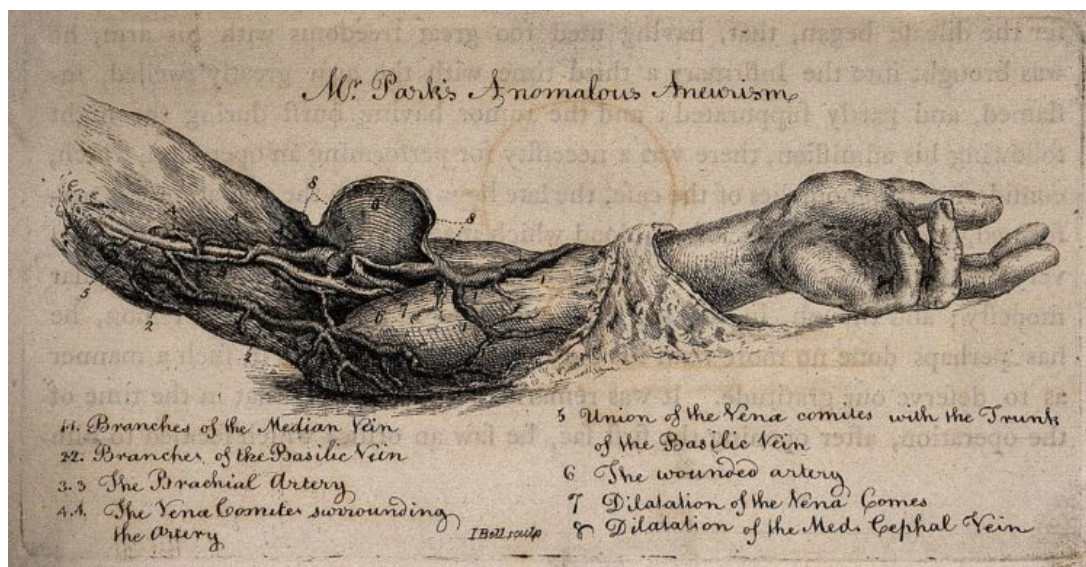


Arteries of the Upper Limb

[See online here](#)

The arterial supply of the upper limb is originated from the subclavian artery. It is divided into trunks to distribute along the upper limb. It becomes later on the axillary artery, which supplies blood to the first intercostal muscles and the shoulder joint. Then, the axillary artery becomes into the brachial artery that supplies blood to the arm. In the forearm, brachial artery divides into the radial and ulnar arteries and then, both form the palmar arches that supply blood to the hands.



Overview

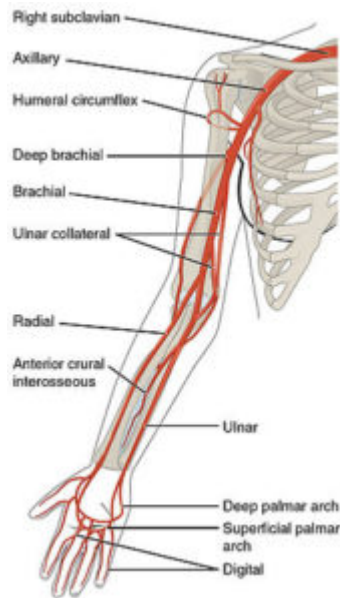


Image: Arteries supplying the upper limb. By: OpenStax College - Anatomy & Physiology, Connexions, <http://cnx.org/content/col11496/1.6/>. License: [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/)

The arterial supply of the upper limb is derived from the subclavian artery (see image). The arch of the aorta is divided into three branches: the **brachiocephalic trunk**, the **left common carotid**, and the **left subclavian artery**.

The **right subclavian artery** arises from the brachiocephalic trunk. Both the right and left subclavian arteries divide further into branches and supply the right and left upper limb, respectively. The first artery arising from the subclavian artery is the axillary artery.

Axillary Artery

As the subclavian artery crosses the lateral border of the first rib, it becomes the axillary artery. The **pectoralis minor muscle** runs in front of the axillary artery and divides it into three parts. The first part lies proximal to the muscle, the second part beneath it, and the third part distal to it (see image).

The first part of the artery gives rise to the **superior thoracic artery**, which supplies blood to the first and second intercostal muscles.

The **thoracoacromial artery**, which arises from the second part, nourishes the **pectoralis major, pectoralis minor, subclavius, and deltoid muscle**. It also supplies blood to the **shoulder joint**.

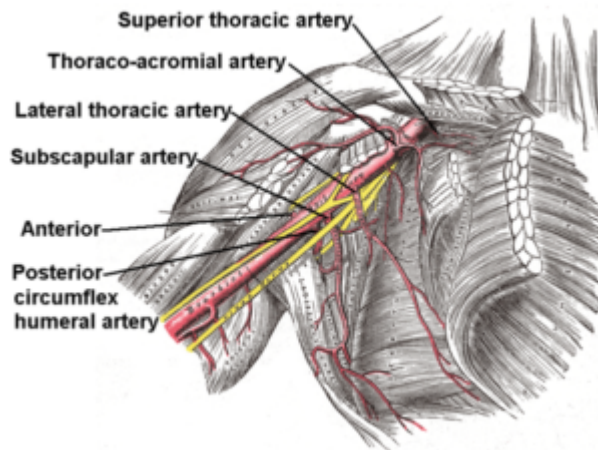


Image: Branches of the axillary artery. By: Häggström, Mikael, medical gallery of Mikael Häggström, 2014. Wikiversity Journal of Medicine 1 (2). DOI:10.15347/wjm/2014.008. ISSN 20018762. Gray523.png, License: [Public domain](#).

The **lateral thoracic artery**, which also arises from the second part of the axillary artery, supplies the **serratus anterior muscle** and the **skin and fascia of the anterolateral thoracic wall**.

The **anterior circumflex humeral artery** and the **posterior circumflex humeral artery**, both arising from the third part of the axillary artery, anastomose around the neck of the humerus. Both arteries supply the **deltoid muscle** and other muscles around the surgical neck of the humerus.

The **subscapular artery** is the largest branch of the axillary artery, arising from its third part. It further divides into the **scapular circumflex artery** and the **thoracodorsal artery**. The former supplies blood to the **teres major, teres minor, and infraspinatus muscle**. The latter supplies blood to the **latissimus dorsi muscle**.

Brachial Artery

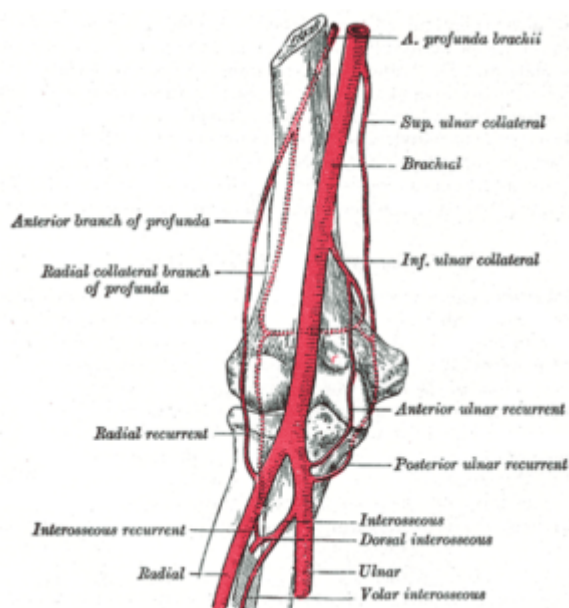


Image: Arterial supply of arm and forearm. By: Henry Vandyke Carter, Henry Gray (1918) in *Anatomy of the Human Body*. Bartleby.com: Gray's Anatomy, plate 526. License: [Public domain](#).

As the axillary artery descends the lower border of **teres major muscle**, it becomes the brachial artery (see image). This also marks the **lower border of the axilla**.

The brachial artery runs down the arm, ending at the neck of the radius, where it divides into **radial and ulnar arteries**. It usually runs a superficial course in the arm, just below the deep fascia, where it branches out.

The **profunda brachii artery** is a deep branch of the brachial artery. It passes posterior to the **shaft of humerus** and supplies the posterior compartment of the arm. It terminates by dividing into **radial collateral and middle collateral arteries**. The former supplies the medial part of **triceps and anconeus muscles**, while the latter supplies the lower lateral part of the arm. Both arteries form a rich anastomotic network around the **elbow joint**.

The **superior and inferior ulnar collateral arteries** are branches of the brachial artery supplying the medial arm.

Radial Artery

The radial artery begins at the neck of the radius and passes laterally along the forearm. Proximally, it has only one branch, the **radial recurrent artery**. As noted, it anastomoses with the **radial collateral artery** and supplies the lateral side of the elbow. (See also "Palmar Arches," below.)

Ulnar Artery

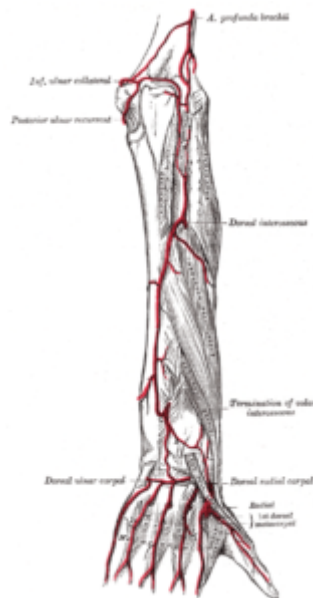


Image: Course of the ulnar artery.
By: Henry Vandyke Carter, Henry Gray (1918) in *Anatomy of the Human Body*. Bartleby.com: Gray's Anatomy, plate 529. License: [Public domain](#).

The ulnar artery passes along the medial aspect of the forearm. The **anterior and posterior ulnar recurrent arteries** originate from the proximal part of the ulnar artery. They anastomose with the **superior and inferior ulnar collateral arteries**. Both arteries supply the medial side of the elbow and proximal portions of the **flexor muscles**

of the forearm (see image).

As the body moves distally, the ulnar artery branches out into another branch called the **common interosseus artery**, which supplies the deep structures of the forearm and further divides into anterior and posterior branches.

The posterior branch branches out into the **interosseus recurrent artery**, which anastomoses with the **middle collateral artery** around the elbow joint.

The anterior interosseous artery supplies the following:

- Flexor pollicis longus
- Flexor digitorum profundus
- Pronator quadrates muscles
- Radius
- Ulna and carpal bones

The posterior interosseus artery supplies the following muscles of the posterior forearm compartment:

- Supinator
- Abductor pollicis longus
- Extensor pollicis longus
- Extensor pollicis brevis
- Extensor indicis muscles

Its interosseus recurrent branch nourishes the elbow joint and anconeus muscle. The ulnar artery, along with the radial artery, forms the **palmar arches**.

Palmar Arches

The radial and ulnar arteries branch out to form **superficial and deep palmar arches** (see image). The ulnar artery usually supplies the medial aspect of the index, third, fourth, and fifth fingers. The thumb and lateral half of the index finger are supplied by the branches of the radial artery.

The superficial palmar arch lies superficial to the **flexor tendons** and deep into the **palmar aponeurosis**. The deep palmar arch lies deep to the flexor tendons and above the **metacarpal bones**.

The **palmar carpal branch** of the ulnar artery anastomoses with the palmar carpal branch of the radial artery on the palmar surface of the hand.

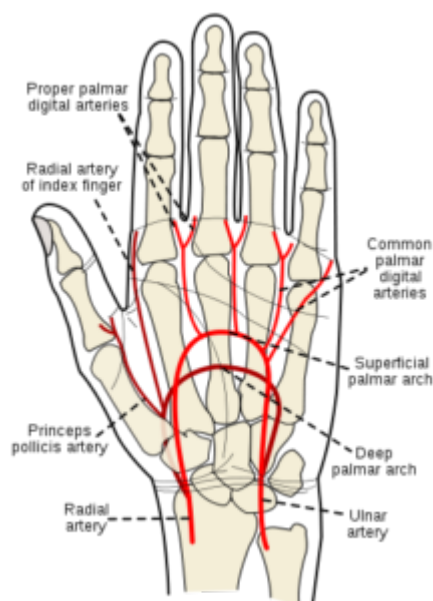


Image: Superficial and deep palmar arches.
 By: Rhcastilhos - Gray1237.png. License: [Public domain.](#)

The **dorsal carpal branch** of the ulnar artery anastomoses with the dorsal carpal branch of the radial artery on the dorsal surface of the hand and forms an arch. This arch branches into the **dorsal metacarpal arteries**, which further divide into **dorsal digital arteries**.

The deep palmar branch of the ulnar artery anastomoses with the continuation of the radial artery to form the **deep palmar arch**. It supplies the deep palm, including the carpal and metacarpal bones, adjacent muscles of the hand, and the metacarpophalangeal, proximal interphalangeal, and radioulnar joints. Its branches include the **palmar metacarpal arteries, recurrent branches, and perforating branches** (the connection between the deep and dorsal circulations of the hand).

The ulnar artery terminates by forming the **superficial palmar arch**. Here, it anastomoses with the superficial palmar branch of the radial artery. It supplies the superficial palm, palmar surface of the digits (excluding the thumb), and the dorsum of the distal phalangeal segments of digits two to five.

Common palmar digital arteries arise from the superficial palmar arch to supply the palmar aspect of two adjacent digits. These further divide into proper palmar digital arteries to supply the palmar aspect of each digit. These arteries also anastomose with the palmar metacarpal arteries, arising from the deep palmar arch.

The radial artery, after branching out into the superficial palmar branch, enters the dorsal surface of the hand, passes over the floor of the **anatomical snuff box**, branches out into the dorsal first metacarpal artery, and, finally, passes between the **heads of the first interosseus muscles** to re-enter the palmar aspect of the hand. It then branches out into the deep palmar branch, forming a deep palmar arch and two other branches called the **princeps pollicis** and **radialis indicis**.

Allen Test

The **Allen test** is a medical sign used in the physical examination of the adequacy of arterial blood flow to the hand. The modified version is commonly used. The test is used to identify the adequacy of blood flow to the hand prior to cannulation of the radial artery

for blood draw and continuous blood pressure monitoring. One hand is examined at a time.

The test is done as follows:

1. The hand is elevated and the patient is asked to clench their fist for about 30 seconds.
2. Pressure is applied over the ulnar and the radial arteries so as to occlude both of them.
3. Still elevated, the hand is then opened. It should appear blanched (pallor may be observed at the fingernails).
4. Ulnar pressure is released while radial pressure is maintained; color should return to the hand within 5-15 seconds.

If color returns as described, Allen's test is considered to be "positive," or **normal**. If color fails to return, the test is considered "negative," or **abnormal**, which indicates that the ulnar artery supply to the hand is not sufficient. This means that it may not be safe to cannulate or place a needle into the radial artery.

References

Bhatt, D. (2004). Guide to peripheral and cerebrovascular intervention. [London]: Remedica Pub.

Chung, K. and Chung, H. (2012). Gross anatomy. Baltimore, MD: Lippinott Williams & Wilkins.

Drake, R., Vogl, W., Mitchell, A. and Gray, H. (2005). Gray's anatomy for students. Philadelphia: Elsevier/Churchill Livingstone.

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Snell, R. (2000). Clinical anatomy. Philadelphia [u.a.]: Lippincott Williams & Wilkins.

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Notes