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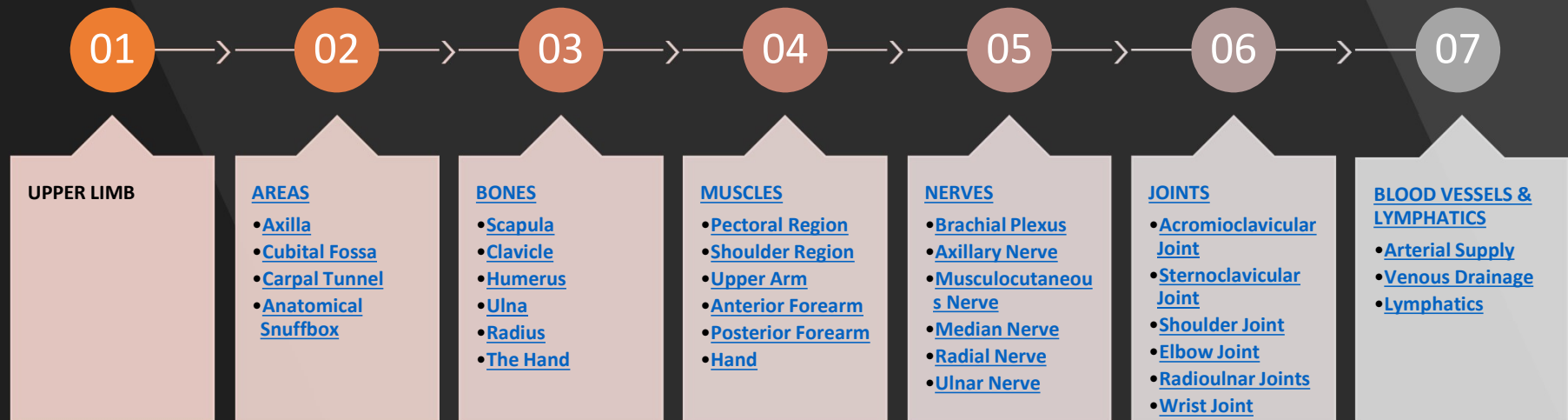


- THE BASICS
- HEAD
- NEUROANATOMY
- NECK
- THORAX
- BACK
- UPPER LIMB
- LOWER LIMB
- ABDOMEN
- PELVIS
- QUIZ

ANATOMY

UPPER LIMB

ANATOMY



Upper Limb

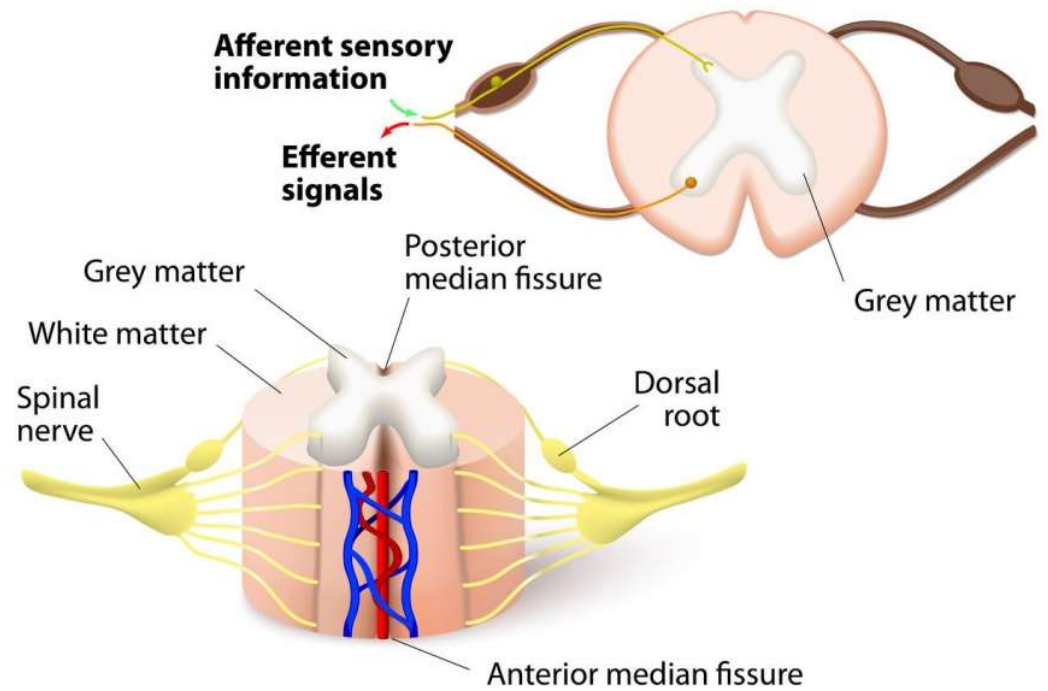
NERVES OF UPPER LIMB

- [BRACHIAL PLEXUS](#)
- [AXILLARY NERVE](#)
- [MUSCULOCUTANEOUS NERVE](#)
- [MEDIAN NERVE](#)
- [RADIAL NERVE](#)
- [ULNAR NERVE](#)

Brachial Plexus

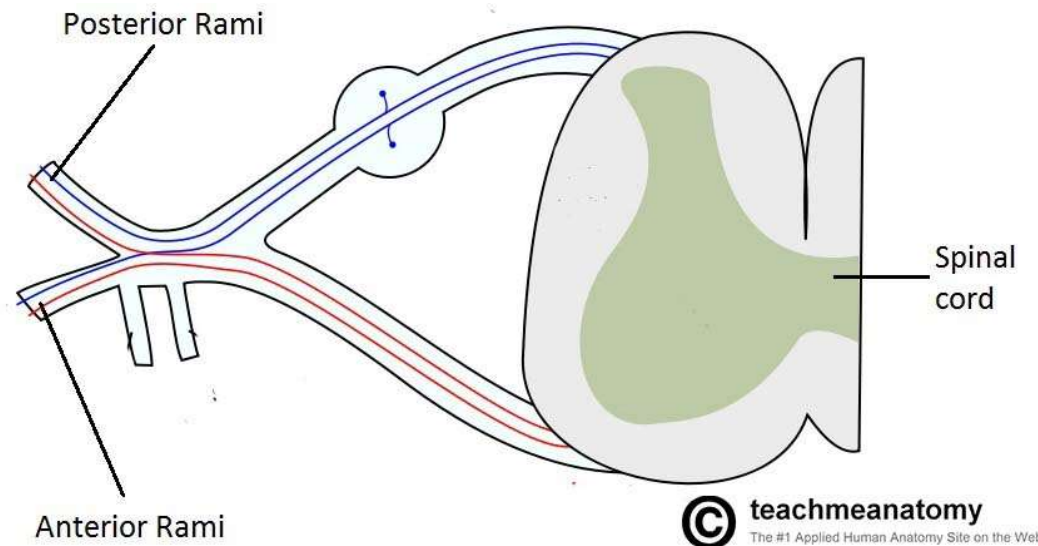
Spinal Cord

SPINAL CORD



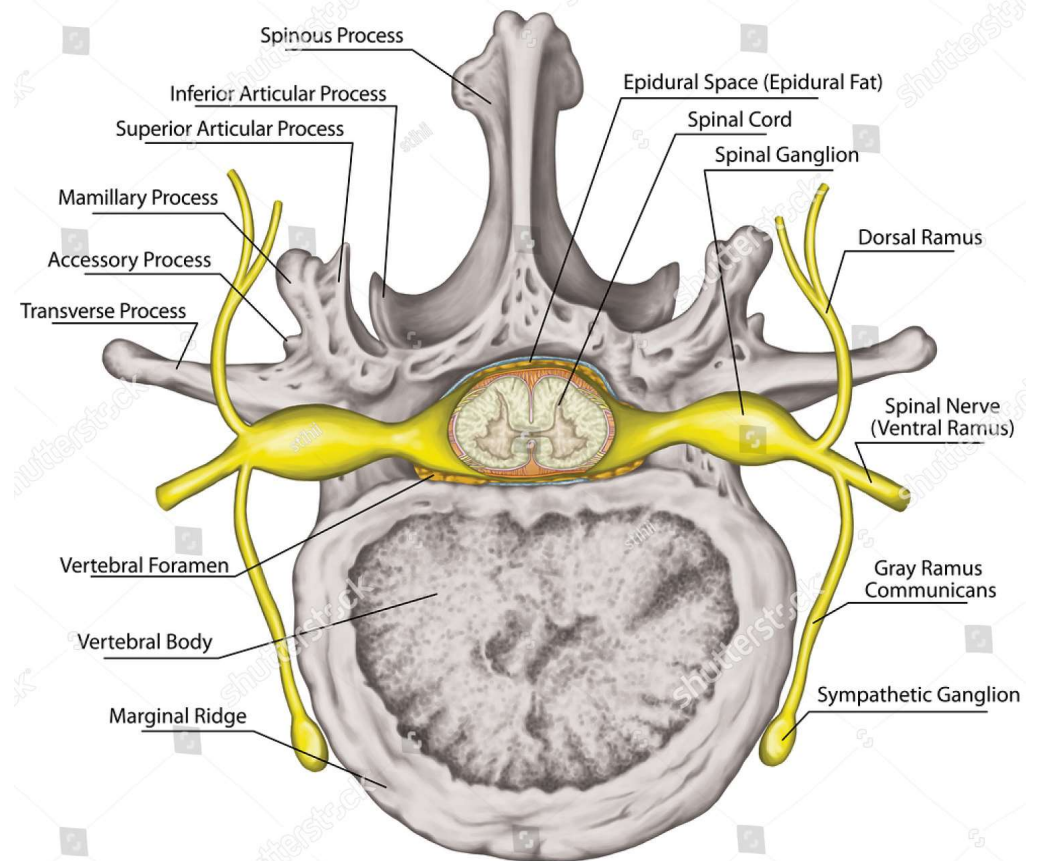
Brachial Plexus

Spinal Cord
Nerve Root, Trunk and Rami



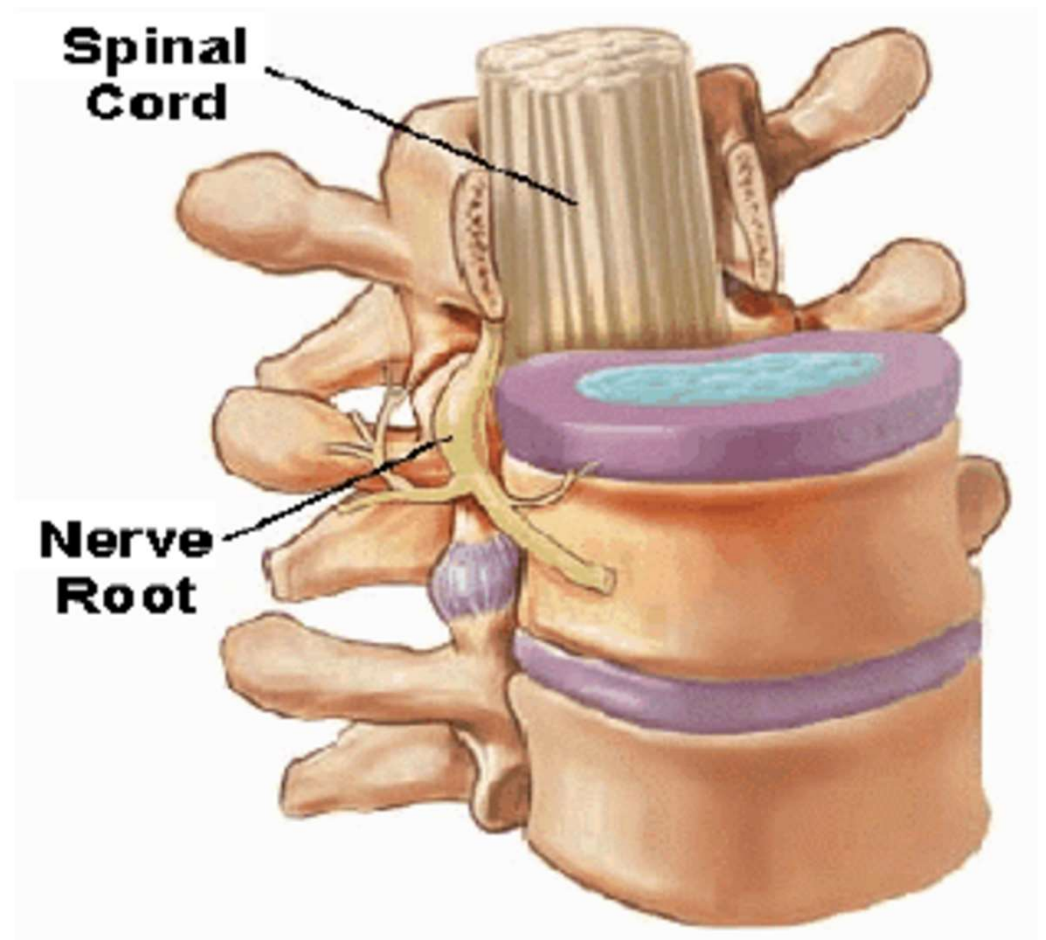
Brachial Plexus

Spinal Cord



Brachial Plexus

Spinal Cord



Nerves of Upper Limb

Brachial Plexus

- 1 Roots
- 2 Trunks
- 3 Divisions
- 4 Cords
- 5 Major Branches
 - 5.1 Musculocutaneous Nerve
 - 5.2 Axillary Nerve
 - 5.3 Median Nerve
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Nerve of Upper Limb

Brachial Plexus

The **Brachial Plexus** is a network of nerve fibres that supplies the skin and musculature of the upper limb. It begins in the root of the neck, passes through the [axilla](#), and runs through the entire upper extremity.

The plexus is formed by the **anterior rami** (divisions) of cervical spinal nerves **C5, C6, C7 and C8**, and the **first thoracic spinal nerve, T1**.

In this article, we shall look at the anatomy of the **Brachial Plexus** – its formation and anatomical course through the body.

Brachial Plexus

Roots

The 'roots' refer to the anterior rami of the **spinal nerves** that comprise the brachial plexus. These are the anterior rami of spinal nerves C5, C6, C7, C8, and T1.

- At each vertebral level, paired spinal nerves arise. They leave the [spinal cord](#) via the **Intervertebral foramina** of the vertebral column.
- Each spinal nerve then divides into an anterior and a posterior ramus. The roots of the brachial plexus are formed by the **anterior rami** of spinal nerves C5-T1 (the posterior divisions innervate the skin and musculature of the intrinsic back muscles).
- After their formation, these nerves pass between the **anterior** and **medial [scalene](#)** muscles to enter the base of the neck.

Brachial Plexus

Trunks

At the base of the neck, the roots of the brachial plexus converge to form three **trunks**. These structures are named by their relative anatomical location:

- **Superior trunk** – a combination of C5 and C6 roots.
- **Middle trunk** – continuation of C7.
- **Inferior trunk** – combination of C8 and T1 roots.
- The trunks traverse laterally, crossing the [posterior triangle](#) of the neck

Brachial Plexus

Divisions

- Each trunk divides into two branches within the posterior triangle of the neck. One division moves **anteriorly** (toward the front of the body) and the other **posteriorly** (towards the back of the body). Thus, they are known as the anterior and posterior divisions.
- We now have three anterior and three posterior nerve fibres. These divisions leave the posterior triangle and pass into the [axilla](#). They **recombine** into the cords of the brachial plexus.

Brachial Plexus

Cords

Once the anterior and posterior divisions have entered the axilla, they combine together to form three cords, named by their position relative to the **Axillary artery**.

Lateral cord is formed by:

- The anterior division of the superior trunk
- The anterior division of the middle trunk

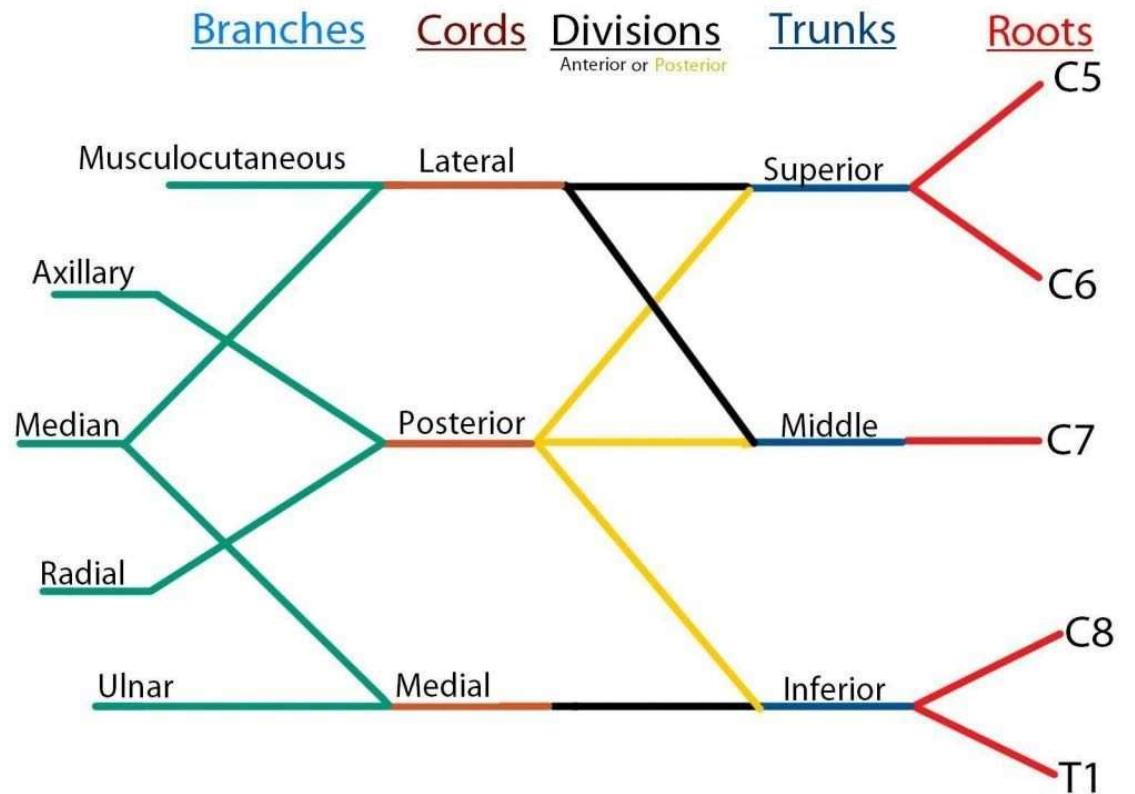
Posterior cord is formed by:

- The posterior division of the superior trunk
- The posterior division of the middle trunk
- The posterior division of the inferior trunk

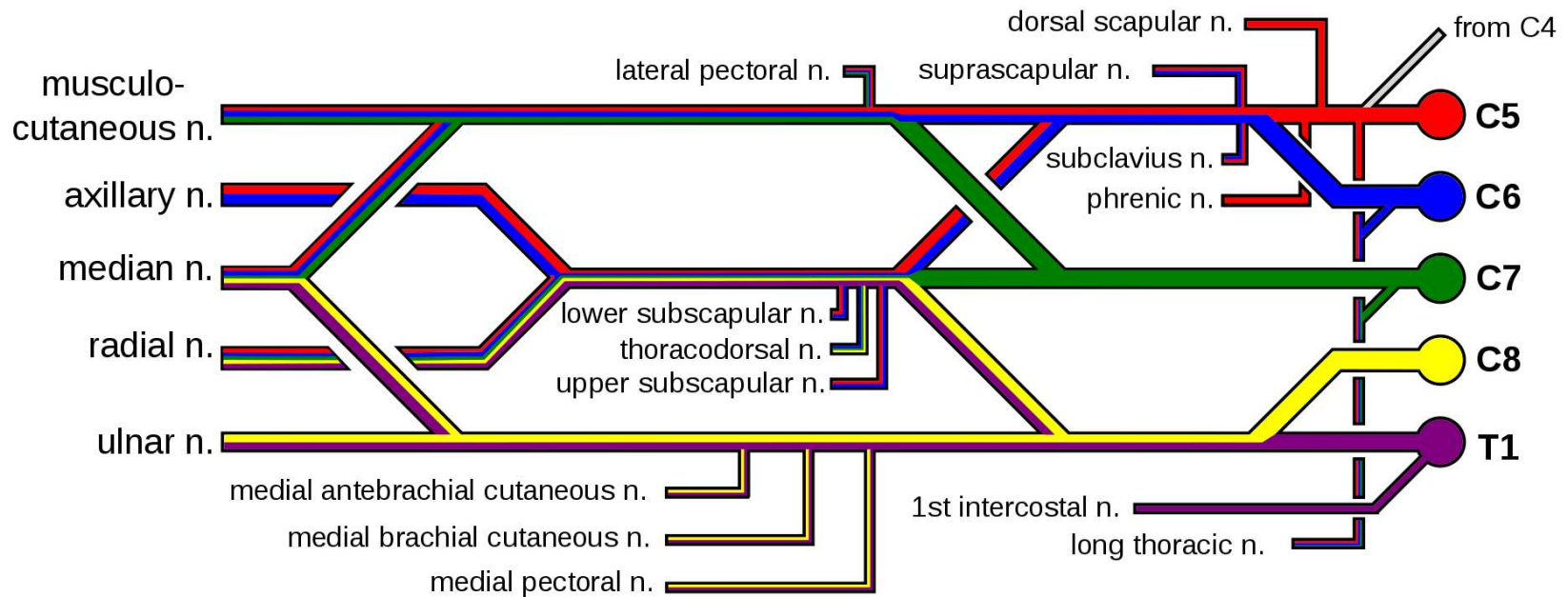
Medial cord is formed by:

- The anterior division of the inferior trunk.

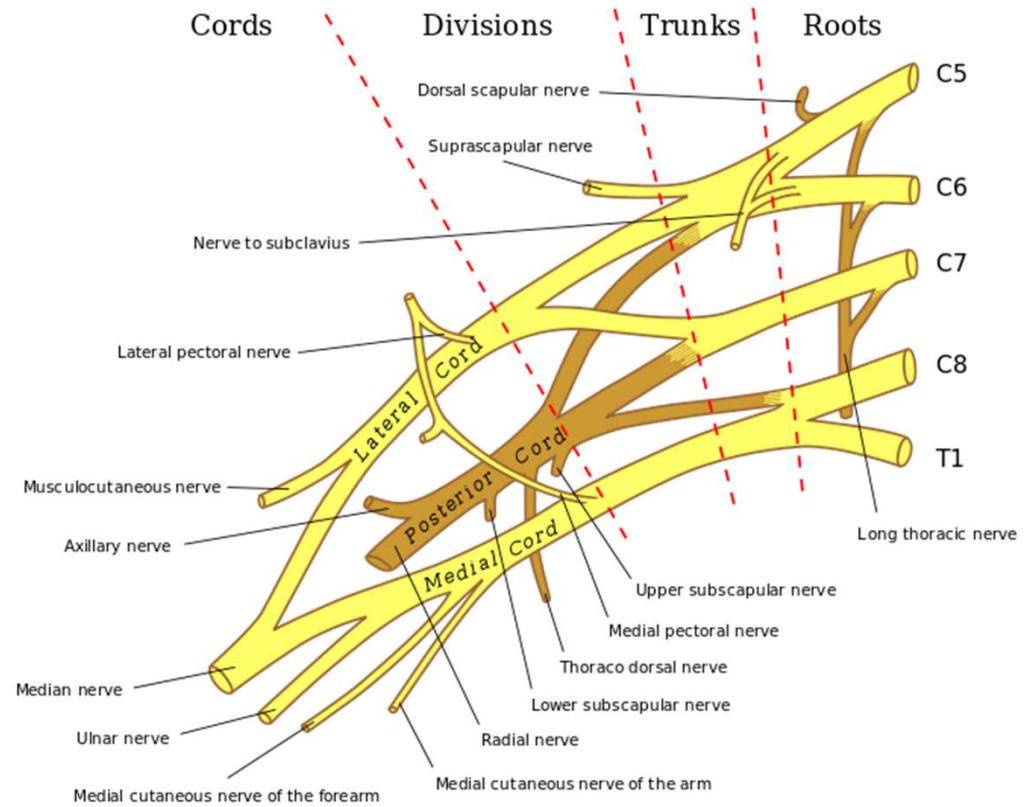
Brachial Plexus



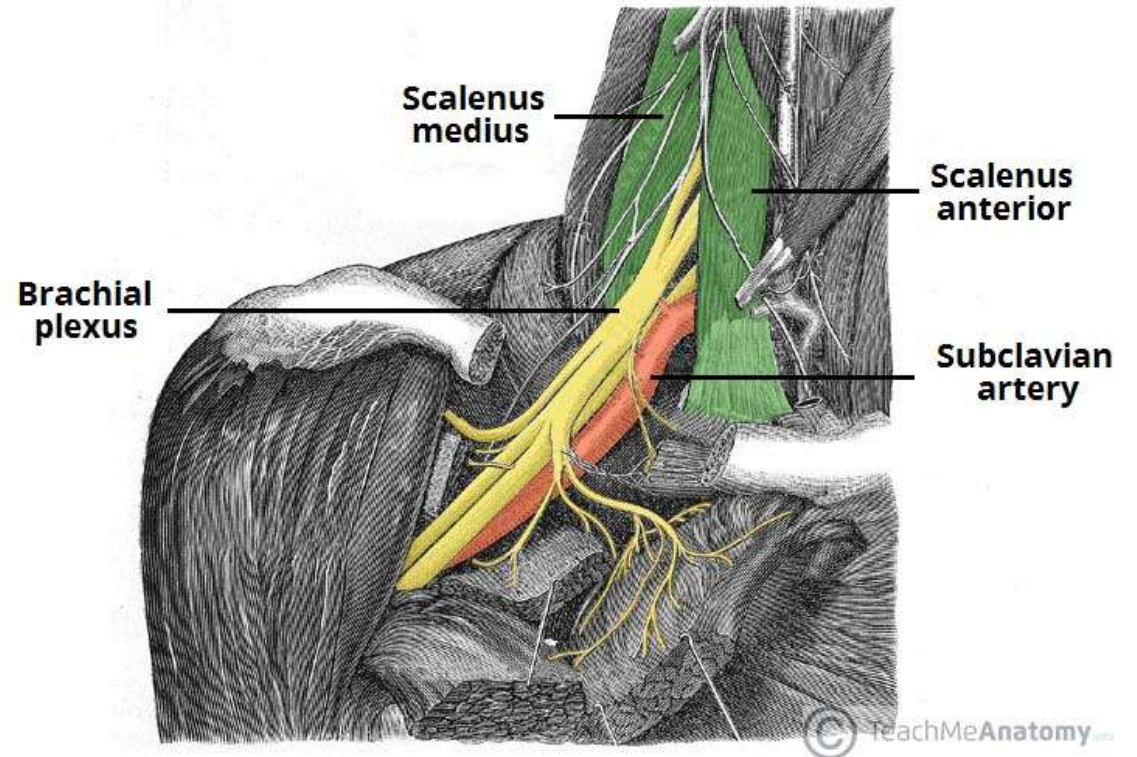
Brachial Plexus



Brachial Plexus



Brachial Plexus



Brachial Plexus

Musculocutaneous Nerve

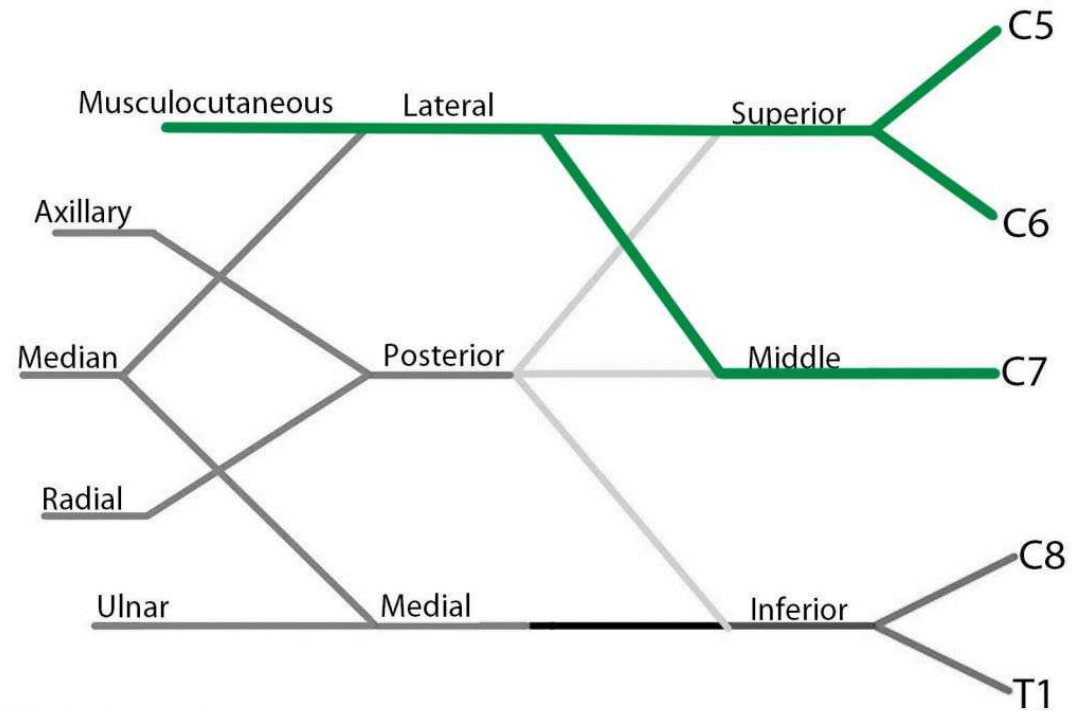
Roots: C5, C6, C7.

Motor Functions: Innervates the brachialis, biceps brachii and coracobrachialis muscles.

Sensory Functions: Gives off the lateral cutaneous branch of the forearm, which innervates the lateral half of the anterior forearm, and a small lateral portion of the posterior forearm

Brachial Plexus

Musculocutaneous Nerve



Brachial Plexus

Axillary Nerve

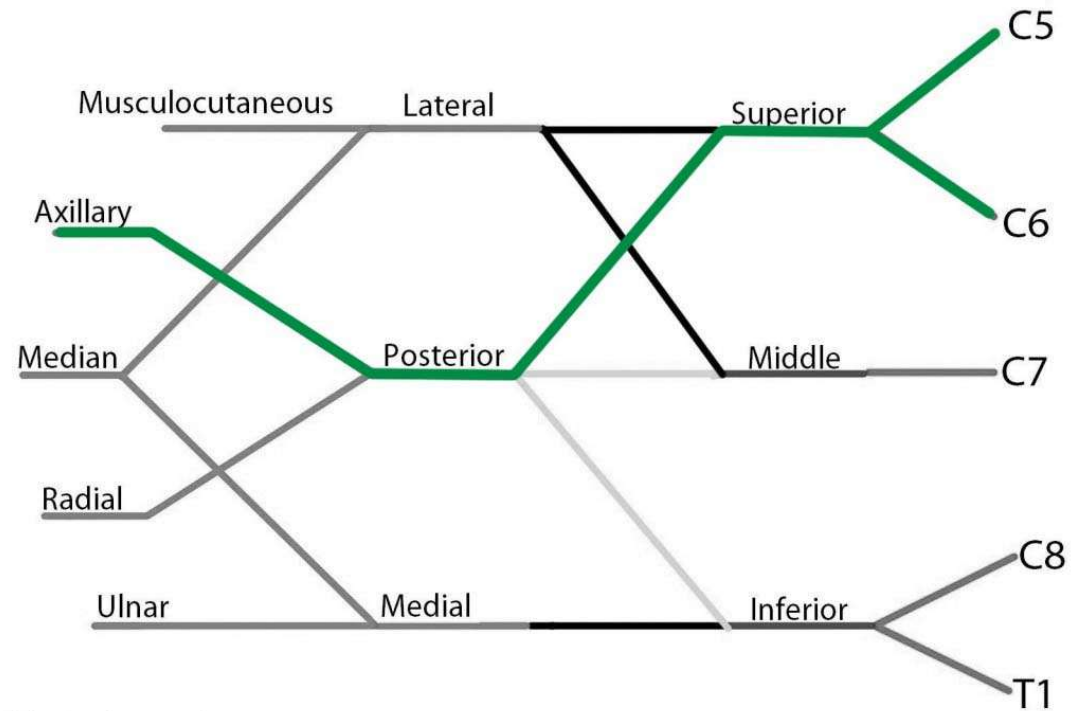
Roots: C5 and C6.

Motor Functions: Innervates the teres minor and deltoid muscles.

Sensory Functions: Gives off the superior lateral cutaneous nerve of arm, which innervates the inferior region of the deltoid (“regimental badge area”).

Brachial Plexus

Axillary Nerve



Brachial Plexus

Median Nerve

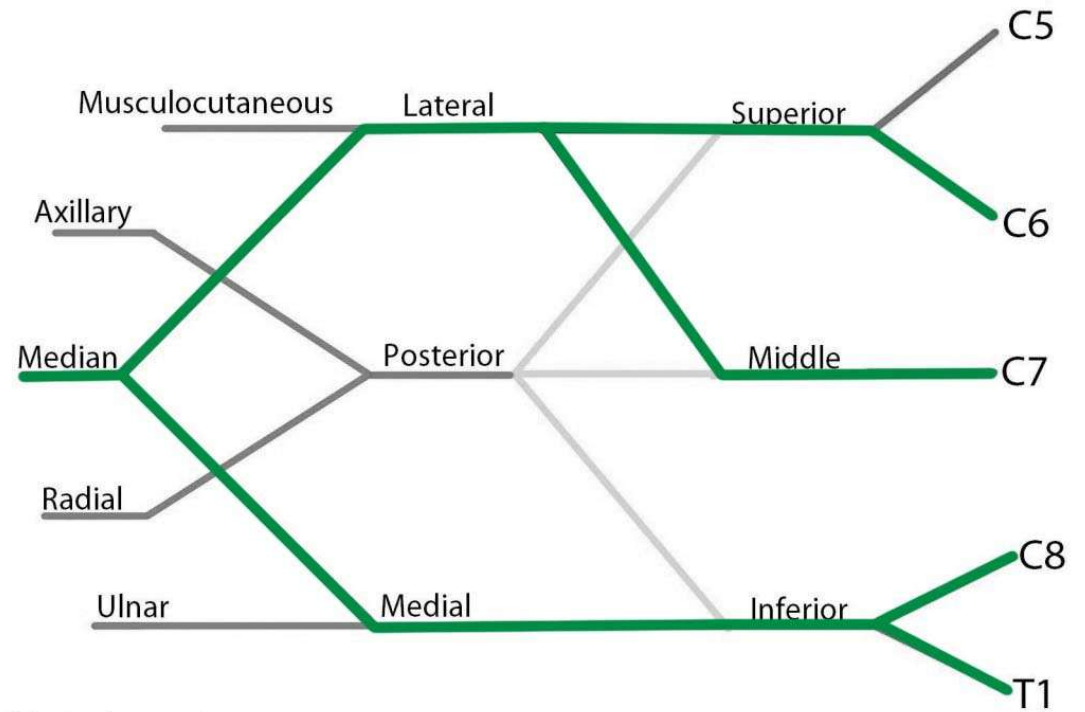
Roots: C6 – T1. (Also contains fibres from C5 in some individuals).

Motor Functions: Innervates most of the flexor muscles in the forearm, the thenar muscles, and the two lateral lumbricals associated with the index and middle fingers.

Sensory Functions: Gives off the palmar cutaneous branch, which innervates the lateral part of the palm, and the digital cutaneous branch, which innervates the lateral three and a half fingers on the anterior (palmar) surface of the hand.

Brachial Plexus

Median Nerve



Brachial Plexus

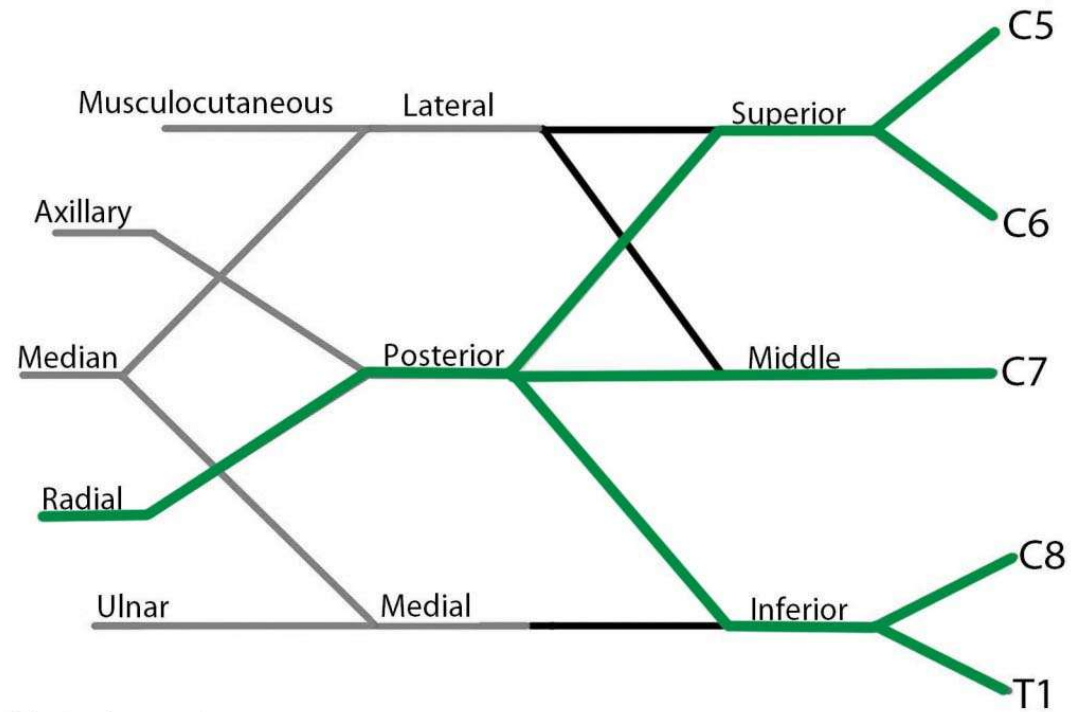
Radial Nerve

Roots: C5 – T1.

- **Motor Functions:** Innervates the triceps brachii, and the muscles in the posterior compartment of the forearm (which are primarily, but not exclusively, extensors of the wrist and fingers).
- **Sensory Functions:** Innervates the posterior aspect of the arm and forearm, and the posterolateral aspect of the hand

Brachial Plexus

Radial Nerve



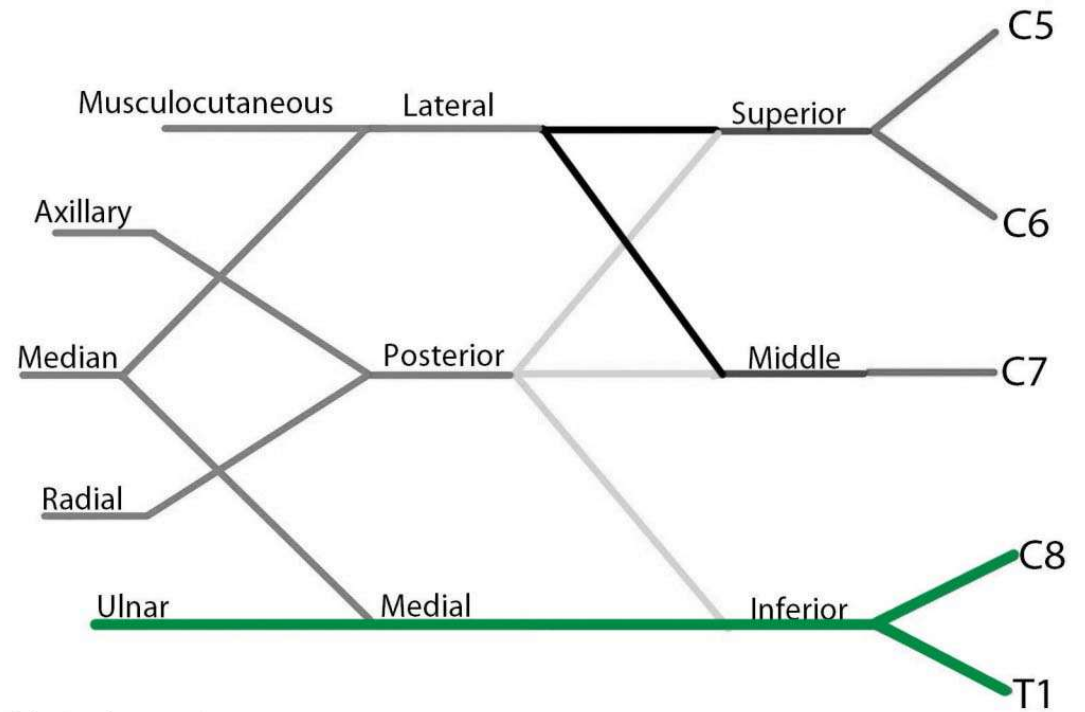
Brachial Plexus

Ulnar Nerve

- **Roots:** C8 and T1.
- **Motor Functions:** Innervates the muscles of the hand (apart from the thenar muscles and two lateral lumbricals), Flexor Carpi Ulnaris and medial half of Flexor Digitorum Profundus.
- **Sensory Functions:** Innervates the anterior and posterior surfaces of the medial one and half fingers, and associated palm area.

Brachial Plexus

Ulnar Nerve



Brachial Plexus

Minor Branches

Root

- Dorsal scapular Nerve
- Long Thoracic Nerve

Trunk

- Suprascapular
- Nerve to Subclavius

Lateral cord

- Lateral Pectoral Nerve

Medial Cord

- Medial Pectoral Nerve
- Medical Cutaneous nerve of Arm
- Medical Cutaneous nerve of Forearm

Posterior Cord

- Superior Scapular Nerve
- Thoracodorsal Nerve
- Inferior Scapular Nerve

Brachial Plexus

Clinical Relevance

Erb's Palsy

Upper Brachial Plexus Injury – Erb's Palsy

Commonly occurs where there is an excessive increase in the angle between the neck and shoulder, which stretches (or even tears) the nerve roots of C5 and C6. It can occur as a result of result of a difficult birth or shoulder trauma.

- **Nerves affected:** Nerves derived from solely C5 or C6 roots: musculocutaneous, axillary, suprascapular and nerve to subclavius.
- **Muscles paralysed:** Supraspinatus, infraspinatus, subclavius, biceps brachii, brachialis, coracobrachialis, deltoid and teres minor.
- **Motor functions:** Movements that are lost or greatly weakened include abduction at shoulder, lateral rotation of arm, supination of forearm, and flexion at shoulder.
- **Sensory functions:** Loss of sensation down lateral aspect of arm, which covers the sensory innervation of the axillary and musculocutaneous nerves.

The affected limb hangs limply, medially rotated by the unopposed action of pectoralis major. The forearm is pronated due to the loss of biceps brachii. The wrist is weakly flexed due to the normal increased tone of the wrist flexors relative to the wrist extensors. This is position is known as '**waiter's tip**', and is characteristic of Erb's palsy.



Brachial Plexus

Clinical Relevance

Lower Brachial Plexus Injury – Klumpke Palsy

- A **lower brachial plexus** injury results from excessive abduction of the arm (e.g. person catching a branch as they fall from a tree). It has a much lower incidence than Erb's palsy.
- **Nerves affected:** Nerves derived from the T1 root – ulnar and median nerves.
- **Muscles paralysed:** All the intrinsic hand muscles (the flexor muscles in the forearm are also supplied by the ulnar and median nerves, but are innervated by different roots). The primary symptom is a “claw hand,” caused by the unopposed action of the finger extensor muscles. The lumbrical muscles flex the metacarpophalangeal joints and extend the interphalangeal joints, so their paralysis will cause the opposite: extension of the MCP and flexion of the IP joints.
- **Sensory functions:** Loss of sensation along medial side of arm.

Nerves of Upper Limb

Axillary Nerve

1 Overview

2 Anatomical Course

2.1 The Quadrangular Space

3 Motor Functions

4 Sensory Functions

5 Clinical Relevance: Injury to the Axillary Nerve

5.1 Erb's Palsy

Nerves of Upper Limb

Axillary Nerve

Spinal roots: C5 and C6.

Sensory functions: Gives rise to upper lateral cutaneous nerve of arm, which innervates the skin over the lower deltoid ('regimental badge area').

Motor functions: Innervates the teres minor and deltoid muscles.

Anatomical Course

- The **axillary nerve** is formed within the [axilla](#) area of the upper limb. It is a direct continuation of the posterior cord from the [brachial plexus](#) – and therefore contains fibres from the C5 and C6 nerve roots.
- In the axilla, the axillary nerve is located posterior to the axillary artery and anterior to the subscapularis muscle. It exits the axilla at the inferior border of subscapularis via the **quadrangular space**, often accompanied by the posterior circumflex humeral artery and vein.

Nerves of Upper Limb

Axillary Nerve

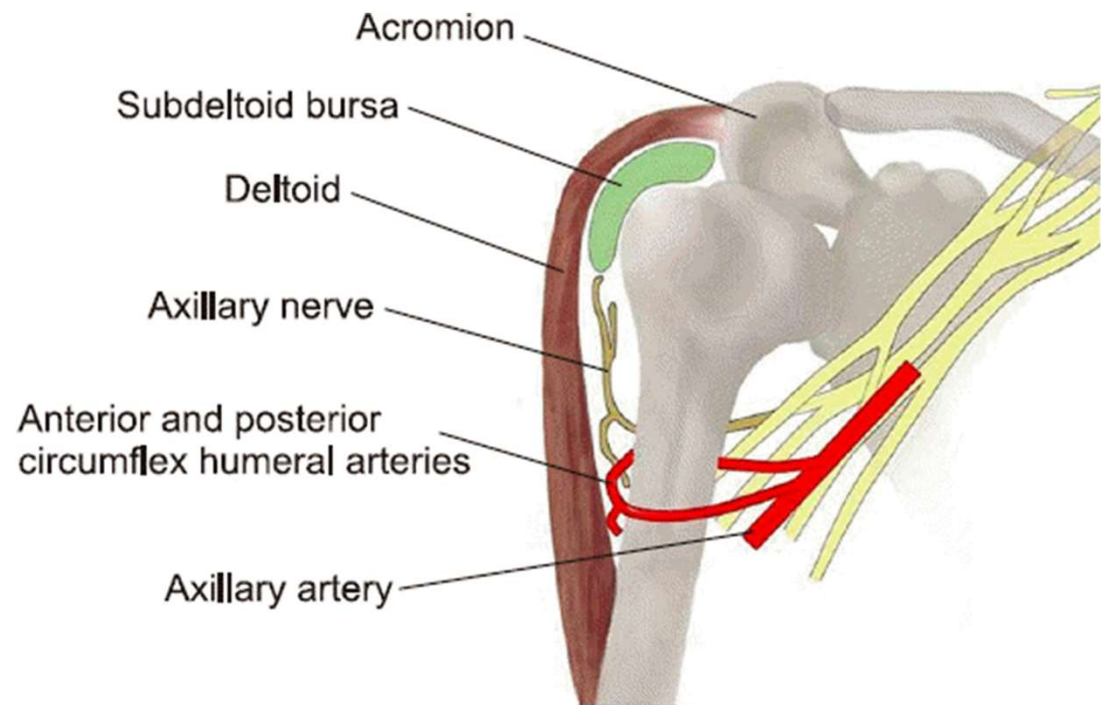
Posterior terminal branch – provides motor innervation to the posterior aspect of the deltoid muscle and teres minor. It also innervates the skin over the inferior part of the deltoid as the upper lateral cutaneous nerve of the arm.

Anterior terminal branch – winds around the surgical neck of the humerus and provides motor innervation to the anterior aspect of the deltoid muscle. It terminates with cutaneous branches to the anterior and anterolateral shoulder.

Articular branch – supplies the glenohumeral joint

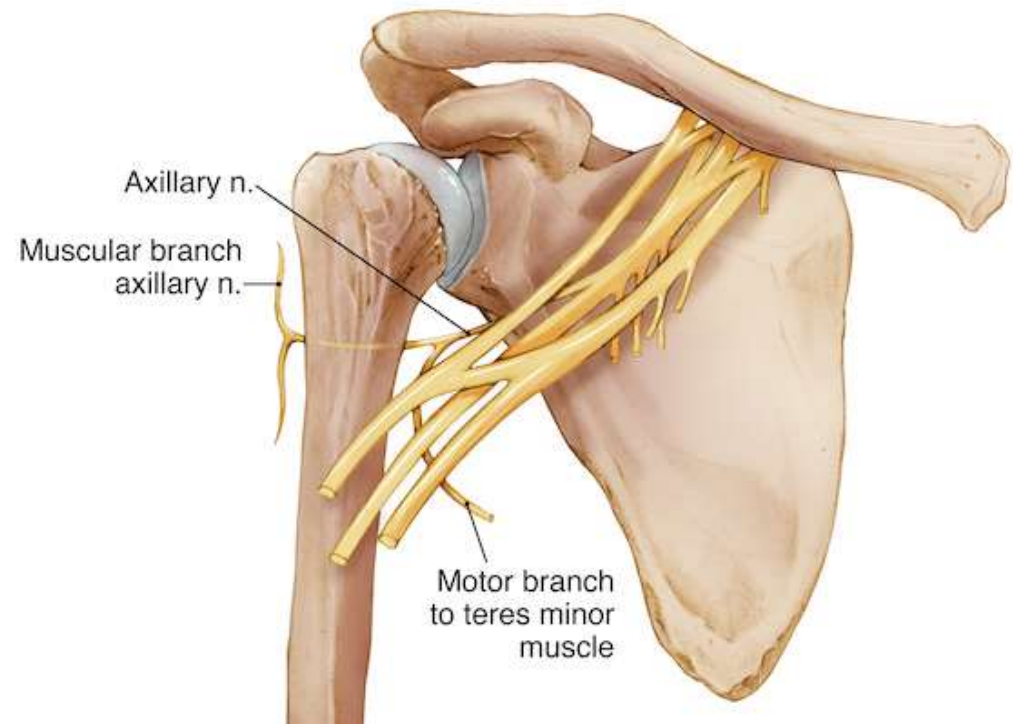
Nerves of Upper limb

Axillary Nerve



Nerves of Upper Limb

Axillary Nerve



Nerves of Upper Limb

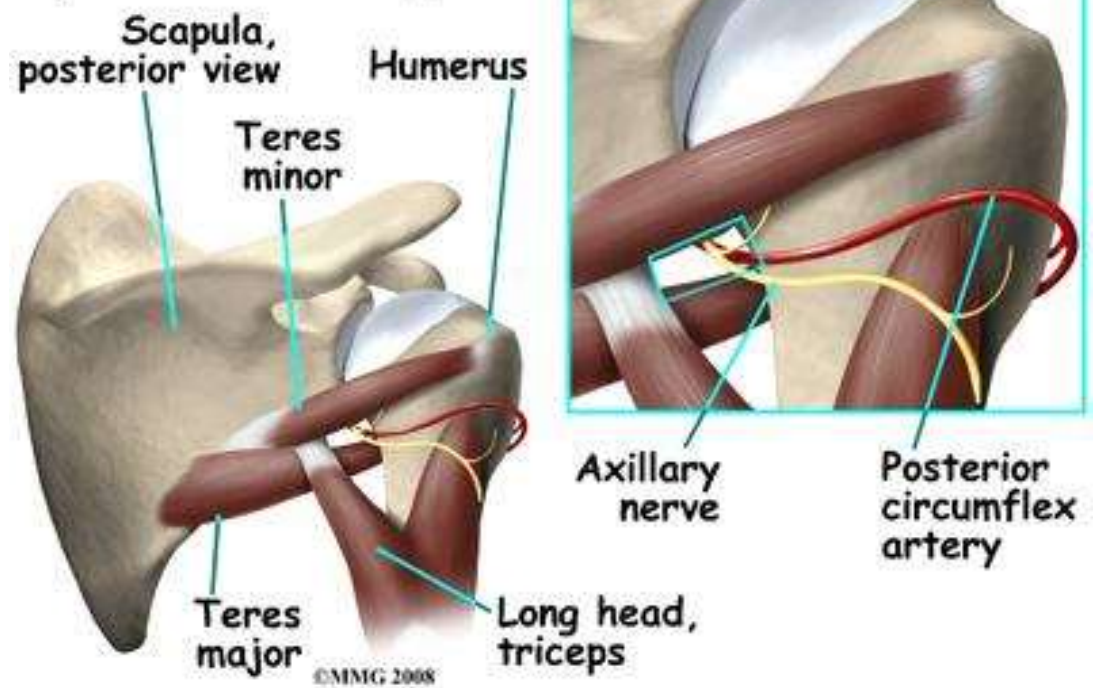
Quadrangular Space

- The **quadrangular space** is a gap in the muscles of the posterior scapular region. It is a pathway for neurovascular structures to move from the axilla anteriorly to the posterior shoulder and arm. It is bounded by:
- **Superior** – inferior aspect of teres minor
- **Inferior** – superior aspect of teres major
- **Lateral** – surgical neck of [humerus](#).
- **Medial** – long head of triceps brachii
- **Anterior** – subscapularis
- The axillary nerve and posterior circumflex humeral artery and vein pass through the quadrangular space. These structures can be **compressed** as a result of trauma, muscle hypertrophy or space occupying lesion; resulting in weakness of the deltoid and teres minor. This is particularly common in athletes who perform overhead activities.

Neveer of Upper Limb

Quadrangular Space

Quadrilateral Space



Nerves of Upper Limb

Axillary Nerve

Motor Function

The **axillary nerve** innervates teres minor and deltoid muscles.

Teres minor – part of the rotator cuff muscles which act to stabilise the [glenohumeral joint](#). It acts to externally rotate the shoulder joint and is innervated by the posterior terminal branch of the axillary nerve.

Deltoid – situated at the superior aspect of the shoulder. It performs abduction of the upper limb at the glenohumeral joint and is innervated by the anterior terminal branch of the axillary nerve.

Nerves Of Upper limb

Axillary Nerve

Sensory Function

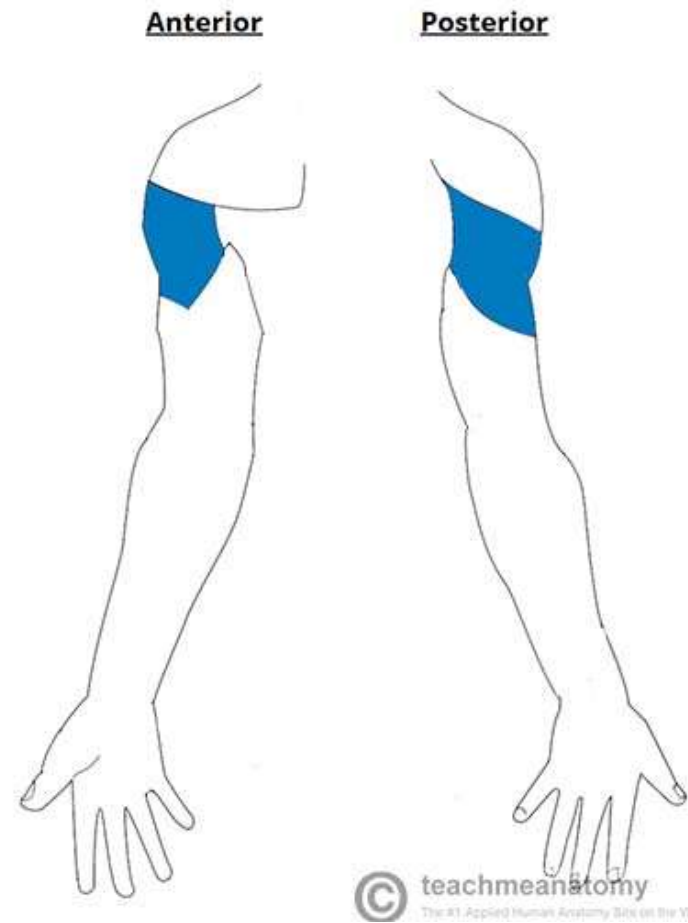
The sensory component of the axillary nerve is delivered via its **posterior terminal branch**.

After the posterior terminal branch of the axillary nerve has innervated the teres minor, it continues as the **upper lateral cutaneous nerve of the arm**. It innervates the skin over the inferior portion of the deltoid (the 'regimental badge area').

In a patient with axillary nerve damage, sensation at the regimental badge area may be impaired or absent. The patient may also report paraesthesia (pins and needles) in the distribution of the axillary nerve.

Nerves of Upper Limb

Sensory Function



Nerves of Upper Limb

Axillary Nerve

Clinical Relevance

- The **axillary nerve** is most commonly damaged by direct trauma to the shoulder or proximal humerus. Common mechanisms of injury include fracture of the humeral surgical neck, shoulder dislocation or iatrogenic injury during shoulder surgery.
- **Motor functions** – the deltoid and teres minor muscles will be affected, rendering the patient unable to abduct the affected limb.
- **Sensory functions** – the upper lateral cutaneous nerve of arm will be affected, resulting in loss of sensation over the inferior deltoid ('regimental badge area').
- **Characteristic clinical signs** – in long standing cases, the paralysed deltoid muscle atrophies, giving the shoulder a flattened appearance, and the greater tuberosity can be palpated in that area.

Erb's Palsy

- **Erb's palsy** is a condition resulting from damage to C5-C6 roots of the brachial plexus. The axillary nerve is affected, and the individual is usually unable to abduct or externally rotate the shoulder joint.
- It commonly occurs where there is an excessive increase in the angle between the neck and shoulder, which stretches (or even tears) the nerve roots

Nerves of Upper Limb

Musculocutaneous Nerve

1 Overview

2 Anatomical Course

3 Motor Functions

4 Sensory Functions

5 Clinical Relevance: Injury to the Musculocutaneous Nerve

Nerves of Upper Limb

Nerve roots – C5-C7.

Motor functions – innervates the muscles in the anterior compartment of the arm – the coracobrachialis, biceps brachii and the brachialis

Sensory functions – gives rise to the lateral cutaneous nerve of forearm, which innervates skin on the lateral surface of the forearm.

Nerves of Upper Limb

Musculocutaneous Nerve

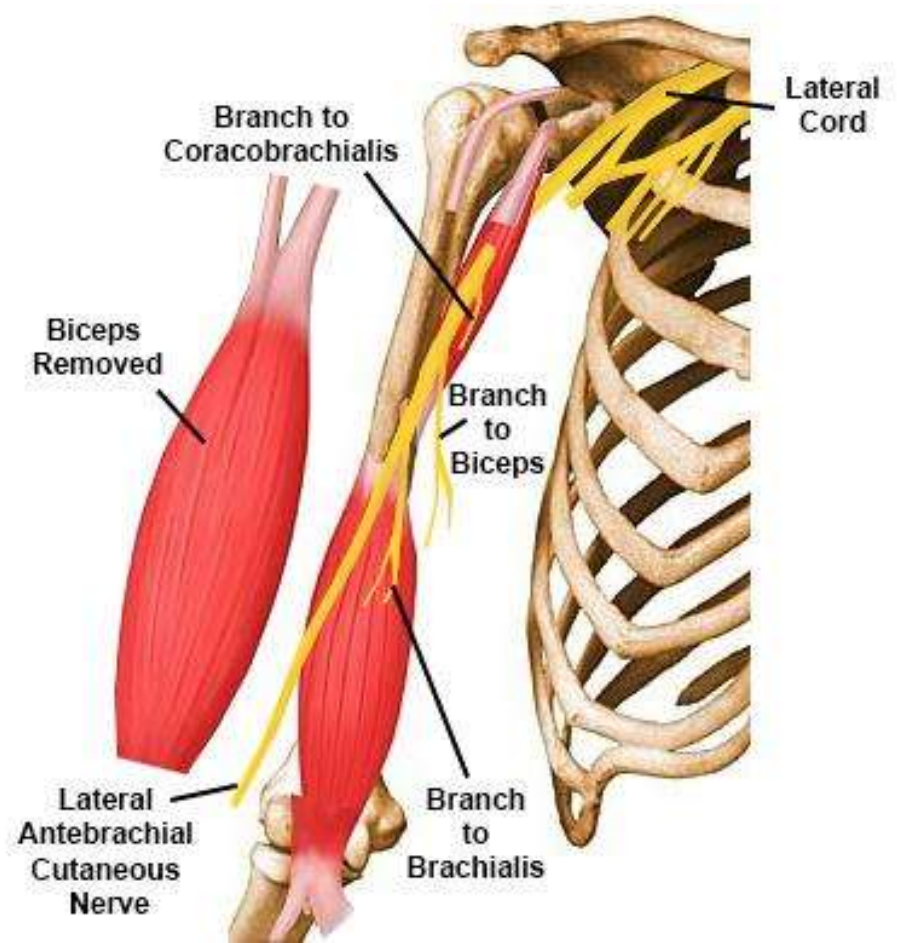
The **musculocutaneous nerve** is the terminal branch of the lateral cord of the [brachial plexus](#) (C5, C6 and C7) and emerges at the inferior border of pectoralis minor muscle.

It leaves the [axilla](#) and pierces the **coracobrachialis** muscle near its point of insertion on the [humerus](#). It gives a branch to this muscle. The musculocutaneous nerve then passes down the flexor compartment of the upper arm, superficial to brachialis but deep to the biceps brachii muscle. It innervates both these muscles and gives articular branches to the humerus and the elbow.

The nerve then pierces the deep fascia lateral to biceps brachii to emerge **lateral** to the biceps tendon and brachioradialis. It continues into the forearm as the **lateral cutaneous nerve** and provides sensory innervation to the lateral aspect of the forearm

Nerves of upper Limb

Musculocutaneous Nerve

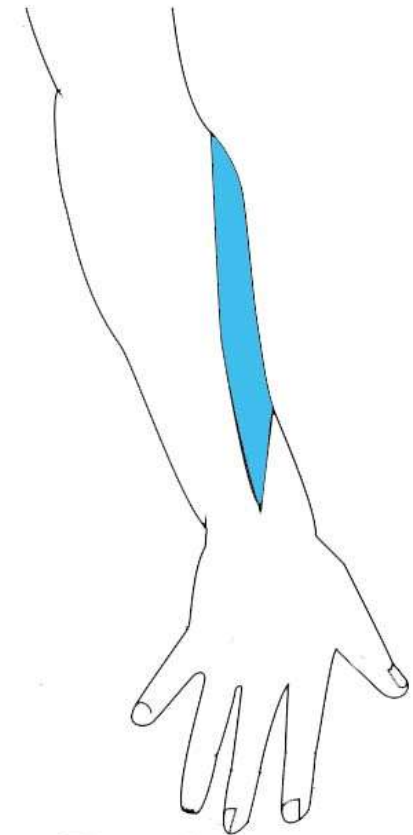
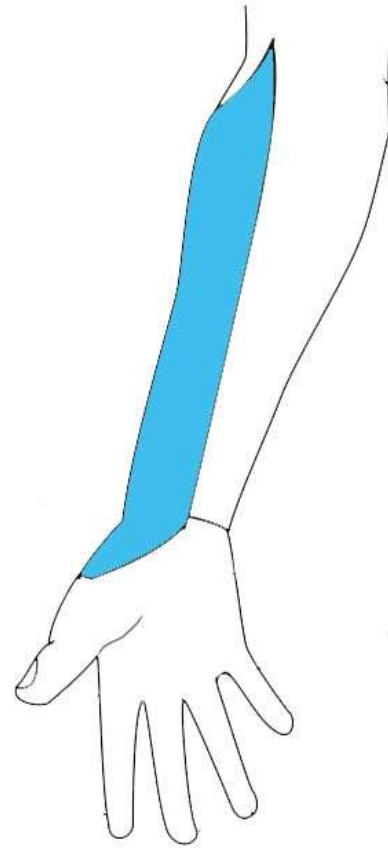


- The musculocutaneous nerve innervates the muscles in the [anterior compartment of the arm](#):
- Biceps brachii
- Brachialis
- Coracobrachialis
- These muscles **flex the upper arm** at the shoulder and the elbow. In addition, the biceps brachii also supinates the forearm.

- The musculocutaneous nerve gives rise to the **lateral cutaneous nerve of forearm**.
- This nerve initially enters the deep forearm, but then pierces the deep fascia to become subcutaneous. In this region, it can be found in close proximity to the **cephalic vein**.
- The lateral cutaneous nerve of forearm innervates the skin of the **anterolateral aspect** of the forearm.



Musculocutaneous Nerve



Nerves of Upper Limb

Clinical Relevance: Injury to the Musculocutaneous Nerve

- The **musculocutaneous nerve** is well protected within the axilla, and injury is uncommon. Characteristic mechanisms of injury include penetrating trauma to the axilla (e.g. stabbing), and iatrogenic injury during the deltopectoral approach to the shoulder as a result of heavy retraction.
- **Motor functions** – Coracobrachialis, Biceps brachii and Brachialis muscles are affected.
 - Flexion at the shoulder and elbow are both weakened but remain possible as a result of pectoralis major and brachioradialis respectively.
 - Brachioradialis also enables supination alongside the supinator muscle – so although weak, it is still possible.
- **Sensory functions** – loss of sensation over the lateral side of the forearm.

Nerves of Upper Limb

Median Nerve

- [1 Overview](#)
- [2 Anatomical Course](#)
 - [2.1 Clinical Relevance: Carpal Tunnel Syndrome](#)
- [3 Motor Functions](#)
 - [3.1 Anterior Forearm](#)
 - [3.2 Hand](#)
- [4 Sensory Functions](#)
- [5 Clinical Relevance: Lesions of the Median Nerve](#)
 - [5.1 Damaged at the Elbow](#)
 - [5.2 Damaged at the Wrist](#)
- [6 Prosection Images](#)

Median Nerve

Nerve roots: C6 – T1 (also contains fibres from C5 in some individuals).

Motor functions: Innervates the flexor and pronator muscles in the [anterior compartment of the forearm](#) (except the flexor carpi Ulnaris and part of the Flexor Digitorum Profundus, innervated by the [ulnar nerve](#)). Also supplies innervation to the thenar muscles and lateral two lumbricals in the hand.

Sensory functions: Gives rise to the palmar cutaneous branch, which innervates the lateral aspect of the palm, and the digital cutaneous branch, which innervates the lateral three and a half fingers on the anterior (palmar) surface of the hand.

Median Nerve

Anatomical Course

The median nerve is derived from the **medial** and **lateral** cords of the [brachial plexus](#). It contains fibres from roots C6-T1, and can contain fibres from C5 in some individuals.

After originating from the brachial plexus in the [axilla](#), the median nerve descends down the arm, initially lateral to the **brachial artery**. Halfway down the arm, the nerve crosses over the brachial artery, and becomes situated medially. The median nerve enters the anterior compartment of the forearm via the [cubital fossa](#).

- In the forearm, the nerve travels between the flexor digitorum profundus and flexor digitorum superficialis muscles. The median nerve gives off two major branches in the forearm:
- **Anterior interosseous nerve** – supplies the deep muscles in the anterior forearm.
- **Palmar cutaneous nerve** – innervates the skin of the lateral palm.

Nerves of upper Limb

Median Nerve

After giving off the anterior interosseous and palmar cutaneous branches, the median nerve enters the hand via the carpal tunnel – where it terminates by dividing into two branches:

- **Recurrent branch** – innervates the thenar muscles.
- **Palmar digital branch** – innervates the palmar surface and fingertips of the lateral three and half digits. Also innervates the lateral two lumbrical muscles.

Nerves of Upper Limb

Medial Nerve

Clinical relevance

- Compression of the median nerve within the carpal tunnel can cause **carpal tunnel syndrome (CTS)**.
- It is the most common **mononeuropathy**, and is caused by an increased tissue pressure within the carpal tunnel. Whilst risk factors for CTS have been identified (such as diabetes, pregnancy and acromegaly), the exact underlying aetiology is not well understood.
- Clinical features include numbness, tingling, and pain in the distribution of the median nerve. Importantly, the **palm is usually spared** – as the palmar cutaneous branch does not travel through the carpal tunnel. Symptoms can wake the patient from sleep, and are usually worse in the morning. If left untreated, chronic CTS can cause weakness and atrophy of the thenar muscles.
- Tests for carpal tunnel syndrome can be performed during physical examination:
- **Tinel's sign** – tapping the nerve in the carpal tunnel to elicit pain in median nerve distribution.
- **Phalen's manoeuvre** – holding the wrist in flexion for 60 seconds to elicit numbness/pain in median nerve distribution

Nerve of Upper Limb

Median Nerve

Motor Function

Anterior Forearm

- **Superficial layer:** Pronator teres, flexor carpi radialis and palmaris longus.
- **Intermediate layer:** Flexor digitorum superficialis.
- The median nerve also gives rise to the anterior interosseous nerve, which supplies the deep flexors:
- **Deep layer:** Flexor pollicis longus, pronator quadratus, and the lateral half of the flexor digitorum profundus (the medial half of the muscle is innervated by the ulnar nerve)

Hand

- The median nerve innervates some of the muscles in the hand via **two branches**.
- The **recurrent branch** of the median nerve innervates the thenar muscles – muscles associated with movements of the thumb. The **palmar digital branch** innervates the lateral two lumbricals – these muscles perform flexion at the MCP joints and extension at the PIP joints of the index and middle fingers



Median Nerve

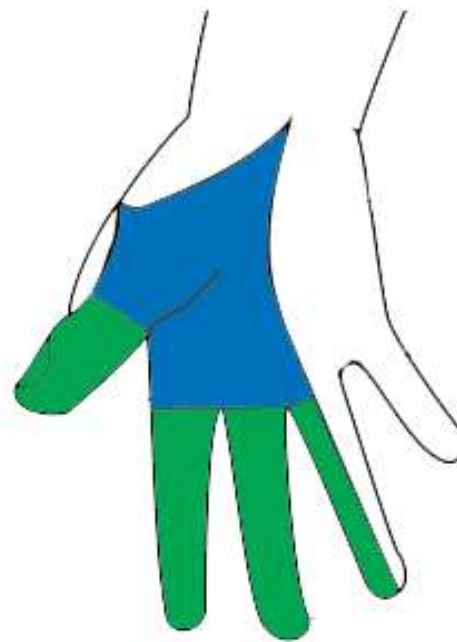
Sensory Function

- **Palmar cutaneous branch** – arises in the forearm and travels into the hand. It innervates the lateral aspect of the palm. This nerve does not pass through the [carpal tunnel](#), and is spared in carpal tunnel syndrome.
- **Palmar digital cutaneous branch** – arises in the hand. Innervates the palmar surface and fingertips of the lateral three and half digits

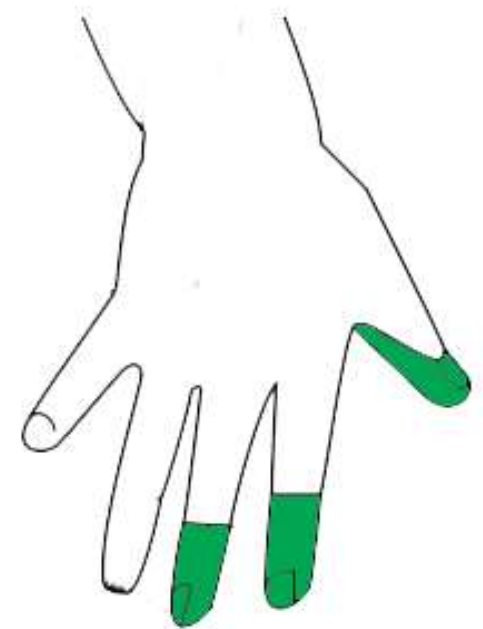
Nerve of upper limb

Medina Nerve

-  **Palmar cutaneous branch**
-  **Digital cutaneous branch**



Palm



© Dorsum Anatomy

Nerve of Upper Limb

Mechanism Of Injury

Supracondylar fracture of the humerus.

- **Motor functions:** The flexors and pronators in the forearm are paralysed, with the exception of the Flexor Carpi Ulnaris and medial half of Flexor Digitorum Profundus. The forearm constantly supinated, and wrist flexion is weak (often accompanied by adduction, because of the pull of the Flexor Carpi Ulnaris).
 - Flexion at the thumb is also prevented, as both the longus and brevis muscles are paralysed.
 - The lateral two lumbricals are affected, and the patient will not be able to flex at the MCP joints or extend at IP joints of the index and middle fingers.
- **Sensory functions:** Lack of sensation over the areas that the median nerve innervates.
- **Characteristic signs:** The thenar eminence is wasted, due to atrophy of the thenar muscles. If patient tries to make a fist, only the little and ring fingers can flex completely. This results in a characteristic shape of the hand, known as hand of benediction

Nerve to Upper Limb

Damaged at the Wrist

Mechanism of injury: Lacerations just proximal to the flexor retinaculum.

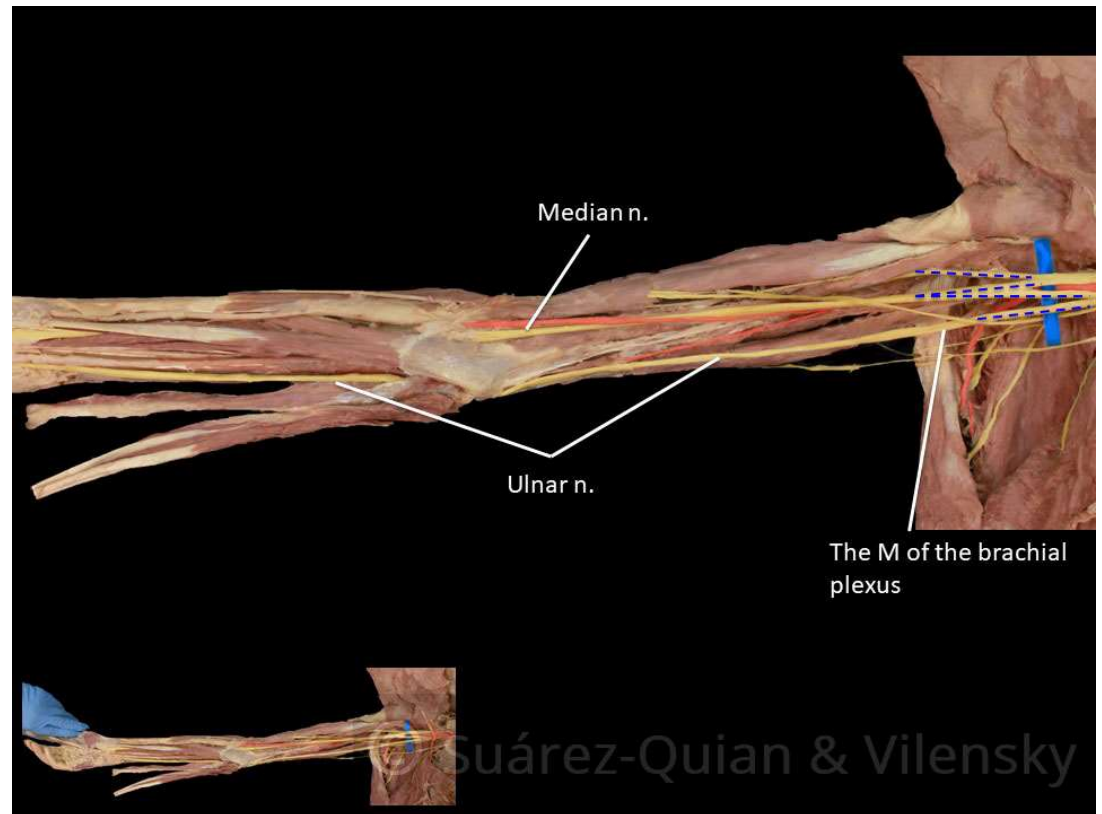
Motor functions: Thenar muscles paralysed, as are the lateral two lumbricals. This affects opposition of the thumb and flexion of the index and middle fingers.

Sensory functions: Same as an injury at the elbow.

Characteristic signs: The hand is held in the same position as damage at the elbow, but the forearm is unaffected (not supinated or adducted, wrist flexion likely unaffected, depending on the location of the lesion).

Nerves of Upper Limb

Median Nerve



Nerves Of Upper Limb

Radial Nerve

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Nerves of Upper Limb

Radial Nerve

One of the major peripheral nerve of the upper limb.

- **Nerve roots** – C5-T1.
- **Sensory** – Innervates most of the skin of the posterior side of forearm, the dorsal surface of the lateral side of the palm, and dorsal surface of the lateral three and a half digits.
- **Motor** – Innervates the triceps brachii and the extensor muscles in the forearm.

Nerves of Upper Limb

Radial Nerve

Anatomical Course

The radial nerve is the terminal continuation of the **posterior cord** of the [brachial plexus](#). It therefore contains fibres from nerve roots C5 – T1.

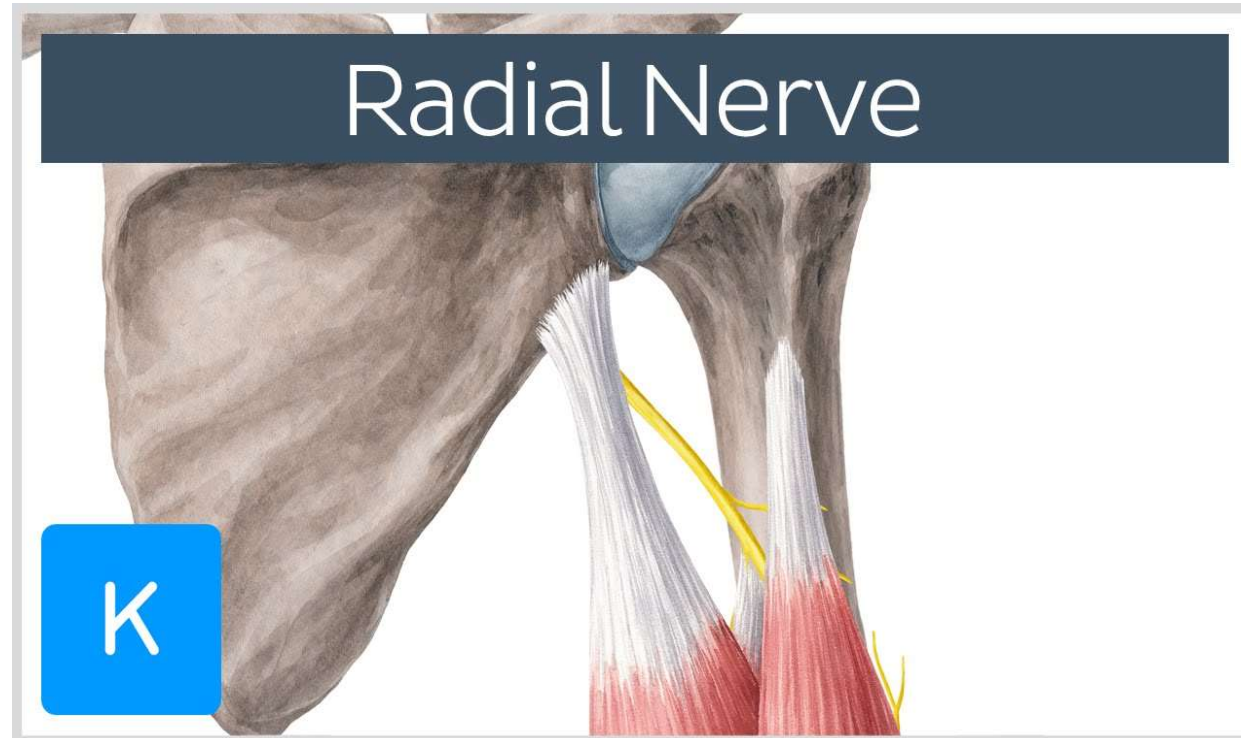
The nerve arises in the [axilla](#) region, where it is situated posteriorly to the **axillary artery**. It exits the axilla inferiorly (via the triangular interval), and supplies branches to the long and lateral heads of the triceps brachii.

The radial nerve then descends down the arm, travelling in a shallow depression within the surface of the [humerus](#), known as the **radial groove**.

As it descends, the radial nerve wraps around the humerus laterally, and supplies a branch to the medial head of the triceps brachii. During much of its course within the arm, it is accompanied by the deep branch of the **brachial artery**

Nerves of Upper Limb

Radial Nerve

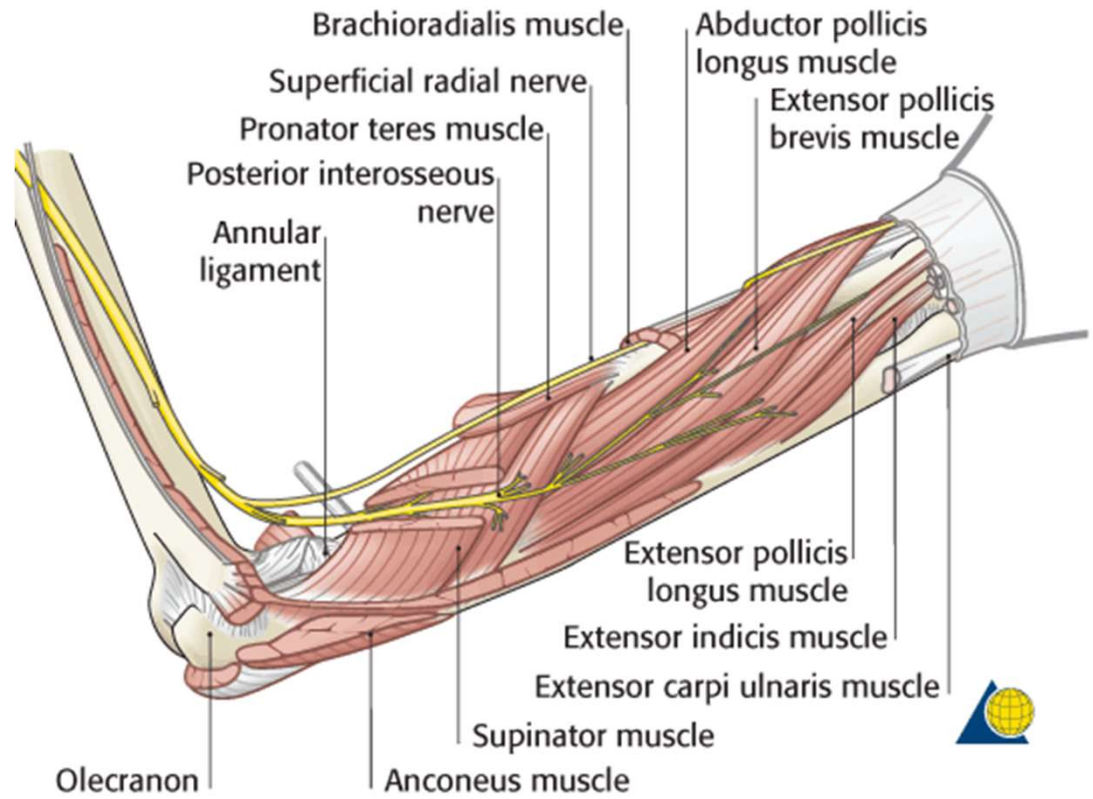


- The radial nerve innervates the muscles located in the posterior arm and [posterior forearm](#).
- In the arm, it innervates the three heads of the **triceps brachii**, which acts to extend the arm at the elbow. The radial nerve also gives rise to branches that supply the brachioradialis and extensor carpi radialis longus (muscles of the posterior forearm).
- A terminal branch of the radial nerve, the **deep branch**, innervates the remaining muscles of the posterior forearm. As a generalisation, these muscles act to extend at the wrist and finger joints, and supinate the forearm

Nerve of Upper Limb

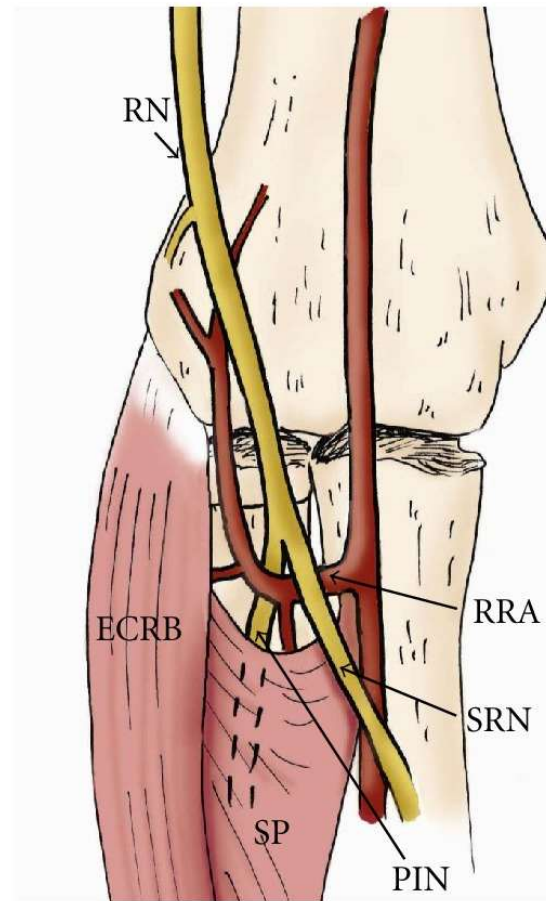
- There are four branches of the radial nerve that provide cutaneous innervation to the skin of the upper limb. Three of these branches arise in the upper arm:
- **Lower lateral cutaneous nerve of arm** – Innervates the lateral aspect of the arm, inferior to the insertion of the deltoid muscle.
- **Posterior cutaneous nerve of arm** – Innervates the posterior surface of the arm.
- **Posterior cutaneous nerve of forearm** – Innervates a strip of skin down the middle of the posterior forearm.
- The fourth branch – the **superficial branch** – is a terminal division of the radial nerve. It innervates the dorsal surface of the lateral three and half digits and the associated area on the back of the hand.

Radial Nerve





Radial Nerve



Nerves of Upper Limb

Radial Nerve

Sensory Branches

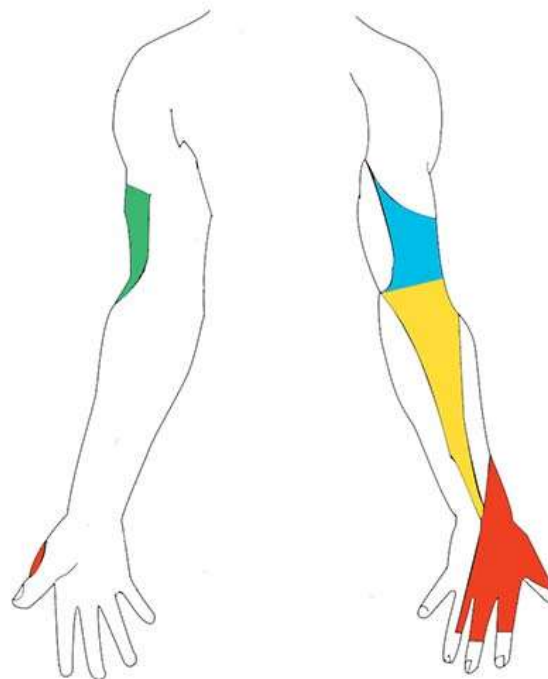
Lower lateral cutaneous nerve of arm

Lower lateral cutaneous nerve of arm

Posterior cutaneous nerve of forearm

Superficial branch

Radial Nerve
Sensory Inervation



- Lower lateral cutaneous nerve of arm
- Posterior cutaneous nerve of arm
- Posterior cutaneous nerve of forearm
- Superficial branch

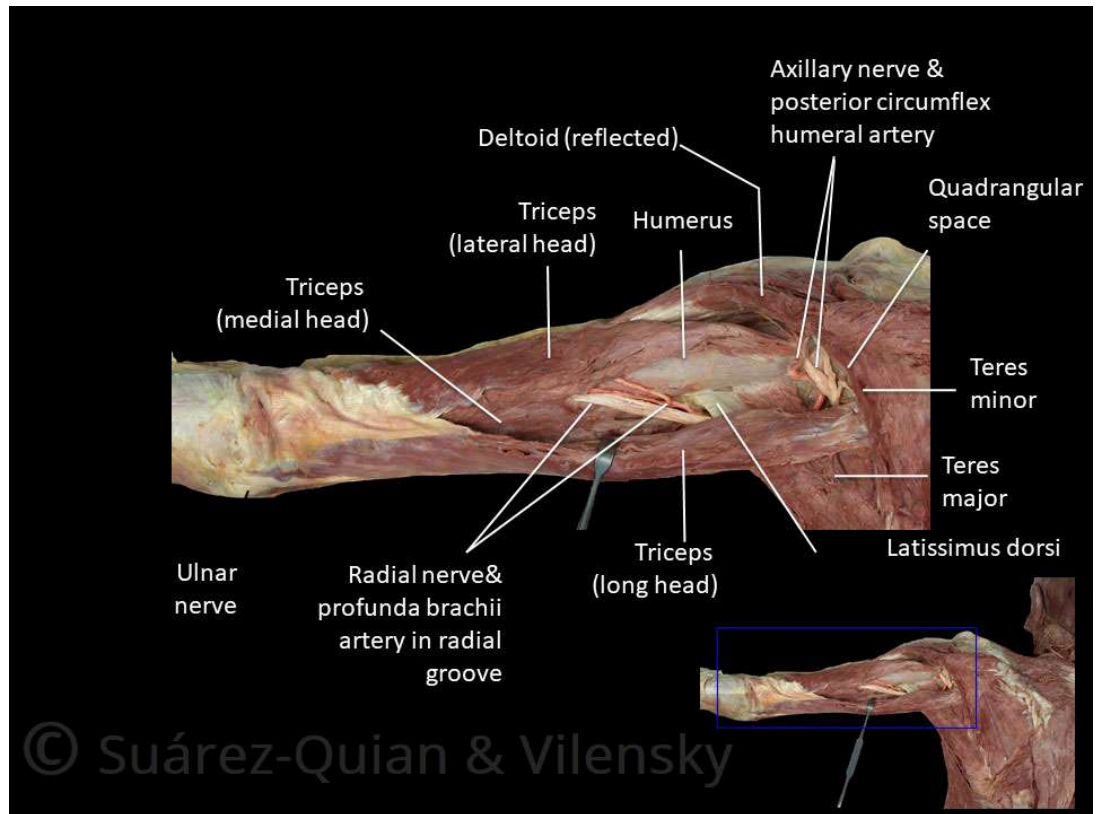
Nerves of Upper Limb

Radial Nerve

Clinical Anatomy

Nerves of Upper Limb

Radial Nerve
Prosection Image



Nerves of Upper Limb

Ulnar Nerve

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[5.1 Damage at the Elbow](#)

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Ulnar Nerve

Major Peripheral nerve of Upper limb.

Spinal roots: C8-T1.

Motor functions: Innervates the intrinsic muscles of the [hand](#) (apart from the thenar muscles and two lateral lumbricals), and two muscles in the forearm; flexor carpi ulnaris and medial half of flexor digitorum profundus.

Sensory functions: Innervates the anterior and posterior surfaces of the medial one and half fingers, and the associated palm area.

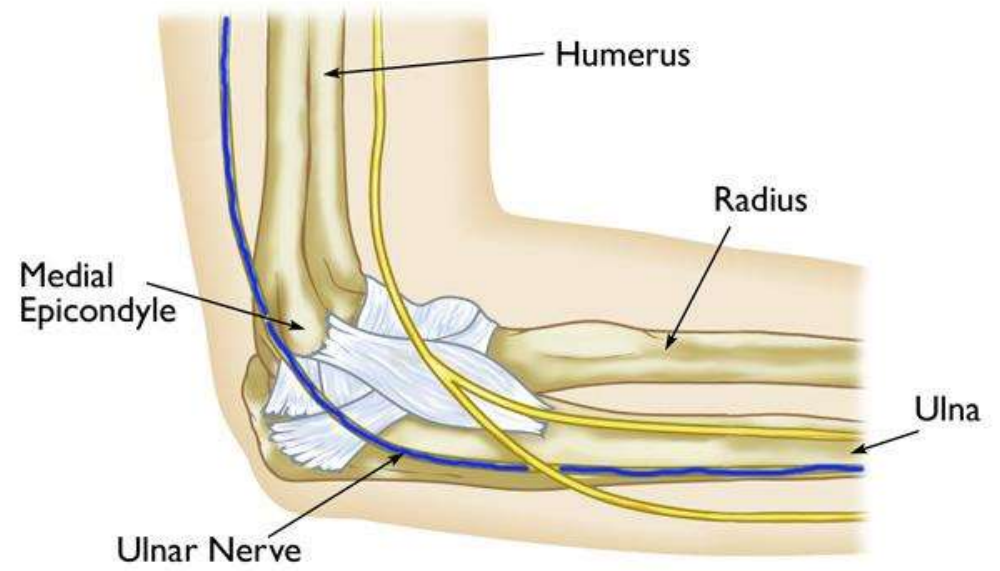
Nerves of Upper Limb

After arising from the brachial plexus, the ulnar nerve descends down the medial aspect of the upper arm. At the elbow, it passes posterior to the **medial epicondyle** of the [humerus](#) and gives rise to an articular branch that supplies the elbow joint. The ulnar nerve is palpable and vulnerable to injury at the medial epicondyle.

- In the forearm, the ulnar nerve pierces the two heads of the **flexor carpi ulnaris**, and travels deep to the muscle, alongside the ulna. Three main branches arise in the forearm:
- **Muscular branch** – innervates two muscles in the anterior compartment of the forearm.
- **Palmar cutaneous branch** – innervates the medial half of the palm.
- **Dorsal cutaneous branch** – innervates the dorsal surface of the medial one and a half fingers, and the associated dorsal hand area.

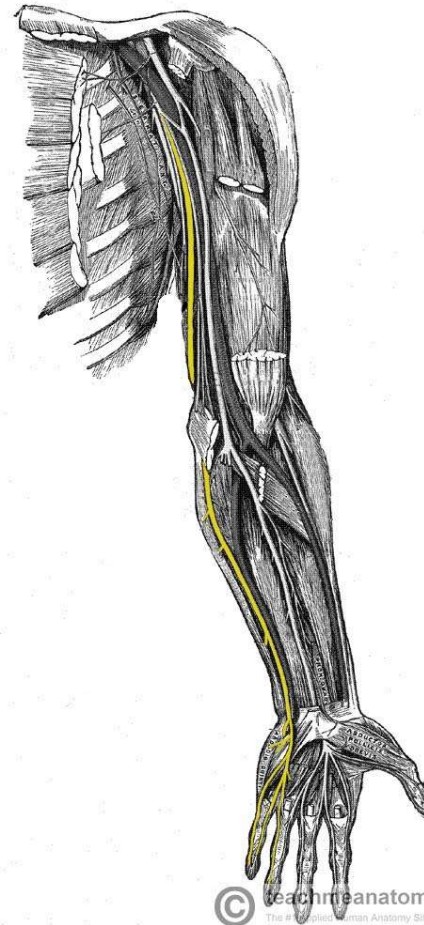


Ulnar Nerve





Ulnar Nerve



Nerves of Upper Limb

Ulnar Nerve

Anterior Forearm

- In the anterior forearm, the muscular branch of the ulnar nerve supplies two muscles:
- **Flexor carpi ulnaris** – flexes and adducts the hand at the wrist.
- **Flexor digitorum profundus (medial half)** – flexes the ring and little fingers at the distal interphalangeal joint
- The remaining muscles in the anterior forearm are innervated by the **median nerve**.

Hand

- The majority of the intrinsic hand muscles are innervated by the **deep branch** of the ulnar nerve:
- Hypothenar muscles (a group of muscles associated with the little finger)
- Medial two lumbricals
- Adductor pollicis
- Palmar and dorsal interossei of the hand
- Palmaris brevis

Nerves of Upper limb

Ulnar Nerve

Sensory Function

- **Palmar cutaneous branch** – innervates the medial half of the palm.
- **Dorsal cutaneous branch** – innervates the dorsal surface of the medial one and a half fingers, and the associated dorsal hand area.
- The last branch arises in the hand itself:
- **Superficial branch** – innervates the palmar surface of the medial one and a half fingers.

Nerves of upper Limb

Ulnar Nerve

- **Mechanism of injury:** Lacerations to the anterior wrist.
- **Motor functions:**
 - Only the intrinsic muscles of the hand are affected.
 - Abduction and adduction of the fingers cannot occur (due to paralysis of the interossei).
 - Movement of the 4th and 5th digits is impaired (due to paralysis of the medial two lumbricals and hypothenar muscles).
 - Adduction of the thumb is impaired, and the patient will have a positive Froment's sign (due to paralysis of adductor pollicis).
- **Sensory functions:** The palmar branch and superficial branch are usually severed, but the dorsal branch is unaffected. This results in sensory loss over palmar side of medial one and a half fingers only.
- **Characteristic signs:** Patient cannot grip paper placed between fingers, positive Froment's sign, wasting of hypothenar eminence