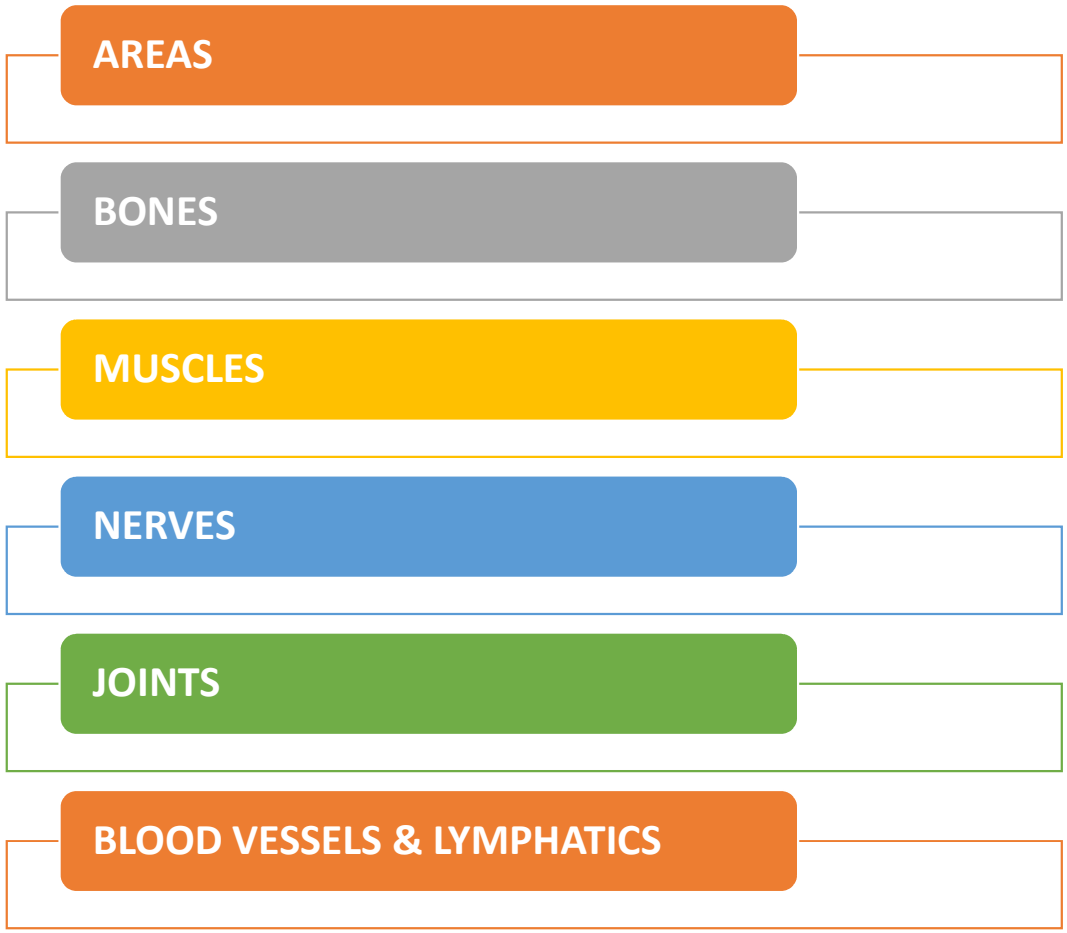
ANATOMY

Major Topics

1	2	3	4	5	6	7	8	9
Basics	Head	Neck	Neuroanatomy	Upper Limb	Lower Limb	Thorax	Abdomen	Lower limb

UPPER LIMB


AREAS
BONES
MUSCLES
NERVES
JOINTS
BLOOD VESSELS & LYMPHATICS

AREAS	BONES	MUSCLES	NERVES	JOINTS	BLOOD VESSELS & LYMPHATICS
Axilla	Scapula	Pectoral Region	Brachial Plexus	Acromioclavicular Joint	Arterial Supply
Cubital Fossa	Clavicle	Shoulder Region	Axillary Nerve	Sternoclavicular Joint	Venous Drainage
Carpal Tunnel	Humerus	Upper Arm	Musculocutaneous Nerve	Shoulder Joint	Lymphatics
Anatomical Snuffbox	Ulna	Anterior Forearm	Median Nerve	Elbow Joint	
	Radius	Posterior Forearm	Radial Nerve	Radioulnar Joints	
	The Hand	Hand	Ulnar Nerve	Wrist Joint	

Upper Limb

Areas

01

Axilla

02

Cubital Fossa

03

Carpal Tunnel

04

Anatomical Snuffbox

AREAS OF UPPER LIMB

AXILLA

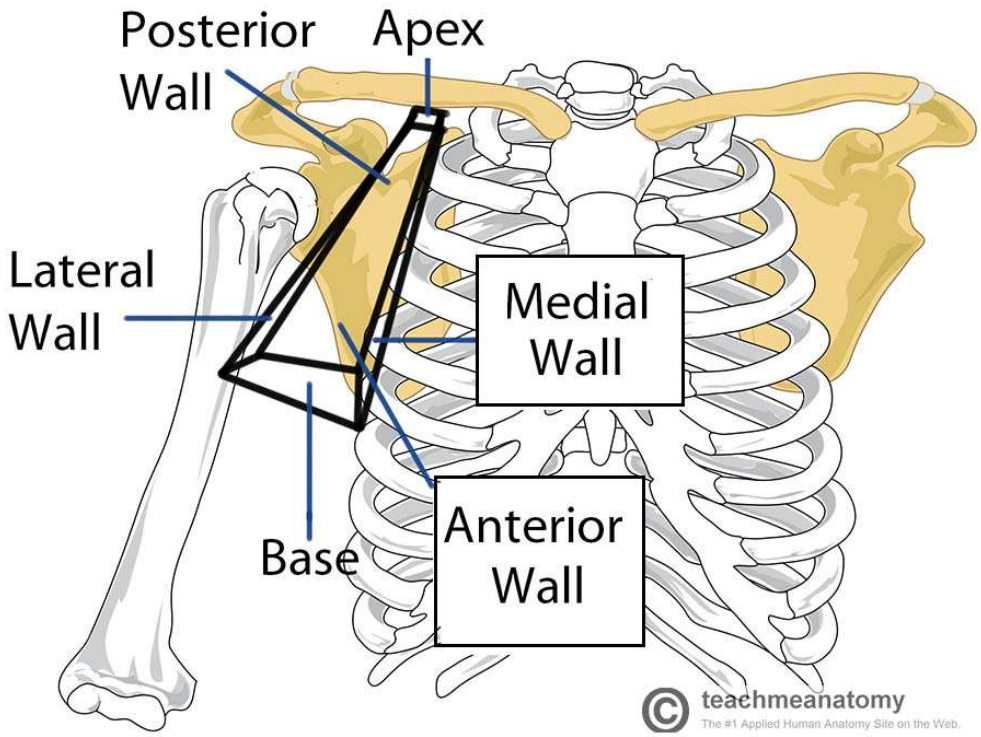
Areas

Axilla

The **axilla** is the name given to an area that lies underneath the glenohumeral joint, at the junction of the upper limb and the thorax. It is a passageway by which neurovascular and muscular structures can enter and leave the upper limb.

Axilla

Shape and Location



Axilla

Border

Apex – also known as the axillary inlet, it is formed by lateral border of the first rib, superior border of scapula, and the posterior border of the clavicle.

Lateral wall – formed by intertubercular groove of the humerus.

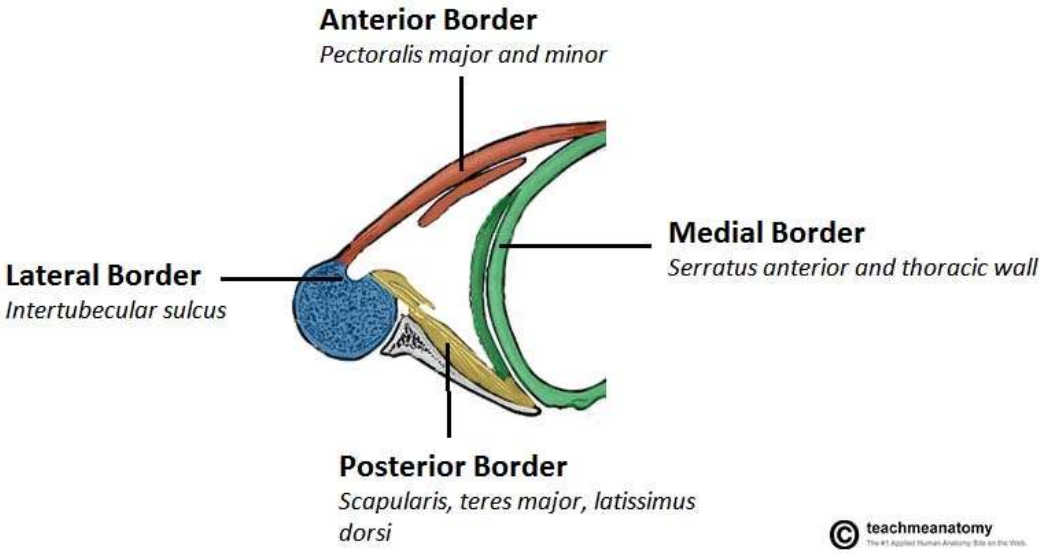
Medial wall – consists of the serratus anterior and the thoracic wall (ribs and intercostal muscles).

Anterior wall – contains the pectoralis major and the underlying pectoralis minor and the subclavius muscles.

Posterior wall – formed by the subscapularis, teres major and latissimus dorsi.

AXILLA

Borders



Axilla

Contents

Axillary artery (and branches) – the main artery supplying the upper limb. It is commonly referred as having three parts; one medial to the pectoralis minor, one posterior to pectoralis minor, and one lateral to pectoralis minor. The medial and posterior parts travel in the axilla.

Axillary vein (and tributaries) – the main vein draining the upper limb, its two largest tributaries are the cephalic and basilic veins.

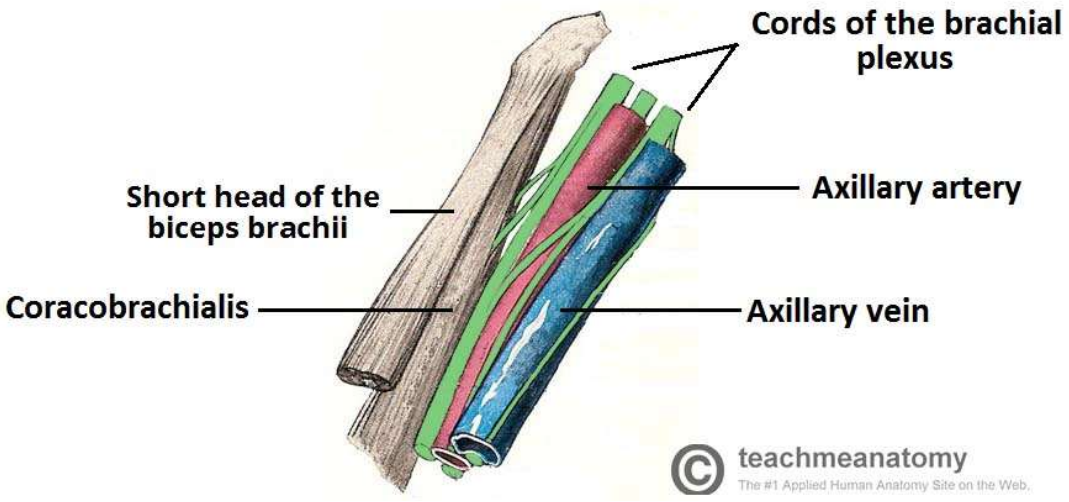
Brachial plexus (and branches) – a collection of spinal nerves that form the peripheral nerves of the upper limb.

Axillary lymph nodes – they filter lymphatic fluid that has drained from the upper limb and pectoral region. Axillary lymph node enlargement is a non-specific indicator of breast cancer.

Biceps brachii (short head) and coracobrachialis – these muscle tendons move through the axilla, where they attach to the coracoid process of the scapula.

Axilla

Content



Axilla

Exits of the Axilla

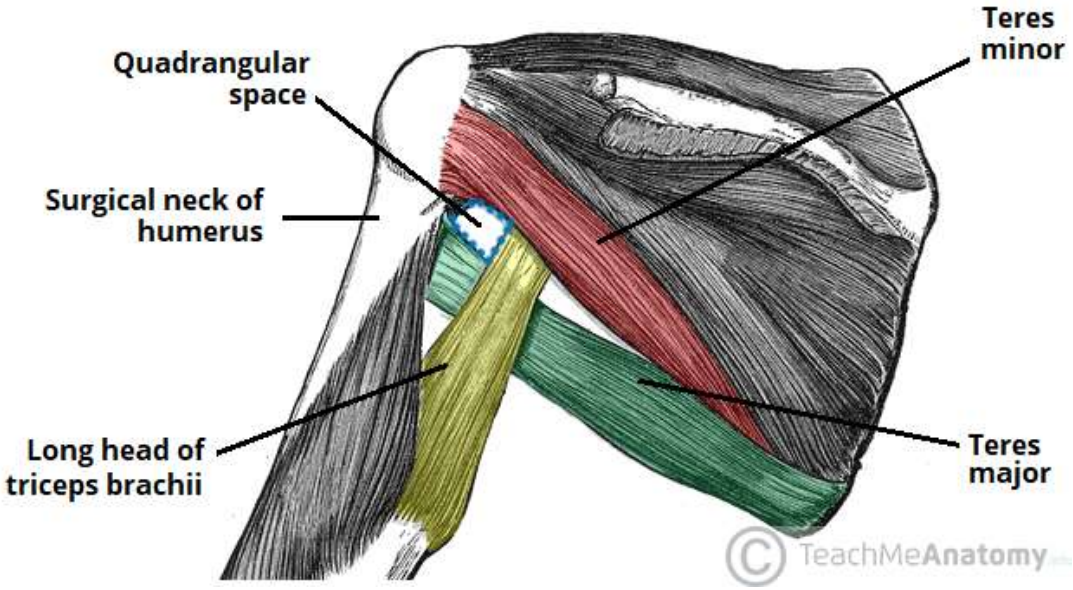
The main route of exit is immediately inferiorly and laterally, into the **upper limb**. The majority of contents of the axilla region leave by this method.

Another pathway is via the **quadrangular space**. This is a gap in the posterior wall of the axilla, allowing access to the posterior arm and shoulder area. Structures passing through include the axillary nerve and posterior circumflex humeral artery (a branch of the axillary artery.

The last passageway is the **clavipectoral triangle**, which is an opening in the anterior wall of the axilla. It is bounded by the pectoralis major, deltoid, and clavicle. The cephalic vein enters the axilla via this triangle, while the medial and lateral pectoral nerves leave.

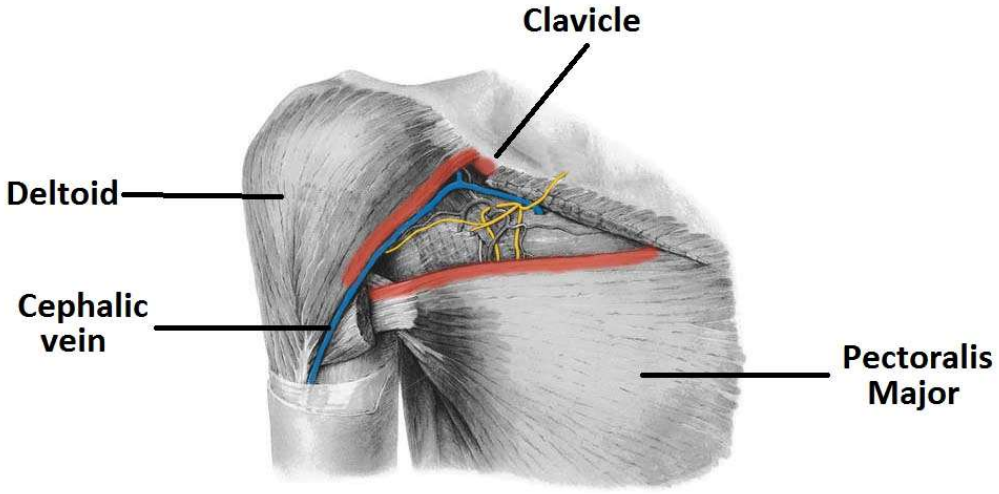
Axilla

Exits of the Axilla



Axilla

Exits of the Axilla



Axilla

Clinical Relevance

Thoracic Outlet Syndrome

- The apex of the axilla region is an opening between the clavicle, first rib and the scapula. In this apex, the vessels and nerves may become **compressed** between the bones – this is called thoracic outlet syndrome.
- Causes of **thoracic outlet syndrome** include:
- **Trauma** – e.g. fractured clavicle.
- **Repetitive movements** – seen commonly in occupations that require lifting of the arms.
- **Cervical rib** – an extra rib which arises from the seventh cervical vertebra.
- It often presents with **pain** in the affected limb, (where the pain is depends on what nerves are affected), tingling, muscle weakness and discolouration.

Axilla

Clinical Relevance

Lymph Node Biopsy

- Approximately 75% of lymph from the **breast** drains into the axilla lymph nodes, so can be biopsied if breast cancer is suspected.
- If breast cancer is confirmed, the axillary nodes may need to be removed to prevent the cancer spreading. This is known as **axillary clearance**. During this procedure, the long thoracic nerve may become damaged, resulting in winged scapula.

AREAS OF UPPER LIMB

THE CUBITAL FOSSA

Areas

The Cubital Fossa

The **cubital fossa** is an area of transition between the anatomical arm and the forearm. It is located as a depression on the anterior surface of the elbow joint.

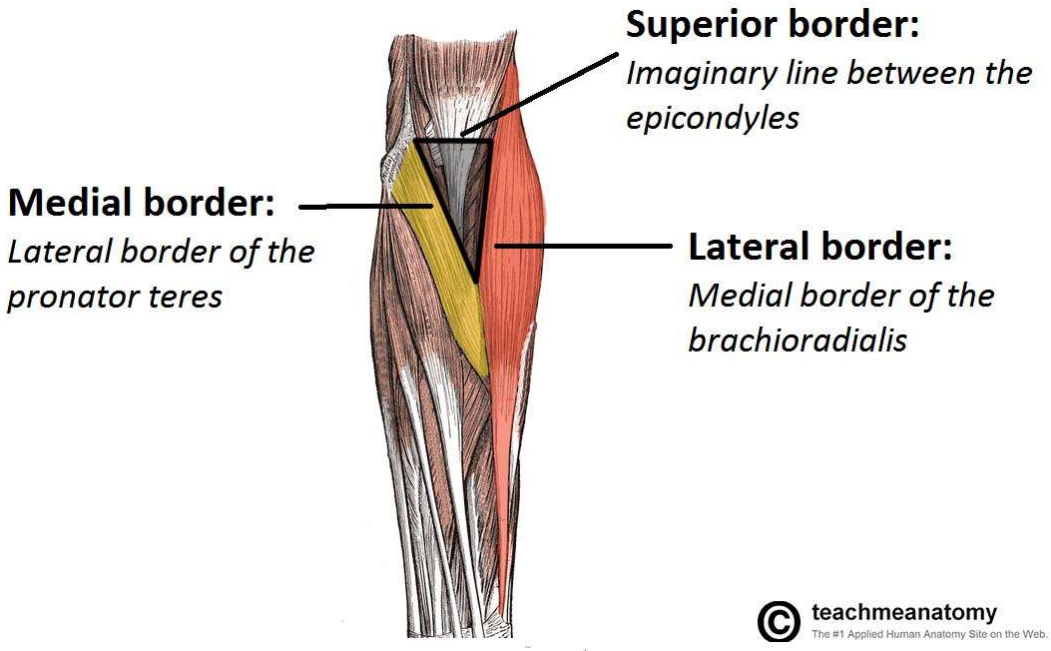
Cubital Fossa

Borders

- The cubital fossa is triangular in shape, and thus has three borders:
- **Lateral border** – medial border of the brachioradialis muscle.
- **Medial border** – lateral border of the pronator teres muscle.
- **Superior border** – hypothetical line between the epicondyles of the humerus.
- **Floor** of the cubital fossa is formed proximally by the brachialis, and distally by the supinator muscle.
- **Roof** consists of skin and fascia, and is reinforced by the bicipital aponeurosis.
- Within the roof runs the **median cubital vein**, which can be accessed for venepuncture

Cubital Fossa

Borders



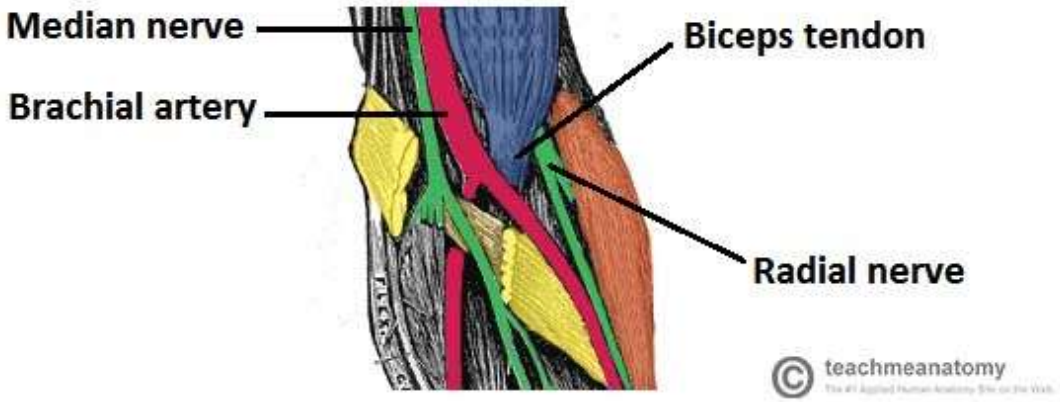
Cubital Fossa

Contents

- Radial nerve – this is not always strictly considered part of the cubital fossa, but is in the vicinity, passing underneath the brachioradialis muscle. As it does so, the radial nerve divides into its deep and superficial branches.
- **Biceps tendon** – runs through the cubital fossa, attaching to the radial tuberosity, just distal to the neck of the radius.
- **Brachial artery** – supplies oxygenated blood to the forearm. It bifurcates into the radial and ulnar arteries at the apex of the cubital fossa.
- Median nerve – leaves the cubital between the two heads of the pronator teres. It supplies the majority of the flexor muscles in the forearm.

Cubital Fossa

Contents



Cubital Fossa

Brachial Pulse and Blood Pressure

- The brachial pulse can be felt by palpating immediately medial to the **biceps tendon** in the cubital fossa. When measuring **blood pressure**, this is also the location in which the stethoscope must be placed, to hear the Korotkoff sounds.

Venepuncture

- The median cubital vein is located superficially within the roof of the cubital fossa. It connects the **basilic** and **cephalic** veins, and can be accessed easily – this makes it a common site for venepuncture.

Cubital Fossa

Supracondylar Fractures

- A supracondylar fracture is a common fracture in the young, and usually occurs by falling onto a **hyper-extended** elbow. It is a transverse fracture, spanning between the two epicondyles. It can also occur by falling onto a **flexed** elbow, but this accounts for <5% of cases.
- The displaced fracture fragments may impinge and damage the contents of the cubital fossa.
- Direct damage, or post-fracture swelling can cause interference to the blood supply of the forearm from the **brachial artery**. The resulting ischaemia can cause **Volkmann's ischaemic contracture** – uncontrolled flexion of the hand, as flexors muscles become fibrotic and short.
- There also can be damage to the median or radial nerves

Cubital Fossa

Clinical Relevance

AREAS OF UPPER LIMB

CARPEL TUNNEL

Areas Of Upper Limb

Carpel Tunnel

The carpal tunnel is a narrow passageway found on the anterior portion of the wrist. It serves as the entrance to the palm for several tendons and the median nerve.

Carpel Tunnel

Border

The carpal tunnel is formed by two layers: a **Deep Carpal Arch** and a **superficial flexor retinaculum**.

Carpal Arch

- Concave on the palmar side, forming the base and sides of the carpal tunnel.
- Formed laterally by the scaphoid and trapezium tubercles
- Formed medially by the hook of the hamate and the pisiform

Carpel Tunnel

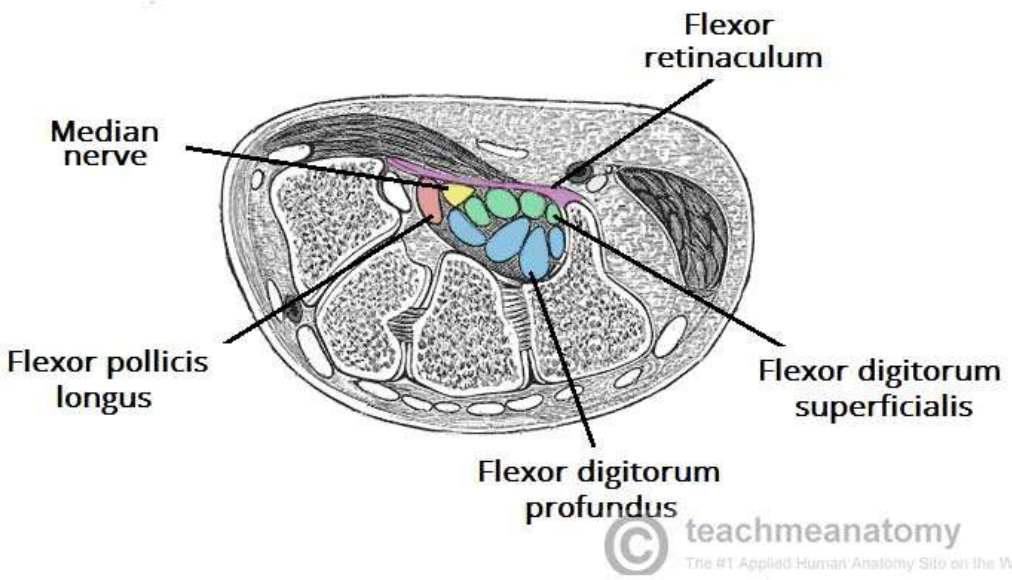
Borders

Flexor Retinaculum

- Thick connective tissue which forms the roof of the carpal tunnel.
- Turns the carpal arch into the carpal tunnel by bridging the space between the medial and lateral parts of the arch.
- Originates on the lateral side and inserts on the medial side of the carpal arch.

Carpel Tunnel

Borders



Carpel Tunnel

Contents

Tendons

- The tendon of **Flexor Pollicis Longus - 4**
- Four tendons of **Flexor Digitorum Profundus - 4**
- Four tendons of **Flexor Digitorum Superficialis – 1**

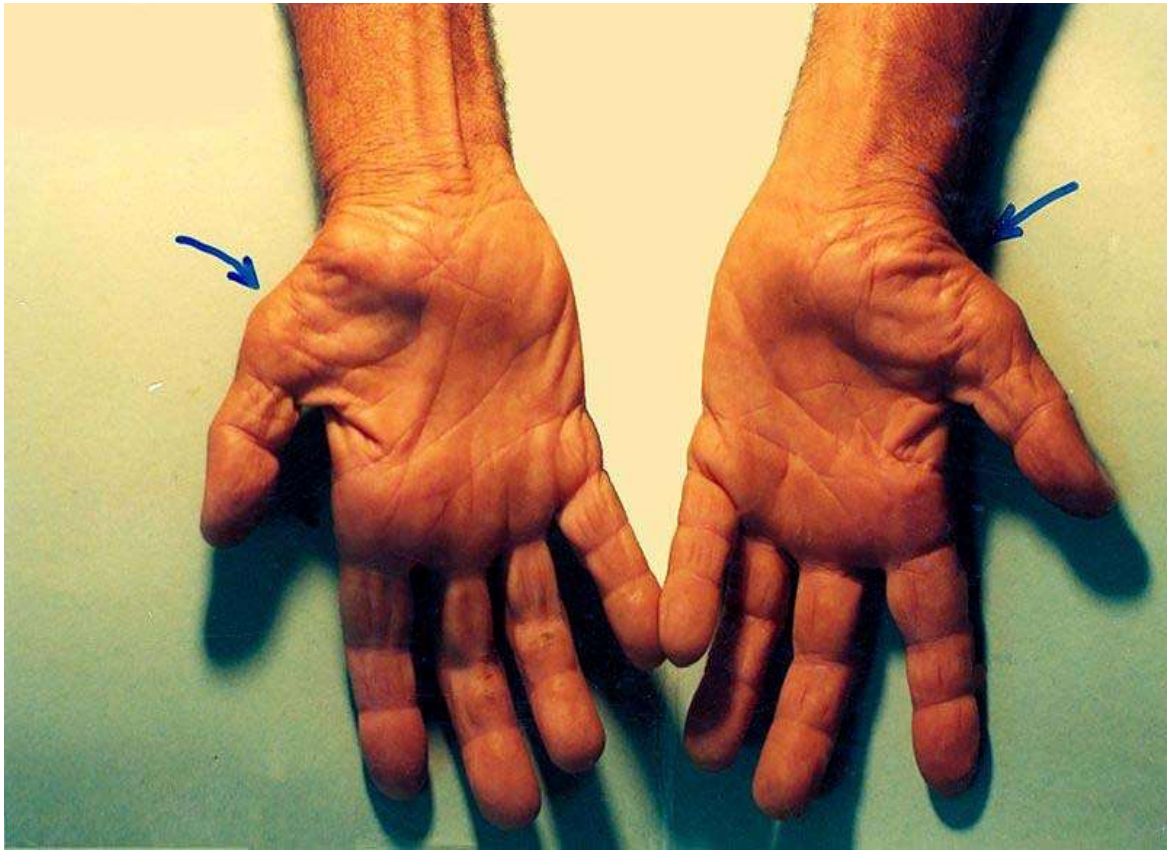
Nerves

- **Median Nerve** Once it passes through the carpal tunnel, the median nerve divides into 2 branches: the **recurrent branch** and **palmar digital** nerves.
- The palmar digital nerves give sensory innervation to the **palmar skin** and **dorsal nail beds** of the **lateral three and a half digits.** They also provide motor innervation to the **lateral two lumbricals**. The recurrent branch supplies the **thenar** muscle group

Carpel Tunnel

Clinical Relevance

Compression of the median nerve within the carpal tunnel can cause **carpal tunnel syndrome (CTS)**. It is the most common mononeuropathy and can be caused by thickened ligaments and tendon sheaths. Its aetiology is, however, most often idiopathic. If left untreated, CTS can cause weakness and atrophy of the **thenar** muscles.

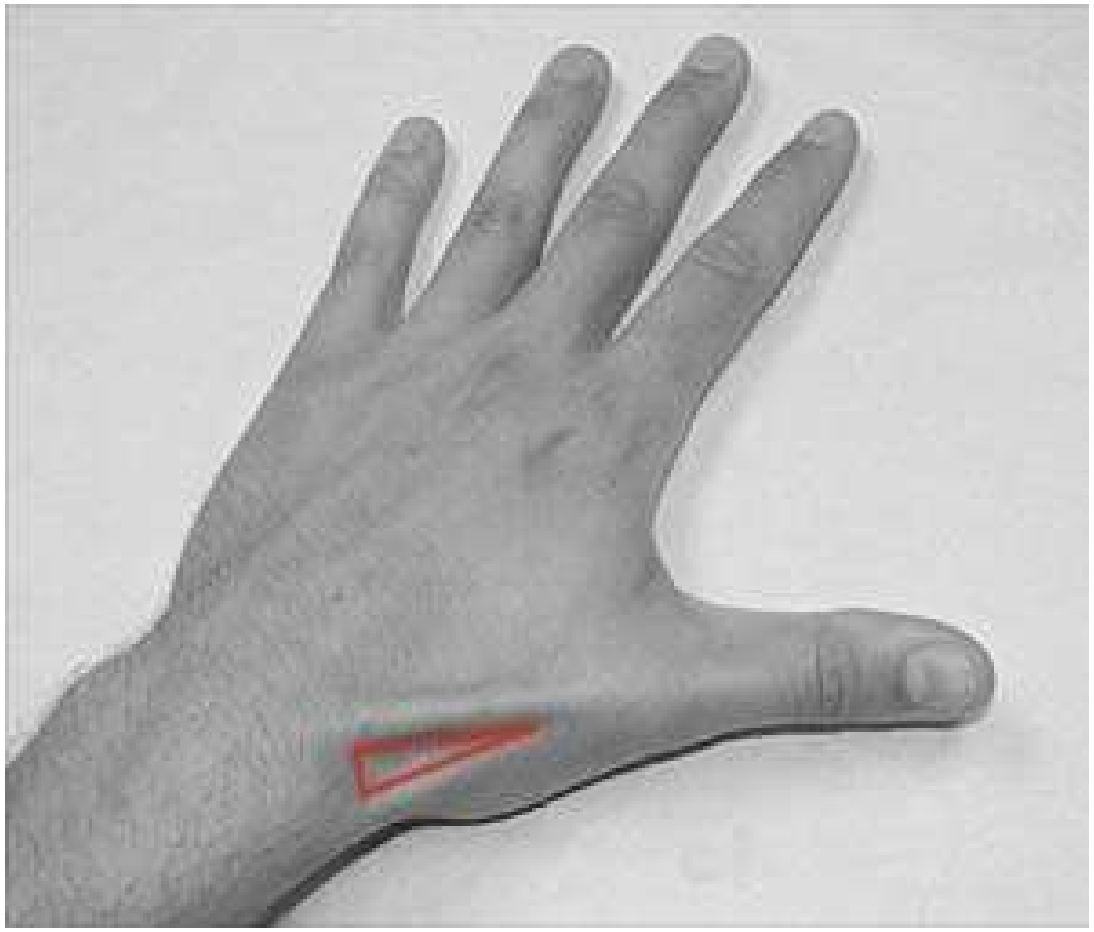


Snuff Box – Radial Fossa

- The **anatomical snuffbox** (also known as the radial fossa), is a triangular depression found on the lateral aspect of the dorsum of the hand. It is located at the level of the carpal bones, and best seen when the thumb is extended.
- In the past, this depression was used to hold snuff (ground tobacco) before inhaling via the nose – hence it was given the name ‘snuffbox’.

Radial Fossa

Anatomical Snuff Box



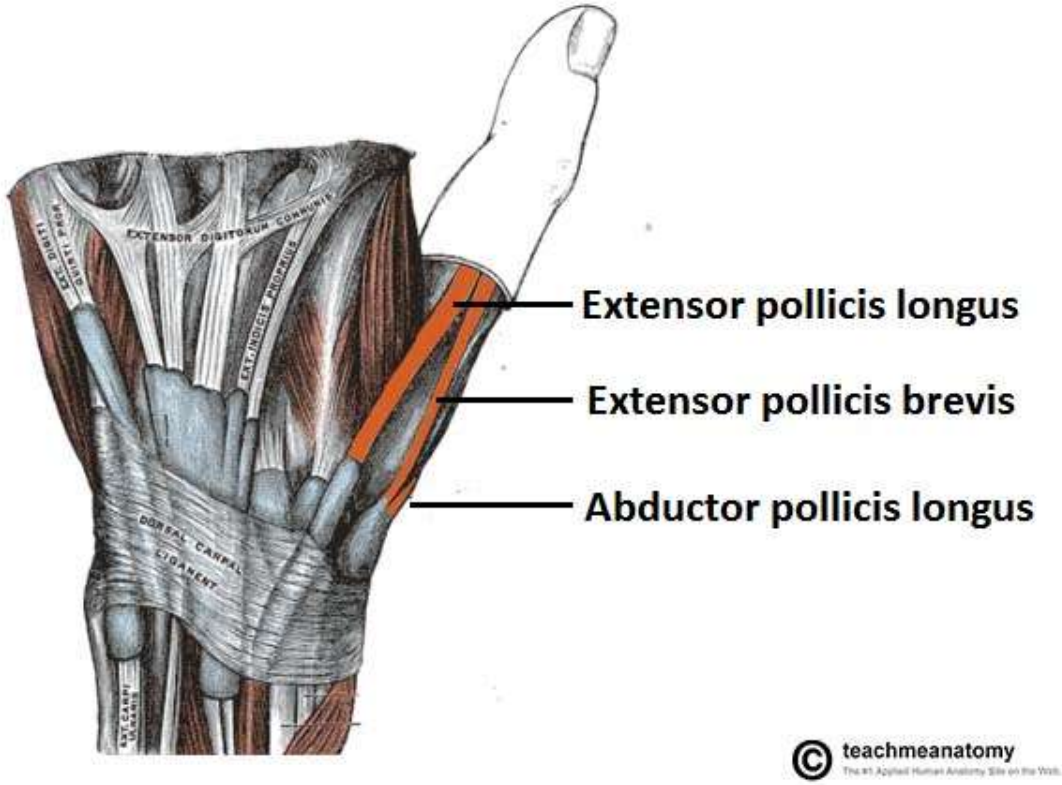
Carpel Tunnel

Borders

- **Ulnar (medial) border**: Tendon of the extensor pollicis longus.
- **Radial (lateral) border**: Tendons of the abductor pollicis longus and extensor pollicis brevis.
- **Proximal border**: Styloid process of the radius.
- **Floor**: Carpal bones; scaphoid and trapezium.
- **Roof**: Skin

Radial Fossa Anatomical Snuff Box

Borders



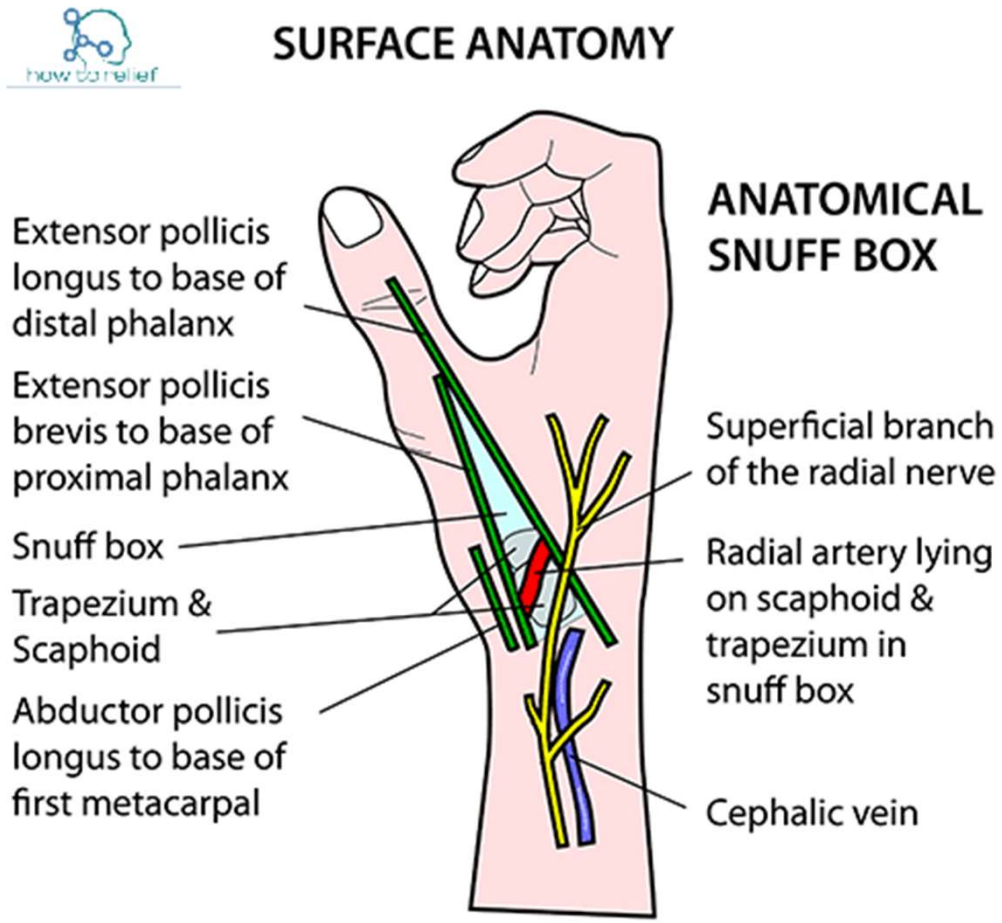
Radial Fossa Anatomical Snuff Box

Contents

- **Radial artery** – crosses the floor of the anatomical snuffbox, then turns medially and travels between the heads of the adductor pollicis muscle.
  - The radial pulse can be palpated in some individuals by placing two fingers on the proximal portion of the anatomical snuffbox.
- **Superficial branch of the radial nerve** – found in the skin and subcutaneous tissue of the anatomical snuffbox. It innervates the dorsal surface of the lateral three and half digits, and the associated area on the back of the hand.
- **Cephalic vein** – arises from the dorsal venous network of the hand and crosses the anatomical snuffbox to travel up the anterolateral aspect of the forearm.

Anatomical Snuff Box

Contents



Radial Fossa Anatomical Snuff Box

Clinical Relevance

- In the anatomical snuffbox, the **scaphoid** and the **radius** articulate to form part of the wrist joint. In the event of a blow to the wrist (e.g falling on an outstretched hand), the scaphoid takes most of the force. If localised pain is reported in the anatomical snuffbox, a **fracture of the scaphoid** is the most likely cause.
- The scaphoid has a unique blood supply, which runs **distal to proximal**. A fracture of the scaphoid can disrupt the blood supply to the **proximal** portion – this is an emergency. Failure to revascularize the scaphoid can lead to avascular necrosis, and future arthritis for the patient.

Radial Fossa Anatomical Snuff Box

Clinical Relvance