



Anatomy Team
MED 439

Revised & Approved



Abdullah Alsubaihi
Rania Almutiri



MED439
KING SAUD UNIVERSITY

The Cranial Nerves 11 & 12

CNS Block

Contact us:
Anatomy439@gmail.com

Don't forget to check the [Editing File](#)

Color index:

Content
Male slides
Female slides
Important
Doctors notes

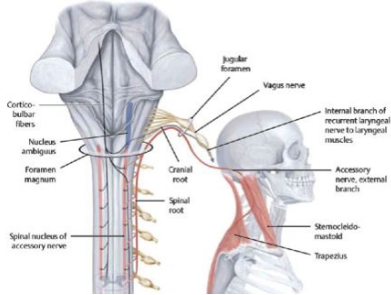
Extra information, explanation

Objectives

At the end of the lecture, students should be able to:

- List the nuclei related to accessory and hypoglossal nerves in the brain stem.
- Describe the type and site of each nucleus.
- Describe site of emergence and course of accessory & hypoglossal nerves.
- Describe important relations of accessory & hypoglossal nerves in the neck.
- List the branches of accessory and hypoglossal nerves.
- Describe the main motor effects in case of lesion of accessory & hypoglossal nerves.

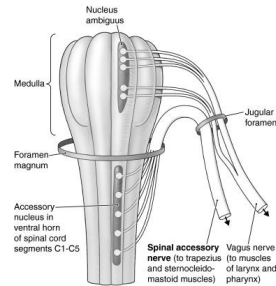
11th CN: Accessory Nerve



Nerve Type: **Motor**

Foramen of exit from skull: **Jugular foramen**

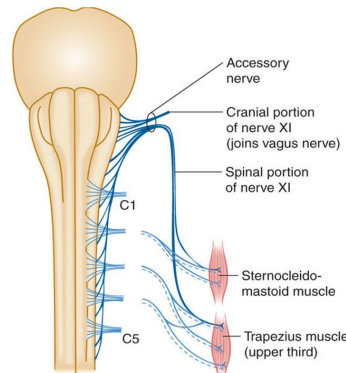
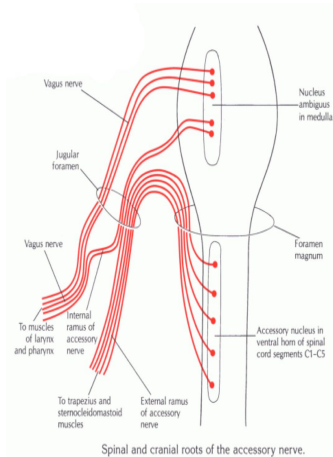
Has two parts (roots):



The Cranial Part

The Spinal Part

| | |
|--------------------|---|
| 1 Origin | Carries fibres that originate in the caudal part of nucleus ambiguus . |
| 2 Course | 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. |
| 3 Course | At the side of medulla it joins the spinal root briefly. |
| 4 Course | It separates once again as the nerve leaves the cranial cavity through the Jugular foramen . |
| 5 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 . |



| | |
|--------------------|---|
| 1 Origin | Arises from motor neurons in ventral horn of the spinal gray matter at levels C1-C5 (spinal nucleus) . |
| 2 Course | The axons leave the cord via series of rootlets, emerge laterally midway between the dorsal and ventral roots of the spinal nerves. |
| 3 Course | Courses rostrally and enter the cranial cavity through the foramen magnum , and joins the cranial root briefly. |
| 4 Course | Separates once again as the nerve leaves the cranial cavity through the Jugular Foramen . |
| 5 Supply | Supplies the sternomastoid and trapezius muscles. |

11th CN: Accessory Nerve

The nucleus ambiguus and the spinal nucleus **receive bilateral corticonuclear fibers** (from both cerebral hemispheres).

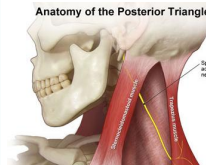
Function :

- 1- Movements of the soft palate, larynx, pharynx.
- 2- Controls the movements of neck.

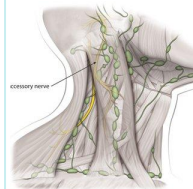
Injury of the Spinal Root of Accessory Nerve

Causes:

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

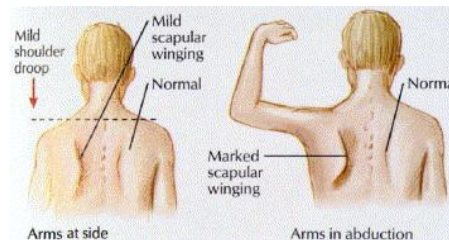


2 It is considered the most commonly **iatrogenically** (means a problem caused by an attempt at treatment) injured nerve as during removal of malignant lymph nodes in the posterior triangle.



Manifestation:

1 It produces atrophy and weakness of trapezius.



2 Unilateral paralysis of trapezius is evident by: 1- inability to elevate & retract the shoulder. 2- Difficulty in elevating the arm. 3- **Winging of scapula.**

3 Drooping of the shoulder is an obvious sign of injury of the nerve.

4 Difficulty in swallowing and speech (like Vagus nerve). Inability to turn the head.

12th Cranial Nerve: Hypoglossal Nerve

Nerve type: Motor.

Origin: Hypoglossal nucleus of the medulla (**in the floor of 4th ventricle**)

Foramen of exit: hypoglossal canal.

Course:

1

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

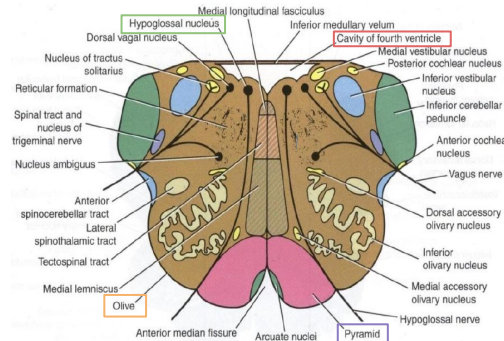
2

The nerve courses **downwards** with the cervical **neurovascular bundle** (internal carotid artery, internal jugular vein and vagus nerve). Then curves **forward** behind **mandible** to supply the tongue

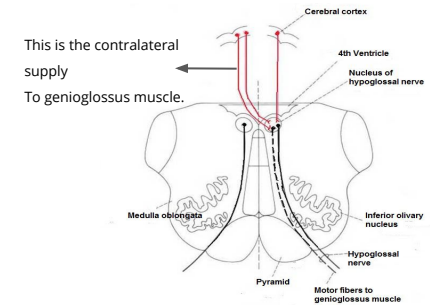
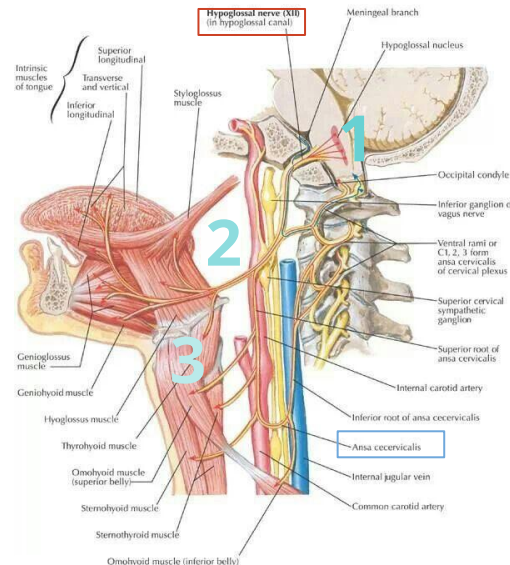
3

During its initial course it carries **C1 fibers**, which leave in a branch to take part in the formation of the **ansa cervicalis** (hypoglossi) (a loop of nerves supplying neck muscles)

Dr's notes the hypoglossal nerve passes along through the canal



Hypoglossal Nerve (XII): Schema



This is the contralateral supply
To genioglossus muscle.

The hypoglossal nucleus receives :

1

The hypoglossal nucleus receives **corticospinal fibers** from both cerebral hemispheres **except** the region that supplies **genioglossus muscle** (the tongue) which receives contralateral supply only.

2

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

Dr's notes the hypoglossal nerve before enter the tongue it leave branch pass Down and contribute in formation of Ansa cervicalis (U shaped)

12th Cranial Nerve: Hypoglossal Nerve

Functions:

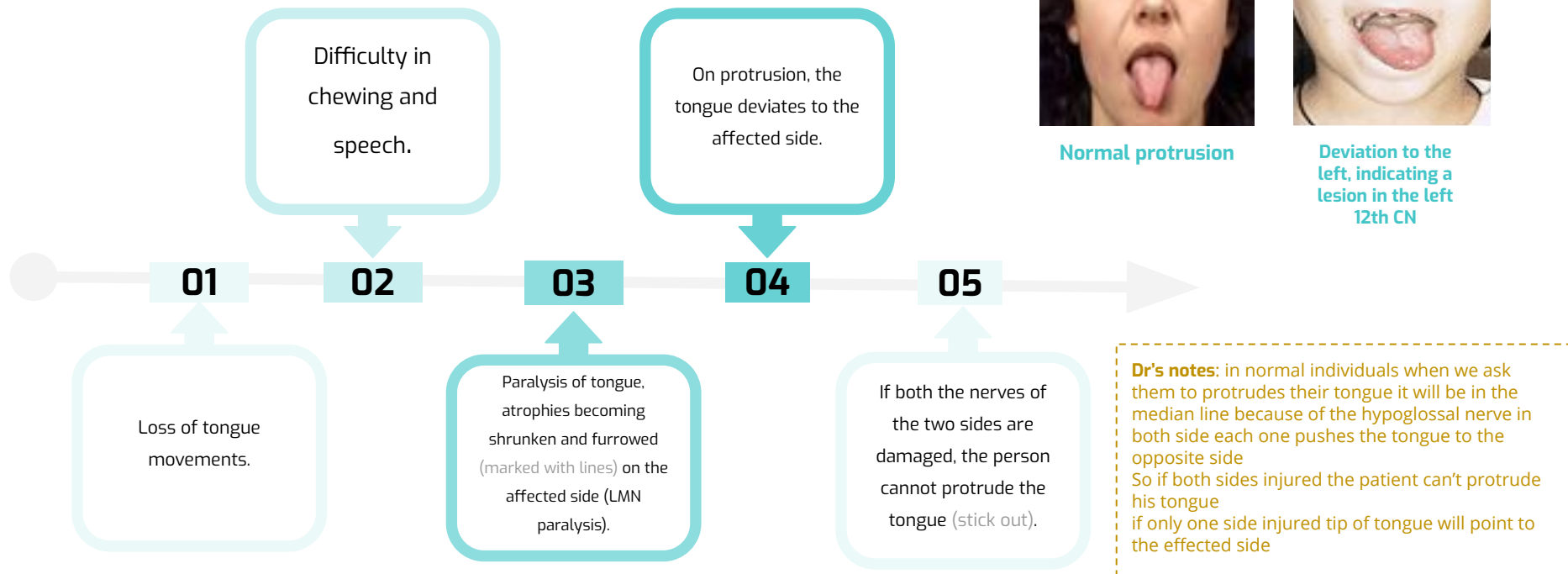
1 - Supplies motor innervation to all of the muscles of the tongue except the palatoglossus (supplied by vagus).

(Controls the movements and shape of the tongue during speech and swallowing)

2 - Carries proprioceptive afferents from the tongue muscles.

Dr's notes the hypoglossal nerve in general when we asked about it it's a motor nerve but sometimes it may carry proprioceptive sensation

Manifestations of Lesion of the nerve (LMN) :



MCQ

Q1: The Accessory Nerve exit from which foramen in the skull?

A: Foramen Magnum

B: Foramen ovale

C: Foramen Lacerum

D: Jugular foramen

Q2: Spinal part of Accessory nerve rises from?

A: Dorsal horn of the spinal gray matter at levels C1-C5

B: Ventral horn of the spinal gray matter at levels T1-T5

C: Ventral horn of the spinal gray matter at levels C1-C5

D: Dorsal horn of the spinal gray matter at levels T1-T5

Q3: At the level of jugular foramen Accessory nerve cranial part fibres join the?

A: Hypoglossal nerve

B: Vagus nerve

C: Glossopharyngeal nerve

D: Trigeminal nerve

Q4: Spinal part of Accessory nerve enters cranial cavity through?

A: Foramen Magnum

B: Foramen ovale

C: Foramen Lacerum

D: Jugular foramen

Q5: The nucleus ambiguus and the spinal nucleus receive?

A: Bilateral corticospinal fibers

B: Unilateral corticonuclear fibers

C: Unilateral corticospinal fibers

D: Bilateral corticonuclear fibers

Q6: Lesion to Accessory nerve produces atrophy and weakness of?

A: Stylopharyngeus

B: Pharynx

C: Trapezius

D: Soft palate

Answer key:
1 (D) , 2 (C) , 3 (B) , 4 (A) , 5 (D) , 6 (C)

MCQ

Q7: The 12th cranial nerve originates from the _____ of the medulla in the _____.

A: Glossopharyngeal nucleus, floor of 4th ventricle

B: Hypoglossal nucleus, floor of 3rd ventricle

C: Hypoglossal nucleus, floor of 4th ventricle

D: Hypoglossal nucleus, roof of 4th ventricle

Q8: The foramen of exit of the 12th cranial nerve is

A: Hypoglossal canal

B: Foramen rotundum

C: Optic canal

D: Jugular foramen

Q9: the tongue muscle receives _____ supply fibers only.

A: Contralateral

B: Ipsilateral

C: Corticonuclear from both hemispheres

D: Optic

Q10: which fibers were carried by the 12th cranial nerve and left to join the ansa cervicalis?

A: C4 fibers

B: C2 fibers

C: C3 fibers

D: C1 fibers

Q11: The functions of the 12th cranial nerve include:

A: Carrying proprioceptive afferents from tongue only

B: Sensory innervation to all of the tongue muscles

C: Motor innervation to ALL of the muscles of the tongue

D: Controlling the movement and shape of tongue

Q12: which is not a manifestation of LMN?

A: Difficulty in chewing

B: Difficulty in swallowing

C: Deviation to the affected side

D: Loss of tongue movement

Answer key:

7(C) , 8(A) , 9(A) , 10(D) , 11(D) , 12(B)

Q1: From where does Accessory nerve (its two parts) originate?

Q2: Mention the muscles that are supplied by the Accessory nerve (its two parts)?

Q3: Mention the type of the 12th CN nerve and the location of emergence for the fibers.

Q4: What is the course of the 12th cranial nerve, and what is the ansa cervicalis?

Answers

1 : A. The cranial part: originate in the caudal part of nucleus ambiguus.
B. The spinal part: Originates from motor neurons in ventral horn of the spinal gray matter at levels C1-C5 (spinal nucleus).

2 : A. The cranial part: supplies muscles of the soft palate, esophagus, pharynx and larynx.
B. The spinal part: Supplies the sternomastoid and trapezius muscles.

3 : Type: Motor, The fibers emerge from the anterior surface of the medulla oblongata between the pyramid and olive

4: the 12th CN courses downward with the cervical neurovascular bundle then curves forward behind the mandible to supply the tongue, and initially it carries C1 fibers that leave in a branch to take part in the formation of the ansa cervicalis, which is a loop of nerve supplying the neck muscles.

Team leaders

Rayan jabaan
Abeer Awwad

A special thanks to Mohamed Alquhidan

Reviser

Norah Alasheikh

Organizer

Shaden Alsaiedan

Note taker

Asma Alamri

Team Members

- Alaa Assulmi
- Albandari Alanazi
- Aljoud Algazlan
- Afnan Almohsen
- Arwa Alqahtani
- Aseel Alshehri
- Asma Alamri
- Bodoor Almubarak
- Deemah Alotaibi
- Fatimah Saad
- Ghada Alabdi
- Ghaida Alassiry
- Joud Alnujaidi
-  May Barakah
- Norah Alasheikh
- Nouf Alsubaie
- Raghad Alasiri
- Raghad Soaeed
- Renad Alosaimi
- Sara Alharbi
- Sarah Almuqati
- Sarah Alqahtani
- Shaden Alsaiedan
- Shahad Almezel
- Shayma Alghanoum
- Sumo Alzeer

- Abdullah Alburikan
- Abdullah Aldosari
- Abdulaziz Alghuligah
- Abdulaziz Alkraida
- Abdulaziz Alomairy
- Abdulaziz Alrabiah
- Abdulaziz Alsuhaim
- Abdulrahman Almugren
- Ahmed Alkhayatt
- Bader Alrayes
- Basel Fakeeha
- Fahad Alajmi
- Faisal Alotaibi
- Fayez Altabbaa
- Feras Alqaidi
-  Hadi Alhems
- Hesham Alsqabi
- Mohammed Aldehaim
- Mohamed Alquhidan
- Mohammed Beyari
- Mubarak Alanazi
- Musab Alamri
- Nawaf Alghamdi
- Osama Alharbi
- Raed Alnutaifi
- Saad Aldohaim
- Saleh Algarni

