

*★ The Cranial Nerves  
8,9,10 ,11 , 12 ★*

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## ★Case1★

A 30 years old male came to the ER with problem in hearing , nausea and reported that he was a little dizzy. When the physician performed a physical examination he reported that one of the cranial nerves was defected . From your previous information which cranial nerve did the doctor reported:

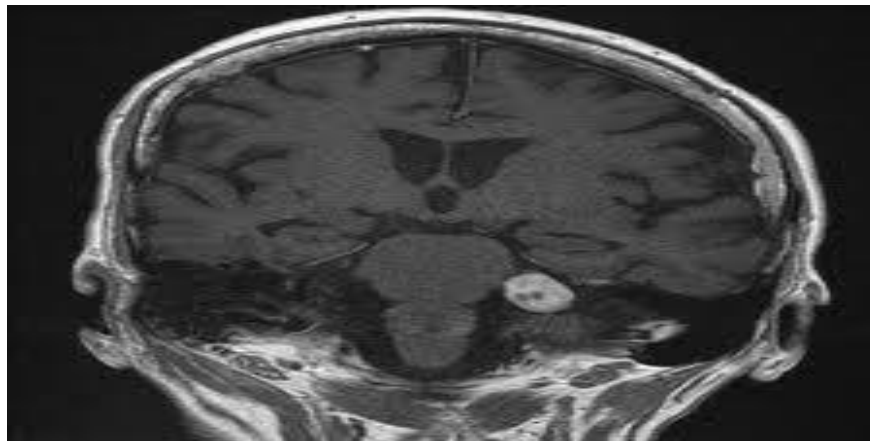
★Answer:

-Vestibulo-cochlear Nerve (Cranial Nerve 8)

## *\*Case 2\**

A 44 years old man presented to his general practitioner with decrease hearing For the past 3 months also he noticed a ringing noise in his ear and general unsteadiness ( the surroundings were rotating) when the physician conducted a physical examination he reported a defect in one cranial nerve . On further investigation he ordered for a MRI that revealed a mass in the cerebellopontine angle .

What is the likely diagnosis, and which cranial nerve is defected?



**Answer:** Acoustic neuroma ( vestibular shwannoma) the 8 cranial nerve.

*\*The Vestibulo-cochlear Nerve  
(Cranial Nerve 8)\**

Type: Special sensory (SSA) (special somatic afferent)

Has 2 parts

-Vestibular part:  
conveys impulses  
associated with  
balance of body  
(position &  
movement of the  
head)

Cochlear part:  
conveys impulses  
associated with  
hearing

-So, any lesion in the 8 cranial nerve will effect both (balance and the hearing)

## *\*The Vestibulo-cochlear nucleus\**

\*This nerve has two nuclei according to their parts:

- 1) The vestibular nucleus which is located in the **rostral medulla**, beneath the lateral part of the floor of 4<sup>th</sup> ventricle (Remember that the central processes of the 1 order neuron Mostly end up in the lateral, medial, inferior and superior vestibular nuclei (2nd order neurons) .
- 2) The cochlear nucleus which lie close to the **inferior cerebellar peduncle** at the (pontomedullary junction).
  - **Remember** (the central processes of the 1st order neuron terminate in the dorsal and ventral cochlear nuclei (2<sup>nd</sup> order neurons)).

Vestibular nuclei & cochlear nuclei  
belong to special somatic afferent  
column in brain stem

*\*The Lesion of vestibulocochlear nerve will produce:*

1) Deafness

(Disturbance of cochlear nerve functions)

2) tinnitus, vertigo, dizziness, nausea, nystagmus, loss of balance and ataxia (Disturbance of vestibular nerve functions)

\*Acoustic neuroma: a benign tumor of 8<sup>th</sup> nerve leads to compression of the nerve leading to attacks of dizziness, and profound deafness and ataxia

## ★Case3★

A 14 year old boy came to his GP with difficulty swallowing (dysphagia) at examination the GP asked the patient to swallow, then he tested the gag reflex by touching the back of the throat by the tongue depressor. The GP reported that the gag reflex was absent Also he tested the taste over the posterior one-third of the tongue that was also reported missing . From this examination which cranial nerve is affected?

*\*Answer:*

The 9<sup>th</sup> cranial nerve "glossopharyngeal nerve"

# *\*Glossopharyngeal (9) Cranial Nerve\**

## *\*Type:*

mixed is principally a Sensory nerve with preganglionic parasympathetic and few motor fibers

## *\*Nucleus:*

It has no real nucleus to itself. Instead it shares nuclei with VII and X.



## \*Functions:

-There are a number of functions of the glossopharyngeal nerve:

- 1) It receives general sensory fibers from the tonsils, the pharynx, the middle ear and the posterior 1/3 of the tongue.
- 2) It receives special sensory fibers (taste) from the posterior one-third of the tongue.
- 3) It receives visceral sensory fibers from the carotid bodies.
- 4) It supplies parasympathetic fibers to the parotid gland via the otic ganglion.
- 5) supplies motor fibers to stylopharyngeus muscle, the only motor component of this cranial nerve.
- 6) It contributes to the pharyngeal plexus.

*\*Glossopharyngeal nerve lesions produces:*

- 1) Difficulty in swallowing;
- 2) impairment of taste over the posterior one-third of the tongue and palate;
- 3) impaired sensation over the posterior one-third of the tongue, palate, and pharynx;
- 4) an absent gag reflex
- 5) dysfunction of the parotid gland.

## ★Case4★

Ms. Fatima is 62 year old diabetic patient , she referred to King Khaled hospital from other center because she is suffering from intractable diarrhea( GIT dysfunction) .The diarrhea developed 2 days after a Laparoscopic Nissen fundoplication. In addition , during the past month her voice becomes hoarsens and easily fatigued She also had impairment of swallowing. Her general practitioner start to examine the cranial nerves and he noticed some abnormal signs of one of these cranial nerves .

-From this case , answer the following questions ;

**-Which cranial nerve is effected in this case ?**

10<sup>th</sup> CN: vagus Nerve

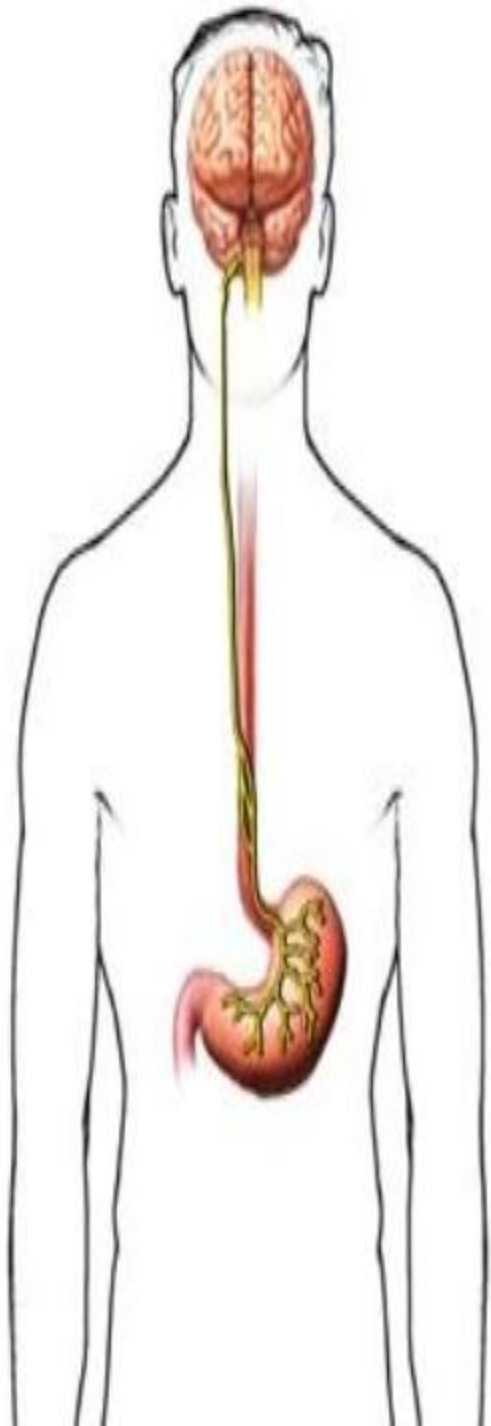
**-What is the type of this nerve ?**

**-Type:** mixed nerve.

**- Foramen of exit from skull:** jugular foramen .

## ★ Branches of vagus nerve ★

- **Meningeal** : to the dura
- **Auricular nerve**: to the external acoustic meatus and tympanic membrane.
- **Pharyngeal** :to muscles and mucous membrane of the pharynx.
- **To carotid body**
- **Superior Laryngeal**: It divides into:
  - (1) **Internal Laryngeal** :  
Supplies; the mucous membrane of the larynx above the vocal folds.
  - (2) **External Laryngeal** :  
supplies the cricothyroid muscle.
- Recurrent Laryngeal** : supplies all the muscles of the larynx (except cricothyroid).
  - The mucous membrane below the vocal folds.
  - The mucous membrane of the upper part of trachea.
- **Cardiac**.



**\* Vagus nerve damage ;.**

- hoarseness or loss of voice.
- impaired swallowing.
- GI dysfunction.
- blood pressure anomalies (with CN IX).

**Diabetes** is the most common cause of gastroparesis, or delayed stomach emptying. That's because years of high blood glucose damage the vagus nerve, which controls the movement of food from the stomach through the digestive tract. Both type 1 and type 2 diabetics are at risk of gastroparesis

When the vagus nerve is damaged, food either moves too slowly through the digestive system, or doesn't move at all. As a result, people with gastroparesis often feel bloated, feel full after eating a small amount, and may experience heartburn, stomach and abdominal pain, nausea and vomiting, loss of appetite, and acid reflux.

## ★Case5★

A 15-year old boy is brought to the emergency department at King Khalid Hospital accompanied by his father. He had difficulty in swallowing and speech. When the physician examine his cranial nerves he noticed that the boy cant not turn his head and he can not raise his shoulder .

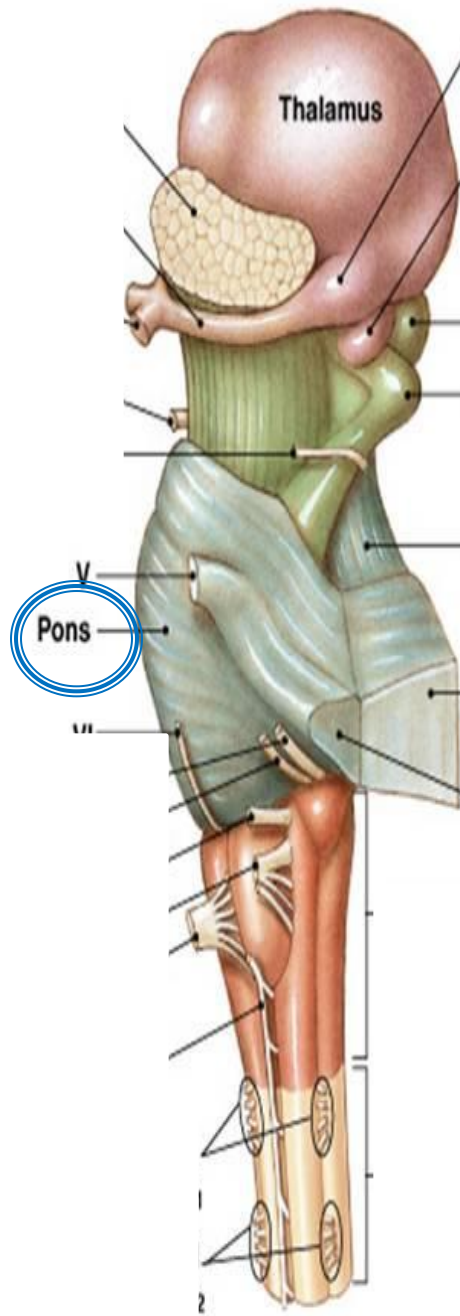
-Regarding the following information :-

-Which cranial nerve is effected in this case ?

Accessory nerve(has 2 parts ;cranial and spinal)

-What is the type of this nerve ?

-Type: Motor (SVE)



## ACCESSORY NERVE has two parts :

Cranial & Spinal parts

### Foramen of exit from skull:

Jugular foramen

### Origin:

#### - Cranial part : -

**Nucleus ambiguus (NA)** in the -  
medulla  
Oblongata

#### Spinal Part-:

It is formed by the axons of the nerve cells in the **spinal nucleus** which is located in the **ventral grey horn** in the **upper 5 cervical segments**



## *\* Distribution:\**

Cranial part: distributed through vagus nerve to voluntary muscles of larynx, pharynx, soft palate & esophagus

Spinal part:

It supplies two muscles:

- 1-sterno-cleidiomastoid muscle
- 2-trapezius muscle

## *Function:*

1-Movements of the soft palate, larynx, pharynx.

2-Controls the movements of neck



- Accessory nerve  
Lesion results into:

1-Difficulty in  
swallowing and  
speech

2-Inability to turn  
the head and raise  
the shoulder

## ★Case6★

A 42-year-old teacher female is referred from a general practitioner because of difficulty in chewing and speech. On examination, her tongue was paralyzed and it becomes shrunk and furrowed on the affected side (LMN paralysis). In addition, on protrusion, her tongue deviates to the affected side.

-Which cranial nerve is effected in this case ?

12<sup>th</sup> CN: Hypoglossal Nerve

-What is the type of this nerve ?

-Type: Motor (**GSE**)

-What is the origin of this nerve ?

Hypoglossal nucleus of the medulla (in the floor of 4<sup>th</sup> ventricle)

- Foramen of exit from skull: Hypoglossal canal

## *★Case7★*

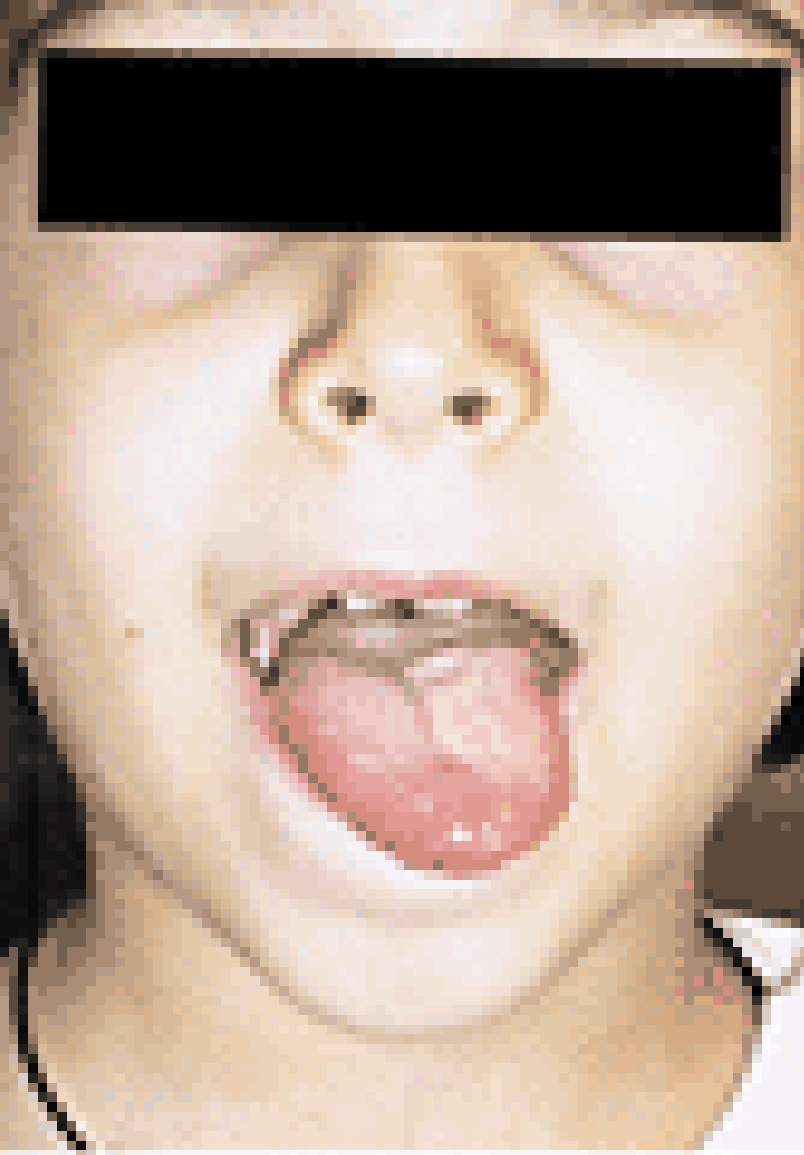
- patient came to the hospital with difficulty in moving his tongue ,on examination the tongue was turned to the left side, the problem is in :

a-left 12TH cranial nerve

b-right 12TH cranial nerve

c-left 11TH

d. Right 11th cranial nerve

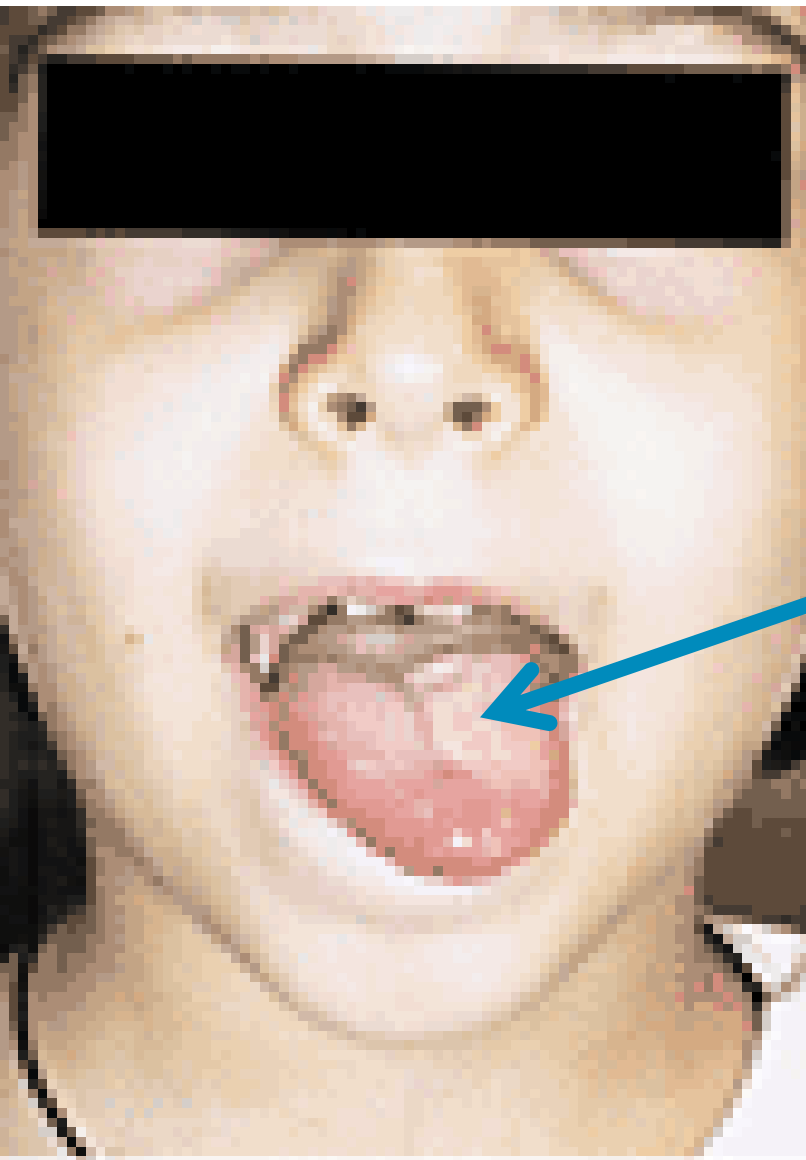


### **-Distribution:**

-Supplies motor innervation to all of the muscles of the tongue except the **palatoglossus** (which is supplied by the pharyngeal plexus ).

### **-Function:**

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



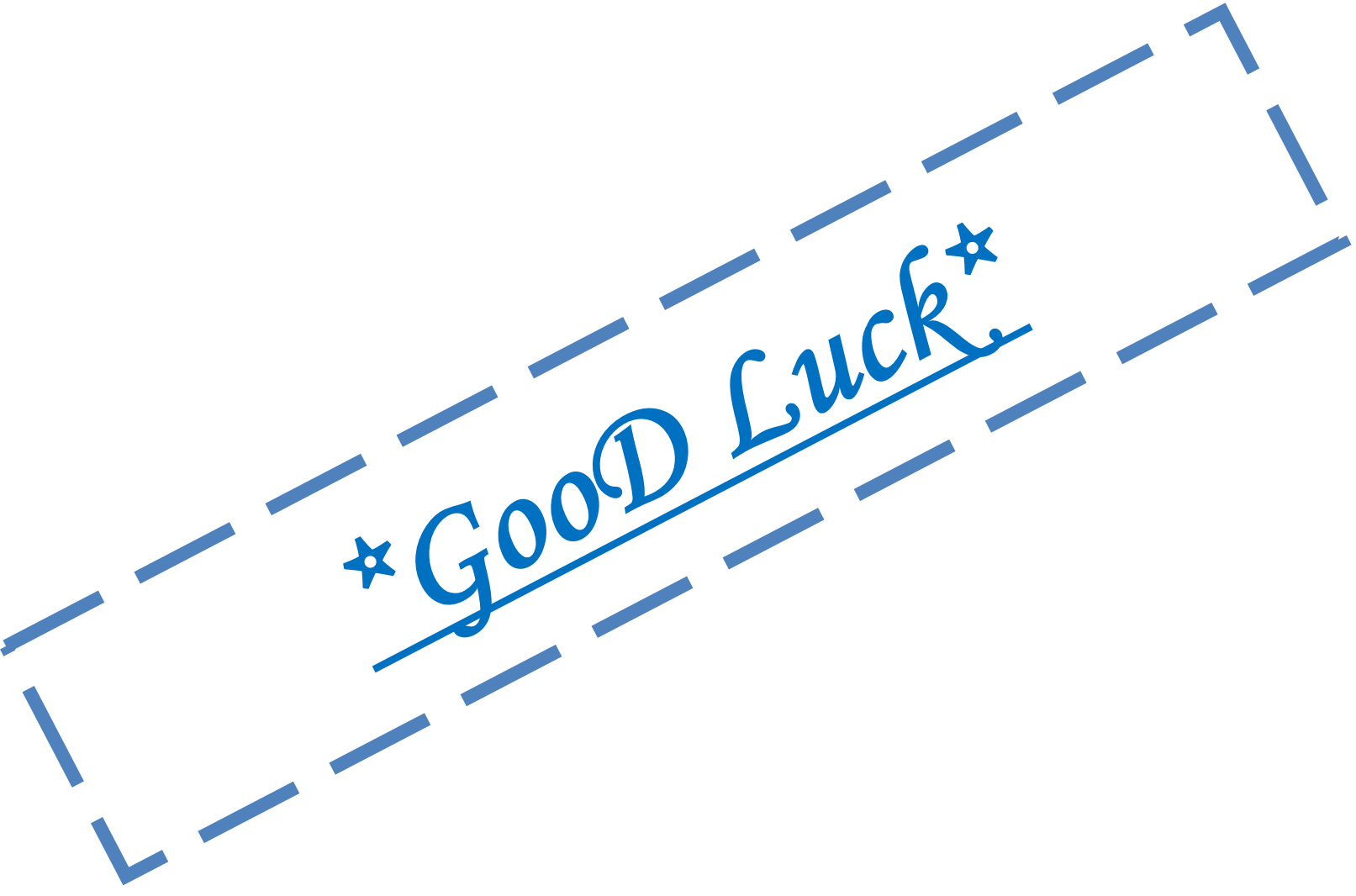
-Lesion of the nerve results into:

Loss of tongue movements

speech Difficulty in chewing and  
The tongue paralyses, atrophies,  
becomes shrunken and furrowed  
on the affected side (LMN  
paralysis)

On protrusion, tongue deviates to  
the affected side

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



*\*Good Luck\**