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GUIDELINES FOR STUDENTS ON THE TOPIC OF THE PRACTICAL TRAINING:

"Brain. Cerebral hemispheres. Relief of the hemispheres: surfaces, lobes, furrows, convolutions. Olfactory brain. The base of the brain. The exit from the brain of 12 pairs of cranial nerves "

Specialty: general medicine

I st year of education

Topic: “The brain. Cerebral hemispheres. Relief of the hemispheres: surfaces, lobes, furrows, convolutions. Olfactory brain. The base of the brain. The exit from the brain of 12 pairs of cranial nerves. "

The purpose of the lesson:
● to study the external structure of the cerebral hemispheres, to study the formation on the basis of the brain, the place of exit of cranial nerves;
● learn to navigate using Latin terminology in the relief of the cerebral hemispheres, to find the places where cranial nerves exit the brain;
● to study the structure and function of the olfactory brain, the localization of functions in the cortex of the cerebral hemispheres.
Motivation for the topic of the lesson: the formation of knowledge about the structure and functioning of the central nervous system as a whole and its departments is necessary for studying the following sections of anatomy, histology, normal physiology, topographic anatomy, pharmacology, pathological anatomy, pathological physiology, and is the basis for studying clinical disciplines: neurology , psychiatry and neurosurgery.

Competencies: OPK-1, 9.

Test questions on the topic of the lesson (App 1)
Lesson plan
1. Testing the assimilation of knowledge obtained in the previous lesson: test control, oral questioning, testing of practical skills.
2. Conversation on the topic of the lesson.
3. Performing assignments.
3.1. Independent classroom work of students

Using a textbook to study the basic plan of the structure of the nervous system. The division of the central nervous system according to the topographic principle into the central (brain and spinal cord) and peripheral (spinal and cranial nerves with their roots, their branches, nerve endings and ganglia). Attention should be paid to the structure and function of the neuron, the reflex principle of the functioning of the nervous system, types of neurons.

Consider a brain development pattern at the stages of three and five cerebral vesicles with an indication of the developing brain regions.
The topography of the parts of the brain in the cranial cavity should be examined on preparations of the whole brain and the inner base of the skull. Further, to indicate the departments of the brain, preparations of the base (whole brain) and the sagittal section of the brain are used.
In the beginning, one will learn to distinguish between three large parts of the brain: the cerebrum (cerebrum), the cerebellum (cerebellum) and the brainstem (truncus encephalicus). Given that the largest part of the entire brain is occupied by the cerebral hemispheres, the cerebellum follows in size, the rest, a relatively small part, is the brain stem. The surface of the hemisphere is formed by a uniform layer of gray matter 1.3–4.5 mm thick containing nerve cells. This layer, called the cerebral cortex, seems to be folded, as a result of which the surface of the cloak has a highly complex pattern consisting of grooves alternating between each other in different directions and the ridges between them are called convolutions. The size and shape of the furrows are subject to significant individual fluctuations, as a result of which not only the brains of various people, but even the hemisphere of the same individual, are not quite similar in the furrow pattern.

The topography and general plan of the structure of the cerebral hemispheres is considered on whole preparations of the brain and preparations of the sagittal section of the brain, freed from the membranes. On the whole preparation of the cerebral hemispheres, consider the frontal, parietal, occipital, temporal, islet lobes, the main grooves separating them, as well as the grooves

and convolutions of the lobes of the brain of the dorsolateral, medial and lower surfaces of the hemispheres. Particular attention is paid to the relationship of the lobes with the structures of the base of the skull: in the anterior cranial fossa are the frontal lobes of the hemispheres, in the middle temporal lobes, in the back - the occipital lobe and cerebellum.
Further study the upper lateral surface of the cerebral hemispheres. Consider the grooves dividing the lobes: the central groove separating the frontal lobe from the parietal, the lateral furrow separating the temporal lobe from the frontal and parietal. Pay attention to the fact that the parieto-occipital groove is traced on the medial surface of the hemisphere and only partially passes to the upper lateral surface. In order to examine the island, the edges of the lateral groove are moved apart and the course of the deep circular furrow of the island, which separates it from other lobes, is traced.
In the frontal lobe are the upper and lower frontal grooves that separate the upper, middle and lower frontal gyrus; precentral gyrus, precentral groove. On the parietal lobe, a postcentral sulcus should be found that separates the corresponding gyrus, the intratuscular sulcus separating the upper and lower parietal lobes. In the temporal lobe - the upper and lower temporal grooves that separate the upper, middle and lower temporal gyrus.
On the medial surface of the hemisphere, you should find the groove of the corpus callosum, trace its continuation below and in front of the groove of the hippocampus. Then you should consider the cingulate gyrus and the waist groove passing above it, find the para-hippocampal gyrus, which ends with a hook.
After this, you should consider the rounded vaulted gyrus, formed by the waist, para-hippocampal gyrus and isthmus. Having spread the furrow of the hippocampus, you should consider a narrow dentate gyrus. A paracentral lobe is found above the lumbar groove, then a wedge and a lingual gyrus bounded above by a spur furrow should be found on the occipital lobe.
After that, they proceed to study the relief of the lower surface of the cerebral hemisphere. It is necessary to find the olfactory sulcus, the olfactory bulb to which thin nerve filaments (olfactory filaments) form the entire pair of cranial nerves — the olfactory nerves — from the nasal cavity through the openings of the ethmoid bone. Usually, when the brain is removed from the skull, these strands come off from the olfactory bulbs, and often the olfactory bulbs themselves come off. Next, you should consider the olfactory tract, passing posteriorly into the olfactory triangle, straight gyrus, orbital grooves. Immediately behind the olfactory triangles on either side is the anterior perforated substance, so called because of the presence of small holes through which blood vessels pass into the medulla. In the middle between both front perforated spaces lies the visual cross. A gray hillock is placed behind the visual intersection; its top is extended into a narrow tube, the so-called funnel, to which the pituitary gland located in the Turkish saddle is suspended. Behind the gray hillock are two spherical, white elevations - mastoid bodies. Behind them lies a rather deep interfoot fossa, laterally bounded by two thick ridges that converge posteriorly and are called the legs of the brain. The bottom of the fossa is pierced by holes for blood vessels, and therefore is called the posterior perforated substance. Next to this substance in the furrow of the medial edge of the cerebral peduncle on both sides comes III pair - the oculomotor nerve. On the side of the legs of the brain, the thinnest cranial nerve is visible - the block nerve, - the IV pair, which, however, departs not from the base of the brain, but from its dorsal side, from the so-called upper brain sail. Behind the legs of the brain is a thick transverse shaft - a bridge, which, tapering from the sides, plunges into the cerebellum. The lateral parts of the bridge closest to the cerebellum are called the middle legs of the cerebellum; on the border between them and the actual bridge comes out on either side of the V pair - the trigeminal nerve. Behind the bridge lies the medulla oblongata; between it and the rear edge of the bridge on the sides of the midline the beginning of the VI pair is visible - the abducent nerve; still further to the side, at the posterior edge of the middle legs of the cerebellum, two more nerves go side by side on the other side: the VII pair - the facial nerve, and the VIII pair - the vestibular nerve. Between the pyramid and olive of the medulla oblongata go the roots of the XII pair - the hyoid nerve.

Roots IX, X and XI pairs - glossopharyngeal nerve, vagus nerve and accessory nerve (upper part) - exit the groove behind the olive. The lower fibers of the XI pair depart already from the spinal cord in its cervical part.

The olfactory brain is phylogenetically the oldest part of the forebrain that arose in connection with the olfactory analyzer, when the forebrain has not yet become the organ of behavior of the animal. Therefore, all its components are different parts of the olfactory analyzer. In fish, almost the entire forebrain is the organ of smell. With the development of a new cortex, which is observed in mammals and humans, a new part of the forebrain - the cloak - develops. But the cloak goes its long way of development and contains three parts of different phylogenetic prescription. Older parts:

1. Paleopallium, which is part of the temporal lobe. Initially, this department was located on the lateral surface of the hemisphere, but later, under the influence of a greatly enlarged neopallium, it curled up into a sausage-shaped formation - the hippocampus and medially shifted to the cavity of the lateral ventricle of the final brain in the form of a protrusion of its lower horn. The hippocampus is covered in ancient bark, paleocortex.
2. Archipallium - a small area of the cortex on the ventral surface of the frontal lobe, lying near the olfactory bulb and covered with old bark, archicortex.
3. Neopallium, a new cloak in the cortex of which, neocortex, higher centers of smell appeared - the cortical ends of the analyzer. This is a hook that is part of the vaulted gyrus.

As a result, the human olfactory brain contains a number of formations of various origins, which can be topographically divided into two departments. The peripheral part is the olfactory lobe, which means a number of formations lying on the base of the brain: 1) bulbus olfactorius; 2) tractus olfactorius; 3) trigonum olfactorium; 4) substantia perforata anterior. The central section is the convolutions of the brain: 1) the para-hippocampal gyrus; 2) dentate gyrus; 3) vaulted gyrus, with its front part located near the temporal pole - hook.

The list of anatomical formations that a student should be able to find and demonstrate on natural preparations

1. Lateral fossa of the large brain	Fossa lateralis cerebri
2. The cerebral hemisphere	Hemispherium cerebralis
3. Central furrow	Sulcus centralis
4. Lateral groove	Sulcus lateralis
5. Frontal lobe	Lobus frontalis
6. Precentral groove	Sulcus precentralis
7. Precentral gyrus	Gyrus precentralis
8. Upper frontal gyrus	Gyrus frontalis superior
9. Upper frontal groove	Sul.frontalis superior
10. The average frontal gyrus	Gyrus frontalis medius
11. Lower frontal sulcus	Sulcus frontalis inferior
12. Lower frontal gyrus	Gyrus frontalis inferior
13. Paracentral lobule	Lobulus paracentralis
14. Olfactory bulb	Bulbus olfactorius
15. The olfactory tract	Tractus olfactorius
16. The olfactory triangle	Trigonum olfactorium
17. Parietal lobe	Lobus parietalis
18. Postcentral sulcus	Sulcus postcentralis
19. Postcentral gyrus	Gyrus postcentralis
20. Upper parietal lobule	Lobulus parietalis superior
21. Intrauterine sulcus	Sulcus intraparietalis

22. Lower parietal lobe	Lobulus parietalis inferior
23. Supra marginal gyrus	Gyrus supramarginalis
24. Angular gyrus	Gyrus angularis
25. Parieto-occipital gyrus	Sulcus parietooccipitalis
26. Occipital lobe	Lobus occipitalis
27. Pre-wedge	Precuneus
28. Wedge	Cuneus
29. Spur furrow	Sulcus calcarinus
30. Bird spur	Calcar avis
31. Temporal lobe	Lobus temporalis
32. Upper temporal gyrus	Gyrus temporalis superior
33. Upper temporal sulcus	Sulcus temporalis superior
34. Middle temporal gyrus	Gyrus temporalis medius
35. Lower temporal sulcus	Sulcus temporalis inferior
36. Lower temporal gyrus	Gyrus temporalis inferior
37. Islet lobe	Lobus insularis
38. The furrow of the corpus callosum	Sulcus corporis callosi
39. Waist gyrus	Gyrus cinguli
40. Isthmus of the cingulate gyrus	Isthmus gyri cinguli
41. Waist furrow	Sulcus cinguli
42. Hippocampal sulcus	Sulcus hippocampi
43. Para-hippocampal gyrus	Gyrus parahippocampalis
44. Hook	Uncus
45. Collateral groove	Sulcus collateralis
46. The corpus callosum	Corpus callosum
47. Roller	Splenium
48. The trunk	Truncus
49. Knee	Genu
50. Beak	Rostrum
51. Terminal plate	Lamina terminalis
52. Code	Fornix
53. Leg	Crus
54. Pillar	Columna
55. Transparent partition	Septum pellucidum
56. Cranial nerves	Nervi craniales
57. Olfactory nerves	Nn. olfactorii
58. Optic nerve	Nervus opticus
59. The oculomotor nerve	Nervus oculomotorius
60. Block nerve	Nervus trochlearis
61. Trigeminal nerve	Nervus trigeminus
62. The abducent nerve	Nervus abducens
63. The facial nerve	Nervus facialis
64. The vestibulo-cochlear nerve	Nervus vestibulocochlearis
65. The glossopharyngeal nerve	Nervus glossopharyngeus
66. Vagus nerve	Nervus vagus
67. The accessory nerve	Nervus accessorius
68. Hyoid nerve	Nervus hypoglossus

3.2. Monitoring knowledge gained in this lesson (App2).

3.3. The solution of situational problems.
1. A patient has a tumor of the temporal lobe of the cerebral hemispheres, the hippocampus, amygdala are destroyed. Violation of what functions will be observed in this patient?
2. The patient was found to have a tumor with localization in the region of the cerebellar angle. Indicate which nerves will suffer in this case and possible dysfunctions.

4. Assignment for the next lesson.
Theme: “The brain. Cerebral hemispheres. Relief of the hemispheres: surfaces, lobes, furrows, convolutions. Olfactory brain. The base of the brain. The exit from the brain of 12 pairs of cranial nerves. "

App 1

Test questions on the topic of the lesson

1. List the lobes of the cerebral hemispheres?
2. What is the groove separating the frontal and parietal lobes?
3. What is the sulcus separating the superior and inferior parietal lobes?
4. What is included in the limbic system, what is its functional significance?
5. In which part of the cortex of the hemispheres is the core of the visual analyzer located?
6. In which part of the cerebral cortex is the core of the analyzer of general (temperature, pain, tactile) sensitivity localized?
7. In which part of the cortex of the hemispheres is the core of the visual analyzer of written language located?
8. What proportion is located in the depth of the lateral groove of the hemispheres?
9. Determine the location of the I and II pairs of cranial nerves on the basis of the brain?
10. On the basis of the brain, determine the output of the third and fourth pairs of cranial nerves?
11. On the basis of the brain, determine the output of the V and VI pairs of cranial nerves?
12. Determine the location of the VII and VIII pairs of cranial nerves on the basis of the brain?
13. On the basis of the brain, determine the location of IX, X and XI pairs of cranial nerves?
14. On the basis of the brain, determine the output of the XII pair of cranial nerves?
15. Where are the higher motor and sensory centers located?
16. Where is the cortical center of the auditory analyzer located?
17. Where is the cortical center of the visual analyzer located?
18. Where is the cortical center of the flavor analyzer located?
19. Where is the cortical center of the olfactory analyzer located?
20. Where is the cortical center of the speech motor center located?
21. Where is the cortical center of the auditory (sensory) center of speech?
22. Where is the writing center located?
23. What is the location of the center of stereognosy?

App2

The list of questions for the test control of knowledge gained in the current lesson
1. What gyruses form a vaulted gyrus?
2. What surfaces do hemispheres have?
3. In which part of the cortex of the hemispheres is the nucleus of the auditory analyzer located?
4. In which part of the cortex of the hemispheres is the core of the motor analyzer of written language (the center of the graph) located?

5. What poles do hemispheres emit?
6. In which part of the cortex of the hemispheres is the core of the visual analyzer located?
7. In which part of the cortex of the hemispheres is the core of the analyzer of general (temperature, pain, tactile) sensitivity localized?
8. In which part of the cortex of the hemispheres is the core of the visual analyzer of written language located?
9. In which part of the cortex of the hemispheres is the core of the taste analyzer located?
10. Which furrows are most consistent?
11. What is deep in the lateral groove of the cortex of the hemispheres?
12. What is the localization of the exit of the abduction nerve from the brain?
13. In which part of the cortex of the hemispheres is the core of the motor analyzer located?
14. What is the place where the block nerve exits the brain?
15. What is included in the central department of the olfactory brain?
16. What are the convolutions that form the vaulted convolutions?
17. In which part of the cortex of the hemispheres is the core of the analyzer of general (temperature, pain, tactile) sensitivity localized?
18. In which part of the cortex of the hemispheres is the core of the motor analyzer located?
19. In which part of the cortex of the hemispheres is the nucleus of the auditory analyzer located?
20. In which part of the cerebral cortex is the core of the visual analyzer located?
21. Where is the core of the motor analyzer of written language (center of the graph) located?
22. In which part of the cortex of the hemispheres is the core of the visual analyzer of written language located?
23. What is the exit site of the abduction nerve from the brain?
24. What is the place where the trigeminal nerve leaves the brain?
25. What is the location of the exit of the facial nerve from the brain?
26. What is the place of exit of the glossopharyngeal nerve from the brain?
27. What is part of the central department of the olfactory brain?
28. In which part of the cortex of the hemispheres is the core of the analyzer of targeted complex combined movements located (center of praxia)?
29. What small gyruses are distinguished in the lower frontal gyrus?
30. What are the furrows that are most consistent?
31. What cranial bladders are the cranial nerve tube divided into at the beginning of development?
32. What is part of the cerebral hemispheres?
33. What is part of the central department of the olfactory brain?
34. What is distinguished on the upper lateral surface of the frontal lobe?
35. What is it that separates the cingulate gyrus from the corpus callosum?
36. In which part of the cerebral cortex is the core of the analyzer of targeted complex combined movements located (center of praxia)?
37. What small gyruses are distinguished in the lower frontal gyrus?
38. What small convolutions are distinguished in the lower parietal lobule?
39. What gyrus covers the end of the lateral groove?
40. What are the furrows that are most variable?
41. What separates the frontal and parietal lobes from the temporal lobe?
42. What separates the cerebral hemisphere from the cerebellum?
43. What separates the cingulate gyrus from the superior frontal gyrus?
44. What formations are located on the lower surface of the cerebral hemispheres?
45. What convolutions are there on the lower surface of the frontal lobe?
46. What formations is the cranial neural tube divided at the beginning of development?
47. What is the furrow that separates the wedge from the wedge?
48. What is a direct continuation of the furrow of the corpus callosum?

49. What formations are involved in the formation of the medial surface of the cerebral hemispheres?
50. What is the continuation of the hippocampal sulcus?
51. What separates the direct gyrus from the orbital gyrus?
52. What are the formations located on the lower surface of the temporal and occipital lobes?
53. What is the border between the medial occipital-temporal gyrus on the one hand and the parahippocampal and lingual gyrus on the other?
54. Which part of the brain includes the cerebral hemispheres?
55. What formations are part of the finite brain?
56. What is the cavity of the finite brain?
57. What is the place of exit of the vagus nerve from the brain?
58. What is the border of the central groove?
59. What is distinguished on the upper lateral surface of the frontal lobe?
60. What is distinguished on the superior lateral surface of the parietal lobe?
61. What is on the lower surface of the temporal and occipital lobes?
62. What is the border between the lateral and medial occipital-temporal gyrus?
63. What relates to the limbic system of the brain?
64. What differentiates the forebrain (bladder)?
65. What are the stages of development of the nervous system in phylogenesis?
66. What is the gray matter of the brain and spinal cord formed?
67. What is the location of the exit of the oculomotor nerve from the brain?
68. What is part of the cerebral hemispheres?
69. What is part of the central department of the olfactory brain?
70. Indicate where the dentate gyrus is located.
71. What covers the end of the lateral groove?
72. What separates the frontal and parietal lobes from the temporal lobe?
73. What separates the wedge from the lingual gyrus?
44. What separates the trunk from the para-hippocampal gyrus?
75. What formations are involved in the formation of the medial surface of the cerebral hemispheres?