

Anatomy of the Arm

[See online here](#)

The arm is the region of the upper limb that extends from the shoulder to the elbow joint. It connects inferiorly to the forearm through the cubital fossa (located anterior to the elbow). The axilla, the region inferior to the shoulder, lies medial to the arm. The arm contains one long bone, the humerus, in addition to numerous muscles, tendons, ligaments, and neurovascular structures that assist in bringing about all its movements.



The Arm in Cross Section

The cross-section view of the arm shows two fascial compartments as well as the following structures:

- **Bone:** humerus
- **Arteries:** brachial artery, profunda vessels
- **Veins:** basilic vein, cephalic vein, brachial vein
- **Nerves:** radial nerve, median nerve, ulnar nerve, musculocutaneous nerve, medial cutaneous nerve of the arm
- **Muscles:** brachialis, biceps, triceps

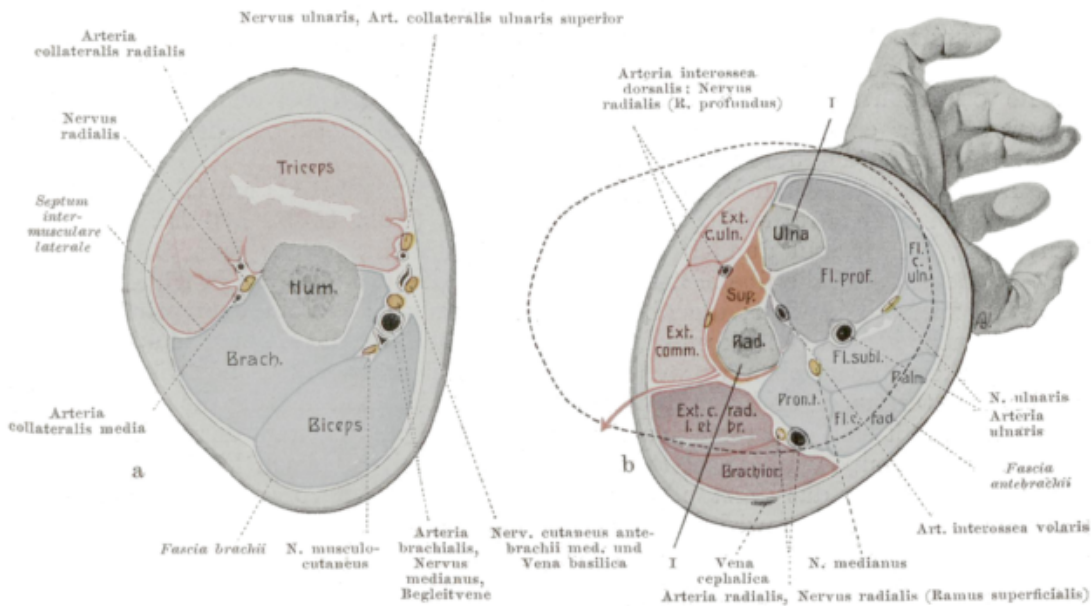


Image: "Diagram showing the cross-section of the upper arm (left) and forearm (right)." by Braus, Hermann - Anatomie des Menschen: ein Lehrbuch für Studierende und Ärzte. License: Public Domain

Humerus

The humerus is the long bone of the arm that gives the arm its structure. In cross section, the humerus has a **prismatic shape**. It articulates with the **scapula** proximally, to make the **shoulder joint**, and with the radius and the ulna distally, to make up the **elbow joint**.

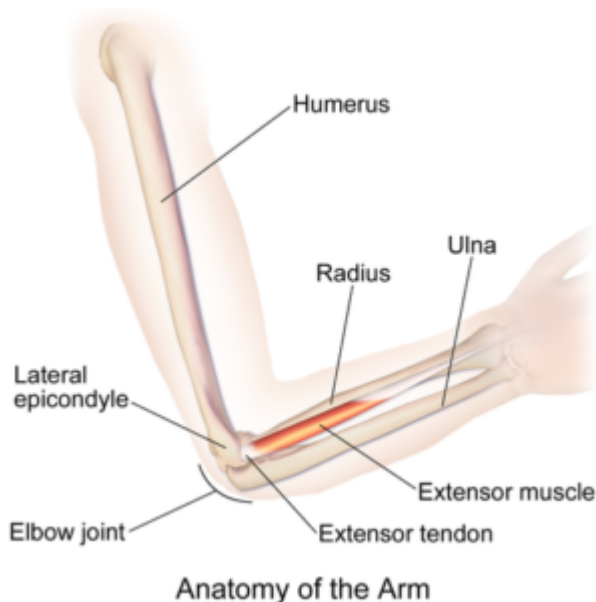


Image: "Diagram showing the articulation between the humerus and the bones of the forearm (radius and ulna)." by BruceBlaus - Own work. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Parts of the humerus involved in the shoulder joint: the head of the humerus articulates with the **glenoid cavity of the scapula** to make up the **glenohumeral joint**. Greater and lesser tubercles, found on the proximal humerus, provide attachment sites for **rotator cuff muscles** of the shoulder joint. The **deltoid tuberosity** serves as

an insertion point for the **deltoid muscle**.

Parts of the humerus involved in the elbow joint: the **condyles** consist of the **capitulum**, which articulates with the radius bone of the forearm, and the **trochlea**, which articulates with the ulna bone of the forearm. Closely superior to the trochlea and capitulum lie the **medial and lateral epicondyle**. Three other important structures also lying superior to the trochlea and capitulum are the **radial fossa**, the **coronoid fossa**, and the **olecranon fossa**. These accommodate different parts of the radius and the ulna to form the elbow joint.

Other important features of the humerus worth mentioning are the **anatomical neck**, in other words, the **surgical neck**. This is a region of the humerus that lies inferior to the greater and lesser tubercles; it is called the surgical neck due to its **susceptibility to fracture**. The **spiral groove** carries the **radial nerve** as it makes its way anteriorly on the shaft of the humerus.

Radial nerve injury can result if a fracture occurs on the shaft of the humerus where the spiral groove is located.

Clinical considerations related to a nerve injury in the arm:

The ulnar nerve passes posteriorly to the **medial epicondyle**; hence, it is susceptible to damage in elbow injuries. A “funny” feeling or intense pain is reported if the ulnar nerve is disturbed, which is also known as ‘hitting the funny bone’.

The **axillary nerve and artery** can both be damaged if the **glenohumeral joint** is dislocated. This is due to the close proximity of both of the structures to the proximal part of the humerus.

Movements of the Arm

- **Flexion:** the act of decreasing the angle between the arm and the shoulder joint
- **Extension:** the act of increasing the angle between the arm and the shoulder joint
- **Abduction:** moving the arms away from the midline
- **Adduction:** moving the arms towards the midline
- **Internal or medial rotation:** rotating the arms inwards, that is, towards the midline while the elbows are at 90° to the ground.
- **External or lateral rotation:** rotating the arms outwards, that is, away from the midline, while the elbows are at 90° to the ground.

The upper arm is divided into the **anterior and posterior fascial compartments** by **medial and lateral intermuscular septa**. Both medial and lateral intermuscular septa extend from the humerus to the deep fascia. Each compartment functions as an **antagonist** of the other, i.e., one flexes while the other extends the elbow joint.

Anterior Compartment of the arm

The anterior compartment of the arm contains **three muscles**, all of which function to **flex the arm and the forearm**. Hence, it is a flexion compartment.

Muscles, along with their functions, attachments, and innervation, belonging to the anterior compartment are as follows:

- **Coracobrachialis:** originates from the **apex of the coracoid process** (a hook-like protrusion on the anterior-superior part of the scapula) and inserts in the **medial side of the mid-shaft of the humerus**. Its function is to flex the arm on the **glenohumeral joint**. Innervated by the **musculocutaneous nerve (C5, C6, C7)**.
- **Biceps brachii:** this muscle originates from two separate locations as two heads, a long head and a short head. The **long head** originates from the **supraglenoid tubercle** of the scapula whereas the **short head** originates from the **coracoid process**. They both insert on the **radial tuberosity** on the radius. They work to cause flexion of the forearm at the elbow joint as well as helping in supination. They also assist **coracobrachialis** in the flexion of the arm on the glenohumeral joint. Innervated by the **musculocutaneous nerve (C5, C6)**.
- **Brachialis:** this muscle originates from the **lateral and medial surface of the anterior part of the humerus** and attaches on the **tuberosity of the ulna**. It, along with biceps brachii, flexes the forearm. Innervated by the **musculocutaneous nerve (C5, C6)**.

Posterior Compartment of the arm

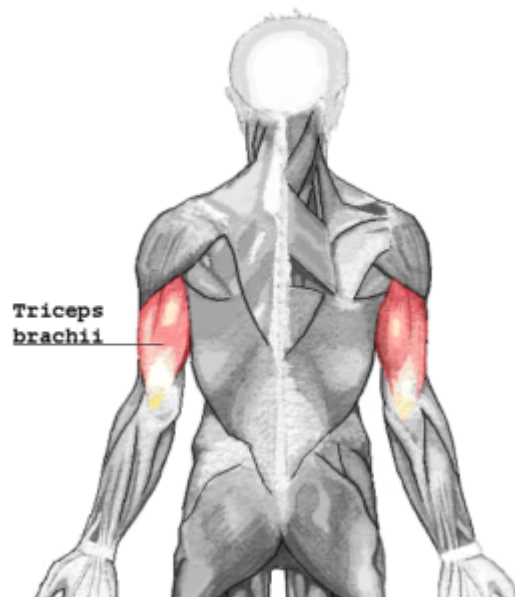


Image: "Diagram showing the triceps brachii muscles from the posterior aspect." Original by sv:Användare:Chrizz, 28 May 2005.
License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

The posterior compartment of the arm contains only a **single muscle** that works to extend the forearm.

This muscle is called the **triceps brachii**. It originates as three separate heads known as the long head, the medial head, and the lateral head. The **long head** takes origin from the **infraglenoid tubercle on the scapula**, whereas both the medial and the lateral heads originate from the **posterior surface of the humerus**, inferior to the **radial groove**. All three heads insert at the **olecranon**.

The **triceps brachii** functions to extend the forearm at the elbow joint, as well as extending and abducting the arm at the shoulder joint. It is innervated by the **radial nerve (C6, C7, C8)**.

Cubital Fossa

The cubital fossa is the region anterior to the elbow. It is seen as the triangular depression between the **brachioradialis** and **pronator teres muscles**. Except for the ulnar nerve (which runs posteriorly), most of the major neurovascular structures transition from the arm to the forearm via the cubital fossa.

Three most important contents of the cubital fossa are (from lateral to medial):

1. The tendon of the biceps brachii muscle
2. The brachial artery
3. The median nerve

The **radial nerve**, although not considered to be a part of the cubital fossa, passes deep to the brachioradialis muscle (the lateral boundary of the fossa).

Boundaries of the cubital fossa:

The boundaries of the cubital fossa are determined once an imaginary line is drawn between the **lateral and the medial epicondyles**. This imaginary horizontal line also makes up the superior margin of the cubital fossa.

Medial or ulnar boundary: lateral border of the pronator teres muscle

Lateral or radial boundary: medial border of the brachioradialis muscle

The apex of this triangle is where the medial and lateral boundaries meet. This is also the point in most people where the **brachial artery** branches into the radial and the ulnar arteries, which then enter the forearm.



Image: "Image showing the stethoscope being placed on the cubital fossa for auscultating the brachial artery during blood pressure measurement." by BruceBlaus - Own work. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

The floor of the cubital fossa is made by the brachialis and supinator muscles, whereas the roof is made of a number of structures including skin, superficial and deep fascia, and the bicipital aponeurosis.

Clinical significance of the cubital fossa: blood pressure measurement and **phlebotomy**.

During measurement of blood pressure, when using a **sphygmomanometer** and a **stethoscope** to monitor the pulse of the brachial artery, the stethoscope is placed on the

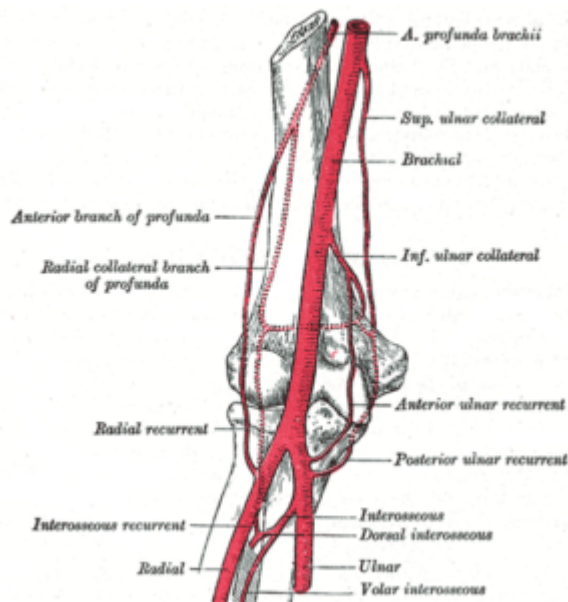
cubital fossa. The brachial artery can be located on the apex of the cubital fossa before it bifurcates into the radial and ulnar arteries.

Due to the shallow location of the numerous veins passing through the cubital fossa, it is also considered easily accessible for insertion of a **central catheter for blood collection**.

The major veins that pass through the cubital fossa are:

- Median cubital vein
- Cephalic vein
- Basilic vein
- Paired brachial veins

Arterial Supply and Nerves of the Arm



[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](#)

The brachial artery is the main [artery of the arms](#). It is the continuation of the **axillary artery** from the region of the **teres major muscle**. The brachial artery maintains its medial position initially, around the proximal part of the arm; toward the distal part of the arm, the brachial artery moves toward the center, just before entering the cubital fossa and bifurcating.

Profunda brachii artery is a branch of the brachial artery that supplies the posterior compartment of the arm.

The four major nerves of the arm are the **musculocutaneous nerve**, the **median nerve**, the **ulnar nerve**, and the **radial nerve**.

Below are the origin, course, function, and clinical correlates of each of the major nerves of the arm.

Musculocutaneous nerve

Origin: [brachial plexus](#)

Course: exits the [axilla](#) and enters the coracobrachialis muscle. Descends diagonally between the **biceps brachii** and the **brachialis** and gives rise to motor branches to all the muscles of the anterior compartment of the arm. Upon reaching the tendon of the biceps brachii, it enters the deep fascia and turns into **the lateral cutaneous nerve** of the arm, which supplies the skin.

Function: motor supply of all three muscles of the anterior compartment of the arm and sensory innervation of the skin of the lateral forearm.

Clinical correlates: musculocutaneous nerve compression or injury may occur due to entrapment between structures such as the **biceps aponeurosis** and the **brachialis fascia, upper brachial plexus palsy, fracture, or surgery**. As a result, clinically, there will be a weakness in flexion and supination of the arm, as well as reduction or absence of the biceps reflex.

Median nerve

Origin: [brachial plexus](#)

Course: exits the axilla and enters the arm by traveling along the inferior margin of the **teres major muscle**. It descends along with the **brachial artery**, following the same route.

Function: gives no significant branches in the upper arm. However, it does give an important branch to **pronator teres** in the forearm.

Clinical correlates: Median nerve injury occurs due to **supracondylar fracture** and **carpal tunnel syndrome**, which occurs due to compression of the median nerve at the wrist, typically due to overworking the wrist in certain activities, such as repetitive movements of the hand or fingers.

Ulnar nerve

Origin: [brachial plexus](#)

Course: emerges from the [axilla](#) and throughout the proximal region of the arm remains medial to the axillary artery. The ulnar nerve then penetrates through the **intermuscular septum** and enters the posterior compartment of the arm, through which it runs posterior to the **medial epicondyle** and enters the [forearm](#).

Function: gives no significant branches in the upper arm.

Clinical correlates: cubital tunnel syndrome

Radial nerve

Origin: posterior cord of the [brachial plexus](#)

Course: emerges from the axilla and passes by the inferior margin of the teres major muscle. In the arm, it initially stays posterior to the brachial artery and then, along with the **profunda brachii artery**, enters the posterior compartment of the arm, where it remains in the radial groove. It gives off motor branches in the posterior compartment

and then moves laterally to pierce the **intermuscular septum** and enters the anterior compartment where it attaches to the **lateral supracondylar ridge**.

Function: gives motor branches to the **triceps brachii** and the **brachioradialis**. It also gives subcutaneous branches through the inferior lateral cutaneous nerve of the arm and the posterior cutaneous nerve of the forearm.

Clinical correlates: wrist drop – patients are unable to extend their wrist.

References

Drake, R. L., Gray, H., Mitchell, A. W. M., & Vogl, W. (2015). *Grays anatomy for students*(3rd ed.). Philadelphia, PA: Churchill Livingstone Elsevier.

Moses, S. (2018, March 3). Arm Anatomy. Retrieved March 14, 2018, from <https://fpnotebook.com/ortho/Anatomy/ArmAntmy.htm>

Whitaker, A. Axial (Cross) Section of Mid Right Arm Viewed From Below. Retrieved March 14, 2018, from <https://www.instantanatomy.net/arm/areas/arm/acrosssection.html>

Legal Note: Unless otherwise stated, all rights reserved by Lecturio GmbH. For further legal regulations see our [legal information page](#).

Notes