

BOGOMOLETS NATIONAL MEDICAL UNIVERSITY

Department of human anatomy

GUIDELINES

Student's independent work during the preparation to practical lesson

<i>Academic discipline</i>	<i>HUMAN ANATOMY</i>
<i>Module №</i>	<i>1</i>
<i>Content module №</i>	<i>2</i>
<i>The topic of the lesson</i>	Basis cranii externa,interna Fossa temporalis, fossa infratemporales, fossa pterygopalatina
<i>Course</i>	<i>Medical 1,2,3,4, military,dental</i>
<i>Number of hours</i>	<i>3</i>

1. Specific objectives:

After completing the course, the student must know and be able to:

- 1.1. Describe and demonstrate the boundary between the base of the skull and its vault.*
- 1.2. Describe and demonstrate the structure of the outer base of the skull, holes and channels connecting it with adjacent cavities.*
- 1.3. Describe and demonstrate the structure of the inner base of the skull, holes and channels connecting it with adjacent cavities.*
- 1.4. Describe and demonstrate the walls of the temporal fossa.*
- 1.5. Describe and demonstrate the walls of the pit and its interconnection.*
- 1.6. Describe and demonstrate the walls of the winged pit and its combination.*
- 1.7. To analyze possible ways of spreading the infection in the cranial cavity and beyond its borders.*

2. Base level of preparation

Students must know and be able to:

- 2.1. Define anatomical planes of the human body and anatomical terms for indication of the location of the skull bones in relation to these planes.*
- 2.2. Demonstrate and describe individual skull bones.*
- 2.3. Analyze position in the skull of individual bones of the brain and face skulls*
- 2.4. Demonstrate the rules of the skull: vertical, main, facial, lateral.*
- 2.5. Describe and demonstrate the structure of the eye fossa, bony nasal cavity and bone palatine and their combination. The organization of the content of educational material. The training material is described in a logical sequence with structural-logical circuits, tables, drawings, representing the contents of the main questions of the topic of practical training.*

4. Content of educational material

Basis cranii externa et interna make up the lower part of the brain skulls. The upper part of the skull is called the vault of the skull (*calvaria*), and the lower part is the base of the skull (*basis cranii*). The boundary between the vault and the inner and outer bases on the outer surface of the skull is a conditional line. It passes through an external occipital protuberance (*protuberantia occipitalis externa*), then on the upper line (*linea nuchalis superior*) to the base mosquito process (*processus mastoideus*), over external auditory aperture (*porus acusticus externus*), at the lower edge of the caudal appendix (*processus zygomaticus*) of the temporal bone and on the crest of the sputum (*crista infratemporalis*) of the large wing of the wedge-shaped bone. Then this line rises upward to the foreskin (*processus zygomaticus*) of the frontal lobe bones and on the palatal edge (*margo supraorbitalis*) of the frontal bone. Skull base outside (*basis cranii externa*) it is not visible in the anterior part of the skull, because it is covered with bones of the front skulls the back of the outer skull base is formed by external surfaces occipital, temporal and wedge-shaped bones. Here you can see numerous holes through which arteries, veins, nerves pass. Almost in the center of this site there is a large hole (*foramen magnum*), and with the sides of it are

occipital vertebrae (right and left condylus occipitalis). By with each appendix a noticeable small fossa (fossa condylaris) with

Non-permanent hole - canalicular canal (canalis condylaris). The basis of each germ is transversely permeated by the channel of the sublingual nerve (canalis nervi hypoglossi).

The back of the outer skull base ends with the outer occipital protuberantia occipitalis externa, from which goes to the right and left top line (linea nuchalis superior).

Ahead of the big hole is the main part of the occipital bones with well-defined pharyngeal tubercle (tuberculum pharyngeum). On the sides of the occipital bone is a jumper hole (foramen jugulare) and the lower surface of the rocky part of the temporal bone, which is noticeable external aperture of the sleep channel (apertura externa canalis carotici), juniper fossa (fossa jugularis), shoelace (processus styloideus), udder appendix (processus mastoideus), and between them a (foramen stylomastoideum). At the anterior edge of the rocky part of the temporal bone there is an inner hole sleepy canal (apertura interna canalis carotici) and musculoskeletal canal to the rocky part of the temporal bone adjacent to the side of the drum (pars tympanica) of the temporal bone surrounding the external auditory hole (meatus acusticus externus).

Behind the drum part of the temporal bone is separated from the duct appendix with a drum-fossil fissure (fissura tympanomastoidea). On the posterior median side of the mosquito process is a dysplastic incision (incisura mastoidea) and the parotid artery (sulcus arteriae occipitalis). On a horizontally located lower section of the scaly part of the temporal bones have a well-defined lower jaw (fossa mandibularis), and in front of it articular tubercle (tuberculum articulare). These formations are joined by a head the mandible, forming the temporomandibular joint. In the intervals between the stony and scaly parts of the temporal bone is the posterior part of the large wing of the wedge-shaped bone, in which well-visible oval hole (foramen ovale) and a spray aperture (foramen spinosum). The stony part of the temporal bone is separated from the occipital bone rocky-occipital slit (fissura petrooccipitalis), (fissura sphenopetrosa).

The uneven hole is also visible on the lower surface of the outer base of the skull (foramen lacerum), which is limited laterally and behind the top of the stony part of the temporal bone, and the median - lateral edge the main part of the occipital bone, and in front - a large wing and a base winged appendix of wedge-shaped bone.

Inner skull base (basis cranii interna) In it there are three cranial fossa: front, middle and back. The rear edge of the small wings and the hump of the saddle wedge-shaped bone are separated front cranial hole from the middle one. The border between the middle and back cranial fossa is the upper edge the rocky part of the temporal bones and the back of the wedge-shaped bone saddle. Front cranial fossa (fossa cranii anterior) it is formed by the protuberant parts of the frontal bone, a hole a plate (lamina cribrosa) of a lattice bone and small wings wedge-shaped bone.

On the interstitial parts of the frontal bones well expressed cerebral glands and finger-shaped squeeze. In the center of the hole plate, a crested ridge (crista galli) rises, in front of which there is a visible blind hole (foramen caecum) and a forehead comb (crista frontalis) of the frontal bone. Right and left visual channels (right and left canalis opticus) are located in the very rear of the anterior cranial fossa. Through these channels are visual nerves and eye arteries.

At the session of the department it is decided to attribute the visual channels from the inside the base of the skull to the anterior cranial fossa.

Fossa cranii media

The walls of the middle cranial fossa are formed by the body and large wings wedge-shaped bone, anterior surface of the rocky part and scaly part of the temporal bones.

In the middle cranial fossa you can identify the central part and the lateral sections.

The central part is the Turkish saddle (sella turcica) with a (fossa hypophysialis). Ahead of this pit can be seen before the cross sulcus (sulcus prechiasmaticus). On the lateral surface of the body of the wedge-shaped bone passes well pronounced throat (sulcus caroticus), and near the top of the rocky part the temporal bone is visible in the irregular shape of a ruptured hole (foramen lacerum).

Between the small wing, the large wing and the body of the wedge-shaped bone the upper frontal lobe (fissura orbitalis superior) is located. Behind the upper orbital gap is a round hole (foramen rotundum). Near the posterior margin of the large wing of the wedge-shaped bone are located (foramen ovale) and (foramen spinosum).

On the front surface of the rocky part of the temporal bone is noticeable (impressio trigeminalis) for the trigeminal node. Side by side with this injection is the development of the channel of a large stony nerve (hiatus canalis nervi petrosi majoris) and a fissure of a large stony nerve (sulcus nervi petrosi majoris).

Somewhat below and from the side of this furrow is noticeable development of the canal small stomach nerve (hiatus canalis nervi petrosi minoris) and small furrow stony nerve (sulcus nervi petrosi minoris). Side by side with these formations can be seen the roof of the tympanic cavity (tegmen tympani) and arc increase (eminencia arcuata).

Fossa cranii posterior

It forms an occipital bone, the back surface of the stony parts and the inner surface of the mosquito-bearing processes of the right and left temporal bones, as well

also the back of the body of the wedge-shaped bone and the pseudobular cornea of the parietal bones the border between the vault and the inner base of the skull in the posterior region the cranial fossa is a furrow of the transverse sinus (sulcus sinus transversi) that passes from each side to the sulcus of the sulcus sinus sigmoid) .In the center of the rear cranial fossa is a large hole (foramen magnum, ahead of it - the slope of the occipital bone (clivus) on which lie such parts of the brain as the bridge and the medulla oblongata. Near the big aperture is a canal of the sublingual nerve (canalis nervi hypoglossi). Through this channel passes the same name cranial nerve. Behind the large hole in the median line are the inner occipital crest (crista occipitalis interna) and cross-raising (eminencia cruciformis). On the back of the stony parts of the temporal bones, the inner one is visible auditory hole (porus acusticus externus) leading to the internal auditory path (meatus acusticus externus). In the depths of this course the canal of the front begins the nerve at the bottom of the rear cranial fossa behind the stony parts of the temporal bone is pair foramen jugulare, which ends with a sore- like sinus (sulcus sinus sigmoidei). Through this hole, the tongue- pharyngeal, vagus and additional nerves (correspondingly IX, X, XI cranial nerves). The inner jugular vein that goes down from the jumper hole goes down continuation of sigmoid sinus. With the upper

part of the furrow of the sigmoid sinus, a furrow is connected upper sinus sinus (sulcus sinus petrosi superioris), and with the lower part of the sinus (sulcus sinus petrosi inferioris).

Fossa temporalis, intratemporalis, pterygopalatina

When considering the skull on the sides lateral norm can be seen fossa temporalis, fossa infratemporalis, floating point fossa pterygopalatin.

Fossa temporalis

It is limited from the top with the lower temporal line, and from the bottom - the back-up the crest of a large wing of wedge-shaped bone. Squeezing comb separates the temporal hole from the fossa fountain fossa infratemporalis. On the side, the temporal fossa is limited to the arched zygomatic (arcus zygomaticus) as well in front - a temporal surface of the caudal bone.

Fossa infratemporalis

It is at the top separated from the temporal fossa by the spark of a large comb wing wedge-shaped bones. The upper wall of the spigot is a temporal bone and a large wing of the wedge-like bone the medial wall of the subcutaneous fossa is formed by a side plate winged appendix of wedge-shaped bone. The front wall is the hump of the upper jaw and partially prickly bone. At the front, the spark pocket is connected with orbit, and moderately, using the fissura pterygomaxillaris.

Fossa pterygopalatina

Walls

The front wall is a hump of the upper jaw (tuber maxillae, located on corpus maxillae) (more precisely, the medial part of this hump) the upper wall is a body (corpus ossis sphenoidalis) and a large wing wedge bones (ala major ossis sphenoidalis) (more precisely - lower side surface of the body and the base of the large wing wedge-shaped bone). Processus pterygoideus (more precisely - the anterior surface of this growth. Medium wall - perpendicular plate of the palatine bone (lamina perpendicularis ossis palatini) (more precisely - external the surface of this plate).

Connection

1. Through the lower orbital fissure (fissura orbitalis inferior), the wing-palatine the pit is connected to the orbit;
2. Through the foramen sphenopalatinum - with the nose cavity
3. Through a round hole (foramen rotundum) - with an average cranial fossa;
4. Through canalis pterygoideus- with the outer base skulls .
5. Through the large palatine canal (canalis palatinus major) - with the mouth cavity.

5.1. First stage

In order to create a motivation for a focused learning activities emphasize the importance of the topic of the lessons for further studying at our department and at other departments of the university, as well as for professional activity of the doctor.

It is explained that through the gaps, holes and channels of the base of the skull and Pitches of the lateral norm pass the vessels and nerves and make connections with adjacent cavities (prerequisites for the propagation of inflammatory

processes). Study of the features of the structure of the base of the skull and the lateral norms - this is the basis of clinical thinking in differential conditions diagnostics for a doctor of any specialty, but above all a neurologist, neurosurgeon, neonatologist, traumatologist, ophthalmologist, otolaryngologist, dentist, plastic surgeon.

Students get to know the specific goals and plan occupation. Standardized entry-level controls are being implemented student knowledge.

5.2. The main stage

The main stage involves studying on the demonstration (on preparations, dummies, drawings, photographs) with the help of textbooks and atlases and under the direction of the teacher of the features of the structure internal and external skull bases, temporal, spin and wing- palatal pits. At the same time, the boundary between the base of the skull . After that, the parts of the bones that form are determined the basis of the skull. Anatomy study of the external basis of the skull involves searching for demonstration material for holes, cracks, canals, pits, sprouts and other formations. Attention is drawn to the presence of jugular openings only on the whole skull and their absence on isolated bones. Also, attention is drawn to the fact that through holes, gaps and channels passes nerves and vessels, and with the processes connected ligaments and muscles. By studying the anatomy of the inner base of the skull, boundaries are determined between the front, middle and back cranial fossa, as well parts of the bones that form these holes. Then the places are determined finding holes, furrows, channels and other internal structures

the base of the skull At the same time attention is paid to their purpose. Then joints of the anterior, middle and posterior cranial fossa are studied. Studying anatomy of the temporal, spasmodic and wing-palatal pits begins with the definition of their walls and parts of the bones that form these the walls Then the combination of all pits is determined. Here attention is drawn n the fact that through these combinations (openings, channels, cracks) pass vessels and nerves, and the pits themselves contain muscles, vessels, nerves and nerve nodes. Also possible ways of spreading infection between these pits are analyzed and adjacent cavities. Oral questioning is accompanied by anatomical demonstration structures, as well as the solution of situational tasks and tests that maximally brings students closer to a specific clinical situation. Answers are discussed both by the students and the teacher.

5.3. The final stage

Standardized control of the final level is carried out knowledge

Evaluates the current success of each student during the class. The score is displayed in the log of visits and progress. Estimates announced and the head of the group simultaneously puts them in the record of accounting the success of attending classes by students, and the teacher attests them to their own signed and signed up to the electronic journal. Students are informed about the topic of the next lesson and methodological receptions regarding preparation for it.

6. Attachments. Means to control:

- Practical tasks concerning illustrations in the manual "Anatomy of a person.

Control of independent preparation of students for practical classes »

- Practical tasks concerning additional illustrations

- Questions for controlling the basic level of knowledge of students

- A question for controlling the initial level of knowledge of students

- A question for controlling the final level of student knowledge
- Test tasks

7. Suggested Reading

- **Basic**

- **1. Human Anatomy: the textbook** : in 3 volumes. / Holovatsky AS, Cherkasov VG Sapignies MR, Parakhin AI, AI Kovalchuk - Kind. 5 rd, complemented - Ball: New Book, 2016. - 1200 p. : Ill.
- **2. Cherkasov VG Bobryk II, Huminskyy Yu.Y., Kovalchuk O. International anatomical terminology (Latin, Ukrainian, Russian and English equivalents)** Vinnitsa: New Book, 2010. - 392 p. (**Manual**)
- **3. Sobotta. Atlas of Human Anatomy**. In two volumes. Processing and editorial ukrayinskoho edition: VG Cherkasov., Trans. O. Kovalchuk. - Kyiv: Ukrainian Medical Journal, 2009.
- **4. Cherkasov VG cloud TV, Makar BH, DV Pronyaev Human Anatomy**. Chernivtsi: Med.universytet. 2012. - 462 p. (**textbook**)
- **5. Human Anatomy. V. Cherkasov, S. Kravchuk**. - Ball: New Book, 2011. - 640p. (**Textbook**)
- **6. Dyubenko KA Human Anatomy**. In two volumes. / KA Dyubenko, AK Kolomiytseva, JB Tchaikovsky. - K: JSC book, 1 volume - 2 004 - 690 p. ; Volume 2 - 2008. - 528 p.
- **8. Human Anatomy** / [Koveshnikov VG Bobryk II, Holovatsky A.S.ta al.]; Ed. V.H.Koveshnikova - Luhansk: Virtual Reality, 2008. - V.3. - 400 p.
- **9. Sviridov AI Human Anatomy**. - Kyiv: High School, 2000.- 399 p.

- **Support**

- **1. Cherkasov VG Huminskyy Yu.Y., Cherkasov EV Shkolnikov VS The history of anatomy (and chronology of prominent anatomists)**. Lugansk LLC "Virtual Reality", 2012. - 148 p. (Textbook).
- **2. Tests "Step 1" - human anatomy** / Edition 5 st, revised / edited by V.H.Cherkasova, I.V.Dzevulskoyi IV, O.I.Kovalchuka. Tutorial. - 2016. - 100 p.
- **3. Chornokulskyy ST Anatomy of bones and their connections**. / Kyiv, Book Plus, 2015. - 159 p. (Educational - methodical manual).
- **4. Anat Exposure RIGHTS (Control Self preparation for practical classes)** . Module 1 "Anatomy of the musculoskeletal system," Module 2 - Splanchnology. Central nervous system. Sense organs "Module 3 -" Heart. Anatomy of the cardiovascular system. "[for the studio. HI. medical (pharmaceutical) teach. bookmark. Fourth level] / Textbook. / Edited V.H.Cherkasova, I.V.Dzevulskoyi IV, O.I.Kovalchuka.
- **5. Netter F. Atlas of Human Anatomy** / Frank Netter [Trans. from English. AA Tsehelskyi]. - Lviv: Nautilus, 2004 - 529 p.
- **6. Frederick Martin Atlas of Human Anatomy** : Per. from the 8th Eng. type [nauk.red.per. V.H.Cherkasov] VSV "Medicine", 2011. - 128 p. (Atlas)

- **Information resources**

- <http://nmu.ua/zagalni-vidomosti/kafedri/kafedra-anatomyy-cheloveka/informatsiya-dlya-studentiv-6/>

- [www . anatom . ua](http://www.anatom.ua)

Questions for controlling the basic level of student knowledge

1. *Identify anatomical planes of the human body and anatomical terms to indicate the location of the skull bones in relation to these planes.*
2. *Name the bones of the brain skull.*
3. *Determine the position in the skull of the individual bones of the brain and the front Skulls.*
4. *Demonstrate the rules of the skull: vertical, lower, front, lateral, occipital.*
5. *Demonstrate the occipital hole, bony nasal cavity and bone marrow palate and their combination.*

Questions to control the entry level knowledge of students

1. *Identify and demonstrate the boundary between the base of the skull and its Arches.*
2. *Lists the bones that form the basis of the skull.*
3. *Name the openings of the base of the skull, which are only on the whole skull.*
4. *Lists the channels whose holes are on the outer skull.*
5. *Lists three holes, which form the inner base of the skull.*
6. *Name the combination of the anterior cranial fossa with the ophthalmic fossa.*
7. *Name the combination of the middle cranial fossa with the outer base skulls.*
8. *What does the wing-palatine channel wing-palatine hole connect?*
9. *What are the furrows of the venous sinuses, which are on the inside of the skull.*
10. *Name the parts of the bones that form the median wall of the temporal holes.*
11. *What forms the medial wall ?*
12. *Name the combination of a spark fossa with an ophthalmic pit.*
13. *What forms the lateral wall of the temporal fossa?*
14. *Name the combination of the wing-palatal fossa with the nasal cavity.*
15. *What forms the upper wall of the spigot pit?*

Question to control the final level of training

1. *Demonstrate and name the formation through which the line passes through delimits the vault of the skull from its base.*
2. *Name and demonstrate three holes that make up the inner core skulls, define the boundaries between them.*
3. *Demonstrate and name the parts of the bones that form the front cranial hole.*
4. *Demonstrate and name the basic connections of the anterior cranial holes .*
5. *Demonstrate and name parts of the bones that form the middle cranial hole.*
6. *Demonstrate and name the basic connections of the middle cranial holes .*
7. *Demonstrate and name the basic connections of the back cranial fossa.*

8. *Demonstrate and name the parts of the bones that form the back cranial hole .*
9. *Name and demonstrate the parts of the bones that form the outer one the base of the skull.*
10. *Demonstrate the processes and fossa of the outer skull base.*
11. *Demonstrate on the outside of the skull channels and openings and Determine what they are joining.*
12. *Identify and demonstrate the boundaries and walls of the temporal fossa and parts the bones that make up them.*
13. *Name and demonstrate the walls of the spasm of the pit and part of the bones, which form each wall.*
14. *Identify and demonstrate the combination of the spark fossa.*
15. *Name and demonstrate the walls of the wing-palatine fossa and part bones that form each wall.*
16. *Identify and demonstrate the combination of the wing-palatal fossa.*

Test tasks "KROK-1"

1. *In a woman after a trauma of the eye there was purulent inflammation of soft tissues of the eye fossa, which later spread to the pit. Through which anatomical formation purulent process spread to this hole?*
 - A. *Through the lower limb gland.*
 - B. *Through the circular hole.*
 - C. *Due to clavicular opening.*
 - D. *Through the upper protuberant gland.*
 - E. *Through the cleft palate.*
2. *The woman got into a hospital with purulent inflammation of cells process. The inflammation has spread to the cranial hole that has a common wall with this process. In what hollow the skull has spread nflammation of the throat?*
 - A. *In the middle cranial hole.*
 - B. *In the anterior cranial hole.*
 - C. *In the back hole.*
 - D. *In the wing-palatal hole.*
 - E. *In the back cranial hole.*
3. *In the man after the eye injury there was purulent inflammation of soft tissues of the facial fossa. Later it inflammation has spread to the wing-palatal hole. Through which anatomical is the purulent process of the development spread to this hole?*
 - A. *Through a round hole.*
 - B. *Through the lower limb gland.*
 - C. *Through the wedge-palatine hole.*
 - D. *Through the upper protuberant gland.*
 - E. *Through the cleft palate.*

4. A man with an abscess appeared in the area of the spasmodic fossa complications in the form of inflammation of the tissues surrounding the eyeball. Through which combination of the spark fossa with the ophthalmic pit extended inflammation?

- A. *Canalis palatinus majus.*
- B. *Fissura orbitalis superior.*
- C. *Foramen sphenopalatinum.*
- D. *Fissura orbitalis inferior.*
- E. *Canalis pterygoideus.*

5. In a patient with purulent inflammation of the nasal cavity, this is an inflammation spread to the anterior cranial hole. Through which anatomical formation spreads the inflammation?

- A. *Foramina cribrosa.*
- B. *Foramen ovale.*
- C. *Foramen ethmoidalae poster.*
- D. *Foramen sphenopalatinum.*
- E. *Foramen rotundum.*

6. The man who turned to the dentist is a doctor for the purpose anesthesia of large angular teeth made anesthetic injection (anesthetic) to the formation of the upper jaw, which is the entry point nerves from the sputum fossa through foramina alveolaria to the back of the tooth cells. Where did the doctor make an injection of anesthetic?

- A. *Sinus maxillaris.*
- B. *Processus frontalis.*
- C. *Processus palatinus.*
- D. *Processus alveolaris.*
- E. *Tuber maxillae.*

7. In a diagnostic center during the examination of a woman is established narrowing the lumen of the right jugular hole (*foramen jugulare*) that was cause of neurological disease. Between the bones of the skull the narrowing of this hole is set?

- A. *Posterior and frontal bones.*
- B. *Temporal and wedge-shaped bones.*
- C. *Occipital and wedge-shaped bones.*
- D. *Temporal and occipital bones.*
- E. *Venous and palatal bones.*

8. A man, 45 years old, who got into a neurosurgical department, a tumor was found on the wall of one of the cranial pits. The tumor has broken down roof of the tympanic cavity (*tegmen tympani*); In what cranial fossais the tumor located?

- A. *Fossa cranii anterior.*
- B. *Fossa temporalis.*
- C. *Fossa infratemporal.*
- D. *Fossa cranii media.*
- E. *Fossa cranii posterior.*

Answers :

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
<i>A</i>	<i>E</i>	<i>B</i>	<i>D</i>	<i>A</i>	<i>E</i>	<i>D</i>	<i>D</i>