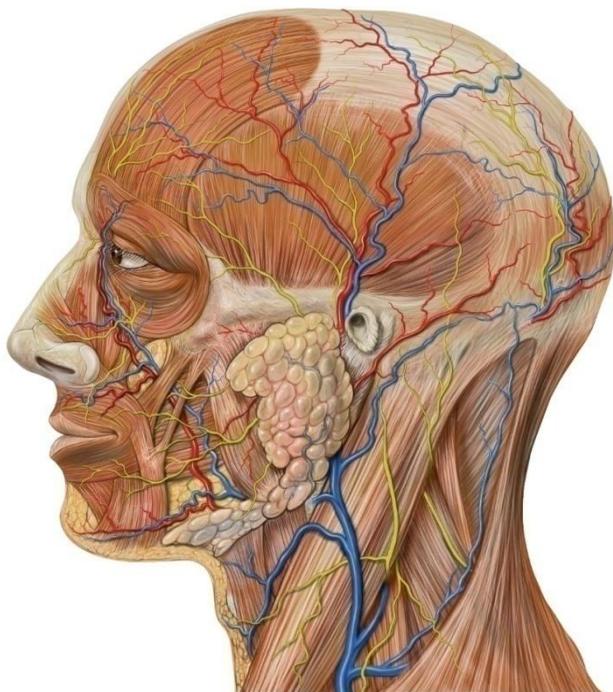




**KORENKOV O. V.,  
TKACH G. F.,  
YARMOLENKO O. S.**

# **TOPOGRAPHIC ANATOMY OF THE HEAD**

Study guide



Ministry of Education and Science of Ukraine  
Ministry of Health of Ukraine  
Sumy State University

**KORENKOV O. V.,  
TKACH G. F.,  
YARMOLENKO O. S.**

# **TOPOGRAPHIC ANATOMY OF THE HEAD**

Study guide

Second edition, revised and expanded

Recommended by the Academic Council of Sumy State University



Sumy  
Sumy State University  
2026

UDC 611.91(075.8)

K 75

Author's team:

*O. V. Korenkov*, Doctor of Medical Sciences, Professor, Sumy State University;  
*G. F. Tkach*, Doctor of Medical Sciences, Professor, National University of Life  
and Environmental Sciences of Ukraine (Kyiv);

*O. S. Yarmolenko*, PhD in Medical Sciences, Associate Professor,  
Sumy State University

Reviewers:

*S. O. Korol* – MD, Dr. of Medical Sciences, Head of the Department  
of Military Surgery at the Ukrainian Military Medical Academy, Merited Doctor  
of Ukraine, Laureate of the Borys Paton National Prize, Professor, Colonel  
of the Medical Service;

*O. L. Appelhans* – MD, Dr. of Medical Sciences, Head of the Department of Human  
Anatomy at Odesa National Medical University, Merited Education Worker  
of Ukraine, Professor

*Recommended for publication*  
*by the Academic Council of Sumy State University*  
*as a study guide*  
*(minutes № 1 of 12.02.2026)*

**Korenkov O. V.**

K 75 Topographic anatomy of the head : study guide / O. V. Korenkov,  
G. F. Tkach, O. S. Yarmolenko. – 2<sup>nd</sup> edition, revised and expanded.  
– Sumy : Sumy State University, 2026. – 129 p.  
ISBN 978-966-446-046-7

This study guide is intended for students medical institutions of higher  
education who are studying Human Topographic Anatomy in English.

UDC 611.91(075.8)



This work is licensed under  
**Creative Commons Attribution-NonCommercial ShareAlike  
4.0 International**

ISBN 978-966-446-046-7

© Sumy State University, 2026

# CONTENTS

	P.
TOPOGRAPHIC ANATOMY OF THE HEAD.....	4
FRONTO-PARIETO-OCCIPITAL REGION.....	4
PARTICULAR QUALITIES OF BLOOD FLOW .....	6
PARTICULAR QUALITIES OF VENOUS OUTFLOW .....	7
TEMPORAL REGION .....	10
MASTOID PROCESS REGION.....	13
MENINGES .....	14
LATERAL REGION OF THE FACE.....	20
BUCCAL REGION.....	21
PAROTID MASSETER REGION.....	24
THE FACIAL NERVE.....	27
THE DEEP FACE REGION .....	29
SURGICAL ANATOMY OF THE MAXILLARY SINUS .....	37
SURGICAL ANATOMY OF THE FRONTAL SINUS .....	38
CLINICAL MANIFESTATIONS OF ANTERIOR CRANIAL FOSSA FRACTURES.....	39
CLINICAL MANIFESTATIONS OF MIDDLE CRANIAL FOSSA FRACTURES.....	39
CLINICAL MANIFESTATIONS OF POSTERIOR CRANIAL FOSSA FRACTURES.....	40
HEMORRHAGES IN CRANIOCEREBRAL TRAUMA .....	41
INCISION AND DRAINAGE OF TEMPORAL REGION PHLEGMON.....	42
INCISION AND DRAINAGE OF LATERAL REGION OF FACE PHLEGMON.....	43
INCISION AND DRAINAGE OF PAROTID GLAND ABSCESS ..	44
INCISION AND DRAINAGE OF THE PTERYGOMAXILLARY SPACE .....	45
INCISION AND DRAINAGE OF THE PARAPHARYNGEAL SPACE.....	45
TECHNIQUE OF INCISION AND DRAINAGE OF RETROPHARYNGEAL ABSCESSES .....	45
APPENDIX .....	47
TEST QUESTIONS .....	67
REFERENCES .....	126

## **TOPOGRAPHIC ANATOMY OF THE HEAD**

The head is divided into two main regions: the brain and the face. These are divided by a line running from the glabella to the supraorbital edge, along the zygomatic arch and to the outer ear canal. The brain consists of the fornix and the base of the skull. The fornix is divided into the fronto-parieto-occipital region and the paired temporal and mastoid areas. The facial region consists of the frontal and lateral areas. Regions of the frontal area include the nasal, orbital, oral and mental regions. The lateral area includes the buccal and parotideomasseteric regions (Figure 1).

### **FRONTO-PARIETO-OCCIPITAL REGION**

Borders:

- Anteriorly: supraorbital edge of the frontal bone.
- Posteriorly: the external occipital protuberance and the upper nuchal line.
- Laterally: superior temporal line.

Layers:

The skin is thick and covered in hair. It contains sweat and sebaceous glands. Sebaceous cysts, also known as atheromas, are formed when the ducts of the sebaceous glands become blocked or when the hair follicle swells, which disrupts the emptying of the sebaceous gland through the pore. Folliculitis is an infection of a single hair follicle. A carbuncle is a deeper skin infection involving a group of infected hair follicles in one area of the skin. The skin is firmly adherent to the subcutaneous tissue, the epicranial muscle and the aponeurotic helmet due to the presence of vertical connective tissue septa. These septa divide the subcutaneous tissue into

separate compartments filled with fat. Therefore, a haematoma in this region takes the form of limited swelling (Figure 2).

In the subcutaneous tissue of the frontal region, the ophthalmic artery branches off from the internal carotid artery system:

- the supratrochlear artery;
- the supraorbital artery.

The supratrochlear artery emerges from the orbit through the frontal notch at the intersection of the supraorbital margin and the vertical line drawn through the medial corner of the eye, while the supraorbital artery emerges from the orbit through the supraorbital foramen or notch between the middle and medial parts of the supraorbital margin. Its terminal branches anastomose with the branches of the supratrochlear artery and the superficial temporal artery, and the outflow of venous blood is carried out by the supratrochlear and supraorbital veins, which flow into the angular vein. These vessels escort the nerves of the same name: the frontal nerve branches from the ophthalmic nerve. There are also temporal branches of the facial nerve that innervate the frontal belly of the epicranium muscle and the orbicularis oculi muscle. Damage to these causes lagophthalmos, or 'rabbit eye'. The eye is open and teary. The lymphatic vessels of the frontal region drain into the superficial and deep parotid lymph nodes (Figure 3).

In the parietal area of the subcutaneous tissue are:

- the superficial temporal artery;
- the superficial temporal vein;
- the auriculotemporal nerve.

The superficial temporal artery is the terminal branch of the external carotid artery. It is located in front of the tragus of the auricle and can be pressed against the bone to stop bleeding. The superficial temporal vein is located near the same artery. It flows into the retromandibular vein and receives the parietal emissary vein. The auriculotemporal nerve is a branch of the

mandibular nerve. It accompanies the temporal artery and is located in front of the vessels. Lymph flow is carried out in the mastoid (retroauricular) lymph nodes (Figure 4).

The subcutaneous tissue of the occipital region contains:

- the posterior auricular artery;
- the posterior auricular vein;
- the occipital artery;
- the occipital vein;
- the greater occipital nerve;
- lesser occipital nerve;
- posterior auricular nerve.

The posterior auricular artery is projected onto the skin at the posterior edge of the auricle's attachment. The occipital artery is projected midway between the mastoid process and the occipital protuberance. The arteries are accompanied by veins of the same name that flow into the external jugular vein. The skin of the occipital region is innervated by the greater and lesser occipital nerves. The greater occipital nerve is a posterior branch of the second cervical nerve. It accompanies the occipital artery. The lesser occipital nerve, which originates from the cervical plexus, passes 3 cm behind the attachment of the ear. It is located at the rear edge of the sternocleidomastoid muscle, near the mastoid process. The posterior auricular nerve is a branch of the facial nerve. It passes through the subcutaneous tissue behind the ear and innervates the muscle of the same name, as well as the occipital belly of the epicranial muscle. Lymphatic vessels flow into the occipital lymph nodes (Figure 5).

## **PARTICULAR QUALITIES OF BLOOD FLOW**

1 The large number of anastomoses between these arteries promotes the regeneration of damaged tissues. Therefore, head injuries heal faster than injuries to other parts of

the body. This makes it possible to accept scalp wounds involving soft tissues on the head.

2 Blood flow to the area is carried out by branches of the internal and external carotid arteries. If there is an insufficient blood supply to the brain between the branches of these arteries, a back collateral blood flow route is formed from the external carotid artery into the internal one, which supplies the brain. This occurs due to anastomoses between the branches of these arteries. Under normal conditions, blood flow in the a. supratrochlearis artery is directed from the skull to the external carotid artery pool. However, when a patient has stenosis or occlusion of the internal carotid artery, the blood flow becomes retrograde. This can be seen with the help of ultrasonic Dopplerography.

3 The vessels are in the subcutaneous tissue above the aponeurosis, so they are often injured.

4 The adventitia of the vessels is fixed with a fibrous membrane. Therefore, when the cranial vault is injured, the vessels gap and bleed profusely.

5 The vessels are directed radially from the periphery to the vertex, which must be taken into consideration when making an incision.

6 The damaged vessel is absent in the event of an injury, which is why it cannot be captured with a hemostatic clamp. We therefore use special neurosurgical clips with pointed ends, applying one end to the edge of the tendon of the helmet and the other to the wall of the vessel.

## **PARTICULAR QUALITIES OF VENOUS OUTFLOW**

The veins in the head are arranged in three layers.

1 The surface layer covers the veins of the head that

accompany the arteries of the same name. These veins carry venous blood outflow into the facial vein, the retromandibular vein, and the external jugular vein.

2 The middle layer is intraosseous. It consists of the diploic veins of the cranial vault.

3 The third layer is intracranial and the sinuses are located between the sheets of the dura mater.

All three layers are connected by emissary veins.

The largest of these are:

- The parietal emissary vein connects the superior sagittal sinus with the superficial temporal vein.

- The occipital emissary vein connects the transverse sinus with the occipital veins.

- The mastoid emissary vein connects the sigmoid sinus with the posterior auricular vein.

The links between the superficial and deep veins facilitate blood outflow from the brain in the event of increased intracranial pressure or obstruction to the main route. They can also cause infection to penetrate the soft tissue of the cranial vault (furuncle) into the bone, resulting in osteomyelitis, or into the dura mater, resulting in meningitis, brain abscess or sinus thrombosis. Such retrograde blood flow, spreading infection, is possible due to the lack of valves in the veins. The next layer is the epicranial muscle. The frontal and occipital bellies of the epicranial muscle connect the epicranial aponeurosis. This fibrous membrane layer is strongly linked with the skin. Thus, the skin, subcutaneous tissue and tendon helmet are integrated and form part of the flap in scalp injuries. Under the tendon helmet, there is subgaleal fibre. It does not have any membranes. Scalp injuries in the cranial vault are possible due to the skin's strong connection to the tendon helmet and the periosteum. Haematomas and suppurative processes in the subgaleal tissue resemble spilled swelling and cover the entire surface of the cranial vault. The next layer is the periosteum, which is firmly

soldered to the bones at the joints and loose elsewhere. Care should be taken when operating on the periosteum because it contains vessels that feed the external lamina of the skull bones. The subperiosteal tissue is located deeper still. The periosteum can easily be scaled off and haematomas are limited by the line of bones and joints and are located within a separate bone due to the subperiosteal tissue. Subperiosteal haematomas disrupt blood flow to the bones, which can lead to necrosis of the outer part of the cranial vault. Therefore, we remove them. All the cellular spaces in the fronto-parieto-occipital region are connected to each other via anastomoses of the external veins, the sinuses of the dura mater, and the diploic veins via the emissary veins. These pathways can facilitate inflammatory processes. The region's bone basis is formed by the frontal, occipital and parietal bones. These bones are connected to each other by ligamentous joints. The bones are flat and their inner surface is smooth with holes for vessels. The outer surface of the bones is rough and has grooves and recesses from arteries, sinuses of the dura mater, granulation tissue and gyri.

The bones of the skull are composed of three layers:

- 1 The external lamina is the outer bone plate and consists of solid substance.

- 2 The second layer is the diploe, which has intraosseous diploic channels (Bréchet channels), in which diploic veins are located.

- 3 The third layer is the inner bone plate, or internal lamina. It is thinner and more brittle, which is why it is called the vitreous lamina (lamina vitrea).

It often breaks more easily than the outer lamina. It breaks with the formation of many fragments. These fragments often damage the vessels of the dura mater and the brain tissue, causing epidural or subdural haematomas. Cranial bone regenerates slowly, so it is possible to observe bone defects on X-ray photographs of the skull bones at the site of the fracture.

In the frontal region between the outer and inner plates is the frontal sinus. Injury to the frontal bone can lead to secondary infection of the nasal cavity.

## **TEMPORAL REGION**

Borders:

- Superiorly and posteriorly: the superior temporal line.
- Inferiorly: the zygomatic arch.
- Anteriorly: the frontal process of the zygomatic bone and the zygomatic process of the frontal bone.

Layers:

1 The skin is thin. It is covered with hair. The skin is innervated by the auriculotemporal nerve, the zygomaticotemporal nerve, and the lesser occipital nerve.

2 The subcutaneous layer is small.

It consists of:

- the anterior auricular muscle;
- the superior auricular muscle;
- the superficial temporal artery and vein; and the auriculotemporal nerve;
- the zygomaticotemporal nerve;
- the posterior auricular artery and vein;
- the lesser occipital nerve.

The anterior and superior auricular muscles are innervated by the temporal branches of the facial nerve. The superficial temporal artery runs alongside the superficial temporal vein and the auriculotemporal nerve. The zygomaticotemporal nerve, which is a branch of the zygomatic nerve from the maxillary nerve, passes along the outer edge of the orbit. The posterior auricular artery, posterior auricular vein, and lesser occipital nerve are located behind the auricle. The superficial fascia is thin and plate-like, and extends from the

tendon helmet. It forms a fascial sheath around the ear's muscles, blood vessels, and nerves. The temporal fascia, also known as the temporal aponeurosis, splits into superficial and deep plates before the zygomatic arch. The superficial plate of the temporal fascia is attached to the outer edge of the zygomatic arch. The deep plate is attached to the inner edge of the zygomatic arch. The interaponeurotic temporal space lies between these plates and contains adipose tissue, the middle temporal artery, the middle temporal vein, and the zygomaticotemporal nerve. Subaponeurotic tissue is located beneath the deep plate of the temporal fascia and extends to the Bichat fat pad behind the zygomatic arch. Haematomas and abscesses in the subaponeurotic space can spread to the lateral region of the face. The temporalis muscle fills the temporal fossa. It is attached to the coronoid process of the mandible. The deep musculoskeletal cellular spaces of the temporal region are located beneath the temporalis muscle. These spaces contain the deep temporal vessels and nerves, including the deep temporal arteries (the maxillary artery) and the deep temporal nerve (the mandibular nerve).

3 The periosteum lies deeper than the subcutaneous adipose tissue. The subperiosteal cellular space lies beneath the periosteum. This space is involved in the inflammatory process of deep temporal phlegmon and pus from deep abscesses can penetrate down into the pterygopalatine and infratemporal fossae and then through the lower orbital fissure into the orbital tissue. There is also a connection with the temporal–pterygoideus cellular spaces of the lateral facial area.

The osteal base consists of the greater wing of the sphenoid bone, the squamous part of the temporal bone, and parts of the frontal and parietal bones. Cancellous bone develops weakly here. It is absent in the temporal scales. The arterial sulcus is located on the inner surface of the temporal bone scales. The middle meningeal artery is located within this

sulcus. Damage to the middle meningeal artery can cause epidural haematomas.

## **MASTOID PROCESS REGION**

Borders:

- Anteriorly: the line of attachment of the ear.
- Superiorly: the line of the zygomatic arch's extension.
- Inferiorly and laterally, the line corresponds to the outline of the mastoid process, which can be felt through the skin.

Layers:

1 The skin is thin. It is covered with hair in the posterior part of the area. The skin is spliced with the deeper tissues.

2 The subcutaneous tissue.

It contains:

- posterior auricular artery;
- the posterior auricular vein;
- lymphatic vessels and nodes (mastoid lymph nodes, which are connected to lymph from the auricle and parietal area).
- the great auricular nerve;
- lesser occipital nerve;

The auricularis posterior muscle is innervated by the posterior auricular nerve, a branch of the facial nerve.

The superficial fascia forms a fascial sheath around the auricularis posterior muscle, and the own fascia is an extension of the tendon helmet which extends to the neck, where it is involved in forming a sheath around the sternocleidomastoid muscle, the trapezius muscle and the posterior belly of the digastric muscle. The interfascial cellular space is located between the trapezius muscle and the posterior belly of the

digastric muscle. This space extends into the lateral triangle of the neck and the sheath of the sternocleidomastoid muscle. This is the main route by which pus spreads in Bezold's abscess. Symptoms of Bezold's abscess include swelling and soreness of the neck.

The periosteum is firmly spliced with the bone, especially in the attachment of sternocleidomastoid muscle, splenius capitis muscle, longissimus capitis muscle and posterior belly of the digastric muscle.

The subperiosteal tissue is developed weakly.

The mastoid process of the temporal bone is located behind and below from the outer ear canal. It has conelike shape. Its lateral surfaces are rough. In the middle of the mastoid process is smooth surface which is called Shypo's trepanation triangle.

The borders of the Shypo's triangle:

- anteriorly – a vertical line from the top of the mastoid process through the mastoid spina suprameatum (spine of Henle) on the posterior edge of the outer ear canal;
- posteriorly – mastoid crest;
- superiorly – the horizontal line is the extension of the zygomatic arch (Figure 6).

The mastoid cells are inside the mastoid process. The upper part of the cellular mastoidea forms the mastoid antrum. The mastoid antrum communicates with the tympanic cavity via the aditus ad antrum. It opens into the epitympanic recess. All the cells of the mastoid process open into the antrum mastoideum, which is covered by a mucous membrane that continues from the mucosa of the tympanic cavity. Thus, the tympanic cavity and its additional cavities form a pneumatic system. This pneumatic system is filled with air via the Eustachian tube. During otitis, inflammatory exudate cannot escape through the inner opening of the auditory tube due to oedematous mucosal adhesion. Consequently, the middle ear

cavity forms a closed space in which purulent exudate accumulates. It is directed through the aditus ad antrum to the cave, overflowing the cells of the mastoid process. It causes mastoiditis. We can drain pus from the middle ear by dissecting the antrum mastoideum through the posterior wall of the tympanic cavity, which is located at the Shipo's triangle. The outer wall of the mastoid cavity measures 1.5–2 cm. The inner wall separates the cave from the groove for the sigmoid sinus, while the upper wall is a continuation of the tegmen tympani (the roof of the tympanic cavity), separating the cave from the middle cranial fossa. The lateral semicircular canal and the facial nerve are located anteriorly to the cave, thus allowing purulent exudate from the tympanic cavity to penetrate the antrum mastoideum. This destroys the inner wall of the mastoid cavity, allowing the exudate to enter the cranial cavity or the sigmoid sinus.

This can cause meningitis, sepsis and thrombophlebitis of the sigmoid sinus, which are displayed clinically as McKenzie syndrome (dysphagia, aphonia and torticollis). This is caused by damage to the IX, X and XI pairs of cranial nerves. Doctors perform a mastoidectomy in all these cases. Rupture of the pus in the lateral triangle of the neck causes Bezold's mastoiditis.

## **MENINGES**

The cranial cavity is lined by the dura mater, which can easily be separated from the bones of the fornx and is firmly fixed to the skull base. Therefore, epidural haematomas are more prevalent in the vault of the skull following skull trauma. The dura mater consists of two sheets. A thin layer of tissue, blood vessels and nerves lies between them.

N. Burdenko exploited this structural feature to remove defects in damaged sinuses. The dura mater is separated at dural

reflections (also known as dural folds), which are places where the inner dural layer is reflected as sheet-like protrusions into the cranial cavity. Examples include the tentorium cerebelli, the falx cerebri, the cerebellar falx and the sellar diaphragm.

The tentorium cerebelli is located between the cerebellum and brainstem and the occipital lobes of the cerebrum, separating them from each other. At the back, it is attached by its convex border to the transverse ridges on the inner surface of the occipital bone, enclosing the transverse sinuses. At the front, it is attached to the superior angle of the petrous part of the temporal bone on either side, enclosing the superior petrosal sinuses. The free and attached borders meet at the apex of the petrous part of the temporal bone, crossing one another as they continue forward to be fixed to the anterior and posterior clinoid processes, respectively. The anterior border is free and concave, forming a large oval opening known as the tentorial incisure through which the cerebral peduncles pass. The brain can be pushed partly down through the tentorium. This is very dangerous for the patient because vital centres of respiration and blood circulation are located there. Therefore, it is impossible to produce a large amount of cerebrospinal fluid during a lumbar puncture. The sinuses are located where the dura mater splits. Blood from the brain's veins flows off there. The sinuses are connected to the diploic veins, as well as the veins of the fornix and the base of the skull. The sinuses' walls are tight and taut, and they do not have valves. This structure of the venous sinuses allows venous blood to flow freely out of the brain, independently of fluctuations in intracranial pressure. If a sinus is damaged, it does not close but gapes, causing severe bleeding. Neurosurgeons pay special attention to the superior sagittal and cavernous sinuses.

The superior sagittal sinus is an unpaired structure located along the margin of the falx cerebri. Starting at the crista galli and the foramen cecum, through which a vein from the

nasal cavity enters, it runs from the front to the back, grooving the inner surface of the frontal lobe and the adjacent margins of the two parietal lobes. It also grooves the superior division of the cruciate eminence of the occipital lobe. Infections can pass through the sinus with chronic inflammatory processes in the nasal cavity. The superior sagittal sinus connects to the superficial temporal vein via the parietal emissary vein and the transverse sinus, between Trolar's vein. Blood lakes (small cavities that communicate with the lumen of the sinus) are present on both sides of the superior sagittal sinus, between the sheets of the dura mater. The veins of the dura mater, the brain's veins, diploic veins, and Pacchionian granulations drain into these lakes. Doctors performing craniotomies must be aware of sinus deviation to the right or left, sinus splitting and the presence of blood lakes.

The cavernous sinus is located at the base of the skull, on either side of the sella turcica. The two cavernous sinuses are connected by the intercavernous sinus. Together, the cavernous and intercavernous sinuses form Ridley's ring, which receives blood from:

- the inferior ophthalmic vein (which anastomoses with facial veins through the profunda facial vein);
- the superior ophthalmic vein (which anastomoses with facial veins through the angular vein) collects blood from the forehead;
- superficial middle cerebral vein;
- inferior cerebral veins;
- the sphenoparietal sinus, and occasionally the central retinal vein and the frontal tributary of the middle meningeal vein.

Drainage of the cavernous sinus is via:

- the superior petrosal sinus to the transverse sinus;
- the inferior petrosal sinus drains directly into the jugular bulb.

- the venous plexus on the internal carotid artery to the pterygoid venous plexus.

- emissary veins passing through the sphenoidal foramen, the foramen ovale and the foramen lacerum.

The cross-section of the cavernous sinus is triangular. The cavernous sinus transmits multiple cranial nerves to the superior orbital fissure and the foramen ovale.

These nerves are:

In the superior wall:

- the oculomotor nerve (CN III);
- trochlear nerve (CN IV).

In the lateral wall:

- the ophthalmic branch of the trigeminal nerve (CN V).

Traversing the lateral sinus to the ICA:

- abducens nerve (CN VI) and internal carotid artery.

The presence of these links explains how the infection can spread rapidly from the soft tissues of the skull to the cavernous sinus, resulting in severe diseases such as meningitis, sepsis and brain abscesses. The Foix syndrome appears at cavernous sinus thrombosis. The main symptom of this condition is ophthalmoplegia, or paralysis of the muscles of the eyeball. This is the result of the paralysis of the third, fourth and sixth pairs of cranial nerves. Other symptoms include exophthalmos (protrusion of the eyeball), swelling of the eyelids, ptosis (drooping of the upper eyelid) and immobility of the eyeball. Pulsating exophthalmos indicates sinus damage. The cavernous sinus is connected to the superior sagittal sinus via Trolar's vein and to the transverse sinus via the Labbe vein. The Trolar vein (superior anastomotic vein) connects the superficial middle cerebral vein with the superior sagittal sinus, and the Labbe vein (inferior anastomotic vein) connects the superficial middle cerebral vein with the transverse sinus. Due to these links, doctors can bandage the posterior parts of the superior sagittal

sinus.

The middle meningeal artery, which branches off from the first part of the maxillary artery, supplies blood to the dura mater. It enters the cranial cavity via the foramen spinosum. It lies on the inner surface of the sphenoid, parietal and temporal bones in a groove specially formed for it. The artery is divided into frontal (anterior) and parietal (posterior) branches. The anterior branch moves upwards to form an arc, while the posterior branch moves backwards or horizontally (Figure 7). The artery passes through the dura mater. It lies closer to the outer sheet. The artery is accompanied by two veins. The anterior branch of the middle meningeal artery is located in the bone canal at the 'pterion' (the point where the frontal, parietal, temporal and sphenoid bones meet). This must be remembered when performing a craniotomy, as the middle meningeal artery and its branches are often damaged. This can cause the formation of epidural and subdural haematomas. The anterior branch's course corresponds to the position of the precentral gyrus. The course of the posterior branch corresponds to the location of the temporal lobe. This is important for diagnosing an epidural haematoma.

The symptoms of an intracranial haematoma are:

- 1 Mydriasis: the dilation of the pupil in the region of the haematoma, which is a condition characterised by unequal pupil size. This is the result of brain injury and damage to the third cranial nerve. Mydriasis is accompanied by ptosis of the upper eyelid.

- 2 Hemiparesis is the weakening of the muscles on one side of the body opposite the site of the haematoma. It is caused by compression of the motor cortex and the intersection of the pyramidal tract.

- 3 Bradycardia is strictly defined in adults as a pulse rate below 60 beats per minute. It is caused by brain stem injury, oedema, brain hypoxia, sympathetic fibre damage and increased

vagal tone.

4 The presence of 'lucid intervals'. Consciousness is gradually suppressed as the haematoma increases in size.

The dura mater is innervated by the tentorial branch of the ophthalmic nerve, the middle meningeal branch of the maxillary nerve, the meningeal branch of the mandibular nerve, which penetrates the cranial cavity through the foramen spinosum, and the meningeal branch of the vagus nerve, which enters the cranial cavity through the jugular foramen. Under the dura mater is the arachnoid membrane of the brain, the arachnoidea mater. The subdural space is located between the arachnoid membrane and the dura mater. The brain's superficial veins pass through this space. These veins empty into the sinuses of the dura mater. Damage to these veins can cause subdural haematomas. These are more extensive and grow more slowly than epidural haematomas. The arachnoid membrane that covers the brain is known as the 'arachnoidea encephali', while the portion that covers the spinal cord is known as the 'arachnoidea spinalis'. The arachnoid mater has two subdivisions surrounding the subarachnoid space: the dorsal layer and the ventral layer. Cerebrospinal fluid circulates in the subarachnoid space, which is located between the arachnoid and the pia mater. This fluid is produced by the choroid plexus. The total volume of CSF in adults ranges from 100 to 150 ml. In the supine position, the pressure is equivalent to a water column of 120–150 ml. This rises to 200–250 mmHg when measured in a sitting position. The pressure and composition of the cerebrospinal fluid are examined at lumbar puncture.

The Queckenstedt-Stookey test is used to detect blockages in the subarachnoid channels. When the jugular vein is compressed, blockages cause little or no increase in the pressure of the spinal fluid. The opening pressure is measured. The clinician's assistant then compresses both jugular veins. If increased intracranial pressure is not suspected, pressure is first

exerted on the abdomen. This causes an engorgement of spinal veins, which in turn rapidly increases cerebrospinal fluid pressure. This will be reflected by a rapidly rising pressure measured from the lumbar needle within 10–12 seconds. Compression of one jugular vein can produce an increase in pressure; compression of the other does not increase the pressure in the presence of Queckenstedt's symptoms. Obturation of the internal jugular vein or transverse or sigmoid sinus (thrombosis) may occur on the side where the pressure does not increase. The majority of cerebrospinal fluid is produced in the choroid plexus of the two lateral ventricles. From there, it passes through the interventricular foramen (of Monro) to the third ventricle and then through the cerebral aqueduct (of Sylvius) to the fourth ventricle. The fourth ventricle is an outpouching on the posterior part of the brainstem. From there, the fluid passes through three foramina to enter the subarachnoid space. It passes through the Foramen of Magendie on the midline and the two Foramina of Luschka laterally. The subarachnoid space surrounds the brain and spinal cord. Hydrocephalus is the abnormal accumulation of CSF in the ventricles of the brain. It causes increased intracranial pressure inside the skull, which can lead to progressive enlargement of the head, convulsions, tunnel vision and mental disability if it occurs in childhood.

## **LATERAL REGION OF THE FACE**

Borders:

- Superiorly: the zygomatic arch and the lower edge of the orbit.
- Inferiorly: the lower edge of the mandible.
- Anteriorly: the nasobuccal fold and nasolabial folds.
- Posteriorly: the rear edge of the mandible.

The side of the face is divided into the buccal and parotideomasseteric regions by the anterior margin of the masseter muscle.

## **BUCCAL REGION**

Layers:

The skin is thin and mobile. There are a lot of sweat and sebaceous glands, as well as blood and lymphatic vessels, and nerve endings. The subcutaneous tissue contains the facial muscles, the facial artery and veins, branches of the trigeminal and facial nerves, lymph vessels and the Stenon's duct (Figure 8). The superficial fascia forms a sheath around the facial muscles and the neurovascular structures of the face. The facial muscles originate from the bones and are embedded in the skin. They form folds. These folds help surgeons perform operations. Surgeons make cuts along the folds so that the postoperative scar will be hardly noticeable. Facial muscles express our emotions. They are also involved in eating, breathing and speech. The facial artery and vein lie between the facial muscles. The facial artery lies at the anterior margin of the masseter muscle. It then turns around the edge of the lower jaw. Pressing it to the bone can help to stop bleeding from wounds on the face. It arises from the external carotid artery in the carotid triangle, a little above the lingual artery. Sheltered by the ramus of the mandible, it passes obliquely upwards beneath the digastric and stylohyoid muscles. It then arches over these muscles to enter a groove on the posterior surface of the submandibular gland. It then curves upwards over the body of the mandible at the anteroinferior angle of the masseter, passing forward and upwards across the cheek to the angle of the mouth. It then ascends along the side of the nose and ends at the medial angle of the eye as the angular artery

The facial artery branches into:

- the inferior labial artery;
- the superior labial artery;
- the lateral nasal branch to the nasalis muscle;
- the angular artery, which is the terminal branch.

The facial vein runs alongside the facial artery. It begins at the medial angle of the eye as the angular vein. It begins after the confluence of the supraorbital and supratrochlear veins. It anastomoses with the ophthalmic veins (the superior and inferior ophthalmic veins). The facial vein connects to the retromandibular vein when it passes around the edge of the lower jaw. This forms the facial vein communis. It then empties into the internal jugular vein. The facial vein anastomoses with the ophthalmic veins and the cavernous sinus, as well as the pterygoid venous plexus via the deep facial vein. These anastomoses are important in the spread of inflammation on the face. Retrograde blood flow is possible from the facial vein into the angular vein, the inferior ophthalmic vein, and the cavernous sinus in cases of thrombophlebitis or furunculosis, or from the facial vein into the deep facial vein, the pterygoid venous plexus, and the emissarium foraminis laceri into the cavernous sinus. A septic embolus can penetrate the cavernous sinus. This can cause thrombosis, meningitis, brain abscess and sepsis. The prognosis for these complications is very serious (Figure 9).

The own fascia is a continuation of the temporal aponeurosis. It is divided into superficial and deep layers. The superficial layer forms a fascial sheath around the Bichat fat pad. The deep layer of the own fascia merges with the buccopharyngeal fascia and continues into the pharyngobasilar fascia. The Bichat fat pad is enclosed in its own capsule and located at the front edge of the masseter muscle. The lateral surface of the buccinator muscle is located on the medial side of the Bichat fat pad. The parotid duct is located outside and in front of it. Cheek fat consists of three parts, from which the

temporal, orbital and pterygopalatine processes originate. The temporal process penetrates beneath the zygomatic arch and connects with the subgaleal cellular space of the temporal region. The orbital process enters the infratemporal fossa. It adheres to the inferior orbital fissure and often joins the adipose body of the orbit. The pterygopalatine process connects to the temporal pterygoid space and penetrates the pterygomaxillary fissure to enter the pterygopalatine fossa. It surrounds the maxillary nerve and the pterygopalatine ganglion. It often passes through the superior orbital fissure in the internal base of the skull, reaching the cavernous sinus. Thus, the cheek fat connects the subcutaneous tissue of the buccal region with the temporal pterygoid space and the subgaleal space of the temporal region. It also connects with the cellular tissue of the pterygopalatine fossa and the orbit. This joint is of great significance in the spread of inflammation. It can be said that the Bichat fat pad is the main conductor of inflammatory processes in the face. The buccinator muscle is located between the jaws. It is covered by the bucco-pharyngeal fascia. It originates from the upper and lower jaws and blends into the facial muscles around the mouth. The parotid duct permeates the cheeks. The buccinator muscle acts as a sphincter for the parotid duct. It is lined with mucosa and supplied by the buccal artery, which branches off the maxillary artery. It is innervated by the buccal branches of the facial nerve. Therefore, injury to this nerve results in atrophy of the cheek muscles (Figure 10).

The maxilla and mandibula, along with the infraorbital and mental foramina (containing the corresponding vessels and nerves), are located deeper than the facial muscles (Figure 11). The infraorbital neurovascular bundle emerges from the same opening, 0.5 cm below the midpoint of the infraorbital rim, entering the soft tissue of the canine fossa and extending to the anterior wall of the maxillary sinus. The infraorbital artery is a branch of the maxillary artery. The infraorbital vein drains into

the inferior ophthalmic vein or the pterygoid venous plexus. The infraorbital nerve is a continuation of the maxillary nerve. It divides into a number of branches on the front surface of the upper jaw.

The branches:

- The inferior palpebral branch innervates the skin of the lower eyelid.

- The external nasal branch innervates the skin of the nose.

- The superior labial branch innervates the skin of the upper lip and forms the so-called 'small goose foot'.

On its way to the infraorbital groove and channel, it gives off anterior, middle and posterior alveolar branches. These branches form the superior dental plexus, which innervates the teeth of the upper jaw. Infraorbital regional anaesthesia is used during operations on the upper jaw and dental extractions. The mental neurovascular bundle emerges from the mental foramen. Valleix points are areas of pain in the distribution of the trigeminal nerve branches. Lymph flow from the buccal region drains into the submandibular lymph nodes and nodes under the chin. Their inflammation can cause compression of the excretory duct of the parotid gland and stasis of saliva. This can lead to inflammation of the parotid gland.

## **PAROTID MASSETER REGION**

Layers:

- The skin is thin and mobile. It is covered with hair.
- The subcutaneous tissue.

The great auricular nerve, the auriculotemporal nerve, the buccal nerve of the mandibular nerve (a branch of the facial nerve), the transverse facial artery and the zygomaticofacial nerve are located in the superficial fascia (fascial compartment).

The parotid-masseteric fascia, also known as the own fascia, is beneath the superficial fascia. It is attached to the zygomatic arch and the lower edge of the lower jaw. It splits into two sheets to form the capsule of the parotid gland (the parotid fascia). It penetrates the gland between its segments. The parotid fascia moves to the masseter muscle and is called the masseteric fascia. The masseter muscle is located in the anterior part of the parotid-masticatory area (it begins at the zygomatic bone and zygomatic arch, and is attached to the masseteric tuberosity). This muscle elevates and moves the mandible forward when contracted. It is located within a bone and fibrous sheath. The inner surface of the masseter muscle is adjacent to the ramus of the mandible. The submasseteric space lies between the ramus of the mandible and the masseter muscle. The submasseteric space contains the masseteric artery, vein and nerve. The submasseteric space communicates with the temporopterygoid space, the interpterygoid space, and the Bichat fat pad. Phlegmon can develop here. Medially, a ramus of the lower jaw extends from the masseter muscle. The condylar process of the mandible completes the temporomandibular joint. The main components of the temporomandibular joint are the mandibular condyle, mandibular fossa and articular tubercle. Jaw dislocations occur when the two bones that originally met at the joint detach (Figure 12).

The parotid gland is located at the back of the parotid-masseter region. It is the largest serous type salivary gland. It is surrounded by sheets of parotid fascia and muscles. It forms the parotid space alongside arteries, veins and nerves.

The borders of the parotid space are:

- Superiorly: the ear canal (external auditory meatus).
- Inferiorly, the submandibular gland.
- Anteriorly, it is bordered by the rear and outer surface of the masseter muscle, the ramus of the mandible and the medial pterygoid muscle.

- Posteriorly, it is bordered by the sternocleidomastoid muscle, the posterior belly of the digastric muscle and the mastoid process.

- Medially, it is the styloid process with the muscles of Riolan's bouquet (stylohyoid, styloglossus and stylopharyngeus muscles) and the tissue of the anterior parapharyngeal space. The spatium parotideum is not closed in this place. The pharyngeal process of the parotid gland fills the space between the styloid process and the medial pterygoid muscle.

It lacks a fascial compartment (a weak spot in the capsule) and is adjacent to the anterior part of the peripharyngeal space. This explains how pus can penetrate from the parotid gland into the parapharyngeal cellular space when inflammation occurs (Figure 13).

The parotid gland is laterally adjacent to subcutaneous fat. The fascial capsule is weakly developed. It can rupture during mumps (purulent parotitis). The inflammatory process can spread to the middle ear.

The parotid gland receives blood from the parotid branches of the superficial temporal artery. Venous outflow occurs via the retromandibular vein. Lymphatic drainage occurs in the superficial and deep parotid lymph nodes. The gland is innervated by the parotid branches of the auriculotemporal nerve. Secretory parasympathetic preganglionic fibres reach the gland from the lower salivary nucleus and consist of the glossopharyngeal nerve, the tympanic nerve and the lesser petrosal nerve to the otic ganglion. Postganglionic fibres reach the gland via the auriculotemporal nerve. The excretory duct of the parotid gland (Stenon's duct) begins at the front edge of the gland. It runs forward at a distance of 1–1.5 cm below and parallel to the zygomatic arch on the outer surface of the masseter muscle. Lying on top of the Bichat fat pad, it passes around the front edge of the masseter muscle and turns inward. The excretory duct pierces the buccal muscle and passes under the buccal mucosa,

opening into the buccal cavity at the level of the second molar. The excretory duct is projected onto a line drawn from the outer ear canal to a point midway between the wing of the nose and the angle of the mouth. The external carotid artery divides into two terminal branches: the superficial temporal artery and the maxillary artery. The retromandibular vein is a continuation of the superficial temporal vein. It passes in front of the auricle and goes down behind the branches of the mandible, laterally to the external carotid artery. It joins the facial vein behind the posterior belly of the digastric muscle. Their common trunk, the common facial vein, empties into the internal jugular vein. The auriculotemporal nerve is a branch of the mandibular nerve. It begins with two roots that cover the middle meningeal artery and are connected to one trunk. It extends along the inner surface of the mandibular articular process and penetrates the parotid gland capsule. It is located medially to the superficial temporal artery. Frey-Baillarger syndrome develops in patients who have undergone surgery on the parotid gland, as a result of postoperative scarring involving the trophic vasomotor fibres of the auriculotemporal nerve, and it is a complex of vegetative and vascular disorders. Symptoms include skin flushing and sweating while eating. Auriculotemporal neuralgia is manifested by burning pain in the temporal region, the external auditory canal and the temporomandibular joint. Attacks are accompanied by flushing of the skin, hyperhidrosis (excessive sweating) and hypersalivation. The superficial and deep parotid lymph nodes collect lymph from the frontal, temporal, and buccal areas, as well as from the periodontal molars. They are located under the fascia on the surface of the gland.

## **THE FACIAL NERVE**

The motor nucleus of the facial nerve (CN VII) is in the

basal part of the pons. The axons of the cells in this nucleus extend into the cerebellopontine angle, running parallel to the intermediate nerves that carry afferent fibres from the geniculate ganglion. They both enter the internal auditory canal of the pyramid and continue into the 3 cm long facial nerve canal. The canal has a bend in which the geniculate ganglion is located. The fibres of the geniculate ganglion form the main part of the intermediate nerve ("Wrisberg's nerve"). These fibres are accompanied by the motor trunk of the facial nerve. The intermediate nerve gives rise to the greater petrosal nerve and the chorda tympani, the latter of which contains secretory fibres from the submandibular and sublingual ganglia. The greater petrosal nerve exits the pyramid of the temporal bone through the hiatus for the greater petrosal nerve. It then moves towards the foramen lacerum, where it joins the deep petrosal nerve to form the pterygoid canal nerve, which passes through the foramen lacerum. This nerve passes through the pterygoid canal to reach the pterygopalatine ganglion. The chorda tympani emerges from the temporal bone via the petrotympanic fissure. It is part of the lingual nerve. It contains fibres that supply flavouring and secretions to the submandibular and sublingual glands. Inflammation of the geniculate ganglion is known as Ramsay Hunt syndrome, also referred to as herpes zoster oticus. Symptoms and signs include acute facial nerve paralysis, ear pain, loss of taste in the front two-thirds of the tongue, dry mouth and eyes, eruption of an erythematous vesicular rash in the external auditory canal, on the tongue and/or hard palate, hearing loss and vertigo. Some of the motor fibres of the facial nerve's main trunk go to the stapedius muscle. The main trunk of the facial nerve emerges from the pyramid through the stylomastoid foramen at the lower end of the auricle's attachment. It supplies the posterior auricular nerve to the muscle of the same name, as well as the occipital belly of the epicranial muscle, the stylohyoid branch, and the digastric

branch to the posterior belly of the digastric muscle. The 'pes anserinus' (so named because the separation of branches resembles the foot of a goose) is the branch point of the facial nerve after it leaves the stylomastoid foramen. This division is also known as the 'parotid plexus' and takes place within the parotid gland. The branches of the pes anserinus are the temporal, zygomatic, buccal, marginal mandibular and cervical branches. The temporal branch is the most consistent. It projects as a line from the earlobe to the outer corner of the eye. The zygomatic and buccal branches follow the course of the Stenson's duct. The marginal mandibular branch is the most variable in position. It runs 0.5–1 cm below the lower edge of the mandible. This must be taken into consideration when operating on submandibular abscesses. The close relationship between the branches of the facial nerve and the parotid gland parenchyma explains why the mimic muscles become paralysed when the parotid gland becomes inflamed. Knowledge of the topography of the facial nerve and its branches is important for operations on the parotid gland. In the Fallopian canal, the facial nerve lies far from the periosteum. Inflammation of the periosteum can cause compression of the facial nerve, resulting in ischaemia. The leading factor in the development of peripheral facial paralysis (Bell's palsy) is disordered blood supply. The main source of blood supply to the facial nerve canal is the stylomastoid artery, a branch of the posterior auricular artery. Spasm of the artery can cause ischaemia and degeneration of nerve fibres.

## **THE DEEP FACE REGION**

M. I. Pirogov named the deep facial area the intermaxillary space. This can be accessed by removing the zygomatic arch, the ramus of the mandible, and the temporal

muscle. It is located in the infratemporal fossa.

The borders of the intermaxillary space are:

- superiorly: the greater wings of the sphenoid bone;
- inferiorly, the medial and lateral walls converge;
- anteriorly, it is the maxillary tuberosity (the infratemporal surface of the maxilla);
- posteriorly: the parotid gland;
- medially, it is the lateral pterygoid plate.

The deep areas of the face contain the medial and lateral pterygoid muscles. The pterygoid venous plexus and adipose tissue surround these muscles. The maxillary artery and the mandibular nerve are also present (Figure 14). The lateral pterygoid muscle has two heads. The superior head originates from the infratemporal surface of the greater wing of the sphenoid bone. The inferior head begins at the lateral pterygoid plate. These heads are attached to the neck of the mandible, the joint capsule of the temporomandibular joint, and the articular disc. Together, the right and left lateral pterygoid muscles protract and depress the mandible. Individually, they move the mandible from side to side. The medial pterygoid muscle originates from the medial surface of the lateral pterygoid plate and the palatine bone. Its insertion attachments are the medial surface of the ramus and the angle of the mandible. Together, the right and left medial pterygoid muscles elevate and protrude the mandible. Individually, they move the mandible from side to side.

The blood supply is from the pterygoid branches of the maxillary artery.

Innervation: medial and lateral pterygoid nerves of the mandibular nerve.

Venous outflow occurs in the pterygoid venous plexus .

The temporoptyergoid and interptyergoid spaces are located in the deep facial area.

The temporoptyergoid space is bordered by:

- superiorly: the bottom surface of the greater wing of the sphenoid bone;
- anteriorly: the maxillary tuberosity;
- posteriorly, the condylar process of the mandible;
- medially: lateral pterygoid muscle;
- laterally, the temporal muscle;
- inferiorly, the temporoptyergoid space transitions into the interptyergoid space.

The temporoptyergoid space contains the deep temporal nerve, the masseteric nerve, the buccal nerve, the pterygoid venous plexus and the maxillary artery and its branches. The pterygoid venous plexus surrounds the pterygoid muscles. This contains the parotid veins, which originate from the parotid gland; the deep temporal veins, which originate from the temporal muscle; the veins that accompany the sphenopalatine artery from the nasal mucosa; the veins that originate from the medial and lateral pterygoid muscles; the veins that accompany the inferior alveolar artery; and the middle meningeal veins. The middle meningeal veins carry blood outflow from the dura mater and the spongy bone tissue of the skull (the diploe). Venous outflow from the pterygoid venous plexus is carried by the maxillary vein into the retromandibular vein and then into the internal jugular vein. The maxillary artery, the largest branch of the external carotid artery, is located in the temporomandibular space. The maxillary artery supplies blood to the deep areas of the face. It begins at the neck of the mandible, bends around the medial side and lies between the temporalis and lateral pterygoid muscles, reaching the pterygopalatine fossa.

The maxillary artery gives rise to a number of branches on its way.

In the first compartment, the mandibular part of the maxillary artery is divided into the following:

- The deep auricular artery, which supplies the temporomandibular joint, the external auditory canal, and the

eardrum.

- The anterior tympanic artery passes through the petrotympanic fissure (Glaserian fissure) into the tympanic cavity.

- The inferior alveolar artery enters the lower jaw canal through the mandibular foramen and provides dental branches to the teeth of the lower jaw. It sends a mylohyoid branch to the muscle of the same name. The mental branch of the inferior alveolar artery emerges from the channel and supplies the muscle of the same name and the skin of the chin.

- The middle meningeal artery runs up the medial surface of the lateral pterygoid muscle. It passes through the foramen spinosum into the cranial cavity and is divided into frontal and parietal branches.

In the second compartment (the pterygoid part of the maxillary artery, between the temporalis muscle and the lateral pterygoid muscle), it is divided into:

- the masseteric artery, which supplies the muscle of the same name;

- the pterygoid branches, which supply the medial and lateral pterygoid muscles;

- the deep temporal arteries, which supply the temporalis muscle;

- the buccal artery, which goes to the buccinator muscle;

- the posterior superior alveolar artery runs through the maxillary tuberosity to supply the upper teeth.

The cellular tissue of the temporopterygoid space is connected to the buccal fat pad and the pterygopalatine fossa via the pterygomaxillary fissure. It is also connected to the cellular tissue of the orbit via the inferior orbital fissure and to the cavity of the skull and cavernous sinus via the foramen ovale and the foramen spinosum. Along the course of the maxillary artery, it is connected to the bed of the parotid gland. Along the course of the masseteric artery and vein, it is connected to the

submasseteric space. Through the pharyngeal appendix of the parotid gland, it is connected to the anterior parapharyngeal space. Downwards, the cellular tissue of the temporopterygoid space turns into the cellular tissue of the interpterygoid space. The interpterygoid space is located between the pterygoid muscles.

It is limited:

- laterally by a branch of the mandible and the medial surface of the lateral pterygoid muscle;
- medially by the lateral surface of the medial pterygoid muscle;
- superiorly by the base of the skull;
- posteriorly by the parotid gland;
- anteriorly by the maxillary tuberosity and the buccal fat pad;
- inferiorly by medial pterygoid muscle.

The spatium interpterygoid contains the mandibular nerve, the maxillary artery and the pterygoid venous plexus. In the medial part of the deep region of the face is located the pterygopalatine fossa, which contains adipose tissue and the following structures: the maxillary artery, the maxillary nerve and the pterygopalatine ganglion. In the event of inflammation of the maxillary sinus (genyantritis), ganglioneuritis of the pterygopalatine ganglion can occur, clinically manifesting as Sluder's syndrome, which is characterised by burning pain and autonomic dysfunctions such as epiphora, ptyalism, rhinorrhoea, swelling and redness of the eyelids and swelling of the face. Inwards from the deep area of the face, on the lateral wall of the pharynx, is the parapharyngeal space. This is divided into two compartments: anterior and posterior.

The anterior parapharyngeal space is limited:

- medially, by the levator veli palatini muscle, the tensor veli palatini muscle, the superior pharyngeal constrictor muscle, the pharyngobasilar fascia and the tonsils;

- laterally by the medial pterygoid muscle and the pharyngeal process of the parotid gland;

- posteriorly by the muscles of anatomical Riolan's bouquet (the styloglossus muscle, the stylopharyngeus muscle and the stylohyoid muscle) and the aponeurosis covering the stylopharyngeus muscle (Zhonesko's diaphragm);

- anteriorly by the lateral and medial walls which are interconnected;

- superiorly by the base of the skull;

- inferiorly by the capsule of the submandibular gland that extends into the tissue of the floor of the mouth (Figure 15).

The ascending palatine artery is a branch of the facial artery that supplies blood to the soft palate. The pharyngeal veins and pharyngeal venous plexus drain blood from the soft palate. The external palatine vein drains blood from the tonsil and the cellular tissue of the anterior parapharyngeal space. It anastomoses with the pharyngeal veins and flows into the facial vein. The anterior parapharyngeal space is connected to the bed of the parotid gland, the external carotid artery, the intercollicular space, the cellular tissue of the mouth floor and the bed of the submandibular glands. It is also connected to the nerve to the tensor veli palatini and the posterior parapharyngeal space via the pharyngeal venous plexus.

The posterior parapharyngeal space is located between the lateral wall of the pharynx and the parotid glands. It is limited:

- On the medial side, it is separated from the retropharyngeal space by the Charpy fascia.

- On the lateral side, it is limited by the styloid process of the temporal bone, the posterior belly of the digastric muscle and the sternocleidomastoid muscle.

- Posteriorly, it is limited by the prevertebral fascia.

- Anteriorly, it is limited by the styloid process and the muscles attached to it (the styloglossus muscle, the

stylopharyngeus muscle and the stylohyoid muscle), and by Zhonesko's diaphragm, which separates the anterior and posterior parapharyngeal spaces.

- Superiorly, it is limited by the base of the skull, where the carotid canal and jugular foramen are located.

- Inferiorly, it transfers through the vessels and nerves into the spatium vasoneurorum of the neck.

The following structures are present in the posterior parapharyngeal space: the internal carotid artery, the internal jugular vein behind and to the side of it, and the glossopharyngeal nerve (IX), the vagus nerve (X), the accessory nerve (XI) and the hypoglossal nerve (XII). Behind and medially from the internal carotid artery, under the prevertebral fascia, is located the superior cervical sympathetic node. The internal jugular vein is surrounded by deep cervical lymph nodes.

The posterior parapharyngeal space combines with the upper mediastinum along the vessels, the posterior mediastinum along the vagus nerve, the spatium vasonervorum of the neck along the vessels and vagus nerve, the bed of the parotid salivary gland along the external carotid artery, the posterior cranial fossa along the internal jugular vein, the middle cranial fossa along the internal carotid artery, the cavernous sinus along the internal carotid artery, the bed of the submandibular gland along the facial artery, and the cellular tissue of the upper back neck area along the occipital artery and occipital vein. Inflammation can occur in this tissue, resulting in furuncles or carbuncles of the neck, which can spread into the posterior parapharyngeal space. When the tissue in the posterior parapharyngeal space becomes inflamed, Villaret's syndrome occurs, which is a combination of Horner's syndrome (miosis, enophthalmos and stenosis of the optic fissure) and unilateral paralysis of the muscles of the soft palate, pharynx, larynx and vocal cords, as well as paresis or paralysis of the

sternocleidomastoid and trapezius muscles. This symptom occurs when the IX, X, XI and XII pairs of cranial nerves and the cervical sympathetic trunk are damaged.

The retropharyngeal space is a gap filled with loose fibres, located behind the pharynx between the buccopharyngeal fascia (which covers the posterior wall of the pharynx) and the prevertebral fascia. It contains retropharyngeal lymph nodes, the inflammation of which can lead to the formation of retropharyngeal abscesses. It also contains branches of the ascending pharyngeal artery and the pharyngeal venous plexus. The retropharyngeal space is limited:

- superiorly by the base of the skull;
- inferiorly, where it transfers into the retrovisceral space of the neck at the level of the sixth cervical vertebra;
- laterally by the aponeurosis pharyngoprevertebralis (Charpy fascia).
- anteriorly by the pharynx and buccopharyngeal fascia, which covers it.
- posteriorly by the prevertebral fascia.

The first symptom of inflammation of the deep facial tissue is tonic contraction of the masticatory muscles (trismus), because the inflammatory process involves the medial pterygoid muscle. The inflammatory process then spreads to all cellular spaces, through the foramen rotundum, foramen ovale and foramen spinosum to the dura mater, and through the inferior orbital fissure into the orbit cavity. Purulent inflammation on the face, in the form of furuncles or carbuncles on the upper lip or at the corners of the mouth, is inevitably complicated by facial venous thrombophlebitis. This spreads to the orbit veins, the cavernous sinus and the pterygoid venous plexus. Through anastomoses, it then reaches the dura mater sinuses, causing sinus thrombosis, which is followed by meningitis. Inflammatory processes in the facial area are complicated and sometimes fatal. The reasons for this are:

- the close location of vital formations;
- the venous plexus and veins have no valves.

Septic emboli spread quickly into the venous sinuses of the dura mater, resulting in intracranial complications. In this respect, the most dangerous area is the upper lip. The "triangle of death", located between the two nasolabial folds and the upper lip, requires special care when manipulating the soft tissues.

The presence of linked cellular spaces in the lateral facial area causes inflammation to spread to neighbouring areas of the body (the orbit, the parapharyngeal space and the mediastinum).

## **SURGICAL ANATOMY OF THE MAXILLARY SINUS**

The maxillary sinus is the largest of the paranasal sinuses. Its anterior wall is thin and is located between the infraorbital margin and the alveolar process of the maxilla. The anterior wall contains the canine fossa and the infraorbital foramen. The infraorbital artery, vein and nerve pass through the foramen. The anterior superior alveolar artery and nerve also pass through the bone of the anterior wall of the maxillary sinus, where they participate in forming the superior dental plexus. The lateral and posterior walls of the maxillary sinus are formed by the maxillary tuberosity. The posterior wall of the maxillary sinus is adjacent to the posterior ethmoidal cells and the sphenoid sinus. The maxillary artery and vein, the infraorbital artery and vein, the descending palatine artery and vein, the posterior superior alveolar artery and vein and the pterygopalatine ganglion are all adjacent to the posterior wall of the maxillary sinus. The posterior superior alveolar arteries supply blood to the molars, gums, and posterior wall of the maxillary sinus. The maxillary hiatus is located on the medial

wall of the maxillary sinus (the lateral wall of the nasal cavity) at the level of the middle nasal meatus. The maxillary hiatus is an opening that connects the nasal cavity to the maxillary sinus. The nasolacrimal duct and the ethmoidal air cells are located on the inner surface of the medial wall of the maxillary sinus. The inferior wall of the maxillary sinus is formed by the alveolar process of the maxilla. The superior wall of the maxillary sinus is formed by the orbital surface of the maxilla, through which the infraorbital groove passes. This groove is continuous with the infraorbital canal, through which the infraorbital artery, vein and nerve pass. The inflammatory process associated with maxillary sinusitis can spread to the orbit through the superior wall of the maxillary sinus, resulting in neuralgia of the infraorbital nerve. Furthermore, debriding the mucosa of the superior wall carries the risk of injuring the infraorbital artery and nerve.

Puncture of the maxillary sinus is performed to treat acute and chronic sinusitis. After anaesthetising the area, a puncture needle is used to make a puncture in the sinus. The needle is inserted 10–15 mm deep beneath the inferior nasal concha. The maxillary sinus cavity is then irrigated with an antiseptic solution (Figure 16).

## **SURGICAL ANATOMY OF THE FRONTAL SINUS**

Frontal sinus is situated within the squamous part of the frontal bone. Its anterior wall is thick. The posterior wall is thin; it separates the frontal sinus from the anterior cranial fossa. The inferior wall of the frontal sinus is the thinnest. Its medial part is located above the nasal cavity and communicates with it through the opening of the frontal sinus. In chronic rhinitis, infection can spread from the middle nasal meatus into the frontal sinus

through its opening. The lateral part of the inferior wall of the frontal sinus is located above the orbit. The septum separates the right frontal sinus from the left. The right and left frontal sinuses are rarely of equal size, and the septum between them is not always positioned centrally. One or both sinuses may rarely be hypoplastic or even absent. In frontal sinusitis the inflammatory process can spread through the thin inferior and posterior walls into the orbit and into the anterior cranial fossa respectively.

### **CLINICAL MANIFESTATIONS OF ANTERIOR CRANIAL FOSSA FRACTURES**

Damage to the ethmoidal artery and veins can result in epistaxis (nosebleeds), bleeding from the nasopharynx and the vomiting up of swallowed blood. Haemorrhaging can occur under the conjunctiva of the eye and eyelids, as well as under the skin of the eyelids (the 'raccoon eyes' sign). There may also be haemorrhaging into the eyeball and exophthalmos. Damage to the dura mater can result in cerebrospinal fluid (CSF) rhinorrhoea. CSF rhinorrhoea carries the risk of developing purulent meningitis. Injury to the frontal sinus can lead to subcutaneous emphysema or pneumocephalus. Trauma to the olfactory nerve can result in anosmia or hyposmia.

### **CLINICAL MANIFESTATIONS OF MIDDLE CRANIAL FOSSA FRACTURES**

Damage to the body of the sphenoid bone can result in bleeding from the nose and nasopharynx. Damage to the cavernous sinus leads to blood from the injured internal carotid artery entering the ophthalmic veins, resulting in pulsating

exophthalmos. Injury to the optic nerve can result in amblyopia or amaurosis. Damage to the oculomotor nerve causes divergent strabismus, ptosis and mydriasis. Damage to the trochlear nerve causes the eyeball to deviate upwards and inwards, resulting in diplopia. Injury to the abducens nerve presents as convergent strabismus. Fractures of the middle cranial fossa often involve the petrous part of the temporal bone. Clinically, this manifests as bleeding or leakage of cerebrospinal fluid from the ear, hearing loss, and impaired function of the facial and intermediate nerves.

### **CLINICAL MANIFESTATIONS OF POSTERIOR CRANIAL FOSSA FRACTURES**

If the facial nerve is damaged as it leaves the facial canal, it can cause sudden weakness or paralysis on one side of the face, with the mouth turning towards the healthy side. The nasolabial and frontal folds become smoother. Due to paralysis of the buccinator muscle, saliva drools from the corner of the mouth, which is lowered and incompletely closed (Figure 17). The palpebral fissure does not close, resulting in lagophthalmos, or 'hare eye', and the incomplete closure of the eyelids leads to drying of the cornea and conjunctiva, causing an inflammatory and dystrophic process to develop.

If the facial nerve is damaged within the facial canal above where the chorda tympani branches off, the patient will present with the previously mentioned symptoms as well as dysgeusia or ageusia of the anterior two-thirds of the tongue and oligoptyalism (dry mouth). If the facial nerve is affected above the branching of the nerve to the stapedius, the aforementioned symptoms occur alongside hyperacusis. If the facial nerve is affected above the branching of the greater petrosal nerve, the aforementioned symptoms occur alongside crocodile tears

syndrome, which is characterised by the shedding of tears while eating or drinking. Fractures of the petrous part of the temporal bone can damage the nerves passing through the internal acoustic canal, including the facial nerve, intermediate nerve and vestibulocochlear nerve. This can lead to surditas (deafness), impaired salivation and symptoms of facial nerve damage.

In fractures of the posterior cranial fossa near the jugular foramen, McKenzie syndrome (characterised by dysphagia, aphonia and torticollis) occurs due to trauma to the glossopharyngeal, vagus and accessory nerves. Damage to the glossopharyngeal nerve can result in dysphagia, dysgeusia and anaesthesia of the pharyngeal mucosa. Damage to the vagus nerve results in cardiac dysfunction and aphonia. Affection of the accessory nerve causes torticollis due to paralysis of the sternocleidomastoid and trapezius muscles. Damage to the hypoglossal nerve results in hemiglossoplegia, dysphagia, dysarthria and tongue deviation.

## **HEMORRHAGES IN CRANIOCEREBRAL TRAUMA**

Haematomas in the subcutaneous tissue appear as localised swelling. Haematomas beneath the epicranial aponeurosis are diffuse, cover the entire surface of the cranial vault, and are limited by the attachment site of the epicranial muscle. Haematomas beneath the periosteum are limited by the cranial sutures. Wounds of the cranial vault bleed profusely.

In non-penetrating head wounds, the dura mater remains intact, whereas penetrating wounds involve damage to the dura mater. The dura mater and pia mater contain blood vessels. Damage to these vessels causes the formation of haematomas, which compress the brain, impair cerebrospinal fluid outflow, increase intracranial pressure, and cause cerebral hypoxia.

An epidural haematoma is localised between the bone of the cranial vault and the dura mater. The source of its formation is bleeding from the middle meningeal artery, diploic veins, and dural sinuses. In the case of an epidural haematoma, there is no blood in the cerebrospinal fluid.

A subdural haematoma is located beneath the dura mater. It forms as a result of bleeding from the vessels of the pia mater, cerebral veins, and dural vessels. Subdural haematomas form slowly, and blood is found in the cerebrospinal fluid upon lumbar puncture.

An intracerebral haematoma is a collection of blood within the brain tissue that forms as a result of damage to intracerebral blood vessels. Spinal puncture reveals blood in the cerebrospinal fluid.

Intraventricular haematomas are collections of blood in the ventricles of the brain. These occur as a result of damage to the choroid plexus, or when an intracerebral haematoma ruptures into the ventricles of the brain.

A subarachnoid haemorrhage is located in the subarachnoid space. In this case, blood mixes with the cerebrospinal fluid and can be detected by lumbar puncture.

The Krönlein-Bryusova scheme of cranial topography is used to determine the projection of the sulci and gyri of the brain, as well as the middle meningeal artery and its branches, onto the surface of the skull (Figure 18).

## **INCISION AND DRAINAGE OF TEMPORAL REGION PHLEGMON**

Superficial phlegmon is located between the skin and the temporal fascia. Interaponeurotic phlegmon forms above the zygomatic arch, between the superficial and deep plates of the temporal fascia. Subaponeurotic phlegmon of the temporal

region is situated between the deep plate of the temporal fascia and the temporal muscle. Deep phlegmon is located between the temporal muscle and the periosteum of the squamous part of the temporal bone.

The phlegmon located between the skin and the temporal fascia is accessed via an anterior incision, taking into account the position of the temporal branches of the facial nerve, and a posterior vertical incision, taking into account the position of the auriculotemporal nerve, the superficial temporal artery and the superficial temporal vein.

A horizontal incision is made above the zygomatic arch to open the phlegmon of the interaponevrotical temporal space.

Phlegmons of the subaponeurotic space (between the deep plate of the temporal fascia and the temporal muscle) and of the deep musculoskeletal cellular spaces of the temporal region (between the temporal muscle and the periosteum of the squamous part of the temporal bone) are opened via three incisions: an anterior incision, a posterior vertical incision and a horizontal incision above the zygomatic arch, with incisions of the superficial and deep plates of the temporal fascia. The horizontal incision prevents the spread of pus into the Bichat fat pad, temporal pterygoid space, infratemporal fossa, and pterygopalatine fossa. If pus is present in the deep musculoskeletal cellular spaces the fibers of the temporal muscle are separated. Next, the temporal muscle is detached from the temporal bone, and the deep musculoskeletal cellular spaces are drained (Figure 19).

### **INCISION AND DRAINAGE OF LATERAL REGION OF FACE PHLEGMON**

An incision is made in a phlegmon of the lateral facial region to drain the abscess and prevent the spread of pus. Given

the aesthetic importance of the face, incisions are made along natural creases beneath the lower jaw, occasionally away from the main site of inflammation. The presence of facial nerve branches in the surgical area requires the surgeon to exercise extreme caution. The skin and subcutaneous tissue are incised with a scalpel. Access to the abscess is gained by blunt dissection, separating the parotid gland parenchyma with hemostatic forceps while considering the location of the facial nerve branches.

### **INCISION AND DRAINAGE OF PAROTID GLAND ABSCESS**

With the head extended backward, the incision is made between the ramus of the mandible and the sternocleidomastoid muscle, extending from the earlobe to the angle of the mandible. It is made parallel to the anterior border of the sternocleidomastoid muscle and is 3.0 cm long. It is positioned 1.0–1.5 cm posterior to the ramus of the mandible to avoid damaging the marginal mandibular branch of the facial nerve. The incision is 2.0–2.5 cm deep. The skin, subcutaneous tissue and parotid fascia are incised. The parenchyma of the parotid gland is then opened bluntly by separating the blades of hemostatic forceps. Dissection of the parotid gland is then performed along the course of the branches of the facial nerve. In cases of diffuse purulent parotitis, an additional incision is sometimes required beneath the zygomatic arch and is then connected to the retromandibular fossa incision. Particular attention should be paid to exploring the pharyngeal process of the parotid gland, as an abscess in this area poses the greatest danger and may penetrate the anterior parapharyngeal space (Figure 20).

## **INCISION AND DRAINAGE OF THE PTERYGOMAXILLARY SPACE**

In dentistry, the external part of the interpterygoid space is known as the pterygomaxillary space. In the case of an abscess in this space, an incision is made 2 cm below the angle of the mandible. The skin, subcutaneous tissue, superficial cervical fascia (fascia colli superficialis), platysma muscle and deep cervical fascia (lamina superficialis fascia colli propria) are incised. The surgeon then penetrates the inner surface of the mandible. The medial pterygoid muscle is then detached from the mandible using a raspator, allowing access to the intercopterygoid space. Pus is removed. The space is then drained (Figure 21).

## **INCISION AND DRAINAGE OF THE PARAPHARYNGEAL SPACE**

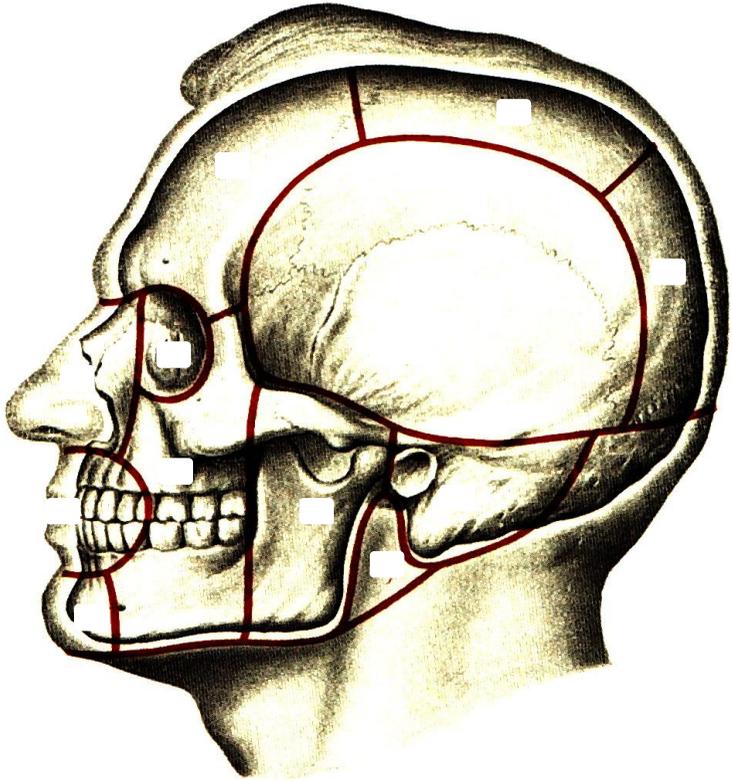
An incision is made 2 cm below the angle of the mandible. The skin, subcutaneous tissue, superficial cervical fascia (fascia colli superficialis), platysma muscle and deep cervical fascia (lamina superficialis fascia colli propria) are incised, exposing the angle of the mandible. The surgeon then penetrates the parapharyngeal space along the inner border of the medial pterygoid muscle and drains it (Figure 22).

## **TECHNIQUE OF INCISION AND DRAINAGE OF RETROPHARYNGEAL ABSCESSSES**

Retropharyngeal abscesses can spread into the retrovisceral space of the neck and the posterior mediastinum, which can lead to mediastinitis developing. Retropharyngeal

abscesses are accessed via the mouth. The root of the tongue is depressed downwards using the left index finger. A 1.0 cm deep, 2.0 cm long vertical incision is made with a scalpel over the bulging, fluctuating area. The patient's head is lowered to prevent aspiration of the purulent contents (Figure 23).

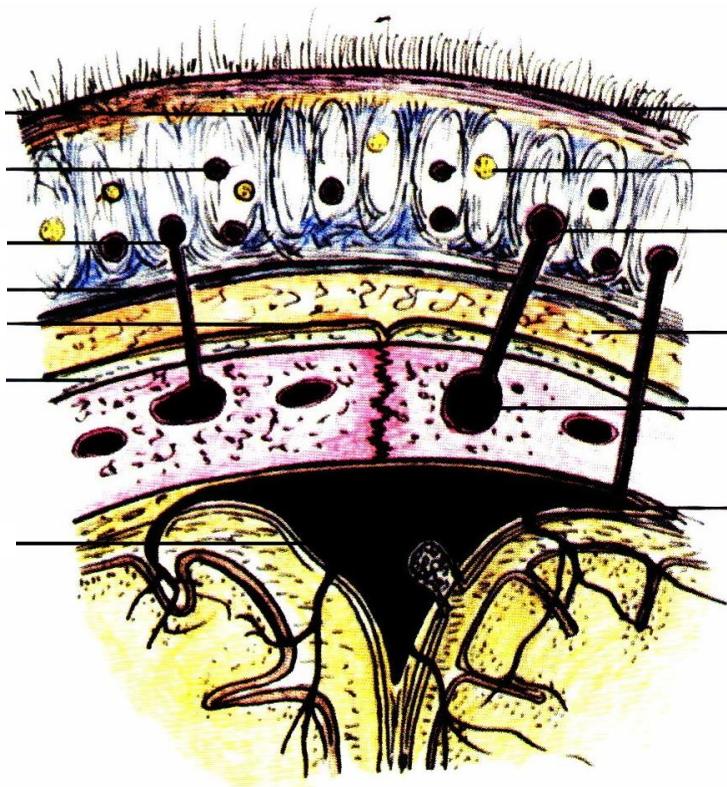
## APPENDIX A



**Figure 1** – Regions of the head:

1 – orbital region; 2 – nasal region; 3 – oral region; 4 – mental region; 5 – buccal region; 6 – parotidomasseteric region; 7 – retromandibular fossa; 8 – mastoid region; 9 – temporal region; 10 – frontal region; 11 – parietal region; 12 – occipital region

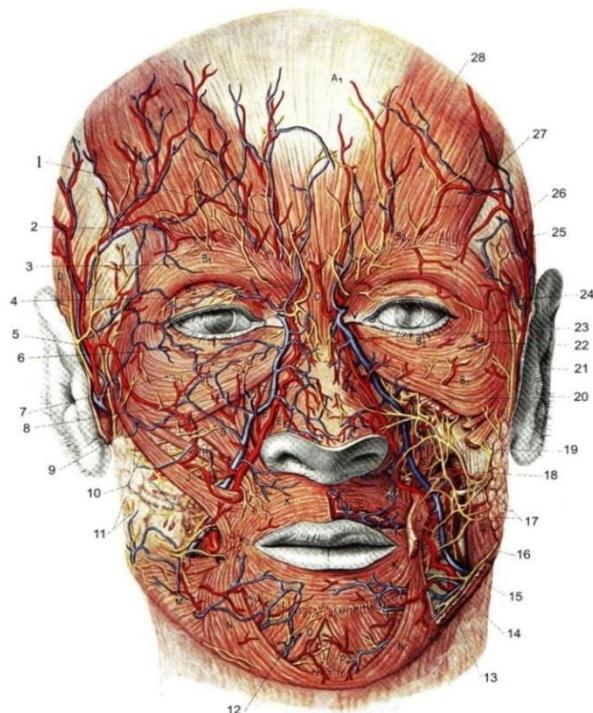
*Continuation of Appendix A*



**Figure 2** – Layer structure of the fronto-parieto-occipital region:

1 – skin and subcutaneous tissue; 2 – subcutaneous nerves; 3 – superficial veins; 4 – subgaleal tissue; 5 – diploic veins; 6 – superior sagittal sinus; 7 – subperiosteal tissue; 8 –periosteum; 9 – epicranial aponeurosis; 10 – superficial arteries; 11 – fascial partitions in subcutaneous tissue; 12 – emissary veins; 13 – superior sagittal sinus

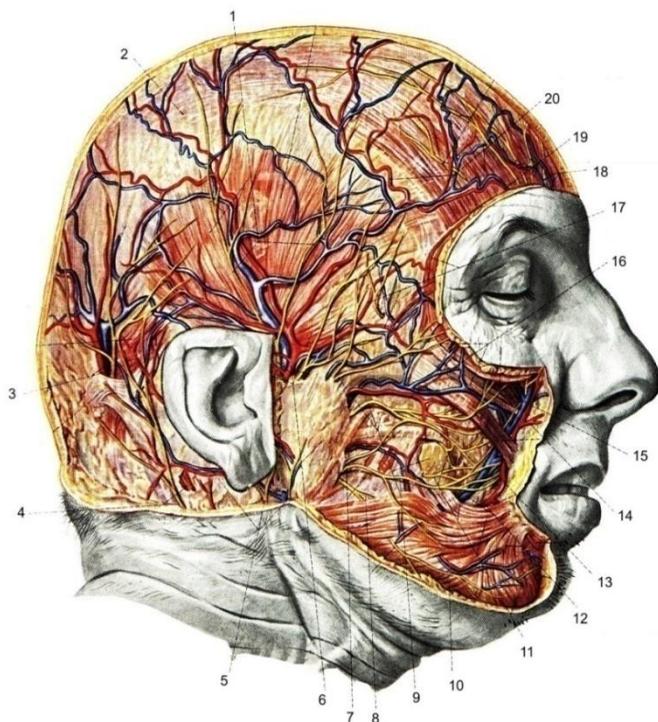
*Continuation of Appendix A*



**Figure 3** – Nerves and blood vessels in the cerebral and facial regions of the head:

1 – supraorbital artery, supraorbital vein and supraorbital nerve; 2 – superficial temporal artery (which anastomoses with the supraorbital artery); 3 – supraorbital nerve (lateral branch of supraorbital nerve), superior palpebral arch; 4 – supraorbital nerve, zygomatico-orbital artery and zygomaticotemporal vein; 5 – superficial temporal artery, superficial temporal vein, auriculotemporal nerve; 6 – zygomaticofacial nerve; 7 – infratrochlear nerve, dorsal nasal artery and palpebral branches of the infraorbital nerve; 8 – external nasal nerve; 9 – zygomatic branches of the facial nerve, temporal branches of the facial nerve; 10 – buccal branch of the facial nerve; 11 – masseteric fascia, parotid gland and great auricular nerve; 12 – mental branch of the inferior alveolar artery and mental nerve (inferior labial branches of the mental nerve); 13 – inferior labial artery (superficial branch); 14 – inferior labial artery (deep branch); 15 – facial artery, facial vein, marginal mandibular nerve; 16 – superior labial artery, superior labial vein; 17 – buccal branch of the facial nerve, Stenon's duct, parotid gland; 18 – buccal branch of the facial nerve, Bichat fat pad; 19 – zygomatic branches of the facial nerve; 20 – infraorbital artery, infraorbital vein and nerve; 21 – superficial temporal artery; 22 – zygomaticofacial artery and nerve; 23 – angular artery and vein; 24 – temporal branches of the facial nerve; 25 – parietal branch of the superficial temporal artery; 26 – frontal branch of the superficial temporal artery; 27 – supraorbital artery, supraorbital nerve and palpebral branch of the lacrimal nerve; 28 – supratrochlear artery and nerve

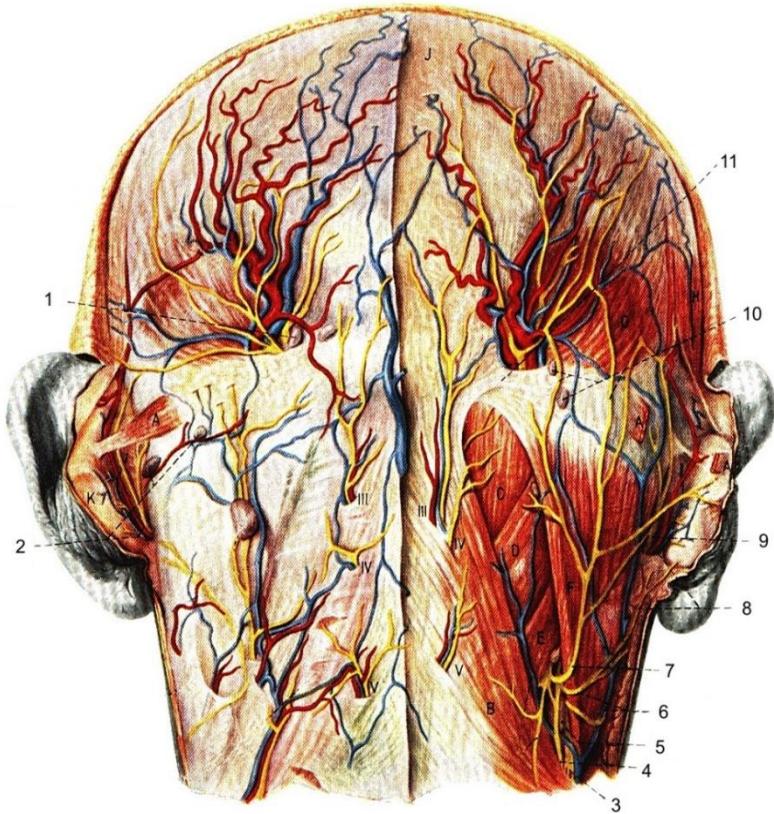
*Continuation of Appendix A*



**Figure 4** – Vessels and nerves of the temporal and facial region of the head:

**1** – parietal branch of superficial temporal artery, superficial temporal vein, auriculotemporal nerve; **2** – epicranial aponeurosis; **3** – occipital artery, occipital vein, greater occipital nerve; **4** – lesser occipital nerve, sternocleidomastoid muscle; **5** – great auricular nerve, posterior auricular artery, posterior auricular vein; **6** – superficial temporal artery, superficial temporal vein, auriculotemporal nerve; **7** – buccal branch of the facial nerve, masseter muscle and masseteric fascia; **8** – marginal mandibular nerve; **9** – Stenon’s duct, zygomatic branches of the facial nerve and buccal branch of the facial nerve; **10** – platysma; **11** – inferior labial artery, risorius muscle, buccal nerve; **12** – facial artery, facial vein; **13** – inferior labial artery; **14** – zygomaticus major muscle and superior labial artery; **15** – angular artery, angular vein, levator labii superioris muscle; **16** – transverse facial artery and zygomaticus minor muscle; **17** – orbicularis oculi muscle, zygomaticofacial nerve; **18** – supratrochlear artery, supratrochlear nerve; **19** – medial branch of supraorbital nerve, supraorbital artery; **20** – frontal branch of superficial temporal artery, frontalis muscle

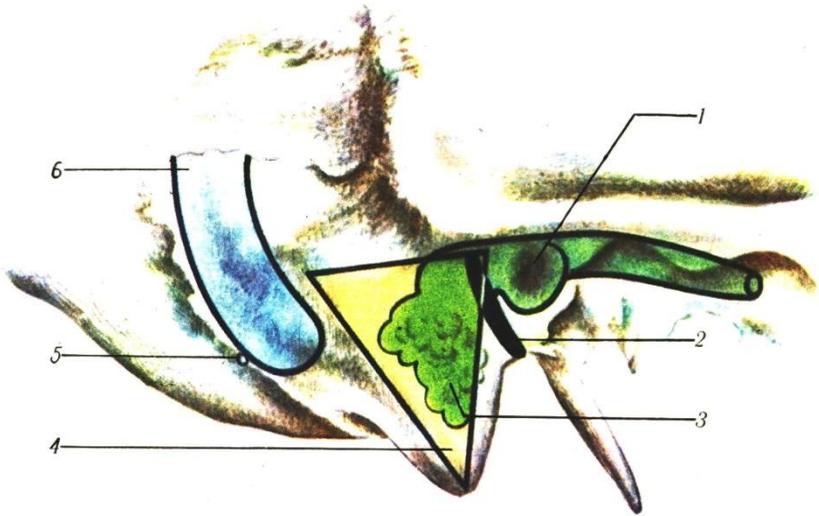
*Continuation of Appendix A*



**Figure 5** – Vessels and nerves of the occipital region:

**1** – occipital artery, occipital vein, greater occipital nerve and occipital lymph nodes; **2** – posterior auricular artery, posterior auricular vein, posterior auricular nerve and mastoid (retroauricular) lymph nodes; **3** – supraclavicular nerves; **4** – accessory nerve; **5** – transverse cervical nerve; **6** – great auricular nerve and external jugular vein; **7** – lesser occipital nerve; **8** – posterior auricular artery, posterior auricular vein and great auricular nerve; **9** – posterior auricular nerve; **10** – lesser occipital nerve and occipital lymph nodes; **11** – occipital artery and occipital vein

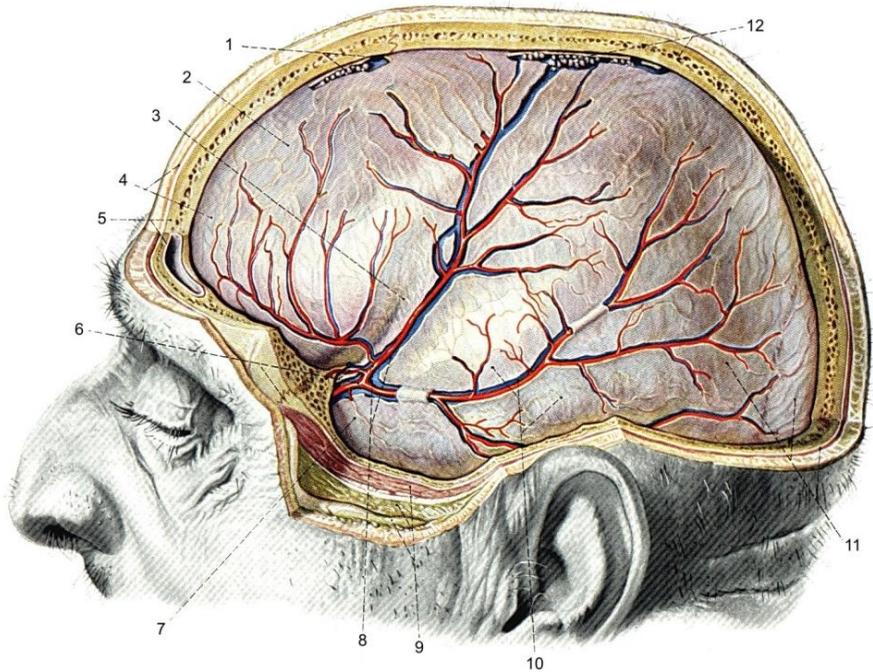
*Continuation of Appendix A*



**Figure 6** – Chipault's triangle:

**1** – external acoustic meatus; **2** – projection of the facial nerve; **3** – mastoid air cells; **4** – mastoid crest; **5** – mastoid foramen; **6** – projection of the sigmoid sinus

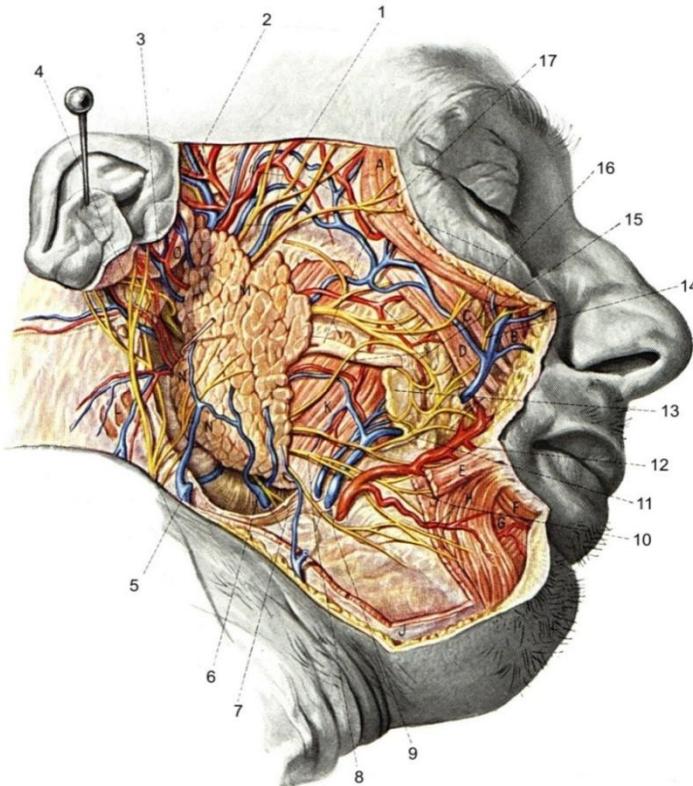
*Continuation of Appendix A*



**Figure 7 – Dura mater and the middle meningeal artery:**

**1** –lateral lacunae (arachnoid granulation); **2** – frontal lobe; **3** – dura mater (lateral sulcus); **4** – frontal pole and epicranial aponeurosis; **5** – frontal sinus and frontal bone; **6** – middle meningeal artery, lesser wing of the sphenoid bone and sphenofrontal suture; **7** – dura mater and temporal pole; **8** – frontal branch of the middle meningeal artery, middle meningeal veins; **9** – temporalis muscle, temporal extension of the buccal fat pad and zygomatic arch; **10** – parietal branch of the middle meningeal artery, middle meningeal veins, dura mater and temporal lobe; **11** – dura mater; **12** – arachnoid granulation, spongy bone tissue of the skull (diploe)

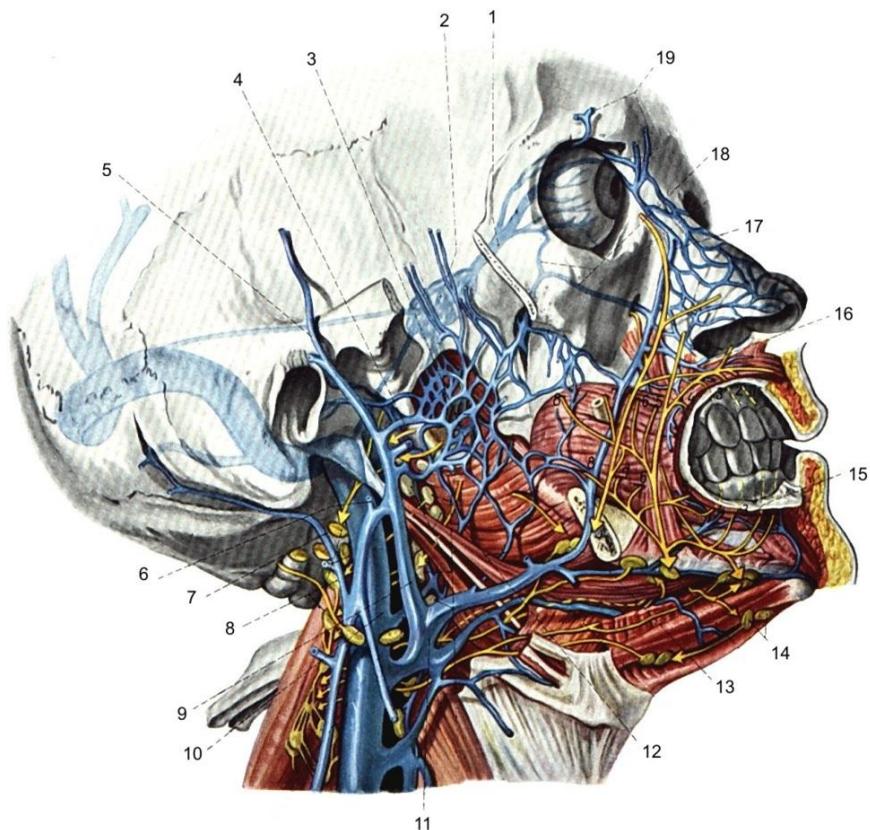
*Continuation of Appendix A*



**Figure 8** – Vessels and nerves of the facial region of the head:

**1** – temporal branches of the facial nerve and zygomatic branches of the facial nerve; **2** –superficial temporal artery, superficial temporal vein and auriculotemporal nerve; **3** – posterior auricular nerve and anterior auricular branches of the superficial temporal artery; **4** – facial nerve, posterior auricular artery and posterior auricular vein; **5** – external jugular vein and great auricular nerve; **6** – cervical branch of the facial nerve; **7** – retromandibular vein; **8** – marginal mandibular nerve; **9** – facial artery and facial vein; **10** – inferior labial artery and buccal branch of the facial nerve; **11** – communicating branches of the facial nerve; **12** – inferior labial artery; **13** – buccal fat pad, branching of the buccal branch of the facial nerve and superior labial artery; **14** – angular vein, branching of the zygomatic branches of the facial nerve; **15** – transverse facial artery, branching of the buccal branch of the facial nerve; **16** – branching of the zygomatic branches of the facial nerve, branching of the infraorbital nerve; **17** – Stenon’s duct, parotid gland and temporal fascia

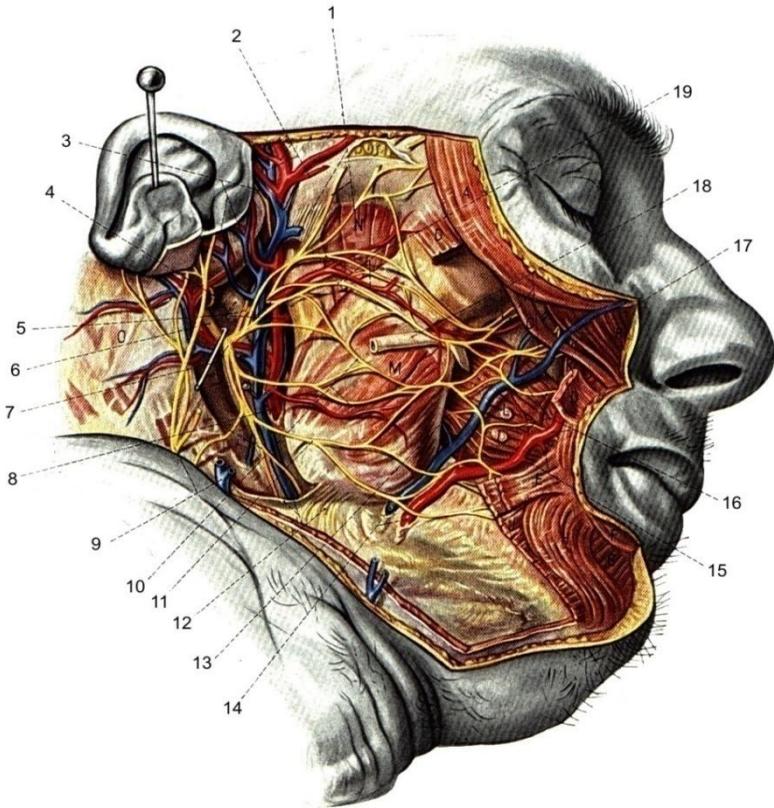
*Continuation of Appendix A*



**Figure 9** – Veins of facial and cerebral region of the head:

**1** – superior ophthalmic vein; **2** – cavernous sinus; **3** – middle meningeal vein and pterygoid venous plexus; **4** – maxillary vein; **5** – superficial temporal vein; **6** – retromandibular vein; **7** – occipital vein; **8** – deep cervical lymph nodes; **9** – retromandibular vein; **10** – internal jugular vein; **11** – common facial vein; **12** – lesser palatine vein (greater palatine vein); **13** – facial vein and inferior alveolar vein; **14** – submental lymph nodes; **15** – inferior labial vein; **16** – superior labial vein; **17** – angular vein; **18** – inferior ophthalmic vein and infraorbital vein; **19** – supraorbital vein, supratrochlear vein

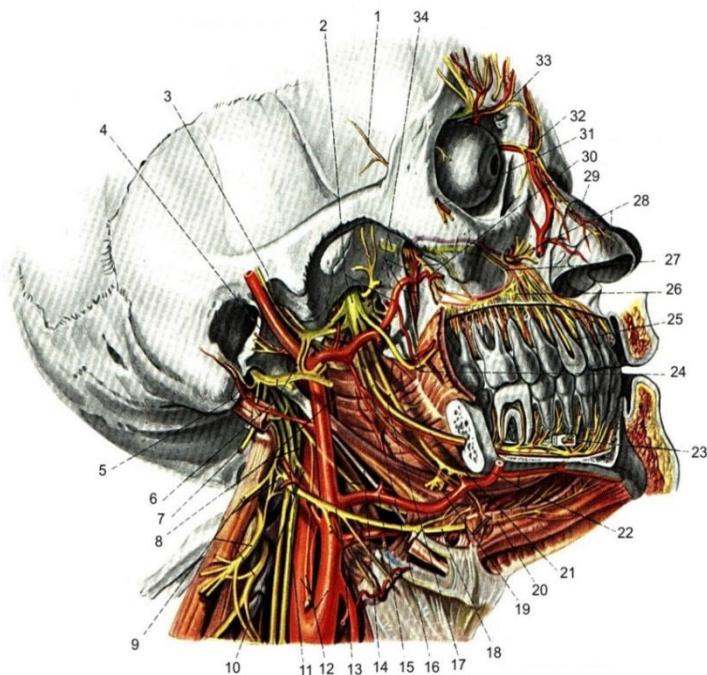
*Continuation of Appendix A*



**Figure 10** – Vessels and nerves of the facial region of the head:

**1** – temporal branches of the facial nerve; **2** – superficial temporal artery, superficial temporal vein and middle temporal artery; **3** –anterior auricular branches of the superficial temporal artery, auriculotemporal nerve; **4** – posterior auricular artery and nerve; **5** –maxillary artery; **6** – facial nerve; **7** – Pes anserinus (“goose’s foot”) facial nerve; **8** – external carotid artery and cervical branch of the facial nerve; **9** – external jugular vein and great auricular nerve; **10** –buccal branch of the facial nerve; **11** – marginal mandibular nerve; **12** – retromandibular vein and parotid gland; **13** – buccal artery and buccal branch of the facial nerve; **14** – facial artery and facial vein; **15** – inferior labial artery; **16** – angular artery, angular vein and branching of the buccal branch of the facial nerve; **17** – infraorbital nerve; **18** – Stenon’s duct and branching of the zygomatic branches of the facial nerve; **19** – transverse facial artery and zygomatic branches of the facial nerve

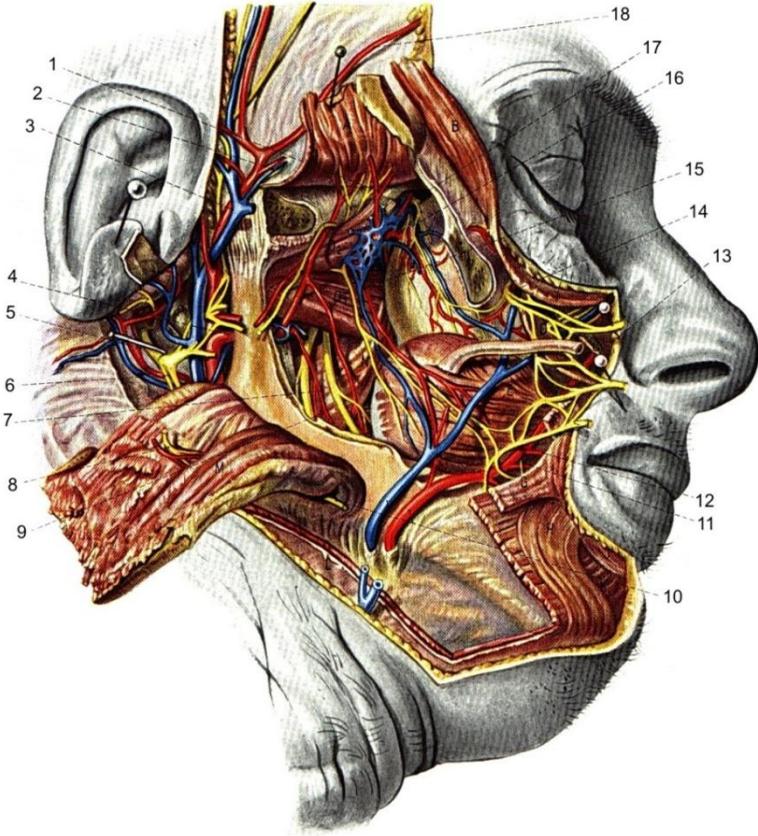
*Continuation of Appendix A*



**Figure 11**– Vessels and nerves of the lateral area of the face:

1 – zygomaticotemporal nerve; 2 –mandibular nerve, otic ganglion, nerve to the medial pterygoid muscle, nerve to the tensor veli palatini and maxillary artery; 3 – superficial temporal artery, auriculotemporal nerve; 4 –deep auricular artery; 5 – posterior auricular artery, posterior auricular nerve, posterior belly of the digastric muscle; 6 – facial nerve, communication between the facial and auriculotemporal nerves; 7 – external ramus branches from the spinal root of the accessory nerve; 8 – superior cervical ganglion, ascending pharyngeal artery; 9 – cervical plexus, hypoglossal nerve; 10 –vagus nerve, superior laryngeal nerve, occipital artery; 11 – cervical sympathetic trunk; 12 –internal carotid artery, external carotid artery, carotid body, carotid sinus nerve; 13 – hypoglossal nerve, superior root of ansa cervicalis; 14 – glossopharyngeal nerve,stylohyoid ligament; 15 – facial artery, ascending palatine artery; 16 – inferior alveolar artery, inferior alveolar nerve; 17 – lingual nerve, chorda tympani; 18 – hypoglossal nerve, lingual artery; 19 – submandibular ganglion, parasymphathetic root of the submandibular ganglion; 20 –mylohyoid branch of the inferior alveolar artery, mylohyoid nerve; 21 – inferior alveolar artery, inferior alveolar nerve; 22 – facial artery, submental artery, lingual nerve; 23 –mental branch of the inferior alveolar artery, mental nerve; 24 – buccal artery, buccal branch of the facial nerve; 25 –peridental branches of the anterior superior alveolar artery, superior dental branches of the superior alveolar nerves; 26 – superior dental plexus; 27 – anterior superior alveolar artery, anterior superior alveolar nerve; 28 – infraorbital artery, infraorbital nerve (“goose’s foot”); 29 – external nasal artery and external nasal nerve; 30 – posterior superior alveolar artery, posterior superior alveolar nerve; 31 – zygomaticofacial artery and zygomaticofacial nerve; 32 – infratrochlear nerve and angular artery; 33 – supratrochlear nerve; 34 – maxillary nerve, pterygopalatine ganglion, palatine nerves and descending palatine artery

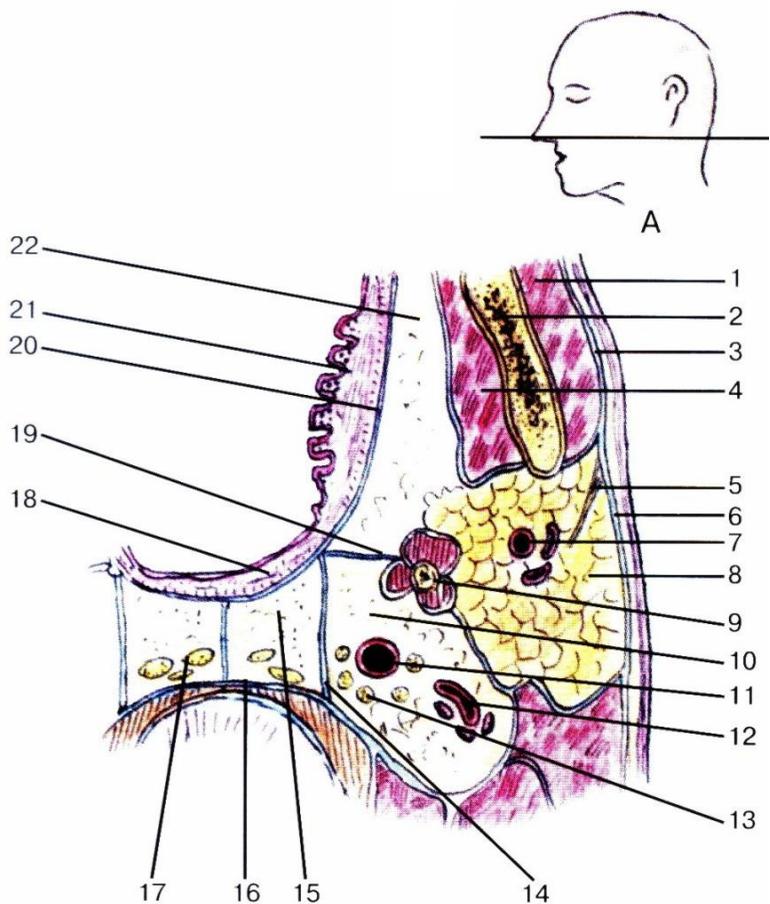
*Continuation of Appendix A*



**Figure 12** – Vessels and nerves of the lateral area of the face:

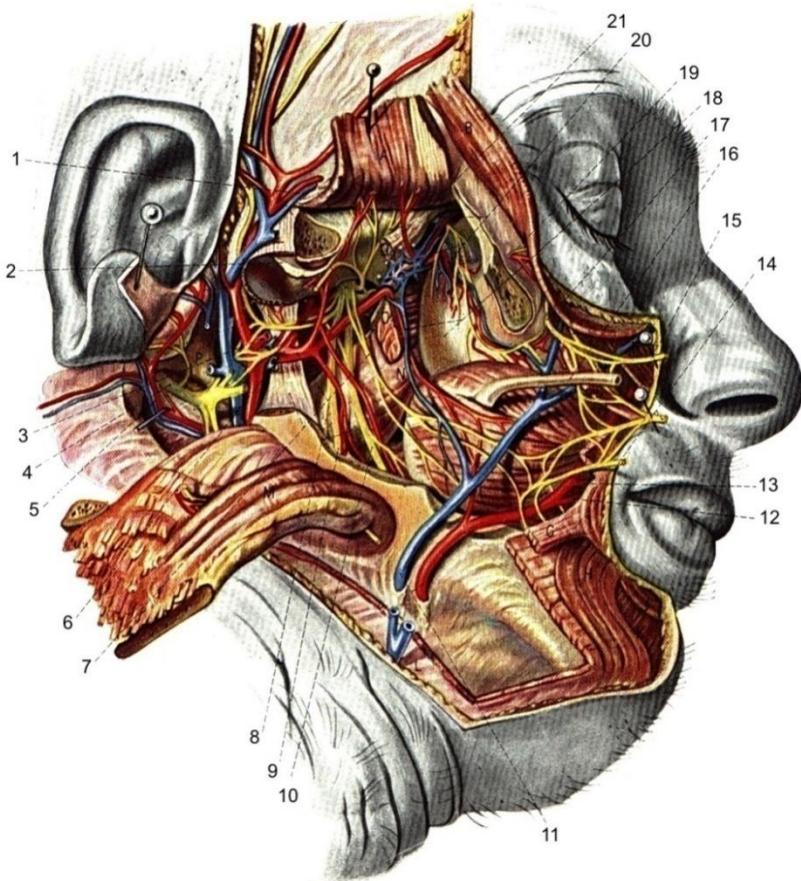
1 – deep temporal artery and nerve; 2 – middle temporal artery and vein; 3 – superficial temporal artery and vein; 4 – posterior auricular nerve, maxillary artery and facial nerve; 5 – stylomastoid artery; 6 – cervical branch of the facial nerve, posterior auricular artery and vein; 7 – mylohyoid branch of inferior alveolar artery and mylohyoid nerve; 8 – masseteric artery and nerve; 9 – mandibular nerve and inferior alveolar artery; 10 – facial artery, facial vein and marginal mandibular nerve; 11 – inferior labial artery; 12 – superior labial artery; 13 – angular artery and vein; 14 – buccal artery, buccal vein and buccal branch of the facial nerve; 15 – buccal artery, buccal vein, buccal branch of the facial nerve and pterygoid venous plexus; 16 – posterior superior alveolar artery, posterior superior alveolar vein and posterior superior alveolar nerve; 17 – sphenopalatine artery and maxillary nerve; 18 – zygomatico-orbital artery

Continuation of Appendix A



**Figure 13** – Parapharyngeal space at horizontal sawing:

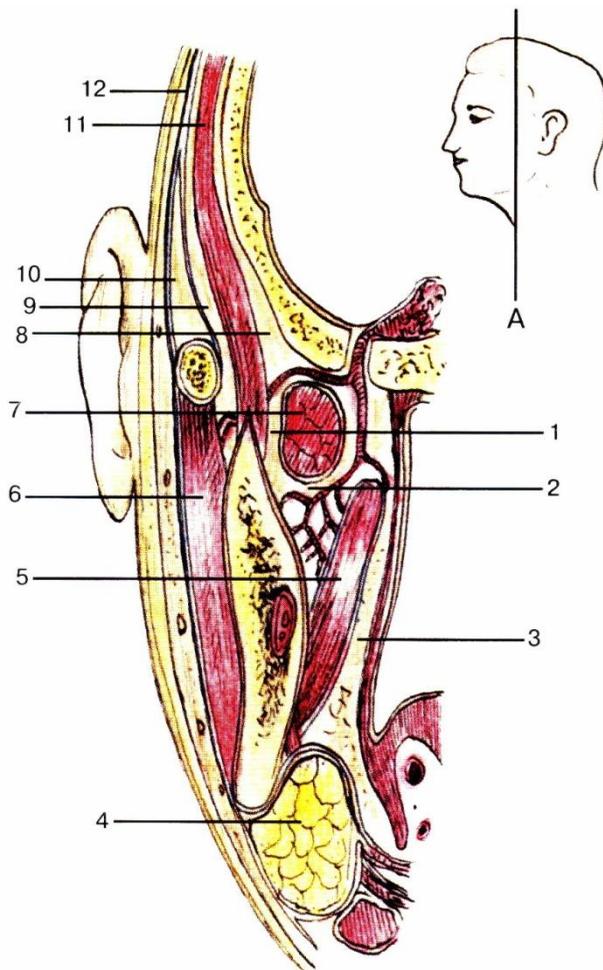
- 1 – masseter muscle; 2 – ramus of the mandible; 3 – masseteric fascia; 4 – medial pterygoid muscle; 5 – facial nerve; 6 – parotid fascia; 7 – external carotid artery; 8 – parotid gland; 9 – styloid process; 10 – posterior parapharyngeal space; 11 – internal carotid artery; 12 – internal jugular vein; 13 – vagus nerve; 14 – Charpy fascia; 15 – retropharyngeal space; 16 – prevertebral fascia; 17 – lymph nodes; 18 – visceral cellular space; 19 – Zhonesko's diaphragm; 20 – pharyngobasilar fascia; 21 – palatine tonsil; 22 – anterior parapharyngeal space



**Figure 14** – Deep area of the face:

**1** – mandibular nerve, middle temporal artery, middle temporal vein;  
**2** – articular disc, superficial temporal artery, superficial temporal vein, auriculotemporal nerve;  
**3** – transverse facial artery; **4** – facial nerve, stylomastoid artery; **5** – posterior auricular artery, posterior auricular vein; **6** – middle meningeal artery; **7** – buccal branch of the mandibular nerve, maxillary artery; **8** – mylohyoid branch of inferior alveolar artery, mylohyoid nerve; **9** – inferior alveolar artery, inferior alveolar nerve; **10** – lingual nerve;  
**11** – facial artery, facial vein; **12** – inferior labial artery; **13** – superior labial artery;  
**14** – buccal branch of the facial nerve; **15** – angular artery, angular vein; **16** – Stenon’s duct;  
**17** – infraorbital nerve; **18** – buccal artery, buccal vein, maxillary tuberosity;  
**19** – zygomaticofacial artery, zygomaticofacial nerve; **20** – maxillary nerve; posterior superior alveolar artery, posterior superior alveolar vein, posterior superior alveolar nerve, pterygoid venous plexus; **21** – deep temporal nerve

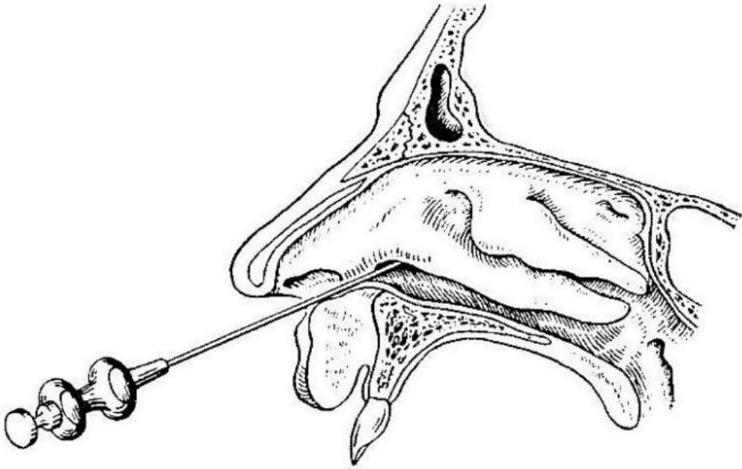
*Continuation of Appendix A*



**Figure 15** –Parapharyngeal space at frontal sawing:

**1** – temporal pterygoid space; **2** – interpterygoid space; **3** – pterygopharyngeal space; **4** – submandibular gland; **5** – medial pterygoid muscle; **6** – masseter muscle; **7** – lateral pterygoid muscle; **8** – deep musculoskeletal cellular spaces of the temporal region; **9** – subaponeurotic space of the temporal region; **10** – interaponeurotic temporal space; **11** – temporal muscle; **12** – temporal fascia

*Continuation of Appendix A*

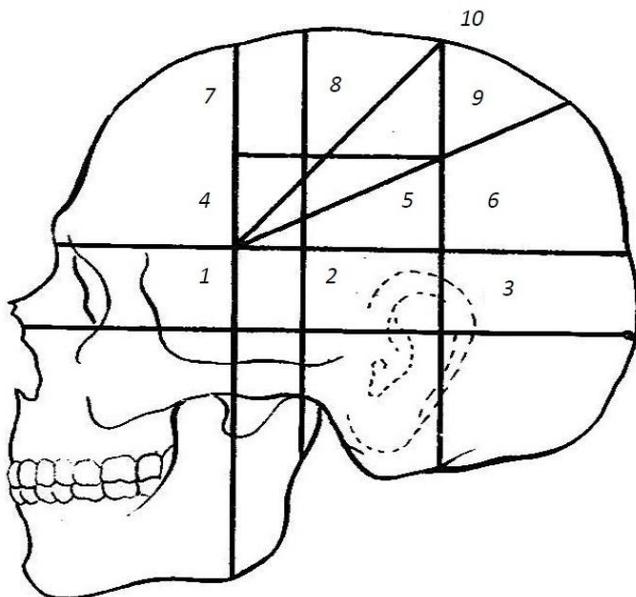


**Figure16**– Puncture of the maxillary sinus



**Figure 17** – Peripheral paralysis of the left facial nerve

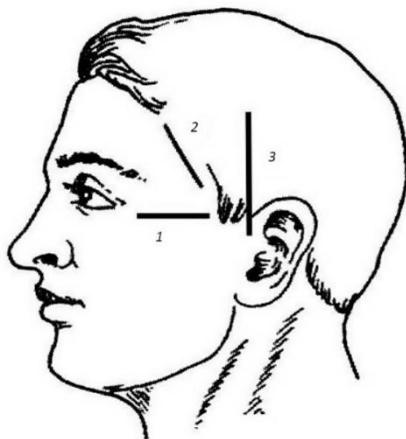
*Continuation of Appendix A*



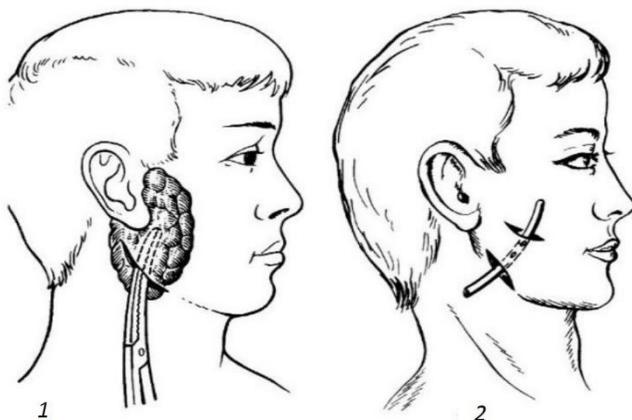
**Figure 18** – Kronlein-Bryusova scheme of cranial topography:

1-3 – inferior horizontal; 4-6 – superior horizontal;  
7-9 – Bryusova's horizontal; 1-7 – anterior vertical; 2-8 – middle vertical;  
3-9 – posterior vertical; 4-10 - projection of the central sulcus; 8-10 – true length of  
the central sulcus; 4-9 – projection of the lateral sulcus;  
1 – projection of the middle meningeal artery trunk; 4 – projection of the frontal  
branch of the middle meningeal artery; 6 – projection of the parietal branch of the  
middle meningeal artery

*Continuation of Appendix A*

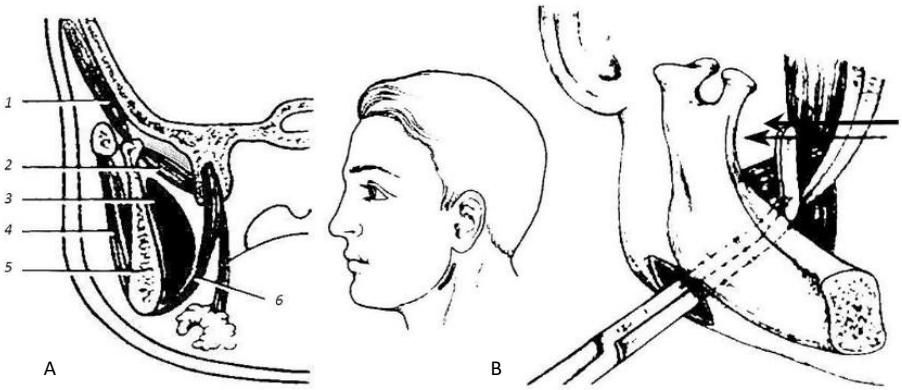


**Figure 19** – Incision sites for drainage of phlegmons in the temporal region:  
1 – horizontal; 2 – anterior oblique; 3 – posterior vertical



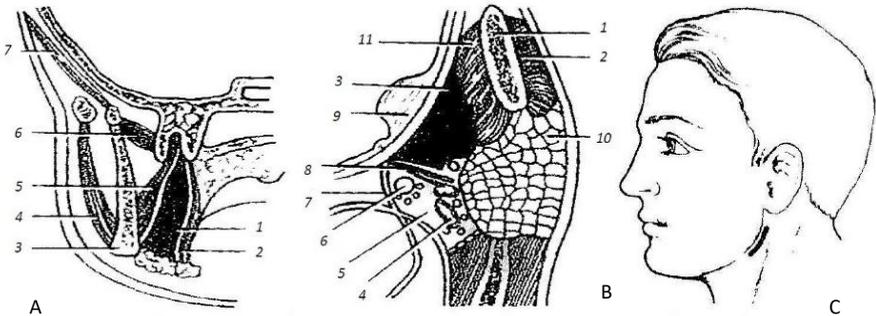
**Figure 20** – Incision of the parotid gland abscess:  
1 – dissection near the inferior projection of the superficial lobe of the parotid gland using a single incision; 2 – dissection near the inferior projection of the superficial lobe of the parotid gland using two incisions and drainage

Continuation of Appendix A



**Figure 21 – A:** Abscess localisation scheme of the pterygomaxillary space: 1 – temporal muscle; 2 – lateral pterygoid muscle; 3 – abscess; 4 – masseter muscle; 5 – mandible; 6 – medial pterygoid muscle.

**B:** I incision and drainage of the pterygomaxillary space abscess

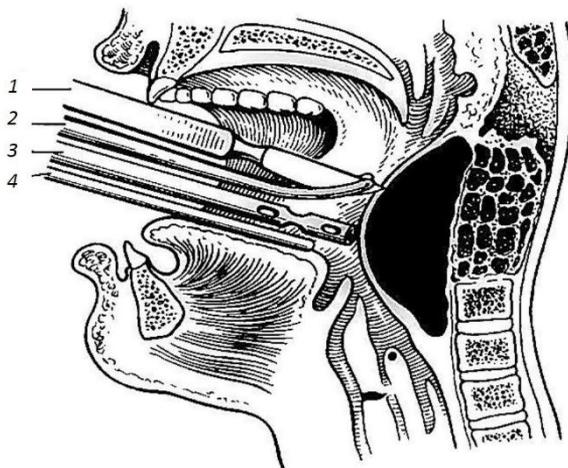


**Figure 22 – A:** Abscess localisation scheme of the parapharyngeal space in the frontal plane: 1 – abscess; 2 – lateral wall of the pharynx; 3 – mandible; 4 – masseter muscle; 5 – medial pterygoid muscle; 6 – lateral pterygoid muscle; 7 – temporal muscle.

**B:** Abscess localisation scheme of the parapharyngeal space in the horizontal plane: 1 – ramus of the mandible; 2 – masseter muscle; 3 – abscess in the anterior parapharyngeal space; 4 – internal jugular vein; 5 – posterior parapharyngeal space; 6 – internal carotid artery; 7 – Charpy fascia; 8 – Zhonesko's diaphragm; 9 – palatine tonsil; 10 – parotid gland; 11 – medial pterygoid muscle.

**C:** incision line

*Continuation of Appendix A*



**Figure 23 - Retropharyngeal abscesses incision:**  
1 – medical scalpel; 2 – clamp; 3 – aspiration tube; 4 – otolaryngological spatula

## TEST QUESTIONS

1 Identify the regions within the calvarium:  
+ the fronto-parieto-occipital region, the temporal region and the mastoid process region;  
– frontal region, parietal region, occipital region and calvarium;  
– temporal region, mastoid process region and parietal region;  
– mastoid process region, occipital region, temporal region and calvarium.

2 Which layers of the calvarium make up a scalp flap:  
+ skin, subcutaneous tissue and epicranial aponeurosis.  
– subcutaneous tissue, epicranial aponeurosis and periosteum?  
– skin, epicranial aponeurosis and periosteal cellular tissue?  
– skin, subcutaneous tissue and subaponeurotic cellular tissue?

3 How many layers of adipose tissue are present in the calvarium:  
+ three;  
– one;  
– two;  
– four?

4 Which layer of cellular tissue contains the main vessels and nerves of the calvarium:  
+ subcutaneous tissue:  
– subaponeurotic cellular tissue:  
– epicranial aponeurosis:  
– periosteum?

5 Which vessels and nerves are present in the subcutaneous tissue of the frontal region:

+ supraorbital artery, supraorbital vein, supraorbital nerve, supratrochlear artery, supratrochlear vein, supratrochlear nerve and the temporal branches of the facial nerve;

– superficial temporal artery, superficial temporal vein, and auriculotemporal nerve;

– posterior auricular artery, posterior auricular vein, greater occipital nerve and posterior auricular nerve;

– supraorbital artery, supraorbital vein, supraorbital nerve and the temporal branches of the facial nerve?

6 Which nerve is the frontal nerve:

+ ophthalmic nerve;

– facial nerve;

– auriculotemporal nerve;

– mandibular nerve?

7 Which vessels and nerves are identified in the subcutaneous tissue of the parietal region:

+ superficial temporal artery, superficial temporal vein and auriculotemporal nerve;

– posterior auricular artery, posterior auricular vein, greater occipital nerve and posterior auricular nerve;

– supraorbital artery, supraorbital vein, supraorbital nerve, supratrochlear artery, supratrochlear vein, supratrochlear nerve and temporal branches of the facial nerve;

– posterior auricular artery, posterior auricular vein, posterior auricular nerve, occipital artery, occipital vein, greater occipital nerve and lesser occipital nerve?

8 Which vessels and nerves are present in the subcutaneous tissue of the occipital region:

+ posterior auricular artery, posterior auricular vein,

posterior auricular nerve, occipital artery, occipital vein, greater occipital nerve and lesser occipital nerve;

- occipital artery, occipital vein, greater occipital nerve, lesser occipital nerve and great auricular nerve;

- superficial temporal artery, superficial temporal vein and auriculotemporal nerve;

- supraorbital artery, supraorbital vein, supraorbital nerve, supratrochlear artery, supratrochlear vein, supratrochlear nerve and temporal branches of the facial nerve?

9 Identify the projection of the supratrochlear artery into the frontal region:

- + at the point where the supraorbital margin crosses the vertical line through the medial eye angle;

- at the border between the middle and medial thirds of the supraorbital margin;

- 3 cm outside the medial third of the supraorbital margin;

- 1 cm below the glabella.

10 Identify the projection of the supraorbital artery into the frontal region:

- + at the border between the middle and medial thirds of the supraorbital margin;

- at the point where the supraorbital margin crosses the vertical line through the medial eye angle;

- along the lateral margin of the orbit;

- on the anterior margin of the chewing muscle.

11 Identify where the exit of the superficial temporal artery can be attached to the bone in order to temporarily stop the bleeding:

- + in front of the tragus of the auricle;

- along the lateral margin of the orbit;

- on the front margin of the masseter muscle;
- behind the tragus of the auricle.

12 Identify the projection of exit of the greater occipital nerve:

- + at the middle point between the mastoid process and the external occipital protuberance;
- at the midpoint between the mastoid process and the upper cervical vertebrae;
- in front of the tragus of the auricle;
- at the posterior margin of the auricle's attachment.

13 The branch of what nerve is the greater occipital nerve:

- + posterior branch of the second cervical nerve;
- cervical plexus;
- facial nerve;
- great auricular nerve?

14 Which nerve is the lesser occipital nerve a branch of:

- + cervical plexus;
- posterior branch of the second cervical nerve;
- ophthalmic nerve;
- facial nerve?

15 Which muscles are penetrated by the greater occipital nerve:

- +semispinal muscle, trapezius muscle;
- sternocleidomastoid muscle;
- superior oblique muscle;
- inferior oblique muscle?

16 The lymphatic vessels of the fronto-parieto-occipital region drain into the following lymph nodes:

- + superficial and deep parotid lymph nodes, mastoid (retroauricular) lymph nodes and occipital lymph nodes;
- posterior auricle lymph nodes, mastoid (retroauricular) lymph nodes and superficial temporal lymph nodes;
- supraorbital lymph nodes, supratrochlear lymph nodes and occipital lymph nodes;
- mandibular lymph node, mastoid (retroauricular) lymph nodes and occipital lymph nodes.

17 How are external cranial haematomas classified into:

- + subcutaneous, subaponeurotic and subperiosteal;
- epidural, subdural and subarachnoid;
- subcutaneous, epidural and subdural;
- subaponeurotic, subperiosteal and subarachnoid?

18 Which layers of the connective tissue in the external calvarium are anatomically suitable for forming haematomas:

- + subaponeurotic cellular tissue and subperiosteal cellular tissue;
- subcutaneous tissue and the subarachnoid space;
- inside the bone and subdural space;
- subcutaneous tissue and subaponeurotic cellular tissue?

19 In which layer of the calvarium is a bunion-shaped haematoma localised:

- +subcutaneous tissue;
- subaponeurotic cellular tissue;
- subperiosteal cellular tissue;
- inside the bone?

20 What are haematomas in the subcutaneous tissue of the calvarium like:

- + bunion-shaped;
- limited swelling;
- spread over the entire surface of the calvarium, limited by the line of attachment to the epicranial muscle;
- limited by the line of attachment of cranial sutures?

21 What are haematomas in the subaponeurotic cellular tissue like:

- + spread occupying the total surface of the calvarium limited by the line of attachment to the epicranial muscle;
- limited swelling;
- limited by the line of the attachment of the cranial sutures;
- bunion-shaped?

22 A patient with a head injury is diagnosed with a spreading haematoma in the soft tissues of the calvarium. It overhangs the eyebrows. In which layer is it located:

- + subaponeurotic cellular tissue;
- subperiosteal cellular tissue;
- subcutaneous tissue;
- periosteum?

23 What are subperiosteal haematomas like?

- + limited by the attachment line of cranial sutures;
- occupy the total surface of the calvarium;
- limited by the attachment line of the epicranial muscle;
- limited swelling?

24 Which incision of the calvarium is the suitable and liest traumatic:

- + radial.

- vertical.
- transverse.
- z-like?

25 The following reasons can cause profuse bleeding in the case of a fronto-parieto-occipital injury:

+ the vessels are located in the subcutaneous cellular tissue above aponeurosis and the vascular adventitia is fixed with a fibrous membrane;

- the blood supply is provided by branches of the external carotid artery, the vessels are located beneath the aponeurosis and marked cellular tissue, and the vessels in this region have a relatively large lumen;

- fixation of cranial vessels with other parts of the head and neck, the walls of the blood vessels are fixed with fibrous membranes, the vessels are located beneath the aponeurosis, and fixation of cranial vessels with the sinuses of the dura mater.

- the blood supply to the occipital region is provided only by the branches of the external carotid artery, while the blood supply to the other regions is provided by the internal carotid artery.

26 What layers does the venous system of the fronto-parieto-occipital region consist of:

+ superficial veins, diploic veins and the sinuses of the dura mater;

- diploic veins, emissary veins and superficial cerebral veins;

- superficial veins, emissary veins and deep cerebral veins;

- diploic veins and the venous plexus of the oval foramen and the sinuses of the dura mater?

27 What connects the superior sagittal sinus to the superficial temporal vein:

- + parietal emissary vein;
- mastoid emissary vein;
- occipital emissary vein;
- venous plexus of the foramen ovale?

28 Which structures does the occipital emissary vein join:

- + transverse sinus and occipital vein;
- sigmoid sinus and the posterior auricular vein;
- the superior sagittal sinus and the superficial temporal vein;
- sigmoid sinus and occipital vein?

29 What does the mastoid emissary vein join:

- + sigmoid sinus and posterior auricular vein;
- transverse sinus and superficial temporal vein;
- sigmoid sinus and occipital vein;
- superior sagittal sinus and superficial temporal vein?

30 How can an infection spread from wounds and suppurated soft tissue lesions on the head to the dura mater sinuses of the brain:

- + through emissary veins;
- through diploic veins;
- through the superior anastomotic vein (Trolar's vein);
- through the inferior anastomotic vein (Labbe's vein)?

31 How can bleeding from bone vessels be stopped:

- + rubbing with wax, stitching, electrocoagulation or pressing with abone rongeur;
- by electrocoagulation, ligatures or clipping;
- by moistening with hydrogen peroxide solution,

electrocoagulation, clipping or tamponade with a hemostatic sponge;

– by tamponade with a hemostatic sponge, interrupted sutures, Bruning-Burdenko plasty or ligation?

32 Which layer of the bone is more often damaged in broken bones of the calvarium:

+ internal plate;

– external plate;

– spongy plate;

– all the plates?

33. How many layers do the bones of the skull consist of:

+ three;

– two;

– four;

– five?

34. How can bleeding from the dura mater be stopped:

+ by ligatures or clipping;

– by rubbing with wax, stitching, electrocoagulation or pressing with a bone rongeur;

– moistening with hydrogen peroxide solution, electrocoagulation, clipping and tamponade with a hemostatic sponge;

– tamponade with a hemostatic sponge, interrupted sutures, Bruning-Burdenko plasty or ligation?

35 How can bleeding from the pia mater vessels be stopped:

+ by moistening with hydrogen peroxide solution, electrocoagulation, clipping and tamponade with a hemostatic sponge.

– by tamponade with a hemostatic sponge, interrupted

sutures, Bruning-Burdenko plasty or ligation;  
– by tamponade with a hemostatic sponge or catgut thread, or with the help of clamps;  
– with the help of clamps?

36 Which of the sinuses of the dura mater are more often damaged when the skull is injured?

- + the superior sagittal sinus;
- transverse sinus;
- straight sinus;
- sigmoid sinus?

37 How can bleeding from the venous sinuses be stopped:

- + by tamponade with a hemostatic sponge, interrupted sutures, Bruning-Burdenko plasty or ligation;
- by moistening with hydrogen peroxide solution, electrocoagulation, clipping or tamponade with a hemostatic sponge;
- by tamponade with a hemostatic sponge, catgut thread or clamps;
- with the help of clamps?

38 During surgery in the cranial cavity, the sinuses of the dura mater can be damaged. According to the Burdenko method, how can bleeding from the dura mater sinuses be stopped;

- + by suturing the P-announcement part of the external layer of the dura mater;
- by packing with a piece of muscle;
- by packing the sinus cavity with catgut;
- should both ends of the sinus be ligated?

39 Consider the following to be penetrating head

injuries:

- + when the dura mater is damaged;
- when the arachnoid mater is damaged;
- when the external plate of the skull is damaged;
- when the pia mater is damaged?

40 A surgeon is performing the final stage of the operation. According to the classification of surgical instruments, which of the following instruments refers to needle holders:

- +Trojanov's needle holder, Mathieu's needle holder or Hegar's needle holder;
- Pier's needle holder, Doyen's needle holder or Bogush's needle holder;
- Farabeff's needle holder, Olie's needle holder or Olivecronie's needle holder;
- Trojanov's needle holder, Mathieu needle holder, Dullgren's needle holder or Gigli's needle holder?

41 Which symptoms of intracranial haematoma are more evident:

- mydriasis, hemiparesis, bradycardia and a lucid interval;
- dysphagia, anaesthesia of the pharyngeal mucosa, dysgeusia;
- aphonia and cardiac disturbances;
- hemiglossoplegia, dysphagia, dysarthria and deviation of the tongue?

42 Which foramen does the middle meningeal artery penetrate:

- + through the foramen spinosum;
- through the foramen rotundum;
- through the foramen ovale;

- through the foramen lacerum?

43 Which part of the brain is affected by the passage of the frontal branch of the middle meningeal artery:

- + precentral gyrus;
- postcentral gyrus;
- angular gyrus;
- limbic lobe?

44 Which part of the brain is affected by the passage of the posterior branch of the middle meningeal artery:

- + temporal lobe;
- precentral gyrus;
- postcentral gyrus;
- parietal lobe?

45 In which projection is the falx cerebri located:

- + in sagittal;
- in frontal;
- in vertical;
- in horizontal?

46 What does the falx cerebri separate:

- + hemispheres of the brain;
- occipital lobe of the cerebri from the cerebellum;
- hemispheres of the cerebellum;
- medulla oblongata from the cerebellum?

47 What is the falx cerebri attached to:

- + margins of the groove for the superior sagittal sinus;
- margins of groove for transverse sinus;
- internal occipital crest;
- the upper margin of the petrous part of the temporal bone?

48 In which direction is the tentorium cerebelli located:

- + horizontal;
- vertical;
- frontal;
- sagittal?

49 Where does the tentorium cerebelli penetrate:

- + in the transverse cerebral fissure;
- between the cerebral hemisphere;
- between the cerebellar hemisphere;
- in the primary fissure of the cerebellum?

50 What passes through the tentorial fissure:

- + brainstem;
- the great cerebral vein;
- inferior sagittal sinus;
- straight sinus?

51 Where is the superior sagittal sinus located:

- + on the upper margin of the falx cerebri in the sulcus of the sinus sagittalis;
- on the lower margin of the falx cerebri in the sulcus of the sinus sagittalis;
- at the point where the falx cerebri is fixed to the tentorium cerebella;
- along the sulcus transversus of the occipital bone?

52 Which sinus of the dura mater is directly connected with the venous system of the face:

- + cavernous sinus;
- straight sinus;
- superior petrosal sinus;
- sigmoid sinus?

53 Where does the superior sagittal sinus drain into:  
+ transverse sinus;  
–straight sinus;  
–sigmoid sinus;  
–cavernous sinus?

54 Where is the inferior sagittal sinus located:  
+ along the low margin of the falx cerebri;  
– along the upper margin of the falx cerebri;  
– at the point of the internal occipital protuberance;  
– at the point where the falx cerebri fixes to the tentorium cerebelli?

55 Where does the inferior sagittal sinus drain into:  
+ straight sinus;  
– transverse sinus;  
– sigmoid sinus;  
– occipital sinus?

56. Where is the straight sinus located:  
+ at the point where the falx cerebri is fixed to the tentorium cerebelli;  
– along the upper margin of the falx cerebri;  
– along the low margin of the falx cerebri;  
– along the internal occipital crest?

57 Where does the straight sinus drain into:  
+ transverse sinus;  
– sigmoid sinus;  
– cavernous sinus;  
– inferior sagittal sinus?

58 Where is the transverse sinus located:  
+at the point of fixation of tentorium cerebelli with the

groove for transverse sinus;

- in the groove for superior sagittal sinus;
- in the groove for sigmoid sinus;
- on the internal occipital crest?

59 Where is the occipital sinus located:

+ along the posterior margin of the falx cerebelli and on the internal occipital crest;

- on the groove for the transverse sinus;
- on both sides of the sella turcica;
- at the point where falx cerebri is fixed to the tentorium cerebelli?

60 Where does the cavernous sinus drain into:

- + sigmoid sinus;
- transverse sinus;
- straight sinus;
- superior sagittal sinus?

61 Where is the cavernous sinus located:

- + on both sides of the sella turcica;
- along the superior margin of the petrous part of the temporal bone;
- at the inferior margin of the petrous part of the temporal bone;
- on the internal occipital crest?

62 On what account is the connection between the cavernous sinus and the superior sagittal sinus performed:

- + superior anastomotic vein (Trolar's vein);
- inferior anastomotic vein (Labbe's vein);
- great cerebral vein;
- ophthalmic veins?

63 On what basis is the connection between the cavernous sinus and the venous system of the face established:

- + superior and inferior ophthalmic veins;
- venous plexus of foramen ovale;
- superior anastomotic vein (Trolar's vein);
- inferior anastomotic vein (Labbe's vein)?

64 What vein connects the cavernous sinus to the transverse sinus:

- + inferior anastomotic vein (Labbe's vein);
- superior anastomotic vein (Trolar's vein);
- great cerebral vein;
- superficial middle cerebral vein?

65 What passes through the upper wall of the cavernous sinus:

- + oculomotor nerve and trochlear nerve;
- ophthalmic nerve;
- abducens nerve and the internal carotid artery;
- facial nerve?

66 What passes through the lateral wall of the cavernous sinus:

- + ophthalmic nerve;
- oculomotor nerve;
- trochlear nerve;
- abducens nerve?

67 What passes through the cavernous sinus:

- + abducens nerve and the internal carotid artery;
- ophthalmic nerve;
- oculomotor and trochlear nerves;
- optic nerve?

68 What is observed at thrombosis of the cavernous sinus:

- + Foix-Thevenard's sign;
- Behr's symptom;
- Mackenzie's syndrome;
- Sluder's syndrome?

69 What are clinical signs of thrombosis at the cavernous sinus:

- + complete ophthalmoplegia, exophthalmos and ptosis;
- pulsing exophthalmos, dysphagia and amaurosis;
- torticollis;
- aphonia?

70 What is observed in cases of cavernous sinus damage:

- + pulsing exophthalmos;
- dysphagia;
- aphonia;
- Foix-Thevenard's sign?

71 Which artery supplies the dura mater of the anterior cranial fossa:

- + anterior meningeal artery;
- middle meningeal artery;
- ophthalmic artery;
- internal carotid artery?

72 Which artery supplies the dura mater of the middle cranial fossa:

- + middle meningeal artery;
- anterior meningeal artery;
- posterior meningeal artery;
- internal carotid artery?

73 What artery supplies the dura mater of the posterior cranial fossa:

- + posterior meningeal artery (branch of the ascending pharyngeal artery);
- posterior meningeal artery (branch of the occipital artery);
- posterior meningeal artery (branch of the posterior auricular artery);
- posterior meningeal artery (branch of the maxillary artery)?

74 Which nerves are innervated by the dura mater:

- + tentorial branch of the ophthalmic nerve, middle meningeal branch of the maxillary nerve, meningeal branch of the mandibular nerve and the meningeal branch of the vagus nerve;
- middle meningeal branch of the maxillary nerve, meningeal branch of the mandibular nerve, auricular branch of the vagus nerve;
- olfactory nerve, ganglionic branches of the maxillary nerve and accessory nerve;
- tentorial branch of the ophthalmic nerve, recurrent meningeal nerve, anterior branch of the meningeal branch of the ophthalmic nerve; middle meningeal branch of the maxillary nerve?

75 What is the pressure of cerebrospinal fluid in the lying position:

- + 120–180 ml of water column;
- 120–180 ml of mercury column;
- 200–250 ml of water column;
- 200–250 ml of mercury column?

76 What is the pressure of cerebrospinal fluid at sitting position:

- +200–250 mm of water;
- 200–250 mm of mercury;
- 120–180 mm of water;
- 120–180 mm of mercury?

77 Which liquid dynamic tests are used to estimate the patency of the subarachnoid space:

- + Queckenstedt's test;
- Delbe-Pertes test;
- Troyanov-Trendelenburg's test;
- Hackenbruch's test?

78 What are the possible routs for of cerebrospinal fluid circulation:

- + from the fourth ventricle through the aqueduct of the cerebrum into the third ventricle;
- from the fourth ventricle through Magendie's and Luschka's foramen into the third ventricle;
- from the fourth ventricle through Monro's foramina into the third ventricle;
- from the fourth ventricle through the aqueduct of the cerebrum into the lateral ventricles?

79 Which arteries form the anterior portion of the circle of Willis:

- + anterior communicating artery;
- internal carotid artery;
- posterior communicating artery;
- anterior cerebral artery?

80 Which arteries form the lateral portion of the circle of Willis:

- + posterior communicating artery;
- posterior cerebral artery;
- anterior cerebral artery;
- anterior communicating artery?

81 Which arteries form the posterior portion of the circle of Willis:

- + posterior cerebral artery;
- anterior cerebral artery;
- anterior communicating artery;
- posterior communicating artery?

82 Which of the brain's veins form the collateral circulation that is of practical significance when the superior sagittal sinus is ligated:

- + superior anastomotic vein (Trolar's vein) and the inferior anastomotic vein (Labbe's vein);
- superficial middle cerebral vein;
- superior cerebral veins;
- inferior cerebral veins?

83 What is observed when the first pair of cranial nerves is damaged:

- + anosmia;
- amaurosis;
- amblyopia;
- aphonia?

84 The following is observed when the second pair of cranial nerves is damaged:

- + amblyopia and amaurosis;
- strabismus divergens, ptosis and mydriasis;

- strabismus convergens;
- aphonia.

85 What is observed when the third pair of cranial nerves is damaged:

- + strabismus divergens, ptosis and mydriasis;
- amblyopia and amaurosis;
- aphonia and anosmia;
- hemianopsia?

86 What is observed when the fourth pair of cranial nerves is damaged:

- + squint, diplopia;
- dysphagia;
- strabismus divergens;
- strabismus convergens?

87 What is observed when the sixth pair of cranial nerves is damaged:

- +strabismus convergens;
- strabismus divergens;
- mydriasis;
- amaurosis?

88 What is observed when the seventh pair of cranial nerves is damaged on the exit of the channel:

- + hemimimima, disproportion of oral fissure towards a healthy side, smoothing of the nasolabial fold and lagophthalmos;
- aphonia;
- hemimimima, oligopterygium and dysgeusia;
- hemimimima and disorders of lacrimal excretory system?

89 A female patient with suppurating mumps on the left side developed smooth nasolabial and nasobuccal folds. The diagnosis is left-sided paresis of the facial muscles. Which nerve is involved in the inflammatory process in this case:

- + facial nerve;
- maxillary nerve;
- mandibular nerve;
- a uriculotemporal nerve?

90 The following symptoms are observed when the facial nerve in the channel above the chorda tympani branch is damaged:

- + hemimimia, oligoptyalism and dysgeuzia;
- hemimimia, disproportion of the oral fissure towards the healthy side, smoothing of the nasolabial fold;
- hemimimia and lacrimal excretory system disorders;
- hemimimia and hyperacusia.

91 The following is observed when the facial nerve in the channel above the branch of the nerve to the stapedius is damaged:

- + hemimimia and hyperacusia;
- hemimimia, oligoptyalism and dysgeuzia;
- hemimimia and lacrimal excretory system disorders;
- anosmia.

92 What is observed when the facial nerve in the channel above the greater petrosal nerve branch is damaged:

- + hemimimia and disorders of the lacrimal excretory system;
- hemimimia and hyperacusia;
- hemimimia, oligoptyalism and dysgeuzia;
- amaurosis?

93 What symptoms are typical for damage to the temporal branches of the facial nerve:

- + lagophthalmos;
- mydriasis;
- ptosis?

94 What is a broken skull characterised by a point at the jugular foramen:

- + Mackenzie's syndrome;
- Behr's symptom;
- Foix-Thevenard sign;
- Villaret's symptom?

95 What is the damage to the ninth pair of cranial nerves characterized by:

- + dysphagia, anesthesia of mucous membrane of the larynx, dysgeusia;
- aphonia and cardiac disturbances;
- hemiglossoplegia, dysphagia, dysarthria and deviation of the tongue;
- hemimimic and disorders of lacrimal system?

96 What damage is characterised by the tenth pair of cranial nerves:

- + aphonia and cardiac disturbance;
- dysphagia, anesthesia of the mucous membrane of the larynx and dysgeusia;
- hemiglossoplegia, dysphagia, dysarthria and deviation of the tongue;
- haemimimic, oligopticism and dysgeusia?

97 What damage is characterised by the eleventh pair of cranial nerve:

- + torticollis;

- amaurosis;
- aphonia;
- anosmia?

98 A female patient has been diagnosed with damage to the foramen jugularis. Which of the following nerves penetrate through it:

- + vagus nerve, accessory nerve and glossopharyngeal nerve;
- vestibulocochlear nerve and intermediate nerve;
- trigeminal nerve and vagus nerve;
- sublingual nerve and facial nerve?

99 What damage is characterised by the twelfth pair of cranial nerves:

- + hemiglossoplegia, dysphagia, dysarthria and deviation of the tongue;
- dysphagia, anesthesia of the mucous membrane of the larynx and dysgeusia;
- hemimimia, oligoptyalism and dysgeuzia;
- torticollis?

100 Which intracranial haematomas and which spaces are more often formed when the middle meningeal artery is damaged:

- + epidural space and epidural haematomas;
- epidural space and subdural haematomas;
- subdural space and subdural haematomas;
- subdural space and subarachnoid haematomas?

101 A patient has been diagnosed with a craniocerebral injury resulting from a punch to the face. What is the broken base of the skull at the anterior cranial fossa characterised by:

+ nasal bleeding, cerebrospinal fluid leakage from the nose, bruising and subcutaneous emphysema in the orbit, and scent disorders;

– complete ophthalmoplegia, proptosis and ptosis;

– squint and diplopia;

– hemimimia, disproportion of the oral fissure towards the healthy side, smoothing of the nasolabial fold, lagophthalmos?

102 What is the break at the middle cranial fossa characterised by the damaged pyramid of the temporal bone:

+ bleeding; liquorrhea from the external auditory canal; and damage to the seventh and eighth cranial nerves;

– nasal bleeding, cerebrospinal fluid leakage from the nose, subcutaneous emphysema in the orbit, olfactory disturbances, aphonia and cardiac disturbances;

– hemiglossoplegia, dysphagia and dysarthria with a deviated tongue;

– hemimimia, lacrimal system disorders and damage to the ninth and tenth cranial nerves?

103 Identify the boundaries of the temporal region:

+ From above and behind – the superior temporal line; from below – the zygomatic arch; in front – the frontal process of the zygomatic bone and the zygomatic process of the frontal bone.

– In front – the supraorbital margin of the frontal bone; behind – the external occipital protuberance and the superior nuchal line; laterally – the superior temporal line.

– From above, it meets the continuing zygomatic arch; in

front, it corresponds to the line of attachment of the auricle; from below and laterally, it corresponds to the shape of mastoid process.

– These are the boundaries of the temporal muscle.

104 The following are located in the subcutaneous tissue of the temporal region:

+ anterior auricular muscle, superior auricular muscle, superficial temporal artery, superficial temporal vein, auriculotemporal nerve, zygomaticotemporal nerve, posterior auricular artery, posterior auricular vein, lesser occipital nerve and the temporal branches of the facial nerve;

– posterior auricular artery, posterior auricular vein, posterior auricular nerve, occipital artery, occipital vein, lesser occipital nerve and the greater occipital nerve;

– posterior auricular muscle, posterior auricular artery, posterior auricular vein, great auricular nerve, lesser occipital nerve, posterior auricular nerve, lymph nodes and lymphatic vessels;

– supratrochlear artery, supratrochlear vein, supratrochlear nerve, supraorbital artery, supraorbital vein and supraorbital nerve, as well as the temporal branches of the facial nerve.

105 How many layers of adipose tissue are present in the temporal region:

+ five;

– four;

– three;

– two?

106 Where is the superficial abscess of the temporal region located:

+ between the skin and the superficial leaf of the

temporal aponeurosis;

- between the temporal aponeurosis and the external surface of the temporal muscle;

- between the superficial and deep leaves of the temporal aponeurosis;

- between the periosteum and bone?

107 Identify the possible ways in which the infection could spread further from the temporal region:

- + into the subtemporal fossa, parotid masseter region, submasseteric space, frontal region, into the orbit, temporal bone, into the cranial cavity;

- into the buccal region, temporal pterygoid and interpterygoid space, parapharyngeal space, into the parotid masseter region;

- into the lateral triangle of the neck, in fronto-parieto-occipital region, into the mastoid process region, into the cranial cavity;

- limited by the temporal region.

108 Which incision is used more often to reveal superficial abscesses in the temporal region:

- + anterior inclined incision behind the frontal process of the zygomatic bone;

- arciform incision alongside the lower temporal lines of the temporal bone;

- horizontal incision over the zygomatic arch;

- posterior vertical incision through the centre of the inflammatory infiltrate?

109 Which incision is most frequently used to reveal interaponeurotic abscesses in the temporal region:

- + horizontal incision over the zygomatic arch;

- horizontal incision under the zygomatic arch;

- posterior vertical incision through the centre of the inflammatory infiltrate;
- zigzag incision above the zygomatic arch?

110 What passes through the interaponeurotic temporal space:

- + middle temporal artery, middle temporal vein and zygomaticotemporal nerve;
- superficial temporal artery, superficial temporal vein and auriculotemporal nerve;
- retromandibular vein;
- parotid duct?

111 What is the deep temporal cellular space limited by:

- + temporal muscle and periosteum;
- periosteum and bone;
- temporal aponeurosis and the external surface of the temporal muscle;
- superficial and deep leaves of the temporal aponeurosis?

112 What incision is used more frequently to reveal deep temporal abscesses:

- + arciform incision along the lower temporal lines of the temporal bone;
- horizontal incision under the zygomatic arch;
- posterior vertical incision through the center of the inflammatory infiltrate;
- two vertical incisions?

113 What does deep temporal cellular space contain:

- + deep temporal artery, deep temporal vein and deep temporal nerve;

- middle temporal artery and middle temporal vein;
- superficial temporal artery and superficial temporal vein;
- auriculotemporal nerve?

114 What does the osseous basis of temporal region contain:

- + a greater wing of the sphenoid bone, squamous part of temporal bone, part of the frontal bone and part of the parietal bone;
- a lesser wing of the sphenoid bone, squamous part of the frontal bone, frontal margin of the parietal one and, ethmoid bone;
- temporal bone, maxilla, zygomatic bone and mandible;
- a greater wing of the sphenoid bone, mastoid process of the temporal bone and part of the frontal bone?

115. What characterises the structure of the temporal bone:

- + absence of spongy layer – squamous structure;
- airway sinus – pneumatic structure;
- spongy and compact layers – diploetic structure;
- three-layer structure?

116 To which anatomical formation is the temporal muscle tendon attached:

- + the ramus and coronoid process of mandible;
- the neck of the mandible;
- the zygomatic process of the maxilla;
- the condylar process of the mandible?

117 Identify one of the initial signs of inflammation of the deep cellular tissue of the temporal lobe:

- + trismus;

- lagophthalmos;
- dysphagia;
- rigidity of the occipital muscles.

118 What can be damaged during the dissection of the temporal abscess:

- + temporal branches of the facial nerve, zygomatic branches of the facial nerve, superficial temporal artery, superficial temporal vein, auriculotemporal nerve, deep temporal artery, deep temporal vein, deep temporal nerve;
  - supratrochlear artery, supratrochlear vein, supratrochlear nerve, supraorbital artery, supraorbital vein, supraorbital nerve, temporal branches of the facial nerve;
  - posterior auricular artery, posterior auricular vein, posterior auricular nerve, occipital artery, occipital vein, lesser occipital nerve, greater occipital nerve;
  - posterior auricular muscle, posterior auricular artery, posterior auricular vein, great auricular nerve, lesser occipital nerve and posterior auricular nerve?

119 What is located in the subcutaneous cellular tissue in the area of the mastoid process:

- + posterior auricular muscle, posterior auricular artery, posterior auricular vein, great auricular nerve, lesser occipital nerve, posterior auricular nerve, lymph nodes and lymphatic vessels;
  - anterior auricular muscle, superior auricular muscle, superficial temporal artery, superficial temporal vein, auriculotemporal nerve and zygomaticotemporal nerve;
  - posterior auricular artery, posterior auricular vein, lesser occipital nerve and temporal branches of the facial nerve;
  - posterior auricular artery, posterior auricular vein, posterior auricular nerve, occipital artery, occipital vein, lesser occipital nerve, greater occipital nerve, superficial temporal

artery, superficial temporal vein and auriculotemporal nerve?

120 Identify the anterior border of Chipault's triangle:  
+ the vertical line that passes along the posterior margin of the external auditory canal from the apex of the mastoid process to the spine of Henle;

- mastoid crest;
- horizontal line that is a continuation of the zygomatic arch;
- supramastoid crest.

121 Identify the posterior border of Chipault's triangle:

- + mastoid crest;
- horizontal line that is a continuation of the zygomatic arch;
- vertical line that passes along the posterior margin of the external auditory canal from the apex of the mastoid process to the spine of Henle;
- supramastoid crest.

122 Identify the superior border of Chipault's triangle:

- + horizontal line that is a continuation of the zygomatic arch;
- mastoid crest;
- vertical line that passes along the posterior margin of the external auditory canal from the apex of the mastoid process to the spine of Henle;
- external auditory pore.

123 Where can pus penetrate destroying the posterior wall of antrum mastoideum:

- + into the sigmoid sinus;

- into the middle cranial fossa;
- into the posterior cranial fossa;
- into the cavity of the middle ear?

124 Where can pus penetrate, destroying the superior wall of the antrum mastoideum:

- + into the middle cranial fossa;
- into the sigmoid sinus;
- into the posterior cranial fossa;
- into the cavity of the middle ear?

125 Using Kronlein's scheme, identify the projection of the central sulcus of the cerebrum:

- + from the intersection of the back vertical line with the sagittal line to the intersection of the front vertical line with the upper horizontal line;
- from the intersection of the back vertical line with the upper horizontal line to the intersection of the front vertical line with the lower horizontal line;
- from the intersection of the upper front vertical line with the upper horizontal line to the intersection of the back vertical line with the lower horizontal line;
- from the intersection of the front vertical line with the sagittal line to the intersection of the back vertical line with the lower horizontal line.

126 According to Kronlein's scheme, where is the column of the middle meningeal artery located:

- + at the intersection of the lower horizontal line and the front vertical line;
- at the intersection of the superior horizontal line and the front vertical line;
- at the intersection of the lower horizontal line and the middle vertical line;

–at the intersection of the lower horizontal line and the back vertical line?

127 According to Kronlein's scheme, where is the projection of anterior branch of middle meningeal artery determined:

+ at the intersection of the upper horizontal line and the front vertical line;

– at the intersection of the lower horizontal line and the middle vertical line;

– at the intersection of the lower horizontal line at the back and the vertical line at the back;

– on the bisector of the angle formed by the projection of the central sulcus and the upper horizontal line?

128 Identify the lateral sulcus (Sylvian fissure) projection according to Kronlein's scheme:

+ bisector of the angle formed by the projection of the central sulcus and the horizontal line;

– intersection of the upper front horizontal line and the front vertical line;

– intersection of the lower horizontal line and the middle vertical line;

– intersection of the lower horizontal line and the posterior vertical line.

129 Which foramen does the middle meningeal artery penetrate to enter the cranial cavity:

+ foramen spinosum;

– foramen rotundum;

– foramen ovale;

– foramen lacerum?

130 Which part of the brain does the course of the anterior branch of the middle meningeal artery correspond to:

- + precentral convolution;
- postcentral convolution;
- angular convolution;
- upper temporal convolution?

131 What gyrus of the brain does the course of the posterior branch of the middle meningeal artery correspond to:

- + temporal lobe;
- precentral gyrus;
- postcentral gyrus;
- parietal lobe?

132 What is the name of the method of trepanation of the skull in which a cutaneous aponeurotic flap is dissected separately with a wide basis, followed by scalping and sawing of the separate osseous flap:

- + osteoplastic craniotomy according to Olivecrona's method;
- osteoplastic craniotomy according to Wagner-Wolfe's method;
- osteoplastic craniotomy according to Cushing's method;
- decompressive craniotomy according to Olivecrona's method?

133 Which tissues make up the first flap in an osteoplastic craniotomy using Olivecrona's method:

- + skin, subcutaneous tissue and aponeurosis;
- skin, subcutaneous tissue, aponeurosis, subaponeurotic cellular tissue, periosteum and bone;
- skin, subcutaneous tissue, muscle, periosteum and bone;

– skin and subcutaneous tissue?

134 Which tissues make up the second flap in an osteoplastic craniotomy performed using Olivecrona's method:

+ muscle, periosteum and bone;

– skin, subcutaneous tissue and aponeurosis;

– skin, subcutaneous tissue, aponeurosis, subaponeurotic cellular tissue, muscle, periosteum and bone;

– skin and subcutaneous tissue?

135 Which vessel is adjacent to the internal surface of the temporal bone:

+ middle meningeal artery;

– deep temporal arteries;

– middle cerebral artery;

– anterior cerebral artery?

136 Which incisions are used for the dissection in the abscesses of the temporal region:

+ front oblique section, rear vertical section, horizontal section above the zygomatic arch;

– two vertical sections and a horizontal section under the zygomatic arch along the upper and lower edges of the orbit;

– zigzag section above the zygomatic arch?

137 Which of these methods corresponds to the decompressive trepanation of the skull:

+ Cushing's technique;

– Wagner-Wolf's technique;

– Olivecrona's technique;

– Bogaert's technique?

138 A patient with increased intracranial pressure was given a decompressive trepanation of the skull. Where is this

performed:

- + in the right temporal region;
- in the right parietal region;
- in the left parietal region;
- in the right and left occipital regions?

139 A head injury resulted in increased intracranial pressure. Where is decompressive trepanation of the skull performed in relation to the known localisation of the pathological process:

- + directly above the focus of the pathological process;
- in the left temporal region;
- in the symmetrically opposite region;
- in the right parietal region?

140 A patient has been scheduled for a mastoidectomy. Which special instruments are used for a craniotomy of the mastoid process:

- + Voyachek's chisel or gouge;
- Liston's forceps;
- Dahlgren's forceps;
- Doyen's forceps?

141 What complications can occur during the postoperative period following a craniotomy of the mastoid process if the front border of Chipault's triangle is damaged during the operation:

- + peripheral paralysis of facial nerve on the side of the operation;
- central paralysis of facial nerve on the opposite side of the operation;
- damage of the inner ear;
- damage of sigmoid sinus and its hemorrhage?

142 What complications can occur during the postoperative period following a craniotomy of the mastoid process if the upper border of Chipault's triangle is damaged during the operation:

- + infection of the cranial cavity;
- peripheral paralysis of the facial nerve on the side of the operation;
- central paralysis of the facial nerve on the opposite side;
- central paralysis of the facial nerve on the side of the operation?

143 What complications can occur during the postoperative period following a craniotomy of the mastoid process if the posterior border of Chipault's triangle was damaged during the operation:

- + damage to the sigmoid sinus and its haemorrhage;
- peripheral paralysis of the facial nerve on the side of the operation;
- infection of the cranial cavity;
- damage to the inner ear?

144 A female patient sustained a blunt injury to the temporal region of her head. She was diagnosed with an epidural haematoma, resulting in an osteoplastic craniotomy being performed. What surgical instruments are used for craniotomy:

- + general surgical instruments, trepan, bone cutter, electrocoagulator, Dalhren's forceps, Polenov's conductor and Gigli wire saw;
- general surgical instruments, trepan, bone cutter, electrocoagulator and a dissecting blade saw;
- general surgical instruments, trepan, bone cutter, electrocoagulator and an arc saw;
- general surgical instruments, trepan, bone cutter, electrocoagulator and Dalhren's forceps?

145 Identify the boundaries of lateral region of the face:

+ from above – zygomatic arch and lower margin of eye fossa, at the bottom – lower margin of mandibular base, in front – nasolabial and nasobuccal folds and behind – posterior margin of the mandible;

– in front – supraorbital margin of the frontal bone, behind – the external occipital protuberance and the superior nuchal line, and laterally – superior temporal line;

– from above – the line that meets the continuing zygomatic arch, in front – the line of the ear, at the bottom and laterally – mimics the shape of mastoid process;

– from above and behind – superior temporal line, at the bottom – zygomatic arch, in front – temporal process of the zygomatic bone and the zygomatic process of the frontal bone.

146 Which nerves innervate the skin of the buccal region:

+ zygomaticofacial nerve, buccal branch of the mandibular nerve, infraorbital nerve and mental nerve;

– zygomaticotemporal nerve, auriculotemporal nerve, great auricular nerve and buccal branch of the facial nerve;

– great auricular nerve, lesser occipital nerve and posterior auricular nerve;

– supratrochlear nerve, supraorbital nerve or temporal branches of the facial nerve?

147 What is located in front of and externally to the Bichat fat pad:

+ parotid duct;

– zygomatic arch;

– parotid gland;

– buccinator muscle?

148 Which arteries accompany the parotid duct:

- + transverse facial artery;
- middle temporal artery;
- facial artery;
- superficial temporal artery?

149 Identify the processes of the Bichat fat pad:

- + temporal, orbital and pterygopalatal;
- temporal, orbital and coronal;
- nasal, orbital and pterygopalatal;
- submasseteric, orbital and pterygopalatal.

150. What cellular spaces does the Bichat fat pad bind:

- + all the listed below;
- cellular tissue of the buccal region, interpterygoid region, temporal pterygoid region and subaponeurotic space of the temporal region;
- cellular tissue of the pterygopalatine fossa;
- orbital cellular tissue?

151 What is the m. depressor labii inferioris innervated by:

- + marginal mandibular branch of the facial nerve;
- mental nerve;
- infraorbital nerve;
- mylohyoid nerve?

152 On examination of the patient's lateral superficial facial wound, no pulse of the facial artery was revealed. Where is the facial artery palpated:

- + near the front margin of the masseter muscle of the lower mandibular margin;
- above the ear;
- near lobule of the ear;

– near tragus?

153 Identify the veins that are capable of transmitting infection to the cavernous sinus via retrograde blood flow in cases of furunculosis of the soft tissues in the lateral region of the face:

+ facial vein → angular vein → ophthalmic vein → cavernous sinus; or facial vein → deep facial vein → pterygoid venous plexus → emissary veins passing through the foramen lacerum → emissary veins passing through the foramen ovale → cavernous sinus;

– facial vein → superficial temporal vein → posterior auricular vein → external jugular vein;

– facial vein → supratrochlear veins, → supraorbital vein, → ophthalmic veins;

– facial vein → supratrochlear veins, → supraorbital vein → deep facial vein → pterygoid venous plexus.

154 Identify the projection of the infraorbital neurovascular fascicle:

+ 0.5 cm below the middle of the lower orbital margin;

– 0.5 cm below the point situated at the medial one-third of the lower orbital margin;

– vertical line via the medial angle of the eye;

– 1.0 cm outside the ala of the nose.

155 Identify the projection of the mental neurovascular fascicle:

+ the vertical line between the supraorbital and infraorbital foramina;

– the region of the angle of the mouth;

– the middle of the mandibular basis;

– the front margin of the masseter muscle.

156 Identify the projection of the supraorbital neurovascular fascicle:

- + the border of the medial and middle thirds of the supraorbital margin;

- the middle of the supraorbital margin crossing the vertical line through the medial angle of the eye;

- 0.5 cm above the midpoint of the supraorbital margin.

157 Which nerves innervate the skin of the parotid-masseteric region:

- + zygomaticofacial nerve, buccal branch of the mandibular nerve, auriculotemporal nerve and great auricular nerve;

- buccal branch of the mandibular nerve, infraorbital nerve and mental nerve;

- auriculotemporal nerve, great auricular nerve and buccal branch of the facial nerve;

- great auricular nerve, supratrochlear nerve, supraorbital nerve and temporal branches of the facial nerve?

158 The following structures are located in the subcutaneous tissue of the parotid-masseter region:

- + great auricular nerve, transverse facial artery, transverse facial vein, branches of the facial nerve, auriculotemporal nerve, buccal branch of the mandibular nerve and zygomaticofacial nerve;

- anterior auricular muscle, superior auricular muscle, superficial temporal artery, superficial temporal vein and auriculotemporal nerve;

- zygomaticofacial nerve, posterior auricular artery, posterior auricular vein, lesser occipital nerve and temporal branches of the facial nerve;

- buccal artery, buccal vein, buccal branch of the mandibular nerve, infraorbital nerve and mental nerve.

159 Identify the anterior border of the parotid space:  
+ masseter muscle, ramus of the mandible and medial pterygoid muscle;  
– lateral pterygoid muscle;  
– submandibular gland;  
– styloid process, styloglossus muscle, stylopharyngeus muscle, stylohyoid muscle and cellular tissue of the anterior parapharyngeal space.

160 Identify the inferior border of the parotid space:  
+ submandibular gland;  
– masseter muscle, ramus of the mandible, medial pterygoid muscle;  
– styloid process, styloglossus muscle, stylopharyngeus muscle, stylohyoid muscle and the cellular tissue of the anterior parapharyngeal space;  
– sternocleidomastoid muscle, posterior belly of the digastric muscle and mastoid process.

161 Identify the posteriorborder of the parotid space:  
+ sternocleidomastoid muscle, posterior belly of the digastric muscle and the mastoid process;  
– masseter muscle, ramus of the mandible and medial pterygoid muscle;  
– Zhonesko’s diaphragm;  
– styloid process, styloglossus muscle, stylopharyngeus muscle, stylohyoid muscle and cellular tissue of the anterior parapharyngeal space.

162 Identify the medial border of the parotid space:  
+ styloid process, styloglossus muscle, stylopharyngeus muscle, stylohyoid muscle and cellular tissue of the anterior parapharyngeal space;  
– subcutaneous adipose tissue;

- ear canal (external auditory canal);
- masseter muscle, ramus of the mandible and medial pterygoid muscle.

163 Identify the lateral border of the parotid space:  
+ subcutaneous adipose tissue;  
– sternocleidomastoid muscle, posterior belly of the digastric muscle and the mastoid process;  
– masseter muscle, the ramus of the mandible and the medial pterygoid muscle;  
– lateral pterygoid muscle.

164 Identify the superior border of the parotid space:  
+ external auditory canal;  
– the base of the skull;  
– the greater wing of the sphenoid bone;  
– zygomatic arch.

165 What passes through the parotid gland:  
+ external carotid artery, retromandibular vein, auriculotemporal nerve and facial nerve;  
– internal carotid artery, internal jugular vein, external jugular vein and facial vein;  
– buccal artery, buccal vein, buccal branch of the mandibular nerve, infraorbital nerve and mental nerve;  
– great auricular nerve, supratrochlear nerve, supraorbital nerve and temporal branches of the facial nerve?

166 Identify the branches of the facial nerve entering parotid gland:  
+ posterior auricular nerve, stylohyoid branch of facial nerve and digastric branch of facial nerve;  
– temporal branches of the facial nerve, auriculotemporal nerve and buccal branch of the facial nerve;

– temporal branch, zygomatic branch, buccal branch, marginal mandibular branch and cervical branch of the facial nerve;

– parotid branch, labial branch and mental branch?

167 Identify the branches of the ‘pes anserinus’:

+ the temporal, zygomatic, buccal, marginal mandibular and cervical branches of the facial nerve;

– the parotid, labial and mental branches;

– posterior auricular nerve, stylohyoid and digastric branches of the facial nerve;

– temporal, auriculotempora and the buccal branch of the facial nerve?

168 Identify the projection of the temporal branch of the facial nerve:

+ from the earlobe to the external angle of the eye;

– from the mastoid process to the angle of the mouth;

– along the vertical line in front of the tragus;

– from the lobule of the ear to the nasofacial angle.

169 Identify the projection of the marginal mandibular branch of the facial nerve:

+ 0.5–1 cm below the bottom edge of the mandible;

– 0.5–1 cm above the lobule of the ear and extending to the lateral angle of the mouth;

– 1 cm below and parallel to the zygomatic arch;

– from the external auditory canal to the point located midway between the wing of the nose and the mouth angle.

170 Identify the projection of the excretory duct of parotid gland (Stenon’s duct):

+ from the external auditory canal to the point located midway between the nasal ala and the mouth’s angle;

- 0.5–1 cm above the earlobe to the nasal ala;
- 1 cm below and parallel to the mandible;
- from the earlobe to the external angle of the eye.

171 Which tissues are dissected in the case of purulent parotitis:

- + all the listed below;
- skin;
- subcutaneous tissue;
- parotid fascia?

172 What tissues are dissected in the case of purulent parotitis:

- + glandular parenchyma;
- subcutaneous tissue;
- mimic muscles;
- parotid fascia?

173 Identify possible complications of dissection in case of purulent parotitis:

- + all the listed below;
- damage to the external carotid artery and retromandibular vein;
- damage to branches of the facial nerve;
- damage to the auriculotemporal nerve.

174 An injury to the bottom of the patient's oral cavity caused motor speech disorders. Which of the following nerves could be damaged in this case:

- + sublingual nerve;
- lingual nerve;
- glossopharyngeal nerve;
- chorda tympani?

175 Identify the sphincter of Stenon's duct:

- + buccinator muscle;
- Oddi's sphincter;
- masseter muscle;
- medial pterygoid muscle.

176 Identify the fibres of Wrisberg's nerve:

- + greater petrosal nerve, chorda tympani;
- lesser petrosal nerve and the nerve of pterygoid canal (Vidian nerve);
- tympanic nerve and the nerve to the stapedius;
- there's no right answer.

177 Identify the motor fibers of the facial nerve in the fallopian canal (facial canal):

- + nerve to the stapedius;
- greater petrosal nerve;
- lesser petrosal nerve;
- chorda tympani.

178 According to its author, what is the excretory duct of the parotid gland called:

- + Stenon's duct;
- Wharton's duct;
- Bartholin's duct;
- Walter's duct?

179 In a patient, thrombosis of the facial vein resulted from its involvement in the inflammatory process. Which vein can a thrombus from the facial vein enter directly into the intracranial sinus and vein system:

- + angular vein;
- internal jugular vein;
- external jugular vein;

– transverse facial vein?

180 What is the temporal pterygoid space externally limited by:

- + temporal muscle;
- lateral pterygoid muscle;
- medial pterygoid muscle;
- masseter muscle?

181 What is the temporal pterygoid space medially limited by:

- + lateral pterygoid muscle;
- medial pterygoid muscle;
- ramus of the mandible;
- lateral pterygoid plate?

182 What limits the temporal pterygoid space from behind:

- + condylar process of the mandible;
- sternocleidomastoid muscle;
- mastoid process;
- posterior belly of the digastric muscle?

183 What limits the temporal pterygoid space anteriorly:

- + maxillary tuberosity;
- masseter muscle;
- ramus of the mandible;
- temporal muscle?

184 What is the temporal pterygoid space superiorly limited by:

+inferior surface of the greater wing of the sphenoid bone;

- zygomatic arch;
- maxillary tuberosity;
- external auditory canal?

185 What is the temporal pterygoid space inferiorly limited by:

- + passes to the inter-ptyergoid space;
- lateral pterygoid muscle;
- medial pterygoid muscle;
- submandibular gland?

186 What is located in the temporal pterygoid space:  
+ pterygoid venous plexus, deep temporal nerve, masseteric nerve, buccal branch of the mandibular nerve and maxillary nerve;

- maxillary nerve, mandibular nerve and retromandibular vein;
- lateral pterygoid muscle, medial pterygoid muscle and submandibular gland;
- pterygoid venous plexus, deep auricular artery, anterior tympanic artery, inferior alveolar artery and middle meningeal artery?

187 What are the branches of the first part of the maxillary artery:

- + deep auricular artery, anterior tympanic artery, inferior alveolar artery and middle meningeal artery;
- masseteric artery, buccal artery and posterior superior alveolar artery;
- masseteric artery, pterygoid branches of maxillary artery, deep temporal arteries, buccal artery and posterior superior alveolar artery;
- anterior superior alveolar artery?

188 Identify the branches of the second part of the maxillary artery:

+ masseteric artery, pterygoid branches of maxillary artery, deep temporal arteries, buccal artery and posterior superior alveolar artery;

– anterior superior alveolar artery;

– middle meningeal artery, inferior alveolar artery and descending palatine artery;

– deep auricular artery, anterior tympanic artery, inferior alveolar artery and middle meningeal artery?

189 Identify the branches of the third part of the maxillary artery:

+ descending palatine artery, infraorbital artery and sphenopalatine artery;

– masseteric artery, buccal artery, middle meningeal artery and inferior alveolar artery;

– posterior superior alveolar artery;

– deep auricular artery, anterior tympanic artery, inferior alveolar artery and middle meningeal artery?

190 Identify the external border of the interpterygoid space:

+ ramus of the mandible and lateral pterygoid muscle;

– medial pterygoid muscle;

– temporal muscle;

– masseter muscle?

191 What is the internal limit in the interpterygoid space:

+ medial pterygoid muscle;

–lateral pterygoid muscle;

–lateral pterygoid plate;

–ramus of the mandible and the lateral pterygoid muscle?

192 What is the superior limit of the interpterygoid space:

- + base of the skull;
- medial pterygoid muscle;
- lateral pterygoid muscle;
- external auditory canal?

193 What is the posterior limit of the interpterygoid space:

- + parotid gland;
- ramus of the mandible and lateral pterygoid muscle;
- sternocleidomastoid muscle;
- posterior belly of the digastric muscle?

194 Identify the anterior border of interpterygoid space:

- + Bichat fat pad, maxillary tuberosity;
- medial pterygoid muscle;
- lateral pterygoid muscle;
- masseter muscle.

195 What is located in the interpterygoid space:  
+ mandibular nerve, maxillary artery and pterygoid venous plexus;

– adipose tissue, maxillary nerve, maxillary artery and pterygopalatine ganglion;  
– lateral pterygoid muscle and temporal muscle;  
–mandibular nerve, retromandibular vein and parotid gland?

196 Identify the anterior wall of the pterygopalatine fossa:

- + maxillary tuberosity;
- pterygoid processes of the sphenoid;

- masseter muscle;
- ramus of the mandible.

197 Identify the posterior wall of the pterygopalatine fossa:

- + pterygoid processes of the sphenoid bone;
- parotid gland;
- maxillary tuberosity;
- ramus of the mandible.

198 Identify the medial wall of the pterygopalatine fossa:

- + perpendicular plate of the palatine bone;
- pterygoid processes of the sphenoid bone;
- maxillary tuberosity;
- lateral pterygoid plate.

199 What does the pterygopalatine fossa communicate with inferiorly:

- + greater palatine canal;
- infratemporal fossa;
- pterygoid canal (Vidian canal);
- temporal pterygoid space?

200 Identify the contents of the pterygopalatine fossa:  
+ adipose tissue, maxillary nerve, maxillary artery and pterygopalatine ganglion;

- mandibular nerve, maxillary artery and pterygoid venous plexus;
- lateral pterygoid muscle and temporal muscle;
- mandibular nerve, retromandibular vein and parotid gland?

201 Which foramen of the skull does the maxillary nerve penetrate to reach the pterygopalatine fossa:

- + foramen rotundum;
- foramen ovale;
- foramen spinosus;
- superior orbital fissure?

202 Identify the branches of the maxillary nerve:  
+ zygomatic nerve, infraorbital nerve and pterygopalatine nerves;

- supraorbital nerve, auriculotemporal nerve and lingual nerve;
- inferior alveolar nerve;
- palpebral branches of the infraorbital nerve, internal nasal branches of the infraorbital nerve and superior labial branches of the infraorbital nerve.

203 Identify the branches of pes anserinus minor:  
+ palpebral, internal nasal and superior labial branches of the infraorbital nerve;

- temporal, zygomatic, buccal, marginal mandibular and cervical branches of the facial nerve;
- zygomatic nerve, infraorbital nerve and pterygopalatine nerves;
- supraorbital nerve, auriculotemporal nerve and lingual nerve.

204 What is the anterior parapharyngeal space medially limited by:

- + levator veli palatini muscle and tensor veli palatini muscle, superior pharyngeal constrictor muscle and pharyngobasilar fascia and tonsils;
- medial pterygoid muscle;
- lateral pterygoid muscle;

– Charpy fascia?

205 The anterior parapharyngeal space is laterally limited by:

- + medial pterygoid muscle;
- lateral pterygoid muscle;
- levator veli palatini muscle, tensor veli palatini muscle, superior pharyngeal constrictor muscle, pharyngobasilar fascia and tonsils;
- temporal muscle.

206 What is the anterior parapharyngeal space posteriorly limited by:

- + Zhonesko's diaphragm;
- Charpy fascia;
- levator veli palatini muscle, tensor veli palatini muscle, superior pharyngeal constrictor muscle, pharyngobasilar fascia and tonsils;
- sternocleidomastoid muscle?

207 Identify the superior border of the anterior parapharyngeal space:

- + base of the skull;
- external auditory canal;
- Zhonesko's diaphragm;
- Charpy fascia.

208 Identify the inferior border of the anterior parapharyngeal space:

- +submandibular gland;
- Zhonesko's diaphragm;
- Charpy fascia;
- parotid gland.

209 What is located in the anterior parapharyngeal space:

+ ascending palatine artery, pharyngeal veins and pharyngeal venous plexus:

– mandibular nerve, internal carotid artery and internal jugular vein;

– vagus nerve and accessory nerve;

– all the listed above?

210 Identify the medial border of the posterior parapharyngeal space:

+ Charpy fascia;

– styloid process of the temporal bone, anatomical Riolan's bouquet (styloglossus muscle, stylopharyngeus muscle and stylohyoid muscle) and aponeurosis covering the stylopharyngeus muscle (Zhonesko's diaphragm);

– prevertebral fascia;

– Zhonesko's diaphragm.

211 Identify the lateral border of the posterior parapharyngeal space:

+ styloid process of the temporal bone, posterior belly of the digastric muscle and sternocleidomastoid muscle;

– medial pterygoid muscle;

– lateral pterygoid muscle;

– masseter muscle?

212 Identify the posterior border of the posterior parapharyngeal space:

+ prevertebral fascia;

– Zhonesko's diaphragm;

– styloid process of temporal bone, posterior belly of digastric muscle, sternocleidomastoid muscle and parotid gland;

– aponeurosis pharyngopevertebralis.

213 Identify the anterior border of the posterior parapharyngeal space:

+ styloid process of temporal bone, anatomical Riolan's bouquet (styloglossus muscle, stylopharyngeus muscle, stylohyoid muscle) and aponeurosis, which cover the stylopharyngeus muscle (Zhonesko's diaphragm);

- maxillary tuberosity;
- Charpy fascia;
- prevertebral fascia.

214 What is located in the posterior parapharyngeal space:

+ all the listed below;

– internal carotid artery and internal jugular vein;  
– glossopharyngeal nerve, vagus nerve, accessory nerve and hypoglossal nerve;

– superior cervical sympathetic node?

215 Identify the author of the extraoral anaesthesia of the maxillary and mandibular nerves:

+ Vaysblat;

– Lukashevych-Oberst;

– Kulenkampff;

– Braun-Usoltseva?

216 What vessels pass through the anterior wall of the maxillary sinus:

+ anterior superior alveolar artery;

– infraorbital artery;

– ascending palatine artery;

– descending palatine artery?

217 What vessels pass through the posterior wall of the maxillary sinus:

+ infraorbital artery, descending palatine artery and

posterior superior alveolar artery;  
– facial artery;  
– ascending palatine artery;  
– sphenopalatine artery?

218 What passes through the thickness of the superior wall of maxillary sinus:

- +infraorbital artery and infraorbital nerve;
- supraorbital nerve and supraorbital artery;
- angular artery and angular vein;
- sphenopalatine artery and sphenopalatine vein?

219 Identify the most widely used method of maxillary sinusotomy for chronic maxillary sinusitis:

- + Caldwell-Luc operation;
- Killian's operation;
- Ritter-Janson's operation;
- Limberg's operation.

220 Which method is most frequently used to dissect the frontal sinus when it is suppurated:

- + Ritter-Janson's technique;
- Caldwell-Luc technique;
- Killian's technique;
- Limberg's technique?

221 A patient with maxillary sinusitis experienced burning pain in the lateral region of the face, as well as rhinorrhoea, lacrimation, ptyalism, and swelling and hyperaemia of the eyelids. What complication is likely to occur:

- + ganglioneuritis of the pterygopalatine ganglion (Sluder's syndrome);
- full ophthalmoplegia, exophthalmus and ptosis, Foix syndrome;

- Mackenzie's syndrome;
- Villaret's syndrome?

222 Where is the submasseteric space located:

- + between the ramus of the mandible and the masseter muscle;
- between the lateral pterygoid muscle and the masseter muscle;
- between the medial pterygoid muscle and the masseter muscle;
- between the buccinator muscle and the masseter muscle?

223 What is located in the submasseteric space:

- + masseteric nerve, masseteric artery and masseteric vein;
- masseteric artery, masseteric vein and buccal branch of the mandibular nerve;
- marginal mandibular branch of the facial nerve;
- there is no right answer?

224 What anatomical formation connects the temporal pterygoid space with the pterygopalatine fossa:

- + pterygomaxillary fissure;
- foramen rotundum;
- superior orbital fissure;
- foramen ovale?

225 Which anatomical formation connects the temporal pterygoid space with the orbit:

- + inferior orbital fissure;
- superior orbital fissure;
- Vidian canal (pterygoid canal);
- foramen rotundum?

226 What anatomical formation connects the temporal pterygoid space with the cranial cavity:

- + foramen ovale and foramen spinosum;
- foramen rotundum and superior orbital fissure;
- inferior orbital fissure;
- pterygomaxillary fissure?

227 What anatomical formation connects the temporal pterygoid space with the submasseteric space:

- + masseteric artery and masseteric vein;
- maxillary artery;
- foramen ovale;
- superior orbital fissure?

228 What anatomical formation connects temporal pterygoid space with parotid space:

- +maxillary artery;
- parotid duct;
- pterygomaxillary fissure;
- superior orbital fissure?

229 What connects the anterior parapharyngeal space to the parotid space:

- + pharyngeal process of the parotid gland;
- pterygomaxillary fissure;
- parotid duct;
- maxillary artery?

230 What anatomical formations join the posterior parapharyngeal space with the superior mediastinum:

- + internal carotid artery, internal jugular vein and vagus nerve;
- accessory nerve;
- hypoglossal nerve;

– glossopharyngeal nerve?

231 What anatomical formation joins the posteriorparapharyngeal space with the posterior mediastinum:

- + vagus nerve;
- esophagus;
- hypoglossal nerve;
- pharynx?

232 What anatomical formations join the posterior parapharyngeal space with the spatium vasonervorum:

- + internal carotid artery, internal jugular vein and vagus nerve;
- glossopharyngeal nerve and accessory nerve;
- external jugular vein;
- auriculotemporal nerve?

233 What anatomical formation joins the posterior parapharyngeal space with the posterior cranial fossa:

- + internal jugular vein;
- internal carotid artery;
- vertebral artery;
- facial nerve?

234 What anatomical formation joins the posterior parapharyngeal space with the middle cranial fossa:

- + internal carotid artery;
- internal jugular vein;
- vagus nerve;
- facial nerve?

## REFERENCES

1. Клінічна анатомія та оперативна хірургія : підручник : у 2 т. / В. І. Півторак та ін. ; за ред. В. І. Півторака, О. Б. Кобзаря. – Вінниця : Нова книга, 2021. – Т. 1. – 568 с.
2. Клінічна анатомія та оперативна хірургія : підручник : у 2 т. / В. І. Півторак, О. Б. Кобзар та ін. ; за ред. В. І. Півторака, О. Б. Кобзаря. – Вінниця : Нова книга, 2025. – Т. 2. – 656 с.
3. Tsyhykalo O. Clinical Anatomy and Operative Surgery : textbook / O. Tsyhykalo. – Vinnytsia : Nova Knyha, 2020. – 528 p.
4. Nemitz R. Surgical Instrumentation 3rd edition / R. Nemitz. – St. Louis, Missouri (USA) : Elsevier Inc, 2022. – 376 p.
5. Schuenke M. Head, Neck, and Neuroanatomy (THIEME Atlas of Anatomy) 3rd Edition / M. Schuenke, E. Schulte, U. Schumacher. – New York (USA) : Thieme, 2020. – 1520 p.
6. Dubey S. P. Color Atlas of Head and Neck Surgery : A Step-by-Step Guide 2nd ed / S. P. Dubey, C. P. Molumi, H. Swoboda. – Switzerland : Springer Nature, 2020. – 668 p.
7. Velmahos G. C. Penetrating Trauma : A Practical Guide on Operative Technique and Peri-Operative Management / G. C. Velmahos, E. Degiannis, D. Doll. – Berlin ; Heidelberg (Germany) : Springer-Verlag, 2017. – 655 p.
8. Demetriades D. Atlas of Surgical Techniques in Trauma / D. Demetriades, K. Inaba, G. Velmahos. – Cambridge (England) : Cambridge University Press, 2020. – 477 p.
9. González-Darder J. M. Trepanation, Trepining and Craniotomy : History and Stories / J. M. González-Darder. – Switzerland : Springer Nature, 2019. – 448 p.
10. Goldenberg D. Robotic Head and Neck Surgery : An Anatomical and Surgical Atlas / D. Goldenberg, N. Goyal. – New York (USA) : Thieme, 2017. – 104 p.
11. Loukas M. Gray's Clinical Photographic Dissector of the

- Human Body / M. Loukas, B. Benninger, R. S. Tubbs. – Philadelphia (USA) : Elsevier, 2018. – 480 p.
12. Sanna M. Middle Ear and Mastoid Microsurgery / M. Sanna, H. Sunose. – New York (USA) : Thieme, 2012. – 1837 p.
  13. Sanna M. The Temporal Bone: Anatomical Dissection and Surgical Approaches / M. Sanna, A. Russo, A. Taibah. – New York (USA) : Thieme, 2018. – 960 p.
  14. Cheesman A. Skull Base Surgery / A. Cheesman, G. Alusi, H. I. Sabin. – Berlin ; Heidelberg (Germany) : Springer-Verlag, 2022. – 105 p.
  15. Raabe A. The Craniotomy Atlas / A. Raabe. – Bern (Switzerland) : Thieme, 2019. – 256 p.
  16. Brennan P. Gray's Surgical Anatomy / P. Brennan, S. Standring, S. Wiseman. – Seattle ; Washington (USA) : Elsevier, 2020. – 672 p.
  17. Radlanski R. J. The Face : Pictorial Atlas of Clinical Anatomy / R. J. Radlanski, K. H. Wesker. – Berlin (Germany) : Quintessence Publishing Co., Inc, 2015. – 354 p.
  18. Pessa J. Facial Topography : Clinical Anatomy of the Face / J. Pessa, R. Rohrich. – New York (USA) : Thieme, 2012. – 299 p.
  19. Wineski L. E. Snell's Clinical Anatomy by Regions / L. E. Wineski. – Philadelphia (Pennsylvania, USA) : Lippincott, Williams and Wilkin, 2018. – 816 p.
  20. Larian B. Comprehensive Management of Parotid Disorders, An Issue of Otolaryngologic Clinics of North America, 1st Edition / B. Larian, B. Azizzadeh. – Philadelphia (Pennsylvania, USA) : Elsevier, 2016. – Vol. 49, No. 2. – P. 273–516.
  21. Chitre A. Manual of Local Anaesthesia in Dentistry / A. Chitre. – New Delhi (India) : Jaypee Brothers Medical Publishers Ltd, 2016. – 240 p.
  22. Lal D. Frontal Sinus Surgery : A Systematic Approach / D. Lal, P. H. Hwang. – Switzerland : Springer Nature, 2019. – 465 p.
  23. Duncavage J. A. The Maxillary Sinus : Medical and Surgical

- Management / J. A. Duncavage, S. S. Becker. – New York (USA) : Thieme, 2011. – 272 p.
24. Masquelet A. C. Atlas of Surgical Anatomy / A. C. Masquelet. – Boca Raton (Florida, USA) : CRC Press, 2019. – 248 p.
25. Clinical Anatomy and Operative Surgery / O. Slobodian, G. Kostyuk, V. Ershov, V. Pivtorak. – Kyiv (Ukraine) : Medicine, 2018. – 504 p.

Навчальне видання

**Кореньков** Олексій Володимирович,  
**Ткач** Геннадій Федорович,  
**Ярмоленко** Ольга Сергіївна

# ТОПОГРАФІЧНА АНАТОМІЯ ГОЛОВИ

Навчальний посібник

Видання друге, перероблене та доповнене

(Англійською мовою)

Художнє оформлення обкладинки О. В. Коренькова  
Редакторка С. В. Чечоткіна  
Комп'ютерне верстання О. В. Коренькова

Формат 60x84/16. Ум. друк. арк. 7,56. Обл.-вид. арк. 7,51.

Видавець і виготовлювач  
Сумський державний університет,  
вул. Харківська, 116, м. Суми, 40007  
Свідоцтво про внесення суб'єкта господарювання до Державного реєстру видавців,  
виготовлювачів і розповсюджувачів видавничої продукції ДК № 8193 від 15.10.2024.

---

Навчальний посібник призначений для здобувачів медичних закладів вищої освіти, які вивчають топографічну анатомію людини англійською мовою.