

Bogomolets National Medical University

Department of human anatomy

GUIDELINES

<i>Academic Subject Matter</i>	HUMAN ANATOMY
<i>Module №</i>	2
<i>Content module №</i>	16
<i>Theme of the lesson</i>	V, VII, IX cranial nerves.
<i>Course</i>	I-st
<i>Amount of hours</i>	3

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1. The relevance of the topic:

The trigeminal nerve is one of the largest and most important cranial nerve because its sensitive fibers innervate the front of the head, the dura of the anterior and middle cranial fossae, as well as teeth. Also motor fibers innervate muscles of mastication and certain muscles of the neck, palate and middle ear. The facial nerve innervates facial muscles and certain muscles of the neck. Its sensitive branches innervate the taste sensitivity of the anterior two thirds of tongue. Vegetative or nodal fibres participate in the formation of vegetative nodes of the head. Branches of the glossopharyngeal nerve innervate the mucous membrane of the posterior third of the tongue, mucosa of pharynx, tonsils, tympanic cavity. The knowledge acquired in the study V, VII, IX pairs of cranial nerves constitutes the ground for many branches of practical medicine, such as neurology, stomatology, maxillofacial surgery and others.

2. Specific objectives :

After lesson the student should know and be able to:

1. To demonstrate on preparation the ophthalmic, maxillary, and mandibular nerves at the point of exit from the skull.
2. To determine the fiber composition of the ophthalmic, maxillary and mandibular nerves.
3. Describe and demonstrate sensitive branches of nerves and areas of their actions. To name and show muscles, which are innervated by branches of the mandibular nerve.
4. To name the nucleus of the VII cranial nerve.
5. To demonstrate the exit of the facial nerve from the brain and skull. Describe the nerve in the facial canal.
6. Identify and demonstrate the course of the muscular branches of the facial nerve, areas of innervation.
7. To describe the intermediate nerve: nucleus, node, its branches, areas of innervation, function, communication with other nerves.
8. To determine the nuclei of glossopharyngeal nerve.
9. To describe the course of the trunk of the glossopharyngeal nerve.
10. To be able to determine the composition of the fibers of the IX cranial nerve.
11. To describe the course of the sensory fibers of the IX cranial nerve, identify the areas of innervation.
12. To describe the course of the motor fibers of the IX cranial nerve, identify the areas of innervation.

3. A basic training level

Before class the student should know and be able to:

- 2.1. To identify the main challenges of modern neurology and neurosurgery , clinical direction.
- 2.2. To know the names of the 12 pairs of cranial nerves.

2.3. Anatomy of the musculo-skeletal system: knowing the structure of the skull bones and skulls in general, the structure of the temporomandibular joint, muscles of the head and neck.

2.4 To know the anatomy of the central nervous system (the brain and spinal cord).

2.5. To know the anatomy of the oral cavity.

2.5. To know and demonstrate the anatomy of the middle ear.

2.6. Be able to draw schematically the structure of the reflex arc (simple, complex).

2.7 . Own classification of the nervous system;

N. trigeminus	The trigeminal nerve
N. ophthalmicus	The ophthalmic nerve
N. maxillaris	The maxillary nerve
N. mandibularis	The mandibular nerve
N. facialis	The facial nerve
N. glossopharyngeus	The glossopharyngeal nerve

4. The organization of the educational material content.

The educational material is described in logical sequence using anatomical preparations of the human skull, separate wet anatomical preparations of the human brain, structural-logical schemes, tables, figures, reflecting the main issues of the topic of practical training.

The content of the topic.

The **trigeminal nerve** originates from three **sensory nuclei** (mesencephalic, principal sensory, spinal nuclei of trigeminal nerve) and one **motor nucleus** (motor nucleus of the trigeminal nerve) extending from the midbrain to the medulla. A nucleus (pl. nuclei) is a collection of nerve cell bodies within the central nervous system.

At the level of the **pons**, the sensory nuclei merge to form a sensory root. The motor nucleus continues to form a motor root. These roots are analogous to the dorsal and ventral roots of the spinal cord.

In **middle cranial fossa**, the sensory root expands into the trigeminal ganglion. A ganglion (pl. ganglia) refers to a collection of the nerve cell bodies outside the central nervous system. The trigeminal ganglion is located lateral to the cavernous sinus, in a depression of the temporal bone. This depression is known as the **trigeminal cave**.

The peripheral aspect of the trigeminal ganglion gives rise to 3 divisions: **ophthalmic (V1)**, **maxillary (V2)** and **mandibular (V3)**.

The motor root passes inferiorly to the sensory root, along the floor of the trigeminal cave. Its fibres are only distributed to the **mandibular division**.

The ophthalmic nerve and maxillary nerve travel lateral to the cavernous sinus

exiting the cranium via the **superior orbital fissure** and **foramen rotundum** respectively. The mandibular nerve exits via the foramen ovale entering the infra-temporal fossa. (Note – be aware that while we talk about the nerves exiting the cranial cavity, the sensory components can also be said to be entering the cranial cavity, since they are afferent fibres).

Ophthalmic nerve gives rise to 3 terminal branches: **frontal**, **lacrimal** and **nasociliary**, which innervate the skin and mucous membrane of derivatives of the frontonasal prominence derivatives:

- Forehead and scalp
- Frontal and ethmoidal sinus
- Upper eyelid and its conjunctiva
- Cornea (see clinical relevance)
- Dorsum of the nose

Parasympathetic Supply:

Lacrimal gland: Post ganglionic fibres from the pterygopalatine ganglion (derived from the facial nerve), travel with the zygomatic branch of V2 and then join the lacrimal branch of V1. The fibres supply parasympathetic innervation to the lacrimal gland.

Maxillary nerve gives rise to 14 terminal branches, which innervate the skin, mucous membranes and sinuses of derivatives of the **maxillary prominence** of the 1st pharyngeal arch:

- Lower eyelid and its conjunctiva
- Cheeks and maxillary sinus
- Nasal cavity and lateral nose
- Upper lip
- Upper molar, incisor and canine teeth and the associated gingiva
- Superior palate

Parasympathetic Supply:

- **Lacrimal gland:** Post ganglionic fibres from the pterygopalatine ganglion (derived from the facial nerve), travel **with** the zygomatic branch of V2 and then join the lacrimal branch of V1. The fibres supply parasympathetic innervation to the lacrimal gland.
- **Nasal glands:** Parasympathetic fibres are also carried to the mucous glands of the nasal mucosa. Post-ganglionic fibres travel with the nasopalatine and greater palatine nerves (branches of V2)

Mandibular nerve gives rise to four terminal branches in the infra-temporal fossa: **buccal** nerve, **inferior alveolar** nerve, **auriculotemporal** nerve and **lingual** nerve. These branches innervate the skin, mucous membrane and striated muscle derivatives of the **mandibular prominence** of the 1st pharyngeal arch.

Sensory supply:

- Mucous membranes and floor of the oral cavity
- External ear
- Lower lip
- Chin

- Anterior 2/3 of the tongue (only general sensation; special taste sensation supplied by the chorda tympani, a branch of the facial nerve)
- Lower molar, incisor and canine teeth and the associated gingiva

Motor Supply:

- Muscles of mastication; medial pterygoid, lateral pterygoid, masseter, temporalis
- Anterior belly of the digastric muscle and the mylohyoid muscle (these are suprahyoid muscles)
- Tensor veli palatini
- Tensor tympani

Parasympathetic Supply:

- **Submandibular and Sublingual glands:** Post-ganglionic fibres from the submandibular ganglion (derived from the facial nerve), travel with the lingual nerve to innervate these glands.
- **Parotid gland:** Post-ganglionic fibres from the otic ganglion (derived from the glossopharyngeal nerve, CN IX), travel with the auriculotemporal branch of the V3 to innervate the parotid gland.

The course of the facial nerve is very complex. There are many branches, which transmit a combination of sensory, motor and parasympathetic fibres.

Anatomically, the course of the facial nerve can be divided into two parts:

- **Intracranial** – the course of the nerve through the cranial cavity, and the cranium itself.
- **Extracranial** – the course of the nerve outside the cranium, through the face and neck.

Intracranial

The nerve arises in the **pons**, an area of the brainstem. It begins as two roots; a large **motor root**, and a small **sensory root** (the part of the facial nerve that arises from the sensory root is sometimes known as the intermediate nerve).

The two roots travel through the internal acoustic meatus, a 1cm long opening in the petrous part of the temporal bone. Here, they are in very close proximity to the inner ear.

Still within the temporal bone, the roots leave the internal acoustic meatus, and enter into the **facial canal**. The canal is a 'Z' shaped structure. Within the facial canal, three important events occur:

- Firstly the two roots **fuse** to form the facial nerve.
- Next, the nerve forms the **geniculate ganglion** (a ganglion is a collection of nerve cell bodies).
- Lastly, the nerve gives rise to the **greater petrosal nerve** (parasympathetic fibres to glands), the nerve to **stapedius** (motor fibres to stapedius muscle), and the **chorda tympani** (special sensory fibres to the anterior 2/3 tongue).

The facial nerve then exits the facial canal (and the cranium) via the **stylomastoid foramen**. This is an exit located just posterior to the styloid process of the temporal bone.

Extracranial

After exiting the skull, the facial nerve turns superiorly to run just anterior to the outer ear.

The first extracranial branch to arise is the **posterior auricular nerve**. It provides motor innervation to some of the muscles around the ear. Immediately distal to this, motor branches are sent to the posterior belly of the **digastric** muscle and to the **stylohyoid** muscle.

The main trunk of the nerve, now termed the **motor root** of the facial nerve, continues anteriorly and inferiorly into the parotid gland (note – the facial nerve does not contribute towards the innervation of the parotid gland, which is innervated by the glossopharyngeal nerve).

Within the parotid gland, the nerve terminates by splitting into five branches:

- Temporal branch
- Zygomatic branch
- Buccal branch
- Marginal mandibular branch
- Cervical branch

These branches are responsible for innervating the muscles of facial expression.

Branches of the facial nerve are responsible for innervating many of the muscles of the head and neck. All these muscles are derivatives of the **second pharyngeal arch**.

The first motor branch arises within the facial canal; the **nerve to stapedius**. The nerve passes through the pyramidal eminence to supply the stapedius muscle in the middle ear.

Between the stylomastoid foramen, and the parotid gland, three more motor branches are given off:

- **Posterior auricular nerve** – Ascends in front of the mastoid process, and innervates the intrinsic and extrinsic muscles of the outer ear. It also supplies the occipital part of the occipitofrontalis muscle.
- **Nerve to the posterior belly of the digastric muscle** – Innervates the posterior belly of the digastric muscle (a suprahyoid muscle of the neck). It is responsible for raising the hyoid bone.
- **Nerve to the stylohyoid muscle** – Innervates the stylohyoid muscle (a suprahyoid muscle of the neck). It is responsible for raising the hyoid bone.

Within the parotid gland, the facial nerve terminates by bifurcating into five motor branches. These innervate the muscles of facial expression:

- **Temporal branch** – Innervates the frontalis, orbicularis oculi and corrugator supercilii
- **Zygomatic branch** – Innervates the orbicularis oculi.
- **Buccal branch** – Innervates the orbicularis oris, buccinator and zygomaticus muscles.
- **Marginal Mandibular branch** – Innervates the mentalis muscle.
- **Cervical branch** – Innervates the platysma.

The **chorda tympani** branch of the facial nerve is responsible for innervating the anterior 2/3 of the tongue with the special sense of taste.

The nerve arises in the facial canal, and travels across the bones of the middle ear, exiting via the **petrotympanic fissure**, and entering the [infratemporal fossa](#). Here,

the chorda tympani 'hitchhikes' with the **lingual nerve**. The parasympathetic fibres of the chorda tympani stay with the lingual nerve, but the main body of the nerve leaves to innervate the anterior 2/3 of the tongue.

The parasympathetic fibres of the facial nerve are carried by the **greater petrosal** and **chorda tympani** branches.

Greater Petrosal Nerve

The greater petrosal nerve arises immediately distal to the **geniculate ganglion** within the facial canal. It then moves in anteromedial direction, exiting the temporal bone into the **middle cranial fossa**. From here, it travels across (but not through) the foramen lacerum, combining with the deep petrosal nerve to form the **nerve of the pterygoid canal**.

The nerve of pterygoid canal then passes through the pterygoid canal (Vidian canal) to enter the **pterygopalatine fossa**, and synapses with the pterygopalatine ganglion. Branches from this ganglion then go on to provide parasympathetic innervation to the **mucous glands** of the oral cavity, nose and pharynx, and the **lacrimal gland**.

Chorda Tympani

The **chorda tympani** also carries some parasympathetic fibres. These combine with the **lingual nerve** (a branch of the trigeminal nerve) in the **infratemporal fossa** and form the **submandibular ganglion**. Branches from this ganglion travel to the submandibular and sublingual **salivary glands**.

The glossopharyngeal nerve as its name suggests is related to the tongue and the pharynx. The ninth cranial nerve exits the brain stem as the most rostral of a series of nerve rootlets that protrude between the olive and inferior cerebellar peduncle. These nerve rootlets come together to form the ninth cranial nerve and leave the skull through the jugular foramen. The tympanic nerve is a branch that occurs prior to exit the skull. The visceromotor or parasympathetic part of the ninth nerve originates in the inferior salivatory nucleus. Nerve fibers from this nucleus join the other components of the ninth nerve during their exit from the brain stem. They branch in the cranium as the tympanic nerve. The tympanic nerve exits the jugular foramen and passes by the inferior glossopharyngeal ganglion. It re-enters the skull through the inferior tympanic canaliculus and reaches the tympanic cavity where it forms a plexus in the middle ear cavity. The nerve travels from this plexus through a canal and out into the middle cranial fossa adjacent to the exit of the greater petrosal nerve. It is here the nerve becomes the lesser petrosal nerve. The lesser petrosal nerve exits the cranium via the foramen ovale and synapses in the otic ganglion. The otic ganglion provides nerve fibers that innervate and control the parotid gland, an important salivary gland. The branchial motor component supplies the stylopharyngeal muscle which elevates the pharynx during swallowing and talking. In the jugular foramen are two sensory ganglia connected to the ninth cranial nerve: the superior and inferior glossopharyngeal ganglia. General sensory components from the skin of the external ear, inner surface of the tympanic membrane, posterior one-third of the tongue and the upper pharynx join either the superior or inferior glossopharyngeal ganglia. The ganglia send central processes into the brain stem which terminate in the caudal part of the spinal trigeminal

nucleus. Visceral sensory nerve fibers originate from the carotid body (oxygen tension measurement) and carotid sinus (blood pressure changes). The visceral sensory nerve components connect to the inferior glossopharyngeal ganglion. The central process extends from the ganglion and enters the brain stem to terminate in the nucleus solitarius. Taste from the posterior one-third of the tongue travels via nerve fibers that enter the inferior glossopharyngeal ganglion. The central process that carries this special sense travels through the jugular foramen and enters the brain stem. They terminate in the rostral part of the nucleus solitarius (gustatory nucleus).

LITERATURE

Base:

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Additional:

1. Tests "KROK-1" - human anatomy: textbook / under the editorship of V. G. Cherkasova, I. V. Dzevulska., O.I. Kovalchuk. 5-th Edition, revised.
2. Human anatomy: in 3 volumes / ed. by V. G. Koveshnikov. – Lugansk: Virtual reality, 2008. – T. 2.
3. Netter F. Atlas of human anatomy / F. Netter; [transl. from eng. A. A. Tsegelsky]; ed. by U.B. Tchaikovsky. – Lviv: Nautilus, 2004.
4. International anatomical nomenclature. Ukrainian standard / edited by I. I. Bobryk, V. G. Koveshnikov. - Kiev: Health, 2001.

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Questions for the control of the basic level.

1. To describe and demonstrate the structure of the middle cranial fossa, walls and posts of the wing-palatine and infratemporal fossa.
2. To determine on preparation the topography of facial and masticatory muscles and neck muscles.
3. To find in the skull the infraorbital, and mental nerves, entering the lower alveolar nerve in the canal of the lower jaw.
4. To distinguish the nerves, that are associated with the visceral arches.
5. To demonstrate on the brain the place of the trigeminal nerve's exit.
6. To name and show the walls of the orbit and its communications.
7. To name and show the walls of the wing-palatine fossa and its communications.
8. To name and show the walls of the infratemporal fossa and its communications.
9. Describe and demonstrate the muscles of mastication.

Questions for the control of final level knowledge of the students.

1. To name and describe the nuclei of the trigeminal nerve and its localization.
2. To describe and demonstrate the exit of the trigeminal nerve roots from the brain.
3. What is formed by the sensitive root of the trigeminal node?
4. What is formed by the motor root of the trigeminal node?
5. What fibers the ophthalmic, the maxillary and mandibular nerves are consist of and where they exit the skull?
6. To describe and demonstrate the branches of the ophthalmic nerve and its innervation.
7. To describe and demonstrate the branches of the maxillary nerve and area of its innervation.
8. To describe and demonstrate the branches of the mandibular nerve and area of its innervation.
9. To name the nuclei of the facial and intermediate nerves and describe its functional purpose.
10. What are the branches of the facial nerve, extending in the same channel?
11. To identify and demonstrate the muscles, that innervate the facial nerve.
12. Determine, which group of cranial nerves the IX pair applies to.
13. Describe the course of the glossopharyngeal nerve.
14. List the sensitive branches of the IX cranial nerve and identify the areas of innervation.
15. List the motor branches of the IX cranial nerve and identify the areas of innervation.

Test tasks «KROK - 1» (examples)

1. A woman came to the dentist with complaints of a bruise and swelling under her eye. The examination revealed that the patient under supraorbital anesthesia was deleted the first small angular tooth, and a few days later there was a hematoma in the region of the foramen infraorbitale. Which nerve is the companion artery, damage to which led to the hemorrhage?

A.:N. lacrimalis.

B.:N. infraorbitalis.

C.:N. frontalis.

D.:N. supraorbitalis.

E.:N. facialis.

№ 2

The examination of the patient with disorders the skin of the face innervation detected inflammation of the trigeminal node. The totality of the bodies wick of neurons forms this knot?

A.: The bodies of preganglia sympathetic neurons.

B.:The bodies of pseudo-unipolar neurons.

C.:The bodies of paraganglia metasympathic neurons.

D.: The bodies of somatomotoneurons.

E.:The bodies of preganglia parasympathic neurons.

№ 3

The patient with sinusitis (inflammation the mucous membrane of the maxillary sinus) carried out a puncture of the sinus to the evacuation of pus. This raises the pain due to irritation of the branches, innervates the lateral wall of the nasal cavity. Branches of what nerve during surgery annoying? A.:N. ethmoidalis posterior, n. maxillaris.

B.:N. facialis, n. maxillaris.

C.:N. mandibularis, n. maxillaris.

D.:N. ethmoidalis anterior, n. maxillaris.

E.:N. lacrimalis, n. maxillaris.

№ 4

In a patient after trauma of the lateral wall of the orbit appeared loss of sensation of the cheeks skin and anterior part of the temporal region. What nerve structures are damaged by trauma?

A.:N. lacrimalis.

B.:Nn. pterygopalatini.

C.:N. infraorbitalis.

D.:N. zygomaticus.

E.:Rr. alveolares superiores anteriores.

№ 5

A man, 60 years old, has a farsightedness in connection with the weakening acomodating properties of the lens and muscles of the vascular layers of the eyeball that require correction lenses. Branches of which node are innervated by the muscles of the corpus ciliare?

A.:Ganglion ciliare.

B.:Ganglion submandibulare.

C.:Ganglion pterygopalatinum.

D.:Ganglion trigeminale.

E.:Ganglion oticum.

№ 6

In a patient after colds appeared a violation of pain and temperature sensitivity of the mucous membrane of the anterior 2/3 of the tongue. Which of the nerves hurts?

A.: N. facialis

B.: N. trigeminus

C.:N.vagus

D.:N. hypoglossus

E.: Chorda tympani

№ 7

The patient has cellulitis of the mouth bottom, which occurred in association with osteomyelitis of the mandibula of dental origin. Which nerve innervates the major muscle (which still is called diaphragma oris), that forms the mouth bottom?

A.:N. alveolaris inferior.

B.:N. mylohyoideus.

C.:N. lingualis.

D.:N. mentalis.

E.:N. buccalis.

№ 8

The patient has a tumor of the brain stem. The patient has strabismus, paresis of facial muscles, jaw drooping, reduced hearing acuity. In what part of the brain is the pathological process?

A.:The pons.

B.:The midbrain.

C.:The spinal cord.

D.: The medulla oblongata.

E.: The cerebellum.

№ 9

The patient's examination revealed paresis of the masticatory muscles, pain and decrease of skin sensitivity in the lower lip area, chin, teeth and gums of the mandibula on the right. The injury of what nerve is possible?

A.: The third branch of the trigeminal nerve.

B.: The second branch of the trigeminal nerve.

C.: The facial nerve.

D.: The first branch of the trigeminal nerve.

E.: The hypoglossal nerve.

№ 10

The patient after suffering a cranial injury x-ray revealed a fracture of the skull base. The line of fracture through the spinous and oval holes. Which nerve is damaged by injury?

A.:N. maxillaris.

B.:N. vagus.

C.:N. trochlearis.

D.:N. hypoglossus.

E.:N. mandibularis.

№ 11

The patient is determined by the sharp pain of the skin on the face. Which nerve is affected?

A.: N. glossopharyngeus.

B.:N. vagus.

C.: N. facialis.

D.:N. oculomotorius.

E.: N. trigeminus.

№ 12

Patient, 30 years old, appealed to the doctor complaining of pain in the parotid-masticatory region. The surgeon removed the stone from the duct of the parotid gland. Removing it he prevented damage to the nerve that innervates this gland. What is a nerve?

A.:N. alveolaris inferior.

- B.:N. lingualis.
- C.:N. glossopharyngeus.
- D.:N. hypoglossus.
- E.:N. auriculotemporalis.**

№ 13

When performing regional anesthesia in the area of the mandibula openings, the dentist injured a vessel, that resulted in hematoma. The next day in a patient appeared numbness of the lower lip, skin of chin, gums. Which nerve was compressed by the hematoma?

- A.:N. infraorbitalis.
- B.:N. alveolaris inferior.**
- C.:N. zygomaticus.
- D.:N. lingualis.
- E.:N. buccalis.

№ 14

To the clinic appealed a man, 45 years old, with complaints of loss of taste sensation in the posterior third of the tongue. A function of which pair of cranial nerves is broken?

- A.:XI.
- B.:XII.
- C.:IX.**
- D.:V.
- E.:VIII.

№ 15

The man, 40 years old, due to a blow to the head disrupted the hearing and there was paresis of the facial muscles. The doctor diagnosed him with a hematoma on the cerebellopontine angle. What nerves have been affected?

- A.:IX, X cranial nerves.
- B.:V, VI cranial nerves.
- C.:XI, XII cranial nerves.
- D.:VIII, IX cranial nerves.
- E.:VII, VIII cranial nerves.**

№ 16

To a man, 68 years old, the doctor found inflammation of the tympanic nerve. A branch of which cranial nerve affected?

- A.:IX.**
- B.:XII.
- C.:VIII.
- D.:XI.
- E.:X.

№ 17

As a result of violations of blood circulation in pool of the vertebral artery the patient have any bulbar palsy, which damaged nuclei IX, X, XI pairs of cranial nerves. The patient has impaired swallowing and phonation, food gets in the nasal cavity,

there is dysphonia, dysphagia, dysarthria. What cranial nerve is damaged?

A.:Nucleus ambiguus.

B.:Nucleus principalis.

C.:Nucleus impar.

D.:Nucleus n. accessorius.

E.:Nucleus salivatorius superior.

№ 18

The patient disturbed secretion of lacrimal gland, which led to drying of the fibrous sheath of the eyeball. Physician a violation of innervation of the lacrimal gland from the ganglion pterygopalatinum. The composition of what nerves the paraganglia secretory fibres reach the lacrimal gland?

A.:N. zygomaticus et n. supraorbitalis.

B.:N. zygomaticus et n. frontalis.

C.:Nn. nasales posteriores et n. lacrimalis.

D.:N. infraorbitalis et n. lacrimalis.

E.:N. zygomaticus et n. lacrimalis.

№ 19

In a patient with a tumor of the brain stem, disturbed act of swallowing due to damage to the nuclei of cranial nerves. What nucleus is affected?

A.:Nucleus ambiguus.

B.:Nucleus spinalis n. trigemini.

C.:Nucleus salivatorius inferior.

D.:Nucleus solitarius.

E.:Nucleus dorsalis n.vagi.

№ 20

In a woman, 56 years old, a neurologist has established lesion of nuclei of IX, X and XI pairs of cranial nerves. What department of the brain has undergone pathological changes?

A.:Diencephalon.

B.:Pons.

C.:Medulla oblongata.

D.:Mesencephalon.

E.:Telencephalon.

№ 21

In a patient after purulent inflammation of the right parotid gland appeared paralysis m. buccinator business. Which pair of nerves were affected?

A.:IX.

B.:VII.

C.:IV.

D.:V.

E.:XI.

№ 22

The patient has a tumor of the brain stem. The patient has strabismus, paresis of facial muscles, jaw drooping, reduced hearing acuity. In what part of the brain stem is the pathological process?

A.:The pons.

B.:The medulla oblongata.

C.:The spinal cord.

D.:The cerebellum.

E.:The midbrain.