

A visual guide to surface anatomy

Systemic Anatomy

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The Nervous System



The Nervous System

☐ Nervous system

- The spinal cord
- The femoral nerve
- The lateral cutaneous nerve of the thigh
- The obturator nerve
- The sciatic nerve
- The tibial nerve
- The common peroneal nerve
- The anterior and posterior triangles of the neck
- The brachial plexus
- The musculocutaneous nerve
- The median nerve
- The radial nerve
- The Ulnar nerve
- Dermatomes of the head – anterior
- Dermatomes of the head posterior
- Dermatomes of the upper limbs and trunk – anterior
- Dermatomes of the upper limbs and trunk – posterior
- Dermatomes of the lower limbs and trunk – anterior
- Dermatomes of the lower limbs and trunk – posterior

Video resources

The Nervous System

<https://www.youtube.com/watch?v=tC6W4SQd9Bo>

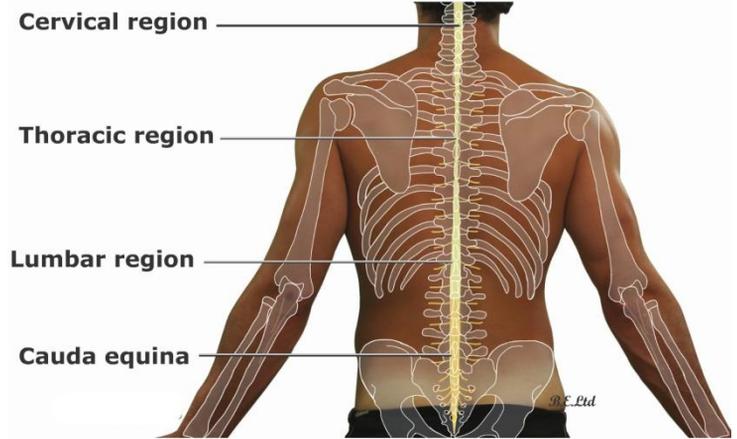
The Spinal Cord

The spinal cord is a continuation of the brainstem as it emerges from the foramen magnum of the occipital bone.

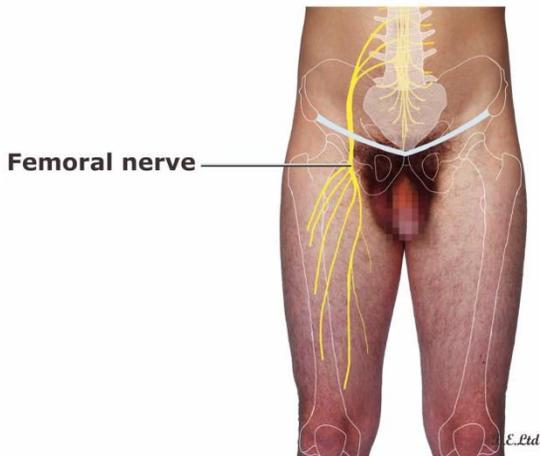
It continues through the cervical and thoracic regions and ends at the level of the 1st lumbar vertebra as the conus medullaris.

Within the spinal canal from L1 down to the end of the sacrum the spinal canal houses the cauda equina. This is made up of the efferent lower motor neurones and afferent dendrons.

The spinal cord



The femoral nerve



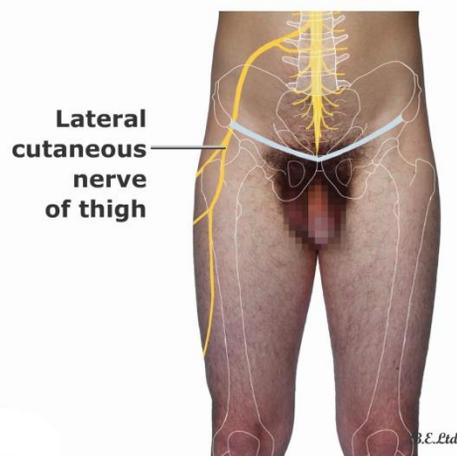
The Femoral Nerve

- The femoral nerve starts from the L2, L3 and L4 nerve roots.
- It descends with the fibres of the psoas major muscle, then between the iliacus muscle to emerge under the inguinal ligament with the other structures of the neurovascular bundle.
- It principally supplies the quadriceps femoris muscles.

The Lateral Cutaneous Nerve of the Thigh

- It arises from L2 and L3.
- It emerges from the lateral border of the psoas major.
- It then passes under the lateral part of the inguinal ligament and over the sartorius muscle to supply the lateral part of the thigh with cutaneous sensation.

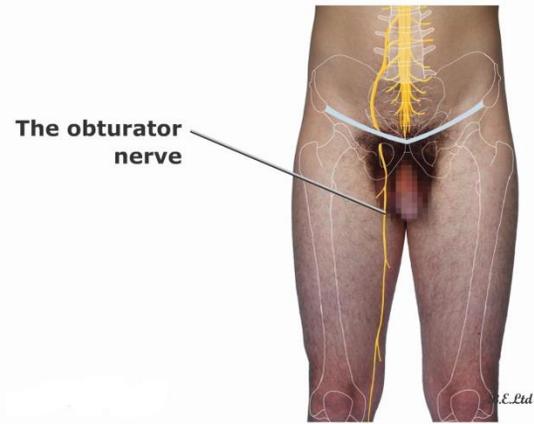
The lateral cutaneous nerve of thigh



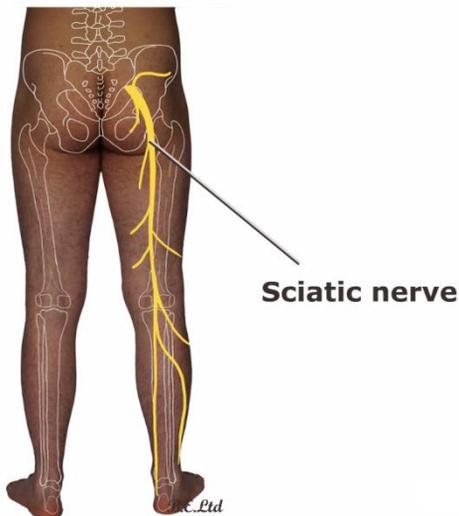
The Obturator Nerve

- Like the femoral nerve it arises from L2, L3 and L4.
- It descends the medial aspect of the psoas muscle and emerges near the brim of the pelvis; then, through the upper part of the obturator foramen. Here it enters the thigh, through the obturator foramen.
- It supplies the adductor muscles of the thigh and overlying skin.

The obturator nerve



Sciatic nerve



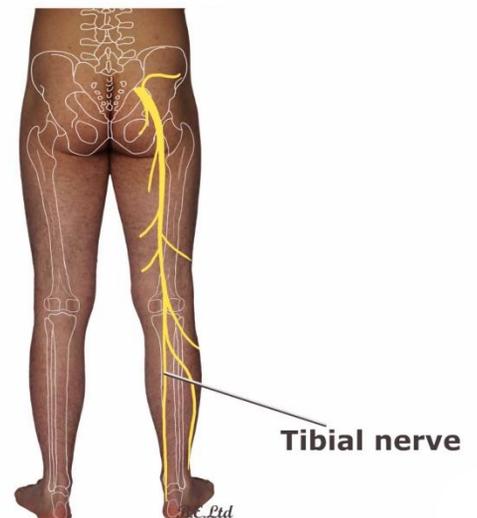
The Sciatic Nerve

- This is the largest of the lumbosacral plexus it arises from L4 though S3.
- It travels deep to the glutei and into the hamstrings.
- It supplies the posterior muscles of the thigh.
- Before the knee it divides into the tibial nerve which travels directly inferiorly and the common peroneal nerve which veers laterally and around the neck of the fibula.

The Tibial Nerve

- From above the popliteal fossa it descends towards the ankle supplying the calf muscles before it passes posterior to the medial malleolus to supply structures of the foot.

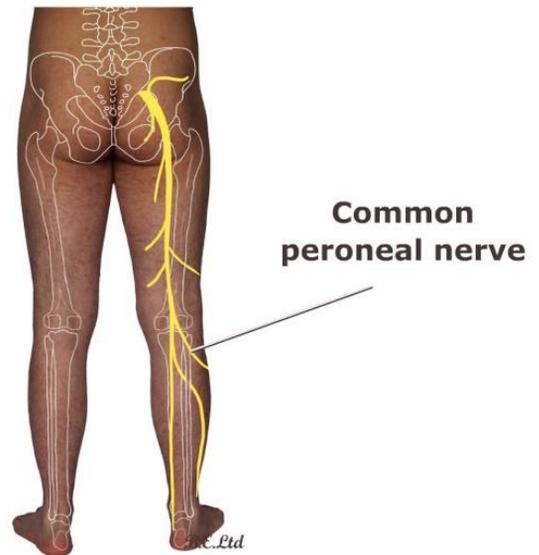
Tibial nerve



The Common Peroneal Nerve

- Also referred to as the common fibular nerve
- It travels around the head of the fibula and then divides into a superficial and deep branch.
- Amongst others, it innervates the peroneus longus, peroneus brevis and extensor muscles of the foot.

Common peroneal nerve



The anterior and posterior triangles of the neck

The anterior triangle has broad superior border and a narrow apex inferiorly.

The borders of the anterior triangle are:

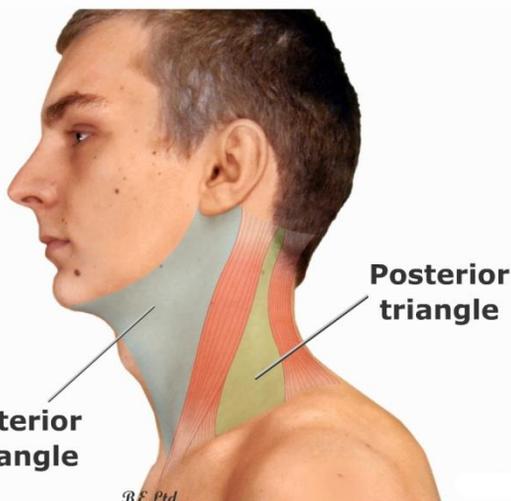
- Anteriorly the trachea
- Superiorly the digastric muscle (or a line extending from the mental protuberance to the mastoid process)
- Posteriorly the oblique sternocleidomastoid muscle.

The **posterior triangle** has a broad base inferiorly and a narrow apex superiorly.

The borders of the posterior triangle are:

- Anteriorly the sternocleidomastoid muscle
- Inferiorly the middle 1/3 of the clavicle
- Posteriorly the anterior fibres of the trapezius muscle.

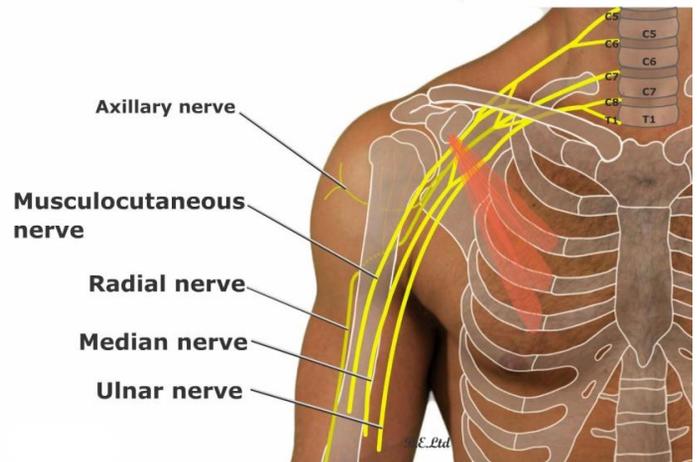
The anatomical triangles of the neck



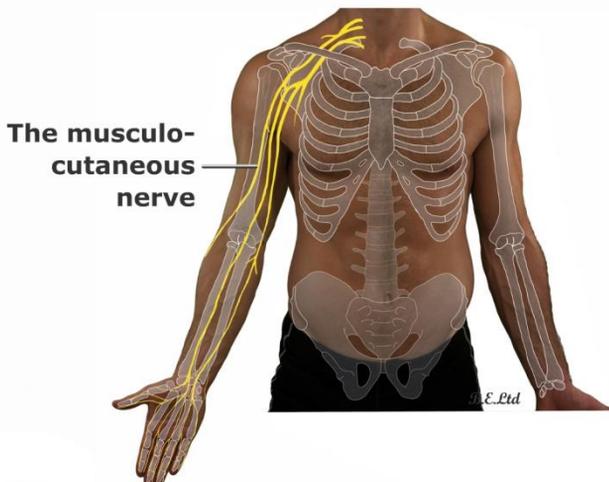
The Brachial Plexus

- The brachial plexus originates from nerve roots C5 to T1.
- The trunks can be palpated in the posterior triangle of the neck. However the lower parts of the plexus are concealed by the subclavian artery.
- The divisions of the brachial plexus are found posterior to the clavicle and are not palpable.
- The best area to palpate the brachial plexus is in the supraclavicular fossa at the medial end of the clavicle. Care must be exercised as these cord-like structures can be sensitive.
- In the upper arm the nerves are difficult to palpate as they are lying deep within the muscles.

The brachial plexus



The musculocutaneous nerve



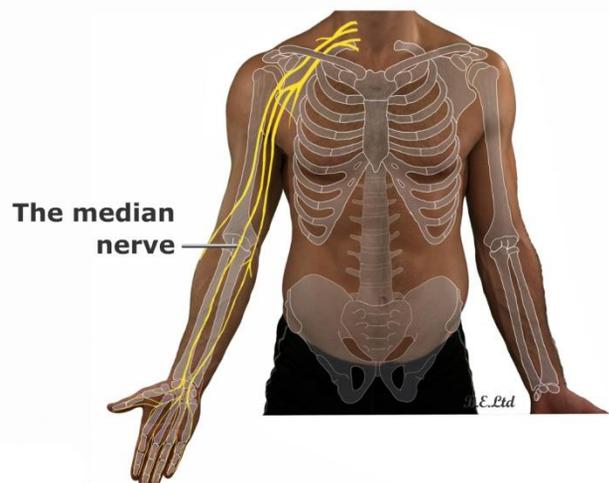
The Musculocutaneous Nerve

- This is not palpable but its surface anatomy runs from the antero-lateral part of the scapula just medial to the coracoid process, the anterior borders of the axilla over the antero-medial part of the arm then the lateral aspect of the forearm.
- It is made up of a terminal branch of the lateral cord of the brachial plexus, containing fibers from the C5, C6, and C7 spinal segments.
- It pierces coracobrachialis, continuing downwards and laterally between biceps and brachialis muscles.
- At the elbow it pierces the deep fascia to continue as the lateral cutaneous nerve of the forearm.

The Median Nerve

- In the arm it descends initially just lateral to the brachial artery. Half way down the arm the median nerve it crosses the artery to be just medial to it, between the biceps brachii and the brachialis.
- Inside the cubital fossa the median nerve passes medial to the brachial artery, in front of the point of insertion of the brachialis muscle and deep to the biceps.
- After the cubital fossa it passes between the two heads of pronator teres.
- It then travels between flexor digitorum superficialis and flexor digitorum profundus before emerging between flexor digitorum superficialis and flexor carpi radialis.
- At the wrist it passes under the flexor retinaculum.

The median nerve

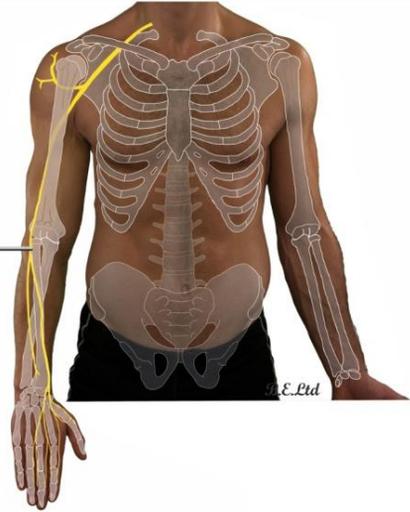


The Radial Nerve

- It originates from the posterior cord of the brachial plexus.
- It travels through the axilla winding posteriorly to the humerus, (between the medial and lateral heads of the triceps), just below the neck of the humerus.
- At the distal part of the arm from its lateral position it comes anteriorly to cross to the medial aspect just anterior to the lateral epicondyle.
- It then divides into a deep branch and superficial branches.
- It divides just below the anterior aspect of the elbow.
- The deep branch becomes the posterior interosseus nerve, passing posteriorly to descend to the wrist.
- A smaller mainly sensory branch descends anteriorly within the forearm under the brachioradialis.
- It is not easy to palpate the radial nerve.

The radial nerve

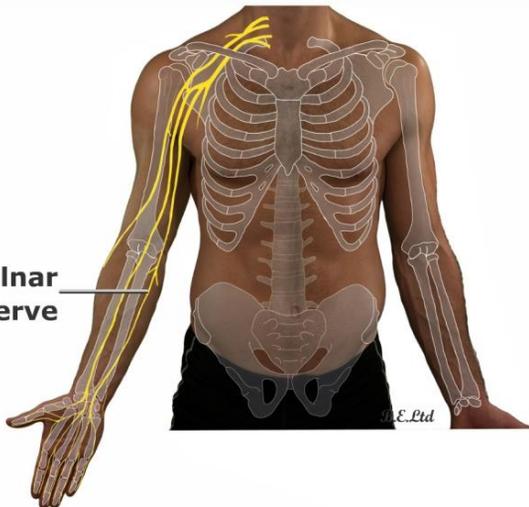
The radial nerve



The ulnar nerve

The Ulnar Nerve

The ulnar nerve



This is the lowest significant nerve of the brachial plexus.

It is therefore the closest to the 1st rib as it travels over it and into the axilla, along the anterior axillary line, then medially in the arm.

At the elbow it lies in a groove just posterior to the medial epicondyle of the humerus.

- At the medial epicondyle the ulnar nerve is exposed and can be palpated with ease.
- It travels in the forearm again medially mostly within the flexor carpi ulnaris.
- The superficial branches may be palpated over the hook of the hamate and just distal to the pisiform.

The Dermatomes

Dermatomes represent cutaneous nerve supply that correspond to individual spinal nerve roots or cranial nerves.

The most clinically significant dermatomes are those of the upper and lower limbs.

Note that the boundaries of each dermatome overlap or diffuses into the boundaries of the adjacent dermatome.

In addition in some individuals the dermatomes vary from their standard location.

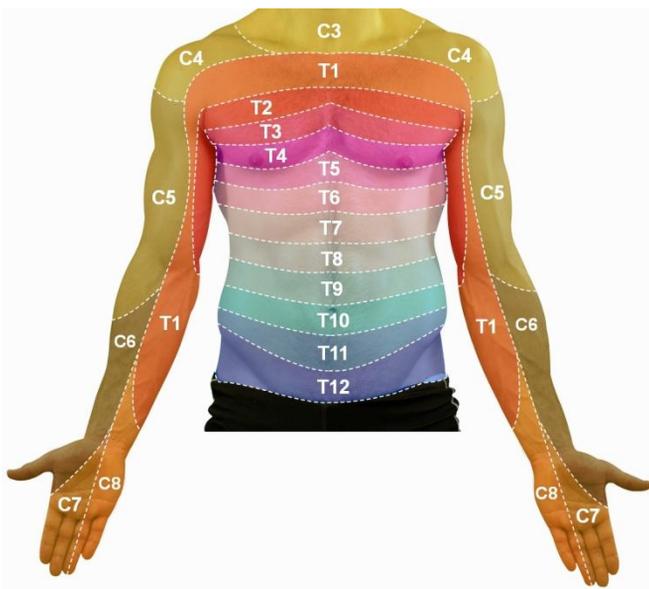
Dermatomes of the upper limbs

- C4 the superior aspect of the shoulder.
- C5 the lateral aspect of the arm
- C6 the lateral aspect of the forearm and down to the lateral 2 fingers.
- C7 is the 3rd and 4th fingers
- C8 is the 5th finger, the medial aspect of the wrist and medial distal part of the forearm.
- T1 is medially just below the elbow and until the axilla
- T2 is in the axilla

Dermatomes of the Body Trunk

- Note that for the anterior of the body trunk, the area above the manubrium is C3 and immediately below it is T1.
- Then in successive horizontal arrangements the dermatomes progress down to T10 at the umbilicus.
- T12 is at the suprapubic region.
- The inguinal regions signify the start of the lumbar dermatomes with L1.

Anterior



Posterior



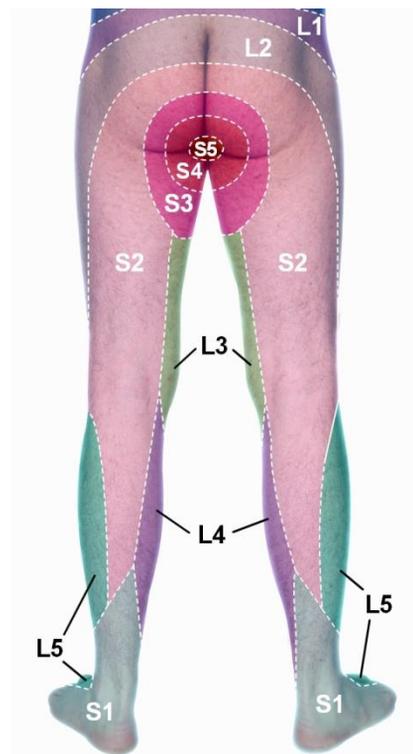
Dermatomes of the Lower Limbs

- L2 The anterior superior and mostly lateral aspect of the thigh.
- L3 is the anterior knee area as well as the inferior aspect of the thigh and superior aspect of the lower leg.
- L4 is the medial aspect of the lower leg until the medial aspect of the foot.
- L5 The anterior and lateral aspect of the lower leg which stretches down to the dorsum of the foot and the medial 3 toes.
- S1 is the lateral aspect of the foot and the plantar aspect until the achilles tendon region.
- S2 continues to cover the skin over the calf muscles and up to the superior part of the back of the thigh.
- S3 is the area around the creases of the glutei. This dermatome is distributed in a concentric shape around the anus and within this are the S4 and S5 dermatomes in a similar pattern.

Anterior

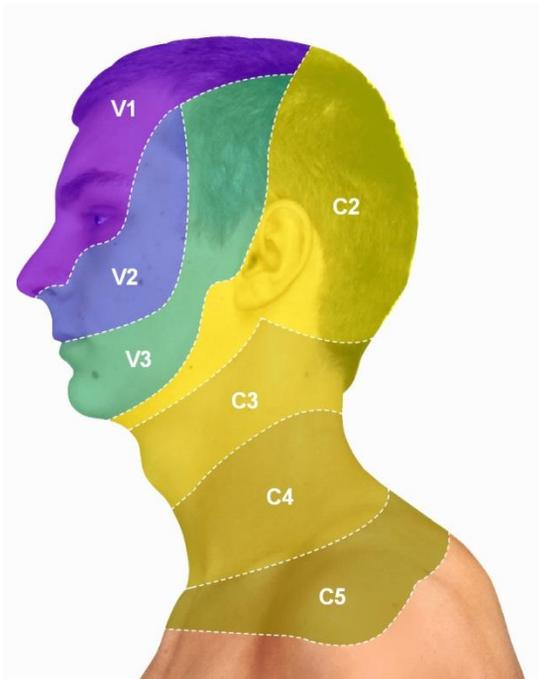
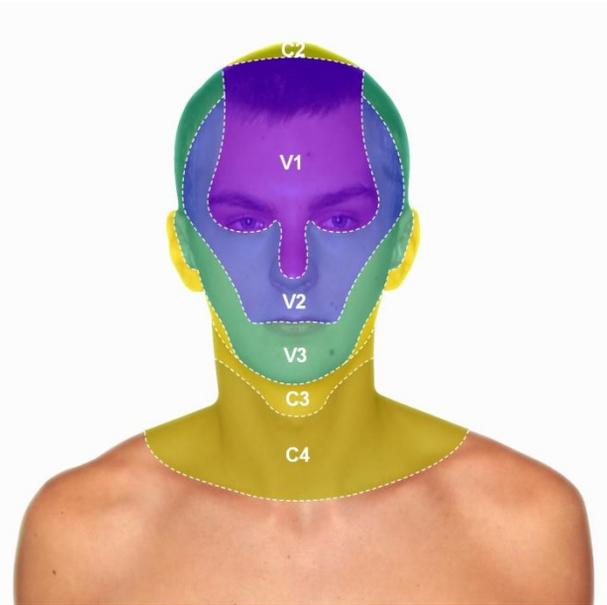


Posterior



Dermatomes of the face - Anterior

- The anterior part of the face is mostly supplied by the trigeminal nerve.
- The ophthalmic division supplies the forehead, until the upper eyelids and supero-lateral parts of the nose
- The maxillary division supplies from the lower eyelids and lower parts of the face until the upper lip.
- The mandibular division supplies from the lower lip down to the chin and skin over the lateral parts of the mandible then superiorly until the temporal region.
- The neck is supplied by C3 then C4 until the sternoclavicular region.

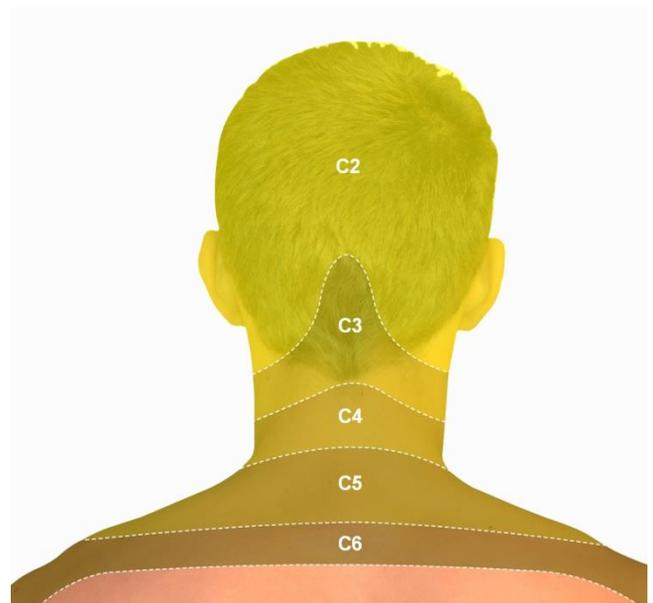


Dermatomes of the head - Lateral

- The antero-lateral parts of the top of the head or vertex is supplied by the ophthalmic division of the trigeminal nerve
- Part of the temporal area is supplied by the mandibular division
- The posterior parts of the head, external ear and under the chin are supplied by the second cervical root (C2).
- Then part of the neck below C2 is by C3.

Dermatomes of the head - posterior

- Most of the posterior part of the head is supplied by C2.
- Just below the nuchal lines and from the external occipital protuberance is by C3.
- The mid section of the back of the neck by C4.
- A horizontal area over the cervico-thoracic junction is supplied by C5.



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Wikipedia online encyclopaedia

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