IMMANUEL KANT BALTIC FEDERAL UNIVERSITY
DEPARTMENT OF FUNDAMENTAL MEDICINE

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ANATOMY: CRANIOLOGY

Methodological recommendations for students of medicine

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The manual is prepared according to requirements of the working program of the discipline “Anatomy” and contains methodical indications for the section Craniology according to the existing curriculum. The manual is intended for the English-speaking students of medical faculty studying on specialties 31.05.01 “General medicine”.

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Topic 1

THE STRUCTURE OF THE SKULL BONES: OCCIPITAL, PARIETAL, FRONTAL, SPHENOID

INTRODUCTION TO THE TOPIC

The treatment of the craniocerebral injuries, inflammation of the paranasal sinuses, and the plastic surgery on the head require a good knowledge of the anatomy of the cranial cavity which is mainly formed by the frontal, parietal, occipital and sphenoid bones. The sphenoid bone forms the skull base; the injuries of this bone are very dangerous to life. The correct diagnosis of these injuries is impossible without good knowledge of the structure of the sphenoid bone.

Before studying the topic, you should know:

1. The general structure of the skull.
2. The structure of the skull bones.

SELF-STUDY GOALS

After independently studying the topic, the student should know: the structure of the occipital, parietal, frontal, sphenoid bones, types of ossification; to palpate protruding parts of the skull on a living person; be able to distinguish the details of the structure of bones on radiographs.

TOPIC CONTENT

- Anatomy of the occipital bone: squama, basilar part, lateral parts and details of their structure (external and internal protuberances, nuchal lines, crests, sinus grooves, pharyngeal tubercle, foramens, canals, notches, clivus);
- Anatomy of the parietal bone: edges, surfaces, angles, tuber, lines, grooves;
- Anatomy of the frontal bone: parts and details of their structure (tuber, glabella, crest, eyebrow ridge, fossa for the lacrimal gland, fovea trochlearis, zygomatic process, frontal sinus, ethmoid notch, sinus groove, crest, digitate impressions).
- Structure of the sphenoid bone: body, greater and lesser wings, pterygoid processes, sella turcica, its back, chiasmatic groove, optic canals, carotid groo-

ves, crest, rostrum, openings of the air sinus, round foramen, spinous foramen, oval foramen; greater surfaces: cerebral, orbital, temporal, maxillary; infratemporal crest; pterygoid processes: the pterygoid canal, medial and lateral plates, fossa.

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE MATERIAL

Activity	Step Description
Read the introduction to the topic	—
Study the corresponding section in literature sources and find the corresponding bone preparations	—
Define the functionality of the bone and visualize its location among other bones of the skull	Which part of the skull does this bone belong to? Functions: support, protection, connection with the brain and sensory organs
Read the relevant paragraph in the textbook, and identify the bone features on the bone preparation	Demonstrate each bone detail found in the textbook with a pointer. Use the list of the practical skills
Revise the studied material while showing bone formations on the preparations	When revising the synovial joint, check the following: a) English and Latin names of the bone; b) location of the bone in the skull; c) type of bone (spongy, mixed, pneumatic, flat); d) participation in the formation of cavities; e) main parts of the bone; f) anatomical formations of each part of the surface, processes, ridges, grooves, etc.; g) radiograph of the bone; h) stages and timing of ossification
Write down new Latin terms	Write down the terms in your notebook (see the list of Practical skills)
Find specific features to determine which side (right or left) of the bone it is. Determine which side of the bone you are studying	Identify the edges, angles, processes, bone tubercles. Find out which of them are located medially and which are lateral

The end of Table

Activity	Step Description
Determine the details of the bone that can be felt on a live person. Find them on your body	Palpate the bone protrusions lying superficially under the skin
Check your knowledge with self-control questions	Answer the questions given in the assignment

QUESTIONS FOR SELF-CONTROL

1. Classify the skull bones. How do they develop? Describe their internal structure. What bones comprise the neurocranium and the viscerocranium? Enumerate the calvaria bones and bones of the base of the skull. Enumerate the borderline between the calvaria and skull base structures. Which skull bones are pneumatized? Why are they pneumatized? What are the functions of the skull bones sinuses? Why does the hyoid bone also belong to the skull bones?

2. Describe the parts and position of the frontal bone. What margins of this bone do you know? With which bones is the frontal bone connected? Describe the relief of the frontal bone squama. Describe the outer and inner relief of the orbital parts. Describe the structures of the pars nasalis. What surfaces are distinguished in the squamous and orbital parts? Why are their inner surfaces called cerebral and have a peculiar relief? Why do the orbital and nasal parts have such names? What is the function of the zygomatic process? What is the function of the foramen caecum and frontal crest? Describe the location of the ethmoidal notch. Why does it have such a name? What are the functions of the trochlear fovea, fossae for lacrimal gland and sac? What parts of the nasal cavity are formed with participation of the frontal bone`s nasal part and its nasal spine? Describe the position, walls and capacity of the frontal sinus. What canal leads from the sinus? Where does it open? Through which bones does the groove for superior sagittal sinus pass? What does it contain?

3. Describe the parts of os occipitale. Find the os occipitale in the whole skull. Is it paired or unpaired bone? Describe the position of the occipital bone in the skull: which skull bones does it connect with? Find and demonstrate anterior and posterior sides of os occipitale, its upper and lower margins, external and internal surfaces. Describe the relief of the pars squamosa. Why is its inner surface called cerebral and has a peculiar relief? What grooves for sinuses pass on the facies interna of the squamous part? What are the functions of the internal and external occipital crests and protuberances? Describe the functions of: the foramen magnum, occipital condyles, jugular notch, intrajugular process, clivus, pharyngeal tubercle.

4. Describe the position of the os parietale. What margins of this bone do you know? With which bones is the parietal bone connected? Describe the relief of the os parietale. Is it paired or unpaired bone? What angles of this bone do you know? How to differentiate the margins, angles and surfaces of the parietal bone? Why do they have such names? Why is its inner surface called cerebral and has a peculiar relief? What is the function of the foramen parietale? What are the functions of the sulcus sinus sagittalis superior, sulcus sinus sigmoidei? Describe the function of the tuber parietale. What structures produce the foveolae granulares on the internal surface?

5. Describe the position of the os sphenoidale. Is it paired or unpaired bone? With which bones is the os sphenoidale connected? How to differentiate the sides and surfaces of the os sphenoidale? What parts of the sphenoid bone do you know? What surfaces are distinguished on the greater wings? Where are they directed? Which bones connect to the ala major and ala minor? Where is the sphenoidal sinus located? Describe its walls and capacity. Where do their apertures open? Describe the superior surface of the sphenoidal body. Describe the functions of: the hypophysial fossa, carotid sulcus, chiasmatic sulcus, foramen ovale and rotundum, superior orbital fissure. Where do the foramina ovale and rotundum lead to? Where does the superior orbital fissure lead to? Describe the location and structure of the pterygoid process. What is its function?

PRACTICAL SKILLS

Frontal bone

1. Squamos part, *squama frontalis*; лобная чешуя.
2. Orbital part, *partes orbitalis*; глазничная часть.
3. Nasal part, *pars nasalis*; носовая часть.
4. Frontal tuber, *tuber frontale*; лобный бугор.
5. Supraorbital margin, *margo supraorbitalis*; надглазничный край.
6. Zygomatic process, *processus zygomaticus*; скуловой отросток.
7. Supraorbital notch, *incisura supraorbitalis* (supraorbital foramen, *foramen supraorbitale*); надглазничная вырезка (надглазничное отверстие).
8. Temporal line, *linea temporalis*; височная линия.
9. Temporal surface, *facies temporalis*; височная поверхность.
10. Superciliary arch, *arcus superciliaris*; надбровная дуга.
11. Glabella, *glabella*; надпереносье.
12. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.
13. Frontal crest, *crista frontalis*; лобный гребень.
14. Cerebral surface of orbital part, *facies cerebralis*; мозговая поверхность.

15. Frontal sinus, *sinus frontalis*; лобная пазуха.

16. Orbital surface of orbital part, *facies orbitalis*; глазничная поверхность.

17. Fossa for lacrimal gland, *fossa glandulae lacrimalis*; ямка слезной железы.

18. Nasal spine, *spina nasalis*; носовая ость.

19. Trochlear fovea, *fovea trochlearis*; блоковая ямка.

20. Trochlear spine, *spina trochlearis*; блоковая ость.

21. Ethmoidal notch, *incisura ethmoidalis*; решетчатая вырезка.

Occipital bone

1. Squamous part, *squama occipitalis*; затылочная чешуя.

2. Foramen magnum, *foramen magnum*; большое отверстие.

3. Pharyngeal tubercle, *tuberculum pharyngeum*; глоточный бугорок.

4. Occipital condyle, *condylus occipitalis*; затылочный мыщелок.

5. Lateral parts, *partes laterals*; латеральная / боковая часть.

6. Condylar fossa, *fossa condylaris*; мыщелковая ямка.

7. Condylar canal, *canalis condylaris*; мыщелковый канал.

8. Basilar part, *pars basilaris*; базилярная часть.

9. Hypoglossal canal, *canalis n. Hypoglossi*; подъязычный канал.

10. Jugular notch, *incisura jugularis*; яремная вырезка.

11. Groove for sigmoid sinus, *sulcus sinus sigmoidei*; борозда сигмовидного синуса.

12. Cruciform eminence, *eminentia cruciformis*; крестообразное возвышение.

13. Internal occipital protuberance, *protuberantia occipitalis interna*; внутренний затылочный выступ.

14. Internal occipital crest, *crista occipitalis interna*; внутренний затылочный гребень.

15. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.

16. Groove for transverse sinus, *sulcus sinus transversi*; борозда поперечного синуса.

17. External occipital protuberance, *protuberantia occipitalis externa*; наружный затылочный выступ.

18. External occipital crest, *crista occipitalis externa*; наружный затылочный гребень.

19. Superior nuchal line, *linea nuchalis superior*; верхняя выйная линия.

20. Inferior nuchal line, *linea nuchalis inferior*; нижняя выйная линия.

21. Highest nuchal line, *linea nuchalis suprema*; наивысшая выйная линия.

Parietal Bone

1. Sagittal border, *margo sagittalis*; сагиттальный край.
2. Frontal border, *margo frontalis*; лобный край.
3. Occipital border, *margo occipitalis*; затылочный край.
4. Squamosal border, *margo squamosus*; чешуйчатый край.
5. Inferior temporal line, *linea temporalis inferior*; нижняя височная линия.
6. Superior temporal line, *linea temporalis superior*; верхняя височная линия.
7. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.
8. Frontal angle, *angulus frontalis*; лобный угол.
9. Occipital angle, *angulus occipitalis*; затылочный угол.
10. Shenoidal angle, *angulus sphenoidalis*; клиновидный угол.
11. Mastoid angle, *angulus mastoideus*; сосцевидный угол.
12. Parietal tuber, *tuber parietale*; теменной бугор.

Sphenoid Bone

1. Body of sphenoid bone, *corpus ossis sphenoidalis*; тело клиновидной кости.
2. Sella turcica, *sella turcica*; турецкое седло.
3. Hypophisial fossa, *fossa hypophysialis*; гипофизарная ямка.
4. Dorsum sellae, *dorsum sellae*; спинка седла.
5. Tuberculum sellae, *tuberculum sellae*; бугорок седла.
6. Prechiasmatic sulcus, *sulcus prechiasmaticus*; предперекрестная борозда.
7. Carotid sulcus, *sulcus caroticus*; сонная борозда.
8. Posterior clinoid process, *processus clinoideus posterior*; задний наклоненный отросток.
9. Anterior clinoid process, *processus clinoideus anterior*; передний наклоненный отросток.
10. Sphenoidal rostrum, *rostrum sphenoidale*; клиновидный клюв.
11. Sphenoidal sinus, *sinus sphenoidalis*; клиновидная пазуха.
12. Lesser wing, *ala minor*; малое крыло.
13. Optic canal, *canalis opticus*; зрительный канал.
14. Greater wing, *ala major*; большое крыло.
15. Sphenoidal crest, *crista sphenoidalis*; клиновидный гребень.
16. Foramen rotundum, *foramen rotundum*; круглое отверстие.
17. Foramen ovale, *foramen ovale*; овальное отверстие.
18. Foramen spinosum, *foramen spinosum*; остистое отверстие.
19. Superior orbital fissure, *fissura orbitalis superior*; верхняя глазничная щель.

20. Infratemporal crest, *crista infratemporalis*; подвисочный гребень.

21. Medial plate of pterygoid process, *lamina medialis prosessus pterygoidei*; медиальная пластинка крыловидного отростка.

22. Lateral plate of pterygoid process, *lamina lateralis prosessus pterygoidei*; латеральная пластинка крыловидного отростка.

23. Pterygoid canal, *canalis pterygoideus*; крыловидный канал.

24. Pterygoid fossa, *fossa pterygoidea*; крыловидная ямка.

25. Scaphoid fossa, *fossa scaphoidea*; ладьевидная ямка.

26. Pterygoid hamulus, *hamulus pterygoideus*; крыловидный крючок.

27. Cerebral surface of greater wing, *facies cerebralis*; мозговая поверхность.

28. Orbital surface of greater wing, *facies orbitalis*; глазничная поверхность.

29. Temporal surface of greater wing, *facies temporalis*; височная поверхность.

30. Infratemporal surface of greater wing, *facies infratemporalis*; подвисочная поверхность.

31. Maxillary surface of greater wing, *facies maxillaris*; верхнечелюстная поверхность.

X-ray

Frontal bone

1. Squamos part, *squama frontalis*; лобная чешуя.

2. Frontal tuber, *tuber frontale*; лобный бугор.

3. Supraorbital margin, *margo supraorbitalis*; надглазничный край.

4. Zygomatic process, *processus zygomaticus*; скуловой отросток.

5. Supraorbital notch, *incisura supraorbitalis* (supraorbital foramen, *foramen supraorbitale*); надглазничная вырезка (надглазничное отверстие).

6. Superciliary arch, *arcus superciliaris*; надбровная дуга.

7. Glabella, *glabella*; надпереносье.

8. Frontal sinus, *sinus frontalis*; лобная пазуха.

Occipital bone

1. Squamous part, *squama occipitalis*; затылочная чешуя.

2. External occipital protuberance, *protuberantia occipitalis externa*; наружный затылочный выступ.

Parietal bone

1. Sagittal border, *margo sagittalis*; сагиттальный край.

2. Frontal border, *margo frontalis*; лобный край.

3. Occipital border, *margo occipitalis*; затылочный край.
4. Frontal angle, *angulus frontalis*; лобный угол.
5. Occipital angle, *angulus occipitalis*; затылочный угол.
6. Shenoidal angle, *angulus sphenoidalis*; клиновидный угол.
7. Mastoid angle, *angulus mastoideus*; сосцевидный угол.
8. Parietal tuber, *tuber parietale*; теменной бугор.

Sphenoid bone

1. Body of shpenoid, *corpus ossis sphenoidalis*; тело клиновидной кости.
2. Sella turcica, *sella turcica*; турецкое седло.
3. Sphenoidal sinus, *sinus sphenoidalis*; клиновидная пазуха.
4. Hypophisial fossa, *fossa hypophysialis*; гипофизарная ямка.
5. Dorsum sellae, *dorsum sellae*; спинка седла.

Literature

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6. *Lecture* material.

Topic 2

THE STRUCTURE OF THE TEMPORAL AND ETHMOID BONES

INTRODUCTION TO THE TOPIC

Knowledge of the structure of the temporal and ethmoid bones is needed to study subsequent topics in human anatomy, courses in radiology, surgery, eye and ENT diseases, and traumatology. The ethmoid bone is involved in the formation of the skull base; the injuries of this bone are very dangerous to life. The correct diagnosis of these injuries is impossible without good knowledge of the structure of the ethmoid bone. The material of this topic is necessary to understand the structure of the whole skull and to study the articulations of the skull bones. Also temporal bone anatomy will be used in the study of the muscles of the head and neck, inner ear, the VII and VIII pairs of cranial nerves, dural sinuses.

Before studying the topic, you should know:

1. The general structure of the skull.
2. The structure of the skull bones.

SELF-STUDY GOALS

After independently studying the topic, the student should know: the structure of the ethmoid and temporal bones, types of ossification; to palpate protruding parts of the skull on a living person; be able to distinguish the details of the structure of bones on radiographs.

TOPIC CONTENT

- The structure of the ethmoid bone: perpendicular and horizontal plates, ethmoid labyrinths, air cells, orbital plate, nasal conchae, nasal meatuses.
- The structure of the temporal bone: squama, tympanic, petrous parts; zygomatic process; fossa mandibularis and tuberculum articulare; fissures; external acoustic porus and meatus; anterior, posterior and inferior surfaces of the pyramid; anterior, superior and posterior margins of the pyramid; roof of the tympanic cavity; arcuate eminence; trigeminal impression; grooves and hiatuses the

greater and lesser petrosal nerves; internal acoustic porus and meatus; grooves of the superior and inferior petrosal sinuses; groove of the sigmoid sinus; mastoid process; mastoid notch; groove of the occipital artery; styloid process; stylomastoid foramen; jugular fossa and foramen; temporal bone canals.

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE MATERIAL

Activity	Step Description
Read the introduction to the topic and self-study goals	—
Study the corresponding section in literature sources and find the corresponding bone preparations	—
Determine the functional purpose of the bone, define its location among other bones of the skull	Which part of the skull does this bone belong to? Functions: support, protection, connection with the brain and sensory organs
Read the relevant paragraph in the textbook, and identify the bone features on the bone preparation	Demonstrate each bone detail found in the textbook with a pointer. Use the list of the practical skills
Revise the studied material while showing bone formations on the preparations	When revising orally, check the following: a) English and Latin names of the bone; b) location of the bone in the skull; c) type of bone (spongy, mixed, pneumatic, flat); d) participation in the formation of cavities; e) main parts of the bone; f) anatomical formations of each part of the surface, processes, ridges, grooves, etc.; g) radiography of the bone; h) stages and timing of ossification
Write down new Latin terms	Write the terms in your notebook (see the list of Practical skills)
Find specific features to determine which side (right or left) of the bone it is. Determine which side of the bone you are studying	Identify the edges, angles, processes, bone tubercles. Find out which of them are located medially and laterally

The end of Table

Activity	Step Description
Determine the details of the bone that can be felt on a live person. Find them on your body	Bone projections lying superficially under the skin can be felt on a live person
Learn the temporal bone canals: position, origination, termination	Use the table below
Check your knowledge with self-control questions	Answer the questions given in the assignment

Canals of Temporal Bone

The name of the canal	The entrance to the canal	The exit of the canal	The content of the canal
Carotid canal	External carotid orifice	Internal carotid orifice	Internal carotid artery
Caroticotympanic canaliculi	Carotid canal	Tympanic cavity	Caroticotympanic arteries
Facial canal	Internal acoustic meatus	Stylomastoid foramen	Facial nerve
Canaliculus of chorda tympani	Facial canal	Petrotympanic fissure	Chorda tympani
Tympanic canaliculus	Petrosal fossula	Hiatus for the lesser petrosal nerve	Tympanic nerve
Musculotubal canal	Apex of the pyramid	Tympanic cavity	Auditory tube; tensor tympani muscle
Mastoid canaliculus	Jugular fossa	Tympanomastoid fissure	Auricular branch of the vagus nerve

QUESTIONS FOR SELF-CONTROL

1. Describe the position of the os ethmoidale. Is it paired or unpaired bone? With which bones is the os ethmoidale connected? How to differentiate the sides of the os ethmoidale? What parts of the ethmoid bone do you know? What is the

function of the crista galli? Where is located the cribriform plate? Which bones is the cribriform plate connected with? Why is it pierced by the openings; where do they lead? Where is the perpendicular plate located? How does the ethmoid bone participate in the formation of the nasal cavity? Which bones is the perpendicular plate connected with? How does the ethmoid bone relate to the orbits? Where are the lamina orbitalis of the ethmoid located? Which bones is the lamina orbitalis connected with? Describe the location and function of the ethmoidal labyrinth. What groups of the ethmoidal cells are distinguished? Where does each of these groups open? Where is the bulla ethmoidalis? Describe the location and function of the semilunar hiatus and ethmoidal infundibulum. What is the function of the uncinate process? What is the concha? Which conchae does the ethmoid bone have?

2. Describe the position of the os temorale. Is it paired or unpaired bone? With which bones is the os temporale connected? How to differentiate the sides of the os temporale? What parts of the temporal bone do you know? What is the function of the pyramid? How to differentiate the margins and surfaces of the os temporale? Show and name all the fissures of the temporal bone.

3. What surfaces and borders are distinguished in the squamous part? Which bones is it connected with? What surfaces has the pyramid? Where are they directed? Where is its apex directed? Which bones does the pyramid connect with? Describe the position of the tympanic part. Describe the position of the processus mastoideus, palpate it on your head. What does it consist of? Which bones is it connected with?

4. Describe the relief of facies externa of the temporal bone (the squamous and tympanic parts). What is the function of the porus acousticus externus, meatus acousticus externus? What is the function of the processus zygomaticus? Where is it directed?

5. Describe the relief of the facies interna of the temporal bone. Where is the processus styloideus? What is located between processus styloideus and processus mastoideus? What canal opens in this foramen? Where is the fossa mandibularis, fossa jugularis, fossula petrosa? What are their functions? Show and describe the functions of the tuberculum articulare. Show and describe the functions of the external opening of cochlear canaliculus.

6. Describe the relief of the facies externa and facies interna of the temporal squamous part.

7. Show and describe the facies anterior and facies posterior of the pars petrosa (pyramid). Find the base and apex of the pyramid, its borders. Describe the function of: the trigeminal impression, tegmen tympani, arcuate eminence, internal acoustic porus and meatus (pay attention to the fact that the external and internal acoustic meatuses are not communicated, i. e. do not form a single ca-

nal). Find external opening of vestibular aqueduct. What is its function? Describe the function of: the grooves for the sigmoid and petrosal sinuses, grooves and hiatus for the petrosal nerves.

8. Describe and show the temporal bone canals: origination, termination. What do they contain?

PRACTICAL SKILLS

Ethmoid bone

1. Ethmoidal labyrinths, *labyrinthi ethmoidales*; решетчатый лабиринт.
2. Cribriform plate, *lamina cribrosa*; решетчатая пластинка.
3. Cribriform foramina, *foramina cribrosa*; решетчатые отверстия.
4. Ethmoidal cells, *cellulae ethmoidales*; решетчатые ячейки.
5. Crista galli, *crista galli*; петушиный гребень.
6. Superior nasal concha, *concha nasalis superior*; верхняя носовая раковина.
7. Middle nasal concha, *concha nasalis media*; средняя носовая раковина.
8. Orbital plate, *lamina orbitalis*; глазничная пластинка.
9. Perpendicular plate, *lamina perpendicularis*; перпендикулярная пластинка.

Temporal bone

1. Petrous part, *pars petrosa* (pyramid, *pyramis*); каменистая часть.
2. Tympanic part, *pars tympanica*; барабанная часть.
3. Squamous part, *pars squamosa seu squama*; чешуйчатая часть.
4. Mastoid part, *pars mastoidea*; сосцевидная часть.
5. Apex of petrous part, *apex partis petrosae*; верхушка каменистой части.
6. Trigeminal impression, *impressio trigeminalis*; тройничное вдавление.
7. Arcuate eminence, *eminentia arcuata*; дугообразное возвышение.
8. Petrosquamous fissure, *fissuraa petrosquamosa*; каменисто-чешуйчатая щель.
9. Hiatus for greater petrosal nerve, *hiatus canalis nervi petrosi majoris*; расщелина канала большого каменистого нерва.
10. Hiatus for lesser petrosal nerve, *hiatus canalis nervi petrosi minoris*; расщелина канала малого каменистого нерва.
11. Groove for greater petrosal nerve, *sulcus nervi petrosi majoris*; борозда большого каменистого нерва.
12. Groove for lesser petrosal nerve, *sulcus nervi petrosi minoris*; борозда малого каменистого нерва.

13. Musculotubal canal, *canalis musculotubarius*; мышечно-трубный канал.

14. Tegmen tympani, *tegmen tympani*; барабанная полость.

15. Internal acoustic opening, *porus acusticus internus*; внутреннее слуховое отверстие.

16. Internal acoustic meatus, *meatus acusticus internus*; внутренний слуховой проход.

17. Subarcuate fossa, *fossa subarcuata*; поддуговая ямка.

18. External opening of vestibular aqueduct, *apertura externa aqueductus vestibuli*; наружная апертура водопровода преддверия.

19. External opening of cochlear canaliculus, *apertura externa canaliculi cochleae*; наружная апертура канальца улитки.

20. Jugular fossa, *fossa jugularis*; яремная ямка.

21. External opening of carotid canal, *apertura externa canalis carotici*; наружное отверстие сонного канала.

22. Internal opening of carotid canal, *apertura interna canalis carotici*; внутреннее отверстие сонного канала.

23. Petrosal fossula, *fossula petrosa*; каменистая ямочка.

24. Stylomastoid foramen, *foramen stylomastoideum*; шилососцевидное отверстие.

25. Styloid process, *processus styloideus*; шиловидный отросток.

26. Mastoid process, *processus mastoideus*; сосцевидный отросток.

27. Mastoid notch, *incisura mastoidea*; сосцевидная вырезка.

28. Mastoid cells, *cellulae mastoideae*; сосцевидные ячейки.

29. External acoustic opening, *porus acusticus externus*; наружное слуховое отверстие.

30. External acoustic meatus, *meatus acusticus externus*; наружный слуховой проход.

31. Groove for sigmoid sinus, *sulcus sinus sigmoidei*; борозда сигмовидного синуса.

32. Tympanomastoid fissure, *fissura tympanomastoidea*; барабанно-сосцевидная щель.

33. Tympanosquamous fissure, *fissura tympanosquamosa*; барабанно-чешуйчатая щель.

34. Groove for occipital artery, *sulcus arteriae occipitalis*; борозда затылочной артерии.

35. Petrotympaanic fissure, *fissura petrotympanica*; каменисто-барабанная щель.

36. Parietal notch, *incisura parietalis*; теменная вырезка.

37. Mastoid foramen, *foramen mastoideum*; сосцевидное отверстие.

38. Zygomatic process, *processus zygomaticus*; скуловой отросток.

39. Groove for superior petrosal sinus, *sulcus sinus petrosi superioris*; борозда верхнего каменистого синуса.

40. Groove for inferior petrosal sinus, *sulcus sinus petrosi inferioris*; борозда нижнего каменистого синуса.

41. Mandibular fossa, *fossa mandibularis*; нижнечелюстная ямка.

42. Articular tubercle, *tuberculum articulare*; суставной бугорок.

X-ray

Ethmoid bone

1. Ethmoidal labyrinths, *labyrinthi ethmoidales*; решетчатый лабиринт.

2. Superior nasal concha, *concha nasalis superior*; верхняя носовая раковина.

3. Middle nasal concha, *concha nasalis media*; средняя носовая раковина.

Temporal bone

1. Mastoid process, *processus mastoideus*; сосцевидный отросток.

2. External acoustic opening, *porus acusticus externus*; наружное слуховое отверстие.

3. Mastoid cells, *cellulae mastoideae*; сосцевидные ячейки.

4. Mandibular fossa, *fossa mandibularis*; нижнечелюстная ямка.

Articular tubercle, *tuberculum articulare,* суставной бугорок.

Literature

1. *Human* anatomy : 2 vol. / M. Prives, N. Lysenkov, V. Bushkovich. — 3d ed. — Moscow : Mir Publishers, 1989. — Vol. 1 : The weight-bearing and locomotor system. The science of the viscera. The science of the organs of internal secretion. — 3d ed. — 608 p. ill. (P. 165—175).

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6. *Lecture* material.

Topic 3

THE STRUCTURE OF THE FACIAL SKULL BONES. CONNECTIONS OF SKULL BONES. TEMPOROMANDIBULAR JOINT

INTRODUCTION TO THE TOPIC

To perform the plastic surgery on the face, to treat the diseases of the pneumatic sinuses and traumatic injuries of the brain it is important to know the anatomy of facial bones. The students should know the anatomy of the skull bones connections to study the nervous and vascular systems because the vessels and nerves supplying the vital organs, pass through different formations of the skull bones. To know these structures is needed in the work of neurologists, dentists, ENT specialists and other physicians.

Before studying the topic, you should know:

1. The general structure of the skull.
2. The general structure of the skull bones.
3. The location of the bones composing calvaria

SELF-STUDY GOALS

After independently studying the topic, the student should know: the structure of the facial bones, types of ossification; to palpate protruding parts of the skull on a living person; be able to distinguish the details of the structure of bones on radiographs; know the connections of the skull bones, the anatomy of the temporomandibular joint, its characteristics and the movements that are possible in this joint.

TOPIC CONTENT

- Upper jaw: body (sinus, relief of surfaces — anterior, infratemporal, nasal, orbital), processes (frontal, alveolar, palatine, zygomatic).
- Palatine bone: horizontal plate, perpendicular plate, processes, fossa, canal.
- Inferior turbinate bone.
- Nasal bone.

• Lacrimal bone.

• Vomer.

• Zygomatic bone: processes (frontal, temporal, maxillary), surfaces (lateral, posterior, orbital).

• Lower jaw: body (alveolar arch, base, mental eminence), ramus, angle, processes (coronoid, condylar), tuberosity, tubercles, notch, fossa digastrica, mylohyoid groove and line, canal.

• Hyoid bone: horns, body.

• Connections of the skull bones: serrate, squamous and plane suture; petro-occipital, sphenoid-petrosal and spheno-occipital synchondroses. Study permanent (coronal, sagittal, lambdoid sutures), non-permanent sutures (metopic suture). Fontanelles.

• Anatomy of the temporomandibular joint. Articular surfaces: caput mandibulae of the mandibular condylar process and the fossa mandibularis of the temporal bone. The articular capsule is attached along the edge of the fossa mandibularis of the os temporale, along the fissure petrotympanica, including the articular tubercle and covers the collum mandibulae. Additional structures: discus articularis. Study the characteristics of the joint: combined, condylar (a type of ellipsoidal), multiaxial (due to intra-articular disc): three directions — lowering and raising the lower jaw, shifting it forward and backward, lateral movements. Ligaments of the joint: ligamentum laterale (from the zygomatic process of the temporal bone to the neck of the mandible), ligamentum sphenomandibulare and stylomandibulare (the last two are artificially isolated areas of fascia).

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE MATERIAL

Activity	Step Description
Read the introduction to the topic and self-study goals	—
Study the corresponding section in literature sources and find the corresponding bone preparations	—
Determine the functional purpose of the bone, imagine its location among other bones of the skull	Which part of the skull does this bone belong to? Functions: support, protection, connection with the brain and sensory organs
Read the relevant paragraph in the textbook, and identify the bone features on the bone preparation	Demonstrate each bone detail found in the textbook with a pointer. Use the list of the practical skills

The end of Table

Activity	Step Description
Revise the studied material while showing bone formations on the preparations	When revising orally, check the following: a) English and Latin names of the bone; b) location of the bone in the skull; c) type of bone (spongy, mixed, pneumatic, flat); d) participation in the formation of cavities; e) main parts of the bone; f) anatomical formations of each part of the surface, processes, ridges, grooves, etc.; g) radiography of the bone; h) stages and timing of ossification
Write down new Latin terms	Write the terms in your notebook (see the list of Practical skills)
Find specific features to determine which side (right or left) of the bone it is. Determine which side of the bone you are studying	Identify the edges, angles, processes, bone tubercles. Find out which of them are located medially and laterally
Determine the details of the bone that can be felt on a live person. Find them on your body	Bone projections lying superficially under the skin can be felt on a live person
Check your knowledge with self-control questions	Answer the questions given in the assignment

QUESTIONS FOR SELF-CONTROL

1. Name all the facial bones. Find and show each of them in the whole skull.

2. Describe the anatomy of the maxilla. Is it paired or unpaired bone? With which bones is the maxilla connected? What parts does the maxilla have? How to differentiate the surfaces of the maxillary body? What processes of the upper jaw do you know? Which bones is the maxilla connected with? Describe relief of each maxillary body surface. Where is the maxillary sinus located? What is its second name? Describe its walls, relations and capacity. How does it open into the nasal cavity? Where is projection of the maxillary sinus onto the face? What parts of the upper jaw participate in the formation of the oral cavity, orbital cavity, nasal cavity? Where is the nasolacrimal canal, infraorbital canal? What are the functions of the upper jaw canals, grooves, notches, crests? Describe the relief of the all maxillary processes.

3. Describe the localization of the lower jaw. Is it paired or unpaired bone? What bone is it connected with? What divisions of the mandible do you know? Describe the relief of the mandibular body. To which parts of the mandible are the muscles attached? What is the function of the mandibular canal? Where is its beginning and end? What are the functions of the lower jaw processes, groove, notch, lines, tuberosity, fossa?

4. Describe the position of the nasal bone. Is it paired or unpaired bone? What bones are they connected with?

5. Show the localization of the os lacrimale. Describe the relief of the lacrimal bone. What bones adjoin the lacrimal bone?

6. Describe the position of the os palatinum. What bones is it connected with? What parts of the os palatinum do you know? What is the function of the lamina perpendicularis and the lamina horizontalis? Which bones are they connected with? What are the functions of the palatine bone processes, grooves, crests, notch? How is the sphenopalatine foramen formed? Where does it lead?

7. Describe the position of the hyoid bone. Describe its parts and function.

8. Describe the position of the vomer. What bones does it connect with? Describe its function.

9. Describe the position of the concha nasalis inferior. What bones does it connect with? Describe its function.

10. What types of the joints connect the skull bones? Which bones are connected by syndesmosis, synchondrosis, synostosis, diarthrosis? Describe the age changes of the skull bone articulations.

11. Describe the temporomandibular joint according to the joint classifications. What parts of the os temporale and of mandible articulate form this joint? What accessory structure does it have? What movements occur in the joint? What ligaments reinforce it?

PRACTICAL SKILLS

Maxilla

1. Body, *corpus maxillae*; тело верхней челюсти.
2. Frontal process, *processus frontalis*; лобный отросток.
3. Zygomatic process, *processus zygomaticus*; скуловой отросток.
4. Alveolar process, *processus alveolaris*; альвеолярный отросток.
5. Palatine process, *processus palatinus*; нёбный отросток.
6. Maxillary sinus, *sinus maxillaris*; гайморова пазуха.
7. Maxillary hiatus, *hiatus maxillaris*; верхнечелюстная расщелина.
8. Anterior surface, *facies anterior*; передняя поверхность.

9. Infratemporal surface, *facies infratemporalis*; подвисочная поверхность.
10. Orbital surface, *facies orbitalis*; глазничная поверхность.
11. Nasal surface, *facies nasalis*; носовая поверхность.
12. Canine fossa, *fossa canina*; клыковая ямка.
13. Nasal notch, *incisura nasalis*; носовая вырезка.
14. Anterior nasal spine, *spina nasalis anterior*; передняя носовая ость.
15. Alveolar arch, *arcus alveolaris*; альвеолярная дуга.
16. Dental alveoli, *alveoli dentales*; зубные альвеолы.
17. Alveolar yokes, *juga alveolaria*; альвеолярные возвышения.
18. Infraorbital margin, *margo infraorbitalis*; подглазничный край.
19. Infraorbital foramen, *foramen infraorbitale*; подглазничное отверстие.
20. Maxillary tuberosity, *tuber maxillae*; верхнечелюстной бугор.
21. Greater palatine groove, *sulcus palatinus major*; большая нёбная борозда.
22. Infraorbital canal, *canalis infraorbitalis*; подглазничный канал.
23. Lacrimal groove, *sulcus lacrimalis*; слезная борозда.
24. Conchal crest, *crista conchalis*; гребень раковины.
25. Anterior lacrimal crest, *crista lacrimalis anterior*; передний слезный гребень.
26. Ethmoidal crest, *crista ethmoidalis*; решетчатый гребень.

Palatine bone

1. Horizontal plate, *lamina horizontalis*; горизонтальная пластинка.
2. Perpendicular plate, *lamina perpendicularis*; перпендикулярная пластинка.
3. Greater palatine groove, *sulcus palatinus major*; большая небная борозда.
4. Conchal crest, *crista conchalis*; гребень раковины.
5. Ethmoidal crest, *crista ethmoidalis*; решетчатый гребень.
6. Pyramidal process, *processus pyramidalis*; пирамидальный отросток.
7. Orbital process, *processus orbitaalis*; глазничный отросток.
8. Sphenoidal process, *processus sphenoidalis*; клиновидный отросток.
9. Sphenopalatine notch, *incisura sphenopalatina*; клиновидно-нёбная вырезка.

Zygomatic bone

1. Infraorbital margin, *margo infraorbitalis*; подглазничный край.
2. Lateral surface, *facies lateralis*; латеральная поверхность.
3. Temporal surface, *facies temporalis*; височная поверхность.

4. Orbital surface, *facies orbitalis*; глазничная поверхность.

5. Zygomaticoorbital foramen, *foramen zygomaticoorbitale*; скулоглазничное отверстие.

6. Zygomaticofacial foramen, *foramen zygomaticofaciale*; скулолицевое отверстие.

7. Zygomaticotemporal foramen, *foramen zygomaticotemporale*; скуловисочное отрвестие.

8. Temporal process, *processus temporalis*; височный отросток.

9. Frontal process, *processus frontalis*; лобный отросток.

Lacrimal bone

1. Posterior lacrimal crest, *crista lacrimalis posterior*; задний слезный гребень.

2. Lacrimal hamulus, *hamulus lacrimalis*; слезный крючок.

3. Lacrimal groove, *sulcus lacrimalis*; слезная борозда.

Mandible

1. Body of mandible, *corpus mandibulae*; тело нижней челюсти.

2. Ramus of mandible, *ramus mandibulae*; ветвь нижней челюсти.

3. Dental alveoli, *alveoli dentales*; зубные альвеолы.

4. Alveolar arch, a*rcus alveolaris*; альвеолярная дуга.

5. Interalveolar septa, *septa interalveolaria*; межальвеолярные перегородки.

6. Mental spine, *spina mentalis*; подбородочная ость.

7. Sublingual fossa, *fovea sublingualis*; подъязычная ямка.

8. Digastric fossa, *fossa digastrica*; двубрюшная ямка.

9. Mental protuberance, *protuberantia mentalis*; подбородочный выступ.

10. Mental tubercle, *tuberculum mentale*; подбородочный бугорок.

11. Masseteric tuberosity, *tuberositas masseterica*; жевательный бугор.

12. Pterygoid tuberosity, *tuberositas pterygoidea*; крыловидная бугристость.

13. Mental foramen, *foramen mentale*; подбородочное отверстие.

14. Mylohyoid line, *linea mylohyoidea*; челюстно-подъязычная линия.

15. Submandibular fossa, *fovea submandibularis*; подчелюстная ямка.

16. Mandibular foramen, *foramen mandibulae*; нижнечелюстное отверстие.

17. Lingula of mandible, *lingula mandibulae*; язычок нижней челюсти.

18. Mandibular notch, *incisura mandibulae*; нижнечелюстная вырезка.

19. Coronoid process, *processus coronoideus*; венечный отросток.
20. Condylar process, *processus condylaris*; мыщелковый отросток.
21. Buccinator crest, *crista buccinatoria*; щечный гребень.
22. Head of mandible, *caput mandibulae*; головка нижней челюсти.
23. Neck of mandible, *collum mandibulaae*; шейка нижней челюсти.
24. Pterygoid fovea, *fovea pterygoidea*; крыловидная ямочка.

Hyoid bone

1. Body, *corpus*; тело.
2. Greater horns, *cornua majora*; большие рога.
3. Lesser horns, *cornua minora*; малые рога.

Skull connections

1. Saggital suture, *sutura sagittalis*; сагиттальный шов.
2. Lambdoid suture, *sutura lambdoidea*; ламбдовидный шов.
3. Temporomandibular joint, *articulatio temporomandibularis*; височно-нижнечелюстной сустав.

X-ray

1. Body of maxilla, *corpus maxillae*; тело верхней челюсти.
2. Maxillary sinus, *sinus maxillaris*; верхнечелюстная пазуха.
3. Zygomatic bone, *os zygomaticum*; скуловая кость.
4. Head of mandible, *caput mandibulae*; головка нижней челюсти.
5. Ramus of mandible, *ramus mandibulae*; ветвь нижней челюсти.
6. Mental protuberance, *protuberantia mentalis*; подбородочный выступ.
7. Neck of mandible, *collum mandibulae*; шейка нижней челюсти.
8. Body of mandible, *corpus mandibulae*; тело нижней челюсти.
9. Coronoid process, *processus coronoideus*; венечный отросток.
10. Condylar process, *processus condylaris*; мыщелковый отросток.
11. Hyoid bone, *os hyoideum*; подъязычная кость.
12. Coronal suture, *sutura coronalis*; венечный шов.
13. Lambdoid suture, *sutura lambdoidea*; ламбдовидный шов.
14. Temporomandibular joint, *articulatio temporomandibularis*; височно-нижнечелюстной сустав.

Literature

1. *Human* anatomy : 2 vol. / M. Prives, N. Lysenkov, V. Bushkovich. — 3^{d} ed. — Moscow : Mir Publishers, 1989. — Vol. 1 : The weight-bearing and locomotor system. The science of the viscera. The science of the organs of internal secretion. — 3^{d} ed. — 608 p. ill. (P. 179—192).

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6. *Lecture* material.

Topic 4

THE STRUCTURE OF THE WHOLE SKULL (INTERNAL AND EXTERNAL BASE OF THE SKULL, NASAL CAVITY, ORBIT, PTERYGOPALATINE FOSSA, TEMPORAL AND INFRATEMPORAL FOSSAE). AGE AND SEX CHARACTERISTICS OF THE SKULL

INTRODUCTION TO THE TOPIC

The students should know the anatomy of the whole skull to study the head muscles, nasal cavity, sensory organs, nervous and vascular systems because the vessels and nerves supplying the vital organs pass through different formations of the skull bones. To know these structures is needed in the work of neurologists, ENT specialists, optometrists and other physicians.

Before studying the topic, you should know:

1. The location of all the skull bones.
2. The structure of the skull bones.

SELF-STUDY GOALS

After independently studying the topic, the student should know the anatomical structure of the whole skull, be able to find individual formations on the skull and know their functional significance; name in English and Latin the anatomical formations that make up the walls of the nasal cavity and orbit and show them.

TOPIC CONTENT

- Internal base of the skull (anterior, middle and posterior cranial fossae): borderlines, formations, communications.
- External base of the skull (anterior, middle and posterior divisions): borderlines, formations, communications.
- Temporal fossa (borders, walls, communications).
- Infratemporal fossa (walls, communications).

- Pterygopalatine fossa (walls, communications).
- The orbit (its walls, formations, communications).
- Nasal cavity. Anatomy of the lateral wall: nasal bone, frontal process of the maxilla, nasal surface of the maxillary body, os lacrimale, labyrinth of the ethmoid bone, inferior turbinate bone, lamina perpendicularis of the palatine bone, lamina medialis of the pterygoid process of the sphenoid bone.
- Medial nasal wall (septum nasi): spina nasalis of the frontal bone, lamina perpendicularis of the ethmoid bone, vomer, nasal crest of the maxilla and the palatine bone, rostrum sphenoidale.
- The structure of the roof of the nasal cavity: the cribriform plate of the ethmoid bone, the nasal part of the frontal bone, the body of the sphenoid bone.
- The structure of the nasal cavity floor (palatum durum): processus palatinus maxillae, lamina horizontalis ossis palatini.
- Anatomical formations of the nasal cavity: superior, middle and inferior nasal conchae; common nasal meatus, posterior nasal meatus, the superior nasal meatus (the sphenoid sinus, the sphenopalatine foramen communicaates with it, and the posterior ethmoid air cells open here). The anterior and middle groups of the ethmoid air cells, the maaxillary sinus, the frontal sinus communicate with the middle nasal meatus. Inferior nasal meatus: the nasolacrimal duct, incisive canal open here.
- Age and sex characteristics of the skull.

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE MATERIAL

Activity	Step Description
Read the introduction to the topic and self-study goals	—
Study the corresponding section in literature sources and find the corresponding bone preparations	—
Determine the functional purpose of the cavity, define its location among other bones of the skull	Which part of the skull does the cavity belong to? Functions: support, protection, connection with the brain and sensory organs
Read the relevant paragraph in the textbook, and identify the bone features on the bone preparation	Demonstrate each bone detail found in the textbook with a pointer. Use the list of the practical skills

The end of Table

Activity	Step Description
Revise the studied material while showing bone formations on the preparations	When revising, check the following: a) English and Latin names of the fossa, cavity; b) location in the skull; c) boundaries of cavities and fossae. d) walls of cavity (fossa), their forming structures; e) openings and communications
Write down new Latin terms	Write the terms in your notebook (see the list of Practical skills)
Determine the details of the bone that can be felt on a live person. Find them on your body	Bone projections lying superficially under the skin can be felt on a live person
Check your knowledge with self-control questions	Answer the questions given in the assignment

QUESTIONS FOR SELF-CONTROL

1. Name all the structures, divisions, foramens, canals of the external skull base.
2. Show the cranial fossae of the internal base of the skull. What do they contain?
3. Explain the structures of the boundaries between the anterior and middle cranial fossa.
4. Which bones and what their structures form the anterior cranial fossa? Enumerate its openings and their communications. What cranial cavities is the anterior cranial fossa connected with?
5. Which bones and what their structures form the middle cranial fossa? Name its openings. Where do they lead? What cranial cavities is the middle cranial fossa connected with?
6. Explain the structures of the boundaries between the middle and posterior cranial fossa.
7. Which bones and what their structures form the posterior cranial fossa? Name its openings. Where do they lead?
8. Which walls does the bony nasal cavity have?
9. What opens into the nasal cavity? What openings form the exit from the nasal cavity? Where do they lead?
10. What bones and their structures form the superior wall of the nasal cavity?

11. What bones and their structures form the lateral wall of the nasal cavity?
12. What bones and their structures form the inferior wall of the nasal cavity?
13. What bones and their structures form the nasal septum?
14. Explain the position of the nasal conchae and nasal meatuses.
15. Describe the boundaries of each nasal meatus. What cranial cavities open into each meatus?
16. What is the common nasal meatus?
17. How many walls does the orbital cavity have?
18. What bones and their structures form the superior, middle, lateral and inferior orbital walls?
19. Name the openings of the orbit. Where do they lead? What cranial cavities is the orbit connected with?
20. Describe the location of the pterygopalatine fossa. What does it contain? How are its walls formed? Describe its communications.
21. Describe the location of the temporal fossa. How is it formed? What does it contain?
22. Describe the location of the infratemporal fossa. How is it formed? What does it contain?
23. Explain age and sex characteristics of the skull.

PRACTICAL SKILLS

1. Anterior cranial fossa, *fossa cranii anterior*; передняя черепная ямка.
2. Middle cranial fossa, *fossa cranii media*; срединная черепная ямка.
3. Posterior cranial fossa, *fossa cranii posterior*; задняя черепная ямка.
4. Orbit (superior, middle, inferior, lateral walls); глазница (верхняя, средняя, нижняя, боковые стенки).
5. Nasal cavity (superior, lateral, inferior walls, nasal septum); носовая полость (верхняя, латеральная, нижняя стенки, носовая перегородка).
6. Nasal meatus (superior, middle, inferior, common); носовой ход (верхний, средний, нижний, общий).
7. Incisive canal, *canalis incisivus*; резцовый канал.
8. External base of skull, *basis cranii externa*; наружное основание черепа.
9. Jugular foramen, *foramen jugulare*; яремное отверстие.
10. Internal base of skull, *basis cranii interna*; внутреннее основание черепа.
11. Foramen caecum, *foramen caecum*; слепое отверстие языка.
12. Foramen lacerum, *foramen lacerum*; рваное отверстие.
13. Piriform aperture, *apertura piriformis*; грушевидное отверстие.
14. Fossa for lacrimal sac, *fossa sacci lacrimalis*; ямка слезного мешка.
15. Coronal suture, *sutura coronalis*; венечный шов.

16. Sagittal suture, *sutura sagittalis*; сагиттальный шов.

17. Lambdoid suture, *sutura lambdoidea*; ламбдовидный шов.

18. Temporomandibular joint, *articulatio temporomandibularis*; височно-нижнечелюстной сустав.

X-ray

1. Orbit (superior, middle, inferior, lateral walls); глазница (верхняя, средняя, нижняя, боковые стенки).

2. Nasal meatus (superior, middle, inferior, common); носовой ход (верхний, средний, нижний, общий).

3. Piriform aperture, *apertura piriformis*; грушевидное отверстие.

4. Coronal suture, *sutura coronalis*; венечный шов.

5. Lambdoid suture, *sutura lambdoidea*; ламбдовидный шов.

6. Temporomandibular joint, *articulatio temporomandibularis*; височно-нижнечелюстной сустав.

Literature

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5. *Atlas* of Human Anatomy / Frank H. Netter. — 6th ed. — Philadelphia : Elsevier, 2014. — 531 p.: ill.

6. *Lecture* material.

Topic 5
MAJOR CONTROL: CRANIOLOGY

INTRODUCTION TO THE TOPIC

This lesson is aimed at generalizing the studied material and revising it. It allows the student to go through the key points of the craniology once again and fix them.

SELF-STUDY GOALS

After revision of the topic material, the student should be able to do computer major test on LMS; identify individual bones and their structures on the skull and the radiographs. Student should know: formation of the main skull cavities, their communication and significance; the types of skull bones articulation.

TOPIC CONTENT

REVISE:

- The structure of all the bones of the skull in accordance with the plan (see the table below).
- Description and characteristics of all the skull cavities according with the plan (see the table below).
- All Latin terms (see the list of practical skills).
- Sutures, fontanelles, synchondrosis, temporomandibular joint.
- Gender, race and age characteristics of the skull (lecture material).
- Development of the skull, developmental anomalies (lecture material).
- Description of skull radiographs (see the list of X-Ray skills: Topic 1—4).

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE MATERIAL

Activity	Step Description
Read the introduction to the topic and self-study goals	—
Study the corresponding section in literature sources and find the corresponding bone preparations	—

The end of Table

Activity	Step Description
Determine the functional purpose of the bone, imagine its location among other bones of the skull	When revising the material on bones, check the following: a) English and Latin names of the bone; b) location of the bone in the skull; c) type of bone (spongy, mixed, pneumatic, flat); d) participation in the formation of cavities; e) main parts of the bone; f) anatomical formations of each part of the surface, processes, ridges, grooves, etc.; g) radiography of the bone; h) stages and timing of ossification. When revising the material on skull as a whole, check the following: a) English and Latin names of the fossa, cavity, bony connection; b) location in the skull; c) boundaries of cavities and fossae; d) walls of cavity (fossa), their structures; e) openings and communications
Revise Latin terms	Use the material that is regularly assigned to classes
Revise the description of the X-ray images of individual bones and the whole skull	It is necessary to specify the projection in which the X-ray is made. Name in English and Latin the anatomical structures that are visualized in the film and show them
Check your knowledge with self-control questions	Answer the questions given in the assignment

QUESTIONS FOR MAJOR CRANIOLOGY

1. The structure of the external skull base: which bones form the external base? Which openings can be found on the external base? Describe the bony structures visible on the external skull base.

2. The structure of the internal skull base: Which bones form the internal base? Which fossae are distinguished here? Which openings can be found in the internal base? Describe the bony structures visible on the internal skull base.

3. Which bones (and which parts of these bones) form the anterior cranial fossa? Describe the content, borderlines, openings and communications of the fossa cranii anterior.

4. Which bones (and which parts of these bones) form the fossa cranii media? Describe the content, borderlines, openings and communications of the fossa cranii media.

5. Which bones (and which parts of these bones) form the fossa cranii posterior? Describe the content, borderlines, openings and communications of the fossa cranii posterior.

6. Describe the structure of the orbit: what walls are distinguished in the orbit? Describe the openings and communications of the obit.

7. Describe the orbital walls: which bones form the superior wall; lateral wall, medial wall and inferior wall?

8. Describe the bony nasal cavity: what walls are distinguished in the nasal cavity? What cavities drain into the nasal cavity? What openings lead from the cavitas nasalis to another cavities of the skull?

9. What bones (and which parts of these bones) form the floor and roof of the cavitas nasalis?

10. What bones and their parts form the medial nasal wall (septum nasi)?

11. Describe the structure of the lateral nasal wall.

12. Describe the borders of the superior nasal meatus and its communications.

13. Describe the borders of the middle nasal meatus and its communications.

14. Describe the borders of the inferior nasal meatus and its communication.

15. Describe the walls and relations of the maxillary sinus. Where does it open?

16. Describe the walls and relations of the frontal sinus. Where does it open?

17. Describe the walls and relations of the sphenoidal sinus. Where does it open?

18. Describe the ethmoidal labyrinth: location and relations. Where do the ethmoidal cells open?

19. Describe the borderlines of the pterygopalatine fossa.

20. Describe the communications of the pterygopalatine fossa.

21. Describe the borderlines of the temporal fossa, its content and communications.

22. Describe the borderlines of the infratemporal fossa, its content and communications.

23. Describe the connections of the skull bones: what sutures and synchondroses connect the bones of the neurocranium?

24. Describe the fontanelles: names, location and function. When do they disappear?

25. Describe the temporomandibular joint according to the joint classifications.

PRACTICAL PART FOR MAJOR SKULL

Frontal bone

1. Squamos part, *squama frontalis*; лобная чешуя.
2. Orbital part, *partes orbitalis*; глазничная часть.
3. Nasal part, *pars nasalis*; носовая часть.
4. Frontal tuber, *tuber frontale*; лобный бугор.
5. Supraorbital margin, *margo supraorbitalis*; надглазничный край.
6. Zygomatic process, *processus zygomaticus*; скуловой отросток.
7. Supraorbital notch, *incisura supraorbitalis* (supraorbital foramen, *foramen supraorbitale*); надглазничная вырезка (надглазничное отверстие).
8. Temporal line, *linea temporalis*; височная линия.
9. Superciliary arch, a*rcus superciliaris*; надбровная дуга.
10. Temporal surface, *facies temporalis*; височная поверхность.
11. Glabella, *glabella*; надпереносье.
12. Frontal crest, *crista frontalis*; лобный гребень.
13. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.
14. Cerebral surface of orbital part, *facies cerebralis*; мозговая поверхность.
15. Orbital surface of orbital part, *facies orbitalis*; глазничная поверхность.
16. Fossa for lacrimal gland, *fossa glandulae lacrimalis*; ямка слезной железы.
17. Trochlear fovea, *fovea trochlearis*; блоковая ямка.
18. Trochlear spine, *spina trochlearis*; блоковая ость.
19. Ethmoidal notch, *incisura ethmoidalis*; решетчатая вырезка.
20. Nasal spine, *spina nasalis*; носовая ость.
21. Frontal sinus, *sinus frontalis*; лобная пазуха.

Occipital bone

22. Foramen magnum, *foramen magnum*; большое отверстие.
23. Basilar part, *pars basilaris*; базилярная часть.
24. Lateral parts, *partes laterals*; латеральная / боковая часть.
25. Squamous part, *squama occipitalis*; затылочная чешуя.
26. Occipital condyle, *condylus occipitalis*; затылочный мыщелок.

27. Pharyngeal tubercle, *tuberculum pharyngeum*; глоточный бугорок.

28. Groove for sigmoid sinus, *sulcus sinus sigmoidei*; борозда сигмовидного синуса.

29. Condylar fossa, *fossa condylaris*; мыщелковая ямка.

30. Condylar canal, *canalis condylaris*; мыщелковый канал.

31. Hypoglossal canal, *canalis n. Hypoglossi*; подъязычный канал.

32. Jugular notch, *incisura jugularis*; яремная вырезка.

33. Internal occipital crest, *crisaa occipitalis interna*; внутренний затылочный гребень.

34. Cruciform eminence, *eminentia cruciformis*; крестообразное возвышение.

35. Internal occipital protuberance, *protuberantia occipitalis interna*; внутренний затылочный выступ.

36. Groove for transverse sinus, *sulcus sinus trasversi*; борозда поперечного синуса.

37. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.

38. Highest nuchal line, *linea nucha suprema*; наивысшая выйная линия.

39. External occipital protuberance, *protuberantia occipitalis externa*; наружный затылочный выступ.

40. External occipital crest, *crista occipitalis externa*; наружный затылочный гребень.

41. Superior nuchal line, *linea nucha superior*; верхняя выйная линия.

42. Inferior nuchal line, *linea nucha inferior*; нижняя выйная линия.

Parietal bone

43. Frontal aagle, *angulus frontalis*; лобный угол.

44. Sagittal border, *margo sagittaalis*; сагиттальный край.

45. Frontal border, *margo frontlis*; лобный край.

46. Sphenoidal angle, *angulus sphenoidalis*; клиновидный угол.

47. Squamosal border, *margo squamosus*; чешуйчатый край.

48. Occipital border, *margo occipitalis*; затылочный край.

49. Occipital angle, *angulus occipitalis*; затылочный угол.

50. Groove for superior sagittal sinus, *sulcus sinus sagittalis superioris*; борозда верхнего сагиттального синуса.

51. Mastoid angle, *angulus mastoideus*; сосцевидный угол.

52. Parietal tuber, *tuber parietale*; теменной бугор.

53. Superior temporal line, *linea temporalis superior*; верхняя височная линия.

54. Inferior temporal line, *linea temporalis inferior*; нижняя височная линия.

Sphenoid bone

55. Sella turcica, *sella turcica*; турецкое седло.

56. Body of sphenoid bone, *corpus ossis sphenoidalis*; тело клиновидной кости.

57. Hypophisial fossa, *fossa hypophysialis*; гипофизарная ямка.

58. Prechiasmatic sulcus, *sulcus prechiasmaticus*; предперекрестная борозда.

59. Tuberculum sellae, *tuberculum sellae*; бугорок седла.

60. Dorsum sellae, *dorsum sellae*; спинка седла.

61. Lesser wing, *ala minor*; малое крыло.

62. Anterior clinoid process, *processus clinoideus anterior*; передний наклоненный отросток.

63. Posterior clinoid process, *processus clinoideus posterior*; задний наклоненный отросток.

64. Carotid sulcus, *sulcus caroticus*; сонная борозда.

65. Optic canal, *canalis opticus*; зрительный канал.

66. Infratemporal crest, *crista infratemporalis*; подвисочный гребень.

67. Sphenoidal rostrum, *rostrum sphenoidalis*; клиновидный клюв.

68. Sphenoidal sinus, *sinus sphenoidalis*; клиновидная пазуха.

69. Greater wing, *ala major*; большое крыло.

70. Foramen ovale, *foramen ovale*; овальное отверстие.

71. Foramen rotundum, *foramen rotundum*; круглое отверстие.

72. Foramen spinosum, *foramen spinosum*; остистое отверстие.

73. Superior orbital fissure, *fissura orbitalis superior*; верхняя глазничная щель.

74. Pterygoid canal, *canalis pterygoideus*; крыловидный канал.

75. Pterygoid fossa, *fossaa pterygoida*; крыловидная ямка.

76. Medial and lateral plates of pterygoid process, *lamina medialis et lamina lateralis*; медиальная пластинка и латеральная пластинка крыловидного отростка.

77. Scaphoid fossa, *fossa scaphoidea*; ладьевидная ямка.

78. Pterygoid hamulus, *hamulus pterygoideus*; крыловидный крючок.

79. Maxillary surface of greater wing, *facies maxillaries*; верхнечелюстная поверхность.

80. Cerebral surface of greater wing, *facies cerebralis*; мозговая поверхность.

81. Temporal surface of greater wing, *facies temporalis*; височная поверхность.

82. Orbital surface of greater wing, *facies orbitalis*; глазничная поверхность.

83. Infratemporal surface of greater wing, *facies infratemporalis*; подвисочная поверхность.

Ethmoid bone

84. Ethmoidal labyrinths, *labyrinthi ethmoidales*; решетчатые лабиринты.

85. Cribriform foramina, *foramina cribrosa*; решетчатые отверстия.

86. Perpendicular plate, *lamina perpendicularis*; перпендикулярная пластинка.

87. Ethmoidal cells, *cellulae ethmoidales*; решетчатые ячейки.

88. Orbital plate, *lamina orbitalis*; глазничная пластинка.

89. Superior nasal concha, *concha nasalis superior*; верхняя носовая раковина.

90. Crista galli, *crista galli*; петушиный гребень.

91. Middle nasal concha, *concha nasalis media*; средняя носовая раковина.

92. Cribriform plate, *lamina cribrosa*; решетчатая пластинка.

Temporal bone

93. Petrous part, *pars petrosa* (*pyramid, pyramis*); каменистая часть.

94. Tympanic part, *pars tympanica*; барабанная часть.

95. Squamous part, *pars squamosa seu squama*; чешуйчатая часть.

96. Mastoid part, *pars mastoidea*; сосцевидная часть.

97. Apex of petrous part, *apex partis petrosae*; верхушка каменистой части.

98. Trigeminal impression, *impressio trigeminalis*; тройничное вдавление.

99. Arcuate eminence, *eminentia arcuata*; дугообразное возвышение.

100. Petrosquamous fissure, *fissuraa petrosquamosa*; каменисто-чешуйчатая щель.

101. Hiatus for greater petrosal nerve, *hiatus canalis nervi petrosi majoris*; расщелина канала большого каменистого нерва.

102. Hiatus for lesser petrosal nerve, *hiatus canalis nervi petrosi minoris*; расщелина канала малого каменистого нерва.

103. Groove for greater petrosal nerve, *sulcus nervi petrosi majoris*; борозда большого каменистого нерва.

104. Groove for lesser petrosal nerve, *sulcus nervi petrosi minoris*; борозда малого каменистого нерва.

105. Musculotubal canal, *canalis musculotubarius*; мышечно-трубный канал.

106. Tegmen tympani, *tegmen tympani*; барабанная полость.

107. Internal acoustic opening, *porus acusticus internus*; внутреннее слуховое отверстие.

108. Internal acoustic meatus, *meatus acusticus internus*; внутренний слуховой проход.

109. Subarcuate fossa, *fossa subarcuata*; поддуговая ямка.

110. External opening of vestibular aqueduct, *apertura externa aqueductus vestibuli*; наружная апертура водопровода преддверия.

111. External opening of cochlear canaliculus, *apertura externa canaliculi cochleae*; наружная апертура канальца улитки.

112. Jugular fossa, *fossa jugularis*; яремная ямка.

113. External opening of carotid canal, *apertura externa canalis carotici*; наружное отверстие сонного канала.

114. Internal opening of carotid canal, *apertura interna canalis carotici*; внутреннее отверстие сонного канала.

115. Petrosal fossula, *fossula petrosa*; каменистая ямочка.

116. Stylomastoid foramen, *foramen stylomastoideum*; шилососцевидное отверстие.

117. Styloid process, *processus styloideus*; шиловидный отросток.

118. Mastoid process, *processus mastoideus*; сосцевидный отросток.

119. Mastoid notch, *incisura mastoidea*; сосцевидная вырезка.

120. Mastoid cells, *cellulae mastoideae*; сосцевидные ячейки.

121. External acoustic opening, *porus acusticus externus*; наружное слуховое отверстие.

122. External acoustic meatus, *meatus acusticus externus*; наружный слуховой проход.

123. Groove for sigmoid sinus, *sulcus sinus sigmoidei*; борозда сигмовидного синуса.

124. Tympanomastoid fissure, *fissura tympanomastoidea*; барабанно-сосцевидная щель.

125. Tympanosquamous fissure, *fissura tympanosquamosa*; барабанно-чешуйчатая щель.

126. Groove for occipital artery, *sulcus arteriae occipitalis*; борозда затылочной артерии.

127. Petrotympaanic fissure, *fissura petrotympanica*; каменисто-барабанная щель.

128. Parietal notch, *incisura parietalis*; теменная вырезка.

129. Mastoid foramen, *foramen mastoideum*; сосцевидное отверстие.

130. Zygomatic process, *processus zygomaticus*; скуловой отросток.

131. Groove for superior petrosal sinus, *sulcus sinus petrosi superioris*; борозда верхнего каменистого синуса.

132. Groove for inferior petrosal sinus, *sulcus sinus petrosi inferioris*; борозда нижнего каменистого синуса.

133. Mandibular fossa, *fossa mandibularis*; нижнечелюстная ямка.

134. Articular tubercle, *tuberculum articulare*; суставной бугорок.

Maxilla

135. Body of maxilla, *corpus maxillae*; тело верхней челюсти.
136. Frontal process, *processus frontalis*; лобный отросток.
137. Zygomatic process, *processus zygomaticus*; скуловой отросток.
138. Alveolar process, *processus alveolaris*; альвеолярный отросток.
139. Palatine process, *processus palatinus*; нёбный отросток.
140. Maxillary sinus, *sinus maxillaris*; гайморова пазуха.
141. Maxillary hiatus, *hiatus maxillaris*; верхнечелюстная расщелина.
142. Anterior surface, *facies anterior*; передняя поверхность.
143. Infratemporal surface, *facies infratemporalis*; подвисочная поверхность.
144. Orbital surface, *facies orbitalis*; глазничная поверхность.
145. Nasal surface, *facies nasalis*; носовая поверхность.
146. Canine fossa, *fossa canina*; клыковая ямка.
147. Nasal notch, *incisura nasalis*; носовая вырезка.
148. Anterior nasal spine, *spina nasalis anterior*; передняя носовая ость.
149. Alveolar arch, *arcus alveolaris*; альвеолярная дуга.
150. Dental alveoli, *alveoli dentales*; зубные альвеолы.
151. Alveolar yokes, *juga alveolaria*; альвеолярные возвышения.
152. Infraorbital margin, *margo infraorbitalis*; подглазничный край.
153. Infraorbital foramen, *foramen infraorbitale*; подглазничное отверстие.
154. Maxillary tuberosity, *tuber maxillae*; верхнечелюстной бугор.
155. Greater palatine groove, *sulcus palatinus major*; большая нёбная борозда.
156. Infraorbital canal, *canalis infraorbitalis*; подглазничный канал.
157. Lacrimal groove, *sulcus lacrimalis*; слезная борозда.
158. Conchal crest, *crista conchalis*; гребень раковины.
159. Anterior lacrimal crest, *crista lacrimalis anterior*; передний слезный гребень.
160. Ethmoidal crest, *crista ethmoidalis*; решетчатый гребень.

Palatine bone

161. Horizontal plate, *lamina horizontalis*; горизонтальная пластинка.
162. Perpendicular plate, *lamina perpendicularis*; перпендикулярная пластинка.
163. Greater palatine groove, *sulcus palatinus major*; большая небная борозда.

164. Conchal crest, *crista conchalis*; гребень раковины.

165. Ethmoidal crest, *crista ethmoidalis*; решетчатый гребень.

166. Pyramidal process, *processus pyramidalis*; пирамидальный отросток.

167. Orbital process, *processus orbitaalis*; глазничный отросток.

168. Sphenoidal process, *processus sphenoidalis*; клиновидный отросток.

169. Sphenopalatine notch, *incisura sphenopalatina*; клиновидно-нёбная вырезка.

Zygomatic bone

170. Infraorbital margin, *margo infraorbitalis*; подглазничный край.

171. Lateral surface, *facies lateralis*; латеральная поверхность.

172. Temporal surface, *facies temporalis*; височная поверхность.

173. Temporal process, *processus temporalis*; височный отросток.

174. Orbital surface, *facies orbitalis*; глазничная поверхность.

175. Zygomaticoorbital foramen, *foramen zygomaticoorbitale*; скулоглазничное отверстие.

176. Zygomaticofacial fooramen, *foramen zygomaticofaciale*; скулолицевое отверстие.

177. Frontal process, *processus frontalis*; лобный отросток.

178. Zygomaticotemporal foramen, *foramen zygomaticotemporale*; скуловисочное отрвестие.

Lacrimal bone

179. Posterior lacrimal crest, *crista lacrimalis posterior*; задний слезный гребень.

180. Lacrimal hamulus, *hamulus lacrimalis*; слезный крючок.

181. Lacrimal groove, *sulcus lacrimalis*; слезная борозда.

Mandible

182. Body of mandible, *corpus mandibulae*; тело нижней челюсти.

183. Ramus of mandible, *ramus mandibulae*; ветвь нижней челюсти.

184. Dental alveoli, *alveoli dentales*; зубные альвеолы.

185. Alveolar arch, a*rcus alveolaris*; альвеолярная дуга.

186. Interalveolar septa, *septa interalveolaria*; межальвеолярные перегородки.

187. Mental spine, *spina mentalis*; подбородочная ость.

188. Sublingual fossa, *fovea sublingualis*; подъязычная ямка.

189. Digastric fossa, *fossa digastrica*; двубрюшная ямка.

190. Mental protuberance, *protuberantia mentalis*; подбородочный выступ.
191. Mental tubercle, *tuberculum mentale*; подбородочный бугорок.
192. Masseteric tuberosity, *tuberositas masseterica*; жевательный бугор.
193. Pterygoid tuberosity, *tuberositas pterygoidea*; крыловидная бугристость.
194. Mental foramen, *foramen mentale*; подбородочное отверстие.
195. Mylohyoid line, *linea mylohyoidea*; челюстно- подъязычная линия.
196. Submandibular fossa, *fovea submandibularis*; подчелюстная ямка.
197. Mandibular foramen, *foramen mandibulae*; нижнечелюстное отверстие.
198. Lingula of mandible, *lingula mandibulae*; язычок нижней челюсти.
199. Mandibular notch, *incisura mandibulae*; нижнечелюстная вырезка.
200. Coronoid process, *processus coronoideus*; венечный отросток.
201. Condylar process, *processus condylaris*; мыщелковый отросток.
202. Buccinator crest, *crista buccinatoria*; щечный гребень.
203. Head of mandible, *caput mandibulae*; головка нижней челюсти.
204. Neck of mandible, *collum mandibulaae*; шейка нижней челюсти.
205. Pterygoid fovea, *fovea pterygoidea*; крыловидная ямка.

Hyoid bone

206. Body, *corpus,* тело;
207. Greater horns, *cornua majora*; большие рога.
208. Lesser horns, *cornua minora*; малые рога.

Whole skull

209. Foramen caecum, *foramen caecum*; слепое отверстие.
210. Piriform aperture, *apertura piriformis*; грушевидное отверстие.
211. Jugular foramen, *foramen jugulare*; яремное отверстие.
212. Fossa for lacrimal sac, *fossa sacci lacrimalis*; ямка слезного мешка.
213. Incisive canal, *canalis incisivus*; *резцовый канал.*
214. Foramen lacerum, *foramen lacerum*; рваное отверстие.

X-ray

215. Occipital bone, *os occipitale*; затылочная кость.
216. Frontal tuber, *tuber frontale*; лобный бугор.
217. Frontal sinus, *sinus frontalis*; лобная пазуха.
218. Coronal suture, *sutura coronalis*; венечный шов.
219. Lambdoid suture, *sutura lambdoidea*; ламбдовидный шов.

220. External occipital protuberance, *protuberantia occipitalis externa*; наружный затылочный выступ.

221. Sphenoidal sinus, *sinus sphenoidalis*; клиновидня пазуха.

222. Sella turcica, *sella turcica*; турецкое седло.

223. Dorsum sellae, *dorsum sellae*; спинка седла.

224. Mastoid cells, *cellulae mastoideae*; сосцевидные ячейки.

225. Maxillary sinus, *sinus maxillaris*; верхнечелюстная пазуха.

226. Maxilla, *maxilla*; верхняя челюсть.

227. Zygomatic arch, *arcus zygomaticus*; скуловая дуга.

228. Hard palate, *palatum durum*; твердое небо.

229. Inferior nasal concha, *concha nasi inferior*; нижняя носовая раковина.

230. Mental protuberance, *protuberantia mentalis*; подбородочный выступ.

231. Superior nasal meatus, *meatus nasi superior*; верхний носовой ход.

232. Inferior nasal meatus, *meatus nasi inferior*; нижний носовой ход.

233. Middle nasal meatus, *meatus nasi medius*; средний носовой ход.

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