FEDERAL STATE BUDGETARY EDUCATIONAL INSTITUTION OF HIGHER EDUCATION
"NORTH OSSETIAN STATE MEDICAL ACADEMY"
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

DEPARTMENT OF HUMAN ANATOMY WITH TOPOGRAPHIC ANATOMY AND OPERATIVE SURGERY

METHODICAL INDICATIONS TO PRACTICAL CLASSES FOR PERFORMING INDEPENDENT EXTRA-AUDITING WORK

BY DISCIPLINE
"TOPOGRAPHIC ANATOMY AND OPERATIONAL SURGERY"

FOR STUDENTS III COURSE
MEDICAL FACULTY

VLADIKAVKAZ

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Methodical instructions are intended for independent preparation of students for practical training and control of knowledge on topographic anatomy and operative surgery.

Approved at the meeting of scums of the SOGMA the ministry of health of Russia, the protocol № _____ _____ 20___ г.

CONTENT:

Introduction Subject and tasks of topographic anatomy and operative surgery. General surgical technique. Surgical instruments. Disconnect the compound and tissues.	
Topographic anatomy of the upper limb. Shoulder girdle shoulder. Topographic anatomy of the elbow area, elbow joint, forearm, hand. Wrist joint, wrist, metacarpus and fingers.	
Topographic anatomy of the lower limb. Gluteal region, hip joint, thigh. Topographic anatomy of the knee, knee, lower leg, ankle, foot.	
Operations on the upper and lower limbs. Operations on vessels, nerves, tendons, on long tubular bones and joints of the upper and lower limbs. Amputation and disarticulation.	
Operations for purulent-inflammatory diseases of the upper and lower extremities. Phlegmon upper and lower limbs. Operations at purulent processes in the area of fingers: panaritiums.	
Module №1 “Subject and tasks of topographic anatomy and operative surgery. Topographic anatomy and operative surgery of the upper and lower limbs "	
Topographic anatomy of the brain. Operative surgery: access to areas of the brain. CSTs of craniocerebral wounds, penetrating and non-penetrating injuries, CSTs of craniocerebral injuries, intracranial hematomas, craniotomy, draining operations for hydrocephalus , mastoid trepanning.	
Topographic anatomy of the facial region of the head. Operative surgery: surgery of injuries of the maxillofacial area, incisions for abscesses and phlegmons of the maxillofacial area, opening of the pharyngeal and paratonsillar abscesses, resection of the upper and lower jaw.	
Topographic anatomy of the neck - areas, triangles, fascia, interfascial spaces, their clinical significance, blood vessels, nerves, plexus. Topographic anatomy of the neck: pharynx, larynx, thyroid, cervical trachea and esophagus.	
Operations on the neck: surgical accesses to the neck organs, operations on the vessels of the neck, operations for purulent diseases of the neck, vagosympathetic blockade according to Vishnevsky, blockade of the vagus nerve in Burdenko, tracheotomy, tracheostomy, operations on the thyroid gland.	
Module №2 "Topographic anatomy and operative surgery of the head and neck"	
Module №3 "Practical skills"	

Lesson on

«Introduction Subject and tasks of topographic anatomy and operative surgery. General surgical technique. Surgical instruments. Disconnect the compound and tissues».

Motivational characteristic: The study of surgical instruments, the rules for its use, types of skin suture, types of nodes, as well as the technique of applying a skin suture and local anesthesia techniques will make it possible to correctly use surgical instruments, as well as freely navigate in the procedural and dressing rooms, operating rooms.

I. Goals:

The student should know:	The student should be able to:	Student must own:
✓ 1. The subject and tasks of topographic anatomy. ✓ 2. Methods of studying topographic anatomy. ✓ 3. General provisions of operative surgery. ✓ 4. Principles of operative surgery. ✓ 5. Stages of surgical intervention. ✓ 6. Types of surgery. ✓ 7. Surgical treatment of wounds: ✓ □ Primary - species ✓ □ Secondary ✓ □ Complete ✓ □ Incomplete 8. Classification of surgical instruments: ✓ □ surgical ✓ □ special 9. Suture material: 10. Requirements 11. Basic parameters 12. Classification 13. The separation and connection of tissues. 14. Skin incision 15. Basic principles of wound closure. 16. Stitches. Nodes. 17. Views 18. Classification 19. Types of anesthesia in surgery: ✓ local - infiltration, conductive, case. ✓ general (anesthesia) - intravenous, mask, combined	1. Knit knots. 2. Work as the main surgical instruments. 3. Dissect the selected area.	1. The method of separation and connection of tissues. 2. The method of suturing the skin with subcutaneous tissue, fascia, aponeurosis, muscle. 3. Special surgical tools to perform the necessary manipulations at each stage.

II. Questions to check the initial level of knowledge:

1. The structure of the skin.
2. The structure of subcutaneous fat.
3. The structure of the muscles.
4. The concept of fascia.
5. Laws N.I. Pirogov about fascias.
6. Classification of wounds.
7. The concept of primary and secondary surgical treatment of wounds.
8. Stages of the formation of postoperative scar.
9. The concept of asepsis and antiseptics.
10. Suture material (types, classification of suture material).
11. Wounds (definition, classification).
12. Bleeding (definition, classification). Ways to stop bleeding.

III. The object of study: the subject and tasks of topographic anatomy and operative surgery, basic concepts and definitions, types of topographic anatomy, methods of studying topographic anatomy. surgical instruments and suture material.

IV. Information part:

The history of the development of topographic anatomy and operative surgery.

The department of topographic anatomy and operative surgery in Russia did not appear immediately as a "dual discipline". It is necessary to distinguish 4 periods in their formation and development. The first period captures (1706-1805) and begins from the moment of its construction in 1706 in Moscow by order of Peter I across the river Yauza hospital (now Central Hospital named after NN Burdenko) and the emergence of the department of anatomy, surgery and midwifery.

Later, in 1716 and 1719, by decree of Peter I, military and Admiralty hospitals were opened in St. Petersburg, which became schools for training Russian surgeons. Topographic anatomy and operative surgery as independent subjects did not yet exist. Anatomy and surgery were taught in the form of one common subject by the same teachers.

The second period (1806-1835) was characterized by the emergence of separate teachers in anatomy and in surgery in connection with the allocation of beds for surgical patients and the separation of surgery from anatomy.

The third period (1836-1863) is qualitatively different from the previous two. Teaching of these subjects was still conducted in various departments: the course of topographic anatomy was studied along with normal anatomy, and the department of

practical surgery paid attention to both operative surgery and topographic-anatomical data substantiating the technique of operations.

The fourth period originates from the moment of combining topographic anatomy with operative surgery in the form of a single object. The first independent department of topographic anatomy of operative surgery was established in St. Petersburg in 1845 and in Moscow in 1867.

The founder of our discipline was N.I. Pirogov, who, as a professor at the Military Medical Academy in St. Petersburg in 1845, opened the first in Russia department of operative surgery with topographic anatomy.

In an effort to subordinate topographic anatomy to the requirements of the clinic, N.I. Pirogov gave this subject the special name "surgical anatomy" and for the first time he himself taught topographic anatomy in conjunction with operative surgery. He said that no new operation can be recommended to the clinic without prior justification on corpses and in the experiment.

N.I. Pirogov left a deep mark in world medicine, and in a number of sections of medical science: in traumatology and orthopedics, anesthesiology, military field, clinical and experimental surgery, forensic medicine.

A significant contribution to the development of topographic anatomy and operative surgery in the Soviet period was made by such scientists as V.N. Shevkunenko, A.N. Makimenkov, V.V. Kovanov, G.E. Ostroverkhov, B.V. Ognev, N.A. Kupriyanov, Yu.M. Lopukhin and others.

The two parts of our discipline, the surgical technique and topographic anatomy, are closely related to the third part, the experimental surgery. Let us briefly review their content.

The content of the subject of topographic anatomy and operative surgery.

Unlike analytic normal anatomy, which studies the structure of the human body according to systems, topographic anatomy is primarily applied science, which studies the location and interrelationships of organs and tissues of the human body by regions.

Thus, topographic anatomy is regional, regional anatomy.

Without knowledge of topographic anatomy, it is impossible to correctly perform a surgical procedure, understand the mechanisms of development of certain pathological processes, and implement the most common technique in clinical practice, such as topical diagnosis.

For example, it is known that the felon I finger can go to the V finger. The development of the purulent process in the region of the fifth finger has an anatomical rationale, which consists in direct contact in the area of the wrist joint of the synovial sheaths of the tendons of the thumb and little finger, through which infection can spread.

This discipline is related to very different specialties of medicine, but it is closest to surgery.

Methods for the study of topographic anatomy.

1. method - "ice anatomy", which includes aspils of frozen corpses or separate parts of the body, which are produced in 3 directions perpendicular to each other, with the subsequent representation of the ratio of tissues in the figure;

2. method - "anatomical sculpture", when with the help of chisels and a hammer on the frozen corpse expose the studied organ, fixed in its natural position.

The advantage of the proposed methods is that they allow you to study the location of organs during pathology.

In topographic anatomy also widely used method of projection lines and points.

In the study of blood and lymphatic vessels, as well as limited cavities, methods of pouring and injection are widely used.

When studying any field, you should pay attention to five main points:

1. Borders area. As a rule, the borders of the region are drawn along bone or muscle landmarks. For example, the upper border of the neck area is carried out along the lower edge of the lower jaw and further from the angle of the jaw along the upper nuchal line to the external occiput; the lower border of the neck goes along the undercut of the sternum, the clavicles and further backwards along the line from the acromion process of the scapula to the spinous process of CVII. Knowledge of the borders of the area allows you to correctly describe the localization of the pathological process or the area of surgical intervention. This is one of the elements of professional medical language.

2. The projection of the most important formations of the area on the skin, the so-called holotopy.

3. Skeletopy - the attitude of the organs or the most important formations of the region to the skeleton.

4. Syntopy - the interposition of organs and entities of the region.

5. Layered structure of the region.

Layered topography - the concept has a direct connection with real-time access, when the surgeon consistently cuts tissue from the body surface into the depths with a scalpel.

"Surgical anatomy is not a purely topographic anatomy; it not only describes the normal correlation of organs, but also indicates the paths along which the disease process proceeds, based on data from clinical experience."

So, surgical anatomy is anatomy through the eyes of a surgeon.

The term clinical anatomy suggested by B.V. Ognev.

In fact, this is an extension of the term surgical anatomy (anatomy - through the eyes of a clinician).

The second section of the discipline is operative surgery or surgical technique.

The introduction of anesthesia entailed tremendous changes in the field of surgery. Previously, surgical interventions could last only a few minutes, because patients could not endure the pain for a long time.

Therefore, the first period of development of modern surgery can rightfully be called the "era of anesthesia."

The second period of development of modern surgery is the "era of antiseptics and asepsis."

The first reports of an antiseptic were heard in 1867 from Lister.

Soon the antiseptic era was replaced by aseptic.

In the second half of the nineteenth century, progress was made in the development of methods to combat bleeding and exsanguination .

J. Pean introduced the method of final arrest of bleeding with the help of a clamp and a ligature.

In 1873, Esmarch proposed a hemostat, which was of great importance for the development of limb surgery.

Finally, K. Landsteiner and J. Jansky created the scientific basis of blood transfusion.

At the end of the 19th century, abdominal surgery was rapidly developing. In 1879, the French surgeon J.Pean performs the first in the world operation of gastrectomy.

The 20th century is a witness to the development of surgery of the chest cavity, the beginning of which was laid by Nasilov and Dobromyslov, who developed extrapleural and transpleural access to the thoracic department of the esophagus.

The well-known Soviet surgeon Burdenko recommended that the following triad be guided in the performance of any surgical intervention:

1. anatomical accessibility;
2. technical capabilities;
3. physiological permissibility

Anatomical accessibility - the ability to make a cut to expose the pathological focus without damaging the vital structures, providing the closest access to the object of intervention.

Technical capability - the way of mechanization of complex and painstaking stages of surgical intervention.

Physiological tolerance - the ability to preserve in one way or another organ function after surgery.

In any surgery, you need to distinguish 3 stages:

1operational access;

2. operational reception;

3. exit from operation

By operational access is meant that part of the operation that provides, with the least injury, a rational approach and the greatest scope to a particular organ or anatomical formation.

Currently, operational access to various organs can be: longitudinal, oblique, transverse, combined.

Operational reception is a technique of operation. With the same disease, several gastric resection options can be applied. For example, gastric resection may be performed according to the methods: Billroth I, Billroth II, Hofmeister-Finsterer, Haberer, etc.

The exit from the operation is the stage of the end of surgical intervention on the organ, when the surgeon must restore the integrity of the tissues disturbed by operative access.

Finally, the last, third section of the discipline should be considered experimental surgery.

Experimental surgery occupies a leading place in 3 main areas:

1. physiology;
2. approbation of new surgical operations, diagnostic and medicinal products and, finally;
3. in training students and doctors.

In physiology, when studying the function of organs and systems, 3 types of operations are mainly used:

1. extirpation;
2. resection
3. making fistulas.

Types of surgeries.

Surgical interventions are usually focused on certain actions, which are characterized by special terminology.

1. Incisio - cut; there are various sections of tissue: longitudinal, transverse, oblique, angular, etc.

2. Tomia - dissection; examples: gastrotomia - dissection of the stomach, regarding the removal of a polyp; craniotomia (trepanation) - opening of the cranial cavity, about epidural hematoma;

3. Stomia - fistula; examples: gastrostomia - fistula of the stomach, about the inoperable tumor of the esophagus; cholecystotomia - fistula on the gallbladder due to mechanical obstruction by the common bile duct stone;

4. Sectio - section; examples: sectio alta - high section (eg, bladder) for prostate adenoma; venesectio - section of a vein, etc.

5. Punctio - puncture; examples: punctio pleurae - puncture of the pleura; punctio fornicis posterioris - puncture of the posterior vaginal fornix;

6. Ectomia - removal; examples: with wellcyctectomia - removal of the gallbladder; necroectomia - removal of necrotic necrotic tissue during primary surgical treatment of a wound;

7. Resectio - excision of the organ or limb with the mandatory preservation of the peripheral division of the organ or limb; examples: resectio ulcus ventriculi - resection of the stomach for stomach ulcers;

8. Amputatio - cutting off the peripheral part of the limb or organ, examples: amputation of the lower leg, amputation of the mammary gland, uterus, rectum;

9. Extraarticula - isolation of the peripheral part of the limb at the level of the joint.

10. Rrhaphia - seam; examples: gastrorrhaphia - gastric suture, neurorrhaphia - nerve suture, etc.

Operations are bloodless and bloody. Bloodless operations include various instrumental interventions, such as cystoscopy, bronchoscopy, gastroscopy, colonoscopy, etc., and non-instrumental, for example, reposition of dislocation of the hip, shoulder, n / jaw, etc..

Bloody operations can be divided into 2 groups according to their nature and goals: radical and palliative.

Radical surgery aims to eliminate not only disorders caused by the disease, but also to completely eliminate the pathological focus.

Palliative surgery is aimed at alleviating the patient's condition and eliminating painful disorders, but does not eliminate the cause of the disease. Operations can be single-stage, two-stage or multi-stage..

One-time operation from beginning to end is performed in one step..

Two-stage operations are performed in cases where the patient's state of health or the risk of complications does not allow to complete the surgical intervention in one stage, in connection with which one part of the operation is performed on one day and the other after the patient has recovered from the injury..

Multi-stage operations are widely practiced in plastic and reconstructive surgery, when the formation or restoration of any damaged part is carried out in several stages, for example, by moving the skin flap on the leg (filatov stem) to replace the defect.

If surgery is performed several times for the same disease, then such operations are called repeated.

Depending on the urgency of the operation, there are distinguished operations: emergency or emergency, urgent or free choice.

Emergency operations are those without which the patient will inevitably die in the very near future. These include stopping bleeding from large vessels, tracheotomy at the intersection of n.laryngeus, hernia repair with a strangulated hernia, surgery for torsion of the intestines, etc. In these cases, the operation must be carried out without delay..

Urgent are operations, the implementation of which can be postponed only for a short period of time necessary to clarify the diagnosis and prepare the patient for surgery..

Planned operations are surgical interventions performed after a systematic examination and appropriate preparation for surgery..

There is another operation of "choice", for example, in case of a duodenal stenotic ulcer, an operation can be performed resection of the stomach with Billurot II-type duodenal disability or duodenoplasty with selective proximal vagotomy according to V.I. Onoprievu.

All operations according to their target orientation are divided into two groups: medical and diagnostic.

Therapeutic operations are aimed at removing the focus of the disease or restoring impaired organ function.

Diagnostic operations include interventions designed to clarify the diagnosis, for example, biopsy, punctures of the pleura and joints, laparoscopy, angiography, and in some cases trial laparotomy, thoracotomy, etc.

Separation and tissue bonding.

Each surgical operation consists of the following successive steps.:

The first - layer-by-layer separation of tissues lying on the path to the lesion with a sharp cutting tool. As far as possible, the direction of the incisions should correspond to the course of the large blood vessels and nerves in order to avoid damage. It should be noted that the dissection of the skin should be made taking into account the location of the so-called Langer skin tension lines, corresponding mostly to the skin folds, thus avoiding the formation of disfiguring scars.

After separation of the tissues, an operational reception is performed, i.e., -

2nd - surgical intervention on the affected organ or tissues, for example, removal of tumors or pus, etc..

Having finished this or that basic operative measure, the surgeon proceeds to:

3rd - to the junction of tissues, approaching the complete restoration of the anatomical and functional integrity.

Suturing is the most common way to join fabrics. The material for the seams are silk, catgut, fishing line, nylon thread, etc. Seams are sutured with a needle and needle holder.

Apply mainly nodal and continuous seams.

With nodal stitches, each stitch is tied separately, with continuous stitches, only the first stitch is tied and a long thread continues to sew the entire wound to the end. At the end of this stitch, the end of the thread is tied to the folded last but one stitch. Continuous seams are used wherever they are not subjected to excessive loads.

Continuous seam can be of different types.:

1. continuous blanket, or furrier;
2. single mattress;
3. Multanovsky seam or seams in the overlap, where the thread each time captures the previous seam loop.

Other types of continuous seams are:

1. pouch;
2. continuous mattress.

In this case, all layers of the wound need to capture evenly in depth and width. Usually, the needle is injected into the skin at a distance of 1 cm from the edge of the incision and punctured at the same distance, after which the ligature is tied with a simple knot, which should be located on the side of the incision. The seams are placed at a distance of 1-2 cm from each other. Particular importance should be given to the careful adaptation of the edges of the skin to achieve a cosmetic scar..

Fascia and muscle can be sewn with catgut. The first - nodal, and the second - U-shaped or mattress seam, which prevents the possibility of teething ligatures. The aponeurosis of the muscles is better to sew by clicking.

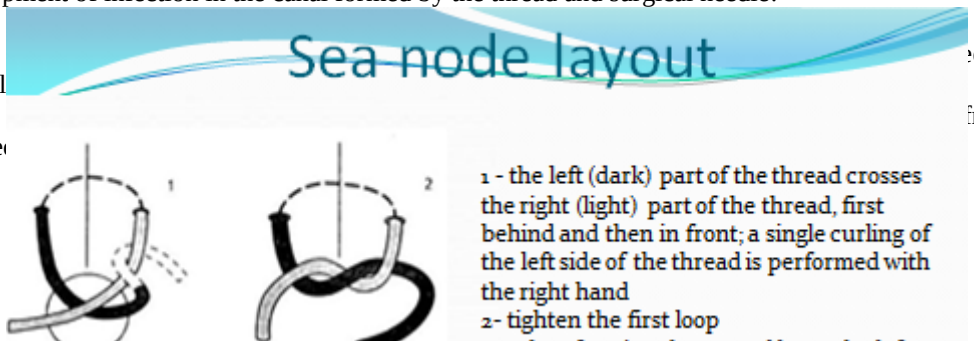
There are the following types of nodes: surgical, marine and simple.

The surgical knot is characterized by double crossing of the thread and always ends with an ordinary crossing. It is the most durable and is especially indicated when dressing large vessels..

A simple knot is characterized by a single crossing. The female node is characterized by two single-type unidirectional single-loop loops. The marine knot is characterized by two counter single-interlocking loops.

In surgical practice, various types of interrupted sutures are often used: the Donati suture, the Allgover suture and the U-shaped.

Skin sutures are usually removed a week after surgery, preferably a little earlier (starting at 4 days) in order to prevent the development of infection in the canal formed by the thread and surgical needle.



ed organ and tissues in the shortest possibl

fresh casual wound is considered infecte

Surgical wound treatment should be performed as early as possible after injury..

According to modern views, wound debridement is produced not so much for "knife sterilization", as for reducing the number of non-viable tissues in the wound, which serve as a favorable nutrient medium for microbes..

Distinguish primary and secondary surgical treatment of wounds..

Primary surgical treatment of wounds is the first surgical intervention in this patient, which consists in dissection of the wound, excision of the edges, walls and bottom within healthy tissues produced according to primary indications to prevent the development of wound infection, i.e. inflammation. The thickness of the layer of tissue being removed ranges from 0.5 to 2 cm.

Secondary surgical treatment is undertaken for secondary indications on the background of inflammation caused by complications or insufficient radical nature of primary treatment for the treatment of wound infection.

Distinguish between complete and incomplete (partial) surgical treatment of wounds..

Complete surgical treatment of a wound involves the excision of the walls and bottom of the wound to eliminate its bacterial contamination and prevent the development of wound infection. However, anatomical and operational conditions do not always allow to perform surgical treatment in full. Often it is necessary to limit the dissection of the wound and the removal of only the largest foci of necrosis. In this case, an incomplete or partial surgical treatment of a purulent wound (purulent focus) is performed..

Depending on the timing, there are: early, delayed and late primary surgical wound treatment.

1. Early primary surgical treatment is carried out within 24 hours after injury. Its purpose is to prevent the development of infection. The prophylactic use of antibiotics allows in some cases to increase the period to 48 hours. This surgical treatment is called primary delayed..

Despite the later terms of intervention, the primary delayed surgical treatment is designed to solve the same problem as the early, i.e. to prevent the development of wound infection.

2. Late surgical treatment of the wound is no longer aimed at prevention, but at the treatment of wound infection. It is produced after 48 hours in persons who received antibiotics or after 24 hours in persons who did not receive them. It is obvious that the possibilities of suturing the wound with sutures after late surgical treatment are sharply limited..

Depending on the time elapsed since the injury and surgical treatment of the wound, the following types of sutures are distinguished: 1. primary suture; 2. primary delayed seam; 3. early secondary suture; 4. late secondary seam.

1. The primary suture is such a suture that is applied to a fresh wound immediately after it has been treated.
2. If the suture is applied to the wound after 24-48 hours, that is, before the appearance of granulations, it is already called the primary delayed suture. Initially delayed suture is applied to the wound, which heals by primary intention.
3. Secondary suture - a suture of a granulating wound cleared of necrotic tissue and having no obvious signs of inflammation. So-called early secondary suture, superimposed on the 2nd week after surgical treatment of wounds. Unlike the primary delayed suture, it is superimposed on the wound, which heals by secondary intention.
4. Late secondary suture is applied to the wound at 3-4 weeks after excision of granulations and scars.

Surgical Instrument Groups.

1.For tissue separation.

2.For tissue bonding.

3.Auxiliary.

4. Hemostatic.

5.Special.

V. Tasks for independent work:

Task number 1.

Give a definition:

Holotopia -

Syntopy -

Skeletopy-

Task number 2.

Describe 4 periods in the formation and development of operative surgery and topographic anatomy.

Task number 3.
Describe methods for studying topographic anatomy.

Task number 4.
Specify the stages of surgery.

Task number 5.
Specify the types of surgical sites.

Task number 6.
Make a task on the topic of the lesson. (In a notebook).

Task number 7.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Test questions:

1. Give a definition of radical and palliative surgery?
2. What does the surgeon mean by “operation of choice”?
3. What is a single-step operation?
4. What operations are called multistage?
5. How many steps are included in each operation?
6. What are the access requirements??
7. What is included in the concept of operational reception?
8. What requirement must be observed when joining the wound edges to form a linear postoperative scar?
9. List the types of surgical instruments?
10. What tools belong to the tools separating and connecting fabrics?
11. What tools are used to fix the edges of the wound?
12. 1What should the surgeon be guided by when choosing a needle and suture material when suturing different tissues?
13. How to properly hold the scalpel when the skin is cut?
14. What kind of scalpel should be used when performing punctures?
15. How to install the needle in the needle holder to ensure its secure fit?

VII. Learning tasks.

№ 1. On the 7th day after the operation, the surgeon removes the nodal skin sutures. What is the sequence of actions of the surgeon? What complications may occur if the skin suture removal technique is not followed??

(Answer: Before removing the suture, the skin is treated with an alcoholic iodine tincture. Parallel to the suture, the surgeon places the jaws of the pointed scissors along the edge (to fix the suture). light "(located in the canal, not infected) part of the ligature. The pointed jaw of the scissors is placed under the ligature, the ligature is cut at the level of its" light "part. The scissors are set along the edge at the seam. edi skin treated with iodine tincture and alcohol aseptic bandage is applied Complications: 1) dehiscence;. 2) infection.)

No. 2. When performing a surgical procedure, one should be guided by the general rules for the use of surgical instruments. Call them.

(Answer: 1 only serviceable instruments are used; 2. each instrument has its own purpose; 3. the surgeon must feel with the hand not the handle, but the working part of the instrument; 4. manipulate the tools in the wound with smooth, rhythmic movements, without any effort; 5 Careful, gentle treatment of organs (i.e., with minimal trauma to the walls and bottom of the wound

No. 3. For the imposition of surgical sutures used cutting (triangular) and piercing (round) needles. Explain the difference in the formation of a ligature channel with these surgical needles. Specify the purpose of the dihedral landing pad at the cutting needle..

Answer: When using a triangular (cutting) needle, the ligature channel is formed by cutting the layer (before applying the skin suture, the skin is treated with an alcoholic iodine tincture.) The cutting part of this needle is wider than the ear. three parts: eyelet adjacent to the ear of the dihedral landing site for the needle holder and the cutting part. The presence of the dihedral landing platform eliminates the rotation of the needle in the needle holder's beak along the axis.)

VIII Control tests:

“Holotopia” is: (1)

position relative to neighboring organs.

the relationship of the organ with the peritoneum or pleura.

+ the position of the body relative to the body and its areas.

attitude to the skeleton.

body dimensions.

"Syntopy" is: (1)

types of joints of skeletal bones.

+ relationship with neighboring authorities.

position relative to the position relative to the skeleton body and its areas.

position relative to the skeleton.

low organ position.

The most important provisions on the structure and position of vascular vagina first formulated: (1)

R.D. Sinelnikov.

A.S. Vishnevsky.

+N.I. Pirogov.

V.N. Shevkunenko.

P.A. Kupriyanov.

The founder of the doctrine of individual variability of the structure and position of organs and systems of the human body is: (1)

N.I. Pirogov.

B.V. Ognev.

+ V.N. Shevkunenko.

A.N. Maksimenkov.

V.V. Kovanov.

The most durable is: (1)

double surgical unit.

+ marine knot.

"Female" knot ..

knot tied apodactylno.

node view does not matter.

IX. Glossary:

Incisio	Incision; there are various sections of tissue: longitudinal, transverse, oblique, angular, etc.
Tomia	Incision; there are various sections of tissue: longitudinal, transverse, oblique, angular, etc;
Stomia -;	Fistula; examples: gastrostomia - fistula of the stomach, about the inoperable tumor of the esophagus; cholecystotomia - performing a fistula on the gallbladder due to mechanical obstruction by the common bile duct stone
Sectio -	Section; examples: sectio alta - high section (eg, bladder) for prostate adenoma; venesectio - vein section, etc.
Punctio	Puncture; examples: punctio pleurae - puncture of the pleura; punctio fornicis posterioris - puncture of the posterior vaginal fornix;
Ectomia	Deletion; examples: with wellcyctectomia - removal of the gallbladder; necroectomia - removal of dead necrotic tissue during primary surgical treatment of wounds;
Resectio	Excision of an organ or limb with mandatory preservation of the peripheral division of the organ or limb; examples: resectio ulcus ventriculi - resection of the stomach for stomach ulcers;
Amputatio -	Cutting off the peripheral part of the limb or organ; examples: amputation of the lower leg, amputation of the breast, uterus, rectum;
Exarticulatio -	Isolation of the peripheral part of the limb at the level of the joint.
Rrhaphia -	The seam; examples: gastrorrhaphia - gastric suture, neurorrhaphia - nerve suture, etc.

Lesson on

«Topographic anatomy of the upper limb. Shoulder girdle (scapular, deltoid, subclavian and axillary areas); shoulder joint, shoulder. Topographic anatomy of the elbow area, elbow joint, forearm, hand. Wrist joint, wrist, metacarpus and fingers».

Motivational characteristic: knowledge of the location of the main neurovascular bundles of the axillary region, the anterior and posterior regions of the shoulder will allow one to predict the ways in which purulent processes may spread from the axilla and promptly carry out surgical interventions. Knowledge of ways of metastasis to the lymph nodes of the axillary cavity will allow timely diagnosis of the localization of malignant tumors of the studied area.

I.Goals:

The student should know:	Студент должен уметь:	Студент должен владеть:
1. Topographic anatomy of the upper limb - blood supply, innervation, lymph and venous outflow: 2. Topographic anatomy of the shoulder girdle area - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 3. Topographic anatomy of the shoulder joint area - borders, holotopy, skeletopy, syntopy, layering. 4. Topographic anatomy of the axillary region of the border, holotopy, skeletopy, syntopy, layering. 5. Topographic anatomy of the shoulder area - borders, holotopy, skeletopy, syntopy, layering. 6. Topographic anatomy of the elbow area - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 7. Topographic anatomy of the forearm region - borders, holotopy, skeletopy, syntopy, layered structure. 8. Topographic anatomy of the wrist area - borders, holotopy, skeletopy, syntopy, layered structure. 9. Topographic anatomy of the hand area - borders, holotopy, skeletopy, syntopy, layering.	1. indicate on the corpse: ✓ shoulder girdle - boundaries. ✓ scapular area - borders. ✓ deltoid area - borders. ✓ subclavian region - borders. ✓ axillary region - borders. ✓ shoulder joint area - borders. ✓ shoulder area - borders. ✓ front shoulder - border. ✓ back shoulder area - borders. ✓ elbow area - borders. ✓ front elbow area – borders posterior elbow area - borders. ✓ forearm area - borders. ✓ front forearm area - borders. ✓ posterior forearm area - borders.Зап wrist area - boundaries. ✓ front wrist area - borders. ✓ back wrist area - borders.Кисти brush area - borders. ✓ palm area - borders. ✓ area of the rear - the border. ✓ armpit - borders. ✓ axillary artery - boundaries. ✓ neurovascular bundle of the shoulder ✓ cubital fossa - borders. ✓ lateral and medial neurovascular bundles of the ulnar fossa. ✓ cellular tissue space of Pirogov-Paron-border. ✓ anterior interosseous neurovascular bundle of the forearm. ✓ ulnar and radial neurovascular bundles of the middle third of the forearm. ✓ the course of the median nerve in the wrist joint. ✓ branches of the median, radial and ulnar nerves on the hand. ✓ fibrous sheaths of flexor tendons ✓ . common finger extensor. ✓ long and short extensors of the thumb. ✓ the average cellular space of the brush. ✓ carpal, ulnar, osteo-fibrous canals of the dorsal surface of the wrist. ✓ palmar aponeurosis and its commissural openings, its lateral and medial partitions. ✓ common neurovascular bundle of the finger. ✓ ulnar artery in the elbow canal of the wrist. ✓ projection of the superficial palmar arterial arch.	1. The method of preparation of the selected area. 2. Special surgical instruments to perform the necessary manipulations at each stage.

II. Questions to check the initial level of knowledge:

1 Muscles of the shoulder girdle.
2 Muscles of the front shoulder area.
3 Muscles of the back shoulder area.
4 Structure of the shoulder joint.
5 branches of the aortic arch involved in the blood supply to the upper limb.
6 The structure of the elbow joint.
7 Muscles of the front surface of the forearm.
8 Muscles of the back of the forearm.

9 Neurovascular bundle of the anterior surface of the ulnar fossa.
10 Neurovascular bundles of the posterior surface of the forearm.
11 Palmar arterial arches.
12 Innervation Brush.
13 Tendons of the palm and back surfaces of the hand.

III. The object of study - the human body.

IV. Information part:

Upper limb, membrum superius

The subclavian region refers to both the chest and the upper limb. However, the layers of the subclavian region take part in the formation of the axillary fossa, and directly to them lies the main neurovascular bundle of the upper limb - the axillary. In this regard, in the topographic anatomy of the subclavian region is considered as part of the shoulder girdle, or shoulder girdle..

External reference points. The clavicle, the sternum, the pectoralis major muscle, the anterior margin of the deltoid muscle. Below the clavicle, between the clavicular portion of the pectoralis major muscle and the anterior margin of the deltoid muscle, on the border between the outer and middle third clavicle, the subclavian fossa, the fossa infraclavicularis, or the Mohrenheim fossa, distally turning into the deltoid-pectoral sulcus, sulcus deltopectoralis, is found. along the anterior margin of the deltoid muscle to the lateral groove of the shoulder.

In the depth of the furrow 1.5-2 cm below the clavicle, the coracoid process of the scapula can be palpated, processus coracoideus.

Borders. Upper - clavicle; medial - outer edge of the sternum; bottom - the horizontal line corresponding to the third intercostal space; lateral - anterior margin of deltoid muscle.

Projections. With the help of external reference points, you can make projections of the following formations.

From the front ends of the III-V ribs to the coracoid process, the small pectoral muscle is projected by a small triangle, m. pectoralis minor. With the help of this muscle, projections of three triangles can be applied to the skin of the subclavian region: the clavicle-pectoralis, the pectoralis and the thoracic (trigonum clavipectorale, trigonum pectorale and trigonum subpectorale).

Within these triangles, the topography of the axillary neurovascular bundle is usually considered: a., V. axillaris, plexus brachialis and its branches (for details, see the axillary region).

The projection of the axillary neurovascular bundle in this area is carried out from the medial half of the middle third of the clavicle downwards and outwards to the border between the lower and middle third of the deltoid pectoral groove. Projection v. axillaris occupies the most medial part of the beam. By sulcus deltopectoralis projected v. cephalica.

Layers

The skin is thin, moderately mobile.

Subcutaneous fatty tissue without features, developed individually. Supraclavicular nerves from the cervical plexus pass through it.

The superficial fascia in the upper third of the region forms a sheath for platysma (subcutaneous muscle of the neck), starting from the breast's own fascia. At level II-III, the fascia is compacted to form the suspension ligaments of the mammary gland, or Cooper ligaments. On all borders of the subclavian region, the fascia moves into the adjacent areas.

Own fascia of the region, fascia pectoralis, surrounds the pectoralis major muscle in front and behind with superficial and deep sheets. Between them, separating the fibers of the pectoralis major muscle, are numerous fascial bridges.

As a result, the spread of purulent processes in the muscle occurs from the surface to depth. Lymphatic vessels also pass along the bridges, which explains the spread of metastases in breast cancer to the deep surface of the pectoralis major muscle.

The superficial and deep sheets of fascia pectoralis at the top are attached to the fascia of the subclavian muscle, as well as to the surface sheet of the own fascia of the neck (second fascia according to Shevkunenko). At the bottom they grow together on the outer edge of the pectoralis major muscle, thus forming a closed case for it. Behind the clavicle, a part of the fifth fascia of the neck (prevertebral) is attached to the I rib, covering the anterior scalene muscle.

The next layer is the fiber of the subpectoral space, spatium subpectorale.

Even deeper is the clavicle-pectoral fascia, fascia davipectoralis. At the top, it starts from the clavicle and the coracoid process of the scapula, from the medial side, at the beginning of the pectoralis major muscle (III-V rib), from below and outside it attaches to the deep leaf of the fascia m. pectoralis major at its outer edge. The thickened bundles of the clavicular-thoracic fascia in this place form a ligament that attaches to the axillary fascia, fascia axillaris.

These bundles are called ligament suspension, lig. suspensorium axillae, or a bunch of poles.

Around the clavicle, the fascia is also sealed. Here the subclavian vein adjoins to it, which with a sharp abduction of the arm can be squeezed between the fascia, the clavicle and the rib with possible acute vein thrombosis..

F. clavipectoralis forms a case for the pectoralis major muscle and for the subclavian muscle, m. subclavius.

Thus, the subpectoral cellular tissue space is located between the pectoralis major and minor pectoral muscles with their fascial integument.The front wall of the space is a deep fascia sheet of the pectoralis major muscle.Posterior - clavicle-pectoral fascia covering the pectoralis major muscle.At the top, it is closed at the clavicle, where both fascia grow together.Medially, it closes at the site of the beginning of both muscles from the ribs..

Laterally and from below, the space is closed by the fusion of the fascia of the pectoralis major muscle and the clavicle-pectoral fascia along the outer edge of the pectoralis major muscle.

The next layer is the fiber of the upper part of the axillary fossa, in which the main neurovascular bundle passes — the axillary vessels and first the bundles, and then the branches of the brachial plexus (sometimes this layer is called the deep subpectoral space).

Behind this fiber is its own pectoral fascia, fascia thoracica, covering the anterior serratus and intercostal space..

The upper border of the area is the clavicle. It is located under the skin and subcutaneous tissue and is easily palpable. The lower fascia of the breast and the clavicular-thoracic fascia are fixed to the lower edge of the clavicle.

The clavicle most often breaks when falling, with emphasis on the shoulder or forearm. The weakest part of the clavicle is on the border between the lateral and middle third. After a clavicle fracture, its middle part rises due to thrust m. sternocleidomastoideus, and the lateral is lowered due to the severity of the upper limb.

In newborns, fractures of the clavicle are common during passage through the birth canal. Such fractures usually heal quickly on their own. In children of preschool and school age, fractures of the clavicle are more common than in adults. Clavicle fractures at this age are often incomplete when one side of the bone is broken and the other is only bent. Similarly, the green branches of a tree break, so there is the term "fracture by the type of the green branch".

Fragments of the clavicle diverging up and down can damage the neurovascular bundle located behind the collarbone, therefore the first aid for fractures is the immobilization of the shoulder girdle by applying an 8-shaped dressing, sometimes from auxiliary material (clothing). Topography of the neurovascular bundle.

In the subclavian region, the topography of that part of the axillary bundle, which passes within the clavicle-pectoral triangle (between the clavicle and the upper edge of the pectoralis major muscle).

In this triangle, just below the clavicular-thoracic fascia is the axillary vein, v. axillaris, coming out from under the upper edge of the pectoralis major muscle and going in an oblique direction from the bottom up to the point located 2.5 cm inwards from the middle of the clavicle. In the area between the I rib and the clavicle, the vein is already called the subclavian. Fascial vagina of the vein is closely connected with the fascia of the subclavian muscle and the periosteum of the I rib, which serves as an obstacle to the collapse of its walls.

In this regard, there is a risk of air embolism if the vein is damaged. At the same time, good fixation of the vein allows for puncture in this area.

Axillary artery, a. axillaris, lies lateral and deeper than the vein. In the clavicle-thoracic triangle, the upper thoracic artery departs from the axillary artery, a. thoracica superior, branching off in the first and second intercostal spaces, and the hematoacromial artery, a. thoracoacromialis, almost immediately disintegrating into three branches: deltoid, thoracic and acromion. All of them pierce the clavicle-pectoral fascia and are directed to the corresponding muscles. In the same place, the lateral saphenous vein of the arm passes through the fascia from the deltoid-thoracic sulcus into the axillary fossa, v. cephalica, and flows into the axillary vein.

Bundles of the brachial plexus are located lateral and deeper artery.

Thus, both in the direction from front to back, and from the medial side to the lateral elements of the neurovascular bundle are located in the same way: first the vein, then the artery, then the brachial plexus (memorization technique - VAPlex).

With a sharp abstraction of the head to the side (for example, during a fall), the upper trunk of the brachial plexus with the development of the so-called Duchenne palsy may be damaged. Since in the upper trunk are the nerve fibers involved in the formation of n. axillaris, n. musculocutaneus and, in part, n. radialis, the function of the muscles innervated by these nerves will suffer. Therefore, it is impossible to take a shoulder (m. Deltoideus - Inn. N. Axillaris), flexing the forearm (m. Biceps brachii, m. Brachialis - Inn. N. Musculocutaneus), the arm hangs like a whip.

At the medial margin of the axillary vein is located the apical group of lymph nodes of the axillary fossa..

Communication of cellulose of subclavial area with the next areas:

1. With cellulose of the armpit through the defect in the posterior wall (f. Clavipectoralis) of the subpectoral space, along the branches a. thoracoacromialis.

2. In the course of the fiber accompanying the main neurovascular bundle, the purulent process can spread to the lateral triangle of the neck.

Along the same bundle, fiber is associated with the lower parts of the axillary fossa..

Scapular area, regio scapularis

External reference points. The upper edge of the scapula is located at the level of the II rib (the medial angle reaches the level of the I rib), the lower angle is at the level of the VIII rib. Shoulder blade corresponds to approximately III edge.

The most accessible for palpation and, therefore, the most reliable external landmarks of the area are the medial edge of the scapula, its lower angle, the scapula and acromion. The line connecting the lateral part of the acromion and the lower angle of the scapula corresponds to the lateral edge of the scapula, which is often not possible to palpate due to the muscles covering it.

Borders. Upper - a line drawn from the acromioclavicular articulation perpendicular to the spine; bottom - a horizontal line running through the bottom corner of the blade; medial - on the inner edge of the scapula to the intersection with the upper and lower boundaries; lateral - from the lateral end of acromion vertically down to the lower border.

Projections of the main neurovascular formations of the region. A. et n. The suprascapularis are projected along a line running from the middle of the clavicle to the point corresponding to the base of the acromion, that is, the border of the outer and middle third of the shoulder blade. Projection line r. profundus a. transversae (a. scapularis dorsalis) goes along the inner edge of the scapula 0.5-1 cm inwards from it. Entry place a. circumflexa scapulae in the hypodermic bed is projected on the middle of the projection of the lateral edge of the scapula.

Layers.

The skin is thick, inactive, it can hardly be gathered into a fold. Sometimes men have skin covered with hair. When skin is contaminated, in places of friction with clothing, in elderly and exhausted people, furuncles (furunculosis) may occur in patients with diabetes in this area. The skin has many sebaceous glands; when they are blocked in this area, cysts of the sebaceous glands - atheroma often occur, requiring surgical removal.

Subcutaneous fatty tissue is monolayer, dense, cellular due to connective tissue partitions, going from the skin in depth, to its own fascia.

The superficial fascia can be represented by several sheets of different density. There are practically no supra-facial formations, subcutaneous nerves are branches of the axillary and supraclavicular nerves..

The own fascia of the superficial muscles of the area (m. Trapezius, m. Deltoideus, m. Latissimus dorsi) forms cases for them. Fascia supraspinata et fascia infraspinata - own fascia of the deep muscles of the scapula, starting from its back surface.

These fascia are dense, have aponeurotic structure. As a result of their attachment to the edges of the scapula and spine, two bone-fibrous spaces are formed - supraspinatus and supraspinatus.

Topography of the supra- and sub-subspace spaces of the scapula.

Supraspinal space corresponds to the fossa supraspinata scapula. From above, it is closed by attaching f. supraspinata to the upper margin of the scapula, to the fascial sheath of the subclavian muscle and to the lig. coracoclaviculare. From below it is closed by a scapula. Outside, at the base of the acromion and under the acromioclavicular articulation, the supraspinatal space is open to the sub-abdominal and the subdeltoid cellulose space. The content of the supraspinatal space (bed) is m. supraspinatus, a., v. et n. suprascapular.

The subosseous bone-fibrous space is formed by its own fascia and scapular bone below the scapular spine. The fascia infraspinata is spliced with the medial margin of the scapula, scapula and lateral margin of the scapula. The contents of the box are m. infraspinatus, m.teres minor, a small layer of fiber located between muscles and bone, as well as vessels and nerves: a. et v. suprascapularis, a. circumflexa scapulae, n. suprascapularis. This includes branches r. profundus a. transversae colli, probodaya own fascia at the medial edge of the scapula. The artery around the scapula, on the way out of the axillary fossa, also pierces this fascia, but at the lateral margin of the scapula.

The branches of these three arteries are anastomized between themselves in the sub-cellular tissue and in the thickness of the sub-muscle. As a result, the so-called scapular arterial collateral circle is formed. In case of difficulty or cessation of blood flow along the trunk - axillary - artery, the circulation of the entire upper limb may be preserved above (proximally) the location of the subscapularis artery (a. Subscapularis) from it above the scapular anastomoses. Read more about this in the section “Collateral circulation in the shoulder girdle.”

From the angle of the scapula and the lower half of its lateral edge, as well as from the outer surface of the subacteal fascia, a large round muscle begins. Its upper edge adjoins the lower edge of a small circular muscle covered by the subfascial fascia; a gap is formed between them. In the middle of the extension of the large round muscle it crosses behind the tendon of the long head of the triceps, which goes anteriorly, under the small round muscle. The gap between the circular muscles is thus divided into two sections: the medial (triangular opening) and lateral (quadrilateral)

The edges of the tripartite hole on the side of the scapula are from the bottom — a large, round muscle, on top — a small, round, and from the lateral side, the tendon of the long head of the triceps. Through this hole in the scapular region of the axillary passes a. circumflexa scapulae. Further, it pierces the fascial case of the small round muscle and forks in the muscles of the sub-fossa.

The quadrilateral opening is located outside the scapular region and is considered in the section “Axillary region».

The next layer is the scapula).

Subscapular space. M. subscapularis is located on the front side of the scapula in the osteo-fascial bed, formed by the fusion of the subscapular fascia with the edges of the scapula. The subscapular muscle, passing into a rather powerful tendon, is directed into the subdeltoid space, in which the tendon attaches to the small tubercle of the humerus. To the point of attachment, the tendon closely adjoins the anterior part of the shoulder joint capsule. A rather large synovial sac, bursa synovialis subscapularis, permanently connected to the cavity of the capsule of the shoulder joint is located under the tendon of the subscapularis muscle. The front surface of the subscapularis muscle, together with its fascia, is involved in the formation of the posterior wall of the axillary fossa and the posterior wall of the precistopal cellular tissue space, which is an extension of the axillary space in the dorsal direction. The front wall of this space is the front gear muscle, covered with its own fascia, fascia thoracica.

Communication fatty tissue of the scapular region with adjacent areas

1. Along the supralopillary bundle - with the fiber of the lateral triangle of the neck.
2. In the course of a. et v. circumflexae scapulae through the trilateral opening - with cellulose of the axillary fossa.
3. Along the tendons of the supra- and subacute muscles - with the fiber of the subdeltoid space..

Axillary area, regio axillaris, and axillary fossa, fossa axillaris

External reference points. Contours mm. pectoralis major, latissimus dorsi et coracobrachialis. With the limb abducted, the region has the form of fossa, fossa axillaris.

The boundaries of the area (not to be confused with the walls of the armpit, they will be discussed below).

Front - bottom edge m. pectoralis major; back - bottom edge m. latissimus dorsi; medial - line connecting the edges of these muscles on the chest wall along the third edge; lateral - a line connecting the edges of these muscles on the inner surface of the shoulder.

Projection of the axillary vascular nerve bundle (a. Et v. Axillaris, bundles of plexus brachialis and nerves extending from them) - a line drawn from a point between the front and middle third of the lateral border of the region (inner surface of the shoulder) to a point 1 cm medially from the middle of the clavicle.

Layers.

The skin is thin, has a hair covering limited to the region, contains many sweat, sebaceous and apocrine glands, with inflammation of which boils and hydradenitis can develop. Subcutaneous fatty tissue is weak and layered between the thin plates of the superficial fascia. In the subcutaneous tissue, the skin branches of the nerves of the shoulder and the superficial lymph nodes are located. Outflow from them is carried out in the deep lymph nodes through the diverting lymphatic vessels, piercing their own fascia.Superficial fascia poorly developed.

Own fascia, fascia axillaris, in the center of the area is thin, there are narrow cracks in it, through which small blood and lymphatic vessels and nerves to the skin pass. At the borders of the region, the axillary fascia is denser and freely passes into the chest fascia, fascia pectoralis, behind the lumbar-chest fascia, fascia thoracolumbalis, laterally to the fascia of the shoulder, fas cia brachii, and medially to its own chest fascia, fascia thoracica, covering the front gear muscle. To the inner surface of the axillary fascia along the edge m. pectoralis major attaches a ligament, suspending the axillary fascia, lig. The suspensorium axillae, Gerdy's bunch (Gerdy), is a derivative of fascia clavipectoralis, discussed in the section on the subclavian region. The ligament pulls up its own fascia upward, so that the axillary region is shaped like a fossa..

Subfascial Education.

The cellular space of the axillary fossa is located under the fascia axillaris. It contains well-defined fatty tissue, the axillary neurovascular bundle, as well as several groups of lymph nodes.

Like any fiber space, the axillary space is bounded by a number of fascias and underlying muscles. The shape is a four-sided pyramid, the base of which is fascia axillaris, and the top lies in the middle of the clavicle, between it and the I edge. Four sides of the pyramid (armpit walls, not to be confused with borders!) Are formed:

- front - f. clavipectoralis with small pectoral muscle;
- medial - f. thoracica covering the chest wall and the front toothed muscle;
- lateral - f. brachii covering m. coracobrachialis and short head m. biceps brachii to the place of their attachment to the coracoid process;
- back - f. m. subscapularis and wide flat tendon m. latissimus dorsi.

The structure of the front wall as a whole also includes the pectoralis major muscle. As already noted, there is a hole in the clavicular-thoracic fascia that allows branches to pass through a. thoracoacromialis and v. cephalica.

Along the medial wall along the teeth of the anterior serratus, m. serratus anterior, or Boxer muscles, go down from top to bottom a. thoracica lateralis (from a. axillaris) and somewhat backwards from it - n. Bell's thoracicus longus, or Bell's nerve (from the supraclavicular part of the brachial plexus).

In the lower third of the lateral wall along m. coracobrachialis passes the axillary neurovascular bundle. His fascial case is connected here with a fascial muscle case. It is believed that at the inner edge of the coraco-brachial muscle (outer landmark), you can press the axillary artery against the humerus. However, the muscle can be found quite easily only in thin and physically well-developed people, therefore, a temporary stop of bleeding by finger pressing is often performed using a projection line..

The posterior wall of the axillary fossa is represented by the tendon of the latissimus dorsi muscle and the subscapularis muscle closely adjacent to it from above. On the front surface m. subscapularis pass nn in an oblique direction. subscapularis et thoracodorsalis.

The tendon of the broadest back muscle is always well defined and is an important internal guideline. With its help it is easy to find two holes in the posterior wall of the armpit: quadrilateral and tripartite. These holes connect the axillary fossa with the deltoid and scapular regions. From the scapular region, they are discussed above. On the side of the armpit, they have other margins.

The edges of the four-sided hole: lower - upper edge of the tendon m. latissimus dorsi, upper - lower edge m. subscapularis, lateral - surgical neck of the humerus, medial - deeper tendon lying long head m. triceps brachii.

The edges of the tripartite hole: lower - upper edge of the tendon m. latissimus dorsi, upper - lower edge m. subscapularis, lateral - tendon m. triceps brachii.

The upper and lower edges of both holes are represented by the same formations: m. subscapularis and m. latissimus dorsi. The quadrilateral opening lies lateral, closer to the humerus, and the trilateral opening is more medial. To find them, it is enough to find the angle between the humerus and the upper edge of the tendon m. latissimus dorsi is already part of a four-sided hole. The movement of the instrument upward immediately determines the subscapularis, and moving inwards and in the depth of this opening, it is easy to reach the tendon of the long head of the triceps. Continuing to move over this tendon in the medial direction, in the gap between the tendon of the latissimus muscle and the subscapularis muscle, one can easily find a three-sided hole.

The axillary nerve passes through the quadrilateral opening from the axillary fossa to the deltoid region, n. axillaris, and the posterior artery, the circumflex humerus, as well. circumflexa humeri posterior. Through the three-sided hole in the scapular region, the artery envelopes the scapula, as well. circumflexa scapulae.

A number of other important neurovascular structures are located close to the posterior wall, the topography of which is described below.

Topography of neurovascular formations.

A. axillaris, continued a. subclavia, is the main vessel of the upper limb.

Its topography is usually considered for triangles formed by relatively small pectoral muscle: tr. clavipectorale, tr. pectorale and tr. subpectorale (they were discussed in the section on the topography of the subclavian region). In the first of them, the axillary artery gives branches: a. thoracica superior and a. thoracoacromialis, in the second - a. thoracica lateralis, in the third, thoracic triangle from it depart a. subscapularis, aa. circumflexae humeri anterior et posterior.

The topography of the elements of the neurovascular bundle in the trigonum clavipectorale is discussed in the section on the subclavian region.

In the pectoral triangle, the axillary vein and lymph nodes along it lie medially (more superficially) from the artery. The three bundles of the brachial plexus — the medial, lateral, and posterior — lie next to a. axillaris according to its names: medial - medial from artery, lateral - lateral, posterior - behind artery. A. thoracica lateralis is directed to the medial wall of the axillary fossa, where it gives branches to the muscles and to the mammary gland.

In the lower triangle, the topography of the vessels and nerves is most complex. Here the bunches of the brachial plexus break up into several large nerves, each of which occupies a certain position relative to the axillary artery. It is appropriate to recall that the medial bundle of the brachial plexus gives the medial cutaneous nerve of the shoulder, n. cutaneus brachii medialis, forearm, n. cutaneus antebrachii medialis, ulnar nerve, n. ulnaris, and medial root of median nerve, n. medianus. The lateral root of the median nerve and the musculo-cutaneous nerve depart from the lateral bundle, n. musculocutaneus, or Casierio nerve, from the posterior - radial, n. radialis, and axillary, n. axillaris nerves.

The most superficial education is v. axillaris, which is located in front of and medial to the artery and nerves.

N. medianus is located anterior to the artery. It is easy to find at the junction of its two roots - the medial and lateral (inner reference point), in the shape of the letter Y. The axillary artery is clearly visible in the gap between the roots..

The nerves from the medial bundle of the brachial plexus are located medially from the artery. The largest among them is n. ulnaris. Besides him, n is located medially from the artery. Cutaneus antebrachii medialis and n. cutaneus brachii medialis.

Lateral to the artery are the lateral root of the median nerve and the musculo-cutaneous nerve heading towards m. coracobrachial and piercing it.

Behind the artery are the radial and axillary nerves (both from the posterior bundle). N. radialis. the largest of the branches of the brachial plexus, lies behind the artery along the entire triangle of the thoracic and, together with the artery, is adjacent to the tendon of the latissimus dorsi, passing into the anterior region of the shoulder. In the same area go and n. medianus, nn. cutanei brachii et antebrachii mediales, n. ulnaris.

N. axillaris is at first located behind and somewhat lateral to the artery on the posterior wall of the axillary fossa, then goes obliquely and laterally towards the four-sided opening at the upper edge of m. latissimus dorsi. The posterior artery envelopes the humerus, a. circumflexa humeri posterior, and its accompanying veins, which together with n. axillaris form a neurovascular bundle, adjacent to the surgical neck of the shoulder from behind and then heading to the subdeltoid space. Here, deeper than the nerve, the lower portion of the capsule of the shoulder joint, recessus axillaris, is exposed under a small layer of loose fiber..

If we delay the axillary artery and the nerves lying behind it, the posterior one, then we can see a diverging from its posterior wall a. subscapularis and aa. circumflexae humeri anterior et posterior. The place of their origin is about 1 cm from the upper edge of the tendon m. latissimus dorsi. A. subscapularis, the largest of the axillary artery branches, goes downwards and almost immediately divides into an artery that surrounds the scapula, a. circumflexa scapulae, and the thoracic artery, a. thoracodorsalis. The first of them goes into the tripartite opening and further to the lateral edge of the scapula, and the second is a continuation of the subscapularis artery, goes downwards accompanied by the subscapularis nerve and at the angle of the scapula disintegrates into terminal branches.

Aa. circumflexae humeri anterior et posterior begin at 0.5-1 cm distal to a. subscapularis. A. circumflexa humeri anterior goes laterally under m. coracobrachialis and caput breve m. bicipitis.

brachii and adjacent to the surgical neck of the shoulder in front. Both arteries surrounding the shoulder supply blood to the shoulder joint and the deltoid muscle, where they anastomose with the deltoid branch a. thoracoacromialis.

A. axillaris is the main trunk vessel of the upper limb. Its branches in the upper arm region form anastomoses with arteries from the systems of the subclavian and brachial arteries, which serve as collateral routes of blood supply to the upper limb in the event of injury and ligation a. axillaris A more reliable collateral blood supply develops when the axillary artery is ligated or occluded above the discharge a. subscapularis and both arteries that surround the humerus (for more details, see below, in the section on collateral circulation in the shoulder girdle).

Lymph nodes of the armpit form 5 groups, which are easier to remember with respect to the walls. One of them - the central - is located at the base of the pyramid, which is formed by the walls. The following three are located along the sides of the pyramid, except the medial. Accordingly, it is the rear, lateral and front nodes. The fifth group is located at the top of the pyramid (top - apex) and therefore is called the apical.

1. Nodi lymphoidei centrales are the largest nodes. They are located in the center of the base of the axillary fossa of the anterior fascia along the axillary vein..

2. Nodi lymphoidei subscapulares (posteriores) lie along the subscapular vessels and take the lymph from the upper back and the back of the neck.

3. Nodi lymphoidei humerales (laterales) are located at the lateral wall of the axillary cavity, medial to the neurovascular bundle, and take the lymph from the upper limb.

4. Nodi lymphoidei pectorales (anteriores) are located on the anterior serratus along a. thoracica lateralis. They take the lymph from the anterolateral surface of the chest and abdomen (above the navel), as well as from the mammary gland. One (or several) of the nodes of this group lies at the level of the third edge under the edge m. pectoralis major and stands out (Zorgius node). These nodes are often the first to cause breast cancer metastases..

5. Nodi lymphoidei apicales lie in the trigonum clavipectorale along v. axillaris and take the lymph from the underlying lymph nodes, as well as from the upper pole of the breast.

Next, the lymphatic vessels pass into the lateral triangle of the neck along the axillary neurovascular bundle and take part in the formation of the truncus subclavius, subclavian lymphatic trunk.

The main groups of lymph nodes of the axillary fossa are palpated in the position of bringing the shoulder; the alignment position is required in order to relax the axillary fascia under which they are located. Only the lymph node of Zorgius is palpated otherwise. The hand of the patient lies on the shoulder of the doctor, and he palpates the lymph node at the site of attachment of the lower edge of the pectoralis major muscle to the chest.

The connection of the fiber of the axillary fossa with neighboring areas.

1. In the course of the neurovascular bundle in the proximal direction, the fiber of the axillary fossa is connected with the fiber of the neck, and from there to the fiber of the anterior mediastinum.

2. In the distal direction along the neurovascular bundle - with the fiber of the shoulder.

3. Through a three-sided hole - with the back surface of the scapular region.

4. Through a four-sided hole - with a subdeltoid space.

5. Through the clavicular-thoracic fascia along the a. thoracoacromialis - with subpectoral space.

6. Between the deep (front) surface of the scapula and the chest wall - with subscapularis space.

Deltoid region, regio deltoidea.

The area is located outwards from the scapular, corresponds to the contour of the deltoid muscle covering the shoulder joint and the upper third of the humerus.

External reference points. The clavicle, acromion and spine of the scapula, the bulge of the deltoid muscle, its front and rear edges, the deltoid-pectoral groove. With dislocations in the shoulder joint, this bulge of the deltoid muscle is smoothed, replaced by a fossa.

Borders. Upper - outer third of the clavicle, acromion and outer third of the scapular spine. Bottom line on the outer surface of the shoulder, connecting the lower edges of the pectoralis major muscle and the latissimus dorsi muscle. Anterior and posterior borders correspond to the edges of the deltoid muscle.

Projections. Along the deltoid-pectoral sulcus, the lateral saphenous vein of the arm is projected, v. cephalica. In a vertical line down from the rear angle of the acromion to the intersection with the rear edge m. deltoideus (6 cm on average; when leading the upper limb from the body to the right angle, this distance will be 2.5-3 cm), the neurovascular bundle of the area is projected - n. axillaris et aa. circumflexae humeri anterior et posterior. At the same level is the surgical neck of the shoulder.. The projection of the recessus axillaris, the lower protrusion of the articular bag of the shoulder joint, is determined by a point located on the same vertical line 4 cm below the posterior angle of the acromion, that is, 2 cm above the projection of the axillary nerve. Here, during inflammation (arthritis) of the shoulder joint, pain is determined by pressure. This point is located under the posterior margin of the deltoid muscle..

Layers.

The skin is relatively thick, sedentary..

Subcutaneous fatty tissue is well defined, especially near the posterior surface of the region, it has a cellular structure. Approximately at the middle of the posterior margin of the deltoid muscle, a branch of the axillary nerve, n. cutaneus brachii lateralis superior.

Superficial fascia poorly developed.

Own fascia, fascia deltoidea, at the upper boundary of the region is firmly adhered to the clavicle, acromion and awn of the scapula. At the front and lower borders, it freely passes into the fascia pectoralis and fascia brachii. On the anterior border of the region, in the sulcus deltopectoralis, in the splitting of its own fascia is located v. cephalica, which goes further to the subclavian region.

Own fascia has superficial and deep sheets that form a case for the deltoid muscle. Both sheets bind numerous spurs that separate the individual muscle fibers. In two places, the spurs are especially developed: they divide the three portions of the deltoid muscle according to their attachment sites - the clavicular, pars clavicularis, acromial, pars acromialis, and spinous, pars spinalis.

The deltoid cellular space is located between the deep leaf of fascia deltoidea (on the deep surface of the deltoid muscle) and the proximal end of the humerus with the shoulder joint and its capsule. In the tissue of space lies the neurovascular bundle, as well as the subdeltoid synovial sac, bursa subdeltoidea, surrounding the large tubercle of the humerus. Attached to this tubercle are supraspinatus, supraspinatus and small circular muscles tendons. As a rule, the subdeltoid bag communicates with another mucous bag located under the acromion (bursa subacromialis).

The subdeltoid cellular space continues upwards under the acromion and further backwards into the subtrapezoidal space.

Topography of vessels and nerves. The main element of the neurovascular bundle is n. axillaris, a branch of the posterior bundle of the brachial plexus. It innervates the deltoid muscle. The fascial sheath of the bundle is connected with the deep leaf of the deltoid muscle fascia. Passing from the armpit through the foramen quadrilaterum, it is adjacent to the axillary torsion, recessus axillaris, capsules of the shoulder joint, and then bends around the surgical neck of the shoulder from back to front.

N. axillaris lies proximal to the posterior artery, enveloping the humerus.

On the deep surface of the deltoid muscle a. circumflexa humeri posterior anastomoses with a. circumflexa humeri anterior, also coming from the armpit, but along the front surface of the surgical neck of the shoulder. Both arteries also anastomize with the deltoid branch a, thoracoacromialis. These anastomoses provide collateral circulation in the case of impeded blood flow along the axillary artery in the area between the chestacromial artery and the two arteries that surround the humerus. An important anastomosis is also the anastomosis between the deltoid branch of the hematocromial artery and the eponymous branch of the deep artery of the shoulder. This anastomosis plays an important role in the obstruction of blood flow in the axillary - brachial artery in the area between the subscapularis artery and the deep artery of the shoulder.

In case of fracture of the humerus at the level of the surgical cervix, the axillary nerve can be trapped. Sometimes the nerve becomes involved in the developing callus and is squeezed by it. It is also possible the involvement of the nerve in the inflammatory process with purulent disease of the shoulder joint and the breakthrough of pus from the capsule through the recessus axillaris. In all such situations, there is a violation of skin sensitivity in the zone of its branches, and most importantly, paresis or paralysis of the deltoid muscle develops. This will be manifested by the impossibility of leading the shoulder to the horizontal level (loss of function of the deltoid muscle).

Communication of cellulose of the subdeltoid space with neighboring areas.

1. In the course of the neurovascular bundle and further through the quadrilateral aperture, the subdeltoid space is connected with the axillary.

2. Along the tendons of the supraspinatus and supraspinatus muscles are associated with the supraspinatus and supraspinous spaces of the scapula.

3. At the top, the fiber continues under the acromion and further backwards into the subtrapezoidal space.

Shoulder joint, articulatio humeri.

The shoulder joint is located under the bulge of the deltoid muscle. It connects the humerus, and through it, the entire free upper limb with the humeral girdle, in particular the scapula..

External reference points. First of all, it is the deltoid muscle. It is almost always possible to identify the sulcus deltopectoralis and to palpate the posterior margin of the muscle. In all people, regardless of the development of subcutaneous fatty tissue, you can palpate the acromion, especially its posterior angle.

Below the outer part of the clavicle, deep in the sulcus deltopectoralis, processus coracoideus is palpable.

The articular fissure is projected from the front to the top of the coracoid process, from the outside - along the line connecting the acromial end of the clavicle to the coracoid process, behind the acromion, between the acromion and spinal part of the deltoid muscle.

The articulating sites are the articular cavity of the scapula, cavitas glenoidalis, and the head of the humerus, caput humeri.

A slightly deeper articular cavity is located on the thickened lateral angle of the scapula..

Above the upper edge of the depression is the supra-articular tubercle, tuberculum supraglenoidale, the place of attachment of the tendon of the long head m. biceps brachii. At the lower edge of the articular cavity, there is a subarticular hillock, tuberculum infraglenoidale, from which the long head, m, originates. triceps brachii.

The coracoid process, processus coracoideus, departs from the superior margin of the scapula in the vicinity of the articular cavity. This appendix serves as the starting point for two muscles: m. coracobrachial and caput breve m. bicipitis brachii. In addition to the muscles, a ligament, lig, leaves the process. coracoacromiale, stretched between the outer end of the coracoid process and the middle part of the inner surface of the acromion process of the scapula. The ligament is dense, 0.8-1 cm wide, has a whitish color. Being above the joint, this ligament together with the acromion and coracoid processes form the roof of the shoulder. The arch limits the abduction of the shoulder up in the shoulder joint to a horizontal level. Above the limb rises already with the spatula.

The humerus at the top has a spherical articular head, which is separated from the rest of the bone by a narrow groove, called the anatomical neck. Immediately behind it are two muscular tubercles, of which the larger tuberculum majus lies laterally, and the other, the smaller tuberculum minus, lies slightly anterior to it. Between the tubercles is a groove, sulcus intertubercularis, in which the tendon of the long head of the biceps of the shoulder passes. Immediately below both tubercles, on the border with the diaphysis, is the surgical neck of the humerus.

In the humeral joint there is a large discrepancy between the almost flat joint end of the scapula and the spherical head of the humerus. This discrepancy is somewhat smoothed by the cartilaginous articular lip, labrum glenoidale, which increases the volume of the cavity without limiting mobility, and also softens the jolts and tremors when the head moves. However, the remaining incongruence causes dislocations of the humerus, which occur more often than in any other joint..

The joint capsule of the shoulder joint is free and relatively thin. It is attached to the scapula to the bone edge of the articular cavity and, covering the head of the shoulder, ends on the anatomical neck. In this case, both tubercles remain outside the cavity of the joint. Inside and below the joint capsule is attached much lower, at the level of the surgical neck of the shoulder, forming the so-called axillary torsion, recessus axillaris.

The fibrous layer of the joint capsule has thickened and weak areas. Thickened formed by ligaments, the most pronounced of them - lig. coracohumerale, starting from the outer edge of the coracoid process and heading towards the large and small tubercles of the humerus. The so-called joint-humeral ligaments, lig. glenohumerale, or Flud ligaments, upper, middle and lower. Between the ligaments are "weaknesses." Especially thin capsule between the middle and lower ligaments - this place is the front "weak point" of the capsule.

Of great importance in strengthening the capsule of the shoulder joint are the tendons of the muscles surrounding the joint..

The strengthening effect of the muscles is realized in different ways. Thus, the biceps muscle of the shoulder, the coraco-brachial and deltoid muscles do not have a direct connection with the joint capsule, but they contribute to the retention of the articular ends of the scapula and humerus.

Other muscles are connected directly to the joint capsule. From above and outside the joint covers the tendon m. supraspinatus, which, heading from the depression of the same name, passes under lig. coracoacromiale and attaches to the top of the large hump of the humerus.

Behind the shoulder joint is covered with tendons m. infraspinatus attaching to the large tubercle below the attachment point m. supraspinatus, and m. teres minor whose tendon attaches to a large tubercle below the tendon m. infraspinatus.

In front of the shoulder joint is a wide and flat tendon m. subscapularis attaching to the small tubercle of the humerus.

Thus, it can be noted that the joint capsule is strengthened by ligaments and tendons of the muscles above and behind, and there is no such strengthening from below and from the inside. This is largely due to the fact that in most cases the head of the humerus is dislocated forward and inward.

Around the joint there is a significant amount of synovial bags that make up the sliding apparatus of the musculo-tendon formations.

The most permanent and connected with the cavity of the joint are the subscapularis, bursa subtendinea m. subscapularis, andlying more superficially above it, sub-helical bag, bursa m. coracobrachialis. Often both of these bags merge. In essence, the subscapular bag can be considered as an extra-articular protrusion of the synovial membrane of the shoulder joint. There is one more protrusion of the synovial membrane - the inter-tubercular. Synovial inversion tightly covers the tendon of the long head of the biceps of the shoulder, passing from the scapula across the entire cavity of the shoulder joint, and can reach the surgical neck of the humerus. At the level of the large and small tubercles of the humerus, the tendon passes in the groove between them, covered in front over the synovial sheath by tendon fibers m. subscapularis, m. infraspinatus and m. teres minor.

Front, outside and behind the shoulder joint covers without merging with the capsule, m. deltoideus. Under it, in the subdeltoid cellular space, there are also synovial bags. In particular, over the large tubercle of the humerus, over the tendon m. supraspinatus, is a subdeltoid synovial sac, and under the acromial process is subacromial. Sometimes they merge to form a common subdeltoid bag.

Axillary neurovascular bundle, a. et v. Axillares with the nerves surrounding them, is located inwards from processus coracoideus and m. coracobrachialis. Its location is taken into account when accessing the joint from the front.

Pathways of purulent processes.The deltoid tissue surrounding the shoulder joint is called periarticular and serves as a site of chronic joint inflammation and the spread of purulent periarthritis.In case of purulent arthritis of the shoulder joint, the subscapularis bag is also involved in the process and often breaks through, giving pus flow into the fascial-bone case of the subscapularis muscle.Involvement in the bursa m process. coracobrachialis and its subsequent breakthrough lead to pus leakage into the axillary fossa and into the subtrapeziform cellular space.

Due to the tight closure of the inter-fossal protrusion of the tendons, pus rarely erupts through it. If this happens, the pus flows into the anterior cellular space of the shoulder with secondary nodules along the neurovascular bundles.

Collateral circulation in the upper arm areas.

In the areas of the upper arm, around the shoulder joint, there are two networks of collaterals - scapular and acromial-deltoid.

The first is the so-called scapular arterial collateral circle. It includes a. suprascapularis (from truncus thyrocervicalis from a. subclavia), r. profundus a. transversae sso (from the subclavian artery) and a. circumflexa scapulae from a. subscapularis (from a. axillaris). The branches of these three arteries are anastomized between themselves in the sub-cellular tissue and in the thickness of the sub-muscle.

In case of difficulty or cessation of blood flow along the trunk - axillary - artery, the circulation of the entire upper limb may be preserved above (proximally) the location of the subscapularis artery (a. Subscapularis) from it above the scapular anastomoses. This happens as follows: from the system of the subclavian artery along its branches — the suprascapular and transverse arteries of the neck — blood enters the subosseous fossa, then through the anastomoses with a. circumflexa scapulae is already retrograde in the subscapularis artery and then in the axillary artery, and then naturally through all the arteries of the upper limb.

The second, the acromial-deltoid network, includes the acromial and deltoid branches of a. thoracoacromialis and both arteries, enveloping the humerus, as well as the deltoid branch of the deep artery of the shoulder. These branches anastomose among themselves mainly in the thickness of the deltoid muscle and connect the system of axillary artery and deep artery of the shoulder..

With a slowly increasing stenosis (narrowing) of the axillary artery in the area between the arteries that surround the humerus and the place of discharge from the brachial artery of the deep artery of the shoulder, the only possible way of developing collateral circulation in the upper limb is r. deltoideus a. profundae brachii. The small diameter of the listed vessels explains that this network can compensate for the impaired blood flow in the main artery only in the case of a slow and gradual development of the process leading to this violation (growth of atherosclerotic plaque).

Front shoulder, regio brachii anterior.

Front shoulder, regio brachii anterior.

Borders. The upper boundary of the region runs along the line connecting the attachment points to the shoulder of the pectoralis major and latissimus dorsi muscle; the lower boundary is drawn through points located 4 cm above the epichelles of the shoulder; the two side borders correspond to the vertical lines drawn up from the epichelves.

Projections to the skin of the main neurovascular formations.

Projection a. brachialis and n. The medianus is drawn from a point on the border of the front and middle third of the line defining the upper border of the area to the middle of the elbow bend, or more precisely, 1 cm medial to the tendon of the biceps of the shoulder. If sulcus bicipitalis medialis is well defined, the projection line of the brachial neurovascular bundle coincides with it. On the same line, v is projected. basilica.

Projection n. ulnaris in the upper third of the shoulder corresponds to the projection of the main neurovascular bundle, and from the point between the upper and middle third it dodges in the medial direction to a point 1 cm lateral to the top of the medial epicondyle (at the base of the epicondyle).

N. radialis is projected onto the skin of the anterior surface in the lower third of the shoulder along the lateral groove. (Often, when viewed from the shoulder, the lateral groove of the shoulder is poorly detected due to the excessive development of subcutaneous fatty tissue. In such cases, the lateral lateral border of the anterior shoulder region is used as a projection line..)

Layers.

The skin in the anterior region of the shoulder is relatively thin, especially in the medial part of the region, rather mobile. In the skin of the medial surface of the upper half of the shoulder, the medial cutaneous nerve of the shoulder, n. cutaneus brachii medialis, from the medial bundle of the brachial plexus.

Subcutaneous fatty tissue is loose. The superficial fascia is quite well expressed in the lower third of the area where it forms a sheath for superficial neurovascular formations, in other places it is weakly expressed.

Superficial formations of the region: on the medial side (along the sulcus bicipitalis medialis) in the lower third of the shoulder is located the medial saphenous vein of the arm, v. basilica, and next to it are branches n. cutaneus antebrachii medialis. From the lateral side, along the sulcus bicipitalis lateralis, along its entire length passes the lateral saphenous vein of the arm, v. cephalica, which at the upper boundary of the region goes into sulcus deltopectoralis.

Own fascia, fascia brachii, surrounds the entire shoulder. On the border of the middle and lower third of the shoulder in the medial furrow of the shoulder in its own fascia there is an opening through which the splitting of the fascia (the Pirogov channel) enters v. basilica, and from it goes n. cutaneus antebrachii medialis.

Intermuscular partitions (septa intermusculare laterale et mediale) extend from the medial and lateral side of the fascia proper to the humerus, resulting in two fascial beds on the shoulder: anterior and posterior.

The walls of the anterior fascial bed of the shoulder, the compartimentum brachii anterius, are: the front is its own fascia, the back is the humerus with intermuscular partitions attached to it.

The contents of the front bed are the muscles: deeper coraco-humeral (upper third of the shoulder), short head of the biceps of the shoulder and shoulder (two lower thirds of the shoulder), and superficially the long head of the biceps of the shoulder. The shoulder muscle, or Casserius, is covered by a deep fascia..

On the inner side, first the coraco-brachial and then the biceps muscles of the shoulder along its entire length in the fascial case formed by the medial intermuscular septum, is the main neurovascular bundle of the region - the brachial artery, the accompanying veins and the median nerve.

The posterior fascial bed of the shoulder, compartimentum brachii posterius, is bounded anteriorly by the humerus with septa, and behind by its own fascia. In the back bed is m. triceps brachii.

Topography of vessels and nerves of the anterior fascial bed.

In the upper third of the shoulder n. The medianus is located near the artery lateral to it. Medially from the artery lies n. ulnaris and more medially - n. cutaneus antebrachii medialis. The medially and superficially vnutri from the main beam lies v.

basilica, which joins the beam on the border of the upper and middle third, immediately after leaving the Pirogov channel. In the upper third of the shoulder, this vein flows either into one of the brachial veins, or enters the axillary region and flows into the axillary vein.

N. musculocutaneus extends from the lateral side of the coraco-brachial muscle, which it pierces on the way from the armpit to the front surface of the shoulder, and goes under the long head of the biceps of the shoulder, and on the border with the middle third lies on the deep fascia covering the brachial muscle. On his way he gives branches to all the muscles of the anterior fascial bed.

On the border of the anterior region of the shoulder and the axillary region immediately below the lower edge of the tendon of the latissimus dorsi behind the artery, a large trunk n is defined. radialis Almost immediately, it goes to the posterior fascial bed between the long and lateral heads of the triceps of the shoulder.

The brachial artery in the upper third of the shoulder gives a large branch - the deep artery of the shoulder, a. profunda brachii, which almost immediately goes along with the radial nerve to the posterior fascial bed. At the border of the upper and middle third of the shoulder, another branch extends from the brachial artery: the upper ulnar collateral artery.

In the middle third of the shoulder n. medianus is located in front of the brachial artery (crossing it).

N. ulnaris смещается еще более медиально от артерии и на границе с верхней третью прободает медиальную межмышечную перегородку, переходя в заднее ложе плеча. Вместе с ним идет и a. collateralis ulnaris superior.

N. cutaneus antebrachii medialis also leaves the anterior fascial bed, entering the splitting of its own fascia (the Pirogov channel), from which v enters the subfascial space. basilica. N. musculocutaneus goes obliquely from top to bottom and from the inside outwards between the biceps and brachial muscles..

In the lower third of the shoulder n. medianus is already located medial to the artery, but next to it. From the artery here goes another branch: a. collateralis ulnaris inferior. It goes obliquely down the surface of the shoulder muscle to the elbow area (the name of the artery is not related to the locusnerve nerve, which is no longer in the anterior bed, but only indicates the ulnar side of the limb), where it participates in the formation of the ulnar collateral network.

On the lateral side of the lower third of the shoulder, n reappears in the front bed. radialis, which pierces the lateral intermuscular septum and passes from the back bed to the front. It is located deep between the muscles: the brachial and lateral head of the triceps. On the border with the ulnar region, it lies just as deep, but already between the brachial and brachio-urachic muscles. In these intermuscular crevices, the nerve is accompanied by a radial collateral artery, a. collateralis radialis, - the final branch of a. profunda brachii.

Here, on the border of the lower third of the shoulder with the anterior ulnar region, from under the biceps of the shoulder comes the final branch of the musculo-dermal nerve, which here is called the "lateral dermal nerve of the forearm," n. cutaneus antebrachii lateralis. From under its own fascia into the subcutaneous tissue, it extends distally, within the anterior ulnar region.

Thus, only the brachial artery with veins passes throughout the anterior fascial bed of the shoulder (the artery lies closest to the bone, as a result of which its finger pressing is possible in case of bleeding; for this reason, the bleeding is effective in this area harness), median nerve and musculo-cutaneous nerve. The median nerve on the shoulder does not give branches. The remaining neurovascular structures pass either into the posterior bed (radial nerve with deep artery of the shoulder in the upper third, ulnar nerve with the upper ulnar collateral artery in the lower third), or into the subcutaneous tissue of the shoulder.

The connection of the fiber of the anterior shoulder area with the neighboring areas.

1. In the course of the fiber surrounding the main neurovascular bundle, the fiber of the anterior fascial shoulder bed is proximally connected with the fiber of the axillary fossa.2. In the distal direction, it is connected with the fiber of the anterior ulnar region.3. Along the radial nerve - with the posterior fascial bed of the shoulder.4. Through the channel Pirogov - with subcutaneous fatty tissue.

Regio brachii posterior

External reference points. The broadest muscle of the back, where it attaches to the shoulder, the deltoid muscle, the bulge of the triceps muscle of the shoulder, the medial and lateral namicles of the humerus.

Borders. The upper border runs obliquely along the posterior margin of the deltoid muscle to the latissimus dorsi muscle. The lower one is located 4 cm above the epichelles of the humerus. Side borders are vertical lines running up from the epicondyle.

Projection n. radialis corresponds to a spiral line drawn from the bottom edge m. latissimus dorsi to a point located on the border of the middle and lower third of the lateral border of the region.

Layers.

The skin is thicker than on the front shoulder area, not mobile.

Subcutaneous fatty tissue is often developed significantly. The dermal nerves pass through the subcutaneous tissue to the skin of the area: n. cutaneus brachii lateralis superior (from n. axillaris), n. cutaneus brachii lateralis inferior and posterior cutaneous nerve of the shoulder, n. cutaneus brachii posterior (from n. radialis), innervating the posterior lateral surface of the shoulder. On the border of the posterior region of the shoulder and posterior ulnar region, the posterior cutaneous nerve of the forearm, n. cutaneus antebrachii posterior (from n. radialis). The abundance of cutaneous nerves in this area explains the frequent painfulness of intramuscular injections into the triceps muscle of the shoulder.

Own fascia covers m. triceps brachii. Together with the already mentioned medial and lateral intermuscular septa, the own fascia forms the posterior fascial bed of the shoulder, compartimentum brachii posterior. The contents of the posterior fascial bed are m. triceps brachii and radial nerve with its accompanying deep artery of the shoulder. In the lower third of the shoulder in the back of the bed are n. ulnaris and a. collateralis ulnaris superior. Immediately below its own fascia are determined from the medial side of the long head m. triceps brachii, and lateral - from lateral. The medial head is located deeper.

Topography of the neurovascular bundle.

The radial nerve comes to the posterior surface of the shoulder from the anterior fascial bed through the gap between the long and lateral heads of the triceps. Next, it is located in the brachial canal, canalis humeromuscularis, which spirals around the humerus in its middle third. One wall of the canal is formed by bone, the other - by the lateral head of the triceps..

In the middle third of the shoulder in canalis humeromuscularis, the radial nerve is directly adjacent to the bone, which explains the occurrence of paresis or paralysis after applying a hemostat to the middle of the shoulder for a long time or in cases of damage caused by fractures of the diaphysis of the humerus.

Together with the nerve goes the deep artery of the shoulder, a. profunda brachii, which shortly after the onset, renders the ramus deltoideus important for collateral circulation between the shoulder girdle and shoulder, anastomosing with the deltoid branch of the hematoacromial artery and the arteries that surround the humerus. In the middle third of the shoulder a. profunda brachii is divided into two final branches: a. collateralis radialis and a. collateralis media. Radiation nerve along with a. The collateralis radialis on the border of the middle and lower third of the region pierces the lateral intermuscular septum and returns to the front shoulder bed, and then to the front ulnar region. There the artery anastomoses with a. recurrens radialis. A. collateralis media anastomoses with a. interossea recurrens.In the lower third of the shoulder in the posterior fascial bed passes the ulnar nerve with a. collateralis ulnaris superior. Next, they are sent to the rear elbow area.

The connection of the fiber back of the shoulder area with neighboring areas.

1. In the course of the radial nerve proximally, the fiber is connected with the fiber of the anterior fascial bed of the shoulder.

2. Distally with ulnar cellulose.

3. In the course of the long head of the triceps muscle of the shoulder, it is connected with the fiber of the armpit.

Regio cubiti anterior

External reference points. Epicondyli medialis et lateralis, tendon m. biceps brachii, m. brachioradialis, transverse fold of the elbow. Three elevations - lateral (due to m. Brachioradialis), medium (m. Biceps brachii) and medial (due to flexor muscles, starting from the medial epicondyle) - limit the deepening, called the cubital fossa, fossa cubiti. Between them are visible anterior lateral and medial ulnar grooves, sulci cubitales anteriores lateralis et medialis, which are a continuation of the corresponding shoulder furrows. At the bottom of fossa cubiti continues into the radial sulcus, sulcus radialis.

Borders. Horizontal lines drawn 4 cm above and below the line connecting the epicondyle of the shoulder (line of the elbow) separate the front elbow from the front shoulder at the top and from the front forearm at the bottom. Two vertical lines drawn through both the epicondyle, the front ulnar region is separated from the posterior ulnar region. The elbow bend line (transverse skin fold) divides the area into two parts - the upper and lower.

Projections. A. brachialis is projected at the medial edge m. biceps brachii, a n. medianus 0.5-1 cm medial to the artery. (It is appropriate to recall here that the terms "medial" and "lateral" denote the position of the anatomical formation about the middle axis of the whole body, not the limb. Thus, the artery lies closer to the tendon, and the median nerve is closer to the medial epicondyle.) At the level of the medial epicondyle at the inner edge m. biceps brachii palpable pulse on a. brachialis. This place also serves as auscultation of its tones when measuring blood pressure..

The place of division of the brachial artery on the radial, a. radialis, and ulnar, a. ulnaris, artery projected 1-2 cm below the elbow bend.

N. radialis is projected in the upper half of the region along the medial edge m. brachioradialis.Layers.

The skin is thin, through it often appear through the saphenous veins, which become strained when applying a tourniquet on the shoulder. Keep in mind the mobility of the skin when performing intravenous injections (it is good to fix the skin with your finger).

Subcutaneous fatty tissue is developed individually, from a very thin layer to a thickness of several centimeters. It is loose, layered. This explains the fact that hematomas, in particular after intravenous injections, spread in width, sometimes taking the form of extensive bruises in the cubital fossa.

Superficial veins and nerves are located in the deep layer of subcutaneous tissue.

On the medial side, this is v. basilica, next to which are located the branches n. cutaneus antebrachii medialis. At the level of the medial epicondyle medially from v. basilica are superficial elbow lymph nodes, nodi lymphoidei cubitales superficiales. On the lateral side is located v. cephalica. These veins are connected by a running oblique median ulnar vein, v. mediana cubiti The anastomosis is in the form of the letter I or N. Sometimes instead of v. mediana cubiti here pass v. mediana cephalica and v. mediana basilica, formed from v. mediana antebrachii. The anastomosis in this case has the shape of a letter M. In any case, the superficial veins are connected by a branch that pierces its own fascia with deep veins.

Intravenous injections are performed in v. mediana cubiti or v. mediana cephalica and v. mediana basilica for two reasons. The first is an anastomosis with a deep vein, with the result that these veins are fixed to their own fascia and become inactive. The second is that there are no subcutaneous nerves near these superficial veins, unlike v. cephalica and v. basilica.

At the level of the elbow bend, branches n go out from under its own fascia into the subcutaneous tissue. cutaneus antebrachii lateralis (continuation of n. musculocutaneus), which run in the distal direction near v. cephalica.

Own fascia above the medial muscle group has the appearance of an aponeurosis, since here the fascia is reinforced by tendon stretch fibers (aponeurosis bicipitalis, or aponeurosis of the biceps of Pirogov's shoulder) superficially removed from the biceps tendon. At the medial edge of the ulnar region, the fascia coalesces with the ulna.

The medial and lateral intermuscular partitions depart from the fascia along the line of the furrows. The medial is attached to the humerus and the medial epicondyle, the lateral to the capsule of the elbow joint and fascia m. supinator. At the lower boundary of the region, these partitions are connected, forming the anterior radiation intermuscular partition of the forearm.

Own fascia and partitions form three fascial beds: medial, middle and lateral.

In the medial bed are located the muscles starting from the medial epicondyle: in the first layer, the medial flexion of the wrist, m., Is located most medially (closer to the ulnar edge of the region). flexor carpi ulnaris, lateral to her - long palmar muscle, m. palmaris longus, then radial flexor of the wrist, m. flexor carpi radialis, and most laterally, closer to the center of the region, is a circular pronator, m. pronator teres, attached to the radius. Deeper lies the surface flexor of the fingers, m. flexor digitorum superficialis. It should be noted that in the elbow area to divide these muscles is difficult; you can trace their course distal, in the front region of the forearm.

On average, the bed is superficially m. biceps brachii, attached to the radius, and deeper - m. brachialis attached to the ulna. The shoulder muscle covers the deepest layer of the area - the elbow joint with its capsule.

The brachioceralis muscle is located in the lateral bed, m. brachioradialis, a support beneath it, m. supinator.

Topography of neurovascular formations.

The bones of the medial septum into m. brachialis, a n. medianus lies 0.5-1 cm medial.Under aponeurosis m. 1-2 cm below the bicipitis brachii below the line connecting the epicondyle of the humerus, the brachial artery is divided into a. radialis and a. ulnaris. A. radialis. crossing the tendon of the biceps of the shoulder in front, goes laterally into the gap between m. pronator teres and m. brachioradialis. A. ulnaris leaves under m. pronator teres, and then located between the superficial and deep flexor of the fingers. N. medianus first, at a short distance, adjoins the ulnar artery, and then moves to the forearm, passing between two heads m. pronator teres.In this area, compression of the median nerve is possible with the development of so-called tunneling neuropathy, accompanied by the appearance of a number of characteristic symptoms (for more details, see the section»).

Within the ulnar fossa of the radial artery, the recurrent radial artery departs, a. recurrens radialis, and from the ulnar artery-common interosseous artery, a. interossea communis and then the recurrent ulnar artery, a. recurrens ulnaris. The latter is divided into two branches: front and rear; r. anterior in the gap between the medial and middle muscle groups anastomoses with a. collateralis ulnaris inferior, a R. posterior medial ulnar sulcus - with a. collateralis ulnaris superior. The recurrent and collateral arteries, anastomosing among themselves, form arterial networks in the anterior and posterior elbow areas, rete articulare cubiti, providing blood supply to the elbow joint. These anastomoses are collateral ways of blood supply to the limb at different levels of injury and ligation of the brachial artery.

The interossea communis on the border with the anterior region of the forearm is divided into the anterior and posterior arteries.

At the bifurcation site a. brachialis are nodi lymphoidei cubitales, taking deep lymph vessels of the distal limb.

N. cutaneus antebrachii lateralis emerges from the gap between the m. biceps brachii and m. brachialis from the lateral edge of the final division of the biceps muscle and soon perforates the own fascia, leaving in subcutaneous fat, where is the neighborhood of v. cephalica.

Radialis and A. collateralis radialis in the cleavage of the lateral intermuscular septum in the upper half of the region lie deep between m. brachioradialis and M. brachialis, and at the level of the lateral epicondyle directly on the joint capsule. Here the radial nerve is divided into two branches: superficial and deep. R. superficialis n. radialis continues the course of the nerve and passes into the intermuscular gap formed by m. brachioradialis and M. pronator teres. R. profundus n. radialis is directed laterally and goes into the canalis supinatorius between the surface and deep parts of m. supinator, skirting the neck of the radius with the muscle. From the canal the deep branch goes between the muscles of the back region of the forearm that innervates.

With fractures of the neck of the radius, a deep branch of the radial nerve may also suffer. In this case, the function of the muscles-extensors of the wrist and fingers falls out, but the skin sensitivity remains in the areas innervated by the surface branch. More proximal damage to the radial nerve - to the point of division into branches-leads to muscle paralysis and loss of skin sensitivity.

Back elbow area, regio cubiti posterior

External reference points. The medial and lateral epicondyle of the humerus, the ulnar process of the ulna and the posterior medial and lateral ulnar grooves located on both sides of it, sulcus cubitalis posterior medialis et lateralis.

Scope. Circular lines drawn 4 cm above and below the interstitial line, on the sides - vertical lines drawn through the epicondyle.

Projections. Ulnaris is projected by sulcus cubitalis posterior medialis. In the middle of the sulcus cubitalis posterior lateralis palpated, especially when supination and pronation of the forearm, the head of the radius, and slightly higher-the articular slit of the shoulder joint.

Layers

The skin is thick and mobile.

In the subcutaneous fat, above the apex of the ulnar process, there is a synovial bag, bursa subcutanea olecrani.

Bag may become inflamed (bursitis) with prolonged pressure on it (engravers, watchmakers, etc.) and injury.

The posterior arterial network of the elbow joint is visible.

Its own fascia is dense, strengthened by bundles of fibrous fibers from the tendon m. triceps brachii. Fascia is firmly adherent to namesake shoulder and the rear edge of the ulna.

Under the fascia in the upper half of the medial area is the medial head of the triceps shoulder muscle, passing into a powerful tendon.

On the lateral side, this tendon forms the lateral muscle head. The tendon attaches to the olecranon, the ulnar process. Under the tendon, at the place of its attachment to the olecranon, is bursa subtendinea m. tricipitis brachii.

From the lateral epicondyle begin the muscles-extensors of the hand and fingers.

Ulnaris, accompanied by a collateralis ulnaris superior emerges from the thickness of the medial head of the triceps muscle. At the level of the epicondyle, it is located under the fascia in the sulcus cubitalis posterior medialis, in the bone-fibrous canal formed by the medial epicondyle, the ulnar process and its own fascia. Here it is closely adjacent to the capsule of the elbow joint. The lower boundary of n. ulnaris goes under m. flexor carpi ulnaris and m. flexor digitorum superficialis, heading into the front bed of the forearm.

Being superficially and close to bone formations, the ulnar nerve is often injured, which can manifest itself well - known short-term burning pain, and in more severe cases-the loss of its function.

More details - in the section "Brush".

Elbow joint, articulatio cubiti

Major external reference points are the elbow bone, olecranon and epicondyles of the humerus. It should be noted that the lateral epicondyle is located 1 cm below the medial.

The projection of the articular slit corresponds to a transverse line extending 1 cm below the lateral and 2 cm below the medial epicondyle.

Articulatio cubiti is formed by the humerus, ulna and radius, which make up a complex joint having a common capsule. The unit of the lower epiphysis of the humerus articulating with the lunate notch of the ulna, forming a hinge preselective, articulatio humeroulnaris.

The head of the humerus condyle, capitulum humeri, articulates with a fossa on the head of the radius, forming a spherical humeroradial joint, articulatio humeroradial. Incisura radialis articulates with the lateral surface of the head of the radial bone, forming a cylindrical proximal radioulnar joint, articulatio radioulnaris proximalis. Form joints allow movement on two axes: flexion and extension and rotation (pronationsupination).

The fibrous fibers of the capsule of the elbow attach to the periosteum of the front shoulder over the radius and the coronal holes in the rear over the elbow fossa, and the side sections to the base of both namyslow. Both humerus epicondyle remain outside the joint cavity.

On the radius and ulna capsule is attached to the edges of the articular cartilage, as well as to the neck of the radius.

The synovial membrane in the front, at the coronal fossa of the humerus, and behind, at the fossa of the ulnar process, fossa olecrani, does not reach the place of attachment of the fibrous capsule and is wrapped on the bone. The spaces between the fibrous and synovial membrane in these places are occupied by loose fatty tissue.

On the radial and ulnar side, the anterior and posterior parts of the joint cavity are connected only by narrow slits, which, with inflammation of the synovial membrane of the joint, can completely close and completely isolate the anterior part of the joint cavity from the posterior.

At the place of attachment of the fibrous capsule to the neck of the radius, the synovial membrane forms a downward inversion, called a saccular inversion, recessus sacciformis. The fibrous capsule here is thinned, so this area is called the" weak point " of the capsule of the elbow joint. With inflammation of the joint, it accumulates purulent effusion, and with its rupture, the purulent process can spread into the deep tissue of the forearm.

Outside the capsule is strengthened by the ulnar and radial collateral ligaments, lig. collateralia ulnare et radiale, as well as the annular ligament of the radius, lig. anulare radii.

The front joint bag almost completely covers the m. brachialis, except for the lateral portion. Here at the lateral edge of m. brachialis directly on the capsule is n. radialis. The outer section of the capsule is covered by m. supinator.

At the back in the upper part of the joint is covered with a tendon m. triceps brachii, and in the lower lateral-m. anconeus. On the medial side of the capsule is not protected by muscles and covered only by its own fascia. Here at the rear of the medial furrow to the bag adjacent the n joint. ulnaris.

The posterior part of the capsule on the sides of olecranon, where the capsule is not strengthened by any muscles, is the second "weak point".

Directly under the distal end of tendon m. triceps brachii is a large area of the articular cavity, corresponding to the fossa olecrani humeri. This part of the joint cavity above the apex of the elbow process is the most convenient place for puncture.

Synovial bags of the posterior elbow with the joint cavity are not reported.

Blood supply to the joint is carried out through rete articulare cubiti, formed by branches a. brachialis, A. radialis and A. ulnaris. Venous outflow goes through the veins of the same name.

The innervation is carried by branches of the nn. radialis, medianus and n. ulnaris.

Lymph outflow occurs through deep lymphatic vessels in the elbow and axillary lymph nodes.

Arterial collaterals of the elbow area.

In the area of the elbow joint, as well as in the shoulder, there is an arterial collateral network that compensates for the loss of the function of the main vessel (a. brachialis) as a result of stenosis, occlusion or injury with subsequent dressing. The largest number of collaterals begins to function with a violation of blood flow in the area between the divergence from the brachial artery a. collateralis ulnaris inferior and the place of division of the artery into radial and ulnar.

The most unfavorable termination of the main blood flow in the area above the deep artery of the shoulder.

Front region of the forearm, regio antebrachii anterior.

External reference points. M. brachioradialis, radial sulcus, sulcus radialis, ulnar sulcus, sulcus ulnaris tendons flexor carpi radialis and m. palmaris longus, subulate processes of the radius and ulna, pea bone.

Scope. The upper line is a horizontal line drawn 4 cm distal from the level of the elbow bend, the lower one is a transverse line drawn 2 cm proximal to the apex of the styloid process of the radius. The vertical lines connecting the shoulder condyle with the subulate processes divide the forearm into the anterior and posterior areas.

Projections. N. medianus is projected on a line running from the middle of the distance between the medial namiseom and the tendon m. biceps brachii to the middle of the distance between the styloid processes. In the lower third, the benchmark for n. medianus is a sulcus formed by the tendons of m. flexor carpi radialis and m. palmaris longus.

Ulnaris is projected along the line connecting the base of the medial condyle of the shoulder with the lateral edge of the pea bone.

Ramus superficialis n. radialis is projected along a line running from the middle of the distance between the medial and lateral epicondyle to the border between the middle and lower third of the radial edge of the forearm.

Projection line a. radialis goes from the middle of the elbow fold to the inner edge of the styloid process of the radius and corresponds to the radial furrow.

In the upper third of the upper arm, the ulnaris is projected along the line connecting the middle of the elbow to the line drawn from the inner supra of the upper arm to the lateral edge of the pisiform bone, at the border of the upper arm and the middle of the forearm.

Layers.

The skin is thin, often translucent through it at the lateral edge V. cephalica and medial - V. basilica. Better they are visible when applying a tourniquet on the shoulder.

Subcutaneous fat is developed individually. It's friable, layered.

Surface fascia is poorly developed. In case of injuries, the skin flap together with subcutaneous tissue can easily and for a considerable length peel off from its own fascia, as in scalped wounds on the arch of the skull.

In subcutaneous tissue at the inner edge of m. brachioradialis is located in V. cephalica accompanied by branches of n. cutaneus antebrachii lateralis, and at the medial edge of the region-V. basilica with branches n. cutaneus antebrachii medialis.

Own fascia, fascia antebrachii, in the proximal part thick and shiny, and distally thinned. On the ulnar side, it fuses with the ulna throughout. From its own fascia depart two intermuscular septum, attached to the radius: the anterior radial intermuscular septum passes along the medial edge m. brachioradialis and posterior along the lateral. The bones of the forearm, its own fascia and intermuscular septum divide the forearm into three fascial beds: front, outer and rear, compartimenti antibrachii anterius, posterius et lateralis.

The lateral fascial bed is limited to the front and lateral-own fascia, medial-anterior radial intermuscular septum and radius, behind - posterior radial intermuscular septum.

In the lateral bed is m. brachioradialis, which in the middle of the forearm goes into a long tendon, and in the lower third is attached to the radius. In the upper third under the muscular abdomen m. brachioradialis is located in m. supinator covered with deep fascia. In the thickness of the muscle is a deep branch of the radial nerve.

The anterior fascial bed is limited to: the front-its own fascia; behind - the bones of the forearm and interosseous membrane; lateral-anterior radial intermuscular septum and medial-own fascia, fused with the posterior edge of the ulna.

In the anterior bed under its own fascia, muscles and neurovascular formations are located. The muscles are arranged in 4 layers.

In the first layer there are 4 muscles: the most medial - m. flexor carpi ulnaris, then-m. palmaris longus, M. flexor carpi radialis and most laterally, closer to the middle of the forearm, m. pronator teres.

All of them start from the medial epicondyle of the humerus and at first look like a single muscular head; only more distally, on the border between the upper and middle third, they become visible as independent formations. M. flexor carpi radialis covering the passing deep to the radial bone distal m. pronator teres, and then at an angle approaching m. brachioradialis and then runs parallel to it. M. palmaris longus is often absent.

The second layer contains m. flexor digitorum superficialis. It also starts from the medial epicondyle. This is a wider muscle, so in the middle and lower third of the forearm it is visible in the" gaps " between the muscles and tendons of the first layer. Behind, from the side of the deep surface of the muscle, a deep fascia leaf lies to it, which separates the first two layers from the third.

The third layer laterally contains m. flexor pollicis longus and medial m. flexor digitorum profundus. Both muscles start from the bones of the forearm and interosseous membrane on the border between the upper and middle third.

In the fourth layer in the lower third of the forearm is m. pronator quadratus.

Between the muscles of the third and fourth layer there is a deep part of the anterior fascial bed of the forearm, or the cellular space of the Parona - Pirogov. Its walls are:

- front-rear (deep) surface m. flexor pollicis longus and m. flexor digitorum profundus;
- rear-membrana interossea and m. pronator quadratus with its fascia;
- lateral-anterior radial intermuscular septum separating the space from m. brachioradialis;
- medial-own fascia of the forearm, fused with the ulna;
- at the top-the place of attachment to the interosseous membrane m. flexor pollicis longus and m. flexor digitorum profundus.

There is no lower wall of the Parona-Pirogov space: it passes into the carpal canal, canalis carpi, where the tendons of the superficial and deep flexors of the fingers go, as well as the long flexor of the thumb of the hand. This circumstance attaches great practical importance to the space, since it is here that purulent processes from the lateral and middle bed of the brush extend. The volume of space of the Parona-Pirogov is large enough: it can hold from 100 to 300 ml of liquid (exudate).

Topography of vascular-nervous formations.

Under its own fascia of the anterior bed of the forearm there are 4 neurovascular bundles.

Radiation beam, a. radialis with the accompanying veins, and r. superficialis n. radialis, is the most superficial and lateral. In the upper third, the vessels and nerve are located between m. brachioradialis laterally and m. pronator teres is medial, and in the middle and lower thirds-respectively between m. brachioradialis and M. flexor carpi radialis. From A. the radialis in the lower third of the forearm departs from the ramus carpeus palmaris, which goes towards a similar branch from a. ulnaris. At the border with the anterior region of the wrist, the radial artery passes outward under the tendons mm. conductor pollicis longus et extensor pollicis brevis and falls into the so-called anatomical snuff box in the wrist area.

R. superficialis n. radialis lies laterally from the artery and accompanies it to the border between the middle and lower third of the forearm. At this level, the nerve is deflected externally, passing under the tendon m. brachioradialis, perforates its own fascia and goes into the subcutaneous layer of the wrist and the rear of the brush.

The ulnar neurovascular bundle is formed at the border of the upper and middle third of the region. In the upper third of the ulnar nerve and ulnar artery go separately. A. ulnaris passes from the middle of the cubital fossa obliquely to the medial side of the anterior surface of the forearm, lying under m. pronator teres and m. flexor digitorum superficialis. On the border between the upper and middle third of the forearm it is already with the ulnar nerve lies between m. flexor carpi ulnaris medial and m. flexor digitorum superficialis is lateral. Next, the ulnar neurovascular bundle goes in the depth between these muscles anteriorly from the deep flexor of the fingers, and on the border with the wrist - anteriorly from m. pronator quadratus.

Upper forearm from a. ulnaris begins common interosseous artery, a. interossea communis, which is soon divided into AA. interosseae anterior et posterior. The latter through the hole in the interosseous membrane goes into the back bed of the forearm.

On the border of middle and lower third of the forearm from a. departs ulnaris ramus carpalis dorsalis, which, passing under the tendon of m. the medial flexor carpi ulnaris, perforates the own fascia and emerges into the subcutaneous tissue of the back of the wrist towards the eponymous branch of the radial artery. Together they form the rete carpale dorsale.

Ulnaris is located in the upper third between the heads of m. flexor carpi ulnaris and only on the border with the middle third is combined with the artery in a bundle and the rest of the length is medial from it.

Between the heads m. flexor carpi ulnaris may occur compression of the ulnar nerve, which leads to a tunnel neuropathy: a weakening of muscle function and paresthesia of the areas of skin sensitivity afforded by the ulnar nerve.

Accompanied by a small artery of the same name, extending from a. interossea anterior, located in the upper third of the forearm between the heads of m. pronator teres, a no outlet from this gap passes in front of the ulnar artery exiting from under the round pronator. In the middle third, the nerve lies between the superficial and deep flexors of the fingers, tightly fixed to the back wall of the fascial case m. flexor digitorum superficialis. Often it is difficult to find, as the nerve is displaced along with the delayed surface flexor of the fingers. In the lower third of the forearm, the median nerve exits the muscle and lies directly beneath its own fascia in the median sulcus, sulcus medianus, formed by m. flexor carpi radialis and m. palmaris longus. Because of the superficial location of this area of the nerve is particularly prone to injury. Distal to the median nerve goes along with the tendons of the flexor muscles in the canalis carpi.

The fourth bundle is the deepest, the anterior interosseous neurovascular bundle, a. et V. interossea anterior, with the same nerve (from n. medianus) on the anterior surface of the interosseous membrane.

Артерия, достигнув m. pronator quadratus, через отверстие в membrana interossea переходит в заднее ложе, где участвует в образовании тыльной артериальной сети запястья, rete carpale dorsale.

Communication cellular spaces of space with the neighboring regions.

The Parona-Pirogov cellular space, in which a significant amount of pus can accumulate, is relatively closed. There is one natural opening through which pus can.

spread to the posterior fascial bed of the forearm. This is an opening in the interosseous membrane, through which the anterior interosseous artery passes from the Parona-Pirogov space to the posterior region of the forearm. The spread of pus along the course of the same artery, but in the proximal direction is very rare, since the artery is spliced with its adventitia muscles, starting from the interosseous membrane.

Distally, as already mentioned, the space is directly related to the wrist canal and the palm surface of the hand.

Collateral blood flow.

On the anterior surface of the forearm are three fairly large arteries: radial, ulnar and anterior interosseous. They go in parallel, have many muscle branches, anastomosing among themselves, which may well compensate for the difficulty or even complete cessation of blood flow on one of them.

This situation occurs in modern clinical practice, when the coronary artery is used as a material for bypass grafting.

The rear region of the forearm, regio antebrachii posterior.

External reference points. The lateral and medial epicondyle of the shoulder, the edge of the ulna, subulate processes of the radius and ulna.

Scope. The upper limit runs along a line spaced 4 cm from the line connecting the shoulder condyle. The lower limit is along the transverse line drawn 2 cm above the apex of the styloid process of the radius. The posterior region is separated from the anterior region by vertical lines from the supraorbital shoulder to the subulate processes of the forearm bones.

Projections. Ramus profundus n. radialis is projected on a line passing from a point at the lateral edge of the tendon m. biceps brachii at the front of the elbow region to a point located on the border of upper and middle third of the midline of the posterior surface of the forearm. Further along this line, the entire neurovascular bundle is projected: the posterior interosseous artery and the deep branch of the radial nerve.

Layers

The skin is thicker than on the anterior surface of the forearm, has hair, is rather fluid.

Subcutaneous fat is relatively poorly developed, as is the surface fascia. In the subcutaneous tissue is a network of veins that carry blood to the front surface, in the main subcutaneous veins - V. cephalica and V. basilica.

Antebrachii posterior originates from n. radialis in the canalis humeromuscularis, and in the subcutaneous tissue comes out at the level of the beginning of m. brachioradialis. Besides him, the innervation of the dorsum of the forearm taking part the branches of the n. cutaneus antebrachii medialis et lateralis.

Own fascia in the upper half has the form of aponeurosis. On the ulnar side, the own fascia is tightly spliced with the posterior edge of the ulna. From the radial side of its own fascia to the radial bone, the posterior radial intermuscular septum separates from the muscles of the posterior surface of the forearm m. brachioradialis. The result is a posterior fascial bed of the forearm, compartimentum antebrachii posterior, having the following walls.

Anterior-forearm bones and interosseous membrane.

Back-own fascia.

Lateral-posterior radial intermuscular septum. Medial-fusion of its own fascia with the posterior edge of the ulna.

Under its own fascia in two layers are the muscles-extensors of the wrist and fingers.

All muscles of the surface layer begin from the lateral epicondyle of the shoulder. Starting from the medial side, at the ulna, they are arranged in the following order:

1) elbow extensor of the wrist, m. extensor carpi ulnaris, attached to the base V of the metacarpal bone;

2) extensor of the little finger, m. digiti minimi extensor going to the little finger and joining the extensor tendon of the fingers;

3) extensor digitorum, m. extensor digitorum, the tendon of which are for all fingers except the thumb;

4) short wrist extensor, m. extensor carpi radialis brevis, attached to the back surface of the base of the III metacarpal bone;

5) long wrist extensor, m. extensor carpi radialis longus, lies most laterally and attaches to the back surface of the base II of the metacarpal bone. In the deep layer, almost all muscles begin from the bones of the forearm and interosseous membrane. Most medially (closer to the ulna) are located:

6) extensor of the index finger, m. extensor indicis starting from the lower third of the ulna;

7) long extensor thumb, m. the extensor pollicis longus, which starts from the middle third of the ulna and interosseous membrane, comes out with its tendon from under the extensor fingers, obliquely crosses the tendons of the long and short extensors of the wrist, being more superficially. Attached to the base of the second (distal) phalanx of the thumb.

Even more laterally, starting from the radius, next are two muscles:

8) short extensor of the thumb, m. extensor pollicis brevis, attached to the base of the proximal phalanx of the thumb;

9) long muscle, abductor thumb brushes m. abductor pollicis longus. It is attached partly to the base of the I metacarpal bone, partly to the tendon beginning of the short retracting muscle of the thumb. The tendons of both these muscles also cross the tendons of the long and short extensors of the wrist, passing more superficially, but proximal to the tendons of the long extensor thumb;

10) m. supinator, located in the upper outer part of the forearm, partly refers to the muscles of the lateral fascial bed, partly - to the muscles of the posterior. The muscles of both layers are separated by fascia, lining the deep (front) surface of the muscles of the first layer and the surface (back) surface of the muscles of the second layer. Between these fascia is the cellular space in which the neurovascular bundle.

Topography of vascular-nervous formations.

Vascular-nerve bundle of the rear region of the forearm are the deep branch of the radial nerve, r. profundus n. radialis, and the posterior interosseous artery and nerve, a. interossea posterior with accompanying veins and n. interosseus posterior, the continuation of the deep branch of the radial nerve. R. profundus n. radialis comes in the posterior bed of the canalis supinatorius, enveloping the radius, and the posterior interosseous vessels - from the upper opening of the interosseous membrane. The posterior is located medial to the nerve. In the lower third in the same bed comes a. interossea anterior, passing through the interosseous membrane. This artery in the caliber is often not inferior to a. radialis and participates in collateral circulation in the injury and ligation of the main arteries of the forearm, including the posterior interosseous artery.

The deep branch of the radial nerve innervates all the muscles of the posterior bed of the forearm, as well as the muscles of the lateral bed, so when this branch is damaged, paralysis of all the extensors occurs, and the brush " hangs».

The distal radioulnar joint, articulatio radioulnaris distalis.

The cavity of this joint can be connected with the cavity of the wrist joint due to the synovial sacciform deepening (recessus sacciformis).

The front and inwards from the bags of the distal radioulnar joint is the ulnar neurovascular bundle, and behind the tendon of the extensor of the little finger.

The front area of the wrist, regio carpalis anterior.

External reference points. Subulate processes of the radius and ulna (subulate process of the radius 1 cm below the ulna).

At the elbow edge, the pea-shaped bone is palpated, 1 cm lateral to the middle furrow of the forearm, continuing into the wrist area, the hook of the hook-shaped bone is palpated. On the front surface are often clearly visible tendons m. palmaris longus (landmark for n. medianus on the border with the forearm) and m. flexor carpi radialis. At the radial edge of the wrist, when the I finger is removed, a hole is visible, called an anatomical snuff box. On the skin are determined by three transverse crease of the wrist.

Scope. The anterior region of the wrist is delimited from the forearm by a transverse line drawn 2 cm above the styloid process of the radius. It is separated from the back of the wrist by the radial and elbow edges. From the palm is separated by a transverse line, spaced 2 cm below the styloid process of the radius.

Projections. At the lateral edge of the pea bone, the ulnar neurovascular bundle is projected. Here it is possible to perform conductive anesthesia of the ulnar nerve. At the lateral (radial) edge of the wrist 0.5-1 cm lateral to the tendon m. flexor carpi radialis projected radial artery. Since it lies directly on the radius in this area, its pulsation is palpated here.

The middle transverse fold of the wrist serves as a projection line of the wrist joint.

Layers.

Own fascia in the anterior region of the wrist is represented by a thickened distal fascia of the forearm. The splitting of the own fascia at the lateral edge of the pea bone forms canalis ulnaris, or the Guyen canal, in which the ulnar neurovascular bundle is located: the artery is superficial and lateral, the nerve is deeper and medial.

Osteofibrosis in the canal of Guyon ulnar nerve can be compressed, which is manifested by hypoesthesia in the medial one and half fingers, weakness of the muscles of hypothenar and interosseous muscles and the adductor muscles of the thumb. These changes are called tunnel neuropathy of the ulnar nerve or Guyon canal syndrome.

Under the fascia on the ulnar side is the tendon m. flexor carpi ulnaris, attached to the pea bone (sesamoid bone) and further to the V metacarpal bone. From the radial side to the base.

II metacarpal bone passes tendon m. flexor carpi radialis, surrounded by a synovial vagina. The upper end of the vagina is 1-2 cm above the upper edge of the retinaculum musculorum flexorum. The midline region is the tendon m. palmaris longus, passing on the Palmar surface of the hand in the Palmar aponeurosis.

The next layer is the thickest and strongest ligament of the brush-the flexor tendon holder, retinaculum musculorum flexorum. This ligament consists of strong transverse fibers, from the radial side attached to the scaphoid bone, os scaphoideum, and to the bone-trapezium, os trapezium, and from the ulna - to the pea bone, os pisiforme, and to the hooked bone, os hamatum. Ligament has superficial and deep sheets.

Retinaculum musculorum flexorum with the bones of the wrist that forms the carpal tunnel, canalis carpi, through which the tendons of the flexors and n. medianus pass from the forearm into the palm and fingers. The anterior wall of the carpal tunnel is the superficial, most powerful part of the retinaculum musculorum flexorum, and the posterior part is the deep leaf and bones of the

wrist. The medial part of the canal space is occupied by the tendons of the superficial and deep flexors of the II-V fingers. Lateral from them is the tendon m. flexor pollicis longus, and more superficially and between them in cellulose is n. medianus.

Carpal tunnel syndrome (tunnel neuropathy of the median nerve) occurs either when ligamentitis (inflammation) of the flexor retinaculum, or when purulent tenosynovitis. In both cases, due to the decrease in the volume of the carpal canal, the compression of the median nerve occurs and its function is impaired until complete disappearance. Symptoms are described below.

Back wrist area, regio carpalis posterior.

External reference points. Subulate processes of the radius and ulna, tendons of the long muscles of the I finger.

Scope. Transverse lines, spaced 2 cm up and down from the line passing through the apex of the styloid process of the radius.

Projections. At the apex of the styloid process of the ulna is projected r. dorsalis n. ulnaris. The apex of the styloid process of the radius corresponds to the position r. superficialis n. radialis. The projection of the wrist joint is in an arc, the top of which is 1 cm above the line connecting the tops of the styloid processes.

Layers.

The skin is thin and mobile.

Subcutaneous fat is loose and moderately developed. It easily accumulates edematous fluid.

The own fascia of the back surface of the wrist is thickened and forms the extensor retainer, retinaculum musculorum extensorum.

Underneath are 6 bone-fibrous canals resulting from the discharge from the retinaculum mm. extensorum fascial septum, attached to the bones and ligaments of the wrist. In the channels there are tendons of the muscles-extensors of the wrist and fingers, surrounded by synovial vaginas.

Starting from the medial (elbow) side, these are the following channels.

1. Elbow extensor canal of the wrist, m. extensor carpi ulnaris. His synovial vagina extends from the head of the ulna to the attachment of the tendon to the base of the V metacarpal.
2. Little finger extensor canal, m. extensor digiti minimi. Synovial sheaths extensor of the little finger proximally is at the level of the distal radioulnar joint, and distal - the middle of V metacarpal bones.
3. Tendon canal m. extensor digitorum and m. extensor indicis, enclosed in a triangular synovial vagina with the base facing the fingers, vagina tendinum mm. extensoris digitorum et extensoris indicis. It blindly ends in the middle of the metacarpal bones, and extends proximally 10 mm above the retinaculum mm. extensorum.
4. Channel m. extensor pollicis longus. The tendon of this muscle, located in its own synovial vagina, vagina tendinis m. extensoris pollicis longi, rotates at an acute angle in the lateral side and crosses the front tendons of the wrist extensors, mm. extensores carpi radiales longus et brevis.
5. The osteo-fibrous canal of the radial extensors of the wrist, mm. extensores carpi radiales longus et brevis, located laterally and deeper than the previous one. Their common synovial vagina, vagina tendinum mm. extensorum carpi radialium, begins 20-30 mm above the retinaculum extensorum, and below the extensor retainer they are located in separate vaginas, continuing to the places of attachment of tendons. The synovial sheaths of the tendons of these muscles can communicate with the cavity of the wrist joint.
6. Channel m. conductor pollicis longus and m. the extensor pollicis brevis is located on the lateral surface of the styloid process of the radius. Their common synovial vagina, vagina tendinum mm. conductoris longi et extensoris pollicis brevis, begins 20-30 mm above retinaculum mm. extensorum and continues to the scaphoid bone.

With inflammation of the common synovial vagina, these tendons can be compressed, as a result of the movement of the thumb there is a strong pain radiating along the branches of n. radialis in the forearm. A painful seal is palpated along the channel projection. Such stenosing tendovaginitis of the long diverting muscle and short extensor of the thumb is called de quervain syndrome.

Under the extensor tendons is rete carpale (carpi) dorsale. It is formed from the connection of the posterior carpal branches of the radial and ulnar arteries and branches from the interosseous arteries. From the network there are branches to the nearest joints, as well as in the second, third and fourth interosseous intervals - aa. metacarpales (metacarpeae) dorsales.

The radial side of the wrist.

With a strong abstraction of the I finger on the radial side of the wrist between the tendons of the mm. conductor pollicis longus et extensor pollicis brevis on the radial side and m. extensor pollicis longus with elbow formed triangular recess, "anatomical snuff box".

In the subcutaneous tissue here are V. cephalica and ramus superficialis N. radialis. Under its own fascia lies a. radialis closely adjacent to the scaphoid bone. Here you can palpate its pulsation and press it when bleeding.

Joints of the hand, articulationes manus.

Wrist joint, articulatio radiocarpalis (see Fig. 3.40) from the forearm formed by the radius and cartilaginous articular disc, discus articularis, and from the wrist - three bones of the proximal row of the wrist: scaphoid, semilunar and trihedral. The articular disc separates from the wrist joint the ulna, which takes part only in the formation of the distal radioulnar joint. However, in almost half of the cases, both joints are joined due to the presence of a gap in the cartilage of the articular disc.

The joint capsule is attached at the edges of the articular surfaces of the above-mentioned bones and strengthened in front by the Palmar radiocarpal ligament (lig. radiocarpale palmare), and behind-the rear wrist ligament (lig. radiocarpale dorsale). Outside the joint capsule is strengthened lig. collaterale carpi radiale, and from the inside of the discus articularis.

The joint cavity may be associated with the synovial vagina of the radial extensors of the wrist.

The middle joint (articulatio mediocarpalis) is located between the first and second row of the wrist bones (except the pea bone) and has its own joint capsule.

Carpal-metacarpal joints (articulations carpometacarpales) are located between the bones of the second row of the wrist and the bases of the metacarpal bones.

Carpal-metacarpal joint of the thumb (articulatio carpometacarpalis pollicis) is completely isolated from the rest of the carpal joints. This is a typical saddle joint, which has great mobility. It is possible flexion, extension, opposition, as well as circular motion.

The joint of the pea bone (articulatio ossis pisiformis) is formed by the articular surfaces os pisiforme and os triquetrum and is located above the hook-shaped bone. The joint bag is attached at the edges of the articulating surfaces, between which the slit-like cavity is determined. The upper surface of the bag replacement is closely connected with the capsule of the distal radioulnar joint. Their cavities can communicate with each other, as well as with the cavity of the wrist joint. Os pisiforme is a sesamoid bone; it is included in the tendon of the elbow flexor of the wrist.

To the rear surface of the joints of the hand prilezhat tendons of the extensors of the wrist and fingers.

The outer surface of the wrist joint reinforced by the tendons of the long abductor of the thumb muscle and the long extensor of the thumb.

To the anterior surface of the capsule of the wrist joint and wrist joints, the radial and ulnar synovial bags of the tendons of the flexor muscles of the fingers lie.

At the outer edge of the anterior surface and on the outer surface of the bag of the wrist joint, a radial artery passes. The anterior-outer surface of the distal end of the ulna and pea bone passes the ulnar neurovascular bundle.

Palm, palma.

External reference points. On the palm there are two elevations - thenar from the radial side and hypothenar - from the elbow. They are formed by the muscles of I and V fingers. Between them is Palmar depression triangular, with its apex directed proximally. The palm cavity is separated from thenar by a longitudinal skin fold. There are also two transverse skin folds - proximal and distal. About 1 cm proximal to the interdigital folds are visible 3 interdigital pads.

Scope. Proximal-transverse line 2 cm below the apex of the styloid process of the radius, distal-interdigital folds.

Projections.

In the proximal third of the fold thenar projected motor branch of the median nerve, going to the short muscles I finger. Here you can not make cuts, so this area is called forbidden (forbidden zone of the Ditch).

Palmar aponeurosis is projected as a triangle, the top facing the middle of the wrist, and the base-to the interdigital spaces. Its lateral side is the thenar crease and the medial - hypothenar.

The apex of the superficial Palmar arterial arc is projected onto the proximal transverse fold of the palm. Here the distal end of the common synovial vagina of the tendons of the flexor muscles of the II-V fingers is projected.

The tendon of the long flexor of the I finger is projected along the line, the proximal point of which is the beginning of the Tenar fold, and the distal point is the base of the I (main) phalanx of the thumb.

On the distal transverse fold of the palm, the proximal ends of the synovial sheaths of the tendons of the flexor muscles of the II-IV fingers and the metacarpophalangeal joints are projected.

Interfingers comissural correspond to the holes of the Palmar aponeurosis. In furrows between the pads is a projection of the tendon of the muscle flexor of II-IV fingers.

Layers.

The skin is thick, it is particularly developed stratum corneum. From the skin to the depth of the Palmar aponeurosis departs a lot of connective tissue jumpers, which is why the skin of the palm is inactive.

Subcutaneous fat has a cellular structure due to the bridges between which the adipose tissue is located. Cellular structure of fiber causes the spread of purulent processes from the surface to the depth.

Superficial fascia of the palm is not (it is formed by vertical connective tissue bridge). In the subcutaneous tissue of the palm there are numerous venous vessels of small caliber and superficial nerves.

Own fascia is a thin plate covers the muscles of the thenar and hypothenar, and the area Palmar depression adherent to the Palmar aponeurosis.

Palmar aponeurosis, aponeurosis palmaris, has a triangular shape. It starts from the lower edge of the retinaculum mm. flexorum. In him are woven the tendon bundles of the long Palmar muscle.

Longitudinal tendon fibers of aponeurosis are combined into 4 bundles, heading to the bases of II-V fingers. In the distal aponeurosis (base of the triangle) between the longitudinal and transverse beams, fasciculi transversi, there are three gaps, which are called commissural holes. They are filled with fatty tissue, which swells out on the skin in the form of pads. Through the commissural holes in the subcutaneous tissue of the lateral surfaces of the fingers, their own finger arteries exit from the aponeurosis.

Contracture of Palmar aponeurosis of Dupuytren-progressive fibrous seal and shortening of Palmar aponeurosis on the medial side of the hand. As a result, the V and IV fingers are partially bent in the metacarpophalangeal and proximal interphalangeal joints. Contracture is often bilateral and usually in people over 50 years of age; it is believed that it is hereditary. Treatment of Dupuytren's contracture usually involves surgical removal of all fibrotic areas of the Palmar aponeurosis to free the fingers.

From the edges of the Palmar aponeurosis, two fascial intermuscular septum - lateral and medial-depart deep. The lateral intermuscular septum first goes vertically into the depth, in the direction of the II metacarpal bone, and then changes its course to the horizontal direction, since it falls on the front surface of the adductor muscle of the I finger and is attached to the III metacarpal bone with it. The medial intermuscular septum is attached to the V metacarpal bone. Thus, three fascial lodges are formed in the palm area: lateral, middle and medial.

The middle bed of the palm, compartimentum palmaris medius, has four walls: the anterior is formed by Palmar aponeurosis, the lateral - vertical part of the lateral intermuscular septum, the medial - medial intermuscular septum, the posterior - deep fascia covering the palm interosseous muscles, and the horizontal part of the lateral intermuscular septum.

The proximal part of the middle bed is directly connected to the carpal canal, from where the median nerve, tendons of the flexor muscles of the fingers (superficial and deep) and the tendon of the long flexor of the thumb come out.

The tendon of the long flexor of the thumb of the hand in the middle bed is located laterally and only in its upper third, and then penetrates the lateral intermuscular septum and goes to the lateral bed. The tendon is enclosed in the radial synovial vagina, vagina tendinis m. flexoris pollicis longi, the proximal blind end of which lies 2 cm above the retinaculum mm in the space of the parona-Pirogov. flexorum. Distal it continues to the base of the distal phalanx.

The tendons of the flexor muscles of the II-V fingers are located in the common (elbow) synovial vagina of the flexors, vagina communis tendinum musculorum flexorum. Its proximal end is located in the Parona-Pirogov space, 3-4 cm above the retinaculum mm. flexorum, and distal in the course of tendons II-IV fingers reaches the middle of the metacarpal bones. The medial side of the common vagina continues along the tendon of the V finger and ends at the base of its distal phalanx.

In 10% of cases, the proximal parts of the ulnar (common) and radial synovial vaginas communicate with each other, which can be the cause of the development of the so-called cross, or V-shaped, phlegmon.

On the fingers of the synovial vagina tendons II-IV fingers, vaginae synoviales digitorum manus, proximally begin at the level of the heads of the metacarpal bones under the longitudinal bundles of Palmar aponeurosis, in the intervals between the commissural holes, and end at the level of the bases of the distal phalanges.

Thus, the areas of the tendons of the flexor muscles of these fingers, located in the cellulose of the middle bed, between the common vagina and the finger vaginas are not covered with the synovial membrane.

The tendons of the flexors of the fingers secondary bed is divided into two spaces: podonevadne and podsaharennoj.

Podonevadne space in the front is limited to the Palmar aponeurosis on the sides - lateral and medial intermuscular septa, and behind the tendons of the flexors of the fingers.

In the subaponeurotic cellular space, the surface Palmar arc, arcus palmaris superficialis, formed by the trunk a, is most superficially located. ulnaris and surface branch a. radialis.

It starts from the common Palmar digital arteries, AA. digitales palmares communes, which are divided into their own Palmar finger arteries, AA. digitales palmares propriae. At the level of the commissural holes, they go through them into the subcutaneous layer on the fingers.

Beneath the superficial arterial arch, there are 4 common digital nerve (nn. digitales palmares communes). Three of them are separated from the n. medianus immediately upon its exit from the carpal tunnel. The first branch almost immediately perforates the lateral intermuscular septum and innervates the Tenar muscles and the skin of the I finger. The level of its departure corresponds to the border of the upper and middle third of plica thenaris (forbidden zone). The second and third go along the second and third interdigital spaces and are divided into their own Palmar finger nerves, nn. digitales palmares proprii, which go out through the commissural openings together with the arteries and Innervate the skin of the I-III and the radial surface of the IV fingers. IV the common finger nerve departs from ramus superficialis n. ulnaris in the medial section of the subaponeurotic space and, having divided into three nn. digitales palmares propriae, innervates the skin of V and the ulnar surface of IV fingers. If you read the first letters of the names of the nerves beginning with the medial surface of the palm of your hand, they are easy to remember (UMRU).

Podonevadne space is associated with subcutaneous adipose tissue using comicsonline holes; in the course of the Palmar metacarpal arteries with the tissue under the tendon space.

In the proximal part of the middle bed and in the carpal canal, the tendons of the flexor muscles of the fingers are very tightly attached to the Palmar aponeurosis and retinaculum mm. flexorum, so direct communication with the space Parody-Pirogov have podavalenko space, as a rule, no.

The subcutaneous cellular space in front is limited by the tendons of the deep flexor of the fingers, on the sides-by the lateral and medial intermuscular partitions, behind - by the horizontal part of the lateral intermuscular septum and the fascia of the Palmar interosseous muscles.

Immediately below the distal end of the common (elbow) synovial bag (at the level of the proximal transverse fold of the palm) from the tendons of the deep flexor of the fingers begin 4 worm-like muscles, mm. lumbricales. Heading to the fingers, the worm-like muscles bend around the heads of the metacarpal bones from the radial side and attach to the rear of the proximal phalanx to the tendon stretching of the common extensor fingers. The worm-like muscles Flex the proximal and straighten the middle and distal phalanges of the II-V fingers. Two muscles on the radial side are innervated by the median nerve, and on the ulnar side - by the ulnar nerve.

It is because of the attachment of the worm-like muscles that the areas of the tendons of the flexor muscles of the II-IV fingers located in the cellulose of the middle bed are not covered with the synovial vagina. The tendons in a common synovial vagina, and a worm-like muscles keep podsaharennoj space from podavalenko.

In the cellulose of the subcutaneous space is a deep Palmar arterial arc, arcus palmaris profundus, formed by a. radialis, coming here through the first interdigital space from the anatomical snuffbox, and r. palmaris profundus a. ulnaris. From deep arc depart Palmar metacarpal arteries of, AA. metacarpales (metacarpeae) are palmares that connect to the common Palmar finger arteries in the commissural openings.

Deep branch n. ulnaris, coming into the subcutaneous space of the middle bed of the medial, innervates all the interosseous muscles (and Palmar, and rear), mm. interossei palmares et dorsales, third and fourth worm muscles, m. adductor pollicis and deep head m. flexor pollicis brevis.

The subcutaneous cellular space communicates proximally with the carpal canal and further with the space of the Parona-Pirogov; distally-along the course of the worm-like muscles with the subcutaneous tissue of the rear of the fingers; along the AA. metacarpales palmares with podporujici space.

These connections of cellulose can serve as ways of distribution of purulent processes.

The next layer is the deep fascia, covering the three Palmar interosseous muscles of the second, third and fourth intervertebral spaces. Palmar interosseous muscles start from the metacarpal bones and lead V, IV and II fingers to the III finger. They attach, like the worm-like muscles, to the back tendon stretching of the extensor fingers on the II, IV and V fingers, so they also bend the proximal phalanx and unbend the middle and distal.

The lateral bed compartimentum palmaris lateralis, or the bed of the thenar, a private limited front fascia, rear fascia deep to the back of the first interosseous muscle and the I metacarpal bone medially - lateral intermuscular septum and the lateral is closed in the result of attaching your own fascia to the I metacarpal bone.

It contains the muscles of the I finger of the hand: superficially and laterally-short muscle, diverting the I finger of the hand, m. conductor pollicis brevis, deeper-the muscle opposing the I finger of the hand, m. opponens pollicis, medially from them - short flexor of I finger, m. flexor pollicis brevis, between the superficial and deep heads of which is the tendon of the long flexor I finger of the hand. These muscles are innervated by the motor branch of n. medianus, passing through the lateral intermuscular septum in the Tenar bed. Inside from the flexors, under the horizontal part of the lateral intermuscular septum, there is a muscle leading to the I finger of the hand, m. adductor pollicis, consisting of oblique and transverse heads. As noted above, it starts from the third metacarpal bone and is innervated by a deep branch of the ulnar nerve.

Tendon m. flexor pollicis longus is enclosed in a synovial vagina, the proximal blind end of which is located in the space of the Parona-Pirogov 2 cm above the retinaculum mm. flexorum. After passing in the carpal tunnel, distal it goes to the proximal part of the middle bed of the palm, then perforates the lateral intermuscular septum, passes in the area of the metacarpal in the cellulose thenar between the heads of the short flexor of the I finger and then continues to the base of the distal phalanx.

A. princeps pollicis is separated from the radial artery in the first place. It is directed downwards and outwards between m. conductor pollicis and m. flexor pollicis brevis along tendon m. flexor pollicis longus. At the level of the metacarpophalangeal joint of the I finger of the hand, it is divided into 3 branches running on both sides of the I finger and on the radial side of the II finger.

The medial section of thenar (closer to the lateral intermuscular septum) occupies a slit - like cellular space limited in front by the horizontal part of the lateral intermuscular septum, and behind by m. conductor pollicis. In the lateral direction it continues up to the synovial vagina of the tendon m. flexor pollicis longus, and in the distal-to the first interdigital fold, where it communicates with a deep cellular space located between the posterior surface of the adductor muscle of the I finger and the anterior surface of the first posterior interosseous muscle.

The medial bed, compartimentum palmaris medialis, or hypothenar bed, is bounded in front and medially by its own fascia attached to the V metacarpal bone, behind - V metacarpal bone, lateral - medial intermuscular septum. It contains the muscles of the V finger: the muscle that removes the little finger, m. conductor digiti minimi, muscle opposing the little finger, m. opponens digiti minimi, and short little finger flexor, m. flexor digiti minimi brevis.

The back of the hand, regio dorsalis manus.

External reference points. On the dorsum of the hand is well palpated all the metacarpal bones. With the maximum extension of the fingers under the skin, the tense tendons of the extensors of the fingers are visible.

I the metacarpal bone is located at an angle to the rest of the metacarpal bones, resulting in the widest interdigital space and interdigital fold. In the first interdigital interval, the bulge of the first posterior interosseous muscle is clearly visible.

Projections. The articular slit of the metacarpophalangeal joints corresponds to the line located 8-10 mm below the heads of the Metacarpals.

The skin is thin, mobile, contains hair bags and sebaceous glands, which can be a place for the development of boils.

Subcutaneous tissue is loose, it can accumulate edematous fluid, including inflammatory processes in the palm. In the subcutaneous layer is the venous network of the rear of the brush in the form of numerous anastomoses. With the radial side of the v is formed. cephalica, and with elbow - V. basilica. On the border of the dorsal area of the wrist v. cephalica accompanied by r. superficialis n. radialis, V. basilica - r. dorsalis n. ulnaris.

At the apex of the styloid process of the ulna from r. dorsalis n. ulnaris depart 5 rear finger nerves, nn. digitales dorsales heading for the innervation of the skin of the V, IV and ulnar side of the III finger. At the apex of the styloid process of the radius from r. superficialis n. radialis depart 5 rear finger nerves, innervating the skin of the I, II fingers and the radial side of the III finger.

Own fascia, fascia dorsalis manus, well expressed. On the ulnar side it fuses with the V metacarpal bone, and on the radial side - with II. Deep fascia covers the second, third and fourth posterior interosseous muscles. All the interosseous muscles, like the back and the palm, are innervated by the deep branch of the ulnar nerve.

Between its own and deep fascia there is a sub-aponeurotic space of the rear of the hand, limited on the sides by the place of attachment of its own fascia to the II and V metacarpal bones.

In the subaponeurotic space, the tendons of the extensors of the fingers pass between which at the level of the heads of the Metacarpals there are inter-tendons, connexi intertendinei, so that the extension of the two middle fingers (III and IV) is possible only together.

The index finger and partly the little finger remain independent due to the existence of their own extensors.

Subfascial neurovascular formations are represented by branches a. radialis, which is at the exit of the" anatomical snuffbox " is in the first interdigital space on the first posterior interosseous muscle. From this section a. radialis departs a. metacarpalis dorsalis prima, which gives 3 branches to I and II fingers. This is an independent source of blood supply to the I finger that does not receive branches from the superficial arterial arc. The radialis then passes through the muscle to the palm of the hand, which is involved in the formation of a deep Palmar arterial arch.

From rete carpale dorsale go to the second, third and fourth interspatial intervals aa. metacarpeae dorsales, each of which at the base of the finger is divided into aa. digitales dorsales.

The first interdigital space is occupied by a well-defined first posterior interosseous muscle. Its anterior (Palmar) surface is attached to the adductor muscle of the I finger of the hand located in the thenar bed. They are separated by a fascial plate.

The fiber of the posterior subaponeurotic space is proximally communicated with the spare channels and through them-with the posterior forearm bed.

The Palmar surface of the fingers, digitorum palmaris, facies.

External reference points. On the skin of the Palmar surface of the fingers are clearly visible metacarpophalangeal and interphalangeal folds. They are below the corresponding joints.

Projections. The articular slit of the metacarpophalangeal joints corresponds to the line located 8-10 mm below the heads of the Metacarpals. The projection of the cracks of the interphalangeal joints is determined in the position of complete flexion of the fingers 2-3 mm below the bulges of the phalanx heads.

Layers.

The skin is dense, sedentary.

The subcutaneous tissue is cellular because of the many connective tissue partitions going from the skin into the depth. On the end (nail) phalanges, these partitions connect the skin and bone (periosteum), on the rest - the skin and fibrous sheaths of the tendons of the flexor muscles. In this connection, when panaritiums (purulent inflammation of a layer of finger) purulent process extends from the surface to depth. On the nail phalanx, this can lead to a rapid rise of bone panaritium.

In the subcutaneous tissue on the lateral surfaces of the fingers, just below the middle, pass the neurovascular bundles consisting of Palmar own finger vessels and nerves. The skin of the I, II, III and the radial side of the IV finger innervates the nerves that depart from the median nerve. The ulnar side IV and both sides V of the fingers Innervate the branches of the ulnar nerve.

The next layer on the main (proximal) and middle phalanges of the fingers are bone-fibrous channels, which are formed by the phalanges of the fingers and tendon bundles: annular at the level of the diaphysis of the phalanges and cross-shaped in the area of the interphalangeal joints. In the areas of the annular ligaments, the fibrous channels are narrowed, and in the cross - shaped areas-expanded. Between the ligaments and the bone is located only the synovial vagina, through which the tendon shines. The most proximal ring ligament is at the level of the metacarpophalangeal junction.

At the level of the head of the main phalanx, the tendon of the surface flexor diverges into two legs attached to the lateral surfaces of the middle phalanx, and passes into this splitting the tendon of the deep flexor attached to the base of the end (distal) phalanx.

The synovial sheaths of the tendons of the fingers II, III and IV are isolated.

The synovial vagina consists of a parietal leaf adjacent to the inner surface of the fibrous vagina, and the inner covering the tendon itself. In place of transition from one sheet to another tendon is formed mesentery, mesotendineum. In its thickness there are vessels and nerves running from the periosteum of the phalanx to the tendon. In the area of the interphalangeal joints it is not. Damage to the mesentery, including during surgery, can lead to necrosis of the corresponding part of the tendon.

The back surface of the fingers, facies dorsalis digitorum.

Layers.

The skin is thinner than the Palmar surface. On the proximal phalanges have hair, expressed in varying degrees.

Subcutaneous tissue is weak, it is loose. In the subcutaneous tissue on the lateral surface closer to the rear pass the rear neurovascular bundles: a., V. et n. digitales dorsales proprii, which are branches of the rear metacarpal.

The tendon of the extensor on the back of the finger is attached to the base of the middle phalanx by the middle part, and by two lateral ones to the base of the distal phalanx. The tendons of the worm-like and interosseous muscles are attached to the aponeurotic stretching over the proximal phalanx. These muscles bend the main phalanges and extend the distal and middle phalanges.

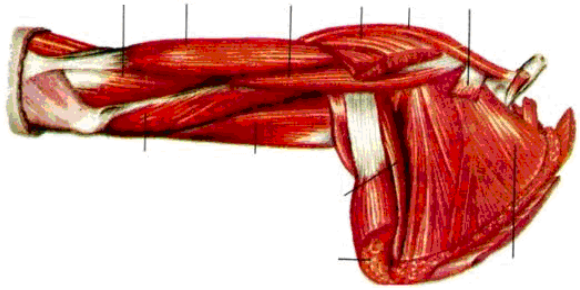
V. Tasks for independent work:

Task №1.

Sketch the three-way and four-way holes. Specify the elements that form them.

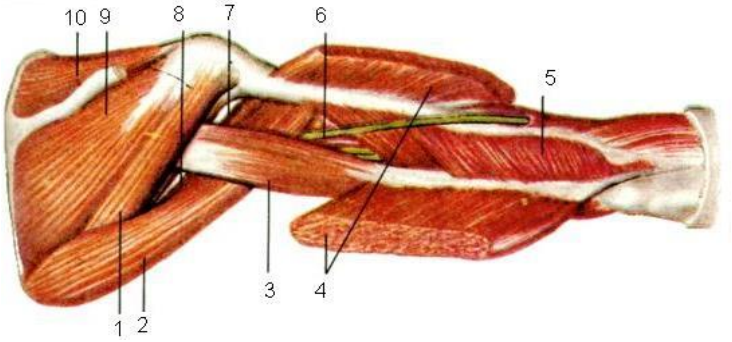
Task №2.

Arrange the symbols:



1 m. subscapularis
2 m. latissimus dorsi
3 m. teres major
4 caput longum m. tricipitis brachii
5 caput mediale m. tricipitis brachii
6 m. brachialis
7 m. brachii
8 m. coracobrachialis
9 m. pectoralis major (отрезана)
10 m. deltoideus
11 m. pectoralis minor (отрезана)

Task №3.
Set compliance:



1 -	6 -
2 -	7 -
3 -	8 -
4 -	9 -
5 -	10 -

Task №4.
List the branches extending from the lateral, medial and posterior bundles of the brachial plexus.

Task №5.
List the groups of lymph nodes of the armpit, indicating the areas from which each group is going to lymph.

Task №6.
Make a task on the topic of the lesson. (In a notebook)

Task №7.

Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control issues:

1. Layer-by-layer topography of the axillary region. The boundaries of the axillary region. The walls of the axillary fossa. The main neurovascular bundle. Projection line of the axillary artery.
2. Layer-by-layer topography of the axillary region. Ways of distribution of purulent processes from the axillary area.
3. Shoulder joint. Weak areas of the capsule of the shoulder joint. Nerves adjacent to the joint capsule.
4. Layer-by-layer topography beneath the deltoid region. Ways of distribution of purulent processes from under the deltoid region.
11. Layer-by-layer topography of the axillary region. Brachial plexus: bundles and branches of the brachial plexus. Lymph nodes of the axillary fossa.
12. Layer-by-layer topography of the shoulder region. The blade of the arterial arch: the vessels involved in the formation of the arc. Clinical significance of the scapular arterial arch.
13. Topography of deep vessels and nerves of the shoulder.
14. Ulnar fossa, boundaries, contents.
15. Ways of distribution of purulent processes and ulnar fossa
16. Boundaries of the medial canal of the forearm
17. Formations passing through the radial channel of the wrist.
18. Education , passing through the ulnar canal of the wrist
19. The boundaries of the cellular spaces of the space of Pirogov –Parona
20. Ways of distribution of purulent processes from the space of Pirogov-Parona
21. Cellulitis of the hand. Ways of distribution of purulent processes.
22. The zone of innervation of the branches of the brachial plexus.

VII. Learning objectives:

No. 1. In the emergency room, the patient turned 25 years old on the rink and he fell on the allotted hand. Diagnosis:"fracture of the collarbone." Explain why the examination of the patient is undesirable definition of pathological mobility and fastening?

(Answer: to avoid damage to the subclavian vein, brachial plexus and subclavian artery).

No. 2.The victim M, 19 years old, oblique fracture of the clavicle, the line of which passes through the middle of the bone. What components of the neurovascular bundle can be damaged by displacement of the lateral fragment of the clavicle?

(Answer: if the lateral fragment of the clavicle is displaced, there may be compression of the subclavian part of the brachial plexus and damage to the subclavian vein and artery.)

No. 3. The surgeon performs one of the stages of surgery for breast cancer-excises the tissue and lymph nodes of the axillary area. Specify the group of deep lymph nodes in this area and their localization.

(Answer: a Lateral group of lymph nodes located on the lateral wall of the axillary cavity medial to the neurovascular bundle; the center - in the center of the base of the axillary cavity, in the course of the axillary vein; the medial - serratus anterior in the course of the lateral thoracic artery and vein; posterior - in the course of the subscapular artery and vein; apical - clavicular-pectoral triangle in the course of the axillary vein.)

VIII. Control tests:

The anterior wall of the axillary cavity is: (1)

+ large and small pectoral muscles
chest wall with the front serrated muscle
the supraspinatus and infraspinatus muscles
humerus with coracobrachialis muscle and biceps muscle of the shoulder
Chuck, big round muscles and latissimus dorsi

For the skin of the axillary cavity, two diseases are most characteristic: (2)

trophic ulcer
+ hydradenitis
+ boils
eczema
psoriasis

Axillary fiber is connected to the fiber of the subclavian area along the way: (1)

rear artery, the envelope of the humerus
the front of the artery, the envelope of the humerus
median nerve
+ axillary artery
radial nerve

Subpectorally superficial cellular spaces of the space enclosed between: (1)

deep leaf Sterno-clavicular fascia and ribs
ribs and the front serrated muscle
large pectoral muscle and clavicle-thoracic fascia
+ large and small pectoral muscles
own and surface fascia of the subclavian region

Through a four-sided hole on the back wall of the armpit are two formations: (2)

artery enveloping the scapula
front artery, the envelope of the humerus
+ tail artery, the envelope of the humerus
radial nerve
+ axillary nerve

1X. Glossary

Fossa infraclavicularis	Subclavian fossa
Sulcus deltopectoralis	The deltoid-pectoral sulcus
Platysma	Subcutaneous neck muscle
Spatium subpectorale	Sub-sectoral space
Fascia axillaris	Axillary fascia
A. Axillaris	Axillary artery
Scapula	Blade
A. Circumflexa scapulae	Artery enveloping the scapula
Epicondyli medialis	The medial condyle

Lesson on

«Topographic anatomy of the lower limb. Gluteal area, hip joint, thigh. Topographic anatomy of the knee, knee joint, tibia, ankle, foot».

Motivational characteristic: knowledge of the location of the trunk neurovascular bundles of the gluteal region, the anterior and posterior regions of the thigh will make it possible to anticipate the pathways for the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of the pathways of metastases to the lymph nodes of the inguinal area will make it possible to diagnose the localization of malignant tumors in a study area.

I. Goals:

Student must know:	Student must be able to:	Student must own:
1.Topographic anatomy of the lower limb - blood supply, innervation, lymph and venous outflow 2. Topographic anatomy of the gluteal region - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 3. Topographic anatomy of the hip joint area - boundaries, holotopy, skeletopy, syntopy, layer-by-layer structure. 4. Topographic anatomy of the hip region - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 5. Topographic anatomy of the knee area - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 6.Topographic anatomy of the lower leg region - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 7. Topographic anatomy of the ankle region - borders, holotopy, skeletopy, syntopy, layer-by-layer structure. 8. Topographic anatomy of the foot area - borders, holotopy, skeletopy, syntopy, layer-by-layer structure.	1. indicate on the corpse: □ gluteal region-boundaries □ the upper gluteal nerve □ superior gluteal artery □ lower gluteal nerve □ lower gluteal artery □ sciatic nerve □ place projection aggressivenes holes □ place projection podkrashivanija holes □ the area of the hip joint - border □ thigh-border area □ femoral artery □ femoral vein □ femoral nerve □ femoral triangle-boundaries □ femoral canal boundaries □ locking hole-borders □ obturator canal - the border □ locking artery □ locking nerve □ driving channel (Gunter channel) - borders □ vascular lacuna-boundaries □ muscle lacuna-boundaries □ knee-border area □ popliteal fossa-boundaries □ front upper inversion of the knee joint □ region of the Shin – border □tibial nerve □ deep peroneal nerve □ calf nerve □ upper muscle-peroneal canal □ ankle-popliteal canal-borders □ long finger extensor □ long extensor of the thumb □ long finger flexor □ long flexor of the thumb □ posterior tibial artery □ posterior tibial vein □ anterior tibial артерию □ anterior tibial vein □ ankle - border □ ankle □ medial ankle canal-borders □ lateral ankle canal-borders □ foot-border area □ the back artery of the foot □ lateral plantar nerve □ medial plantar nerve □ heel (Achilles) tendon □ the muscular-fascial bed of the sole, their contents □ projection line of the back artery of the foot □ To spend on cadaver line Rosera-Nelaton □ Draw Ken's line on cadaveric material □ To conduct a projection line of the sciatic nerve on the cadaveric material	1. Method of preparation of the selected area. 2. Special surgical instruments to perform the necessary manipulations at each stage.

II. Questions to check the initial level of knowledge:

1. List the layers of the gluteal region.
2. What features of the mutual position of the gluteus maximus muscle and gluteus fascia cause the spread of phlegmon deep into.
3. How exactly big and small sciatic slotted become big and small sciatic holes.
4. How is a suprapiriforme hole and a infrapiriforme hole formed?
5. What formations pass through the suprapiriforme hole?
6. What formations pass through the infrapiriforme hole?
7. Where does the genital nerve go after it leaves the pelvis through the infrapiriforme hole?
8. Where does the sciatic nerve go after it leaves the pelvis through the infrapiriforme hole?
9. What are the boundaries of the front of the thigh?
10. Why is it necessary to take into account the fact that the lower border of the thigh is located 5-6 cm above the upper edge of the patella?
11. Name the boundaries of the Skarpov triangle.
12. Anatomy of the pelvic bones.
13. The structure of the hip joint.
14. Muscles of the lower limbs.
15. Vessels of the lower limb.
16. The areas of the knee.
17. Knee-joint.
18. The region of the leg.
19. Ankle joint.
20. The areas of the feet:

III. The object of study -human body**.**

IV. Information part:

Lower limb, membruminferius

External reference points. Symphysis, pubic tubercle, anterior superior iliac spine, great spit of femur, epicondyle of femur, patella, tailor muscle.

Borders. Upper - line connecting spina iliaca anterior superior and pubic tubercle (projection of the inguinal ligament); lateral - a line drawn from this spine to the lateral epicondyle of the thigh; medial - a line running from the pubic symphysis to the medial epicondyle of the thigh; bottom - transverse line drawn 6 cm above the patella.

Projections. Inguinal, or Pupartova, ligament, lig. inguinale, projected along the line connecting the spina iliaca anterior superior and tuberculum pubicum. Femoral artery, a. femoralis, projected along a line drawn from the middle of the inguinal ligament to the medial nimischelku thigh with a slightly bent at the knee joint and the extremity retracted to the outside (Ken line). The femoral vein is projected inwards from the artery, and the femoral nerve outwards from it. The exit of the front skin nerves of the thigh - along the line corresponding to the direction of the tailor muscle.

In the anterior region of the thigh, important practical formations are distinguished: femoral (karpovsky) triangle, femoral canal, obturator and adductor canal.

Femoral triangle, trigonum femorale

The femoral triangle, the Skarpov or, more correctly, the Scarpa triangle, is bounded on the lateral side by the sartorius muscle, m. sartorius, with medial - long adductor muscle, m. adductor longus; its top is formed by the intersection of these muscles, and the base is the inguinal ligament. The height of the femoral triangle - 15-20 cm.

Layers

The skin in the femoral triangle is thin, mobile.

In the subcutaneous tissue are blood vessels, lymphatic vessels and nodes and skin nerves. The superficial arteries (an exception to the rule; most of the arteries having a name are located under their own fascia) go out from under their own fascia through the fascia cribrosa in the subcutaneous slit, hiatus saphenus. Superficial epigastric artery, a. epigastrica superficialis, goes in the subcutaneous tissue of the thigh to the middle of the projection of the inguinal ligament and then in the subcutaneous tissue of the anterior abdominal wall towards the navel.

The superficial artery circumventing the iliac bone, a. circumflexa ilium superficialis, is sent from the subcutaneous slit to the upper anterior iliac spine parallel to the inguinal ligament.

Superficial external genital artery, a. pudenda externa superficialis, goes inwards, in the crotch area.

Arteries, as usual, are accompanied by the same veins (these veins are involved in the formation of portocaval and cava-cavalis anastomosis).

Greater saphenous vein of leg, v. saphena magna, rises from the top of the femoral triangle to hiatus saphenus, where it bends near the lower horn, cornu inferius, enters the subfascial tissue and falls into the femoral vein. Many branches falls into the great saphenous vein of leg, mainly near the subcutaneous crevice. The saphenous vein serves as a good reference point for finding hiatus saphenus, which is the surface ring of the femoral canal and through which the surface arteries exit.

Under the medial part of the inguinal ligament branch is separated nerve, that innervating skin femoral branch of the femoral-genital, r. femoralis n. genitofemoralis.

The lateral cutaneous nerve of the thigh passes in the subcutaneous tissue below the superior anterior iliac spine, n. cutaneus femoris lateralis.

Cutaneous branch of the obturator nerve, r. cutaneous n. obturator, reaching the level of the patella on the inner surface of the thigh.

Sometimes in the area of the knee joint there may be pains not related to the joint disease. They are explained by irritation of the obturator nerve in the pelvic cavity during inflammatory processes of the uterus or its appendages, since the nerve is located next to them.

In the subcutaneous tissue of the femoral triangle are three groups of superficial inguinal lymph nodes. On the projection of the femoral artery, the lower superficial inguinal lymph nodes, nodi inguinales superficiales inferiores, into which the lymph flows from the skin of the lower limb, are located. On the projection line of the inguinal ligament are superficial inguinal upper medial and upper lateral lymph nodes, nodi inguinales superficiales superomediales and superolaterales.

In them the lymph flows from the anterior abdominal wall below the navel, from the external genital organs, the skin of the anal triangle of the perineum, as well as from the bottom of the uterus (along the blood vessels of the round ligament of the uterus), lumbar and gluteal regions.

The outgoing vessels of the superficial lymph nodes of the femoral triangle go to the deep inguinal nodes lying along the femoral artery under its own fascia. From here, the lymph flows into the nodi lymphoidei iliaci externi, located around a. iliaca externa in the pelvic cavity.

The wide fascia, fascia lata, at the top is spliced with the inguinal ligament, and continues to the gluteal fascia at the back. Heading down, it surrounds all the muscles of the thigh. On the outer surface of the thigh it is especially dense; here the ilio-tibial tract is formed, tractus iliotibialis.

Fascia lata forms insulated shells for the muscles of the surface layer: m. tensor fasciae latae, inwards from it - for mm. sartorius et adductor longus, and even more medially for m. gracilis It gives three intermuscular partitions: external, internal and posterior, septa intermuscularia femoris laterale, mediale et posterior, which are attached to the femur along a rough line, linea aspera, and divide the entire subfascial space of the thigh into three fascial beds: anterior, studytimorium anmorius, containing the extensor muscles of the tibia, posterior, compartimentum femoris posterius, containing the flexor muscles and the medial bed, compartimentum femoris mediale, which contains adductors of the thigh.

The femoral triangle and its contents are located in the anterior fascial case.

In the subfascial layer under the inguinal ligament are muscular and vascular lacunae, lacuna musculorum and lacuna vasorum. The muscular lacuna corresponds to the outer 2/3 of the inguinal ligament and is separated from the vascular lacuna of the tendon iliac-comb arc, arcus iliopectineus, going from the inguinal ligament to the iliac-pubic elevation, eminentia iliopubica.

The walls of the muscle lacunae are: in front - the inguinal ligament, behind - the crest of the pubic bone, medially - arcus iliopectineus. Through the muscle lacuna, m. Go to the front of the thigh. iliopsoas and femoral nerve, n. femoralis (lumbar plexus branch).

The walls of the vascular lacunae are: in front - the inguinal ligament, behind - the crest of the pubic bone, laterally - the tendinous arch, medially - lacunar, or dzhimbarnatova, ligament, lig. lacunare. The lacuna vasorum passes through the femoral artery and vein (the vein is located medially, and the artery is lateral) and the femoral branch of the femoral-genital nerve.

The femoral artery can be pressed against the bone here to temporarily stop the bleeding if it is damaged.

To inside from the vessels (v. Femoralis) is the femoral ring, anulus femoralis, which is the deep opening of the femoral canal.

In the region of the femoral triangle, the wide fascia at the inner edge of the sarticularis muscle is divided into two plates.

The plate on the surface is heterogeneous in structure: dense in the outer part, in m. sartorius, it is loosened in the medial part and here has the name "lattice fascia", fascia cribrosa. Here, at a distance of 1-2 cm down from the inner third of the inguinal ligament, there is a hole in it: the subcutaneous slit, hiatus saphenus, through which v passes from the subcutaneous tissue into the subfascial space. saphena magna. In the hiatus saphenus, the outer crescent margin of margo falciformis (Burn) * and its upper and lower horns are distinguished, cornua superius et inferius. The lower horn is easily determined by the v bending over it. saphena magna.

Hiatus saphenus is also a superficial (subcutaneous) opening of the femoral canal.

The deep plate of the wide fascia goes inwards from m. sartorius behind the femoral vessels and connected with the fasciae iliopsoas and crest muscles. Called fascia iliopectinea, the deep plate reaches the long adductor muscle, where it again connects to the superficial leaf of the broad fascia.

Even deeper, under the deep leaf of the fascia, is the bottom of the femoral triangle, which is called the ilio-comb fossa, fossa iliopectinea. Here is m outside. iliopsoas, attached to the small skewer, inside - m. pectineus, starting from pecten ossis pubis and also attached to a small skewer. Even deeper are located the short adductor muscle of the thigh and the external obturator muscle.

Neurovascular formations of the femoral triangle

Femoral vessels, a. et v. femoralis, are enterin the femoral triangle from the vascular lacuna medially from the middle of the inguinal ligament. Then they are located along the bisector of the femoral triangle to its vertex.

The femoral vessels are surrounded by a dense fascial sheath that passes over to their branches..

Some vascular surgeons call the proximal part of the femoral artery (from the level of the inguinal ligament to the site of the deep femoral artery) "common femoral artery", and its part distal to the deep femoral artery - "superficial femoral artery". This is fundamentally wrong, since no part of the femoral artery, located under its own fascia, can be called superficial.

The same applies to the similar name "superficial femoral vein". Most often, a competent doctor associates this name with a large saphenous vein of the leg, and the condition of the incoming patient with a diagnosis of “thrombosis of the superficial femoral vein” does not cause concern. At the same time, thrombosis of the true femoral vein is a potential threat to the life of the patient, since it is from here that a thrombotic embolus can reach the pulmonary arteries and cause their fatal thromboembolism. Thrombolytic therapy can be prescribed in a timely manner to prevent death if the initial diagnosis is correct.

A. femoralis is a direct continuation of the external iliac artery. Its diameter is 8-12 mm. At the interruption level of the saphenus, the artery covered upthe front of the crescent edge of the hypodermic slit and lies outside the eponymous vein. Here

three superficial branches depart from the artery: a. epigastrica superficialis, a. circumflexa ilium superficialis и aa. pudendae externae superficialis et profundus.

V. femoralis lies medially from the artery, under the lattice fascia, where v. saphena magna and the eponymous veins of the superficial arteriesa falls into it. Further downwards the vein gradually moves to the back surface of the artery. At the apex of the femoral triangle, the vein is hidden behind the artery.

Deep artery of thigh, a. profunda femoris, - main vascular collateral femur - sometimes equal in diameter to the femoral. It usually departs from the posterior external or, less frequently, from the posterior or posterior inner semicircle of the femoral artery at a distance of 1-6 cm from the inguinal ligament. Eponymous vein is always located inwards from the deep artery of the thigh.

Gradually deviating from the femoral artery posteriorly, the deep femoral artery is separated from the femoral vessels at the apex of the triangle by 0.5-1 cm, and below, at the level of the tendon m. adductor longus, by 3-3.5 cm.

The two main branches of the deep femoral artery are the medial artery that surrounds the femur, a. circumflexa femoris medialis, and the lateral artery around the femur, a. circumflexa femoris lateralis, depart from it at the very beginning, at the place of discharge of the deep artery from the femoral artery. (Sometimes these arteries or their branches move away from the most femoral artery.)

A. circumflexa femoris medialis goes inwards behind the femoral vessels in the transverse direction. At the inner edge of the iliopsomatic muscle, it is divided into superficial and deep branches. R. superficialis a. circumflexae femoris medialis continues in the transverse direction to m. gracilis R. profundus is a continuation of a. circumflexae femoris medialis. Penetrating into the gap between the comb and external obturator muscles, it is divided into ascending and descending branches. The ascending branch is sent to the gluteal region along the external obturator muscle and anastomoses with the gluteal arteries. The descending branch appears in the posterior region of the thigh in the gap between the external obturator and small adductor muscles, anastomosing with the obturator branches and the perforating arteries.

A. circumflexa femoris lateralis, larger, moving away from the deep artery of the thigh 1.5-2 cm below its beginning or from the femoral artery and divided into ascending and descending branches.

Ascending branch, r. ascendens a. circumflexae femoris lateralis, first passes between the tailor's muscle and the rectus muscle, then goes up and out to the gluteal region. Its branches anastomose with the superior gluteal artery, participating in the formation of an extracuteal network on the outer surface of the greater trochanter (rete trochanterica).

Descending branch, r. descendens a. circumflexae femoris lateralis, heading down between the muscle rectus femoris and m. vastus intermedius and reaches the arterial network of the knee joint, anastomosis here with branches of the popliteal artery. This is the main source of blood supply to the limb when occluding the femoral artery below the discharge of the deep femoral artery.

Femoral nerve, n. femoralis, coming out of the muscle lacuna and lying in the femoral triangle outwards from the vessels. The femoral vessels and the nerve are separated here by the fascia of the iliopsoas muscle. N. femoralis almost immediately splits into many branches. Deep branches innervate the head of the quadriceps and the comb muscle. Surface branches, rr. cutanei anteriores, pierce fascia through the case of the tailor muscle and go to the skin.

The femoral vessels are accompanied by only one, the longest branch of the femoral nerve - n. saphenous

The connection of the cellular tissue of the femoral triangle with neighboring areas:

1) cellular tissue of femoral triangle along the femoral vessels through the vascular lacuna connected to the subperitoneal floor of the pelvis;
2) along the superficial branches of the femoral vessels through the holes in the lattice fascia that fills hiatus saphenus, it is connected with the subcutaneous tissue of the femoral triangle;
3) along the lateral artery that surrounds the femur, with the gluteal region;
4) along the medial artery around the femur - with a bed of adductor muscles;
5) along the femoral vessels - with adductor canal;
6) along the perforating branches of the deep femoral artery, aa. perforantes, with posterior fascial case of the thigh.

The so-called psoac abscesses, or natice cold abscesses, can penetrate the fiber of the femoral triangle through the muscle lacuna. This occurs in cases where the source of purulent infection is located at a distance from this area. Most often this source is located in one of the vertebrae with bone tuberculosis. The purulent exudate flows between the psoas major muscle and its fascia (part of the intra-abdominal fascia) to the muscle lacuna and then to the site of attachment of the psoas major muscle in the iliopsoas muscle to the lesser skewer.

Femoral canal, canalis femoralis

The femoral canal is formed when a hernia escapes through the femoral ring (femoral hernia). It is located between the superficial and deep sheets of the wide fascia and has two openings - deep and superficial, and three walls. The deep opening (femoral ring) of the femoral canal is projected onto the inner third of the inguinal ligament. The superficial foramen of the femoral canal, or subcutaneous fissure, hiatus saphenus, is projected 1-2 cm downward from this part of the inguinal ligament.

A hernia emerging from the abdominal cavity penetrates the canal through a deep hole - the femoral ring, anulus femoralis. It is located in the medial part of the vascular lacuna and has four edges.

In front the ring is bound by the inguinal ligament, at the back by the comb ligament, lig. pectineale, or Cooper's ligament located on the crest of the pubic bone (pecten ossis pubis), medial-lacunar ligament, lig. lacunare, located in the corner between the inguinal ligament and the crest of the pubic bone. From the lateral side, it is limited to the femoral vein.

Enlarged pubic branch from a. epigastrica inferior replaces the obturator artery in about 20% of people or forms an additional obturator artery. On the way to the locking hole, it lies next to or passes across the deep femoral ring closer to the lacunar ligament. Such a rather frequent variant must be remembered during operations, especially endoscopic, for the strangulated femoral hernia. This option is often called the "crown of death" («corona mortis»), since when dissecting the infringing ring, the femoral vein may be injured from the lateral side and the additional obturator artery may be wounded at the superior and medial edges of the femoral ring.

The femoral ring is turned into the pelvic cavity and on the inner surface of the abdominal wall is covered with a transverse fascia, which has the appearance of a thin plate, septum femorale. Within the ring is the deep inguinal lymph node of Pirogov-Rosenmüller.

The superficial annulus (orifice) is the subcutaneous fissure, hiatus saphenus, a defect in the superficial leaf of the wide fascia. Hole closed with lattice fascia, fascia cribrosa.

The walls of the channel are a triangular pyramid.

The front wall is formed by a superficial sheet of the wide fascia between the inguinal ligament and the upper horn of the subcutaneous slit - cornu superius.

Lateral - medial semicircle of the femoral vein.

The posterior one is a deep leaf of the broad fascia, which is also called fascia iliopectinea.

There is no medial wall, since the superficial and deep sheets of the fascia of the long adductor muscle grow together.

The length of the channel ranges from 1 to 3 cm.Бедренная грыжа

Through the femoral canal one of the external hernias of the abdomen can exit - the femoral.

Abdominal hernia, hernia abdominalis, is called the exit from the abdominal cavity of its contents through a natural or newly formed opening in the abdominal wall while maintaining the integrity of the parietal peritoneum.

The hernia includes hernial ring, hernial sac, and hernial contents.

The hernial ring is called the “weak spot” of the abdominal wall, through which the internal organs of the abdominal cavity exit into the hernial sac. "Weak points", as a rule, are sections of the abdominal wall, where one or several muscle layers are missing.

The hernial sac is a parietal peritoneum, pushed by the organs exiting the abdominal cavity. In the hernial sac distinguish the bottom, body and neck. The neck is the narrowest part of the hernial sac, corresponding to the hernial ring.

The hernial contents are the greater omentum, the loops of the small intestine, and other organs.

Hernia of the abdomen is divided into two large groups: external, hernia abdominales externae, and internal, herniae abdominales internae, opening into pockets or holes in the peritoneum inside the peritoneal cavity.

Internal hernias include hernia of the duodenal ulcer, hernia recessus duodenojejunalis; hernia stuffing bags, hernia bursae omentalis; retrocecal hernia, hernia retrocaecalis, etc., as well as various types of diaphragmatic hernia.

External hernias are much more common internal. Depending on the anatomical location, inguinal hernias are distinguished (oblique and straight); femoral hernia; hernia of the white line of the abdomen (epigastric hernia); umbilical hernia, etc. According to the etiological basis distinguish congenital, acquired, postoperative and other.

The hernia pinching is called a sharp and constant compression of the hernial contents at the level of the hernia gate. As a result, the blood circulation of the bowel loop is impaired, venous stasis and edema occur. The phenomena of intestinal obstruction develop, intoxication of the organism occurs and, finally, necrosis of the strangled intestines.

The principles of operations for hernia of the anterior abdominal wall are to eliminate the hernial protrusion and plastic reinforcement of the “weak point” to prevent hernia recurrence. Strengthening of the abdominal wall is carried out with the help of auto-tissues - muscles and aponeuroses or with the help of synthetic materials.

Femoral hernia - the output of the internal organs of the abdomen through the femoral canal. With an increase in intraperitoneal pressure, most often the loop of the small intestine begins to squeeze the parietal peritoneum in front of itself, and that, in turn, is a section of the transverse fascia (septum femorale) in the thigh ring, anulus femoralis. In this case, the femoral ring serves as a hernial ring, and the area of the hernial sac at the ring is the neck. nnulus femoralis is not covered by any muscles and therefore is one of the "weak points" of the abdominal wall. After passing through the ring, the hernial sac and its contents are within the femoral canal and exit into the subcutaneous tissue through the superficial femoral ring - hiatus saphenus.

Obturator canal, canalis obturatorius

The channel is a furrow on the lower surface of the pubic bone, bounded below by locking membrane and muscles attached at its edges. The external opening of the obturator canal is projected 1.2-1.5 cm down from the inguinal ligament and 2.0-2.5 cm outward from the pubic tubercle.

The deep (pelvic) opening of the canal is drawn into the pre-vesicular cellular pelvic space. The external opening of the obturator canal is located at the upper edge of the external obturator muscle. It is covered with a comb muscle, which has to be dissected when accessing the obturator canal. The length of the obturator canal is 2-3 cm, the vessels of the same name and the nerve pass through it. The obturator artery anastomoses with the medial artery around the femur and the inferior gluteal artery.

The anterior and posterior branches of the obturator nerve innervates the adductors and the thin muscles, as well as the skin of the medial surface of the thigh.

Front thigh groove

Down the femoral triangle passes apex into the anterior furrow of the thigh, sulcus femoris anterior, located in the middle of its third between the adductor muscles и m. quadriceps femoris.

The wide fascia forms for superficial muscles, mm. rectus femoris, sartorius et gracilis, cases. The fascia gives to the femur an internal intermuscular septum, septum intermusculare femoris mediale, covering the front surface of the adductor muscles and separating the front femoral bed from the medial one. Another partition, septum intermusculare femoris laterale, separates the front bed from the back. In the anterior fascial bed of the femur, compartimentum femoris anterius, are the heads of the quadriceps: straight, m. rectus femoris, medial broad thigh muscle, m. vastus medialis, lateral broad muscle of the thigh, m. vastus lateralis, and intermediate hip muscle, m. vastus intermedius, which are joined down to one tendon, passing on to the patella, and then attaching to tuberositas tibiae. In the medial femur bed, compartimentum femoris mediale, are the long, short and large adductors, mm. adductores longus, brevis et magnus.

Under its own fascia in the front furrow, covered with m. sartorius, are the femoral vessels accompanied by n. saphenus

Deeper and closer to the femur is the deep femoral artery. Here, the three most distorting arteries, aa, often depart from it. perforantes I, II et III. I departs at the level of the small trochanter, II - at the proximal edge of the long adductor muscle, and III is

the direct continuation of the trunk of the deep artery of the thigh. These arteries pass through holes in the tendon of the adductor muscles and perforate (hence the name) the medial and posterior intermuscular partitions covering the adductors in front and behind. Next, the vessels overlook the back of the thigh. The adventitia of these arteries is connected with the edges of the tendons of the adductor muscles, as a result of which, when injured, the lumen gapes and the bleeding from them does not stop for a long time.

Lead channel, canalis adductorius.

The leading channel, or Hunter's channel, in Russia, this channel is traditionally called the “Gunter Canal”. It is a continuation of the front groove of the thigh at the border of the middle and lower third.

Layers

The skin in the medial part of this area is thin and mobile, outwardly thickened and firmly fixed to the underlying tissues.

In a well-developed layer of subcutaneous tissue there is (in the form of one or two trunks) a large saphenous vein, v. saphena magna. Rr. cutanei anteriores (n. femoralis) penetrate the wide fascia along the inner edge of the m. sartorius and spread in the skin of the anterior surface of the thigh down to the patella. The skin branch of the obturator nerve penetrates through the wide fascia in the middle of the medial surface of the thigh and reaches the patella.

Canalis adductorius is located under the wide fascia and is covered in front by m. sartorius. The medial wall of the canal is m. adductor magnus, lateral - m. vastus medialis. The anterior wall of the canal forms a widespread intermuscular septum, septum intermusculare vastoadductoria, stretched from the large adductor muscle to m. vastus medialis.

There are three holes in the channel. Through the upper opening of the sulcus femoralis anterior canal pass through the femoral vessels and n. saphenus. The lower opening is a gap between the bundles of the large adductor muscle or between its tendon and the femur; through it, the femoral vessels pass into the popliteal fossa. The front hole in the septum intermusculare vastoadductoria is the place of exit of the channel (in the tissue under m. sartorius) descending knee artery and veins, a. v et. descendens genus and n. saphenus. Vessels and n. saphenus can exit the channel separately; in these cases, there will be several front holes.

Length eanalis adductorius - 5-6 cm, its middle is separated by 15-20 cm from tuberculum adductorium namesake femoris on the medial thigh.

In the proximal direction, the channel communicates with the space of the femoral triangle, distally with the popliteal fossa, along the course of a. et V. descendens genus and n. saphenus - with subcutaneous tissue on the medial surface of the knee joint and lower leg. Accordingly, these relationships can occur the spread of purulent processes in this area.

Fascial vagina femoral vessels firmly adherent to the upper edge of the septum intermusculare vastoadductoria, and below the vessels deviate from this record to 1-1,5 cm, and the femoral artery lies medial and anterior, and Vienna - back and lateral.

A. genus descendens (single or double) comes to the arterial network of the knee joint, sometimes forming a direct anastomosis of the anterior recurrent branch of anterior tibial artery, a. recurrens tibialis anterior.

N. saphenus in the subcutaneous tissue of the lower leg joins v. saphena magna and extends to the middle of the inner edge of the foot.

Gluteal region, regio glutea.

External reference points. The iliac crest, anterior superior iliac spine, posterior superior iliac spine, ischial tuberosity, greater trochanter of the femur, the sacrum and the coccyx, the gluteal fold, fold mezhyagodichnoy.

Scope. On top - the crest of the Ilium, below - the gluteal fold, outside - a vertical line drawn downwards from the anterior upper iliac spine, inside-the sacrum and coccyx, located in the depth of the interdigital fold.

Projections. The ischiadicus is projected to a point located in the middle of the distance between the inner edge of the saddle hill and the tip of the large trochanter. The place of exit to the gluteal region of the upper gluteal neurovascular bundle is projected on the border between the upper and middle third line drawn from the posterior upper spine of the Ilium to the apex of the large spit; the lower gluteal bundle is projected downward and outward from the middle of the line drawn from the same spine to the inner edge of the sciatic hillock.

All neurovascular bundles are projected onto two inner and lower outer quadrants of the area. In this regard, intramuscular injections are made in the upper outer quadrant, where there are no large neurovascular formations.

The projection of the lower edge of the gluteus Medius obliquely crosses the horizontal crease in the direction from the sacrum to the large trochanter of the femur.

Layers.

The skin is thick, sedentary, often has hair in the medial part of the area. It has a lot of sweat and sebaceous glands (so there are often atheromas, lipomas, boils).

Subcutaneous fat is usually highly developed. In Nizhnetagilskom Department (point of buttock) cellulose honeycomb because of the connective tissue of the jumpers going from the skin to its own fascia. Above the large trochanter of the femur is the subcutaneous synovial SAC, bursa subcutanea trochanterica.

Own fascia upwards and medially attaches to the crest of the Ilium and sacrum, and downwards and anteriorly passes into the broad fascia of the thigh, fascia lata.

The muscles of the gluteal region are located in three layers.

In the first (rear or surface) layer is the gluteus Maximus, m. gluteus maximus. It starts from the Ilium crest, from fascia thoracolumbalis, the dorsal surface of the sacrum and coccyx, and from lig. sacrotuberale, descends obliquely down and out. Its anterior upper bundles pass into a wide flat tendon, enveloping the side of a large spit (between the tendon and the large spit lies the vertebral synovial bag of the large gluteus Medius, bursa trochanterica m. glutei maximi). The tendon continues into the broad fascia of the thigh, taking part in the formation of tractus iliotibialis [Maissiat]. The bulk of the gluteus Maximus attaches to the tuberositas glutea of the femur.

The gluteus Maximus muscle that surrounds the fascial sheath derived from the fascia of its own. From the surface sheet to the deep pass fascial septum, dividing the muscle into many bundles.

This explains the spread of inflammation in post-injection phlegmons from the surface of the muscle in depth. Purulent exudate melts deep fascial sheet of the case and distributed in the cellular spaces space under the gluteus Maximus.

In the middle layer from top to bottom are the middle gluteal muscle, m. gluteus medius, pear-shaped, m. piriformis, upper twin, m. gemellus superior, internal locking, m. obturatorius internus, lower twin, m. gemellus inferior, and square thigh muscle, m. quadratus femoris.

M. gluteus medius begins from the outer surface of the Ilium, where it is covered by a large gluteal muscle, then protrudes from under its upper edge and attaches to the outer side of the large spit.

M. piriformis, adjacent to the lower edge of the middle gluteal, begins on the pelvic surface of the sacrum lateral to the anterior sacral foramina, comes out through foramen ischiadicum majus, formed by a large sciatic notch and sacral-spinous ligament, and is attached to a large spit. The piriformis muscle divides the greater sciatic hole at the top and a small hole subpiriforme, suprapiriforme foramen and foramen infrapiriforme.

Even lower is m. gemellus superior, starting with spina ischiadica.

M. obturatorius internus begins on the inner surface of the pelvic bone from the circumference of the obturator and membrana obturatoria. Her tendon comes out of the pelvic cavity, bending over the edge of the small sciatic orifice, and attaches to the fossa trochanterica.

Bottom m adjacent to it. gemellus inferior, starting from the tuber ischiadicum.

The pear-shaped muscle, the tendon of the internal locking muscle and the twin muscles adjacent to it go in the transverse direction to the large spit.

The M. quadratus femoris, starting from the sciatica and attaching to the crista intertrochanterica, is adherent to the lower twin.

All muscles of the middle layer are covered with deep fascia.

In the deep layer are: at the top - small gluteal muscle, m. gluteus minimus, under-outer locking muscle, m. obturatorius externus.

The gluteus minimus begins on the outer surface of the wing of the Ilium, it is completely covered with the middle gluteus Medius muscle and is located with it in the bone-fibrous cell space.

M. obturatorius externus, starting from the outer surface of the circumference of the obturator foramen and obturator membrane surrounds the hip joint from the bottom and goes backwards in the gluteal region, to the fossa trochanterica.

The next layer is the pelvic bone, acetabulum and hip joint covered with powerful ligaments of the femoral neck.

Between the gluteus Maximus and muscles of the middle layer is the desired length cellular spaces of the vast space. Its anterior wall is the fascia covering the muscles of the middle layer; the posterior is a deep sheet of its own fascia of the large gluteal muscle; from above the space is closed due to the attachment of its own fascia to the crest of the Ilium, from the inside - by the attachment of the same fascia to the sacrum and coccyx.

Topography of neurovascular formations of the region.

All arteries and nerves of the gluteal region emerge from the pelvis through the great sciatic foramen, above the through - hole and podkrucheno.

From aggressivenes holes (between the lower edge of the gluteus Medius muscle and the upper edge of pear-shaped) leaves upper gluteal neurovascular bundle. Upper gluteal artery, a. glutea superior, departs from the posterior trunk of the internal iliac artery in the pelvic cavity. After leaving aggressivenes holes it supplies the piriformis muscle, large, medium and small gluteal muscles. The veins of the same name, forming a plexus, cover the upper gluteal artery, and the upper gluteal nerve, n. gluteus superior, located down and out in relation to the vessels and innervates the above muscles.

Through the podgrushevidnoe hole (between the lower edge of the piriformis muscle and the upper twin muscle) in the podyagodichnoe space out sciatic nerve, lower gluteal and sexual neurovascular bundles.

The most laterally in this hole is n. ischiadicus, the largest nerve of the human body. The sciatic nerve is the most noticeable, so it can be considered as an internal reference point for finding the sub-parietal opening and other vascular bundles. Medial from the sciatic nerve are the posterior cutaneous nerve of the thigh, n. cutaneus femoris posterior, and the artery accompanying the sciatic nerve, a. comitans n. ischiadici, extending from the lower gluteal artery.

Next, the sciatic nerve is directed downward, with the upper twin muscle, the tendon of the inner obturator muscle, the lower twin muscle CA and the square thigh muscle in front of it from top to bottom. Behind the nerve lies a large gluteus Maximus. Coming out from under the lower edge of the gluteus Maximus, the sciatic nerve is superficial and covered only by the broad fascia.

Here, at the intersection of the gluteal fold and the contour of the lower edge m. gluteus maximus, you can perform a conductive anesthesia of the sciatic nerve. To find the point of insertion of the needle, you can use the projection of the nerve on the skin, presented above.

Lower gluteal artery, a. glutea inferior, 2-3 times thinner than the upper gluteal artery. The artery is surrounded by the veins and branches of the lower gluteal nerve of the same name, n. gluteus inferior. In the peritoneal opening, this bundle lies inside of the sciatic nerve and the posterior skin nerve of the thigh. At the exit from the sub-parietal opening, the artery and nerve break up into branches that penetrate into the thickness of the large gluteal muscle and into the pear-shaped muscle, where the lower and upper gluteal arteries anastomose.

Sexual neurovascular bundle (a. v et. pudendae internae and n. pudendus) is podgradina the hole is most medial. On leaving podkrashivanija holes sexual neurovascular bundle lies on the Sacro-spinous ligament,

lig. sacrospinale, and spine of the ischium, forming the top edge of the lesser sciatic foramen. Then the beam passes through a small sciatic opening under the Sacro-tubercular ligament, lig. sacrotuberale,on the inner surface of the sciatica. The latter is part of the lateral wall of the sciatic-anal fossa and is covered with an internal locking muscle and its fascia. The splitting of this fascia forms the so-called Olcock canal, in which the sexual neurovascular bundle passes. It is located in the bottom and medially from the vessels.

The connection of the fiber of the subclavian space with neighboring areas.

The desired length cellular spaces space reported:

1) through the over - and podkrucheno holes with the cavity of the pelvis;

2) through the small sciatic foramen - ischial anal fossa;

3) along the sciatic nerve - with the back of the thigh;

4) through the gap under the proximal part of the tendon of the gluteus Maximus-with the lateral and anterior thigh areas.

Hip joint, articulatio coxae.

The hip joint is formed from the side of the pelvic bone by a hemispherical acetabulum, acetabulum, more precisely, its facies lunata, which includes the head of the femur. Around the edge of the acetabulum passes fibrous-cartilaginous rim, labrum acetabuli, making the cavity even deeper, so that together with the rim of its depth exceeds half the ball. This rim over incisura acetabuli is thrown in the form of a bridge, forming a lig. transversum acetabuli. Acetabulum covered with hyaline articular cartilage only throughout facies lunata, the rest of its area is occupied by loose fat tissue and the base of the ligament of the femoral head.

The articular surface of the femoral head articulating with acetabulum is generally equal to two-thirds of the ball. It is covered with hyaline cartilage, with the exception of fovea capitis, where the ligament of the head is attached.

The ratio of the bones that make up the hip joint is judged by the conventional Roser-Nelaton line. It goes from spina iliaca anterior superior through the bulge of the gluteus Maximus to tuber ischiadicum. Normally, on this line is the tip of a large spit. With a fracture of the neck of the femur, the tip of the large spit moves upward, and with dislocations-either down from this line, or up from it.

The joint capsule of the hip joint is attached throughout the circumference of the acetabulum. In the area of the acetabular tenderloin bag fuses with lig. transversum acetabuli, leaving a free hole between this ligament and the edges of the tenderloin. Sealing of the joint at this point is achieved by the synovial membrane, which covers the ligament of the head here.

On the neck of the femur capsule is attached to the lower surface at the base of a small spit, on the front - on linea intertrochanterica, on the top - at the level of the outer quarter of the length of the neck. On the back surface of the neck attachment bags varies greatly - from 2/3 to 1/2 of its length and even less. Due to the described location of the line of attachment of the bag on the thigh, most of the neck is lying in the joint cavity.

The ligaments of the hip joint are divided into intra-and extra-articular.

The blood supply to the neck and femoral head is carried out by the medial femoral envelope of the artery, the upper and lower gluteal arteries, the lateral femoral envelope of the artery and the artery of the ligament of the head.

There are two intra-articular ligaments: the mentioned lig. transversum acetabuli and ligament of the head, lig. capitis femoris. It starts from the edges of the tenderloin of the acetabulum and from the lig. transversum acetabuli, the tip attaches to the fovea capitis femoris. The ligament of the head is covered with a synovial membrane, which rises to it from the bottom of the acetabulum. It is an elastic pad that softens the tremors experienced by the joint, and also serves to hold the head of the thigh a. lig. capitis femoris departing from a. obturatoria.

The extra-articular ligaments of the hip joint strengthen the fibrous layer of its capsule. Three ligaments extend from the three pelvic bones: the Ilium, pubis and ischium and attaches on the femur.

1. Ilio-femoral ligament, lig. iliofemorale, or bartenieva located on the front side of the joint. The top is attached to the spina iliaca anterior inferior, and the extended base-to the linea intertrochanterica. Its width reaches 7-8 cm, thickness - 7 to 8 mm. It inhibits the extension and prevents the fall of the body backward when standing erect. This explains the greatest development bartenieva a bunch of the person from whom it becomes the most powerful of all the ligaments of the human body, keeping the load equal to 300 kg.

2. Pubic-femoral ligament, lig. pubofemorale, located on the lower medial side of the joint. Starting from the eminentia iliopubica and the lower horizontal branch of the pubic bone, it attaches to a small spit. The bunch holds up the lead and slows down the rotation from the outside.

3. The sciatic-femoral ligament, lig. ischiofemorale, strengthens the medial part of the joint capsule. It starts at the back of the joint from the edge of the acetabulum in the sciatic bone area, goes laterally and upwards over the neck of the thigh and, weaving into the bag, ends at the front edge of the large spit.

4. The circular zone, zona orbicularis, has the form of circular fibers that are embedded in the deep layers of the joint bag under the described longitudinal ligaments and form the basis of the fibrous layer of the joint capsule of the hip joint. The fibers of the zona orbicularis cover in the form of a loop, the hip, in the form at the top of the bone under spina iliaca anterior inferior.

The abundance of ligaments, the congruence of the articular surfaces of the hip joint make this joint more limited in its movements than the shoulder, which is associated with the function of the lower limb, requiring greater stability in this joint. This limitation and strength of the joint are the cause and more rare than in the shoulder joint dislocations.

Areas where the edges of the extra-articular ligaments do not close are called "weak spots" of the fibrous capsule of the hip joint. With purulent inflammation of the hip joint (coxitis) through the "weak spots", a breakthrough of pus and its spread in the periarticular (periarticular) tissues is possible.

The anterior "weak spot" of the hip capsule is between the lig. iliofemorale and lig. pubofemorale.

This area is covered by the fascial sheath of the iliolumbar muscle, m. iliopsoas. Between the capsule and the muscle is bursa iliopectinea, which in 10% of cases is reported with the joint cavity.

The plug from the anterior weak spot extends along the posterior surface of m. iliopsoas, that is, through the muscle lacuna, further along the wing of the Ilium and the lateral surface of the spine to the lumbar region proximally, to the small spit - distally. Swelling with such streaks is shaped like an hourglass - the waist forms the unyielding inguinal ligament.

From under the inner edge of m. iliopsoas zatek can spread between the pubic bone and the comb muscle in the medial thigh bed. The most dangerous numb in the course of the femoral vessels-by sulcus femoris anterior and further into the drive channel.

The posterior "weak spot" of the hip capsule is located under the lower edge of the lig. ischiofemorale.

Here, a protrusion of the synovial membrane from the lower edge of this ligament is formed. On lowback "weak spot" is m. obturatorius externus.

Through the posterior "weak spot", the occlusion from the cavity of the hip joint can spread along the fascial case of the external obturator muscle to the medial fascial bed of the thigh, in which the adducting muscles are located. From here, through the locking channel, it can penetrate into the pelvic cavity. When spreading the occlusion posteriorly, it falls under the large gluteal muscle through the gap between the lower twin and square thigh muscles.

Collateral circulation in the area of the hip joint.

In the area of the hip joint in the surrounding muscles, there is a wide network of anastomoses, as a result of which can compensate for the violation of blood flow through the external iliac and femoral arteries. Thus, the anastomosis between the lumbar artery and the deep artery, enveloping the Ilium, can compensate for the violation of blood flow in the area from the aortic bifurcation to the distal part of the external iliac artery.

Occlusion in the area between the internal iliac artery and the femoral artery is compensated by anastomoses between the gluteal arteries and the ascending branches of the lateral and medial arteries enveloping the femur. In the development of collateral circulation is also involved obturator artery, anastomosing with the medial artery, enveloping the femur.

It should be noted an extremely important role in the development of collateral blood flow in the proximal femur of the deep femoral artery, from which the arteries extending around the femur.

Posterior femoral region, regio femoris posterior.

External reference points. Sciatic tubercle, anterior superior iliac spine, femoral epicondyle.

Scope. The upper is a transverse gluteal fold, plica glutea, the lower is a circular line drawn 6 cm above the patella, the medial is a line connecting the pubic symphysis with the medial epicondyle of the femur, the lateral is a line drawn from the spina iliaca anterior superior to the lateral epicondyle of the thigh.

The projection of the sciatic nerve is determined by a line drawn from the middle of the distance between the sciatic hillock and the large spit to the middle of the line connecting the supraorbital femur.

Layers.

The skin on the back of the thigh is thin, has a more or less pronounced hairline.

In the subcutaneous tissue, usually abundantly developed, in the lateral part there are branches of n. cutaneus femoris lateralis, and behind, on the border of the upper and middle third of the thigh, there are branches n. cutaneus femoris posterior.

Own fascia (fascia lata) at the lateral border of the region gives a strong, aponeurotic structure of the lateral intermuscular septum, septum intermusculare femoris laterale, delineating the anterior and posterior fascial bed of the thigh. The posterior intermuscular septum, septum intermusculare femoris posterior, covers the posterior surface of the large adductor muscle and separates the posterior fascial bed from the medial.

Thus, the wide rear fascia, intermuscular septum on each side and thigh front limit rear bed of the thigh, compartimentum femoris posterius.

Under its own fascia are muscles, vessels, nerves and lymphatic vessels with lymph nodes. All the muscles of the flexor of the posterior fascial bed of the thigh begin from the sciatic hillock.

Biceps femoris, m. biceps femoris, lies most laterally. Its long head begins from the sciatic hillock, short - from the linea aspera and the external intermuscular septum. The common tendon of the biceps thigh muscle is attached to the head of the fibula.

Semi-tendon muscle, m. semitendinosus, lies superficially on the medial side. The lower third of this muscle is occupied by the tendon, which, together with the tendons of the sartorial and thin muscles, is attached to the tuberosity of the tibia, forming the so-called goose's foot, pes anserinus.

Semi-webbed muscle, m. semimembranosus, noticeably wider than semi-tendon, lies anteriorly and deeper from it.

The upper third of the femur of the bicuspid is located directly under the broad fascia. Here it can be found in the corner between the lower edge of the gluteus Maximus and the outer edge of the biceps femur. In the upper half of hips he covered by a long the head this muscle, and below is in intervals of between m. biceps femoris and M. semimembranosus. Anterior to the nerve is a large adductor muscle, m. adductor magnus, covered with a loose posterior intermuscular septum. Right next to the nerve is a very thin accompanying artery - a. comitans n. ischiadici.

In the lower half of hips, and often and higher, n. ischiadicus is divided into two large trunks - the tibial nerve, n. tibialis, and common peroneal nerve, n. fibularis (peroneus) communis.

There are no major arteries in the posterior femur bed. Blood supply the muscles of the branch area of the three perforating arteries coming here from the anterior thigh area, perforating the large adductor muscle. Anastomosing among themselves, they perform the function of the trunk of the region.

In the lower medial part of the region, on the border with the posterior region of the knee joint (popliteal fossa), under the semi-tendon and semi-membranous muscles, the distal part m is located. conductor magnus. Between the muscle fibers of this muscle or between its tendon and the femur is the lower opening of the drive channel. Here, from the canal to the popliteal fossa, the femoral vessels come out, and the femoral vein lies superficially and laterally, and deeper and medial, closer to the bone, the femoral artery.

The connection of the fiber of the posterior thigh with adjacent areas.

The cellular space of the posterior fascial bed of the thigh is reported:

1. Top with desired length cellular spaces space in the course of the sciatic nerve. 2.The bottom - fiber of the popliteal fossa in the course of the same nerve. 3. In the course of perforating arteries-with the anterior thigh bed.

Anterior knee, regio genus anterior

Scope. The upper is a circular line drawn 6 cm above the patella, the lower is a circular line at the level of tuberositas tibiae, the lateral is vertical lines drawn through the posterior edges of the thigh condyles.

External reference points. Patella; up from him-the tendon of the quadriceps of the thigh; down-the patella ligament, lig. patellae attaches to tuberositas tibiae. On the lateral side of the knee palpable head of the fibula, caput fibulae, which is attached to m. biceps femoris.

Layers.

The skin of the anterior region of the knee joint is dense, mobile. Through it the patella is well defined.

In the subcutaneous tissue are branches of skin vessels and nerves.

Under the skin between the sheets of superficial fascia in front of the patella is a synovial bag, bursa prepatellaris subcutanea.

Subfascial bags are described in the section "knee joint Topography".

Under the fascia in the area of the patella there is a vascular network of the patella, rete patellare. Deeper, on the anterior surface of the knee joint, there is a dense arterial network-rete articulare genus, which plays an important role in the development of collateral circulation in violation of blood flow through the femoral or popliteal artery.

Posterior knee joint, (popliteal fossa), regio genus posterior (fossa poplitea)

External reference points. Epicondyle of femur. When bending the leg in the knee joint on the back surface, the muscular-tendon edges of the rhombus limiting the popliteal fossa are palpated from the top: from the medial side - mm. semitendinosus et semimembranosus, with lateral-m. biceps femoris. Forming the lower angle of the popliteal rhombus, both heads of the calf muscle usually represent a bulge in which it is not always possible to distinguish the heads. In the position of full extension in the middle of the region, a longitudinal roller corresponding to the adipose tissue filling the popliteal fossa is visible.

Scope. The upper border of the region is a circular line 6 cm above the base of the patella, the lower one is a circular line drawn at the level of tuberositas tibiae.

Projections. The tibial nerve and popliteal vessels are projected along a vertical line running from the upper corner of the popliteal fossa through its middle. The common peroneal nerve from the same point at the top is further projected along the medial edge of the biceps tendon to the outer surface of the neck of the fibula. The projection of the slit of the knee joint (joint line) is slightly below the transverse skin fold.

Layers.

The skin is thin and mobile.

In the subcutaneous tissue of the branch n. cutaneus femoris posterior reaches the articular line. On the border with the anterior region of the medial branches n. saphenus. In the middle of the area are superficial popliteal lymph nodes, nodi poplitei superficiales.

Poplitea, fascia poplitea, is a continuation of the broad fascia. It is comparable in density to aponeurosis, which prevents the determination of the pulse on the popliteal artery with the limb bent.

Topography of vascular-nervous formations.

Immediately below the fascia poplitea, almost exactly in the middle of the area, from top to bottom is the tibial nerve, n. tibialis. He gives here the muscle branches, as well as the skin branch - the medial skin nerve of the calf, n. cutaneus surae medialis. Together with V. saphena parva the skin nerve goes first in the furrow between the heads of m. gastrocnemius, and on the lower leg goes through the cleavage of its own fascia into the subcutaneous tissue and connects with n. cutaneus surae lateralis in the calf nerve, n. suralis.

Laterally from n. tibialis goes common peroneal nerve, n. fibularis (peroneus) communis, which is adjacent closely to the inner edge of the tendon m. biceps femoris. The common peroneal nerve gives in the popliteal fossa n. cutaneus surae lateralis. Popliteal vein, V. poplitea, lies medial to the n and deeper. tibialis.

Popliteal artery, a. poplitea, located even deeper and medial, closest to the femur. Remember their location in relation to each other easier with mnemonic reception (Nerve, vein, Artery - NEVA). So they are located in the direction from back to front and from the lateral side to the medial.

Popliteal artery and vein, enclosed in a dense fascial vagina, come into the popliteal fossa at the upper boundary of the area from the outlet of the channel of the adducting muscles, formed by the femur and tendon of the large adductor muscle.

In the popliteal fossa a. poplitea gives muscle branches as well as five knee arteries.

Upper knee artery, medial and lateral, and begin above the articular fissure. The superior lateralis genus is the largest, directed first laterally, and then forward, skirting the upper edge of the lateral condyle of the femur under the tendon m. biceps femoris. The superior medialis genus of small caliber, goes to the front, skirting the tendons of the mm. semimembranosus et adductor magnus upper edge of the medial condyle of the thigh.

Middle patellar artery, a. media genus (unpaired), departs from a. poplitea is slightly lower; it immediately heads forward and branches in the back wall of the knee capsule and in its cruciate ligaments.

The lower knee arteries depart from a. poplitea at the level of the articular slit or at the upper attachment of the popliteal muscle, usually 3-4 cm distal to the upper knee arteries. The inferior genus lateralis goes under the lateral meniscus and the lateral meniscus under the lig. collaterale fibulare. The inferior medialis genus is the medial condyle of the tibia, which goes under the lig. collaterale tibiale under the tendons of the mm. gracilis, sartorius, semitendinosus and medial head m. gastrocnemius.

All these arteries, except the middle one, form deep and superficial arterial networks in the anterior area of the knee joint.

In the tissue of the popliteal fossa to the sides of the popliteal artery lie deep lymph nodes of the popliteal fossa, nodi lymphoidei poplitei profundi, collect lymph from the entire lower leg. From here, the lymph is directed to the deep lymphatic inguinal nodes through the lymphatic vessels accompanying the blood vessels.

The bottom of the popliteal fossa is made up of the popliteal surface of the femur and the back of the knee joint capsule, strengthened by the oblique popliteal ligament, lig. popliteum obliquum, or ligament Winslow Bourget. There is also a popliteal muscle, m. popliteus, starting at the lateral condyle of the femur and attaching to the posterior medial surface of the tibia.

The connection tissue of the popliteal fossa with the neighbouring regions:

1. The cellular space of the popliteal fossa along the sciatic nerve is reported with the posterior thigh bed.

2. In the course of the femoral vessels, the fiber is connected through the leading channel with the anterior region of the thigh up to the fiber of the femoral triangle.

3. Along the popliteal vessels and n. tibialis cellulose is associated with the deep space of the posterior Shin area.

Knee joint, articulatio genus.

The knee joint is the largest and at the same time the most complex of all joints. Three bones participate in its formation: the lower end of the thigh, the upper end of the tibia and the patella. The articular surfaces of the femoral condyle, articulating with tibia, are convex in the transverse and sagittal direction and represent segments of the ellipsoid. The medial condyle is larger than the lateral condyle.

Facies articularis superior tibia, articulating with the condyle of the thigh, consists of two weakly concave, covered with hyaline cartilage joint areas. The latter are supplemented by two intra-articular cartilages, or meniscus, meniscus lateralis et medialis, lying between the thigh condyle and the articular surfaces of the tibia.

Each meniscus is a triangular, bent on the edge of the plate, a peripheral thickened edge of which is adherent to the joint capsule, and facing the inside of the joint sharp edge free. The lateral meniscus is more bent than the medial; the latter is similar in shape to the letter C, and the lateral one approaches the circle. The ends of both meniscus are attached to the front and back of the eminentia intercondylaris. The front between the two meniscus stretches the fibrous bundle, which is called lig. transversum genus.

The articular capsule on the thigh rises up in front, bypassing the facies of patellaris, on the sides goes between the condyle and the condyle, and from behind falls to the edges of the articular surfaces of the condyle. On the tibia capsule is attached to the edge of the articular surfaces of the condyle. Due to the fusion of the outer circumference of the meniscus with the joint capsule, the cavity of the knee joint is divided into larger (femoral-meniscus) and smaller (tibial-meniscus) sections. On the patella capsule grows to the edges of its cartilaginous surface, whereby it is as if inserted into the front of the bag, as in the frame.

On the outside, the capsule is strengthened by collateral ligaments, lig. collaterale tibiale (epicondylus medialis of the thigh to the edge of the tibiae) and with the lateral side of lig. collaterale fibulare (from epicondylus lateralis to the head of fibulae). The last ligament is in the form of a lace that does not fuse with the joint bag, separating from it with fatty tissue.

On the back of the capsule of the knee joint are two ligaments, woven into the rear wall, - lig. and popliteum arcuatum lig. popliteum obliquum.

On the front side of the knee joint is the quadriceps tendon of the thigh, which covers patella as a sesamoid bone, and then continues into a thick and strong ligament, lig. patellae coming from the top of the patella down to the tuberositas tibiae. This ligament is separated from the joint bag by fatty tissue. On the sides of the patella lateral extensions of the quadriceps tendon form supporting ligaments of the patella, the so-called retincicula patellae (laterale et mediale). They hold the patella in motion.

In addition to the extra-articular ligaments, the knee joint has two intra-articular ligaments, called cruciform, ligg. cruciata genus. Front, lig. cruciatum anterius, connects the inner surface of the lateral femoral condyle with area intercondilaris anterior tibiae.

Back, lig. the cruciatum posterius, goes from the inner surface of the medial condyle of the thigh to the area of the intercondylaris posterior of the tibia.

They firmly connect the femur and tibia, providing the function of the knee joint.

Collateral and cruciate ligaments play the greatest role in fixing the knee joint. However, excessive tension of the ligaments with unusual movements in the knee joint is often the cause of their stretching or rupture. The rupture of a collateral ligament is manifested in the form of a symptom of lateral diversion. The deviation of the tibia inside or outside by more than 10"indicates a rupture of the collateral ligament. It should be noted that in case of rupture of the tibial collateral ligament, the medial meniscus, tightly spliced with the joint capsule and ligament, almost always suffers.

Damage to the cruciate ligaments is manifested by the symptom of a"drawer". If there was a rupture of the anterior ligament, it is a symptom of the "front drawer", if the rear-rear.

The cruciate ligaments lie partly outside the synovial membrane of the knee capsule. The synovial membrane from the condyle of the thigh passes to the anterior surface of the cruciate ligaments and, covering them from the front and from the sides, leaves their posterior parts uncovered. Due to this course of the synovial membrane, the lateral and medial parts of the knee joint are separated. In addition, the same ligaments divide the joint cavity into the anterior and posterior parts, preventing the penetration of pus from one part to another until a certain time in the case of inflammation.

The synovial membrane forms on the anterior wall of the joint below the patella two fat-containing folds, plicae alares, which adapt to the articular surfaces, filling the gaps between them at each knee position.

At the sites of the transition of the synovial membrane to the bones that make up the knee joint, 13 inversions are formed, which significantly increase the joint cavity, and in inflammatory processes can be places of accumulation of pus, blood, serous fluid. In the front there are 5 inversions: at the top, above the condyles of the femur, in the middle - top front, sides - 2 medial, top and bottom, and 2 lateral, top and bottom. Behind are 4 inversions: 2 medial, upper and lower, and 2 lateral, upper and lower. On the lateral surfaces of the femoral condyles and lateral surfaces of the tibia, 4 lateral inversions are distinguished: 2 medial, upper and lower, and 2 lateral, upper and lower.

Outside of the joint capsule lies a number of synovial bags, some of them communicate with the joint. The front is a supra-knee bag, bursa suprapatellaris, which in 85% of cases is reported with the upper front inversion.

On the anterior surface of the patella there are bags, the number of which can reach up to three: under the skin - bursa subcutanea prepatellaris; deeper under the fascia - bursa prepatellaris subfascialis; finally, under the aponeurotic stretching m. quadriceps-bursa subtendinea prepatellaris. At the place of the lower lig attachment. patellae, between this ligament and the tibia, lies a permanent, non-communicating with the joint synovial bag, bursa infrapatellaris profunda. Outside there is a rear popliteal, recessus subpopliteus, - synovium that separates m. popliteus from the capsule of the knee joint. It is constantly communicated with the cavity of the knee joint and in about 20% of cases - with the cavity of the intercostal joint, connecting them.

Behind and inside are two bags separating the joint capsule from the medial head of the calf muscle (bursa subtendinea m. gastrocnemii medialis) and from the tendon of the semi-membranous muscle (bursa M. semimembranosi, or Brody's bag). They both communicate with the cavity of the knee joint in 50% of cases.

Synovial bags of the knee joint are important in the spread of numbs with purulent inflammation of the knee joint (chases).

Collaterals in the region of the knee joint

The knee joint gets its power from the rete articulare, top of which included AA. superiores medialis et lateralis genus, a. descendens genus (from A. femoralis) and ramus descendens a. circumflexae femoris lateralis, and below - aa. inferiores medialis et lateralis genus and aa. recurrent es tibiales anterior et posterior (from a. tibialis anterior). Venous outflow occurs through the veins of the same name in the deep veins of the lower limb-vv. tibiales anteriores, V. poplitea, V. femoralis.

With difficulty in blood flow through the femoral or popliteal artery due to this network develops collateral circulation. Stenosis or occlusion of the femoral artery in the area between a. profunda femoris and a. descendens genus it is very important to ramus descendens a. circumflexae femoris lateralis. In the area of the knee joint, it anastomoses with the articular network. It carries out blood flow around the stenotic portion of the femoral artery.

Сверху: a. superior medialis genus, a. superior lateralis genus, a. descendens genus (из a. femoralis), r. descendens a. circumflexae femoris lateralis, rete articulare genus et rete patellare. Снизу: a. inferior medialis genus, a. inferior lateralis genus, a. recurrens tibialis anterior, a. recurrens tibialis posterior.

Front region of leg, regio cruris anterior.

External reference points. The condyles of the tibia, the head of the fibula, the medial and lateral ankles, the tuberosity, the anterior and medial edges of the tibia.

Scope. The upper is a transverse line drawn at the level of the tibial tuberosity, the lower is a transverse line drawn through the bases of the ankles, the medial is along the inner edge of the tibiae, the lateral is along the furrow separating the fibular muscles and m. soleus.

Projections. The anterior tibial artery and deep peroneal nerve are projected along a line connecting the middle of the distance between tuberositas tibiae and caput fibulae and the middle of the distance between the ankles.

Layers.

The skin on the front surface of tibiae is thinner than in other parts.

Subcutaneous tissue has a normal structure, except for the area on the anterior surface of the tibia, where it is practically absent.

Superficial peroneal nerve, n. fibularis (peroneus) superficialis, appears in the subcutaneous tissue at the border of the middle and lower third of the tibia at the lateral border of the anterior surface of the tibia.

On the anteromedial side passes V. saphena magna accompanied by n. saphenus, on the lateral side-branches V. saphenaparva and n. cutaneus surae lateralis. Saphenous veins through perforating veins, vv. perforantes, are connected with the deep veins.

The fascia of the lower leg has an aponeurotic structure and serves as one of the places of the beginning of the extensor muscles and fibula muscles. It plays an important role in the functioning of the muscular "venous pump", which ensures the advancement of venous blood in the proximal direction against the gravity of the blood. The Contracting muscles of the tibia as it rests on the fascia of the tibia and bone, squeezing the thin walls of the veins, and "push" the blood through them up. Move down the blood prevent the valves of the veins. It should be noted that the valves of the penetrating veins normally pass blood from the superficial veins to the deep ones in the muscle relaxation phase. In case of insufficiency of these valves, the blood flows from deep veins to the superficial veins during muscle contraction, which causes their varicose (in the form of nodes) expansion.

The fascia is firmly fused with the periosteum of the anterior surface of the tibiae, especially along its sharp anterior edge, and gives the anterior and posterior intermuscular septum to the fibula: septum intermusculare cruris anterius, attached to the anterium, and septum intermusculare cruris posterius, attached to the posterior edge of the fibulae.

Due to this, two fascial lodges are formed on the anterior surface of the tibia: the anterior and lateral.

The anterior fascial bed of the tibia, compartimentum cruris anterius, is bounded in front by its own fascia, behind by the interosseous membrane, the medial - tibia, with which the fascia is spliced, the lateral - anterior intermuscular septum of the tibia.

The lateral fascial bed of the tibia, compartimentum cruris laterale, in front is limited to the anterior intermuscular septum, lateral - own fascia, medial - fibular bone and behind - the posterior intermuscular septum.

In the anterior bed medially lies the anterior tibial muscle, m. tibialis anterior, outside of it-long extensor fingers, m. extensor digitorum longus, and between them, starting from the middle third , is a long extensor of the big toe, m. extensor hallucis longus, covered with the first two muscles.

Topography of blood vessels and nerves.

In the front and lateral fascial bed of the leg.

Neurovascular bundle anterior Lodge of the tibia consists of a. v et. tibiales anteriores and n. fibularis (peroneus) profundus. A. tibialis anterior, separated from the popliteal artery in the back bed of the Shin, gives to the popliteal fossa a. recurrens tibialis posterior, forming anastomoses with branches of a. descendens genus and a. inferior medialis genus. Then it passes into the anterior bed through the hole in the membrana interossea, located at the inner edge of the fibula, 4-5 cm below its head.

The neurovascular bundle in the upper half of the tibia lies on the membrana interossea between m. tibialis anterior and m. extensor digitorum longus. In the lower part of the tibia, the beam shifts medially and lies in the interval between m. tibialis anterior and m. extensor hallucis longus.

In the lower third of the Shin, above the ankles, from the anterior tibial artery, the medial and lateral anterior ankle arteries, AA, depart. malleolares anteriores medialis et lateralis. The anterior tibial artery is accompanied by the veins of the same name, entwining it with their anastomoses.

The profundus passes from the lateral bed to the anterior one, penetrating the septum intermusculare anterius cruris in the upper third. In the anterior bed, it lies laterally from the vessels at the beginning, and in the lower third - in front and medially from them.

In the bed of the lateral lower leg are the long and short peroneal muscles, mm. fibularis (peroneus) longus et brevis, covering the top two thirds of the bone of the same name. Between the portions of the long peroneal muscle originating from the lateral tibial condyle and head of fibula, formed by the upper musculo-peroneal canal, canalis musculofibularis (musculoperoneus) superior, which includes n. fibularis communis.

In the upper muscular-peroneal canal n. fibularis (peroneus) communis is divided into deep and superficial peroneal nerves, nn. fibulares profundus et superficialis, at a distance of 6-7 cm from the top of the head of the fibula.

N. fibularis (peroneus) superficialis, leaving gaps between the portions of the long peroneal muscle, then descends along the septum intermusculare cruris anterius in the lateral bed to the lower third of the leg, where it pierces the fascia and then go over it in the subcutaneous tissue.

Posterior tibial region, regio cruris posterior.

External reference points. The head of the fibula, the condyle of the tibia, the lateral and medial ankles, the Achilles tendon, the bulges of the heads of the calf muscle.

Scope. The upper is a circular line drawn at the level of the tibial tuberosity, the lower is a line drawn at the base of the ankles.

Projections. The tibial neurovascular bundle is projected along a line drawn from the middle of the popliteal fossa at the top to the middle of the distance between the medial ankle and the Achilles tendon-at the bottom.

Layers.

The skin is thin, easily taken into the fold. In the subcutaneous tissue of the posterior region of the tibia, the trunk v is formed. saphena parva, which, having rounded the lateral ankle, rises upwards and medially. Like the great saphenous vein, V. saphena parva is associated with deep veins through perforating veins, vv. perforantes. Especially a lot of them in the lower third of the Shin. In the middle of the lower leg, a small subcutaneous vein pierces the fascia and is located between its leaves (in the Pirogov channel), then goes under the fascia, enters the gap between the two heads of the calf muscle and flows into the popliteal vein. The small saphenous vein is accompanied by n. cutaneus surae medialis. On the lateral side of the subcutaneous tissue passes away from the common peroneal nerve n. cutaneus surae lateralis. In the distal tibia, this nerve is with n. cutaneus surae medialis forms n. suralis, innervating the skin in the lateral ankle area.

N. saphenus (from the femoral nerve) is branched in a narrow area of the skin of the posterior surface of the tibia. Throughout the rest of the posterior region of the tibia, the skin is innervated by the branches of the tibial and peroneal nerves.

Fascia of the tibia on the posterior surface forms the back fascial bed of the leg, compartimentum crurisposterius, with the medial side being attached to the medial surface of the tibia, and forming a rear lateral intermuscular septum attaches to fibula. This partition separates the back bed from the lateral.

With its deep leaf, the fascia of the Shin separates the superficial muscles of the area from the deep ones. The superficial part of the posterior fascial bed of the tibia is occupied by two heads of the calf muscle, m. gastrocnemius, and soleus muscle, m. soleus. Together they form the triceps muscle of the tibia, m. triceps surae. Between the medial head of the calf muscle and the soleus muscle there passes a narrow tendon of the plantar muscle, m. plantaris. The tendons of all three muscles are connected to the heel, or Achilles tendon, attached to the heel hillock.

A layer of flexors occupies a deep space of the bed.

Between the superficial and deep muscle groups is the ankle canal, canalis cruropopliteus. The inlet of the channel is located between m. popliteus anterior and tendon arch of soleus muscle, arcus tendineus m. solei, behind. At the inlet, at the level of the tendon arc, a. poplitea is divided into the anterior and posterior tibial arteries, which enter the tibial canal. Almost immediately a. tibialis anterior goes into the anterior fascial bed of the tibia through the upper outlet of the canal. It is located between the neck of the fibula outside, m. popliteus top and initial Department m. tibialis posterior from inside and below.

Posterior tibial artery, a. tibialis posterior, larger, is an extension of a. poplitea. Tibial nerve, n. tibialis, lies laterally from the artery. First, the whole beam is located on the back surface of m. tibialis posterior. Then, as the displacement of this muscle and its tendons anteriorly, in the lower third of the tibia, the neurovascular bundle is located already on m. flexor digitorum longus.

At the border of the middle and lower third of the tibia, the posterior tibial neurovascular bundle exits from under the lower inner edge of the soleus muscle (the lower outlet of the tibial canal) and is located inside the Achilles tendon. Here he was clad only in the deep and superficial leaf of the fascia of the lower leg.

Damage n. tibialis at the level of the popliteal fossa and the upper third of the leg causes paralysis of the muscles flexing the foot and toes (plantar flexion) and turning the foot inward. Falls Achilles reflex. Sensitivity falls on the back of the Shin, on the sole and plantar surfaces of the fingers, on the rear of their end phalanges. The muscles of the posterior fascial bed of the Shin and the muscles of the sole atrophy. The foot due to paralysis and atrophy of the interosseous muscles acquires a clawed appearance, and as a result of the contracture of the extensors takes the form of a "hollow foot". It is also called "heel" foot. Walking on the toes is impossible. Fibular artery, a. fibularis (peronea), departs from the tibial artery at the border between the upper and middle third tibia and lies as a. tibialis posterior, on the posterior surface of the posterior tibial muscle. Then it is directed obliquely downwards and laterally and enters the lower muscular-fibular canal, canalis musculofibularis (musculoperoneus) inferior. The front wall of this channel is m. tibialis posterior, lateral-fibula, posterior-m. flexor hallucis longus. At the border of the middle and lower third of the tibia, the fibular artery exits the canal at the lower outer edge of the long flexor of the thumb and goes along the lateral edge of the bone, covered with deep and superficial sheets of the fascia of the tibia. Lower third of Shin a. fibularis gives two important branches for the development of collateral circulation: r. communicans and R. perforans. The first of them anastomoses with the posterior tibial artery, the second-with the anterior tibial artery, penetrating into the anterior bed of the tibia through the hole in the interosseous membrane.

In the absence or underdevelopment of a. dorsalis pedis this branch reaches a large caliber and replaces it.

Along with branches to the peroneal muscles a. fibularis gives off lateral malleolar and calcaneal branches, rr. malleolares laterales and rr. calcanei, which are involved in the formation of arterial networks of the lateral ankle and heel area, rete malleolare laterale and rete calcanei.

The connection of the fiber of the posterior region of the tibia with neighboring areas

The fiber of the deep fascial space of the tibia is connected along the vessels:

1. Bottom - medial ladygrove channel, and through him with the tissue of the foot.
2. At the top, along the anterior tibial artery, with the cellulose of the anterior fascial bed of the tibia.
3. Along the course of the posterior tibial artery - with the cellulose of the popliteal fossa.

Anterior ankle, regio talocruralis anterior.

External reference points. At the edges of the area are the medial and lateral ankles, and between them-extensor tendons, clearly visible in the back flexion of the foot. On the sides of the tendons of the extensors are visible predlagaemye furrow, which, in effusion in the ankle joint become predlagaemye rollers.

Scope. At the top-a horizontal plane drawn through the bases of both ankles, at the bottom - a plane drawn at the level of the tops of the ankles.

Projection of the rear artery of the foot, a. dorsalis pedis, and deep peroneal nerve, n. fibularis profundus, determined by a line drawn from the middle of the intervertebral distance to the first interdigital space.

Layers.

The skin is thin and mobile.

Subcutaneous tissue is poorly developed. On the front surface of the medial ankle are v. saphena magna and N. saphenus, surrounded by surface fascia. In this place because of the constancy of position V. saphena magna usually produce venesection, that is, the exposure of the vein to introduce a catheter into it.

Anterior to the lateral malleolus in the layer of superficial fascia are the superficial branches of the peroneal nerve, n. fibularis (peroneus) superficialis.

Fascia in the area of the ankle joint is thickened and has the form of ligaments: circular retainer-retinaculum musculorum extensorum superius, and oblique - retinaculum mm. extensorum inferius. From the top of the retinaculum of the tendons of the extensor muscles to the tibia and the bag of the ankle joint are vertical partitions, forming three bone-fibrous channel. Through these channels to the rear foot moving the prisoners in the synovial vagina of tendon. On the medial side is the tendon m. tibialis anterior, the beginning of the synovial vagina of which is 5-6 cm above the ankles, and distally reaches the level of the talus-scaphoid joint. The middle position is occupied by the tendon m. extensor hallucis longus, whose synovial vagina is 2-3 cm above the inter-ankle line, and distally reaches the level of the first pre-metatarsal joint. On the lateral side there is a tendon m. extensor digitorum longus, whose synovial vagina rises above the vagina of the long extensor of the thumb by 1-2 cm, and in the distal direction expands as the tendons diverge to the fingers.

A. dorsalis pedis with veins of the same name and n. fibularis profundus are located in the bone-fibrous canal of the long extensor of the thumb. The neurovascular bundle is separated from the capsule of the ankle joint by a layer of fatty tissue.

The rear of the ankle region, posterior regio talocruralis

External reference points. Lateral and medial ankles, heel (Achilles) tendon and grooves on the sides of it.

The upper and lower boundaries are the same as for the front area. The lateral pass along the edges of the heel tendon.

Layers

The skin is thicker than the front, with plantar flexion of the foot forms transverse folds.

Subcutaneous tissue is loose, poorly developed.

The fascia covers the Achilles tendon with two plates, forming a case for it.

Immediately above the attachment of the heel tendon to the bone between them is the heel synovial bag, bursa tendinis calcanei.

Lateral pseudologica area, regio lateralis retromalleolaris

External reference points. Lateral ankle, Achilles tendon, heel bone.

Scope. The upper and lower boundaries correspond to the boundaries of the anterior and posterior ankle areas. The anterior border is a vertical line drawn through the largest bulge of the lateral ankle, the posterior - lateral edge of the heel tendon.

Projections. V. saphena parva and n. suralis projected no line running from the middle of the distance between the lateral ankle and the Achilles tendon to the tuberosity V of the metatarsal bone.

Layers

The skin in the circumference of the lateral ankle is thin, mobile. In the subcutaneous tissue behind the lateral ankle go V. saphena parva and N. suralis.

The fascia of the tibia is supported by two ligaments running from the lateral ankle to the calcaneus, the upper and lower tendon holders of the fibula, retinaculi mm. fibularium (peroneorum) superius et inferius.

Under the upper restraint, the tendons of the long and short fibular muscles pass in the common synovial vagina, which rises 4-5 cm above the ligament. Under the lower tendon holder, the tendons of these muscles are located in separate synovial sheaths, which are separated by the fibula fibularis (peronealis). The synovial vagina of the short fibula reaches its attachment to the tuberosity of the V metatarsal bone, and the tendon of the long fibula and its synovial vagina pass under the forearm to the furrow of the cuboid bone (on the medial side of the foot).

Medial area, regio retromalleolaris medialis

External reference points. The medial malleolus and calcaneus, calcaneal tendon.

Scope. The upper and lower correspond to the boundaries of the anterior and posterior ankle areas. The anterior border is a vertical line drawn through the largest bulge of the medial ankle, the posterior is the medial edge of the heel tendon.

Projections. The posterior tibial neurovascular bundle is projected along an arcuate line extending posteriorly from the medial ankle to the width of the finger (2 cm). Here you can feel the pulsation of the posterior tibial artery.

Layers.

The skin is thin, sedentary.

Subcutaneous fat loose, it is easy to develop edema.

Fascia is strengthened by the retinaculum of the flexor tendons, retinaculum mm. flexorum, and together with it forms the medial wall of the medial ankle canal, canalis malleolaris medialis, located behind the medial ankle.

The lateral wall of this canal consists of the medial ankle and the calcaneus. From above, the ankle canal includes tendons of flexor muscles surrounded by synovial sheaths from the deep layer of the posterior surface of the tibia. Front and down malleolar canal goes into the heel channel, bounded on the outside heel bone, inside - muscle, abductor big toe, m. abductor hallucis. With fibrous spurs coming from the surface deep into the medial ankle canal is divided into bone-fibrous channels, in which tendons and vagina of the neurovascular bundle pass.

Within the medial ankle canal in the direction from front to back, they are arranged as follows.

1. The most close to the medial malleolus, to the groove on its posterior surface with the tendon m. tibialis posterior. It is surrounded by a synovial vagina, which begins at the top of the upper border of the area, that is, at the base of the medial ankle, and at the bottom continues until the tendon is attached to the tuberosity of the scaphoid bone.
2. The next is tendon m. flexor digitorum longus. Its synovial vagina starts slightly lower, and the sole extends to the middle of the Tarsus.
3. Behind the tendon of the long flexor of the fingers, there is a posterior tibial neurovascular bundle in its own fascial case. It lies superficially and is surrounded by a layer of fatty tissue. A. tibialis posterior in the beam occupies the front position, n. tibialis lies behind. Both the artery and nerve at the distal border of the region (at the level of the apex of the medial ankle) are divided into medial and lateral plantar arteries and nerves. The resulting medial and lateral plantar neurovascular bundles go to the heel canal and then to the sole.

The pulsation of the posterior tibial artery is palpated in the middle of the distance between the medial ankle and the medial edge of the Achilles tendon. To loosen the tension of the retinaculum flexorum, the foot is slightly tucked inside. This study is mandatory when the patient complains of intermittent claudication that occurs during walking and disappears after rest. The absence of pulsation of the posterior tibial artery indicates its occlusion, most often as a result of atherosclerosis.

The tibial nerve can be compressed within the medial ankle canal (tarsal tunnel syndrome) in edema and tendovaginitis. This is most often manifested by pain in the heel and a violation of the sensitivity of the skin of the sole.

The most obey and the most deeply lies a tendon m. flexor hallucis longus. At the distal border of the region, it crosses the tendon of the long flexor of the fingers, passing closer to the bones of the preplusna, and at the medial edge of the sole it turns out to be lying in front. The synovial vagina of the tendon of the long flexor of the big toe begins lower than that of the tendons of the two previous muscles, but continues further. It is close to the posterior "weak point" of the ankle joint bag and in some cases it is reported with the cavity of this joint.

Ankle joint, articulatio talocruralis.

The ankle joint is formed by the articular surfaces of the lower ends of both tibia, which cover the block, trochlea, talus, talus-like fork. In this case, the lower articular surface of the tibia is articulated with the facies articularis superior block, and the lateral surfaces of the block - the articular surfaces of the ankles.

The distal connection of the ends of the tibia and fibula occurs through syndesmosis or joint, syndesmosis (articulatio) tibiofibularis. This connection is supported by the anterior and posterior intercostal ligaments.

The structure of the ankle joint is a block joint. The movements occur around the frontal axis passing through the block of the talus bone, and the foot then rises up with the toe (rear flexion), then falls down (plantar flexion).

The articular slit of the ankle joint is projected from the front along the line connecting the bases of the ankles.

The articular capsule is attached along the cartilaginous edge of the articular surfaces, in front of it captures part of the neck of the talus. Auxiliary ligaments are located on the sides of the joint and go from the ankles to the adjacent bones of the tarsus. Medial collateral ligament, lig. The collaterale mediale (deltoideum), has the appearance of a plate resembling the Greek letter delta. Lateral collateral ligament, lig. collaterale laterale, consists of three beams, running from the lateral ankle in three different directions: forward - lig. talofibulare anterius, down - lig. calcaneofibulare and back - lig. talofibulare posterius. The lateral ligaments strengthen the joint capsule, and the front and rear capsule is thin.

Directly to the capsule of the ankle joint, the tendon of the long flexor of the big toe lies behind, the tendons of the extensors lie in the front.

The ankle joint is supplied with blood from rete malleolare mediale et laterale, formed by the ankle branches of a. tibialis anterior, a. tibialis posterior and A. fibularis (peronea). Venous outflow occurs in the deep veins of the tibia of the same name.

Lymph outflow is carried out by deep lymphatic vessels to nodi poplitei.

The joint is innervated outside n. suralis, on the medial side-n. saphenus and front-n. fibularis (peroneus) profundus.

Foot, pes the back of the foot, dorsum pedis

External reference points. The tuberosity of the scaphoid bone, located 3-4 cm distal to the medial ankle, is palpated in the middle of the inner edge of the foot. To the tuberosity, the tendon of the anterior tibial muscle is traced, and the outside of it is well noticeable, especially with the back flexion of the thumb, the tendon m. extensor hallucis longus. On the outer edge of the foot is easily palpable tuberosity of metatarsal V bone, tuberositas ossis metatarsalis V. During dorsiflexion of II-V fingers in the distal foot are well marked tendon m. extensor digitorum longus.

The border between the back of the foot and the sole extends from outside along the line extending from the middle of the height of the calcaneus to the center of the head of the V metatarsus, from the inside along the line running from the middle of the height of the calcaneus to the center of the head of the metatarsus.

Layers.

The skin is thin and mobile.

Subcutaneous tissue is loose, poor in adipose tissue. It easily accumulates edematous fluid.

In the subcutaneous tissue the distal is the back of the venous arch, dorsalis pedis arcus venosus, which collects blood from the veins of Miloshevich intervals. It is linked by anastomoses to the posterior venous network of the foot, rete venosum dorsale pedis. The posterior venous network of the foot serves as the source for V. saphena parva, running along the outer edge of the foot, and for V. saphena magna, which goes to the anterior surface of the medial ankle.

Deeper veins are nerves: medial-branches n. saphenus, reaching the middle of the inner edge of the foot; lateral-branches n. suralis, innervating the skin of the outer edge of the foot and V finger.

A large part of the skin of the back of the foot Innervate branches n. fibularis (peroneus) superficialis: the inner surface of the distal half of the foot and I the finger - back of the medial cutaneous nerve, n. cutaneus dorsalis medialis, the mating surfaces II-III, III-IV fingers - back of the intermediate cutaneous nerve, n. cutaneus dorsalis intermedius.

The touching sides of the IV and V fingers Innervate the lateral posterior skin nerve, n. cutaneus dorsalis lateralis from n. suralis.

Ветви n. fibularis (peroneus) profundus иннервируют кожу соприкасающихся поверхностей I и II пальцев.

Fascia on the back of the foot is a continuation of fascia cruris. Between the leaves of its own fascia are the tendons of the long extensors and the anterior tibial muscle. The fascia is attached to the I and V metatarsal bones on the sides, forming the rear sub-fascial space. The deep (lower) wall of the space is the deep fascia covering the metatarsal bones and the back interosseous muscles. The tendons of the long extensors of the fingers and the anterior tibial muscle are surrounded by synovial vaginas, the distal border of which is at the level of the metatarsal joints. The proximal border is located on the anterior surface of the ankle area, just above the upper tendon holder.

In pdfscanner space are short extensors of the fingers, mm. extensores hallucis brevis et digitorum brevis, as well as blood vessels and nerves.

The back artery of the foot, a. dorsalis pedis, lies in one layer with short extensors. At the level of the scaphoid bone (determined by its tuberosity on the inner edge of the foot), the rear artery of the foot lies laterally from the tendon m. extensoris hallucis longus. Here it is not covered with muscles and tendons, so you can palpate its pulsation. At the level of the Tarsus from the rear artery of the foot the medial side moves several smaller medial tarsal artery and lateral fairly large lateral tarsal artery, a. tarsalis (tarsea) lateralis. The final branch a. tarsalis lateralis at the lateral edge of the short extensor anastomoses with the penetrating branch of the fibular artery and participates in the formation of the lateral ankle network, rete malleolare laterale. Distal branches anastomose with the arched artery at the level of tuberosity of the V metatarsal bone. Arcuate artery, a. arcuata, departing from a. dorsalis pedis at the level of the metatarsal joints in the lateral side. It's pulling the posterior metatarsal arteries, AA. metatarsales (metatarseae) dorsales, and from them - the rear finger arteries, AA. digitales dorsales.

The continuation of the main trunk of the rear artery of the foot is the first posterior metatarsal artery, a. metatarsalis I, which goes to the first interdigital space. The second terminal branch of the rear artery of the foot is the deep plantar artery, a. (ramus) plantaris profunda, penetrates through the muscles of the first interplusal interval to the sole, where it anastomoses with the lateral plantar artery, a. plantaris lateralis (from A. tibialis posterior).

The profundus is located inside the artery of the foot. At the level of the inter-ankle line, it gives the motor branch to the short extensors of the fingers, which goes along with the lateral preflux artery.

Sole, planta.

External reference points. On the plantar surface of the foot you can see the longitudinal and two transverse arches. The lateral part of the longitudinal arch is formed by the heel, cuboid and IV-V metatarsal bones; the medial part (spring) of the longitudinal arch consists of the talus, scaphoid, three wedge-shaped and I-III metatarsal bones. Of the ligaments, lig plays a crucial role in strengthening the arch of the foot. plantare longum-long plantar ligament. It starts from the lower surface of the calcaneus, stretches forward and is attached by deep fibers to tuberositas ossis cuboidei and superficial - to the base of the metatarsal bones.

Exchanging through a sulcus ossis cuboidei, the long plantar ligament converts the groove in the osteo-fibrous canal through which passes the tendon of m. fibularis (peroneus) longus.

The distal transverse arch is formed by the metatarsal bones and strengthened by the transverse head m. adductor hallucis; proximal transverse arch formed by the bones of the forearm and strengthened by tendons m. tibialis posterior and m. fibularis (peroneus) longus.

With the weakening of the strengthening apparatus, the arch descends, the foot flattens, as a result of which flat feet develop as a pathological phenomenon.

The projection of the lateral neurovascular bundle and intermuscular septum corresponds to the line from the mid-width of the sole (or from the middle of the line connecting the tops of the ankles) to the fourth interdigital interval. The medial beam is projected along a line drawn from the middle of the inner half of the sole width to the first interdigital gap.

Layers.

The skin of the sole is inactive, thickened, especially on the heel hillock, the heads of the metatarsal bones and the lateral edge of the foot. It is strongly associated with connective tissue septa of the plantar aponeurosis.

Subcutaneous tissue is dense and has a cellular structure. This layer is especially developed over the calcaneus and above the metatarsophalangeal joints: its thickness here reaches 1.0-1.5 cm.

There is no surface fascia in this area.

Plantar aponeurosis, aponeurosis plantaris, in the middle part of the sole is a thickened own fascia. At his sides, the fascia becomes thinner and is attached to the bones of the Tarsus and distal to I and V metatarsal bones. Plantar aponeurosis has a particularly dense structure in the area of the forearm, where part of the fibers of the short flexor of the fingers begins from it. In the area of the metatarsal, aponeurosis is split into 4-5 legs covering the tendons of the flexors of the fingers. As on the palm, in the distal part of these legs are connected by transverse beams, fasciculi transversi, limiting the commissural holes. The commissural holes are filled with fatty tissue, here are the tendons of the worm-like muscles and the common finger vessels and nerves, AA. et

nn. digitales plantares communes. Through the commissural holes of the plantar aponeurosis, the subcutaneous tissue communicates with the middle fascial bed of the sole.

The medial and lateral fascial intermuscular septum, extending from the edges of the plantar aponeurosis, divide the podaponeurotic space of the sole into three fascial lodges: medial (the bed of the muscles of the I finger), middle and lateral (the bed of the muscles of the V finger). The medial intermuscular septum is attached to the heel, scaphoid, medial wedge - shaped and I metatarsal bones, the lateral-to the long ligament of the sole and to the V metatarsal bone. The middle fascial bed of the sole. The lower wall of this bed is formed by plantar aponeurosis. The upper wall in the prefrontal area is formed by a long ligament of the sole and bones of the forearm, in the metatarsal area - by deep fascia covering the plantar interosseous muscles. The lateral walls are medial and lateral intermuscular septa.

The contents of the middle bed.

In the forearm, immediately above the plantar aponeurosis, the first layer is a short flexor of the fingers, m. flexor digitorum brevis. It starts from the calcaneus and directly from the plantar aponeurosis. The muscle is covered with its own fascial plate. Above lies the tendon of the long flexor of the fingers, to which a square muscle of the sole is attached from the lateral side, m. quadratus plantae. Together they make up the second, middle, layer. This layer, together with the plantar neurovascular bundles running along the lower surface, is located in the so-called plantar canal, which is a direct continuation of the heel canal. From below it is limited by the fascia of the short flexor of the fingers, from above-the oblique head m. adductor hallucis.

The next layer is the oblique head of the adductor muscle of the thumb, caput obliquum m. adductor hallucis. It starts from the plantar ligaments of the preplus, lateral sphenoid bone and from the bases of the II-IV metatarsal bones. Posterior to this head is the tendon of the long peroneal muscle, tendo m. fibularis (peronei) longi between the fibers of the lig. plantare longum (ligament runs from the calcaneus to the bases of II-V metatarsal bones is the fourth layer of the soft tissues of the Tarsus). The tendon of the long fibula is attached to the medial sphenoid bone and to the base of the I metatarsal bone. The tendons of the long flexors and the long fibula at the level of the forearm are covered with synovial vaginas.

Between the first and second layer is the surface cellular space. Through this space from the heel canal to the metatarsals are medial and lateral vascular bundles. Between the second and third layers is a deep cellular space.

In the area of the metatarsals, the layers of the sole are arranged as follows.

Following the plantar aponeurosis, the tendons of the short flexor of the fingers are located. The tendon of the long extensor fingers also splits into tendons to the individual fingers. From each of the four legs of the tendon of the long flexor of the fingers begin the worm-like muscles, mm. lumbricales, going to the rear of the fingers - to the dorsal aponeurosis of the main phalanges II-V fingers. Even higher (closer to the metatarsal bones) are the oblique and transverse head of the muscle leading to the thumb, m. adductor hallucis.

The next layer is the deep interosseous fascia covering the plantar interosseous muscles.

In the metatarsal part of the middle bed there are also superficial and deep cellular spaces of the sole: the first - between the tendons of the short and long flexors of the fingers, the second - between the tendons of the long flexor of the fingers with worm-like muscles and the muscle that leads the thumb.

Midsole bed reported:

1) with a subfascial space of the rear of the foot in the course of the anastomosis between the rear and lateral plantar arteries;

2) with the fiber of the interdigital spaces and the back surface of the fingers-in the course of the worm-like muscles;

3) from the subcutaneous tissue of the soles - in the course of the plantar metatarsal and plantar digital vessels going through commissural holes;

4) with the medial bed of the sole-in the course of the tendon of the long flexor of the thumb, penetrating the internal intermuscular septum;

5) with the lateral bed of the sole-in the course of the tendon of the flexor of the little finger and the lateral plantar vessels penetrating the lateral intermuscular septum;

6) with a deep space of the posterior Shin bed - along the tendon of the long flexor of the thumb, as well as the neurovascular bundle going through the ankle canal.

The medial fascial bed of the sole is bounded below and medially by its own fascia (continuation of thinned plantar aponeurosis), lateral-medial intermuscular septum, above-scaphoid and medial sphenoid bones in the area of the forearm and I metatarsal bone.

At the level of the forearm, it contains a muscle that removes the thumb, m. the conductor hallucis, and the tendon of its long flexor, tendo M. flexoris hallucis longi, at the level of the metatarsal-short flexor of the thumb, m. flexor hallucis brevis, tendon of the retracting muscle and tendon of the long flexor of the thumb.

Heel bone and m. the abductor hallucis are the walls of the calcaneal canal in the proximal part of the medial bed of the foot. Through the heel channel, the average bed soles sent from the malleolar canal, the tendon of the long stimates toes and the lateral plantar neurovascular bundle.

The medial neurovascular bundle is located in the internal intermuscular fascial septum of the sole.

The lateral fascial bed of the sole from below and from the lateral side is limited by its own fascia, with a medial - lateral intermuscular septum, at the top - cuboid and V metatarsal bone. Within the bed are the lateral muscles of the little finger of the foot: abductor little finger of the foot, m. abductor digiti minimi, short flexor of the finger, m. flexor digiti minimi brevis muscle that opposes the little finger, m. opponens digiti minimi, and muscle, abductor little finger, forms the outer edge of the foot.

Neurovascular bundles of the sole. The medial and lateral plantar arteries are formed as a result of separation of the posterior tibial artery in the medial ankle canal. On the same branch and n shares. tibialis.

Medial plantar vessels and nerve, a., V., n. plantares mediales, pass in the medial intermuscular septum and give branches to the muscles of both the medial and middle fascial bed.

The superficial branch of the artery branches on the medial side of the I finger and the medial edge of the sole. The deep branch gives the branches to the muscles of the I finger and anastomoses with the first plantar metatarsal artery, a. metatarsalis plantaris I (from lateral plantar).

Medial plantar nerve, n. plantaris medialis, innervates the muscles of the I finger, the short flexor of the fingers, the two medial worm-like muscles and gives nn. digitales plantares propriae to the skin of I, II, III and the inner side of the IV finger.

Lateral plantar artery, a. plantaris lateralis, larger than the medial, from the heel canal goes in an arc between the short flexor of the fingers and m. quadratus plantae with the same name veins and nerves. In the area of the metatarsal this beam is located in the lateral intermuscular septum. At the level of the base of the metatarsal bones, the lateral plantar artery passes into the plantar arc, arcus plantae, located between the interosseous plantar fascia and the oblique head of the muscle leading to the thumb. In the first interosseous interval, it anastomoses with a deep plantar artery from a. dorsalis pedis. From the arterial arch depart plantar metatarsal arteries, AA. metatarsales plantares. Each of them gives off perforating branches, rr. perforantes passing through the interosseous muscles at the rear of the foot where they anastomose with the posterior metatarsal arteries. Having perforating and muscular branches of the distal plantar metatarsal artery continues the General in the finger artery, AA. digitales plantares communes. The latter are divided into their own finger arteries, AA. digitales plantares propriae.

Lateral plantar nerve, n. plantaris lateralis, all over lies next to the lateral plantar artery. It innervates the muscles of the V finger, m. adductor hallucis, m. quadratus plantae, two lateral vermiform and all interosseous muscles. The cutaneous branches are nn. digitales plantares propriae, going to the skin of the V and lateral side of the IV finger.

In General, the distribution of branches of the medial and lateral plantar nerves corresponds to the course of the median and ulnar nerves on the hand.

Toes, digit pedis.

Fingers are separated from the foot by inter-finger skin folds, which correspond to the middle of the proximal phalanges.

On the sole of the finger border passes through the arcuate plantar-finger fold, corresponding to the distal third of these phalanges. The lines of the interphalangeal joints are projected 3-4 mm distal to the heads of the proximal phalanges and 2-3 mm distal to the heads of the middle phalanges.

Layers of the back surface of fingers

The skin is thin, mobile,has hair.

Subcutaneous tissue is poorly developed. The skin folds are located above the interphalangeal joints. In the subcutaneous tissue closer to the middle of the lateral surface are the rear finger vessels and nerves. In the same layer at the base of the nail are expressed by the anastomosis between the back of the finger arteries.

The fascia on the back of the fingers is thinned, tightly spliced with tendons.

The tendon of the short extensor of the thumb is covered by the tendon of the long extensor attached to the base of the distal phalanx. The tendons of the long extensor II-V fingers are attached by their lateral parts to the bases of the distal phalanges, by the middle parts - to the bases of the middle ones

phalanxes'. At the level of the proximal phalanges tendons are fixed circular and cruciate ligaments, intertwining here in its own fascia. The tendons of the short extensor of II-V fingers with no clear boundaries go into the back of the aponeurosis of these fingers.

Layers of the plantar surface of the fingers

Thickened skin, subcutaneous tissue well developed, forms the pads are permeated by connective fibers of dividing cells. The fibers are smaller in the region of the plantar-finger fold; in this layer on the sides of the fingers are their own plantar finger vessels, anastomosing with each other, and nerves.

Tendons pass in the bone-fibrous channels formed by ligaments and phalanges. The synovial sheaths of these tendons begin at the level of the metatarsophalangeal joints, end at the base of the distal phalanges, where the tendons are attached with one common plate.

The joints of the foot, articulationes pedis.

Ragged joint, art. subtalaris, formed by the posterior articular surfaces of the talus and calcaneus, representing in General the segments of the cylindrical surface. They are surrounded by a completely closed joint bag, supported by auxiliary ligaments from the sides.

Heel-cuboid joint, art. calcaneocuboidea, together with the neighboring art. talonavicularis is also described under the common name of the transverse joint of the preplus, art. tarsi transversa, or chopar joint. The line of this joint is projected at a distance of 2.5-3.0 cm distal to the medial ankle and 4.0-4.5 cm distal to the lateral ankle. If we consider the General line of the joint of the chopar on the cut, it resembles a transversely laid Latin letter S.

Except for the ligaments that strengthen art. calcaneocuboidea and art. talonavicularis separately, the joint Chopra has shared a bunch of, practically very important. It's a bifurcated ligament, lig. bifurcatum, which begins at the upper edge of the calcaneus and then divides into two parts, one attached to the posterior lateral edge of the scaphoid bone and the other to the posterior surface of the cuboid bone. This short, but strong ligament is the" key " of the chopar joint, since only its cutting leads to a wide divergence of the articular surfaces during the operation of foot extraction in the named joint.

Metatarsals and metatarsals, art. tarsometatarsales, also called together the joint of Lisfranc , connect the bones of the second row of the Tarsus (the three cuneiform and the cuboid) metatarsals. Wedge-shaped bones articulate with the first three metatarsals, cuboid-with IV and V metatarsals. The first three joints have separate isolated articular bags, IV and V metatarsal - common. In General, pattern of joints that are included in limantova joint, arc protrusion, with rectangular back, respectively, the base of the II metatarsal bone. The articular slit is projected along the line extending posterior from tuberositas ossis metatarsalis V to the point located 2.0-2.5 cm distal to the tuberosity of the scaphoid bone.

The" key " of The lisfranc joint is lig. cuneometatarsalia interossea mediale. It goes from the medial sphenoid bone to the base of the II metatarsal bone. Only after dissection of the ligament in the joint is widely opened. The metatarsal joints are supported by the back and plantar ligaments, ligg. tarsometatarsalia dorsalia et plantaria.

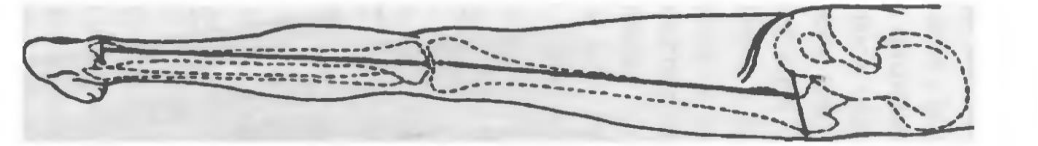
Metatarsophalangeal joints, articulationes metatarsophalangeae, connect the heads of the metatarsal bones and the bases of the proximal phalanges. The articular cracks of the metatarsophalangeal joints are projected along the line passing on the back of the foot by 2.0-2.5 cm proximal to the plantar-finger fold. These joints, like the joint of Lisfranc, from the rear, covered by the tendons of the extensors of the fingers, and from the sole - and-bone-fibrous channels of the flexor tendons of the fingers and caput transversum m. adductoris hallucis. The first metatarsophalangeal joint from the inside is strengthened by the tendon m. adductor hallucis.

Movement joints in General are the same as the brushes in the respective joints, but is limited. In addition to the easy retraction of the fingers to the sides and back, there is only the back and plantar flexion of all fingers together, and the back flexion is greater than the plantar, as opposed to the flexion of the fingers of the hand.

V. Tasks for independent work:

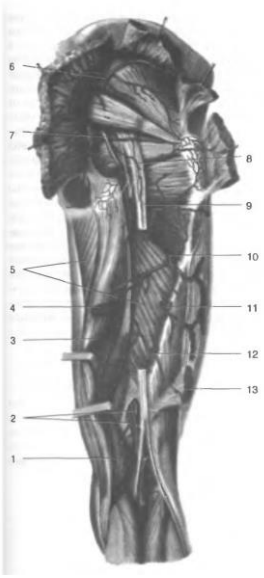
Task №1.

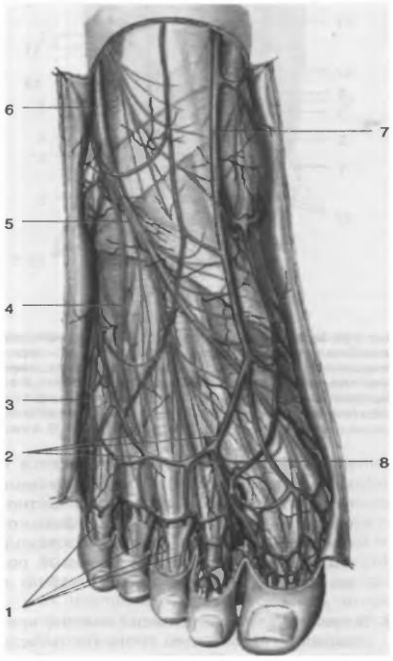
Indicate the projection of which nerve is indicated?



Task №2.

Specify education:





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Task №3.

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Task №4.
Make a task on the topic of the lesson. (In a notebook)

Task №5.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:

1. Borders and layer-by-layer topography of the gluteal region
2. Topography and aggressivenes podkrashivanija holes.
3. Adipose tissue of the gluteal region, communication with adipose tissue of adjacent areas.
4. The Boundaries and contents of the muscular lacuna.
5. The Boundaries and contents of the vascular lacuna.
6. Boundaries of the femoral ring.
7. Concept of "corona mortis»
8. Projection of the femoral artery.
9. Circumferential arterial circulation of the hip.
10. Boundaries and contents of the driving channel.
11. Ways of distribution of purulent processes and the leading channel.
12. Inversions of the knee joint their clinical significance.
13. Collateral circulation in the knee joint.
14. Topography of the popliteal fossa. The neurovascular bundle of the popliteal fossa.
15. The Topography of the popliteal fossa. Ways of distribution of purulent processes from the popliteal fossa.
16. Layer-by-Layer topography of the rear area of the lower leg. Helenoftroy channel: wall channel content.
17. Layer-by-Layer topography of the anterior region of the tibia front and lateral fascial bed of the leg. Neurovascular bundles of the anterior tibia.
18. Medial malleolar channel: wall channel content. Ways of distribution of purulent processes of the medial malleolar channel.
19. Layer-by-Layer topography of the sole of the foot. Cellular spaces of the foot. Ways of distribution of purulent processes from the middle cellular space of the foot.

VII. Learning objective:

№ 1. The patient K., 70 years old, developed a post-injection abscess in the thickness of the right large gluteal muscle Explain the cause of significant tissue tension and severe pain syndrome. What is the nature of the prevalence of purulent inflammation?

(Answer: the large gluteal muscle is divided into chambers by means of the processes of the gluteal fascia, as a result of which the suppuration processes are limited, accompanied by significant tissue tension and severe pain.)

No. 2. In an obese patient 68 years, perform operative access to the sciatic nerve in the back of the thigh. Can I use the gluteal fold as an external guide when cutting the skin? Why? How does this crease form?

(Answer: you Can not, because there is a shift of the gluteal fold downwards. The fold does not correspond to the lower edge of the large gluteal muscle (crosses it at an acute angle). This fold is formed due to the thinning of the proximal end of the broad fascia of the thigh, on top of which the subcutaneous fat forms a kind of arch)№ 3. Explain in which quadrant of the gluteal region do intramuscular injections take place? Why? Describe methods for determining the quadrant of the area in which the injection?

(Answer: Upper lateral. There are no neurovascular bundles. The first technique: a horizontal line drawn through a large spit, and a vertical line drawn through the sciatic hillock, the gluteal region is divided into four quadrants (Department). The second technique: the brush, opposite the gluteal area, with the maximum allotted thumb is placed so that the thumb is at the level of the large spit. The upper lateral part will be limited to the index and thumb)

VIII. Control tests:

Two arteries and four nerves pass from the pelvis through the submerged hole into the gluteal region: (6)

upper gluteal artery
+ internal genital artery
+ lower gluteal artery
upper gluteal nerve
+ back skin nerve of the thigh
+ the inferior gluteal nerve
+ sexual nerve

+ sciatic nerve

In a patient with tuberculous spondylitis of the 3rd lumbar vertebra, a "cold" leaky abscess in the anterior thigh area was detected during the examination, which descended along the course: (1)

next, the iliac and femoral blood vessels

femoral nerve extending from the lumbar plexus

+ ileum and lumbar muscles

The femoral artery in the femoral triangle is located in relation to the femoral nerve: (1)

from the front

below

lateral

+ medially

behind

The phlegmon of the popliteal fossa spread to the anterior thigh, which occurred along the: (1)

fascial vagina Sartorius muscle

the fascial vagina of the thin muscle

+ drive channel

the course of the sciatic nerve

IX. Glossary.

V. Saphena magna	Great saphenous vein
A. Femoralis	Femoral artery
R. Superficialis a. Circumflexae femoris medialis	Superficial branch of the femoral envelope artery
N. Femoralis	Femoral nerve
Canalis obturatorius	Locking channel
Sulcus femoris anterior	Anterior femoral furrow
Compartimentum femoris mediale	Medial thigh bed
Zona orbicularis	Circular area

Lesson on

«Upper and lower limb surgeries. Operations on vessels, nerves, tendons, long tubular bones and joints of the upper and lower extremities. Amputation and assertequal».

Motivational characteristics: knowledge of the location of the main neurovascular bundles of the axillary area, anterior and posterior shoulder, thigh, Shin and foot will allow to foresee the pathways of the spread of purulent processes from the axillary cavity and to conduct timely surgical interventions. Knowledge of ways of metastasis to the lymph nodes of the axillary cavity will allow to diagnose the localization of malignant tumors of the studied area in a timely manner.

I. Goals:

The student needs to know:	The student must be able:	The student must own:
1. Vascular suture-requirements, classification, types. 2. Projection of large vessels on the surface of the skin of the upper and lower extremities. 3. The technique of puncture and kanalirovaniya Central veins by Seldinger in each stage. 4. Technique of exposure and ligation of large vessels of the upper and lower extremities at each stage. 5. The technique of surgical intervention in operations on the vessels of the upper and lower extremities at each stage: • Vascular suture of Carrel • Vascular suture frost 6. Nerve suture-requirements, classification, types. 7. Projection of large nerves on the surface of the skin of the upper and lower extremities. 8. The technique of surgery for operations on the nerves of the upper and lower extremities at each stage: • Neurolysis • Endo neurolysis * Neurotomy * Nerve plasty 9. Tendon suture-requirements, classification, types. 10. Projection of large tendons on the surface of the skin of the upper and lower extremities. 11. Technique of surgical intervention in operations on the tendons of the upper and lower extremities at each stage: • Tenerife • Tenotomy * Tenolysis * Tenodesis • Tendon suture, Cuneo * Brown tendon suture * Lange tendon suture * Schwartz tendon seam * Witzel tendon suture * Bennell tendon suture 12. Joint operations-classification, types: • Arthroplasty * Arthrolysis • Arthrodesis * Arthrotomy • Resection • Disarticulation13. Technique of performing puncture of shoulder, elbow, wrist, hip, коленного суставов на каждом stage 14. Operations on the bones: • Amputations • Osteotomy • Trepanation • Resection • Bone grafting 15. The technique of performing operations on the bones at each stage.	1. Inspect and palpate areas of the upper and lower limbs. 2. Use special surgical instruments for operations on vessels, nerves, tendons, joints and bones of the upper and lower extremities at each stage. 3. Perform basic surgical interventions at each stage.	1. Skills of inspection and palpation of all parts of the extremities. 2. Skills of working with surgical instruments for operations on vessels, nerves, tendons, long tubular bones and joints of the upper and lower limbs. 3. Surgical manipulation skills at each stage.

II. Questions to test your baseline knowledge:

1. The projection of vascular and nerve bundles of the upper and lower limbs.
2. Out-and projection access to the neurovascular bundle (for example, access to the brachial artery in the middle third of the shoulder).
3. Types of primary surgical treatment of limb wounds. Damage to blood vessels, nerves, tendons of the limbs.

4. The types of vascular suture (node, suture (Carrel), "U" shaped).
5. Vessel suture by Carrel (phases of operation).
6. The structure of the nerve (cross-sectional diagram).
7. Suture of nerve (stages of the operation).
8. Bennel's tendon suture.
9. The types of amputation and the indications for it
10. Special surgical instruments for operations on bones and joints of limbs.

III. The object of study - the human body.

IV. Information part:

Symptoms of damage to the large nerves of the upper extremities

Damage or compression of the ulnar nerve most commonly occurs in four places: 1) in the rear region of the elbow with fracture of the medial epicondyle of the humerus or the olecranon (olecranon), 2) in the muscular tunnel formed at the junction of the humeral and ulnar heads of m. flexor carpi ulnaris in the anterior elbow region, and 3) in the canal of Guyon in the anterior region of wrist and 4) in the field of hypothenar where the nerve is relatively superficial and can be prone to injury.

Complete lesion of the ulnar nerve causes a weakening of the Palmar flexion of the hand due to the loss of function m. flexor carpi ulnaris (flexion is partially preserved due to m. flexor carpi radialis and m. palmaris longus, innervated by n. medianus), the lack of flexion of the main phalanges IV and V, and partly III fingers due to paralysis of the vermiform and interosseous muscles, the inability to reduce and dilute the fingers, especially V and IV (paralysis of the interosseous muscles), the inability to bring the thumb (paralysis m. conductor pollicis).

As a result of mm atrophy. interossei and lumbricales, as well as the muscles of the hypothenar and hyperextension of the main phalanges, there is a flexion of the middle and end, as a result of which the brush takes the form of a "clawed, bird's paw". Simultaneously, the fingers somewhat diluted, especially allotted and IV, mostly V fingers.

Surface sensitivity is usually disturbed in the skin of the V and medial half of the IV finger and the corresponding medial part of the hand.

Damage to the radial nerve often occurs when the humerus is broken in the middle third (here the nerve is directly attached to the bone) and when the neck of the radius is broken. In this case, the deep branch of the radial nerve may be damaged. However, the leading symptoms will be the same: due to the violation of innervation of the muscles-extensors of the wrist and fingers, the brush acquires a typical hanging form of "seal paw", it is also impossible to remove the thumb (paralysis m. conductor pollicis longus). The sensitivity of the skin of the hand is disturbed only when the radial nerve is damaged more proximally than the elbow joint, since the function of the sensitive surface branch of the radial nerve falls out.

With the defeat of the median nerve in the elbow region and the front region of the forearm suffer from pronation and the Palmar flexing the wrist, loss of flexion in the distal interphalangeal joints of fingers II and III because of violations of the innervation of the m. flexor digitorum superficialis and m. flexor digitorum profundus from the radial side. I cannot opposition of the thumb and flexion of the terminal phalanx of the I toe (paralysis m. flexor pollicis longus et brevis). The flexion of the fingers in the proximal interphalangeal joints of the II and III fingers is also lost due to paralysis of the first and second worm-like muscles. Thus, when you try to compress fingers in a fist, 2nd and 3rd fingers are straightened: a symptom of "the hand of the preacher».

Atrophy of the thenar muscles, loss of the function of the opposition of the I finger, violations of the flexion of the fingers, bringing the thumb close and in one plane to the index give the brush a flat-

Sensitivity falls on the Palmar surface of the I, II and III fingers and the adjacent half of the IV finger. On the back surface of the fingers falls skin sensitivity of the end phalanges II, III and IV fingers. There are trophic disorders-dry and cold skin, peeling, cyanosis.

With even lower nerve lesions (carpal tunnel syndrome), the flexion function of the end phalanges of I, II and III fingers (m. flexor pollicis longus and m. flexor digitorum profundus), and then all the symptoms of the lesion are limited to muscle damage thenar, mm. lumbricales and disturbances of sensitivity in a typical zone.

Upper limb surgery.

Joint punctures are used to determine the nature of the contents of the joint cavity, for the evacuation of pathological fluid, the introduction of drugs, as well as for the introduction of instruments in arthroscopy. As with all other punctures, the needle is injected through the skin displaced by the finger over the puncture site, so that when the skin returns to its place there is no direct wound channel through which the infection could enter the joint cavity. In most cases, the needle is injected through a pre-anesthetized area of the skin on the extensor surface of the joint, where there are no large vessels and nerves.

Puncture of the shoulder joint. The puncture is performed in the position of the patient lying on a healthy side or sitting, it can be performed in front, outside and behind.

In front of the shoulder joint is punctured, focusing on the coracoid process of the scapula, which is palpated in the subclavian fossa 3 cm down from the acromial end of the clavicle. The needle is inserted under the coracoid process and move posteriorly between it and the head of the humerus to a depth of 3-4 cm.

When the joint is punctured from the outside, the needle is injected downward from the most convex part of the acromion in the frontal plane through the thickness of the deltoid muscle.

When the shoulder joint is punctured from behind, the needle is inserted downwards from the acromion, into the recess formed by it and the posterior edge of the deltoid muscle, perpendicular to a depth of 4-5 cm.

Puncture of the elbow joint. The arm is bent in the elbow at right angles. Rear puncture produce over the tip of the olecranon and guide the needle forward. Behind the outside, the needle is inserted between the lateral epicondyle of the humerus and the ulnar process of the ulna and penetrates into the joint above the head of the radius.

Femoral neck fractures are quite common in people over 60 years of age, especially in women who at this age have weak bones and breakage as a result of developing osteoporosis. Currently, such fractures are successfully treated with a three-bladed

metal nail. Relatively rare failures of such treatment are often associated with impaired blood supply to the neck and femoral head. This occurs when the articular branches of the medial femoral envelope of the artery are damaged and all the blood supply to the head is assumed by a small artery of the ligament of the head. If this artery is damaged, the blood supply to the head stops and its aseptic necrosis occurs.

The common peroneal nerve due to the superficial position is damaged quite often. This is facilitated by the passage of the nerve around the neck of the fibula (in the upper muscular-fibular canal), which often leads to nerve damage in bruises or fracture of the neck of the bone. A complete rupture of the common peroneal nerve is accompanied by paralysis of all muscles of the anterior and lateral fascial bed of the tibia (deep peroneal nerve) and a violation of the skin sensitivity of the anterolateral surface of the tibia and the rear of the foot (superficial peroneal nerve). At the same time, the extension of the foot is impossible, it hangs, slightly turned inside, the fingers are slightly bent "horse foot".

The patient has to lift his leg high so as not to touch his foot on the ground (a symptom of "cock gait"). Walk on heels sick not can.

Ankle fractures account for up to 60% of all Shin fractures. Most often, the fracture of the ankles occurs when the foot is" turned " from the outside, that is, when the foot is pierced. Therefore, this type of damage is called pronational fractures. In the classical pronational fracture of the Dupuytren, a fracture of the medial ankle or a rupture of the medial collateral (deltoid) ligament, a fracture of the fibula in the lower third, a rupture of the distal intervertebral syndesmosis, subluxation or dislocation of the foot outside.

Forced "turning" of the foot inside leads to the so-called supination fracture. This damage - reverse mechanism pronational fracture. Sharp supination of the posterior part of the foot leads to tension of the heel-fibular ligament and to its rupture or tear-off fracture of the outer ankle. The fracture line runs in the transverse direction.

Supination fracture includes: 1) tear-off fracture of the outer ankle or its equivalent-rupture of the external lateral ligaments of the ankle; 2) oblique fracture of the inner edge of the tibia; 3) subluxation or dislocation of the foot inside.

Lower limb surgery.

Puncture of the knee joint. To puncture the knee joint in 4 spots: in the field verhnesadovogo, Nizhnetagilskogo, verkhnemartynovo and nizhnemartynova corners of the patella.

The most commonly used is the upper lateral approach: the point of injection is located at the same time 1.5-2 cm outside and down from the base of the patella (here the upper lateral inversion of the knee joint is projected, in which there is no cartilage tissue, and the joint capsule is not covered by muscles, i.e. the puncture is made only through the skin, subcutaneous fat and the joint capsule).

The needle is inserted perpendicular to the surface of the skin and lead behind the patella in a horizontal plane. Typically, the depth of the needle is not more than 1.5-2.5 cm. This is the easiest, safest and most effective way to puncture the knee joint.

If it is impossible to puncture the joint in the upper lateral point, the puncture can be carried out in the lower lateral (1.5-2 cm outside and down from the top of the patella), the needle is led by the patella (the depth of the needle is 1.5-2.5 cm).

When a puncture in the lower medial (1.5-2 cm outside and down from the top of the patella) and upper medial points (1.5-2 cm outside and up from the base of the patella), the needle leads behind the patella to its center (the depth of the needle is 1.5-2.5 cm).

Amputation

Amputation is the operation of cutting off the distal part of an organ or limb. Amputation at the level of the joint is called exarticulation.

Distinguish primary amputation indications (primary), secondary reading (secondary) and re, or reamputation.

Primary amputation is performed in the order of primary surgical treatment of the wound to remove the non-viable part of the limb in the early stages-before the development of clinical signs of infection.

Secondary amputation is performed when conservative measures and surgical treatment are ineffective. Amputations for secondary indications are performed in any period of treatment with the development of complications that threaten the life of the patient.

Reamputation carried out after unsatisfactory results produced by the earlier truncation of the limb, with a vicious stumps preventing the prosthesis, the propagation of the tissue necrosis after amputation, the gangrene due to occlusive vascular disease or the progression of anaerobic infections.

Indications for primary amputation: complete or almost complete traumatic separation of the limb; wounds with damage to the main vessels, nerves, soft tissues, with bone fragmentation; extensive open damage to bones and joints when it is impossible to correct and secondary circulatory disorders; extensive soft tissue damage over 2/3 of the circumference of the limb; frostbite and extensive burns bordering on charring.

Amputation for primary indications should be simple and quick. The level of amputation is determined by the location of the wound, the General condition of the victim and local changes. Emergency amputation is performed within healthy tissues and at a level that guarantees the life of the victim and provides a favorable postoperative course.

Emergency amputation should be made as far as possible in order to preserve the length of the future stump.

It should be borne in mind, however, that with the development of new surgical technologies, such as microsurgery, it is possible to preserve the limb even in situations that were previously considered an absolute indication for amputation. Many successful cases of hand replantation after its complete separation have already been described.

Indications for secondary amputations: extensive soft tissue damage with bone fractures, complicated by anaerobic infection; common purulent complications of tubular bone fractures in the failure of conservative treatment; purulent inflammation of the joints when they are injured or the transition of the inflammatory process with bone epiphyses in the phenomena of intoxication and sepsis; repeated bleeding from large vessels with large purulent wounds, developing sepsis and depletion of the wounded, failure of conservative treatment; necrosis of the limb due to obliteration or ligation of the main arterial trunks; frostbite IV degree after necrectomy or rejection of dead areas.

As can be seen from the list of indications, each of them somehow mentions the development of infection. Only when exhausted all the possibilities of fighting infection, there are indications for amputation.

In peacetime, amputations are most often performed in connection with the defeat of the arteries in atherosclerosis and obliterating arteritis and in cases of road injuries.

Amputation of the limb consists of 4 main points: dissection of the skin and other soft tissues; bone sawing; wound treatment, vascular ligation, nerve excision; wound suturing.

By type of soft tissue dissection amputations are divided into circular and patchwork. Circular amputations are used on those parts of the limbs, where the bone is uniformly surrounded by soft tissues.

Circular amputations are divided into guillotine, one-, two - and three - torque.

When guillotine amputation of all soft tissue and bone cross in the same plane without prior pulling of the skin. This method is used for anaerobic infection. The limb in these cases is amputated within healthy tissues, the stump remains widely open for aeration. With appropriate treatment with serums and antibiotics in this case, you can save the life of the wounded. At the same time, it is clear - with this method, a pathological stump with a bone protruding from the soft tissues is deliberately formed, which will require re-amputation.

With simultaneous amputation, the skin and subcutaneous tissue are previously pulled proximally, after which all soft tissues are cut with one movement of the amputation knife. Then, pulling as much as possible proximally soft tissue with a retractor, saw the bone. This method of amputation differs from the guillotine in that the bone is not crossed at the same level with soft tissues, and after pulling them. This creates a small supply of soft tissue, which, however, is not enough to fully cover the stump. This amputation is performed in a serious condition of the patient, when he can not tolerate more complex methods of amputation.

Two-stage method of amputation: first dissect the skin, subcutaneous tissue and fascia (the first moment), then along the edge of the contracted and drawn skin dissect all the muscles to the bone (the second moment), after which the muscles are pulled proximally and sawed bone. The three-stage method also begins with the dissection of the skin, fiber and fascia, the second point is the dissection of the superficially located muscles, which can be reduced by a significant distance when cut. The third point is dissecting the deep muscles on the edge of the reduced surface, pulling the entire array of soft tissues with a retractor and cutting the bone.

It is easy to note that the number of "moments" refers to the dissection of soft tissues only, bone cutting as a stage of amputation does not apply to these "moments". The principle of two-and three-moment soft tissue dissection in circular amputation introduced N. And. Pie. These methods make it possible to hide the cut of the femur or humerus in the depth of the cone of soft tissues. The scar of the skin with such a conical-circular method of amputation is located on the end (support for the lower limb) surface of the stump.

Patchwork methods of amputation are now more common. More often they are used in the amputation of the Shin and forearm. There are one-and two-flap amputations, in which the wound is covered with one or two flaps. Flaps are formed from the skin and subcutaneous fat. If the flap is activated and fascia, amputation is called fascinations. In most cases, a long flap should be equal in length to 2/3, and the width - the full diameter of the limb at the level of amputation. The short flap is 1/3 of the diameter, i.e. half the length of the long flap. Due to this, the skin scar of the stump is shifted from the end to the non-supporting part of the stump, which facilitates subsequent prosthetics. The optimal is considered to be a cutting out of the flap, which allows to achieve the location of the scar on the back surface on the leg and thigh stumps.

По способу укрытия опила кости различают фасциопластические, миопластические и костно-пластические ампутации. Для верхней конечности наиболее приемлем фасциопластический метод, для нижней конечности - костно-пластический. Начало костнопластическим ампутациям положил Н.И. Пирогов, который впервые сформировал опорную культю голени за счет лоскута пяточной кости.

Later, this principle was used in the amputation of the Shin (bir), thigh (Gritti). However, these methods are quite technically complex, a prerequisite for their use is a good blood supply to all tissues of the limb. In practice, they are used relatively rarely.

According to the method of processing bone stump distinguish periosteal (subperiosteal) and aperistalsis methods. At the first of them, the periosteum is dissected distal to the level of the cut of the bone and pushed in the proximal direction, so that after cutting the bone to cover this periosteum of sawdust of the bone. In practice, this method can be used only in children because of the good elasticity of their periosteum. In adults, it is almost impossible to move the periosteum without its damage, and the damaged areas of the periosteum subsequently become the site of growth of acute bone spikes - osteophytes, which makes the stump unsuitable for prosthetics ("vicious" stump).

As a rule, currently applied aperistalsis method. It lies in the fact that after a circular incision of the periosteum with a scalpel it move rasp Farabee in the distal direction for a distance of at least 0.5 cm Saw to perelivania bones put on 2-3 mm distal to the smooth edges cross the periosteum. As a result, the periosteum is not injured by the saw, and the blood supply to the bone stump remains good.

Treatment of the nerves of the stump when amputation. After cutting off the bone, the nerves in the soft tissues of the stump are processed. Currently, the nerves are crossed by a razor blade or a sharp scalpel after moving the soft tissues in the proximal direction by 5-6 cm.it is not recommended to pull the nerve. Cutting the nerve with scissors is unacceptable. In the process of operation should be shortened not only the main nerve trunks, but major cutaneous nerves. High the intersection nerve is the prevention of ingrowth of neurom inevitably formed in the connective tissue of the scar soft tissue. If this happens, there are severe pains, sometimes phantom, that is, in amputated fragments. At the same time, the intersection of the nerve should not be too high, because in this case, muscle atrophy can develop with the formation of trophic skin ulcers, contractures, etc.

Treatment vessels of the stump. As a rule, amputations are performed under a tourniquet. This makes it possible to cross all soft tissues bloodlessly. At the end of the operation, before removing the tourniquet in the cult, all large vessels are tied, and the arteries are tied with two ligatures, the lower of which must be stitched: one of the ends of the ligature is inserted into the needle,

with which both walls of the artery are stitched. This additional fixation insures against slipping of the ligature. As a suture material, many surgeons prefer catgut, because the use of silk may form a ligature fistula. The ends of ligatures cut off only after removal of a plait. Smaller vessels are tied with stitching of surrounding tissues.

Operations on vessels of the lower extremity

Puncture of the femoral artery by the Seldinger. Puncture is carried out for the purpose of introducing into the aorta and its branches of the catheter, through which it is possible to carry out contrasting vessels, to probe the heart cavity. The needle is injected with an internal diameter of 1.5 mm immediately below the inguinal ligament by the projection of the femoral artery. Through the lumen of the needle introduced into the artery, the conductor is first introduced, then the needle is removed and instead a polyethylene catheter with an external diameter of 1.2-1.5 mm is put on the conductor.the Catheter together with the conductor is moved along the femoral artery, iliac arteries into the aorta to the desired level. Then the conductor is removed, and a syringe with a contrast agent is attached to the catheter.

Surgery for varicose veins of the lower leg and thigh. With varicose veins of the lower limb (V. saphena magna and V. saphena parva) because of the insufficiency of venous valves, blood stagnates in the lower parts of the lower leg, resulting in impaired tissue trophism, developing trophic ulcers. This is facilitated by the insufficiency of the valves of the perforant veins, due to which the blood from the deep veins is discharged into the superficial veins. The purpose of operations is the elimination of blood flow through the superficial veins (with full confidence in the patency of deep veins!). Previously used operations for ligation of the great saphenous vein at the site of its confluence into the femoral (in particular, the operation of Troyanov-Trendelenburg was not effective enough. The most radical is the operation of complete removal of the great saphenous vein by Babcock. The principle of the method is to remove the vein by means of a special flexible rod inserted into it with a Mace-shaped head at the end through a small incision under the inguinal ligament to the level of the knee joint, where venesection is also performed through a small incision. The conductor is withdrawn through the hole, clavate head replaced by unextracted (metal cone with sharp edges). Pulling the extractor for the conductor at the upper incision, remove the vein from the subcutaneous tissue. By the same principle, the distal part of the vein on the lower leg is removed.

To eliminate the discharge of venous blood from the deep veins into the superficial veins, an operation is performed to ligate the perforant veins by the Kokkett method (in the subcutaneous tissue, that is, epifascial) or by the Linton method (subfascial). Currently, operations on dressing of perforant veins have been successfully performed with the help of video endoscopic techniques.

V. Tasks for independent work:

Task №1.

Specify the basic requirements for the vascular suture. Explain the clinical significance of the Carrel suture.

Task №2.

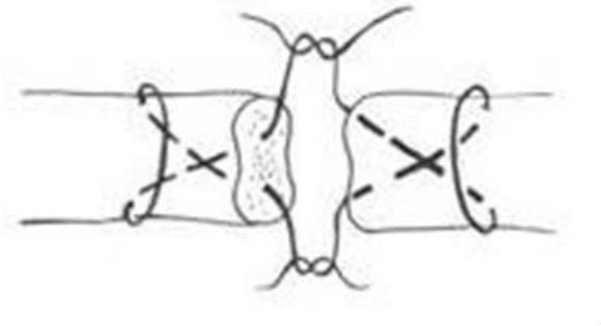
Specify the basic requirements for the nerve suture.

Task №3.

Specify the basic requirements for the tendon suture.

Task №4.

Tendon suture. Name the author.



Task №5.
Make a task on the topic of the lesson. (In a notebook)

Task №6.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:

1 The Main methods of surgical interventions on the joints of the limbs.
2 Primary surgical treatment of limb wounds.
3 Ways to stop bleeding.
4 Technique of performing puncture of shoulder, elbow, hip, knee joints. Indications and technique of execution, guillotine amputation of the limb. Treatment of blood vessels and nerves.
5 Indications and technique dvuhmomentnaya amputation of the limb. Treatment of blood vessels and nerves.
6 Indications and technique of three-stage amputation. Treatment of blood vessels and nerves.
7 Osteoplastic amputation of the foot by Pirogov.

VII. Learning objective:

№1 The surgeon applies a circular vascular suture by the method of Carrel. Explain what purpose a pre-excised outer casing (the adventitia), freeing her from 2-3 mm of the ends of the artery?

(Answer: So that when sewing the artery wall to eliminate the screwing of the outer shell into the lumen (athrombogenic vascular suture)

No. 2. When performing a circular vascular suture according to Carrel's method, the surgeon connects the ends of the artery with three “P” - shaped sutures-taped. For what purpose are used the suture-holders?

(Answer: 1) rapprochement of the ends of the artery and fixing them in this position; 2) transfer of the wound of the artery to the horizontal plane; 3) inversion of the wall of the ends of the artery to compare them with the inner shells ("intima to intima", to ensure the atrombogenicity of the vascular suture); 4) the possibility of rotation of the artery along the axis, to suture the three faces.)

No. 3. In the treatment of closed fractures of long tubular bones used skeletal traction, providing good reposition and fixation of bone fragments. In some cases, shows a skeletal traction? In what ways it is carried out?

(Answer: in fractures that are not amenable to simultaneously reposition; if it is impossible to retain the fragments after one-stage reduction with a plaster bandage. Two methods of skeletal traction: holding the metal needles and the use of metal terminals in the area metafit (most often in the area of the condyles of the femur, tibial tuberosity, calcaneal tuberosity, the olecranon)

VIII. Control tests:

Puncture of the elbow joint in the medial epicondyle of the humerus is not performed due to the risk of damage: (1)
radial nerve
+ ulnar nerve
brachial artery
shoulder vein
median nerve

The location of the postoperative scar at the end of amputation is desirable: (1)
on the work surface
+ on non-working surface
at the end of the stump
on the surface with the most durable leather
the location of the scar does not matter

Circular amputations are: (3)
+ one-stage
+ two-stage
+ three-stage
four-stage
five torque

Excision of the articular ends of the bones affected by any pathological process is called: (1)
+ resection of the joint
arthroplasty
synovectomy
arthrodesis

arthrotomy

Alignment and comparison of displaced bone fragments in fractures is called: (1)

redressing

osteosynthesis

osteotomy transplantation

+ reposition

IX. Glossary:

M. Adductor pollicis	The muscle that leads the thumb
V. Saphena parva	Small saphenous vein
Flexor digitorum profundus	Deep flexor of fingers
M. Flexor carpi ulnaris	Elbow flexor of the wrist
M. Interossea	Interosseous muscle
N. Medianus	Median nerve
Mm. Lumbricales	Worm-like muscles
Thenar	The muscles of elevation of the thumb

Lesson on

«Operations for purulent inflammatory diseases of the upper and lower extremities. Phlegmons of the upper and lower extremities. Operations at purulent processes in the region of the fingers: panaritiums».

Motivational characteristics: knowledge of the location of the main neurovascular bundles of the axillary area, anterior and posterior shoulder area, elbow, forearm, hand, thigh, Shin and foot will allow to foresee the ways of the spread of purulent processes and to conduct timely surgical interventions. Knowledge of ways of metastasis to the lymph nodes of the axillary cavity will allow to diagnose the localization of malignant tumors of the studied area in a timely manner.

I. Goals:

The student needs to know:	The student must be able:	The student must own:
1. Basic principles of surgical treatment of purulent processes of limbs 2. Anatomical justification of incisions on the upper and lower limbs 3. Anatomical substantiation of operative access to the main vascular and nervous elements of the upper limb 4. Anatomical substantiation of operative access to the main vascular and nervous elements of the lower limb 5. Ways of distribution of purulent processes in the course of the main anatomical structures (the course of neurovascular elements, fascial case) 6. Anatomical justification of incisions in the phlegmon of the upper and lower extremities 7. Anatomical study of the breakdown when panaracer. 8. The technique of various methods of anesthesia. 9. Technique of opening purulent processes of different localization.	1. Inspect and palpate areas of the upper and lower limbs. 2. Use special surgical instruments for operations with purulent inflammatory diseases of the upper and lower extremities at each stage. 3. Perform basic surgical interventions at each stage	1. Skills of inspection and palpation of all parts of the extremities. 2. Skills of working with surgical instruments for operations on soft tissues of the upper and lower extremities. 3. Skills of surgical procedures at each stage.

II. Questions to test the initial level of knowledge:

1. To inspect and palpate the limbs.
2. Basic principles of surgical treatment of purulent processes of limbs.
3. Technique of different methods of anesthesia and opening of purulent processes of different localization.

III. The object of study-the human body.

VI. Information part:

Operations for purulent diseases of the hand and fingers

Panaritiums. Panaritium-acute purulent inflammation of the tissues of the finger. Types of panaritium are called in to the layer thumb, which developed inflammation. According to V. K. Gostishev stands out 12 kinds of panaritium.

Treatment of panaritium, like other chronic diseases, surgical. The task of the surgeon is to create an outflow of purulent discharge, resulting in relieving tension, pain and swelling of inflamed tissues, improving the flow of antibacterial drugs to the purulent focus.

Subcutaneous panaritiums of distal phalanx of good drainage of purulent exudate reaches using glucoamylase cut. The scalpel is injected from the side of the phalanx (stick hook) and leads towards the interphalangeal joint in the frontal plane, thus dissecting the connective tissue strands running from the skin to the bone. As a result, all cells filled with pus are destroyed and pus easily flows.

On the lateral surface of the phalanx remains incision (stick handle), which after the elimination of the purulent process heals to form a thin elastic scar. From Fig. 3.59 it is clear that the median incision cannot be effective because only a limited number of purulent cells will be revealed. In addition, the incision on the palm surface limits the function of the finger.

Subcutaneous panaritii II and III phalanges are opened on the Clap with anterolateral incisions, also dissecting the subcutaneous tissue with a scalpel.

Operations on the back surface of the distal (nail) phalanx

With paronychia, the skin nail fold (eponychium) is dissected by a transverse incision and from the ends of this incision in the proximal direction two parallel incisions are made throughout the purulent infiltrate that has developed in the periungual bed. The resulting U-shaped flap is turned away proximally and resected by the pus exfoliated edge of the nail.

Subungual panaritium, developed as a result of suppuration of the subungual hematoma, is drained with a hole created in the nail plate or with a scalpel, removing the layers of the nail to the purulent focus, or a trepanation cutter.

Subungual when panaritiums, developed around a splinter, has penetrated under the free edge of the nail, produce a wedge-shaped excision site of the nail plate covering the splinter and surrounding abscess.

Operations at purulent tendovaginitis

Tendovaginitis is an acute purulent inflammation of the synovial vagina of the tendon. This disease is dangerous because of the compression of the feeding vessels can occur necrosis of the tendon. Surgical treatment consists in opening the synovial vagina and evacuation of purulent contents. With tendovaginitis II, III and IV fingers, small incisions of the skin, subcutaneous tissue are produced on the lateral surfaces of the middle and main phalanges anteriorly from palpable bone phalanges.

Then open the bone-fibrous channels and synovial vagina, focusing on the shiny tendons. These cuts should not enter the skin Palmar interphalangeal folds and the corresponding circular ligaments of the bone-fibrous channels, the damage of which the tendons of the flexors of the fingers are dislocated from the wound, followed by their drying and loss of function. In addition to these incisions, incisions are made at the projection site of the blind proximal ends of the synovial sheaths on the palm of the hand.

Through the lateral incisions on the phalanges of the fingers, drains are carried out anteriorly from the tendon. Attempt to carry out the drainage behind the tendon will cause damage bryzheechki of the tendon and necrosis.

Tendovaginitis I and V fingers also referred to as andalusite, radius and ulna. Their treatment differs from the previous ones by additional incisions in the palm of the hand on the projection of the corresponding tendons. Almost always, additional incisions are made on the corresponding side of the lower third of the forearm to open the space of the Parona-Pirogov, where the proximal blind bags of the radial and ulnar synovial bags are located.

Operations at phlegmon of a brush

On the brush there are the following inflammatory diseases: skin abscess (Namin, corn abscess); subcutaneous (nationalaties) cellulitis of the hand; podmonastyrskaya phlegmon of hand; a thenar abscess; abscess of hypothenar; subcutaneous abscess of the back of the hand; podmonastyrskaya cellulitis of the back of the hand.

The opening of the subaponeurotic phlegmon of the middle fascial palm bed along the Voino-Yasenetsky Peak is carried out by longitudinal incisions along the elevation of the I finger inside from the projection of the tendon of the long flexor of this finger and over the elevation of the muscles of the V finger.

In the middle bed penetrate through the outer and inner intermuscular septum, destroying them in a blunt way.

Drainage tubes depending on the location of the phlegmon are introduced into the subaponeurotic or subcutaneous slit of the middle bed through both incisions. The brush and fingers are fixed on the tire in a semi-bent position.

Podrastali autopsy phlegmon of Tenar bed. An incision of all layers 4-5 cm long is made in parallel and outwards from the projection of the tendon of the long flexor of the I finger. Drainage of the deep cellular gap between the muscle leading to the thumb and the first posterior interosseous muscle is carried out by incision from the I to the II finger along the first interdigital fold.

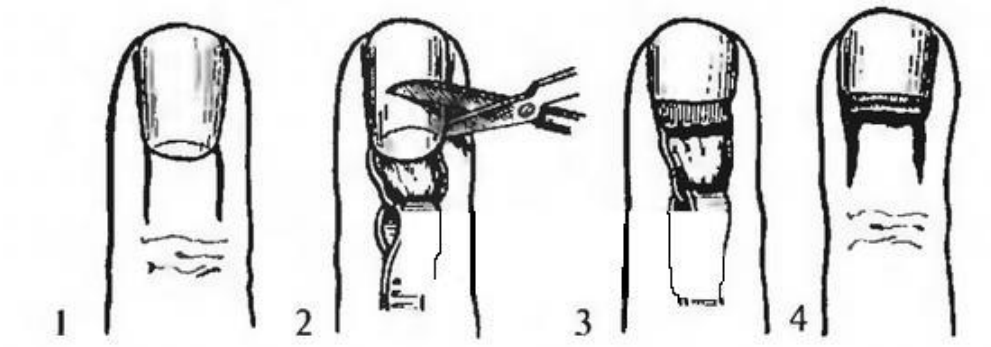
Opening of the rear of the brush. Subcutaneous cellulitis of the back of the hand open slit through the center of the fluctuations.

The autopsy podporujici cellulitis of the back of the hand. Incisions are made over the II and V metacarpal bones, to which own fascia is attached. In both cuts start drainage tubes.

V. Tasks for independent work:

Task №1.

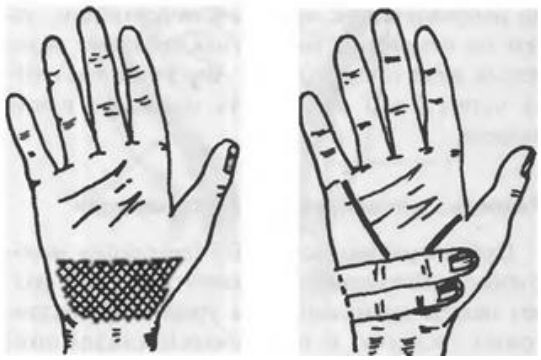
Specify the operation steps:



1 -	
2 -	
3 -	
4 -	

Task №2.

Specify what is shown in the picture?



Task №3.
What are the types of local anesthesia used in the surgery of felon.

Task №6.
Make a task on the topic of the lesson. (In a notebook)

Task №7.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:

1 Technique of different methods of anesthesia and opening of purulent processes of different localization.
2 Anatomical justification of incisions on the upper and lower limbs
3 Inspect and palpate the limbs.
4 To Implement cuts in all types of felon.
5 To Perform incisions at phlegmon of the shoulder, cubital fossa, forearm (space of Pirogov-Parona).

VII. Learning objective:

№1. The patient has subcutaneous panaritium of the Palmar surface of the middle phalanx of the middle finger. What is the reference point when applying the cut? Explain where the incision is made?

(Answer: the Neutral line (srednevekovaja). The incision is made on the anterior-lateral surface of the phalanx, without continuing it to the interphalangeal joints.)

No. 2. The patient has subcutaneous panaritium. The focus of destruction on the Palmar surface of the nail phalanx of the ring finger. What kind of incision will be used by the surgeon?

(Answer:" club-Shaped " on the anterolateral surface of the phalanx.)

No. 3. The history of the development of purulent surgery it is known that subcutaneous and tendon panaritiums after a bilateral anterior-lateral incision on the phalanx offered through the drains from one side to the other? What are the disadvantages of this method of drainage of the synovial vagina?

(Answer: the Risk of damage to the mesentery of the tendon (when tenosynovitis) and infection of the tendon sheath (subcutaneous panaritiums).)

VIII. Control tests:

U-shaped phlegmon is: (1)

+ purulent tendovaginitis of 1 and 5 fingers
purulent tenosynovitis of the fingers 2 and 4
purulent tenosynovitis of the fingers 2 and 3
purulent defeat of intermuscular spaces of elevation of 1 and 5 fingers
all of the above

The phlegmon of the popliteal fossa spread to the anterior thigh, which occurred along the: (1)

fascial vagina Sartorius muscle
the fascial vagina of the thin muscle
+ drive channel
the course of the sciatic nerve

For the skin of the axillary cavity, two diseases are most characteristic: (2)

trophic ulcer
+ hydradenitis
+ boils
eczema
psoriasis

Axillary tissue is associated with tissue infraclavicular region during: (1)

rear artery, the envelope of the humerus
the front of the artery, the envelope of the humerus
median nerve
+ axillary artery
radial nerve

Two arteries and four nerves pass from the pelvis through the submerged hole into the gluteal region: (6)

upper gluteal artery
+ internal genital artery
+ lower gluteal artery
upper gluteal nerve
+ back skin nerve of the thigh
+ the inferior gluteal nerve
+ sexual nerve
+ sciatic nerve

IX. Glossary:

Panaricium	Panaritiums
M. Extensor digiti minimi	Little finger extensor canal
Phlegmone	Phlegmon
M. Extensor carpi ulnaris	The ulnar extensor of the wrist
Vagina tendinum	Synovial vagina
Canalis humeromuscularis	Radial nerve canal
Caput humeri	The head of the humerus
Collum anatomicum humeri	Anatomical neck of the humerus

Lesson on
Module
"Subject and tasks of topographic anatomy and operative surgery. Topographic anatomy and operative surgery of the upper and lower extremities»

TO MODULAR NOT ALLOWED STUDENT:
1. With unprocessed passes
2. With unfulfilled independent work

Purposes:

The student needs to know:	The student must be able:	The student must own:
1. Subject and tasks of topographic anatomy and operative surgery. Methods of studying topographic anatomy. Basic concepts of topographic anatomy. General provisions, principles of operative surgery, stages of surgical intervention, types of surgical operations. Type of anesthesia. Classification of surgical instruments. General rules and techniques for using tools for various purposes. Methods of separation and connection of tissues. The main ways of knitting knots. 2. Topographic anatomy and operative surgery of the upper and lower extremities. 3. Ways of distribution of purulent processes in the course of the main anatomical structures (the course of neurovascular elements, fascial case) 4. Anatomical substantiation of operative access to the main vascular and nervous elements of the upper and lower extremities. 5. Basic principles of operations on vessels, nerves, tendons, joints, bones of limbs. 6. Technique of different methods of anesthesia and opening of purulent processes of different localization.	1. Inspect and palpate areas of the upper and lower limbs. 2. Show the drug elements, education and organs of the selected area. 3. Use special surgical instruments for operations on vessels, nerves, tendons, joints and bones of the upper and lower extremities at each stage. 4. Perform basic surgical interventions at each stage.	1. Skills of inspection and palpation of all parts of the extremities. 2. The method of preparation of the selected area. 3. Skills of working with surgical instruments for operations on vessels, nerves, tendons, long tubular bones and joints of the upper and lower limbs. 4. Skills of surgical manipulations on каждом этапе.

QUESTIONS TO MODULAR LESSON "THE SUBJECT AND TASKS OF TOPOGRAPHICAL ANATOMY AND OPERATIVE SURGERY. TOPOGRAPHICAL ANATOMY AND OPERATIVE SURGERY OF THE UPPER AND LOWER LIMBS»

1. The subject and tasks of topographical anatomy.
2. Methods of studying topographic anatomy.
3. General provisions of operative surgery.
4. Principles of operative surgery.
5. Stages of surgery.
6. Types of surgery.
7. Surgical treatment of wounds:
8. Primary-species
9. Secondary: complete, incomplete
10. Classification of surgical instruments: General surgical, special
11. Suture material:
12. Requirements for suture material.
13. Main parameters
14. Classification
15. Separation and connection of fabrics.
16. Skin incision
17. Basic principles of wound closure
18. Seams. Nodes.
19. Views
20. Classification
21. Types of anesthesia in surgery: local – infiltration, conductor, case; General (anesthesia) – intravenous, mask, combined.
22. Layer-by-layer topography of the axillary region. The boundaries of the axillary region. The walls of the axillary fossa. The main neurovascular bundle. Projection line of the axillary artery.
23. Layer-by-layer topography of the axillary region. The boundaries of the axillary region. The walls of the axillary fossa. The main neurovascular bundle. Projection line of the axillary artery.
24. Layer-by-layer topography of the axillary region. Ways of distribution of purulent processes from the axillary area.
25. Shoulder joint. Weak areas of the capsule of the shoulder joint. Nerves adjacent to the joint capsule.
26. Layer-by-layer topography of the fake area. Ways of distribution of purulent processes from the fake area.
27. Layer-by-layer topography of the axillary region. Brachial plexus: bundles and branches of the brachial plexus. Lymph nodes of the axillary fossa.
28. Layer-by-layer topography of the shoulder region. The blade of the arterial arch: the vessels involved in the formation of the arc. Clinical significance of the scapular arterial arch.
29. Topography of deep vessels and nerves of the shoulder.
30. Layer-by-layer topography of the elbow region. Surface vessels of the ulnar region. Arterial network of the elbow joint.
31. Elbow joint. Weak areas of the capsule of the elbow joint. Nerves adjacent to the joint capsule.
32. Topographic anatomy of the anterior forearm. Neurovascular bundles of the anterior forearm.
33. Topographic anatomy of the posterior forearm. Neurovascular bundle of the posterior forearm.
34. Pirogov-Paron Space. Ways of distribution of purulent processes in Pirogov-Paron space.
35. Layer-by-layer topography of palm. Cellular space of the palm. Innervation of the fingers.
36. The median cellular space of the palm. Formation and localization of arterial arcs of the palm.
37. Synovial sheaths of the tendons of the flexors of the fingers. Features of the synovial sheaths of the flexor tendons in different fingers.
38. Layer-by-layer topography of the gluteal region. Ways of distribution of purulent processes from the deep tissue of the gluteal region.
39. Layer-by-layer topography of the anterior region of the thigh. Muscular and vascular lacunae: the boundaries and formations passing through them. Femoral hernias.
40. Layer-by-layer topography of the anterior region of the thigh. The boundaries of the scarp triangle. The relative position of the femoral vessels at different levels of the scarp triangle.
41. Topography of femoral artery and its branches. Drive channel. Projection line of the femoral artery.
42. Topography of the locking channel. Neurovascular bundle of the obturator canal. The clinical significance of the obturator canal. The projection of its external opening on the skin of the thigh.
43. The circumferential arterial circle of blood circulation of the hip area. Vessels involved in its formation. Clinical significance of this arterial circle.
44. Layered topography of the posterior thigh. The projection line of the sciatic nerve.
45. Inversions of the knee joint are of clinical importance.
46. Collateral circulation in the knee joint.
47. опография подколенной ямки. Сосудисто-нервный пучок подколенной ямки.
48. Топография подколенной ямки. Пути распространения гнойных процессов из подколенной ямки.
49. Layer-by-layer topography of the rear area of the lower leg. Helenoftroy channel: wall channel content.
50. Layer-by-layer topography of the anterior region of the tibia front and lateral fascial bed of the leg. Neurovascular bundles of the anterior tibia.

51. The medial malleolar channel: wall channel content. Ways of distribution of purulent processes of the medial malleolar channel.

52. Layered topography of the sole of the foot. Cellular spaces of the foot. Ways of distribution of purulent processes from the middle cellular space of the foot.

Lesson on

«Topographic anatomy of the brain of the head. Operative surgery: access to areas of the brain. Craniocerebral wounds, penetrating and non-penetrating wounds, craniocerebral injuries, intracranial hematomas, craniotomy, drainage operations in hydrocephalus (concept), trepanation of the mastoid process».

Motivational characteristics: knowledge of the location of the main neurovascular bundles of the brain Department of the skull allows to foresee the ways of the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of ways of metastasis to the lymph nodes will allow to diagnose the localization of malignant tumors of the studied area in a timely manner.

I. Goals:

The student needs to know:	The student must be able:	The student must own:
1. A topographical anatomy of cerebral Department of the head - region, borders, holotape, syntopia, sellotape, layered structure. 2. Brain skull bones 3. Topographic anatomy of the brain regions of the head: □ frontal area of homotopia, syntopia, sellotape, layered structure. □ the parietal region of homotopia, syntopia, skeletopy, the layered structure of the □ the occipital region of homotopia, syntopia, sellotape, layered structure. □ temporal region of homotopia, syntopia, sellotape, layered structure. □ mastoid region of homotopia, syntopia, sellotape, layered structure. 4. The shells of the brain, the interlobular space 5. Topographic anatomy of venous sinuses. 6. Blood supply to the brain 7. Craniocerebral topography (scheme Konlein Brusovo) 8. Topographic anatomy of the ventricles of the brain 9. Signs of impaired outflow of liquid from the ventricles of the brain. 10. The technique of surgical intervention in operations on the brain section of the head at each stage.	1. Inspect and palpate areas of the brain of the head. 2. Show on drug: □ brain Department of the head-border □ frontal area-borders □ parietal region-boundaries □ occipital region-borders □ temporal region-boundaries □ mastoid region-boundaries □ membranes of the brain □ venous sinus projection 3. Draw a diagram Cranlana Brusovo 4. To explain the scheme Cranlana Brusovo 5. Show the projection of the ventricles of the brain 6. Use special surgical instruments for operations on the brain section of the head at each stage. 7. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the brain Department of the head. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the brain section of the head. 4. Surgical manipulation skills at each stage.

II. Questions to test your baseline knowledge:

1. Frontal-parietal-occipital and temporal regions.
2. region of the mastoid process.
3. Inner and outer skull base.
4. The shells of the brain and the subshell spaces.
5. Sinuses of the Dura mater. Liquor system. Blood supply to the brain.
6. Scheme of craniocerebral topography.
7. Primary surgical treatment of penetrating craniocerebral wound.
8. Decompressive (at Cushing) and osteoplastic (for Olivecrona) craniotomy.
9. Trepanation of mastoid process.

III. The object of study-the human body.

IV. Information part:

In the brain section of the head distinguish the cranial vault, fornix cranii, and base, basis cranii. Arch and base are separated from each other nasolabial suture, supraorbital edge, the upper edge of the zygomatic arch, base of the mastoid process, hereinafter, the upper nuchal line and the protuberantia occipitalis externa.

Skull vault, fornix cranii

In the arch of the skull there are areas: unpaired-frontal, parietal, occipital and paired - temporal, auricle and mastoid processes. The similarity of the anatomical structure of the first three allows you to combine them into one - frontal-parietal-occipital.

Frontal-parietal-occipital region, regio frontoparietooccipitalis

External reference points. Supraorbital edge of the orbit, occiput, the tragus of the ear, the external auditory meatus.

Scope. Front - supraorbital margin, margo supraorbital, posterior - external occipital protuberance, protuberantia occipitalis externa, and upper nuchal line, linea nuchae superior, reaching in the horizontal direction on the sides of the hill, on the sides of the initial division of the temporal muscle, m. temporalis, corresponding to the skull superior temporal line.

Projections. Supraorbital vessels and nerve, a., V. et n. supraorbitales are projected on the supraorbital margin at the border of its middle and inner thirds. The nerve lies medial to the vessels. Suprablock vessels and nerve, a., V. et n. supratrochlear, projected in the corner between the upper and inner edges of the eye socket.

The main trunk of the superficial temporal artery, a. temporalis superficialis, together with the ear-temporal nerve, n. auriculotemporal (from the III branch of the trigeminal nerve), projected vertically anteriorly from the tragus.

Occipital artery, a. occipitalis, and the great occipital nerve, n. occipitalis major, on the arch of the skull are projected to the middle of the distance between the posterior edge of the base of the mastoid process and protuberantia occipitalis externa.

Layers

The skin of most of the area is covered with hair. It is inactive because of the strong connection with the subject tendon helmet, galea aponeurotica, numerous fibrous strands.

The subcutaneous tissue is cellular, the gaps between the connective tissue partitions are filled with adipose tissue.

Unlike other areas in the areas of the head (cranial vault and face) arteries with accompanying veins are located in the layer of subcutaneous tissue, and not under its own fascia.

The adventitia of the vessels firmly adherent to the connective-tissue bridges separating tissue cells. As a result, the blood vessels in the surface layer, if the damage is covered. Even small wounds of the skin, subcutaneous tissue are accompanied by severe bleeding from these gaping vessels. Bleeding in the first aid is stopped by pressing the wounded vessels to the bones of the skull, for which it is necessary to know the projections of the vascular trunks that supply blood to the soft tissues of the cranial vault.

Supraorbital vessels and nerve, a., V. et n. supraorbitales (from the internal carotid artery system), exit the orbit and bend over the supraorbital margin at the border of its middle and inner thirds. The nerve lies medial to the vessels. Upon exiting the eponymous canal (or tenderloin), they are located first under the frontal abdomen of the occipital-frontal muscle, directly on the periosteum. Then their branches, going in the upward direction, penetrate the muscles, tendon helmet and go into the subcutaneous tissue.

Superblock beam: a., V. et n. supratrochleares (also from the internal carotid artery system), located inside of the supraorbital neurovascular bundle.

In the subcutaneous tissue of the frontal region,the temporal branch of the facial nerve (to the frontal abdomen of the occipital-frontal muscle) passes 2-2.5 cm above the outer third of the upper orbital edge from behind and above.

A. temporalis superficialis (one of the two final branches of the external carotid artery) comes to the parietal region from the temporal and splits into a set of branches, anastomosing with the vessels of the frontal and occipital areas, as well as with the same branches of the opposite side.

In the occipital region branches of the occipital artery are distributed, a. occipitalis, and the great occipital nerve, n. occipitalis major. Posterior ear vessels and nerve, a., V. et n. auricularеposteriores, go parallel and posterior to the attachment of the auricle.

The veins of the area form a network in which it is difficult to separate the individual vessels. Most veins are accompanied by arteries of the same name, but there are additional ones.

Lymph flows to three groups of lymph nodes: from the frontal region-in the superficial and deep parotid lymph nodes, nodi parotide superficiales et profundi; from the parietal region-in the mastoidei, nodi mastoidei; from the parotid areas-in the occipital lymph nodes, nodi occipitales, located under the tendon helmet or above it.

For subcutaneous tissue should musculoaponeurotic layer, consisting of the occipital-frontal muscle, m. occipitofrontalis, c frontal and occipital bellies and connecting these muscles with broad tendon of the plate: the tendon of the helmet, the galea aponeurotica. As already noted, the skin tendon helmet is firmly connected, and with a deeper layer - periosteum - loosely.

This explains the fact that the wounds of the cranial vault are often scalped. The triad of tissues-skin, subcutaneous tissue and tendon helmet - completely exfoliates from the bones of the cranial vault on a greater or lesser extent. Although scalped wounds are serious injuries, with timely assistance, they heal well thanks to the abundant blood supply to the soft tissues.

Tissue beneath the galea aponeurotica loose. It's called cellular spaces podporujici space, which is widely distributed on the vault of the skull: anterior - to the subcutaneous tissue of the forehead (under the frontal abdomen m. occipitofrontalis, which is attached to the skin of the forehead) backwards - to the attachment of the occipital belly of this muscle to the upper nuchal line. On the sides of the sheets of the tendon helmet fused with the superficial fascia of the temporal region. Along the line of attachment of the temporal muscle, a deep leaf of the tendon helmet firmly fuses with the periosteum, delimiting the subaponeurotic space on the sides.

Between the periosteum and the outer plate of the skull bones is also friable tissue (subperiosteal). However, along the suture line, the periosteum fuses firmly with them and can not be detached.

The peculiarities of the anatomical structure of the layers of the cranial vault are explained by various forms of hematomas in its bruises. So, subcutaneous hematomas swell in the form of "bumps" due to the fact that the blood is not able to spread in the subcutaneous tissue due to fibrous bridges between the skin and the tendon helmet; podaponeurotic hematomas-flat, spilled, without sharp boundaries; with damage to blood vessels in the front of the space, the blood sometimes flows by gravity into the subcutaneous tissue of the forehead, going around the eye sockets, penetrates into the upper eyelid with the appearance of the symptom "points". Subperiosteal hematomas have sharply-defined edges, respectively, of the attachment of the periosteum at the line of the bony sutures.

The structure of the flat bones of the skull has features. They consist of two plates of compact bone substance: strong outer, lamina externa, and less elastic, fragile inner, lamina interna ("vitreous" - lamina vitrea). In the frontal area under the outer plate there is an air-bearing sinus of the frontal bone, sinus frontalis, lined with a mucous membrane.

With injuries of the skull, the inner plate is often damaged more significantly and over a greater extent than the outer plate. Often the inner plate breaks, and the outer remains intact.

Between the plates there is a spongy substance-diploe, in which numerous diploic veins are located. Diploic veins are associated with both the veins of the covers that make up the extracranial system of veins, and with the venous sinuses of the Dura mater - the intracranial venous system. This communication takes place through the so - called graduates (emissarium) - holes in the corresponding bones, where the emissary veins pass. Of these, the most constant V. emissaria parietalis, V. emissaria occipitalis, V. emissaria condilaris and V. emissaria mastoidea. The latter is usually the largest and opens in a transverse or sigmoid sinus. The parietalis opens into the upper sagittal sinus of the Dura mater. Parietal emissaries (VV exit points. emissariae parietales) are located on the sides of the sagittal suture anteriorly and posteriorly from the biauricular line drawn from the opening of the right external auditory canal to the left.

Veins of soft tissues of the arch, intraosseous and intracranial veins form a single system in which the direction of blood flow changes due to changes in intracranial pressure.

Connections between extracranial and intracranial venous systems make possible the transition of infection from the skull to the meninges (eg, boils, carbuncles of the head), followed by the development of meningitis (inflammation of the membranes of the brain), sinustrombosis and other serious complications.

Thus, it is possible to note certain characteristics as the arterial blood supply and venous outflow from the tissue lopetamine-occipital region.

Features of arterial blood supply

1. The arteries of the soft tissues of the cranial vault, unlike the arteries of other areas, go in the subcutaneous tissue.
2. Adventitia of the arteries is associated with connective tissue bridges connecting the skin and the tendon helmet, so the vessels do not fall off when damaged, but gape. This leads to heavy bleeding.
3. Arteries go from bottom to top (radial direction).
4. Blood supply of soft tissues of the cranial vault is carried out by arteries both from the system of the external carotid artery (superficial temporal, occipital) and from the system of the internal carotid artery (supraorbital, suprablock).
5. In the soft tissues of the cranial vault there is a wide network of anastomoses between the branches of all arteries involved in their blood supply, including the arteries of the contralateral side of the same name.

Features of venous outflow

1. Veins, like arteries, are in the subcutaneous tissue.
2. Veins form a wide network of anastomoses.
3. The veins of the soft tissues of the cranial vault are associated with both intraosseous (diploic) veins and intracranial veins (sinuses of the Dura mater) through the emissary veins.
4. Veins of soft tissues of the cranial vault have no valves.
5. Emissary veins also do not have valves, so blood flow can be carried out in the direction of both superficial and intracranial veins. It should be remembered, however, that, since the emissary veins exist to equalize intracranial pressure, normally the blood flow through them is directed from depth to the surface and further along the superficial veins into the system of the internal or external jugular vein. Only in cases of thrombosis of superficial veins can blood from the surface layers be discharged into the sinuses of the Dura mater.
6. The connection between the superficial and intracranial veins makes it possible to spread infection from the soft tissues into the skull cavity with the development of inflammation of the brain membranes.

Temporal region, regio temporalis

External reference points. Zygomatic arch, outer edge of the orbit, external auditory canal.

Scope. The temporal area is separated from the orbit by the zygomatic process of the frontal and frontal process of the zygomatic bones, from the lateral area of the face - by the zygomatic arch. The upper limit is determined by the contour of the upper edge of the temporal muscle.

Projections. A. temporalis superficialis (the end branch of the external carotid artery) is projected from the vertical line in front of the goat.

At the intersection of this line with the zygomatic arch, you can palpate the pulsation of the artery or press it when bleeding.

Layers

The skin is thinner than in the frontal-parietal-occipital region; hair is preserved in the posterior part of the region. In the anterior part of the skin is thinner and due to the significant looseness of the subcutaneous layer can be captured in the fold.

The subcutaneous tissue is loose, layered, so the hematomas in this area extend in width.

Superficial temporal vessels and the ear-temporal nerve, n. auriculotemporalis (from the III branch of the trigeminal nerve), leave the thickness of the parotid salivary gland in the subcutaneous tissue and rise up anteriorly from the tragus (see Fig. 5.3). Above the zygomatic arch from a. temporalis superficialis departs the middle temporal artery, a. temporalis media. At the level of the supraorbital margin, the superficial temporal artery is divided into frontal and parietal branches.

Above the anterior third zygomatic arch in the subcutaneous tissue from the facial nerve to the frontal abdomen m. occipitofrontalis rises r. frontalis, and to the circular muscle of the eye-r. zygomaticus.

Sensitive innervation of the temporal region is provided by the branches of the trigeminal nerve: n. auriculotemporalis (III branch) and n. zygomaticotemporalis (II branch), which goes from the cavity of the orbit through the same hole in the zygomatic bone to the skin of the anterior temporal region.

Fascia temporalis, fascia temporalis, has the form of aponeurosis with fan-shaped oriented bundles of connective tissue fibers. Attaching to the bones at the boundaries of the region, on the upper temporal line, the fascia closes the temporal fossa from above. 3-4 cm above the zygomatic arch, the fascia splits into superficial and deep sheets. The surface sheet is attached to the outer side of the zygomatic arch, and deep - to the inner. Between the superficial and deep sheets of the temporal fascia lies megfelelne (metapopulations) adipose tissue.

Under the deep leaf of the temporal fascia, between it and the outer surface of the temporal muscle, there is a layer of loose subfascial fiber, continuing down from the zygomatic arch into the masticatory-maxillary slit, limited by the inner surface of T. masseter and the branch of the lower jaw. In the interval between the anterior edge of the temporal muscle and the outer wall of the orbit, the temporal process of the fat body of the cheek leaves.

Temporal muscle, t. temporalis, is the masticatory muscle that lifts the lower jaw. It starts from the periosteum of the temporal bone and from the deep surface of the temporal fascia. Here it is wide and flat. Downwards its bundles converge, it becomes narrower, passes behind the zygomatic arch and passes into a powerful tendon, which is attached not only to the coronal process, but also to the anterior edge of the branch of the lower jaw.

Between the deep surface of the temporal muscle in its lower half and the temporal bone is a deep subcutaneous tissue associated with the temporal-pterygoid gap of the deep part of the face and the front with the tissue of the cheek area. Through this

tissue, the anterior and posterior deep temporal vessels and nerves, a, rise directly along the periosteum from the suspension fossa. V. et n. temporales profundi anteriores et posteriores. These arteries extend into the deep area of the face from the maxillary artery, a. maxillaris, nerves - from n. mandibularis (III branch of the trigeminal nerve), now after its exit from the oval hole, and enter the muscle from its inner surface.

Deep temporal veins flow into the pterygoid venous plexus, plexus pterygoideus.

Lymph flows into the nodes located in the thickness of the parotid gland-nodi parotideae profundi.

The periosteum in the lower part of the area is quite firmly connected with the underlying bone, above its connection with the bone is as loose as in the frontal-parietal-occipital region. The scales of the temporal bone are very thin, almost does not contain diploe and easily subjected to fracture.

Due to the fact that the inner surface of the temporal bone adjacent a. meningea media, the fracture of the scales of the temporal bone may be accompanied by intracranial bleeding with the formation of EPI - and subdural hematomas and compression of the medulla.

Under the Dura mater within the temporal region are the frontal, parietal and temporal lobes of the brain, separated by Central , or Roland, and lateral, or Sylvian furrows. The projection of these furrows can be judged by a specially compiled scheme of craniocerebral topography.

A bouquet of Riolan is an anatomical "bouquet", which includes a group of ligaments and muscles, beginning on the subulate process of the temporal bone (Stylo—lingual, Stylo-lingual and Stylo-lingual).

Scheme of craniocerebral topography. The projection on the skin of the cranial vault of the main furrows and convolutions of the cerebral hemispheres of the brain and a stroke. meningea media and its branching is possible with the help of diagrams Kroenlein Brusovo. First, a median sagittal line of the head connecting the adrenal axis, glabella, with protuberantia occipitalis externa is carried out. Then apply the lower horizontal line running through the lower orbital margin, the upper edge of the zygomatic arch and the upper edge of the external auditory canal. Parallel to it from the upper edge of the eye socket spend the upper horizontal line.

Three vertical lines lead up to the middle sagittal line from the middle of the zygomatic arch (1st), from the joint of the lower jaw (2nd) and from the posterior border of the base of the mastoid process (3rd).

The projection of the Central sulcus centralis (Roland) furrow corresponds to the line drawn from the point of intersection of the posterior vertical of the middle sagittal line at the top to the place of intersection of the anterior vertical and the upper horizontal. On the bisector of the angle composed by the projection of the Central furrow and the upper horizontal, the lateral (Sylvian) furrow, sulcus lateralis is projected. Its projection occupies a segment of the bisector between the front and rear vertical lines.

Barrel a. meningea media is projected at the intersection of the front vertical with the bottom horizontal, that is, at the middle of the top edge of the zygomatic arch. Frontal branch a. meningea media is projected on the intersection point of the front vertical with the top horizontal, and the parietal branch-on the intersection point of this horizontal with the back vertical.

The area of the ear, regio auricularis

On the border of the brain and facial parts of the head is the area of the auricle. Together with the external auditory canal, it is part of the outer ear.

Outer ear, auris externa

The outer ear consists of the auricle and the external auditory canal.

The auricle, auricula, usually called simply the ear, is formed by an elastic cartilage covered with skin. This cartilage determines the external form of the ear and lugs: the free bent edge curl, helix, and parallel to it - protivotumanok, anthelix, and the front edge of the tragus, tragus, and lying behind it proteomelab, antitragus. At the bottom of the ear ends without cartilage ear lobe. In the depth of the shell behind the trestle, an opening of the external auditory canal opens. Around it are remains of the vestigial muscles that do not have functional significance.

The external auditory canal, meatus acusticus externus, consists of cartilage and bone parts. The cartilaginous part is about one third, the bone part is two thirds of the length of the external auditory canal. In General, its length is 3-4 cm, vertical size-about 1 cm, horizontal-0.7-0.9 cm Passage narrows at the junction of the cartilage in the bone. The direction of the auditory meatus is generally frontal, but forms an S-shaped bend in both the horizontal and vertical planes. To see the deep eardrum, it is necessary to straighten the auditory canal, pulling the ear back, up and out.

The anterior wall of the bone part of the auditory canal is immediately posterior to the temporomandibular joint, the posterior wall separates it from the cells of the mastoid process, the upper one from the cavity of the skull, and its lower wall borders the parotid salivary gland.

The external auditory meatus is separated from the middle ear by the eardrum, membrana tympani.

Region of the mastoid process, regio mastoidea

The area of the mastoid process is located behind the auricle and is covered by it.

Its boundaries correspond to the outlines of the mastoid process, which is well palpable. From above the border forms a line, which is a continuation of the posterior zygomatic process of the temporal bone.

Intraosseous formations are projected onto the surface in four quadrants.

To build quadrants, draw a line from the top of the process to its base (from bottom to top) and a line perpendicular to it in its middle. The antrum mastoideum cave is projected on the anterior quadrant, the anterior bone canal of the facial nerve, sanalis facialis, the posterior cranial fossa and the posterior quadrant are projected sigmoid venous sinus of the Dura mater.

Layers

The skin in the anterior region (closer to the auricle) is thinner than in the posterior.

In the subcutaneous tissue are the posterior ear artery and vein, a. et V. auriculares posteriores, posterior branch of the large ear nerve, n. auricularis magnus (sensitive branch from the cervical plexus), as well as the posterior ear nerve, n. auricularis posterior (branch of the facial nerve).

Under its own fascia, which is a continuation of the fascia of the sternocleidomastoid muscle, or on top of it there are mastoideae nodes, nodi mastoideae. They collect lymph from the frontal-parietal-occipital region, from the back surface of the ear, from the external auditory canal and the tympanic membrane.

Under the fascia and muscles starting from the mastoid process (m. sternocleidomastoideus, posterior abdomen m. digastricus and m. splenius), in the furrow on the medial side of the process passes the occipital artery, a. occipitalis, heading for the soft tissues of the occipital region.

The periosteum is firmly spliced with the outer surface of the mastoid process, except for a smooth triangular platform, where the periosteum is easily peeled off. This area is allocated under the name of the triangle Shipo. The boundaries of the triangle are the front posterior edge of the external auditory canal and spina suprameatica, behind - crista mastoidea, and above - a horizontal line drawn posterior to the zygomatic process of the temporal bone. Within the triangle of the Spike, trepanation of the mastoid process is produced in mastoiditis and chronic inflammation of the middle ear. At a depth of 1.5-2 cm there is a mastoid cave, antrum mastoideum, communicating through aditus ad antrum with a tympanic cavity. The upper wall separates the cave from the middle cranial fossa. In front of the cave is the lower part of the canal of the facial nerve. To the back wall near the sigmoid venous sinus.

Within the triangle of the Spike, trepanation of the mastoid process is produced in mastoiditis and chronic inflammation of the middle ear. However, it is relatively easy to do this only in children whose cortical plate is very thin. In adults, the thickness of this plate reaches 15 mm, so it is more expedient and safer for them to enter the mastoid cave through the back wall of the external auditory canal.

At the posterior border of the triangle of the Spike is a mastoid hole, foramen mastoideum, through which the mastoid emissary vein passes into the cavity of the skull, connecting the superficial veins with the sigmoid sinus of the Dura mater.

The inner base of the skull, basic cranii interna

The inner surface of the skull base, basis cranii interna, is divided into three fossa, of which the anterior and midbrain accommodates the cerebellum and the posterior cerebellum. The border between the anterior and middle pits are the posterior edges of the small wings of the sphenoid bone, between the middle and posterior - the upper face of the pyramids of the temporal bones.

The anterior cranial fossa, fossa cranii anterior, is formed by the orbital parts of the frontal bone, the lattice plate of the ethmoid bone lying in the recess, the small wings and part of the body of the sphenoid bone. In the anterior cranial fossa, the frontal lobes of the hemispheres of the brain are located. On the sides of the crista galli are laminae cribrosae, through which the olfactory nerves pass, nn. olfactorii (I pair of cranial nerves - FMN), from the nasal cavity and a. ethmoidalis anterior (from a. ophthalmica) accompanied by the same vein and nerve (from the I branch of the trigeminal nerve).

A fracture of the skull base in the anterior cranial fossa is sometimes accompanied by a rupture of lamina cribrosa and an expiration of cerebrospinal fluid through the nose.

Middle cranial fossa, fossa cranii media, deeper than anterior. In it, the middle part formed by the upper surface of the body of the sphenoid bone (the area of the Turkish saddle) and two lateral are isolated. They are formed by large wings of the sphenoid bone, the anterior surfaces of the pyramids and partly by scales of the temporal bones. The Central part of the middle fossa is occupied by the pituitary gland, and the lateral - temporal lobes of the hemispheres. Anterior to the Sella, in the sulcus chiasmatis, is the optic chiasma, chiasma opticum. On the sides of the Turkish saddle lie the most important in practical terms sinuses of the Dura mater-cavernous, sinus cavernosus, into which the upper and lower eye veins flow.

The middle cranial fossa communicates with the orbit through the optic canal, Canalis opticus, and the upper orbital fissure, fissura orbitalis superior. Through the canal passes the optic nerve, n. opticus (II pair of cranial nerves), and ophthalmic artery, a. ophthalmica (internal carotid artery), and through the crack - the oculomotor nerve, n. oculomotorius (III pair of cranial nerves), block, n. trochlearis (IV pair of cranial nerves) abducens, n. abducens (VI pair of cranial nerves) and the eye, n. ophthalmicus, nerves and ocular vein.

The middle cranial fossa is communicated through a round hole, foramen rotundum, where the maxillary nerve, n. maxillaris (II branch of the trigeminal nerve), with a pterygoid Palatine fossa. It is connected to the posterior fossa through the oval foramen, foramen ovale, where the mandibular nerve passes, n. mandibularis (III branch of the trigeminal nerve), and spinous, foramen spinosum, where the middle artery of the Dura mater is located, a. meningea media. At the top of the pyramid is an irregularly shaped hole-foramen lacerum, in which the inner opening of the carotid canal, where the cavity of the skull enters the internal carotid artery, a. carotis interna.

A fracture of the skull base and damage to the Dura mater in the region of the middle cranial fossa, in particular the temporal bone pyramid above the projection of the middle ear, may be accompanied by an expiration of cerebrospinal fluid through the ear, if the tympanic membrane is damaged.

The flow of cerebrospinal fluid through the nose or ear may be the primary symptoms of a skull base fracture. In both cases, there is a risk of developing meningitis due to infection to the membranes of the brain through the nose or ear.

The posterior cranial fossa, fossa cranii posterior, is the deepest and is separated from the middle upper edges of the pyramids and the back of the Turkish saddle.

It is formed by almost the entire occipital bone, part of the body of the sphenoid bone, the posterior surfaces of the pyramids and mastoid parts of the temporal bones, as well as the posterior lower corners of the parietal bones. In the center of this pit is a large occipital foramen, in front of him is the slope of Blumenbach, clivus . On the rear surface of each of the pyramids is the internal auditory hole, porus acusticus internus; it is crossed by facial n. facialis (VII pair of cranial nerves) intermediate, n. intermedius, and the vestibulocochlear n. vestibulocochlearis (VIII pair of cranial nerves), nerves.

The pyramid of the temporal bone and lateral parts of the occipital are of the jugular holes, foramina jugularia, through which the glossopharyngeal, n. glossopharyngeus (IX pair of cranial nerves) vagus n. vagus (X pair of cranial nerves), and the extension, n. accessorius (XI pair of cranial nerves), nerves and the internal jugular Vienna, V. jugularis interna. The Central part of the posterior cranial fossa occupies a large occipital foramen, foramen occipitale magnum, through which the medulla oblongata

with its membranes and vertebral arteries, AA, pass. vertebrales. In the lateral parts of the occipital bone there are channels of the sublingual nerves, canaks n. hypoglossi (XII pair of FMN). In the region of the middle and posterior cranial pits, the furrows of the sinuses of the Dura mater are particularly well represented.

In the sigmoid sulcus or next to it is V. emissaria mastoidea, linking the occipital vein and the veins of the outer base of the skull to the sigmoid sinus.

Membranes of the brain, meninges

The next layer after the bones of the cranial vault is the hard shell of the brain, dura mater cranialis (encephali). It is loosely connected to the bones of the arch and tightly spliced with the inner base of the skull. Normally, there is no natural space between the bones and the Dura mater. However, when the concentration of blood (hematoma) revealed a space called the epidural.

The hard shell of the brain continues into the hard shell of the spinal cord.

The hard shell of the brain gives the skull three processes. One of them - the sickle of the big brain, falx cerebri, - is located in the middle, in the sagittal direction, and separates the hemispheres of the big brain. The second is the falx cerebelli, falx cerebelli, -

separates the hemisphere of the cerebellum and the third - namet cerebellum, tentorium cerebelli, - separates the big brain from the cerebellum. Posterior part of the falx cerebri connects with the Tentorium of the cerebellum. Tentorium cerebelli is attached at the back along the transverse furrow, on the sides - to the upper edges of the stony parts of the temporal bones.

The hard shell of the brain consists of two sheets. In places of its attachment to the bones of the skull leaves diverge and form channels of triangular shape, lined with endothelium, - sinuses of the hard shell of the brain.

Arteries of the Dura. A large part of the hard shell of the brain supplies the middle meningeal artery, a. meningea media, a branch. maxillaris. It penetrates into the skull cavity through the spinous foramen, foramen spinosum. In the cavity of the skull artery is divided into frontal and parietal branches. The trunk of the middle meningeal artery and its branches are quite tightly connected with dura mater, and on the bones form grooves - sulci meningei. In this regard, the artery is often damaged by a fracture of the temporal bone. Frontal branch a. meningea media quite often passes on a small extent in the bone channel-it is observed in the place of convergence of four bones: frontal, parietal, temporal and wedge-shaped. This area of the skull is called bregma (bregma). The artery is accompanied by two vv. meningeae mediae, passing, unlike the artery, in the thickness of the Dura mater.

Anterior meningeal artery, a. meningea anterior, is a branch of the anterior ethmoid artery, a. ethmoidalis anterior (from the ocular artery of the internal carotid artery system). Posterior meningeal artery, a. meningea posterior, departs from the ascending pharyngeal artery, a. pharyngea ascendens (from the external carotid artery). Both of them form numerous anastomoses with a. meningea media.

The nerves of the Dura mater, rr. meningei, depart from the branches of the trigeminal nerve: ocular, maxillary and mandibular nerves.

The next layer is the arachnoidea mater cranialis, the arachnoid membrane of the brain, extending over the furrows of the brain. Hematoma formed between the solid and the arachnoid membranes, called a subdural.

Between the arachnoid and the next, soft cerebral membrane of the brain, pia mater cranialis (encephali), located subarachnoid (subarachnoid) space, together with the membranes passing to the spinal cord. And in the cranial cavity, and around the spinal cord, the subarachnoid space contains cerebrospinal fluid, liquor cerebrospinalis. This liquid also fills the ventricles of the brain.

Subarachnoid (subarachnoid) space is particularly well expressed on the basal surface of the brain. Extended areas of space called subarachnoid cisterns. The largest of the ten cisterns is the posterior cerebellar cistern, cisterna cerebellomedullaris posterior, or the large cistern, located in a deep gap between the cerebellum and the medulla. It communicates with the cavity of the IV ventricle, then through the brain, or Sylvius [Sylvius] water-with the III ventricle having a communication with the lateral ventricles of the brain. The large cistern also communicates with the subarachnoid space of the spinal cord. At the upper edge of the rear atlantization membrane this tank has a depth of 1.5 cm. Here it is puncture for diagnostic or therapeutic purposes - suboccipitally puncture.

Anteriorly from the optic chiasm within the chiasm cistern, cisterna chiasmatica. Here, the developing inflammatory process (optiganally arachnoiditis) is often accompanied by loss of vision.

The soft shell of the brain, pia mater cranialis (encephali), lies close to the brain and enters all the furrows. It is rich in vessels that feed the brain. Penetrating into the cavity of the III and IV ventricles, and their forms the choroid plexus that produce cerebrospinal fluid.

Blood supply to the brain

The brain supplies blood to four arteries - two internal carotid arteries from the common carotid artery system and two vertebrates from the subclavian artery system.

A carotis interna, through the neck part of its outer space, comes to the external aperture of the carotid canal, aperture externa canalis carotid. It enters the skull cavity through the internal aperture of the carotid canal at the apex of the temporal bone pyramid and ascends the sulcus caroticus of the sphenoid bone. Near the Turkish saddle, the internal carotid artery is directed anteriorly, passes through the thickness of the cavernous sinus and, upon exiting it, gives the eye artery a. ophthalmica, going through the optic canal into the cavity of the eye socket. After that a. carotis interna perforates the Dura and arachnoid membranes of the brain and gives the posterior connective artery, a. communicans posterior, which anastomoses with the posterior cerebral artery, a. cerebri posterior, departing from a. basilaris. The final branches of the internal carotid artery are the anterior and middle cerebral arteries, aa. cerebri anterior et media. At the anterior edge of the Turkish saddle, the left and right anterior cerebral arteries approach and connect with each other by means of the anterior connective artery, a. communicans anterior. The anterior cerebral arteries supply the medial surfaces of the frontal, parietal and partially occipital lobes of the cerebral hemispheres. Larger a. cerebri media, or Silvia, supplies the lateral surfaces of the same lobes of the brain.

Vertebral artery, a. vertebralis, steam room, passing on the neck through the holes in the transverse processes of the cervical vertebrae, through the large occipital opening enters the cavity of the skull. At the base of the skull, both vertebral arteries merge to form the basilar artery, a. basilaris, which runs in a furrow on the lower surface of the brain bridge. From A. basilaris depart two AA. posteriores cerebri, which are connected via the posterior communicating artery with the middle cerebral artery. Thus there is a Willis (Willis) arterial circle-circulus arteriosus cerebri, which is located in the subarachnoid space of the base of the brain and on the base of the skull surrounds the Turkish saddle.

Once again, we recall the components of the circle of Willis. The anterior communicating anterior, connecting the anterior cerebral arteries, thus connecting the left and right internal carotid arteries. The posterior connective arteries extending from the internal carotid arteries connect them to the posterior cerebral arteries extending from a. basilaris, formed by the confluence of the right and left vertebral arteries.

Willisii arterial circle plays a vital role in the blood supply of the brain, because its constituent anastomoses brain food saved by reducing blood flow (most commonly atherosclerosis) in any of the four major arteries, the sides.

Venous outflow from the brain

The veins of the brain usually do not accompany the arteries. Superficial veins are located on the surface of the brain gyrus, deep-in the depths of the brain. Deep veins, merging, form a large vein in the brain, V. magna cerebri, or Galena vein,is a short trunk that flows into the straight sinus of the Dura mater. All other veins of the brain also flow into one or another sinus.

The sinuses of the Dura mater

Sinuses of the Dura mater, collecting venous blood from the veins of the brain, are formed in the places of attachment of the Dura mater to the bones of the skull due to the splitting of its leaves. Sinus blood flows from the skull cavity into the inner jugular vein. Valves sinuses not have.

The upper sagittal sinus of the Dura mater, sinus sagittalis superior, is located in the upper edge of the falx cerebri, attached to the same furrow of the cranial vault, and extends from crista galli to protuberantia occipitalis interna. In the anterior parts of this sinus there are anastomoses with the veins of the nasal cavity. Through the parietal emissary veins it is associated with diploic veins and superficial veins of the cranial vault. The posterior end of the sinus flows into the sinus drain of the Herophilus], confluens sinuum.

The lower sagittal sinus, sinus sagittalis inferior, is at the lower edge of the falx cerebri and passes into the straight sinus.

Straight sinus, sinus rectus, is located at the junction of the falx cerebri and Tentorium of cerebellum, and is in the sagittal direction. It also flows into the great vein of the brain, V. magna cerebri, collecting blood from the substance of the big brain. The straight sinus, like the upper sagittal sinus, flows into the sinus flow.

The occipital sinus, sinus occipitalis, passes at the base of the cerebellum sickle, falx cerebelli. Its upper end flows into the sinus drain, and the lower end at the large occipital opening is divided into two branches, enveloping the edges of the hole and falling into the left and right sigmoid sinuses. The occipital sinus through the emissary veins is associated with the superficial veins of the cranial vault.

Thus, the sinus drain venous blood from the superior sagittal sinus, straight and occipital sinuses. From the confluens sinuum blood flows into the transverse sinuses.

The transverse sinus, sinus transversus, lies at the base of the cerebellum nameta. On the inner surface of the scales of the occipital bone it corresponds to a wide and well-visible furrow of the transverse sinus. The right and left transverse sinus continues into the sigmoid sinus of the respective side.

The sigmoid sinus, sinus sigmoideus, takes venous blood from the transverse and is directed to the front of the jugular opening, where it passes into the upper bulb of the internal jugular vein, bulbus superior V. jugularis internae. The course of the sinus corresponds to the same furrow on the inner surface of the base of the mastoid process of the temporal and occipital bones. Through the mastoid veins of the emissary sigmoid sinus is also associated with the superficial veins of the cranial vault.

In the paired cavernous sinus, sinus cavernosus, located on the sides of the Turkish saddle, blood flows from the small sinuses of the anterior cranial fossa and veins of the orbit. Eye veins flow into it, vv. ophthalmicae, anastomosing with facial veins and with deep pterygoid venous plexus of the face, plexus pterygoideus. The latter is connected with the cavernous sinus also through the emissaries. The right and left sinuses are interconnected by interstitial sinuses-sinus intercavernosus anterior et posterior. From cavernous sinus blood flows through the upper and lower stony sinuses (sinus petrosus superior et inferior) in the sigmoid sinus and then into the internal jugular vein.

The connection of the cavernous sinus with superficial and deep veins and with the Dura mater of the brain is of great importance in the spread of inflammatory processes and explains the development of such severe complications as meningitis.

Through the cavernous sinus are internal carotid artery, a. carotis interna, and the abducens nerve, n. abducens (VI pair of cranial nerves); in its outer wall, the oculomotor nerve, n. oculomutorius (III pair of cranial nerves) the trochlear nerve, n. trochlearis (IV pair of cranial nerves) as well as the first branch of the trigeminal nerve - the optic nerve, n. ophthalmicus.

In some fractures of the skull base, the internal carotid artery may be damaged within the cavernous sinus, resulting in the formation of an arteriovenous fistula. Arterial blood under high pressure enters sinus veins, especially eye veins. As a result, there is protrusion of the eye (exophthalmus) and redness of the conjunctiva. In this case, the eye pulsates synchronously with the pulsation of the arteries - there is a symptom of "pulsating exophthalmos". The above nerves adjacent to the sinus may also be damaged, with appropriate neurological symptoms.

To the posterior part of the cavernous sinus lies the Gasser node of the trigeminal nerve-ganglion trigeminale. To the anterior part of the cavernous sinus, sometimes the fatty tissue of the wing is visible-the Palatine fossa, which is a continuation of the fat body of the cheek.

Thus, venous blood from all parts of the brain through the brain veins enters one or another sinus of the Dura mater and then into the internal jugular vein. With an increase in intracranial pressure, blood from the skull cavity can be further discharged into the system of superficial veins through the emissary veins. The reverse movement of blood is possible only as a result of developing for one reason or another thrombosis of the superficial vein associated with emissary.

Closed craniocerebral injuries are often accompanied by internal bleeding with the formation of EPI - and subdural hematomas. If the diagnosis is established, it is possible to remove the spilled blood with the help of one trepanation hole.

An aperture impose over a place where the greatest accumulation of blood is defined. Most often it happens in the temporal or parietal region, where the middle meningeal artery is branched. Spend a small (3-4 cm) vertical (radial) incision of the skin with subcutaneous tissue and aponeurotic helmet. Bleeding is most often stopped by coagulation. The periosteum longitudinally cut through and push to the side with a periosteal Elevator. Using at first a spear-shaped, and then a spherical mill, make a hole in the bone with a trepan. Bleeding from the bone is stopped with bone wax. With subdural hemorrhage, the Dura acquires a dark blue color, it is tense, convex and does not pulsate. Produce a cross-shaped incision with a pointed scalpel. A catheter is inserted into the space between the hard and soft cerebral membranes, with the help of which the blood is sucked. The subdural cavity is washed with a warm isotonic solution of sodium chloride, removing blood clots.

Primary surgical treatment of penetrating wounds of the cranial vault. Penetrating wounds of the cranial vault are called soft tissue, bone and Dura. If the meninges are not damaged, even the extensive wounds of the other layers are impenetrable.

The purpose of the operation is to stop bleeding, remove foreign bodies and bone fragments, prevent the development of infection in soft tissues, in the bones and in the skull cavity, as well as prevent damage to the brain, prolapsing into the wound with traumatic edema.

The hair around the wound carefully shave in the direction of the edges of the wound to the periphery. The skin is treated with iodine tincture. Scalpel sparingly excised, crushed wound edges, retreating from the edges of the wound 0.5-1 cm Incisions carried out so that the wound was close to linear or elliptical, and the wound had radial direction. In this case, the edges of the wound are easier to reduce without tension, and their blood supply is minimal.

To temporarily stop (or reduce) bleeding with your fingers, press the edges of the wound to the bone, and then, consistently weakening the pressure of the fingers, the bleeding vessels are squeezed by hemostatic clips of Bilrot or the "Mosquito" type, followed by coagulation or stitching with a thin catgut.

Hooks or a small retractor stretch the edges of the wound of soft tissues. Remove loose bone fragments, and periosteum associated with intact sections of bone remain, after treatment to put them in their place. Abundant blood supply to the soft tissues and bones of the cranial vault ensures their subsequent engraftment. If the opening of the bone wound is small and makes it impossible to examine the wound of the Dura mater to the limits of the intact tissue, the bone slices of the Luer bite the edges of the bone. First bite the outer plate, and then the inner. Through the trepanation defect, fragments of the inner plate are removed, which may be under the edges of the trepanation hole.

Such an expansion of the opening of the bone wound or a test milling hole is called resection trepanation of the skull. After the bones of the skull remains a defect that subsequently need to be closed. For this purpose, many methods of cranioplasty are proposed.

Stop bleeding from the cranial vault are diploic veins are produced in several ways. To do this, either RUB a special bone wax into the spongy part of the bone, or use Luer's clippers to squeeze the outer and inner plates of the bone, thus breaking the trabeculae. To cut the bone, apply gauze swabs moistened with a hot isotonic solution of sodium chloride. Bleeding from the damaged emissary veins is stopped by rubbing the wax into the bone hole, for which the periosteum is exfoliated.

After stopping the bleeding, the hole is gradually expanded to an intact Dura. If the Dura is not damaged and pulsates well, it should not be dissected. The intense, non-pulsating Dura mater of a dark-blue color indicates subdural hematoma. The Dura is dissected crosswise. The blood is sucked off, the destroyed brain tissue, the superficially located bone fragments and the remains of the blood are gently washed off with a stream of warm isotonic sodium chloride solution, which is then sucked off.

Find the source of bleeding (most often it is the middle meningeal vessels or damaged sinus of the Dura mater). Bleeding from the artery and its branches is stopped, stitching the artery together with the Dura mater. Just treat the middle meningeal vein.

Damage to the sinus wall of the Dura mater is a very serious and dangerous complication. The best way is a vascular suture on the linear wound of the sinus or plastic of its wall by the outer sheet of the Dura mater with fixation by the vascular suture. However, technically it can be difficult to do. More simple, but less reliable methods of artificial thrombosis of the sinus by a piece of muscle or a bundle of collagen fibers with the expectation of subsequent recanalization. More often, however, the clot blocks the blood flow, as in the case of stitching sinus ligature, which leads to more or less pronounced swelling of the brain. The closer to the confluens sinuum produced dressing, the worse the forecast.

After stopping the bleeding and thoroughly cleaning the wound, the edges of the dissected Dura are placed on the surface of the brain wound, but do not sew it up for decompression in case of cerebral edema and increased intracranial pressure. On the soft tissues of the cranial vault, frequent stitches are applied to prevent liquorrhea.

Bone-plastic trepanation of the skull is performed for the purpose of access to the cavity of the skull. Indications for it are operations for tumors and strokes of the brain, wounds of vessels of the Dura mater, depressed fractures of the bones of the skull. The difference between osteoplastic trepanation and resection is that a wide access to the cavity of the skull is created by cutting out a large bone flap, which after performing an operative reception is placed in place. After such trepanation, repeated surgery is not required to eliminate the bone defect, as in resection trepanation.

Horseshoe-shaped incision of soft tissues is made in such a way that the base of the flap is at the bottom. Then the vessels running radially from the bottom up do not intersect and the blood supply of the flap of soft tissues is not disturbed. The length of the flap base is not less than 6-7 cm. After stopping the bleeding, the musculoskeletal-aponeurotic flap is turned downwards on gauze wipes and covered with gauze moistened with isotonic sodium chloride solution or 3% hydrogen peroxide solution.

Cutting out the bone-periosteal flap begins with an arcuate incision of the periosteum with a scalpel, retreating 1 cm inside from the edges of the skin incision. The periosteum is peeled off from the cut in both directions by a width equal to the diameter of the cutter, which is then applied depending on the magnitude of the created trepanation defect 5 - 7 holes with a manual or electric trepan. First, a spear-shaped cutter is used, and when bone sawdust appears, stained with blood, which indicates that the cutter enters the diploic layer of the bone, the spear-shaped cutter is replaced with a cone-shaped or spherical cutter, so as not to "fall" into the cavity of the skull. The areas between these holes saws wire saw Gigli. From one hole to another a saw carried out using a

fine steel plates - conductor Vasily Polenov. Sawing lead at an angle of 45° to the plane of the operating field. Due to this, the outer surface of the bone flap is larger than the inner one: when the flap returns to its place, it does not fall into the defect created during trepanation. So cut all the bridges between the holes, except one, lying on the side or bottom against the base of the flap soft tissue. This jumper nagligivaget, causing the entire bone flap remains associated with the undamaged regions of bone with periosteum only. The bone flap on the periosteal leg, through which its blood supply is provided, is turned away. Next, the scheduled operational reception is performed. Completing the operation, first sew up the Dura. The bone flap is placed in place and fixed with catgut sutures conducted through the periosteum, muscle and tendon helmet. The wound of soft tissues is sutured layer by layer.

Resection trepanation is sometimes used for decompression - reduction of increased intracranial pressure. This operation is also called decompressive trepanation. This palliative operation: it is produced when the pressure in the cases of inoperable tumors of the brain or in progressive cerebral edema of other etiology. The purpose of the operation is to create a permanent defect in the bones of the skull and Dura in a certain area of the vault. Decompressive trepanation is usually carried out in the temporal region. This makes it possible to cover the hole created by the temporal muscle to prevent injury to the brain through this hole.

After dissection of soft tissues and periosteum with a large spherical cutter, a hole in the bone is created, which is further expanded with the help of Luer pliers towards the zygomatic arch. Before opening a highly stressed Dura, a spinal puncture is performed. Cerebrospinal fluid is removed in small portions (10-30 ml) to avoid wedging of the brain stem into the large occipital opening. The Dura is opened, giving the outflow of cerebrospinal fluid, after which the wound is sutured layer by layer, except for the Dura mater.

V. Tasks for independent work.

Task №1

1. Specify features:

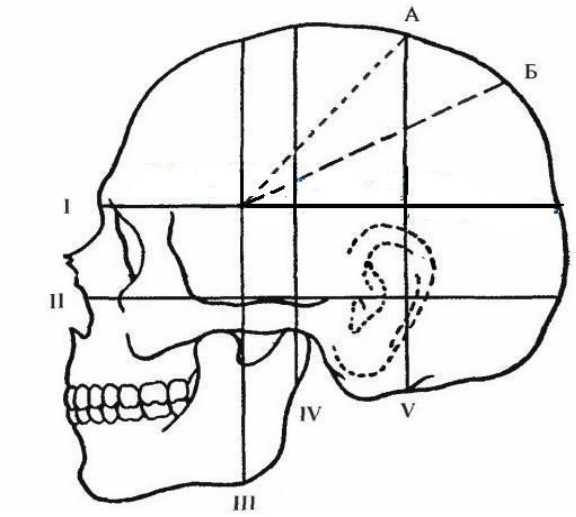
(A) subcutaneous hematoma

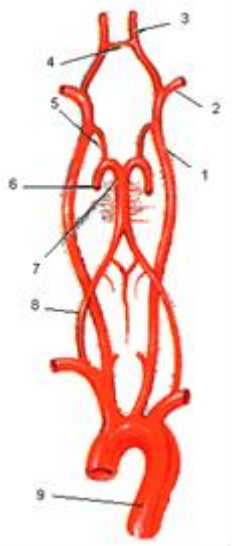
B) subaponeurotic hematoma

C) subperiosteal hematoma

Task №2

Name the scheme: specify the notation. Explain its clinical significance





Task №3.

I -	
II -	
III -	
IV -	
V -	
A -	
Б -	

1 -	
2 -	
3 -	
4 -	
5 -	
6 -	
7 -	
8 -	
9 -	

Task №4.
List the sinuses of the Dura mater.

Task №5.
Explain the structure of the cerebrovascular system.

Task №6.
Make a task on the topic of the lesson. (In a notebook)

Task №7.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:

1. Layer-by-layer topography of the fronto-parieto-occipital region. Features blood supply and innervation of the soft tissues of the cranial arches. Topographic and anatomical study of scalped wounds on the head.
2. Layer-by-layer topography of the fronto-parieto-occipital region. Cellular spaces of the frontal-parietal-occipital region. Differential diagnosis of bruising of the soft tissues of the arches of the skull.
3. Layer-by-layer topography of the temporal region. Features of the structure of bones and cellular spaces of the temporal region. Clinical significance.
4. Layer-by-layer topography of the mastoid region. The triangle of the Shipo, its boundaries and clinical significance.
5. The inner base of the skull. Anterior cranial fossa: the boundaries and openings of the anterior cranial fossa. Clinical manifestations of skull base fractures in the anterior cranial fossa.

6. The inner base of the skull. Middle cranial fossa: the boundaries and openings of the middle cranial fossa. Clinical manifestations of skull base fractures in the middle cranial fossa.
7. The inner base of the skull. Posterior cranial fossa: posterior fossa boundaries and openings. Clinical manifestations of skull base fractures in the middle cranial fossa.
8. Topographic anatomy of the brain. Sheaths of the brain. Differential diagnosis of intracranial hematomas.
9. Liquor system of the brain. Differential diagnosis of hydrocephalus at different levels of occlusion.
10. Blood supply to the brain. Arterial circle of the big brain.
11. Venous network of the head: diploic and emissary veins. Clinical significance.
12. Venous sinuses of the Dura mater: sinuses of the roof and base of the skull.
13. Cranio-cerebral topography. Scheme Kronlein Brusovo. Practical application.
14. Primary surgical treatment of wounds of soft tissues of the skull.
15. Ways to stop bleeding in wounds of soft tissues of the skull.
16. Ways to stop bleeding from the bones of the cranial arches.
17. Ways to stop bleeding from the vessels of the Dura of the brain.
18. Plastic wall of the venous sinus by Burdenko.
19. Sources of bleeding in epidural hematomas. Technique of epidural hematoma removal.
20. Sources of bleeding in subdural hematomas. Technique of removal of subdural hematoma.
21. Tactics of treatment for subarachnoid bleeding.
22. Indications and technique of puncture of the anterior horns of the lateral ventricles of the brain.
23. Indications and technique of puncture of the posterior horns of the lateral ventricles of the brain.
24. Indications and technique of performing a decompression craniotomy for Cushing's way.
25. Indications and technique of performing bone-plastic trepanation of the skull by way Olivecrona.
26. Indications and technique of performing bone-plastic craniotomy by the Wagner-wolf method.
27. Indications and technique of trepanation of mastoid process.

VII. Learning objectives:

№1. Patient M, 29 years old, as a complication of a skull fracture in the anterior cranial fossa with the formation of cerebrospinal fluid fistula, showed symptoms of a “handkerchief” (a scarf moistened with cerebrospinal fluid from the nasal passages, remains soft after being dried, soaked with mucus - hard) and a “double spot” (in the center of the white napkin, a red spot is an admixture of blood in the cerebrospinal fluid, on the periphery - a bright halo from the cerebrospinal fluid) purulent meningitis has developed. Explain the mechanism of occurrence of this complication.

(Answer: At the turn of the base of the skull, the line of which passes in the anterior cranial fossa, the meninges from the ethmoid sinuses are infected.)

№2. Patient O., 12 years old, occlusive hydrocephalus with a uniform expansion of the lateral and 3rd ventricles of the brain. At what level can occlusion of the cerebrospinal fluid pathways take place in this patient? What does “hydrocephalic swelling of the brain mean?

(Answer: Occlusion (sylvieva) - plumbing or openings of the Magendis (middle) and Lyushka (lateral). Excess content of tissue fluid in the substance of the atrophied brain due to its impregnation with a large number of cerebrospinal fluid from the ventricular system.)

№2. Neurosurgeon in the surgical treatment of a cranial cerebral wound of the frontal-temporal region after excision of the soft tissues and the periosteum proceeded to the treatment of the bone wound. What is the sequence of this phase of the operation? What are the ways to provide bone wound hemostasis?

(Answer: First, remove the fragments of the external bone plate. To remove the fragments of the inner plate (the damage zone is 2-4 times larger than the outer one), the defect of the outer plate is widened with Luer pliers. Hemostasis is provided by crushing the bone (when leveling the wound edges with nippers), with a 3% solution of hydrogen peroxide, rubbing hemostatic paste into the bone wound)

VIII. Контрольные тесты:

В больницу доставлен пострадавший с обширной скальпиро¬ванной раной в теменной области. Определите клетчаточный слой, в котором произошла отслойка лоскута: (1)

подкожная жировая клетчатка
+ подапоневротическая жировая клетчатка
поднадкостничная рыхлая клетчатка

Для остановки кровотечения из губчатого вещества костей сво¬да черепа применяют два способа: (2)

+ втирание восксодержащей пасты
клипирование
+ орошение раны перекисью водорода
перевязку

Врач обнаружил у пострадавшего следующие симптомы: экзофтальм, симптом «очков», ликворея из носа. Предварительный диагноз - перелом: (1)

свода черепа
+ основания черепа в передней черепной ямке
основания черепа в средней черепной ямке
основания черепа в задней черепной ямке

Лицевой нерв выходит из полости черепа на его основание через: (1)

круглое отверстие
овальное отверстие

остистое отверстие
сосцевидное отверстие
+ шилососцевидное отверстие

В артериальном (Виллизиевом) круге задняя соединительная артерия соединяет артерии: (1)

внутреннюю сонную и базиллярную
+ внутреннюю сонную и заднюю мозговую
внутреннюю сонную и позвоночную
среднюю мозговую и заднюю мозговую
среднюю мозговую и позвоночную

IX. Глоссарий:

Mastoidotomia	Трепанация сосцевидного отростка
Galea aponeurotica	Сухожильный шлем
Regio frontoparietooccipitalis	Лобно-теменно-затылочная область
V. Emissaria	Эмиссарная вена
Regio temporalis	Височная область
Plexus pterygoideus	Крыловидное венозное сплетение
Regio auricularis	Область ушной раковины
Regio mastoidea	Область сосцевидного отростка

Lesson on

«Topographic anatomy of the facial part of the head. Operative surgery: surgery of injuries of the maxillofacial region, incision of the abscesses and phlegmons of the maxillofacial area, the autopsy retropharyngeal and peritonsillar abscesses, resection of the maxilla and mandible (the concept**)»**

Motivational characteristic: knowledge of the location of the main neurovascular bundles of the facial part of the skull will allow to foresee the ways of the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of ways of metastasis to the lymph nodes will allow to diagnose the localization of malignant tumors of the studied area in a timely manner.

I. Goals:

The student needs to know:	The student must be able:	The student must own:
1. Topographic anatomy of the facial Department of the head - region, borders, holotape, syntopia, sellotape, layered structure. 2. Topographic anatomy of the anterior facial area: • the area of the eye socket borders, holotape, syntopia, skeletopy, the layered structure of the • infraorbital region of homotopia, syntopia, skeletopy, the layered structure of the • the nose of homotopia, syntopia, skeletopy, the layered structure of the • the mouth area of homotopia, syntopia, skeletopy, the layered structure of the • chin region of homotopia, syntopia, skeletopy, the layered structure of the 3. Topographical anatomy of the lateral facial region is the cheek region, parotid-chewing, the cheek 4. Topographical anatomy of deep face region. 5. The method of opening and drainage of the retropharyngeal abscess 6. The method of opening and drainage of the peritonsillar abscess 7. Technique of surgical intervention in operations on the facial part of the head at each stage	1. To inspect and palpate the areas of the facial part of the head. 2. Show on drug: • the subscriber's Department head border • the area of the orbit – border * subglacial area-boundaries * nose-border area • the area of the mouth – border * chin area-boundaries * buccal area-boundaries • the parotid-masticatory region – boundary * zygomatic area-borders 3. Use special surgical instruments for operations on the facial part of the head at each stage. 4. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the brain Department of the head. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the brain section of the head. 4. Skills of surgical procedures at each stage.

II. Questions to test your baseline knowledge:

1. Parotid chewing area of the face.
2. Buccal, facial area.
3. Nose area,
4. Mouth area.
5. Anatomy of the orbit.
6. Anatomy of facial muscles.
7. Anatomy of the paranasal sinuses.
8. Anatomy of the trigeminal and facial nerves.
9. Areas of the facial part of the head (layered topography, blood supply, innervation).
10. Topographic anatomy of the parotid-masticatory region.
11. Topographical anatomy of deep face region.
12. Topographic anatomy of the buccal region.

II. The object of study - the human body.

III. Information part:

The facial part of the head

On the surface of the facial part of the head, the areas of the orbit, regio orbitalis, nose, regio nasalis, mouth, regio oralis, the adjacent chin area, regio mentalis are isolated in front. The sides are infraorbital, regio infraorbitalis, buccal, regio buccalis, and parotid-chewing, parotideomasseterica regio, region. In the latter, the surface and deep parts are isolated.

The blood supply to the face is mainly through the external carotid artery, a. carotis externa, through its branches: A. facialis, A. temporalis superficialis and a. maxillaris. In addition, the blood supply of the face is involved and a. ophthalmica from a. carotis interna. Between the arteries of the internal and external carotid arteries there are anastomoses in the orbital region.

The vessels of the face form an abundant network with well-developed anastomoses, as a result of which the wounds of the face bleed heavily. However, due to the good blood supply to the soft tissues of the facial wounds, as a rule, heal quickly, and plastic surgery on the face ends favorably. As in the arch of the skull, the arteries of the face are located in the subcutaneous fat, unlike other areas.

The veins of the face, as well as the arteries, are widely anastomosed with each other. From superficial layers of the venous blood flowing in the front, Vienna, v. facialis, and partly pozavcherashny, v. retromandibularis, from deep - maxillary Vienna, v. maxillaris. In the end, all these veins blood flows into the inner jugular vein. It is important to note that the veins of the face are also anastomosed with the veins flowing into the cavernous sinus of the Dura mater (through V. ophthalmica, as well as through

the emissary veins on the outer base of the skull), whereby purulent processes on the face (boils) along the veins can spread to the brain membranes with the development of severe complications (meningitis, phlebitis sinuses, etc.).

Sensitive innervation on the face is provided by the branches of the trigeminal nerve (n. trigeminus, V pair of FMN): n. ophthalmicus (I branch), n. maxillaris (II branch), n. mandibularis (III branch). The branches of the trigeminal nerve for the skin of the face come out of the bone channels, the holes of which are located on one vertical line: foramen (or incisura) supraorbitale for n. supraorbitalis of the I branch of the trigeminal nerve, foramen infraorbitale for n. infraorbitalis of the II branch of the trigeminal nerve and foramen mentale for n. mentalis from the III branch of the trigeminal nerve.

Trigeminal neuralgia is characterized by sudden bouts of excruciating pain, not removable painkillers. The most common affected n. maxillaris, n less. mandibularis and even more rarely - n. ophthalmicus. The exact cause of trigeminal neuralgia is unknown, but in some cases it is found that it occurs due to compression of the trigeminal nerve in the cranial cavity by an abnormally running blood vessel. His dissection led to the disappearance of pain.

Facial muscles Innervate branches of the facial nerve, n. facialis (VII pair of FMN), masticatory-III branch of the trigeminal nerve, n. mandibularis.

The area of the eye socket, regio orbitalis

Orbit, orbita-a pair of symmetrical recess in the skull, in which the eyeball with its auxiliary apparatus.

The human eye sockets have the shape of tetrahedral pyramids, the truncated tops of which are turned back to the Turkish saddle in the skull cavity, and the broad bases - anteriorly, to its front surface. The axes of the orbital pyramids converge (converge) posteriorly and diverge (diverge) anteriorly. The average size of the orbit: the depth of an adult ranges from 4 to 5 cm; the width at the entrance to it is about 4 cm, and the height usually does not exceed 3.5-3.75 cm.

The walls are formed by bone plates of different thickness and separate the orbit: the upper-from the anterior cranial fossa and frontal sinus; the lower - from the maxillary sinus, sinus maxillaris (maxillary sinus); the medial - from the nasal cavity and the lateral - from the temporal fossa.

Almost at the very top of the eye sockets is a rounded hole about 4 mm in diameter-the beginning of the bone optic canal, canalis opticus, 5-6 mm long, serving for the passage of the optic nerve, n. opticus, and the ocular artery, a. ophthalmica, into the skull cavity.

In the depth of the orbit, on the border between the upper and outer walls, next to the canalis opticus, there is a large upper orbital slit, fissura orbitalis superior, connecting the cavity of the orbit with the cavity of the skull (middle cranial fossa). There are:

1) the optic nerve, n. Ophthalmicus;
2) the oculomotor nerve, n. Oculomotorius;
3) diverting nerve, n. Abducens;
4) block nerve, n. Trochlearis;
5) upper and lower eye veins, vv. ophthalmicae superior et inferior.

On the border between the outer and lower walls of the orbit is the lower orbital slot, fissura orbitalis inferior, leading from the cavity of the orbit in the pterygoid-Palatine and inferior fossa. Through the inferior orbital fissure are:

1) lower orbital nerve, n. infraorbitalis, together with the same name artery and vein;
2) the zygomatic nerve, n. zygomaticotemporal;
3) zygomatic nerve, n. zygomaticofacialis;
4) venous anastomoses between the veins of the eye sockets and the venous plexus of the pterygoid Palatine fossa.

On the inner wall of the eye sockets are located front and rear lattice holes, serving for the passage of the same nerves, arteries and veins of the eye sockets in the labyrinths of the lattice bone and the nasal cavity.

In the thickness of the lower wall of the eye sockets lies the lower orbital sulcus, sulcus infraorbital, passing anteriorly into the same channel, opening on the front surface of the corresponding hole, foramen infraorbitale. This channel serves for the passage of the lower orbital nerve with the same artery and vein.

The entrance to the orbit, aditus orbitae, is bounded by the bony edges and closed by the orbital septum, septum orbitale, which separates the eyelid area and the orbit itself.

Eyelids (palpebrae)

These are skin-cartilage plates curved in the shape of the anterior segment of the eyeball, protecting the surface of the eye.

Layers

The skin is thin and mobile.

The subcutaneous tissue is loose, it contains anastomoses of the vessels of the eyeball with the vessels of the face. As a result, it is easily edema occurs in local inflammatory processes (eg, barley), and in General (angioedema Quincke, kidney disease, etc.).

The thin subcutaneous muscle is part of the mimic muscle of the eye, m. orbicularis oculi, and, like the rest of the facial muscles of the face, is innervated by the facial nerve.

Under the muscle lies a layer consisting of the cartilage of the eyelid and the orbital septum attached to it, which is fixed to the over - and under-eye edges by other edges.

The posterior surface of the cartilage and orbital septum is lined with a mucous membrane - conjunctiva, conjunctiva palpebrarum, passing to the sclera of the eyeball, conjunctiva bulbi. Places of transition of the conjunctiva from the eyelids to the sclera form the upper and lower arches of the conjunctiva-fornix conjunctivae superior et inferior. The lower arch can be viewed by pulling the eyelid down. To inspect the upper arch of the conjunctiva, it is necessary to turn the upper eyelid.

The anterior edge of the eyelids has eyelashes, at the base of which the sebaceous glands are located. Purulent inflammation of these glands is known as barley - chalazion. Closer to the posterior edge of the eyelids, holes of peculiar sebaceous or meibomian glands are visible, embedded in the thickness of the cartilage of the eyelids.

The free edges of the eyelids at the lateral and medial corners of the eye slit form angles fixed to the bones of the orbit by ligaments.

Lacrimal gland, glandula lacrimalis

The lacrimal gland is located in the lacrimal fossa in the upper lateral part of the orbit.

The medial parts of the eyelids, devoid of eyelashes, limit the lacrimal lake, lacus lacrimalis. The lacrimal tubules starting at this point fall into the lacrimal SAC, saccus lacrimalis. The contents of the lacrimal SAC is diverted by the nasolacrimalis duct, ductus nasolacrimalis, to the lower nasal passage.

Eyeball, bulbus oculi

The eyeball is placed in the cavity of the orbit, occupying it only partially. It is surrounded by fascia, a sheath of the eyeball, the vagina bulbi or tenon's capsule. Tenonova capsule, wearing an eyeball almost all its length, except for the area corresponding to the cornea (front) and the place of exit from the eye of the optic nerve (back), as it hangs the eyeball in the orbit of adipose tissue, being itself fixed fascial strands, going to the walls of the eye sockets and its edge. The walls of the capsule penetrate the tendons of the muscles of the eyeball. The tenon capsule does not fuse tightly with the eyeball: between it and the surface of the eye there is a gap, spatium episclerale, which allows the eyeball to move in this space.

Behind the tenon capsule is located retrobulbar Department.

The retrobulbar Department is occupied with fatty tissue, ligamentous apparatus, muscles, vessels, nerves.

The muscular apparatus of the eye sockets includes 6 muscles of the eyeball (4 straight muscles and 2 oblique) and the muscle lifting the upper eyelid (m. levator palpebrae superior). The outer rectus muscle innervates n. abducens, upper oblique-n. trochlearis, the rest, including the muscle lifting the upper eyelid, - n. oculomotorius.

The optic nerve, n. opticus (II vapor) coated with continuing on it (including the sclera) solid, arachnoid and soft shells. In the adipose tissue surrounding the optic nerve with its membranes, the eye artery and neurovascular bundles of the muscles of the eyeball pass.

All tissues of the eye socket, including the eyeball, are powered by the main arterial trunk - the eye artery, a. ophthalmica. It is a branch of the internal carotid artery, from which it departs in the cavity of the skull; through the visual channel, this vessel penetrates into the orbit, gives branches to the muscles and the eyeball and, divided into final branches: a. supraorbitalis, a. supratrochlearis and a. dorsalis nasi, out of the eye socket on the front surface.

Anastomoses of the superficial branches of the ocular artery with branches of the external carotid artery provide the possibility of collateral blood flow with a decrease in blood filling of the Willis circle (atherosclerotic plaques in the internal carotid artery). In this case, retrograde blood flow is observed in the eye artery.

According to the results of Doppler ultrasound examination of the suprablock artery, it is possible to judge the state of intracranial arterial blood flow.

Eye veins, vv. ophthalmicae superior et inferior, go to the upper and lower walls of the orbit; at the rear wall of the lower flows into the upper, which through the upper orbital slot enters the cavity of the skull and flows into the cavernous sinus. Eye veins anastomose with the veins of the face and nasal cavity, as well as with the venous plexus of the pterygoid fossa. There are no valves in the veins of the eye sockets.

Nose area, regio nasalis

The upper border of the area corresponds to the horizontal line connecting the medial ends of the eyebrows (the root of the nose), the lower - the line drawn through the attachment of the nasal septum, and the lateral boundaries are determined by the nasolabial and nasolabial folds. The nose area is divided into the outer nose and the nasal cavity.

The outer nose, nasus externus, is formed at the top of the nasal bones, side-frontal processes of the upper jaw and cartilage. The upper narrow end of the back of the nose at the forehead is called the root, radix nasi; above it is a somewhat deepened area between the superciliary arches - the adrenal axis, glabella. The lateral surfaces of the nose are convex downward, delimited by a pronounced nasolabial groove, sulcus nasolabialis, mobile and make up the wings of the nose, alae nasi. Between the lower free edges of the wings of the nose formed a movable part of the nasal septum, pars mobilis septi nasi.

The skin at the root of the nose is thin and mobile. On the tip of the nose and on the wings of the skin is thick, rich in large sebaceous glands and firmly fused with the cartilage of the outer nose. At the nasal openings, it passes to the inner surface of the cartilage forming the vestibule of the nasal cavity. The skin here has sebaceous glands and thick hairs (vibrissae); they can reach considerable length. Next, the skin passes into the mucous membrane of the nose.

The blood supply to the external nose is a. dorsalis nasi (finite branch a. ophthalmica) and branches of the facial artery. Veins are associated with facial veins and with the origins of the eye veins.

Sensitive innervation is carried out by the I branch of the trigeminal nerve.

The nasal cavity, cavum nasi,is the initial Department of the respiratory tract and contains a sense of smell. It is in front of apertura piriformis nasi, rear twin vents, joany, report it with the nasopharynx. By means of the nasal bone septum, septum nasi osseum, the nasal cavity is divided into two not quite symmetrical halves. Each half of the nasal cavity has five walls: upper, lower, posterior, medial and lateral.

The upper wall is formed by a small part of the frontal bone, lamina cribrosa of the ethmoid bone and partly by the sphenoid bone.

The composition of the lower wall, or bottom, includes the Palatine process of the upper jaw and the horizontal plate of the Palatine bone, making up the hard palate, palatum osseum. The bottom of the nasal cavity is the" roof " of the oral cavity.

The medial wall is the septum of the nose.

The back wall is available only for a small extent in the upper part, as below are hoans. It is formed by the nasal surface of the body of the sphenoid bone with the fresh opening, apertura sinus sphenoidalis.

The formation of the lateral wall of the nasal cavity involves the lacrimal bone, os lacrimale, and lamina urbitalis of the ethmoid bone separating the nasal cavity from the orbit, the nasal surface of the frontal process of the upper jaw and its thin bone plate that separates the nasal cavity from the maxillary sinus, sinus maxillaris.

On the lateral wall of the nasal cavity, three nasal shells hang inward, which separate three nasal passages from each other: the upper, middle and lower.

The upper nasal passage, meatus nasi superior, is located between the upper and middle shells of the ethmoid bone; it is twice shorter than the middle passage and is located only in the posterior part of the nasal cavity; it is communicated with sinus sphenoidalis, foramen sphenopalatinum, it opens the posterior cells of the ethmoid bone.

The middle nasal passage, meatus nasi medius, goes between the middle and lower shells. It opens cellulae ethmoidales anteriores et mediae and sinus maxillaris.

The lower nasal passage, meatus nasi inferior, runs between the lower shell and the bottom of the nasal cavity. In its front section opens the nasolacrimal duct.

The space between the nasal conchae and the nasal septum is designated as a common nasal passage.

On the side wall of the nasopharynx there is a pharyngeal opening of the auditory tube connecting the pharynx cavity with the middle ear cavity (tympanic cavity). It is located at the level of the posterior end of the lower shell at a distance of about 1 cm behind it.

The vessels of the nasal cavity form anastomotic networks that arise due to several systems. The arteries are branches of the a. ophthalmica (aa. ethmoidales anterior and posterior), a. maxillaris (a. sphenopalatina) and a. facialis (rr. septi nasi). The veins form a network located more superficially.

Especially thick venous plexus, having the form of cavernous formations, concentrated in the submucosal tissue of the lower and middle nasal shells. From these plexuses the majority of nasal bleeding. The veins of the nasal cavity anastomose with the veins of the nasopharynx, orbit and meninges.

Sensitive innervation of the nasal mucosa is carried out by the I and II branches of the trigeminal nerve, that is, the ocular and maxillary nerves. Specific innervation is carried out by the olfactory nerve.

Paranasal sinuses, sinus paranasales

On each side of the nasal cavity adjacent to the maxillary and frontal sinuses, ethmoid labyrinth and sphenoid sinus in part.

The maxillary, or maxillary, sinus, sinus maxillaris, is located in the thickness of the maxillary bone.

This is the largest of all the paranasal sinuses; its capacity in an adult - an average of 10-12 cm3. In the form of the maxillary sinus resembles a tetrahedral pyramid, the base of which is located on the side wall of the nasal cavity, and the tip - at the zygomatic process of the upper jaw. The front wall is facing anteriorly, the upper or orbital wall separates the maxillary sinus from the orbit, the back is facing the suspension and pterygoid Palatine fossa. The lower wall of the maxillary sinus forms the alveolar process of the upper jaw, separating the sinus from the oral cavity.

The internal, or nasal, wall of the maxillary sinus is clinically the most important; it corresponds to most of the lower and middle nasal passages. This wall, except for its lower part, is quite thin, and gradually thinning from the bottom up. The hole through which the maxillary sinus communicates with the nasal cavity, hiatus maxillaris, is located high under the very bottom of the orbit, which contributes to the stagnation of inflammatory secretion in the sinus. To the front of the inner wall of the sinus maxillaris lies the nasolacrimal canal, and to the posterior part - the lattice cells.

The upper or orbital wall of the maxillary sinus is the thinnest, especially in the posterior part. With inflammation of the maxillary sinus (sinusitis), the process can spread to the area of the orbit. In the thickness of the orbital wall passes the channel of the subglacial nerve, sometimes the nerve and blood vessels are directly attached to the sinus mucosa.

The anterior, or facial, wall is formed by the portion of the upper jaw between the subglacial edge and the alveolar process. This is the thickest of all the walls of the maxillary sinus; it is covered with soft tissues of the cheek, available for feeling. The flat recess in the center of the front surface of the front wall, called the Fang fossa, corresponds to the thinnest part of this wall. У верхнего края клыковой ямки расположено отверстие для выхода подглазничного нерва, foramen infraorbitale. Through the wall pass rr. alveolares superiores anteriores et medius (branches n. infraorbitalis from the II branch of the trigeminal nerve) forming plexus dentalis superior as well as AA. alveolares superiores anteriores from the infraorbital artery (a. maxillaris).

The lower wall, or the bottom of the maxillary sinus, is located near the posterior part of the alveolar process of the upper jaw and usually corresponds to the holes of the four posterior upper teeth. This makes it possible, if necessary, to open the maxillary sinus through the corresponding tooth socket. With the average size of the maxillary sinus, its bottom is approximately at the level of the bottom of the nasal cavity, but often located below.

When the lower wall of the sinus is very thin, when the tooth is removed, infection may penetrate into the cavity of the maxillary sinus. On the other hand, inflammation of the sinus mucosa (sinusitis) due to the common sensitive branches of the maxillary nerve can lead to a feeling of toothache. If necessary, you can open the maxillary sinus through the appropriate tooth socket.

The frontal sinus, sinus frontalis, is located between the plates of the orbital part and the scales of the frontal bone. Its size varies greatly. There are lower, or the superior, anterior, or front, back, or brain, and a median wall. With inflammation of the frontal sinus (frontitis) through its thinned walls, the process can spread to the orbit, as well as to the anterior cranial fossa.

The frontal sinus communicates with the nasal cavity through the aperture of the frontal sinus, aperture sinus frontalis, which opens in front of the middle nasal passage.

The sphenoid sinus, sinus sphenoidalis, is located in the body of the sphenoid bone directly behind the lattice labyrinth above the khans and the vault of the nasopharynx. Sagittal septum is divided into two, in most cases, unequal in volume parts. On the front, the thinnest wall in each half of the sinus is a hole, aperture sinus sphenoidalis. The shape and size of the sphenoid sinus vary greatly. Its upper wall faces the anterior and middle cranial fossa.

The middle part of the upper sinus wall corresponds to the Turkish saddle with the pituitary gland located in its fossa, and anteriorly from them - the intersection of the optic nerves.

Outside the side wall of the sphenoid sinus are internal carotid artery and cavernous venous sinus. In addition, on the sides of the sinus are the oculomotor, trochlear and abducens nerves, perforating the outer wall of the cavernous sinus, as well as the first branch of the trigeminal nerve.

The lower wall of the sphenoid sinus forms the arch of the nasal cavity.

The lattice labyrinth, labyrinthus ethmoidalis, consists of 2-5 and more different in size and shape lattice cells, cellulae ethmoidales, which are separated from the anterior cranial fossa by the orbital part of the frontal bone and the lattice bone, and from the orbit by the orbital plate, lamina orbitalis. Behind the cells of the lattice maze sometimes reach the anterior wall of the sphenoid sinus. The wedge-shaped plate of the lattice labyrinth, the free edge of which in the nasal cavity is the skeleton of the middle shell, divides the air-bearing cells into the anterior and posterior; the anterior cells open in the middle nasal passage, and the posterior cells open in the upper one.

Through the thinned walls of the lattice labyrinth, the inflammatory process can spread into the cavity of the skull, the orbit and the optic nerve, the channel of which, with the strong development of the cells of the lattice labyrinth, is in close proximity to it.

The mucous membrane of the paranasal sinuses differs little in structure from the mucous membrane of the nasal cavity, but it is much thinner and relatively poorer in vessels and glands than the mucous membrane of the nasal cavity.

Blood supply to the paranasal sinuses comes from the branches of the internal and external carotid arteries, mainly through the ocular and maxillary arteries. The veins of the maxillary sinus anastomose with the veins of the face and the pterygoid plexus, and the veins of the frontal sinus - with the veins of the Dura, with the longitudinal sinus and cavernous sinus. In these ways, sometimes the infection penetrates into the orbit or cranial cavity.

Innervation of the paranasal sinuses is carried out from the I and II branches of the trigeminal nerve, as well as from the pterygoid-Palatine node.

Mouth area, regio oralis

The mouth area is located between the nose area at the top and the chin area at the bottom. The upper border of the region passes along a horizontal line drawn through the base of the septum of the nose, the lower - along the chin-lip furrow, on the sides of the area is limited to nasolabial furrows. The mouth area includes the lips and the mouth.

The lips form the anterior wall of the oral cavity; their free edges border the oral slit, rima oris, and form the corners of the mouth.

The skin of the lips contains sebaceous and sweat glands, in men has hair, in women-fluff. On the red border of the skin passes into the mucous membrane of the inner surfaces of the lips.

Subcutaneous tissue is almost not expressed, as the skin attached to the facial muscles. The most pronounced circular muscle of the mouth, m. orbicularis oris, in addition to it, in this area are the muscles that raise and lower the corner of the mouth and the entire lip as a whole. The muscles of the oral area, like all mimic muscles, are innervated by the branches of the facial nerve, suitable for the posterior (deep) surface of the muscles: rr. buccales and R. marginalis mandibularis. Facial muscles are covered with superficial fascia.

Sensitive innervation is provided by the nervous branches of the trigeminal nerve system.

Loose submucosa tissue lies behind the muscle layer. In it pass blood vessels: the upper and lower labial artery from the facial artery with their accompanying veins. The mucosa in the middle forms the upper and lower frenulum. In the lateral parts, it passes into the mucous membrane of the cheeks, above and below - on the gums, forming the upper and lower arches.

Lymphatic vessels of the lips take the lymph to the submandibular and, in addition, to the cheek, parotid, superficial and deep cervical lymph nodes. Vessels from the middle part of the lower lip carry the lymph to the chin nodes. Lymphatic vessels of both sides of the lips are widely anastomosed with each other, so the pathological process can cause a reaction of the lymph nodes of the other side.

The oral cavity, cavitas oris, is topographically divided into two parts - the anterior, or vestibule of the mouth, vestibulum oris, and the posterior, or the oral cavity itself, cavitas oris propria, communicating widely with each other when the mouth is open.

With closed jaws, the vestibule communicates with the oral cavity through the interdental spaces and holes at the ends of the alveolar processes behind the last molars of both jaws. The bases of the branches of the lower jaw are covered with a wing-jaw fold.

The vestibule of the oral cavity in the form of a narrow horseshoe-shaped, repeating the shape of the alveolar arches of the slit extends from front to back.

The borders (walls) of the vestibule in front are the lips, from the sides outside - the cheeks, from the inside - the labial-buccal surfaces of the teeth and the alveolar processes of the jaws.

On the eve of the oral cavity, the ducts of the parotid salivary glands open. The openings of the ducts are located on the right and left sides of the cheek mucosa in the form of a papillary elevation at the level of the crown of the first or second molar of the upper jaw. Under the mucous membrane in the center of the anterior surface of the lower jaw is the chin opening, from which come a., V. et n. mentales.

In fact, the oral cavity with the mouth closed is represented as a narrow horizontal slit formed by the vault of the hard palate and the tongue; the lateral edges of the tongue tightly touch the jaws and the lingual surface of the teeth. The anterolateral wall of the oral cavity is represented by alveolar processes with teeth and partly by the body and the inner surface of the branches of the lower jaw and medial pterygoid muscles. Behind the mouth opens the isthmus of the throat, isthmus faucium, in the middle part of the pharynx, pars oralis pharyngis. At the top of this Department is connected through the nasal part of the pharynx and the hole Hoan, choanae, with the nasal cavity, below - through the laryngeal part of the pharynx, pars laryngeapharyngis, with the cavity of the larynx and esophagus.

The upper wall of the oral cavity is formed by a solid sky. At the front end of the longitudinal Palatine suture, almost directly at the necks of the Central incisors located incisor hole, foramen

In the posterolateral corners of the sky symmetrically arranged large and small palatal holes, foramina palatina minores et majores, wing - seen-palatal canal, canalis palatinus major. Connecting the pterygoid-Palatine fossa with the oral cavity, the pterygoid-Palatine canal serves to pass the Palatine nerves, nn. palatini anterior, medialis and posterior, and descending Palatine artery, a. palatina descendens.

The back wall of the oral cavity is represented by a soft sky, palatum molle. It consists of symmetrical muscles of the soft palate and the muscles of the tongue. With the contraction of the muscles of the soft palate between its edge, the front arms and the back of the tongue, a hole in the throat is formed.

The posterior edge of the soft palate passes into the side wall of the throat in the form of two folds, the front and rear Palatine arches. In the front is the Palatine muscle, m. palatoglossus, posterior-palatoglossus, m. palatopharyngeus.

Between the arches is formed mindalikovye fossa, fossa tonsillaris, where is the Palatine tonsil, tonsilla palatinae. It is separated from the pharyngeal wall by loose fiber. The Palatine tonsil has its own capsule, capsula tonsillae, and is covered with a mucous membrane. Blood supply is provided by the ascending pharyngeal and facial arteries (branches of the external carotid artery), as well as the descending Palatine artery (from a. maxillaris). The nerves of the Palatine amygdala are branches of the pharyngeal (IX pair of FMN), vagus (x pair of FMN), lingual nerve (from the III branch of the trigeminal nerve), and the pterygoid-Palatine node. They approach the amygdala from the outside.

Palatine tonsils with the pharyngeal (back of throat), lingual (behind the tongue) and two tubal tonsils (pharyngeal opening of the auditory tube) form the pharyngeal lymphatic ring, anulus lymphoideus pharyngis, first described by N. And. Pirogov, and then Valldaura.

Pathologically enlarged pharyngeal tonsil is called adenoids. Adenoids complicate nasal breathing, so they are often removed surgically.

Innervation of the mucous membrane of the hard and soft palate is carried out by the II branch of the trigeminal nerve through ganglion pterygopalatinum, from which the Palatine nerves depart, nn. palatini. The muscles of the soft palate are innervated in this way: the muscle stretching the soft palate, m. tensor veli palatini, supplied with the III branch of the trigeminal nerve; the remaining muscles are innervated by the branches of the pharyngeal plexus.

The lower wall, or bottom, of the oral cavity is formed by a set of soft tissues located between the tongue and the skin of the supra-lingual part of the anterior region of the neck. The basis of the floor of the mouth is mylohyoid muscle, m. mylohyoideus, placed over the muscle (mm. genioglossus, geniohyoideus, hyoglossus, styloglossus).

The floor of the mouth is fixed the root of the tongue, lingua. The tongue is a muscular organ, to which the muscles running from the chin, the sublingual gland and the subulate process of the temporal bone are attached on the sides. Ha m. mylohyoideus, in the interval between the lower jaw and mm. geniohyoideus and genioglossus, lies a paired sublingual salivary gland, or rivinus gland.

At the bottom of the oral cavity, the mucous membrane, passing to the lower surface of the tip of the tongue, forms a frenulum, frenulum linguae, along the middle line. On the sides of it, at the middle of the body of the lower jaw, there are papillae, carunculae sublinguales, on which the duct of the submandibular salivary gland and the large duct of the sublingual are opened. Along the lower surface of the tongue, under the mucosa, in the place where it passes from the gums to the lateral surface of the tongue, stretches the neurovascular bundle (V. lingualis, N. lingualis, A. profunda linguae, and behind-n. hypoglossus).

The arterial supply of the tongue is carried out mainly by the lingual artery, a. lingualis, - a branch of the external carotid artery.

The veins of the oral cavity accompany the arteries of the same name, and form anastomoses with venous plexuses: pterygoid and pharyngeal.

Motor innervation of the tongue is carried out n. hypoglossus (XII pair of FMN).

Innervation of the mucous membrane of the tongue is carried out by the lingual and lingual (IX pair of FMN) nerves. Sensitive fibers (except flavoring) for the front two-thirds of the tongue are composed of n. lingualis (from the III branch of the trigeminal nerve), and the taste fibers are in the composition of the drum string, chorda tympani, which is connected to the lingual nerve at the exit of the tympanic cavity. For the back third of the tongue taste fibers are composed of n. hypoglossus, the remaining sensitive fibers are part of the same nerve and the inner branch of the upper laryngeal.

The lymph from the tip of the tongue and from the front of the bottom of the mouth flows into the sub - chin nodes, and from there-into the submandibular and deep cervical lymph nodes. From the side surface of the body

the tongue lymph flows directly into the submandibular, and from the pharyngeal surface of the tongue root and lingual tonsils - into the upper deep lymph nodes of the neck.

Teeth, dentes

The teeth are arranged in the form of two arcs located one above the other, arcus dentalis superior et inferior, and freely protruding crowns into the oral cavity. With the maximum lifting of the lower jaw, both arches are closed with crowns. Teeth separate the vestibule of the mouth from the oral cavity itself.

In the tooth, dens, distinguish the crown, corona dentis, neck, cervix dentis, and root, radix dentis. Dentin, which is their basis, in the area of crowns covered with enamel, and at the root-cement. Inside the tooth is a cavity, savitas dentis, continuing into the root (or roots) in the form of a canal, canalis radicis dentis. The last one on the tops of the tooth roots ends with a hole, foramen apicis dentis. The cavity of the tooth is filled with pulp, pulpa dentis, into which vessels and nerves penetrate through the apical opening of the root from the jaws.

The connection of the tooth root with the wall of the Lune occurs by the type of hammering (gomphosis). Ligament, holding luecke the root of the tooth is called the periodontium, periodontium.

The front teeth are called incisors, dentes incisivi. On the sides of the incisors, in the area of the greatest bending of the dental arch, there are teeth with pointed conical crowns-fangs, dentes canini. Posterior to them are located dwuhpuchkova small molar teeth or premolar teeth, dentes premolares. The rear mnogoborya teeth, called the large molars - molar teeth, dentes molares.

Blood supply to the teeth is mainly due to a. maxillaris. Moving away from her upper alveolar artery, AA. alveolares superiores, and the lower alveolus artery and. alveolaris inferior. On the upper jaw, molars receive blood from the posterior upper alveolar artery, and the anterior teeth receive blood from the anterior upper alveolar arteries extending from one of the final branches of a. maxillaris-subglacial artery, a. infraorbitalis, which takes place in the same channel.

A. alveolaris inferior, passing in the mandibular canal, and gives branches to the teeth of the lower jaw.

From the alveolar arteries depart AA. dentales, penetrating into the pulp through the apical hole.

Venous outflow occurs through the veins accompanying the artery in the pterygoid plexus, plexus pterygoideus. The veins of the teeth of the upper jaw are also connected with the eye veins and through them - with the venous sinuses of the skull. Through the facial and submandibular veins blood from the teeth enters the system of jugular veins.

Lymph flow is carried out in the submandibular and chin lymph nodes. From here the lymph flow goes to the superficial and deep cervical nodes.

The upper teeth are innervated by n. maxillaris, II branches of the trigeminal nerve, giving the upper alveolar nerves accompanying the arteries of the same name. The posterior upper anterior, middle and posterior alveolar nerves, connecting with each other by arcades, form the upper dental plexus, plexus dentalis superior. This plexus may be partially located directly under the mucous membrane of the maxillary sinus.

The lower teeth Innervate the III branch of the trigeminal nerve, n. mandibularis. It departs from the n. alveolaris inferior, which, passing in the mandibular canal, it divides into the trunks forming the lower dental plexus, plexus dentalis inferior. From the latter, through the apical opening of the root, the dental branches, rami dentales, enter the pulp.

Vegetative innervation of teeth is carried out from the head of the sympathetic and parasympathetic nervous system.

Chin area, regio mentalis

An unpaired area located between the mouth area and the chin protrusion.

External reference points. Chin protrusion, chin bumps, lower lip, chin-lip furrow.

Scope. Above - chin-lip furrow, from the base (bottom edge) lower jaw, on the sides there are vertical lines running down from the corners of the mouth.

Projections. At the intersection of the vertical line going down from the point on the border of the inner and middle third of the orbit, with the middle of the distance between the alveolar and lower edge of the lower jaw is projected chin hole through which the chin neurovascular bundle. This point is located 1 cm above and lateral to the genial tubercle.

Layers

The skin is quite thick, men covered with hair.

Subcutaneous tissue is poorly expressed. In the subcutaneous tissue are facial muscles: chin, lowering the corner of the mouth and lowering the lower lip. They are covered with surface fascia. Like the rest of the facial muscles, they are innervated by the facial nerve, its marginal branch, r. marginalis mandibularis.

There is no fascia of its own in this area.

The chin neurovascular bundle comes out of the same-named opening of the lower jaw and is located on the periosteum. N. mentalis is the final branch of n. alveolaris inferior (from the III branch of the trigeminal nerve), innervates the skin and mucous membrane of the lower lip. A. mentalis alveolaris inferior, departing from a. maxillaris. The eponymous Vienna is the v source. alveolaris inferior, running in a deep region of the face.

Suborbital region, regio infraorbitalis

External reference points. The subglacial edge of the orbit is sharp in the outer part and smoothed when moving into the back of the nose. Down from this edge in thin people visible to the eye Fang fossa, fossa canina, passing down into the alveolar process of the upper jaw, the lateral edge of the outer nose, zygomatic bone.

Scope. Upper-lower edge of the orbit, lower-horizontal line drawn through the skin part of the nasal septum, medial - outer edge of the nose, lateral-vertical line drawn from the lower lateral angle of the orbit to the intersection with the lower border.

Projections. Along the vertical line drawn through the point on the border between the inner and middle third of the supraorbital margin, the exit points of the sensitive branches of the I, II and III branches of the trigeminal nerve are projected. In the subglacial region it is the subglacial nerve, n. infraorbitalis (from N. maxillaris, II branch n. trigeminus), 0.5-0.8 cm below the subglacial edge.

Layers

The skin has a lot of sebaceous and sweat glands, thin.

Subcutaneous fat is loose. In it are the facial muscles and neurovascular education. The facial muscles that begin on the bones of the facial skull are located in the subglacial area in several layers. The lower part of the circular muscle of the eye is superficially located, m. orbicularis oculi, under it-small and large zygomatic muscles, mm. zygomatici minor et major, covering, in turn, the muscle lifting the upper lip, m. levator labii superioris. The muscles are separated by layers of subcutaneous tissue and surrounded by superficial fascia. There is no fascia of its own in this area. Under the muscles in the infraorbital area, at the bottom of the fossa canina, infraorbital hole goes and splits on the branches of the infraorbital neurovascular bundle.

Suborbital artery, a. infraorbitalis, - branch a. maxillaris, penetrates through the lower orbital slot into the cavity of the orbit, then through the lower orbital channel is sent to fossa canina. The same vein flows into the lower eye vein or into the pterygoid venous plexus. Infraorbital vessels anastomosing with branches of facial. Suborbital nerve, n. infraorbitalis, is the final branch of n. maxillaris. Upon exiting the eponymous canal, the nerve innervates the skin of the subglacial area, the skin and the mucous membrane of the upper lip.

The facial artery and vein go in the subcutaneous tissue diagonally from the lower lateral angle of the region to the upper medial (medial angle of the orbit).

With stenosis of the internal carotid artery with weakening of intracerebral blood flow, these arteries (facial and eye) can take on the functions of collateral.

A facialis (from the external carotid artery), giving the branches to the nose, anastomoses with the subglacial (from the internal carotid artery system). At the medial angle of the eye, it's already called a. angularis, passing between layers of mimic muscles, anastomoses with the ocular artery, a. ophthalmica.

Facialis forms the same anastomoses, the most important of which are the anastomoses with the upper and lower eye veins that carry blood to the cavernous sinus of the Dura of the brain.

Under normal conditions, the outflow of venous blood from the face occurs downward, towards the internal jugular vein. With suppuration processes on the upper lip, nasolabial fold, on the wings of the nose, the facial vein or its tributaries can be thrombosed or compressed with edematous fluid. In such cases, the blood flow has a different direction (retrograde) - up, and the septic embolus can reach the cavernous sinus, which leads to the development of sinus phlebitis, sinus thrombosis, meningitis or pyemia.

Infection in the subcutaneous tissue of the area may occur as a result of damage to the wing of the nose or when squeezing pimples in the area limited to the nasolabial folds and the upper lip. Therefore, this zone is called the "danger triangle" of the face.

Motor nerves of the facial muscles - rr. zygomat^s et buccales-branches of n. facialis-go in the direction of the outer corner of the eye and the middle of the distance between the wing of the nose and the corner of the mouth. They pass in a deep layer of subcutaneous tissue and enter the facial muscles from their deep surfaces.

The next layer is the periosteum of the anterior surface of the upper jaw.

Buccal area, regio buccals

External reference points. Zygomatic bone and zygomatic arch, lower edge of mandible, nasolabial sulcus, anterior edge m. masseter.

Scope. Upper-zygomatic arch, lower-lower edge of the lower jaw, front-vertical line drawn from the outer corner of the eye, back - palpable anterior edge of the masticatory muscle.

Projections. The facial artery and vein are projected from the intersection of the anterior edge of the masticatory muscle with the lower edge of the lower jaw in a diagonal direction to the inner corner of the eye. On this line, approximately at the level of the nose wing, one of the most important anastomoses of the facial vein with the pterygoid venous plexus is determined.

Layers

The skin is thin, contains a large number of sweat and sebaceous glands, firmly fused with a well-developed layer of subcutaneous fat.

In loose subcutaneous tissue are facial artery and vein. A. _facialis appears in the corner of the low back region, the front edge of the chewing muscles on the bottom edge of the lower jaw. In this area, it is easy to palpate its pulsation or press it to the bone to stop bleeding.

Skirting the edge of the jaw, the artery enters the buccal area from the submandibular triangle of the neck. Further, according to its projection, it goes in the diagonal direction to the subglacial area. The facial artery is strongly convoluted, forming bends inside the places of departure from it of the lower and upper lip arteries, aa. labiales superior et inferior. Branches a. facialis is anastomosed with the transverse artery of the face, a. transversa faciei (from superficial temporal), and with a. buccalis (from the maxillary artery).

The facial vein comes to the buccal area from the subglacial area along the same diagonal line as the facial artery, located behind it.

At the level of the wing of the nose, above or below it, it anastomoses with a deep pterygoid venous plexus of the face, which, in turn, is associated with the cavernous sinus of the Dura mater.

Branches n. facialis take place in a deep layer of subcutaneous tissue.

Practically an important formation, also located in the subcutaneous tissue, is the fat body of the cheek bisha, corpus adiposum buccae. It is located at the posterior border of the region, adjacent to the anterior edge of the masticatory muscle. The fat body of the cheek is enclosed in a rather dense fascial capsule, which separates it from the subcutaneous tissue, as well as from the cheek muscle located deeper. Part of the fat body is located in the adjacent, parotid chewing area, between the deep surface m. masseter and M. buccinator. From this part of the fat body, the processes depart: temporal, orbital and pterygoid-Palatine, penetrating into the corresponding areas.

The temporal process rises under the zygomatic bone along the outer wall of the orbit, located in the masticatory-maxillary space, and reaches the anterior edge of the temporal muscle. Here it is associated with the subfascial temporal space and deep temporal space (between the bone and the deep surface of the temporal muscle).

The orbital process of the fat body of the cheek, located in the pendulous fossa, lies to the lower orbital slit.

The pterygoid-Palatine process penetrates even further to the outer base of the skull between the posterior edges of the upper and lower jaw and the base of the pterygoid process. Often, the pterygoid-Palatine process of the fatty body of the cheek reaches the lower medial part of the upper orbital slit and through it penetrates into the cavity of the skull, where it lies to the wall of the interstitial sinus of the Dura mater.

In this regard, purulent inflammatory diseases from the areas of the face can spread into the cavity of the skull, even if venous anastomoses are not involved in the process. Often the source of infection, spreading along the processes of the fatty body of the cheek, are purulent inflammatory diseases in the upper and lower jaws.

The next layer is a dense buccal-pharyngeal (own) fascia of the buccal muscle.

Buccal muscle, m. the buccinator starts from the upper and lower jaws and weaves in front of the muscles surrounding the mouth slit. On the outer surface of the buccal muscle are n. buccalis (from n. mandibularis), cheek vessels and small facial lymph nodes are located.

The inner (deep) surface of the cheek muscle is covered by the oral mucosa.

At the level of the first upper molars, the buccal muscle perforates the excretory duct of the parotid salivary gland.

The parotid-masticatory region, regio parotideomasseterica

The area is located between the anterior margin of the masticatory muscle and the external auditory canal. It distinguished a superficial division, occupied by the branch of the mandible with m. masseter and parotid gland. Inside of the branch of the lower jaw is a deep section (deep area of the face), which are the pterygoid muscles, blood vessels and nerves.

The superficial division of the parotid-masticatory region, pars superficialis regio parotideomasseterica

In the superficial part, the external landmarks are the angle and lower edge of the lower jaw, the zygomatic arch, the external auditory canal and the palpable anterior edge of the masticatory muscle.

Scope. Upper-zygomatic arch, lower-lower edge of the lower jaw, anterior-anterior edge of the masticatory muscle, posterior-a line drawn from the external auditory canal to the apex of the mastoid process.

Projections. The motor branches of the facial nerve, innervating the mimic muscles, are projected along the lines diverging fan-shaped from the point located downwards and anteriorly from the tragus.

Remember the direction of the branches of the facial nerve is better as follows. The hand with the divorced fingers should be applied to the side of the face so that I finger crossed vertically upwards the middle of the zygomatic arch, II finger went to the outer corner of the eye, III - over the upper lip, IV - along the edge of the lower jaw, and V finger went vertically down the neck. At such position of a brush rr. temporales correspond to the first finger; rr. zygomatici-II, rr. buccales-III, r. marginalis mandibularis-IV and r. colli-V finger.

The excretory duct of the parotid gland, or stenon duct, is projected along a line parallel to the zygomatic arch and below it by 1.5-2.5 cm in the direction from the external auditory canal to the middle of the distance between the wing of the nose and the corner of the mouth. Anterior to the tragus are palpated, especially with movements in the joint, the articular process of the lower jaw and the temporomandibular joint. Further anterior, downwards from the middle of the zygomatic arch, the coronal process of the lower jaw is projected.

Layers

The skin is thin, men covered with hair.

The subcutaneous tissue is permeated with connective tissue strands connecting the skin with its own fascia.

Surface fascia is expressed only in the anterior region of the area where the lower jaw is thrown and attached to the skin platysma.

On the outer surface of the masseter muscle, covered with fascia parotideomasseterica, in the transverse direction in accordance with the above projection are the ductus parotideus, a. v et. transversa faciei and buccal branches of the facial nerve, which lie in the beginning of the splitting of the fascia parotideomasseterica, and then in the subcutaneous tissue.

Own fascia of the region, fascia parotideomasseterica, quite dense, forms a case of masticatory muscle, passing anteriorly into the fascial capsule of the fat body of the cheek. Behind its own fascia, splitting, forms a capsule of the parotid salivary gland.

Masticatory muscle, m. masseter, starting from the zygomatic process of the upper jaw and zygomatic arch, is attached to the corresponding tuberosity of the lower jaw.

Between m. masseter and the lateral surface of the coronal process of the branch of the lower jaw, to which the temporal muscle tendon is attached, is the masticatory-maxillary space filled with loose fiber. It continues under the zygomatic arch upward to the outer surface of the temporal muscle to the place of its fixation to the inner surface of the temporal fascia (aponeurosis), that is, to the subfacial (subaponeurotic) space of the temporal region. Through this crack purulent puffs penetrate from one area to another.

On the deep surface of the branch of the lower jaw, in its center, there is an opening of the lower jaw, foramen mandibulae, through which the lower alveolar vascular bundle penetrates the canal of the lower jaw.

The parotid gland, glandula parotidea, fills the posterior mandibular fossa, bounded from the front by the posterior edge of the lower jaw branch, from above by the external auditory passage, from behind by the mastoid process and the sternoclavicular muscle starting from it, from below by a strong fascial spur, linking the case of the sternocleid muscle with the angle of the lower jaw and separating the bed of the parotid gland and the submandibular gland, inside - the side wall of the pharynx.

The superficial part of the parotid salivary gland is located on the outer side of the masticatory muscle. It often continues in the course of the excretory duct of the gland to the anterior edge of the masticatory muscle.

Deep part (the pharyngeal bone) reaches medially to the adipose tissue located at the lateral walls of the pharynx in the anterior lateral peripharyngeal space. The lower process of the parotid gland descends to the inner surface of the angle of the lower jaw.

The fascial capsule of the parotid gland is developed differently: on the outer surface of the gland, on its anterior, lower and posterior sides it is thickened. The fascial capsule of the gland has two "weak points": one on the upper surface of the gland adjacent to the external auditory canal; the second - on the inner side of the pars profunda of the parotid gland, facing the anterior parapharyngeal space, between the styloid process and the internal pterygoid muscle.

With purulent inflammation of the parotid salivary gland (mumps), pus in 4 times more often breaks into this space, to the wall of the pharynx than into the external auditory canal.

In the thickness of the parotid salivary gland are important vasculature.

Facial nerve, n. facialis. Coming out of foramen stylomastoideum, it penetrates through the capsule in the gland bed, where it is divided into upper and lower branches. From the upper branches of the depart rr. temporales, zygomatici et buccales, from lower-r. marginalis mandibularis and R. colli. Upon exiting the gland, the branches of the facial nerve penetrate the fascia parotideomasseterica and are directed to the mimic muscles in the subcutaneous tissue.

The external carotid artery and. carotis externa, passes obliquely upward behind the branches of the lower jaw. At the neck of the articular process of the lower jaw, it is divided into a. temporalis superficialis and a. maxillaris. From primary Department A. temporalis superficialis departs the transverse artery of the face, a. transversa faciei, accompanying the excretory duct of the gland and anastomosing in the buccal area with the facial artery. A. maxillaris is sent into a deep Department of area.

Ear-temporal nerve, n. auriculotemporal, departs from n. mandibularis immediately upon its exit from the oval hole and penetrates the parotid gland. Along with a. temporalis superficialis, located inside of it, n. auriculotemporalis exits through the posterior surface of the gland capsule and rises vertically, in front of the external auditory canal, into the temporal region. In iron n. auriculotemporalis gives branches to the gland tissue, to the external auditory canal, tympanic membrane and connective branches to the facial nerve.

Mandibular vein, V. retromandibularis, in the bed of the parotid gland lies most superficially. It is formed from the veins of the parotid gland, vv. parotidii, v. maxillaris and from v. transversa faciei. In the direction from top to bottom she comes out of the

glands in the carotid triangle of the neck empties into the facial vein heading to the inside jugular. Retromandibularis anastomoses with the pterygoid venous plexus in the deep region, as well as with the external jugular vein.

Purulent exudate in the inflammatory process (mumps) can squeeze the branches of the facial nerve, which leads to paresis or paralysis of the facial muscles. The causes of non-traumatic facial paralysis may also be inflammation of the facial nerve near foramen stylomastoideum, swelling and compression of the nerve in the canalis n. temporal bone facialis. Damage to the facial nerve or its branches is possible with surgical interventions on the face. Therefore, during operations on the parotid and submandibular glands, careful identification of the nerve is necessary to avoid its damage.

Loss of tone m. orbicularis oculi leads to the inversion of the lower eyelid, its departure from the surface of the eye, as a result of which the cornea is not moistened with lacrimal fluid and ulcers may occur in it. Patients are unable to whistle, blow into wind instruments or effectively chew from paralysis m. buccinator and m. orbicularis oris, which helps the chewing, holding food in the mouth and forcing it out of the gutter between the teeth and cheek. The displacement of the angle of the mouth (facial asymmetry) is due to its pulling by the healthy muscles of the contralateral side.

Severe purulent process or tumor of the parotid gland can lead to corrosion (erosion) of the walls of the vessels passing in the gland bed, and heavy bleeding.

The deep division of the parotid-masticatory region (deep face), pars profunda parotideomasseterica regio (regio facialis profunda)

The deep part of the parotid chewing area, which is often called the deep area of the face, is located between the posterior surface of the upper jaw and the inner surface of the branch of the lower jaw. There is another name-the inter-jaw area. It is limited: from the outside-the branch of the lower jaw and the inner surface of the temporal muscle, from the front-the hillock of the upper jaw, medial-lateral surface of the pharynx, from above-that part of the outer base of the skull, which corresponds to the middle cranial fossa. In the fossa there is most of the holes connecting the outer and inner base of the skull: oval, awn, front torn, lower orbital slot, round. The posterior wall of the region is the parotid gland with its capsule.

In a deep division region there are two spaces: the temporo-pterygoid, spatium temporopterygoideum located between the inner surface of the lower half of the temporal muscle and lateral pterygoid muscle; micruroides, spatium interpterygoideum concluded between the two pterygoid muscles (mm. pterygoideus lateralis et medialis). In both spaces, communicating with each other, pass vessels and nerves, surrounded by fiber: a. maxillaris and its branches, branches n. mandibularis, venous pterygoid plexus, plexus pterygoideus. The cellulose of the temporal-pterygoid and intercranial spaces directly and along the vessels and nerves reaches the holes on the basis of the skull, the pterygoid-Palatine fossa, the orbit and the bottom of the oral cavity.

In the temporal-pterygoid space are located a. maxillaris and venous pterygoid plexus, plexus pterygoideus. For better comprehension, we can assume that in this space are mainly vessels.

Venous pterygoid plexus is located mainly on the outer surface of the lateral pterygoid muscle, although its small branches pass to the medial pterygoid muscle, and to the opening of the auditory tube. The pterygoid plexus is represented either in the form of a looped network, or in the form of several large venous trunks surrounded by small veins. Larger branches of the pterygoid plexus are attached to the lateral pterygoid muscle.

Plexus pterygoideus takes blood from V. alveolaris inferior, V. meningea media, vv. parotide, V. temporalis profunda. From a practical point of view, it is important that the pterygoid plexus is associated with the cavernous sinus of the Dura through the vv. emissarii foraminis laceri anterioris et rete foraminis ovalis. Through the lower orbital slot it is connected to V. ophthalmica inferior. With the superficial veins of the face, the pterygoid plexus is connected through the branches of the deep vein of the face. The described venous connections are of great clinical importance, as they are the ways of infection transfer.

Blood outflow from the pterygoid plexus is carried out through V. retromandibularis, which takes place in the bed of the parotid gland and on the neck merges with the facial vein. There is also an anastomosis connecting this vein to the external jugular vein.

Once again, we emphasize that normally the outflow of venous blood is carried out in the direction downwards, that is, the blood in the pterygoid plexus falls from the cavernous sinus, and not Vice versa.

Maxillary artery, a. maxillaris, located on the surface of the lateral pterygoid muscle, passes among the venous branches in the transverse direction and then goes inside and somewhat upward to the pterygoid Palatine fossa. In the initial Department after leaving the parotid gland, it is located near the capsule of the temporomandibular joint.

Maxillaris gives numerous branches (up to 16), which supply the formation of a deep area of the face, as well as the Dura mater. Meningea media immediately moves anteriorly from the articular process of the lower jaw and is directed between the branches of the auricular nerve up to the opening. The alveolaris inferior branches off at the level of the mandible notch and goes vertically downwards into the mandibular canal. Except them, from a. maxillaris depart upper alveolar branches, temporal, Palatine, subglacial, etc.

The intercranial space is located between the lateral and medial pterygoid muscles. Both of them begin from the pterygoid process of the sphenoid bone, and are attached differently: medial - to the inner surface of the angle of the lower jaw, and lateral - to the anterior surface of the neck of the lower jaw and to the joint capsule. The outer surface of the medial pterygoid muscle is covered by the inter-pterygoid fascia, behind which the nerves are located mainly.

Mandibular nerve, n. mandibularis (III branch of the trigeminal nerve), comes out of the oval hole and, covered by the lateral pterygoid muscle, is divided into branches. This nerve, unlike the I and II branches of the trigeminal nerve, is mixed, has motor and sensitive branches. Motor branches (n. massetericus, nn. temporales profundi, nn. pterygoidei lateralis et medialis, N. musculi tensor veli palatini) almost immediately go to the appropriate masticatory muscles.

Sensitive branches on different over go through picrylamino space.

Buccal nerve, n. buccalis, passes between two portions of the lateral pterygoid muscle and on the way to the cheek area occupies the most anterior and medial position. Other nerves lie on the outer surface of the medial pterygoid muscle.

Lower alveolar nerve, n. alveolaris inferior, passes in the interval between the branch of the lower jaw and the medial pterygoid muscle and, together with the same artery and vein, descends to the opening of the canal of the lower jaw, probodaya

intercranial fascia. Before entering this channel, the lower alveolar nerve gives the motor maxillofacial nerve, n. mylohyoideus, running along the inner surface of the lower jaw to the same muscle through the area of the submandibular triangle.

Lingual nerve, n. lingualis, located on the outer surface of the medial pterygoid muscle anterior and medial to n. alveolaris inferior. Outside to the top down chorda tympani, is covered by a trunk of the inferior alveolar nerve.

Ear-temporal nerve, n. auriculotemporalis, departs from the mandibular nerve near the oval opening by two bundles that cover a. meningea media. Next, the nerve goes along the medial surface of the articular process of the lower jaw and penetrates into the bed of the parotid gland, through which it passes upward into the temporal region.

The pterygopalatina, fossa pterygopalatina, is located in the anteromedial part of the region. It is bounded behind by the pterygoid process, in front-by the hillock of the upper jaw, from the inside-by the perpendicular plate of the Palatine bone. From the middle cranial fossa through the round opening of the skull, foramen rotundum, it includes the maxillary nerve, n. maxillaris (II branch of the trigeminal nerve). Its direct extension is n. infraorbitalis, which enters the subglacial canal (in the lower wall of the orbit formed by the maxillary bone) and before its exit to the subglacial area gives the upper alveolar and gingival branches, innervating the upper teeth and gums.

The eponymous process of body fat cheeks up in the wing - seen-palatal fossa of the buccal region.

The most profound division of the area is the throat with the surrounding peripharyngeal space, spatium peripharyngeum.

It consists of a pharyngeal space, spatium retropharyngeum, and two lateral, spatium lateropharyngeum.

The occipital space is located between the pharynx (with its visceral fascia) and the pre-vertebral fascia and extends from the base of the skull to the level VI of the cervical vertebra, where it passes into the spatium retroviscerale of the neck.

Directly to the deep division of the face adjacent the lateral peripharyngeal space. At the top it reaches the base of the skull, and at the bottom-the hyoid bone. Outside lateral space is limited to the medial pterygoid muscle and its covering fascia and the parotid gland, behind - the transverse processes of the cervical vertebrae, and the interior lateral wall of the pharynx and extending from the pharynx to the base of the transverse processes of the lateral pharyngeal-vertebrates fascial spurs separating the lateral peripharyngeal space from the retropharyngeal.

Each side peripharyngeal space is divided, in turn, on the front and rear using a bundle of muscles and fascia, starting from the styloid process (soldiername).

To the anterior part of the lateral peripharyngeal space adjacent the inside tonsils, on the outside (between the medial pterygoid muscle and the styloid process) - pharyngeal process of the parotid gland.

In the posterior part of the lateral peripharyngeal space behind "soldiarity" are the internal jugular Vienna, V. jugularis interna (outside), internal carotid artery, a. carotis interna (inside) and 4 cranial nerve: glossopharyngeal n. glossopharyngeus (IX pair of cranial nerves) vagus n. vagus (X pair of cranial nerves), plus, n. accessorius (XI pair of cranial nerves), and hypoglossal n. hypoglossus (XII pair of cranial nerves). The first three nerves come out of the skull cavity through the jugular hole, and the sublingual - through the canalis n. hypoglossi over the condyles of the occipital bone.

Along the inner jugular vein are deep lymph nodes of the neck, nodi lymphoidei cervicales profundi.

The lateral peripharyngeal tissue and retropharyngeal spaces plays a significant role in the development of a deep phlegmon of the face and neck.

Infection of the parathyroid space is often observed in purulent mumps, inflammation of the intercranial fiber, inflammation of the lower jaw gums, lesions of the 7 and 8 teeth of the lower jaw. Inflammation of the tissue lateral peripharyngeal space may lead to difficulty swallowing and breathing. In the transition of infection from the anterior part of the lateral peripharyngeal space in the back (the destruction of "soldiarity") may cause symptoms of cranial nerve. There is also a risk of necrosis of the wall of the internal carotid artery and subsequent erosive bleeding, most often fatal. Another complication may be septic thrombosis of the internal jugular vein.

In the course of the fascial vagina of the carotid neurovascular bundle, the infection can spread to the upper mediastinum. In the case of infection in the swallowing space, further spread along the posterior pharyngeal wall and further along the esophagus can lead to the development of posterior mediastinitis.

Operation in acute suppurative parotitis. The operation is performed under General anesthesia. The purpose of the operation-opening the purulent necrotic focus, drainage of the wound to complete rejection of necrotic tissue.

A skin incision of about 2 cm long is made above the site of fluctuation, taking into account the topography of the facial nerve. After opening the abscess, the pus is removed and the cavity is drained.

With extensive damage to the gland, two incisions are made. The first, horizontal, 2-2. 5 cm long, begin 1 cm in front of the base of the ear lobe and run parallel to the lower edge of the zygomatic arch. After dissection of the skin, subcutaneous tissue and fascial gland capsule, pus is removed. The cavity is examined not with a probe, but with a finger to avoid damage to the neurovascular formations passing in the bed of the parotid gland. The second incision begins from the base of the ear lobe, retreating 1-1.5 cm posteriorly from the branch of the lower jaw,and lead it down parallel to the anterior edge of the sternocleidomastoid muscle. After dissection of the skin, subcutaneous tissue and gland capsules, the pus is removed. A finger or a blunt instrument connects both incisions and conducts a drainage tube, leaving the free ends of both incisions.

IV. Tasks for independent work:

Task 1

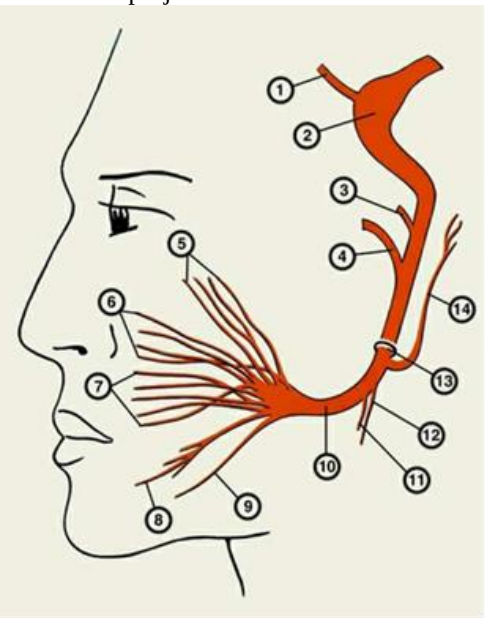
Describe what formed the bed and capsule of the parotid gland.

Task 2.

What are the formations that pass or are located in the parotid salivary gland.

Task 3.
List the paranasal sinuses. What are their boundaries and messages.

Task 4.
What is the projection of a nerve is shown in the figure. Set compliance.



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Task №6.
Make a task on the topic of the lesson. (In a notebook)

Task №7.
Make 5 tests on the topic of the lesson. (In a notebook)

V. Control question:

1.Topographic anatomy of the face. Fascia of the facial part of the head.

2.Topographic anatomy of the face. Nasal cavity: walls of the nasal cavity and the nasal passages. The message of the nasal passages. Blood supply and venous outflow.

3.Topographic anatomy of the face. Paranasal sinuses. Messages with the nasal cavity.

4.Topographic anatomy of the face. The course of the branches of the trigeminal nerve. Areas of innervation.

5.Topographic anatomy of the buccal region. Adipose body of the cheek and its processes. Ways of distribution of purulent processes.

6.Topographic anatomy of the parotid-masticatory region. Blood supply and innervation.

7.Topographic anatomy of the parotid-masticatory region. Parotid gland. Bed and capsule of the parotid salivary gland. Weak points of the capsule. Features of distribution of pus at mumps.

8.Parotid gland. Neurovascular formations, passing in the thickness of the parotid salivary gland.

9.Features of primary surgical treatment of maxillofacial area.

10. Indications, technique of dissection and drainage of the peritonsillar abscess.
11. Indications, technique of opening and drainage of the abscess of the pharyngeal space.
12. Indications, technique of opening and drainage of abscesses and phlegmon of the parapharyngeal space.
13. Indications and technique of maxillary sinus puncture.
14. Features of opening and drainage of phlegmon of the parotid chewing area.

VII. Learning objective:

No. 1. During operations in the lateral area of the face, the cuts are performed in the" neutral " zones. Explain what these zones represent? What complications can occur with an incorrectly performed incision?

(Answer: "the Neutral zone" - zone of the face where there are no branches of the facial nerve. With an incorrectly performed incision, paralysis of the facial nerve, salivary fistula are possible.)

№2 Patient S., 45 years old, perform a right-sided parotidectomy for a mixed tumor. What nerve and its branches should be prepared during the operation?

(The response of the Facial nerve and its branches (temporal, zygomatic, buccal, marginal branch of the lower jaw, cervical)

No. 3. Patient R., 19 years old, as a complication of pulpitis (7th right upper tooth), purulent sinusitis-maxillitis (sinusitis). What features of the anatomical relationship of the roots of the 7 upper tooth can be explained by the transition of the inflammatory process in the maxillary sinus?

(Answer: the thickness of the compact plate separating the alveoli of the 7th upper tooth from the maxillary sinus often does not exceed 0.3 mm (sometimes can be separated from the sinus only by the mucous membrane). This feature determines the occurrence of foreign bodies (tooth root during tooth extraction), cysts and purulent inflammation of the sinus of odontogenic origin.)

VIII. Control tests:

When boils can develop thrombophlebitis and thrombosis of the cavernous sinus of the Dura mater according to the scheme (1):

+ upper lip vein-facial vein and its initial part at the medial edge of the eye slit - angular vein - upper and lower eye veins - cavernous sinus.

the upper lip vein-the angular vein-the facial vein and its initial part at the medial edge of the eye slit - the upper and lower eye veins - the cavernous sinus.

the upper and lower eye veins are the upper lip vein-the facial vein and its initial part at the medial edge of the eye slit - the angular vein - the cavernous sinus**.**

The "neutral" zone of the face (1):

+ areas of the face where there are no branches of the facial nerve

areas of the face where produmat branches of the facial nerve

areas of the face where the facial vein passes

areas of the face where there is no facial vein

The parotid-chewing of the capsule is poorly developed in the Department: (2)

+ Vernisage (external auditory canal)

+ medial (pharyngeal process)

in the lateral (posterior abdomen)

in front (from the styloid process of the**)**

Anatomical "bouquet" consists of the following muscles: (1)

+ Chelopechene, stylopharyngeus and xylazine

chewing, cheek, facial

stair, nod, relief

The maxillary sinus with the nasal cavity communicates through: (1)

+ maxillary cleft

upper nasal shell

middle nasal shell

lower nasal conch

IX. Glossary:

Regio orbitalis	Eye socket area
Regio nasalis	Nose area
Regio oralis	The area of the mouth
Regio mentalis	Chin area
Dentes	Teeth
Regio infraorbitalis	Suborbital area
Regio buccals	Buccal area
Regio parotideomasseterica	The parotid-masticatory region

Lesson on

«Topographic anatomy of the neck-areas, triangles, fascia, interfacial spaces, their clinical significance, vessels, nerves, plexus. Topographic anatomy of the neck: pharynx, larynx, thyroid, cervical trachea and esophagus».

Motivational characteristic: knowledge of the location of the main neurovascular bundles of the neck area, allows to foresee the ways of the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of the ways of metastasis in allows timely diagnosis of the localization of malignant tumors of the study area.

I. Goals:

The student needs to know:	The student must be able:	The student must own:
1. Topographic anatomy of the neck - border, holotape, syntopia, sellotape, layered structure. 2. Topographic anatomy of neck triangles: • submandibular triangle – boundaries, holotape, syntopia, skeletopy, the layered structure of the • lingual (Pirogov's) triangle borders, holotape, syntopia, skeletopy, the layered structure of the • podvodnogo triangle – borders, holotape, syntopia, skeletopy, the layered structure of the • the carotid triangle – borders, holotape, syntopia, skeletopy, the layered structure of the scapular-tracheal triangle – borders, holotape, syntopia, skeletopy, the layered structure of the scapular-clavicular triangle – borders, holotape, syntopia, skeletopy, the layered structure of the • * trapezoidal triangle – borders, holotape, syntopia, skeletopy, the layered structure of the • stair–vertebral triangle – borders, holotape, syntopia, skeletopy, the layered structure of the * triangles of the target area: upper nuchal triangle – borders, holotape, syntopia, skeletopy, the layered structure of the lower nuchal triangle – borders, holotape, syntopia, sellotape, layered structure. 3. Topographical anatomy of the fasciae of the neck, predestinado space, the interscalene space. 4. Topographic anatomy диафрагмальных и блуждающих нервов, симпатического ствола. 5. Топографическую анатомию дна полости рта 6. Топографическую анатомию органов шеи. 7. Сообщения шейных межлестничных пространств. 8. Технику препарирования основных образований шеи на каждом этапе.	1. To inspect and palpate the neck, to determine the boundaries of the neck 2. Perform palpation of cervical lymph nodes 3. Show on drug: * submandibular triangle-border * lingual (Pirogov) triangle-borders • podporovany triangle – border • carotid triangle – borders * scapular-tracheal triangle-boundaries * spatula-clavicular triangle-boundaries • * * trapezoidal triangle – border * stair-vertebral triangle-boundaries * upper triangle – borders * lower triangle – edge • predestine space • interscalene space boundaries 4. To dissect the skin and superficial formations of the neck areas 5. Dissect the carotid triangle 6. Dissect the lateral triangle of the neck. 7. Dissect the sternoclavicular-mastoid area 8. Perform palpation of the thyroid gland 9. To define the localization очага при гнойных процессах в области шеи 10. Обнажить диафрагмальный нерв в пределах лопаточно–ключичного треугольника.	1. Skills of examination and palpation of the neck. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the neck. 4. Surgical manipulation skills at each stage.

II. Questions to test your baseline knowledge:

1. What are the formations used as guidelines for determining the boundaries of the neck.
2. What areas of the neck you know.
3. How many and what neck fascia do you know?
4. What formed the triangle Pirogov?
5. Anatomy of neck muscles.
6. Anatomy of the diaphragmatic and vagus nerves, sympathetic trunk.
7. Medial neck area: sub-chin, submandibular, sleepy, scapular-tracheal triangles.
8. Sternocleidomastoid region.
9. Predestiny and interscalene space.
10. Stair-vertebral triangle.
11. Lateral neck area: shoulder-trapezoidal and scapular-clavicular triangles.
12. Cellular spaces spaces of the neck.
13. Anatomy of the thyroid gland.
14. Anatomy of the parathyroid glands.
15. Anatomy of the trachea.
16. Anatomy of the esophagus.
17. Anatomy of the pharynx.
18. Anatomy of the larynx.

III. The object of study-the human body.

IV. Information part:

Topographic anatomy of the neck

The boundaries of the neck are above the line drawn from the chin to the bottom edge of the lower jaw through the top of the Breasts prominent bone at the upper nuchal line to the external occipital protuberance, the bottom - line from the jugular notch

of the sternum at the upper edge of the clavicle to the clavicular-acromial joint and then to the spinous process of VII cervical vertebra.

The sagittal plane, drawn through the median line of the neck and the spinous processes of the cervical vertebrae, the neck area is divided into the right and left halves, and the frontal plane, drawn through the transverse processes of the vertebrae, - the anterior and posterior areas. Each anterior neck area of the sternoclavicular-mastoid muscle is divided into internal (medial) and external (lateral) triangles.

The borders of the medial triangle are the upper lower edge of the lower jaw, behind - the anterior edge of the sternoclavicular-mastoid muscle, in front - the median line of the neck. Within the medial triangle are the internal organs of the neck (larynx, trachea, pharynx, esophagus, thyroid and parathyroid glands) and distinguish a number of smaller triangles: suborbital triangle (trigonum submentale), submandibular triangle (trigonum submandibulare), carotid triangle (trigonum carotid), scapular triangle (trigonum omotracheal).

The boundaries of the lateral triangle of the neck are below the clavicle, medial-posterior edge of the sternoclavicular-mastoid muscle, behind - the edge of the trapezius muscle. The lower belly of the scapular-hyoid muscle is divided into blade-trapezius and scapular-clavicular triangles.

Fascia and cellular spaces spaces of the neck

Fasciae of the neck

According to the classification proposed by V. N. Shevkunenko, on neck emit 5 fascia:

• superficial fascia of the neck (fascia superficialis colli);

• a superficial sheet of own fascia of the neck (lamina superficialis fasciae colli propriae);

* deep neck fascia leaf (lamina profunda fascae colli propriae);

* intra-cervical fascia (fascia endocervicalis) consisting of two leaves - parietal (4A - lamina parietalis) and visceral (lamina visceralis);

• predposledney fascia (fascia prevertebralis).

According To the international anatomical nomenclature, the second and third fascia of the neck, respectively, are called their own (fascia colli propria) and spatula-clavicular (fascia omoclavicularis).

The first fascia of the neck covers both the posterior and anterior surface of the neck, forming a vagina for the subcutaneous muscle of the neck (m. platysma). At the top it goes to the face, and at the bottom-to the chest area.

The second fascia of the neck is attached to the front surface of the handle of the sternum and collarbone, and on top - to the edge of the lower jaw. It gives spurs to the transverse processes of the vertebrae, and the back is attached to their spinous processes. This fascia forms the sheaths for the sternoclavicular-mastoid (m. sternocleidomastoideus) and the trapezius (m.trapezius) muscles and for the submandibular salivary gland. The superficial fascia leaf, going from the hyoid bone to the outer surface of the lower jaw, is characterized by density and strength. The deep leaf reaches considerable strength only at the borders of the submandibular bed: at the place of its attachment to the hyoid bone, to the inner oblique line of the lower jaw, with the formation of the cases of the posterior abdomen of the bicuspid muscle and the styloid muscle. In the region of the mylohyoid and the sublingual-lingual muscles he loosened and weakly expressed.

In podporovana triangle this fascia forms covers for the front dobrusky bellies of the muscles. Along the median line formed by the suture of the maxillofacial muscle, the superficial and deep leaves are spliced together.

The third fascia of the neck begins from the hyoid bone, falls down, having the outer border of the scapula-hyoid muscle (m. omohyoideus), and the bottom is attached to the back of the handle of the sternum and collarbone. It forms a fascial vagina for Sterno-hyoid (m. sternohyoideus), scapular-hyoid (m. omohyoideus), Sterno-thyroid (m. sternothyrcoideus) and thyrohyoid (m. thyreohyoideus) muscles.

The second and third fascia on the midline of the neck grow together in the interval between the hyoid bone and the point located 3-3.5 cm above the handle of the sternum. This formation is called the white line of the neck. Below this point the second and third fascia diverge, forming nadgradnje metapopulations space.

The fourth fascia is attached at the top to the outer base of the skull. It consists of parietal and visceral leaves. Visceral leaf forms cases for all organs of the neck (pharynx, esophagus, larynx, trachea, thyroid and parathyroid glands). It is equally well developed in both children and adults.

The parietal leaf of fascia a strong spurs linked with predposlednii fascia. Pharyngeal-vertebral fascial spurs divide the whole tissue around the pharynx and esophagus on positivation and lateral pharyngeal (peripharyngeal) fiber. The latter, in turn, is divided into front and rear sections, the boundary between them is stylopharyngeus aponeurosis. The anterior part is the bottom of the submandibular triangle and falls to the hyoid muscle. The posterior part contains the common carotid artery, internal jugular vein, 4 last pairs of cranial nerves (IX, X, XI, XII), deep cervical lymph nodes.

Of practical importance is the spur of the fascia, going from the posterior wall of the pharynx to the pre-vertebral fascia from the base of the skull to the III-IV cervical vertebrae and dividing the swallowing space into the right and left halves. From borders the back and side walls of the pharynx to predposlednii fascia stretch the spurs (cords Sharpie) that separates the retropharyngeal space from the posterior peripharyngeal space.

Visceral leaf forms fibrous cases for organs and glands located in the medial triangles of the neck - pharynx, esophagus, larynx, trachea, thyroid and parathyroid glands.

The fifth fascia is located on the muscles of the spine, forms closed cases for the long muscles of the head and neck and passes to the muscles starting from the transverse processes of the cervical vertebrae.

The outer part of the pre-vertebral fascia consists of several spurs that form the cases for the muscle that raises the scapula, stair muscles. These cases are closed and go to the shoulder blade and I-II ribs. Between the spurs are cellular spaces of slit (predestiny and interscalene spaces), where the subclavian artery and vein and the brachial plexus.

Fascia takes part in the formation of the fascial vagina of the brachial plexus and subclavian neurovascular bundle. In the splitting of the pre-vertebral fascia, the cervical part of the sympathetic trunk is located. In the thickness of the pre-vertebral fascia are vertebral, lower thyroid, deep and ascending cervical vessels, as well as the diaphragmatic nerve.

Cellular spaces

The most important and well-expressed is the cellular space surrounding the inside of the neck. In the lateral parts, the fascial vaginas of the neurovascular bundles adjoin it. Surrounding organs fiber front has the form of pronounced adipose tissue, and in the posterior - lateral parts-loose connective tissue.

In front of the larynx and trachea there is a pretracheal cellular space, bounded from above by the fusion of the third fascia of the neck (a deep leaf of the own fascia of the neck) with the hyoid bone, from the sides - its fusion with the fascial vaginas of the neurovascular bundles of the medial triangle of the neck, from behind-the trachea, down to 7-8 rings of the trachea. On the anterior surface of the larynx, this cellular space is not expressed, but down from the isthmus of the thyroid gland is fatty tissue containing vessels [the lowest thyroid artery and veins (a. et vv. thyroideae imae)]. The pretracheal space in the lateral parts passes to the outer surface of the thyroid lobes. At the bottom of the pretracheal space in the course of lymphatic vessels is connected to the fiber of the anterior mediastinum.

The pretracheal tissue behind the back passes into the lateral parathyroid space, which is a continuation of the parathyroid space of the head. Okoloplodna space is limited on the outside sheaths neurovascular bundles of the neck, rear - lateral fascial spurs extending from the visceral leaf nutricianal fascia, forming a fibrous sheath of the esophagus, the sheaths neurovascular bundles.

The post-esophageal (retrovisceral) cellular space is limited in front by a visceral leaf of the intra - cervical fascia on the posterior wall of the esophagus, in the lateral parts by pharyngeal-vertebral spurs. These ridges delimit okolovodnye and postepisode space. The latter passes at the top into the pharyngeal cellulose, divided into the right and left halves by the fascial leaf running from the posterior wall of the pharynx to the spine in the sagittal plane. It does not descend below the VI-VII cervical vertebrae.

Between the second and third fascia directly above the handle of the sternum is located nadgrudinnoe interfacial cellular space (spatium interaponeuroticum suprasternale). The vertical size is 4-5 cm In the side of the median line of this space communicates with the bags Gruber - cellular spaces spaces, located behind the lower divisions of the sternocleidomastoid muscle. At the top they are delimited by the joints of the second and third fascia of the neck (at the level of intermediate tendons of the scapula-hyoid muscles), at the bottom - the edge of the sternum tendon and the upper surface of the sternoclavicular joints, outside reach the lateral edge of the sternoclavicular-mastoid muscles.

The fascial cases of the sternoclavicular mastoid muscles are formed by the surface sheet of the own fascia of the neck. At the bottom they reach the muscle attachment to the clavicle, sternum and their articulation, and at the top - to the lower border of muscle tendon formation, where they grow together with them. These cases are closed. To a greater extent, the layers of adipose tissue are expressed on the back and inner surfaces of the muscles, to a lesser extent - on the front.

The anterior wall of the fascial sheaths of the neurovascular bundles, depending on the level, is formed either by the third (below the intersection of the sternoclavicular-mastoid and scapular-sublingual muscles) or by the parietal leaf of the fourth (above this intersection) fascia of the neck. The posterior wall forms the spur of the pre-vertebral fascia. Each element of the neurovascular bundle has its own vagina, thus, the total neurovascular vagina consists of three-the vagina of the common carotid artery, internal jugular vein and vagus nerve. At the level of the intersection of the vessels and the nerve with the muscles coming from the subulate process, they are tightly fixed to the back wall of the fascial cases of these muscles, and thus the lower part of the vagina of the neurovascular bundle is separated from the posterior part of the okologlotochnogo space.

Predposlednii space is behind the organs and posabilities fiber. It is delimited by the common pre-vertebral fascia. Inside this space there are cellular cracks of the fascial cases of individual muscles lying on the spine. These slits are separated from each other by attaching the cases together with the long muscles on the vertebral bodies (below these spaces reach the II-III thoracic vertebrae).

The fascial cases of the stair muscles and the trunks of the brachial plexus are located outside the bodies of the cervical vertebrae. The trunks of the plexus are located between the anterior and middle stair muscles. The interstellar space along the branches of the subclavian artery connects with the pre-vertebral space (along the vertebral artery), with the pretracheal space (along the lower thyroid artery), with the fascial case of the fat lump of the neck between the second and fifth fascia in the scapular-trapezoidal triangle (along the transverse artery of the neck).

The fascial case of the fat lump of the neck is formed by the surface sheet of its own fascia of the neck (front) and the pre-vertebral (back) fascia between the sternoclavicular-mastoid and trapezius muscles in the blade-trapezoidal triangle. Down the fat tissue of this case falls into the scapula-clavicular triangle, located under a deep sheet of its own fascia of the neck.

Messages cellular spaces of the neck. Cellular spaces submandibular space areas have direct connections with submucosal tissue of the floor of the mouth and fatty tissue filling the anterior peripharyngeal cellular spaces space.

Positivation space of the head passes directly into the tissue, located behind the esophagus. At the same time, these two spaces are separated from other cellular spaces of the head and neck.

Fatty tissue of the neurovascular bundle is well separated from the neighboring cellular spaces. Extremely rare is the spread of inflammatory processes in the posterior part of the parapharyngeal space along the internal carotid artery and internal jugular vein. Also rarely there is a connection between this space and the anterior Department of the near-pharyngeal space. This can occur due to the insufficient development of the fascia between Chelopechene and milopotamou muscles. Down the fiber extends to the level of the venous angle (Pirogov) and the place of departure from the aortic arch of its branches.

The parathyroid space in most cases is reported with cellulose located on the anterior surface of the cricoid cartilage and the lateral surface of the larynx.

Pretracheal space is sometimes reported with the parathyroid spaces, much less-with the anterior mediastinal tissue.

Nadgradnje megfelelne space with bags of Gruber are also isolated.

The fiber of the lateral triangle of the neck has messages along the trunks of the brachial plexus and branches of the subclavian artery.

Front neck area

Submandibular triangle

The submandibular triangle (trigonum submandibulare) is bounded by the anterior and posterior abdomen of the bicuspid muscle and the edge of the lower jaw, which forms the base of the triangle at the top.

The skin is mobile and easily extensible.

The first fascia forms the vagina of the subcutaneous neck muscle (m. p1atysma), whose fibers have a direction from bottom to top and from outside to inside. The muscle begins from the thoracic fascia below the clavicle and ends on the face, part connecting with the fibers of the facial muscles in the corner of the mouth, part intertwining in the parotid-chewing fascia. The muscle is innervated by the cervical branch of the facial nerve (r. colli n. facialis).

Between the posterior wall of the vagina of the subcutaneous muscle of the neck and the second fascia of the neck immediately under the edge of the lower jaw lies one or more superficial submandibular lymph nodes. In the same layer pass the upper branches of the transverse nerve of the neck (n. transversus colli) of the cervical plexus.

Under the second fascia in the submandibular triangle are submandibular gland, muscles, lymph nodes, vessels and nerves.

The second fascia forms a capsule of the submandibular gland. The second fascia has two leaves. The surface covering the outer surface of the gland is attached to the lower edge of the lower jaw. Between the angle of the lower jaw and the anterior edge of the sternoclavicular-nipple muscle, the fascia is compacted, gives deep into a dense partition separating the bed of the submandibular gland from the bed of the parotid. Heading to the midline, the fascia covers the anterior abdomen of the bicuspid muscle and the maxillofacial muscle. The submandibular gland partially adjoins directly to the bone, the inner surface of the gland adjoins the maxillofacial and sublingual muscles, separating from them by a deep sheet of the second fascia, significantly inferior in its density to the surface sheet. At the bottom of the capsule gland associated with the hyoid bone.

The capsule surrounds the gland freely, without fusing with it and without giving into the depths of the gland processes. Between the submandibular gland and its capsule there is a layer of loose fiber. The bed of the gland is closed on all sides, especially at the level of the hyoid bone, where the superficial and deep sheets of its capsule coalesce. Only in the direction in front of the fiber contained in the bed of the gland, reported in the course of duct of the gland in the gap between the hypoglossal and podjazykovoj muscle fiber of the floor of the mouth.

The submandibular gland performs the gap between the anterior and posterior abdomen of the bicuspid muscle; it either does not go beyond the triangle, which is characteristic of old age, or has a large size and then goes beyond it, which is observed at a young age. In the elderly, the submandibular gland is sometimes well contoured due to partial atrophy of the subcutaneous tissue and subcutaneous neck muscle.

The submandibular gland has two processes that go beyond the gland bed. The posterior process goes under the edge of the lower jaw and reaches the place of attachment of the internal pterygoid muscle to it. The cutting process is accompanied by the excretory duct of the gland and with him goes in the gap between the mylohyoid and the sublingual-lingual muscles, reaching often the sublingual salivary gland. The latter lies under the mucous membrane of the bottom of the mouth on the upper surface of the maxillofacial muscle.

Around the gland are submandibular lymph nodes, adjacent mainly to the upper and posterior edges of the gland, where the anterior facial vein. Often, the presence of lymph nodes is noted in the thickness of the gland, as well as between the leaves of the fascial septum, separating the posterior end of the submandibular gland from the lower end of the parotid gland. The presence of lymph nodes in the thickness of the submandibular gland makes it necessary to remove the metastases of cancer tumors (eg, lower lip) not only submandibular lymph nodes, but also submandibular salivary gland (if necessary on both sides).

The excretory duct of the gland (ductus submandibularis) begins from the inner surface of the gland and stretches anteriorly and upwards, penetrating into the gap between m. hyoglossus and M. mylohyoideus and further passing under the mucous membrane of the bottom of the mouth. The specified intermuscular slit, letting in the salivary duct, surrounded by loose tissue, can serve as the path by which the pus in the abscesses of the floor of the mouth descends into the region of the submandibular triangle. Below the duct into the slit penetrates the hypoglossal nerve (n. hypoglossus), accompanied by the lingual vein (V. lingualis), and higher flow it is accompanied by the lingual nerve (n. lingualis).

The muscles, vessels and nerves are deeper than the submandibular gland and the deep plate of the second fascia.

Within the submandibular triangle, the surface layer of the muscles is bicuspid (m. digastricum), Stylo-lingual (m. stylohyoideus), maxillofacial (m. mylohyoideus) and sublingual (m. hyoglossus) muscles. The first two limit (with the edge of the lower jaw) the submandibular triangle, the other two form its bottom. The posterior abdominal muscle begins from the mastoid clipping of the temporal bone, the anterior muscle - from the fossa of the lower jaw of the same name, and the tendon connecting both abdomen is attached to the body of the hyoid bone. To the posterior abdomen of the bicuspid muscle is adjacent to the Stylo-lingual muscle, starting from the styloid process and attaching to the body of the hyoid bone, covering with its legs the tendon of the bicuspid muscle. The maxillofacial muscle lies deeper than the anterior abdomen of the bicuspid muscle; it begins from the same line of the lower jaw and attaches to the body of the hyoid bone. The right and left muscles converge along the median line, forming a seam (raphe). Both muscles are almost quadrangular plate, forming the so-called diaphragm of the mouth.

The hyoid-lingual muscle is a continuation of the maxillofacial muscle. However, the maxillofacial muscle is connected to the lower jaw with its other end, while the hyoid-lingual muscle goes to the lateral surface of the tongue. On the outer surface of the sublingual-lingual muscle are the lingual vein, the hypoglossal nerve, the duct of the submandibular salivary gland and the lingual nerve.

The facial artery always passes in the fascial bed under the edge of the lower jaw. In the submandibular triangle, the facial artery makes a bend, passing along the upper and posterior surfaces of the posterior pole of the submandibular gland near the pharynx wall. In the thickness of the surface plate of the second fascia of the neck, the facial vein passes. At the posterior border of

the submandibular triangle, it merges with the submandibular vein (V. retromandibularis) into the common facial vein (V. facialis communis).

In the interval between the maxillofacial and sublingual-lingual muscle, the lingual nerve passes, giving branches to the submandibular salivary gland.

A small area of the triangle, where the lingual artery can be exposed, is called the Pirogov triangle. Its boundaries: the upper-hypoglossal nerve, the lower-intermediate tendon of the bicuspid muscle, the anterior-free edge of the maxillofacial muscle. The bottom of the triangle is the hyoid muscle, the fibers of which should be separated to expose the artery. Pirogov's triangle is revealed only under the condition that the head is thrown back and strongly turned in the opposite direction, and the iron is removed from its bed and pulled up.

Submandibular lymph nodes (nodi lymphatici submandibulares) are located above, in the thickness or under the surface plate of the second fascia of the neck. In them, the lymph flows from the medial part of the eyelids, the outer nose, the mucous membrane of the cheek, gums, lips, the bottom of the mouth and the middle part of the tongue. Thus, with inflammatory processes in the inner part of the lower eyelid, submandibular lymph nodes increase.

The carotid triangle (trigonum caroticum) is restricted to the lateral - front edge of the sternocleidomastoid muscle on top - the back of the abdomen digastric and Chelopechene muscle inside the upper belly of the scapular-hyoid muscles.

The skin is thin, mobile, easily taken into the fold.

Innervation is carried out by the transverse nerve of the neck (n. transverses colli) from the cervical plexus.

The superficial fascia contains the fibers of the subcutaneous muscle of the neck.

Between the first and second fascia is the transverse nerve of the neck (n. transversus colli) of the cervical plexus. One of its branches is directed to the body of the hyoid bone.

The surface leaf of the own fascia of the neck under the sternoclavicular-mastoid muscle fuses with the vagina of the neurovascular bundle formed by the parietal leaf of the fourth fascia of the neck.

In the vagina of the neurovascular bundle, the internal jugular vein is laterally located, the medial common carotid artery (a. carotis communis), and behind between them-vagus nerve (n.vagus). Each element of the neurovascular bundle has its own fibrous vagina.

In the vein of top and medial at an acute angle empties into the common facial vein (V. facialis communis). In the corner at the place of their merger may be located a large lymph node. Along the vein in her vagina is a chain of deep lymph nodes of the neck.

On the surface of the common carotid artery, the upper root of the cervical loop descends from top to bottom and medially.

At the level of the upper edge of the thyroid cartilage, the common carotid artery is divided into external and internal. External carotid artery (a. carotis externa) is usually superficial and medial, and the internal carotid-lateral and deeper. This is one of the signs of the difference between the vessels from each other. Another distinctive feature is the presence of branches in the external carotid artery and their absence in the internal carotid. In the area of bifurcation, there is a small expansion, continuing to the internal carotid artery-carotid sinus (sinus caroticus).

On the posterior (sometimes medial) surface of the internal carotid artery there is a carotid tangle (glomus caroticum). In the adipose tissue surrounding the carotid sinus and carotid tangle, lies the nerve plexus formed by the branches of the pharyngeal, vagus nerves and the borderline sympathetic trunk. This is a reflex area that contains a Baro - and chemoreceptors, regulating through the nerve of Hering, together with the nerve of Ludwig-Zion blood circulation and breathing.

The external carotid artery is positioned in the corner formed by the trunk of the common facial vein from the inside, the internal jugular vein lateral, hypoglossal nerve on top (triangle Farabee).

At the site of formation of the external carotid artery is the upper thyroid artery (a. thyroidea superior), going medially and down, going under the edge of the upper abdomen of the scapula-hyoid muscle. At the level of the upper edge of the thyroid cartilage, the upper laryngeal artery departs from this artery in the transverse direction.

Slightly above the divergence of the upper thyroid artery at the level of the large horn of the hyoid bone directly below the hypoglossal nerve on the anterior surface of the external carotid artery is the mouth of the lingual artery (a. lingualis), which is hidden under the outer edge of the hyoid-lingual muscle.

At the same level, but from the inner surface of the external carotid artery, the ascending pharyngeal artery (a. pharyngea ascendens).

Above the lingual artery, the facial artery (a. facialis). It is directed upwards and medially under the posterior abdomen of the bicuspid muscle, perforates a deep leaf of the second fascia of the neck and, making a bend in the medial side, enters the bed of the submandibular salivary gland.

At the same level, the lateral surface of the external carotid artery leaves the sternoclavicular-mastoid artery (a. sternocleidomastoidea).

On the posterior surface of the external carotid artery at the level of the discharge of the facial and sternoclavicular-mastoid arteries is the mouth of the occipital artery (a. occipitalis). It is directed back and up along the lower edge of the posterior abdomen of the bicuspid muscle.

Under the posterior abdomen of the bicuspid muscle anteriorly from the internal carotid artery is the hypoglossal nerve, which forms an arc of bulge downwards. The nerve is directed forward under the lower edge of the bicuspid muscle.

Upper laryngeal nerve (n. laryngeus superior) is located at the level of the large horn of the hyoid bone behind both carotid arteries on the pre-vertebral fascia. It is divided into two branches: inner and outer. The internal branch is directed down and forward, accompanied by the upper laryngeal artery (a. laryngea superior), located below the nerve. Then it penetrates the thyroid membrane and penetrates the larynx wall. The outer branch of the upper laryngeal nerve is directed vertically downwards to the cricoid muscle.

The cervical section of the borderline sympathetic trunk is located under the fifth fascia of the neck immediately inside the palpable anterior tubercles of the transverse processes of the cervical vertebrae. It lies directly on the long muscles of the head and

neck. The upper cervical sympathetic node is located in front of the transverse processes of the II-III cervical vertebrae and the long muscle of the head, behind the carotid artery, medial to the vagus nerve, reaches 2-4 cm in length and 5-6 mm in width.

Spatula-tracheal triangle

The scapular-tracheal triangle (trigonum omotracheale) is bounded above and behind by the upper abdomen of the scapula-hyoid muscle, below and behind - by the anterior edge of the sternocleidomastoid muscle, in front-by the median line of the neck. The skin is thin, mobile, easily stretched. The first fascia forms the vagina of the subcutaneous muscle.

The second fascia fuses along the upper border of the region with the hyoid bone, and below it is attached to the anterior surface of the sternum and clavicle. In the middle line, the second fascia fuses with the third, but for about 3 cm up from the jugular tenderloin, both fascial leaves exist as independent plates that delimit the cellular space (spatium interaponeuroticum suprasternale).

The third fascia has a limited length: above and below it is connected with the bone boundaries of the region, and from the sides ends at the edges of the spatula-hyoid muscles connected to it. Fused in the upper half of the region with the second fascia along the median line, the third fascia forms the so-called white neck line (linea alba colli) 2-3 mm wide.

The third fascia forms the vagina of 4 paired muscles located below the hyoid bone: mm. sternohyoideus, sternothyroideus, thyrohyoideus, omohyoideus.

Gradinitza and glutinosity muscles start most of the fibers of the sternum. The pectoral muscle is longer and narrower, lies closer to the surface, the pectoral muscle is wider and shorter, lies deeper and is partially covered by the previous muscle. The thoracic muscle is attached to the body of the hyoid bone, converging near the median line with the same muscle on the opposite side; the sternum is attached to the thyroid cartilage, and, going from the sternum upwards, diverges from the same muscle on the opposite side.

The thyroid muscle is to a certain extent a continuation of the sternum muscle and extends from the thyroid cartilage to the hyoid bone. The scapula-hyoid muscle has two abdomen - lower and upper, the first is associated with the upper edge of the scapula, the second - with the body of the hyoid bone. Between the two bellies of the muscle, there is an intermediate tendon. The third fascia ends at the outer edge of the muscle, firmly fuses with its intermediate tendon and the wall of the internal jugular vein.

Under the described layer of muscles with their vaginas are the leaves of the fourth fascia of the neck (fascia endocervicalis), which consists of a parietal leaf covering the muscles, and visceral. Under the visceral leaf of the fourth fascia are the larynx, trachea, thyroid gland (with parathyroid glands), pharynx, esophagus.

Topography of larynx and cervical trachea

Larynx forms 9 cartilages (3 paired and 3 unpaired). The basis of the larynx is cricoid cartilage, located at the level of the VI cervical vertebra. Above the front part of the cricoid cartilage is the thyroid. Thyroid cartilage is associated with the hyoid bone membrane (membrane hyothyroidea), from the cricoid cartilage to the thyroid go mm. cricothyroidei and ligg. cricoarytenoidei.

In the cavity of the larynx there are three divisions: the upper (vestibulum laryngis), the middle, corresponding to the position of false and true vocal cords, and the lower, called in laryngology a sublingual space.

Sellotape. The larynx is located from the upper edge of the V cervical vertebra to the lower edge of the VI cervical vertebra. The upper part of the thyroid cartilage can reach the level of the IV cervical vertebra. In children, the larynx is much higher, reaching its upper edge of the level III of the vertebra, in the elderly lies low, with its upper edge at the level of the VI vertebra. The position of the larynx changes dramatically from one and the same person depending on the head position. Thus, when the tongue is protruding, the larynx rises, the epiglottis takes a position close to the vertical, opening the entrance to the larynx.

Perfusion. The larynx is supplied with blood by branches of the upper and lower thyroid arteries.

Innervation of the larynx is carried out by pharyngeal plexus, which is formed by branches of the sympathetic, vagus and pharyngeal nerves. Upper and lower laryngeal nerves (n. laringeus superior et inferior) are branches of the vagus nerve. In this case, the upper laryngeal nerve, being mainly sensitive, innervates the mucous membrane of the upper and middle parts of the larynx, as well as the cricoid muscle. The lower laryngeal nerve, being predominantly motor, innervates the laryngeal muscles and the mucous membrane of the lower larynx.

Lymph drainage. With regard to lymph flow, it is customary to divide the larynx into two parts: the upper - above the vocal cords and the lower - below the vocal cords. Regional lymph nodes of the upper larynx are mainly deep cervical lymph nodes located along the internal jugular vein. Lymphatic vessels from the lower part of the larynx end in nodes located near the trachea. These nodes are associated with deep cervical lymph nodes.

Trachea - is a tube consisting of 15-20 cartilaginous semirings, constituting approximately 2/3-4/5 of the circumference of the trachea and closed behind the connective membrane, and interconnected annular ligaments.

Membrane membrane membrane contains, in addition to going in the longitudinal direction of elastic and collagen fibers, and also passing in the longitudinal and oblique directions of smooth muscle fibers.

Inside the trachea is covered with a mucous membrane, in which the most superficial layer is a multilayer ciliated columnar epithelium. A large number of goblet cells, located in this layer, produce together with the tracheal glands a thin layer of mucus, protecting the mucous membrane. The middle layer of the mucous membrane is called the basal membrane and consists of a network of argyrophil fibers. The outer layer of the mucous membrane is formed by elastic fibers arranged in the longitudinal direction, especially developed in the region of the membranous part of the trachea. Due to this layer, the folding of the mucous membrane is formed. Between the folds, the excretory tubules of the tracheal glands open. Due to the pronounced submucosal layer of the mucous membrane of the trachea is movable, particularly in the area of the membranous portion of its walls.

Outside the trachea is covered with fibrous leaf, which consists of three layers. The outer leaf is intertwined portages perichondrium with an outer and an inner sheet with an inner perichondrium cartilaginous half rings. The middle layer is fixed at the edges of the cartilaginous semirings. Between these layers of fibrous fibers are located adipose tissue, blood vessels and glands.

There are cervical and thoracic trachea. The total length of the trachea varies in adults from 8 to 15 cm, in children varies depending on age. In men it is 10-12 cm, in women - 9-10 cm Length and width of the trachea in adults depend on body type. So,

with brachymorphic the body type she is short and broad, with dolichomorphic long and narrow. In children during the first 6 months of life are dominated by a funnel shape of the trachea, with age, the trachea becomes cylindrical or conical shape.

Sellotape. The beginning of the cervical spine depends on the age of the children and the type of physique in adults, in which it ranges from the lower edge of the VI cervical to the lower edge of the II thoracic vertebrae. The border between the cervical and thoracic sections is the upper aperture of the chest. According to various researchers, the thoracic trachea may be in children of the first years of life 2/5-3/5, in adults-from 44.5-62% of its total length.

Syntopia. In children, a relatively large thymus gland is attached to the anterior surface of the trachea, which in young children can rise to the lower edge of the thyroid gland. The thyroid gland in newborns is relatively high. Its lateral lobes with their upper edges reach the level of the upper edge of the thyroid cartilage, and the lower ones - 8-10 tracheal rings and almost touch the thymus gland. The isthmus of the thyroid gland in newborns is attached to the trachea on a relatively large length and occupies a higher position. Its upper edge is located at the level of the cricoid cartilage of the larynx, and the lower reaches the 5-8-th tracheal rings, while in adults it is located between the 1st and 4th ring. A thin pyramidal process occurs relatively often and is located near the middle line.

In adults, the upper part of the cervical trachea is surrounded by the front and sides of the thyroid gland, behind it lies the esophagus, separated from the trachea by a layer of loose fiber.

The upper cartilage of the trachea is covered by the isthmus of the thyroid gland, in the lower part of the cervical trachea, the lower thyroid veins and the unpaired thyroid venous plexus are located. Above the jugular notch of the handle of the sternum in humans brachymorphic body type quite often is the top edge of the left brachiocephalic vein.

In the esophagus and trachea formed esophageal-tracheal furrows, recurrent laryngeal nerves lie. In the lower part of the neck, common carotid arteries lie to the lateral surfaces of the trachea.

To the thoracic part of the trachea behind lies the esophagus, in front at the level of the IV thoracic vertebra immediately above the bifurcation of the trachea and to the left of it - the aortic arch. The right and front of the shoulder trunk covers the right semicircle of the trachea. Here, near the trachea, the trunk of the right vagus nerve and the upper Vena cava are located. At the top of the aortic arch is the thymus gland or its replacement fatty tissue. To the left of the trachea is the left recurrent laryngeal nerve, and above it-the left common carotid artery. To the right and left of the trachea and below the bifurcation are numerous groups of lymph nodes.

Along the trachea are located in the front nadgradnje metapopulations, pretracheal colorhello cellular spaces and spaces containing unpaired venous plexus of the thyroid gland, the inferior thyroid artery (10-12% of cases), lymph nodes, vagus nerves, cardiac branches of the sympathetic trunk boundary.

Blood supply to the cervical trachea is carried out by branches of the lower thyroid arteries or thyroid trunks. Blood flow to the thoracic trachea occurs due to the bronchial arteries, as well as from the arc and the descending part of the aorta. Bronchial arteries in the amount of 4 (sometimes 2-6) most often depart from the anterior and right semicircle of the descending part of the thoracic aorta on the left, less often from 1-2 intercostal arteries or the descending part of the aorta on the right. They can start from the subclavian, lower thyroid arteries and from the costal-cervical trunk. In addition to these regular sources of blood supply there are additional branches extending from the aortic arch, brachiocephalic trunk, subclavian, vertebral, internal thoracic and common carotid arteries.

Before entering the lungs, the bronchial arteries give parietal branches in the mediastinum (to the muscles, spine, ligaments and pleura), visceral branches (to the esophagus, pericardium), adventitia of the aorta, pulmonary vessels, unpaired and semi-paired veins, to the trunks and branches of the sympathetic and vagal nerves, as well as to the lymph nodes.

In the mediastinum, the bronchial arteries anastomose with the esophageal, pericardial arteries, branches of the internal thoracic and lower thyroid arteries.

Venous outflow. The tracheal venous vessels are formed from intra - and extra-organ venous networks of mucous, deep submucosal and superficial plexuses. Venous drainage is via the inferior thyroid veins, which flows into the unpaired thyroid venous plexus, the veins of the cervical esophagus, and thoracic - pronephroi and azygos vein, sometimes in the brachiocephalic vein, as well as anastomosing with the veins of the thymus gland, mediastinal tissue, the thoracic esophagus.

Innervation. The cervical part of the trachea is innervated by the tracheal branches of the recurrent laryngeal nerves with the inclusion of branches from the cervical heart nerves, cervical sympathetic nodes and interstitial branches, and in some cases from the thoracic part of the sympathetic trunk. In addition, the sympathetic branches to the trachea are also suitable from the common sleepy and subclavian plexus. To the thoracic trachea on the right fit twigs from the recurrent laryngeal nerve, from the main trunk of the vagus nerve, and to the left - from the left recurrent laryngeal nerve. These branches of the vagus and sympathetic nerves form a closely related surface and deep plexus.

Lymph drainage. Lymphatic capillaries form two networks in the mucous membrane of the trachea - superficial and deep. In the submucosa is the plexus of lymphatic vessels. In the muscular layer of the membranous part, the lymphatic vessels are located only between the individual muscle bundles. In adventitia the lymphatic vessels are located in two layers. Lymph from the cervical trachea flows into the lower deep cervical, pretracheal, paratracheal, swallowed lymph nodes. Part of the lymphatic vessels carry the lymph into the anterior and posterior mediastinal nodes.

Tracheal lymph vessels are connected to the vessels of the thyroid gland, pharynx, trachea and esophagus.

Topography of thyroid and parathyroid glands

The thyroid gland (glandula thyroidea) consists of two lateral lobes and the isthmus. In each lobe of the gland, the upper and lower poles are distinguished. The upper poles of the lateral lobes of the thyroid gland reach the middle of the height of the plates of the thyroid cartilage. The lower poles of the lateral lobes of the thyroid gland descend below the isthmus and reach the level of 5-6 rings, not reaching 2-3 cm to the sternum tenderloin. Approximately in 1/3 of cases there is a presence of a divergent upward from the isthmus in the form of an additional share of the gland of the pyramidal lobe (lobus pyramidalis). The latter may be associated not with the isthmus, but with the lateral lobe of the gland, and often comes to the hyoid bone. The size and position of the isthmus is very variable.

The isthmus of the thyroid gland lies in front of the trachea (at the level from the 1st to the 3rd or from the 2nd to the 5th cartilage of the trachea). Sometimes (in 10-15% of observations) the isthmus of the thyroid gland is absent.

The thyroid gland has its own capsule in the form of a thin fibrous plate and a fascial vagina formed by a visceral leaf of the fourth fascia. From its own capsule of the thyroid gland into the depth of the parenchyma of the organ, connective tissue partitions depart. Allocate partitions of the first and second orders. In the thickness of the connective tissue partitions are organ blood vessels and nerves. Between the capsule of the gland and its vagina there is loose fiber, which are arteries, veins, nerves and parathyroid glands.

From the fourth fascia depart places more dense fibers, which have the character of ligaments, passing from the gland to neighboring organs. The median ligament is stretched in the transverse direction between the isthmus, on the one hand, the cricoid cartilage and the 1st cartilage of the trachea-on the other. Lateral ligaments go from the gland to the cricoid and thyroid cartilage.

Syntopia. The isthmus of the thyroid gland lies in front of the trachea at the level from the 1st to the 3rd or from the 2nd to the 4th of its cartilage, and often covers part of the cricoid cartilage. The lateral lobes through the fascial capsule of the posterior-lateral surfaces come into contact with the fascial vaginas of the common carotid arteries. The posterior medial surfaces of the lateral lobes are attached to the larynx, trachea, tracheoesophageal furrow, as well as to the esophagus, in connection with which, with an increase in the lateral lobes of the thyroid gland, its compression is possible. In the interval between the trachea and the esophagus on the right and the anterior wall of the esophagus on the left rise to the cricoid ligament recurrent laryngeal nerves lying outside the fascial capsule of the thyroid gland. The front of the thyroid gland is covered with mm. sternohyoidei, sternothyroidei, and omohyoidei.

Blood supply to the thyroid gland is carried out by branches of four arteries: two AA. thyroideae superiores and two AA. thyroideae inferiores. In rare cases (6-8%) in addition to these arteries, there is a. thyroidea ima, extending from the brachiocephalic trunk or aortic arch and heading to the isthmus.

The superior thyroidea supplies the upper poles of the lateral lobes and the upper edge of the thyroid gland. A. thyroidea inferior departs from truncus thyrocervicalis in a ladder-vertebral gap

and rises under the fifth fascia of the neck along the anterior stair muscle up to the level of the VI cervical vertebra, forming a loop or arc here. Then it descends downwards and inside, penetrating the fourth fascia, to the lower third of the posterior surface of the lateral lobe of the gland. The ascending part of the lower thyroid artery goes inside from the diaphragmatic nerve. At the posterior surface of the lateral lobe of the thyroid gland, the branches of the lower thyroid artery cross the recurrent laryngeal nerve, being anteriorly or posteriorly from it, and sometimes cover the nerve in the form of a vascular loop.

The arteries of the thyroid gland form two collaterals: intra-organ (due to the thyroid arteries) and non-organ (due to anastomoses with the vessels of the pharynx, esophagus, larynx, trachea and adjacent muscles).

Venous outflow. Veins form plexuses in the circumference of the lateral lobes and isthmus, especially on the anterolateral surface of the gland. The plexus lying on the isthmus and below it is called plexus venosus thyreoideus impar. It arises from the inferior thyroid veins, often flowing in the respective unnamed vein, and the inferior thyroid veins vv. thyroideae imae (one or two), flowing into the left unnamed. The upper thyroid veins flow into the internal jugular vein (directly or through the common facial vein). The lower thyroid veins are formed from the venous plexus on the anterior surface of the gland, as well as from the unpaired venous plexus (plexus thyroideus impar), located at the lower edge of the isthmus of the thyroid gland and in front of the trachea, and flow into the right and left plexus veins, respectively. The veins of the thyroid gland form numerous intraorganic anastomoses.

Innervation. The nerves of the thyroid gland arise from the borderline trunk of the sympathetic nerve and from the upper and lower laryngeal nerves. The lower laryngeal nerve comes into close contact with the lower thyroid artery, crossing it on its way. Among other vessels, the lower thyroid artery is tied when the goiter is removed; if the ligation is made near the gland, then it is possible to damage the inferior nerve or involve it in the ligature, which can lead to paresis of the vocal muscles and a disorder of the phonation. The nerve passes either ahead of the artery or behind, and on the right it lies more often in front of the artery, and on the left - behind.

Lymph flow from the thyroid gland occurs mainly in the nodes located front and sides of the trachea (nodi lymphatici praetracheales et paratracheales), partly - in the deep cervical lymph nodes.

Closely related to the thyroid gland are the parathyroid glands (glandulae parathyroideae). Usually in the amount of 4, they are most often located outside their own thyroid capsule (between the capsule and the fascial vagina), two on each side, on the back surface of its lateral lobes. There are significant differences in the number and size, and in the position of the parathyroid glands. Sometimes they are located outside the fascial vagina of the thyroid gland. As a result, the search for parathyroid glands in surgical interventions is a significant difficulty, especially due to the fact that next to the parathyroid glands are very similar to them in appearance education (lymph nodes, fat lumps, additional thyroid glands).

To establish the true nature of the removed with surgical intervention of the parathyroid gland, a microscopic examination is carried out. To prevent complications associated with the erroneous removal of the parathyroid glands, it is advisable to use microsurgical techniques and tools.

Sternoclavicular-mastoid region

The sternoclavicular-mastoid region (regio sternocleidomastoidea) corresponds to the position of the eponymous muscle, which is the main external reference point. The sternoclavicular-mastoid muscle covers the medial neurovascular bundle of the neck (common carotid artery, internal jugular vein and vagus nerve). In the carotid triangle, the neurovascular bundle is projected along the anterior edge of this muscle, and in the lower one is covered by its sternal portion.

At the middle of the posterior edge of the sternoclavicular-mastoid muscle, the place of exit of the sensitive branches of the cervical plexus is projected. The largest of these branches is the large ear nerve (n. auricularis magnus). Between the legs of this muscle is projected venous angle of Pirogov, as well as the vagus and phrenic nerves.

The skin is thin and easily folds together with subcutaneous tissue and superficial fascia. Near the mastoid process, the skin is dense, sedentary.

Subcutaneous fat is loose. At the upper boundary of the area, it is compacted and becomes cellular due to connective tissue bridges connecting the skin with the periosteum of the mastoid process.

Between the first and second fascia of the neck are the external jugular vein, superficial cervical lymph nodes and cutaneous branches of the cervical plexus of the spinal nerves.

External jugular vein (V. jugularis extema) is formed by the fusion of the occipital, ear and partially submandibular veins at the angle of the lower jaw and is directed downward, obliquely crossing m. sternocleidomastoideus, to the apex of the angle formed by the posterior edge of the sternocleidomastoid muscle and the upper edge of the clavicle.

Here, the external jugular vein, penetrating the second and third fascia of the neck, goes deep and flows into the subclavian or internal jugular vein.

The large ear nerve goes along with the external jugular vein behind it. It innervates the skin of the mandibular fossa and the angle of the mandible. Transverse neck nerve (n. transversus colli) crosses the middle of the outer surface of the sternocleidomastoid muscle and at its anterior edge is divided into upper and lower branches.

The second fascia of the neck forms an isolated case for the sternocleidomastoid muscle. The muscle is innervated by the outer branch of the accessory nerve (n. accesses). Inside the fascial case of the sternoclavicular-mastoid muscle along its posterior margin rises up the small occipital nerve (n. occipitalis minor), innervating the skin of the mastoid process.

Behind the muscle and its fascial case is a sleepy neurovascular bundle, surrounded by a parietal leaf of the fourth fascia of the neck. Inside the bundle, the common carotid artery is located medially, the internal jugular vein is lateral, the vagus nerve is between them and behind.

The cervical sympathetic trunk (truncus sympathicus) is parallel to the common carotid artery under the fifth fascia, but deeper and medial.

From under the sternoclavicular-mastoid muscle branches of the cervical plexus (plexus cervicalis). It is formed by the anterior branches of the first 4 cervical spinal nerves, it lies on the side of the transverse processes of the vertebrae between the vertebral (behind) and pre-vertebral (front) muscles. The branches of the plexus include:

* small occipital nerve (n. occipitalis minor), extends up to the mastoid process and further into the lateral parts of the occipital area; innervates the skin of this area;

• large ear nerve (n.auricularis magnus), goes up and anteriorly along the anterior surface of the sternoclavicular-mastoid muscle covered with the second fascia of the neck; innervates the skin of the auricle and the skin above the parotid salivary gland;

* transverse neck nerve (n. transversus colli), goes anteriorly, crossing the sternoclavicular-mastoid muscle, at its anterior edge is divided into upper and lower branches, innervating the skin of the anterior region of the neck;

* supraclavicular nerves (nn. supraclaviculares), in an amount of 3-5 spread fan-shaped down between the first and second fascia of the neck, branched into the skin of the back of the neck (lateral branches) and the upper front of the chest to the III ribs (medial branches);

* diaphragmatic nerve (n. phrenicus), mainly motor, goes down the anterior ladder muscle in the chest cavity, where it passes to the diaphragm in front of the roots of the lungs between the mediastinal pleura and pericardium; innervates the diaphragm, gives sensitive branches to the pleura and pericardium, sometimes to the cervical-thoracic plexus;

* lower spine of the neck loop (r.inferior ansae cervicalis), goes anteriorly to the connection with the upper spine, arising from the hypoglossal nerve;

* muscle branches (rr. musculares), are the vertebral muscle, muscle, levator scapulae, sternocleidomastoid and trapezius muscles.

Between the deep (posterior) surface of the lower half of the sternoclavicular-mastoid muscle with its fascial case and the anterior ladder muscle covered with the fifth fascia, a prelestinal space (spatium antescalenum) is formed. Thus, the vestibular space in front is limited to the second and third fascia, and behind - the fifth fascia of the neck. In this space the medial carotid neurovascular bundle is located. The internal jugular vein lies here not only lateral to the common carotid artery, but also somewhat anteriorly (superficially). Here it is the bulb (the lower extension; bulbus venae jugularis inferior) is connected with a suitable outside the subclavian vein. The vein is separated from the subclavian artery by the anterior stair muscle. Immediately outside the confluence of these veins, called the venous angle of Pirogov, the external jugular vein flows into the subclavian vein. In the left venous angle empties into the thoracic (lymphatic) duct. V joined. intema and v jugularis. subclavia give rise to the brachiocephalic vein. Predestiny through the gap in the transverse direction and suprascapular artery (a. suprascapularis). Here on the anterior surface of the anterior scalene muscle fascia under the heel of the neck is phrenic nerve.

Behind the anterior stair muscle, under the fifth fascia of the neck, there is an interstellar space (spatium interscalenum). The inter-stair space at the back is limited to the middle stair muscle. In the interstellar space pass from above and laterally the trunks of the brachial plexus, below-a. subclavia.

The stair-vertebral space (triangle) [spatium (trigonum) scalenovertebral] is located behind the lower third of the sternoclavicular-mastoid muscle, under the fifth fascia of the neck. Its base is the dome of the pleura, the top is the transverse process of the VI cervical vertebra. Behind and medially, it is limited by the spine with a long neck muscle, and in front and the lateral - medial edge of the anterior ladder muscle. Under the pre-vertebral fascia is the contents of the space: the beginning of the cervical subclavian artery with branches extending here from it, the arc of the thoracic (lymph) duct, ductus thoracicus (left), lower and cervical (stellate) nodes of the sympathetic trunk.

Topography of blood vessels and nerves. The subclavian arteries are located under the heel of the fascia. The right subclavian artery (a. subclavia dextra) departs from the brachiocephalic trunk and the left (a. subclavia sinistra), from the aortic arch.

The subclavian artery is conventionally divided into 4 sections:

* thoracic-from the place of origin to the medial edge (m. scalenus anterior);

• interscalene corresponding to the interscalene space (spatium interscalenum);

• supraclavicular division from the lateral edge of the anterior scalene muscle to the clavicle;

* subclavian-from the clavicle to the upper edge of the pectoral muscle. The last part of the artery is called the axillary artery, and it is studied in the subclavian region in the clavipectorale (trigonum clavipectorale).

In the first section, the subclavian artery lies on the dome of the pleura and is connected to it by connective tissue strands. On the right side of the neck anterior to the artery is the venous angle of the Pirogov-the confluence of the subclavian vein and the internal jugular vein. Along the anterior surface of the artery, a vagus nerve descends transversely to it, from which the recurrent laryngeal nerve departs here, enveloping the artery from below and behind and rising upwards in the corner between the trachea and the esophagus. The right diaphragmatic nerve crosses the artery outward from the vagus nerve. Between the vagus and diaphragmatic nerves is a subclavian loop of the sympathetic trunk (ansa subclavia). Inside of the subclavian artery is the right common carotid artery.

On the left side of the neck, the first part of the subclavian artery lies deeper and is covered by the common carotid artery. In front of the left subclavian artery is the internal jugular vein and the beginning of the left brachiocephalic vein. Between these veins and the artery are the vagus and left phrenic nerves. Medial to the subclavian artery are the esophagus and trachea, and in the furrow between them – the left recurrent laryngeal nerve. Between the left subclavian and common carotid artery, skirting the subclavian artery from behind and above, the thoracic lymphatic duct passes.

Branches of the subclavian artery. Vertebral artery (a. vertebralis) departs from the upper semicircle of the subclavian medial inner edge of the anterior ladder muscle. Rising up between this muscle and the outer edge of the long neck muscle, it enters the opening of the transverse process of the VI cervical vertebra and further up in the bone channel formed by the transverse processes of the cervical vertebrae. Between the first and second vertebrae she comes out of the channel. Then the vertebral artery enters the cavity of the skull through the large occipital opening. In the skull cavity on the basis of the brain, the right and left vertebral arteries merge into one basilar artery (a. basilaris), involved in the formation of the circle of Willis.

Internal thoracic artery, a. thoracica interna, directed downward from the lower semicircle of the subclavian artery opposite the vertebral. Passing between the dome of the pleura and the subclavian vein, it descends to the rear surface of the anterior thoracic wall.

The thyroid trunk (truncus thyrocervicalis) departs from the subclavian artery at the medial edge of the anterior ladder muscle and gives 4 branches: the lower thyroid (a. thyroidea inferior), ascending cervical (a. cervicalis ascendens), supra-scapular (a. suprascapularis) and the transverse artery of the neck (a. transversa colli).

• . thyroidea inferior, rising up, arc at the level of the transverse process of VI cervical vertebra, crossing lying behind the vertebral artery and passing in front of the common carotid artery. From the lower medial part of the arc of the lower thyroid artery branches depart to all organs of the neck: rr. pharyngei, oesophagei, tracheales. In the walls of the organs and the thickness of the thyroid gland, these branches anastomose with branches of other arteries of the neck and branches of the opposite lower and upper thyroid arteries.

• . cervicalis ascendens goes up on the front surface of the m. scalenus anterior, parallel to n. phrenicus inwards from it.

• . suprascapularis is directed in the lateral direction, then the same vein is located behind the upper edge of the clavicle and along with the lower abdomen m. omohyoideus reaches the lateral cutting blades.

• . transversa colli may deviate both from the truncus thyrocervicalis and from the subclavian artery. A deep branch of the transverse artery of the neck, or dorsal artery of the scapula, lies in the cellular interval of the back at the medial edge of the scapula.

The costal-cervical trunk (truncus costocervicalis) most often departs from the subclavian artery. Going up the dome of the pleura, it is divided at the spine into two branches: the upper - intercostal (a. intercostalis suprema), reaching the first and second intercostals, and the deep cervical artery (a. cervicalis profunda), penetrating the muscles of the back of the neck.

The cervical-thoracic (stellate) node of the sympathetic trunk [ganglion cervicothoracicum (stellatum)] is located behind the inner semicircle of the subclavian artery, medially extending from it the vertebral artery. It is formed in most cases from the connection of the lower cervical and first thoracic nodes. Moving to the wall of the vertebral artery, the branches of the stellate node form the periarterial vertebral plexus.

Lateral neck area

Blade-trapezoidal triangle

* Trapezoidal triangle (trigonum omotrapecoideum) is limited from below the scapular-hyoid muscle, in the front - rear edge grudinoklyuchichno-mastoid muscle, behind - the anterior edge of the trapezius muscle.

The skin is thin and mobile. Innervated by the lateral branches of the supraclavicular nerves (nn. supraclaviculares laterals) from the cervical plexus.

Subcutaneous fat is loose.

The superficial fascia contains the fibers of the superficial neck muscle. Are located under the fascia cutaneous branches. External jugular vein (V. jugularis externa), crossing from top to bottom and outside the middle third of the sternocleidomastoid muscle, goes to the lateral surface of the neck.

The surface leaf of the own fascia of the neck forms a vagina for the trapezius muscle. Between it and the deep fascia is predposlednii accessory nerve (n. accessorius), Innervate grudinoklyuchichno-mastoid and trapezius muscles.

The brachial plexus (plexus brachialis) is formed by the anterior branches of the 4 lower cervical spinal nerves and the anterior branch of the first thoracic spinal nerve.

In the lateral triangle of the neck is the supraclavicular part of the plexus. It consists of three trunks: upper, middle and lower. The upper and middle trunks lie in the interstellar gap above the subclavian artery, and the lower - behind it. From the supraclavicular part, short branches of the plexus depart:

* dorsal nerve of the scapula (n. dorsalis scapulae) innervates the muscle that raises the scapula, large and small rhomboid muscles;

• long thoracic nerve (n. thoracicus longus) innervates the anterior serratus muscle;

* subclavian nerve (n. subclavius) innervates the subclavian muscle;

* the hypodermic nerve (n. subscapularis) innervates large and small round muscles;

* thoracic nerves, medial and lateral (nn. pectorales medialis et lateralis) Innervate pectoralis major and minor muscles;

* axillary nerve (n.axillaris) innervates the deltoid and small round muscles, the capsule of the shoulder joint and the skin of the outer surface of the shoulder.

Spatula-clavicular triangle

In the scapular-clavicular triangle (trigonum omoclavicularis), the lower border is the clavicle, the anterior - posterior edge of the sternoclavicular-mastoid muscle, the upper-posterior border is the projection line of the lower abdomen of the scapular - hyoid muscle.

The skin is thin, mobile, innervated supraclavicular nerves of the cervical plexus.

Subcutaneous fat is loose.

The superficial fascia of the neck contains the fibers of the subcutaneous muscle of the neck.

The surface sheet of the own fascia of the neck is attached to the front surface of the collarbone.

A deep leaf of its own neck fascia forms a fascial vagina for the scapula-hyoid muscle and is attached to the posterior surface of the clavicle.

Adipose tissue is located between the third fascia of the neck (front) and the pre-vertebral fascia (back). It extends in the gap: between the first rib and clavicle adjacent the bottom of the subclavian muscle, between the clavicle and the sternocleidomastoid muscle in front and the anterior scalene muscle at the back between the anterior and middle scalene muscle.

The neurovascular bundle is represented by a subclavian vein (V. subclavia), located most superficially in the pre-ladder space. Here it merges with the internal jugular vein (V. jugularis interna), and also takes in the anterior and external jugular and vertebral veins. The walls of the veins of this area are fused with fascia, so when injured vessels gape, which can lead to a deep breath to an air embolism.

Subclavian artery (a. subclavia) lies in the interstellar space. Behind it is the posterior bundle of the brachial plexus. The upper and middle bundles are located above the artery. The artery itself is divided into three parts: before entering the interstellar space, in the interstellar space, after exiting it to the edge of the I rib. Behind the artery and the lower beam of the brachial plexus is the dome of the pleura. In prelestnitsa space is the phrenic nerve that crosses the front of the subclavian artery.

The venous jugular angles formed by the fusion of internal jugular and subclavian veins, flows into the left chest duct (ductus thoracicus), right - right lymphatic duct (ductus lymphaticus dexter).

The thoracic duct, coming out of the posterior mediastinum, forms an arc on the neck, rising to the VI cervical vertebra. The arc is directed to the left and forward, located between the left common carotid and subclavian arteries, then between the vertebral artery and the internal jugular vein and before entering the venous angle forms an extension - lymphatic sinus (sinus lymphaticus). The duct can flow into both the venous angle and the veins that form it. Sometimes before the confluence of the chest duct crumbles into several smaller ducts.

The right lymphatic duct has a length of 1.5 cm and is formed from the fusion of the jugular, subclavian, and internal thoracic lymph trunks bronholegochnogo.

V. Tasks for independent work:

Task №1.

Specify the main neurovascular bundles of the neck

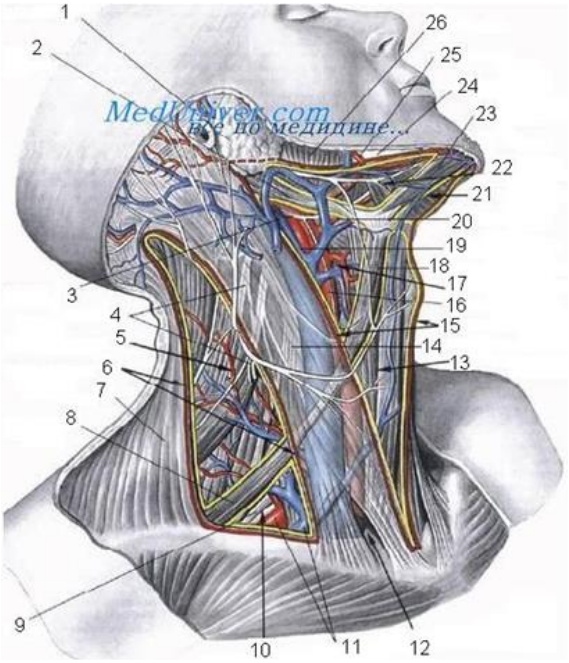
Task №2.

Specify by merging any vessels formed jugular venous angle. Where is it? Its clinical significance.

Task №3.

Specify what formed bed and capsule submandibular salivary gland. What are the differences in the structure of the capsule of the submandibular gland and the capsule of the parotid gland.

Task №4



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Task №5.

Make a task on the topic of the lesson. (In a notebook)

Task №6.

Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:

1. The boundaries and external landmarks of the neck.
2. Triangles of the neck: limits.
3. The main neurovascular bundles of the lateral and medial triangles of the neck.
4. Submandibular triangle of neck: boundaries.
5. Submandibular salivary gland: bed, capsule, its differences from the parotid salivary gland.
6. Carotid triangle: borders, the neurovascular bundle: the relative positions of the components of the neurovascular bundle.
7. Lateral triangle of the neck: the main neurovascular bundle, the relative position of the components in it.
8. Fascias and cellular spaces of the space of the neck: clinical significance, the messages between the individual spaces.
9. Topographic anatomy of diaphragmatic and vagus nerves, sympathetic trunk.
10. Topographic anatomy of the bottom of the mouth.
11. Topography of the pharynx: sellotape, syntopia.
12. Blood supply to the pharynx, innervation, lymph flow.
13. Concepts of the throat and the ring of Pirogov.
14. Topography of the larynx: sellotape, syntopia.
15. Blood supply to the larynx, innervation, lymph flow.
16. Topography of the thyroid gland: sellotape, syntopia,
17. Blood supply to the thyroid gland, innervation, lymph flow.
18. The topography of the parathyroid glands: sellotape, syntopia
19. Blood supply to the parathyroid glands, innervation, lymph flow.

VII. Learning objective:

No. 1. In the Department of purulent surgery hospitalized patient 3., 16 years. Due to the perforation of the wall of the esophagus with the bone, the patient has a neck swelling more on the left side, pain when swallowing, turning the head, body

temperature 39,3°. Specify in what cellular spaces space neck abscess developed? In what area can be formed purulent numb? Where do they make the incision to open the phlegmon?

(Answer: the patient have any cellulitis positionrange (retrovirales) space (on the sides and behind the esophagus). Timely and wide opening of the ulcer can prevent the development of secondary mediastinitis. Opening of the phlegmon is performed along the anterior edge of the left sternocleidomastoid muscle.)

No. 2. One of the stages of surgical treatment of lower lip cancer is fascial-box excision of the fiber and lymph nodes of the submandibular triangle (Vanach operation). Explain the need to remove the submandibular gland. What nerve can be damaged during surgery? What blood vessels are tied and crossed during surgery?

(Answer: on the Basis of intraoperative elastichnost. In cancer of the lower lip, submandibular lymph nodes (which are regional) are affected, the middle group of which is located in the thickness of the submandibular gland. In the process of fascial-box excision of fiber there is a need for ligation of the facial veins and arteries; during the operation, there is a danger of injury to the hypoglossal nerve.)

No. 3. The operation preceding the resection of the upper jaw in cancer is the ligation of the external carotid artery in the carotid triangle. What caused the need for such an operation? Describe the projection line and the incision site to expose the external carotid artery. What signs should the surgeon use to distinguish the external carotid artery from the internal one?

(Answer: Ligation of the external carotid artery throughout (in the carotid triangle) in this situation is produced for hemostasis. The external carotid artery in the carotid triangle is projected along the bisector of the angle formed by the sternoclavicular-mastoid muscle and the upper abdomen of the scapula-sublingual muscle. An incision 6-8 cm long is made from the angle of the lower jaw along the anterior edge of the sternocleidomastoid muscle so that its middle corresponds to the upper edge of the thyroid cartilage. To distinguish the carotid artery from the internal one, the following signs are used:

1) a sign of the "anatomical" paradox (mismatch with the position of the name of the artery): external-is located inside and in front, internal-outside and behind;

2) a sign of branches-from the external carotid artery leaves the anterior group of branches (upper thyroid, lingual, facial), internal-branches does not give;

3) the external carotid artery is crossed by the hypoglossal nerve and the common facial vein;

4) with finger compression of the external carotid artery, there will be no pulse on the superficial temporal and facial arteries.)

VIII. Control tests:

Part of the anterior region of the neck includes three pairs of triangle: (3)

scapular-clavicular
+ spatula-tracheal
blade-trapezoidal
+ submandibular
+ sleepy

The lateral neck area consists of two triangles: (2)

+ spatula-clavicle
spatula-tracheal
+ * trapezoidal
submandibular
sleepy

The vagus nerve, being in one fascial vagina with a common carotid artery and an internal jugular vein, is located in relation to these blood vessels: (1)

medial to the common carotid artery
lateral to the internal jugular vein
front between an artery and a vein
+ rear between an artery and a vein

When Subtotal resection of the thyroid gland should be left part of the gland containing parathyroid glands. This part is: (1)

the upper pole of the lateral lobes
+ rear inner side lobes
rear outer lobes
anterior-inner side lobes
anterior-outer portion of the lateral lobes
the lower pole of the lateral lobes

During the operation of strumectomy performed under local anesthesia, when applying clamps on the blood vessels of the thyroid gland, the patient developed hoarseness of voice due to: (1)

violations of blood supply to the larynx
compression of the upper laryngeal nerve
+ compression of the recurrent laryngeal nerve

IX. Glossary:

M. Sternohyoideus	Sternum-hyoid muscle
M. Omohyoideus	Scapular-hyoid muscle
M. Sternothyrcoideus	Sterno-thyroid muscle
M. Thyreohyoideus	Thyroid muscle
Lamina profunda fascae colli propriae	Deep fascia own piece neck

M.trapezius	Trapezius muscle
Spatium cellulosum	Cellular spaces
Trigonum submandibulare	Submandibular triangle

Lesson on

«Neck surgery: surgical access to the neck, operations on the vessels of the neck, operations for purulent diseases of the neck, vagosympathetic blockade of Vishnevsky, vagus nerve blockade of Burdenko, tracheotomy, tracheostomy, thyroid surgery».

Motivational characteristic: knowledge of the location of the main neurovascular bundles of the neck allows you to foresee the pathways of the spread of purulent processes from the neck and timely surgery. Knowledge of ways of metastasis to the lymph nodes will allow timely diagnosis of the localization of malignant tumors of the study area.

I. Goals:

Студент должен знать:	Студент должен уметь:	Студент должен владеть:
1. Surgical access to organs and to the main neurovascular bundles of the neck. 2. Methods of exposure and ligation of the lingual artery. 3. Technique vagosympathetic blockade of Vishnevsky. 4. Technique of blockade of the vagus nerve at the Burdenko 5. Tracheostomy technique 6. Tracheostomy technique 7. Typical incisions in purulent processes in the neck. 8. The technique of performing basic surgical interventions at each stage.	1. Inspection and palpation of the neck. 2. Use of special surgical instruments for operations on the neck at each stage. 3. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the neck. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the organs of the neck. 4. Surgical manipulation skills at each stage.

I. Questions to test the initial level of knowledge:

1. Cervical vagosimpaticescoy blockade on AV Vishnevsky.
2. Tracheostomy.
3. Surgical access and ligation of the external carotid artery.
4. Operative access, opening and suture of the cervical esophagus.
5. Incisions in the purulent-inflammatory processes of the neck.
6. Subtotal subfascial resection of the thyroid gland by O. V. Nikolaev.
7. Puncture and catheterization of the subclavian vein.
8. Drainage of ductus thoracicus.

II. The object of study-the human body.

III. Information part:

Tracheostomy

Tracheostomy is the operation of forming an artificial external fistula of the trachea (tracheostomy) after opening its lumen. The tearing of the wall of the trachea is called a tracheotomy, and it is the runtime tracheostomy.

Tracheostomy is divided into upper, middle and lower. The reference point for the unit is the isthmus of the thyroid gland. It is attached to the trachea in front at the level from the 1st to the 3rd or from the 2nd to the 4th of its cartilage.

With upper tracheostomy, the opening of the tracheal lumen is performed above the isthmus of the thyroid gland by dissection of the 2nd and 3rd semiring, with the middle-at the level of the isthmus after its intersection and the stumping to the sides, with the lower tracheostomy, the trachea is opened below the isthmus, usually the 4th and 5th cartilaginous semiring are crossed.

A specific type of tracheostomy is the percutaneous puncture microrheology (tracheitis). Microrheology (micro + tracheostomy) - puncture of the trachea through the skin, produce a thick surgical needle in the midline of the neck under setuid - ness of the cartilage. A thin elastic tube is inserted through the puncture with the help of a guide into the tracheal lumen to suck the contents from the trachea and bronchi, introduce drugs or conduct high-frequency injection ventilation of the lungs.

Indications for tracheostomy: obstruction of the upper respiratory tract - to prevent mechanical asphyxia; violation of the patency of the lower respiratory tract due to the ingress of aspiration and secretion products - for drainage and sanitation of the respiratory tract; violation of spontaneous breathing due to injury to the chest, cervical segments of the spinal cord, acute vascular pathology of the brain, etc. - for artificial ventilation; intubation anesthesia when it is impossible to intubation through the mouth or nose.

Depending on the timing of the tracheostomy is divided into emergency, urgent, planned and preventive.

Emergency tracheostomy is performed as soon as possible with minimal preoperative preparation or without it, in some cases without anesthesia at the patient's bed, and in field conditions with improvised means.

Indications for emergency tracheostomy are: obstructive apnea while closing the lumen of the larynx foreign body, tight tamponade of the mouth and throat to stop the massive bleeding, aspiration, asphyxia in case of impossibility of extraction of aspirated masses, stenotic asphyxia due to compression of the larynx and trachea, rapidly growing hematoma, injuries of the larynx. Emergency tracheostomy is performed with paralysis and spasm of the vocal folds, acute stenosis of the larynx III-IV degree. Acute stenosis is most often caused by inflammatory and toxicoallergic lesions of the larynx, phlegmon of the bottom of the mouth, tongue, parapharyngeal space, neck.

Urgent tracheostomy is performed after a short-term (within a few hours) conservative treatment of acute respiratory failure, if the measures taken do not lead to an improvement in the patient's condition, for intubation of the trachea and anesthesia during urgent operations for diseases accompanied by restriction of mouth opening, pronounced swelling of the tissues of the bottom of the mouth, pharynx, larynx, preventing intubation. It is performed for long-term mechanical ventilation in case of

violation of spontaneous breathing caused by chest injuries, traumatic brain injury, spinal injury, cerebral circulation disorder, poisoning, polio, tetanus.

Planned tracheostomy is performed for intubation anesthesia through the tracheostomy during planned operations, if it is impossible to intubate through the mouth or nose or the operation is performed on the larynx. Indications for a planned tracheostomy can occur with chronic progressive stenosis of the larynx, the gradual compression of her neck tumors, disorders of the patency of the lower respiratory tract by the products of inflammation, and the secretion of for drainage and sanitation of the trachea and bronchi.

A prophylactic tracheostomy is performed as an extended stage of surgical intervention in tumors of the floor of the mouth, tongue, and lower parts of the face, organs of the neck, surgery of lungs, heart, trachea, esophagus. The need for tracheostomy arises in these cases because of the possibility of the development of severe edema in the area of the larynx and larynx due to surgical trauma, for artificial lung ventilation and performing endotracheal or endobronchial therapeutic interventions in the postoperative period.

Tracheostomy is a high-risk operation, as it is performed near the major vessels and vital organs of the neck.

Tool. To perform a tracheostomy, a set of General surgical and special tools is required: a scalpel, hooks for wound expansion, sharp one - tooth hooks, a grooved probe, hemostatic clamps, a needle holder, scissors, a two-or three-blade truss expander, tracheotomic tubes, surgical and anatomical tweezers, surgical needles. In addition to this set, you need an anesthetic solution for infiltration anesthesia, suture threads, 1% solution of dicaine, towel, gauze balls and napkins.

The top technique of tracheostomy. The surgeon is located to the right of the patient, the assistant - on the other hand, the operating nurse is to the right of the assistant at the table for surgical instruments. After treatment of the surgical field on the skin indicate the middle line of the neck, from the lower edge of the thyroid cartilage to the sternum cut, usually a solution of diamond green. This line serves as a guide to the direction of the cut.

Skin incision to access the trachea can be vertical and transverse. A transverse incision is used by some surgeons, producing it 1-2 cm below the arch of the cricoid cartilage. They believe that the transverse wound on the neck is less gaping, heals faster, and the scar after healing is less noticeable. In clinical practice, more often used vertical skin incision.

Identification points in the performance of tracheostomy are the angle of the thyroid and the arc of the cricoid cartilage. The surgeon places the I and III fingers of the left hand on the lateral surfaces of the thyroid cartilage, and the II finger puts in the gap between the thyroid and cricoid cartilage. This achieves a reliable fixation of the larynx, and with it the trachea and keeping them in the middle plane. According to the pre-planned middle line, a skin incision is made; it begins under the protrusion of the thyroid cartilage and continues down 6-7 cm in adults and 3-4 cm in children. Dissect the skin with subcutaneous tissue, superficial fascia of the neck. Bleeding from the skin vessels is stopped by clamping with hemostatic clamps and bandaging or electrocoagulation. Assistant stretches the edges of the wound with blunt hooks.

They're looking for a white neck line. It is formed by the second and third fascia of the neck, which at the level of the isthmus of the thyroid gland along the median line merge with each other, forming aponeurosis. The width of the white line is 2-3 mm, down it does not reach the sternum tenderloin by about 3 cm, where the fascia diverge and form an inter-aponeurotic supra-thoracic space. White neck line usually well marked, it corresponds to the interval between the right and left grodnovodokanal muscle. In its projection, the spliced sheets of the second and third fascia of the neck strictly along the middle line are cut with a scalpel in the lower part of the wound, exfoliate from the underlying tissues with a curved hemostatic clip, cut along the grooved probe. During this stage of the operation, it should be taken into account that the anterior surface of the sternal-hyoid muscles descend down the anterior jugular veins, and sometimes they merge into one vessel - the median vein of the neck, which is located along the midline. This vein is either withdrawn to the side with a blunt hook, or crossed between two ligatures.

Next, expose the isthmus of the thyroid gland, the upper edge of which lies at the level of the 1st, rarely-the 2nd or 3rd cartilaginous semiring of the trachea. To do this, the right and left chest muscles are separated by a clamp along the middle line, then pushed to the sides with blunt hooks along with the anterior jugular veins. Visually and by palpation determine the cricoid cartilage and located beneath the isthmus of the gland. It should be remembered that above the cricoid cartilage is the cricoid muscle, which can be taken as the isthmus. On the sides of the trachea is the thyroid gland, which differs from the surrounding tissues in a softer consistency and a kind of brown-red color.

A further task of the surgeon is to shift the isthmus down to expose the upper rings of the trachea. Dissect along the lower edge of the cricoid cartilage a leaf of the fourth fascia of the neck, connecting the isthmus and cartilage (Bose ligament).

With a blunt instrument (Buyalsky's scapula, closed Cooper's scissors), the isthmus is separated, together with the fascia covering it from the back, from the cricoid cartilage and trachea, with a blunt hook, from the bottom and expose the three upper semirings of the trachea. Certain difficulties in performing upper tracheostomy can create a pyramidal lobe of the thyroid gland, which occurs in 1/3 of people. To produce an upper tracheostomy, the lobe should be cut between two hemostatic clamps, the stump stitched and tied with catgut.

Next, you have to open the lumen of the trachea. Previously, it is necessary to stop even a small bleeding. Bleeding vessels, if the patient's condition allows, are better tied before opening the trachea, otherwise they should be left under the clamps; the wound is dried with gauze swabs. Failure to comply with this rule leads to blood entering the trachea, which causes coughing, increased intra-chest and blood pressure, increased bleeding, and in the postoperative period, pneumonia may occur.

To facilitate the opening of the trachea along the midline, its fixation is necessary. To this end, a sharp one-toothed hook pierce the arc of the cricoid cartilage or ligament of the latter - cricoid, cricoid or capture the 1st ring of the trachea. Assistant pulls the larynx and trachea hook up and fixes them in the middle position, the isthmus is removed down a blunt hook.

Before opening the trachea, it is advisable to introduce a syringe into its lumen through the interval between the cartilages of 0.25-0.5 ml of 1-2% dicaine solution to suppress the cough reflex. On the blade of the scalpel, a cotton wool is wound, which delimits the free sharp end of the length of 1 cm, so that when the trachea is cut, it does not damage its back wall.

The anterior wall of the trachea is dissected by vertical, horizontal, flap incisions or a section 10-12 mm in diameter is excised in it to form a permanent tracheostomy.

The 2nd and 3rd tracheal rings are crossed by a vertical incision (Fig. 13.6). At the same time, a pointed scalpel is thrust into its lumen to a depth of not more than 1 cm above the isthmus of the thyroid gland and is pushed upwards, and not Vice versa, so as not to damage the gland and its venous plexus. It is not recommended to cross the 1st cartilage of the trachea and the ring-tracheal ligament due to the possibility of development in the subsequent chondroperichondritis of the larynx.

Signs of opening the lumen of the trachea are short-term breath holding, a characteristic whistling sound caused by the passage of air through a narrow slit, the appearance of a cough accompanied by the release of mucus and blood. Opening of the tracheal lumen is a crucial stage of the operation. The mucous membrane of the trachea when it is inflammatory and infectious diseases is easily peeled from the perichondrium that can create a false impression of the penetration into the trachea, entailing a gross error - the insertion of the tracheotomy tube into the trachea, and between its wall and the exfoliated mucosa. This leads to a rapid increase in the phenomena of asphyxia in the patient. In such cases, it is necessary to inject a sharp hook into the mucous membrane, pull it up, cut with a scalpel in the vertical direction.

In the longitudinal section of soft tissues above the trachea, it is possible to open its lumen by a transverse incision of the anterior wall (longitudinal-transverse tracheostomy By V. I. Voyachek). The dissection is made between the 2nd and 3rd rings, while the scalpel is injected into the gap between them, consisting of a dense fibrous tissue, on the side, the blade upward to a depth that allows you to immediately penetrate into the tracheal cavity.

The technique of a flap opening of the tracheal lumen along the Björk consists in cutting out a rectangular flap on the lower feeding leg on its front wall, while the trachea is held on both sides by sharp hooks. This flap is turned forward and down and stitched with the skin in the lower part of the wound.

Tracheostomy for long-term or permanent use is formed by cutting out in the wall of the trachea at the level of the 2-4-th cartilage of the hole with a diameter of 10-12 mm.the Edges of the hole are sewn with the skin by 4-6 kapron seams. The edge of the skin while tightening the two sutures, surgical tweezers screw into the lumen of the trachea.

Many ways of forming a permanent tracheostomy functioning without a tracheostomy tube with complete removal of the larynx are proposed. Generally accepted is the technique of kolomiichenko, in which the middle of the neck is completed by the cut of the skin in the form of a racket over the jugular tenderloin of the sternum. At the final stage of the operation of laryngectomy, the tracheal stump is sewn into the oval skin defect and forms a tracheostomy.

An important detail in the performance of tracheostomy is the size of the incision of the tracheal wall. It should correspond to the size of the diameter of the tracheostomy tube. When the incision is much larger than the diameter of the tube, air penetrates from the trachea into the tissue cracks under the seams on the wound and subcutaneous emphysema occurs. The introduction of the tube into a narrow incision leads to necrosis of the mucous membrane and tracheal cartilage, followed by the development of granulation and stenosis.

After opening the trachea into its lumen insert the dilator of the truss, dilute the edges of the wound and under its protection introduce a tracheostomy cannula.

Tracheostomy cannula is administered in three stages. At the first stage, the end of the cannula is introduced from the side, the shield is in a vertical position; at the second stage, the cannula with the end inserted into the trachea is deployed at 900 clockwise downwards and the rotational movement in the sagittal plane is moved to the tracheal lumen; at the third stage, the tracheostomy cannula is completely introduced into the tracheal cavity until the shield comes into contact with the skin.

After the introduction of the tracheostomy tube, guide seams are applied to the upper and lower corners of the wound.

The operation is completed by fixing the tracheostomy tube. To do this, two long gauze ties are passed into the ears of the tracheostomy cannula flap, which form 4 ends. They are tied around the neck with a knot with a bow on the side so that between the ties and the neck could fit the index finger. Under the Board from below enclose several gauze napkins put together with an incision in the middle to a half in which the tube lays down. Under the top ends of this napkin enclose the second napkin folded in several layers. Then impose above an aperture of a tracheostomy tube a bandage from a gauze bandage. After that, directly under the flap down the apron from the medical sheets with a cutout for the tubing to discharge from it was not soaked bandage. The apron with attached to it the upper ends of the drawstring tie to the neck in the same way as a tracheostomy cannula.

Technique of middle tracheostomy. The technique of this operation is basically similar to the technique of upper tracheostomy, it includes only one additional step - the intersection of the isthmus of the thyroid gland. After exposure of the isthmus and the dissection of the ligaments between it and the cricoid cartilage, its blunt usepreview from the trachea. Then on the isthmus impose two hemostatic clamps and cross between them. The stumps of the isthmus are stitched, tied with catgut and bred to the sides with hooks. The remaining stages of the operation are performed as in the upper tracheostomy.

Lower tracheostomy technique. The bottom half-ring of the cervical trachea is separated from the skin of the anterior surface of the neck subcutaneous tissue, superficial and own fascia of the neck, netgroupenum cellular spaces of space, the third leaf of the fascia and cellular spaces pretracheal space, the trachea is covered by the visceral leaf of the fourth fascia.

The position of the patient on his back with a roller placed under his shoulders and his head thrown back. Surgeon fingers of the left hand fixes the larynx. The incision is carried out strictly along the midline of the neck from the tubercle of the cricoid cartilage to the jugular tenderloin of the sternum. Dissect the skin, subcutaneous tissue, superficial fascia of the neck, under which

the median vein of the neck may be located. It is isolated from the fiber by means of a clamp, removed from the outside or cross between the two ligatures.

Next, cut the second fascia of the neck, fluted probe that provides access to nadgradnje metapopulations space.

The fiber of this space along the middle line is stupidly separated by a clamp, while in the lower part of the wound a jugular venous arc is found. With blunt hooks, the cellulose is bred to the sides, the venous arc is pushed downwards, after which the third fascia of the neck is exposed.

It is dissected in the middle in the longitudinal direction and several are separated on the sides of the incision, which allows to detect the thoracic and sternal muscles. With blunt hooks, the muscles are bred to the sides, below them is the parietal leaf of the fourth fascia of the neck.

This paper carefully netscout or stupid divide in a small area, through an incision peeled a curved clamp and dissected by fluted probe, the wound edges are bred hooks, then open pretracheal cellular spaces space.

It is advisable to examine the space with a finger, which will help the surgeon to navigate in the position of the trachea and timely detect abnormally located large arteries in front of it, feeling their pulsation.

The cellulose of the pretracheal space is stupidly separated along the midline to the anterior wall of the trachea and diluted to the sides, the meeting vessels are pushed aside, protected by blunt hooks or crossed between ligatures. Especially carefully it is necessary to manipulate near a sternum because of danger of wound of large venous and arterial vessels.

The trachea is stupidly freed from the visceral leaf of the fourth fascia of the neck enveloping it. In the upper corner of the wound revealed the isthmus of the thyroid gland, it usepreview from the trachea and pull upwards with a blunt hook for an exposure of 4-5-th of the cartilage semi-rings. Produce a thorough stop of bleeding, the wound is dried with gauze wipes.

A sharp one-toothed hook is inserted into the front wall of the trachea, it is pulled up and towards the operating wound and fixed in this position. In the lumen of the trachea through the puncture of the wall with a needle is administered 0.25-0.5 ml of 1% solution of dicaine.

The isthmus of the thyroid gland is protected by a blunt hook. The movement of the scalpel upwards cut through the two rings of the trachea, usually 4-e and 5-e or 5-e and 6-E. the size of the incision must correspond to the diameter of tracheostomy tube. In addition to the vertical, a horizontal (transverse) incision, a flap incision along the Björk, excision of the tissues of the anterior wall of the trachea to create an opening in it.

The edges of the wound of the trachea are diluted with an inserted truss dilator or a curved clip, a tracheostomy cannula is inserted into the hole.

The final stage of the operation is the same as in the upper tracheostomy.

Complications of tracheostomy and their prevention. Complications during tracheostomy often occur with restless behavior of the patient and performing emergency surgery during the onset or onset of clinical death.

If the incision is not carried out strictly along the midline, the assistant can grab the hook along with the soft tissues of the trachea, shift to the side, which prevents its detection. The situation in this case can be threatening, especially with emergency tracheostomy. If the trachea can not be found within 1 minute, and the patient is in a state of complete or almost complete obstruction of the respiratory tract, then immediately dissect the cricoid ligament together with the arc of the cricoid cartilage, in some cases, dissect the thyroid cartilage.

After the restoration of breathing and necessary resuscitation measures produce a typical tracheostomy, and dissected parts of the larynx are sewn.

The emergence of complications during tracheostomy contribute to violations of topographic relationships of anatomical structures of the neck due to various pathological processes. Violations cause severe swelling and infiltration of tissues in purulent inflammatory diseases and wounds of the neck, the bottom of the mouth, tongue, cancer metastases in paratracheal lymph nodes, previously undergone surgery on the neck. With asphyxia, numerous veins of the thyroid gland overflow with blood, which significantly increases its volume and exacerbates difficulties with tracheostomy. As already mentioned, the abnormal location of large arterial trunks in front of the lower cervical trachea creates the possibility of injury and dangerous bleeding.

The most frequent complications of tracheostomy include respiratory arrest after opening the tracheal lumen, bleeding from the lower thyroid veins, the isthmus and the thyroid gland itself with their accidental injuries. When bleeding, the veins are tied, the bleeding areas of the gland and the isthmus are sheathed with catgut sutures. Possible wounds of the posterior wall of the trachea and esophagus and, as already mentioned, detachment of the mucous membrane and the introduction of the tube between it and the tracheal rings.

The cases of damage to the pleural dome with the appearance of pneumothorax, erroneous opening of the esophagus instead of the tracheal lumen, complete rupture of the trachea with a rough introduction of the tracheostomy tube into the hole of insufficient diameter are described. To avoid these complications can be carefully performing the technique of surgery.

Conicotomy

Conicotomy - cut middle sticks (conical) ligament (lig. cricothyroideum medianum), located between the lower edge of the thyroid and the upper edge of the cricoid cartilage of the larynx.

Between the conical ligament and the skin on the midline of the neck is a thin layer of subcutaneous tissue and there is a slight layer of muscle fibers, there are no large vessels and nerves. The lower edge of the thyroid cartilage is the middle laryngeal artery. In order not to damage this artery during the operation of a conicotomy, a transverse incision of the middle cricoid (conical) ligament should be made closer to the cricoid, and not to the thyroid cartilage. Sometimes the middle part of the ligament perforates relatively thin cricoid arteries.

To detect the middle thyroid ligament in men, a protrusion of the thyroid cartilage is groped, the finger is moved down the middle line and the tubercle of the cricoid cartilage is determined, above which the ligament is located. In women and children, thyroid cartilage can be worse contoured than cricoid. It is expedient for them, moving the finger up the middle line from the jugular tenderloin of the sternum, to initially detect the cricoid cartilage, and above it - the middle cricoid ligament.

Indications. Conicotomy is performed with sudden asphyxia when there is no time to perform a typical tracheostomy or intubation.

The advantage of a conicotomy before a tracheostomy is the speed (within a few tens of seconds) of execution, technical simplicity and safety. In conicotomy, the possibility of damage to the main vessels, pharynx, esophagus is excluded, since the back wall of the larynx at the incision level forms a dense plate of the cricoid cartilage. The vocal folds are located above the cricoid membrane, so when it is cut, they are not damaged.

Disadvantages of conicotomy. Being in the lumen of the larynx, the cannula can lead to the rapid development of chondrodermatitis of cartilage followed by the appearance of persistent stenosis. Therefore, after the restoration of breathing, a typical tracheostomy is performed and the cannula is moved to the tracheostomy.

Position of the patient: on the back under the shoulder blade is placed a roller height of 10-15 cm, the head is thrown back. If possible, the treatment of the surgical field is performed and infiltration anesthesia is performed.

The technique of operation. The doctor, standing to the right of the patient, with the index finger of the left hand feels the tubercle of the cricoid cartilage and the deepening between it and the lower edge of the thyroid cartilage, corresponding to the location of the conical ligament. The thumb and middle fingers of the left hand fix the thyroid cartilage, pulling the skin over the cartilages of the larynx and displacing the posterior sternoclavicular-mastoid muscles with the cervical vascular bundles located under them, the second finger is between the arc of the cricoid and the lower edge of the thyroid cartilage. With a scalpel, a horizontal cross-section of the skin and subcutaneous tissue of the neck is made about 2 cm long at the level of the upper edge of the cricoid cartilage. The second finger is inserted into the incision so that the tip of the nail phalanx rests against the membrane. The nail, touching it with the plane of the scalpel, perforeret ligament and open the lumen of the larynx. The edges of the wound are diluted with a truss dilator or a hemostatic clip, a cannula of a suitable diameter is inserted through the hole in the larynx.

Stop bleeding, as a rule, is not required, and manipulation usually takes 15-30 C. the Tube introduced into the trachea, is fixed to the neck.

In primitive conditions, in an emergency situation, a penknife can be used to cut tissues. To expand the wound after the dissection of the conical ligament, a flat object of suitable size is introduced into it and unfolds across the wound, increasing the hole for air passage. As a cannula, you can use a cylinder from a fountain pen, a piece of rubber tube, etc.

Puncture conicotomy. A typical conicotomy in children is dangerous because of the high probability of damage to the cartilage of the larynx. Damaged cartilage lags behind in development, which leads to narrowing of the respiratory tract. Therefore, in patients under the age of 8 years perform puncture (with a needle) conicotomy. When using the needle, the integrity of only the conical ligament is violated.

Position of the patient: on his back with a roller placed under his shoulders and his head thrown back.

The technique of operation. The thumb and middle finger fix the larynx for the lateral surfaces of the thyroid cartilage, the index finger determines the thyroid ligament. A wide-bore needle is introduced into the membrane is strictly in the midline until you feel the "Pro - shaft". This indicates that the end of the needle is in the larynx cavity. The needle is fixed with a strip of sticky plaster. To increase the respiratory flow, several needles can be inserted in series. Microanatomy perform in just a few seconds.

Currently available connectomics special sets, which consist of razor-soldering tip for incision of the skin, the trocar for holding the larynx in a special cannula, and the cannula mounted on the trocar.

Operations at purulent processes on the neck

Characteristic of phlegmon of neck and ways of distribution of purulent streaks

Abscesses and neck phlegmons are divided into superficial and deep. Surface phlegmons occur, as a rule, due to penetration into the subcutaneous fat layer of the neck infection through the skin with its damage, boils, carbuncles.

Deep cellulitis of the anterior neck most often develop in the cellular spaces of the space of the neurovascular bundle, cellular spaces spaces around the trachea and esophagus, predpolagaemom crate - catachrom space. Most often, they occur as a complication of the phlegmon of the bottom of the oral cavity and parapharyngeal space, as well as a swallowing abscess, suppuration of neck cysts, wounds of the cervical esophagus and trachea, purulent inflammation of the lymph nodes of the neck.

Surgical treatment of deep neck phlegmon should include the opening of the primary ulcer and purulent numb, spreading through the cervical cell-fascial spaces. The pus from the bottom of the oral cavity penetrates into the neurovascular bundle of the neck along the fiber surrounding the lingual vein and artery, from the submandibular region along the facial vein and artery. This distribution is also possible in the lymphatic vessels connecting the submandibular lymph nodes with the upper group of deep cervical nodes. Through the cellular space of the neurovascular bundle of the neck, the infection penetrates into the anterior mediastinum; if the vascular vagina is destroyed, the inflammatory process extends into the cellulose of the supraclavicular fossa.

The second way to spread pus on the neck with a spilled phlegmon of the bottom of the mouth and the root of the tongue occurs when a deep sheet of its own fascia of the neck is melted, in this case, the purulent exudate overcomes the barrier in the region of the hyoid bone and enters the pretracheal tissue of the neck between the parietal and visceral leaves of the fourth fascia. Along the gap between the trachea and the fascial case of the neurovascular bundle of the neck, the previsceral cellular space of the pus descends down into the anterior mediastinum.

From the periarticular space (posterior), the inflammatory process extends to the neck and to the anterior mediastinum also along the course of the neurovascular bundle. Breakthrough of pus from retropharyngeal abscess, leads to the development of cellulitis cellular spaces retrovirales space from which inflammation along the esophagus is rapidly spreading in the posterior mediastinum.

Technique of operations for abscesses and phlegmons of the neck

Surgical treatment of superficial abscesses and phlegmon is usually carried out under local anesthesia. Cutaneous incisions for opening the phlegmon of the subcutaneous cellular spaces of the neck are carried out over the ulcer along the cervical folds and large vessels and continue to its lower border. After dissection of the skin tissue is bluntly separated with a clamp, open the abscess. Its cavity is examined with a finger to separate the fascial partitions and detect possible pus plugging in adjacent areas, in the latter case, additional cuts are carried out. The wound is washed with antiseptic solutions, drained with rubber tubes or rubber-gauze tampons.

The operation of opening the deep neck phlegmon is performed under General anesthesia. When respiratory failure tracheostomy impose for the implementation of anesthesia and prevention of asphyxia in the postoperative period.

Position of the patient: on the back, under the shoulders is placed a roller, the head is thrown back and turned to the side opposite to the side of the operation.

The technique of operation. When performing the operation, it is necessary to separate the tissues layer by layer, widely dilute the edges of the wound with hooks and ensure thorough hemostasis. This is important for the prevention of accidental damage to large vessels and nerves, a detailed examination of the cellular spaces in order to identify additional puffiness.

Surgery for pyoinflammatory process of odontogenic nature starts opening cellulitis of floor of the mouth, peripharyngeal space through an incision in the submandibular triangles, podvodburstroy region or through vorotnikovsky cut.

Then the skin incision is carried out along the inner edge of the sternoclavicular-mastoid muscle, starting above the angle of the lower jaw and continuing to the jugular tenderloin of the sternum. The length of the incision may be shorter if the ulcer does not extend to the lower neck.

Dissect the skin, subcutaneous tissue, superficial fascia and superficial muscle. In the upper corner of the wound, an external jugular vein is found, it must be displaced laterally or crossed between the two ligatures. Dissect the outer leaf of the fascial vagina of the sternoclavicular-mastoid muscle, separate its inner edge, pull it out with a blunt hook.

Carefully cut a deep leaf of the sternoclavicular-mastoid muscle, peel off from the underlying tissues with a grooved probe and cut through it. For orientation in topographic relationships in the wound, it is advisable to feel the pulsation of the common carotid artery and determine the position of the vascular bundle of the neck on its bottom with a finger. Fascia and cellulose over it stratify a hemostatic clip, a bunch expose.

When spreading the plug along the beam at this point, pus is released. Next, the fiber with purulent-necrotic changes in a blunt way is widely stratified to healthy tissues, a finger is examined with a purulent cavity to detect possible numbs, which are widely opened. Visually and by palpation, the internal jugular and facial veins are examined. If they detect blood clots, the vessels are tied above and below the boundaries of the thrombosis sites and excised.

If necessary autopsy of ulcers in the pre - and pozadivistseralnoe spaces in the lower half of the wound discover and traverse the scapular-hyoid muscle, which runs towards posterior to anterior and from the bottom up. The intersection of the muscle makes it easier to access the trachea and the esophagus. Pre-grope the common carotid artery and trachea, then delaminate the fiber between them, the neurovascular bundle is removed with a blunt hook outside.

In front of the trachea below the thyroid gland, an ulcer is opened in the pretracheal cellular space with a clamp or finger. Continuing to pull the vascular bundle outwards, the assistant shifts the trachea with a blunt hook in the medial direction. Between the beam and the esophagus, tissue is stratified in the direction of the cervical vertebrae to the pre-vertebral fascia and the ulcer is opened in the lateral part of the parathyroid cell space. Near the esophagus is the common carotid artery: right 1-1. 5 cm, left 0.5 cm from its walls. Behind the common carotid artery and the internal jugular vein are the lower thyroid artery and veins, which at the level of the VI cervical vertebra make an arc and are directed to the lower pole of the thyroid gland. To prevent injury to these vessels, the tissues in the circumference of the esophagus are separated only in a blunt way. Pulling the esophagus medially, between him and predposlednii fascia clip open the abscess in the tissue pozadivistseralnoe space.

When purulent streaks in the supraclavicular area and netgroupenum metapopulations space along with the vertical do a second wide horizontal section of the tissues above the clavicle. Horizontal incisions in the submandibular triangle and above the collarbone in combination with the vertical form a z-shaped wound. With putrefactive necrotic phlegmon, skin-fat flaps at the corners of the wound are separated, turned away and fixed with a seam to the skin of the neck. Wide exposure of inflamed tissues creates conditions for their aeration, ultraviolet irradiation, washing with antiseptic solutions. The operation ends with the washing of purulent cavities and their drainage. The tubular drainage to sum up to the vascular bundle dangerous because of the possibility of bedsores wall of the vessel and erosivnogo bleeding.

With common phlegmon, surgical interventions are performed on both sides of the neck.

Cervical mediastinotomy

Indications. The presence of clinical and radiological signs of mediastinitis in odontogenic inflammatory processes, the detection of purulent congestion in the mediastinum when opening a deep neck phlegmon are indications for mediastinotomy.

Anesthesia: intubation anesthesia, if it is impossible to intubate through the mouth, it is performed through the tracheostomy.

Position of the patient: on the back, under the shoulders of the roller is placed, the head is thrown back and turned to the side opposite to the side of the operation.

The technique of operation. The skin incision is carried out in the projection of the anterior edge of the sternoclavicular-mastoid muscle from the level of the upper edge of the thyroid cartilage and 2-3 cm below the sternoclavicular joint. After dissection of skin, subcutaneous tissue and subcutaneous muscle dissect fascial outer leaflet of the vagina of the sternocleidomastoid muscle, which mobilize and divert lateral. Next cut the inner leaf of the vagina fascia of the sternocleidomastoid muscle and cut the upper abdomen scapular-hyoid muscle. The fascia and cellulose of the neurovascular bundle of the neck are dissected, the bundle is exposed, in the presence of a deep neck phlegmon, a purulent focus is opened.

The neurovascular bundle of the neck is pulled outwards, the finger is moved along the lateral and anterior surfaces of the trachea down into the thoracic cavity and the ulcer in the cellulose of the anterior mediastinum is opened. By moving the finger along the walls of the esophagus, the cellulose of the posterior mediastinum is opened.

Cervical mediastinotomy can be performed through a transverse incision of tissues directly above the handle of the sternum. The finger is inserted through the wound into the anterior section of the mediastinum between the sternum and the anterior surface of the trachea, the ulcer is opened, tubular drains are introduced into it.

Exposure and ligation of the blood vessels of the neck

Indications for ligation of the neck vessels

The indication for the ligation of blood vessels of the neck is the need to stop bleeding from the wounds of the maxillofacial region and neck with mechanical damage to both the arteries and veins, and their large branches, or the purulent inflammatory process that has arisen due to the erosion of the vessel wall by the tumor.

Internal and common carotid artery ligated, when wounded near the bifurcation with the impossibility of imposition of vascular suture, the surgical treatment of their aneurysms, removal of chemodectoma, if it is not possible to separate from the arterial wall.

Ligation of the internal jugular vein is indicated in the formation of a septic thrombus in it to prevent its spread into the cavity of the skull, metastasis to the lungs and other internal organs. Her ligated and excised in the process of operation krila.

Ligation of the facial artery

The shortest distance between the skin and the facial artery is determined in the area of its passage near the lower edge and the outer surface of the body of the lower jaw, which the artery crosses from the outside in the direction from the bottom up at the anterior edge of the masticatory muscle. In this anatomical zone, the facial artery is pressed and tied with a finger. The facial artery is accompanied by the facial vein, located behind it.

The technique of operation. The cut of the skin 5 cm long is carried out in the submandibular area parallel to the base of the lower jaw and retreating 2 cm down from it. The beginning of the incision is 1 cm anteriorly from the angle of the lower jaw. Dissect the skin, subcutaneous fat, superficial fascia of the neck, subcutaneous muscle, the second cervical fascia, which in this area forms the surface sheet of the capsule of the submandibular salivary gland. The dissected tissues are separated and pulled up together with the marginal branch of the facial nerve passing in this layer. Under the lower edge of the body of the lower jaw in the projection of the anterior edge of the chewing muscle itself, the facial artery is isolated and tied.

Ligation of the lingual artery

The lingual artery is tied in the Pirogov triangle. It is a small area of the submandibular triangle, bounded from above by the hypoglossal nerve and located parallel to it by the lingual vein, from below-by the intermediate tendon of the bicuspid muscle, from the front-by the free posterior edge of the maxillofacial muscle. The bottom of the triangle forms a sublingual-lingual muscle, inside of which the lingual artery is located.

Position of the patient: on the back, under the shoulders of the roller is placed, the head is thrown back and maximally rejected in the opposite direction. In this position is best revealed in the triangle of Pirogov.

The technique of operation. Under infiltration anesthesia, an incision 6 cm long is made in the submandibular area parallel to the lower edge of the lower jaw and retreating from it down to 2-3 cm.The beginning of the incision is 1 cm anteriorly from the anterior edge of the sternocleidomastoid muscle. Layer by layer dissect the skin with subcutaneous tissue, superficial fascia and subcutaneous muscle of the neck. Then, along the grooved probe, a leaf of the second fascia is cut, forming the outer part of the capsule of the submandibular salivary gland, which is released from the capsule and pulled up by the hook. The inner leaf of the capsule is separated in a blunt way, and the surgeon is guided in the location of the triangle Pirogov. Delaminate the fascial cover and secrete an intermediate tendon of the bicuspid muscle, the anterior edge of the maxillofacial muscle and the hypoglossal nerve. The tendon of the bicuspid muscle is pulled down, and the hypoglossal nerve is pulled up. Triangle stupid severs fiber sublingual-lingual muscles and find the lingual artery. The artery is isolated, under it from the nerve in the direction from top to bottom, a Deshan needle is fed with a ligature and it is bandaged. Stratification of the fibers of the sublingual-lingual muscle should be done carefully, since the muscle is thin, it adheres to the middle constrictor of the pharynx and with rough intervention, it is possible to open the lumen of the latter.

Exposure of the neurovascular bundle of the neck

Indications. Exposure of the neurovascular bundle of the neck is a common stage of operations of ligation of the General, internal, external carotid arteries and internal jugular vein.

The technique of operation. The incision is performed along the anterior edge of the breast-but-clavicular-mastoid muscle from the level of the angle of the lower jaw to the level of the lower edge of the thyroid cartilage or to the sternoclavicular joint. Layer by layer dissect the skin, subcutaneous tissue, superficial fascia, subcutaneous muscle of the neck. In the upper corner of the wound, the external jugular vein is drawn laterally or tied and crossed. At the fluted probe to dissect fascial front piece of the vagina of the sternocleidomastoid muscle, which with a blunt instrument (clamp closed Cooper scissors) is isolated from her vagina and push a blunt hook outwards. In the lower corner of the wound becomes visible spatula-hyoid muscle, forming an angle with the sternocleidomastoid muscle. The angle bisector usually corresponds to the course of the common carotid artery. Through the inner leaf of the fascial vagina of the sternocleidomastoid muscle, the finger determines its pulsation, the bluish internal jugular vein is usually seen outside the artery. Along the wound along the grooved probe carefully, so as not to damage the vein, dissect the posterior leaf of the vagina of the sternocleidomastoid muscle, stupidly delaminate the fiber and fascia of the neurovascular bundle, the tissues are diluted with hooks, after which they become visible forming its vessels and nerves.

Ligation of the common and internal carotid arteries

The technique of operation. After exposure of the neurovascular bundle of the neck, the facial vein is isolated, which crosses the initial sections of the external and internal carotid arteries from the top from the inside downwards and outwards, displaces it upwards or bandages and crosses. Located on the anterior wall of the common carotid artery, the descending branch of the hypoglossal nerve (the upper spine of the cervical loop) is withdrawn in the medial direction. The artery is separated in a blunt way from the internal jugular vein and the vagus nerve, which is located between these vessels and several posterior. Further, the common carotid artery is isolated from all sides, under it in the direction from the internal jugular vein, a Deshan needle with a ligature is fed,tied 1-1.5 cm below the bifurcation or the site of injury.

The internal carotid artery is located laterally from the external carotid, on the neck does not give branches, secrete and bind it with similar techniques.

Ligation of the external carotid artery

The technique of operation. After exposure of the neurovascular bundle of the neck, the facial vein and its branches are isolated, tied or displaced downwards. The bifurcation of the common carotid artery and the initial parts of the external and internal carotid arteries are exposed. Ahead of them in the transverse direction is the hypoglossal nerve, which is displaced downward. Next, the external carotid artery is identified. Its distinctive features are the location of the medial and anterior to the internal, the absence of a descending branch of the hypoglossal nerve on it (it passes along the anterior surface of the internal carotid artery), the cessation of pulsation of the superficial temporal and facial arteries or bleeding from the wound after temporary clamping of its trunk. The external carotid artery, in contrast to the domestic, has in the neck the branches that can be detected by its mobilization. The first vessel, departing from the external carotid artery, is the upper thyroid artery, above it separates the lingual artery.

The external carotid artery is bluntly separated from the internal carotid artery, jugular vein and vagus nerve, under it from the internal jugular vein from the outside inwards is fed a Deshan needle with a ligature. The artery is tied in the area between the discharge of the lingual and upper thyroid arteries. The ligation between the upper thyroid artery and the bifurcation of the common carotid artery can be complicated by the formation of a blood clot in the short stump of the vessel, followed by its spread to the lumen of the internal carotid artery.

The external carotid artery is crossed with inflammatory phenomena in the region of the neurovascular bundle and metastases of malignant tumors to the lymph nodes of the neck to prevent the eruption of ligatures. At the same time, two stitched ligatures are applied to each segment of the artery.

Ligation of the internal jugular vein

The technique of operation. After exposure of the neurovascular bundle of the neck, the spatula-hyoid muscle is pulled downwards or crossed if it interferes with the further course of the operation.

The internal jugular vein is separated from the carotid artery and vagus nerve in a blunt way. Deshan's needle is placed under the vein on the side of the artery. The vein is tied with two ligatures above and below the boundaries of the spread of the thrombus or its resection site, while the facial vein is tied and excised. Purulent thrombus from the lumen of the vein is removed after dissection of its wall, in this case, the postoperative wound is drained, the seams are not applied.

Operations on the cervical esophagus

The operation includes operative access to the cervical esophagus, then, depending on the nature of the damage, various techniques are performed: dissection (esophagotomy) and suture of the esophagus, imposition of the esophageal fistula (esophagostomy), drainage of the esophageal cellular space..

Surgery is more convenient to make on the left side of the neck, as the cervical esophagus deviates to the left of the median line.

Position of the patient: on the back, under the shoulders of the roller is placed, the head is thrown back and turned to the right.

The technique of operation. The surgeon becomes to the left of the patient. The incision is carried out along the inner edge of the left sternocleidomastoid muscle from the level of the upper edge of the thyroid cartilage to the sternal notch. Dissect the skin with subcutaneous tissue, superficial fascia and subcutaneous muscle of the neck. Under the muscle, the external jugular vein and branches of the anterior jugular vein are ligated and crossed. Open the anterior wall of the vagina of the sternoclavicular-mastoid muscle, which is separated from the fascia and disposed externally. Then in the longitudinal direction dissect the back wall of the vagina of the muscle, the third fascia, the parietal leaf of the fourth fascia, with the dissection line located inside of the common carotid artery. Also cross the upper abdomen of the scapula-hyoid muscle. The neurovascular bundle together with the lower stump of the muscle is gently pushed outwards. Left lobe of the thyroid gland along with the trachea and the muscles lying in front of her (gradinitza and glutinosity), a blunt hook is pulled medially. Between the trachea and the neurovascular bundle, soft tissues are stupidly stratified towards the cervical vertebrae.

Predpolagaetsya Open fascia with passing it first under, then over her inferior thyroid artery. The latter is isolated, Ted with two ligatures and crossed between them. Bluntly then divide the leaf of the fourth fascia at the left edge of the trachea, strip the tissue of the tracheoesophageal sulcus (sulcus tracheooesophageus) in which the left recurrent nerve. Trying not to damage it, with caution, the fiber together with the nerve and the left lobe of the thyroid gland is pushed up and medially. Between the trachea and the spine is detected esophagus, which is recognized by the longitudinal muscle fibers and brown-red color.

On the wall of the esophagus, without piercing the mucous membrane, impose a ligature-holder, with its help, the esophagus is slightly pulled into the wound. The posterior wall of the esophagus is exfoliated from the pre - vertebral fascia, the anterior wall from the trachea. Under the esophagus, a rubber catheter is fed, for the ends of which the esophagus is displaced into the wound to perform the necessary surgical techniques on it. Before removing the foreign body in the area of its location on the esophagus impose two ligatures, without capturing the mucous membrane, its wall is dissected between them in the longitudinal direction layer by layer - first the muscle layer, then the mucous membrane.

After removal of the foreign body, the wound of the esophagus is sewn up in layers. Before suturing the wound through the nasal passage, a sterile gastric probe is introduced to feed the patient.

Surgery for metastases of malignant tumors in the lymph nodes of the neck.

Metastases in the lymph nodes of the neck occur with malignant tumors of the oral cavity and maxillofacial region, ENT organs, cervical esophagus, thyroid gland; in the lower group of deep cervical lymph nodes metastasize tumors of the gastrointestinal tract and lungs.

Designed 4 types of operations for treatment and prevention of metastases in lymph nodes of the neck: operation Wanaka (upper cervical excision according to the first embodiment), the upper fasciale-casing excision of tissue of the neck (upper cervical excision according to the second embodiment), fasciale-casing excision of cervical tissue, operation krila.

Operation Wanaka named after the author of a Russian doctor R. H. Wanaha, who first described it in 1911, the purpose of the operation - removal of submandibular salivary glands, lymph nodes tissue submandibular and mental regions.

When performing the upper case-fascial excision of the cervical tissue, the lymph nodes of the submandibular and chin triangles, the submandibular salivary gland, as well as the upper deep cervical lymph nodes from the level of bifurcation of the common carotid artery, including those located along the accessory nerve, are removed.

Case-fascial excision of the cervical tissue is to remove all superficial and deep lymph nodes in this half of the neck together with the surrounding tissue and submandibular salivary gland. This type of operation is most commonly used.

Krail's operation is named after the author, who first described it in 1906. krail's Operation differs from fascial-fuller excision of cervical fiber in that, together with all superficial and deep lymph nodes, cellulose, submandibular salivary gland on the half of the neck, the sternoclavicular-mastoid muscle and internal jugular vein are removed. In this case, the additional, large ear, small occipital nerves are inevitably damaged. Trapezius muscle subsequently ceases to function. The operation is performed simultaneously only on one side of the neck.

Thyroid surgery

Indications. Surgical interventions on the thyroid gland are performed with thyrotoxic nodular or diffuse goiter, not amenable to conservative treatment, euthyroid nodular goiter, increasing against the background of conservative therapy, causing compression of the neck and its cosmetic deformation, benign and malignant tumors. In some cases, operations are performed with autoimmune thyroiditis and fibrous thyroiditis Riedel.

Depending on the volume of removed tissues, glands secrete: sparing resection - removal of a node from adjacent tissues; Subtotal resection - removal of the gland, leaving in each a fraction 3-6 g of its tissues; hemithyroidectomy (lobectomy) - removal of the lobe of the gland; hemithyreoidectomy with removal of isthmus; thyroidectomy performed - complete removal of the thyroid gland in common malignant tumors.

Subtotal resection of the thyroid gland

Most often perform Subtotal subfascial resection of the thyroid gland On O. V. Nikolaev.

The technique of operation. Vorotnikovsky skin incision with subcutaneous tissue is performed from the medial edge of one grudinoklyuchichno-mastoid muscle to the medial edge of the other at 1.5 cm above the jugular notch of the sternum. Dissect the superficial fascia with the subcutaneous muscle of the neck. The edges of the incision pull up and down, capture and cross between the two clips superficial cervical veins located between the first and second fascia. Under the second and third fascia, a solution of novocaine is introduced to facilitate the next stage-separation and dissection of the fascia.

Then expose rodinovedenie, glutinosity and scapular-hyoid muscles, the thyroid gland covers the front. With the help of the Kocher clamp, the medially located pectoral muscles are stupidly separated from the rest of the muscles, grab them with two clips imposed in the transverse direction and dissect between them.

Novocaine solution is administered under the parietal fourth fascia leaf on both sides of the median line, so that it spreads under the fascial capsule of the thyroid gland and blocks the nerves suitable to the gland. This makes it easier to perform the next stage of the operation-the allocation of the right lobe of the gland and dislocating it into the wound. To grow territory glutinosity muscles in the midline vertically cut parietal leaf of the fourth fascia and stupidly (partly a tool, partly fingers) peeled a piece of the parietal fascia of the gland from the visceral. The surgeon then sprained his finger in the wound, the proportion of glands. Next, the visceral leaf of the fourth fascia is cut, surrounding the gland, it exfoliates from its own capsule from front to back within the boundaries of the resection zone of the lobe, while its upper and lower poles are released. In the process of preparation, the clamps are seized and the vessels passing between the outer fascial and inner self-sheath of the gland are crossed.

Cross the isthmus, bleeding vessels capture clips. Then produce a partial step-by-step cutoff of the gland, starting from the trachea in the lateral direction, the share is fixed with a finger. The tissue of the gland, together with its own capsule, is sequentially captured in small portions by clamps and cut off. If the patient is operated under local anesthesia, after each capture of the parenchyma glands produce voice control of the recurrent nerve. The change in voice timbre indicates nerve irritation and the need to reduce the volume of captured tissues.

In the proportion of the gland, it is recommended to leave a tissue area of 15x15 or 10x20 mm in size.

Sew the dissected parts of the outer capsule of the gland, thereby closing the stump of the right lobe. Then, similar techniques resect the left lobe of the gland.

Stump lobes of the gland cover gruenesalien muscles, and remove the cushion from under the shoulders of the patient, mattress seams sew rodinovedenie muscles. The wound cavity is washed again, the glands are drained from a strip of rubber to the stumps, sutures are applied to the skin and subcutaneous tissue.

Complications in the process of surgery: bleeding, removal of parathyroid glands, damage to the recurrent nerve, air embolism due to the intersection of veins without their prior ligation.

Prevention of complications is the thoroughness of the surgical techniques

Endoscopic operations on the thyroid gland

Endoscopic or endovideoscopic surgery on the thyroid gland is an intervention performed through a skin incision or trocar instruments for endosurgery under visual control through the optical system. During the operation, the image of anatomical structures with the help of a video camera is displayed on the monitor.

The technique of operation. To perform the operation, the so-called mini-access is usually used, in which the length of the skin incision is 2-5 cm.when it is performed, the superficial veins of the neck, chest muscles do not cross, which prevents the development of pronounced tissue edema after the operation and the formation of a rough scar. The observation system provides optical magnification of the surgical field and facilitates the surgeon orientation in the topographic relationships of anatomical structures. Endosurgical instruments with a diameter of 2 to 12 mm allow to perform all surgical techniques inherent in traditional surgical technique. Capture of an organ is made by a clip, separation of tissues by a dissector, dissection of tissues by endoscopic scissors or electrosurgical method. Before crossing the ligated vessels by ligatures or clips applied titanium, their brackets stitch endoscopic sewing machine, use electricity, laser, ultrasonic coagulation. The advantages of endoscopic operations over traditional ones are in reducing the intensity of pain in the postoperative period, reducing the number of complications, reducing the duration of inpatient treatment, the formation of a barely noticeable skin scar.

V. Tasks for independent work:

Task №1.

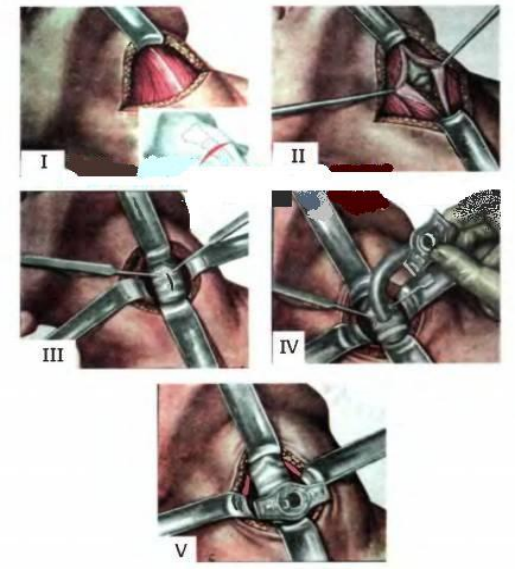
Specify the location of the most common localization of neck phlegmon.

Task №2.

Describe the path of the spread of pus under preveterinary and retrovirales phlegmon.

Task №3.
Indicate why when the neck vagosimpaticescoy blockade on AV Vishnevsky, verify the absence in the syringe of blood?

Task №3.
Name the operation. Specify the stageы:



I -	
II -	
II -	
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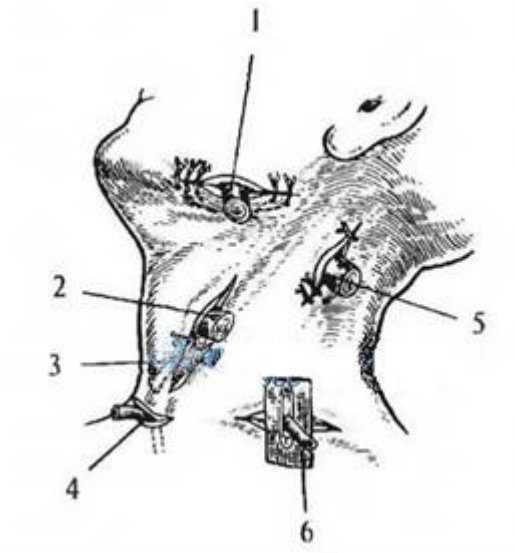
V -	

Task №4.



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Task №5.
Make a task on the topic of the lesson. (In a notebook)

Task №6.
Make 5 tests on the topic of the lesson. (In a notebook)

VI. Control question:
1. Indications and technique of exposure and ligation of the subclavian artery.
2. Indications and technique of exposure of the common carotid artery and internal jugular vein.
3. Indications and technique exposure and ligation of the external carotid artery.
4. Indications and technique of exposure and ligation of the lingual artery.
5. Opening and drainage of phlegmon of the neck.
6. Indications and technique vagosimpaticescoy blockade by Vishnevsky.

7. Tracheostomy: indications, types, technique and possible complications.
8. Indications and technique of Subtotal subfascial resection of the thyroid gland in Nikolaev.

VII. Learning objective:

No. 1. In the surgical Department entered the patient V., 15 years. The diagnosis: "Abscess nagradnogo metapopulations space." Specify how this space is limited. Where can there be purulent numb? What kind of education can be corrupted when opening the phlegmon slit 1 cm upward from the jugular notch of the sternum?

(Answer: the inter - Aponeurotic supra-thoracic space from below is limited by the jugular notch of the sternum, from the front by the second fascia of the neck, attached to the front surface of the sternum and the sternoclavicular joint, from behind by the third fascia, attached to the posterior surface of the sternum. Pus from this space can spread into a blind bag lying posteriorly from the sternocleidomastoid muscle or into the case of this muscle. The purulent cavity is opened by an arcuate incision 1 cm above the jugular tenderloin of the sternum or by a vertical incision along the midline (in this case, the jugular venous arc may be damaged.)

No. 2. Lisa M., age 19, phlegmon of the right submandibular region. During the examination: in the lower part of the cheek area there is a suppurated skin wound-a consequence of an insect bite and combing. Body temperature-38,3°, severe pain and swelling in the submandibular area. Explain the relationship between these inflammatory processes? In what layer of the submandibular triangle did phlegmon develop? Why at the opening of this cellulitis should back off 1.5-2 cm downwards from the lower edge of the mandible?

(Answer: Lymph from the skin of the lower part of the face is taken to the superficial submandibular lymph nodes. Lisa M. had a complication of the infected skin wound with lymphangitis, lymphadenitis, purulent melting of the lymph node with the transition of the purulent process into the subcutaneous tissue of the submandibular triangle. When opening the submandibular phlegmon, they retreat 1.5-2 cm downwards from the lower edge of the lower jaw in order to avoid damage to the marginal branch of the facial nerve.)

No. 3. The ENT Department received a patient with a foreign body of the esophagus. It was not possible to remove a foreign body during esophagoscopy. Where are most often delayed foreign bodies of the cervical esophagus? Which cervical vertebra does it match? On which side do they access the esophagus, why?

(Answer: Foreign bodies of the cervical esophagus are more often localized at the level of its first anatomical narrowing (CVI) in 15-20 cm from the upper incisors. Operative access to the cervical part of the body is carried out by incision (8-10 cm) along the anterior edge of the left sternocleidomastoid muscle, starting from the jugular tenderloin of the sternum (the trachea displaces the esophagus to the left side). The esophagus lies between the trachea and the spine (the main neurovascular bundle of the medial triangle of the neck crochet Farabee slip in the lateral direction)

VIII. Control tests:

At the bottom of tracheostomy can be damaged: (4)

+ the inferior thyroid artery
+ brachiocephalic trunk
+ left common carotid artery
+ aortic arch
esophagus
jugular vein
the isthmus of the thyroid gland

With a penetrating chest wound, complicated by pleuropulmonary shock, it is indicated: (1)

+ cervical vagosimpaticescoy blockade on AV Vishnevsky.
tracheostomy
mediastinotomy for Rape

Nadgradnje metapopulations space is limited: (1)

+ below the jugular tenderloin of the sternum, in front-the second fascia of the neck, attached to the front surface of the sternum and sternoclavicular joint, behind-the third fascia, attached to the back surface of the sternum

bottom of the third with a fascia, fixed to the rear surface of the sternum, at the front, the jugular notch of the sternum, behind the second fascia of the neck that attach to the anterior surface of the manubrium

below - the second fascia of the neck, attached to the front surface of the sternum, front-jugular tenderloin of the sternum, behind-the third fascia, attached to the rear surface of the sternum,

After resection of the thyroid gland, voice hoarseness developed due to damage: (1)

+ recurrent laryngeal nerve
the inferior thyroid artery
common carotid artery
oesophagus'

With a sharp difficulty in external respiration, acrocyanosis, the inclusion of auxiliary muscles in breathing is shown: (1)

+ tracheostomy
catheterization of the common carotid artery
bandaging of the shoulder-head barrel
intubation

IX. Glossary:

Lig. Cricothyroideum medianum	Middle cricoid ligament
Plica vocalis	The vocal folds
Médiastinotomie	Mediastinotomy

Articulatio sternoclavicularis	Sternoclavicular joint
V. Jugularis interna	Internal jugular vein
Vertebra cervicalis	Cervical vertebra
Arteria carotis externa	External carotid artery
Arteria thyroidea superior	Upper thyroid artery

Lesson on
MODULE
"TOPOGRAPHICAL ANATOMY AND OPERATIVE SURGERY OF HEAD AND NECK»

TO MODULAR NOT ALLOWED STUDENT:
1. WITH UNPROCESSED PASSES
2. WITH UNFULFILLED INDEPENDENT WORK

Goals:

The student needs to know:	The student must be able:	The student must own:
1 Topographical anatomy of the head of homotopia, syntopia, sellotape, layered structure. 2 Topographic anatomy of venous sinuses. 3 Blood supply to the brain 4 craniocerebral topography scheme (Cranlana Brusovo) 5 membranes of the brain, metabolicheskie space 6 Topographic anatomy of the ventricles of the brain 7 Signs of impaired outflow of liquid from the ventricles of the brain. 8 technique of surgical intervention in operations on the brain and facial parts of the head at each stage. 9 Topographic anatomy of the neck - border, holotape, syntopia, sellotape, layered structure. 10 Posts cervical interscalene spaces. 11 technique of preparation of the main formations of the selected area at each stage. 12 Surgical accesses to organs and to the main neurovascular formations of the selected area. 13 Technique of performing basic surgical interventions at each stage.	1. Inspect and palpate the selected area. 2. To dissect a selected area. 3. Show the drug elements, education and organs of the selected area. 4. Use special surgical instruments for operations in the selected area at each stage. 5. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the selected area. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the selected area. 4. Surgical manipulation skills at each stage.

QUESTIONS FOR MODULE
"TOPOGRAPHICAL ANATOMY AND OPERATIVE SURGERY OF HEAD AND NECK»

1. Layer-by-layer topography of the fronto-parieto-occipital region. Features blood supply and innervation of the soft tissues of the cranial arches. Topographic and anatomical study of scalped wounds on the head.
2. Layer-by-layer topography of the fronto-parieto-occipital region. Cellular spaces of the frontal-parietal-occipital region. Differential diagnosis of bruising of the soft tissues of the arches of the skull.
3. Layer-by-layer topography of the temporal region. Features of the structure of bones and cellular spaces of the temporal region. Clinical significance.
4. Layer-by-layer topography of the mastoid region. The triangle of the shipo, its boundaries and clinical significance.
5. The inner base of the skull. Anterior cranial fossa: the boundaries and openings of the anterior cranial fossa. Clinical manifestations of skull base fractures in the anterior cranial fossa.
6. The inner base of the skull. Middle cranial fossa: the boundaries and openings of the middle cranial fossa. Clinical manifestations of skull base fractures in the middle cranial fossa.
7. The inner base of the skull. Posterior cranial fossa: posterior fossa boundaries and openings. Clinical manifestations of skull base fractures in the middle cranial fossa.
8. Topographic anatomy of the brain. Sheaths of the brain. Differential diagnosis of intracranial hematomas.
9. Liquor system of the brain. Differential diagnosis of hydrocephalus at different levels of occlusion.
10. Blood supply to the brain. Arterial circle of the big brain.
11. Venous network of the head: diploic and emissary veins. Clinical significance.
12. Venous sinuses of the dura mater: sinuses of the roof and base of the skull.
13. Cranio-cerebral topography. Scheme kronlein brusovo. Practical application.
14. Topographic anatomy of the face. Fascia of the facial part of the head.
15. Topographic anatomy of the face. Nasal cavity: walls of the nasal cavity and the nasal passages. The message of the nasal passages. Blood supply and venous outflow.
16. Topographic anatomy of the face. Paranasal sinuses. Messages with the nasal cavity.
17. Topographic anatomy of the face. The course of the branches of the trigeminal nerve. Areas of innervation.
18. Topographic anatomy of the buccal region. Adipose body of the cheek and its processes. Ways of distribution of purulent processes.
19. Topographic anatomy of the parotid-masticatory region. Blood supply and innervation.
20. Topographic anatomy of the parotid-masticatory region. Parotid gland. Bed and capsule of the parotid salivary gland. Weak points of the capsule. Features of distribution of pus at mumps.
21. Parotid gland. Neurovascular formations, passing in the thickness of the parotid salivary gland.
22. The boundaries and external landmarks of the neck. Triangles of the neck: limits. The main neurovascular bundles of the lateral and medial triangles of the neck.
23. Submandibular triangle of neck: boundaries. Submandibular salivary gland: bed, capsule, its differences from the parotid salivary gland.
24. Carotid triangle: borders, the neurovascular bundle: the relative positions of the components of the neurovascular bundle.
25. Lateral triangle of the neck: the main neurovascular bundle, the relative position of the components in it.
26. Fascias and cellular spaces of the space of the neck: clinical significance, the messages between the individual spaces.
27. Topography of the pharynx: sellotape, syntopia, blood supply, innervation, lymphatic outflow. Concepts of the throat and the ring of pirogov.
28. Topography of the larynx: sellotape, syntopia, blood supply, innervation, lymphatic outflow.
29. Topography of the thyroid gland: sellotape, syntopia, blood supply, innervation, lymphatic outflow.
30. The topography of the parathyroid glands: sellotape, syntopia, blood supply, innervation, lymphatic outflow.

Lesson on
MODULE «PRACTICAL SKILLS»

Goals:

The student needs to know:	The student must be able:	The student must own:
1. Technique of preparation of the main formations of the selected area at each stage. 2. Surgical access to organs and to the main neurovascular bundles. 3. Technique of performing basic surgical interventions at each stage.	1. Inspect and palpate the selected area. 2. To dissect a selected area. 3. Show on the drug and name the main elements, neurovascular bundles and organs of the selected area. 4. Use special surgical instruments for operations in the selected area at each stage 5. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the selected area. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the selected area. 4. Surgical manipulation skills at each stage.

QUESTIONS TO THE MODULE ON PRACTICAL SKILLS

1.Indications for suturing the vessel. Requirements for vessel seam. The technique of vascular suture in the Carrel.
2.The indications and technique of ligation of the vessel throughout.

3.Requirements for the suture of nerve Indications and the technique of primary suture of the nerve.
4.Indications and technique of neurolysis.
5.Classification of the tendon suture by time of application and technique of application. The technique of suture, Cuneo.
6.Indications and technique of puncture of the shoulder joint.
7.Indications and technique of puncture of the elbow joint.
8.Indications and technique of puncture of the wrist joint.
9.Indications and technique of puncture of the hip joint.
10.Indications and technique of puncture of the knee joint.
11.Indications and technique of execution, guillotine amputation of the limb. Treatment of blood vessels and nerves.
12.Indications and technique dvuhmomentnaya amputation of the limb. Treatment of blood vessels and nerves.
13.Indications and technique drehmomente amputation of the limb. Treatment of blood vessels and nerves.
14.Bone-plastic amputation of the foot on Pirogov.
15.The technique of dissection and drainage in a U-shaped phlegmon of the hand.
16.Primary surgical treatment of wounds of soft tissues of the skull.
17.Methods of stopping bleeding in injuries of soft tissues of the skull.
18.Ways to stop bleeding from the bones of the cranial arches.
19.Ways to stop bleeding from the vessels of the Dura of the brain.
20.Plastic wall of the venous sinus by Burdenko.
21.Sources of bleeding in epidural hematomas. Technique of epidural hematoma removal.
22.Sources of bleeding in subdural hematomas. Technique of removal of subdural hematoma.
23.Tactics of treatment for subarachnoid bleeding.
24.Indications and technique of puncture of the anterior horns of the lateral ventricles of the brain.
25.Indications and technique of puncture of the posterior horns of the lateral ventricles of the brain.
26.Indications and technique of performing a decompression craniotomy for Cushing's way.
27.Indications and technique of performing bone-plastic trepanation of the skull by way Olivecrona.
28.Indications and technique of performing bone-plastic craniotomy by the Wagner-wolf method.
29.Indications and technique of trepanation of mastoid process.
30.Features of primary surgical treatment of maxillofacial area.
31.Indications, technique of dissection and drainage of the peritonsillar abscess.
32.Indications, technique of opening and drainage of the abscess of the pharyngeal space.
33.Indications, technique of opening and drainage of abscesses and phlegmon of the parapharyngeal space.
34.Indications and technique of maxillary sinus puncture.
35.Features of opening and drainage of phlegmon of the parotid chewing area.
36.Indications and technique of exposure and ligation of the subclavian artery.
37.Indications and technique of exposure of the common carotid artery and internal jugular vein.
38.Indications and technique of exposure and ligation of the external carotid artery.
39.Indications and technique of exposure and ligation of the lingual artery.
40.opening and drainage of phlegmon of the neck.
41.Indications and technique vagosimpaticescoy blockade by Vishnevsky.
42.Tracheostomy: indications, types, technique and possible complications.
43. Indications and technique of Subtotal subfascial resection of the thyroid gland in Nikolaev.

Topic: Topographic anatomy of the body.Topographic anatomy of the breast: chest wall. Surgical interventions on the chest wall.

Motivational characteristic: To study the topography of the chest wall to justify the choice of surgical access to the organs of the chest cavity. Disassemble the technique of operations on the breast. Get acquainted with the surgical tactics in penetrating and impenetrable wounds of the chest wall, pneumothorax. To justify the mechanism of pleuropulmonary shock. The shape of the chest is in accordance with the shape and position of the chest cavity. Individual differences in the shape of the breast, the direction of the ribs, the width of the intercostal spaces should be taken into account both when choosing surgical approaches and when examining patients.

Chest - the upper part of the trunk, the upper border of which runs along the edge of the jugular notch of the sternum, clavicles and further along the line of the acromioclavicular joints to the top of the spinous process of the VII cervical vertebra.

I. Objectives:

The student should know:	The student should be able to:	Student must own:
1. Topographic anatomy of the chest border, holotape, syntopia, sellotape, layered structure. 2. Topographic lines chest. 3. Topographic anatomy of the regions of the chest. 4. Topographic anatomy of: • - breast - blood supply, innervation, lymph flow, venous outflow. • intercostal space - blood supply, innervation, , venous outflow. 5. The technique of resection of the ribs. 6. Concept, classification of mastitis. 7. The technique of resection of the mammary gland. 8. Mastectomy technique.	1. Define boundaries, external landmarks, and chest areas. 2. To inspect and palpate the breast. 3. To dissect a selected area 4. Define intercostal space 5. Show on drug: • breast – borders in the chest cavity • root of lung – borders, elements • sinuses of the thoracic cavity – borders • mediastinal organs • pericardium – border • coronary vessels 6. Use special surgical instruments for operations on the chest wall, chest cavity organs, mediastinal organs at each stage 7. Perform basic surgical interventions at each stage.	1. Skills of examination and palpation of the breast. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the chest and chest organs. 4. Surgical manipulation skills at each stage.

II. Questions to check the initial level of knowledge:

1. Education used as a guide to determine the boundaries of the breast.
2. Topographic lines.
3. The bony skeleton of the chest.
4. Chest area.
5. Breast.

III. The object of study - human body.

IV. Information part:

The upper border of the breast is a line passing along the upper edge of the sternum handle, the upper edge of the clavicles, to the acromial joints, further to the spinous process of the VII cervical vertebra.

The lower boundary extends from the base of the xiphoid process of the sternum along the edges of the rib arches, the anterior ends of the XI and XII ribs and further along the lower edge of the XII ribs to the spinous process of the XII thoracic vertebra. In the chest distinguish the chest wall and chest cavity.

The lateral border is a conventional line corresponding to the deltoid-thoracic sulcus in front, the medial edge of the deltoid muscle in the back.

On the thoracic wall (anterior and posterior) the following topographic and anatomical areas are distinguished:

•pregrading area or the front middle chest;

•thoracic region, or upper front chest;

•underbelly, or anterior lower breast area;

•the spinal area, back or middle chest;

•shoulder area, or posterior upper chest area;

•the scapular area, or the posterior lower chest area. The last three areas in international anatomical terminology refer to the areas of the back.

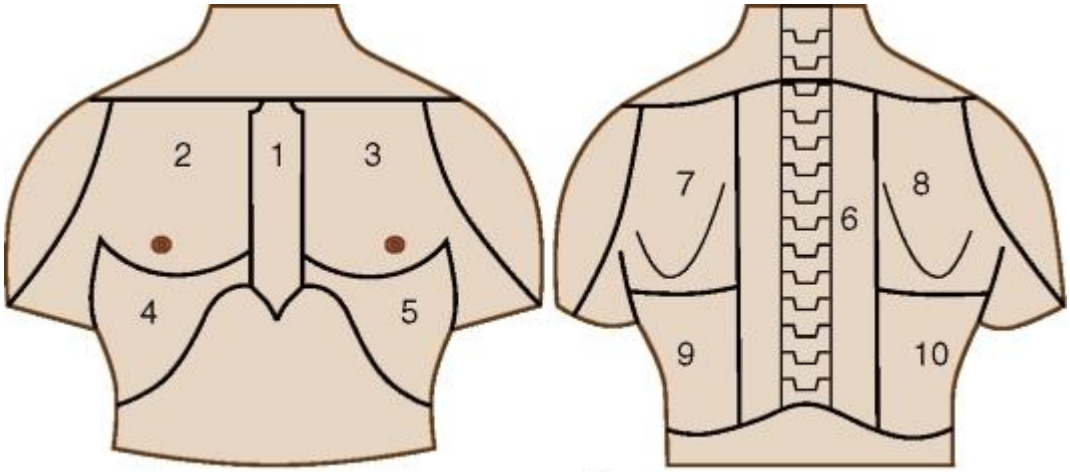
The layered structure of the skin, subcutaneous fat, superficial fascia (superficial leaf) – forms the capsule of the breast (in women), the parenchyma of the mammary gland (in women), superficial fascia (deep leaf), retromammary cellular spaces space (in women), own fascia (surface sheet) – clavicular-pectoral fascia, pectoralis major muscle, superficial cellular spaces subpectoral space, own fascia (deep leaf), pectoralis minor, deep cellular spaces subpectoral space, own fascia of the chest, ribs, intercostal spaces, - SNP, hilar fascia, predelovalne tissue, the parietal leaf of the pleura, pleural cavity, visceral pleura, lungs.

Intercostal space – a portion of the chest wall, filled intercostal muscles, blood and lymph vessels, nerves, lymph nodes.

V. Tasks for independent work:

Task number 1.

Specify what is shown in the picture. Name and specify the breast area. Show the areas on the drug.



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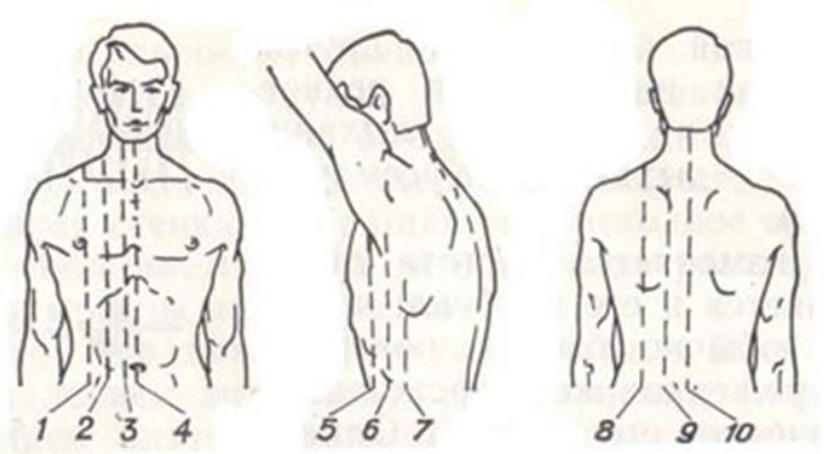
Task number 2.

Specify what is shown in the picture. Name and specify the topographic lines. Show topographical lines on the



preparation.

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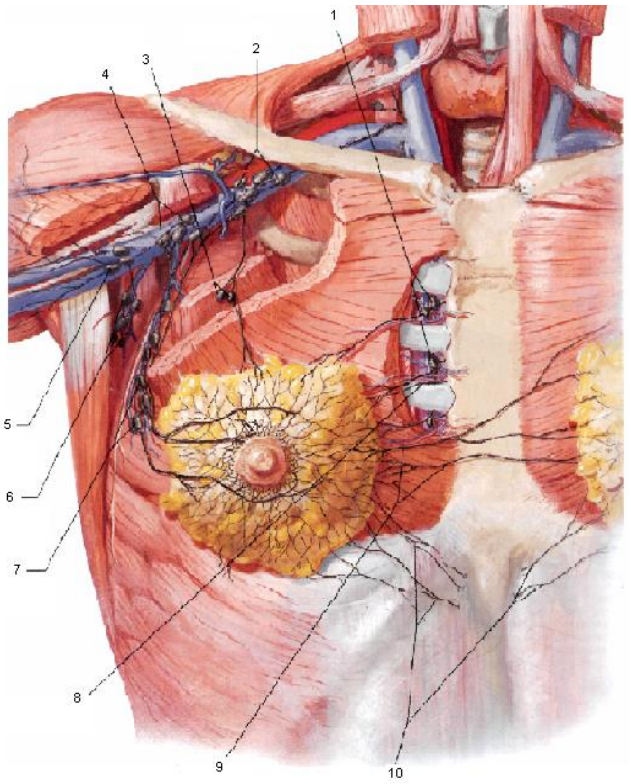
Task number 3.

Describe the technique of radical mastectomy by Halsted - Meyer. Justify the need for the specified volume of surgery?

Task number 4.
Mastitis: give definition, classification. Describe the types of cuts at different locations of the purulent process.

Task number 5.
Specify what is shown in the picture. Name and specify the education.



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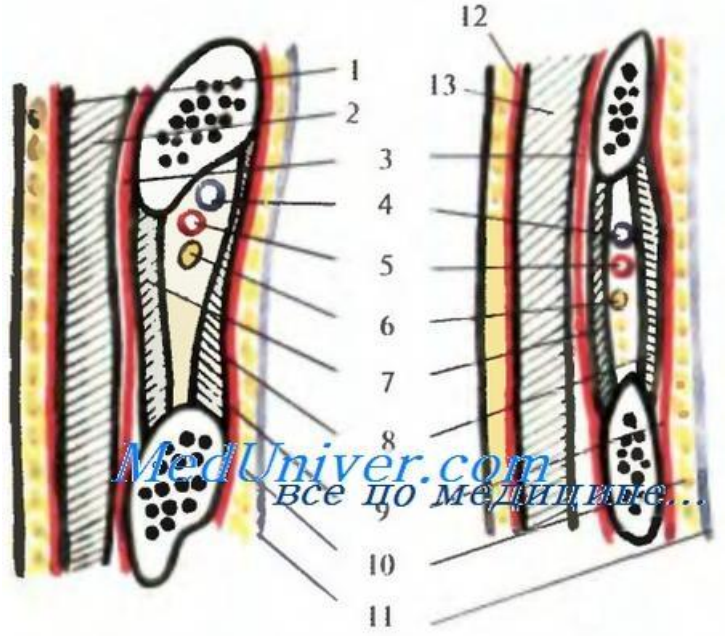
Task number 6.

Specify what is shown in the picture. Name and specify education.



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Task number 7.

Make a task on the topic of the lesson. (In a notebook)

Task number 8.

Make 5 tests on the topic of the lesson. (In a notebook).

VI. Control question:

1. The border of the thorax, indicative of the vertical line, constitutional shape.
2. Topography of the chest wall. Fiber layers, their topography and messages.
3. The structure of intercostal spaces, their contents.
4. The topography of the breast, lymph flow, practical value.
5. Topography of the diaphragm, "weaknesses".
6. Topography of pleura, sinuses, their practical significance.
7. Classification of mastitis. Cuts at mastitis (scheme).
8. General principles of operations in breast tumors. Radical mastectomy.
9. Technique of the puncture of the sternum to capture the bone marrow.
10. Technique of primary surgical treatment of impenetrable and penetrating wounds of the chest wall.

VII. Learning objective.

№1. Patient T., 29 years old, received a blow to the right half of the chest with a blunt object at the level of VII rib. Damage to any anatomical formations and layers of the chest wall was the cause of hemothorax?

(Answer: Hemothorax was caused by damage to intercostal vessels, rupture of the intrathoracic fascia and the costal part of the parietal pleura.)

№2. The ambulance delivered P., 18 years old, with a stab wound VI intercostal space on the anterior axillary line on the right. On the radiograph hemo - and pneumothorax are determined. Damage to any anatomical formations should be suspected in the first place?

(Answer: Hemo - and pneumothorax in patient P., is a consequence of damage to the intercostal vessels and lung.)

№3. Patient S., 19 years old, sick with the flu. On the 3rd day, he had severe pain in the scapular areas (no pathological changes were found in chest x-rays). What are these pains connected with?

(Answer: the Closed nature of the osteo-fibrous lodges for the supra - and infraspinatus muscles when inflammation causes high blood pressure and, as a consequence, compression of nerve endings.)

VIII. Control tests:

When opening an intramammary abscess, the radial incision should not move to the periarticular circle due to: (1)

damage to blood vessels

+ damage to the excretory ducts

deformation of the nipple in the formation of skin scar

Metastasis in breast cancer can occur in different groups of regional lymph nodes under the influence of a number of specific conditions, including tumor localization. Determine the most likely group of lymph nodes, where metastasis may occur when the tumor is localized in the upper part of the breast: (1)

sternal

+ subclavian

axillary

sub-sectoral

When opening an intramammary abscess, an incision is used: (2)

vertical

+ semi-circular under gland

cross

+ radial

The effusion in the pleural cavity, first of all, begins to accumulate in the sinus: (1)

+ costal-diaphragmatic

rib-mediastinal

middle-diaphragmatic

When performing a diagnostic pleural puncture, the following is punctured: (1)

+ costal-diaphragmatic sinus

rib-mediastinal sinus

mid-diaphragmatic sinus

IX. Glossary:

PLEURA	Плевра	pleura
PARIETAL PLEURA	Париетальная плевра	pleura parietalis
THE VISCERAL PLEURA	Висцеральная плевра	pleura visceralis
PLEURAL CAVITY	Плевральная полость	cavitas pleuralis
PULMONARY LIGAMENT	Легочная связка	lig. pulmonale
THE COSTAL PLEURA	Реберная плевра	pleura costalis
MEDIASTINAL PLEURA	Медиастинальная плевра	pleura mediastinalis
DIAPHRAGMATIC PLEURA	Диафрагмальная плевра	pleura diaphragmatica
EASY	Легкие	pulmones
DIAPHRAGMATIC SURFACE	Диафрагмальная поверхность	facies diaphragmatica
RIB SURFACE	Реберная поверхность	facies costalis
MEDIAL SURFACE	Медиальная поверхность	facies mediales
THE TIP OF THE LUNG	Верхушка легкого	apex pulmonalis
THE BASE OF THE LUNG	Основание легкого	basis pulmonalis
FOREFRONT	Передний край	margo anterior
BOTTOM EDGE	Нижний край	margo inferior
CARDIAC IMPRESSION	Сердечное вдавление	impressio cardiaca
GATE EASY	Ворота лёгкого	hilum pulmonis
THE ROOT OF THE LUNG	Корень лёгкого	radix pulmonis
APERTURE	Диафрагма	diaphragma, m. Phrenicus
TENDON CENTER	Сухожильный центр	centrum tendineum
THE MEDIAL ARCUATE LIGAMENT	Медиальная дугообразная связка	lig. arcuatum mediale
HOLE THE INFERIOR VENA CAVA	Отверстие нижней полой вены	foramen venae cavae

Topic: Topographic anatomy of the chest: chest organs. Surgical interventions on the organs of the thoracic cavity.

Motivational characteristic: knowledge of the location of the main neurovascular bundles of the anterior surface of the chest allows to foresee the ways of the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of the ways of metastasis to the lymph nodes will allow timely diagnosis of the localization of malignant tumors of the study area.

The thoracic cavity is the internal space of the breast, limited by the intrathoracic fascia, lining the chest and diaphragm. It contains mediastinum, two pleural cavities, right and left lung.

The bone basis is the chest, formed by the sternum, 12 pairs of ribs and the thoracic spine.

I. IObjectives:

Student should know:	Student should be able to:	Student should own:
1. Topographic anatomy, pleura and pleural cavity. Blood supply, innervation. 2. Topographic anatomy of the lungs. Blood supply, innervation. 3. Topographical anatomy of the roots of the lungs. 4. Thoracotomy. 5. Types of pneumothorax. Treatment of pneumothorax. 6. Surgical treatment of acute and chronic pleural empyema. Thoracoplasty, its types. Thoracoplasty on Shed, indications, technique. 7. Surgical treatment of lung abscess. 8. Principles of pulmonectomy, lobectomy.	1. Perform a puncture of the pleural cavity. 2. Perform a wedge-shaped resection of the lung. 3. To perform the suturing wounds of the lung. 4. Perform basic types of thoracotomy.	1. Skills of examination and palpation of the breast. 2. The method of preparation of the selected area 3. Skills of working with surgical instruments for operations on the chest and chest organs. 4. Surgical manipulation skills at each stage.

II. Questions to check the initial level of knowledge:

1. Anatomy of the pleura.
2. Anatomy of the lungs.
3. Anatomy of the diaphragm.

III. The object of study - the human body.

IV. Information part:

The pleura (pleura) – serous membrane of the lungs. Pleura is divided into parietal (pleura parietalis) and visceral (pulmonary) (pleura visceralis s . pulmonalis) , between which the pleural cavity (cavitas pleuralis) is located.

The parietal pleura lines the walls of the thoracic cavity adjacent to the lung.

The visceral pleura tightly fuses with the lung tissue, covers it from all sides, enters the cracks between the lobes, and in the area of the root of the lung passes into the parietal pleura. Down from the root of the lung, the visceral pleura forms a vertically located pulmonary ligament (lig. pulmonale). From the parietal pleura distinguish the costal, mediastinal and diaphragmatic parts.

- Rib pleura (pleura costalis) covers the inside of the inner surface of the ribs and intercostal spaces and passes into the mediastinal pleura in front near the sternum and behind the spine.
- Mediastinal pleura (pleura mediastinalis) limits side the mediastinum, adherent to the pericardium. In the region of the root of the lung, the mediastinal pleura passes into the visceral pleura. Above the dome of the pleura, at level I ribs, rib and mediastinal pleura pass into each other and form the dome of the pleura.

At the bottom, the costal and mediastinal pleura passes into the diaphragmatic pleura (pleura diaphragmatica), covering the diaphragm from above.

The anterior and posterior borders of the pleura, as well as the dome of the pleura correspond to the borders of the right and left lungs. The lower border of the pleura is 2 – 3 cm (one edge) below the corresponding border of the lung.

The lower limit of the pleura crosses the 7th rib in the midclavicular line, 8th rib at the anterior axillary, 9 – mid-axillary, 10 on the rear axillary, 11 – on the scapular line.

Lungs (pulmones), organs of the respiratory system, located in the pleural cavities, right and left, are located each in its half of the chest cavity. Each lung has the shape of a truncated cone with a base located on the diaphragm.

- ✓ The lung has three surfaces.
- ✓ The diaphragmatic surface (facies diaphragmatica) is concave, facing the diaphragm.
- ✓ Rib surface (facies costalis) convex, adheres to the inner surface of the chest wall.
- ✓ The medial surface (facies medialis) is attached to the mediastinum.

Each lung has a apex (apex pulmonalis), directed upwards, in the region of the supraclavicular fossa, and a base (basis pulmonalis), facing the diaphragm. Have easy distinguish between;

*the cutting edge (margo anterior), which separates the costal surface from the medial surface of the

*the lower edge (margo inferior) separates the rib and medial surfaces from the diaphragmatic.

At the front edge of the lung is a depression – cardiac depression (impressio cardiaca),bounded below the tongue of the lung (lingual pulmonis).

Outside, the lung is covered with visceral (pulmonary) pleura, tightly fused with lung tissue. Through interlobar gaps in which comes in the pleura, the lung is divided into shares (lobipulmonales). The right lung - oblique slit (fissura obliqua) and horizontal slit (fissura horizontalis) is divided into 3 parts: upper (lobus superior), middle (lobus medius) and lower (lobus inferior). The left lung oblique slit (fissura obliqua) is divided into 2 lobes - upper and lower.

On the mediastinal surface there are the gates of the lung (hilus pulmonis), through which the nerves, main bronchi, blood and lymph vessels pass, making up the root of the lung (radix pulmonis). The largest components of each root are the main bronchus, pulmonary artery and two pulmonary veins.

The topography of the lungs.

In practical terms, the most important knowledge of the skeletotopy of the lungs - the boundaries of the lungs.

- The tops of the lungs are 3-4 cm above the I ribs and 2-3 cm above the clavicle. The lower border of the right lung crosses the VI rib along the middle clavicle line, VII rib along the anterior axillary line, VIII rib along the middle axillary line, IX along the posterior axillary line, X along the scapular line, XI along the paravertebral line.
- The lower border of the left lung is 1.0-1.5 cm lower.
- The front boundary of the left lung, given the presence of the heart of the tenderloin, shifting from okolovrusno line at the level of the IV rib to the left midclavicular line, where should be down to VI rib, where it enters the lower border of.

The diaphragm (diaphragm, m. phrenicus-thin and broad muscular and tendinous partition separating the chest and abdominal cavities, is the primary respiratory muscle, its convex side facing up (into the chest cavity), concave in the abdominal cavity, the diaphragmatic muscle bundles located at the periphery, converge toward the center, forming the Central tendon (centrum tendineum). Distinguish lumbar, rib and sternal parts of the diaphragm. The lumbar part begins with the right and left legs on the medial and lateral arched ligaments and on the front surface of the lumbar vertebrae. Medial arcuate ligament (lig. Cory arcuatum) begins on the lateral side of the I lumbar vertebra and attaches to the apex of the transverse process of the II lumbar vertebra. The costal part of the diaphragm is represented by muscle bundles coming from the inner surface of the 6-7 lower ribs and passing upwards into the center of the tendon of the diaphragm.The sternal part of the diaphragm is the narrowest, begins on the back surface of the sternum, and also passes into the tendon center. In the center of the tendon is the opening of the inferior Vena cava (foramen venae cavae).

V. Задания для самостоятельной работы:

Task number 1.

Give the definition of thoracotomy, explain the testimony, name the species.

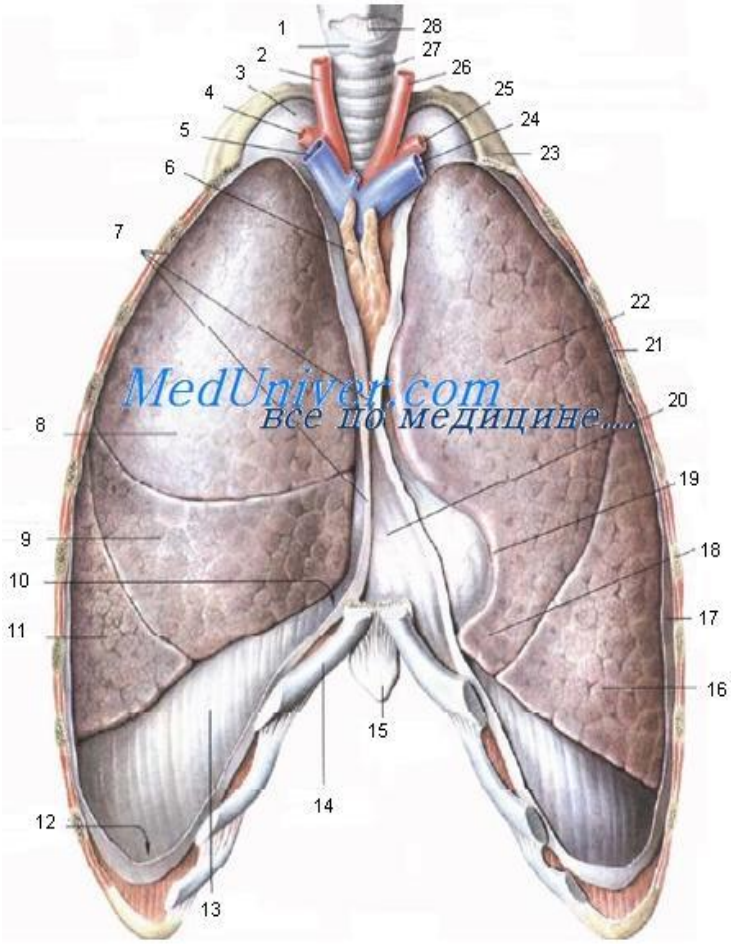
Task number 2.

Give the definition of thoracoplasty, and explain that evidence. Describe the technique of performing thoracoplasty on the Shede.

Task number 3.

Give the definition of pneumothorax, name the species. Specify the stages of first aid. Explain the features of suturing wounds of the chest wall.

Task number 4.
Specify what is shown in the picture. Arrange the symbols.



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Task number 5.

Specify which operation is shown in the picture. Label the stages of the operation. Specify the features of the processing of the components of the root of the lung..

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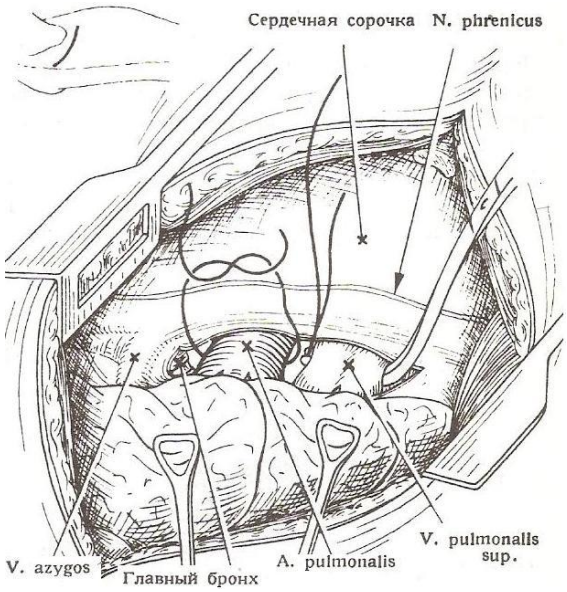

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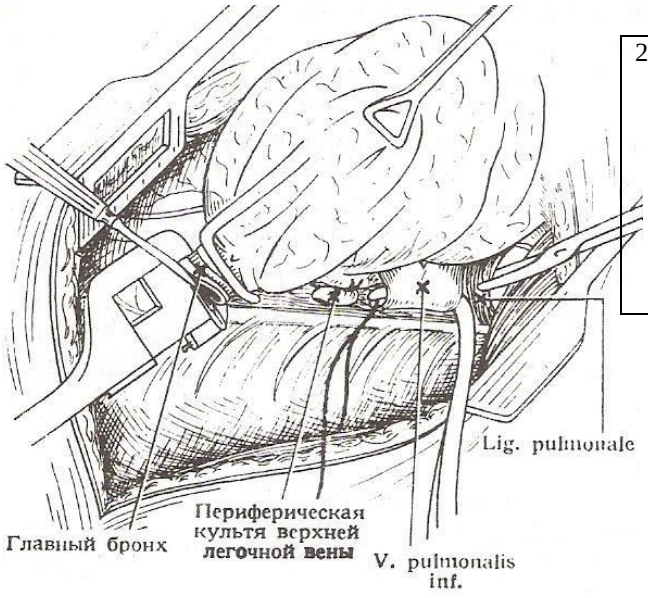

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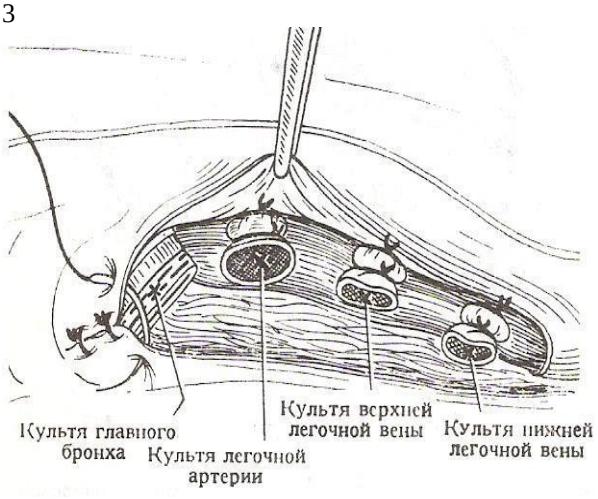

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Task number 6.

Make a task on the topic of the lesson. (In a notebook)

Task number 7.

Make 5 tests on the topic of the lesson. (In a notebook).

VI. Control question:

1. Topographic anatomy, pleura and pleural cavity. Blood supply, innervation.
2. Topographic anatomy of the lungs. Blood supply, innervation.
3. Topographic anatomy of the roots of the lungs.
4. Types of pneumothorax.
5. Treatment of pneumothorax.
6. Surgical treatment of acute and chronic pleural empyema. Thoracoplasty, its types.
7. Thoracoplasty on Shed, indications, technique.
8. Surgical treatment of lung abscess.
9. Principles of pulmonectomy, lobectomy, segmentectomy.

VII. Learning objective.

№1. In patient B., 57 years, after removal of the upper left lung lobe in the pleural cavity, yellowish-milky liquid was found during puncture. What is the reason and what is the name of this complication?

(Answer: the thoracic (lymphatic) duct is Damaged. Chylothorax - the presence in the pleural cavity lymph.)

№2Patient L., 30 years old, penetrating chest wound in the projection of the heart. That a patient could die? What do you mean" dangerous " in the chest?

(Answer: from blood loss and cardiac tamponade. The "dangerous" area of the breast corresponds to the border of relative cardiac dullness-the projection of the heart on the chest wall.)

№3In the clinic appealed patient A., 27 years, complaints of hoarseness. No pathological changes were found in the upper respiratory tract. Chest x-ray was done. Specify what education can be squeezed tumor (or inflammatory infiltrate), followed by a change in the tone of voice?

(Answer: Laryngeal nerve.)

VIII. Control tests:

The effusion in the pleural cavity, first of all, begins to accumulate in the sinus: (1)

+ costal-diaphragmatic
rib-mediastinal
middle-diaphragmatic

In the gate of the left lung, the main bronchus and pulmonary vessels are arranged from top to bottom in the following order: (1)

+ artery, bronchus, veins
bronchus, artery, veins
veins, bronchus, artery

When suturing an open pneumothorax in the first row of seams to capture: (1)

parietal pleura
parietal pleura and intrathoracic fascia
+ parietal pleura, intracranial fascia and intercostal muscles
all of these layers and the superficial muscles
all layers of the chest wall

The Zorgius lymph node is located: (1)

above the clavicle behind the outer edge of the sternocleidomastoid muscle
along the internal thoracic artery
in the center of the armpit
+ under the outer edge of the pectoral muscle at the level of the 3rd rib
under the edge of the broadest back muscle

Intra-abdominal bleeding, as a complication of pleural puncture, may occur as a result of damage to: (2)

apertures
+ livers
+ spleens

IX. Glossary:

LUNG	Легкое	pulmo
PLEURA	Плевра	pleura
THE THORACIC CAVITY	Полость грудная	cavitas pleuralis
STERNUM	Грудина	sternum
BREAST CELL	Клетка грудная	thorax
COLLARBONE	Ключица	clavicula
SCAPULA	Лопатка	scapula
BONE MARROW	Мозг костный	medulla ossium
MUSCLE STRIGHTING SPINE	Мышца, выпрямляющая Позвоночник	musculus erector spinae
MUSCULE CHEST TRANSVERSE	Мышца груди поперечная	m. transversus thoracis

MUSCLE BREAST SMALL	Мышца грудная малая	musculus pectoralis mior
MUSCLE BREASTIC BIG	Мышца грудная большая	musculus pectoralis major
MUSCLE DELTA	Мышца дельтовидная	musculus deltoideus
SCALLOPED MUSCLE BACK TOP	Мышца зубчатая задняя верхняя	vusculus serratus posterior superior
MUSCLE GEAR REAR LOWER	Мышца зубчатая задняя нижняя	musculus serratus posterior superior
THE FRONT SERRATED MUSCLE	Мышца зубчатая передняя	musculus serratus anterior
MUSCLE ROUND BIG	Мышца круглая большая	musculus teres major
MUSCLE ROUND SMALL	Мышца круглая малая	musculus teres minor
MUSCLE SUPRASPINATUS	Мышца надостная	musculus supraspinatus
MUSCLE SUBCLAVIAN		musculus subclavius
THE SUBSCAPULARIS MUSCLE	Мышца подлопаточная	musculus subscapularis
MUSCLE, LEVATOR SCAPULAE	Мышца, поднимающая лопатку	musculus levator scapulae
COSTAL ARCH	Реберная дуга	arcus costanim
JUGULAR NOTCH OF THE STERNUM	Яремная вырезка грудины	incisura jugularis sterni
INTERCOSTAL SPACES	Межреберные промежутки	spatio intercostali

Theme: Topographic Anatomy of the Torso. Topographic anatomy of the breast: mediastinum. Surgery on the organs and vessels of the mediastinum.

Motivational characteristic: The mediastinum (mediastinum) is a complex of internal organs limited by the sternum at the front, the spine at the back, the right and left mediastinal pleura from the sides.

Knowledge of the location of the main neurovascular bundles and organs of the thoracic cavity of the chest cavity will allow one to predict the pathways for the spread of purulent processes and to carry out surgical interventions in a timely manner. Knowledge of ways of metastasis to the lymph nodes will allow timely diagnosis of the localization of malignant tumors of the studied area.

I. Objectives:

Student should know	Student should be able to:	Student must own:
1. Topographic anatomy of the pericardium. 2. Topographic anatomy of the heart. 3. Topographic anatomy of the esophagus, their blood supply and innervation. 4. Topographic anatomy of the thoracic trachea and bronchi. 5. Topographic anatomy of the aorta, unpaired and semi-unpaired veins. 6. Topographic anatomy of the thoracic lymphatic duct. 7. Cellular spaces of the mediastinum	1. Perform puncture of the pericardium. 2. Perform a pericardial dissection. 3. Complete suturing wounds of the heart.	1. Skills of examination and palpation of the breast. 2. Methods of preparation of the selected area 3. Skills of working with surgical instruments for operations on the chest and chest cavity organs. 4. Skills of surgical manipulations at each stage.

II. Questions for the initial level of knowledge:

1.Mediastinum.
2.Anatomy of the heart.
3.Anatomy of the pericardium.
4.Anatomy of the esophagus.
5. Neurovascular formations and tissue spaces of the mediastinum

III. The object of study is the human body.

IV. Information part:

The mediastinum (mediastinum) is a complex of internal organs, bounded by the sternum in front, the spine in the back, the right and left mediastinal pleura from the sides.

The mediastinum is subdivided into the upper (mediastinum superius) and lower (mediastinum inferius) sections, the boundary between which is the horizontal plane connecting the anterior angle of the sternum, and the posterior intervertebral disk between the 4 and 5 thoracic vertebrae.

The lower mediastinum, in turn, is divided into anterior (mediastinum anterius), intermediate (mediastinum medium) and posterior (mediastinum posterius).

In the upper mediastinum are located:- тимус;
- superior vena cava;
- left and right brachiocephalic veins;
- aortic arch and its branches - brachiocephalic trunk, left common carotid artery, left subclavian artery;
- thoracic trachea;
- the upper part of the thoracic esophagus;
- thoracic duct;
- the vagus nerves and partly the trunks of the vagus nerves accompanying the esophagus;
- phrenic nerves;
- an unpaired vein, an additional semi-unpaired vein;
- the upper part of the thoracic sympathetic trunks;
- internal chest and pericardo-phrenic vessels.

In front of the lower mediastinum are connective tissue fiber, internal thoracic arteries and veins, lymph nodes.

The middle part of the lower mediastinum contains:

- pericardium;
- a heart;
- intrapericardial departments of large vessels;
- trachea bifurcation;
- main bronchi;
- pulmonary arteries and veins;
- phrenic nerves;
- diaphragmatic and pericardial vessels;
- Lower tracheobronchial and lateral pericardial lymph nodes.

The back of the lower mediastinum contains:

- part of the esophagus and its accompanying trunks of the vagus nerves;
- Thoracic aorta;
- part of the thoracic duct;
- part of the unpaired vein;
- semi-unpaired vein;
- part of the thoracic sympathetic trunks;
- internal nerves;
- lymph nodes (posterior mediastinal and prevertebral).

The heart (cor) is located in the middle section of the lower mediastinum, between the two lungs. Most of the heart is located to the left of the median plane. The shape of the heart resembles a cone, its lower pointed part - the apex of the heart (apex cordis), as well as its longitudinal axis, is facing down, left and forward. The wide base of the heart (basis cordis) is directed upwards, backwards and to the right. The transverse size of the heart in an adult is 12-15 cm, the longitudinal - 14-16 cm, the mass of the heart is about 250-300 g.

The heart is projected on the anterior chest wall so that its upper border corresponds to the transverse line connecting the upper edge of the right and left third rib cartilage

• The right border of the heart goes down vertically from the upper edge of the third right costal cartilage (1-2 cm to the right of the sternum) to the level V of the right costal cartilage.

• The lower border of the heart goes along the line from the V right costal cartilage to the apex of the heart.

• The left border of the heart is directed from the upper edge of the third left rib (at the level of the middle distance between the left edge of the sternum and the left midclavicular line) and goes down to the apex of the heart.

The right and left atrioventricular openings are projected onto the anterior chest wall along an oblique line extending from the sternal end of the III left costal cartilage to the VI right costal cartilage.

The left atrioventricular opening is determined on this line at the level of attachment of the III costal cartilage to the sternum.

The aortic opening is located behind the left edge of the sternum at the level of the third intercostal space.

The opening of the pulmonary trunk is projected over the attachment of the third left costal cartilage to the sternum.

The heart allocate sterno-costal, diaphragmatic and two pulmonary surfaces. The sternum-costal surface (facies sternocostalis) of the heart, or the anterior surface (facies anterior), more convex, faces the inner surface of the sternum and ribs. The diaphragmatic surface (facies diaphragmatica), or lower surface (facies inferior), is adjacent to the diaphragm, and the paired lung surface (facies pulmonalis), or lateral surface (facies lateralis), faces the corresponding lung. On the surfaces of the heart visible boundaries between its four chambers - the atria and ventricles. The atria on the surface of the heart are separated from the ventricles by the transverse coronary sulcus (sulcus coronarius). This sulcus is better visible on the diaphragmatic (back) surface of the heart. The front of the furrow is interrupted by the pulmonary trunk and the aorta. Above the sulcus on the sterno-costal (anterior) surface are part of the right atrium with its right ear and the left atrial appendage. Most of the left atrium is determined on the diaphragmatic surface of the heart. On the sterno-costal (anterior) surface of the heart from its base to the apex is the anterior interventricular sulcus (sulcus interventricularis anterior), which separates the right ventricle, located to the right of the sulcus, from the left ventricle of the heart. On the diaphragmatic surface of the heart, the posterior interventricular sulcus (sulcus interventricularis posterior) is visible, which connects at the apex of the heart with the anterior interventricular sulcus by cutting the apex (incisura apicis cordis).

The heart has four chambers: the right and left atria, the right and left ventricles. The atria receives blood from the upper and lower hollow and pulmonary veins, as well as from the coronary sinus of the heart. The contraction of the ventricles directs blood to the arteries. From the left ventricle, arterial blood flows into the aorta and along its branches to the organs and tissues. From the right ventricle, venous blood enters the pulmonary trunk, then into the pulmonary arteries. The right and left halves of the heart do not communicate with each other. The right atrium through the right atrioventricular opening communicates with the right ventricle, and the left at the left through the left atrioventricular opening.

The pericardium, or pericardium, has the shape of a closed sac surrounding the heart, the initial parts of the aorta, the pulmonary trunk, and the terminal part of the hollow veins.

The pericardium grows down below with the tendon center of the diaphragm, on the sides - with the mediastinal pleura, in front - with the sternum and costal cartilage. Behind the pericardium is adjacent to the esophagus, the thoracic aorta, to the unpaired and semi-unpaired veins. At the pericardium, fibrous (outer) and serous (inner) layers are distinguished. The fibrous pericardium (pericardium fibrosum) at the base of the heart is fused with the adventitia of large vessels (aorta, pulmonary trunk, hollow and pulmonary veins). The serous pericardium (pericardium serosum) is represented by two plates of the parietal and visceral, forming a pericardial cavity, containing moisture, facilitating the movement of the heart. A parietal plate (lamina parietalis) lines the inside of the fibrous pericardium. Visceral plate (lamina visceralis) serves as the outer membrane of the heart and is called the epicardium. Parietal and visceral plates pass into each other in the region of the base of the heart, where the fibrous pericardium grows together with the adventitia of large vessels.

The esophagus (oesophagus) - is a direct continuation of the pharynx, has the shape of a tube, 25-30 cm long, flattened from front to back, designed to move food and fluid from the pharynx to the stomach.

It begins in the neck at the level of the VII cervical vertebra and ends at the level of the XI thoracic vertebra. In connection with the position in the body in the esophagus are distinguished:

- neck, (pars cervicalis), equal to the height of the body VII of the cervical vertebra;
- 2 breast part, (pars thoracica), passing through the entire chest cavity;
- abdominal part, (pars abdominalis), the shortest, having a length of 1-1.5 cm.

The lumen of the esophagus has three anatomical narrowing: pharyngeal, bronchial and diaphragmatic. Pharyngeal narrowing (pharyngeal-esophageal narrowing, (constrictio pharyngooesophagealis) is at the very beginning of the esophagus at the level of the cricoid cartilage of the larynx, which is projected between the VI and VII cervical vertebrae. Bronchial constriction is formed at the intersection of the esophagus with the left main bronchus, projected between the IV and V thoracic vertebrae. Diaphragmatic narrowing corresponds to the area of the esophageal aperture of the diaphragm, which is located at the level of X-XI thoracic vertebrae.

V. Tasks for independent work:

Task number 1.

Give a classification of the wounds of the heart. Describe the accesses and techniques for performing wound repair.

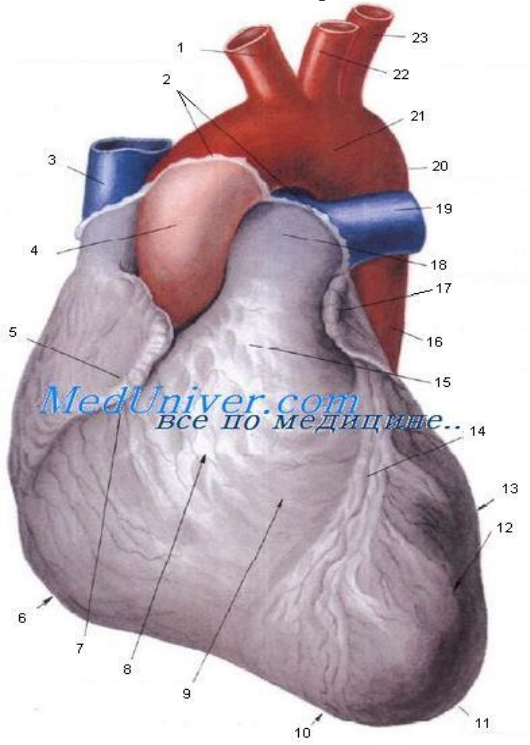
Task number 2.

Describe the indications and technique of performing the pericardial puncture according to Larrey:

Task number 3.

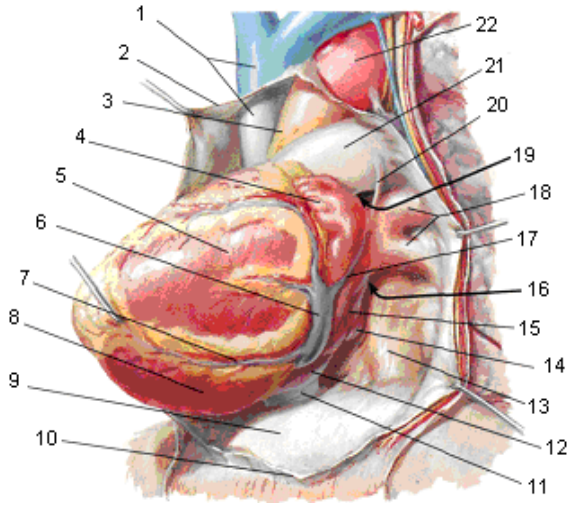
Specify the types of mediastinitis. Describe the indications and technique of surgical treatment.

Task number 4.
Indicate what is shown in the picture. Please indicate compliance:



truncus brachiocephalicus -	sulcus interventricularis anterior--
v. Cava superior -	conus arteriosus -
pars ascendens aortae -	pars descendens aortae -
uricular dextra -	truncus pulmonalis -
margo dexter -	a. pulmonalis dextra -
sulcus uricular	uricular sinistra -
facies sternocostales (anterior)-	isthmus aortae -
ventriculus dexter -	facies pulmonalis -
incisura uricu cordis -	arcus aortae -
apex cprdis -	a. carotis communis sinistra -
ventriculus sinister -	a. subclavia sinistra -
the transition point of the pericardium in the epicardium -	

Task number 5.
Indicate what is shown in the picture. Indicate the notation.



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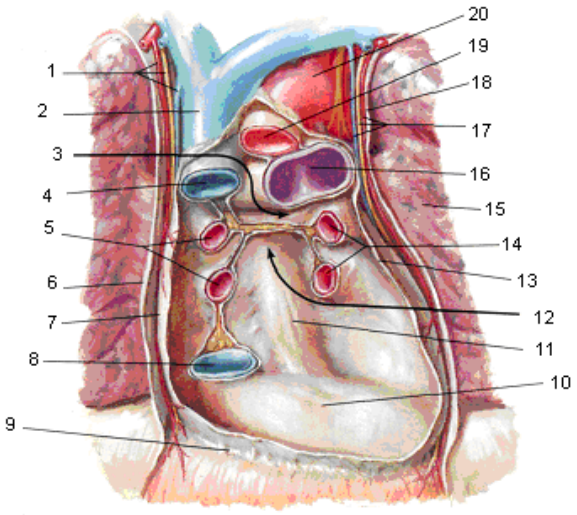

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Task number 7.

Make a task on the topic of the lesson. (In a notebook)

Task number 8.

Make 5 tests on the topic of the lesson. (In a notebook)

VI. Test questions:

1. Topographic anatomy of the pericardium.
2. Topographic anatomy of the heart.
3. Topographic anatomy of the esophagus, their blood supply and innervation.
4. Topographic anatomy of the thoracic trachea and bronchi.
5. Topographic anatomy of the aorta, unpaired and semi-unpaired veins.
6. Topographic anatomy of the thoracic lymphatic duct.
7. Cellular spaces of the mediastinum.

VII Learning Objectives:

№1. Patient B., 40 years old, hydropericardium. In which sinus of the pericardium does the pathological fluid accumulate when the patient is standing on his back? How is this sinus limited in front, behind, below and to the right, left and above?

(Answer: In the oblique sinus of the pericardium. In front it is bounded by the posterior wall of the left atrium, behind by the posterior wall of the pericardium, below and to the right by the inferior vena cava and the mouth sections of the right pulmonary veins, above and to the left by the mouth sections of the left pulmonary veins :)

№2. In an elderly patient, cerebral blood flow is ischemic. Occlusion of which branches of the aortic arch can this patient have?

(Answer: Shoulder head, left common carotid artery, left subclavian artery.)

Number 3. What pericardial sinus is used to put a turnstile on the ascending part of the aorta and the pulmonary trunk during a heart operation? What is this limited sinus is limited to the front and top, back, bottom?

(Answer: Through the transverse sinus of the pericardium; in front and above it is limited to the ascending part of the aorta and the pulmonary trunk; behind it, the posterior wall of the pericardium and the right pulmonary artery; from below, the groove between the left ventricle and the atria.)

VIII. Control tests:

Of the four heart chambers involved in the formation of its front surface, the main one is: (1)

left atrium
left ventricle
right atrium
+ right ventricle

The coronary sinus of the heart is located in: (1)

anterior interventricular groove
+ posterior interventricular sulcus
left coronary sulcus
right coronary sulcus
posterior part of the left coronary sulcus

The coronary sinus of the heart flows into: (1)

superior vena cava
inferior vena cava
+ right atrium
left atrium

In the gate of the left lung, the main bronchus and pulmonary vessels are arranged from top to bottom in the following order: (1)

+ artery, bronchus, veins
bronchus, artery, veins
veins, bronchus, artery

In the gate of the right lung, the main bronchus and pulmonary vessels are arranged from top to bottom in the following order: (1)

artery, bronchus, veins
+ bronchus, artery, veins
veins, bronchus, artery

Ix. Glossary:

MEDIASTINUM	Средостение	mediastinum
BREAST-SURFACE	Грудино-реберная поверхность	facies sternocostalis
DIAPHRAGM SURFACE	Диафрагмальная поверхность	facies diaphragmatica
PULMONARY SURFACE	Легочная поверхность	facies pulmonalis
CORONARY SULCUS	Венечная борозда	sulcus coronarius
ANTERIOR INTERVENTRICULAR SULCUS	Передняя межжелудочковая борозда	sulcus interventricularis anterior
REAR INTERVENTRICULAR SULCUS	Задняя межжелудочковая борозда	sulcus interventricularis posterior
CUTTING THE APEX OF THE HEART	Вырезка верхушки сердца	incisura apicis cordis
PERICARDIUM	Перикард	pericardium

FIBROUS PERICARDIUM	Фиброзный перикард	pericardium fibrosum
SERIOUS PERIKARDIUM	Серозный перикард	pericardium serosum
PARIETAL PLATE	Париетальная пластинка	lamina parietalis
PARIETAL PLATE	Висцеральная пластинка	lamina visceralis
ESOPHAGUS	Пищевод	oesophagus
NECK PART	Шейная часть	pars cervicalis
BREAST PART	Грудная часть	pars thoracica
ABDOMEN PART	Брюшная часть	pars abdominalis
FARINGEALNY CONSTRICTION (PHARYNGEAL-ESOPHAGEAL NARROWING)	Фарингеальное сужение (глоточно-пищеводное сужение)	constrictio pharyngooesophagealis
BRONCHIAL CONSTRICTION CONSTRICTION OF THORACIC PART	Бронхиальное сужение сужение грудной части	constrictio partis thoracicae
DIAPHRAGMATIC CONTRACTION	Диафрагмальное сужение	constrictio phrenica

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