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Department of Dentistry No. 2

METHODOLOGICAL RECOMMENDATIONS FOR STUDENTS

MODULE

"FEATURES OF THE MAXILLOFACIAL REGION"

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The topic of the lesson: "Anatomical features of the structure of the bones of the facial skeleton".

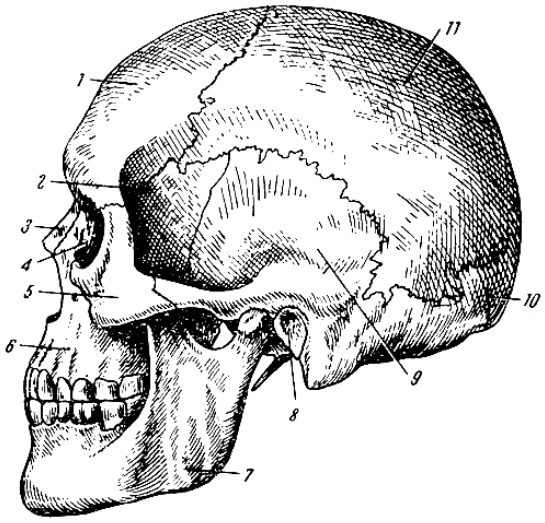
Purpose: To know the features of the structure of the bones of the facial skeleton.

Questions to study:

1. Classification of the bones of the facial skeleton
2. Anatomy of the lower jaw
3. Anatomy of the upper jaw
4. Anatomy of the hyoid bone
5. Which muscles are attached to the hyoid bone
6. Anatomy of the palatine bone and in the formation of which this bone is involved
7. Anatomy of the coulter, zygomatic b., nasal b., lacrimal b., lower nasal conch.

The facial part of the skull (splanchnocranium) includes 15 bones:

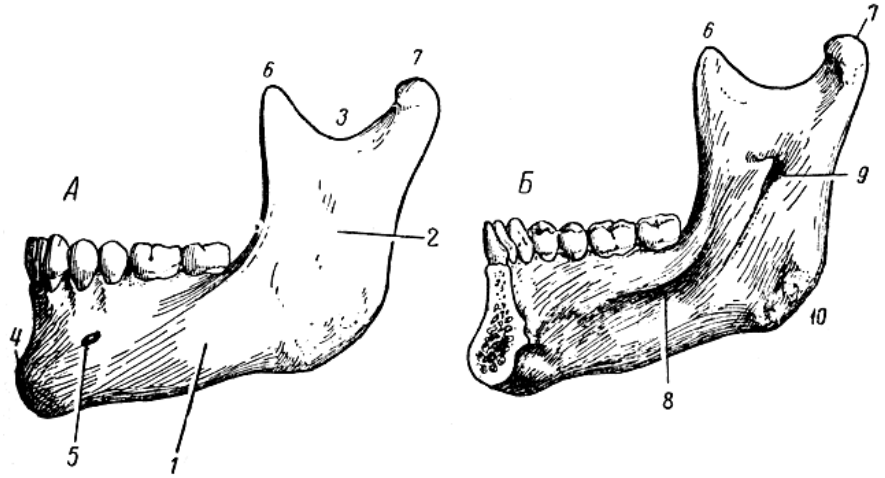
- unpaired - lower jaw, coulter, hyoid bone;
- paired - upper jaw, palatine, zygomatic, nasal, lacrimal, lower nasal concha.



Skull (side view). 1 - frontal bone; 2 - sphenoid bone (large wing); 3 - nasal bone; 4 - lacrimal bone; 5 - zygomatic bone; 6 - upper jaw; 7 - lower jaw; 8 - external auditory orifice; 9 - temporal bone; 10 - occipital bone; 11 - parietal bone.

The lower jaw (mandibula) has the shape of a horseshoe, consists of a body and two branches. The upper edge of the body is called alveolar, it contains 16 cells for the roots of the teeth. On the outer surface of the body there are two chin tubercles and

two chin openings, on the inner surface there is a chin protrusion and a maxillofacial line. The branch of the jaw departs from the body at an obtuse angle and ends at the top with two processes: coronal and articular, separated by a tenderloin. On the inner surface of the branch there is a mandibular opening leading to the canal of the same name. The lower jaw is the only movable bone of the skull.

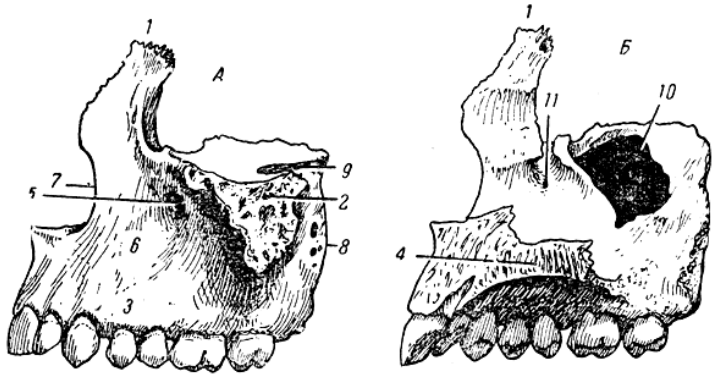


The lower jaw. A - left half (outside view); B - right half (inside view); 1 - body; 2 - branch; 3 - tenderloin; 4 - chin elevation; 5 - chin opening; 6 - coronal process; 7 - articular process; 8 - maxillofacial line; 9 - mandibular hole; 10 - angle of the lower jaw

The coulter (vomer) has the shape of an irregular quadrangular plate, participates in the formation of the nasal septum.

The hyoid bone (oshyoideum) has the shape of a horseshoe and consists of a body and two pairs of horns (large and small). The hyoid bone is located between the lower jaw and the larynx, being the place of attachment of many neck muscles.

The maxilla consists of a body and four processes: frontal, zygomatic, palatine and alveolar. There are four surfaces on the body of the bone: anterior, posterior, or suspensory, orbital and nasal. On the front surface there is a recess - a dog pit, on the back there is a protrusion called the maxillary hillock. The alveolar process contains eight recesses-cells in which the roots of the teeth are placed. Inside the body of the upper jaw there is an air-bearing cavity called the maxillary sinus.



The upper jaw. A - left (outside view); B - right (inside view); 1 - frontal process; 2 - zygomatic process; 3 - alveolar process; 4 - palatine process; 5 - subglacial opening; 6 - canine fossa; 7 - nasal notch; 8 - maxillary tubercle; 9 - subglacial furrow; 10 - maxillary sinus; 11 - lacrimal furrow

The palatine bone (ospalatinum) consists of two plates: horizontal and vertical, participates in the formation of the hard palate and the lateral wall of the nasal cavity.
The zygomatic bone (oszygomaticum) has the shape of an irregular quadrilateral, forms a protrusion in the lateral part of the face and participates in the formation of the zygomatic arch.
The nasal bone (osnasale) has the shape of a plate, participates in the formation of the back of the nose.
The lacrimal bone (oslacrimale) is a small bone, has a lacrimal groove and a scallop, participates in the formation of the pit of the lacrimal sac and the lacrimal canal.
The lower shell is a thin curved bone plate, located on the side wall of the nasal cavity.

The topic of the lesson: "Anatomical and topographic features of the innervation of maxillofacial region. The concept of neuralgia, neuropathies of the trigeminal and facial nerves".

Objectives: To know the anatomy and topography of the nerves innervating maxillofacial region. Know the clinic, diagnosis and treatment of neuralgia and neuritis of the trigeminal and facial nerves.

Questions to study:
1. clinic of neuritis and trigeminal neuralgia.
2. clinic of neuritis and traumatic injury of the facial nerve.
3. differential diagnosis of neuritis and trigeminal neuralgia.
4. differential diagnosis of neuritis and traumatic damage to the facial nerve.
5. methods of treatment of neuritis and trigeminal neuralgia.
6. methods of treatment of neuritis and traumatic damage to the facial nerve.
7. surgical methods of treatment of trigeminal neuralgia and traumatic damage to the facial nerve.
8. possible complications of surgical treatment of neuritis, trigeminal neuralgia and traumatic injuries of the facial nerve.

The maxillofacial region receives innervation from motor, sensitive, vegetative (sympathetic, parasympathetic) nerves. Of the 12 pairs of cranial nerves, the following are involved in innervation:

- V para – trigeminal nerve
- VII para – facial nerve
- IX para – lingual nerve
- X para – vagus nerve

- XII para – sublingual nerve

V para – trigeminal nerve (mixed).

1) Sensitive nerve fibers carry information about pain, tactile and temperature sensitivity from the skin of the face, mucous membranes of the nasal and oral cavities, as well as impulses from the mechanoreceptors of the masticatory muscles, teeth, temporomandibular joints.

2) Motor fibers innervate the following muscles: masticatory, temporal, pterygoid, maxillofacial, anterior abdomen of the bicuspid muscle, as well as the muscle that strains the eardrum and the lifting palatine curtain.

Three sensory nerves depart from the trigeminal node: the orbital, maxillary and mandibular. Motor fibers that are not involved in the formation of the trigeminal node are attached to the mandibular nerve and make it a mixed (sensitive and motor) nerve.

- The orbital nerve is the first branch of the trigeminal nerve. It passes together with the oculomotor block-like nerves in the thickness of the outer wall of the cavernous (cavernous) sinus and enters the orbit through the upper orbital slit. Before entering this gap, the nerve gives off three branches: frontal, nasolacrimal and lacrimal.
- The maxillary nerve is the second sensitive branch of the trigeminal nerve. It exits the cranial cavity through a round hole into the pterygoid fossa, where it gives off a number of branches:

branch	topography	innervation
Infraorbital	It begins in the pterygoid fossa, exits the subglacial orifice and branches out, forming a small goose's foot.	The region of innervation of the posterior, middle and anterior upper alveolar branches, the small crow's foot.
Small crow's foot: lower eyelid, external nasal, internal nasal, upper labial branches.	Terminal branches of the suborbital nerve. They branch into the region .skin and mucous membrane top.lips, lower.the eyelid, the under-eye area, the wing of the nose and the skin part of the nasal septum.	The skin is lower.eyelids, subglacial region, wings of the nose and skin.parts of the nasal septum, skin and mucous in.lips to the corner of the mouth.
Posterior upper alveolar branches	They depart from the subglacial space in the pterygoid fossa. Most of the posterior upper alveolar branches penetrate through the	Hillock top.jaws, slim.the shell of the maxillary sinus, the top.molars, sliz.the shell and periosteum of the alveolar process in the area of

	foramina alveolaria into the canalis alveolaris, from which the upper surface extends to the outer surface.jaws and enter its bony channels.	these teeth.
Middle upper alveolar branch	Departs from the subglacial space in the pterygoid fossa or in the posterior part of the subglacial furrow. Passes through the thickness of the front wall of the top.jaws and branches in the alveolar process.	Top. premolars, sliz.the shell of the alveolar process and the gums from the vestibular side in the region of these teeth.
Anterior upper alveolar branches	They depart from the subglacial nerve in the anterior part of the subglacial canal. They can exit through the subglacial opening or in a separate bone canal. It gives the nasal branch to the mucous membrane of the anterior part of the nasal floor.	Incisors and fangs, sliz.the shell and periosteum of the alveolar process, as well as the mucous membrane of the gum from the vestibular side in the region of these teeth.
Zygomatic nerve	Departs in the pterygoid fossa from the maxillary n. penetrates into the eye socket through the lower.the orbital slit and gives 2 branches that penetrate into the thickness of the zygomatic bone and exit through the holes of the same name and branch out in the zygomatic area.	The skin of the zygomatic area, up.the cheek and the outer corner of the eye, the anterior temporal and lateral frontal region.
Nasolabial nerve	Departs from the wing node. Anastomoses with the same name on the opposite side and exits through the incisor opening to the hard palate.	The triangular section of the slip.the shells of the hard palate in the anterior section between the canines (from the middle of the canine to the middle of the canine).

Great palatine nerve	Departs from the wing node and through the foramen palatinus major enters the firm palatine.	The posterior and middle sections of the mucous membrane of the hard palate to the middle of the canine and small saliva.glands, partially slimed.the shell of the soft palate.
Small palatine nerves	They depart from the wing node, exit through the palatine openings and branch into the mucous membrane of the soft palate.	Tears'.soft palate, palatine tonsil.
Lower posterior lateral nasal branches	They move away from the wing node and penetrate into the nasal cavity	The mucous membrane of the lower nasal conch, tears.cf. and nih.nasal passage and maxillary sinus.

- Mandibular nerve. Mixed, since it consists of a smaller (front) part-motor and a larger (rear) part-sensitive.

1) The masticatory nerve (motor branches to the masticatory muscle and temporomandibular joint), deep temporal nerves (to the temporal muscle), lateral pterygoid nerve (goes to the lateral pterygoid muscle), buccal nerve (sensitive branches that innervate the skin and mucous membrane of the cheek) depart from the anterior branch. Thus, the anterior part (branch) of the mandibular nerve is predominantly motor.

2) The posterior part (branch) of the mandibular nerve consists of both motor fibers - the medial pterygoid nerve (to the muscle stretching the soft palate), the nerve straining the palatine curtain and the nerve of the muscle straining the eardrum, and three large sensory nerves — the auricular, inferior alveolar and lingual.

The auricular-temporal nerve contains both sensitive branches (innervate the skin of the temporal region) and post-nodular sympathetic and secretory parasympathetic fibers from the ear node (provide vegetative innervation of the parotid gland and vessels of the temporal region). Having separated under the oval opening, it is directed along the inner surface of the lateral pterygoid muscle, and then goes outward, bending around the neck of the condyle process of the lower jaw from behind. Then it is directed upwards, penetrating through the parotid gland, it approaches the skin of the temporal region, where it branches into terminal branches.

The inferior alveolar nerve (mandibular) is the largest branch of the mandibular nerve. It contains mainly sensitive fibers. Its motor branches are the maxillofacial nerve (branches in the maxillofacial and anterior abdomen of the bicuspid muscle). In the mandibular canal, a large number of lower dental branches depart from the lower alveolar nerve, forming the lower dental plexus. When exiting the mandibular canal through the chin opening, this nerve is already called the chin nerve.

VII para – facial nerve (motor).

It is a motor nerve innervating facial facial muscles, cranial arch muscles, stirrup muscles, subcutaneous neck muscle, shilopodygoid muscle and posterior abdomen of the bicuspid muscle. In addition to motor fibers, the nerve carries gustatory (for the tongue) and secretory fibers (for the salivary glands of the bottom of the oral cavity). The facial nerve exits the skull through the shilosocular foramen, goes below the external auditory canal and laterally from the posterior abdomen of the biconvex muscle, the external carotid artery to the parotid gland, which it pierces. In the depth of the parotid gland, the facial nerve is divided into the upper (thicker) temporal-facial and lower (smaller) cervical-facial branches. Radially diverging branches of the facial nerve in the parotid gland are called the great crow's foot.

All branches are divided into three groups:

1) upper — temporal and zygomatic branches (for the muscles of the outer ear, forehead, zygomatic and circular muscles of the eye socket);

2) the middle — buccal branch (for the buccal muscle, the muscles of the nose, the upper lip, the circular muscles of the mouth, the triangular and square muscles of the lower lip);

3) the lower one — the marginal branch of the lower jaw (for the square muscle of the lower lip, chin muscle), the cervical branch (for the subcutaneous muscle of the neck).

IX para - lingopharyngeal nerve (mixed). It contains sensitive, gustatory, motor and secretory fibers. Innervates the posterior 1/3 of the eponymous half of the tongue, palatine tonsils, palatine arches, the mucous membrane of the upper pharynx. Dendrites of taste cells – carry out gustatory innervation of the posterior 1/3 of the tongue.

X pair – vagus nerve (mixed). It contains motor, sensory and vegetative fibers. Innervates the facial area, the pharyngeal cavity, the upper larynx.

XII para – hyoid nerve (motor). Innervates the muscles of the same side.

TRIGEMINAL NEURALGIA

Trigeminal neuralgia is a sensitivity disorder expressed in paroxysmal pain in the nerve innervation zone.

Etiology and pathogenesis. Currently, trigeminal neuralgia is considered a polyethological disease. Among its causes are: narrowing of the bone openings through which it passes; fusion of the dura mater in the area of the trigeminal node; violation of the circulation of ventricular fluid of the brain as a result of arachnoiditis: molecular and colloidal changes in the nerve fiber, changes in the chewing apparatus, leading to malocclusion. The cause of neuralgia may also be an allergic-inflammatory reaction in the branches of the nerve as a result of infections or hypothermia of the face. In old age, neuralgia occurs as a result of changes in the vessels feeding both the extracranial and intracranial sections of the trigeminal nerve.

Clinical picture. Sharp paroxysmal pains lasting from a few seconds to 1 min. They are usually limited to the innervation zone of one of the affected nerve branches. The intensity of pain varies. Over time, they become drilling, cutting, burning, beating like an electric current. An attack of pain occurs both spontaneously and as a result of any irritation With strong pressure on the affected nerve branch with c- tup subsides, and sometimes breaks off. Usually there is an exact localization of pain, but sometimes the pain may not correspond to the topography of the nerve, it becomes diffuse.

Attacks of pain in some cases are accompanied by vegetative symptoms: sweat appears on the diseased side of the face, redness of the skin, pupil dilation, swelling, lacrimation, increased saliva and nasal secretions are observed.

Diagnosis. To diagnose the lesion of one or another branch of the trigeminal nerve, "trigger" zones and zones of perversion or sensitivity disorders on the skin or oral mucosa are determined.

Treatment.

Conservative treatment of trigeminal neuralgia, physical methods:

• darsonvalization

• Bernard currents (diadynamic therapy)

• fluctuation

• medicinal electrophoresis:

• vitamin therapy (B1, B6, nicotinic acid)

• sedative (seduxen, meprobamate, trioxazine, bromide-medinal medicine)

• antiepileptic (carbamazepine, diphenine, tegretol, baclofen)

Surgical treatment of trigeminal neuralgia:

• local blockades with trimecaine

• intravenous infusion of anesthetic on the peripheral nerve

• nerve fiber intersection

• alcoholization of the nerve

• intersection of conducting paths

• destruction of sensory nuclei in the medulla oblongata and medulla at the level of the thalamus and pain-conducting pathways from the thalamus to the cerebral cortex at the trigeminal node and sensitive root

• intersection

• electrical destruction

• decompression

• stereotactic destruction of the trigeminal node (rhizotomy and rhizolysis) (open and percutaneous hydrothermal and chemical rhizotomy, selective thermal destruction, high-frequency coagulation, glycerol rhizolysis).

Trigeminal neuropathy is a lesion of the trigeminal system characterized by changes in the interstitium, myelin sheath and axial cylinders of fibers, manifested by symptoms of prolapse and (or) irritation in the innervation zone of the main branches or twigs.

Etiological factors of trigeminal neuropathy:

- infectious lesion (herpetic herpes zoster or herpes simplex, malaria, viral hepatitis, brucellosis, syphilis, multiple sclerosis, influenza, etc.)
- traumatic
- compression of the nerve in the cranial canal or orifice- developmental anomaly- compression during the formation and eruption of teeth
- nerve compression in the cranial canal or orifice- acquired pathology- traumatic injury
- nerve compression in the cranial canal or orifice- acquired pathology - compression by neoplasm.

Clinical picture of trigeminal neuropathy with allergic symptoms:

• constant pain in the innervation zone of the terminal (less often the main) branches of the nerve

• pain is spontaneous or provoked by pressure, facial expressions, talking, eating, temperature changes, etc.

• aching, excruciating, piercing, burning, cutting, etc., of varying intensity • presence of trigger points

• disorder of all types of sensitivity

• manifestation of trophic disorders (edema, hyperemia, desquamation) with hypesthesia/anesthesia

• decreased sensitivity in the area of innervation of the affected nerve branch

• feeling of numbness or paresthesia ("cold", "crawling goosebumps", "bundle of needles", etc.)

• disorder of all types of sensitivity

• manifestation of trophic disorders (edema, hyperemia, desquamation).

Treatment of trigeminal neuropathy, main tasks:

- elimination of the causal factor
- restoration of nerve fiber conduction means
- conservative
- surgical

Conservative means of restoring nerve conduction:

• elimination of ischemia (scars, etc.): trilon B (introduction by ultrasound) lidase (introduction by electrophoresis)

• enhancement of regenerative ability of nerve fiber: nicotinic acid, vitamin B1, vitamin B6

• stimulation of the trophic nerve.

Defeat of the facial nerve.

Syndromes observed in the area of facial nerve innervation (facial convulsions and hyperkinesis):

- facial hemispasm is a unilateral hyperkinetic syndrome observed in the area of facial nerve innervation and manifested by paroxysms of myofasculations and myoclonia of facial muscles on the affected half of the face
- facial paraspasm is a bilateral hyperkinetic syndrome observed in the area of facial nerve innervation and manifested by paroxysms of myofasculations and myoclonia of facial muscles on the affected half of the face
- blepharospasm is hyperkinesis, limited to convulsive contractions of the circular muscle of the eye all these lesions are the result of damage to the extrapyramidal system externally manifested by facial hyperkinesis.

Syndromes observed in the area of facial nerve innervation (systemic lesions of the central nervous system and brain tumors):

- multiple sclerosis
- myasthenia gravis
- Rossolimo-Melkersson-Rosenthal syndrome
- Guillain-Barre syndrome
- vascular lesions of the central nervous system
- CNS tumors

(these processes are more often expressed in bilateral paresis and paralysis of facial muscles).

Causes of facial nerve damage (facial neuropathy):

- ischemia compression of the nerve in the bone canal with edema caused by vascular disorders, hemorrhages of paranephral tissues, dystrophic tissue changes, inflammation
- injury mechanical damage caused by injuries and operations
- inflammation destruction of the myelin sheath and loss of axial cylinders by axons, perivascular infiltration by lymphocytes and edema of the nerve stem caused by a viral and autoimmune process
- combined defeat.

Clinical picture of facial neuropathy:

- impaired function of facial muscles
- reduced tissue sensitivity
- vegetative-vascular disorders (discoloration of the skin and mucous membranes, decrease in tissue temperature).

Treatment of facial neuropathy tasks:

• correction of microcirculatory disorders low molecular weight dextran vasoactive drugs (trental)

• edema relief steroid hormones (prednisone, hydrocortisone)

• correction of neurotrophy B vitamins (B1, B6, B12, milgama) ATP hyperbaric oxygenation

• surgical restoration of nerve integrity neuroraphy nerve branch transposition nerve transplantation neuromuscular block transplantation static suspension of the face.

The topic of the lesson: "Anatomical and topographic features of blood supply to maxillofacial region".

Purpose: To know the anatomy and topography of the vessels involved in the blood supply of the maxillofacial region.

Questions to study:

1. Arteries involved in the blood supply of maxillofacial region
2. Veins involved in the blood supply of maxillofacial region
3. Common carotid artery. Its branches.
4. Branches of the external carotid artery.
5. Branches of the internal carotid artery.

Arterial system of maxillofacial region.

The common carotid artery (a. carotis communis) passes in the carotid triangle and at the level of the upper edge of the thyroid cartilage or the body of the hyoid bone is divided into a. carotis externa and a. carotis interna.

The maxillofacial region is supplied with blood by the branches of the **external carotid artery**, which, in turn, form a group of anterior, middle and posterior branches.

The anterior group includes the thyroid, lingual and facial arteries.

The middle group consists of the ascending pharyngeal artery, superficial temporal and maxillary arteries.

The posterior group is formed by the sternocleidomastoid branch, occipital artery and posterior auricular artery.

The thyroid artery departs from the external carotid artery, slightly above its beginning, goes down and forward to the thyroid gland. The lingual artery departs at the level of the large horns of the hyoid bone and goes to the tongue. The facial artery departs slightly above the lingual artery at the level of the angle of the lower jaw, passes inside from the posterior abdomen of the m. digastricus and goes to the m. masseter, where it bends over the face at its anterior edge. Then this artery is directed to the medial corner of the eye, where its terminal branch - a. angularis anastomoses with a. dorsalis. It supplies blood to the pharynx and soft palate, palatine tonsils, submandibular gland, muscles of the bottom of the oral cavity, sublingual glands, upper and lower lips. The ascending pharyngeal artery begins from the inner surface of the external carotid artery at its very beginning and supplies blood to the side wall of the pharynx, the soft palate and partially the palatine amygdala, as well as its branches penetrate into the cranial cavity to the meninges. A. sternocleidomastoidea directs and supplies blood to the muscle of the same name. The occipital artery begins on the posterior surface of the external carotid artery and

under the posterior abdomen m. digastricus goes to the occipital region, blood supplies the skin and muscle of this area, the auricle, the dura mater. The posterior auricular artery passes over the posterior abdomen of M. digastricus and goes to the skin behind the auricle, supplying blood to the skin and muscles of this area, the facial nerve and the middle ear. The superficial temporal artery, one of the two terminal branches of the external carotid artery. It passes in front of the external auditory canal into the temporal region, is located under the skin on the fascia of the temporal muscle. Its terminal branches, ramus frontalis and ramus parietalis, supply blood to m. temporalis and the soft integuments of the cranial vault. Along the way, this artery gives branches to the parotid salivary gland, to the lateral surface of the auricle, to the external auditory canal, soft tissues in the area of the outer corner of the eye, m. orbicularis oculi and to the zygomatic bone. The maxillary artery is another terminal branch of the external carotid artery. It gives the following branches: the middle meningeal artery, (to the dura mater of the brain); the lower alveolar artery in the mandibular canal gives branches to the teeth, interalveolar septa and mucous membrane, and leaving the canal a. mentalis branches in the soft tissues of the lower lip and chin); the subglacial artery, , enters through the fissura orbitalis interior into the eye socket and through the canalis infraorbitalis exits to the anterior surface of the maxillary bone (it supplies blood to the upper teeth, the mucous membrane of the alveolar process and the maxillary sinus); the pterygoid-palatine artery, penetrating through the hole of the same name into the nasal cavity, branches in the nasal mucosa. A. maxilaris also gives branches to the palate, pharynx, auditory tube, part of the vessels descends into the canalis palatinus majores et minores and branches in the hard and soft palate.

The internal carotid artery, a.carotis interna, departs from the common carotid artery and rises up, enters the canalis caroticus of the temporal bone. In the skull , it gives the following branches:

— carotid-tympanic branches, rr.caroticotympanici, penetrate into the tympanic cavity;

— the ocular artery, a.ophthalmica, penetrates through the canalis opticus into the cavity of the eye socket and supplies blood to the dura mater of the brain, the lacrimal gland (a.lacrimalis), the eyeball and its muscles, to the eyelids (aa.palpebrales laterales et mediales), to the nasal mucosa (aa.ethmoidales anterior et posterior), to the skin of the brow (a.supraorbitalis), to the skin of the nose (a.dorsalis nasi);

— anterior cerebral artery, a.cerebri anterior, supplies blood to the cerebral cortex;

— the middle cerebral artery, a.cerebri media, supplies blood to the brain;

— artery of the vascular plexus, a.chorioidea;

— posterior connective artery, a.communicans posterior.

The venous system of the maxillofacial region essentially repeats the system of arterial. Venous blood from the organs of the oral cavity and tissues of the maxillofacial region flows through the system of jugular veins. The internal jugular vein receives blood from the head and neck. The tributaries of the internal jugular vein are divided into intracranial and extracranial. The first ones include the sinuses of the dura mater and the veins of the brain, cranial bones, eye sockets, and dura mater flowing into them. To the second: facial vein, post-maxillary vein (collects blood from the temporal and parotid regions); pharyngeal veins.; lingual vein,; upper thyroid veins, (corresponds to the course of the corresponding arteries); middle thyroid vein. The final venous vessel collecting venous blood from the departments of the maxillofacial region is the facial vein (v. facialis). After merging with the post - maxillary vein, the facial vein flows into the internal jugular vein.

The pterygoid venous plexus, plexus venosus pterygoideus, is located in the subsurface fossa. Collects blood from the membranes of the brain, from the upper pharyngeal plexus, from the inner, middle and outer ear, from the parotid gland, masticatory muscles, partially from the vein of the eye socket, from the mucous membrane of the nasal and oral cavities, as well as from the teeth. It flows into v.retromandibularis, v.facialis communis.

Topic: "Anatomical and topographic features of the lymphatic system of the maxillofacial region".

Goals: To know the groups of lymph nodes, structure, topography.

Questions:

1. Regional lymph nodes of the head and neck

2. LN groups

3. Anatomy of LN

4. Topography of LN

Lymph from the head and neck collects into the right and left jugular lymphatic trunks, which run parallel to the internal jugular vein on each side and flow: the right - directly into the right venous angle and the left - into the left venous angle.

Before getting into the named duct, the lymph passes through the regional lymph nodes. Among these node groups, the following can be noted:

1. Occipital. Lymphatic vessels flow into them from the posterior part of the temporal, parietal and occipital regions of the head. 2. Mastoids collect lymph from the same areas, as well as from the back surface of the auricle, the external auditory

canal and the eardrum. 3. Parotid (superficial and deep) collect lymph from the forehead, temple, lateral part of the eyelids, outer surface of the auricle, temporomandibular joint, parotid gland, lacrimal gland, wall of the external auditory canal, eardrum and auditory tube of this side. 4. Submandibular lymph is collected from the lateral side of the chin, from the upper and lower lips, cheeks, nose, gums and teeth, medial part of the eyelids, hard and soft palate, from the body of the tongue, submandibular and sublingual salivary glands. 5. Facial collect lymph from the eyeball, facial muscles, mucous membrane of the cheek, lips and gums, mucous glands of the oral cavity, periosteum of the mouth and nose, submandibular and sublingual glands. 6. The submandibular collect lymph from the same areas of the head as the submandibular, as well as from the tip of the tongue.

There are two groups of lymph nodes on the neck: anterior cervical and lateral cervical.

The anterior cervical lymph nodes are divided into superficial and deep, among the latter are: pre-laryngeal (lying in front of the larynx), thyroid (in front of the thyroid gland), pre-tracheal and paratracheal (in front and on the sides of the trachea).

The lateral nodes also make up the superficial and deep groups. The superficial nodes lie along the external jugular vein.

Deep nodes form chains along the internal jugular vein, the transverse artery of the neck (supraclavicular nodes) and behind the pharynx - the pharyngeal nodes.

Lymphatic vessels: 1. the skin and neck muscles are directed to nodi lymphatici cervicales superficiales; 2. larynx (lymphatic plexus of the mucous membrane above the vocal cords) - through membrana thyrohyoidea to nodi lymphatici cervicales anteriores profundi; lymphatic vessels of the mucous membrane below the glottis go in two ways: anteriorly - through membrana thyrohyoidea to nodi lymphatici cervicales anteriores profundi (preglottal) and posteriorly - to the nodules located along the N. laryngeus recurrens (paratracheal); 3. thyroid gland - mainly to nodi lymphatici cervicales anteriores profundi (thyroid); from the isthmus - to the anterior superficial cervical nodes; 4. from the pharynx and palatine tonsils, lymph flows to nodi lymphatici retropharyngei et cervicales laterales profundi.

Topic: "Anatomical and topographic features of chewing and mimic muscles".

Purpose: To know the anatomy and topography of the masticatory and mimic muscles.

Questions to study:

1. Anatomy and topography of the masticatory muscles.

2. Muscles that lift the lower jaw.

3. Muscles lowering the lower jaw.

4. Anatomy, topography and functions of facial muscles.

The chewing muscles set the lower jaw in motion, with the contraction of these muscles, a certain amount of chewing pressure develops, which ensures the ability of the teeth to bite and grind a food lump. These muscles also take part in the act of swallowing, speech formation, etc.

Part of the muscles belongs to the main masticatory:

• masticatory muscle (m. masseter),

• temporal muscle (m. temporalis),

• medial pterygoid muscle (m. pterygoideus medialis),

• lateral pterygoid muscle (m. pterygoideus lateralis).

Auxiliary muscles include:

• chin-hyoid muscle (m. geniohyoideus),

• maxillohyoid muscle (m. mylohyoideus),

• anterior abdomen of the bicuspid muscle (venter anterior m. digastricus).

The masticatory muscles are divided into:

1. muscles that raise the lower jaw (chewing, temporal, medial pterygoid muscles);

2. muscles lowering the lower jaw (anterior abdomen of the bicuspid muscles, chin-hyoid, maxillofacial);

3. extending the lower jaw (lateral pterygoid).

The masticatory muscle (m. masseter) begins in two parts (superficial and deep) from the zygomatic arch and attaches to the outer surface of the lower jaw branch and its corner.

The temporal muscle (m. temporalis) starts from the temporal surface of the large wing of the main bone, and the scales of the temporal bone, the bundles form a powerful tendon that attaches to the coronal process of the lower jaw.

The medial pterygoid muscle (m. pterygoideus medialis) starts from the walls of the pterygoid fossa of the main bone and attaches to the tuberosity of the pterygoid muscle of the lower jaw.

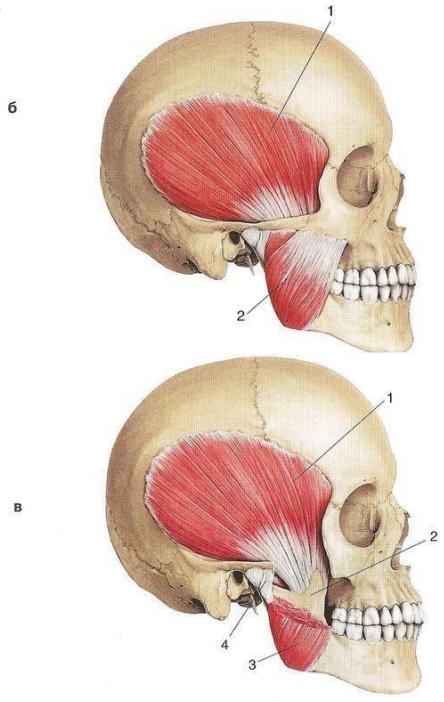
Lateral pterygoid muscle (m. pterygoideus lateralis) — the upper head begins from the subsurface and the subsurface crest of the main bone and attaches to the medial

surface of the articular bag of the temporomandibular joint and articular disc; the lower head begins from the outer surface of the lateral plate of the pterygoid process of the main bone and attaches to the pterygoid fossa of the lower jaw.

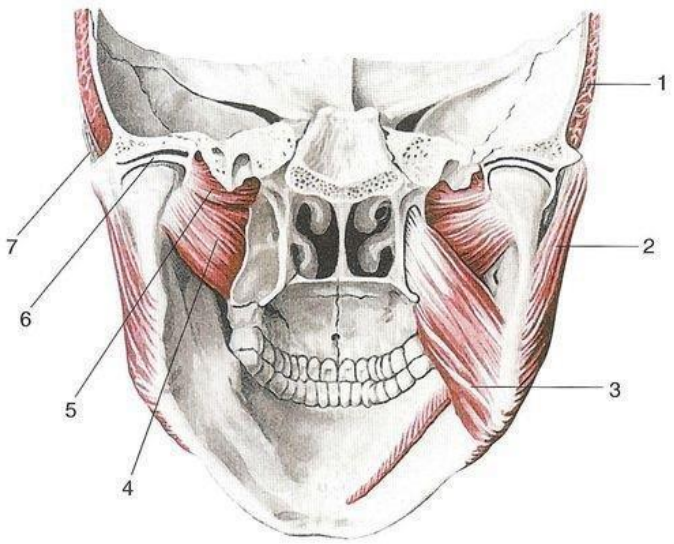
The anterior abdomen of the bicuspid muscle (venter anterior m. digastricus) —starts from the bicuspid fossa of the lower jaw goes back and down and passes into the tendon, which is attached to the body of the hyoid bone.

The maxillohyoid muscle (m. mylohyoideus) begins from the maxillohyoid line of the lower jaw, the bundles are directed from top to bottom, from behind to front and along the middle line form the seam of the maxillohyoid muscle, attached to the body of the hyoid bone.

The chin-hyoid muscle (m. geniohyoideus) starts from the chin spine of the lower jaw and attaches to the body of the hyoid bone.



Masticatory and temporal muscles (Pic.1): b — temporal and masticatory muscles after removal of the temporal fascia: 1 — temporal muscle; 2 — masticatory muscle; b — temporal muscle (the zygomatic arch and part of the masticatory muscle are removed): 1 — temporal muscle; 2 — coronal process of the lower jaw; 3 — masticatory muscle; 4 — temporomandibular joint.



Pic.2 Chewing muscles, rear view

1 — temporal muscle; 2 — masticatory muscle; 3 — medial pterygoid muscle; 4— lower head of lateral pterygoid muscle; 5 — upper head of lateral pterygoid muscle; 6 — articular disc; 7 — zygomatic arch.

Facial muscles begin on the surface of the bone or from the underlying fascia and are woven into the thickness of the skin. With its reduction, certain areas of the scalp are displaced and thereby give, mainly to its facial department, a wide variety of expressions. They also determine the configuration of the lips, partly the nostrils, eyelids, the shape and direction of natural and acquired (individual) furrows and sclal skin. In the center of the facial muscles is the circular muscle of the mouth. Posteriorly from the corners of the mouth, the circular muscle passes into the buccal muscle, intertwining with its fibers. Bilateral contraction of the buccal muscle pulls the corners of the mouth posteriorly, somewhat stretching them. The function of the circular muscle is to close and open the oral slit, to perform sucking, chewing, swallowing and speech. These functions are also performed by the action of other facial muscles starting on the anterior surface of the upper jaw, the zygomatic bone, on the chin part of the lower jaw and interwoven into the skin of the lips and fibers of the circular muscle of the mouth.

This group includes:

• the muscle that raises the upper lip, which, with unilateral contraction, raises the nasolabial fold, and with bilateral contraction, the free edge of the upper lip takes the form of a trapezoid;

• zygomatic muscles (large and small) and the muscle that raises the corners of the mouth;

• incisor lip muscle — helps to tighten the corners of the mouth inside and up; • laughter muscle — participates in pulling the corners of the mouth outward;

• the muscle that lowers the corners of the mouth pulls the corners of the mouth down and promotes the closing of the mouth (pulls the upper lip down);

• the muscle that lowers the lower lip pulls the lower lip down and out, promotes the extension of the lower lip forward and retraction of the corners of the mouth down and in.

Topic: "Anatomical and topographic features and functionality of the TMJ".

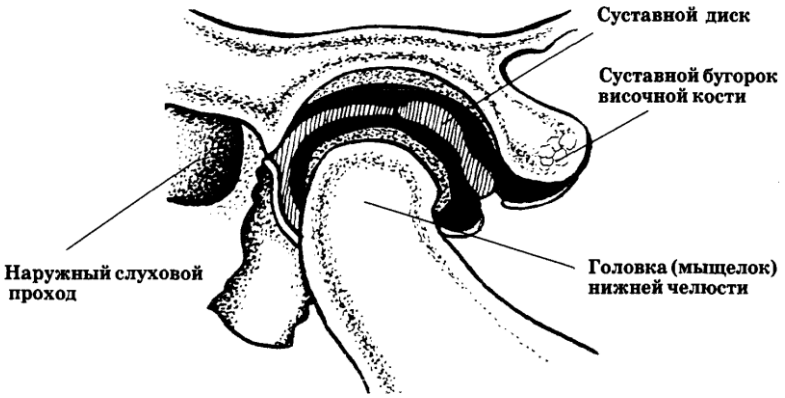
Purpose: To study the structure and functions of the TMJ.

Questions to study:

1. The structure of the TMJ (elements)
2. The boundaries of the articular fossa
3. Intra-articular disk. Disk functions
4. TMJ ligaments
5. Biomechanics of TMJ.

The temporomandibular joint (TMJ) is a combined paired incongruent joint formed by the head of the lower jaw, the mandibular fossa, the articular tubercle of the temporal bone, the articular disc, intra-articular ligaments and the joint capsule.

The anatomical feature of the temporomandibular joint is incongruence and the presence of an intra-articular disc. The joint is complex in its function, various movements (sliding, rotation) occur in it both on the horizontal and vertical axis. TMJ refers to the type of block-shaped joints. The right and left TMJ form one combined joint.



Clinical anatomy.

Elements of TMJ:

- articular depression (pit)
- articular tubercle
- articular head
- intra-articular disc (meniscus)
- the capsule together with the capsular and extracapsular ligaments proper.

The articular fossa is located on the temporal bone, has an ellipsoid shape. In front, the fossa is bounded by the posterior slope of the articular tubercle, behind — by a tympanic plate separating it from the external auditory canal, above — by a thin bone layer representing the arch of the fossa and separating it from the cerebral cavity, outside — by the posterior leg of the zygomatic process, inside — by the sphenoidalis. The anterior part of the fossa is covered with connective tissue cartilage.

The articular tubercle is located parallel to the articular fossa and is a roller curved sagittal and slightly concave in the frontal direction. Its shape can be different: flat, medium-convex, steep.

The articular heads of the lower jaw are transverse ellipsoid-shaped rollers. The anterior upper surface is covered with cartilage, it is this part that is involved in the formation of the joint.

The intra-articular disc is located between the articular tubercle and the articular fossa and is an oval biconcave plate of fibrous cartilage. The back of the disc is thickened. The meniscus is fused at the edges with the capsule and divides the articular cavity into two floors: upper-anterior and lower-posterior.

The articular bag stretches from the edges of the articular surface of the temporal bone to the neck of the articular head of the lower jaw and fuses with the articular disc along its edge. It consists of a hard fibrous tissue, lined with a synovial membrane from the inside.

Ligamentous apparatus of the joint.

The TMJ ligaments are divided into:

1. Intracapsular ligaments

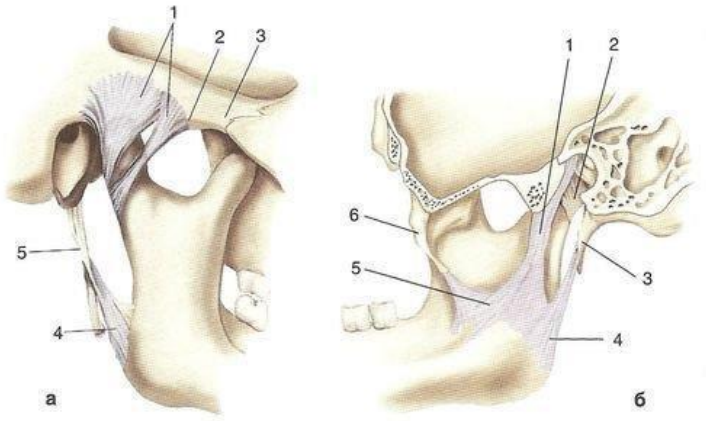
- anterior and posterior discovis, extending from the upper edge of the disc upwards and, respectively, forward and backward towards the root of the zygomatic arch;
- lateral and medial disconjuncular, located from the lower edge of the disc down to the attachment of the capsule at the neck of the lower jaw.

2. Extracapsular ligaments

- The lateral ligament (ligamentum laterale) starts from the base of the zygomatic process and the zygomatic arch, goes down to the neck of the

articular process. The ligament prevents excessive lowering of the articular head down, as well as its displacement outward and inward.

- The sphenomandibular ligament (ligamentum sphenomandibulare) originates from the spine of the sphenoid bone, spreads downwards, attaching to the tongue of the lower jaw. The ligament delays lateral and vertical movements of the lower jaw.
- The mandibular ligament (ligamentum stylomandibular) runs from the awl-shaped process of the temporal bone down to the posterior edge of the lower jaw branch closer to the angle. This ligament restricts the extension of the lower jaw forward.



a — view from the lateral side: 1 — lateral ligament; 2 — articular tubercle; 3 — zygomatic arch; 4 — maxillary ligament; 5 — styloid process;

b — view from the medial side: 1 — sphenoid-mandibular ligament; 2 — medial ligament; 3 — styloid process; 4 — shilonidomandibular ligament; 5 — pterygoid-mandibular ligament, 6 — medial plate of the pterygoid process

Muscle apparatus:

• m. temporalis

• m. masseter

• m. pterygoideus lat.

• m. pterygoideus med.

• m. stylohyoideus

• m. digastricus

TMJ biomechanics.

Components of movements:

• vertical (opening and closing the mouth)

• sagittal (forward and backward movements)

• transversal (jaw displacement to the right and left).

Disk movements:

• when lowering the lower jaw - remains motionless

• when the chin is pushed forward, it moves forward, following the articular head

• with lateral movements – in one joint it moves forward behind the head, in the second it rotates.

Topic: "Mechanisms of jaw fractures. The direction of muscle traction in fractures of the lower jaw".

Purpose: To know the mechanisms of jaw fractures and the direction of muscle traction in fractures of the lower jaw.

Questions to study:

1. Mechanisms of jaw fractures

2. Types of fractures of the upper jaw

3. Muscle functions

4. The direction of muscle traction in fractures of the lower jaw

Fractures of the jaws are caused by various types of mechanical action, of which the main ones are compression, rupture, flexion and shear.

The upper jaw, due to its cellular structure, significantly resists external violence, but does not have sufficient elasticity and breaks from direct violence.

Types of fractures of the upper jaw.

1. The first type of fracture (lower) - the fracture line passes over the alveolar process and over the hard palate (almost parallel to them), through the lower edge of the pear-shaped opening and the ends of the pterygoid processes of the sphenoid bone, along the bottom of the maxillary sinuses. (when struck with a blunt object on the upper lip).

2. The second type of fracture (suborbital, medium) - the fracture line passes through the root of the nose (the junction of the frontal processes of the upper jaw and the nasal process of the frontal bone), then goes along the inner wall of the eye socket to

the lower orbital slit, passes through it and goes forward along the lower wall of the orbit to the junction of the zygomatic process of the upper jaw with the zygomatic with a bone. From behind, the fracture line goes through the pterygoid processes of the sphenoid bone (when a blunt object is struck in the area of the bridge of the nose).

3. The third type of fractures (subbasal, upper) -the fracture line passes in the area of the root of the nose along the medial wall of the orbit to the lower orbital slit, then goes forward along the lower wall of the orbit, through the frontal-zygomatic suture and the zygomatic arch (when a blunt object is struck in the area of the eye sockets or the base of the nose, as well as with a side impact in the area of the zygomatic bone).

A fracture of the lower jaw occurs due to inflection, less often — compression and shear, extremely rarely — separation. The lower jaw has an arched shape. The force acting on it causes pronounced tension of the bone tissue in its most curved areas (chin, angle of the jaw, the area of the chin opening and the fang hole) and in thin places, i.e. the most likely bend of it (the neck of the lower jaw). It is in these most "weak" areas that the lower jaw breaks due to the fracture.

There may be various clinical variants of fractures of the lower jaw as a result of an inflection:

1. a direct fracture of the lateral part of the body of the lower jaw, if force is applied on a small area of this area.

2. an indirect fracture from the opposite side in the area of the neck of the lower jaw or its angle, if the force is applied over a large area of the lateral part of the body of the lower jaw

3. indirect fracture along the midline, if the force is applied symmetrically on the wide area of the lateral part of the lower jaw body on both sides

4. an indirect fracture in the lateral part of the subcutaneous part of the body of the lower jaw and in the area of its neck (on the other hand), if the force is applied on both sides asymmetrically on the wide area of the lateral part of the body of the lower jaw (Fig. 12.5, d). When the place of application of force is shifted from one side to the angle of the lower jaw body posteriorly, a direct fracture will occur in the area of the angle and not straight in the lateral section of the chin of the lower jaw body

5. an indirect fracture in the area of the necks of the lower jaw on both sides, if the force is applied over a wide area in the area of the chin from the body of the lower jaw.

Thus, as a result of an inflection, a direct fracture of the lower jaw occurs in the case of the application of force on a small area of a certain area of the jaw. The fracture will be indirect (from the opposite side) if the force is applied to a significant area of bone tissue.

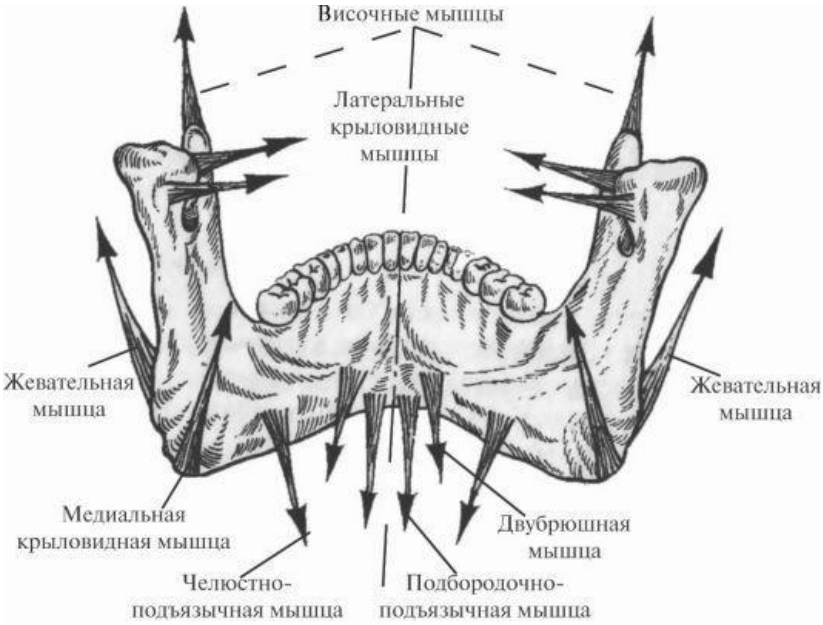
The mechanism of separation. They can explain the fracture of the coronal process of the lower jaw, when force is applied to the chin from top to bottom or from the side, and the teeth are tightly compressed and the temporal muscle is tense. Isolated damage to it is extremely rare.

The mechanism of the shift. This mechanism can be traced when the area of the bone exposed to the force is displaced in relation to the neighboring one having a fulcrum. Most often, due to the shift, a longitudinal fracture of the branch of the lower jaw occurs when the force is applied to the area of the lower edge of the angle of the jaw in the projection of the coronal process on a narrow area and is directed upwards.

Compression mechanism. If two forces act towards each other and are applied over a wide area, the bone tissue undergoes compression.

By grouping the muscles according to their function, you can get a fairly clear idea of their role in the displacement of the fragments of the lower jaw:

- upward displacement of the lower jaw (closing of the jaws): temporal, masticatory, medial pterygoid muscles; lowering of the lower jaw: bicuspid, maxillofacial, chin-hyoid muscles;
- displacement of the lower jaw forward: lateral pterygoid, medial pterygoid (with bilateral contraction), chewing (on the upper layer); displacement of the lower jaw backward, previously extended anteriorly: temporal (posterior bundles), biconvex and chin-hyoid muscles;
- displacement of the lower jaw to the left: right lateral and medial pterygoid; left temporal, double-abdominal, maxillofacial and chin-hyoid muscles.



Features of displacement of fragments of the lower jaw depending on the localization of the fracture.

Types of single fractures of the mandible in the chin:

1. The median fracture runs clearly along the median line between the incisors.

2. Oblique fracture begins from the edge of the alveolar process between the central incisors, deviating to the right or left side and ends at the lower edge of the jaw in the projection of the second incisor, canine or premolar.

With a median fracture, the dimensions of the fragments of the lower jaw are approximately the same and they are in a state where the traction of the muscles on each fragment is balanced with each other. The displacement of fragments occurs only in the frontal plane and there is a so—called tubercle contact - the inclination of small and large molars to the lingual side, the masticatory muscle turns outwards the fragments of the lower jaw.

With an oblique fracture of the lower jaw, fragments of unequal size are formed in its mental part. A large fragment of the jaw is displaced downward due to the pull of a larger number of muscles lowering the lower jaw, and a smaller fragment is displaced inward (lateral pterygoid muscle).

In case of single fractures of the lower jaw body on the lateral section, there are two fragments of unequal sizes. The large one shifts downwards and towards the fracture (under the action of the lateral and medial pterygoid muscles). The smaller fragment shifts upwards, anteriorly and in the lingual direction.

With single fractures in the area of the angle of the lower jaw, the large fragment shifts downwards and towards the fracture, and the small fragment — upwards and inwards.

Fractures of the actual branch of the mandible, coronal and condylar processes. There are longitudinal and transverse. There are usually no significant dislocations of fragments - there are no pronounced malocclusion.

Fractures of the coronal process are rare, more often with a fracture of the zygomatic complex. The broken fragment of the jaw (the coronal process) is shifted upward, i.e. in the direction of the traction of the temporal muscle.

Fractures of the condyle process may be in the area of its base, neck and head. With unilateral fractures of the condylar process, the lower jaw on the side of the injury is pulled up (due to traction of the temporal, masticatory and medial pterygoid muscles).

With bilateral fractures of the lower jaw, the fragments shift depending on the location and location of the fracture gap, as well as under the action of traction of the muscles attached to the jaw.

With bilateral fractures of the lower jaw in the area of the body, angles, branches and condylar processes, the middle fragment falls down and shifts posteriorly.

Bilateral fractures in the area of chin openings with dislocation of fragments are accompanied by posterior displacement of the tongue and impaired swallowing function

With double fractures of the mandible (localized on one side), the middle fragment shifts downward (under the action of the pull of the muscles lowering the lower jaw) and inward (due to the pull of the maxillofacial muscle). The large fragment shifts downwards and towards the damage, and the small fragment (the posterior fragment) is pulled up and shifted inward.

With multiple fractures of the mandible, the displacement of fragments occurs under the action of muscle traction in different directions. The greater the displacement of the fragments, the greater the number of muscle fibers attached to the jaw fragment.

Topic: "Anatomical and topographic features of the scalp and neck".

Goal: Know the anatomy and features of the scalp and neck.

Questions:

1. Skin structure
2. Anatomy and features of the skin in the eye socket
3. In the zygomatic area.
4. In the buccal region.
5. In the parotid-chewing area.
6. In the lip area.

The skin consists of 3 layers:

1. Epidermis
2. Derma
3. Subcutaneous fat

EYE SOCKET AREA

The surface part. Eyelids.

The upper and lower eyelids (palpebrae superior et inferior) are skin-muscle-cartilaginous folds protecting the eyeball in front (Fig. 10.5).

The skin of the eyelids is thinner than in other areas of the face, elastic, mobile. Contains a small amount of sebaceous and sweat glands. The innervation of the eyelid skin is carried out by the branches of the first (n.ophthalmicus) and second (n. maxillaris) branches of the trigeminal nerve.

Subcutaneous fat is very loose, contains almost no fat. Blood vessels and nerves are located here. In the subcutaneous tissue of the upper eyelid, branches of the frontal and supraorbital vessels pass from the medial side (a. et v. frontales et supraorbitales), from the lateral side - branches and tributaries of the superficial temporal arteries and veins (a. et v. temporales superficiales). Branches and tributaries of the subcutaneous blood vessels (a. et v. infraorbitales) pass through the subcutaneous tissue of the lower eyelid. Near the free edges, they form arterial and venous arches. The outflow of lymph from the lateral half of the conjunctiva of the upper eyelid is carried out into the parotid lymph nodes (nn. lymph. parotidei), and from the medial half - into the submandibular lymph nodes (nn. lymph. submandibulares). From the lower eyelid, the outflow of lymph occurs similarly, but mainly to the submandibular nodes.

The looseness of subcutaneous tissue causes the ease of the spread of edema with local inflammatory processes on the face, with disorders of venous circulation, some common diseases (kidney disease).

THE SUBGLACIAL REGION

The skin is thin, well mobile. Contains sebaceous and sweat glands. It is innervated by the subglacial nerve. Subcutaneous fat is well expressed.

ZYGOMATIC AREA

The skin is thin, elastic, quite easy to take into the fold. The appendages of the skin are represented by hair follicles, sebaceous and sweat glands. Innervation is carried out by the zygomatic nerve. Subcutaneous fat is quite well expressed.

BUCCAL REGION

The skin is thin, mobile, easily taken into the fold. The appendages of the skin are well expressed. Innervation is carried out by branches of the trigeminal nerve: the subglacial, buccal and chin nerves. Subcutaneous fat is loose, expressed quite well, especially well in the middle part of the area. Here is the fat body of the cheek (Bichat's fat lump), separated from the surrounding formations by a thin fascia. Laterally and anteriorly, it is encircled by the excretory duct of the parotid salivary gland. Deeper are the facial muscles, which are innervated by the branches of the facial nerve.

PAROTID-CHEWING AREA

Surface department.

The borders of the parotid-masticatory region (regio parotideomasseterica) correspond to the zygomatic arch from above. The skin is thin, elastic, is taken in a fold, has well-defined appendages in the form of sweat, sebaceous glands, hair follicles. Sensitive innervation is carried out in the upper parts of the region by the auriculotemporalis nerve (n.auriculotemporalis) from the third branch (n.mandibularis) of the trigeminal nerve, and the lower part by the large auricular nerve (n. auricularis magnus) from the cervical plexus.Subcutaneous fat contains cutaneous arteries, venous network, branches of the large auricular and auricular nerves, branches of the facial nerve com ing out of the bed of the parotid salivary gland.

NOSE AREA

External nose.

The skin in the nasal area has different mobility and density. It is especially thick and sedentary in the area of the tip and wings of the nose. In the area of the bridge of the nose, it is thinner, elastic and movable. A large number of sebaceous glands and the presence of hair follicles attract attention. In the subcutaneous tissue on the lateral surface of the nose there are bundles of the nasal muscle (m.nasalis), the muscles of the "proud" (m.procerus; in the area of the root of the nose), the muscles lowering the nasal septum (m. depressor septi nasi; in the area of the nasal septum and upper lip), the muscles lifting the upper lip (m. levator labii superioris; branches of the facial arteries and veins). The arteries running along the back of the nose belong to the branches

a.dorsalis nasi, from the sides - branches of a. angularis. At the root of the nose there are interarterial (between the systems of the external and internal carotid arteries) and intervenous (between the systems of the facial and ocular veins) anastomoses. Nerves arise from the first and second branches of the trigeminal nerve: nn. infratrochlearis et etmoidalis anterior, from the nasociliary nerve - give cutaneous branches to the dorsum and lateral surface of the external nose (n. infraorbitalis) gives branches to the skin of the wings of the nose and nasal septum. The facial muscles are suitable for the branches of the facial nerve.

Lips

The lips consist of three parts: cutaneous, intermediate and mucous. The skin of the lips is somewhat compacted, contains appendages in the form of sebaceous and sweat glands, hair follicles.

The intermediate part has a red border - an area in which the venous network shines through the non-corneal epithelium. On the upper lip, this area is delimited from the skin by a line called "Cupid's bow". In this part of the lip, only the sebaceous glands are preserved. In newborns, this part of the lips is covered with a large number of

papillae. The mucous part of the lips is turned towards the vestibule of the oral cavity, contains salivary labial glands. In infants, the mucous membrane is very thin, mobile, its folds and frenules are more pronounced. Sensitive innervation is carried out by the upper labial nerves (from the subglacial nerve), the lower labial nerves (from the chin nerve), and in the area of the corners of the mouth - branches of the buccal nerve. Subcutaneous fat is moderately pronounced.

The neck area is characterized by a small amount of adipose tissue, low content of collagen and elastin fibers. Moreover, the collagen framework has a pasty type of structure, when the bundles of fibers are parallel to each other and the surface of the skin. It is considered the weakest and quickly undergoes decay. Also, the skin of the neck is characterized by slower blood circulation, and therefore oxygen and nutrients are supplied in a smaller volume.

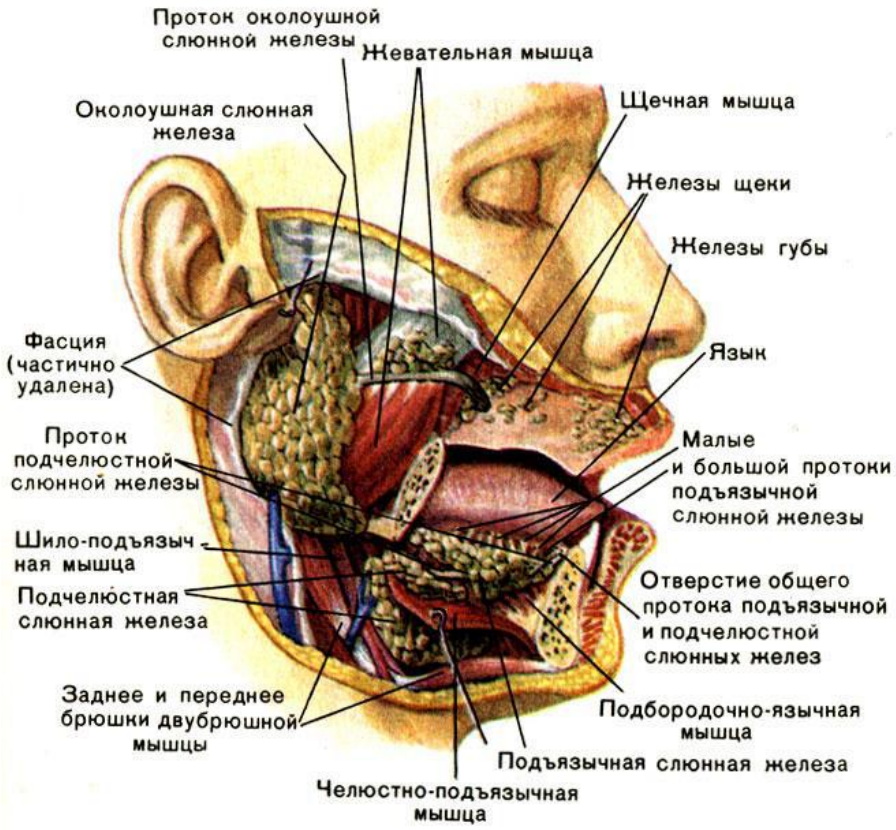
Topic: "Anatomical, topographic and physiological features of salivary glands".

Purpose: To know the topography and anatomy of small and large salivary glands

Questions to study:

1. Anatomy and topography of the small salivary glands.
2. Anatomy and topography of the large salivary glands.
3. Salivary gland function.

Clinical anatomy of the salivary glands.



SALIVARY APPARATUS.

1. Large salivary glands:

• Parotid

• Submandibular

• Sublingual

2. Small salivary glands:

• Lip mucosa

• Cheeks

• Palatines

• Language

Parotid salivary gland:

• the largest

• located in the parotid region and the maxillary fossa

• covered and divided into segments by its own fascia

• contains 6-13 lymph nodes in its thickness

• the duct opens on the cheek, at the level of the first molars, along the line of teeth closure

Innervated:

- parasympathetic innervation – ear-temporal nerve

- sympathetic innervation – branches of the upper cervical sympathetic node

Through the gland pass:

- internal and external carotid arteries

- the mandibular and internal jugular veins

- facial nerve, divided into 5 branches.

Submandibular salivary gland:

• located in the submandibular triangle is limited by: on the sides - the peritoneum of the bicuspid muscle from above – the maxillofacial muscle from below – the skin

• the gland is encircled by the facial artery and vein

• blood is supplied by the branches of the facial, lingual. chin artery

• several lymph nodes are located near the gland

• the duct bends around the posterior edge of the maxillofacial muscle, penetrates into the sublingual area, opens with the salivary papilla

• innervated by branches of the submandibular node and lingual nerve.

Sublingual salivary gland:

• located at the bottom of the oral cavity, between the inner surface of the lower jaw and the side wall of the tongue

• may have a lower process penetrating through the maxillofacial muscle into the submandibular region, uniting with the submandibular gland

• opens with a single flow with the submandibular gland, less often a separate one

• at the level of the second-third molar, the lingual nerve is located laterally from the posterior part of the gland, which crosses with the submandibular duct

• secretory – serous-mucosal (mixed).

Salivary gland physiology.

Salivary gland function:

1. secretory

2. excretory

3. endocrine

4. secretory

By secretory function:

• parotid – serous

• submandibular – serous-mucous

• sublingual – serous-mucous

Normally, the glands secrete about 0.5-1.5 liters of saliva per day.

Topic: "Functions of the salivary glands and its effect on the state of the body. Chemical composition, properties and functions of saliva".

Purpose: To know the function of the salivary glands. Saliva composition, properties, functions.

Questions to study:

1. Anatomy of the salivary glands

2. Salivary gland function

3. Composition of saliva

4. Saliva proteins

5. Saliva enzymes

6. Properties of saliva

7. Saliva functions.

Saliva is the secret of the salivary glands secreted into the oral cavity. It is necessary to distinguish between saliva obtained from the excretory ducts and mixed saliva, or oral fluid. It is the total secret of all salivary glands, which also includes detritus of the oral cavity, microflora, contents of gingival pockets, gingival fluid, waste products of plaque microflora, decay of leukocytes migrating from the mucous membrane and released with saliva, food residues, etc.

Functions of salivary glands.

1. Protective - provided by the bactericidal activity of a number of enzymes (lysozyme, lipase, RNA-aza, DNA-aza), opsonins, etc.; determined by the buffer capacity of saliva, neutralizing acid and alkali; supported by hemocoagulating and

fibrinolytic activity of thromboplastin, antiheparin substance, prothrombin, etc. due to pellicle formation (mucin, glycoprotein, sialoprotein).

2. Digestive - saliva creates the necessary conditions for the formation and sliding of a food lump along the esophagus; the presence of a-amylase and maltase promotes the fermentation of carbohydrates.

3. Trophic - consists in maintaining constant moistening of the mucosa, a high level of physiological regeneration and metabolic processes.

4. Endocrine - consists in the production of substances similar in action to hormones — insulin-like protein, glucagon, parotin, erythropoietin, thymotropic factor, etc.

5. Cleansing - by cleansing and washing away microorganisms, food residues from the surface of the mucous membrane and teeth.

6. Mineralizing - is provided by mechanisms that prevent the release of its constituent components from the enamel from saliva into the enamel (hydroxyapatite, hydroxyfluoropatite).

The composition and properties of saliva.

On average 1-2.5 liters of saliva are released per day. Salivation is controlled by the autonomic nervous system. Salivation centers are located in the medulla oblongata. Stimulation of the parasympathetic endings causes the formation of a large amount of saliva with a low protein content. On the contrary, sympathetic stimulation leads to the secretion of a small amount of viscous saliva. Without stimulation, saliva secretion occurs at a rate of about 0.5 ml/min.

Buffer capacity (the ability to neutralize acid and alkali) is provided by three main systems: bicarbonate, protein and phosphate. Bicarbonates provide 80% of the buffering properties of saliva, their concentration in saliva increases in direct proportion to the rate of secretion. The buffer capacity varies significantly and may depend on the nature of nutrition, time of day, and the state of the gastrointestinal tract. The second most important is the phosphate system, the third is the protein system.

K ions in a calm gland are normally much higher than in plasma, but with an increase in the rate of saliva discharge, the concentration decreases. The ratio of K and Na ions in a quantitative ratio is very important for assessing the state of electrolyte metabolism in the body. Saliva also contains Ca, Mg ions, Phosphates.

Saliva contains numerous organic components - proteins, carbohydrates, amino acids, enzymes, vitamins, etc., the main of which is protein. The amount of total protein in mixed saliva is 0.8 — 3.0 g/l.

The following main groups of oral fluid proteins are distinguished:

1. Proteins rich in proline. They bind to streptococci, bind the tannins of food and thereby protect the SOPR from their damaging effects, give viscosity to saliva, contribute to the creation of a tooth pellicle.

2. Proteins rich in histidine have a bactericidal effect, suppressing glucose transport and glycolysis reactions in microorganisms (Str. mutans, Candida albicans).

3. Proteins rich in tyrosine prevent the nucleation and growth of Ca and P salts forming tooth enamel, which provides a protective restorative effect to preserve healthy teeth.

4. Albumins - mostly get into saliva from gingival fluid. Their number increases with stomatitis, diseases of the gastrointestinal tract and others.

5. Saliva glycoproteins determine the viscosity.

6. Mucin - moistens the SOPR and teeth, protects them from damage, is able to adsorb on the surface of the teeth, forming an insoluble film. It has a high viscosity, elastic, participates in the formation of pellicles.

In mixed saliva, the activity of more than **10 enzymes** is determined, which are divided into 3 groups by origin:

1. Glands secreted by the saliva parenchyma;

2. Formed during the enzymatic activity of bacteria;

3. Formed as a result of the breakdown of leukocytes in the oral cavity.

From the enzymes of saliva, first of all, a-amylase should be isolated, which already partially hydrolyzes carbohydrates in the oral cavity, converting them into dextrins and maltose, maltase, etc.

- Alkaline and acid phosphatase.
- Saliva nucleases
- Hyaluronidase and kallikrein
- Lysozyme
- Lactoferrin
- Myeloperoxidase.

Saliva immunoglobulins.

Immunoglobulins enter saliva from two sources:

- the result of local synthesis by plasma cells
- from the blood by transudation through the gingival groove, which is the main source of leukocytes entering the oral cavity.

The main, locally forming, is S-IgA. The mechanism of action of Sega on microorganisms is that it activates complement in an alternative way, which leads to

the lysis of the microbe. S-IgA prevents the adhesion of bacteria to epithelial cells, making it difficult for them to colonize the mucous membrane. It forms complexes with mucin.

- *Immunoglobulin M* is found in small amounts in saliva, synthesized locally and selectively secreted. Unlike Sega, it is more labile in the secrets of the glands. In individuals with insufficient sIgA production, IgM production is increased as a compensatory mechanism.
- *Immunoglobulin G* comes from the blood serum through a cheap liquid, as well as with the secret of CSF. The absolute IgG content can change significantly with local inflammatory processes and an increase in vascular permeability.