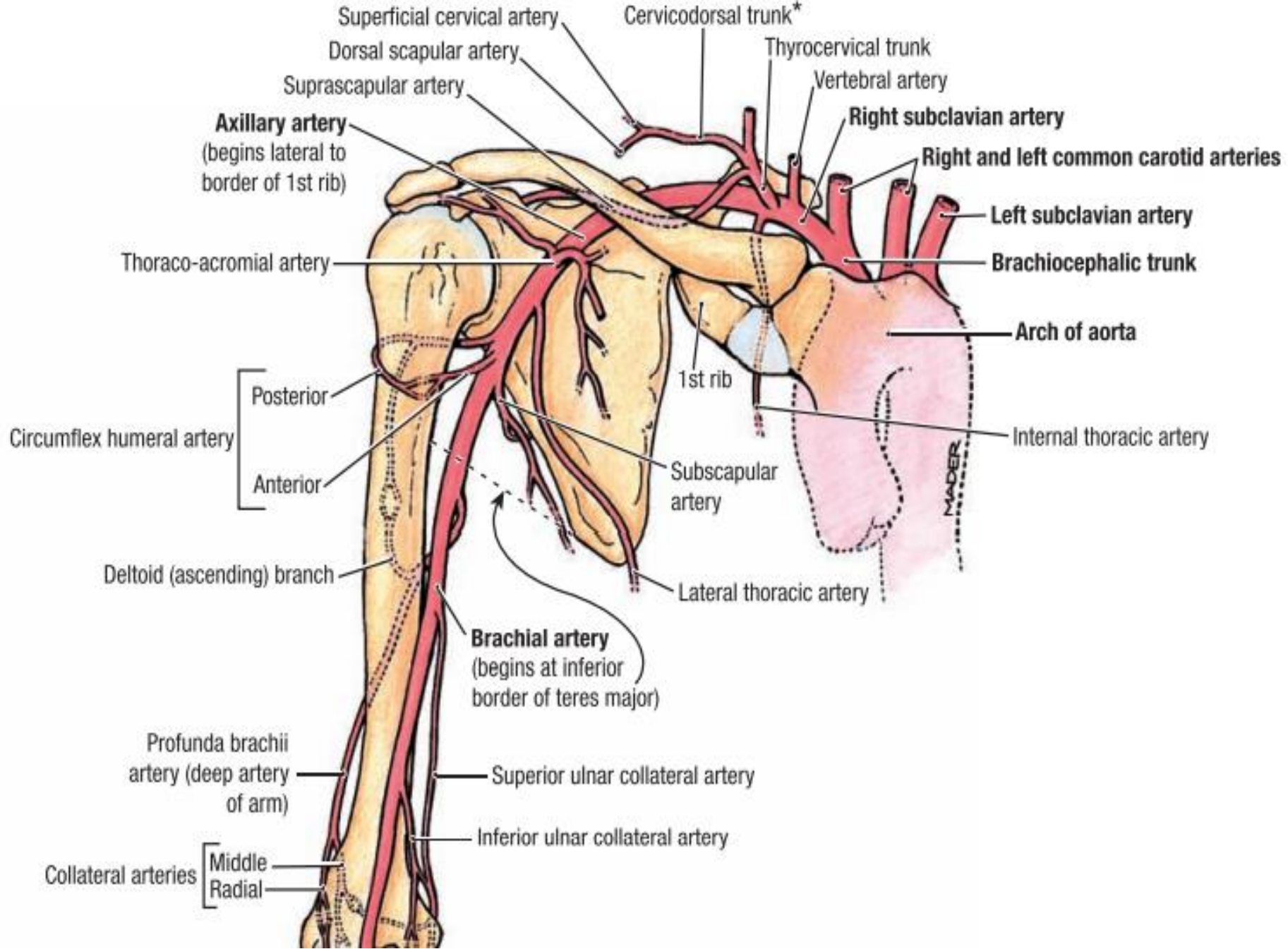
# Objectives

At the end of this lecture student must know:

- 1- Main arteries of the upper limbs.
- 2-Arterial anastamosis arround scapula and elbow.
- 3-Arterial anastamosis of the hand.

# ARTERIES OF THE UPPER LIMBS

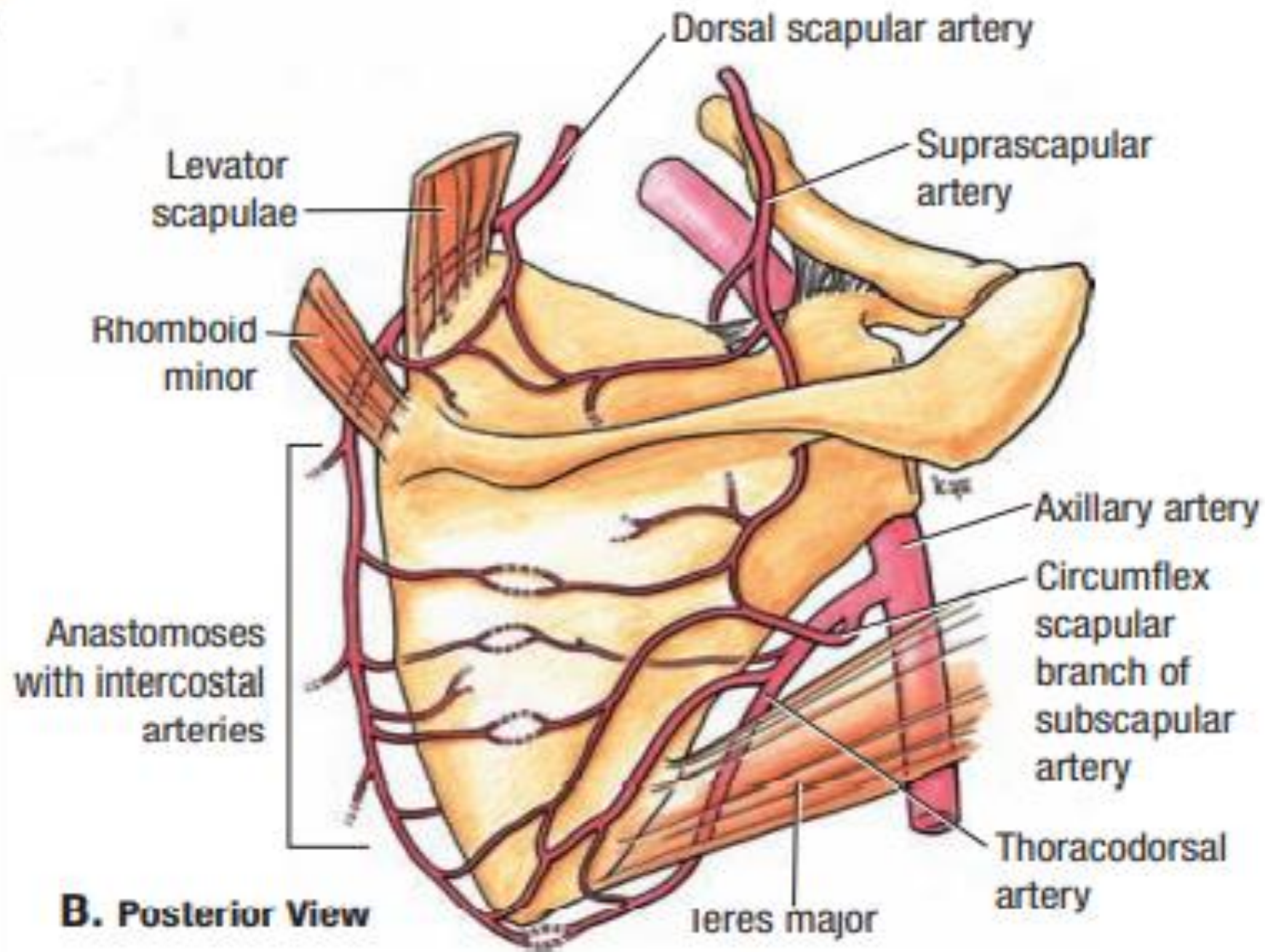
د. خالد عبد الحسين الخزرجي  
فرع التشريح والأنسجة والأجنة

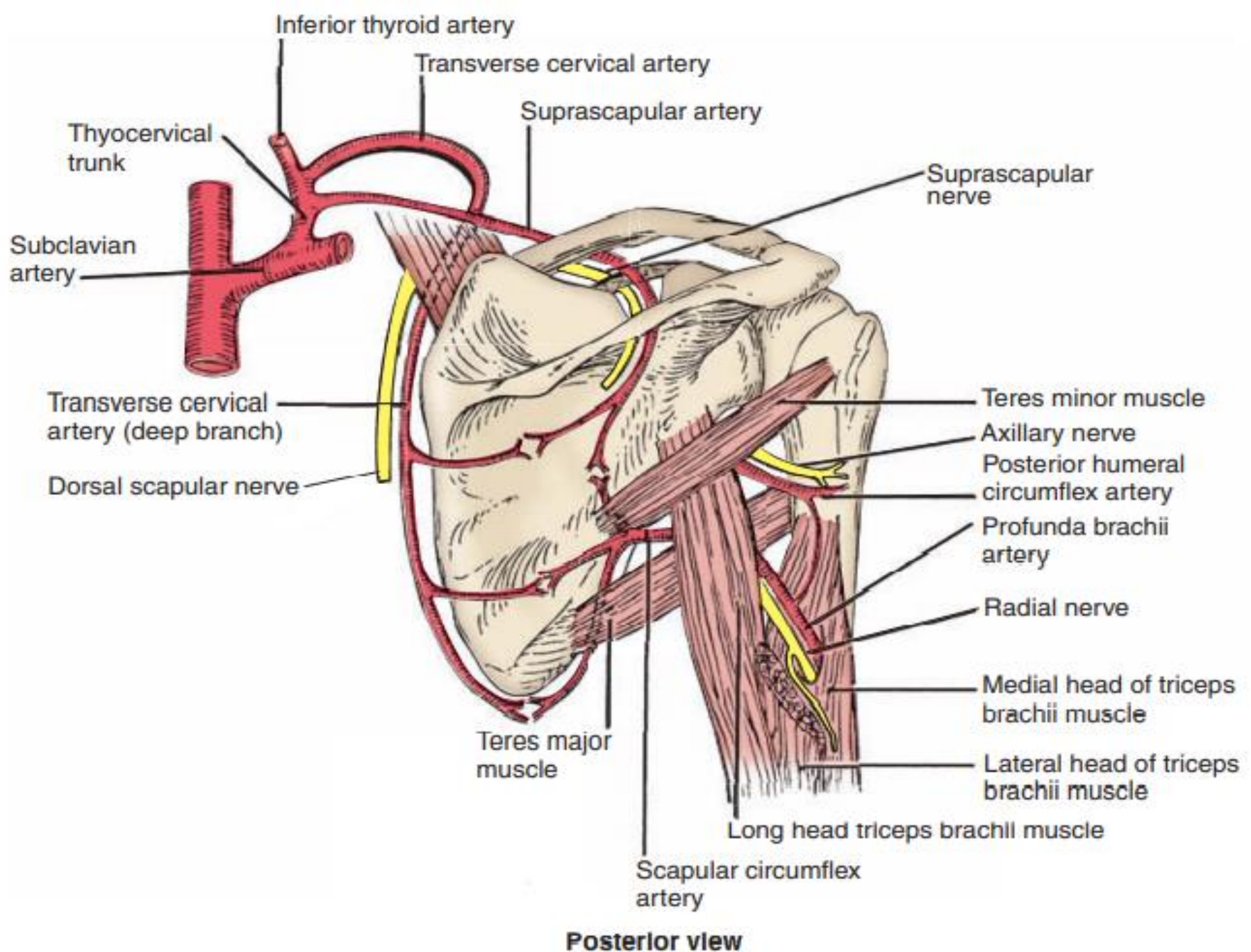


# I. BRANCHES OF THE SUBCLAVIAN ARTERY (Figure 2-8)

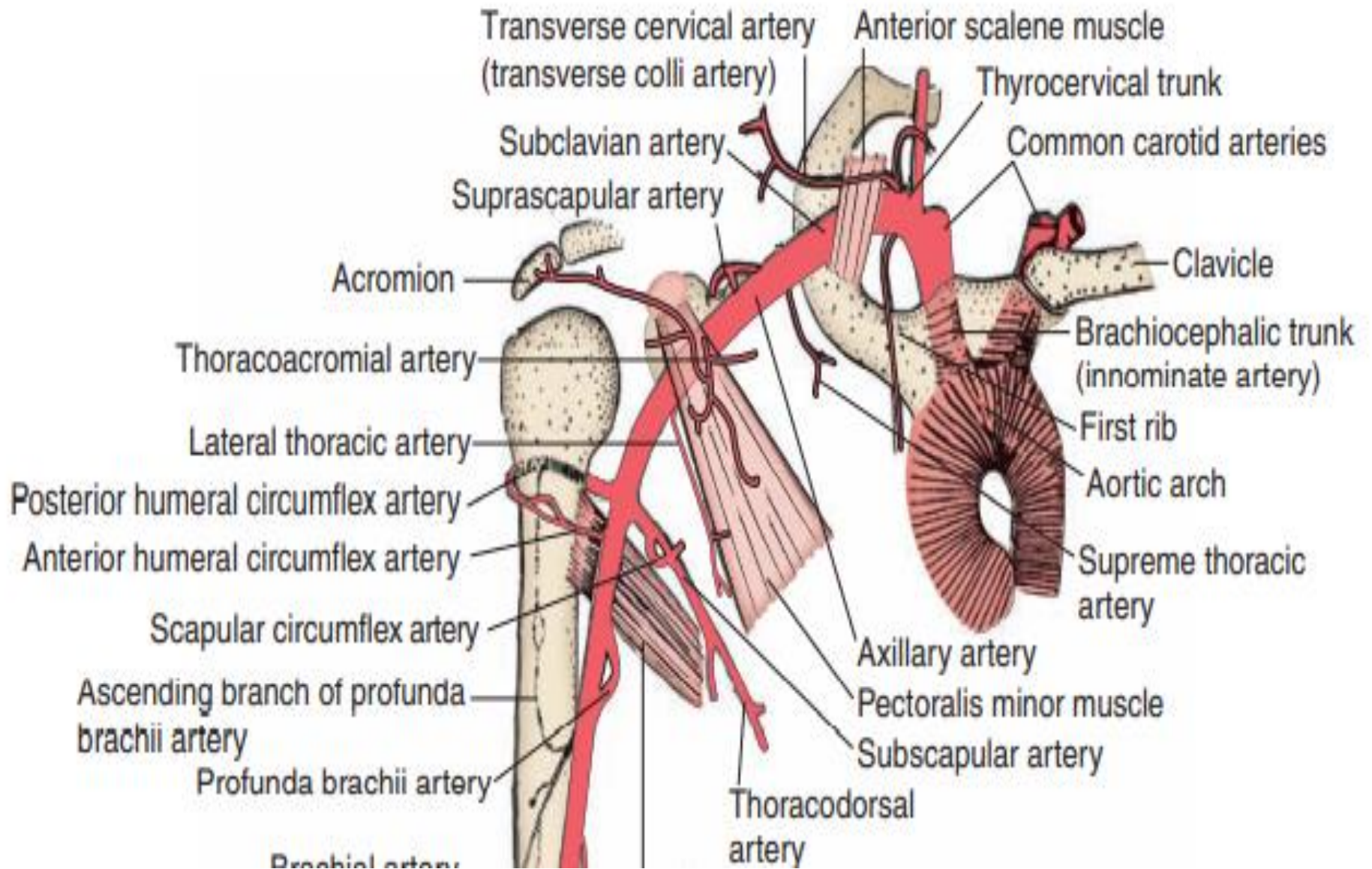
## A. Suprascapular Artery

- Is a branch of the thyrocervical trunk.
- Passes over the superior transverse scapular ligament (whereas the suprascapular nerve passes under the ligament).
- Anastomoses with the deep branch of the transverse cervical artery (**dorsal scapular artery**) and the circumflex scapular artery around the scapula, providing a collateral circulation.
- Supplies the supraspinatus and infraspinatus muscles and the shoulder and acromioclavicular joints.





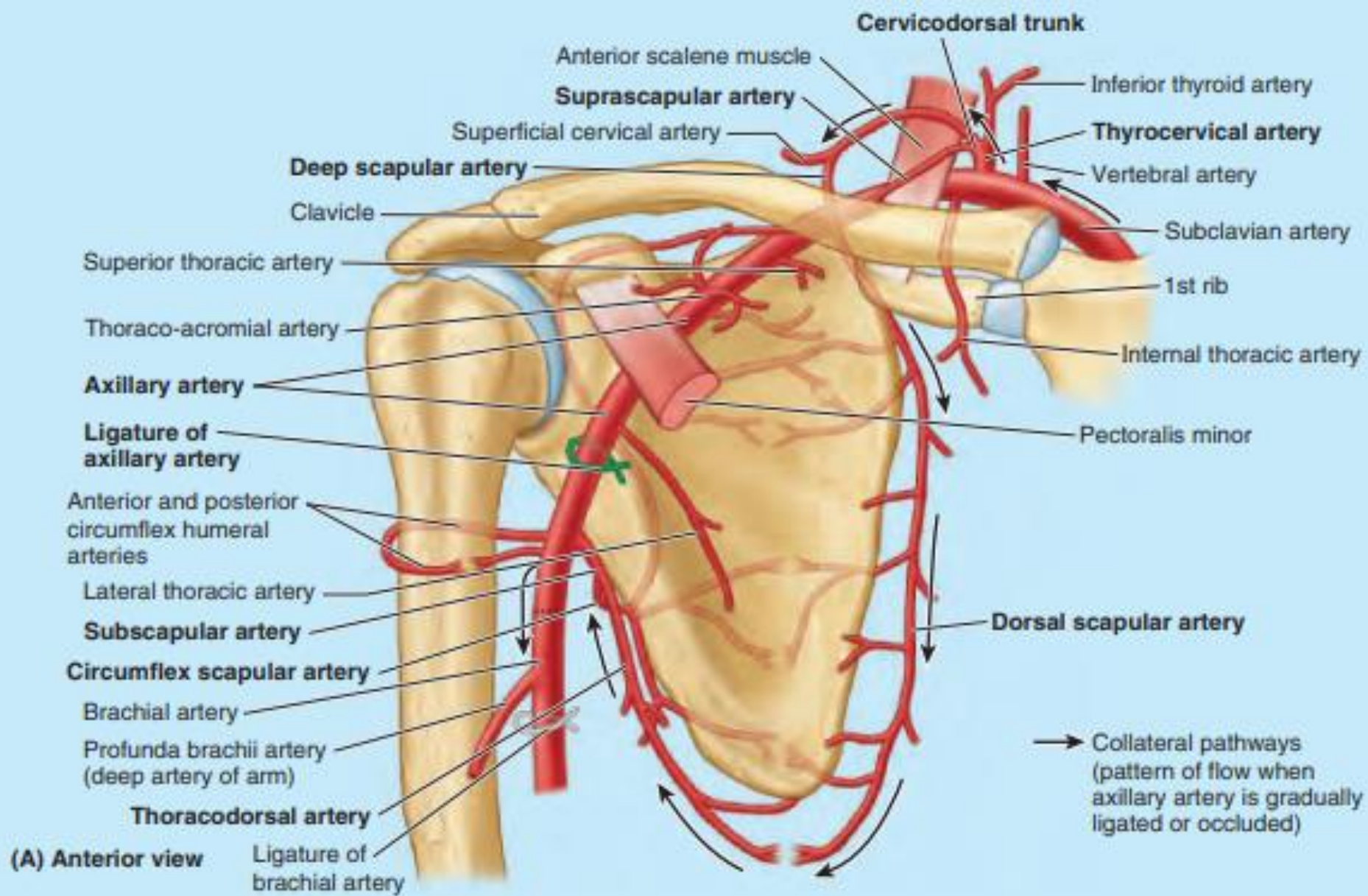
**FIGURE 2-12.** Structures of the shoulder region (posterior view).





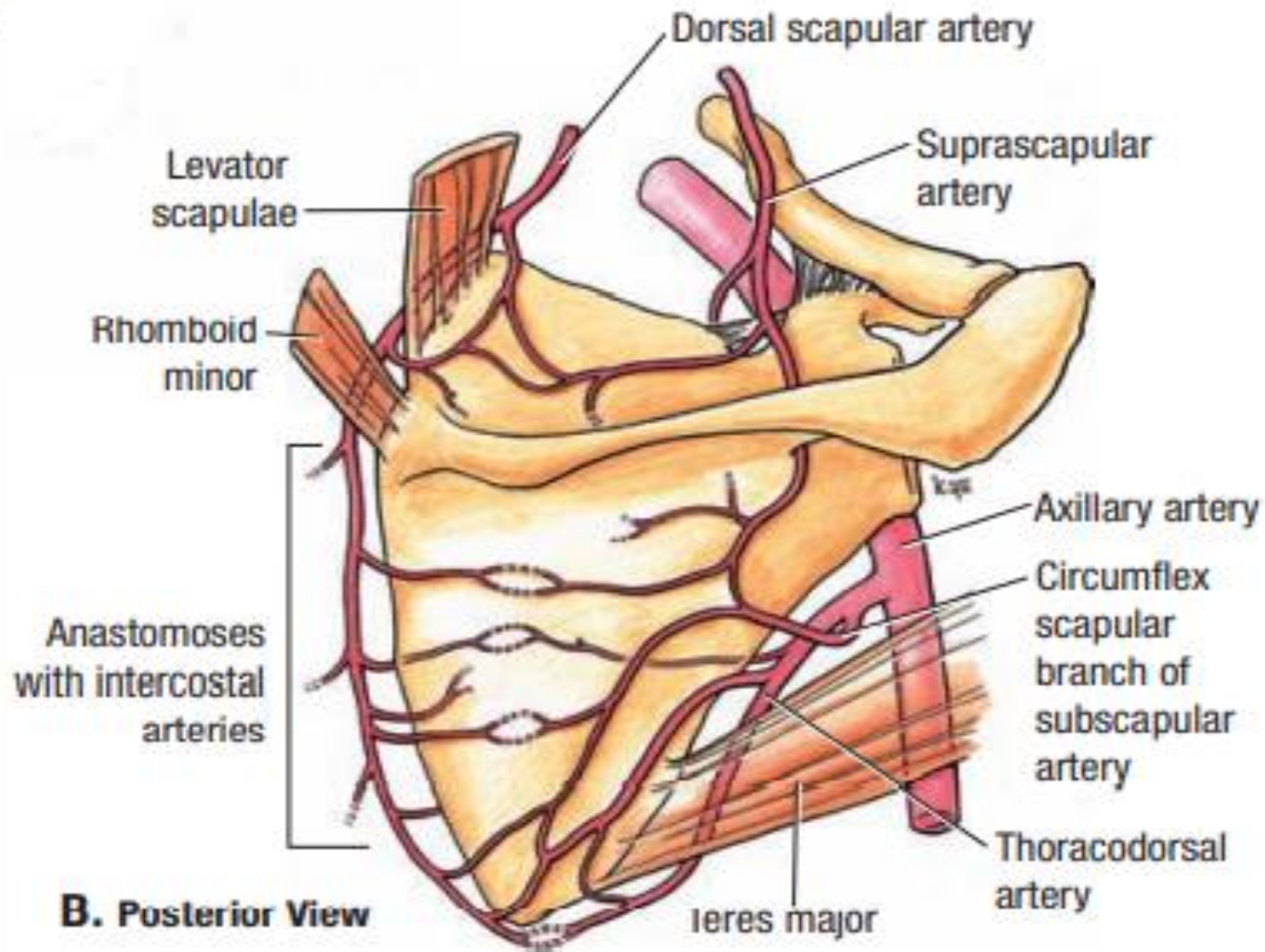
## B. Dorsal Scapular or Descending Scapular Artery

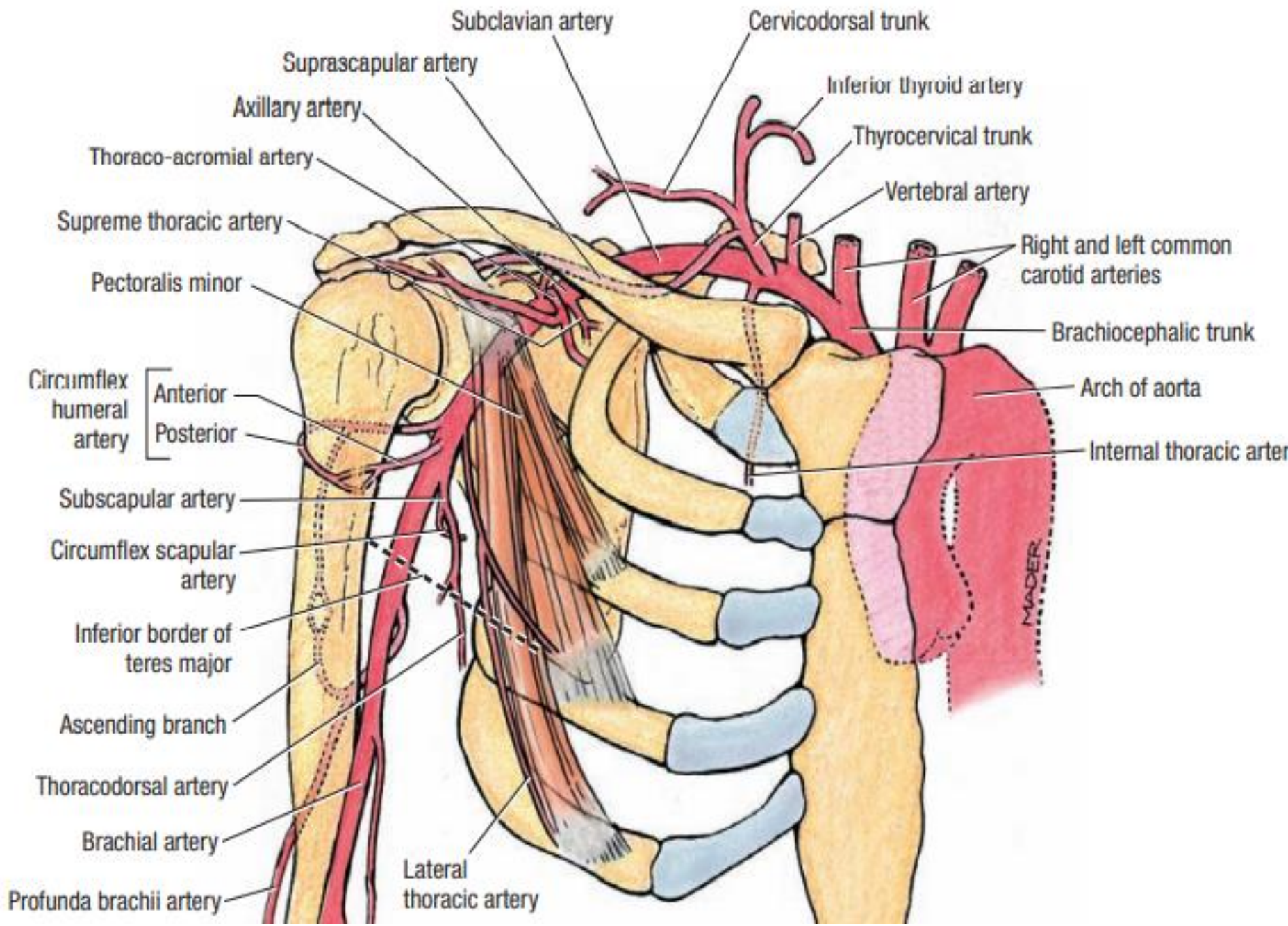
- Arises from the subclavian artery but may be a deep branch of the transverse cervical artery.
- Accompanies the dorsal scapular nerve.
- Supplies the levator scapulae, rhomboids, and serratus anterior muscles.



### C. Arterial Anastomoses Around Scapular

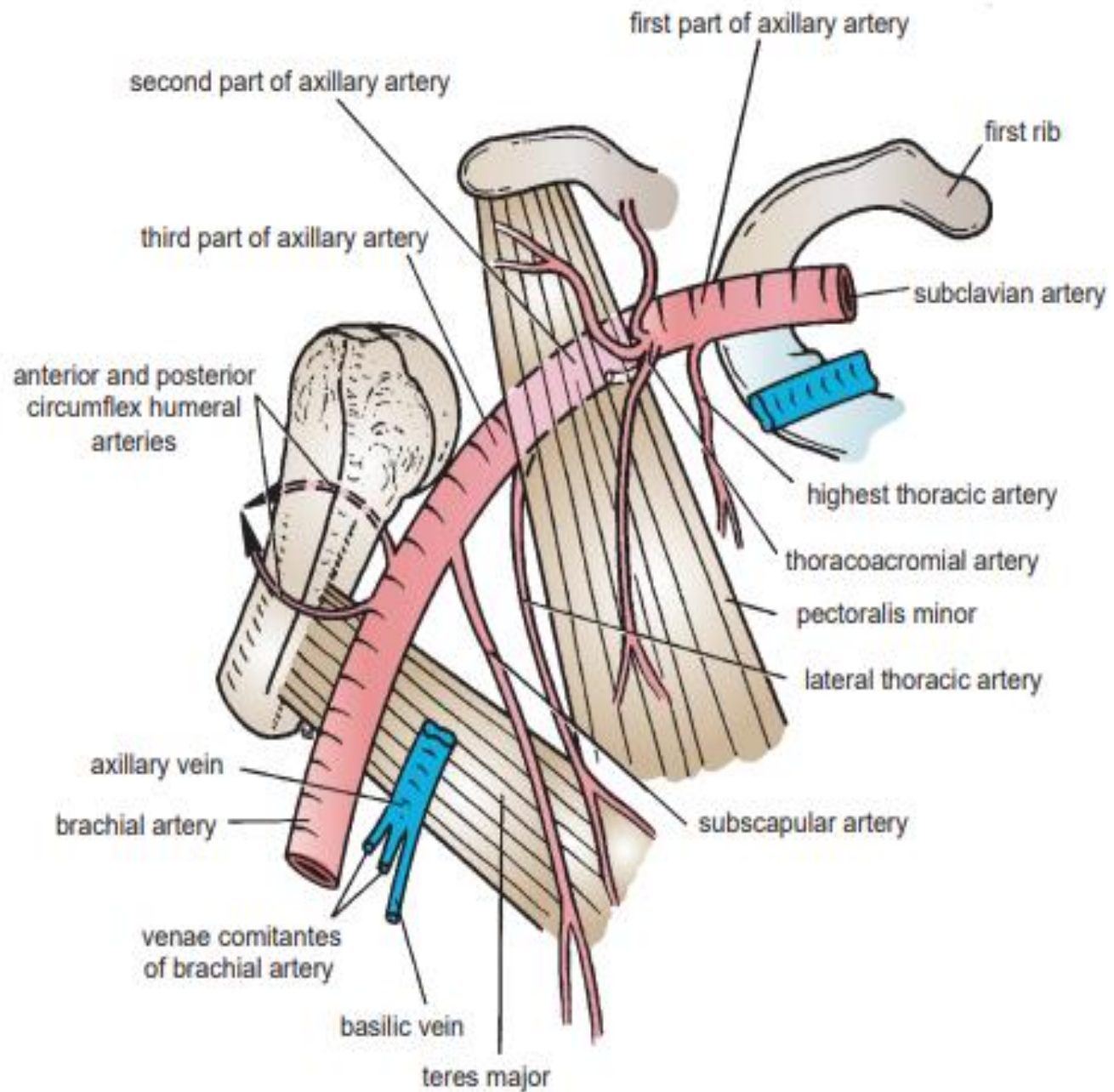
- Occur between three groups of arteries: (a) suprascapular, descending scapular, and circumflex scapular arteries; (b) acromial and posterior humeral circumflex arteries; and (c) descending scapular and posterior intercostal arteries.





## II. AXILLARY ARTERY (See Figures 2-8 and 2-9)

- Is considered to be the **central structure of the axilla**.
- Extends from the outer border of the first rib to the inferior border of the teres major muscle, where it becomes the **brachial artery**. The axillary artery is bordered on its medial side by the axillary vein.
- Is divided into three parts by the pectoralis minor muscle.



**FIGURE 9.17** Parts of the axillary artery and its branches. Note the formation of the axillary vein at the lower border of the teres major muscle.

## A. Superior or Supreme Thoracic Artery

- Supplies the intercostal muscles in the first and second anterior intercostal spaces and adjacent muscles.

## B. Thoracoacromial Artery

- Is a short trunk from the first or second part of the axillary artery and has pectoral, clavicular, acromial, and deltoid branches.
- Pierces the costocoracoid membrane (or clavipectoral fascia).



### C. Lateral Thoracic Artery

- Runs along the lateral border of the pectoralis minor muscle.
- Supplies the pectoralis major, pectoralis minor, and serratus anterior muscles and the axillary lymph nodes and gives rise to **lateral mammary branches**.

### D. Subscapular Artery

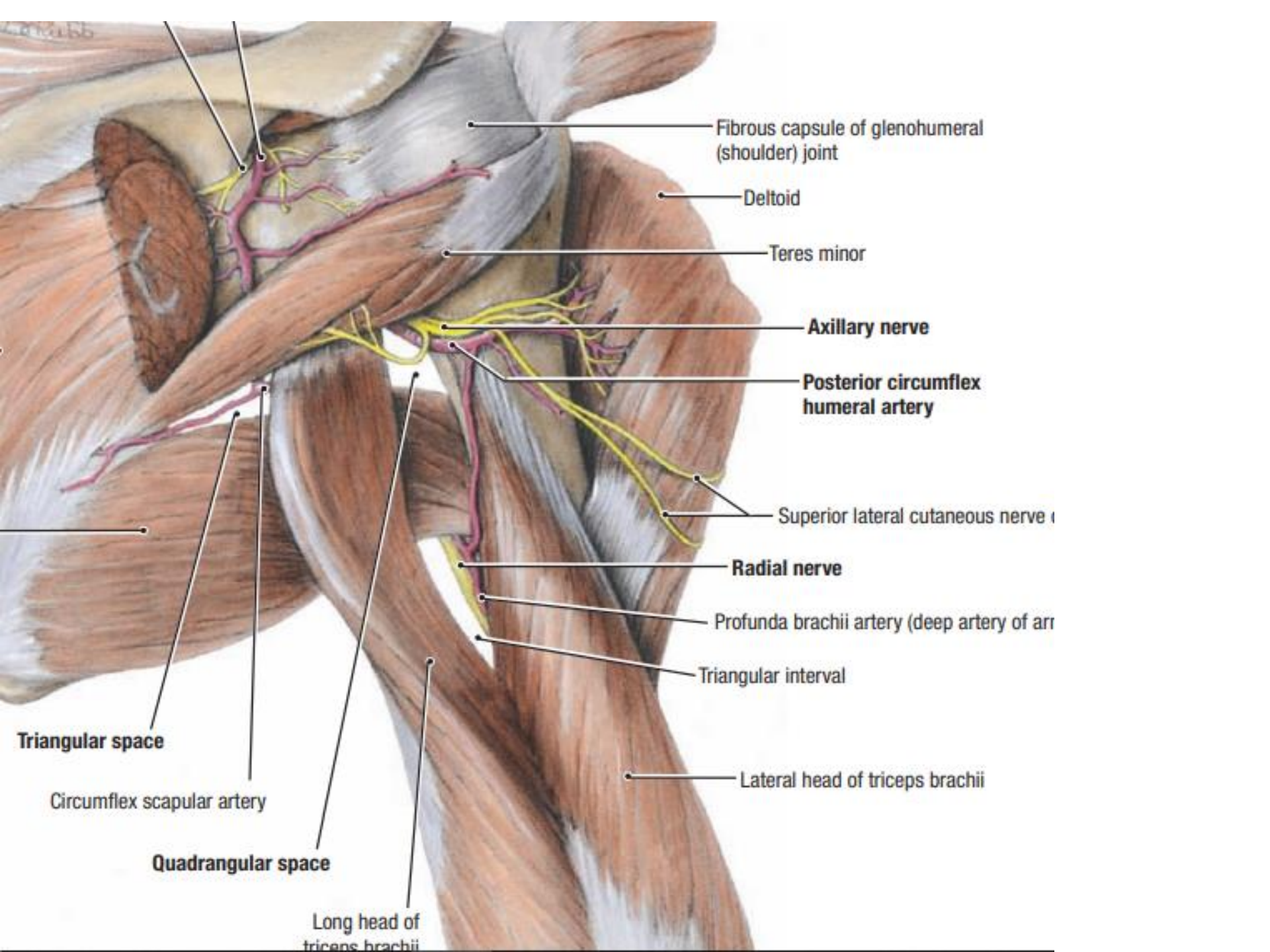
- Is the largest branch of the axillary artery, arises at the lower border of the subscapularis muscle, and descends along the axillary border of the scapula.
- Divides into the thoracodorsal and circumflex scapular arteries.

### **E. Anterior Humeral Circumflex Artery**

- Passes anteriorly around the surgical neck of the humerus.
- Anastomoses with the posterior humeral circumflex artery.

### **F. Posterior Humeral Circumflex Artery**

- Runs posteriorly with the axillary nerve through the quadrangular space bounded by the teres minor and teres major muscles, the long head of the triceps brachii, and the humerus.
- Anastomoses with the anterior humeral circumflex artery and an ascending branch of the profunda brachii artery and also sends a branch to the acromial rete.



Fibrous capsule of glenohumeral (shoulder) joint

Deltoid

Teres minor

Axillary nerve

Posterior circumflex humeral artery

Superior lateral cutaneous nerve of arm

Radial nerve

Profunda brachii artery (deep artery of arm)

Triangular interval

Lateral head of triceps brachii

Triangular space

Circumflex scapular artery

Quadrangular space

Long head of triceps brachii

## Branches of the Axillary Artery

From the first part:

The **highest thoracic artery** is small and runs along the upper border of the pectoralis minor.

From the second part:

The **thoracoacromial artery** immediately divides into terminal branches.

The **lateral thoracic artery** runs along the lower border of the pectoralis minor (Fig. 9.17).

From the third part:

The **subscapular artery** runs along the lower border of the subscapularis muscle.

The **anterior and posterior circumflex humeral arteries** wind around the front and the back of the surgical neck of the humerus, respectively (Fig. 9.17).

### III. BRACHIAL ARTERY (See Figures 2-8 and 2-9)

- Extends from the inferior border of the teres major muscle to its bifurcation in the cubital fossa.
- Lies on the triceps brachii and then on the brachialis muscles medial to the coracobrachialis and biceps brachii and is accompanied by the basilic vein in the middle of the arm.
- Lies in the center of the cubital fossa, medial to the biceps tendon, lateral to the median nerve, and deep to the bicipital aponeurosis. The stethoscope should be placed in this place when taking **blood pressure** and listening to the **arterial pulse**.
- Provides muscular branches and terminates by dividing into the radial and ulnar arteries at the level of the radial neck, approximately 1 cm below the bend of the elbow, in the cubital fossa.

## A. Profunda Brachii (Deep Brachial) Artery

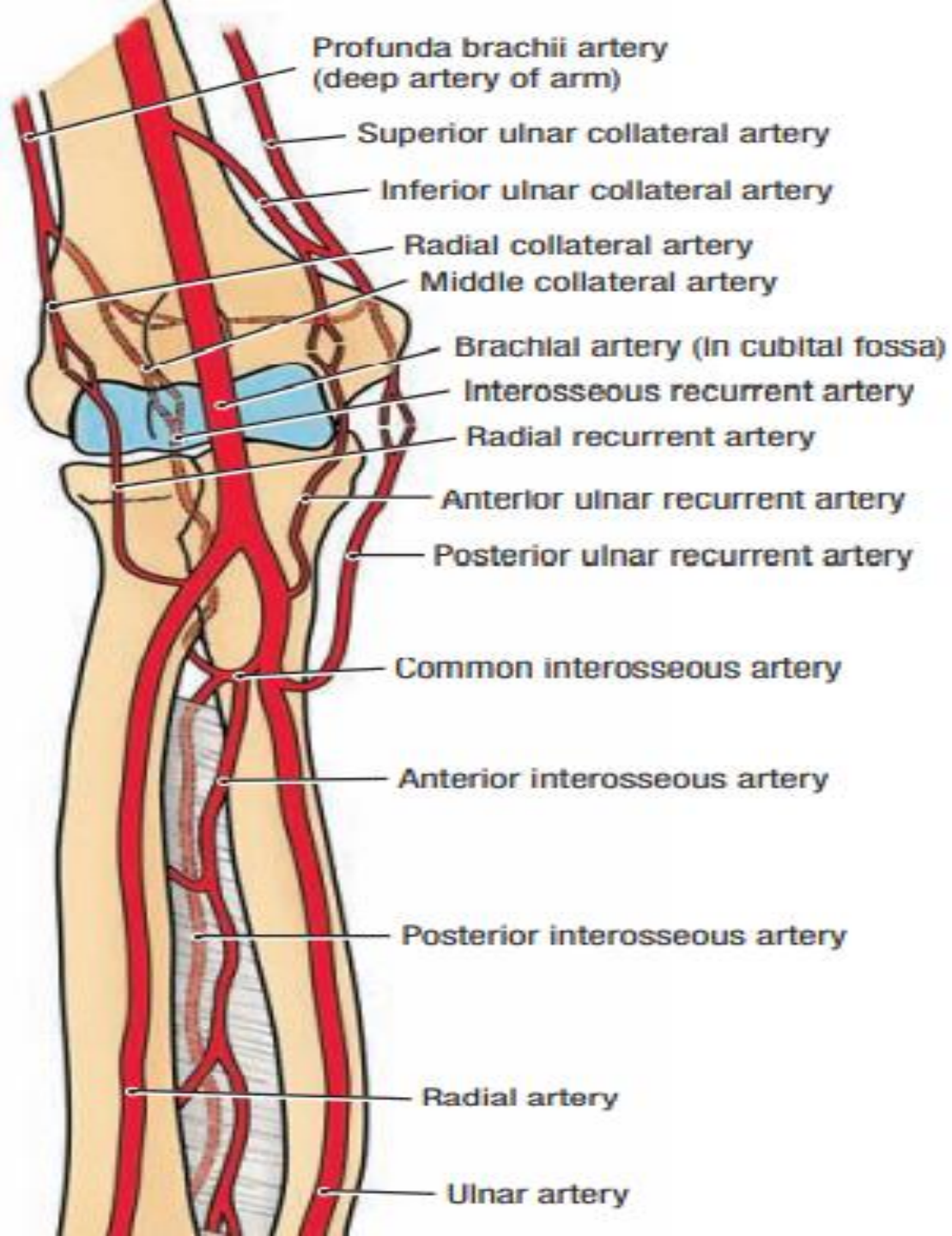
- Descends posteriorly with the radial nerve and gives off an **ascending branch**, which anastomoses with the descending branch of the posterior humeral circumflex artery.
- Divides into the **middle collateral artery**, which anastomoses with the interosseous recurrent artery, and the **radial collateral artery**, which follows the radial nerve through the lateral intermuscular septum and ends in front of the lateral epicondyle by anastomosing with the radial recurrent artery of the radial artery.

## B. Superior Ulnar Collateral Artery

- Pierces the medial intermuscular septum and accompanies the ulnar nerve behind the septum and medial epicondyle.
- Anastomoses with the posterior ulnar recurrent branch of the ulnar artery.

## C. Inferior Ulnar Collateral Artery

- Arises just above the elbow and descends in front of the medial epicondyle.
- Anastomoses with the anterior ulnar recurrent branch of the ulnar artery.





## IV. RADIAL ARTERY (See Figures 2-8, 2-9, and 2-20)

- Arises as the smaller lateral branch of the brachial artery in the cubital fossa and descends laterally under cover of the brachioradialis muscle, with the superficial radial nerve on its lateral side, on the supinator and flexor pollicis longus muscles.
- Curves over the radial side of the carpal bones beneath the tendons of the abductor pollicis longus muscle, the extensor pollicis longus and brevis muscles, and over the surface of the scaphoid and trapezium bones.

- Runs through the anatomic snuffbox, enters the palm by passing between the two heads of the first dorsal interosseous muscle and then between the heads of the adductor pollicis muscle, and divides into the **princeps pollicis artery** and the **deep palmar arch**.
- Accounts for the **radial pulse**, which can be felt proximal to the wrist between the tendons of the brachioradialis and flexor carpi radialis muscles. The radial pulse may also be palpated in the anatomic snuffbox between the tendons of the extensor pollicis longus and brevis muscles.
- Gives rise to the following branches:

### **A. Radial Recurrent Artery**

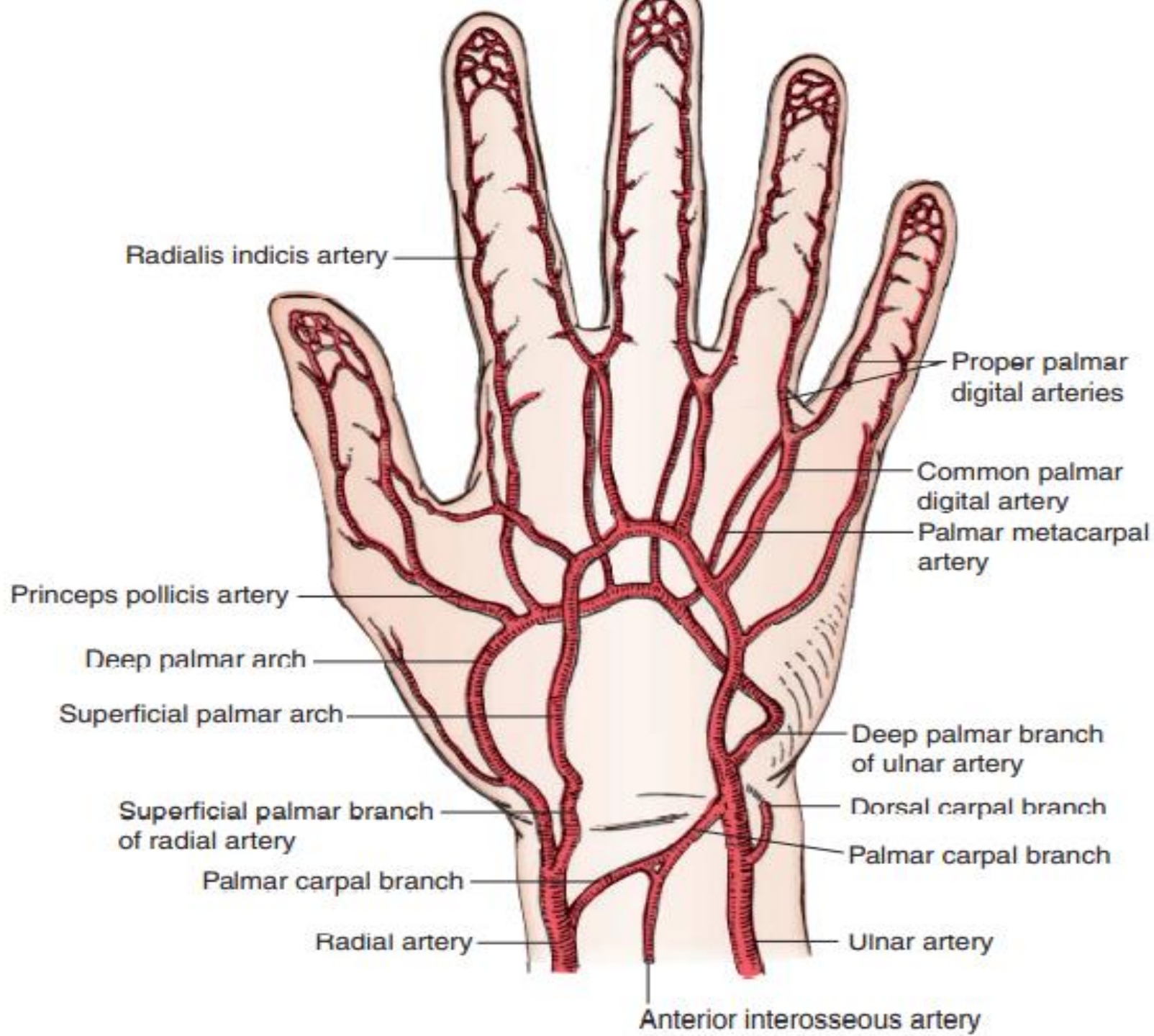
- Arises from the radial artery just below its origin and ascends on the supinator and then between the brachioradialis and brachialis muscles.
- Anastomoses with the radial collateral branch of the profunda brachii artery.

### **B. Palmar Carpal Branch**

- Joins the palmar carpal branch of the ulnar artery and forms the palmar carpal arch.

### **C. Superficial Palmar Branch**

- Passes through the thenar muscles and anastomoses with the superficial branch of the ulnar artery to complete the superficial palmar arterial arch.



#### D. Dorsal Carpal Branch

- Joins the dorsal carpal branch of the ulnar artery and the dorsal terminal branch of the anterior interosseous artery to form the **dorsal carpal rete**.

#### E. Princeps Pollicis Artery

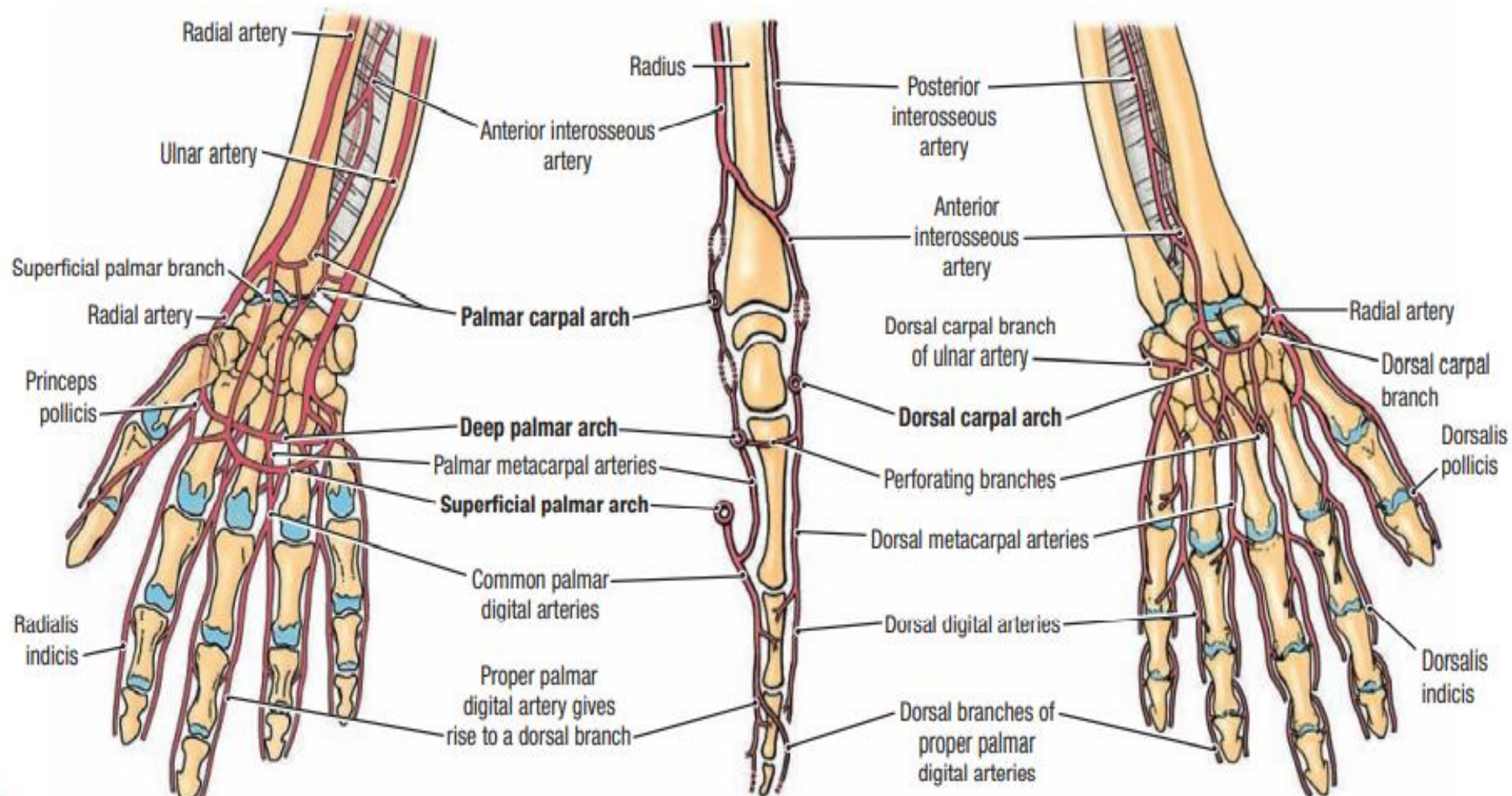
- Descends along the ulnar border of the first metacarpal bone under the flexor pollicis longus tendon.
- Divides into two **proper digital arteries** for each side of the thumb.

## F. Radialis Indicis Artery

- Also may arise from the deep palmar arch or the princeps pollicis artery.

## G. Deep Palmar Arch

- Is formed by the main termination of the radial artery and usually is completed by the deep palmar branch of the ulnar artery.
- Passes between the transverse and oblique heads of the adductor pollicis muscle.
- Gives rise to **three palmar metacarpal arteries**, which descend on the interossei and join the common palmar digital arteries from the superficial palmar arch.



**Anterior View (Palmar Aspect)**

**Lateral View  
(isolated third digit)**

**Posterior View (Dorsum of Hand)**

**D**

## V. ULNAR ARTERY (See Figures 2-8, 2-9, and 2-20)

- Is the **larger medial branch of the brachial artery** in the cubital fossa.
- Descends behind the ulnar head of the pronator teres muscle and lies between the flexor digitorum superficialis and profundus muscles.
- Enters the hand anterior to the flexor retinaculum, lateral to the pisiform bone, and medial to the hook of the hamate bone.
- Divides into the superficial palmar arch and the deep palmar branch, which passes between the abductor and flexor digiti minimi brevis muscles and runs medially to join the radial artery to complete the deep palmar arch.



- Accounts for the **ulnar pulse**, which is palpable just to the radial side of the insertion of the flexor carpi ulnaris into the pisiform bone. If the ulnar artery arises high from the brachial artery and runs invariably superficial to the flexor muscles, the artery may be mistaken for a vein for certain drugs, resulting in disastrous gangrene with subsequent partial or total loss of the hand.
- Gives rise to the following branches:

#### A. Anterior Ulnar Recurrent Artery

- Anastomoses with the inferior ulnar collateral artery.

#### B. Posterior Ulnar Recurrent Artery

- Anastomoses with the superior ulnar collateral artery.

### C. Common Interosseous Artery

- Arises from the lateral side of the ulnar artery and divides into the anterior and posterior interosseous arteries.

#### 1. Anterior Interosseous Artery

- Descends with the anterior interosseous nerve in front of the interosseous membrane, located between the flexor digitorum profundus and the flexor pollicis longus muscles.
- Perforates the interosseous membrane to anastomose with the posterior interosseous artery and join the dorsal carpal network.

## 2. Posterior Interosseous Artery

- Gives rise to the interosseous recurrent artery, which anastomoses with a middle collateral branch of the profunda brachii artery.
- Descends behind the interosseous membrane in company with the posterior interosseous nerve.
- Anastomoses with the dorsal carpal branch of the anterior interosseous artery.

#### **D. Palmar Carpal Branch**

- Joins the palmar carpal branch of the radial artery to form the palmar carpal arch.

#### **E. Dorsal Carpal Branch**

- Passes around the ulnar side of the wrist and joins the dorsal carpal rete.

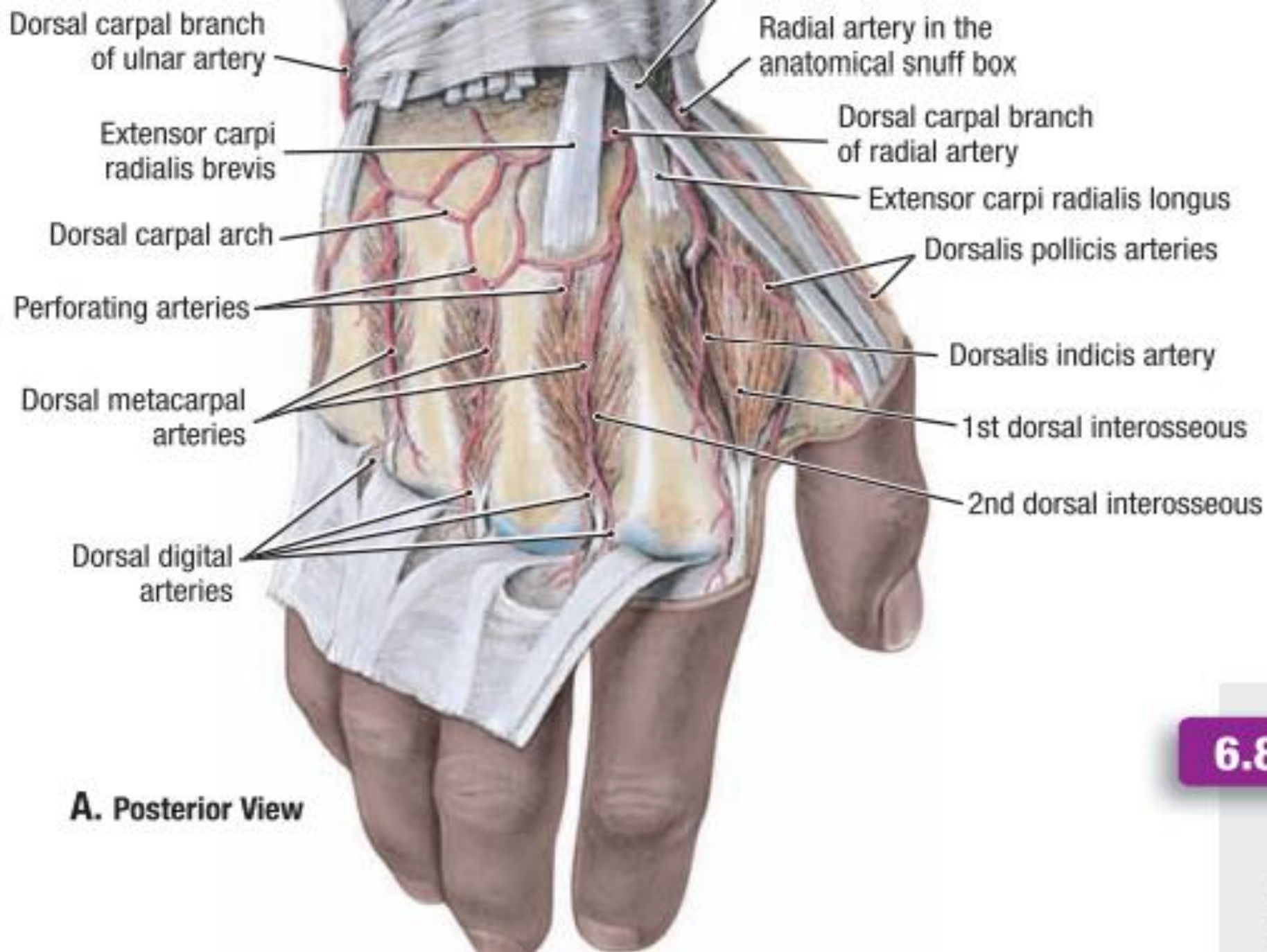
#### **F. Superficial Palmar Arterial Arch**

- Is the main termination of the ulnar artery, usually completed by anastomosis with the superficial palmar branch of the radial artery.

- Lies immediately under the palmar aponeurosis.
- Gives rise to three **common palmar digital arteries**, each of which bifurcates into proper palmar digital arteries, which run distally to supply the adjacent sides of the fingers.

### G. Deep Palmar Branch

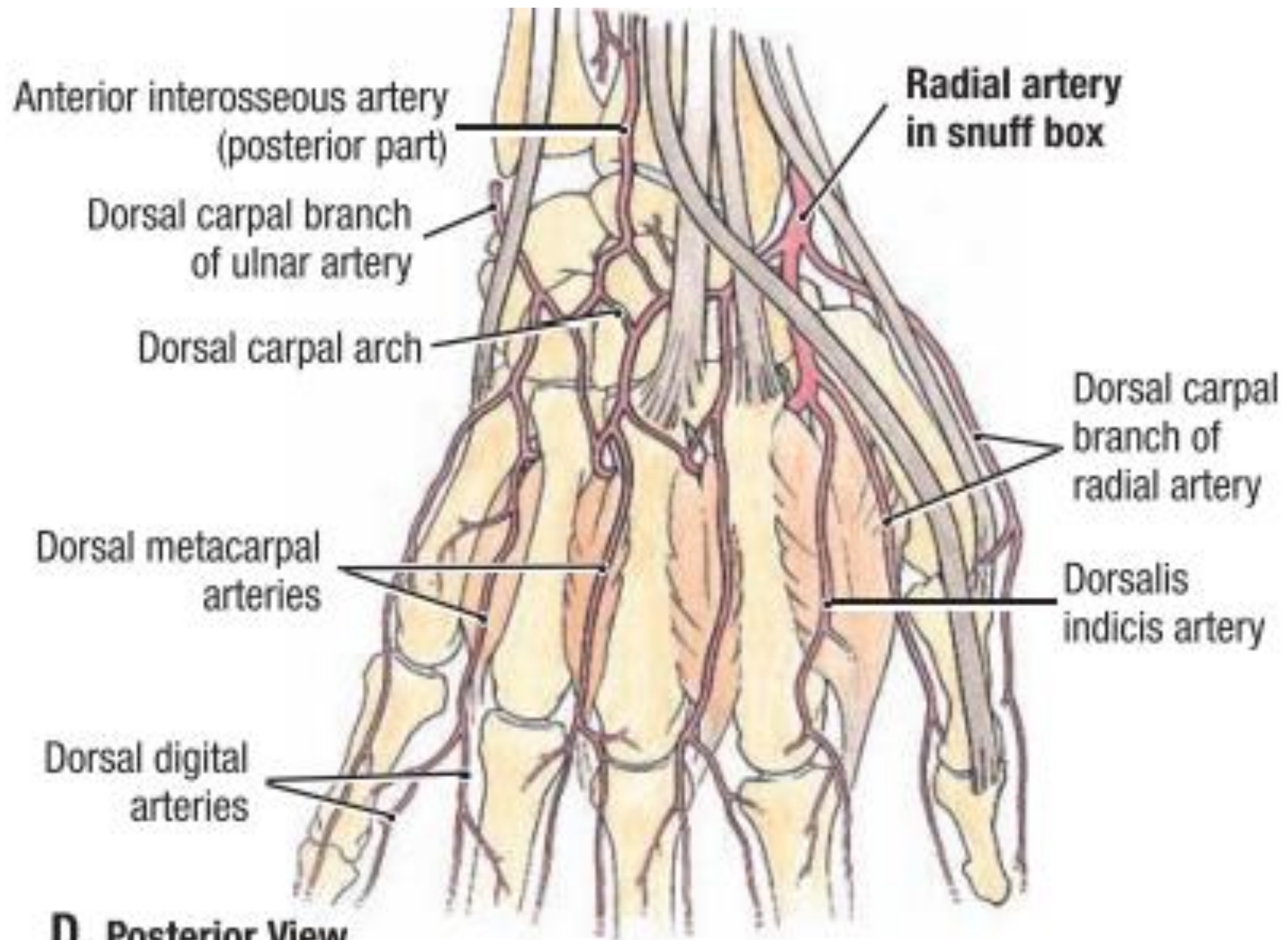
- Accompanies the deep branch of the ulnar nerve through the hypothenar muscles and anastomoses with the radial artery, thereby completing the **deep palmar arch**.
- Gives rise to the palmar metacarpal arteries, which join the common palmar digital arteries.



**A. Posterior View**

**6.84**

**A.**  
OU



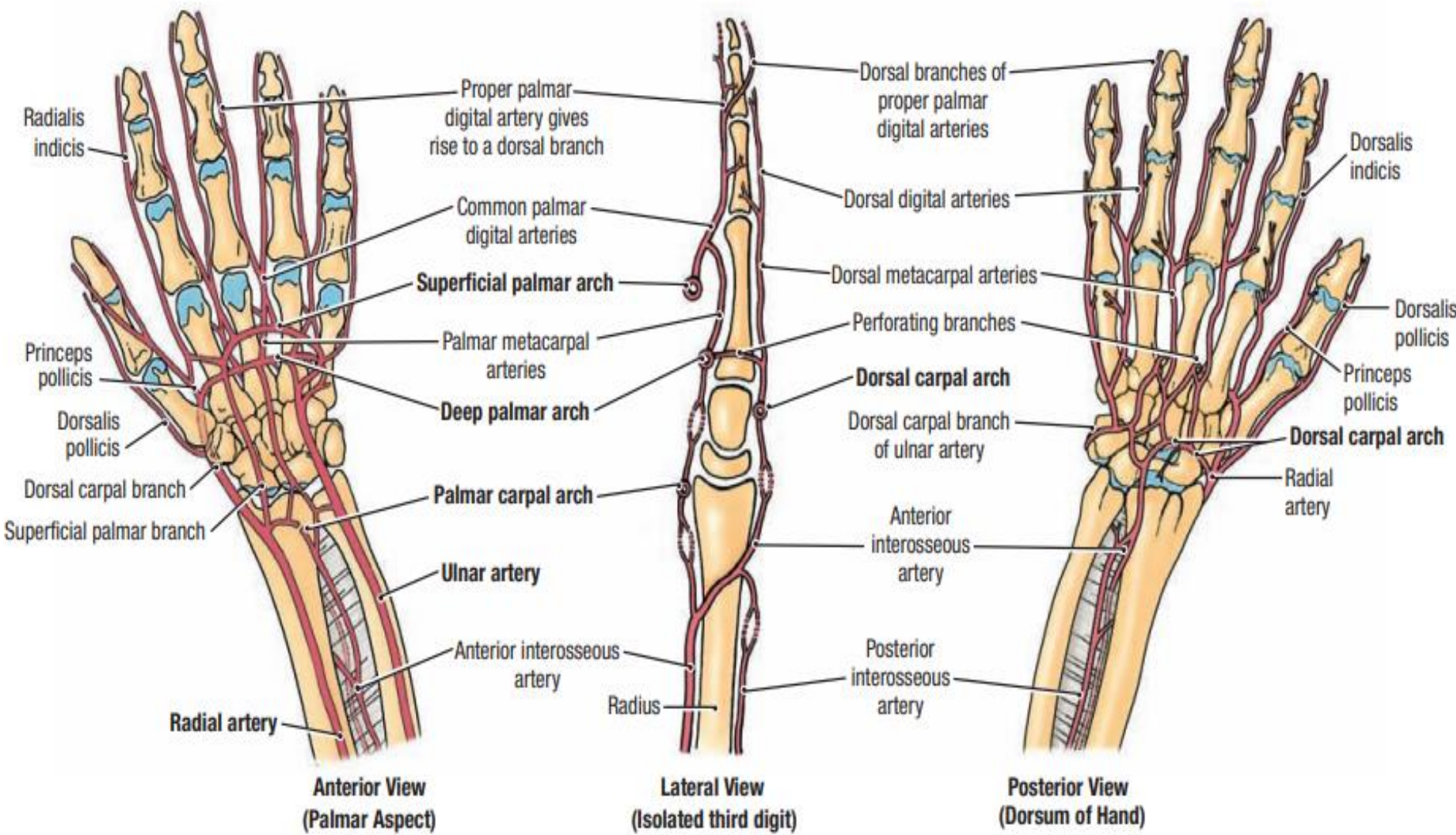
**D. Posterior View**

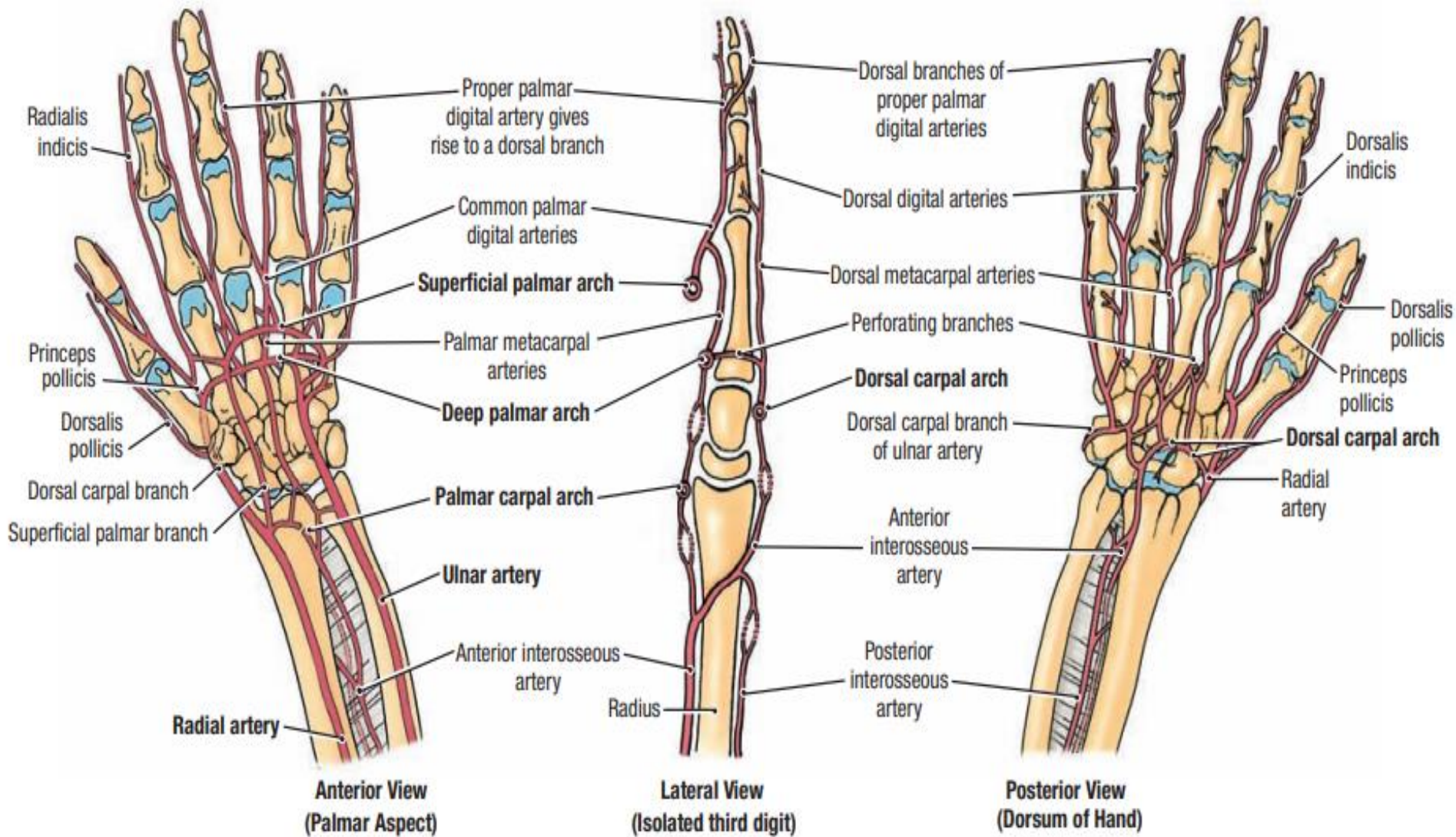
**TABLE 6.14 ARTERIES OF HAND**

<b>Artery</b>	<b>Origin</b>
<b>Superficial palmar arch</b>	Direct continuation of ulnar artery; arch is completed on lateral side by superficial branch of radial artery or another of its branches
<b>Deep palmar arch</b>	Direct continuation of radial artery; arch is completed on medial side by deep branch of ulnar artery
<b>Common palmar digital</b>	Superficial palmar arch
<b>Proper palmar digital</b>	Common palmar digital arteries
<b>Princeps pollicis</b>	Radial artery as it turns into palm
<b>Radialis indicis</b>	Radial artery, but may arise from princeps pollicis artery
<b>Dorsal carpal arch</b>	Radial and ulnar arteries



# أرجوا مراجعة الصورة في أطلس غرانتس





**TABLE 6.7. ARTERIES OF PROXIMAL UPPER LIMB (SHOULDER REGION AND ARM)**

Artery	Origin	Course
Internal thoracic	Inferior surface of the first part } Subclavian artery	Descends, inclining anteromedially, posterior to sternal end of clavicle and first costal cartilage; enters thorax to descend in parasternal plane; gives rise to perforating branches, anterior intercostal, musculophrenic, and superior epigastric arteries
Thyrocervical trunk		Ascends as a short, stout trunk, giving rise to four branches: suprascapular, ascending cervical, inferior thyroid arteries, and the cervicodorsal trunk
Suprascapular	Thyrocervical (or as direct branch of subclavian artery)	Passes inferolaterally crossing anterior scalene muscle, phrenic nerve, subclavian artery, and brachial plexus running laterally posterior and parallel to clavicle; next it passes over transverse scapular ligament to suprascapular fossa; then lateral to scapular spine (deep to acromion) to infraspinous fossa on posterior surface of scapula
Superior thoracic	First part (as only branch) } Axillary artery	Runs anteromedially along superior border of pectoralis minor; then passes between it and pectoralis major to thoracic wall; helps supply 1st and 2nd intercostal spaces and superior part of serratus anterior
Thoraco-acromial		Curled around superomedial border of pectoralis minor; pierces costocoracoid membrane (clavipectoral fascia); divides into four branches: pectoral, deltoid, acromial, and clavicular
Lateral thoracic		Descends along axillary border of pectoralis minor; follows it onto thoracic wall, supplying lateral aspect of breast
Circumflex humeral (anterior and posterior)		Encircle surgical neck of humerus, anastomosing with each other laterally; larger posterior branch traverses quadrangular space
Subscapular		Descends from level of inferior border of subscapularis along lateral border of scapula, dividing within 2–3 cm into terminal branches, the circumflex scapular and thoracodorsal arteries

	Subscapular artery		Arises, anastomosing with suprascapular artery
<b>Thoracodorsal</b>			Continues course of subscapular artery, descending with thoracodorsal nerve to enter apex of latissimus dorsi
<b>Profunda brachii</b> (deep artery of arm)	Near its origin	} Brachial artery	Accompanies radial nerve along radial groove of humerus, supplying posterior compartment of arm and participating in peri-articular arterial anastomosis around elbow joint
<b>Superior ulnar collateral</b>	Near middle of arm		Accompanies ulnar nerve to posterior aspect of elbow; anastomoses with posterior ulnar recurrent artery
<b>Inferior ulnar collateral</b>	Superior to medial epicondyle of humerus		Passes anterior to medial epicondyle of humerus to anastomose with anterior ulnar collateral artery

**THE END**