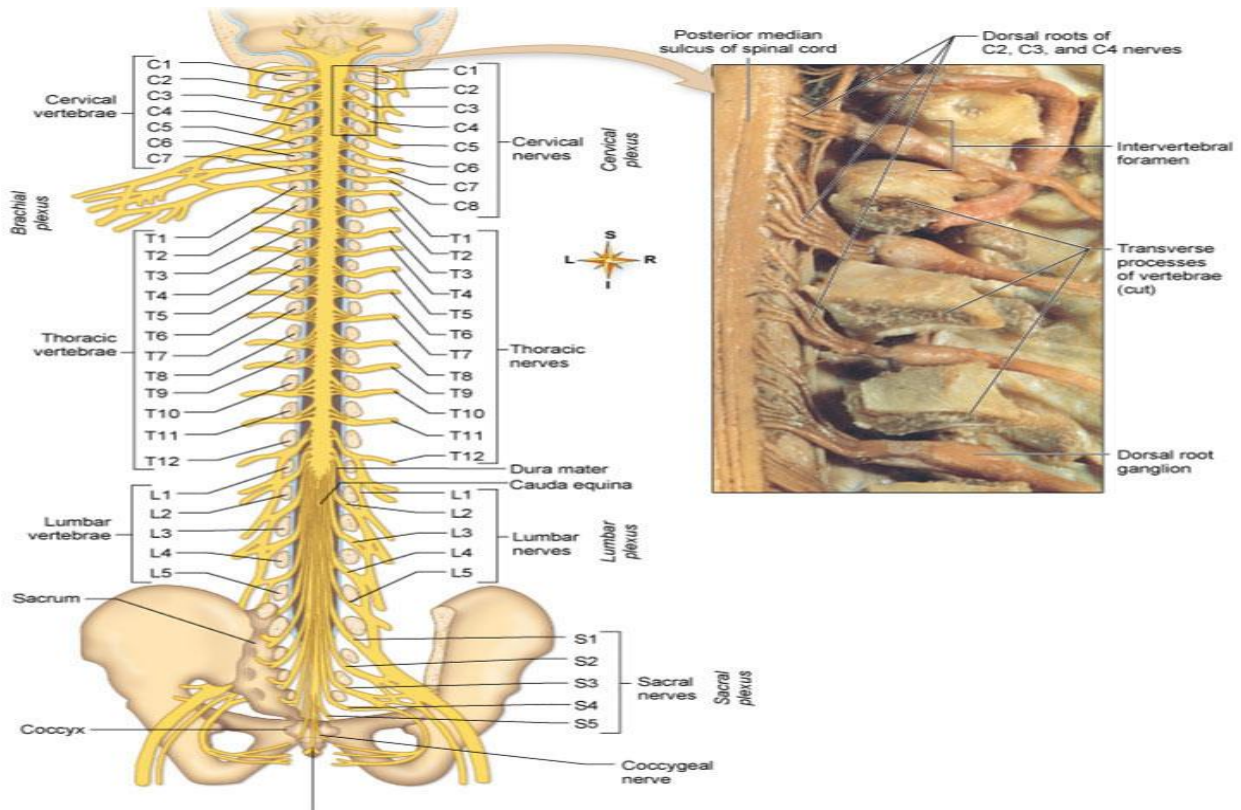


Cervical Plexus

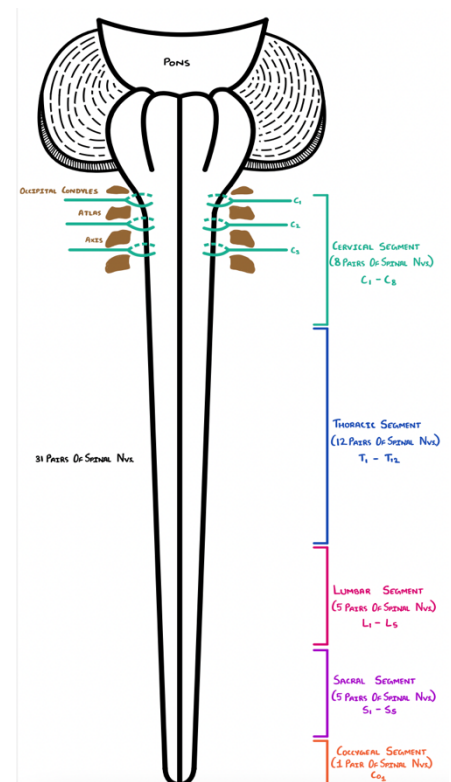
Dr. Gary Mumaugh – Campbellsville University



Quick Overview of Plexuses

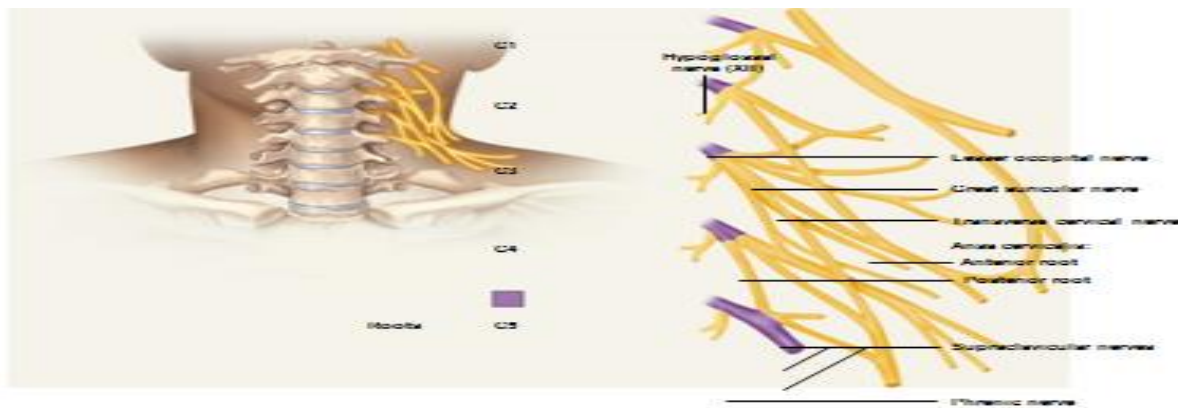
- Fibers come out of the anterior and posterior grey horn of the spinal cord.
- Rootlets come out of the intervertebral foramen and become spinal nerve.
 - Except for C1, it emerges from between the occipital condyle and atlas.

These are paired, so the same nerves will come out of the opposite side.
- **Cervical segment:** C1-C8 → 8 pairs of spinal nerve
- **Thoracic segment:** T1-T12 → 12 pairs of spinal nerves.
- **Lumbar segment:** L1-L5 → 5 pairs of spinal nerves
- **Sacral segment:** S1-S5 → 5 pairs of spinal nerves
- **Coccygeal segment:** Co1 → 1 pair of spinal nerve
- **In total there are 31 pairs of spinal nerves**



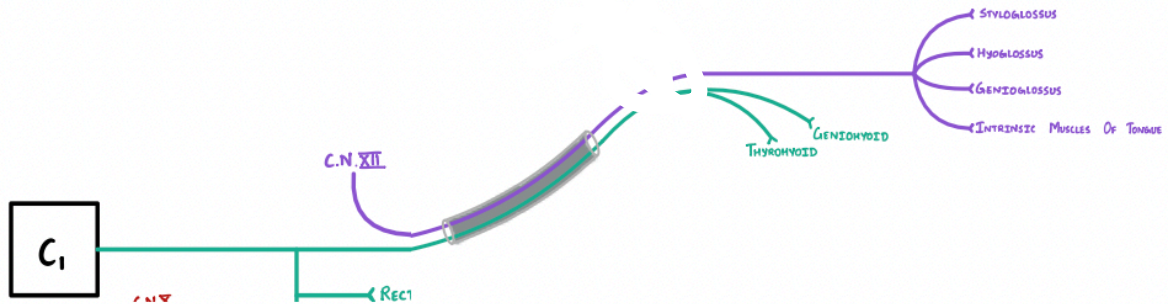
Cervical Plexus

- The cervical plexus comes mainly from the C1-C4 segment, (a small part from C5 for the phrenic nerve).
- C1 from occipital condyles and atlas
- C2 from Atlas and Axis
- C3-C7 from intervertebral foramen of the cervical spinal cord
- C8 from between 7th spinal vertebrae and T1
- The cervical plexus can also be defined as a network of nerves formed by the anterior rami of spinal nerves from C1-C5 that gives off both motor (deep) and sensory (superficial) nerves.

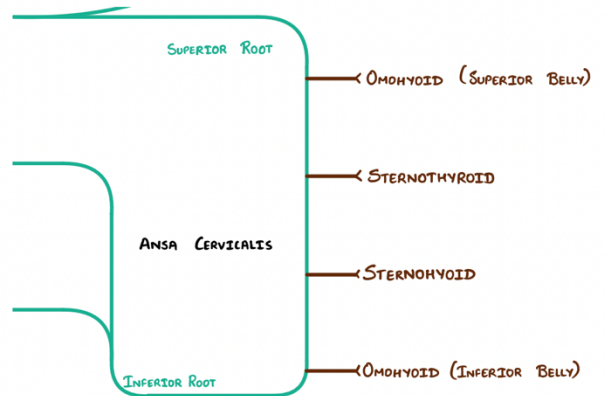


C1 - C1 gives off 2 branches:

- **1st Branch:**
 - C1 gives off a branch that moves with the hypoglossal nerve (CN XII) and move together in a sheath.
 - CN XII comes out of the hypoglossal canal to move with C1 branch
 - This branch supplies:
 - **C1 from the sheath will come out & supplies 2 muscles:**
 - Geniohyoid- elevate the hyoid bone
 - Thyrohyoid - depresses the hyoid bone and elevates the larynx
- **The hypoglossal nerve will supply other muscles:**
 - Styloglossus - extrinsic muscles that helps to elevate and retract the tongue.
 - Hyoglossus - extrinsic muscles of the tongue depresses and retracts the tongue.
 - Genioglossus - helps to protrude the tongue.
 - Intrinsic muscles of the tongue

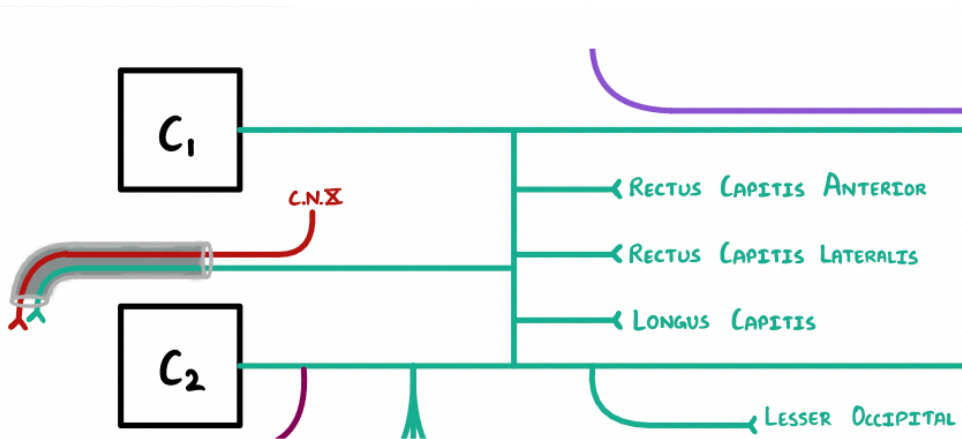


- **2nd branch:**
 - The other branch C1 gives off is the superior root of the ansa cervicalis



C2 - C1 and C2 will give off a communicating branch

- **1st branch:**
 - Gives off a branch posteriorly → which moves with the Vagus nerve (CN X)

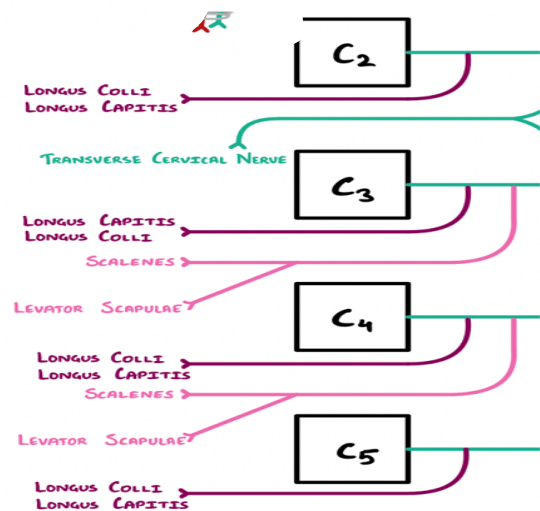


- **Other branches supply:**
 - Rectus capitis anterior - flexion and lateral flexion of the neck at the C1 occipital condyle region.
 - Rectus capitis lateralis - lateral flexion of the neck.
 - Longus capitis - flexes the neck at the atlas occipital region.

- **C2 gives off main branch:**
 - This forms the inferior root of Ansa Cervicalis
- Branches from posterior aspect:
 - Branches that supply muscles:
 - Longus colli
 - Longus capitis
 - Function: flexes the neck.

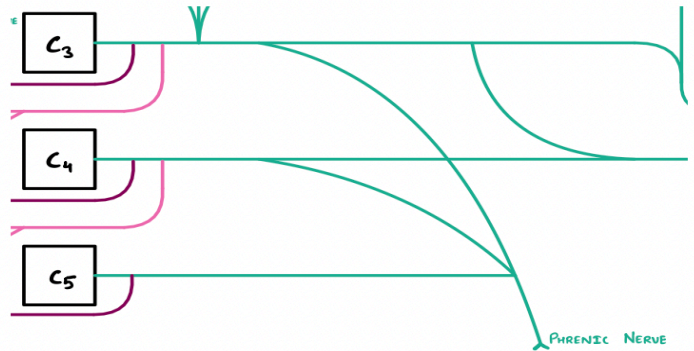
C3 – C2 and C3 will give off a communicating branch

- **From the communicating branch:**
 - Greater auricular nerve – supplies skin of ear and parotid gland
 - Transverse cervical nerve – supplies skin over the anterior and lateral neck
- **Ansa Cervicalis:**
 - The inferior root of C2 and C3 join together and form the inferior root of ansa cervicalis, then they join with the superior root of C1.
 - Ansa cervicalis forms 5 branches:
 - Sternohyoid (C1-C3) - depresses hyoid bone
 - Sternothyroid (C1-C3) - depresses the thyroid cartilage
 - Geniohyoid nerve (via hypoglossal nerve) (C1)
 - Omohyoid (C1-C3) – depresses the hyoid bone
 - Thyrohyoid nerve (via hypoglossal nerve) (C1)
 - Ansa cervicalis (mnemonic: Susan Saw Game Of Thrones)
- **Branches from posterior aspect:**
 - Branches that supply muscles:
 - Longus colli
 - Longus capitis
 - Scalenes (used in forceful inspiration)
 - Levator scapulae (elevates scapulae)



C4 – C3-C5 forms the phrenic nerve

- **C3-C5 forms the phrenic nerve**
 - Phrenic nerve supplies:
 - **Diaphragm** - main muscle of inhalation.
 - Any type of damage to C3-C5 → respiratory arrest
 -
- **Branches from posterior aspect:**
 - Branches that supply muscles:
 - Longus colli
 - Longus capitis
 - Scalene
 - Levator Scapulae
- **C3 and C4 forms the supraclavicular nerve:**
 - Cutaneous branch, supplies:
 - Skin of clavicle
 - Skin on the medial aspect of the deltoid and in the acromion region.



C5

- Branches from posterior aspect
 - Branches that supply:
 - Skin of clavicle
 - Skin on medial aspect of the deltoid and in the acromion region

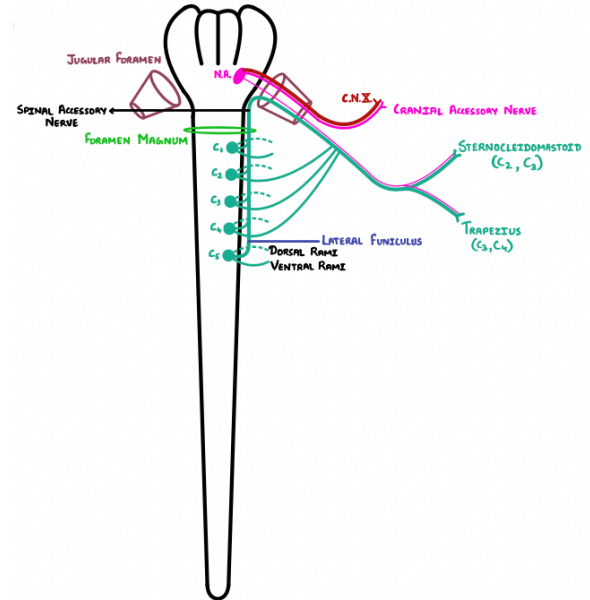
You can easily remember the motor branches of cervical plexus by using the mnemonic MAP (Muscular branches, Ansa cervicalis, Phrenic nerve)

Cervical Plexus and the Accessory Nerve

- Fibers come from the **lateral funiculus of C1-C5** → move outwards and upwards → then move posteriorly to the ventral root and anteriorly to the dorsal root.
 - All the fibers from each cervical spinal cord move upwards and into the foramen magnum → then through the jugular foramen and forms the extracranial fibers of CN X1

Spinal Accessory Nerve Picks up Fibers

- From ventral ramus of C2-C3 to SCM
 - Fibers from C2-C3 → ventral ramus runs with accessory nerve which supplies the SCM
- From ventral ramus of C3-C4 to trapezius
 - Fibers from C3-C4 → ventral ramus → moves into posterior triangle of the neck which supplies the trapezius
- Note: the cervical plexus can give C1-C5 connections to form the spinal accessory nerve but C2-C4 gives the most fibers
 - Trapezius gets mostly from C3-C4
 - Sternocleidomastoid gets mostly from C2-C3



Key Facts About the Cervical Plexus

Sensory Branches	Lesser occipital nerve, G reat auricular nerve, Transverse cervical nerve, S upraclavicular nerves Mnemonic: Let's Go To Sleep
Motor Branches	M uscular branches (to sternocleidomastoid, prevertebral and levator scapulae), A nsa Cervicalis, P hrenic nerve Mnemonic: MAP
Innervation	Lesser occipital nerve: skin of the neck and the scalp posterosuperior to the clavicle Great auricular nerve: skin over the parotid gland, the posterior aspect of the auricle, and an area of skin extending from the angle of the mandible to the mastoid process Transverse cervical nerve: skin covering the anterior triangle of the neck Supraclavicular nerves: skin over the neck and shoulder Ansa cervicalis: infrahyoid muscles Phrenic nerve: diaphragm, mediastinal pleura, pericardium of the heart

Clinical Applications

Phrenic nerve severance

- Severance (injury) of the phrenic nerve results in paralysis of the diaphragm.
- Temporary paralysis of the diaphragm can also result from phrenic nerve block.
 - In this condition, the anesthetic is injected around the nerve where it lies on the anterior surface of the middle third of the anterior scalene muscle.
 - A surgical phrenic nerve crush will produce a longer period of paralysis (for example, for weeks after surgical repair of a diaphragmatic hernia).

Cervical plexus block

- Nerve block is a measure to inhibit nerve impulse conductance, usually for regional anesthesia prior to surgical operations.
- In a cervical plexus block, an anesthetic agent is injected at several points along the posterior border of the SCM muscle, mainly at the junction of its superior and middle thirds - the nerve point of the neck.
- Because the phrenic nerve supplying the diaphragm pericardium is also paralyzed by cervical plexus block, this procedure is not performed on patients with pulmonary or cardiac disease.

CERVICAL PLEXUS (C₁-C₄/C₅)

