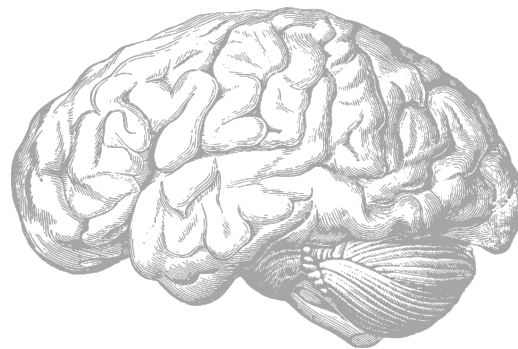




Cranial Nerves XI & XII

CNS Block



Color Index

- ◆ Main Text
- ◆ Female Slides
- ◆ Male Slides
- ◆ Drs' Notes
- ◆ Important
- ◆ Extra info

[The Editing File](#)



Objectives



List the nuclei related to accessory and hypoglossal nerves in the brainstem.



Describe the type and site of each nucleus.



Describe site of emergence and course of accessory and hypoglossal nerves.



Describe important relations of accessory and hypoglossal nerves in the neck.



List the branches of accessory and hypoglossal nerves.



Describe the main motor effects in case of lesion of accessory and hypoglossal nerves.



You can find helpful video by [Clicking HERE!](#)

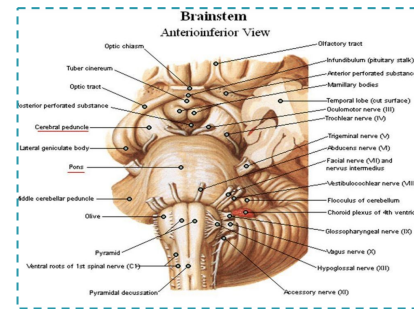
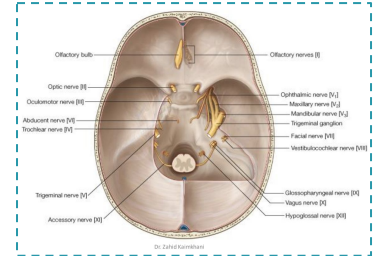


You can find Atlas by [Clicking HERE!](#)

Introduction

Functional Components of Cranial Nerve

Afferent Fibers	Functions
General somatic afferent (GSA)	General sensations
Special somatic afferent (SSA)	Hearing, balance, vision
General visceral afferent (GVA)	Viscera
Special visceral afferent (SVA)	Smell, taste



The Cranial Nerves

Name	Root		Components	Function	Exit From Skull
Accessory Nerve	Cranial Root	XI	Motor (SVE)	Muscles of: <ol style="list-style-type: none"> Soft palate (except tensor veli palatini). Pharynx (except Stylopharyngeus). Larynx (except cricothyroid) in branches of vagus. 	Jugular Foramen
	Spinal Root		Motor (GSE)	Sternocleidomastoid & trapezius muscles.	
Hypoglossal Nerve	-	XII	Motor (GSE)	Muscles of: <ol style="list-style-type: none"> Tongue (except palatoglossus), controlling its shape and movement. 	Hypoglossal Canal

11th CN: Accessory Nerve



Introduction:

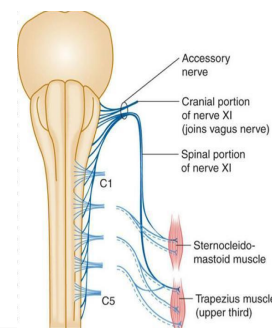
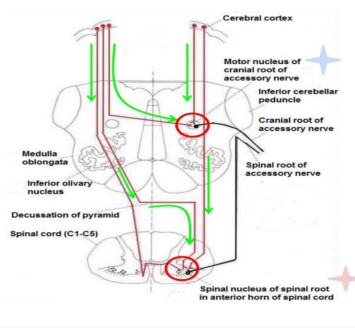
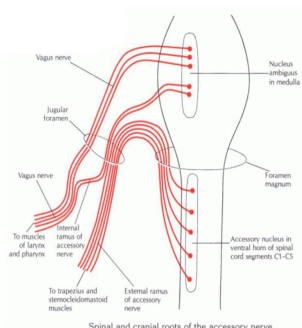
1 Nerve type: Motor

2 Exit the skull through **Jugular foramen**

3 Has two roots:

Root/Part	Cranial Root	Spinal Root
Origin	Carries fibres that originate in the caudal part of nucleus ambiguus .	Arises from motor neurons in ventral horn of the spinal cord at levels C1-C5 (Accessory spinal nucleus) .
Course	<ul style="list-style-type: none"> - Emerges from lateral aspect of the medulla, between olive and inferior cerebellar peduncle, as a linear series of rootlets caudal to rootlets of the vagus nerve. - At the side of medulla it joins the spinal root briefly. - It separates once again as the nerve leaves the cranial cavity through the Jugular foramen. 	<ul style="list-style-type: none"> - The axons leave the cord via series of rootlets, emerge laterally midway between the dorsal and ventral roots of the spinal nerves. - Courses rostrally and enter the cranial cavity through the foramen magnum, and joins the cranial root briefly. - It separates once again as the nerve leaves the cranial cavity through the Jugular foramen. - Runs downward and laterally and enters the deep surface of the sternocleidomastoid muscle. - Then crosses the posterior triangle of the neck and passes beneath the trapezius muscle.
Supply	- At the level of jugular foramen, these fibres join the vagus nerve and distribute with it to muscles of the soft palate, esophagus, pharynx and larynx .	- Supplies the sternocleidomastoid and trapezius muscles.
Function	- Movements of the soft palate, larynx, and pharynx.	- Controls the movements of neck and shoulder .
Fibers Received	- The nucleus ambiguus and the accessory spinal nucleus both receive bilateral corticonuclear fibers (from both cerebral hemispheres)	

Pictures



Injury of the Spinal Root

Injury of the Spinal Root of Accessory Nerve:

1. Causes/Why:

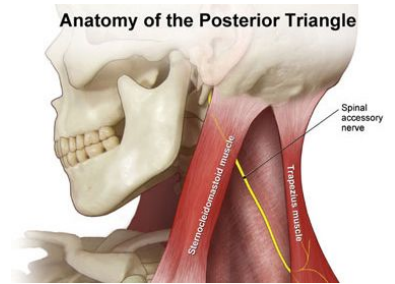
Because of the relatively **superficial position** of the nerve in the **posterior triangle**, it may be damaged by penetrating trauma as stab wounds.

It is considered the **most commonly iatrogenically injured nerve** as during removal of malignant lymph nodes in the posterior triangle.

Block dissections of the lymph nodes of the neck.

A supraclavicular lymph node biopsy/ minor operative procedures in this region.

Great care must be exercised to avoid this complication.



2. Manifestations:

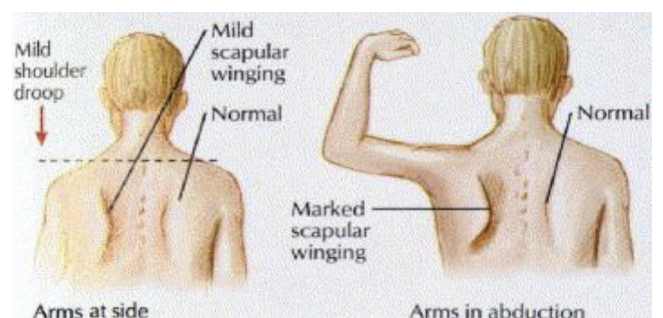
1 It produces **atrophy, weakness, paralysis of trapezius and sternocleidomastoid.**

2 Unilateral **paralysis of trapezius** is evident by inability to **elevate & retract the shoulder, difficulty in elevating the arm.**

3 Inability to turn the head.

4 **Dropping** and flattening of the ipsilateral shoulder is an obvious sign of injury of the nerve, resulting from a paralyzed trapezius.

5 The lesion also causes difficulty in **swallowing and speech.**

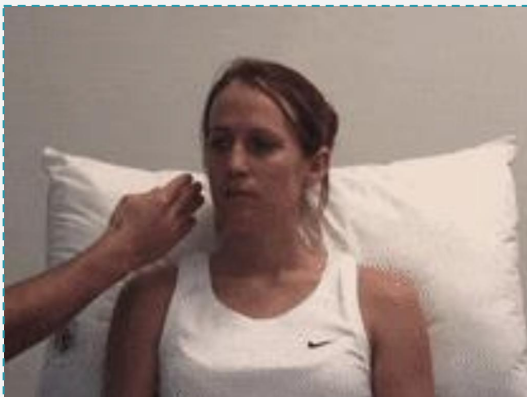


Injury of the Spinal Root of Accessory Nerve:

3. Clinical Examination:

For Sternocleidomastoid

Ask the patient to turn his/her face to the opposite side against the resistance of the examining clinician's hand.



For Trapezius

It is tested by asking the patient to elevate his/her shoulder against the resistance applied by the clinician's hand. Injury to the accessory nerve in the posterior triangle will result in paralysis of trapezius with the sternocleidomastoid being spared.



12th CN: Hypoglossal Nerve



Introduction:

Type	Motor
Origin	Hypoglossal nucleus of the medulla (in the floor of 4th ventricle)
Foramen of exit from skull	Hypoglossal Canal

Course of CN 12:

The fibers emerge from the anterior surface of the medulla oblongata through the sulcus **between the pyramid and the olive**.

Then it leaves the skull through the hypoglossal canal. It passes downward and forward **with cervical neurovascular bundle** (internal carotid artery, internal jugular vein, vagus nerve) in the neck between the Internal carotid artery (ICA) and Internal jugular vein (IJV) until the posterior belly of the digastric muscle.

Then turns forward and crosses the carotid arteries, and passes deep to the mylohyoid muscle lying on the hyoglossus muscle. Then **curves forward behind mandible**, sends branches to **supply the tongue**

In the upper part of its course, the hypoglossal nerve is joined by C1 fibers. During its initial course, it carries **C1 fibers** which leave it **in a branch** to take part in the formation of **ansa cervicalis** (a loop of nerves supplying neck muscles).



The delicate cervical nerve fibers merely run with the hypoglossal nerve for support and later leave it to supply muscles in the neck.

The Hypoglossal Nucleus receives:

1 It receives **corticospinal** fibers from both cerebral hemispheres **EXCEPT** the region that supplies **genioglossus** muscle (receives contralateral supply only).

2 It also receives afferent fibers from **nucleus solitarius** and **trigeminal sensory nucleus**.

12th CN: Hypoglossal Nerve

Functions of Hypoglossal Nerve

Supplies motor innervation to **all of muscles of tongue** **except** the **palatoglossus** (which is supplied by the vagus nerve), so it controls the movements and shape of the tongue during speech and swallowing.

Receives proprioceptive afferents from the tongue muscles.

Manifestations of Lesion of the Hypoglossal Nerve (LMN):

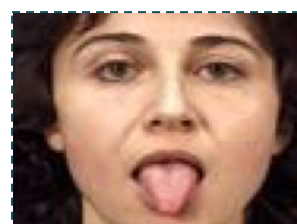
1 Loss of tongue movements.

2 Difficulty in chewing and speech.

3 On protrusion, tongue deviates to the affected side.

4 If both nerves are damaged, person **can't protrude tongue**.

5 The tongue **paralyses, atrophies**, becomes **shrunk** and furrowed on the affected side (LMN paralysis).



Normal tongue



Lesion in **LEFT** 12th Cranial Nerve

Clinical features and Diagnosis of Hypoglossal nerve injury

Genioglossus

It is the most common clinically tested tongue muscle. Both genioglossus point toward the center, so the tongue moves forward. When one side of the genioglossus fails to activate, the tongue moves forward and toward the side of the lesion (away from the intact side).



Corticonuclear innervation to the portion of each hypoglossal nucleus that innervates the genioglossus is **predominantly contralateral**. Therefore, with lesions proximal to the hypoglossal nucleus (UMN lesion), tongue protrusion is either normal (if there is significant bilateral cortical innervation) or it points away from the side of the lesion. For instance, in a right-side lesion, the left genioglossus will be weak, so the tongue will deviate toward the left (away from the injured side of the brain (the right side)).

UMN lesion

Supranuclear paralysis (lesion involving the corticobulbar pathways) leads to **PARESIS** but not atrophy of the muscles of the contralateral side.

MCQs

Q1. Which of the following cranial nerves exits the cranial cavity through the jugular foramen?

A. Oculomotor Nerve	B. Abducens Nerve	C. Hypoglossal Nerve	D. Accessory Nerve
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Q2. Which of the following is the site where hypoglossal nerve fibers arise from?

A. Lateral to pyramids	B. Medial to crus cerebri	C. Lateral to basis pontis	D. Cerebellopontine angle
------------------------	---------------------------	----------------------------	---------------------------

Q3. Which of the following deep nuclei is the origin for the motor fiber supplying the sternomastoid muscle?

A. Inferior salivatory nucleus	B. Nucleus ambiguus	C. Nucleus solitarius	D. Spinal nucleus (C1-C5)
--------------------------------	---------------------	-----------------------	---------------------------

Q4. Which of the following is a manifestation of right hypoglossal nerve lesion?

A. Loss of taste sensation of the anterior 2/3 of the tongue.	B. Loss of pain and temperature of the right side of the tongue.	C. Deviate the tip of the tongue to the right side.	D. Deviate the tip of the tongue to the left side.
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Q5. Which of the following manifestation indicates injury to the spinal part of accessory nerve?

A. Difficulty in swallowing	B. Drooping of shoulders	C. Impaired speech	D. Loss of sensation to the pharynx
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Q6. A patient can't elevate their right arm because of a lesion in which nerve?

A. Hypoglossal Nerve	B. Abducens Nerve	C. Accessory Nerve (Spinal)	D. Accessory Nerve (Cranial)
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A1. D A2. A A3. D A4. C A5. B A6. C

FOR ANKI FLASHCARDS





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Team Leaders

Remaz Almahmoud Moath Alhudaif
Areej Alquraini Faris Alzahrani
Sarah Alshahrani

Team Members

Aleen Alkulyah	Ghaida Aldossary	Omar Almogren
Khawla Alfaqih	Retal Alshohail	Nazmi M Alqutub
Haya Alajmi	Norah Almania	Abdulaziz Alqarni
Sarah Alajaji	Deena Almahawas	Mansour Alotaibi
Almas Almutairi		Khalid Alsobei
Bayan Alenazi		Khalid Alanezi
Sadeem Alyahya		Almuthana Alageel
 Zahra Alhazmi		Aban Basfar
Salma Alsaadoun		 Zeyad Alotaibi
Norah Almohaimeed		Mohammed Alqutub
Waad Alanazi		Abdalmalik Alshammakhi
Aseel Alshehri		Hamad Alyahya
Lama Alsuliman		Mohammed Alsalamah
Aljoharah Alkhalifah		Mohammed Alarfaj
Aishah Boureggah		Ziyad Alsalamah
Maryam Alghannam		Faisal Alshowier
Lama Alotaibi		Faisal Alhejji
Wafa Alakeel		Abdullah Aldhuwaihy

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Anatomy.med443@gmail.com