ЛД-21ИН

STATE BUDGET EDUCATIONAL ESTABLISHMENT OF HIGHER PROFESSIONAL EDUCATION
"NORTH-OSSETIAN STATE MEDICAL ACADEMY" OF THE MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

Department of human anatomy
with topographic anatomy and operative surgery

THE COLLECTOR METHODOLOGICAL GUIDES

to practical training and extracurricular independent work
FOR THE DISCIPLINE "ANATOMY"
for 1st year students of the medical faculty

discipline «Anatomy»
on specialty 31.05.01 «General Medicine»

the main professional educational program of higher education -specialty program

in the specialty 31.05.01 General medicine, approved on 24.05.2023

2 semester
THE CARDIOVASCULAR SYSTEM

Part 2

Student's Full Name _____

Group №_____ Faculty _____

Collection methodological guides to practical training and extracurricular independent work for 1st year students (2 semester) of the medical faculty for the discipline «anatomy» on specialty 31.05.01 «General Medicine», developed by the Department Of Human Anatomy With Topographic Anatomy And Operative Surgery Of State Budget Educational Establishment Of Higher Professional Education "North-Ossetian State Medical Academy" Of The Ministry Of Health Of The Russian Federation

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Second Term

№	Name of topic
1.	Anatomy and topography of the mouth, teeth, tongue and salivary glands, soft palate.
2.	Anatomy and topography of the pharynx, esophagus. The course of the food lump. Age features. X-ray anatomy.
3.	Anatomy and topography of the stomach and intestines.
4.	Anatomy and topography of the rectum. Age features. X-ray anatomy.
5.	Anatomy and topography of the liver and pancreas. The wonder of the liver network.
6.	Anatomy and topography of the peritoneum. Age features. X-ray anatomy.
7.	Anatomy and topography of the nasal cavity, larynx, trachea. Anatomy and topography of bronchi and lungs.
8.	Features of the structure of the pulmonary acinus. The course of the air jet. Anatomical and physiological dead spaces. Anatomy and topography of the pleura and mediastinum organs. Age features. X-ray anatomy
9.	**FINAL LESSON ON PREPARATIONS OF DEGESTIVE AND RESPIRATORY SYSTEMS.**
10.	Anatomy and topography of the kidneys, ureters, bladder and urethra. The wonder of the kidney network. The course of urine. Age features. X-ray anatomy.
11.	Anatomy and topography of male genital organs. Shells of the testicle and scrotum. The course of the seed.
12.	The male crotch. Age features. X-ray anatomy.
13.	Anatomy and topography of female genital organs.
14	Female crotch. Age features. X-ray anatomy.
15.	**FINAL LESSON ON PREPARATIONS OF URINARY AND SEXUAL SYSTEMS.**
16.	Anatomy and topography of the heart. Chambers of the heart, the structure of the wall of the heart. Circles of blood circulation.
17.	Blood supply to the heart: arteries and veins.
18	Conductive system of the heart. Pericardium. Age features. X-ray anatomy.
19.	Anatomy and topography of the aorta and its parts. The branches of the arch of the aorta. Common carotid artery. Anatomy and topography of the external carotid artery and its branches.
20.	Anatomy and topography of the internal carotid artery and its branches. Anatomy and topography of the subclavian artery and its branches. Blood supply to the brain. Age features. X-ray anatomy.
21.	Anatomy and topography of the thoracic part of the aorta and its branches. Age features. X-ray anatomy.
22.	Anatomy and topography of the abdominal part of the aorta and its branches. Age features. X-ray anatomy.
23.	Anatomy and topography of the common and external iliac arteries and their branches. Age features. X-ray anatomy.
24.	Anatomy and topography of the internal iliac artery and its branches. Age features. X-ray anatomy.
25.	Anatomy and topography of the arteries of the free upper limb (axillary, brachial arteries, arteries of the forearm and hand). Age features. X-ray anatomy.
26.	Arteries of the free lower limb (artery of the hip, artery of the lower leg and foot). Age features. X-ray anatomy.
27.	The veins of the neck and head. Upper hollow vein. The veins of the thoracic, abdominal cavities and pelvis (unpaired, semi-unpaired, inferior hollow, portal veins).
28.	Anatomy and topography of cava-caval and porto-caval anastomoses. Fetal blood circulation. Anatomy of the veins of the upper and lower extremities. Age features. X-ray anatomy.
29.	**FINAL LESSON ON PREPARATIONS OF HEART, ARTERIES AND VIENS.**
30.	Anatomy and topography of the organs of the lymphatic system. Age features. X-ray anatomy.
31.	Anatomy and topography of the immune system.
32.	Anatomy and topography of organs of the endocrine system
33.	**FINAL LESSON ON PREPARATIONS OF ORGANS OF LYMPHATIC, ENDOCRINE AND IMMUNE SYSTEMS ".**

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: "Anatomy and topography of the heart. HEART CAMERAS, STRUCTURE OF HEART WALL. CIRCLES OF CIRCULATION. BLOOD SUPPLY OF THE HEART: ARTERIES AND HEART OF THE HEART. CONDUCTING THE HEART SYSTEM. PERICARDIUM. AGE PECULIARITIES OF THE HEART».

The urgency of the growth of patients with the pathology of the cardiovascular system, despite the ongoing preventive and therapeutic measures, creates the need for more careful study of morpho-functional and anatomical and topographical features of the structure of the heart wall, the conducting system. Knowledge of the features of the organization of independent circulation, the features of the structure of the valvular apparatus and possible damage to them in various diseases are necessary for work in the departments of the therapeutic and cardiosurgical profile, as well as in pulmonology.

I.Objectives:

Student must know:	1. Structure of the cardiovascular system and circulatory system. 2.Construction and topography of the heart. 3. Borders of the heart and skeleotopia of its departments and valves. 4.Stroenie connective tissue skeleton and individual layers of the heart wall. 5. Features of the structure of the myocardium of the ventricles and atria. Their difference. 6.Construction of the conduction system of the heart and localization of its structures 7. Blood circulation: small pulmonary and large arterial 8. Blood supply to the heart wall, the way outflow of venous blood and topographic relationships of the arteries and veins of the heart. 9.Construction of the pericardium. Fibrous pericardium and serous pericardium, their visceral and parietal plates. 10. Borders, cavity and sinuses of the pericardium. 11.Sredenie and its departments.
Student must be able to:	1. Name and show on the corpse of the border of the heart. 2. Name and show the departments, surfaces and grooves of the heart. 3. Name and show the chambers of the heart, the septum, the holes and the valve apparatus. 4. Name and show an oval fossa, ears, comb and papillary muscles and vessels of the base of the heart. 5. Name and show on the native preparation layers of the heart (endocardium, myocardium, epicardium). 6. Find and show the pericardial and pericardial cavities, as well as its sinuses (transverse and oblique).
Student must possess:	1) Medical-anatomical conceptual apparatus; 2) Anatomical knowledge for understanding pathology, diagnosis and treatment 3) The simplest medical instruments - a scalpel and tweezers. 4) The technique of preparation of the studied organs (under the supervision of the teacher).

II. ***Required level of knowledge****:*

а) from related disciplines:

1) Phylogeny of the cardiovascular system.
2) Ontogeny of the cardiovascular system

б) from previous topics:

1) Structure of the thorax.
2) Structure of the mediastinum organs.
3) The structure of the diaphragm.

***в) from the current lesson*:**

1) To know circulatory circles and microcirculatory bed.
2) To understand the skeletonopia, sintopia and holotopia of the heart.
3) Know the structure of the pericardium.
4) To understand the skeletontopia, sintopy and holotopia of the vessels of small and large circles of the circulation, as well as of the own vessels of the heart.

III. Object of study:

1. Wet heart preparations: heart shape, base, apex, surface, furrows. Right and left atriums and ventricles. Vessels that flow into and out of the heart. Atrial and interventricular septa, oval fossa. Ears of the atria. Atrioventricular apertures and valves, the border of the heart. Pericardium, its cavity, transverse and oblique sinuses.

IV. Informational part:

The heart is located in the anterior mediastinum and is covered at the sides by the lungs.

Has an apex turned downward, forward and left, formed entirely by the left ventricle, and the base turned up, back and to the right, it is formed by the atria, and in front - by the aorta and the pulmonary trunk.
The heart is divided into 3 surfaces:
a) sternal-rib (anterior) surface;
b) diaphragmatic (inferior);
c) pulmonary (lateral);
The heart is a hollow muscular organ that has the form of a somewhat flattened cone and consists of 4 chambers: 2 auricles (right and left) and 2 ventricles (right and left).
The left atrium and left ventricle form the left, or arterial heart, and the right atrium and right ventricle form the venous heart. The reduction of the walls of the cardiac chambers is called systole, relaxation is diastole. The projection of the heart on the anterior thoracic wall is determined from the right contour from the 3rd costal cartilage to the 5th rib cartilage on the right, and the left one in the middle of the distance between the left edge of the sternum and the left midclavicular line from the upper edge of the 3rd rib to the 5th intercostal space on the left on 1,0-1,5 cm to the inside of the sredneklyuchichnoy line.
The projection of ventricular outlets is as follows: the pulmonary trunk is at the sternal end of the 3rd rib cartilage on the left, the aorta is somewhat to the right.
On the surface between the 4 chambers, the boundaries are visible: the ventricles from the ventricles are separated by a transverse coronary furrow (better visible on the diaphragm surface). On the front surface, the anterior interventricular furrow is visible, on the diaphragm surface, the posterior interventricular, joining at the apex of the heart with the tip of the heart.
At the walls of the atria and ventricles, three layers are distinguished: an endocardium (a thin inner layer), a thick myocardial muscle layer, and a thin outer layer-the epicardium, which is a visceral leaf of the serous membrane of the heart-the pericardium).

Endocardium lining the inside of the heart cavity, repeating their complex relief and covering the papillary muscles with their tendon chords ..

The folds of the endocardium and there are valves.

Myocardium is formed by cardiac transverse striated muscle tissue and consists of cardiac myocytes (cardiomyocytes) connected by a large number of bridges, which result in a narrowly looped network. The muscle fibers of the atria and ventricles begin from fibrous rings completely separating the atrial myocardium from the ventricular myocardium. These fibrous rings, as well as a number of other connective tissue formations of the heart, are part of its soft skeleton. To the skeleton of the heart are: connected to each other the right and left fibrous rings that surround the right and left atrioventricular orifices and form the support of the right and left atrioventricular valves. There are atrial myocardium and myocardium of the ventricles. Because there is no transfer of muscle fibers into each other, their self-contraction is determined.

In atria, the myocardium consists of two layers: surface (transverse), common for both atria, and deep (longitudinal), separate for each of them.

The myocardium of the ventricles consists of three different muscle layers: the outer (oblique), which starts from the fibrous rings, continues downward and toward the apex of the heart, where it forms a curl of the heart and passes into the inner (deep) layer consisting of longitudinal fibers. Medium (circular), separate for each ventricle.

Epicardium the external shell of the heart, is a visceral leaf of the serous pericardium. Epicardium covers the heart, the initial sections of the ascending aorta and pulmonary trunk, the terminal sections of the hollow and pulmonary veins. On these vessels the epicardium passes into the parietal plate of the serous pericardium.

Pericardium pericardial bag) delimits the heart from neighboring organs, is a thin strong fibrous-serous sac, in which the heart is located. It consists of two sheets: external - fibrous and internal - serous. The serous pericardium has two plates, a parietal one, which fleshes from inside the fibrous pericardium, and visceral, which covers the heart, being its outer shell-epicardium. Between the two plates is the pericardial fluid. In the pericardium, three divisions are distinguished:

a) anterior-sternum-rib,

b) the lower-diaphragmatic,

c) the mediastinal department (right and left) is the most significant in length.

In the pericardial cavity, between him and the surface of the heart and large vessels there are quite deep pockets - sinuses:

a) transverse sinus of the pericardium located at the base of the heart;

b) The oblique sinus of the pericardium is located on the diaphragmatic surface of the heart.

Arteries of the heart

aortic bulb - leaves their left ventricle;

- the right coronary artery - starts from the bulb of the aorta below the upper edges of the semilunar valves with a small hole, located between the aorta and the right atrial eye, is directed into the coronary furrow;

- the posterior interventricular branch - departs from the right coronary artery and is located in the posterior interventricular sulcus;

- the left coronary artery - starts from the aortic bulb below the upper edges of the semilunar valves with a small opening, located between the aorta and the left ear in the coronary sulcus;

- the forward interventricular branch - departs from the left coronary artery and lies down in the anterior interventricular furrow;

- The envelope branch is a continuation of the left coronary artery in the coronary sulcus behind.

Veins and sinuses of the heart:

a) coronary sinus - is in the posterior part of the coronal sulcus between the left atrium and the left ventricle and falls into the right atrium;

b) a large vein - begins in the anterior interventricular sulcus, passes next to the anterior interventricular branch, goes from the tip along the interventricular furrow, then along the coronary sulcus and continues into the coronary sinus;

c) the posterior left ventricle of the left ventricle lies on the posterior surface of the left ventricle, and falls into a large vein or coronary sinus;

d) The oblique vein of the left atrium is on the posterior surface of the left atrium, it flows into the large vein of the heart;

Conductive system of the heart plays an important role in rhythmic work and coordination of the activity of the musculature of individual chambers, although the musculature of the atria is separated from the muscles of the ventricles, but between them there is a connection through a conducting system, including the following structures:

Sinus-atrial node, is located in the wall of the right atrium, between the upper vena cava and the right ear.

Atrial-ventricular node, is located in the right atrial wall near the tricuspid valve. Continuing into the septum between the ventricles in the form of the atrioventricular bundle (bundle of Hyis), where it is divided into 2 legs-the right and left.

Heis bundle is very important for the work of the heart, because it transfers the impulse of contraction from the atria to the ventricles, causing the regulation of the rhythm of the systole - the atria and the ventricles.

Right atrium is separated from the left atrium by the interatrial septum, on which the oval fossa, which is the remainder of the overgrown oval aperture, is clearly visible. It also has an opening for the superior vena cava and for the inferior vena cava, between the holes of the hollow veins there is an intervenous tubercle (rogue) - a small remnant of the valve directing blood flow from the superior vena cava into the right atrioventricular orifice. Between the last and inferior vena cava there is an opening of the coronary sinus.

Right ventricle – The cavity from which the venous blood enters the pulmonary trunk. Between the right atrium and the right ventricle is a tricuspid valve. The left atrium taking blood from the 4 pulmonary veins, resets it to the left ventricle, through the left atrial-gastric opening, where the two-folded valve (mitral) is located. Blood from the left ventricle enters the aorta and spreads to all organs and tissues. A large circle of blood circulation (arterial) including the initial aorta and ending with the upper and lower hollow veins flowing into the right atrium. A small circle of circulation (pulmonary) provides a gas exchange between the blood and air of the pulmonary alveoli.

The left atrium contains 5 holes, four of them are located on the top and back. These are the openings of the pulmonary veins. Pulmonary veins are devoid of valves. The fifth largest, the opening of the left atrium is the left atrioventricular opening that communicates the atrium with the same ventricle.

Left ventricle Cone-shaped, the base turned upward. In the uppermost widest part there are openings: at the back and left is the left atrioventricular aperture and to the right of it is the aortic aperture

Age features.

The most strongly developed fleshy trabeculae in adolescence (17-20 years). After 60-75 years the trabecular network of the ventricles is smoothed out, and its networked character is preserved only in the region of the apex of the heart. At newborns and children of all age groups, the atrioventricular valves are elastic, the valves are shiny. In the 20-25 years, the valves of these valves are compacted, their edges become uneven.

V. Practical work:

Task № 1 For a better representation of the shape and position of the heart, you need to be able to correctly position it. To do this, place the heart on the left palm so that the tip of the heart is directed down and to the left, and the broad base of the heart with the large vessels is pointed upwards. In this position, find the right atrium lying on the right side of the heart, the right ventricle located on the front surface and the right edge of the heart, and at the top it passes into the pulmonary trunk, the left ventricle forming the apex of the heart, and the left edge of the heart and continuing into the aorta lying behind and to the right of the pulmonary trunk. On the sternum-costal surface, find the anterior interventricular furrow, and on the diaphragm surface the coronoid furrow.

Task № 2. On an open heart, examine each of the four chambers of the heart, beginning with the right atrium. Find and view the parts of the right atrium (venous sinus, right eye with scalloped muscles, oval fossa and upper and lower hollow veins flowing into the atrium.) Find the right atrioventricular aperture and the valves of the right atrioventricular (tricuspid valve), then the tendon chords, Papillary muscles and fleshy trabeculae of the ventricles. At the left edge of the heart, find the left atrium, examine its cavity, find the left ear and crest muscles and through the left atrioventricular orifice pass into the cavity of the left ventricle. In this case, study the structure of the left atrioventricular (bivalve or mitral valve, find its valves, tendon chords, papillary muscles and fleshy trabeculae

Task № 3. Consider the layers of the heart wall (inner-endocardium, middle-myocardium and outer-epicardium). Pay attention to the thickness of the walls of the chambers of the heart, the structure of the myocardium in the atria and ventricles, the fixation of muscle fibers to the fibrous rings and triangles of the heart. Consider the semilunar flaps of the valves of the aorta and pulmonary trunk.

***Task* № 4**. Examine the boundaries of the heart and project them onto the anterior thoracic wall

Task № 5. On the corpse with the thoracic cavity uncovered, find the heart enclosed in the pericardium. Enter the pericardial cavity, insert tweezers between the aorta and the pulmonary trunk in front and the pulmonary veins from behind - this is the transverse sinus. Raise the apex of the heart and find between the inferior vena cava and the left pulmonary veins an oblique sine of the pericardium.

Task № 6 On an isolated heart with prepared vessels, examine the arteries of the heart:

a) bulb of the aorta-leaves the left ventricle;

b) the right coronary artery is located between the aorta and the auricle of the right atrium;

c) left coronary artery - located between the aorta and the left ear;

d) the posterior interventricular branch - departs from the right coronary artery and is located in the posterior interventricular sulcus;

e) the anterior interventricular branch - departs from the right coronary artery and is located in the anterior interventricular sulcus;

e) the envelope branch is the extension of the left coronary artery in the coronal sulcus behind.

VI. Control questions:
1. Anatomy and skeletotopia of the heart.
2.Tstroenie heart wall.
3.List out the available holes and valves.
4. Small and large circle of blood circulation.
5. Call the sinuses of the heart.
6. What is the location of the existing structures of the conduction system of the heart?
7. Surfaces of the heart, their structure.

VII. Academic pursuits:
Task №1 Child during inspection the inaccuracy of valves of a pulmonary trunk is found out (semilunar valves not completely close a mouth of a pulmonary trunk).
1. Indicate the direction of movement of venous blood in the heart at the time of diastole of the right ventricle.
2. How many valves have a valve of the pulmonary trunk?
Answer:
1. Direction towards the pulmonary trunk.
2.3 semilunar dampers: front, right and left

Task №2 An ambulance crew was delivered to the injured victim in the car accident. The doctor at the admission department did not detect a cardiac shock in the 4th intercostal space, although very weak pulsation of the arteries was determined. There was no time for further examination of the patient, according to the doctor, he felt that in the near future there would be a complete stop of the heart, at his order the whole complex of resuscitative influences was applied. After a while it turned out that there was no need.
Answer:
The patient had a right-sided position of the heart-dextrocardia. This variant of development is rare, in most cases it is combined with the reverse position of other organs.

VIII. Control Tests:
1. Specify parts of the interventricular septum:
   a) the muscular part
   b) Serous part
   c) endocardial part
   d) membranous part
2. Specify the anatomical formations that are allocated as part of the interventricular septum
   a) myocardium
   b) epicardium
   c) endocardium
   d) pericardium
3. Specify the name of the valve closing the right atrioventricular orifice of the heart
   a) aortic valve
   b) mitral valve
   c) three-leaf valve
   d) two-leaf valve
4. Specify the valves of the left atrioventricular valve of the heart
   a) back
   b) Partitioning
   c) lateral
   d) the front
5. Specify the projection site on the anterior chest wall of the opening of the pulmonary trunk in an adult
   a) above the place of attachment of the third left rib to the sternum
   b) above the place of attachment of the 4-th left rib to the sternum
   c) sternum at the level of 3 ribs
   d) sternum at the level of 4 ribs
6. Indicate the veins of the heart that flow into the coronary sinus
   a) average vein of the heart
   b) posterior vein of the left ventricle
   c) oblique vein of the left atrium
   d) small vein of the heart
7. Specify the branches of the thoracic part of the aorta
   a) anterior intercostal arteries
   b) posterior intercostal arteries
   c) visceral branches
   d) lower diaphragmatic arteries
8. Indicate blood supply sources of the pericardium
   a) right, coronary artery

b) pericardial branches of the thoracic aorta
c) branches of the upper diaphragmatic branches
d) branches of intercostal arteries

IX. Anatomical terminology :

English Name.	Latin Name.
1) Aortic bulb	1) bulbus aortae
2) Right coronary artery	2) a. coronaria dextra
3) Rear interventricular branch	3) r. interventricularis posterior
4) Left coronary artery	4) a. coronaria sinistra
5) Anterior interventricular	5) r. interventricularis anterior
6) Mean vein of the heart	6) v. cordis media
7) Small vein of the heart	7) v. . cordis parva
8) Posterior vein of left ventricle	8) v. posterior ventriculi sinistri
9) The oblique vein of the left atrium	9) v. obliqua atrii sinistri
10) Fore veins of the heart	10) vv. cordis anteriores
11) The smallest veins of the heart (the Namians)	11) vv. cordis minimae
12) Holes of Least Veins	12) foramina venarum minimarum
13) Sinus-atrial node	13) nodus sinuatrialis
14) Atrioventricular node	14) nodus atrioventricularis
15) Atrioventricular bundle	15) fasciculus atrioventricularis
16) Right and left legs	16) crus dextrum et crus sinistrum
17) Pericardium	17) pericardium
18) Fibrous pericardium	18) pericardium fibrosum
19) Serous pericardium	19) pericardium serosum
20) The parietal plate	20) lamina parietalis
21) Visceral plate	21) lamina visceralis
22) The pericardial cavity	22) cavitas pericardialis
23) Breast-pericardial ligaments	23) ligg. sternopericardiaca
24) Transverse sinus pericardium	24) sinus transversus pericardii
25) Sinus sinus pericardium	25) sinus obliquus pericardii

X. Preparations and manuals:
1. Isolated heart (whole and opened).
2. A corpse with an open thoracic cavity.
3. The skeleton.
4. Complex of thoracic cavity organs.
5. Textbook of anatomy. Atlas of anatomy.
6. Tests of Level 2 and standards of answers to them.

Methodical recommendations for out-of-class independent work on the topic: Anatomy and topography of the heart. CAMERAS AND HEART VALVES. STRUCTURE OF HEART WALL, CIRCLES OF CIRCULATION. CONDUCTING HEART SYSTEM.

I. Questions of the initial level of knowledge.

1. Circles of blood circulation (arteries, capillaries, veins, microcirculatory bed).
2. Structure of the walls of the chest. Diaphragm.
3. General structure of serous membranes.

II. Objectives.

STUDENT MUST KNOW:

1. General plan of the structure of the cardiovascular system.
2. External structure of the heart, its parts, surfaces and vessels of the base, furrows.
3. Chambers, openings and valves of the heart. Atrial and interventricular septa. Muscular and membranous (fibrous) parts of the interventricular septum.
4. The structure of connective tissue skeleton and individual layers of the heart wall - endocardium, myocardium and epicardium.
5. Features of the structure of the myocardium atrium and ventricles.

6. Conductive system of the heart.

STUDENT MUST BE ABLE TO:

1. Determine and show the areas, surfaces and grooves of the heart (base and apex, right and left ventricles, right and left atriums with corresponding ears).
2. On the moist preparation show the heart chambers, the holes in them and the valves - semilunar and atrioventricular (two- and three-leaved).
3. Show on the preparation fibrotic rings, interventricular and interatrial septa.
4. To find and show the oval fossa (interatrial septum). Show overgrown Batalov duct.
5. To name, find and show the vessels of the base of the heart - the aorta, the pulmonary trunk, the hollow and pulmonary veins.
6. Identify and show papillary and comb muscle, fleshy crossbeams.
7. Trace the direction of the blood flow according to the circles of the blood circulation.

III. Tasks for self-work:

1. Fill in table:

Table №1. Heart chambers and valves.

Cameras	Opening	Valves	Projection to the anterior abdominal wall
Right atrium			
Left atrium			
Right ventricle			
Left ventricle			

2. Fill in the scheme: the correspondence of the external structure of the heart to its internal relief.

	Topography	Relevance and location
1. The vein groove.		
2. Anterior longitudinal (interventricular) furrow		
3. Rear longitudinal (interventricular) furrow		
4. The tip of the heart		
5. Oval fossa		

3. Make a diagram of the conduction system of the heart.

IV. Qwestions for self-control.

1. Where the circles of circulation begin and end (large and small).

2. What surfaces are excreted in the heart? Their characteristic features.

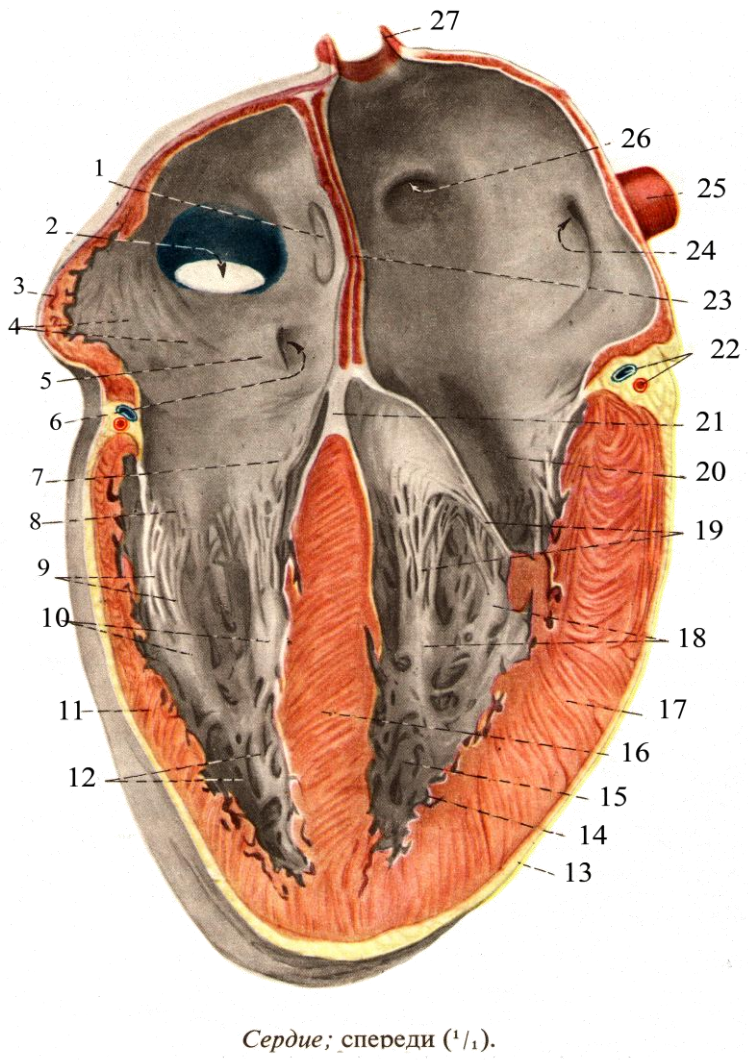
3. From which layers (shells) is the wall of the heart?

4. Where do the beams of the myocardium begin? Describe their course.

5. From what knots and bundles is the cardiac conduction system ?

V. Make the notation in the following figures.

Pic. №1



Сердце; спереди ($^1/_1$).

	Auricula dextra
	Chordae tendineae (правый желудочек)
	Chordae tendineae (левый желудочек)
	Cuspis posterior(v. tricuspidalis)
	Cuspis septalis (v. tricuspidalis)
	Endocardium
	Fossa ovalis
	Lamina visceralis (epicardium)
	Mm. papillares (правый желудочек)
	Mm. papillares (левый желудочек)
	Mm. pectinati
	Myocardium (стенка левого желудочка)
	Myocardium (стенка правого желудочка)
	Ostium v. cava inferioris-
	Ostium v. pulmonalis dextra
	Ostium v. pulmonalis sinistra
	Pars membranacea septi interventricularis
	Pars muscularis septi interventricularis
	Septum interatriale
	Trabeculae carneae (правый желудочек)
	Trabeculae carneae (левый желудочек)
	V. pulmonalis dextra
	V. pulmonalis sinistra
	Valva atrioventricularis sinistra (v. mitralis)
	Valvula sinus coronarii
	Vasa cordis
	Устье sinus coronarius cordis

METHODOLOGICAL RECOMMENDATIONS FOR EXTERNAL AUDITORIAL WORK ON THE TOPIC: BLOOD SUPPLY OF THE HEART OF THE HEART (ARTERY AND VIENNA). TOPOGRAPHY OF HEART, PERICARD

I. Questions of the initial level of knowledge:

1. Mediastinal organs and the structure of serous membranes and cavities.
2. External structure of the heart and vessels of the base.
3. Sections of the aorta. Bulb and ascending part.
4. Aortic valves and coronary arteries.

II. Objectives:

1. STUDENT MUST KNOW:

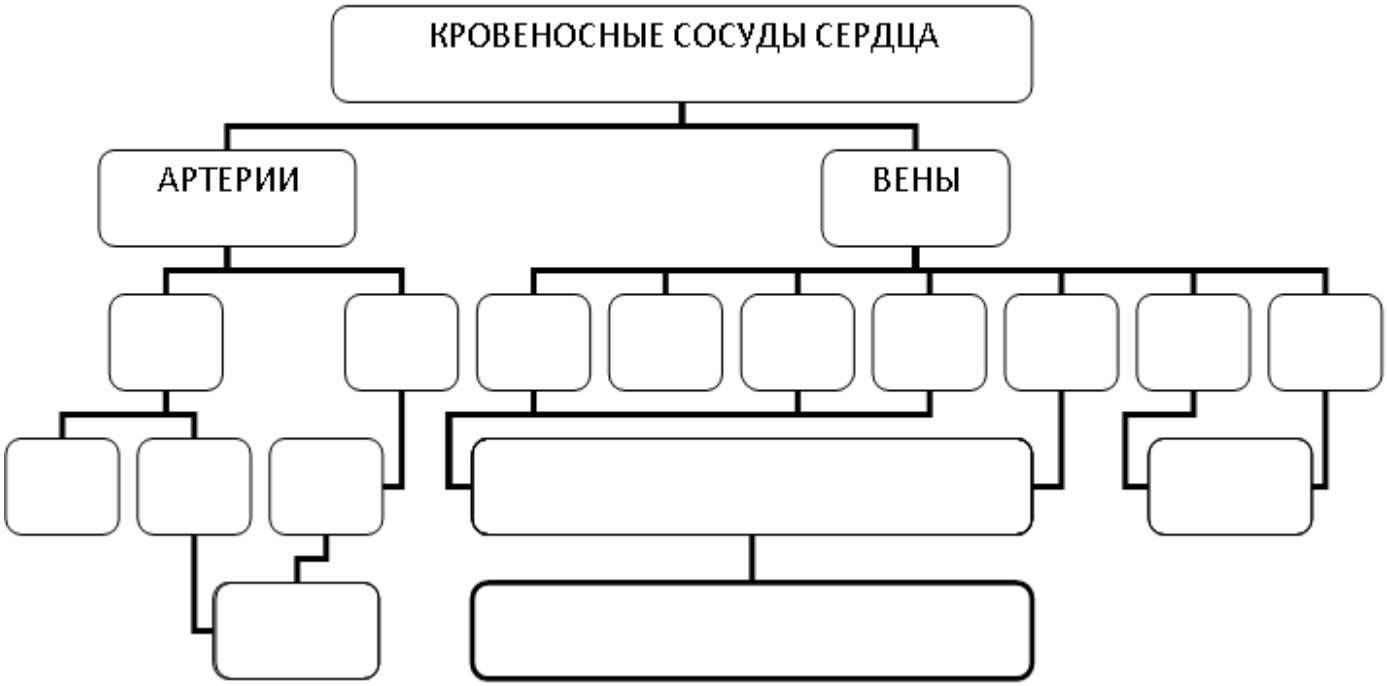
1. Sources of blood supply to the heart and the course of coronary arteries and their branches.
2. Own veins of the heart, flowing into the coronary sinus (cardiac circulation).
3. Topographic features of location and relationship of arteries and veins, their correspondence to internal structures of the heart.
4. Presence of anterior and small veins of the heart (veins of Tebezia), flowing directly into the cavity of the right auricle.
5. The structure of the pericardium. Fibrous pericardium and serous pericardium; its parietal and visceral plates; cavity and sinus pericardium, their boundaries (walls).
6. Topography and heart boundaries, and the projection of valves on the anterior chest wall.

2. STUDENT MUST BE ABLE TO:

1. Show the right and left coronary arteries on the preparation; determine the place of their origin. Show areas of blood supply to the right and left coronary arteries.
2. Call, find and show your own veins of the heart. Determine the coronary sinus on the diaphragm surface, the total flow of the heart veins (small, large, medium).
3. Show the site of the coronary sinus inflow into the right atrium.
4. Find and show the pericardial space and cavities, as well as its sinuses (transverse and oblique).
5. Show the projection of the borders of the heart and its openings on the anterior thoracic wall.

III. Tasks for self-work.

1. Fill in the scheme of cardiac supply of the heart:



2. Complete phrases:

1 Inflows of the coronary sinus are
2 The veins of Thebezia flow into
3 The transverse sinus of the pericardium is located
4 The oblique sinus of the pericardium is limited.
5 The right border of the heart passes
6 Atrioventricular valves are projected:
right:.
left

IV. Qwestions for self-control.

1. Which heart artery is located in the anterior interventricular sulcus?

_____

2. Which arteries and veins lie in the posterior longitudinal groove?

_____

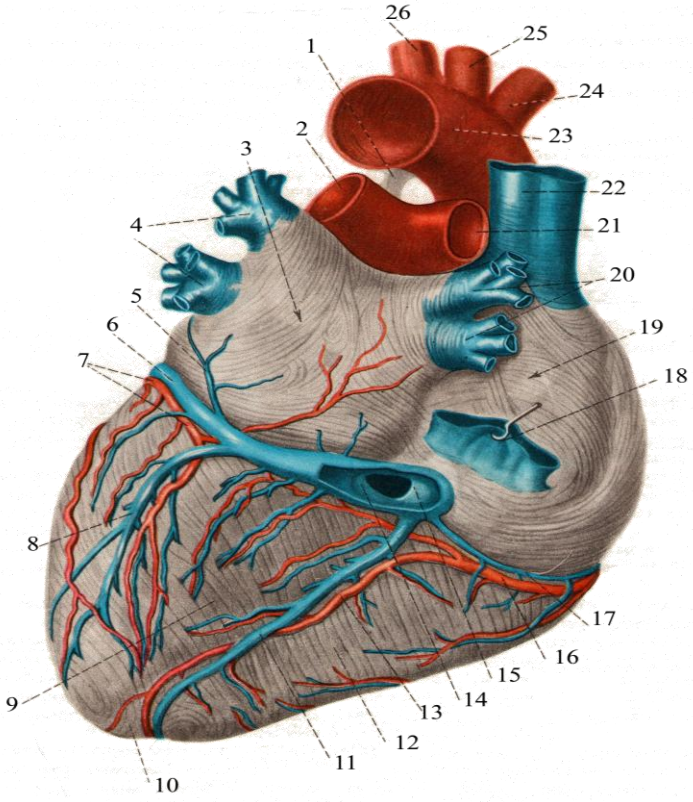
3. What part of the serosa of the heart is the epicardium?

_____

4. What are the ways of the outflow of blood from the heart wall?

_____

V. ***Make the notation in the following pictures.***



Артерии и вены сердца, aa. et vv. cordis; сзади ($^1/_1$).

	A. carotis communis sinistra
	A. coronaris dextra
	A. pulmonalis dextra
	A. pulmonalis sinistra
	A. subclavia sinistra
	Apex cordis
	Arcus aortae
	Atrium dextrum
	Atrium sinistrum
	Lig. arteriosum
	R. circumflexus a. coronariae sinistrae
	R. interventricularis posterior a. coronariae dextrae
	Sinus coronarius cordis
	Truncus brachiocephalicus
	V. cava inferior
	V. cava superior
	V. cordis magna
	V. cordis media
	V. cordis parva
	V. obliqua atrii sinistri
	V. posterior ventriculi sinistri
	Valvula sinus coronarii
	Ventriculus dexter
	Ventriculus sinister
	Vv. pulmonales dextrae
	Vv. pulmonales sinistrae

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: "ANATOMY AND TOPOGRAPHY OF ORTHA AND ITS PARTS. Branches of the Aorta arch. GENERAL SLEEPY ARTERY. ANATOMY AND TOPOGRAPHY OF OUTSIDE SLEEP ARTERY AND ITS BRANCHES. ANATOMY AND TOPOGRAPHY OF THE INTERNAL SLEEP ARTERY AND ITS BRANCHES. ANATOMY AND TOPOGRAPHY OF CONCLUSIVE ARTERY AND ITS BRANCHES. BLOOD SUPPLY OF THE BRAIN. AGE FEATURES. X-RAY - ANATOMY».

Knowledge of the anatomy of the vessels of the head and neck, their topographic relationships with other structures will be needed in the future for understanding: pathogenesis, the occurrence of possible complications, treatment and prevention of diseases of internal organs, and for choosing methods of treatment. The knowledge of topography, sintopia and holotopia is necessary for work in surgical departments, including in x-ray surgery.

I. Objectives:

Student must know:	1). Stenosis and topography of the aorta, and its departments. 2). The branches of the arch of the aorta. 3) .Topography of the common carotid artery and the place of its division into the external and internal carotid arteries. 4) .Topography, stroke and branches of the external carotid artery. 5). The terminal branches of the external carotid artery. 6) .Topography and the course of the internal carotid artery. 7). Classification of the branches of the internal carotid artery (eye artery and brain arteries). 8). Blood supply to the brain and formation of a large arterial circle (Willis circle). 9) .Topography of the course and branches of the subclavian artery prior to entry into the interstitial space, in the very interval and the exit from it)
Student must be able to:	1). Find and show on the prepared corpse and native preparation the departments of the aorta and its branches. 2. To name and show the branches of the arch of the aorta: brachiocephalic trunk, left common carotid and subclavian arteries. 3). To name and show the branches of the brachiocephalic trunk: the right common carotid and subclavian arteries. 4) .Show the place of division of the common carotid artery into the external and internal. 5). Find and show on the moist preparation the external carotid artery and its branches. 6). Determine and show on the wet preparation the internal carotid artery and its branches. 7). Show the boundaries of the subclavian artery. 8). Call and show the branches of the subclavian artery before entering the interstitial space (vertebral artery, internal thoracic artery and shitosheyny trunk). 8). Call and show the branches of the subclavian artery in the interstitial space (costal cervical trunk). 9). Call and show the branches of the subclavian artery at the exit from the interstitial space (transverse artery of the neck). 10). Show on the basis of the brain arteries involved in the formation of the arterial circle of the large brain (Willis circle)
Student must possess:	1) Medical-anatomical conceptual apparatus; 2) Anatomical knowledge for understanding pathology, diagnosis and treatment 3) The simplest medical instruments - a scalpel and tweezers. 4) The technique of preparation of the studied organs (under the supervision of the teacher).

II. ***Required level of knowledge****:*

a) from related disciplines

1). Development of the heart and blood vessels in phylogeny.
2). Development of the heart and blood vessels in ontogenesis.

б) from previous topics:

1) .Myscles and organs of head and neck.
2). Circulation and microcirculatory bed.
3). The development of the heart and its topography.
4). The erection of the pericardium.
5). Mediastinum and its departments.

***в) from the current lesson*:**

1). General characteristics and topography of the aorta and its parts.
2). Topography of the common carotid artery.
3) .Construction and topography of the external carotid artery and its branches.

4) .Construction and topography of the internal carotid artery and its branches
5) .Construction and topography of the subclavian artery and its branches
6) Know the features of the blood supply to the brain (Willis circle).

III. Object of study

Aorta, arch of the aorta, brachiocephalic trunk. Common carotid, internal and external carotid arteries. Branches of the external carotid artery: upper thyroid, lingual, facial artery; occipital, posterior auricle and sternum - clavicle - mastoid artery; ascending pharyngeal, superficial temporal and maxillary arteries. The branches of the internal carotid artery: the eye artery, and the arteries of the brain. The subclavian artery and its branches: the vertebral column, the inner thoracic and the shield-neck trunk; costo- cervical trunk; transverse artery of the neck.

IV. Informational part

Aorta – the largest arterial vessel of the human body, it distinguishes the ascending part, the arc and the descending part. The descending part is divided into the thoracic and abdominal parts.

The ascending part, emerging from the left ventricle, forms an extension - the aortic bulb, from it the right and left coronary arteries, blood supplying the heart.

The aortic arch forms a bend to the left and back to the left side of the IV thoracic vertebra, where it passes into the descending part of the aorta. From the convex side of the aortic arch, the brachiocephalic trunk, the left common carotid artery and the left subclavian artery are sequentially removed.

The ascending part of the aorta (bulb) gives the right and left coronary arteries, blood supplying the heart. From the arch of the aorta, the brachiocephalic trunk, the left common carotid and left subclavian arteries, supplying blood to the neck, head and upper limbs. Common carotid arteries at the level of the upper edge of the thyroid cartilage are divided into the outer and inner carotid arteries.

External carotid artery gives the following groups of branches:

Front branch group:

a) the upper artery of the thyroid gland;
b) the lingual artery;
c) facial artery;

Back group of branches:

a) occipital artery;
b) posterior ear artery;
c) sternocleidomastoid artery;

Middle branch group:

a) an ascending pharyngeal artery;
b) superficial temporal artery;
c) maxillary artery;

Internal carotid artery starting from the common carotid artery, rising to the base of the skull and entering the sleep canal of the temporal bone, it makes bends corresponding to the bend of the canal and, upon exiting it, enters through the laceration in the cavity of the skull. Here, the artery lays in the carotid furrow on the lateral surface of the body of the sphenoid bone, passing through the cavernous sinus. Passing the indicated sinus in the small wings, the artery passes to the base of the brain.

In the neck part, the internal carotid artery does not give branches. In the sleepy canal of the pyramid of the temporal bone, the artery gives an insignificant twig - a sleepy drum branch that passes into the eponymous canal and enters the tympanum, and supplies its mucous membrane.

In the cavity of the skull from the internal carotid artery the following branches depart:

a) the ocular artery;
b) lacrimal artery;
c) the central artery of the reticular membrane;
d) posterior ciliary arteries, short and long;
e) Muscular branches;
f) anterior ciliary arteries;
g) supraorbital artery;
h) anterior latticed artery;
i) medial arteries;
f) frontal artery;
l) posterior artery of nose

Subclavian artery pair formation: the right begins from the brachiocephalic trunk, and the left one directly from the arch of the aorta. The subclavian artery forms a convex upward arc that envelops the dome of the pleura. It leaves the thoracic cavity through the upper aperture, approaches the collarbone, lies in the groove of the subclavian artery of the 1st rib and bends through it. Further, the artery continues into the armpit, where starting from the outer edge of the 1st rib, it is called the axillary artery. On its way, the subclavian artery passes along with the brachial plexus through the interstitial space, therefore, it distinguishes three sections: the first - from the place of origin to the entrance to the interstitial space, the second - in the interstitial space and the third - after leaving it.

Branches of the first department:

a) vertebral artery;
b) basilar artery;

c) internal thoracic;
d) shield - cervical trunk;

Branch of the second department:

a) rib-cervical trunk

Branch of the third department:

a) transverse artery of the neck

Blood circulation of the brain.

The branches of the internal carotid and subclavian artery (anterior cerebral arteries, middle cerebral arteries, anterior connective artery, posterior connective arteries, posterior cerebral arteries, basilar and vertebral arteries) participate in the formation of the arterial (ellisian) circle of the large brain. The right and left posterior cerebral arteries close the arterial circle behind. The posterior cerebral artery with the internal carotid on each side connects the posterior connective artery. The anterior part of the arterial circle of the large brain is closed by the anterior connective artery, located between the right and left anterior cerebral arteries that extend respectively from the right and left internal carotid arteries. The arterial circle of the large brain is located on its base in the subarachnoid space.

Age features:

The formation, growth, tissue differentiation of the vessels of the intraorganic blood channel in various organs of man proceeds unevenly in ontogeny. The length of the arteries increases in proportion to the growth of the body and limbs. For example, the length of the ascending aorta by the age of 50 increases by 4 times, while the length of the thoracic part increases more rapidly than the abdominal. The older the person, the lower the aortic arch is. In newborns, the aortic arch is above level 1 of the thoracic vertebra, at 17-20 years old it is at level 2, at 25-30 years - at level 3, at 40-45 years - at the level of 4 thoracic vertebrae, in elderly and old people - at the level of the intervertebral disc between 4 and 5 thoracic vertebrae.

V. Practical work

Task№ 1

Before proceeding to the study of the superficial vessels of the neck, it is necessary to repeat the muscles and fascia of the neck on the muscular corpse. Then proceed to study the vessels. First, find the main neurovascular bundle of the neck, trace its course, location, remember the names of the formations that make up it. The vascular bundle of the neck is located behind the sternocleidomastoid muscle, which is enclosed in the inner fascia of the neck. In it, find the common carotid artery, located anteriorly and medially and the internal jugular vein.

Task№ 2

Next, follow the course of the common carotid artery in the sleep triangle to the upper edge of the thyroid cartilage, at the level of which it divides into the external and internal carotid arteries. Find the main branches of the external carotid artery. They are divided into three groups: front, middle and back. The front group of branches includes: the upper thyroid, lingual and facial arteries. The upper thyroid artery is a thin stalk, which is directed downward and soon gives up to the larynx the upper laryngeal artery. Somewhat higher than the place of divergence of the upper thyroid artery, the places of the beginning of the lingual and facial arteries are visible. The lingual artery passes in the triangle of Pirogov, where it is covered by a sublingual-lingual muscle. The facial artery is directed to the face area. From the posterior group of branches, the sternocleidomastoid artery, the thin trunk penetrating into the same muscle, and the occipital artery are visible. From the middle group in this triangle is an ascending pharyngeal artery, starting from the place of division of the common carotid artery. The external carotid artery at the posterior edge of the lower jaw is 4-5 cm from its angle divided into the jaw and superficial temporal arteries.

After the branches of the external carotid artery were found and studied before dividing it into the jaw and superficial temporal, you find and study the internal jugular vein. This vein begins at the jugular hole, where its upper extension (upper bulb) can be found. Further it goes laterally from the common carotid artery and behind the sternoclavicular joint it merges with the subclavian vein, but before that it forms the lower extension (the inferior bulb). The internal jugular vein can easily be detected by receding laterally the sternocleidomastosus and the scapular-hyoid muscle. Along the way, the internal jugular vein receives the following tributaries: the facial, submandibular, pharyngeal, lingual, upper and middle thyroid veins. Basically, the listed veins follow in parallel with the same arteries.

Task№ 3

Proceed to study the subclavian artery. Note that the left subclavian artery begins from the arch of the aorta, and the right from the brachiocephalic trunk. The left subclavian artery forms an arc convex upward and leaves the thoracic cavity through the upper aperture of the thorax, after which the artery lays in the subclavian groove of the 1st rib (at this point it can be pressed to stop bleeding). In the subclavian artery, three departments are conventionally identified: a) from the beginning to the entrance to the interstitial space; b) in the interstitial space; c) after leaving this gap to the lateral edge 1 of the rib. Branches of the first section: the vertebral artery is visible between the anterior staircase and the long neck muscle, and then it leaves into the transverse aperture of the sixth cervical vertebra; the internal thoracic artery starts from the subclavian artery, from its lower surface, opposite the vertebral artery, and through the upper aperture of the thoracic cavity penetrates into the thoracic cavity. The branches of this artery are given in the study of the vessels and nerves of the thoracic cavity. Finally, the shield-neck trunk. You will find this trunk at the medial edge of the anterior staircase. It has a length of about 4 cm and is divided into the lower thyroid artery going to the lower pole of the thyroid gland on the posterior surface; the ascending cervical artery that you find on the front surface of the staircase and the supraclavicular artery. The branches of the second part of the subclavian artery are the rib-cervical trunk. You will find it in the interstellar space. If possible, find its two branches, going to 1-2 intercostal spaces and deep muscles of the neck. After the exit of the artery from this interval, the transverse artery of the neck begins from it.

Task№ 4

Find the facial artery. The facial artery extends above the lingual artery from the external carotid artery at the level of the angle of the lower jaw. It comes from the posterior abdomen of the digastric muscle and, reaching the front edge of the masticatory muscle, bends through the base of the lower jaw and passes into the face area. Near the corner of the mouth you will find the lower and upper labial arteries. Further, following the course of the main trunk towards the medial corner of the eye, you will find the angular artery, which is its continuation.

The superficial temporal artery is considered as an extension of the external carotid artery and it can be detected anterior to the external auditory canal (here the artery may be pressed to stop bleeding). Understanding vertically upward, it is located under the skin on the fascia that covers the temporal muscle, and soon divides into two branches: the frontal and parietal.

The facial vein is located next to the facial artery. Its tributaries correspond to branching of the facial artery. From the inflows of the facial vein, it should be noted and found on the preparation an angular vein, which is its initial section, the upper and lower labial veins. Superficial temporal veins accompany the artery and flow into the submandibular vein.

Find the jaw artery - one of the terminal branches of the external carotid artery. For the convenience of studying its branches, it is subdivided into three sections: the first section envelops the neck of the lower jaw; the second - located in the lower temporal fossa; the third - continues into the pterygoid fossa. From the branches of the first department, you can show the lower alveolar artery, which goes to the canal of the lower jaw and its terminal department called the chin artery goes into the chin area through the chin aperture. Branches of the second part go to the chewing muscles and to the teeth of the upper jaw - the upper alveolar arteries. Branches of the third division: the infraorbital artery goes into the orbit and then exits through the infraorbital foramen, the superior anterior alveolar artery departs from the infraorbital, it can be found by exposing the infraorbital canal of the upper jaw. Find the middle meningeal artery, which is guided into the awning hole.

Task№5. Before beginning the study of the vessels of the brain and the orbital vessels, it is necessary to repeat the anatomy and topography of the skull. On the preparation of the brain with the shells and vessels preserved on it, find the final sections of vertebral arteries and study their branches: the right and left spinal arteries are connected along the median line and form the anterior spinal artery, the lateral surface is the posterior spinal arteries. On the lower surface of the cerebellum you find the right and left lower posterior cerebellar arteries. On the basal surface of the bridge, find the basilar artery and its branches: anterior lower cerebellar arteries, upper cerebellar arteries and, finally, posterior cerebral arteries. The latter go around the legs of the brain and branch on the lateral surface of the occipital lobes of the cerebral hemispheres.

Find the inner carotid artery on the neck, and then in the cranial cavity on the sides of the Turkish saddle. Here it lies inside the cavernous sinus and gives the eye artery, going in the orbit through the visual canal. Emerging from the cavernous sinus, the internal carotid artery gives to the brain the following branches: the anterior cerebral artery, this artery you will find on the medial surface of the cerebral hemispheres in the furrow of the corpus callosum. The anterior connective artery connects the right and left anterior cerebral arteries; the middle cerebral artery passes in the depth of the lateral sulcus, the posterior connective artery is directed backward and comes into communication with the posterior cerebral artery from the basilar artery. This artery of the right and left sides and their connections form on the basal surface of the brain a circular arterial anastomosis - the arterial ring (the Velisian circle). The veins of the brain are found in the thick of the pia mater on the lateral surface of the cerebral hemispheres. From the deep veins of the brain, you find a large vein of the brain at the point of its entry into a straight sine.

Sinuses of the dura mater find on the corpse with an uncovered cavity of the skull and a preserved dura mater. The transverse sine is located at the posterior margin of the cerebellum nest in the transverse furrow of the occipital bone; sigmoid sinus is an extension of the lateral sinus, lateral and downward reaches the jugular opening; the superior sagittal sinus is found along the upper edge of the cerebral crescent, along the upper sagittal fissure, and extends from the cock's crest to the inner occipital elevation; the occipital sinus is a continuation of the superior sagittal and is located at the attachment site of the cerebellum sickle to the inner occipital crest; a straight sine is located at the place where the cerebellum sickle is attached to the hump of the cerebellum, the upper and lower stony sinuses can be found in the same-named furrows of the pyramid of the temporal bone. The cavernous sinuses are located on each side of the Turkish saddle and are interconnected by the intercellular sinus.

VI. Control questions

1) Topography of the aorta and its branches
2) Topography of the left common carotid artery
3) The external carotid artery, its branches (anterior group)
4) Blood supply of the eyeball
5) Lip irrigation
6) Blood supply of the sky
7) Internal carotid artery, branch stroke and topography.
8) Medial group of branches, external carotid artery.
9) Back group of branches of the external carotid artery.
10) Blood supply to the brain.
11) Blood supply of the thyroid gland.

VII. Academic pursuits

Task№1. In case of traumatic damage of the tongue due to severe bleeding as an emergency aid, it became necessary to apply a ligature to the lingual artery.

1. At what level does it branch off from the external carotid artery?
2. In what topographical formation of the neck can you find the lingual artery?

Answer:

1. A little above the branch of the upper thyroid artery - at the level of the large horn of the hyoid bone.
2. In the area of the submandibular triangle.

Task№2. When performing the operation of removing the palatine tonsil, one of the complications can be arterial bleeding.
1. From which arteries the palatine tonsil is fed?
2. Which artery supplies the hard and soft palate?

Answer:

1. From the ascending pharyngeal artery, the facial artery, ascending and descending (branch a.maxillaris) of the palatine arteries and lingual arteries.
2. An ascending palatine artery (branch of the facial artery), pharyngeal arteries of the ascending pharyngeal artery, large and small palatine arteries (branches of the descending palatine artery that extends in the pterygo-palatine section of the maxillary artery).

VIII. Control Tests

1) Specify the branches of the jaw section of the maxillary artery:
   a. Deep ear artery.
   b. Drum artery.
   c. Middle cerebral artery.
   d.Lower alveolar artery.

Ответ: г

2) From which artery the middle cerebral artery departs:
   a. The infraorbital artery.
   b. Internal carotid artery.
   c. Maxillary artery.
   d. Occipital artery.

Ответ: в

3) From which vessels the upper alveolar arteries:
   a. Maxillary artery.
   b. The facial artery.
   c. The orbital artery.
   d. Infraorbital artery.

Ответ: г

4) Specify the branches of the facial artery:
   a. Angular artery.
   b. Artery of the back of the nose.
   c. Lower labial artery.
   d. Upper labial artery

Ответ: а, в, г

5) Specify the branches of the eye artery:
   a - lacrimal artery
   b - central retinal artery
   c - supra-lateral artery
   d - infraorbital artery

Ответ: б,в

6) Indicate the arteries forming the arterial circle of the brain:
   a - anterior connective artery;
   b - anterior cerebral arteries;
   c - posterior cerebral arteries
   g - anterior villous arteries.

Ответ: а,б,в

7) What is the blood supply of the lingual artery?
   a. Lower dental arch.
   b. The lower jaw.
   c. The sublingual gland.
   d. The submandibular gland.

Ответ: в

8) What does supplies by blood the facial artery?
   a. Parotid gland.
   b. Eyeball.
   c. The muscle of the face.
   d. Upper jaw.

Ответ: в

9) What does supplies y blood to the occipital artery?
   a. An ear concha.
   b. A solid medulla.

c. The circular muscle of the mouth.
d. The submandibular gland.

Ответ:а,б

10. What does supplies bu lood the superficial temporal artery?
a. The submandibular gland.
b. The subcutaneous muscle.
c. Eyeball.
d. Parotid gland.

Ответ: г

IX. Anatomical terminology

English Name.	Latin Name.
aorta	Aorta
ascending part of the aorta	pars ascendens aortae
aortic bulb	bulbus aortae
aortic arch	arcus aortae
aortic isthmus	isthmus aortae
arterial ligament	lig. arteriosum
descending part of the aorta	pars descendens aortae
brachiocephalic trunk	truncus brachiocephalicus
common carotid artery	arteria carotis communis
right common carotid artery	a. carotis communis dextra
left common carotid artery	a. carotis communis sinistra
external carotid artery	a. carotis externa
upper thyroid artery	a. thyroidea superior
upper laryngeal artery	a. laryngea superior
hyoid branch	r. Infrahyoideus
Chest-clavic-mastoid and finger-branch-shaped branches	rr. sternocleidomastoideus et cricothyreoideus
lingual artery	a. lingualis
deep artery of the tongue	a. profunda linguae
supra-lingual branch	r. suprahyoideus
hyoidal artery	a. sublingualis
facial artery	a. facialis
lingual-facial trunk	truncus linguofacialis
glandular branches	rami glandulares
ascending palatine artery	a. palatina ascendens
almond branch	r. tonsillaris
podborodonochnaya artery	a. submentalis
lower and upper labial arteries	aa. labiales superior et inferior
angular artery	a angularis
occipital artery	a. occipitalis
occipital branches	rr. occipitales
sternocleidomastoid branches	rr. Sternocleidomastoidei
aural branch	r. auricularis
mastoid	r. mastoideus
anterior ear	a. auricularis posterior
styloid artery	a. stylomastoidea
posterior tympanum	a. tympanica posterior
ascending pharyngeal artery	a. pharyngea ascendens
posterior meningeal artery	a. meningea posterior
lower drum artery	a. tympanica inferior
superficial temporal artery	a. temporalis superficialis

frontal and parietal branch	rr. frontalis et parieta

X. Preparations and manuals

1. The vascular corpse, with the prepared area of the neck and face, as well as the thorax, which involves opening the vessels of the above areas.
2. The brain with the existing arterial ring on the basal surface of the brain.
3.Auditornye stands, tables, atlas and textbook, methodical manual.
4. Graphs. Tests of level 2. and standards to them.

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ANATOMY AND TOPOGRAPHY OF INTERNAL SLEEP AND CONCLUSIVE ARTERY AND THEIR BRANCHES. BLOOD SUPPLY OF THE BRAIN.**

I. Questions of the initial level of knowledge:

1. Topography and space of the neck and head.
2. Structure and channels of the temporal bone.
3. The internal structure of the base of the skull.
4. Divisions of the brain.
5. Divisions and branches of the arch of the aorta.

II. Objectives.

STUDENT MUST KNOW:
1. Topography of the right and left subclavian arteries, features of their beginning. 2. Branches of the subclavian artery before entering the interstitial space (I department), in the very interval (II department) and after exiting it (department III). 3. Branches of the 1st department and the area of their blood supply: a. vertebral artery, its course and branches in the cranial cavity; b. internal thoracic artery, its branches and course along the posterior surface of the anterior thoracic wall; at. Shchitosheyny trunk and its branches (lower thyroid, supralpus artery, ascending neck artery). 4. The course of the vertebral artery (transverse processes of the cervical vertebrae, posterior atlanto-occipital membrane, large opening of the occipital bone, skull cavity) and the formation of the basilar artery and their branching. Branches: posterior cerebral arteries, arteries of the spinal cord and cerebellar arteries. 5. Topography of the internal carotid artery and its branches in the neck, the drowsy canal, the cranial cavity (anterior and medial cerebral, anterior villous and adherent arteries). 6. Topography of the eye artery and branching it in the eye area. 7. The presence of anastomoses between the anterior and posterior cerebral arteries with the formation of the arterial circle (ring) of the large brain - the Willis circle.
STUDENT MUST BE ABLE TO:
1. To show on the preparation (on the corpse and organocomplex) the branches of the arch of the aorta. 2. Show the boundaries of the subclavian artery. 3. To find and show on the corpse a vertebral artery that is directed upwards into the holes of the transverse processes of the cervical vertebrae, the inner thoracic artery that extends downward, the shield-cervical and costo- cervical trunks, and the transverse artery of the neck. 4. Identify and show on the corpse the internal carotid artery in the neck and on the base of the brain in the cranial cavity. 5. To find and show on the preparation the basis of the brain vertebral, basilar arteries, their connections with the branches of the internal carotid artery with the help of the front and back connecting branches - the formation of the Vilisius circle. 6. Show on the basis of the brain of the Willis circle.

III. Tasks for self-work.

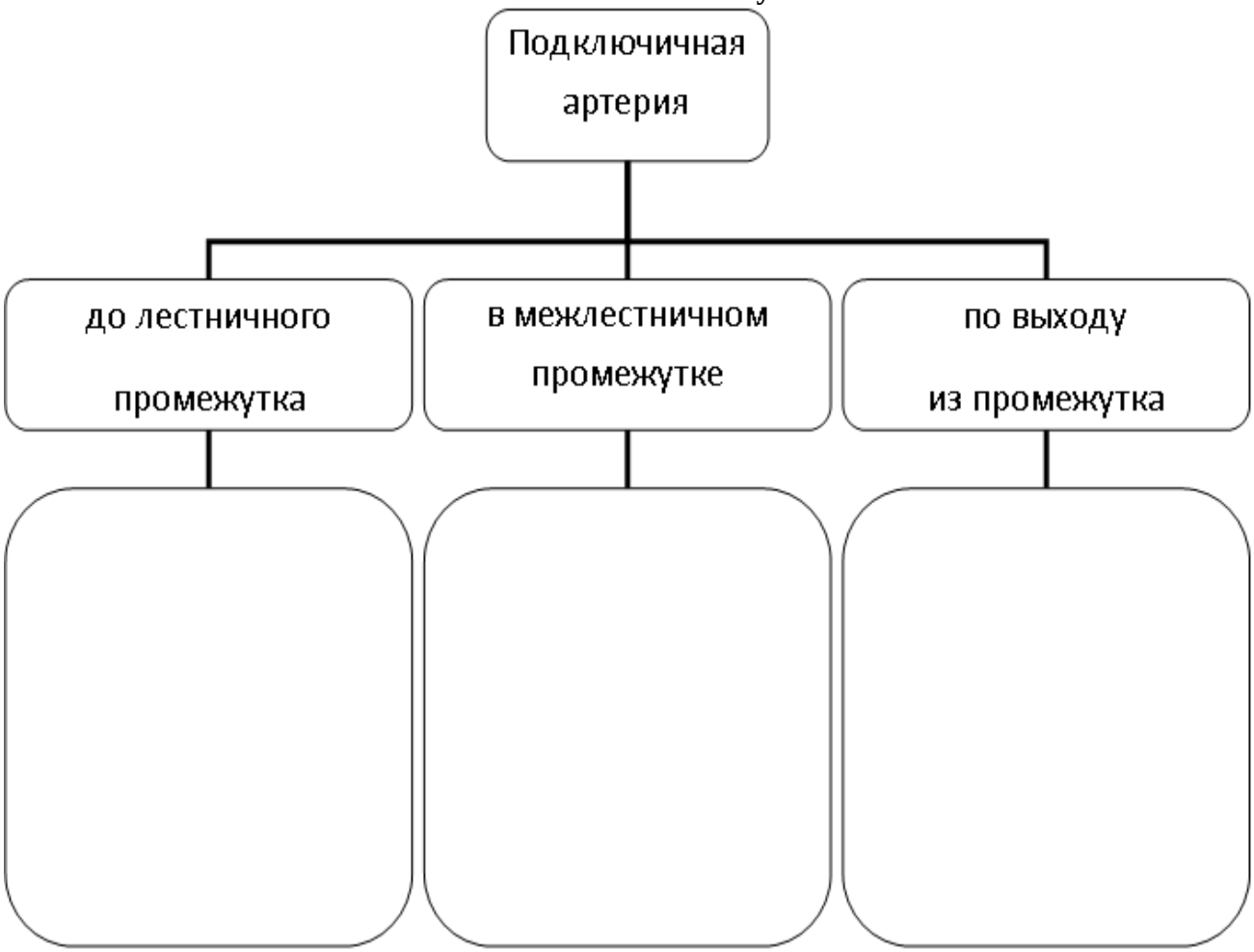
Complete phrases:

1. Right subclavian artery departs _____
2. The left subclavian artery is a branch _____
3. The subclavian artery in the neck region passes _____
4. The internal carotid artery branches into _____
5. After departing from the common carotid artery, the lateral _____. artery
6. In the blood supply of the brain participates branches _____

1. Fill in the tables:

ARTERIES	Branches	Topography in the neck area	Topography in the cranial cavity	Anastomoses
Subclavian artery				
Internal carotid artery				

2. Fill in the scheme: the branches of the subclavian artery.



3. Make a diagram of the blood supply of the brain - the Wilzieva ring:

***IV*. Qwestions for self-control.**

1. Where does the left subclavian artery begin?_____

_____

2. Which artery descends on the inner surface of the anterior thoracic wall?_____

_____

3. What is the blood supply to the mesh of the eye?_____

_____

4. Name the branches of the stony part of the internal carotid artery._____

_____

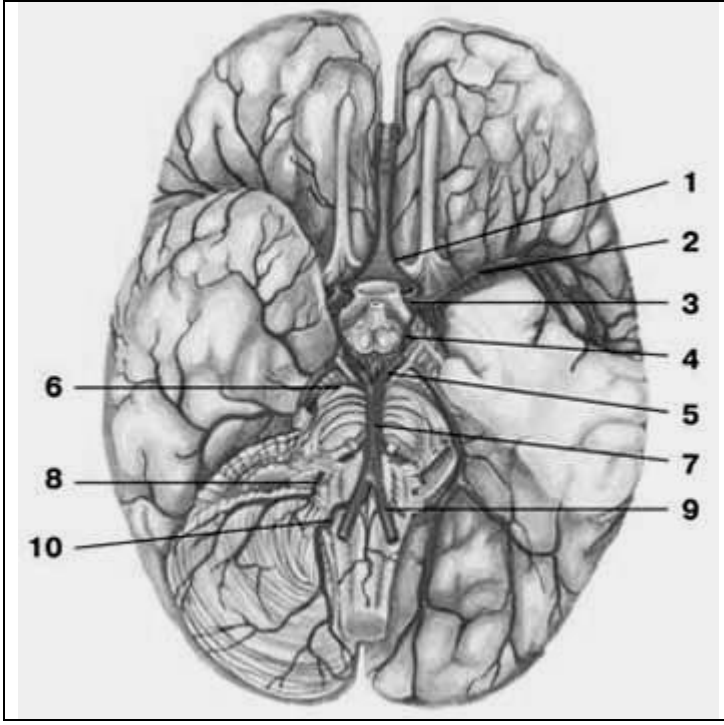
5. Name the terminal and lateral branches of the internal thoracic artery._____

_____

6. Anastomosis of which arteries is located in the medial angle of the orbit?_____

_____

V. Make the notation in the following figures.

	1
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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: «ANATOMY AND TOPOGRAPHY OF THE BREAST AND ABDOMINAL PARTS OF THE AORTA AND THEIR BRANCHES. ANATOMY AND TOPOGRAPHY OF GENERAL, EXTERNAL AND INTERNAL SUB-ARTERIES AND THEIR BRANCHES. VALUE AND PRACTICAL SKILLS. AGE FEATURES. X-RAY ANATOMY».

Due to the wide range of organs supplied by branches of the descending part of the aorta, the need for in-depth study of the features of topography, holotopia and sintopy used for the successful diagnosis and treatment of diseases in cardiological, nephrological and many other patients is increasing. The number of patients with congenital and acquired anomalies, connected with the disturbance of blood flow in the system of the descending part of the aorta, which seriously disturb the functions of the blood supply organs, does not cease to decrease. The knowledge of topography and holotopia is necessary for work in surgical departments, including in x-ray surgery.

I. Objectives:

Student must know:	1.Sections of the aorta. 2. Skeleototopy of the thoracic part of the aorta. 3. Topography of the parietal branches of the thoracic part of the aorta, their area of blood supply. 4.Topografiya visceral branches of the thoracic part of the aorta, their area of blood supply. 5. Skeleototypy of the abdominal part of the aorta. 6.Topography of the parietal branches of the abdominal part of the aorta. 7.Topography, stroke and area of blood supply of paired visceral branches of the abdominal part of the aorta. 8.Topography, stroke and area of blood supply of unpaired visceral branches of the abdominal part of the aorta. 9. Skeleototopy of the common iliac artery and its branches. 10.Topography and branches of the external iliac artery. 11.Topografiyu internal iliac artery, its departments and branches.
Student must be able to:	1. Find and show on the corpse and native preparations the departments of the aorta. 2. Find and show the place of transition of the thoracic part of the aorta into the abdominal. 3. Determine the sources of blood supply to the organs and walls of the thoracic and abdominal cavities. 4. Find and show on the preparation site of the common iliac artery from the aorta (aortic bifurcation). 5. Show the place of dividing the common iliac artery into the internal and external. 6. Show the branches of the external and internal iliac arteries. 7. Determine the sources of blood supply to the walls and organs of the small pelvis.
Student must	1.Latinskoy terminology on this topic.

possess:	2. Skills of preparation

II. ***Required level of knowledge****:*

a) from related disciplines

1). The development of vessels of the thoracic and abdominal cavities in phylogeny.

2) .Construction of the vessels of the thoracic and abdominal cavities in ontogenesis.

б) from previous topics:

1) .Construction and organs of the thoracic cavity.
2). Steny and abdominal organs
3). Stroenie and topography of the diaphragm.
4). Circulation of blood
5). The mediastinum and peritoneum.

***в) from the current lesson*:**

1). To know the anatomical and topographic features of the branches of the descending part of the aorta.
2). To study the blood supply to the organs of the thorax.
3). Clarify and understand the blood supply to the abdominal cavity organs.
4). To know the skeletal and sintopy of the descending part of the aorta.
5). To study visceral and parietal branches in various parts of it.
6). To know the topography of the general, external and internal iliac arteries.

III. Object of study

Aorta and its departments. The thoracic part of the aorta and its branches (parietal and visceral), the abdominal branches of the aorta (paired and unpaired), the common iliac artery, the external and internal iliac arteries and their branches.

IV. Informational part

The descending part of the aorta is divided into the thoracic and abdominal parts. The thoracic part begins at level IV of the thoracic vertebra, then, passing through the aortic slit of the diaphragm, passes into the abdominal part of the aorta and reaches the level IV of the lumbar vertebra giving 2 large branches - the right and left common iliac arteries. All branches of the descending part of the aorta (thoracic and abdominal parts) are divided into parietal (parietal) and visceral (intragranular) branches.

Thoracic department of descending part of aorta gives following **visceral branches:**

a). bronchial branches.

b). esophageal branches to the walls of the esophagus.

c). mediastinal branches to the lymph nodes and connective tissue of the posterior mediastinum.

d). pericardial branches to the pericardium

parietal branches:

a) .10 pairs of posterior intercostal arteries

b). The upper diaphragm arteries branch out on the upper surface of the diaphragm.

Abdominal part of the aorta gives visceral branches divided into paired and non-paired branches.

paired branches:

a). The median adrenal artery, departs at the level of the superior mesenteric artery.

b. the renal artery, departs at level II of the lumbar vertebra, almost at right angles and is directed to the gates of the corresponding kidney.

c). ovarian women, in men the testicle arteries.

Unpaired visceral branches:

The celiac trunk is short (2 cm), but the thick artery, which departs at the level of the XII thoracic vertebra, goes forward over the upper edge of the body of the pancreas and divides into three branches:

a) the left gastric artery departs from the celiac trunk and is directed to the small curvature of the ventricle on the left.

b) the general hepatic artery - departs from the celiac trunk, has a length of 4 cm, gives the one going to the small curvature of the stomach on the right - the right gastric artery and divides into 2 branches: its own hepatic - thicker and directed to the gates of the liver, where it divides into the left and the right branch, respectively, of the liver.

c) spleen going to the left along the upper edge of the pancreas to the gates of the spleen and giving pancreatic branches, splenic branches -4-5 in the area of the spleen gates.

Upper mesenteric artery Leaves from the anterior surface of the aorta just below the celiac trunk, leads down and forward, giving the following branches:

a) pancreatic - duodenal artery

b) small intestine arteries of 10-16 branches that extend from the superior mesenteric artery to the left side to the lean and iliac arteries.

c) the ileal-intestinal artery departs from the superior mesenteric to the right, supplying with the branches the lower portion of the ileum to the vermiform appendix.

d). The right intestinal artery goes behind the peritoneum to the ascending colon and near it is divided into 2 branches: ascending and descending.

e). The middle intestinal artery reaching the transverse colon divides into the right and left branches, which divergent anastomose: the right branch with the right intestinal artery, the left branch with the left intestinal artery.

Lower mesenteric artery departs at the level of the edge of the third lumbar vertebra, going down and to the left gives the following branches:

a). The left intestinal artery is divided into two branches: ascending and descending;

b) sigmoid arteries;

c) upper rectal artery;

The abdominal part of the aorta at level IV of the lumbar vertebra is divided into terminal branches: the right and left common iliac arteries, which in turn are divided into the internal and external iliac arteries.

Internal iliac gives the following branches to the walls and organs of the pelvis:

1) iliac lumbar artery;

2) the lateral sacral artery;

3). Upper gluteal artery;

4) occlusal artery;

5). Lower gluteal artery;

Visceral branches:

a) umbilical artery;

b) luminal branches;

c) upper and lower cystic arteries;

d) the artery of the vas deferens (in men);

e) Uterine artery in women;

e). The middle rectal artery, gives branches to the ureter and bladder, prostate gland, seminal vesicles, in women - to the vagina.

g). Internal sexual artery, blood supply to the lower section of the rectum, urethra, perineal and vaginal muscles in (women), bulbourethral glands (in men), external genitalia.

External iliac artery gives two large branches that extend near the inguinal ligament:

a). The lower epigastrium artery departs from the external iliac at the level of the inguinal ligament and is directed upward into the vagina of the rectus abdomin along its inner surface. In the umbilical area anastomosing with the upper epigastric artery.

b.) a deep artery surrounding the iliac bone, runs parallel to the inguinal ligament to the iliac crest posteriorly and nourishes the iliac muscle.

Age features.

The descending aorta is located all over the left half of the spine. Up to 5 months of life because of the accelerated growth of the spine, it seems to be shortened, but then normal relationships are established. The inner membrane has thickenings in the areas of the beginning of the posterior intercostal arteries.

The trunk is large, muscular type. Newborns often have a hepatic branch of the left gastric artery, which is then obliterated.

The renal artery because of the peculiarities of the kidney position in the child is oblique and subsequently becomes horizontal.

The common iliac artery after puberty (16-20 years) grows and surpasses in size the subclavian and common carotid artery. On the second day after birth, the terminal thrombus appears in the umbilical arteries. Their obliteration ends at 3 to 3.5 months after birth. Department of the umbilical artery above the divergence of the upper cystic artery is obliterated and becomes a fibrous cord, involved in the formation of the lateral umbilical fold.

V. Practical work

Task№ 1. On the prepared corpse to find the aorta: the ascending part, the arc, thoracic and abdominal parts.

Task№ 2. On the prepared corpse, find the bifurcation of the descending part of the aorta.

Task№ 3. On the prepared corpse find common iliac arteries and their branches external and internal iliac arteries.

Task№ 4. On the prepared corpse find the paired and unpaired branches of the thoracic part of the aorta.

Task№5. On the prepared corpse to find the unpaired branches of the abdominal part of the aorta: celiac trunk, common hepatic artery, left gastric artery.

Task№ 6. On the prepared corpse to find paired branches of the abdominal part of the aorta.

Task№ 7. On the prepared corpse to find arteries of the pelvis (parietal and visceral).

Task№ 8. Compare the arteries found with the pattern in the atlas, table. If you do not see everything on the artery preparation, find them in the picture. Make a schematic drawing of the arteries and designate in it in Russian and in Latin the names of the vessels.

VI. Control questions

1. Specify the topography of the thoracic part of the aorta.
2. List the parietal branches of the thoracic part of the aorta. What kind of blood supply is each of them?
3. Specify the topography of the posterior intercostal arteries. On which branches are they divided and what is the blood supply?
4. Which arteries anastomose the posterior intercostal arteries?
5. List the visceral branches of the thoracic aorta.
6. What are the blood supply to the bronchial branches of the thoracic aorta?
7. List the arteries that supply the esophagus.
8. What are the blood supply to the mediastinal branches of the thoracic aorta?

9. Describe the topography of the abdominal part of the aorta.
10. List the parietal branches of the abdominal aorta. What is the blood supply of each of them?
11. List the arteries that supply the diaphragm.
12.Calculate the unpaired visceral branches of the abdominal part of the aorta, indicate the level of their deviation from the aorta and topography.
13. Which branches divide the celiac trunk? Indicate the course of each of its branches, the area of blood supply and anastomosis.
14. List the branches of the superior mesenteric artery. Indicate their course, areas of blood supply and anastomosis.
15. List the branches of the inferior mesenteric artery. Indicate their course, areas of blood supply and anastomosis.
16.Calculate pair visceral branches of the abdominal part of the aorta, indicate their course and areas of blood supply.
17. Point the arteries, blood supplying the adrenal gland.
18. Tell me the level of the renal artery? On which branch is it divided in the parenchyma of the kidney?
19. Specify the level of separation of the testicle (ovarian) artery, describe its topography.
20. On what arteries the abdominal part of the aorta is divided?

VII. Academic pursuits

Task№ 1 The patient was clinically evacuated and, of course, uterine arteries were bandaged.
1. Will the blood supply to the ovaries be disturbed as a result of this operation?
2. Give anatomical justification for the conclusion.

Answer:

1.No.

1. The ovaries receive arterial blood from the abdominal aorta, the ovarian artery.

Task№ 2.

The patient developed thrombosis of the superior mesenteric artery.

1. Which organs can suffer as a result of this until the appearance of necrotic changes (necrosis of tissues)?
2. Give anatomical justification.

Answer:

1. Pancreas, duodenum, jejunum, ileum, caecum, ascending and transverse colon.
2. The necrosis of tissues can occur in the jejunum and ileum, since the superior mesenteric artery is the only source of nutrition of these parts of the intestine.

VIII. Control Tests

1) The thoracic part of the esophagus is supplied with blood:
a) bronchial branches
b) esophageal branches
c) the mediostinal branches
d) pericardial branches

Ответ: б

2) The parietal branches of the abdominal part of the aorta are:
a) Upper diaphragmatic artery
b) lower diaphragmatic artery
c) lumbar arteries
d) pelvic arteries

Ответ: б, в

3) From aortic bifurcation down the pelvic surface of the sacrum goes:
a) upper rectal artery
b) middle sacral artery
c) lower rectal artery

Ответ: б

4) To the ventral part of the esophagus the esophageal branches give:
a) left gastric artery
b) the right gastric artery
c) splenic artery

Ответ: а

5) The splenic artery is a branch of:
a) the superior mesenteric artery
b) the inferior mesenteric artery
c) celiac trunk

Ответ: в

6) The lateral sacral artery gives:
a) Sexual branches
b) blocking branches

c) spinal branches

Ответ: в

7) The branches of the occlusion artery are:

a) pubic branch
b) anterior branch
c) posterior branch
d) acetabular branch
e) deep branch

Ответ: а, б, в, г

8) Lower gluteal artery blood supply:

a) the gluteus majorus
b) the square muscle of the thigh
c) hip joint
d) gluteal region skin
e) middle gluteal muscle

Ответ: а, б, в, г

9) Lower adrenal artery supplies by blood :

a) the kidney
b) adrenal gland
c) upper ureter
d) capsule of the kidney
e) the lower pole of the kidney

Ответ: а, б, в, г

10) The lower posterior intercostal arteries (VII-XII) pass in the thickness of the anterior abdominal wall between:

a) transverse and internal oblique abdominal muscles
b) transverse and external oblique abdominal muscles
c) external and internal oblique abdominal muscles

Ответ: а

IX. Anatomical terminology

Latin Name	English Name
Rami bronchiales	bronchial branches
Rami esophageales	esophageal branches
Rami mediasfinales	mediastinal branches
Rami pericardiaci	pericardial branches
a. intercostales posteriors	posterior intercostal arteries
a. pfirenicae superiors	upper diaphragmatic artery
a. suprarenalis media	middle adrenal artery
a. renalis	renal artery
a. testicularis, a. ovarica	ovarian artery, ovarian artery
truncus coeliacus	celiac trunk
a. gastrica sinistra	left gastric artery
a. lienales	splenic artery
a. mesenterica superior	superior mesenteric artery
a. mesenterica inferior	lower mesenteric artery
a. iliolumbalis	iliac lumbar artery)
a. sacralis lateralis	lateral sacral artery
a. glutea superior	upper gluteal artery
a. obturatoria	occlusal artery
a. glutea	lower gluteal artery
a.umbilicalis	umbilical artery
aa. vesicalis superior et inferior	upper and lower cystic arteries

X. Preparations and manuals

1. Prepared corpse with vessels of the thoracic and abdominal cavities.
2.Native preparations of blood vessels.
3. Tables.
4.Tutorial and atlas of human anatomy.

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC:
ANATOMY AND TOPOGRAPHY OF THE BREAST AND ABRASIVE PARTS OF THE AORTA.

Questions of the initial level of knowledge.

1. Walls and organs of the thoracic cavity.
2. Walls and organs of the abdominal cavity.
3. General characteristics of the aorta, divisions.
4. Relative organs to the pleura and peritoneum.
5. Topography of the thoracic part of the aorta.
6. Construction and topography of the diaphragm.
7. Topography of the abdominal aorta.

II. Objectives.

STUDENT MUST KNOW:
1. Organs of the chest cavity, pleura. 2. Departments of the descending aorta. 3. Skeleotopia of the thoracic part of the aorta. 4. Parietal branches of the thoracic part of the aorta (intercostal, diaphragmatic). 5. Visceral branches of the thoracic part of the aorta. 6. Walls and organs of the abdominal cavity 7. Skeleotopia of the abdominal aorta. 8. The parietal branches of the abdominal part of the aorta are the lower diaphragmatic and lumbar arteries. 9. Pairwise visceral branches of the abdominal aorta, their course and skeleotopia, the area of blood supply. 10. Visceral unpaired branches of the abdominal aorta (celiac trunk, upper and lower mesenteric arteries), their branches and anastomoses. 11. Blood supply to the diaphragm
STUDENT MUST BE ABLE TO:
1. Show the thoracic part of the aorta on the corpse. 2. Show intercostal arteries and intercostal branches on the corpse. 3. Find and show the place of transition of the thoracic part of the aorta into the abdominal. 4. Show parietal branches of the abdominal aorta - lumbar and diaphragmatic. 5. Find and show on the corpse unpaired visceral branches of the abdominal aorta: a). Show the celiac trunk, its branches (spleen, left gastric, hepatic artery). b) Show the superior mesenteric artery, its branches - intestinal, ilio-blind-intestinal, right and middle colonic arteries and their anastomoses. at). Show the inferior mesenteric artery of the artery and its branches: left colon, sigmoid, upper rectal and their anastomoses. 6. Find and show on the corpus a pair of visceral branches of the abdominal aorta: the middle adrenal, renal, testicle (ovarian). 7. Show the terminal branches of the abdominal part of the aorta-common iliac arteries and the middle artery of the sacrum. 8. Show the vessels of separate organs of the abdominal cavity forming interarterial anastomoses.

III. *Tasks for self-work.*

1.Complete phrases:

1. The parietal branches of the abdominal aorta are _____

_____

2. The branches of the superior and inferior mesenteric arteries anastomose, forming _____

_____

3. In the blood supply of the pancreas take part _____

_____

4. The diaphragm is blood supplies by:

а) _____

б) _____

в) _____

г) _____

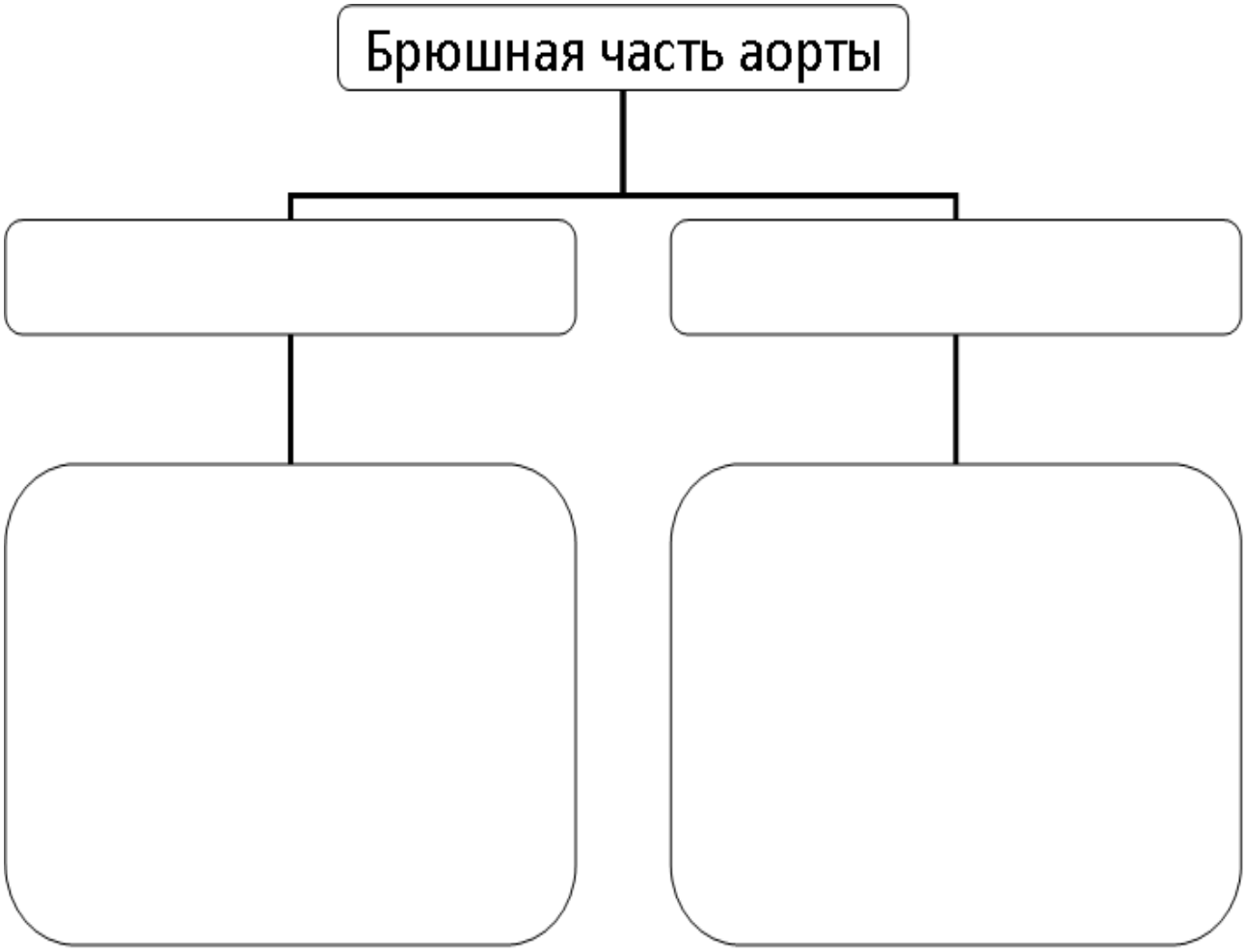
5. Visceral branches of the thoracic aorta are _____

_____

2.Fill in table:

DEPARTMENTS OF THE STOMACH	MAIN ARTERIES	BRANCHES	ANASTOMOSES
Small curvature			
Large curvature			
Fundal part of stomach			

3. Compose and continue the scheme of branching of the abdominal part of the aorta.


Брюшная часть аорты

IV. ***Qwestions for self-control*:**

1.Перечислите висцеральные ветви брюшной и грудной частей аорты. _____

_____

2. Name the anastomoses of the branches of the thoracic and abdominal parts of the aorta.

_____

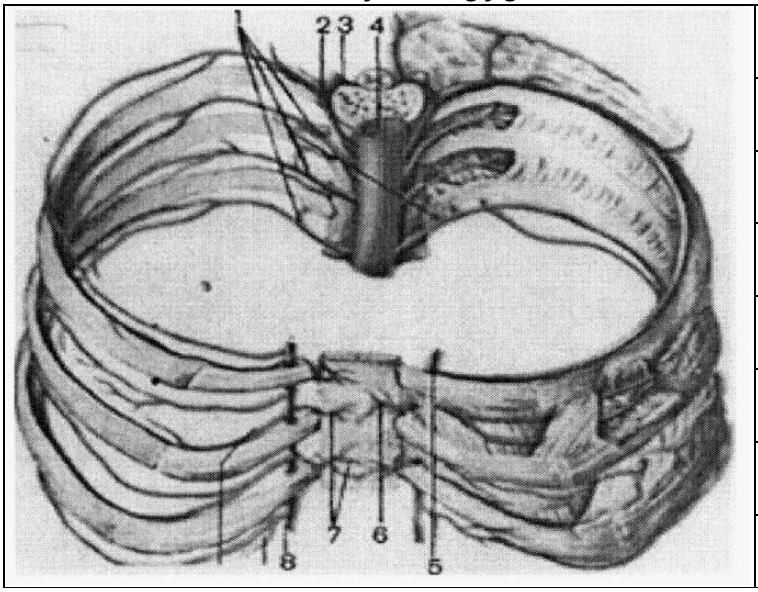
3. Name branches that supply blood to the adrenal glands._____

_____

4. Blood supply of the duodenum is carried out: _____._____

_____

V. ***Make the notations in the following figures.***



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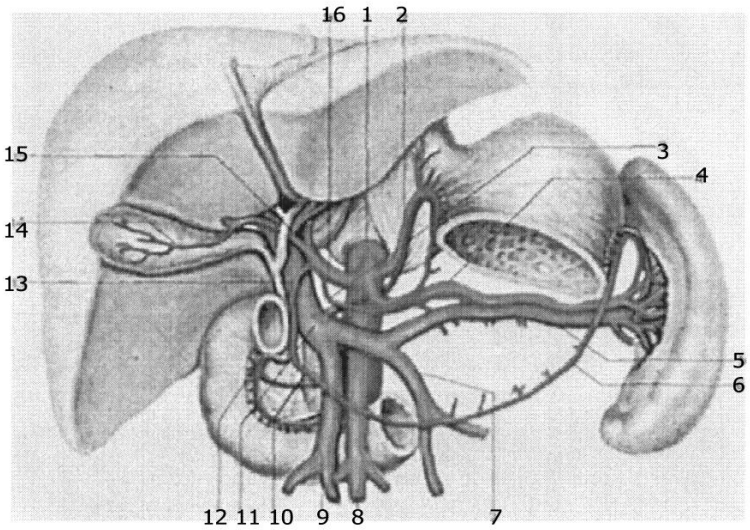

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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ANATOMY AND TOPOGRAPHY OF GENERAL AND EXTERNAL AND INTERNAL SUB-ARTERY AND THEIR BRANCHES.**

Questions of the initial level of knowledge.

1.Topography of organs and walls of the small pelvis (canals and holes). Crotch.

2. General characteristics of the aorta and its departments.

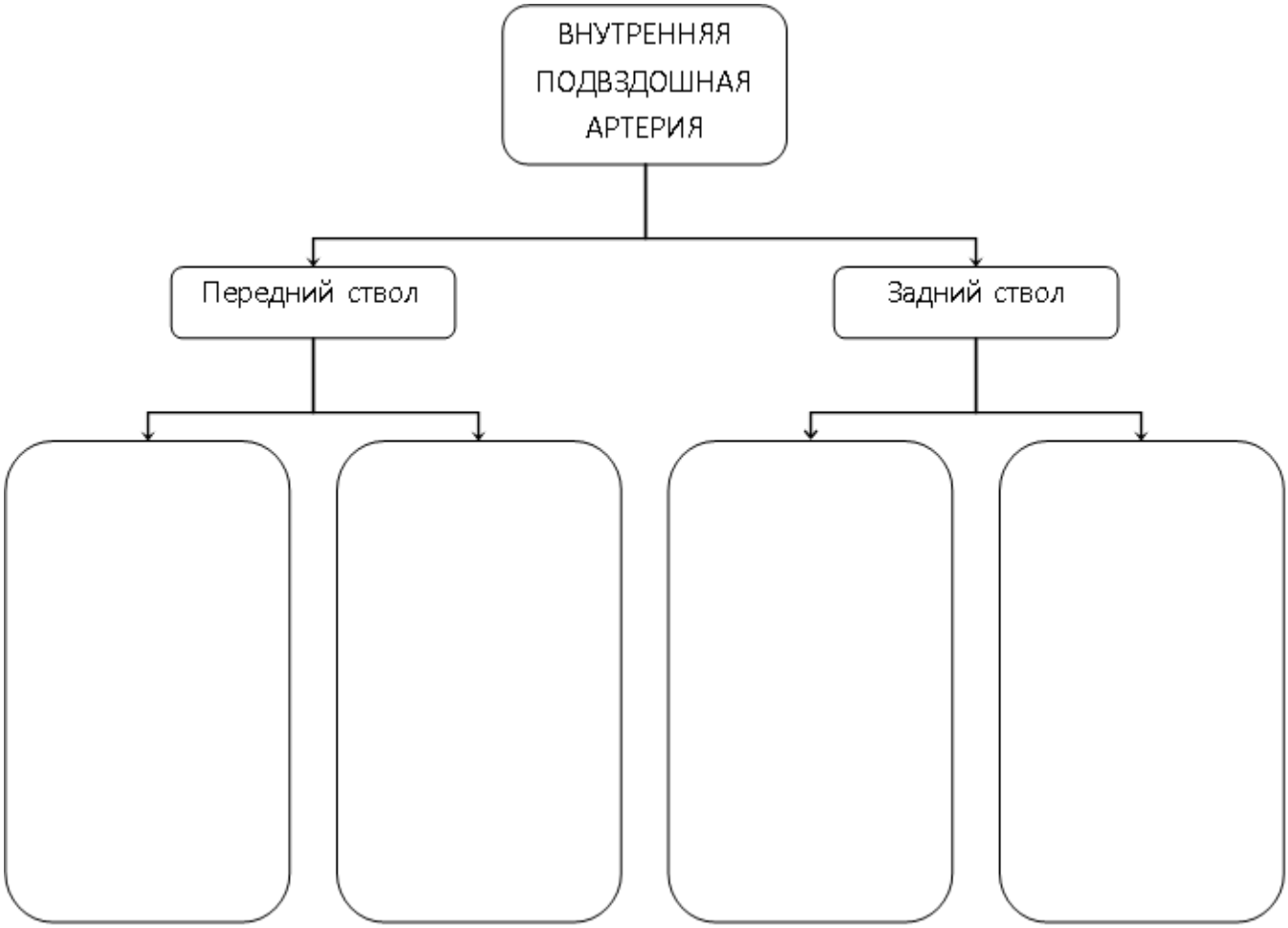
3. The terminal branches of the descending part of the aorta are common iliac arteries.

2. ***Objectives*****.**

STUDENT MUST KNOW:
1. Topography of the common iliac artery and its branches. 2. External iliac artery and its branches (the inferior hypogastric and enveloping ileal bone is deep). 3. Topography of the internal iliac artery and its sections, anterior and posterior trunk 4. Stroke and branches of the anterior trunk of the internal iliac artery (umbilical, upper and lower arteries, obstructive, internal pudendal, gluteal, middle rectal, uterine). 5. Topography, stroke and branches of the posterior trunk of the internal iliac artery (upper gluteal, vertebral-lumbar, lateral sacral artery). 6. Blood supply to organs and walls of the small pelvis (bladder, uterus, rectum, prostate, ovary, uterine tube, ureter, perineum) 7. The presence of anastomoses in the system of the external and internal iliac arteries.
STUDENT MUST BE ABLE TO:
1. Name and show on the preparation a common iliac artery. 2. Show on the preparation the external iliac artery and its branches. 3. Show on the preparation the internal iliac artery and its branches. 4. Find and show on the preparation branches of the back and front trunk 5. Show and name the arteries, blood supplying the walls of the small pelvis. 6. Show and name the umbilical artery and its branches.

III. ***Tasks for self-work.***

1. Make a scheme of branching of the internal iliac artery.



2. Fill in the pelvic blood supply table.

PELVIC ORGANS	MAIN ARTERIES	ANASTOMOSES
Bladder		
Prostate		
Uterus		
Testis (ovary)		
Rectum		

3. What is the "crown of death"? Describe the anastomoses, its generatrixes and depict schematically.

IV. ***Qwestions for self-control:***

1. Indicate the location of the common iliac artery _____

_____

2. Name anastomoses of the branches of the internal iliac artery._____

_____

3. Which arteries supply the bladder _____

_____

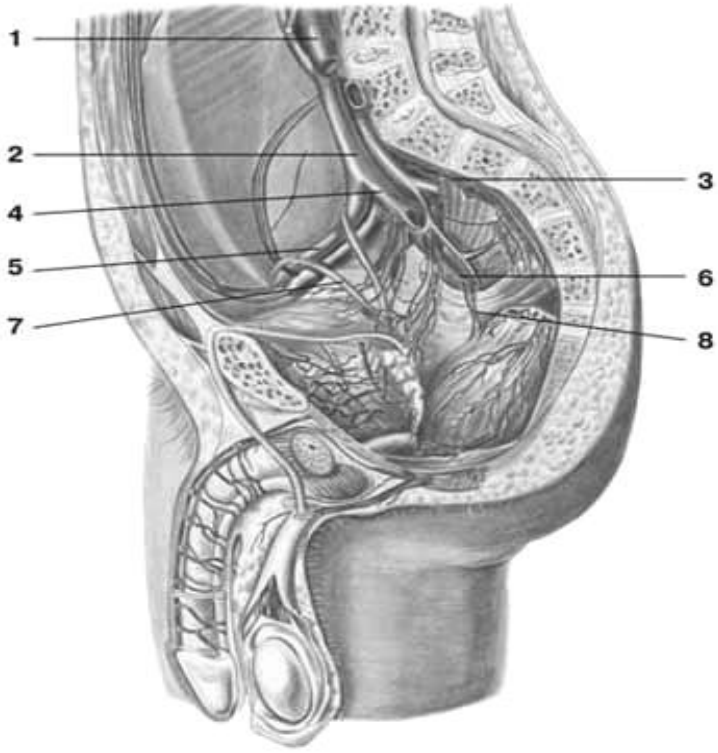
4. List the branches of the external iliac artery _____

_____

5. Indicate sources of blood supply to the prostate and ureter._____

_____

V. ***Make the names in the picture.***

	1
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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: «ANATOMY AND TOPOGRAPHY OF THE ARTERY OF FREE UPPER LIMB ASSEMBLY (ARTERNAL, ARTERY, ARTERY OF FORTRESS AND BRUSHES). ARTERIES OF FREE LOWER LIMB (THIGH, HEAD, STENDS AND STOP). VALUE AND PRACTICAL SKILLS. AGE FEATURES. X-RAY ANATOMY».

Knowledge of the anatomy of the vessels of the free upper and lower limbs, as well as their relationship with the surrounding muscular-fascial formations, are necessary for general practitioners. Knowledge of the topography of trunk shafts, the path of roundabout blood flow, blood supply to the joints are necessary when deciding on the application of ligatures and surgical interventions.

I.Objectives

Student must know:	1.Topography of the axillary artery in the vascular-neural bundle. 2. The branches of the axillary artery according to the three divisions. 3. Anastomoses with branches of the subclavian artery. 4.Topography of the brachial artery in the vascular-neural bundle. 5.Topography and course of lateral branches of the brachial artery. 6. Finial branches of the brachial artery (Their topography, course and branches). 7. Branches of the radial artery in the region of the hand. 8. Branch of the ulnar artery in the area of the hand. 9. Education of the superficial palmar arc and its branches. 10. Education of deep palmar arc and its branches. 11.Topografiyu femoral artery in the vascular-neural bundle. 12.Topography and the course of the proximal branches of the femoral artery. 13. The deep artery of the thigh and its branches. 14.Topography, stroke and branches of the popliteal artery. 15.Topography, stroke and branches of the anterior tibial artery. 16.Topography, stroke and branches of the posterior tibial artery. 17. Dentate and dorsal arteries of the foot with the formation of a dorsal arterial arch. 18. End branches of the posterior tibial artery with the formation of plantar arterial arch. 19. Branches of the back and plantar arterial arches.
Student must be	1. Show the axillary artery and its branches on the wet preparation

able to:	2. To call and show on the preparation the brachial artery and its branches. 3. To name and show the final branches of the brachial artery (elbow and ray) on the preparation. 4. Show the topography of the radial artery in the lower third of the forearm. 5. Show the topography of the ulnar artery in the lower third of the forearm. 6. Show the superficial arterial arch and its branches. 7. Show the deep arterial arch and its branches. 8.Explain the blood supply of the shoulder, elbow and wrist joints. 9. Call and show on the preparation the femoral artery and its branches. 10. Call and show on the preparation popliteal artery and its branches. 11. To call and show on the preparation an anterior tibial artery and its branches. 12. To call and show on the preparation the posterior tibial artery and its branches. 13. Show on the preparation surface and plantar arterial arches. Explain their education. 14.Explain the blood supply of the hip, knee and ankle joints
Student must possess:	1.Latin terminology on this topic. 2. Skills of preparation

II. ***Required level of knowledge****:*

b) from related disciplines

1) Phylogeny of organs and vessels of the head and neck region.
2) Ontogenesis of the vessels of the head and neck.

б) from previous topics:

1) Anatomy and topography of bones of the upper and lower extremities.
2) Anatomical and topographic features of the muscles of the free upper and lower limbs.

***в) from the current lesson*:**

1. Axillary artery. Topography of the course, branches, blood supply area.
2. The brachial artery. Topography of the course, branches, blood supply area.
3. Radial artery. Topography of the course, branches, blood supply area.
4. The ulnar artery. Topography of the course, branches, blood supply area.
5. Artery brushes. Topography of the course, branches, blood supply area.
6. Formation of arterial arches of the hand.

III. Object of study

Arteries of the upper limb and their branches: axillary, brachial, radial, ulnar arteries and arteries of the hand.
Arteries of the lower limb and their branches: femoral, popliteal, tibial anterior, tibial artery posterior and artery of foot.

IV. Informational part

Arteries of the upper limb.

Axillary artery is a direct extension of the subclavian artery, located in the depth of the axillary fossa and surrounded by trunks of the brachial plexus. In its turn, the axillary artery is divided into three sections.

In the first department, at the level of the clavicle-thoracic triangle from the axillary artery,
a) subscapular branches;
b) upper thoracic artery;
c) pectoral artery.
In the second part, at the level of the thoracic triangle from the axillary artery, the lateral thoracic artery departs.
In the third department, at the level of the pectoral triangle from it departs
a) subscapular artery - the largest of the branches of the axillary artery. It is divided into two parts: the thoracic artery and the artery enveloping the scapula;
b) anterior artery circumscribing the humerus;
c) posterior artery circumscribing the humerus.

Shoulder artery is an extension of the axillary artery. Its origin is at the level of the lower edge of the large pectoral muscle. Then the artery is located in the furrow, passing medial to the biceps muscle of the shoulder, on the anterior surface of the brachial muscle. In the ulnar fossa, the brachial artery divides into its terminal branches, the radial and ulnar arteries.
From the brachial artery depart:
a) deep artery of the shoulder;
b) the superior collateral artery;
c) the lower ulnar collateral artery.
In turn, a few branches branch from the deep artery of the shoulder (middle collateral artery, radial collateral artery). All these collateral arteries are involved in the formation of the elbow articular network.

Radial artery begins 1-3 cm distal to the cleft of the humerus and continues the direction of the brachial artery. It lies between the round pronator and the brachial muscle, and in the lower third of the forearm it is covered only with fascia and skin, so it is easy to feel its pulsation. In the distal part of the forearm, the radial artery, bypassing the styloid process of the radius, passes to the rear of the hand, and then through the 1st interosseous space it penetrates into the palm. The end section of

the radial artery forms a deep palmar arch. From this arch the palatal metacarpal arteries begin. From the radial artery on its length branch out:
a) radial recurrent artery;
b) superficial palmar branch;
c) the palmar carpal branch, which takes part in the formation of the palmar wrist network;
d) the rear carpal branch, which takes part in the formation of the back network of the wrist;
e) artery of the thumb of the hand.

The ulnar artery from the ulnar fossa goes under the round pronator, and further, accompanied by the ulnar nerve, passes between the superficial and deep flexors of the fingers. Then, passing under the muscles of the little finger, the elbow artery penetrates into the palm and forms a superficial palmar arch.

a) branches of the ulnar artery:
b) ulnar recurrent artery;
c) a common interosseous artery taking part in the formation of the rear wrist network;
d) palm carpal branch, involved in the formation of palmar wrist network;
e) deep palmar branch.

Arteries of the lower limb.

Femoral artery is the extension of the external iliac artery, passes under the inguinal ligament through the vascular lacuna and extends to the anterior surface of the femur (in the femoral triangle). Then the artery enters the leading channel and leaves it on the back of the thigh in the popliteal fossa. The branches of the femoral artery are:

a) superficial epigastric artery;
b) superficial artery surrounding the iliac bone;
c) external sexual arteries;
d) a deep artery of the thigh from which the medial and lateral arteries, enveloping the femur and the perforating arteries;
e) descending knee artery.

Popliteal artery is a continuation of the femoral artery. At the level of the lower edge of the popliteal muscle, this artery divides into its terminal branches, the anterior and posterior tibial arteries.

The branches of the popliteal artery:
a) lateral upper knee artery;
b) medial superior knee artery;
c) middle knee artery;
d) Lateral lower knee artery;
e) medial lower knee artery.
All these branches participate in the formation of the knee joint network.

Posterior tibial artery serves as a continuation of the popliteal artery, passes in the golenopodkolennom channel, which leaves under the medial edge soleus muscle.

Then the artery goes to the medial ankle, behind which, in a separate fibrous channel, passes to the sole.

Branches of posterior tibial artery:
a) a branch that encircles the fibular bone;
b) peroneal artery;
c) medial plantar artery;
d) lateral plantar artery.

This artery forms a plantar arch. From the plantar arch four plantar metatarsal arteries depart, which pass into the common plantar finger artery. At the level of the main phalanges of the fingers, each common plantar artery (except the first) is divided into two of its own plantar finger arteries. The first branching into three of its own plantar finger arteries.

Anterior tibial artery departs from the popliteal artery in the popliteal fossa, enters the nasal canal and immediately leaves it through the anterior opening in the upper part of the interosseous membrane of the tibia. Then descends the front surface of the membrane down and continues on the foot called the back artery of the foot.

Branches of anterior tibial artery:
1). Posterior tibial recurrent artery;
2). The anterior tibial recurrent artery (takes part in the blood supply of the knee and inter-vertebral joints);
3). The anterior anterior ankle artery (takes part in the formation of the lateral ankle net);
4). The medial anterior ankle artery;
5). The artery of the foot.

Age features.

After birth of the child as the age increases, the circumference, diameter, thickness of the artery walls and their length increase. The level of divergence of the arterial branches from the main arteries is also changing, even the type of their branching.

The diameter of the subclavian artery is most intensively increased from the moment of the birth of the child to 4 years. During the first 5 years of life, the diameter of the ulnar artery increases more intensively than the radial artery, but in the future the diameter of the radial artery predominates.

The length of the arteries increases in proportion to the growth of the body and limbs. With age, the arteries, blood supplying the internal organs, and the arteries of the upper and lower extremities are lengthened. Thus, in the newborn infants, the inferior mesenteric artery has a length of 5-6 cm, and in adults it is 16-17 cm.

The levels of branches from the main arteries in newborns and children, as a rule, are located more proximally, and the angles under which these vessels go are greater in children than in adults.

The topography of arteries of extremities also changes. For example, in the newborn, the projection of the ulnar artery corresponds to the anterior medial edge of the ulnar bristle. With age, the luteal and radial arteries move relative to the median line of the forearm in the lateral direction. In children older than 10 years, these arteries are located and projected in the same way as in adults. The projection of the femoral and popliteal arteries in the first years of the child's life also shifts in the lateral direction from the midline of the thigh. In this case, the projection of the femoral artery approaches the medial edge of the femur, and the projection of the popliteal artery to the midline of the popliteal fossa. There is a change in the topography of palmar arterial arches. The superficial palmar arc in newborns and young children is proximal to the middle of II and III metacarpal bones, in adults it is projected at the level of the third medulla of the metacarpal bone.

The formation, growth, tissue differentiation of the vessels of the intraorganic blood channel (small arteries and veins) in different human organs proceed unevenly in ontogenesis. The walls of the arterial department of the intragonal vessels, in contrast to the venous vessels, have three shells at the time of birth: on the outer, middle and inner. After birth, the length of intraorganic vessels increases, their diameter, the number of interstitial anastomoses, and the number of vessels per unit volume of the organ. This process is most intensive in the first year of life and in the period from 8 to 12 years.

Blood vessels at the time of birth are equipped with special mechanisms that regulate blood flow. One such mechanism is precapillary sphincters, which are a cluster of smooth muscle cells at the mouth of the capillaries. Age changes of the microcirculatory bed in humans in different organs and tissues proceed depending on the time of the formation of the structures of these organs.

X-ray anatomy.

At present, almost all blood vessels (angio- or vasograph) are available for roentgenologic examination on living subjects. In the clinic, various methods of radiologic examination of vessels filled with radiocontrast material are used: vascular studies (angiography), arteries (arteriography), heart and main arteries (angiocardiography) and veins (phlebography).

X-ray examination of blood vessels of a living person by introducing directly into the vessels contrast media with simultaneous at the time of injection radiography is called vasograph. By introducing contrasting substances into the humeral or femoral artery, an image of large arterial trunk arterial trunks and their branches is obtained. Due to the simultaneous x-ray image of bones on the radiographs of any area of the body, the skeleotopy of the arteries.

V. Practical work

Task№ 1. In the depth of the armpit, find a vascular bundle that consists of an axillary artery surrounded by trunks of the brachial plexus and axillary vein located medial to the artery. Vessels scan all over from 1 rib to the lower edge of the large pectoral muscle. In the clavicle-thoracic triangle in the proximal part of the axillary artery, find the thin upper thoracic artery, trace it from the 1 and 2 intercostal spaces. At the level of the upper edge of the small pectoral muscle, the thoraco-acromal artery departs, the deltoid and acromial branches of which are directed into the deltoid-thoracic furrow, and the thoracic branches are visible on the inner surface of the small and large pectoral muscles. The lateral thoracic artery departs from the axillary artery at the level of the thoracic triangle and descends along the outer surface of the anterior dentate muscle. In the pectoral triangle, at the level of the lower edge of the subscapular muscle, the submaxillary artery branches out from the axillary artery, which divides into two branches: the thoraco- dorsal line that extends along the lateral margin of the scapula and approaches the latissimus muscle of the back and artery enveloping the scapula passing through the three-sided opening. At the level of the upper edge of the tendon of the latissimus muscle of the back, find the anterior and posterior arteries surrounding the humerus. The posterior artery of larger diameter is directed to the quadruple orifice along with the axillary nerve. Axillary artery at the exit from the axillary cavity continues into the brachial artery.

Task№ 2. In the depth of the medial groove of the biceps muscle, find the neurovascular bundle of the shoulder: the brachial artery, the two brachial veins, the long branches of the brachial plexus. Trace the brachial artery from the lower edge of the large pectoral muscle to the ulnar fossa. At the boundary between the upper and middle third of the shoulder from the brachial artery, a deep artery of the shoulder departs. At the middle of the shoulder from the main trunk, the upper ulnar collateral artery departs, which descends along with the ulnar nerve. A little above the medial musculature of the humerus, find the lower collateral artery. It goes down from the front of the shoulder muscle. Throughout the pleural artery many muscular branches are visible.

In the ulnar fossa at the level of the neck of the radius, under the aponeurosis of the biceps brachii, the brachial artery is divided into two trunks: the ulnar and brachial arteries.

Task№ 3. Find the terminal branches of the brachial artery. In the ulnar fossa (the place of division of the brachial artery) the lateral position is occupied by the radial and the medial by the ulnar artery. In the upper part of the radial artery, a radial recurrent artery emerges upward towards the anterior lateral ulnar fissure. On the forearm, locate the radial artery in the radial groove. At the level of the lower edge of the square pronator, the palm carpal branch from it goes to the capsule of the wrist joint. On the elevation of the thumb, sometimes piercing it, there is a superficial palmar branch that joins the ulnar artery, closes the superficial palmar arch. Next, find the radial artery in the area of the "anatomical snuffbox". Here the back carpal branch departs from it. The first rear carpal artery runs along the back surface of the hand and gives branches to the radial side of the index and to both sides of the thumb. The artery of the thumb moves away from the radial artery after it penetrates into the palm of the hand through 1 interosseous space. On the palm under the tendons of the flexor of the fingers at the level of the bases of the metacarpal bones, it forms a deep palmar arch. It is visible at the cut tendons of long flexors. It is possible to determine pulsation of the radial artery in the lower third of the forearm in the radial groove and in the "anatomical snuff-box"».

Task№ 4. Find the ulnar artery. She departs from the shoulder at the level of the head of the radius and lies under the round pronator. With a dissected circular pronator, find the recurrent artery, which extends upward and medially, the ulnar artery, which is later divided into the anterior and posterior branches participating in the formation of the elbow joint network. Multiple distal to the ulnar recurrent artery find the common interosseous artery. It is divided into the anterior interosseous and

posterior interosseous arteries in the interosseous membrane. The latter perforates the interosseous membrane and passes to its dorsal side. In the lower third of the forearm, show the ulnar artery, accompanied by veins and ulnar nerve in the ulnar fissure. At the level of the pea-bones, from the ulnar artery the rear carpal branch branches, which together with the branch of the same name from the radial artery forms the rear carpal axis (not always visible, the branch is thin). The deep palmar branch, which anastomoses with the radial artery, forms a somewhat distal to the dorsal carpal branch, forming a deep palmar arch. It can be considered with the cut tendons of long finger flexors. If the palmar aponeurosis is removed, one can see the superficial palmar arc, which is formed by the extension of the ulnar artery and the superficial palmar branch of the radial artery. From the convex part of the arc, four common palmar finger arteries depart, each of which is divided into two own finger arteries running along the facing surfaces of adjacent fingers.

Task№ 5. Turn aside the flaps of the gluteus maximus and discern the upper gluteal artery and vein passing through the peri-vesicular aperture and the lower gluteal artery and vein passing through the sub-necklet. Through this same hole comes the inner sexual artery. Turn the corpse over. On the front surface of the thigh, find in the femoral triangle the femoral artery that has emerged through the vascular lacuna. It lies in the iliac crest, in the anterior femoral groove, and then leaves through the leading canal into the popliteal fossa. In the proximal part of the femoral artery, the superficial epigastric artery departs and is directed upwards. On the training drug, it is usually removed together with the fatty tissue. Along the inguinal ligament, the superficial artery that surrounds the iliac bone is directed laterally, the external genital arteries extend into the medial side. In the upper third of the thigh from the femoral artery a very large trunk - a deep artery of the thigh - departs. From it originate in the upper part of two large trunks of the lateral artery, enveloping the femur with its ascending, descending and transversal branches and a medial artery enveloping the femur, with ascending, transverse and deep branches. Below from the deep artery of the hip go three perforating arteries. They are directed back to the back group of hamstrings. The first perforating artery leaves at the level of the lower edge of the short adductor muscle, the second - at the level of the lower edge of the long adductor muscle, the third - is the continuation of the main trunk. The femoral artery gives off numerous muscle branches, branches to the inguinal nodes. In the leading canal, a descending knee artery departs from it, which, through the anterior opening of the canal, leaves it and participates in the formation of the knee joint network. Then the femoral artery leaves the leading channel through the lower opening and lies down in the popliteal fossa. In this zone, the arterial trunk is called the popliteal artery. The artery is located on the bone, behind it is the popliteal vein and the tibial nerve. The muscular branches of the arteries that participate in the formation of the knee joint network depart from the popliteal artery: the lateral upper knee artery, the medial upper knee artery, the middle knee artery, the medial lower knee artery, the lateral lower knee artery. In order to properly show these arteries, you need to clearly orientate in the preparation, exclude muscle branches, the remaining arteries to call by their position. On the training product of some branches may not be visible.

Task№ 6. Find the place where the popliteal artery divides under the soleus muscle into two trunks: the anterior tibial artery and the posterior tibial artery. The anterior tibial artery gives the posterior recurrent tibial artery (on the drug is not visible), perforates the interosseous membrane, gives the anterior tibial return artery (on the drug is not visible) and is located among the anterior group of calf muscles. It can be seen between the anterior tibialis muscle and the long extensor of the fingers. Numerous muscle branches extend from it, in the distal part it gives the medial and lateral anterior ankle arteries forming the ankle nets. Then, between the anterior tibialis muscle and the long extensor of the thumb, it extends to the rear of the foot and is called the back artery of the foot. It is located in the proximal part of the lateral and medial tarsal arteries (thin branches, medial tarsal artery is not always visible on the preparation) at the level of the base of the metatarsal bone from the dorsal artery of the foot the largest branch of it - an arched artery that follows the lateral margin of the foot the level of metatarsal bones and anastomoses with the lateral tarsal artery, forming a back arterial arch. Three tarsal dorsal arteries separate from it, each of which divides into two rear finger arteries following the rearward surfaces of the fingers (II, III, IV, V) facing each other. The rear tarsal first artery is, as it were, an extension of the dorsal artery of the foot and gives the dorsal finger arteries for the first and second fingers. Between the first and second metatarsal bones from the rear artery of the foot a deep plantar branch departs. She anastomoses with the lateral plantar artery. The posterior tibial artery is, as it were, an extension of the popliteal artery and is located in the knee-popliteal canal, it gives off numerous muscle branches. Its largest branch - the peroneal artery departs in its proximal part and lies in the lower muscular-peroneal canal. The posterior medial and lateral ankle branches extend from the posterior tibial artery in the distal part. Upon exiting the tibial incision, the posterior tibial artery runs midway between the medial malleolus and the medial rim of the Achilles tendon and is guided to the sole. Under the muscle that removes the thumb, it is divided into two trunks: plantar medial and plantar lateral arteries. The medial plantar artery lies in the medial plantar furrow. Lateral plantar artery - in the lateral plantar sulcus. The latter at the level of the base V of the metatarsal bends sharply to the medial side and anastomoses with the medial plantar artery and with a deep plantar branch (from the rear artery of the foot).

Here, a plantar arch is formed, from which the plantar tarsar arteries emerge, each of which gives up two of its own plantar finger arteries. The exception is the medial plantar tarsal artery, which gives three composite plantar finger arteries to the first and second fingers.

VI. Control questions

1. Name the largest branch of the axillary artery.
2. Which artery passes through a three-way opening on the back surface of the scapula.
3. Which artery will pass along with the axillary nerve through a four-sided opening.
4. Name the terminal branches of the brachial artery.
5. Which artery will lie in the shoulder - the muscular canal.
6. Which arteries will anastomose with the anterior and posterior branches of the ulnar recurrent artery.
7. Which arteries are involved in the formation of the elbow articular network.
8. Which artery anastomoses the radial recurrent artery.
9. After which muscles the radial artery is located.
10. Which artery will be located in the anatomical "snuffbox".
11. Which artery forms a deep palmar arc.

12. Which artery forms a superficial palmar arc.
13. Through which topographic formations the femoral artery passes.
14. Which of the branches of the femoral artery is the largest.
15. Which arteries supply the muscles of the back of the thigh.
16. Name all branches involved in the formation of the knee joint network.
17. Which artery forms the plantar arch.
18. Which arteries supply the ankle.

VII. Academic pursuits

Task№1. The surgeon bared the brachial artery for ligation. Determine the preferred level of her dressing to maintain blood supply to the distal portion of the upper limb.

Answer:

The most dangerous ligation of the brachial artery is the level corresponding to the upper third of the shoulder, i.e. above the place of departure of the deep artery of the shoulder, where only the muscle branches are roundabout ways. When ligating the brachial artery at any site below the site of the deep artery, the shoulder is less dangerous and thus the blood supply of the distal portion of the upper limb.

Task№2. Child during unsuccessful falling on a brush there was a comminuted fracture of 4 and 5 metacarpals, which is accompanied by an abundant hemorrhage. Damage to the branches, which arterial arch of the hand caused this hemorrhage? Which vessel forms this arc?

Answer:

The superficial palmar arc is damaged. The superficial palmar arch is formed by the extension of the ulnar artery.

VIII. Control Tests

1. Indicate the largest branch of the axillary artery:
    a) the upper thoracic artery;
    b) chest cavity artery;
    c) subscapular artery;
    d) the suprapulum artery.
2. Which of the listed arteries gives branches to the triceps brachii muscle:
    a) Radial recurrent artery;
    b) middle collateral artery;
    c) radial collateral artery;
    d) interosseous artery.
3. Specify the location of the radial artery:
    a) between the round pronator and the brachial muscle;
    b) in the carpal tunnel;
    c) in the scapular canal;
    d) in the lead channel.
4. Which of the listed arteries form a deep palmar arch:
    a) common palmar finger arteries;
    b) radial artery;
    c) deep palmar branch of the ulnar artery;
    d) ulnar artery.
5. Which of the listed arteries form a superficial palmar arc:
    a) a deep palmar branch of the ulnar artery;
    b) the ulnar artery;
    c) radial artery;
    d) superficial palmar branch of the radial artery.
6. Specify the anatomical formation through which the femoral artery passes:
    a) leading channel;
    b) Muscular lacuna;
    c) the blockage channel;
    d) vascular lacuna.

7. Which of the listed arteries supply the back of the thigh muscles:
    a) a medial artery circumflexing the femur;
    b) inferior gluteal artery;
    c) perforating arteries;
    d) lateral artery enveloping the femur.
8. Indicate the terminal branches of the popliteal artery:
    a) anterior tibial artery;
    b) posterior peroneal artery;
    c) posterior tibial artery;
    d) anterior peroneal artery.

9. Which of the listed arteries are involved in the blood supply of the ankle:

a) peroneal artery;
b) lateral anterior ankle artery;
c) medial anterior ankle artery;
d) dorsal artery of foot.

10. Which of the listed arteries form the lateral ankle network:
a) medial anterior ankle artery;
b) lateral anterior ankle artery;
c) heel branches;
d) lateral ankle branches.

Keys:

1	2	3	4	5	6	7	8	9	10
в	*б*	*а*	*б, в*	*б, г*	*г*	*в*	*а, б, г*	*б, в*	*б, г*

IX. Anatomical terminology

Russian Name.	Latin Name.
Axillary artery	a.axillaris
Subclavian branches	rr.subscapulares
Upper thoracic artery	a.thoracica superior
Breast Cancer Artery	a.thoracoacromialis
The akromial branch	r.acromialis
The clavicular branch	r.clavicularis
The deltoid branch	r.deltoideus
Breast Branches	rr.pectorales
Lateral thoracic artery	a.thoracica lateralis
Lateral branches of the mammary gland	rr.mammarii laterales
The subscapular artery	a.subscapularis
Arterial stenosis	a.thoracodorsalis
Artery enveloping the shoulder blade	a.circumflexa scapulae
Anterior artery circumscribing the humerus	a.circumflexa anterior humeri
Back artery circumscribing the humerus	a.circumflexa posterior humeri
Shoulder artery	a.brachialis
Deep artery of the shoulder	a.profunda brachii
Arteries feeding the humerus	aa.nutriciae humeri
The middle collateral artery	a.collateralis media
Radial collateral artery	a.collateralis radialis
Upper ulnar collateral artery	a.collateralis ulnaris superior
Lower ulnar collateral artery	a.collateralis ulnaris inferior
Radial artery	a.radialis
Deep palmar arc	arcus palmaris profundus
Palmar metacarpal arteries	aa.metacarpals palmares
Searing branches	rr.perforantes
Radial recurrent artery	a.recurrens radialis
Superficial palmar branch	r.palmaris superficialis
Palmar wrist branch	r.carpalis palmaris
Artery of the thumb	a.princeps pollicis
Radial artery of index finger	a.radialis indicis
The rear carpal branch	r.carpalis dorsalis
Rear wrist network	rete carpale dorsale
Rear metacarpal arteries	aa.metacarpales dorsales
Rear finger arteries	aa.digitales dorsales
First dorsal metacarpal artery	a.digitalis dorsalis prima
The ulnar artery	a.ulnaris
Superficial palmar arch	arcus palmaris superficialis
The ulnar recurrent artery	a.recurrens ulnaris
General interosseous artery	a.interossea communis
Anterior interosseous artery	a.interossea anterior
Artery accompanying the median nerve	a.comitans nervi mediani
Posterior interosseous artery	a.interossea posterior
Recurrent interosseous artery	a.interossea recurrens
Palmar wrist branch	r.carpalis palmaris
Deep palmar branch	r.palmares profundus
Common palmar arteries	aa.digitales palmares communes
Own palmar arteries	aa.digitales palmares proprii
The ulnar arterial network	rete cubiti
The palmar wrist network	rete carpale palmare
Femoral artery	a.femoralis

Superficial epigastric artery	a.epigastrica superficialis
Surface artery surrounding the iliac bone	a.circumflexa iliaca superficialis
External genitalia	aa.pudendae externae
Fore scrotal branches	rr.scrotales anteriores
Front labial branches	rr.labiales anteriores
Deep throat artery	a.profunda femoris
Medial artery circumflex femur	a.circumflexa femoris medialis
The lateral artery enveloping the femur	a.circumflexa femoris lateralis
The perforating arteries	aa.perforantes
Descending knee artery	a.descendes genicularis
Popliteal artery	a.poplitea
Lateral upper knee artery	a.superior lateralis genus
Medial Upper Knee Artery	a.superior medialis genus
The middle knee artery	a.media genus
Lateral lower knee artery	a.inferior lateralis genus
Medial lower knee artery	a.inferior medialis genus
Knee joint network	rete articulare genus
Posterior tibial artery	a.tibialis posterior
The branch that surrounds the fibula	r.circumflexa fibularis
Osteoarthritis	a.fibularis
Lateral ankles and heel branches	rr.maleolares laterales et rr.calcanei
Heel chain	rete calcaneum
Connecting branch	a.communicans
Medial plantar artery	a.plantaris medialis
Lateral plantar artery	a.plantaris lateralis
Deep plantar arch	arcus plantaris profundus
Plantar metatarsal arteries	aa.metatarsales plantares
Common plantar digital arteries	aa.digitales plantares communes
Own plantar finger arteries	aa.digitales plantares propriae
Anterior tibial artery	a.tibialis anterior
Posterior tibial recurrent artery	a.recurrens tibialis posterior
Anterior tibial recurrent artery	a.recurrens tibialis anterior
Lateral anterior ankle artery	a.maleolaris anterior lateralis
Lateral ankle network	rete maleolare laterale
Medial anterior ankle artery	a.maleolaris anterior medialis
Posterior artery of foot	a.dorsalis pedis
Arc artery	a.arcuata
Lateral and medial tarsal arteries	aa.tarsales laterales et mediales
Rear finger arteries	aa.digitales dorsales
Deep plantar artery	a.plantaris profunda

X. Preparations and manuals

1. Prepared vascular corpse.
2. Native preparations of the vessels of the upper and lower extremities.
3. Tables.
4.Tutorial and atlas of human anatomy.

OUT-CLASS SELF-WORK.

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPICANATOMY AND TOPOGRAPHY OF ARTERY.

I. Questions of the initial level of knowledge.:

1. Walls and posts of the armpit. Three-sided and four-sided holes.
2. General plan of the structure of the arteries of the upper limbs.
3. The boundaries of the subclavian artery and its branches.

II. Objectives.

STUDENT MUST KNOW:

1. Boundaries of the axillary artery. 2. Topography of the axillary artery in the structure of the neurovascular bundle along with the same vein and trunks of the brachial plexus. 3. The branches of the axillary artery according to the three divisions: I. the key-thoracic triangle; II. thoracic triangle; III. pectoral triangle. 4. Anastomoses with branches of the subclavian artery .
STUDENT MUST BE ABLE TO:
1. Show on the preparation of the axillary artery and its branches. 2. Show the three-sided opening of the back wall of the axillary cavity and the artery surrounding the scapula. 3. Show the quadrilateral opening and the posterior artery circumscribing the humerus. 4. Show the branches of the axillary artery: the upper thoracic, thoracoacromial, subscapular arteries, anterior and posterior arteries, circumscribing the humerus. 5. Show the boundaries of the axillary artery.

III. Tasks for sekf-work.

1. Complete phrases:

1. Axillary artery is a continuation of_____ and extends from

_____ and until _____

2. In the axillary artery isolated _____ departments.

3. The superior thoracic artery departs from _____

4. The artery enveloping the scapula is a branch _____ arteries.

2. Fill in the table of anastomosis of the branches of the axillary artery:

ARTERIES	Subclavian artery branches	The branches of the axillary artery
Subclavian		
Axillary		

***IV*. Questions for self-control.**

1. From which part of the axillary artery the subscapular artery leaves? _____

_____

2. Which arteries move away from the middle section of the axillary artery (thoracic triangle)._____

_____

3. What is the lower limit of the axillary artery?_____

_____

4. Continuation of which vessel is the axillary artery?_____

_____

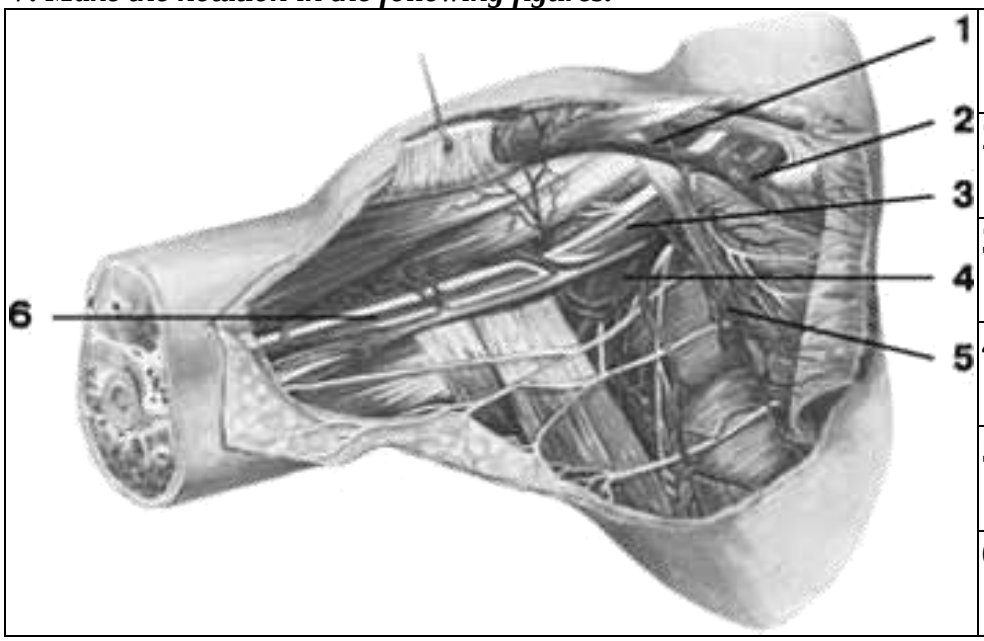
5. Which artery blood supply the anterior dentate muscle?_____

_____

6. Where the anterior thoracic artery is directed?_____

_____

V. Make the notation in the following figures.



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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ANATOMY AND TOPOGRAPHY OF THE SHOULDER AND FOREPLAY ARTERIES.**

Questions of the initial level of knowledge.1. Topographic formations of the upper limb (canals, grooves, pits)
2. Boundaries of the axillary artery.
3. The general plan of the blood channel of the upper limb.

II. Objectives.

STUDENT MUST KNOW:
1. Medial and lateral grooves of the shoulder and forearm, radial nerve canal, borders and grooves of the ulnar fossa. 2. Topography of the brachial artery in the composition of the neurovascular bundle and its extent. 3. Topography and course of lateral branches of the brachial artery: a. a deep artery of the shoulder, its branches in the canal of the radial nerve (middle and radial oblique arteries); b. upper oblique artery; at. lower circumoral artery. 4. The end branches of the brachial artery - radial and ulnar, their topography, extension and their branches: a) in the region of the elbow fold (recurrent radial artery); b) recurrent ulnar artery; c) common interosseous artery. 5. Numerous muscular branches of the brachial, ulnar and radial arteries. 6. Anastomoses of the axillary and brachial artery as well as the arteries of the shoulder and forearm with the formation of vascular networks.
STUDENT MUST BE ABLE TO:
1. Name and show on the preparation the brachial artery and its branches. 2. Name and show in the corresponding anatomical formations the radial artery and its branches. 3. Name and show the preparation in the appropriate departments of the ulnar artery and its branches. 4. Name and show the arteries of the ulnar fossa. 5. Show the places of determination of the pulse rate, the place of measurement and the determination of the blood pressure of blood.

III. Tasks for self-work.

1. Make a diagram of the course of the artery of the shoulder and forearm.

2. Complete phrases:

1. Deep artery of the shoulder passes in _____.

2. Recoverable ulnar artery dividing _____

3. General interosseous artery to divide _____

4. The following branches are involved in the blood supply of the shoulder joint _____

_____

_____

5. The muscles of the posterior surface of the forearm are blood _____

_____

3. Fill in the table of blood supply of the ulnar fossa (anastomoses of the arteries of the shoulder and forearm):

DEPARTMENTS OF THE LOCKBACK	BRANCHES OF THE SHOULDER ARTERY	BRANCHES OF ULNAR ARTERY	BRANCHES OF RADIAL ARTERY
FRONT MEDIAL FURROW			
FRONT LATERAL FRAGRANCE			
POSTERIOR MEDIAL FURROW			
POSTERIOR LATERAL FURROW			

IV. Questions for self-control.

1. Continuation of which is the brachial artery? _____

_____

2. Which artery passes through the canal of the radial nerve?_____

_____

3. Where lies the lower circumferential artery?_____

_____

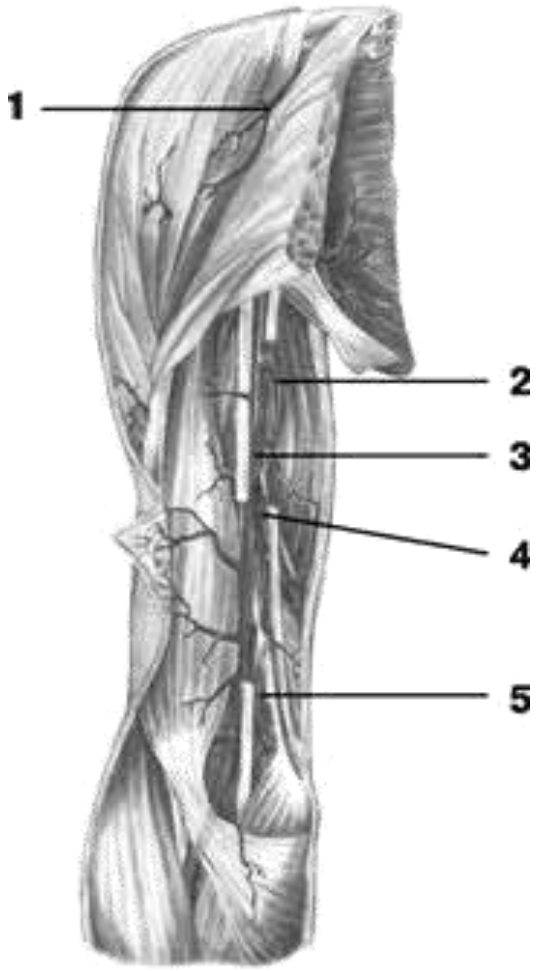
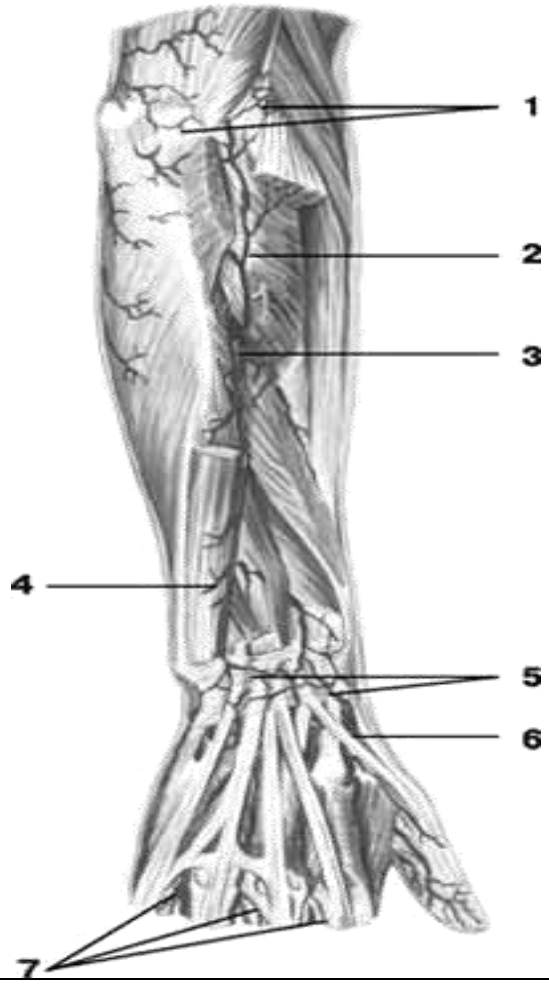
4. What muscles of the forearm supply the brachial artery?_____

_____

5. Which arteries form the ulnar vasculature?_____

_____

V. Make the notation in the following figures.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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ARTERIES OF HAND.**

Questions of the initial level of knowledge

1. Skeleton and muscles of the hand and their classification.
2. Topographic formations of the brush, canals and grooves.
3. General plan of the location of the arteries of the upper limb. Trunking trunks.
4. Radial and ulnar arteries.

STUDENT MUST KNOW:

1. Topography of the muscle of the hand - the muscles of the elevation of the thumb (tenor) and the small finger (hypoteners). Palmar aponeurosis. 2. Topography of the radial artery in the lower third of the forearm (anatomical snuffbox) and on the hand. 3. Branches of the radial artery in the region of the hand. 4. Topography of the ulnar artery, its course in the lower third of the forearm and hand. 5. The formation of the surface lateral arc and its branches. 6. The formation of a deep arterial arch and its branches. 7. Anastomoses of the arteries of the forearm and hand with the formation of the wrist joint.
STUDENT MUST BE ABLE TO:
1. Find and show the radial artery in the lower third of the forearm (the location of the pulse rate), in the anatomical snuffbox and in the first interdigital space. 2. Show the ulnar artery in the lower third of the forearm and on the anterior medial surface of the hand. 3. Show the superficial arterial arch and its branches (common finger and actual finger arteries). 4. Show the deep arterial arch and its branches. 5. Show the posterior carpal branch of the radial artery. 6. Show dorsal metocarpal arteries. 7. Show the branches going to the first finger. 8. Describe the blood supply to the wrist joint.

III. Tasks for self-work.

1. Make a scheme of blood supply to the carpal articulation.

2. Complete phrases:

1. From the superficial palmar arc leave _____

_____

2. Deep palmar arc form _____

_____

3. The palmar wrist reticulum is formed by

_____

_____

4. The rear (dorsal) carpal network is formed _____

_____

5. The posterior branch of the common interosseous artery supplies by blood folowing

_____

6. In the forearm area, the main arterial trunks are located.

1) _____

2) _____

7.Palmar metacarpal arteries blood supply _____ muscles and fall into _____ arteries.

3. Complete the scheme of blood supply of hand.

TOPOGRAPHY OF THE HAND	BRANCHES A. RADIALIS	BRANCHES A. ULNARIS	ANASTOMOSES
MUSCLES OF THE HILL OF THE FIRST FINGER (BIG)			
MUSCLES OF THE FIFTH FINGER RISE (PINKY)			
MIDDLE GROUP OF MUSCLE			

IV. Self-control questions.

1. General plan of blood supply to the upper limb _____

_____

_____

_____

_____

2. List the sources of blood supply to the fingers _____

_____

_____

3. Name the area of the blood supply to the back of the wrist: _____

_____

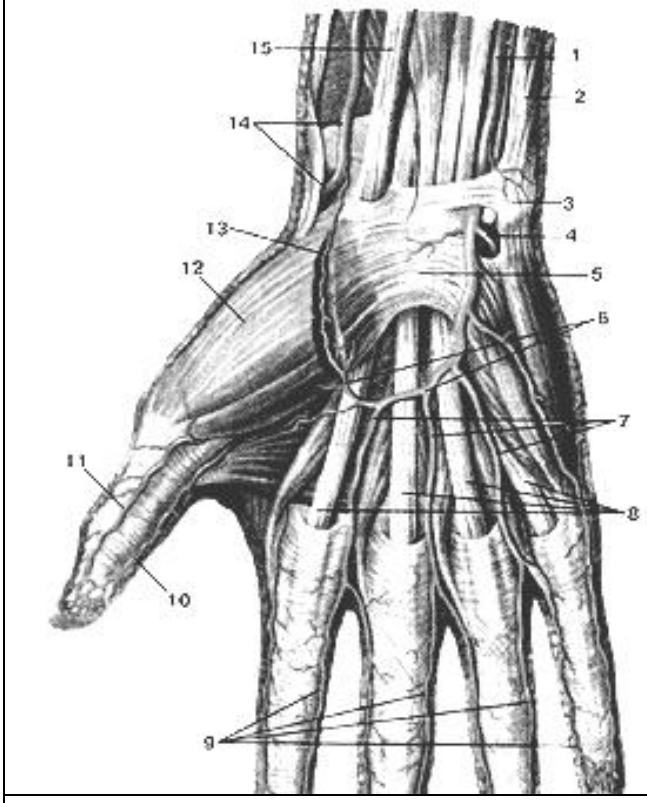
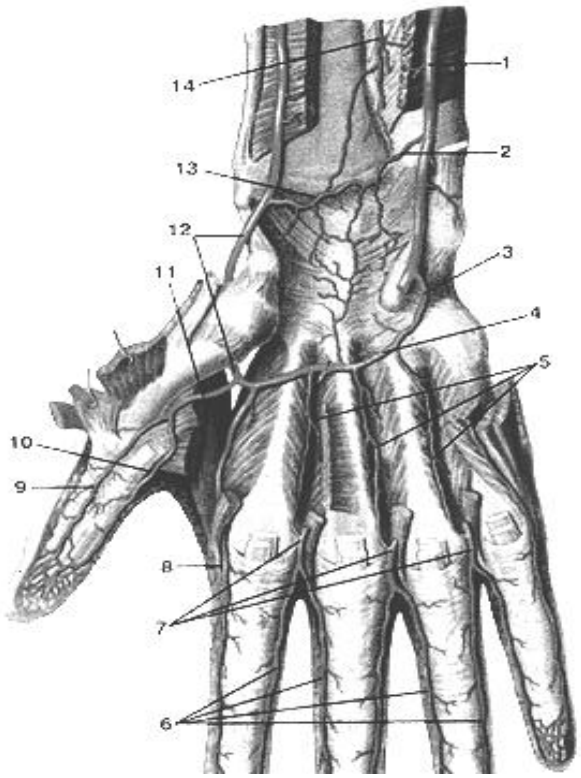
4. Point out that the blood supply to the superficial palmar arch: _____

_____

5. Point out that the blood supply to the deep palmar arch: _____

_____

V. Make the notation in the following pictures.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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **LOWER LIMBS ARTERIES.**

I. Вопросы исходного уровня:

1. Functional muscle groups corresponding to the lower limb (thigh, drumstick, foot)
2. Topographic formations of the lower limb, their messages (holes, pits, furrows, lacunae, canals).
3. General plan of blood supply to the lower limb.
4. External and internal iliac arteries.

II. Objectives.

STUDENT MUST KNOW:
1. Topography, course and extent of the main arteries of the lower limb (femoral, popliteal, tibial, fibular) and vascular-neural bundles. 2. The femoral artery, which emerged from the vascular lacuna, and its proximal branches: a) superficial epigastric artery; b) superficial artery surrounding the iliac bone; c) external sexual arteries. 3. The deep artery of the thigh and its branches: a) medial and lateral arteries enveloping the femur b) three perforating arteries 4. Arrangement of the femoral artery in the vascular-neural bundle in the leading channel. 5. Descending artery of the knee joint and muscle branches. 6. Popliteal artery, its topography and branches. 7. Topography, stroke and branches of the anterior tibial artery: 8. Dorsal and arched arteries of the foot with the formation of a dorsal arterial arch. 9. Topography of the posterior tibial artery and its branches (peroneal artery, muscular branches, medial and lateral ankle arteries). 10. Final branches of posterior tibial artery with formation of plantar arterial arch. 11. Branches of the back and plantar arterial arches. The presence between them anastomoses in the form of perforating arteries. 12. Interarterial anastomoses in the system of the lower extremity with the formation of vascular networks of joints.
STUDENT MUST BE ABLE TO:
1. Call and show on the drug vascular and muscle gaps, the femoral triangle, the Gunter (leading) channel, popliteal fossa, the knee-popliteal canal (Gruber), the furrows of the foot. 2. To name and show on the preparation femoral, popliteal, peroneal, tibial arteries and their branches. 3. Call and show the deep artery of the thigh and its branches - perforating and enveloping arteries. 4. Show and name the branches of the popliteal artery. 5. Show the posterior tibial artery and its branches in the knee-popliteal canal. Find and show the preparation of the peroneal artery and its continuation to the foot. 6. Show the anterior tibial artery and its branches. 7. Show on the preparation surface and plantar arterial arches and their branches. Explain their education. 8. Find and show perforating arteries of the foot 9. To name the ways of roundabout blood flow in the system of arteries of the lower extremity and anastomosis between the branches of the main arteries of the pelvis, hip, shin and foot.

III. Self-work tasks.

1 .Complete phrases:

1. The femoral artery is a continuation _____. and lies on _____.
1. Deep femoral artery gives blood supply _____
2. In the formation of the vascular network of the knee joint

_____

_____

3. Anterior tibial artery lies on _____ surface of shin
4. The fibular artery blood supply _____
5. From the plantar arterial arch depart _____
6. The dorsal surface of the foot is blood-flowing with arteries: _____

_____

2. Make a general outline of the arteries of the lower limb.

3. Fill in the table of blood supply to the joints of the lower limb

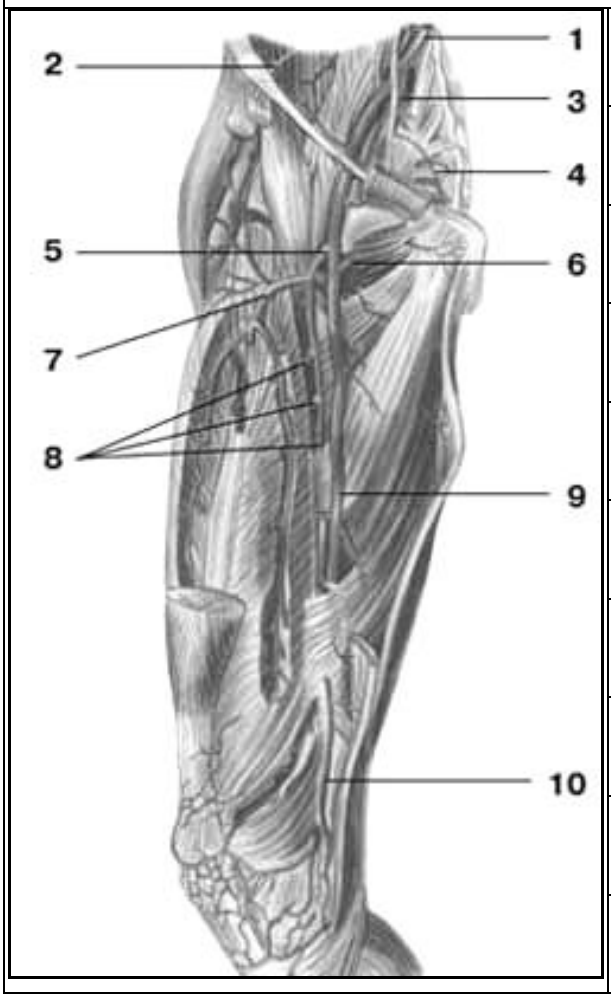
Name of articulation	Source of blood suply	Anastomoses
Pelvis joint		
Knee-joint		
Ankle joint		
Articulationsof foot		

IV. ***Self-control questions*:**

1. Where does it begin and in what topographical formations is the posterior tibial artery? _____
_____
2. Which branches move away from the femoral artery?_____
_____
3. Which arteries supply the muscles of the lateral groups of the lower leg?_____
_____
4. What is called the continuation of the anterior tibial artery? _____
_____
5. List the branches of the popliteal artery: _____
_____
6. Which arteries of the foot of the foot are anastomosed with the arteries of the plantar surface _____
_____

V. MAKE SYMBOLS ON THE FOLLOWING DRAWINGS.

femoral artery



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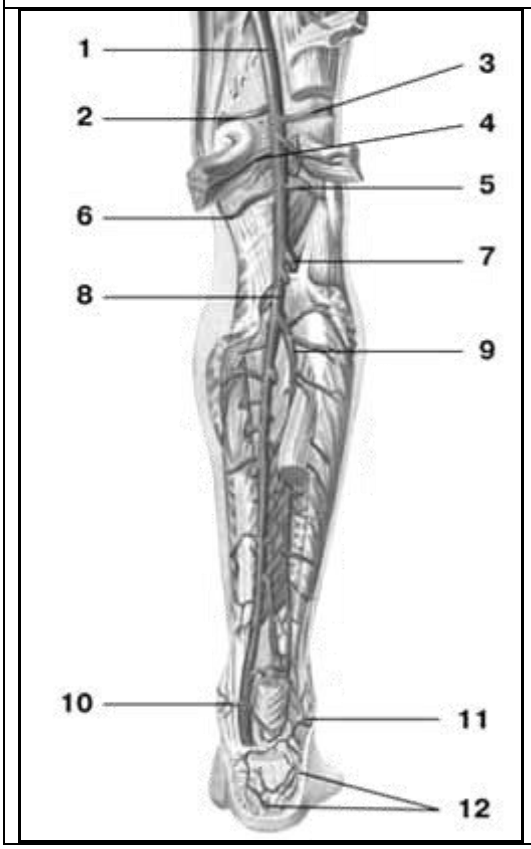
leg arteries



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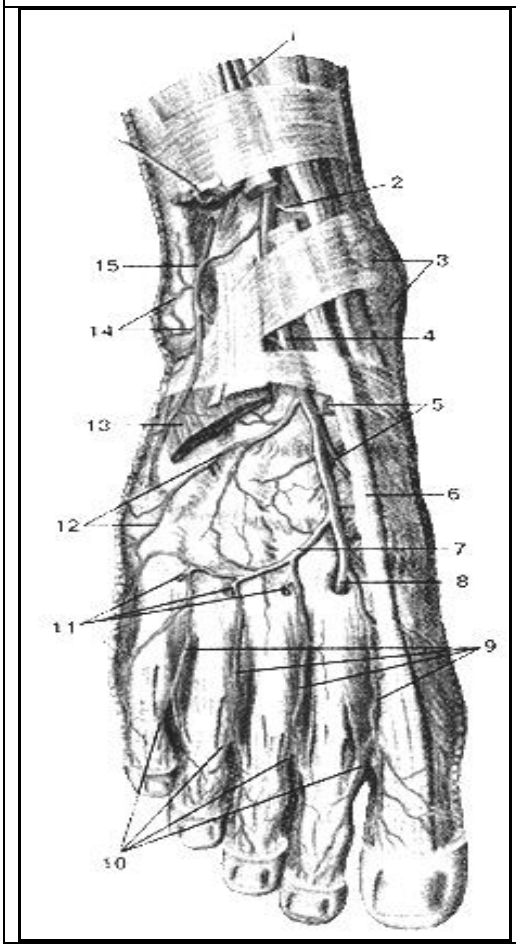
Arteries of the foot



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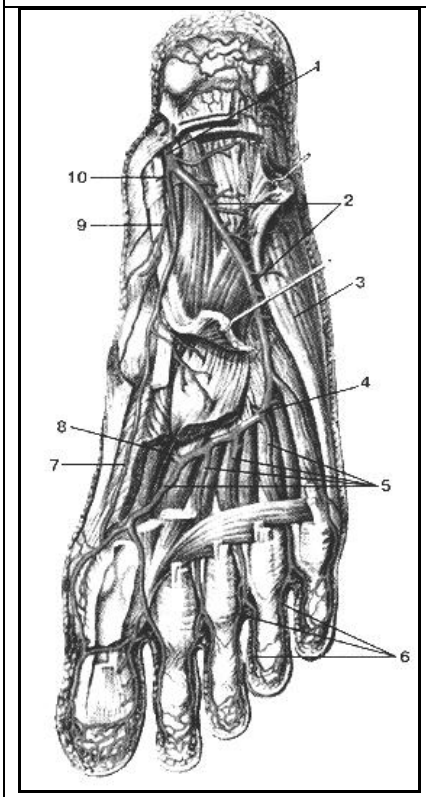
Arteries of the foot



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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: «VEINS OF HEAD AND NECK. Upper Vienna. Veins of the thoracic, abdominal and pelvic floor (unpaired, hemispherical, lower floor vein, gorilla). ANATOMY AND TOPOGRAPHY OF KAVA - CAVAL AND PORTO - Caval Anastomoses. CIRCULATION OF FRUIT. Anatomy of the upper and lower limbs. VALUE AND PRACTICAL SKILLS. AGE FEATURES. X-RAY - ANATOMY».

The veins carry blood in the opposite direction from the arteries, from the organs to the heart. Their walls are arranged according to the same plan as the walls of the arteries, but they are much thinner and they have less elastic and muscle tissue. The veins merging with each other form large venous trunks. The reverse current of venous blood is prevented by special devices - valves. Knowledge of the anatomy of the veins of the head, neck of the trunk and extremities, as well as their topographic relationships with other structures, will be needed in the further understanding of the pathogenesis, treatment and prevention of diseases of internal organs and for the selection of rational surgical approaches in the conduct of surgical interventions.

I. ***Objectives:***

Student must know:	1.Corny of the superior vena cava. 2.Polecheloglovnye vein and its tributaries. 3. Education, topography and course of the internal jugular vein. 4. Intracranial and extracranial inflows of the internal jugular vein. 5. Flow of venous blood from the cranial cavity. 6.Topography of the external jugular vein. 7.Popography of the anterior jugular vein. 8. Education of the jugular venous arch. 9. Education, topography and the course of unpaired and semi-unpaired veins. Their tributaries. 10.Topgraniyu and the course of the inferior vena cava. 11. Peripherals of the inferior vena cava (paired and parietal and visceral) 12. Cores, stroke and topography of the portal vein. 13. Portal Gate Protocols.
Student must be able to:	1. Name and show on the moist preparation the upper vena cava and its roots (brachiocephalic and subclavian veins). 2. Find and show on the native preparation an internal jugular vein. 3. Find and show the unpaired vein to the right of the spinal column. Its inflows and the place of confluence in the upper vena cava 4. Find and show to the left of the vertebral column a semi-unpaired vein, its tributaries and the place of its entry into the unpaired vein. 5. Find and show on the preparation an additional semi-unpaired vein and the place of its confluence into the semi-unpaired vein. 6. Name and show on the moist preparation the lower vena cava and its roots (iliac veins). 7. Find and show on the corpse pairs of parietal inflows of the inferior vena cava. 8. Name and show on the corpus a pair of visceral tributaries of the inferior vena cava. 9. Find the portal vein and its tributaries (splenic, upper and lower mesenteric veins.)
Student must possess:	1.Latin terminology on this topic. 2. Skills of preparation.

II. ***Required level of knowledge****:*

c) from related disciplines

1). Phylogeny of organs and vessels of the head, neck and trunk;
2). Organogenesis of the vessels of the head, neck and trunk;

б) from previous topics:

1). Microcirculatory bed;
2). Blood circulation;
3) .Construction and topography of the heart and major arterial trunks;

***в) from the current lesson*:**

1). Education and topography of the upper;
2). Peripherals of the superior vena cava;
3) .Priotics of the inferior vena cava;
4). Topography of the internal jugular vein;
5). Flow of venous blood from the cranial cavity;
6). Unpaired and semi-unpaired veins and their tributaries;
7). Education and topography of the portal vein;

III. Object of study: Veins of large and small circles of blood circulation. Pulmonary veins Upper hollow vein, tributaries, its formative; their topography, projection on the surface of the chest wall. Veins of the brain. Sinuses of the hard shell of the

brain. Connections between intracranial and extracranial veins (diploic and emissary veins). Superficial and deep veins of the head and neck. Internal, external and anterior jugular veins, their tributaries, topography and projection to the outer covers. Pleurochelovnye veins, their formation, topography. Sub-inclusive vein, its tributaries, topography. Superficial and deep veins of the upper limb. Axillary vein, its topography, tributaries. Intercostal veins. Unpaired and semi-unpaired veins. Post-venous venous plexus.

Lower hollow vein, sources of its formation. Superficial and deep veins of the lower limb. External iliac vein. Pristenochnye veins of the pelvis and veins located in the pelvis organs. Internal iliac vein. Visceral veins, which are inflows of the inferior vena cava. Anastomoses between the tributaries of the upper and lower hollow veins are cava-caval anastomoses. Portal vein; its topography, tributaries. Anastomosis of the vein vein with inflows of the upper and lower hollow veins: porto-caval anastomoses.

IV. Informational part

Internal jugular vein begins in the jugular aperture of the skull forming the upper bulb of the jugular vein. From the bulb the main trunk of it goes down, adjoining first to the back surface of the internal carotid artery, and then to the front surface of the external carotid artery. Above the level of the sternoclavicular joint, at the lower end of the internal jugular vein, before joining the subclavian vein, an extension is formed - the lower bulb of the internal jugular vein. Behind the sternoclavicular joint, the inner jugular vein merges with the subclavian vein and forms a brachiocephalic vein.

The internal branches of the jugular vein are:

1). Syncope of the dura mater;

2). The eye of the eye;

3). The veins of the inner ear;

4). Veins of the spongy substance of the bones of the cranial vault;

5). The veins of the meninges;

6). The veins of the large brain.

Along the way, the internal jugular vein receives the following tributaries: the facial, the mandibular, pharyngeal, lingual, upper and middle thyroid veins follow in parallel with the same arteries. Find the facial vein. Its tributaries correspond to branching of the facial artery. From the inflows of the facial vein, it should be noted and found on the preparation an angular vein, which is its bed, the upper and lower labial.

Upper vena cava is formed in the anterior mediastinum by the fusion of two, right and left brachiocephalic veins, behind the right 1 rib at the sternum. Going down, and at level 2 of the rib enters the pericardial cavity, and below, at the level of the cartilage connection of the right 3 ribs with the sternum, flows into the right atrium. The upper vena cava does not have valves. It falls into: mediastenal veins, pericardial veins, posterior to the upper edge of the right bronchus, just before entry into the pericardium, the unpaired vein flows into the upper vena cava. Unpaired and semi-unpaired veins collect blood from the walls of the abdominal and thoracic cavities. Both veins begin in the lower part of the lumbar region, unpaired - on the right, semi-unpaired to the left of the ascending lumbar veins. Which in turn originate from the common iliac veins and follow upwards behind the large lumbar muscle and in front of the lumbar vertebrae of their transverse processes. Here they widely anostomoziruyut with lumbar veins. Heading to the top, the right and left ascending lumbar veins approach the middle plane and already at level 1 of the lumbar vertebra lie on the front surface of the vertebral body. Then each of them penetrates into the chest cavity through a gap in the diaphragm. After the ascending lumbar veins entered the posterior mediastinum, they received the name: the right one - the unpaired vein, the left semi-unpaired vein. The unpaired vein, going up the right anterolateral surface of the thoracic spine, crosses the anterior surface of the right posterior intercostal arteries. At level 4 - 5, the thoracic vertebra is diverted to the right and back, skirting the posterior surface of the lung's root and forming an arc at the level of the 3 thoracic vertebrae, is thrown across the right bronchus, into the upper vena cava. An unpaired vein is poured: esophageal veins, bronchial veins, posterior intercostal veins and semi-uneven veins.

Semi-divided vein entering the thoracic cavity, is directed upwards along the left lateral surface of the vertebral column, posteriorly and outward from the aorta, intersecting the front intercostal posterior arteries. At the level of 10 - 12 thoracic vertebrae, the vein turns to the right, lies on the anterior surface of the vertebrae. Behind the aorta, and esophagus and thoracic duct and at level 8 of the thoracic vertebra is poured into an unpaired vein. Semi-unpaired vein takes: esophageal, mediastinal, posterior intercostal number 5-6 and additional semi- unpaired veins. The added semi-unpaired vein is anastomosed with the left brachiocephalic vein.

Intercostal veins anterior and posterior, right and left with their branches accompany the branching of the intercostal arteries. The anterior intercostal veins lie in the anterior sections of the 9-10 upper intercostal spaces and flow from each side into the right and left internal thoracic veins, respectively. The posterior intercostal veins are located in all intervals between the inner and outer intercostal muscles. These veins collect blood from the rib spaces. The veins of the spinal column form plexuses on its outer and inner surfaces. The outer vertebral branches are located on the anterior and posterior surfaces of the vertebral column. Therefore,:

a) anterior external vertebral plexuses that collect blood from the anterior parts of the vertebral bodies, anterior longitudinal ligament and adjacent muscles (deep neck muscles)

b) posterior external venous vertebral plexuses lie on the posterior surface of the spinal column (on the posterior surface of arches, transverse and spinous processes, these plexuses take blood from the deep muscles and back and vertebrae.

2) internal venous plexuses are located in the cavity of the spinal canal and lie on the inner surface of its bone walls outside of the dura mater and are divided:

a) front;

b) posterior internal vertebral venous plexus. They are located from the large occipital opening to the lower edge of the sacral canal. The anterior and posterior venous plexuses are connected by transverse anastomoses, forming venous rings at the

level of each vertebra. In addition, the anterior anterior anastomoses with anterior external venous plexuses, and in the posterior ones with posterior external venous plexuses.

3) The basic vertebral veins go in channels of the spongy substance, going to the back surface of the vertebral bodies, and pour into the rear internal venous plexuses. Internal vertebral venous plexuses have connections with external anterior venous vertebral plexuses through intervertebral foramen: with vertebral veins in the neck, with intercostal veins in the thoracic region, with lumbar lumbar punctures.

The outflow of blood from the spinal cord and plexus is often effected through the intervertebral veins, or directly into segmental.

Brachiocephalic viens; right and left collect blood from the head of the neck and upper limbs. Each brachycephalic vein is formed in the region of the upper thoracic aperture, behind the corresponding sternoclavicular joint of two veins: the internal jugular vein and the subclavian vein. In the brachiocephalic veins fall: a number of small veins from the mediastinal organs (thymus, medial, esophageal, bronchial, tracheal, pericardial-diaphragmatic veins, highest intercostal, lower thyroid, deep cervical vertebral, internal thoracic veins.

Inferior vena cava collects blood from the lower extremities, walls and organs of the pelvis and abdominal cavity. The lower hollow vein is formed by the fusion of two common iliac veins, left and right. From your place of origin, go up and slightly to the right along the lateral surface of the vertebral bodies to the venous aperture opening next to the aorta, the posterior surface is adjacent to the large right lumbar muscle, and then to the right foot of the diaphragm. The lower hollow vein, passing through the venous aperture of the diaphragm into the sternum cavity, flows into the right atrium. It has parietal (parietal) veins: it receives anastomoses from the vertebral plexus, lumbar vein, lower diaphragmatic, visceral (internal) veins of the ovary (ovarian), renal, adrenal, hepatic veins. The portal vein is formed from the connection of three veins: the inferior mesenteric, the superior mesenteric and splenic behind the head of the pancreas. The portal vein from the place of its formation goes up and to the right, passing behind the upper part of the duodenum and enters the hepatic duodenal ligament, between the leaves of which it reaches the gates of the liver. In the thickness of this ligament, the portal vein is located along with the common bile duct and the common hepatic artery. At the gates of the liver, the portal vein is divided into two branches, left and right. Three veins forming the portal vein are called the roots of the portal vein. The portal vein takes blood from the left and right gastric veins.

Lower mesenteric vein collects blood from the walls of the upper part of the rectum, the sigmoid colon and its branches corresponds to the inferior mesenteric artery. It begins with a small pelvic cavity called the upper rectal vein, which in its rectal walls is connected to the rectal venous plexus.

Upper mesenteric vein collects blood from the small intestine and its mesentery, the abdominal process and the cecum. The superior mesenteric vein begins in the region of the otic corner, and is called the ilio-colonial vein.

Splenic vein collects blood from the spleen, stomach, pancreas, large omentum. Begins at the gates of the spleen with numerous splenic veins leaving the spleen.

The roots of the portal vein are anostomized with the roots of the veins belonging to the upper and lower hollow veins, forming porto-caval anastomoses.

Above in the abdominal cavity, esophagus, between the left gastric vein, flowing into the portal vein and esophageal veins flowing into the unpaired and semi-unpaired veins and then into the upper vena cava.

In the lower part of the rectum, between the upper rectal vein, flowing through the inferior mesenteric vein into the portal vein, and the medial rectal vein and the lower rectal vein flowing into the internal iliac vein and further into the common iliac vein from the inferior vena cava system.

In front in the navel, where the inflows of the anostomosing veins: an umbilical vein going to the portal vein, upper epigastric veins from the system of the superior vena cava.

Behind in the lumbar region, between the roots of the veins of the mesoteritoneal parts of the colon (from the portal vein system) and the parietal lumbar veins (from the inferior vena cava system).

In the posterior abdominal wall there is a cavo-caval anastomosis between the roots of the lumbar veins (the system of the inferior vena cava) that are associated with the paired ascending lumbar vein (from the system of the superior vena cava).

Cavalocaval anastomoses between the lumbar veins and the intervertebral veins, which in the neck region are the roots of the superior vena cava.

Veins of upper limb.

Isolate the superficial and deep veins of the upper limb. They are connected by a large number of anastomoses and have numerous valves. Surface (subcutaneous) veins are more developed than deep veins (especially on the back of the hand). They begin the main venous pathways of the skin and subcutaneous tissue - the lateral and medial subcutaneous veins of the hand, which take blood from the venous plexus of the back surface of the fingers.

Superficial veins of the upper limb. Dorsal metacarpal veins and anastomoses between them form a dorsal venous network of the hand on the back surface of the fingers, pastern and wrist. On the palmar surface of the brush surface veins are thinner than on the rear. The beginning is given by the venous plexus of the fingers, in which palmar finger veins are distinguished. By numerous anastomoses, located mainly on the lateral sides of the fingers, the blood flows into the dorsal venous network of the hand.

The superficial veins of the forearm, in which the veins of the wrist continue, form a plexus, the arms of the lateral and medial subcutaneous veins clearly stand out.

The lateral subcutaneous vein of the arm begins from the radial part of the venous network of the dorsal surface of the hand, being, as it were, the extension of the first dorsal metacarpal vein. It follows from the back surface of the hand on the front surface of the radial edge of the forearm and, coarsening, is directed to the ulnar fossa. Here the lateral subcutaneous vein of the arm anastomizes through the intermediate vein of the elbow with the medial subcutaneous vein of the arm. Then the vein continues on the shoulder in the lateral sulcus of the biceps arm muscle, then in the furrow between the deltoid and large pectoral muscles, perforates the fascia and falls under the clavicle into the axillary vein.

The medial subcutaneous vein of the arm is the extension of the fourth dorsal metacarpal vein that passes from the back of the hand to the ulnar side on the front surface of the forearm and to the ulnar fossa where it takes the intermediate vein of the elbow. Further, the medial subcutaneous vein rises along the medial groove of the biceps arm muscle to the shoulder. At the border of its lower and middle third it perforates the fascia and runs into one of the shoulder veins.

The intermediate elbow of the elbow does not have valves, is located under the skin in the anterior elbow region. Passes obliquely from the lateral subcutaneous vein of the arm to the medial subcutaneous vein of the arm, anastomosing also with deep veins. Often, in addition to the lateral and medial subcutaneous veins, the forearm of the forearm is located on the forearm. In the anterior elbow region it falls into the intermediate vein of the elbow or is divided into two branches, which independently flow into the lateral and medial subcutaneous veins of the arm.

Deep veins of the upper limb. Deep (pair) veins of the palmar surface of the hand accompany the arteries, form a superficial and deep venous arch.

Palmar digital veins flow into the superficial palmar venous arch located near the arterial surface palmar arch. Paired palmar metacarpal veins are directed to the deep palmar venous arch. Deep as well as superficial palmar venous arcs continue into deep veins of the forearm - paired ulnar and radial veins that accompany the same-named arteries. Formed from the deep veins of the forearm, two brachial veins, not reaching the axillary cavity, at the level of the lower edge of the tendon of the latissimus muscle of the back merge into one trunk - into the axillary vein. This vein extends to the lateral margin of the 1st rib, where it passes into the subclavian vein. The sub-muscular vein, like its tributaries, has valves. It is attached to the anteromedial semi-circumference of the axillary artery, collects blood from the superficial and deep veins of the upper limb. Its inflows correspond to branches of the axillary artery. The most significant inflows of the axillary vein are the lateral thoracic vein, into which the thoracospring veins anastomose with the lower epigastric vein - the influx of the external iliac vein. The lateral thoracic vein also receives thin veins that connect with I-VII posterior intercostal veins. In the chest-epigastric veins, venous vessels flowing out of the paranasal plexus formed by the subcutaneous veins of the mammary gland.

Deep veins of the upper limb collect blood from the muscles, bones, joints. The superficial and deep veins of the upper limb contain a large number of valves and an anostomose with each other. The veins that form these anastomoses do not have valves.

Veins of the pelvis and lower limb.

Venous blood from the walls of the pelvis and organs collects into two venous trunks: the external iliac and internal iliac veins, which join together form a common iliac vein. Connecting both common iliac veins, form the inferior vena cava. The external iliac vein is a continuation of the femoral vein and in the initial section it has 1-2 valves. In the external iliac vein fall: the lower iliac veins - collect blood from the lower sections of the anterior abdominal wall. Deep iliac vein, its forming veins, are divided into visceral and parietal veins.

The parietal veins - infused into the internal iliac vein: 1) ilio-lumbar vein, accompanies the same artery and collects blood from the intervertebral veins;

2) the upper gluteal veins accompany the paired branches of the same artery, collect blood from the upper parts of the gluteal region. Passing through the peri-conical aperture, form a venous plexus around it;

3) the lower gluteal veins accompany the eponymous artery, collect the blood of the gluteus maximus and the muscles of the thigh;

4) the occlusive vein, repeats the course of the same-named artery and anastomoses with the external iliac vein and the medial vein that surrounds the femur;

5) lateral sacral veins accompany the same artery, anostomoziruyut with the median sacral vein forming a sacral venous plexus.

Visceral veins – These include: 1) the inner hollow vein, begins in the perineal region by the subalpine fusion, connecting with the deep dorsal vein of the penis (clitoris);

2) the venous plexus venous plexus, it lies in the lower parts of the bladder, in men it passes into the prosthetic venous plexus, in the women to the initial section of the urethra. The plexus takes blood from men from the bladder, the vas deferens, the seminal vesicles and the prostate gland, in women from the bladder, the initial section of the urethra and the vagina.

3) the prosthetic venous plexus, located behind the pubic adhesion and in front of the prostate gland, receives blood from the prostate gland, the lower part of the bladder, the urethra, the cellulose of the pre-tubercular space and the large veins - the deep dorsal vein of the penis;

4) the rectal plexus is divided into the external and internal plexus of the rectum;

5) uterine venous plexus.

The veins of the lower limb are divided into superficial and deep.

Superficial veins: in the region of the foot a dense network forms - the plantar venous network and the dorsal venous network. On the plantar surface, locate and select the plantar venous arch. It is located in the furrow, separating the fingers from the rest of the foot and sends into each interstratum gap the intercostal veins that pass to the rear of the foot, where they connect with the rear finger veins of the foot. Subcutaneous venous arch and other superficial veins of the sole on the periphery of the foot widely anostomoziruyut with lateral marginal veins are part of the cutaneous venous backbone network. Surface veins anostomoziruyut with deep veins of the foot, forming a large and small saphenous veins. The large saphenous vein has several valves. Climbing up takes the front femoral vein, which collects blood from the veins of the front surface of the thigh. The small and large saphenous veins on their way anostomoziruyut each other. To the deep veins of the lower limb that originate on the plantar surface of the foot. On the sides of each finger, which merge into the plantar metatarsal veins. After that they flow into the plantar venous arch from which the blood flows into the anterior tibial veins: 1) the posterior tibial veins; 2) anterior tibial veins; 3) popliteal vein; 4) femoral vein. On its way, the femoral vein receives blood from the veins that accompany the arteries of the lower limb: a) the veins are the companions of the femoral artery; b) deep vein of thigh;

Students should study all veins of the trunk, head and neck, upper and lower extremities according to the textbook and the atlas and consider all this on an autopsy vascular corpse.

Blood circulation of fetus. All that is necessary for development, the fetus receives from the blood of the mother.

Maternal blood through the uterine artery penetrates into the placenta ("child's place"). The blood of the mother and fetus in the placenta is not mixed, therefore the blood circulation of the fetus is called placental. In the placenta, the fetal blood receives nutrients from the mother's blood through the hematoplacental barrier. From the placenta arterial blood enters the umbilical vein of the fetus, which, in the umbilical cord, goes to the lower edge of the liver, lies in the furrow of the umbilical vein and divides into two branches at the level of the lobes of the liver. The first branch falls into the portal vein, and the second branch is the venous (arantzium) duct - into one of the hepatic veins or into the inferior vena cava. Thus, the arterial blood that flows through the umbilical vein

from the placenta, partially enters directly into the inferior vena cava, and partly into the liver, which is the fetus's organ of hematopoiesis. Further through the hepatic veins, blood enters the inferior vena cava, where it mixes with the venous blood flowing from the lower part of the fetus's body. In the inferior vena cava, mixed blood enters the right atrium. From this atrium through the oval aperture of the interatrial septum, the blood enters the left atrium, where its current is directed by a distinctly developed damper of the inferior vena cava (eustachian valve) near the fetus. From the left atrium, the blood enters the left ventricle, and then it goes to the organs and tissues of the fetal body along the aorta and the outgoing arteries.

Venous blood from the upper part of the fetal body enters the right atrium through the superior vena cava. Through the right atrioventricular ventricular aperture, this venous blood passes into the right ventricle. From the ventricle, the blood is directed to the pulmonary trunk, and then flows along the large arterial (botallian) duct directly into the aorta (below the left subclavian artery). In the aorta to the mixed blood, which came from the left ventricle, new portions of venous blood from the right ventricle are added. This mixed blood flows down the branches of the descending aorta to all the organs and walls of the lower half of the fetal body. Thus, the upper half of the fetal body (in particular, the brain), which is supplied with blood from the branches of the aortic arch, leaving it before the admission of the arterial duct (common carotid and subclavian arteries), receives blood richer in oxygen and nutrients than the lower half.

Enrichment of fetal blood with oxygen and nutrients occurs in the placenta, where the mixed blood from the aorta follows through the internal iliac arteries, and then along its branches - the paired umbilical artery - into the placenta. After birth in the vascular system of the newborn there are significant changes. Placental circulation is abruptly replaced by pulmonary circulation. Light, pulmonary arteries and veins begin to function. Bandaged after birth umbilical vessels empty: the trunk of the umbilical vein turns into a circular ligament of the liver, and the umbilical arteries into the right and left lateral umbilical ligaments; the lumen of the arteries is preserved only in their initial section. These umbilical ligaments are located on the back surface of the anterior abdominal wall. The venous duct becomes a venous ligament; the arterial duct, which in the fetus connected the pulmonary trunk to the concave part of the arch of the aorta, becomes an arterial ligament connecting the trunk (or the left pulmonary artery) with the arch of the aorta.

Age features.

The veins of the fetus's body are laid in the 4th week in the form of paired, located along the sides of the body of the trunks (ventral to the dorsal aorta). In the anterior area of the body, the veins are called precardinal (anterior cardinal), and in the posterior region - postcardinal (posterior cardinal). Those and other veins of each side flow into the right and left common cardinal veins (cuveroids), and the latter into the venous sinus of the heart. Further transformations that undergo veins of the embryo's body are closely related to the development of the heart, the reduction of its venous sinus, and also to the formation of internal organs and limbs. The liver develops along the way of the yolk-mesenteric veins, therefore these veins become an integral part of its portal system. From the common vein-removing liver, which is formed after the exit from the liver due to the fusion of the proximal sections of the yolk-mesenteric veins, the hepatic part of the inferior vena cava develops.

The left umbilical vein (the right one is rapidly reduced) a large number of anastomoses is connected to the portal system of the liver. One of these anastomoses turns into a wide venous (arantzium) duct, which connects the umbilical vein directly to the hepatic veins at the point of their entry into the inferior vena cava. After birth, the remainder of this duct is the venous ligament of the liver.

The main veins of the human body - the upper and lower hollow veins develop as a result of restructuring the pre- and postcardinal veins and the formation of new veins. From the anastomosis between the precordinal veins, the left brachiocephalic vein forms, which carries the venous blood into the right precordinal vein. The last posterior to this anastomosis, together with the right common cardinal vein, turns into the upper hollow vein. The development of the inferior vena cava is closely related to the development of the middle (primary) kidney and cardinal veins, as well as the anastomoses between them. The presence of anastomoses leads to a significant widening of the veins of the right side of the posterior part of the embryo's body and the reduction of the veins of the left side. As a result, the lower hollow vein develops from different parts of the veins of the right side of the posterior part of the embryo's body: its liver part (from the mouth to the point of adrenal admission into it) from the common vein-removing liver, the frontal part from the right subcardinal vein, part - from the anastomosis between the right sub- and supracardinal veins, behind the renal part - from the lumbar region of the right supracardinal vein. Most of the veins flowing into the lower vena cava, also develops at the expense of various departments of cardinal veins. Remains of cardinal veins are on the right - non-spheroidal and on the left - a semi-unpaired vein.

The veins and arteries of the lungs develop most intensively in the first year of the child's life, which is associated with the formation of the function of respiration, as well as with postnatal obliteration of the arterial (botallova) duct. During puberty, there is a new increase in the development of pulmonary vessels.

With age, the diameter of the veins, their cross-sectional area and length increase. For example, the upper vena cava due to high cardiac position in children is short. In the first year of life of the child, in children aged 8-12 years and adolescents, the length and cross-sectional area of the superior vena cava increases. In people of mature age, these indices almost do not change, and in elderly people and the elderly, due to the age-related changes in the structure of the walls of this vein, an increase in its diameter is observed. The lower hollow vein of the newborn is short and relatively wide (diameter about 6 mm). By the end of the first year of life, its diameter increases slightly, and then faster than the diameter of the superior vena cava. In adults, the diameter of the inferior vena cava (at the level of confluence of the renal veins) is approximately 25-28 mm. Simultaneously with the increase in the length of the hollow veins, the position of their tributaries changes. The portal vein and its upper and lower mesenteric and splenic veins in the newborn are mainly formed.

After the birth, the topography of superficial veins of the body and limbs changes. So, the newborn has dense subcutaneous venous plexus. Against their background, large veins are not contoured. By the 1-2 years of life, the larger and small saphenous veins of the legs are distinctly distinguished from these veins, and the upper and lower limbs are the lateral and medial subcutaneous veins of the arm. Rapidly increase the diameter of the superficial veins of the leg from the period of the newborn to 2 years: a large saphenous vein almost 2 times, and a small saphenous vein - 2.5 times.

V. Practical work

Task№1. Before proceeding to the study of the veins of the chest wall, it should be repeated on the prepared corpuscle of the muscle and fascia of the breast. Then proceed to the first stage. Turning down the chest wall, on the inner surface of it, find and follow the course of the arteries and veins of the chest wall, compare with the figure in the atlas, the table, consult the instructor if necessary. Make a schematic drawing of the anterior thoracic wall and apply to it all the arteries and veins. Designations in the picture do in Russian and in Latin. Find the internal thoracic veins accompanying the inner thoracic artery; inflows of the internal thoracic vein, corresponding to the branches of the internal thoracic artery and accompanying them.

After comparing the arteries and veins you found with the drawings in the atlas, the table, after consultation with the teacher, sketching and noting in the figure in Russian and in Latin all the formations proceed to the second stage. Find the upper half of the vein, which is located on the right and behind the aorta and empties into the right atrium.

Task№2.

On the prepared corpse with the removed right lung on the right, in the posterior mediastinum, find the unpaired vein lying on the lateral surface of the spinal column and accepting the posterior intercostal veins located in the intercostal spaces on the right. In the course of an unpaired vein, go up to the point of its entry into the upper vena cava. Find the lower vena cava (lifting the apex of the heart), on the diaphragmatic surface of the heart and trace its course to the point of confluence in the right atrium.

Task№3. The thoracic part of the aorta is best viewed from the left, lifting the left lung. From her in the intercostal spaces are directed posterior intercostal arteries. Next to them lie veins and intercostal nerves. Note that the intercostal nerves are the anterior (ventral) branches of the thoracic spinal nerves. Find all of the listed formations on the left, show that the semi-unpaired vein going to the side of the spine passes to level IX of the thoracic vertebra, assumes the left posterior intercostal veins, then crosses the vertebral column and empties into the unpaired vein. Make sure that the upper posterior intercostal veins flow into the additional semi-unpaired vein located above the semi-unpaired vein.

Having found all the listed entities on the corpse, compare them with the figures in the atlas, consult the correctness of the finding with the teacher, make a schematic drawing, on which mark all the educations in Russian and Latin.

Task№4. Before proceeding to study the vessels of the anterior abdominal wall and abdominal cavity, repeat the abdominal muscles, the structure of the vagina of the rectus abdominus, the organs of the upper abdominal cavity: liver, stomach, spleen, duodenum, pancreas, paying attention to the topography of these organs, peritoneum.

Then start studying the topic. Unscrew the anterior abdominal wall and swing it downward. On the inner surface, find: a) on the back wall of the vagina of the rectus abdominal muscle, the upper epigastric artery passing downwards from the top (the artery moves away from the internal thoracic artery and is directed to the umbilical region); b) below the navel, find the lower epigastric artery, which goes from the bottom up - from the external iliac artery to the umbilical region. Next to the listed arteries find the same veins, which pair in pairs accompany the arteries. Trace the places of their confluence (the upper ones into the internal thoracic veins, and the lower ones into the external iliac veins). Compare the vessels you found with the drawings in the atlas and on the table, consult with the teacher if necessary, schematically depict the vessels in the figure, indicating on them their Russian and Latin names.

Find the portal vein, which is located behind and between the common bile duct on the right and the common hepatic artery - on the left in the hepatic-duodenal ligament. Behind the head of the pancreas is the origin of the portal vein, which is formed from the splenic upper and lower mesenteric veins.

After that, proceed to study the sources of blood supply to organs, ways to drain blood from them, cava-caval and port-caval anastomoses of this area, outflow of lymph from organs.

Task№5. Before proceeding to study the vessels of the unpaired organs of the middle and lower abdominal cavity, repeat the anatomy of the skinny, ileum, blind, ascending, transverse, descending, sigmoid, colon and rectum, paying attention to their topography, attitude to the peritoneum.

Swing up the transverse colon together with a large omentum, and pull the loops of the small intestine to the left. At the site of the root of the mesentery of the small intestine, at level 2 of the lumbar vertebra to the left, find the unpaired branch of the abdominal aorta - the superior mesenteric artery that goes alongside the superior mesenteric vein (note that on the unsealed corpse both vascular formations are in the thickness of the small mesentery root). Consider the course of the branches of the superior mesenteric artery. Note that the veins are accompanied by the same name arteries, which flow into the upper mesenteric vein that runs along the upper mesenteric artery and forms the portal vein along with the splenic and inferior mesenteric veins (find the place of formation of the portal vein behind the head of the pancreas). Compare the formations found with the drawings in the atlas, make a schematic drawing, mark on it the Russian and Latin names of the vessels and the location of the vessels listed. On the back abdominal wall, find the abdominal aorta, to the right of it is the lower hollow vein. The veins of the lower abdominal cavity, carrying blood from unpaired organs, as seen on the corpse, repeat the course of the arteries, bear the same names and fall into the lower mesenteric vein, located somewhat to the left and above the inferior mesenteric artery. Trace its course to the place of formation of the portal vein. Compare the findings you found with the drawings in the atlas, on the table, consult the teacher. After that, study the sources of blood supply of unpaired organs of the abdominal cavity (middle and lower divisions), the zone of blood supply, the way outflow of venous blood from these organs.

Task№6. Find the lower hollow vein located to the right of the aorta and its paired tributaries:

b) renal veins emerging from the gates of the kidneys and flowing into the inferior vena cava at an angle of 900 (the right renal vein is shorter than the left one, which crosses the abdominal part of the aorta);

c) adrenal veins: the right veins into the inferior vena cava, and the left one flows into a nearby left renal vein;

d) the lower diaphragmatic veins located above and flowing into the lower vena cava;

e) ovarian (ovarian) veins. Left - flows into the left renal vein; right-in the lower vena cava. Both ovarian (ovarian) veins accompany the same-named arteries;

e) lumbar veins - accompany the same arteries, flow into the inferior vena cava at an angle approaching 900, note that there are connections between each lumbar vein and these connections serve as the beginning of the formation of an unpaired vein on the right and a semi-unpaired vein on the left;

g) common iliac veins - accompany the same arteries and, connecting, form the lower vena cava at the level of IV-V lumbar vertebrae.

After completing the first part of the task, study the sources of blood supply to the posterior abdominal wall and paired organs of the abdominal cavity, the way of outflow of venous blood and the formation of caval-caval and porto-caval anastomoses.

Task№7. Before proceeding to the study of the superficial vessels of the neck, it is necessary to repeat the muscles and fascia of the neck on the muscular corpse. Then proceed to study the vessels.

On the prepared corpse behind the auricle, at the level of the angle of the lower jaw, under the subcutaneous muscle of the neck, on the external surface of the sternocleidomastoid muscle, find the external jugular vein that crosses the muscle obliquely at the bottom and back and at the posterior edge of this muscle flowing into the subclavian vein. The beginning of the anterior jugular vein is shown in the region of the hyoid bone, from where the right and left anterior jugular veins descend vertically down, perforate the pre-tracheal plate of the cervical fascia and enter the supra-hormone interapearoneurotic space. Here they form a jugular venous arch, and then pour into the subclavian veins. It should be remembered that sometimes there is an anterior jugular vein (unpaired), which is poured into the venous arch, formed in this case by the anastomosis between the external jugular veins.

After you find all the superficial veins, compare them with the figures in the atlas and on the tables. If necessary, consult the teacher.

Task№8. Find and study the internal jugular vein. Before studying the vessels of the neck, repeat the main anatomical formations of this body: organs, muscles, fascia, cell spaces, their messages. Arteries and veins are studied on the prepared corpse. After the branches of the external carotid artery were found and studied before dividing it into the jaw and superficial temporal, you find and study the internal jugular vein. This vein begins at the jugular hole, where its upper extension (upper bulb) can be found. Further it goes laterally from the common carotid artery and behind the sternoclavicular joint it merges with the subclavian vein, but before that it forms the lower extension (the inferior bulb). The internal jugular vein can easily be detected by receding laterally the sternocleidomastosus and the scapular-hyoid muscle. Along the way, the internal jugular vein receives the following tributaries: the facial, submandibular, pharyngeal, lingual, upper and middle thyroid veins. Basically, the listed veins follow in parallel with the same arteries.

Task№ 9 Find the facial vein next to the facial artery. Its tributaries correspond to branching of the facial artery. From the inflows of the facial vein, it should be noted and found on the preparation an angular vein, which is its initial section, the upper and lower labial veins. Superficial temporal veins accompany the artery and flow into the submandibular vein.

Task№ 10. Deep veins of the axillary region and shoulder accompany the same-named arteries in a double quantity (except - axillary vein - one). The superficial lateral subcutaneous vein is located in the lateral groove of the biceps muscle, in the deltoid-thoracic furrow and flows into the axillary vein.

Find the beginning of the lateral subcutaneous vein of the arm in the subcutaneous tissue of the radial portion of the rear of the bone. It goes up the radial edge of the forearm. In the subcutaneous tissue of the ulnar margin of the rear of the hand, a medial subcutaneous vein of the arm is formed, which along the ulnar margin of the forearm rises and falls into the brachial vein in the distal part of the arm. In the area of the ulnar fossa between the lateral and medial subcutaneous veins of the arm there is an anastomosis - an intermediate vein of the elbow. The deep veins of the forearm and the hand are followed by two arteries of the same name.

Task№ 11. Turn aside the flaps of the gluteus maximus and discern the upper gluteal artery and vein passing through the peri-vesicular aperture and the lower gluteal artery and vein passing through the sub-necklet. Deep veins accompany the same-named arteries in double numbers. The exception is large veins: the femoral, popliteal. In the subcutaneous tissue along the anterior medial surface of the thigh passes a large subcutaneous vein of the leg. It flows into the femoral vein in its proximal part under the inguinal ligament. At this point in the subcutaneous adipose tissue there are large inguinal superficial lymph nodes.

Task№ 12. Find the deep veins that accompany the same-named arteries in a double quantity, of the superficial veins, the two largest. A large subcutaneous vein of the leg is formed at the rear of the medial edge of the foot and rises along the medial surface of the shin in the subcutaneous tissue, continuing on the thigh. A small subcutaneous vein of the leg forms at the rear of the foot in the region of the lateral margin, rises along the posterior surface of the shin in the subcutaneous tissue and in the popliteal cavity into the popliteal vein. The large and small saphenous veins of the leg anastomose with each other and with deep veins of the leg. You can feel the pulsation close to the skin of the located arteries: the posterior tibial artery in the middle between the medial malleolus and the Achilles tendon: the dorsal artery of the foot - above the scaphoid bone, lateral, the tendon of the long extensor of the thumb

VII. Academic pursuits

Task№ 1. The patient sharply increased spleen. With his further examination, a tumor was identified in the region of the portal vein. What is the cause of the enlargement of the spleen? Give anatomical justification.

Answer:

The splenic vein is one of the main tributaries of the portal vein. When the latter is compressed, the outflow of blood and from the spleen is disturbed, which causes its increase.

Task№2 Why is the vein of the esophageal or rectal venous plexuses sharply widening when the tumor is compressed by the tumor of the portal vein? Give anatomical justification.

Answer:

These plexuses are built into the same-named port-caval anastomoses, which, when the pressure in the portal vein system increases, begin to function in a strengthened mode, discharging blood into the systems of the upper and lower hollow veins. This leads to the expansion and overstrain of the venous plexus vessels, which can be complicated by esophageal or rectal bleeding.

Task№3 The patient has a tumor of the right adrenal gland. Along with the clinical manifestations of this disease, there are signs of venous stasis in the system of the inferior vena cava. How can this be explained? Give anatomical justification.

Answer:

The medial margin of the right adrenal gland borders directly on the trunk of the inferior vena cava. In connection with this, the adrenal gland, significantly enlarged due to tumor growth, can squeeze the lower vena cava, which will impede the flow of blood in it and lead to stagnation in its system.

Task№4 The patient has a failure of the tricuspid valve. Will there be a violation of the outflow of venous blood along the upper and lower hollow veins? Give anatomical justification.

Answer:

When the tricuspid valve is insufficient, the blood from the right ventricle of the heart is partially ejected into the right atrium. As a result, hemodynamic disorders may occur in the system of the upper and lower hollow veins.

Task№5 With increasing blood pressure in the portal vein system (portal hypertension), the causes of which are quite numerous, but in any case, there is blockage of the blood flow pathways from most abdominal organs through the liver to the inferior vena cava, patients in the abdominal cavity may show a clearly increased liters, the amount of fluid (ascites state, ascidic liquid). Than, from the anatomical point of view, this can be explained?

Answer:

The pressure increase in the portal vein system will spread to all its roots and their inflows, leading to stagnation, including in the microcirculatory bed of drained organs, which in most of the area of their walls have a peritoneal cover. This bed also includes the vessels of the exchange link included in the mechanisms of the transmural (through the wall) transport fluid. As a result of increased pressure in them, the amount of the filtered liquid increases, it accumulates in the abdominal cavity.

VIII. Control Tests

1. Specify the anatomical formations adjacent to the superior vena cava on the right
- a-ascending part of the aorta;
- b-thymus;
- c- the anterior surface of the root of the right lung;
- g-mediastinal pleura.

2. Specify the location of the internal vertebral venous plexus.
- a) the surface of the spinal cord;
- b-between the solid and spider webs of the spinal cord;
- c- within the vertebral canal;
- d- between the dura mater and the periosteum of the vertebrae.

3. Specify the location of the subclavian vein on its path from the axillary cavity.
- a-in the interstitial space behind the front staircase;
- b) in front of the front staircase;
- c-behind from the sternoclavicular joint;
- d- between the first and second edges.

4. Specify, at the level of what vertebra originates the lower hollow vein
- a-third lumbar vertebra;
- b-first sacral vertebra;
- c-fourth lumbar vertebra;
- d-5th lumbar vertebra;

5. Indicate the veins located in the thickness of the circular ligament of the liver
- a-peripodal veins;
- b-esophageal veins;
- в-hepatic veins;
- d-gall-bladder veins.

6. Specify the veins into which the venous blood flows from the rectum
- a-inferior mesenteric vein;
- b-internal iliac vein;
- c- the superior mesenteric vein;
- g-external iliac vein.

7. Specify the location of the medial saphenous vein of the hand
- a-back surface of the hand;
- b - anterior surface of the radial edge of the forearm;
- c-ulnar vein;
- d-axillary vein.

8. Indicate places of localization of the lateral saphenous vein of the hand
   a-in the furrow between the deltoid and large pectoral muscles;
   b - in the lateral groove of the biceps arm muscle;
   c-in the carpal tunnel;
   d-under the collarbone.
9. Indicate parietal inflows of the internal iliac vein
   a-superior gluteal veins;
   b-lower intestinal veins;
   c- the lower gluteal veins;
   g-lateral sacral veins.
10. Indicate inflows of the large saphenous vein of the leg
   a-small saphenous vein;
   b- superficial epigastric vein;
   c- the superficial dorsal vein of the penis;
   г- anterior scrotal veins.

Keys

1	2	3	4	5	6	7	8	9	10
г	в,г	б,в	в,г	б,в	а,б	а,в,г	а,б,в,	а,б,в	б,в,г

IX. Anatomical terminology

Venae	Veins
Venae pulmonales	Pulmonary veins
Vena pulmonalis superior dextra	Right upper pulmonary vein
Vena pulmonalis inferior dextra	Right lower pulmonary vein
Venae pulmonales sinistrae	Left pulmonary veins
Vena pulmonalis superior sinistra	Left upper pulmonary vein
Vena pulmonalis inferior sinistra	Left lower pulmonary vein
Venae cordis	Heart veins
Sinus coronarius	Venous sinus
V. Cordis magna	Great vein of the heart
V. Posterior ventriculi sinistri	Posterior vein of left ventricle
V. Obliqua atrii sinistrii	oblique vein of the left atrium
Plica v. Cavae sinistrae	left vena cava fold
V. Cordis media	Average heart vein
V. Cordis parva	Small vein of the heart
Vv. Cordis anteriores	Fore veins of the heart
Vv. Cordis minimae	The smallest veins of the heart
Vv. Atriales	Atrial veins
Vv. Ventriculares	Ventricular veins
Vv. Atrioventriculares	Atrial-ventricular veins
Vena cava superior	Upper vena cava
Venae brachiocephalicae	Pleurochelovnye veins
Vena jugularis interna	Internal jugular vein
Bulbus venae jugularis superior	Upper bulb of internal jugular vein
V. Canaliculi cochleae	The Vienna canal of the cochlea
Bulbus venae jugularis inferior	Lower bulb of internal jugular vein
Vena facialis	Facial vein
V. Angularis	Angular vein
V. Submentalis	Subdominal vein
Vena retromandibularis	The jagged vein
Vena jugularis externa	External jugular vein
V. Aurieularis posterior	Posterior ear
V. Jugularis anterior	Anterior jugular vein
Arcus venosus juguli	Jugular venous arch
V. Suprascapularis	Supraclavicular vein
Vv. Transversae colli	Transverse veins of the neck
Sinus durae matris	Sinuses of a solid cerebral envelope
Sinus transversus	Transverse sinus
Confluens sinuum	Sinus sink
Sinus occipitalis	Occipital sinus
Plexus basilaris	Basilar plexus
Sinus sigmoideus	Sigmoid sinus
Sinus sagittalis superior	Upper sagittal sinus
Lacunae laterales	Side lacunae

Sinus sagittalis inferior	Lower sagittal sinus
Sinus rectus	Straight Sinus
Sinus petrosus inferior	Lower stony sine
Vv. Labyrinthi	Veins of the labyrinth
Sinus petrosus superior	Upper stony sine
Sinus cavernosus	Cavernous sinus
Sinus intercavernosi	Interstitial sinus
Sinus sphenoparietalis	Cuneiform parietal sinus
Venae diploicae	Diploic veins
V. Diploica frontalis	Frontal diploic vein
V. Diploica temporalis anterior	Anterior temporal diploic vein
V. Diploica temporalis posterior	Rear temporal diploic vein
V. Diploica occipitalis	Occipital Diplic Vein
Venae emissariae	Emissary veins
V. Emissaria parietalis	The dark emissary vein
V. Emissaria mastoidea	Mesothelial emissary vein
V. Emissaria condylaris	Caudal efferent vein
V. Emissaria occipitalis	Occipital emissary vein
Plexus venosus canalis hypoglossi	Venous plexus of the sublingual canal
Plexus venosus foraminis ovalis	Venous plexus of the oval aperture
Plexus venosus caroticus inter-nus	Venous plexus of the canal
Venae cerebr	Brain veins
Vv. Cerebri superficiales	Superficial cerebral veins
Vv. Cerebri superiores	Upper cerebral veins
Vv. Prefrontales	Prefrontal veins
Vv. Frontales	Frontal veins
Vv. Parietales	The dark veins
Vv. Occipitales	Occipital veins
Vv. Cerebri inferiores	Lower cerebral veins
V. Unci	Vienna hooks
V. Cerebri media superficialis	Superficial middle cerebral vein
Venae cerebri profundae	Deep Veins
Vena ophthalmica inferior	Eye vein
Vena subclavia	Subclavian vein
Vv; pectorales	Thoracic veins
V. Scapularis dorsalis	Dorsal scapular vein
Vena axillaris	Axillary vein
V. Thoraeiea lateralis	Lateral thoracic vein
Vv. Brachiales	Shoulder veins
Vv. Ulnares	The ulnar veins
Vv. Radiales	Radial veins
V. Cephalica	Lateral saphenous vein of arm
V. Thoraeoaeromialis	Breast enlargement vein
V. Cephalica aeeessoria	Additional lateral subcutaneous vein of the hand
V. Basilica	Medial saphenous vein of arm
V. Intermedia cubiti	The intervening vein of the elbow
Rete venosum dorsale manus	The dorsal venous network of the brush
Vv. Intercapitales	Interstitial veins
Vv. Digitales palmares	Palmar Finger Veins
Vv. Metacarpeae dorsales	Dorsal metacarpal veins
Vv. Metacarpeae palmares	Palmar metacarcheal veins
Vena azygos	Unpaired Vienna
V. Intercostalis superior dextra	Right upper intercostal vein
V. Hemiazygos	Semi-divided vein
V. Hemiazygos aeeessoria	Semi-split secondary vein
Vv. Esophageales	Esophageal veins
Vv. Bronchiales	Bronchial veins
Vena cava inferior	Lower hollow vein
Vv. Phrenicae inferiores	Lower diaphragmatic veins
Vv. Lumbales vv. Hepaticae	Lumbar veins
Vv. Hepaticae dextrae	Right hepatic veins
Vv. Hepaticae mediae	Middle hepatic veins
Vv. Hepaticae sinistrae	Left hepatic veins
Vv. Renales	Renal veins

V. Suprarenalis sinistra	The left adrenal vein
V. Testicularis sinistra	Left ovarian vein
V. Ovarica sinistra	Left ovarian vein
V. Suprarenalis dextra	Right adrenal vein
V. Testicularis dextra	Right testicle vein
V. Ovarica dextra	Right ovarian vein
Plexus pampiniformis	Lozovidnoe plexus
Vena portae [portalis]	Portal vein
Vena femoralis	Femoral vein
Vv. Pudendae externae	External genital veins
V. Circumflexa ilium superficialis	Superficial vein surrounding iliac bone
V. Epigastrica superficialis	Superficial epigastric vein
V. Saphena magna	Large saphenous vein of leg
V. Saphena accessoria	Additional subcutaneous vein of the leg
V. Profunda femoris	Deep Vein Thigh
Vv. Circumflexae femoris mediates	medial veins surrounding the femur
Vv. Circumflexae femoris laterales	The lateral veins surrounding the femur
Vv. Perforantes	The perforating veins
Vv. Paraumbilicales	Peri-ocular veins
V. Gastrica sinistra	Left gastric vein
V. Gastrica dextra	Right gastric vein
V. Prepylorica	Pericular vein
Vena mesenterica superior	Upper mesenteric vein
Vv. Jejunales et ileales	Veins of the jejunum and ileum
V. Gastroepiploica dextra	Right gastro-omental vein
Vv. Pancreaticae	Pancreatic veins
Vv. Pancreaticoduodenales	Pancreatoduodenal veins
V. Ileocolica	Ilio-colonic vein
V. Appendicularis	Vein of the appendix
V. Colica dextra	Right colon
V. Colica media	The mediocerepal vein
Vena lienalis (splenica)	Splenic vein
Vv. Pancreaticae	Pancreatic veins
Vv. Gastricae breves	Short gastric veins
V. Gastroepiploica sinistra	Left gastro-omental vein
Vena mesenterica inferior	Lower mesenteric vein
V. Colica sinistra	Left colon
Vv. Sigmoideae	Sigmoid veins
V. Rectalis superior	Upper rectal vein
Vena iliaca communis	Common iliac vein
V. Sacralis mediana	Median sacral vein
V. Iliolumbalis	Ilio-lumbar vein
Vena iliaca interna	Internal iliac vein
Vv. Gluteae superiores	Upper gluteal veins
Vv. Gluteae inferiores	Lower gluteal veins
Vv. Obturatoriae	Obstructive veins
Vv. Sacrales laterales	Lateral sacral veins
Plexus venosus sacralis	Sacral venous plexus
Plexus venosus rectalis	The rectum venous plexus
Vv. Vesicales	Urinary tube veins
Plexus venosus vesicalis	venipuncture venous plexus
Vena poplitea	Popliteal vein
Vv. Genus	Veins of the knee
V. Saphena parva	Minor saphenous vein of leg
Vv. Tibiales anteriores	Anterior tibial veins
Vv. Tibiales posteriores	Rear tibial veins
Vv. Peroneae [fibulares]	Otorhinolateral veins

X. Preparations and manuals1. Prepared vascular corpse. Native preparations of the vessels of the upper and lower extremities. Tables. Textbook and atlas of human anatomy.

OUT-CLASS SELF-WORK.

METHODOLOGICAL RECOMMENDATIONS ON THE TOPIC:

ANATOMY AND TOPOGRAPHY OF THE UPPER HOLLOW VIEN, UNPAIRED AND SEMI- UNPAIRED VIENS. SUBCLAVIAN VIEN AND ITS INFLOWS. JUGULAR VIEN. FACIAL VIEN. SINUSES OF SCLEROMENINX.

Questions of the initial level of knowledge.

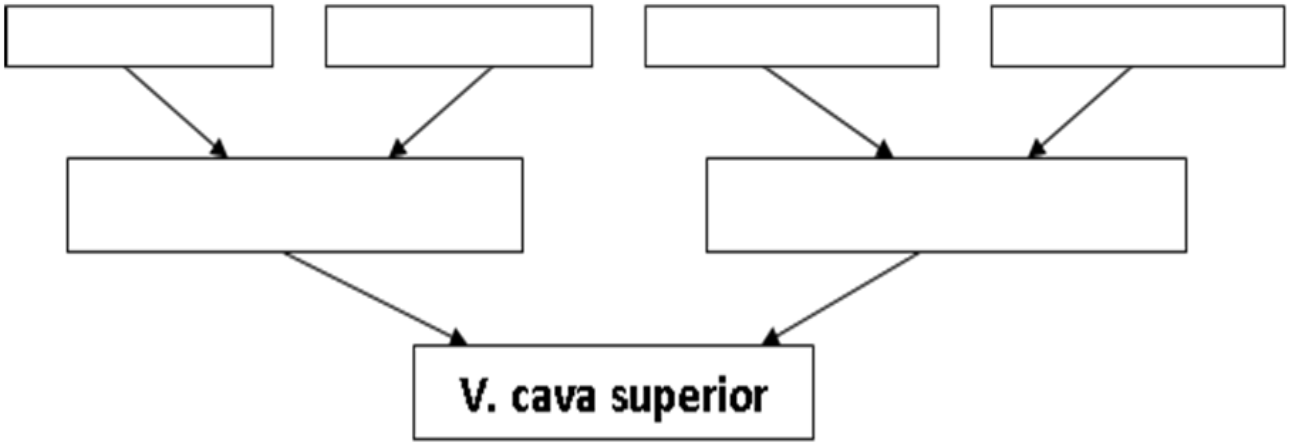
1. Topography of the head, neck and thoracic cavity.
2. The veins of the great circle of blood circulation (upper and lower hollow veins)
3. Roots of the superior vena cava (right and left brachiocephalic veins).
4. Unpaired and semi-unpaired veins and their inflows.

II. Objectives.

STUDENT MUST KNOW:
1. Roots of the superior vena cava (right and left). Pleurochelovnoy trunk. 2. Subclavian vein and its tributaries. 3. Education, topography and the course of the internal jugular vein and its extracranial tributaries - pharyngeal, lingual, upper thyroid, facial, mandibular veins with the formation of the pterygoid plexus. Outflow of venous blood from the skull (sinus of a hard shell). 4. The external cerebral membrane, the jugular vein and their tributaries. 5. Topography of the anterior jugular vein, anastomosis of the right and left veins. Formation of the jugular venous arch. 6. Superficial and deep veins of the upper limb. 7. The origins, topography and course of the lateral (head) cutaneous vein of the upper limb. Its location on the shoulder in the lateral groove of the biceps arm muscle, deltoid-thoracic furrow, its entry into the axillary vein. 8. The origins, topography and course of the medial (royal) cutaneous vein of the upper limb. Place it on the medial fissure of the biceps arm and its flow into one of the shoulder veins at the midpoint of the shoulder. 9. The medial ulnar vein. 10. Deep veins of the upper limb, compassion veins repeating the course of the arteries. 11. Mevenvenous anastomoses in the system of superficial and deep veins of the upper limb. 12. Origins, topography and course of unpaired and semi-unpaired veins in the thoracic and abdominal cavity, their inflows and confluence into the superior vena cava.
STUDENT MUST BE ABLE TO:
1. Find, name, show on the moist preparation the upper hollow, brachiocephalic, jugular, subclavian veins. 2. Find and show on the preparation the superficial and deep veins of the upper limb: the radial, ulnar, humeral, axillary, lateral, medial and medial cutaneous veins. 3. Find and show the unpaired vein on the right side of the spine, its inflows and the place of confluence in the upper vena cava above the lung root at the level of IV-V thoracic vertebrae. 4. Find, name and show to the left of the spine a hollow paired vein and its tributaries, the place of its entry into the unpaired vein at the level of VIII-X thoracic vertebrae. 5. To find and show on the preparation an additional semi-unpaired vein and the place of its inflow into the semi- unpaired vein. 6. Show on the preparation the internal thoracic vein and its tributaries.

III. Tasks for self-work.

1. Fill in the formation of the superior vena cava.



2. Fill in the table of inflows of the main venous trunks of the neck, head and thoracic cavity.

Верхняя полая вена		
Vein	**Formation and topography**	**Inflows**
1. Internal Jugular vien		
2. Vien subclavian		
3. Superior vena cava		
4. Unpaired vien		
5. Semi-unpaired vien		

***IV*. Questions for self-control.**

1. Name the roots of the superior vena cava

_____

_____

2. List the intracranial and extracranial inflows of the internal jugular vein._____

_____

_____

3. Name the inflows of the axillary vein. _____

_____

_____

4. Where the medial dermal vein of the upper limb lies (tsar's vein) _____

_____

5. Name the superficial veins of the upper limb, characterize their formation and topography.

_____

_____

_____

6. Name the venous trunks located in the shoulder area, anastomosis and venous drainage from the area. _____

_____

_____

7. List the veins of the ulnar fossa. _____

_____

8. Name the venous trunks and plexus of the neck and head. _____

_____

9. Назовите межвенозные анастомозы в области головы и шеи, их практические значения.

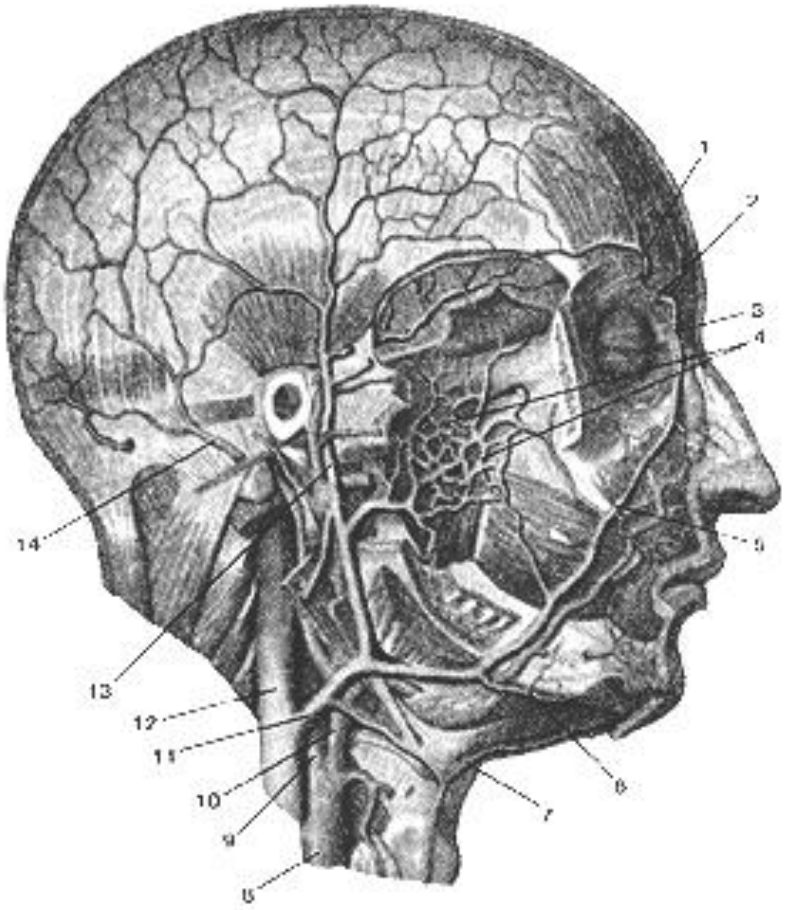
_____

_____

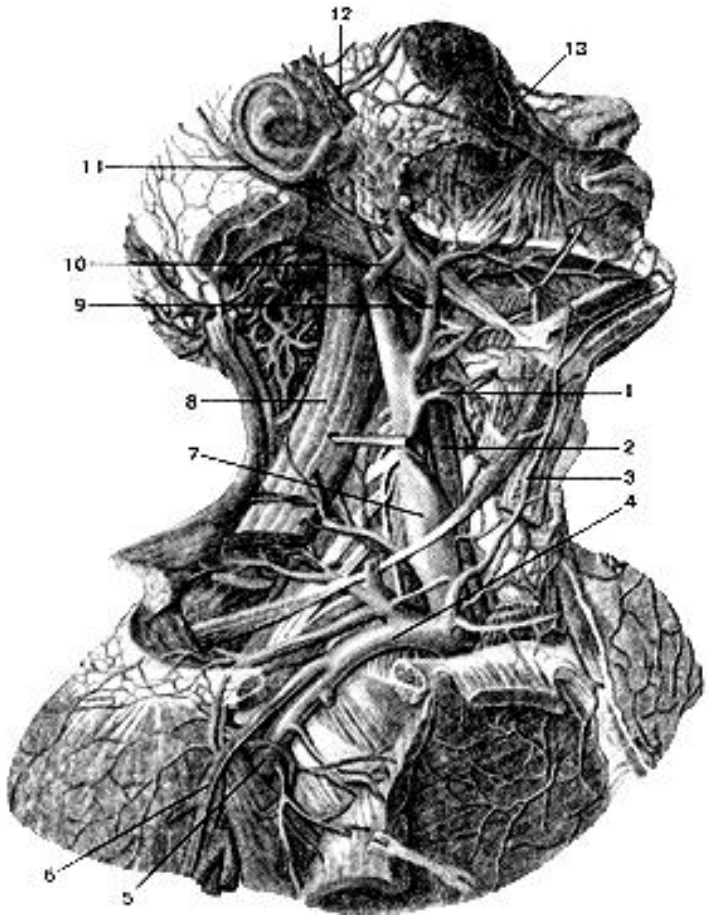
_____

V. Make the notation in the following pictures.

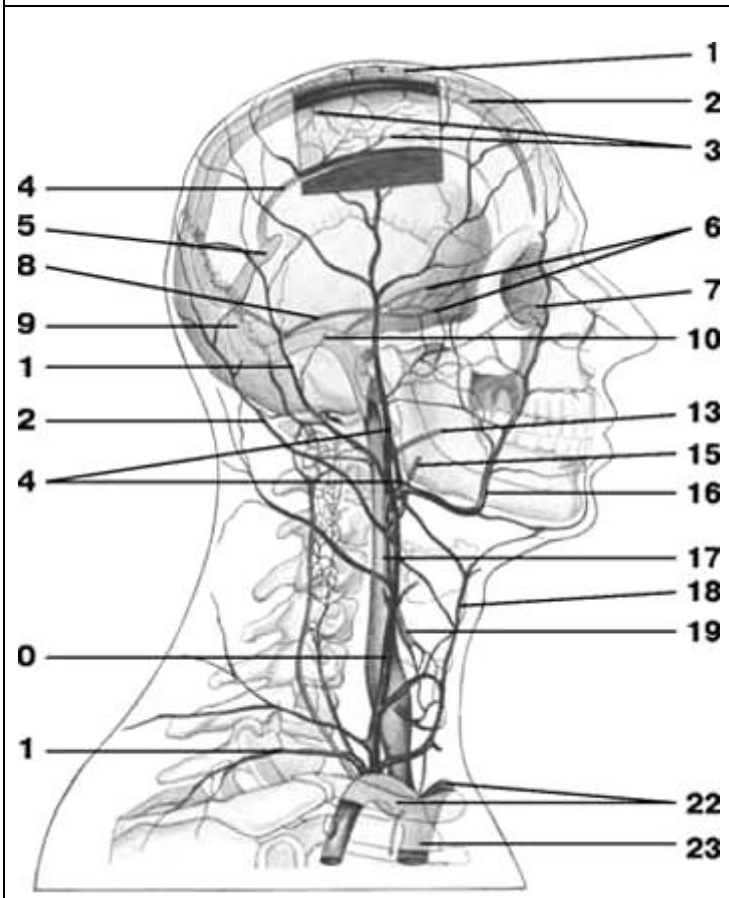
Make the notation and add the Latin name:

Veins of the head. Right view.		
		*arteria carotis interna*

Make the notation and add the Latin name:

Deep veins of the neck. Right view.		
		

Make the notation and add the Latin name:

Scheme of veins of head and neck		
		veins of the brain;
		upper stony sinus;
		upper vena cava
		upper sagittal sinus;
		upper thyroid vein;
		internal jugular vein;
		ocular vein;
		pharyngeal vein;
		diploic veins;
		posterior auric vein;
		dormant jaw;
		occipital vein;
		facial vein;
		suprapulmonary vein;
		external jugular vein;
		lower sagittal sinus;
		anterior jugular vein;
		cavernous sinus;
		brachiocephalic veins;
		transverse sinus;
		a direct sinus;
		sigmoid sinus;
		lingual vein;

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **INFERIOR VENA CAVA AND PORTAL VENA AND ITS INFLOWS.**

Questions of the initial level of knowledge

1. Structure, blood supply, topography of the abdominal organs and their relation to the peritoneum.
2. Pelvic veins and venous plexuses.
3. Surface and deep veins of the lower limb.
4. Education and topography of the inferior vena cava.
5. Inflows of the inferior vena cava.
6. Education and topography of the portal vein.
7. Fetal blood supply.

II. Objectives

STUDENT MUST KNOW:
1. Root and topography of the inferior vena cava, its extent and course. 2. Relations of the inferior vena cava and liver. 3. Spiral and visceral tributaries - ovarian (ovarian), renal, adrenal and hepatic veins. 4.Parnye, parietal inflows of the inferior vena cava. 5. Root, stroke and topography of the portal vein (splenic, upper and lower mesenteric.) 6. Peritoneal portal vein. 7. Branching of the portal vein in the thickness of the liver and the outflow of venous blood from the liver. 8. Features of the fetus blood supply.
STUDENT MUST BE ABLE TO:
1. Name and show on the corpse general, iliac veins and a hollow vein. 2. Show the lower vena cava on the lower surface of the liver and the diaphragm. 3. Name and show on the corpus a pair of visceral tributaries of the inferior vena cava. 4. Name and show paired, parietal inflows of the inferior vena cava. 5. Show the portal vein in the thickness of the hepatic-duodenum ligament. 6. Show behind the head of the pancreas the site of the fusion of the roots of the portal vein - the splenic vein, the superior and inferior mesenteric veins. 7. Name and show inflows of the portal vein. 8.Show on the preparation: a) Splenic vein. b) upper and lower mesenteric veins. 9. Answer orally the features of the fetus's blood supply.

III. Tasks for self-work.

1) Complete phrases:

1. The roots of the portal vein are :

а. _____

б. _____

в. _____

2. The formation of the portal vein occurs _____

_____

3. The portal vein lies in _____ ligament.

4. Lower hollow vein extends from _____ to _____ vertebraes.

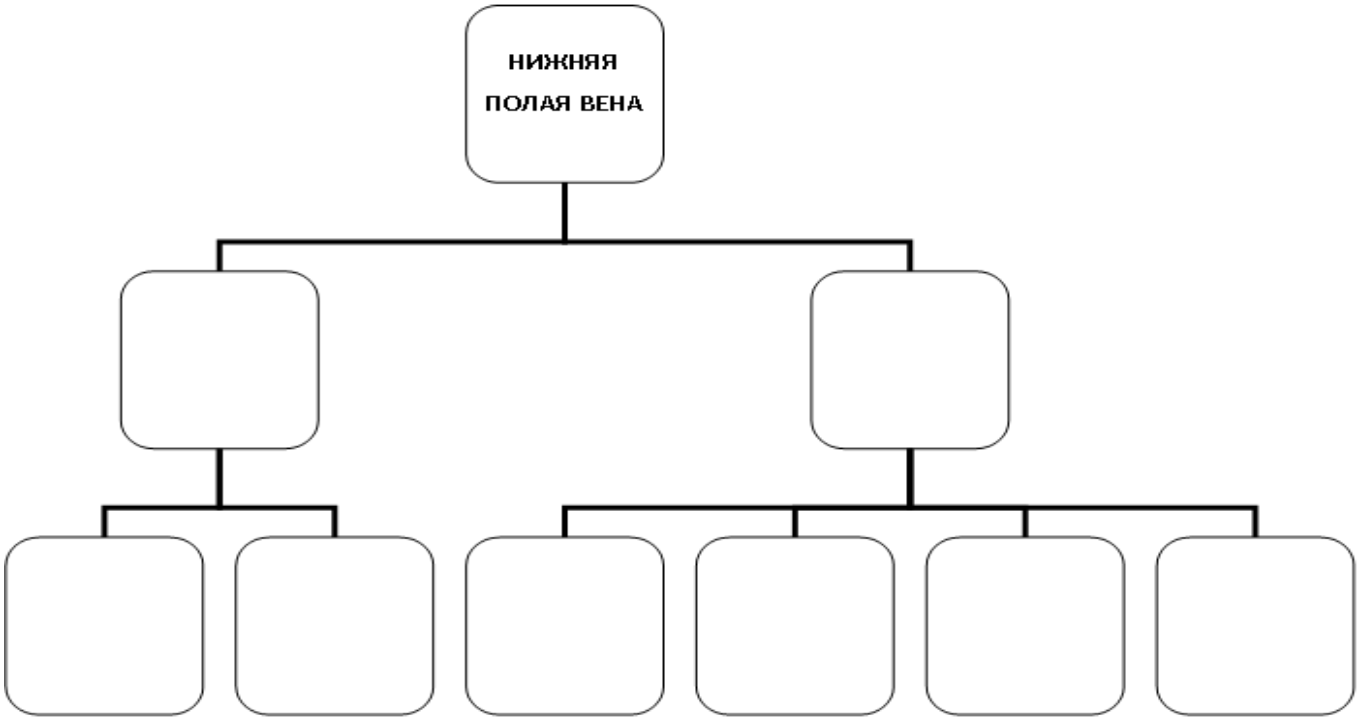
5. The right ovarian vein flows into the _____

6. The left ovarian vein is a tributary _____

7. Botallov duct is located and provides in the embryonic period the blood flow between

_____

2) Make up the scheme of the inferior vena cava:



3) Fill in the table:

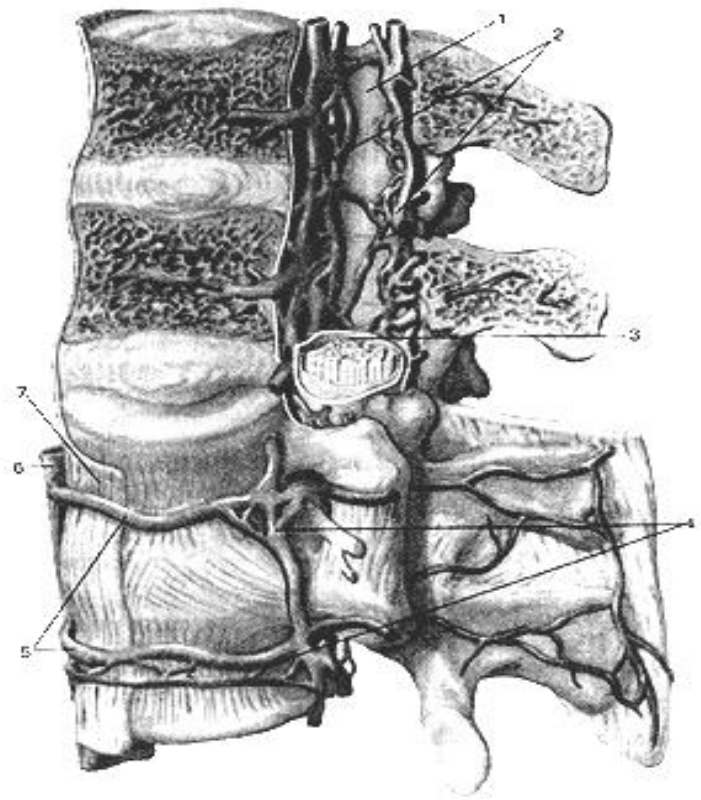
Veins of the abdominal cavity		
NAME	TOPOGRAPHY	INFLOWS
1		
2		
3		

***IV*. Questions for self-control.**

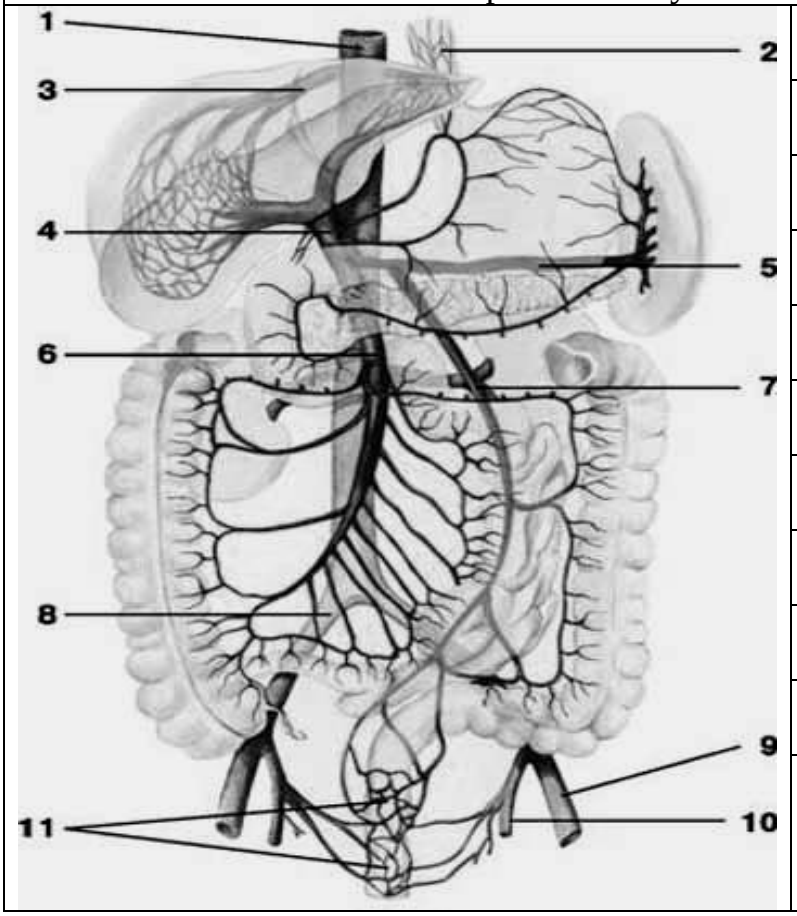
Question	*Answer*
1. The inflow of which vein is the inferior mesenteric vein?	
2. Which organs collect blood from the portal vein?	
3. Specify the location of the portal vein	
4. From which veins and at what level the lower hollow vein is formed?	
5. List the internal tributaries of the inferior vena cava?	

V. Make the notation in the following pictures.

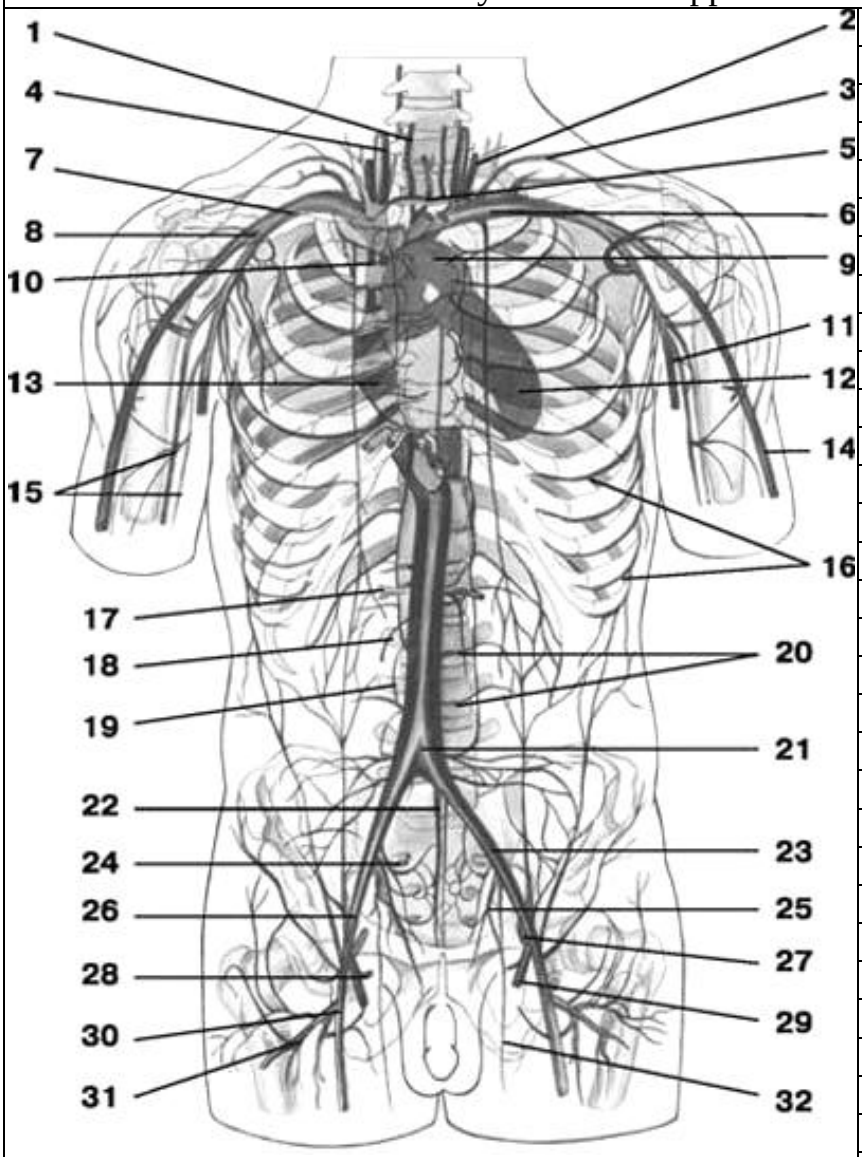
Make the notation and add the Latin name:

External and internal vertebral plexus		
		

Make the notation and add the Latin name:

Scheme of the portal vein system and inferior vena cava		
		inferior vena cava;
		lower mesenteric vein;
		superior mesenteric vein;
		internal iliac vein;
		anastomosis between the portal and lower vena cava branches
		external iliac vein;
		portal vein;
		anastomosis between the branches of portal and upper hollow veins;
		splenic vein;
		hepatic vein;
		common iliac vein;

Make the notation and add the Latin name:

Scheme of the system of the upper and lower hollow veins		
		femoral vein; large latent vein; the superior vena cava; internal iliac vein; internal jugular vein; deep vein of the thigh; head vein of the hand; aortic arch; posterior intercostal veins; occlusive vein lateral sacral vein; left ventricle; suprapulmonary vein; external iliac vein; external genital vein; external jugular vein; inferior vena cava; common iliac vein; anterior jugular vein; brachial vein; brachiocephalic vein; superficial epigastric vein; subclavian vein; axillary vein; renal vein; lumbar veins; right ascending lumbar vein; right ventricle; median sacral vein; the royal vein; testicular veins; jugular venous arch;

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ANATOMY AND TOPOGRAPHY OF THE VIENS OF PELVIC AND LOWER LIMBS. ANATOMY AND TOPOGRAPHY OF KAVA-CAVAL AND PORTO-CAVAL ANASTOMOSIS.**

I. Questions of the initial level of knowledge.

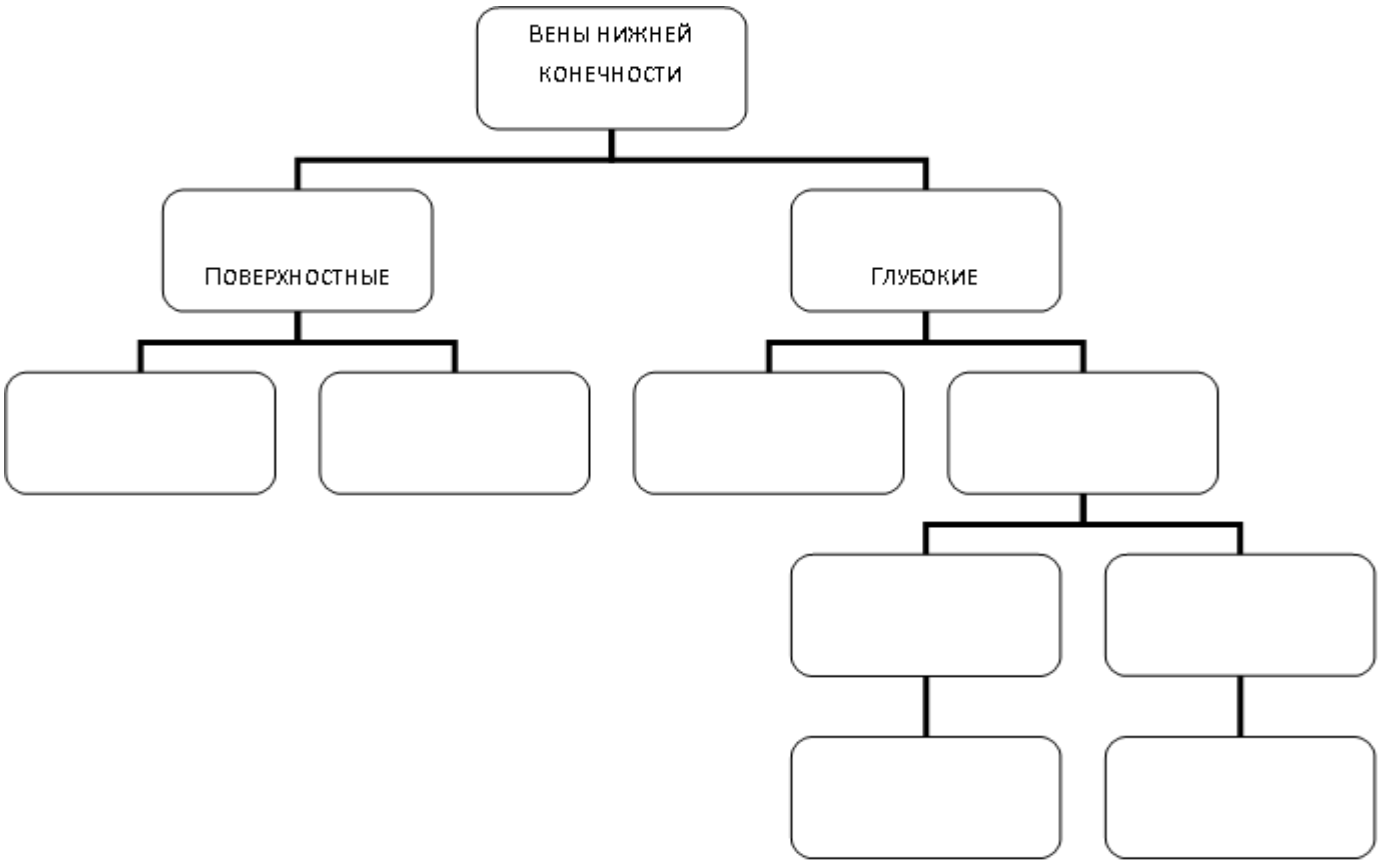
1. Blood supply to the organs and walls of the small pelvis.
2. Lower vena cava and its tributaries.
3. The portal vein and its tributaries.
4. General external and internal iliac veins.
5. Fascia and topography of the lower limb.
6. The trunk veins of the lower limb.
7. Topographic formations of the lower limb.

II. Objectives.

STUDENT MUST BE ABLE TO:
1. Organs and walls of the pelvis. 2. Topography of the common iliac vein (right, left). 3. Topography of the internal iliac vein and its tributaries. 4. Venous anastomoses. Plexus of small pelvis. 5. Topography of the external iliac vein, its tributaries and extension to the thigh. 6. Deep veins of the lower limb (femoral, popliteal, peroneal, tibial, lateral and medial plantar veins), their topography and course in the corresponding openings, furrows, canals, pits parallel to the same arteries 7. The length of the small saphenous vein from the dorsal venous arch of the foot to the popliteal fossa and the place of its entry into the popliteal vein 8. The presence of numerous anastomoses between the influxes of superficial and deep veins of the lower limb 9. Superficial veins of the lower limb, their formation, topography and course 10. The boundaries of the large saphenous vein and the place of its confluence in the region of the femoral ring in the femoral vein 11. Formation of cava-caval anastomoses between the inflows of the upper and lower hollow veins. 12. Formation of porto-caval anastomoses between inflows of hollow veins and portal vein, the value of anastomoses
STUDENT MUST POSSESS:
1. To name and show the common, external and internal iliac veins and their tributaries 2. Call the venous plexus of the pelvic organs and show their location 3. Show, starting with the vascular lacuna, femoral vein and in other topographic formations of the lower limb 4. Show in poplar formations popliteal, small and tibial veins. To name their tributaries. 5. Show the venous surface of the foot 6. Show the place of formation and location of a small cutaneous vein. Find the place of her confluence in the popliteal vein. 7. Show the place of formation and location of the large dermal vein of the lower limb in the region of the thigh, shin and foot, to find the place of its confluence in the femoral vein. 8. Explain the formation of port-caval and cava-caval anastomoses and their significance

III. Tasks for self-work.

1. **Make a diagram of the venous channel of the lower limb**:



2. **Complete the table of intervenous anastomoses of the branches of the hollow and portal veins:**

LOCATION OF ANASTOMOSIS	BRANCHES FORMING ANASTOMOSIS
On the posterior thoracic and abdominal walls	
In the course of the ascending and descending part of the colon	
Between the lower part of the esophagus and the cardiac part of the stomach	
In the course of the vertebral plexus of the thoracic and abdominal parts	
On the anterior abdominal wall in the peripodal region	

3. **Complete phrases:**

1. The parietal influxes of the internal iliac vein are _____

_____

_____

2. The following venous plexuses lie in the pelvic cavity _____

_____

_____

_____

3. A small subcutaneous vein of the lower limb begins from _____

And flows into

4. The large hypodermic vein begins from _____

and extends to the confluence in _____

***IV*. Questions for self-control.**

1. Which anastomosis actually represents the trunk of an unpaired vein? _____

_____

_____

2. What channels passes on its way the femoral vein? _____

_____

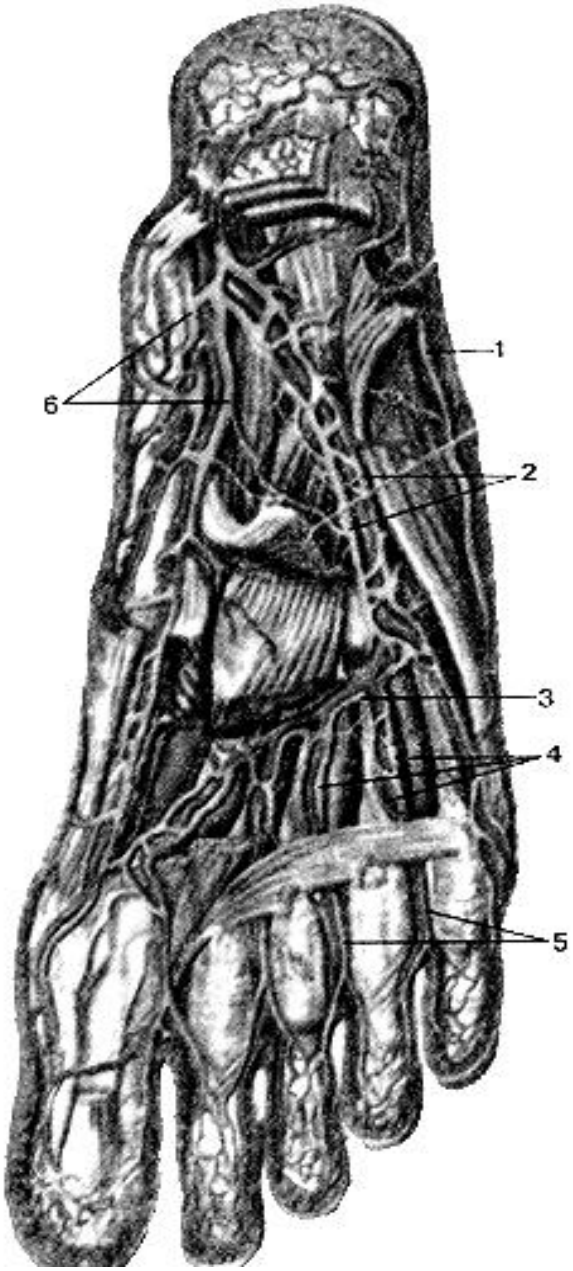
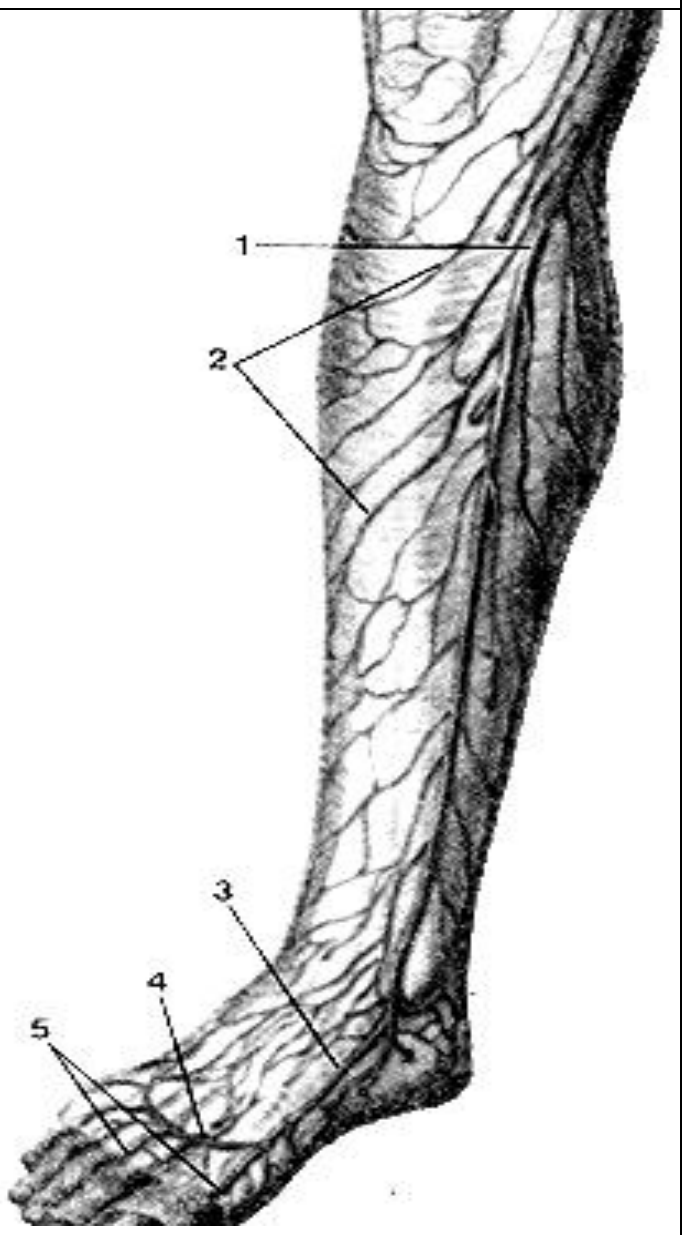
_____

3. Inflows of which veins are located in the navel and what anastomoses are formed here? _____

_____

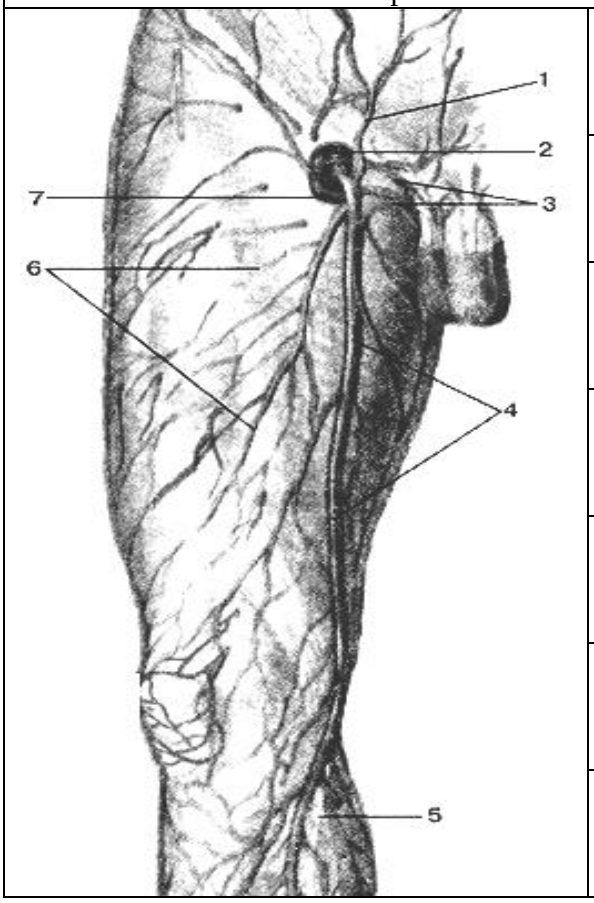
_____

V. Make the notation in the following figures and add the Latin name:

Veins of sole of foot, right. Bottom view.	Superficial veins of lower leg, right. Front view
	

	lateral marginal vein of the foot;		large saphenous vein of the foot;
	lateral plantar veins;		medial marginal vein of the foot;
	medial plantar veins.		subcutaneous veins of the lower leg;
	plantar venous arch;		a dorsal venous arch of the foot;
	plantar finger foam;		rear finger veins.
	plantar metatarsal veins;		

Make the notation and add the Latin name:

Superficial veins of the hip, right. Front view.		
		femoral vein;
		large saphenous vein of the foot;
		external genital veins:
		oval fossa.
		superficial epigastric vein;
		subcutaneous veins of the thigh;
		subcutaneous nerve;

FINAL LESSON ON THE TOPIC: "HEART. ARTERIES. VIENS»

Questions for final lesson:

1. Arterial arches of the foot.
2. Artery of the hand.
3. Arteries of the foot.
4. Femoral artery.
5. Venous anastomoses along the posterior surface of the ascending and descending colon.
6. Veins of the anterior wall of the trunk, anastomoses.
7. Heart veins.
8. Upper hollow vein, topography, stroke, tributaries.
9. Branches of the abdominal aorta.
10. Branch of the thoracic aorta.
11. Internal iliac artery.
12. Internal iliac vein, topography, stroke, tributaries.
13. Internal carotid artery. Topography and departments
14. Internal jugular vein, topography, stroke, tributaries.
15. Age features of the heart.
16. Gate vein, topography, stroke, roots.
17. Deep palmar arc.
18. Deep veins of the upper limb, topography, stroke, tributaries.
19. Deep veins of the lower limb, topography, stroke, tributaries.
20. Posterior intercostal veins. External and internal venous plexus of the spine.
21. Cava-caval anastomoses, formation and location.
22. Chambers of the heart. Circles of blood circulation.
23. Valvular heart apparatus.
24. Valves of the heart.
25. Blood supply to the thigh.
26. Blood supply to the lower leg.
27. Blood supply to the brain.
28. Blood supply to the teeth of the upper jaw.

29. Blood supply to the teeth of the lower jaw.
30. Blood supply to the knee joint.
31. Blood supply of the sacrum.
32. Blood supply of the wrist joint.
33. Blood supply to facial muscles.
34. Blood supply of the bladder.
35. Blood supply to the muscles of the neck.
36. Blood supply to the pelvic organs.
37. Blood supply of the shoulder joint.
38. Blood supply to the perineum.
39. Blood supply to the heart wall.
40. Blood supply to the walls of the abdominal cavity.
41. Blood supply to the walls of the thoracic cavity.
42. Circles of blood circulation.
43. Radial artery. Topography and branches.
44. External iliac artery.
45. External iliac vein, topography, stroke, tributaries.
46. External carotid artery. Topography and its branches.
47. External jugular vein, topography, stroke, tributaries.
48. External structure of the heart. Furrows, their contents.
49. Unpaired vein, topography, course, tributaries.
50. Lower mesenteric artery.
51. Lower hollow vein, topography, stroke, roots.
52. General characteristics of the aorta, divisions.
53. A close-in bag.
54. Features of venous outflow from the anterior abdominal wall, peripodal ring, anastomosis.
55. Features of venous outflow from the esophageal-gastric department, anastomosis.
56. Features of venous outflow from the rectum, anastomosis.
57. Features of the fetal circulation.
58. Features of blood supply to the liver.
59. Paired branches of the thoracic and abdominal aorta.
60. Anterior tibial artery.
61. Brachial artery.
62. Superficial palmar arch.
63. Superficial veins of the upper limb, topography, stroke, tributaries.
64. Superficial veins of the lower limb, topography, stroke, tributaries.
65. Superficial and deep veins of the pelvis. Venous plexus of the pelvis.
66. Subclavian artery.
67. Popliteal artery
68. Axillary artery.
69. Semi-paired and semiparous additional veins, topography, course, tributaries.
70. Porto-caval anastomoses, formation and location.
71. Conductive system of the heart.
72. The projection of the valvular valves does not have a front chest wall.
73. Sinuses of the pericardium.
74. Own skeleton of the heart.
75. The structure of the stomach and its blood supply.
76. Structure and blood supply of the pharynx.
77. Structure and blood supply of the larynx.
78. Structure and blood supply of teeth.
79. Structure and blood supply of the esophagus
80. Structure and blood supply of the rectum.
81. Structure and blood supply of the large intestine.
82. The structure of the myocardium.
83. The structure of the pericardium and its sinuses.
84. The structure of the wall of the heart.
85. Topography and borders of the heart.
86. Topography of the heart. Projection of valves.

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC:
«ANATOMY AND TOPOGRAPHY OF LYMPHATIC SYSTEM ORGANS. VALUE AND PRACTICAL SKILLS. AGE FEATURES. X-RAY».

The lymphatic system is part of the immune system. It is represented by a system of lymphatic capillaries and networks branched into organs and tissues, lymphatic vessels, trunks and ducts, through which lymph from the place of formation flows to the venous angle - the junction of internal jugular and subclavian veins. On the way of lymph flow lie numerous lymph nodes related to the immune system. The process of lymphogenesis is a complex multistage process, the disturbance of which leads to a number of diseases and the spread of tumor processes. Knowledge and understanding of the function of the lymphatic system, ways of formation and outflow of lymph are necessary for specialists of any profile. To understand the spread of the pathological process and in particular tumor origin.

I.Objectives

Student must know:	a) circulation circles, microcirculatory bed; b) a scheme of the structure of the lymphatic channel; c) know the structure and functions of the structural elements of the lymphatic system; d) know the ways of lymph drainage from separate organs and systems; e) to know large collector lymphatic trunks (intestinal, lumbar, jugular) and ducts (right lymphatic and thoracic); f) the formation of the jugular angle, the root of the upper genital vein; g) composition of lymph.
Student must be able to:	a) to name, find and show on preparations; b) to name, find and show on the preparations the most important groups of regional lymph nodes; c) to name ways of outflow of lymph regional lymph nodes from some organs: from mammary gland to axillary, perigendinal, mediastinal lymph nodes; from the lungs to bronchopulmonary, tracheobronchial, mediastinal nodes; from the esophagus - into the deep cervical, brachiobronchial, posterior mediastinal nodes; from small curvature of the stomach and cardiac part - into the nodes of the small omentum and the gates of the liver; from the large curvature, into the gastric-glandular nodes.
Student must possess:	Latin terminology on this topic.

II. Required level of knowledge:

б) from previous topics:

1. General anatomy of the circulatory system. Circles of blood circulation.
2. Large venous trunks of the neck, head, thoracic and abdominal cavities, limbs.

в) from the current lesson:

1. Sources of development and general plan of the structure of the lymphatic system.
2. Functional significance of the lymphatic system and the principles of its organization. Ways of lymph drainage.
3. General characteristics and structure of lymph nodes.

III. Object of study

1. Enlightened micro-preparations of the lymphatic system of separate organs and tissues in the field of view of the MBS-1 microscope. Injection of the blue mass of Gerota.
2. Macro-preparations with injected lymphatic vessels, nodes and ducts.
3. Lymph nodes.

IV. Informational part

In the lymphatic system, according to the functions, the following components are distinguished:

1. Lymphatic capillaries.
2. Lymphatic vessels.
3. Lymph nodes.
4. Lymphatic collectors: trunks and ducts.

1. Lymphatic capillaries are the roots of the lymphatic system, they are found in all organs and tissues, except the brain and spinal cord, the organs of the immune system, the placenta. The contours of the capillaries are uneven, with extensions, their diameter is 20-25 μm. Connecting together, they form capillary nets, their shape is different and corresponds to the construction of organs. Lymphatic capillaries are oriented by the course of connective tissue bundles surrounding the connective tissue, located between the structural and functional elements of the organs. They begin blindly in the form of extensions, the wall is represented by a continuous layer of endothelial cells, which are attached by bundles of anchor (sling)

filaments, facilitating the opening of the lumen of the capillaries. Lymphatic capillaries lack a basal layer, they are surrounded by collagen and reticular fibers, which provides a closer relationship with the intercellular substance of connective tissue. The movement of lymph from the capillaries to the lymphatic vessels is due to the interstitial pressure and the current of the formed lymph. Fusing among themselves and enlarging, capillaries, give rise to lymphatic vessels.

2. Lymphatic vessels, unlike capillaries, are characterized by the appearance in their wall of connective tissue and muscle membranes and the presence of valves, which gives the vessels a distinctive appearance. Valves pass lymph (tissue fluid) only in one direction, in the direction of the lymphatic vessels. Each valve consists of two folds (valves), which are formed by 2 layers of the endothelium. Lymphatic vessels contract rhythmically and promote lymph. In the organs, lymphatic vessels anastomosing with each other form a plexus. Isolate the surface and deep lymph vessels. Surface lymphatic vessels are located in the skin and subcutaneous tissue, and deep vessels accompany the blood vessels of internal organs. On their way lymphatic vessels pass necessarily one lymph node (Moscania law), more often through 2-3 knots.

3. Lymphatic nodes are biological filters for the tissue fluid, which is absorbed into the lymphatic capillaries, receives the name of lymph. Lymph nodes are located in groups of one to ten, are called at the location, allocate regional groups of nodes (inguinal, femoral, axillary), superficial and deep lymph nodes, visceral, somatic, etc. The vasoconstrictors enter the lymph nodes from their convex side, and the outgoing vessels exit the gate of the nodes.

4. Collecting lymphatic trunks of the corresponding regions are formed from the lymphatic vessels. From the right upper limb, the lymph gathers into the right subclavian trunk, from the right side of the head and neck to the right jugular trunk, from the right half of the thoracic cavity and its walls into the right bronchial trunk. The named 3 trunks in the lower part of the neck joining together form the right lymphatic duct, which flows into the right venous angle. From the left upper limb and the left side of the head and neck, lymph flows through the left subclavian and jugular trunks. These trunks flow into the left venous angle or into the terminal section of the thoracic duct, along which lymph flows from the entire lower half of the body. The thoracic duct is formed by the fusion of the right and left lumbar lymphatic trunks and the inconstant intestinal trunk in retroperitoneal tissue at the level of the XII thoracic and II lumbar vertebrae. The wall of the initial section of the thoracic duct is fused to the right foot of the diaphragm. Through the aortic aperture in the diaphragm, the thoracic duct passes into the posterior mediastinum along the anterior surface of the vertebral column, located behind the esophagus. At level II-III of the thoracic vertebrae, the thoracic duct emerges from behind the left edge of the esophagus and rises. At the level of V-VII cervical vertebrae, the cervical part of the thoracic duct above the dome of the pleura forms an arch and flows into the left venous angle. At the mouth of the thoracic duct there is a paired valve, due to which the blood from the veins does not enter the duct, the same valves are present along the duct (7-9). The wall of the thoracic duct has a well-defined middle muscular membrane, the contraction of which promotes the progress of lymph. In 75% of cases in the initial part of the thoracic duct, extensions are formed - the cistern of the thoracic duct. The formation and outflow of lymph is "from the blood to the blood" - formation at the level of the blood capillaries and admission to the venous bed.

V. Practical work

1. Using a textbook, an atlas, lecture tables and native preparations, to study the structural elements of the lymphatic system.
2. Study the relationship between the blood and lymphatic capillaries.
3. Study the mechanism of formation and outflow of lymph from separate organs and systems. Make a diagram of the formation and outflow of lymph from separate organs and systems.
4. Name in Latin and show on the native preparations of a group of lymph nodes - superficial and deep - in various areas.

VI. Control questions

1. General characteristics of the lymphatic system.
2. Differences in lymphatic and circulatory capillaries.
3. Pathways of lymph. What is the "integrative centers of the lymph drainage"?
4. The structure of the lymph nodes.
5. What is the law of Moscany?
6. What is lymph??

VII. Academic pursuits

1. At the inspection at the man of 63 years the malignant disease of a prostate is revealed. What are the possible ways of spreading the tumor? Give anatomical justification.
2. Explain why with cancerous lesions of the stomach, the appearance of metastases in the ovaries.

IX. Anatomical terminology

Systema lymphaticum	Lymphatic system
Vasa limphocapillaria	Lymphatic capillaries
Vasa limphatica	Lymphatic vessels
Truncus jagularis dexter et sinister	Jugular trunk right and left
Ductus limphaticus dexter	Right lymphatic duct
Truncus subclavicus dexter et sinister	Sub-stem right and left
Ductus thoracicus	Thoracic duct

Cisterna chili	Breast duct cistern
Nodi limphatici	The lymph nodes
Plexus limphaticus	Lymphatic plexus
Rete limphocapillare	Lymphafacillary networks
Hilum	Goal
Cortex	Cortical substance
Folliculi limphatici	Lymphatic follicles
Sinus subcapsularis	Subcapsular sysnus
Sinus corticalis perifollikularis	Perifollicular cortex
Sinus medullaris	Brain sine
Sinus hillaris	Gate Sine
Paracortex zona timodependens	Peripheral substance
Chordae medullaris	Brain Chords

X. Preparations and manuals

1. Prepared vascular corpse. Native preparations of the vessels of the upper and lower extremities. Tables. Textbook and atlas of human anatomy.

OUT-CLASS SELF-WORK.

METHODOLOGICAL RECOMMENDATIONS ON THE TOPIC: **GENERAL ANATOMY OF THE LYMPHATIC SYSTEM.**

Questions of the initial level of knowledge.

1. General anatomy of the circulatory system. Microcirculatory bed.
2. Functional significance of the lymphatic system. Its links.
3. Large venous trunks of the neck and head, thoracic and abdominal cavities.

Objectives

Student must know:
1. Circles of blood circulation and microcirculatory bed. 2. Veins of the neck and head. Venous angle. 3. General characteristics and structural elements of the lymphatic system - lymphatic capillaries, lymphatic vessels, regional and collector lymphatic trunks and nodes. 4. The structure of the lymph nodes and lymphatic circulation in them. 5. Lymphatic bed of separate organs. 6. Thoracic duct - formation, topography and stroke 7. Right lymphatic duct - formation, topography and stroke. 8. Education and ways of movement of lymph - "from blood to blood". Differences in the blood and lymphatic capillaries.
Student must be able to:
1. Identify, name in Latin and show on the preparation venous angle - the junction of the internal jugular and subclavian veins. 2. Determine, name in Latin and show on the corpse the level of formation in the abdominal cavity of the thoracic duct. 3. Identify, name in Latin and show on the corpse regional lymph nodes. 4. Draw a diagram of the formation and movement of lymph. 5. Explain possible ways of metastasizing cells of tumor cells.

I. Tasks for self-work.

1. Complete phrases:

А) Lymphatic capillaries are _____

_____

Б) The shape of the lymphatic capillary networks corresponds _____

_____

В) Outflow of lymph from the organs of the abdominal cavity is carried out through _____

_____

Г) The thoracic duct is formed at the level of _____ and flows into

_____

Д) Outflow of lymph from the lymph nodes occurs by _____

_____

E) The outflow of lymph from the right side of the chest and the right half of the neck and head is accomplished

_____

2. Fill in the table of differences between the blood and lymphatic capillaries.

Feature of the difference	*Blood capillaries*	*Lymphatic capillaries*
1 Shape		
2 Caliber		
3 Structure of the wall		
4 Basal membrane		

3. Describe the relationship between the blood and lymphatic capillaries (microcirculatory bed)

4. Make a diagram of the formation and conduct of lymph to the venous angle.

II. Self-control questions.

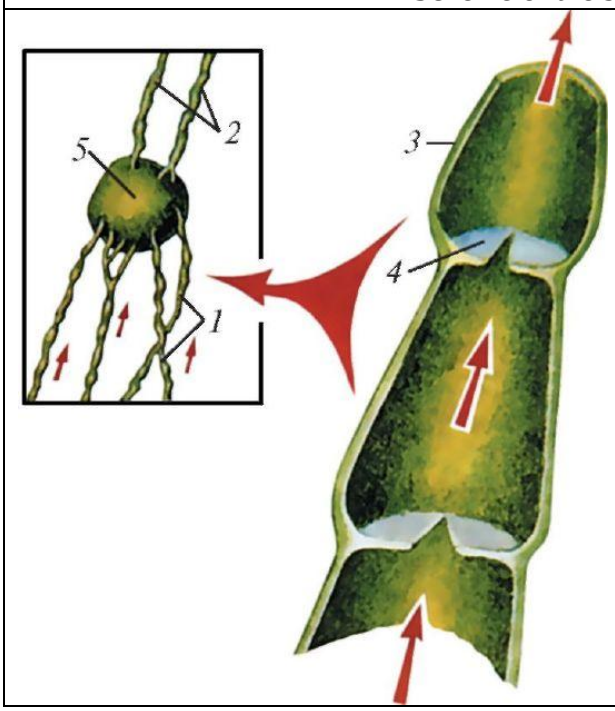
1. What are the functions of the lymphatic system.

2. What is the "deep lymph nodes».

3. What is the "somatic lymph nodes»

4. Where the "jugular" trunks are formed. Their function.

V. Make designations for pictures:

Scheme of the structure of lymphatic vessels	
	*– eng. –* *-lat. -*
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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: «**ANATOMY AND TOPOGRAPHY OF THE IMMUNE SYSTEM. ANATOMY AND TOPOGRAPHY OF ORGANS OF THE ENDOCRINE SYSTEM. VALUE AND PRACTICAL SKILLS. AGE FEATURES».**

THE IMMUNE SYSTEM

The immune system (IS) protects the body from foreign substances coming from outside or formed in the body itself. The immune system is a set of anatomical entities that have representation in various organs and tissues, but are united by the similarity of origin and a single function - the protection of the organism from all genetically alien to it. IP is all those organs that participate in the formation of cells (immunocytes) that recognize and destroy genetically alien substances (antigens). Immunocytes that spread in the body along with blood, lymph and tissue fluid flow, recognize and destroy foreign substances for the body, providing the body - immunity. The organs of the immune system include the bone marrow, tonsils, lymphoid (Peyer's) plaques of the small intestine, single lymphoid nodules in the mucous membrane of the respiratory, digestive, genitourinary systems, lymph nodes and the entire lymphatic system: appendix, spleen, tonsils, and individual lymphocytes, freely moving lymphocytes in organs and tissues in search of foreign substances. In this case, the bone marrow and thymus, in which the lymphocytes from the stem cells are differentiated, belong to the central organs of the immune system, the remaining of these are the peripheral organs of immunogenesis. The term "immune" comes from the Latin. immunis - which means "free, free from anything". The organs of the IP include organs that participate in the formation of cells that perform protective reactions of the body (lymphocytes, plasma cells). Immune organs are constructed from lymphoid tissue, which has a reticular stroma. In its loops are cells of the lymphoid series: lymphocytes of varying degrees of maturity (blasts, large, medium and small lymphocytes), young and mature plasma cells (plasmablasts, plasmocytes). Knowledge of the structure and functioning of the IP organs is needed by physicians of any profile to understand the patterns of the immune response and the development of treatment tactics for various immune deficient states.

I.Objectives

Student must know:	1. Classification of the immune system. 2. Regularities of the bookmark and topography of the organs of the immune system throughout ontogeny. 3.Topography and departments of the immune system. 4. The external and internal structure of the central and peripheral organs of the immune system. 4. "T" and "B" lymphocytes, their formation, difference and circulation functions. Humoral and cellular immunity. 5.Extreme features of the immune system. The population of "T" -limfotsitov: "T" -ciller, "T" -pressors, "T" -Amplicators, "T" -helpers, "T" -effectors. 6. Blood supply and innervation of the immune system. 7. Presence in the peripheral organs of the immune system of lymphoid nodules located at different stages of development with germinal light and germinative centers and without them.
Student must be able to:	1. Name in Latin and show on the native preparations the central and peripheral organs of the immune system. Thymus, spleen, tonsils, appendix, peyer's plaques, single lymphoid nodules of the mucous membranes of internal organs. 2. Explain the functions of the immune system. 3. On the mucous membrane of the ileum to identify and show the group lymphatic follicles - Peyer's plaques. 4.Histo-drugs determine the germinal centers of lymphatic follicles - centers of reproduction, light receptors. 5. Find the vermicular appendage on native preparations of the abdominal cavity organs, determine its position and mesentery.
Student must possess:	1. Knowledge of the features of the functioning of the immune system. 2. The ability to find on the corpse and isolated organs and organocomplexes the organs of the immune system.

II. ***Required level of knowledge****:*

d) from related disciplines

a) The connection of the immune system and hematopoiesis.
b) Development of the immune system in phylo- and ontogenesis.

б) from previous topics:

a) Features of the structure of the mucous membrane of the digestive, respiratory and genitourinary organs (single and group lymphatic follicles).
b) The structure of the Pirogov-Valdeier ring.

c) Structure and position of the appendix.
d) Structure of lymph nodes.
e) Structure of the spleen.

***в) from the current lesson*:**

a) Central and peripheral organs of the immune system.
b) Internal structure of the thymus gland.
c) Cellular composition of the spinal cord.
d) Topographic features of lymph nodes, tonsils, single and group lymph nodes, worm-like process, nodules with germinal centers and without them.
e) Features of the blood supply of the immune system

III. Object of study

1) Saws of tubular bones.
2) Macro-preparations of thymus gland, adult and child.
3) Macro-preparations of the spleen, adult and child.
4) Sections of the ileal section of the small intestine with arranged group lymph nodes - Peyer's plaques.
5) Single lymphatic nodules of the mucous membrane of the digestive, respiratory and urogenital organs.
6) Tonsils that are part of the pharyngeal ring of NI Pirogov.
7) Appendix - worm-like process.

IV. Informational part

IS organs develop immunocompetent cells - lymphocytes and plasmocytes, incorporate them into the immune process, recognize and destroy penetrated into the body or formed in it foreign substances (CV). When ingested into the body of CV - antigens - it forms neutralizing protective substances - antibodies that are immunoglobulins (humoral immunity), or specifically reactive lymphocytes (cell-mediated immunity). T-lymphocytes provide the realization of cellular and humoral immunity. B-lymphocytes perform the functions of humoral immunity. Derived B-lymphocytes - plasma cells - synthesize and secret into the blood, secretions of the glands of antibodies that are able to join the compound with the corresponding antigens and neutralize them. Antibodies bind to antigens, which allows phagocytes to absorb them.

In the IC distinguish the central (thymus, red bone marrow) and peripheral organs (lymphatic nodules, ring Pirogov - Valdeier, spleen, lymph nodes). The organs of IP have general laws of structure and development, which boil down to the following:

a) all IS bodies are laid in the early stages of embryonic development;

b) IS organs are ready for the body's immune defense by the time of birth;

c) they reach full perfection by the end of adolescent development;

d) IS bodies are early exposed to involution;

e) in all organs of the IS lymphoid tissue is replaced by connective or fat tissue;

d) in all organs of the IS the parenchyma of the immunogenesis organs is lymphoid tissue.

The patterns of the structure of the central organs of the IS - red bone marrow and thymus gland consist in the fact that both central organs are located in well protected from external exposure. The red bone marrow is in the cells of the spongy substance, and the thymus gland lies in the thoracic cavity behind the sternum - a fairly wide and strong bone.

Both central organs of the IS are equally responsible for the differentiation of lymphocytes. In this case, unlike the peripheral organs of the IP, lymphocyte differentiation occurs without a significant influence of antigens, the development of lymphocytes in peripheral organs is associated with antigenic stimulation of the organism. Only when contact with the antigen in the peripheral organs is the formation of new lymphocytes.

In contrast to the central organs of IP for peripheral organs is characterized by the following: they are located on the pathway of possible introduction into the body of antigens and on the way of displacement of foreign substances formed in the body. Palatine, tubal, lingual and pharyngeal tonsils, form a ring (Pirogov-Valdeier), located around the entrance to the pharynx from the oral and nasal cavities. Tonsils are the first to meet with air and food, being a kind of guard posts. On their surface, when genetically foreign substances come in contact, the first recognition of a stranger takes place, on either side of the ilio-cecal flap separating the small intestine from the thick intestine; on the border of different microflora there are numerous accumulations of lymphoid tissue.

Numerous lymphoid nodules, accumulations of lymphoid tissue are scattered in the thickness of the mucous membranes of the digestive, respiratory and urogenital tracts.

A characteristic feature of peripheral organs of the IS is that the lymphoid tissue entering into their composition is at different stages of functional maturity and passes the following stages:

The first stage is a diffuse stage of development, where the lymphoid tissue does not have sharp boundaries.

The second stage of development is the appearance of focal aggregations of lymphoid cells - the stage of the pregrowth.

The third stage is the appearance in the lymphoid nodules of breeding centers, more luminous. and the nodules themselves are lymphoid nodules with centers of reproduction. Functioning of lymphoid nodules occurs in a specific environment of the microenvironment, which is formed by reticular cells and fibers, fibroblasts, macrophages, blood and lymphatic vessels.

Isolate red and yellow bone marrow. Red bone marrow (CMC) is located in cells of the spongy substance of bones, epiphyses of long tubular bones and is the organ of immunogenesis and organ of hematopoiesis.

Thymus or thymus gland is the central organ of immunogenesis, consists of two asymmetric lobes (right and left), fused with each other in the middle part, develops during puberty. It is located in the anterior part of the upper mediastinum, between the right and left mediastinal pleura. The gland is covered with a connective tissue capsule, from which septa separating the thymus into lobules form the inside of the organ. The stroma of the thymus is represented by the reticular cells and fibers, as well as by the epithelio-reticular cells - the stellate cells. Parenchyma - thymocytes (lymphocytes), plasma cells and macrophages; consists of cortical (darker) and cerebral (light) substance, located in the center of the lobule. A characteristic feature for the brain substance is the presence of epithelial layers - the bodies of Hassal. The parenchyma of the gland in the process of age involution does not completely disappear, but remains in the form of islets surrounded by a fatty tissue lying behind the sternum.

Thymus secretes biologically active substances that affect calcium, phosphorus metabolism, muscle tone and gland growth.

The lymph nodes are the peripheral organs of the immune system, lie on the paths of lymph flow from organs and tissues, including from the covers of the human body - the skin and mucous membranes. Lymph nodes are biological filters for tissue fluid, where foreign particles trapped in tissue fluid, in lymph are trapped, recognized and destroyed by macrophages. The lymph containing the exchange products, coarse proteins, particles of the destroyed cells, passes through their sinuses, containing a fairly dense network of reticular fibers and cells, due to this lymph is under constant immune control from the lymph node tissue of the nodes. Sinus walls are thin and easily permeable to lymphocytes and macrophages. The bringing lymph vessels (4-6) approach the convex side of each LU. The current of lymph in the lymph node goes along its sinuses: marginal (subcapsular), intermediate and portal. In the gates of the nodes lie outgoing lymphatic vessels (2-4). The LU is covered with a connective tissue capsule, the crossbeams leaving it - capsular trabeculae - with blood vessels and nerves. In the parenchyma, LU distinguishes cortical (darker), which occupies the periphery of the node where the formation of lymphocytes occurs, and the brain (lighter), which occupies the central part of the node and is located closer to the gate.

In the cortex are located lymphoid nodules - clusters of B-lymphocytes. The stroma of nodules is formed by the reticular cells and fibers forming a three-dimensional network, in the loops of which lymphoid cells are located. In lymphoid nodules there is a center of reproduction - a cluster of lymphoblasts, small and medium lymphocytes, macrophages, single plasma cells. At the border with the brain substance, there is a thymus-dependent paracortical zone from the nodules. The brain substance is represented by the lymphoid tissue cords - the fleshy strands that extend from the inner parts of the cortex to the lymph node gates. The flesh strands are connected to each other, forming complex weaves. Flesh strands are a zone of accumulation of mature B-lymphocytes and plasma cells, there are also macrophages.

Single and group (Peyer's plaques) lymphatic follicles In the thickness of the mucosa and the submucosa of the organs of the digestive, respiratory, urogenital systems there are single lymphoid nodules. In the wall of the ileum in addition to solitary there are group lymphoid nodules (Peyer's plaques). In the cecum an appendix is located - a vermiform appendage, in the wall of which lie numerous nodules around the lumen in 2-3 rows. The tender stroma of the nodule is formed by the reticular cells and reticular fibers forming a three-dimensional network, in the loops of which lymphocytes are located. In the centers of reproduction, there are also plasma cells. Some activated B-lymphocytes migrate to the bloodstream through the walls of postcapillary venules, others migrate beyond the nodules. Each nodule is surrounded by a network of blood capillaries and a grid of fine reticular fibers. Individual fibers penetrate the nodules. Lymphoid nodules are located as "guard posts" throughout the length of these organs at different distances from each other (from 1 to 5 mm) and at different depths.

Tonsils (paired - tubal, palatine; unpaired - lingual, pharyngeal) are first encountered with food and inhaled air. On their surface, when they come into contact with the antigen, the first recognition of the stranger occurs. On their surface and in the thickness of the covering epithelium, where the lymphocytes are located, the first response to the antigen.

Spleen – is the only body that controls blood. The functions of recognition and utilization, of failed red blood cells are performed by periarterial lymphoid clutches, ellipsoids, peculiarly arranged wide sinuses of the spleen and its red pulp (parenchyma of the spleen). Lymphoid formations of the spleen surround the terminal branching of the blood vessels and perform immune control. In the spleen, red blood cells are recognized and disposed of. The spleen is the only body that controls blood.

The spleen is located in the left hypochondrium, on all sides covered with a peritoneum fused with its capsule. From the capsule inside the organ trabeculae or crossbeams containing smooth myocytes, fibroblasts and collagen fibers depart. In addition, the connective tissue core is a network of reticular fibers and cells, in the loops of which the parenchyma of it is located between the trabeculae - the pulp. Isolate white and red pulp. White pulp represents the lymphoid apparatus of the spleen to which periarterial lymphoid clutches, lymphoid nodules, formed on the basis of these couplings and ellipsoid macrophage lymphoid clutches (ellipsoids) belong. White pulp is located inside the red pulp, which owns the parenchyma of the spleen, which have branched sinusoids. Around the sinusoids in the loops of the reticular stroma, granular and non-grained white blood cells, macrophages, a large number of erythrocytes and lymphoid cells are found. Red pulp occupies 75-78% of the total mass of the spleen.

V. Practical work

Task№ 1. On the cuts of the tubular bones consider the central organ of the immune system, their internal structure, determine the component substance of the diaphysis and the spongy substance of the epiphyses, in cells of which the red bone marrow is located. Using atlases and tables, study the internal structure and cellular composition of the bone marrow.

Task№ 2. On macro preparations of the thoracic cavity organs of the fetuses, newborns, infants and corpses, find the thymus gland in the anterior mediastinum. Using the textbook, atlas and tables, study its external and internal structure, the brain and cortical matter of its lobules, the epithelial bodies of Hassal.

Task№3. Consider on the native preparations separate groups of lymph nodes (axillary, inguinal, submandibular, subclavian), study their internal structure, using tables and atlas.

Task№4. Define and study in the left hypochondrium of the abdominal cavity of the spleen, examine its position and attitude to the peritoneum, the external structure and sources of blood supply. Using the textbook, atlas and tables, study the internal structure, the peculiarities of the blood supply and the structure of the red and white pulp.

Task№4. On the macro preparations of the oral and pharyngeal organs, determine, name the elements of the Pirogov-Valdeyer peripheral ring,

Task№5. On the macro preparations of the abdominal cavity define the appendix, study its internal structure, position and attitude to the peritoneum. Using tables, an atlas, a textbook, study its internal structure. Pay attention to the structure of lymphoid nodules. Note the presence of nodules of two types-with the presence of light germinal (germinative) centers and without them.

VI. Control questions

1). Which organs belong to the immune system?
2). Name the primary (central) immune organs, their topography.
3). What is the functional significance of primary (central) immune organs?
4). What is the formation of the lymphoid pharyngeal ring?
5). List the secondary (peripheral) immune organs.
6). How is the lymph node arranged? Its function.
7). What lymph nodes are called "regional".
8). What is the structure and function of the spleen? His topography.
9). What are the age specific features of immune organs?

VII. Academic pursuits

Task№ 1.

At the meeting of the student scientific circle, during the report on the structure of the thymus, a slide was shown, reflecting the typical age pattern of this organ. On it there was a proliferation of tissue with the presence of only an islet of the parenchyma of the thymus.

1). For people, how old are the features of the thymus?
2). At what age in the thymus is the maximum content of lymphoid tissue?

Answer:

1). At 30-50 years, most of the parenchyma of the thymus is replaced with adipose tissue, as a result of which the lymphoid tissue is preserved as separate islands separated by fat tissue.
2). By the period of puberty - to 10-15 years

Task№ 2.

It is known that a number of regularities are determined in the development of the organs of the immune system.

1). How early (in embryogenesis) is the central and peripheral and immune organs laid?
2). In what age periods the maximum development of lymphoid tissue is observed?

Answer:

1). Bone marrow and thymus are laid on the 4-5th week of development. Appendix and lymphoid plaques of the small intestine - 14-16 weeks of development. Lymphoid nodules - 16-18 weeks; spleen at 5-6 weeks; LU - 7-8 weeks.
2). At 14-15 years, the thymus reaches its maximum development.

Task№ 3.

It is known that T - and B-lymphocytes have significant morphological differences that determine their different function in the immunogenesis system.

1). How can T and B lymphocytes be distinguished in a light microscope?
2). How do T and B lymphocytes differ in the number of receptors on their surface.

Answer:

1). T- and B-lymphocytes can not be distinguished in a light microscope.
2). T-lymphocytes do not have receptors, B-lymphocytes have on the surface ultramicroscopic cytoplasmic outgrowths - microvilli with receptors located on them.

VIII. Control Tests

1. Indicate the central organs of the immune system
a-spleen
b-thymus
c - lymph nodes
г - tonsils

2. Specify the location of the thymus
   a - posterior mediastinum
   b - upper mediastinum
   c - anterior mediastinum
   r - mediastinal
3. Specify the parts of the thymus
   a - anterior lobe
   b - right share
   in - isthmus
   r - left share
4. Specify the location of the palatine tonsil
   a - above the pharyngeal arch
   b - behind the pharyngeal arch
   в - between the nebolo-pharyngeal and the tongue-lingual
   g - on the soft palate
5. Specify the location of the pharyngeal tonsil
   a - oropharynx
   b - nasopharynx
   c - pharyngeal arch
   d- the base of the soft palate
6. Specify the location of clusters of lymphoid nodules (Peyer's plaques)
   a - the wall of the esophagus
   b - ileal wall
   c - the wall of the stomach
   d - cecal wall
7. Specify the correct version of the skeleton of the spleen. Specify the correct version of skeletal spleen
   a - between VIII and X ribs
   b - between VII and IX edges
   c - at the level of the XII edge
   d- between IX and XII ribs
8. Specify the surface of the spleen
   a - diaphragm surface
   b - gastric surface
   c-kidney surface
   d - visceral surface
9. Specify the anatomical formations that make up the spleen
   a - lymphoid nodules
   b - fibrous membrane
   c - red pulp
   d - trabeculae

Keys:

1	2	3	4	5	6	7	8	9
б	б	б, г	в	б, в	б	г	а, г	а, б,в,г

IX. Anatomical terminology

	English Name	Latin Name
1	Bone marrow	Medulla ossium
2	Thymus	Thymus
3	The palatine tonsil	Tonsilla palatine
4	The lingual tonsil	Tonsilla linqvalis
5	Pharyngeal tonsil	Tonsilla pharyngealis
6	Tubular tonsil	Tonsilla tubaria
7	Single lymphoid nodules	Noduli lymphoidei solitarii
8	Lymphoid plaques of the small intestine	Noduli (folliculi) lymphoidei aggregati
9	Lymphatic nodules	Nodi lymphatici
10	Capsular trabeculae	Trabeculae lymphonodi
11	Node Gate	Hilus lymphonodi
12	Cortical substance	Cortex lymphonodi
13	Brain substance	Medylla lymphonodi
14	Flesh Strands	Horda medyllaris
15	Edge (subcapsular) sine	Sinus marginalis
16	Intermediate sinus, cortical and cerebral	Sinus intermedius cortillaris medullaris
17	Spleen	Lien, splen
18	Gates of the spleen	Hilum splenicum
19	White and red pulp	Pulpa lienis alba et rubra
20	Splenic hairs	Chorda lienis

X. Preparations and manuals

Wet chest preparations. Skull. Tables. Textbook of human anatomy. Atlas of human anatomy. Tests

STUDENT INDEPENDENT WORK

METHODOLOGICAL RECOMMENDATIONS ON THE TOPIC: **GENERAL ANATOMY OF THE IMMUNE SYSTEM**

I. Questions of the initial level of knowledge..

1. Immune structures of the mucous membranes of the digestive, respiratory, urogenital systems.
2. Structure and location of lymphoid nodes.
3. Structure and location of tonsils
4. The structure of bone tissue. Spongy substance.
5. Communication of the immune system and hematopoiesis.

II. Objectives.

Student must know: 1. Communication of the immune system and hematopoiesis. 2. Functions of the immune system 3. Classification of the organs of the immune system. Regularities of development and structure. 4. Topography of the structure of the red bone marrow (B-lymphocyte) 5. Topography and the structure of the thymus gland (T-lymphocytes) 6. Features of topography of peripheral organs of the immune system. 7. Stages of development of lymphoid tissue of peripheral organs of the immune system. 8. Structure and functional significance of the peripheral organs of the immune system: lymph nodes, spleen, single and group nodules of internal organs, tonsils. 9. Blood supply and cellular composition of the immune system. 10. Age-related changes in the immune system.
Student must be able to: 1. Explain the central and peripheral organs of the immune system. 2. Identify, name and show on native preparations: a. thymus gland b. spleen c. lymphoid nodes d.single and group lymphoid follicles e. tonsils 3. Determine the surfaces and lobes, ligaments 4. Determine the proportion of the thymus gland 5. Explain the peculiarities of the blood supply to the thymus gland and the formation of perivascular spaces and the hematotymus barrier. 6. Identify and show on the surface of the mucous membrane of the intestine and the appendix, the lymphoid follicles are single and group.

III. Tasks for self-work

1. Make a scheme for classifying the organs of the immune system:

2. Complete phrases:

А) The peripheral organs of the IS concern:

Б) The thymus gland is the organ of _____ and it is located in _____.

В) Immune structures of the spleen are _____

Г) Lymphoid tissue of the immune system is represented _____ _____

Д) The only organ of the immune system that controls blood is _____

1. **Make a diagram of the structure of the lymph node.**

IV. Self-control questions.

1. 1. Which organs are considered immune system?
2. What is the function of central IS organs?
3. How the lymph node is arranged?
4. What features of the structure and functioning of peripheral organs of the IC?

5. Where is the spleen located? What is its meaning?

6. Hows does lymphoepithelial ring of Pirogov-Valdeier is formed?

V. Make the names on the pictures

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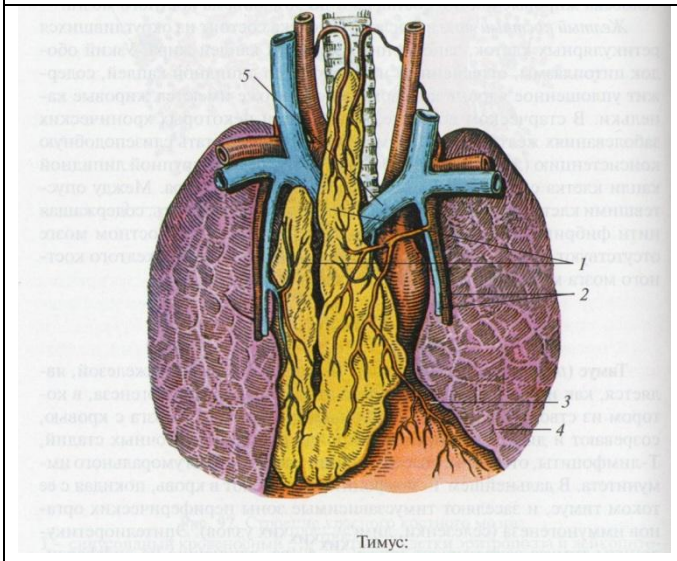 Тимус:	- *eng.* – *lat.* - - *eng.* – *lat.* - - *eng.* – *lat.* - - *eng.* – *лат.* - - *eng.* – *lat.* -

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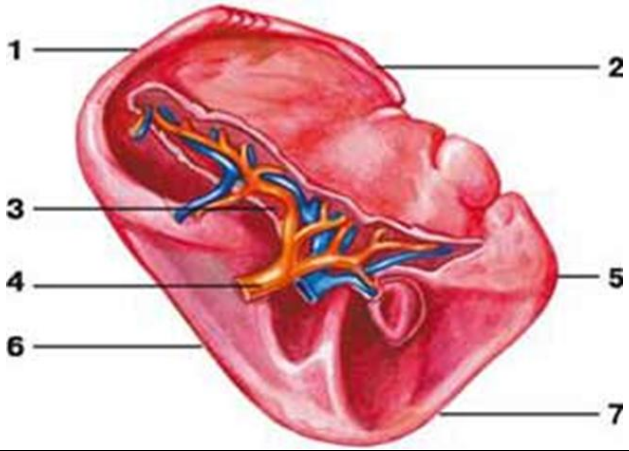	
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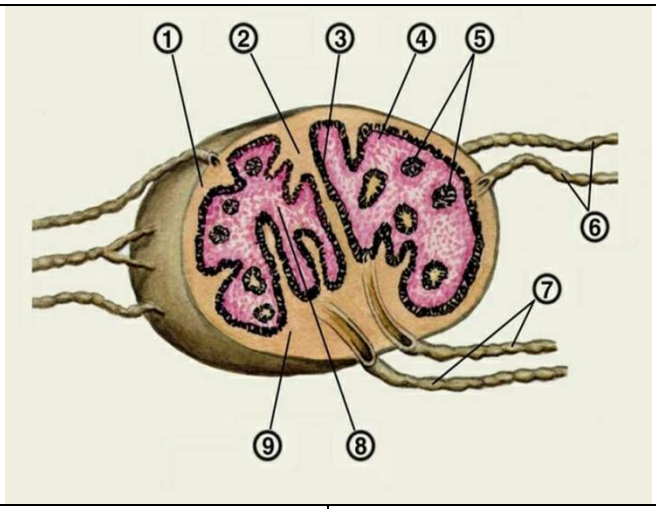	
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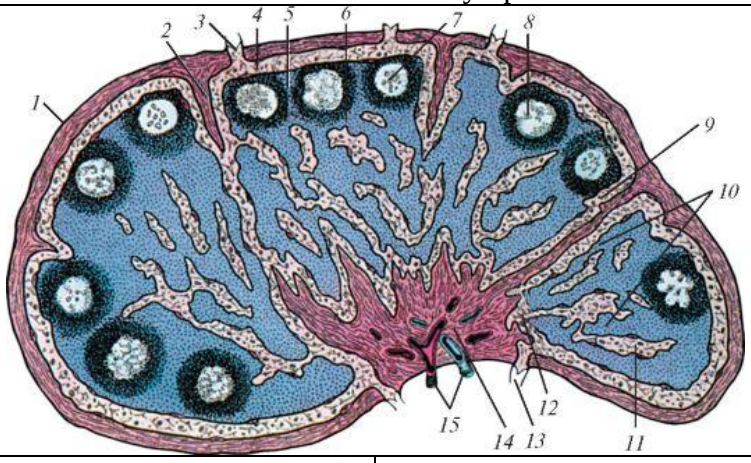
Internal structure of the lymph node	
	
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METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **ENDOCRINE GLANDS.**

Endocrine glands are specialized glands, as well as a number of groups of compactly located cells (pancreatic islets, interstitial eggs) scattered in the body that produce physiological active substances-hormones that are released directly into the internal environment of the organism (blood, lymph, tissue fluid). The ability of hormone release is possessed by cells of various organs and tissues belonging to the cells of the APUD system. Hormones have the ability to enhance or weaken various physiological functions. Their action is characterized by high selectivity and specificity. To change the state of the body leads to an inadequate production of the hormone gland (hypofunction of the gland), and an excessive amount of the hormone (hyperfunction of the gland)

I. Objectives:

Student must know:	1. General characteristics of endocrine glands and their differences from exocrine glands. 2. Development of endocrine glands. Classification of the endocrine glands according to the features of development (ectodermal, mesodermal, ectodermal) 3. Features of the blood supply to endocrine glands 4. Functions of hormones and their differences from other biological active substances. 5. Classification of endocrine glands in relation to the anterior lobe of the pituitary gland dependent (thyroid gland, cortical adrenal gland, sex glands) and independent (parathyroid, epiphysis of adrenal medulla, pancreatic islets, paraganglia) 6.Cent of regulation of endocrine glands functions - hypothalamus. 7. Structure of the hypotolamo-pituitary system-hypothalamus neurohypophysis and hypothalamus-adenohypophysis. 8. General characteristics, topography, external structure and functions of endocrine organs. 9. Know the structure of the sex glands 10. Age features of the endocrine glands
Student must be able to:	1. To call and show on the native preparations the location of the endocrine glands: 1) the pituitary gland 2) Pineal gland 3) the thyroid gland 4) the adrenal gland 5) the parathyroid gland 2.Explain the features and functions of the blood supply to the anterior and posterior lobes of the pituitary-the primary and secondary capillary networks. 3.Explain the features of the functioning of the pineal, thyroid, parathyroid, adrenal, pancreas, gonads.
Student must possess:	1.Anatomical knowledge for understanding violations of organ function, pathology, diagnosis, the definition of hypo- and hyper gland functions 2. To master the simplest medical instruments 3. To learn the technique of preparation using the simplest medical instruments (scalpel and tweezers) 4.Methodics and autopsy of the brain skull and corpse as a whole.

II. ***Required level of knowledge****:*

a) from related disciplines

1) Structure and parts of the hypothalamus.
2) X-vagus nerve.
3) The sympathetic nervous system.

б) from previous topics:

). Classification of glands.
2). Distinction of exocrine glands from endocrine glands.
3). Wandering nerve, nucleus, stroke and branching zone.
4). The sympathetic nervous system.

***в) from the current lesson*:**

1). Classification of endocrine glands depending on their origin.
a) external secretion - exocrine
b) internal secretion - endocrine
c) mixed
2). General characteristics and topography of endocrine glands.
3). Functional features of the endocrine glands.
4). The development of the diffuse endocrine system - (ARUD-system).

III. Object of study

1. The stem part of the brain is the middle brain-the epiphysis.
2. Inner skull base. Turkish saddle - fossa - pituitary.
3. Organs of the neck - larynx - thyroid and parathyroid glands.
4. Adrenals - retroperitoneal space.
5. Pancreas in the abdominal cavity.
6. Sex glands - male and female.
7. Hypothalamus - the intermediate brain.

IV. Informational part

The endocrine system is an integrative - the regulatory system of the organism, which is a set of functionally connected glands.

Under the endocrine system is understood the functional union of endocrine glands and a complex of various structures associated with the production of numerous hormones that regulate the most important metabolic processes in the body. The function of hormones is the humoral regulation of the basic processes of life: growth, development, reproduction, adaptation, behavior.

Hormones differ from other biologically active substances in a number of properties: 1) their action is distant, in other words, the organs to which hormones act are far from the gland; 2) the action of hormones is strictly specific, some hormones act only on certain target cells, others - on a lot of different cells; 3) hormones possess high biological activity and are present in very small concentrations; 4) hormones act only on living cells.

In contrast to the glands of external secretion, the endocrine gland products enter directly into the bloodstream. The close contact of the endocrine glands with blood vessels is an indispensable condition for their work. Most endocrine glands have a rich network of blood vessels. They have a lot of wide capillaries - sinusoids, the wall of which is directly in contact with the cells of the gland.

Features of the functioning of the endocrine glands depend on their development and specialization.

According to the functional characteristic, endocrine glands are divided into dependent and independent from the anterior lobe of the pituitary gland. The first group includes the thyroid gland, the cortical substance of the adrenal glands, and the sex glands. To the second group - parathyroid glands, pineal gland (epiphysis), pancreatic islets, adrenal medulla, paraganglia.

The center of regulation of endocrine functions is the hypothalamus of the intermediate brain, which coordinates the nervous and hormonal mechanisms of the regulation of the functions of internal organs, unites the nervous and endocrine regulatory mechanisms in the common neuroendocrine system. The hypothalamus forms a single functional complex with the pituitary gland, in which the former plays a regulating role, and the second plays an effector role. The hypothalamus and pituitary gland form a single hypothalamic-pituitary system, which includes such subsystems as hypothalamus-neurohypophysis (posterior pituitary) and hypothalamic-adenohypophysis (anterior pituitary). The nuclei of the hypothalamus produce neurohormones that enter the pituitary gland. In the anterior part of the pituitary, neurohormones (releasing hormones and statins) fall through the system of portal blood vessels and here promote the release of tropic hormones that stimulate the activity of pituitary glands. In the posterior part of the pituitary, the neurohormones synthesized in the hypothalamus (vasopressin and oxytocin) are transported along the processes of the nerve cells themselves, from which the neurohormones are secreted directly into the blood.

Thyroid - the largest of the endocrine glands, with a mass of about 30-40 g (in women slightly larger than in men), up to 60 mm across: The position of the thyroid gland in the anterior region of the neck, in the | and I di of the trachea and the lower part of the larynx.

The thyroid gland consists of the right and left lobes of the isthmus connecting them, and not always a well expressed pyramidal lobe. Near the thyroid gland in the embryonic period, additional thyroid glands can form.

The thyroid gland is surrounded by a fascial membrane, beneath which is its fibrous capsule. From the latter into the septum, dividing the parenchyma of the gland into lobules. Inside the lobules of the parenchyma of the thyroid gland is represented by follicles, which are densely braided by blood capillaries. The secretion products accumulate inside the follicles in the form of a colloid that liquefies and passes through the wall of the follicle into the bloodstream.

In the thyroid gland, hormones (thyroxine, thyrocalcitonin, etc.) are formed that contain iodine, which affect growth and development, and also stimulate metabolic processes in the body. Tirokaltsitonin regulates the content of calcium and phosphorus I of bone tissue and serves as an antagonist of the parathyroid hormone (thyroid gland) .At the same time, the thyroid hormones affect the functional state of the nervous system.

With hypofunction of the thyroid gland in childhood, there is a retardation of growth and mental development (cretinism). Hypofunction of the gland in adults leads to a disease called myxedema (mucous edema), in which the metabolism is reduced

(heartbeat and respiration slow down, body temperature decreases), nervous system nervousness and memory decrease, and characteristic facial edema appears. Lack of iodine in the natural environment (water and food) can lead to a disruption of the thyroid gland, called endemic goiter.

When hyperfunction of the thyroid gland develops a Graves disease characterized by an increase in metabolism (hypertermia, increased heart rate and respiration), an increase in the excitability of the nervous system, weight loss, exophthalmia and the presence of goiter.

Parathyroid gland - paired, in the amount of 2 to 8 (usually 4) is located on the posterior surface of the thyroid gland under its fascial membrane. There are paired upper and lower, as well as additional parathyroid glands. Each gland has the appearance of a round body of the size of a pinhead (Figure 62). The total mass of all parathyroid glands in an adult is 0.2-0.4 g.

The parathyroid gland is covered externally with a thin connective tissue capsule. From it deep into the trabeculae, separating the parenchyma of the gland into incomplete lobules. The parathyroid hormone secreted by these glands regulates the exchange of calcium and phosphorus: it helps to release them from the bones into the blood, strengthens the reabsorption of calcium in the kidneys and increases absorption in the intestine (provided that the necessary amount of vitamin D enters the body). The antagonist of the parathyroid hormone is thyrocalcitonin (thyroid hormone).

When the hypothyroidism of the parathyroid glands develops tetany (convulsions) and softening of the bones (osteoporosis). Extirpation (removal) of the glands leads to death.

With hyperfunction of the parathyroid glands, calcium is deposited in unusual places: the aortic wall, other vessels, in the kidneys

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Adrenal - The paired gland located retroperitoneally above the upper end of each kidney. The adrenal mass is about 12-13 g, while the right gland is slightly smaller than the left one. The shape of the adrenal gland resembles a flattened cone with an enlarged base adjacent to the kidney. Differentiate anterior (fades anterior), posterior (fades posterior) and renal (fades renalis) surfaces of the adrenal gland, as well as the upper (margo superior) and medial (mar go medialis) edges. The vertical size of the adrenal gland is about 3 cm, the transverse diameter is 4-6 cm. On the anterior surface of the adrenal gland there is a furrow - the hilum, through which the adrenal vessels and nerves pass (Figure 63).

The adrenal glands are located at the level of the XI-XII thoracic vertebrae, the right is slightly lower than the left one. The right adrenal gland with the front surface is in contact with the visceral surface of the liver and the duodenum, the posterior surface belongs to the lumbar part of the diaphragm, and the medial margin borders on the inferior vena cava. The anterior surface of the left adrenal gland is in contact with the stomach and spleen at the top, with the tail of the gastrointestinal underneath, the posterior surface is attached to the diaphragm, and the medial margin is bordered by the abdominal part of the aorta. Between the adrenal gland and the kidney is a layer of fatty tissue. Its size increases with age and in accordance with the fatness of a person. Both adrenal glands in front are covered with a renal fascia and a parietal leaf of the abdomen. The renal fascia forms a fascial membrane for the adrenal gland.

The parenchyma of the adrenal gland is covered with a connective tissue capsule, densely connected to it, from which thin trabeculae go deep. In the composition of the parenchyma, cortical and cerebral substances are distinguished, having a different origin, structure and function.

Cortical substance adrenal gland lies along the periphery of the gland and consists of cellular (epithelial) cords producing a number of hormones with the common name of corticosteroids. Among them there are mineralocorticoids (aldosterone), affecting the water-salt metabolism in the body, glucocorticoids (hydrocortisone and corticosterone) regulating the metabolism of carbohydrates, as well as a small amount of androgens, estrogens and progesterone, close to the male and female sex hormones

Brain substance The adrenal gland, located in the center of it, is constructed of chromaffin cells that are well colored with chromium salts. There is also a large number of demyelinated nerve fibers and ganglionic (sympathetic) nerve cells. Clusters of cells are permeated with wide capillaries (sinusoids). The brain substance of the adrenal gland secretes adrenaline and norepinephrine into the blood. They have an effect on the body, similar to the action of the sympathetic nervous system. The secretion of epinephrine and norepinephrine increases when the sympathetic nervous system is excited in various stressful situations.

The weight of the adrenal gland increases in women, especially during pregnancy.

When adrenal hypofunction develops bronze (addison) disease, which is characterized by emaciation, rapid fatigue, muscle weakness and the appearance of "bronze" color of the skin.

Of chromaffin cells, paraganglia are also constructed - local clusters of cells secreting catecholamines. They are located along the course of large vascular branches. The sleepy glomus is located in the division of the common carotid artery into the external and internal carotid arteries, the coccygeal glomus) at the end of the median sacral artery, the para-aortic bodies on the sides of the aorta. Many small paraganglia lie near the sympathetic stem and along the course of the sympathetic nerves.

Each paraglanguage is surrounded by a thin connective tissue capsule, and its parenchyma is permeated with blood capillaries and nerve fibers. The functioning of paraganglia is closely related to the sympathetic nervous system.

Paraganglia are most pronounced in infancy. After 1.5-2 years, their involution begins-the chromaffin cells gradually disappear and are replaced by a connective tissue.

Pituitary - железа округлой формы, массой 0,4-0,6 г, связанная с гипоталамической областью промежуточного мозга посредством воронки.

In accordance with the development of the pituitary gland from two different primordia, the anterior part, or adenohypophysis, and the posterior lobe or neurohypophysis are distinguished in it). The adenohypophysis is larger and is 70-80% of the gland mass. In its composition, you choose a tubercular, intermediate and distal. The smaller neurohypophysis in size consists of a funnel and a nervous part, or a lobe. The neurohypophysis is part of the hypothalamus (from the middle of the brain).

The adenohypophysis is constructed from epithelial cells, forming strands densely braided by wide capillaries (sinusoids). In the neurohypophysis there are numerous nerve fibers - the processes of nerve cells lying in the nuclei of the hypothalamus.

The glandular cells of the anterior lobe of the pituitary gland produce hormones that selectively regulate the activity of other endocrine glands (goatotropic - gonadal glands, corticotropic adrenal glands, thyroid - thyroid), and the growth and development of the body as a whole (growth hormone). In the anterior lobe prolactin is formed, which contributes to the growth of the breast and the secretion of milk. The intermediate part of the anterior lobe synthesizes melanocyte-stimulating hormone, which controls the formation of melanin pigment in the skin.

The posterior lobe of the pituitary gland secrete hormones formed by the neurosecretory cells of the hypothalamus. They regulate the tone of the smooth musculature of the vessels (vasopressin) and the uterus (oxytocin), and also affect the water content in the body (antidiuretic hormone).

With hyperfunction of the anterior lobe of the pituitary gland in childhood, there is an increased body growth (gigantism), and with hypofunction - stunting (dwarfism). In an adult human hyperfunction of the anterior lobe leads to acromegaly - an increase in individual parts of the body: hands, feet, nose, tongue, lower jaw, auricles, a number of internal organs.

When hypothyroidism of the pituitary gland in adults, there are changes in metabolism, which leads either to obesity (pituitary obesity) or to abruptly emaciated (pituitary cachexia).

Pancreas along with the excretory function also has an incremental function associated with the production of hormones insulin and glucagon, which are involved in the regulation of carbohydrate metabolism. Pancreatic islets (insulaepancreatisae), or islets of Langerhans, which produce these hormones, are cell clusters in the region of the tail (predominantly) and the body of the pancreas. The islets are surrounded by a developed network of capillaries and together form the endocrine part of the pancreas. The shape of the pancreatic islets is different: from round to ribbon and stellate. Their diameter is 100-300 microns. The number of islets reaches 1-2 million, but their total mass does not exceed 0.03 mass of the gland.

Genital glands (testis and **ovary**) have in their composition cells that fulfill the endocrine function. The sex hormones they produce are responsible for the formation of secondary sexual characteristics, affect the development of the skeleton, musculature, subcutaneous fat, and also affect the function of the reproductive system.

In the testicle, the production of androgens (in particular, the testosterone hormone) is performed by interstitial cells (Leydig cells). These cells are located between the seminal ducts and come in contact with the wall of the blood capillaries. Testosterone affects the development of sexual organ, sexual maturation, spermatogenesis, the appearance of secondary sexual characteristics, sexual behavior, and stimulates the synthesis of protein in the body.

In the ovary cells of the follicular epithelium form estrogens, and cells of the yellow body synthesize progesterone. In addition, a small amount of androgen is formed in the ovary. Estrogens affect the development and growth of genital organs and secondary sexual signs, sexual behavior. Progesterone regulates the menstrual cycle, prepares the mucous membrane of the uterus for implantation of the embryo, affects the development of the placenta and mammary glands.

In elderly and senile age, the endocrine part of the gonads significantly reduces its activity, and the ovaries themselves undergo atrophy.

Pineal gland, or pineal body - gland conical or ovoid form, weighing about 0.2 g and up to 15 mm in length. It is part of the midbrain (its department - epithalamus).

Outside, the iron is covered with a connective tissue capsule, from which septa (trabeculae) separating the parenchyma of the gland into lobules. Parenchyma of the pineal gland is represented by cells of two types: pinealocytes and gliocytes. There are also rounded layered bodies, in which calcium salts are present.

Pineal gland cells secrete serotonin, melatonin and other hormones, which exert a retarding effect on the pituitary gland before puberty. The pineal gland also inhibits the activity of other endocrine glands: pancreatic islets, adrenals, thyroid and parathyroid glands, gonads. Melatonin plays a role in maintaining the immune status of the body. The activity of pinealocytes has a diurnal rhythm: melatonin is synthesized at night, serotonin in the afternoon. It is believed that the hormones of the pineal gland are involved in the regulation of pigment metabolism and cyclic activities of the body, due to diurnal and seasonal rhythms.

When hyperfunction of the pineal gland is observed delay in puberty (infantilism), with hypofunction - early puberty with an exaggerated development of the sex glands and secondary sexual characteristics. Normally, signs of involution are noted in the structure of the pineal gland at the age of 7.

V. Practical work

Task№ 1. On the corpse of an adult and a newborn, on the neck in front of the trachea and on the side walls of the larynx in the region of the thyroid cartilage, determine the position of the thyroid gland. Find the left and right lobes of the gland and its isthmus, as well as the pyramidal lobe. On a museum preparation look parathyroid glands located on a back surface of lateral shares of a thyroid gland.

Task№ 2. On the corpse of the newborn, in the upper mediastinum, find the thymus gland. Label her left and right lobes. Make sure that the upper ends of the thymus gland protrude above the upper edge of the sternum, and its lower sections are located in front of the pericardium and large vessels that drain from the heart. Adult the upper edge of the thymus gland is located behind the handle of the sternum at a different distance from its notch, the lower edge corresponds to the level of the 2nd intercostal space or the rib. Study sintopia of the thymus gland in children: from above behind the sternum-thyroid and sternum-hyoid muscles, from behind - next to the trachea, laterally to the right next to the jugular vein, common carotid artery and partly with the vagus nerve, left with the left lower thyroid artery, jugular vein, common carotid artery and vagus nerve. In

the thoracic region - with the back surface of the sternum, from below and from behind with the pericardium. Behind with the upper vena cava, the left brachiocephalic vein and the brachiocephalic trunk. On the diagram show the lobules of the thymus, cortical and medulla.

Task№ 3. On the corpse, in the retroperitoneal tissue above the upper poles of both kidneys, determine the location of the adrenal glands. The right adrenal gland, with its lower pointed edge, encompasses the upper pole of the kidney, the left part being partly toward the inner edge of the kidney. On the anterior surface of the adrenal glands, determine their gates - the location of the arteries and the exit of the veins. In the diagram, indicate the location of the cortical and medulla of the adrenal glands.

Task № 4. On the preparation of the stem section of the brain, between the upper hills of the quadruple, determine the position of the epiphysis or pineal body, a small oval body, the narrower end of which is directed downwards and backwards. On a moist base preparation of the skull in the hypothalamic region in the hypophyseal fossa of the Turkish saddle, look at the location of the pituitary gland. On the tables, select the anterior and posterior lobes of the pituitary gland. Note that the upper part of the anterior lobe, adjacent to the gray mound, forms the tuberous region, and the posterior part is located in the form of a rim between it and the posterior lobe, is identified as an intermediate section.

VI. Control questions

1.Which glands are called endocrine glands?
2. What is the main difference between endocrine glands and exocrine glands?
3. Which glands are mixed glands? What is the peculiarity of their structure?
4. Do endocrine glands have a common source of development, or do they have different embryonic formations?
5. Where is located and what features of the structure and functioning of the thyroid gland?
6. Where is the parathyroid gland located? What is their function?
7. Describe the structure, location and function of the adrenal glands.
8.Why are the anterior and posterior lobes in the pituitary gland? What hormones are produced by each of the lobes?
9. Describe the structure, location and functions of the pineal gland.
10. Where are pancreatic islets located? What do they produce?
11. What is the endocrine function of the sex glands?
12. Which glands, in terms of their functional characteristics, are related to the anterior lobe of the pituitary gland?

VII. Academic pursuits

Task№ 1. The patient has a swelling of the anterior lobe of the pituitary gland. Loss of lateral fields of vision is revealed. Where did I grow and what affected the tumor? Give anatomical justification.

Answer:

From the lateral fields of vision, light beams are projected onto the medial halves of the retina. The axons of ganglionic neurocytes emanating from them pass at the visual intersection into the visual pathway of opposite sides. In this case, the tumor of the anterior lobe of the pituitary gland affected the anterior crossover, which gave the described clinical picture of the loss of lateral visual fields.

Task№ 2. The sick girl showed signs of premature puberty. When she was examined, a tumor was found affecting the epithalamus region. If we start from the functional anatomy of this zone, which of the structures was affected in this patient?

Answer:

Most likely it is a lesion of the pineal gland (epiphysis) - an unpaired organ, anatomically related to this region. It is believed that it has a retarding effect on the rate of puberty. Lesion of the organ can lead to premature puberty.

Task№ 3. When examining the patient and during further surgical intervention, a connective tissue cord, extending from the pyramidal lobe of the thyroid gland to the root of the tongue, was identified. A tumorous cyst was found on his way. How to explain this from the anatomical point of view?

Answer:

The thyroid gland develops primarily as a product of the differentiation of the walls of the diverticulum, which forms in the proximal part remains there as a blind hole. The distal parts of the diverticulum give rise to iron, gradually shifting to the area of its constant position, and the remaining lengthening part of it plays at these stages the role of the gland's player (the tongue-lingual prtok). Subsequently, the stream is reduced. However, in some cases, the reduction may be incomplete, then on the spot of the duct, a connective tissue cord or small strips that change it can be found, which can develop into cysts (middle cysts of the neck). By the way, the inconstant pyramidal part of the gland is essentially the remainder of the stream, but of a glandular nature.

Task№ 4. It is known that each adrenal gland is supplied with 25-30 arteries originating from different sources. One of the peculiarities of the adrenal vascular system is that one of the arterial branches feeds mainly the cortical substance of the organ, and the other - the brain. How can anatomically explain this phenomenon?

Answer:

In embryogenesis, the cortical and medulla of the adrenal gland have a different origin - mesodermal and neurogenic. In the early stages of development, each of these formations has its own system of vascular supply, which is reflected in the aftermath.

Task№5. At the resection of the thyroid gland, the lower thyroid arteries were bandaged. Subsequently, the patient was found to have signs of deficiency of the parathyroid glands. How can this be explained? Give anatomical justification.

Answer:

The parathyroid glands are often located at the sites of penetration of the lower thyroid arteries into the tissue. Careless manipulations with the lower thyroid arteries can cause damage to them. It should be borne in mind that the blood supply of parathyroid glands is carried out by the lower and upper artery.

VIII. Control Tests

1. Where do substances (hormones) produced by cells of the endocrine glands?
   a) excretory ducts of the endocrine glands
   b) blood
   c) body surface

   Ответ: б
2. What glands belong to glands with mixed secretion (exo-and endocrine)
   a) the thyroid gland
   b) parathyroid gland
   c) pancreas
   d) pituitary gland
   e) adrenal glands
   e) testicles
   g) Pineal gland
   h) ovaries

   Ответ: в, е, з
3. What endocrine glands develop from the epithelium of the pharynx and belong to the branhyogenic group?
   a) the thyroid gland
   b) parathyroid gland
   c) neurohypophysis
   d) adrenal glands
   e) pineal gland

   Ответ: а,б
4. The development of which endocrine glands is associated with the nervous system?
   a) the thyroid gland
   b) parathyroid gland
   c) neurohypophysis
   d) cortical substance of the adrenal gland
   e) pineal gland
   f) adenohypophysis

   Ответ: в,д
5. What is the source of development of the anterior lobe of the pituitary (adenohypophysis)?
   a) epithelium of pharynx
   b) epithelium of the primary oral cavity (Rathke's pocket)
   c) the intestine
   d) wall III of the ventricle of the brain

   Ответ: б
6. What is the source of development of the cortex of the adrenal gland??
   a) coelomic epithelium (ventral mesoderm)
   b) ectoderm
   c) the intestine
   d) nephritis

   Ответ: а
7. Which plate of the cervical fascia forms a fascial envelope for the thyroid gland?
   a) surface plate
   b) pre-tracheal plate
   c) the prevertebral plate

   Ответ: б
8. At what level is the lower boundary of the thyroid gland?
   a) 5-6 cartilage of the trachea
   b) the lower edge of the cricoid cartilage of the larynx
   c) the middle of the thyroid cartilage of the larynx
   d) the hyoid bone

   Ответ: а
9. Which of the statements concerning the most typical position of the parathyroid glands are correct?

   a) are located on the posterior surface of the thyroid gland
   b) on the anterior surface of the thyroid gland

c) on the side of the thyroid gland
d) between the fibrous capsule and the fascial envelope of the thyroid gland

Ответ: а,г

10. What is the relationship of the adrenal gland to the peritoneum?
a) intraperitoneally
b) Mesoperitonally
c) retroperitoneally

Ответ: в

11. Which of these endocrine glands or parts of them are formed by chromaffin cells?
a) cortical substance of the adrenal gland
b) adrenal medulla
c) paraganglia
d) endocrine part of the gonads

Ответ: б, в

IX. Anatomical terminology

	English Name	Latin Name
1.	Endocrine glands	glandulae eпdocrinae
2.	Thyroid	glandula thyroidea.
3.	Share (right / left) -	Iobus (dexter/sinister).
4.	The isthmus of the thyroid gland,	sthmus thyroideae.
5.	Pyramid share	lobus pyramidalis
6.	Additional thyroid glands	glandulae thyroideae accessories
7.	Fibrous capsule	capsula fibrosa
8.	Parenchyma	parenchima
9.	Lobules	lobuli
10.	Upper parathyroid gland	glandula parathyroidea superior
11.	Lower parathyroid gland	glandula parathyroidea inferior
12.	Pituitary	hypophysis
13.	Adenohypophysis (anterior lobe)	adenohypophysis (lobus anterior)
14.	Cusp	pars tuberalis
15.	The distal part,	pars distalis
16.	Pharyngeal part	pars pharyngea
17.	Neurohypophysis (posterior lobe)	nemohypophysis (lobus posterior).
18.	Funnel	infundibulum
19.	Nervous share	lobus nervosus
20.	Pineal body	corpus pineale (glandula pinealis).
21.	Thymus gland (thymus)	thymus
22.	Additional rare thymus gland	noduli thymici accessorii
23.	(thymus),	lobuli thymi
24.	Thyroid lobules,	cortex thymi
25.	Cortical substance of thymus gland	medulla thymi
26.	(thymus)	glandula suprarenalis
27.	Brain substance of thymus gland	Facies anterior
28.	(thymus),	facies posterior
29.	Adrenal	Facies renalis
30.	Front surface	margo superior
31.	The rear surface,	margo medialis
32.	Renal surface	hilum.
33.	Top edge	v. centralis
34.	Medial edge	cortex
35.	Goal	medulla
36.	Central Vienna	glandulae suprarenales accessoriae
37.	Cortical substance	pancreas
38.	Brain substance	сарит pancrearis
39.	Supplementary adrenal glands	processus инcinatus
40.	Pancreas	incisura pancrearis
41.	The head of the pancreas	lobules pancreaticus
42.	Hook-shaped process	facies anterior
43.	Pancreas cutting	facies posterior
44.	Pancreatic lobules	facies inferior
45.	Front surface	margo superior
46.	Rear surface	margo anterior.
47.	Bottom surface	margo inferior
48.	Top edge	pars endocrina pancrearis

49.	Front edge	capsula pancrearis
50.	Lower Edge	pars exocrina pancrearis insulaepancreaticae
51.	Endocrine part of the pancreas	testis
52.	Capsule of pancreas	lobuli testis
53.	Exocrine part of pancreas	parenchyma testis.
54.	Pancreatic islets	ovarium
55.	Testicle	Cortex ovarii
56.	Eyelong slices	Medulla ovarii

X. Preparations and manuals: Wet chest preparations. Skull. Tables. Textbook of human anatomy. Atlas of human anatomy. Tests .

OUT-CLASS SELF-WORK.

METHODOLOGICAL RECOMMENDATIONS FOR PRACTICAL LESSON ON THE TOPIC: **GENERAL ANATOMY OF THE ENDOCRINE GLAND.**

Questions of the initial level of knowledge.

1. The glands of external, internal and mixed secretion.
2. General structure of the gonads.

Objectives

Student must know:

1. Functional characteristics of the endocrine glands and their development.
2. Classification of endocrine glands according to the peculiarities of development:
   a) ectodermal (adrenal medulla, additional adrenal glands);
   b) endodermal - pancreas;
   c) mesodermal - (genital and cortical substance of the adrenal glands);
   d) neurogenic - pituitary, epiphysis;
   e) bronchio-genic - thyroid and parathyroid glands.
3. Functional features of endocrine glands - hypo- and hyperfunction.
4. Differences of endocrine glands from exocrine glands.
5. Structure and topography of endocrine glands: pituitary gland, epiphysis, adrenal, thyroid and parathyroid glands, sex glands and hormones secreted by them.
6. The peculiarity of the blood supply to the glands of internal secretion.
7. Departments of the pituitary - neurohypophysis (posterior lobe) and adenohypophysis (anterior lobe).
8. Parts of the adenohypophysis (tubercle, intermediate and distal) and neurohypophysis (funnels and lobes).
9. Functional classification of the endocrine glands in relation to the anterior lobe of the pituitary gland is dependent (thyroid and sex glands, as well as cortical adrenal glands) and independent (parathyroid, pineal glands, pancreatic islets and medulla of the adrenal glands).
10. Structure and function of the hypothalamic-pituitary system.
11. To know the structural elements in Russian and Latin transcriptions.

Student must be able to:

1. Explain the structure and function of the endocrine glands.
2. To name and show on the corpse or separate native preparations endocrine glands:
   A) the thyroid gland;
   B) parathyroid glands;
   B) pituitary gland;
   D) the epiphysis;
   D. adrenal glands;
   E) the sex glands;
   G) the pancreas.
3. Determine the topography of the endocrine glands and explain their projection to the surface of the body.
4. Explain the structure of the endocrine glands in connection with the features of development.
5. To name and show on the preparation departments of the hypothalamus - the center of regulation of endocrine functions.
6. Explain the structure of the hypothalamic-pituitary system - the hypothalamus - neurohypophysis and the hypothalamus - adenohypophysis.
7. Explain the mechanism of action of the hormones of the hypothalamic-adenohypophysis (liberins) and the hypothalamic-neurohypophysis (statins), which are connected by nerve endings with the portal veins of the pituitary gland.

I. ***Tasks for self-work.***

1. Make a scheme of classification of endocrine glands according to the peculiarities of development

1. Complete phrases:

А) In the pituitary gland are distinguised

_____

Б) The adenohypophysis consists of

_____

_____

В) Thyroid gland is located _____ on the level of _____ and consists of_____

Г) Secondary hemocapillary network of the pituitary gland is formed

_____

Д) The primary hemocapillary network of the pituitary gland forms

_____

Е) The fascicle of the adrenal gland is located

_____

Ж) Cells of adrenal medulla produce

_____

II. ***Questions for self-control.***

1. What is the main difference between endocrine glands from endocrine glands?

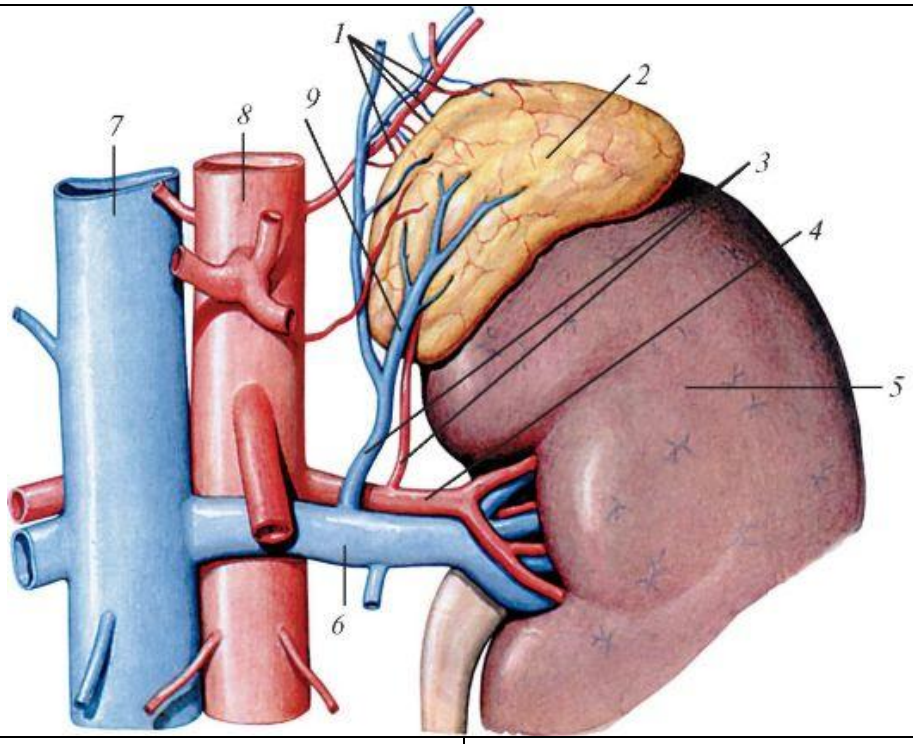
2. What is the endocrine function of the sex glands?

3. What is the structure, location and function of the adrenal glands?

4. What hormones secret the cortex and medulla of the adrenal glands?

5. What is the role of the hypothalamus in the regulation of endocrine gland functions?

Make the notation in the following pictures.

ADRENAL	
	
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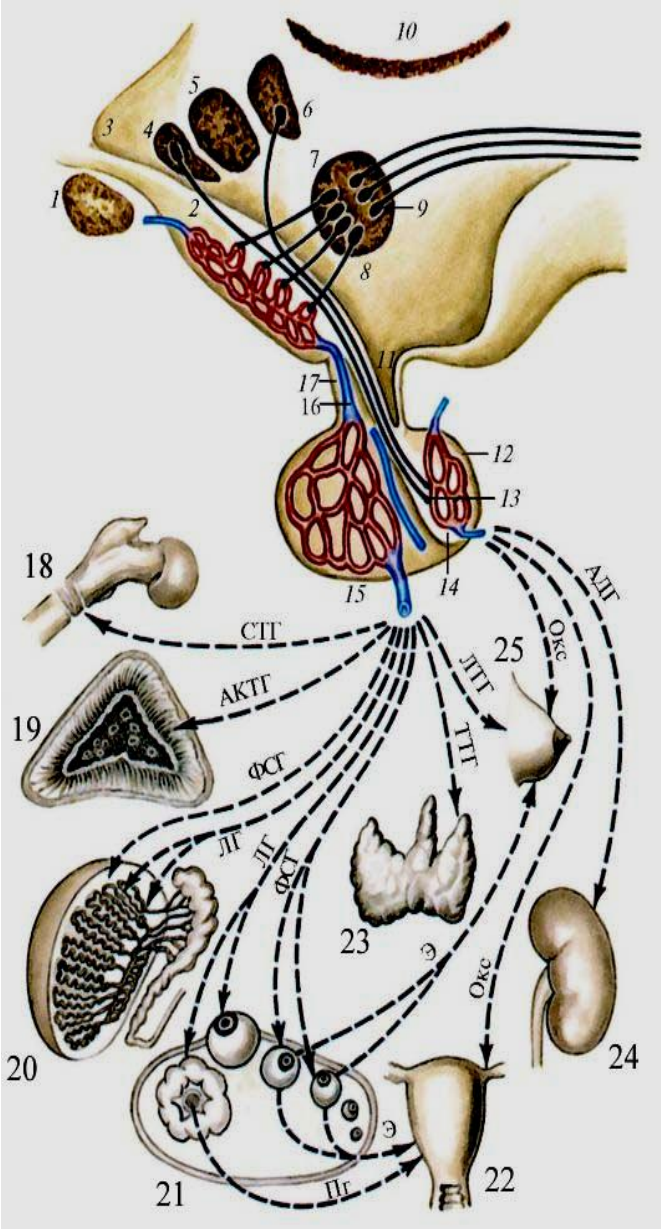
4– *eng.* – *lat.* -	9– *eng.* – *lat.* -
5– *eng.* – *lat.* -	

The scheme of interference of organs of the hypothalamic-pituitary system	
	*1– eng. –* *lat. -*
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	23– *eng. –* *lat. -*
	24– *eng. –* *lat. -*
	25– *eng. –* *lat. -*

FINAL LESSON ON THE TOPIC: "LYMPHATIC, ENDOCRINE AND IMMUNE SYSTEM»

LYMPHATIC SYSTEM.

1. Features of the structure and topography of lymphatic capillaries. Differences from lymphatic vessels.
2. Features of the structure and topography of lymphatic vessels. Differences from lymphatic capillaries.
3. Features of the structure and topography of lymph nodes.
4. Features of the structure and topography of the thoracic lymphatic duct.
5. Features of the structure and topography of the right lymphatic duct.
6. Features of the structure and topography of the jugular and subclavian trunks.
7. Lymphatic vessels and nodes of the lower limb.
8. Lymphatic vessels and visceral nodes of the pelvis.
9. Lymphatic vessels and parietal nodes of the pelvis.
10. Lymphatic vessels and visceral nodes of the abdominal cavity.
11. Lymphatic vessels and parietal nodes of the abdominal cavity.
12. Lymphatic vessels and visceral nodes of the thoracic cavity.
13. Lymphatic vessels and parietal nodes of the thoracic cavity.
14. Lymphatic vessels and nodes of the head.
15. Lymphatic vessels and nodes of the neck.
16. Lymphatic vessels and nodes of the upper limb.

THE IMMUNE SYSTEM.

1. General characteristics of the immune system.
2. Features of the topography and structure of the bone marrow.
3. Features of topography and structure of the thymus gland.
4. Age features of the thymus gland.
5. Features of topography and structure of lingual and palatine tonsils of the lymphoepithelial ring of Pirogov-Valdeier.
6. Features of topography and structure of the pharyngeal and tubal tonsils of the lymphoepithelial ring of Pirogov-Valdeier.
7. Group lymphoid nodules of the appendix.
8. Group lymphoid nodules of the ileum.
9. Single lymphoid nodules.
10. Topography of the spleen.
11. External structure of the spleen.
12. Internal structure of the spleen.

ENDOCRINE SYSTEM.

1. General characteristics of endocrine glands, differences from exocrine glands.
2. General characteristics, topography and external structure of the thyroid gland. Blood supply
3. General characteristics, topography and internal structure of the thyroid gland. Blood supply.
4. General characteristics, topography and structure of parathyroid glands. Blood supply.
5. General characteristics, topography of the pancreas. Features of the structure of the endocrine part of the pancreas.
6. General characteristics, topography of the testicle. Features of the structure of the endocrine part of the testicle.
7. General characteristics, topography of the ovary. Features of the structure of the endocrine part of the ovary.
8. General characteristics, topography and structure of the adrenal gland.
9. General characteristics, topography and structure of the pineal gland.
10. General characteristics, topography and structure of the anterior lobe of the pituitary gland. Features of the pituitary blood supply.
11. General characteristics, topography and structure of the posterior lobe of the pituitary gland. Features of the pituitary blood supply.

Questions for PRACTICAL SKILLS.

(show on macro preparations and give correct name in Latin)

Splanchnology

Show and name in Latin

1. Uterine tube ampoule.
2. Tracheal bifurcation
3. Great oil seal.
4. Large papilla of the duodenum.
5. Great curvature of the stomach.
6. Venous ligament of the liver.
7. The vagina
8. The vaginal part of the cervix.
9. Inside the urethra.
10. The gate of the lung.
11. The gate of the liver.
12. Rising colon.
13. The entrance to the larynx.
14. The main bronchi
15. A pharyngeal opening of the auditory tube.
16. The pharyngeal tonsil.
17. Vocal folds.
18. Spongy part of the male urethra
19. Spongy body of the penis
20. Twelve fingers perishchekishechny bend
21. The duodenum
22. The bottom of the stomach.
23. The bottom of the bladder
24. Lobes of the left lung.
25. Lacerated papillae of the tongue.
26. Ventricles of the larynx.
27. The gall bladder.
28. Posterior calcaneus muscle
29. Zev.
30. Ileocecal valve.
31. Cardiac part of the stomach.
32. The square fraction of the liver.
33. The root of the lung.
34. The root of the tongue.

1. The cortical substance of the kidney
2. Slanting slit of the lung.
3. Round ligament of the uterus.
4. Round ligament of the liver.
5. Lateral cricoid muscle
6. The left kidney.
7. Left triangular ligament of the liver.
8. Low curvature of the stomach.
9. Small oil seal.
10. Fallopian tube.
11. The bladder.
12. Urinary diaphragm
13. The urinary and uterine cavity.
14. Erythritis Triangle
15. Ureter.
16. The soft sky.
17. Nadegvaginal part of the cervix.
18. The palatine tonsil.
19. Palatine arches
20. Descending colon.
21. The descending part of the duodenum.
22. Nasal passages
23. Common hepatic duct
24. Parotid salivary gland
25. Hole of the uterus (s).
26. Department of pharynx
27. The membranous part of the male urethra
28. Isthmus of the fallopian tube.
29. The cricoid cartilage of the larynx.
30. The cavernous bodies of the penis
31. The surface of the lung.
32. Suspension of the ovarian ligament
33. Pancreas and its parts.
34. Sublingual and submandibular salivary glands
35. Transverse colon.
36. Transverse cleft of the lung.
37. The renal pelvis.
38. The renal sinus.
39. The renal pyramid.
40. Kidney gates
41. Right kidney.
42. Right triangular ligament of the liver.
43. The threshold of the oral cavity.
44. The anterior folds of the larynx.
45. The prostate gland.
46. The male part of the urethra
47. Pyloric part of the stomach.
48. Pyloric sphincter.
49. Adherence of the testicle.
50. The rectum-uterine cavity.
51. The rectum-urinary cavity.
52. The rectum.
53. Bleeding duct.
54. Ribno-diaphragmatic sinus pleura.
55. Stuffing processes.
56. Body of the pharynx.
57. Seed cord
58. Seminal vesicles.
59. The seed-throwing duct
60. The vas deferens.
61. Sickle ligament of the liver.
62. Sigmoid colon.
63. The blind hole of the tongue.
64. The cecum.
65. Layers of the uterus wall
66. Properly oral cavity.
67. Own ovarian ligament.
68. Mediastinum
69. The walls of the oral cavity
70. Esophageal narrowing
71. The pelvic diaphragm
72. The jejunum.
73. Tubular tonsil
74. Tubular tonsil.
75. Fibrous capsule of the kidney.
76. Hvostatuyu share of the liver.
77. Worm-like process and its mesentery.
78. The arytenoid cartilage of the larynx.
79. A wide ligament of the uterus.
80. Thyroid cartilage of larynx.
81. The lingual almond.
82. Testicle.
83. Ovary.

Angiology

Show and name in Latin

1. Artery, enveloping the scapula.
2. Basilar artery.
3. Femoral artery.
4. Femoral vein.
5. A large subcutaneous vein of the foot.
6. Venous groove of the heart.
7. The superior mesenteric artery.
8. The superior mesenteric vein.
9. The upper epigastric artery.
10. The upper vena cava.
11. Upper perforating artery.
12. Upper rectal artery.
13. The upper thyroid artery.
14. Internal thoracic artery.
15. Internal thoracic vein.
16. Internal iliac artery.
17. Internal iliac vein.
18. Internal carotid artery.
19. Internal jugular vein.
20. The portal vein.
21. The ascending cervical artery.
22. Deep throat artery.
23. Deep artery of the shoulder.
24. Deep artery surrounding the iliac bone.
25. Deep vein of the thigh.
26. The thoracic artery
27. The thoracic artery.
28. Dorsal artery of the foot.
29. Aortic arch.
30. The gastroduodenal artery.
31. Posterior artery circumscribing the humerus.
32. Posterior tibial artery.
33. Posterior interventricular furrow
34. Posterior intercostal artery.
35. Posterior cerebral artery.
36. Back joint artery.
37. Aortic valve.
38. Valve of the pulmonary trunk.
39. Lateral artery of the femur.
40. The lateral subcutaneous vein of the arm.
41. The lateral plantar artery.
42. Left coronary artery.
43. Left gastro-omental artery.
44. Left gastric artery.
45. Left colonic artery.
46. Left atrioventricular valve.
47. Left sine of the aorta.
48. Left sinus of the pulmonary trunk.
49. The facial artery.
50. Elbow artery.
51. Second ulnar vein.
52. Elbow return artery.
53. Radial artery.
54. Radial vein.

55. Radial recurrent artery.
56. Small subcutaneous vein of the foot.
57. Medial envelope of the thigh artery.
58. The medial subcutaneous vein of the arm.
59. The medial plantar artery.
60. Interventricular septum.
61. Atrial septum.
62. Fleshy trabeculae of the heart.
63. Suprapathic artery.
64. External iliac artery.
65. External iliac vein.
66. External carotid artery.
67. Lower mesenteric artery.
68. Inferior mesenteric vein.
69. Lower epigastric artery.
70. Inferior vena cava.
71. Lower thyroid artery.
72. The common interosseous artery.
73. The common hepatic artery.
74. The common iliac artery.
75. The common iliac vein.
76. Common carotid artery.
77. Ovale fossa of the heart.
78. Aperture of the coronary sinus.
79. Anterior artery circumscribing the humerus.
80. Anterior tibial artery.
81. Anterior interventricular furrow.
82. Anterior interosseous artery.
83. Anterior cerebral artery.
84. Anterior connective artery.
85. Shoulder artery.
86. Brachial vein.
87. Brachiocephalic trunk.
88. Pleurochelovnuyu vein.
89. Surface artery circumscribing the iliac bone.
90. Superficial temporal artery.
91. Superficial palmar arc.
92. The ileo-intestinal arteries.
93. The iliac-artery.
94. The ilio-lumbar artery.
95. The infraorbital artery.
96. Subclavian artery.
97. Subclavian vein.
98. Popliteal artery.
99. Popliteal vein.
100. Subclavian artery.
101. Axillary artery.
102. Axillary vein.
103. The vertebral artery.
104. The transverse artery of the neck.
105. The renal artery.
106. The renal vein.
107. Lumbar arteries.
108. Right coronary artery.
109. Right gastric artery.
110. Right colonic artery.
111. Right atrioventricular valve.
112. The intermediate vein of the elbow.
113. Umbilical artery.
114. Splenic artery.
115. Splenic vein.
116. Sigmoid arteries.
117. Papillary muscles of the heart.
118. The middle cerebral artery.
119. The middle colonic artery.
120. Tendons of the heart.
121. Ciliated artery.
122. The angular artery.
123. The mouth of the coronary arteries.
124. Ears of the atria
125. The celiac trunk.
126. Shitoshey trunk.
127. The lingual artery.
128. Ovary (ovarian) artery.

1. Topography and throat borders
2. Topography and laryngeal boundaries
3. Topography and borders of the duodenum
4. Topography and borders of the stomach
5. Topography and borders of the gallbladder
6. Topography and lung boundaries
7. Topography and borders of the bladder
8. Topography and ureteral boundaries
9. Topography and borders of the liver
10. Topography and borders of the esophagus
11. Topography and Kidney Boundaries
12. Topography and borders of the prostate
13. Topography and borderline of the rectum
14. Topography and Spleen Limits
15. Topography and border of the vas deferens
16. Topography and sigmoid colon boundaries
17. Topography and borders of the cecum and vermiform appendage
18. Topografija and borders of a thick intestine
19. Topography and borders of the jejunum and ileum
20. Topography and tracheal border

Перечень основной и дополнительной учебной литературы,
необходимой для освоения дисциплины «Анатомия»
для иностранных студентов, обучающихся по специальности
31.05.01 General medicine (educational program, partially implemented in English)

Основная учебная литература:

п/№	Наименование	Автор (ы)	Год, место издания	Кол-во экземпляров	
				в библиотеке	на кафедре
1	Textbook of human anatomy : For medical students. In 2 volumes-	Sapin M.R., Kolesnikov L.L., Nikitjuk D.B.	M.: New Wave Publishing Aqency, 2015	Vol.1 -35 Vol.2 - 35	-
2	Textbook of human anatomy: For medical students. In 2 volumes-	Sapin M.R., Kolesnikov L.L., Nikitjuk D.B.	M.: New Wave Publishing Agency, 2015	Vol.1 -40 Vol.2-40	-
3	Атлас анатомии человека в 4 Т.	Синельников Р.Д. Синельников Я.Р. Синельников А.Я.	М.: Новая волна : Издатель Умеренков. 2007-2017	Т.1 – 25, Т.2 - 19 Т.3 – 17, Т.4 - 15	1

Дополнительная учебная литература:

п/№	Наименование	Автор (ы)	Год, место издания	Кол-во экземпляров	
				в библиотеке	на кафедре
1	Атлас анатомии человека: учсб. пособие	Неттер Ф.	М.: ГЭОТАР-Медиа. 2003, 2007. 2015	22	1
2	Human developmental anatomy	Kurt E. Johnson.	Baltimore: Williams & Wilkins, 1991	1	
3	Clinically oriented anatomy	Moore K.	Baltimore: Williams & Wilkins. 1992	1	