

**MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION OF
UZBEKISTAN
BUKHARA STATE MEDICAL INSTITUTE
NAMED AFTER ABU ALI IBN SINO
DEPARTMENT OF ANATOMY**



"APPROVED"

**by Vice-Rector for Academic and educational
work, Associate prof. G.J.Jarilkasinova**

_____ 2020

Area of knowledge: 500000 - Health and social care
Education field: 510000 - Healthcare
Educational direction: 5510100 - Medical business
5111000 - Professional education (5510100 - Medicine business)
5510200 - Pediatric Medicine
5510300 - Medico-prophylactic business
5510400 – Dentistry (by directions)
5510900 – Medico-biological business

**EDUCATIONAL - METHODOICAL COMPLEX
ON
GROSS ANATOMY FOR II COURSE**



Bukhara 2020

The scientific program was approved by the Resolution of the Coordination Council No. ____ of August ____, 2020 on the activities of educational and methodological associations in the areas of higher and secondary special and vocational education.

The teaching and methodical complex was developed by order of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan dated March 1, 2017 No. 107.

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The working educational program for anatomy is compiled on the basis of working educational curriculum and educational program for the areas of 5510100 - Medical business.

This is discussed and approved at the department

Protocol № _____ of " ____ " _____ 2020

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Chairman of the council, PhD D.Ya.Khodjiev _____

The working educational program for anatomy is compiled on the basis of working educational curriculum and educational program in directions of 5510100 – Medicine

This is discussed and approved by the scientific-methodological Council of BSMI

Protocol № _____ of " ____ " _____ 2020

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Annotation

Educational - methodical complex on Gross anatomy for II course starts in the fall semester of the academic year for the second year students of general medicine and dentistry.

Topographic anatomy is a section of human anatomy, which studies layering structure of anatomical regions, their interposition (syntopy), projection on the skin (golotopy), relation to the skeleton (skeletopy), blood supply, innervation and lymph flow in normal and pathological conditions, taking into account the age, sex and constitutional peculiarities of the organism.

The course has practical significance for medicine students and is the theoretical basis for surgery.

Course program:

1. Introduction to topographic anatomy
2. Topographic anatomy of anterior abdominal wall
3. Basics of intestinal suturing
4. Topographic anatomy of pelvis
5. Topographic anatomy of thoracic wall and thorax organs
6. Topographic anatomy of neck
7. Topographic anatomy of brain

I. The relevance of the academic discipline and its place in higher professional education

One of the main objectives of the National Program for the Training of Personnel in Medicine is the education of a fully developed, highly spiritual person; in the development of his scientific worldview a huge role is played by the subject of human anatomy. This subject studies the structure, shape, arrangement of organs in connection with the change and influence of external factors; it studies not only the structure of man, but also their phylogenetic origin, the variation of each organ depending on age, as well as anthropogenesis, individual and sex differences, organ structure in connection with their function, as well as the topographic interaction between them.

According to the Bologna process, the educational process is conducted according to the modular system. Depending on this, the anatomy program on the basis of structures studies anatomical experiments and the structure of the human body and its organs in a normal state.

II. Goals and objectives of the academic science

The purpose of studying the subject is to study the development of the human body, systems and their parts, the structure and their names according to the international anatomical nomenclature, as well as phylogenetic development, explain the structure of organs and systems on models and schemes.

Objectives of the subject:

- the construction of the human body, their systems, organs and tissues, the structure of man, depending on age.

- the basis of the structure of a person in connection with their function.

- ontogenetic and phylogenetic development of organs, knowledge of frequent anomalies.

- knowledge that every organ is an integral part of the body.

The construction of each organ is connected with the function that they perform.

Anthropological changes in the structure of certain organs as a result of labor activity.

- individual changes in the body, depending on age and external factors.

- the contribution of Russian scientists to the history of the development of anatomy.

- cognition and application of organ topography in the study of anatomy.

- development of basic morphological studies.

Requirements for knowledge, skills and qualifications of students:

As a result of the development of Anatomy, a bachelor must know:

- value of bones, muscles, joints, internal organs, blood vessels, central and peripheral nervous system and sense organs.

- basic patterns of growth, development and formation of the organism.

- Anatomy serves as a basis for the assimilation of clinical subjects.

- the construction of the human body, depending on the composite systems of organs and tissues, as well as the age structure of the organism.

- the structure of organs is closely related to their function.

- every organ in the body system, knowledge of the whole organism.

- individual changes in the body, depending on age and external factors.

- the contribution of Russian scientists to the history of the development of anatomy.

- application of the topography of organs in the study of anatomy.

In order to know topography and sintopia, a bachelor must master the following skills:

- to find and show the spinous procession of the cervical vertebra, to be able to count the ribs, to know the bones of the upper limbs, their processes, the surfaces, the edges, the bones of the hand, the characteristics of each bone, the bones of the lower limb, the bones of the foot, the large and small pelvis, sex differences, , the eyeball, the surface and edges of the bones of the skull.

- be able to show the movements of each joint.

- be able to show the movements of muscles that occur during their contraction.
- be able to show the location of organs in models and schemes and call them according to the international anatomical nomenclature.
- be able to find various blood vessels on the models and call them according to the international anatomical nomenclature.
- to be able to find and show various nerves on models and tables, call them by international anatomical nomenclature.
- to be able to find and show the senses and call them according to the international anatomical nomenclature.

The connection of anatomy with other objects and their continuity:

Anatomy, being the fundamental basis of medical science, is studied at 1, 2, 3, semesters. For the implementation of the curriculum, mathematical and natural-scientific knowledge is required (medical biology and genetics, histology, cytology and embryology, biophysics, normal physiology, bioorganic and bioorganic chemistry).

Modern pedagogical technologies in the study of the subject:

To assimilate the human anatomy, students should use modern information and pedagogical technologies. At assimilation of an object use teaching aids, lecture, distributing, electronic materials. Pedagogical technologies are used in lecture and practical exercises: (visual, problematic, author's lectures, two side analysis, insert, cluster, "Venn diagram", syncvein, assisment) and others.

Place in the health system:

Anatomy plays an important role in forming the basis of medical knowledge of a general practitioner. Human anatomy together with other objects allows us to present a complete and complete picture, provides clinical thinking.

№	Type of classes	Hours	Semester
1	Lectures	10	III
2	Practical	108	III
3	Individual active work	116	III
4	Monitoring (control)	c/c, i/c, f/c – oral, written, test	

**Calendar-thematic plan for lecture classes
for students 2 course**

III SEMESTER

№	Theme	Hours
1	Introduction. The object and purpose of topographic anatomy. Methods of study of the topographycal anatomy. Basic concepts of topographic anatomy. General principles of transplantation of organs and tissues.	2
2	Surgical anatomy of the great vessels upper and lower extremities. Surgical anatomy of the nerve trunks of the upper and lower limbs.	2
3	Surgical anatomy of fascia and cellular spaces with the proliferation of purulent processes.	2
4	Topographic anatomy of the head, neck and chest.	2

5	Topographic anatomy of the anterolateral abdominal wall. Topographic anatomy of the abdomen.	2
	TOTAL	10

The content of the lecture materials

Topic 1. Introduction. The object and purpose of topographic anatomy. Methods of study of topographic anatomy. Basic concepts of topographic anatomy. General principles of transplantation of organs and tissues.

The subject of topographical anatomy and tasks. Topographic anatomy and applied science which studies the relative position of organs and tissues of different areas and body. Projection and back sight anatomy is part of the topographic anatomy.

Basic concepts of topographic anatomy: the area and its boundaries, external and internal orientation, the projection on the skin organ, fascial sheath, the collateral circulation.

Value Research founder of topographical anatomy - Pirogov. Contribution to the development of topographic anatomy of the subject of domestic. Teaching V.N. Shevkunenko extreme forms of variability and age characteristics of the structure and topography of the organs and systems of the human body.

Literature:

About the (main) -1,2,3,5,6,7

D (optional) -8,9,14,16,23.

Theme 2. Topographic anatomy of the main vessels of the upper and lower limbs. Operations. Surgical anatomy of nerve trunks limbs.

External landmarks, border projections. The fascia, fascial receptacle and intermuscular intervals, cellular spaces. Pirogov Doctrine of the vagina and vascular structure of the upper and lower limbs. Pathways of pus. The system of superficial and deep veins, their attitude to the fascia. Collateral circulation. Ways of development of collaterals. Superficial and deep lymph nodes, vascular system.

Literature:

About the (main) -1,3,5,

D (optional) -1,2,7.

Theme 3. Surgical anatomy of fascia and cellular spaces with the proliferation of septic processes

Technology and basic principles of primary surgical treatment of wounds of the upper and lower limbs. Operations in purulent lesions of the soft tissues. Cuts in phlegmon of the shoulder girdle, shoulder, hip, foot and topographic-anatomic substantiation. Topographic-anatomic substantiation of cuts with phlegmon and panaritiums brush.

Literature:

About the (main) -1,3,5,6,7

D (optional) -8,9,11,16,23.

Theme 4. Head. Neck. Chest. Surgical anatomy of the head, neck, chest and thorax. Individual and age differences shapes the breast and the chest cavity. Breast. Malformations of breast development. Incisions with purulent mastitis and retromammary cellulitis. Surgical anatomy of the diaphragm. Surgical anatomy of the chest cavity. Pleural cavity, pleural sinuses. Surgical anatomy of the anterior mediastinum organs. The practical significance of cellular spaces of the anterior mediastinum. Surgical anatomy of the posterior mediastinum organs. The role and importance of the posterior mediastinum spaces. Thoracic duct, thoracic sympathetic trunk department.

Literature:

About the (main) -1,2,3,5,6,7

D (optional) -8,13,14,16,21,23.

Theme 5. Topographic anatomy of the anterolateral abdominal wall.

Conditional division on the field. Individual differences and age structure of the abdominal wall. Projection of the abdominal cavity on the front - side of the abdomen wall adult stomach, duodenum, liver, gall bladder, spleen, pancreas, small intestine and colon, appendix. The structure of the anterior - lateral wall of the abdomen in its medial and lateral sections. Weak spots. The structure of the white line of the abdomen and the umbilical ring. The slots in the aponeurosis of the external oblique abdominal muscles. "Amyous areas" internal oblique abdominal muscles. Inguinal canal in males and females. Inguinal period. Intra-abdominal fascia. Preperitoneal tissue and its role in the formation of hernias anterior - lateral abdominal wall. Surgical anatomy of the oblique, straight, sliding and congenital inguinal hernias. The topography of the scrotum due to the surgical anatomy of the hernia. The topography of the inner surface of the anterior abdominal wall. Femoral hernias. The division of the abdominal cavity on the "floor." Topographical overview of the peritoneum and its derivatives (ligament, pockets, bags, wrinkles, side channels, small and big omentum, mesenteric sinuses).

Literature:

About the (main) -1,3,4,5,7

D (optional) - 8,9,12,16,21,23

Calendar-thematic plan of practical classes

№	Theme	Hours
1	Introduction. Basic concepts of topographic anatomy. Topographic anatomy of the main vessels of the upper limb. General characteristics. Topography of the scapular region. Topography of the axillary region.	4
2	Topography of the deltoid region. Topography of the subclavian region.	2
3	Topography of the anterior and posterior regions of the arm.	4
4	Topography of the elbow region. Topography of the anterior cubital region. Topography of the posterior cubital region.	2
5	Topography of the anterior and posterior regions of the forearm.	4
6	Topography of the palmar region of the hand. Topography of the dorsal region of the hand.	2
7	Topography of the wrist. Topography of the fingers. Grooves, canals and fatty tissue of these regions.	4
8	Topographic anatomy of the main vessels of the lower limb. General characteristics. Clinical anatomy of the gluteal region. Topography of the hip joint.	2
9	Topography of the anterior and posterior femoral regions.	4
10	Topography of the anterior region of the knee. Topography of the popliteal region. Popliteal fossa.	2
11	Topography of the anterior region of the leg. Topography of the posterior region of the leg. Canalis cruropopliteus.	4

12	Topography of the plantar region of the foot. Topography of the dorasal region of the foot.	2
13	Topographic anatomy of the head. Fronto-parieto-occipital region. Particular qualities of blood flow. Particular qualities of venous outflow.	4
14	Temporal region. Mastoid region.	2
15	Meninges of the brain. The symptoms of an intracranial hematoma.	4
16	Side area of face. The facial branches.	2
17	Parotid-masticatory area. The facial nerve.	4
18	The deep area of the face. Temporopterygoid and interpterygoid spaces.	2
19	Topographical anatomy of the neck. Triangles of the neck.	4
20	Fascias of the neck. Spaces of the neck.	2
21	Sternocleidomastoid region. The lateral triangle of the neck.	4
22	Organs of the neck. Thyroid gland. Parathyroid glands (gl. parathyreoideae).	2
23	Topography of the larynx, trachea, pharynx and the cervical esophagus.	4
24	Topography of the thorax and the chest wall. Infraclavicular segment.	2
25	Thoracic area (regio mammaria). Blood supply of the mammary gland. Breast innervation.	4
26	Thoracic cavity. Pleura. Lungs (pulmones). Surgical anatomy of the root of lung.	2
27	Interpleural space (mediastinum). Organs of mediastinum superius. Thymus. Brachiocephalic veins. Superior vena cava. Aorta.	4
28	Pericardium. Surgical anatomy of the heart.	2
29	Esophagus. Thoracic duct. Azygos and hemiazygos veins. Thoracic section of sympathetic trunk. The thoracic part of aorta.	4
30	Anterolateral abdominal wall. Abdominal hernia.	2
31	Peritoneum and its derivaties. Topographic anatomy of the lower floor.	4
32	Topographic anatomy of the upper floor of the abdominal cavity.	2
33	Topographic anatomy of the lumbar region (regio lumbalis).	4
34	Topographic anatomy of the retroperitoneal space. Fasciae and fatty layers of the retroperitoneal space.	2
35	Topographic anatomy of the pelvis.	4
36	Topography of the perineum. Topography of the male and female perineum.	2

TOTAL	108
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5.2. Topics of practical training

III-semester

Topic 1. Introduction. Basic concepts of topographic anatomy. Topographic anatomy of the main vessels of the upper limb. General characteristics. Topography of the scapular region. Topography of the axillary region.

Literature:

O (main) - 1,2.

D (additional)-1,2,8,11,13,16

Topic 2. Topography of the deltoid region. Topography of the subclavian region. Landmarks, borders, layers. Shoulder girdle (scapular, deltoid, subclavian and axillary area), shoulder (front and back area), shoulder joint

Literature:

O (main)-1.2

D (additional)-1,4. 8,12,13,16

Topic 3. Topography of the anterior and posterior regions of the arm. Farthest, posterior area of the forearm. Literature:

O (main)-1.2

D (additional)-1,4. 8,12,13,16

Topic 4. Topography of the elbow region. Topography of the anterior cubital region. Topography of the posterior cubital region. Topographic anatomy of the elbow area (front, back, ulnar joint)

Literature:

O (main)-1.2

D (additional)-4,9,12,14,16.

Topic 5. Topography of the anterior and posterior regions of the forearm.

Literature:

O (main)-1.2

D (additional)-4,9,12,14,16.

Topic 6. Topography of the palmar region of the hand. Topography of the dorsal region of the hand. Joints of the hand.

Literature:

O (main)-1.2

D (additional)-4,9,12,14,16.

Topic 7. Topography of the wrist. Topography of the fingers. Grooves, canals and fatty tissue of these regions.

Literature:

O (main)-1.2

D (additional)-1,2,4,12,16.

Topic 8. Topographic anatomy of the main vessels of the lower limb. General characteristics. Clinical anatomy of the gluteal region. Topography of the hip joint.

Literature:

O (main)-1.2

D (additional)-1,2,4,12,16.

Topic 9. Topography of the anterior and posterior femoral regions.

Literature:

O (main)-1.2,

D (additional)-4,7,9,12,14,16

Topic 10. Topography of the anterior region of the knee. Topography of the popliteal region. Popliteal fossa.

Literature:

O (main)-1.2,

D (additional)-4,6,9,12,16

Topic 11. Topography of the anterior region of the leg. Topography of the posterior region of the leg. Canalis cruropopliteus. Borders, layers, muscles and neurovascular bundles

Literature:

O (main)-1.2,

D (additional)-4,6,9,12,16

Topic 12. Topography of the plantar region of the foot. Topography of the dorso-lateral region of the foot. Borders, layers, muscles and neurovascular bundles

Literature:

O (main)-1.2,

D (additional)-4,6,9,12,16

Topic 13. Topographic anatomy of the head. Fronto-parieto-occipital region. Particular qualities of blood flow. Particular qualities of venous outflow. Borders, layered structure, blood supply, innervation.

Literature

O (main)-1.2,

D (additional)-1,2,6,9,12,14,16

Topic 14. Temporal region. Mastoid region. Borders, layered structure, blood supply, innervation.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,14,16

Topic 15. Meninges of the brain. The symptoms of an intracranial hematoma. Ways to stop bleeding when the soft tissues of the arch, bones, middle sheath artery, venous sinuses, and brain vessels are damaged.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,14,16

Topic 16. Side area of face. The facial branches.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,14,16

Topic 17. Parotid-masticatory area. The facial nerve. Parotid-chewing area. Topography of the trigeminal and facial nerves.

Literature:

O (main)-1.2

D (additional)-2,9,12,14,15,16.

Topic 18. The deep area of the face. Temporopterygoid and interpterygoid spaces.

Literature:

O (main)-1.2

D (additional)-2,9,12,14,15,16.

Topic 19. Topographical anatomy of the neck. Triangles of the neck.

Literature:

O (main)-1.2,

D (additional)-2,9,12,14,15,16.

Topic 20. Fascias of the neck. Spaces of the neck.

Literature:

O (main)-1.2,

D (additional)-1,2,6,9,12,16.

Topic 21. Sternocleidomastoid region. The lateral triangle of the neck.

Literature:

O (main)-1.2,

D (additional)-1,2,6,9,12,16.

Topic 22. Organs of the neck. Thyroid gland. Parathyroid glands (gl. parathyroideae). Deep interstitial space, topography of the stair-vertebral triangle of the cervical part of the thoracic lymphatic duct.

Literature:

O (main)-1.2,

D (additional)-1,2,6,9,12,16.

Topic 23. Topography of the larynx, trachea, pharynx and the cervical esophagus.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,16

Topic 24. Topography of the thorax and the chest wall. Infraclavicular segment.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,16

Topic 25. Thoracic area (regio mammaria). Blood supply of the mammary gland. Breast innervation. Topography of the intercostal space. The main ways of lymph outflow from the breast. Topography of the internal thoracic artery, diaphragm.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,16

Topic 26. Thoracic cavity. Pleura. Lungs (pulmones). Surgical anatomy of the root of lung. Borders, layered structure, cellular spaces.

Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

Topic 27. Interpleural space (mediastinum). Organs of mediastinum superius. Thymus. Brachiocephalic veins. Superior vena cava. Aorta. Practical significance of mediastinal cell spaces. Practical significance of cellular spaces of the anterior mediastinum.

Literature:

O (main)-1.2

D (additional)-1,2,6,9,12,16

Topic 28. Pericardium. Surgical anatomy of the heart. The borders of the heart

Venous drainage

Literature:

O (main)-1.2

D (additional)- 2,6,7,12,14,16.

Topic 29. Esophagus. Thoracic duct. Azygos and hemiazygos veins. Thoracic section of sympathetic trunk. The thoracic part of aorta. Thoracic duct (ductus thoracicus)

Literature:

O (main)-1.2

D (additional)- 2,6,7,12,14,16.

Topic 30. Anterolateral abdominal wall. Abdominal hernia. Borders, layers, muscles and neurovascular bundles

Literature:

O (main)-1.2

D (additional)- 1,2,10,12,15,16

Topic 31. Peritoneum and its derivatives. Topographic anatomy of the lower floor.

Literature:

O (main)-1.2

D (additional)- 2,6,7,12,14,16.

Topic 32. Topographic anatomy of the upper floor of the abdominal cavity.

Topography of the liver and biliary tract. Topography of the stomach and duodenum. Topography of the pancreas and spleen.

Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

Topic 33. Topographic anatomy of the lumbar region (regio lumbalis). Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

Topic 34. Topographic anatomy of the retroperitoneal space. Fasciae and fatty layers of the retroperitoneal space.

Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

Topic 35. Topographic anatomy of the pelvis. Urethra. The topography of the female pelvis. Rectum. Uterus. Urethra

Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

Topic 36. Topography of the perineum. Topography of the male and female perineum. Borders: Urogenital diaphragm Pelvic diaphragm Anal triangle

Literature:

O (main)-1.2

D (additional)-7,12,13,15,16,

7. The essence of independent work.

To learn independent work, the student must know:

- through a series of sections and topics, use of teaching AIDS;
- * assimilation of lecture material using handouts ;
- * working with automated and monitoring systems;
- * work on specialized literature and topics on the subject;
- * study of new technology, equipment, and processes;
- * in-depth study of the student's educational and research work related to the sections and topics of the subject;

- training session with the use of active and problem teaching methods;
- distance learning.

Indications for the preparation of laboratory work

There are no laboratory classes on this subject

Calendar-themed plan of independent work

№ topics	The title of the topic	The number of hours
1	Surgical anatomy of the great vessels of the upper limb.	5
2	The structure of the parts of the main vessels of the upper limb	5
3	Surgical anatomy of the great vessels of the upper limb.	5
4	Cellular spaces of the space of the palm.	5
5	Aneurysms and nontraumatic hemorrhages.	6
6	Aneurysms of the common carotid artery.	6
7	Congenital and acquired defects of the chest wall and diaphragm. Diaphragmatic hernia.	6
8	Violation of the coronary circulation.	6
9	Stenosis, atresia of the esophagus and tracheoesophageal fistula in children.	6
10	Topographic anatomy of congenital anomalies of the abdominal wall, surgery.	6
11	Hernias of the umbilical cord and umbilical fistula (urinary and biliary) and postoperative internal hernias of the abdomen.	6
12	Meckel diverticulum	6
13	Intestinal obstruction, congenital stenosis and atresia of the intestine.	6
14	Hirschsprung's disease and megacolon	6
15	Congenital atresia of the biliary tract	6

16	The particular location of the kidney, the renal pelvis in infants and children: congenital and acquired dystopias of the kidneys.	6
17	The anomaly of the urinary tract: congenital narrowing the doubling revealed the teachings and congenital hydronephrosis.	6
18	Congenital anomalies of pelvic organs: bladder extrophy, bladder diverticulum, atresia of the rectum and anus.	6
19	Fistulas of the rectum and external genitalia. Hydrocele of the seminal ducts, and shell eggs, epispadias, hypospadias.	6
20	Spinal hernias.	6
	Total	116

Main literature:

1. Inderbir Singh. Textbook of anatomy. 2016
2. Netter's Clinical Anatomy, John T. Hansen, PhD, USA 2019
3. Dr. BD. Chaurasia. Human anatomy. 2019
4. Richard L. Drake, A. Wayne Vogl, Adam W.M. Mitchell, Richard M. Tibbits, Paul E. Richardson. Gray's atlas of anatomy. Second edition. 2015.
5. Anne M. Gilroy, Brian R. MacPherson, Lawrence M. Ross, Michael Schuenke, Erik Schulte, Udo Schumacher. Atlas of anatomy. 2009.
6. Richard S. Snell. Clinical anatomy by regions. Ninth edition. 2012.
7. Carmine D. Clemente. A regional atlas of human body. Sixth edition. 2011. Chapter 1. P. 1-138
8. Michael Schuenke, Erik Schulte, Udo Schumacher. Atlas of Anatomy. Head and Neuroanatomy. 2010.

General subject of topographical anatomy.

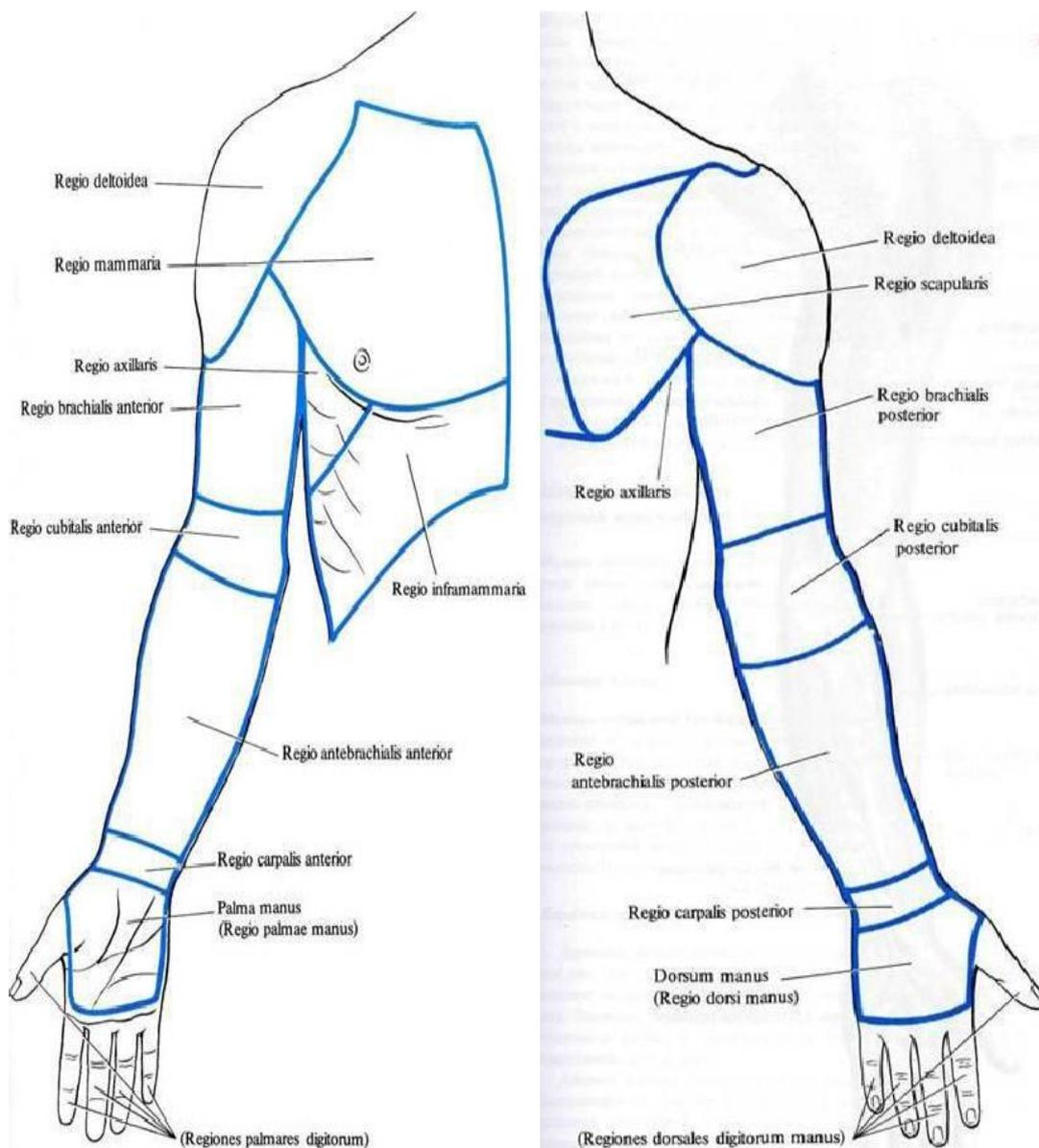
For define area boundaries to plan slit line at operation, to feature a standing of a wound or localisation of pathological process use external reference points. To them refer: bone formations, muscles, tendons, superficial veins etc.

interrelation of blood-vessels and fascias. The topography of neurovascular fascicles is spotted by two factors: interrelation neurovascular fascicles to muscles and intermuscular gaps; their attitude to fascias which participate in formation of vascular vaginas. N.I. Pirogov formulated laws of vascular vagina build-up: 1-law-vascular vaginas are formed by fascias of muscles located near vessels; 2-law shape of vascular vaginas has prismatic (in lateral section triangular) shape; 3 - law apex of prismatic vagina of vessels directly or mediocre connected with the proximate bone or joint sheath

Positions of internals: 1) holotopy-attitude of an internal to a body and its areas; 2) skeletopia - the attitude of an internal to an atomy (vertebra); 3) syntopy - the attitude of an internal to the next organs.

GENERAL CHARACTERISTICS

The upper extremity is divided into the following regions: scapular region, deltoid region, infraclavicular region, axillary region, anterior and posterior regions of the arm, anterior and posterior elbow regions, anterior and posterior regions of the forearm, wrist region, palmar and dorsal regions of the hand.



TOPOGRAPHY OF THE SCAPULAR REGION

Landmarks: acromion, superior angle of the scapula, inferior angle of the scapula.

Borders:

Superior – horizontal line drawn through the acromion . Inferior – horizontal line

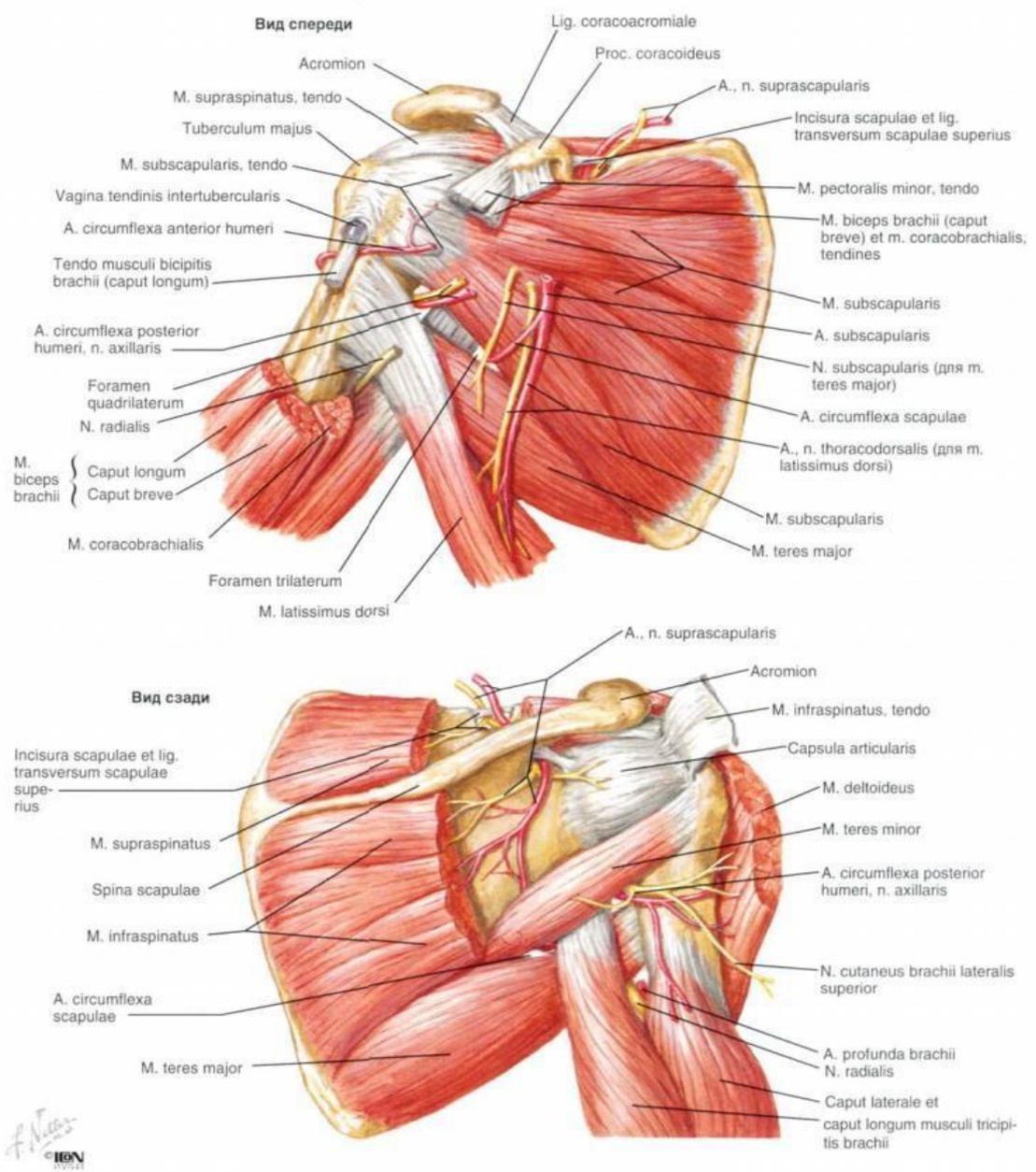
drawn through the inferior angle of the scapula. Lateral – vertical line drawn through the acromion. Medial – medial margin of the scapula.

Layers:

Skin: it is thick with limited movement. It is innervated by the superior lateral cutaneous nerve of the arm.

Subcutaneous tissue.

Superficial fascia: it is dense and consists of many layers. It contains the fibrous tissues which connect the subcutaneous tissue and are fixed to the skin. That is why the skin has limited movement. It contains fat and cutaneous nerve. *Deep fascia:* it consists of 2 layers: superficial layer covers the latissimus dorsi and trapezius muscles. Deep layer covers the supraspinatus, infraspinatus, teres major and teres minor muscles.



SCAPULAR ARTERIAL NETWORK

Anastomosis around the scapula occurs in 3 fossae:

1. Suprascapular fossa.
2. Infrascapular fossa.
3. Subscapular fossa.

It is formed by: *suprascapular artery* (branch of the thyrocervical artery of the subclavian artery), *dorsal scapular artery*/ deep branch of the transverse cervical artery; *circumflex scapular artery*.

To provide collateral circulation when the subclavian artery or axillary artery is blocked/damaged. To help preserve the upper limb during injury. Anastomosis over the acromion : acromial branch of the thoracoacromial artery; acromial branch of the suprascapular artery; acromial branch of the posterior circumflex humeral artery.

TOPOGRAPHY OF THE AXILLARY REGION

Landmarks:

Outlines of the pectoralis major, latissimus dorsi and coracobrachialis muscles; axillary fossa is shown by lifting up the upper extremity.

Borders: anterior- lower margin of the pectoralis major muscle; posterior – lower margin of the latissimus dorsi muscle; medial – line connecting the margin of the pectoralis major and latissimus dorsi muscles along the sagittal section of the lateral surface of the thorax at the level of the 3rd rib; lateral – line connecting the margin of the pectoralis major and latissimus dorsi muscles on the medial surface of the arm.

Layers:

Skin: it is thin and easily movable. It contains the suspensory ligament of the axilla. It separates and forms the pectoral fascia anteriorly, thoracolumbar fascia posteriorly and brachial fascia laterally.

Axillary cavity:

Borders:

Anterior – pectoralis major muscle and clavipectoral fascia. Posterior – subscapularis, latissimus dorsi, teres major muscles. Medial – thoracic wall, serratus anterior muscle and 1st until 4th intercostal muscles. Lateral – surgical neck of the humerus, short head of the biceps brachii muscle and coracobrachialis muscle.

Contents: axillary is divided into 3 parts and gives branches according to: clavipectoral triangle (thoracoacromial artery, arteria thoracica suprema, lateral and medial pectoral nerves); pectoral triangle (lateral thoracic artery and long

thoracic nerve); subpectoral triangle(subscapular artery, anterior and posterior circumflex humeral arteries).

The axillary artery is in relation first with the posterior and then with the outer wall of the axillary cavity. The pulsations of the vessel may be distinctly felt to the inner side of the prominence caused by the coracobrachialis muscle; this is the situation in which the artery may be most safely ligated by elevating the arm and keeping close to the border of the muscle. The vessel is comparatively close to the shoulder-joint and is sometimes torn across in dislocations or in attempts at their forcible reduction. The branches of the axillary artery are:

1. **The acromiothoracic**

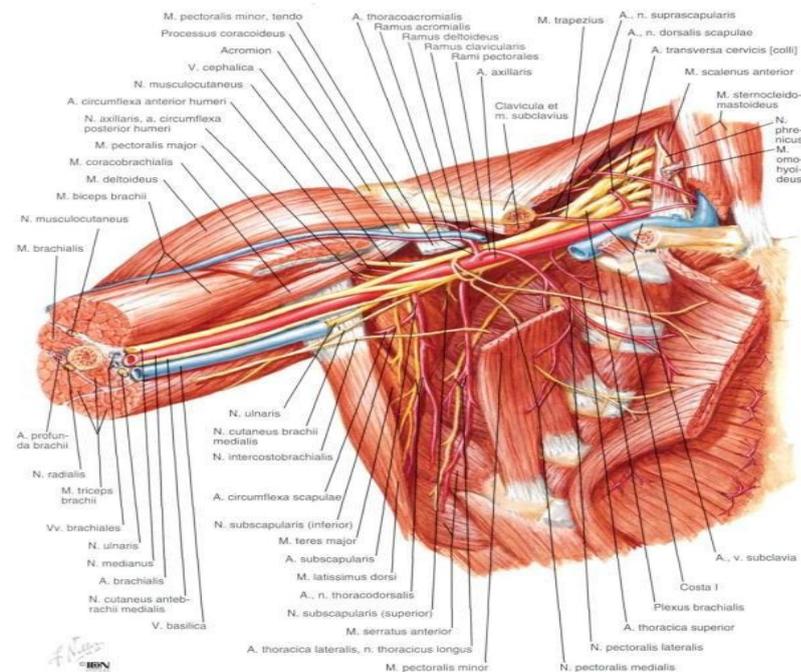
2. **The subscapular**, which arises from about the middle of the axillary and consequently at the mid-point between the clavicle and the lower border of the pectoralis major muscle, in which latter situation the axillary becomes the brachial. **The subscapular artery** divides into two chief branches, the dorsalis scapula and the thoracodorsalis .

The dorsalis scapula runs over the external border of the scapula to the dorsal surface of this bone, supplies the surrounding muscles, and anastomoses freely with the suprascapular branch of the subclavian. This is the main path for the collateral circulation when the blood-current in the axillary artery is interfered with or when this vessel is ligated. **The thoracodorsalis** is the largest vessel of the lateral thoracic wall. It runs down the axillary border of the scapula, under cover of the edge of the latissimus dorsi, and particularly supplies the teres major, the latissimus dorsi, and the serratus magnus muscles .

3. **The long thoracic**, an inconstant branch, which arises above the subscapular and is situated in front of the thoracic dorsalis.

4. **The anterior circumflex**, a small branch which runs outward over the anterior surface of the neck of the humerus.

5. **The posterior circumflex**, a large branch which arises beside the preceding one, passes through the quadrangular space close to the bone to run posteriorly with the circumflex nerve and, like it, to particularly supply the deltoid muscle. **The axillary vein**, like the subclavian, is situated in front and to the inner side of the artery; it consequently covers the artery to a varying extent, dependent upon the degree of its distention. It is only in exceptional cases that the axillary vein is double.



Brachial plexus: lateral cord, posterior cord, medial cord.

Just beneath the clavicle the trunks of the brachial plexus, with the exception of a few small branches, are situated to the outer side of the vessel. Beneath the *pectoralis minor muscle* these trunks form three cords which are so arranged about this portion of the artery that we may differentiate an outer, an inner, and a posterior cord. The outer and inner cords supply chiefly the skin and muscles of the flexor surface, while the posterior cord supplies the extensors surface. A more detailed study of the axilla shows that the outer cord gives off the *musculocutaneous nerve* and the outer head of the median. From the inner cord arises the inner head of the median which, together with the outer head, surrounds the axillary artery like the prongs of a fork; the inner cord also gives off the ulnar, the internal cutaneous, and the lesser internal cutaneous nerves. From the posterior cord arise the circumflex, the musculus spiral, and the subscapular nerves. Of the other branches of the brachial plexus there is one which is of particular importance from a surgical stand point; this is the long thoracic, the motor nerve of the serratus magnus muscle. It lies directly upon the serratus magnus, in association with *the thoracodorsalis artery*, and is covered by the edge of the latissimus dorsi; it is not particularly exposed to injury in operations in the axillary cavity. The comparatively superficial long or middle subscapular nerve running to the latissimus dorsi is more easily injured, and its division is followed by paralysis of this muscle. The other two subscapular nerves supply *the teres major and the subscapularis muscles* and are more deeply situated. The suprascapularis nerve, which runs through the subscapularis notch to the dorsal surface of the scapula and supplies the supraspinatus and infraspinatus muscles, is more rarely divided by the knife of the surgeon; the nerve filaments supplying the levator anguli scapulae and the rhomboid muscles are also rarely injured.

Axillary lymph nodes (5 groups): lateral axillary lymph nodes, central axillary lymph nodes, medial axillary lymph nodes, posterior axillary lymph nodes, apical axillary lymph nodes.

TOPAGRAPHY OF THE DELTOID REGION

Landmarks: anterior and posterior margins of the deltoid muscle, clavicle, acromioclavicular joint, acromion, spine of the scapula. **Borders:**

Superior – line drawn on the deltoid muscle from lateral 1/3 of the clavicle, acromion and lateral 1/3 of the spine of the scapula. Inferior – horizontal line drawn on the lower margin of the

pectoralis major muscle and latissimus dorsi muscle. Anterior – anterior margin of the deltoid muscle. Posterior – posterior margin of the deltoid muscle.

Layers:

Skin: it is thick with limited movement. Upper half of the deltoid muscle: lateral supraclavicular nerve. Lower half of the deltoid muscle: superior lateral brachial cutaneous nerve.

Subcutaneous tissue with superficial fascia: it contains moderate amount of fat. It is divided by septa.

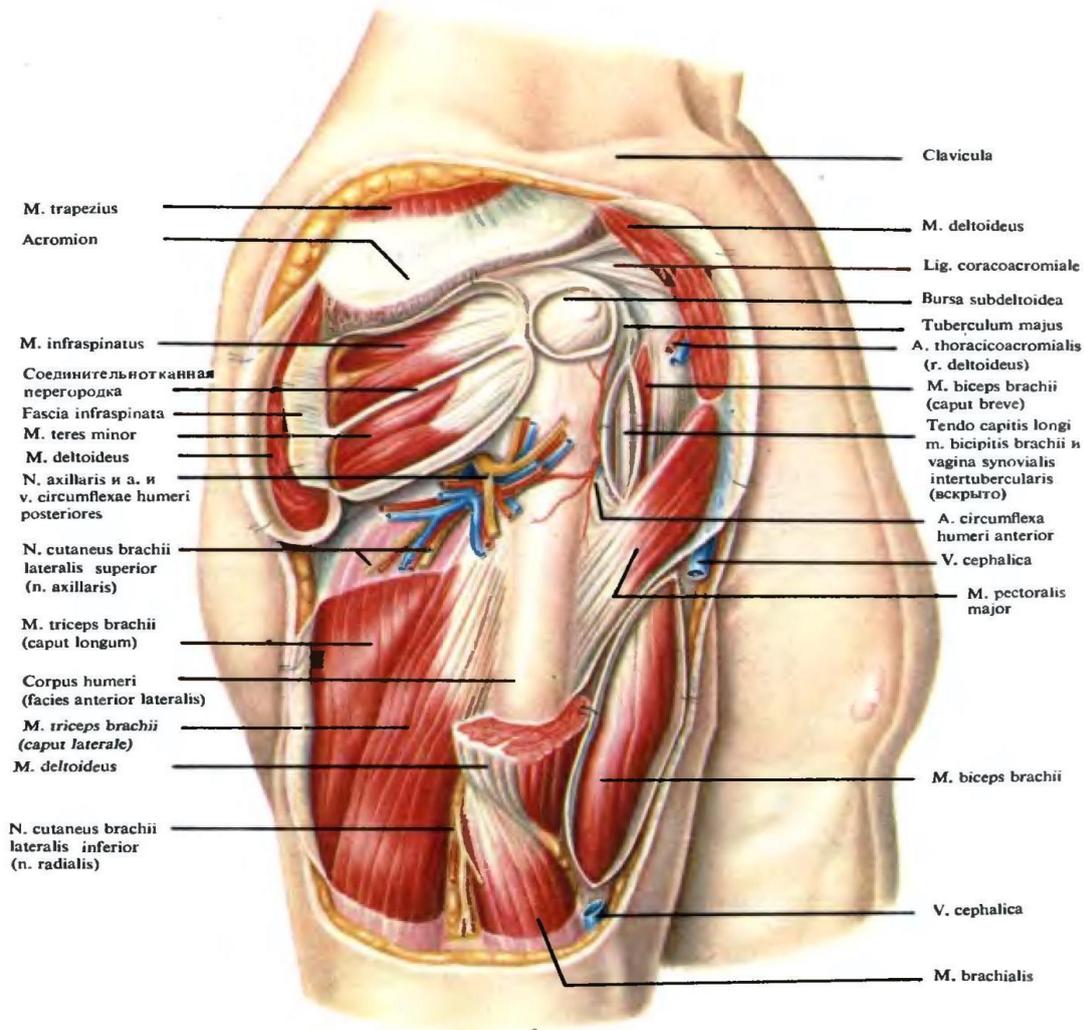
Deep fascia.

Superficial layer: it covers the outer surface of the deltoid muscle; it is continuous

with the pectoral fascia; it divides the deltoid muscle into 3 parts, which are the clavicular, acromial.

Deep layer: it invests the deltoid nerve; it is continuous with the fascia covering the triceps brachii muscle; it sends numerous septa and fasciculi. **Muscles:**

Unipennate: clavicular and spine of the scapula parts; Multipennate: acromial part; all fibres converge and are attached to the deltoid tuberosity. Actions: abduction, pulling the arm forwards and pronating is slightly, pulling the arm backwards and supinating it slightly, anterior part helps the pectoralis major muscle in arm flexion and medial rotation of the arm; posterior part helps latissimus dorsi muscle in arm extension and lateral rotation of the arm.



Сосуды, нервы и мышцы, лежащие под дельтовидной мышцей; вид справа (1/2).

TOPOGRAPHY OF THE SUBCLAVIAN REGION

Landmarks: sternum, clavicle, coracoid process, 3rd rib, cephalic vein, pectoralis

major muscle, deltoid muscle, border between pectoralis major and deltoid muscles.

Borders:

Superior – clavicle. Inferior – horizontal line drawn through the 3rd rib; upper margin of the mammary gland (in women). Medial – lateral margin of the sternum. Lateral – anterior margin of the deltoid muscle.

Layers:

Skin: it is thin, easily movable; it contains sebaceous glands; it is innervated by the supraclavicular nerve.

Subcutaneous tissue: it is well-developed, especially in women. It contains the cutaneous nerve. It contains the thoracoacromial and thoracoepigastric veins form the cephalic and axillary veins.

Superficial fascia: it is thin and firm. It is attached to the inferior margin of the clavicle and upper margin of the mammary gland, which forms the Cooper's suspensory ligaments of the mammary gland.

Deep fascia: it covers the pectoralis major muscle, it divides the pectoralis major muscle into 3 parts (clavicular, sternocostal, abdominal).

Borders: superior – clavicle; inferior – fascia of the serratus anterior and rectus abdominis muscles; medial – sternum; lateral – deltoid and axillary fasciae. *Proper fascia:* it is attached to the lower margin of the clavicle, coracoid process and 1st rib. It covers the subclavius and pectoralis minor muscles. Lower part of proper fascia forms the suspensory ligaments of the mammary gland.

TOPOGRAPHY OF THE ANTERIOR REGION OF THE ARM

Landmarks: deltoid muscle, pectoralis major muscle, latissimus dorsi muscle, biceps brachii muscle, triceps brachii muscle, medial and lateral epicondyles of the humerus, greater tubercle of the humerus; sulci bicipitales lateralis et mediales. **Borders:**

Superior – horizontal line drawn from the pectoralis major and latissimus dorsi muscles. Inferior – imaginary line drawn with 2 fingers above the lateral and medial epicondyles of the humerus; medial and lateral: vertical lines drawn on medial and lateral epicondyles of the humerus respectively. **Layers:**

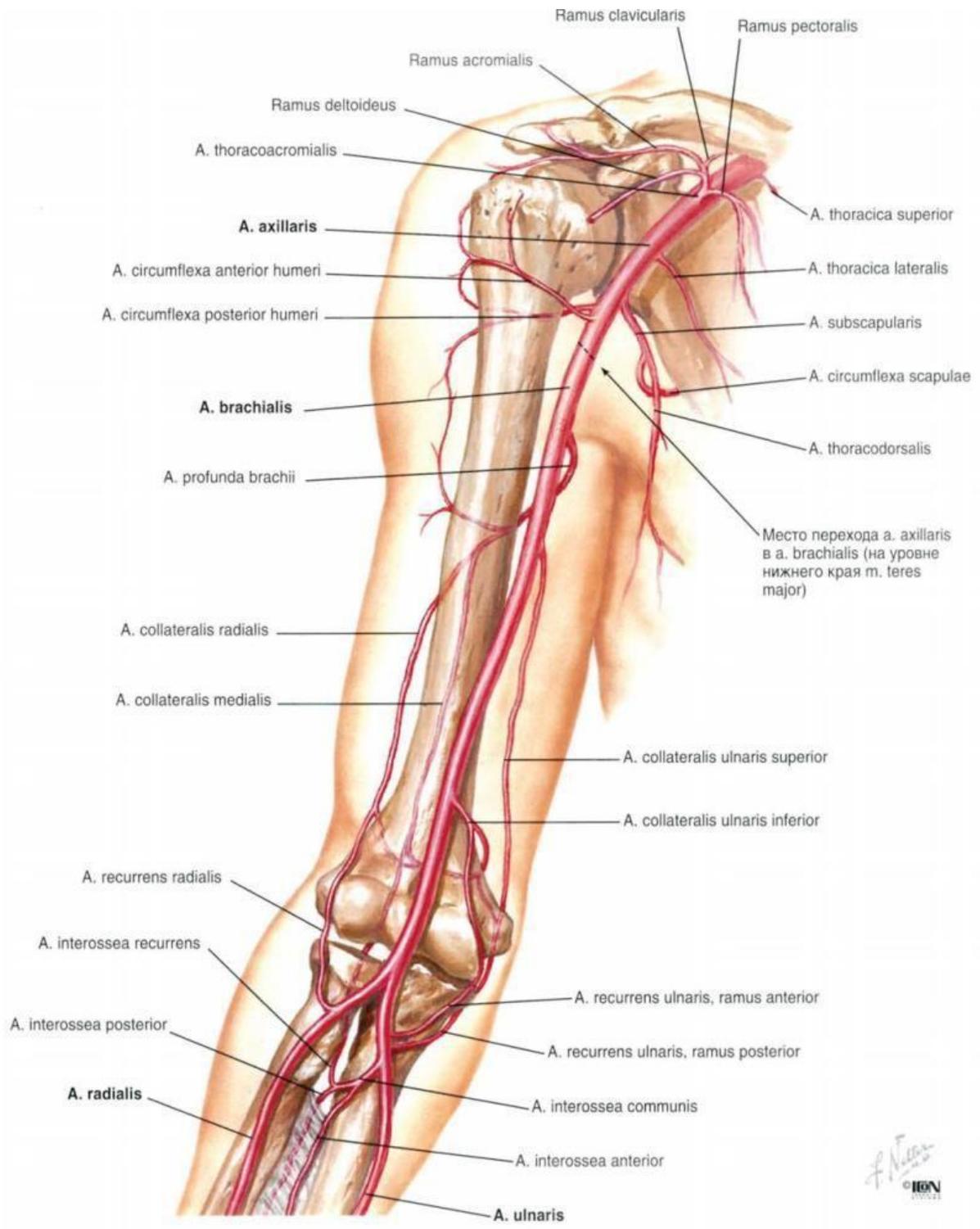
Skin: lateral is thicker than the medial one. It is slightly movable. It is innervated by the medial cutaneous nerve of the arm, lateral cutaneous nerve of the arm, superior lateral cutaneous nerve of the arm and inferior lateral cutaneous nerve of the arm.

Subcutaneous tissue: it contains the cephalic and basilica veins. It contains the cubital lymph nodes.

Superficial fascia: it forms a covering for the superficial veins and cutaneous nerves.

Deep fascia: it forms 2 septa which are connected to the humerus, namely the lateral and medial intermuscular septa. These 2 septa divide the brachial region into anterior and posterior parts. Transverse septum is pierced by the ulnar nerve and anterior descending branch of profunda brachii artery to the anterior surface of the lateral epicondyle. Anteroposterior septum separates the brachialis muscle from the muscles attached to the lateral supracondylar ridge. This septum also encloses the radial nerve and anterior descending branch of the deep artery of arm.

Muscles: *coracobrachialis muscle* (from the coracoid process in common with the short head of the biceps, and its insertion is at about the middle of the internal border of the humerus), *biceps brachii muscle* (arises by long head from the apex of the coracoid process; it inserts into the tuberosity of the radius), *brachialis muscle* (situated beneath the biceps, arises from the anterior aspect of the humerus, below the insertion of the deltoid muscle, and from the intermuscular septa, and is inserted into the coronoid process of the ulna).



TOPOGRAPHY OF THE POSTERIOR REGION OF THE ARM

Landmarks: deltoid muscle, pectoralis major muscle, latissimus dorsi muscle, biceps brachii muscle, triceps brachii muscle, medial and lateral epicondyles of the humerus, greater tubercle of humerus, sulcus deltoideopectoralis, sulci bicipitales lateralis et mediales.

Borders:

Superior – horizontal line drawn from the pectoralis major latissimus dorsi muscles. Inferior – imaginary line drawn with 2 fingers above the lateral and medial epicondyles of the humerus. Medial and lateral – vertical lines drawn on the medial and lateral epicondyles of the humerus respectively.

Layers:

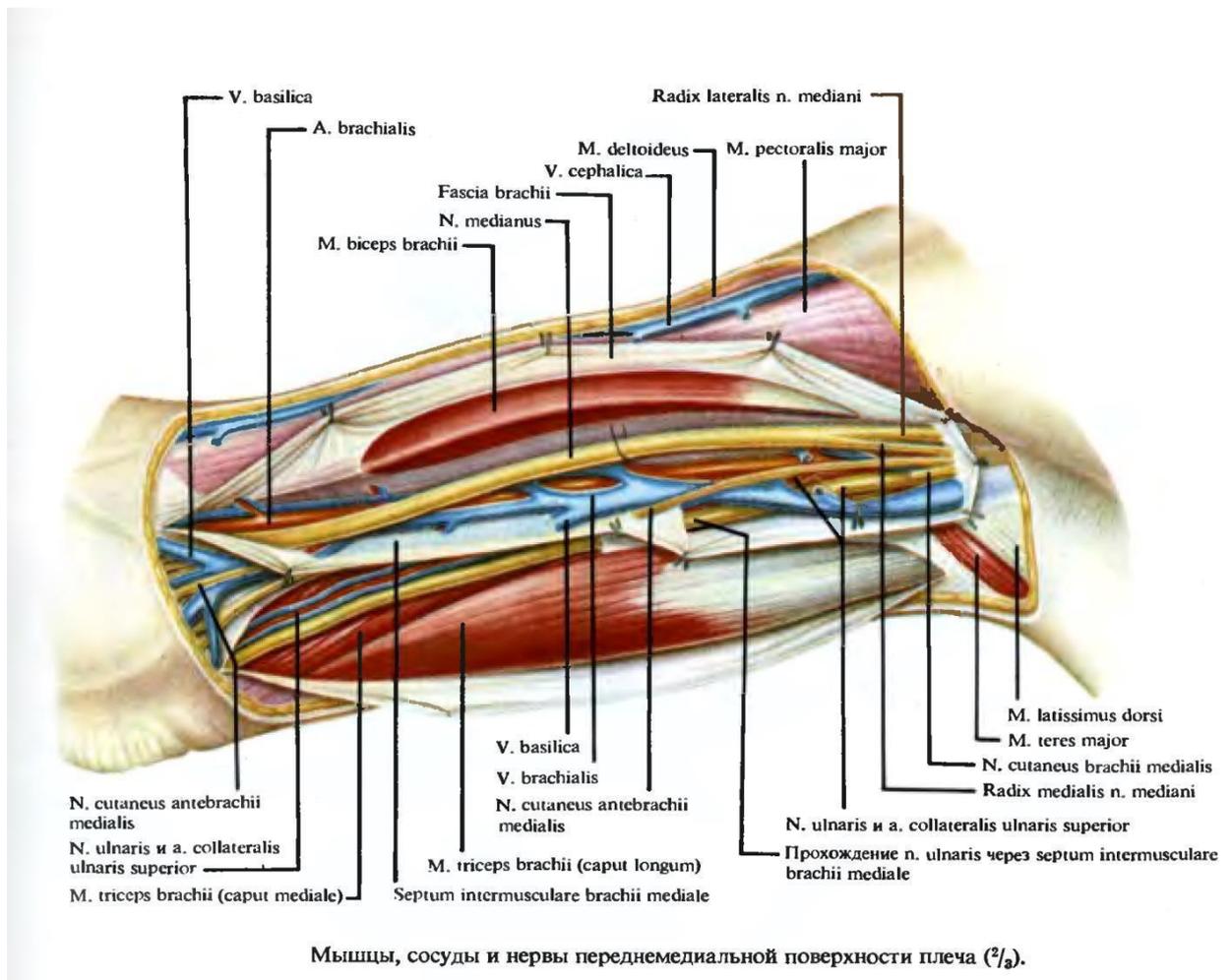
Skin: it is thick and well-connected with the subcutaneous tissue.

Subcutaneous tissue: it contains the superior lateral cutaneous nerve of the arm, inferior lateral cutaneous nerve of the arm and posterior cutaneous nerve of the forearm.

Superficial fascia.

Deep fascia: it forms a covering for the triceps brachii muscle and its tendon. **Muscle:** *triceps brachii muscle* (the long head arises from the infraglenoid tubercle of the scapula; the inner head arises from the posterior surface of the humerus below the musculospiral groove; the outer head commences above the musculospiral groove, which it bridges over, and arises from the outer surface of the bone and from the external intermuscular septum. These 3 heads are inserted into a common tendon which is attached to the olecranon).

Humeromuscular canal: it is also known as canalis spiralis. Radial nerve, deep artery of arm and its vein pass through this canal.



Superior trilateral foramen

Borders:

Medial – teres minor muscle. Lateral – medial margin of the long head of the triceps muscle.

Inferior – teres major muscle.

Contents: circumflex scapular artery.

Inferior trilateral foramen

Borders:

Medial – long head of the triceps brachii muscle; lateral – medial margin of the humerus. Superior – teres major muscle.

Contents: radial nerve, deep artery of the arm.

Quadrilateral foramen

Borders:

Medial – lateral margin of the long head of the triceps brachii muscle; Lateral – surgical neck of the humerus. Superior – teres minor muscle, subscapularis muscle. Inferior – teres circumflex humeral artery

Canal of the radial nerve

Topography: it is bounded by the humerus and triceps brachii muscle. It contains the radial nerve, deep artery of the arm and its veins.

The ulnar, the second great nerve of the arm, lies internal to the artery, but gradually becomes more distant from the vessel. It pierces the internal intermuscular septum at the lower third of the arm and reaches the space between the internal condyle and the olecranon. The ulnar nerve also gives off no branches in the upper arm as the median one.

Shoulder-joint -This joint has the widest range of motion of any joint in the body. The articulation is formed by the head of the humerus and the glenoid cavity of the scapula. The humeral head is covered by cartilage and the articular surface of the glenoid cavity is enlarged (deepened) by the glenoid ligament. As a consequence of the incongruity between the two articular surfaces, the head of the humerus projects far beyond the edge of the glenoid cavity. The lax capsular ligament passes down from the circumference of the glenoid cavity and is attached, anteriorly, to the anatomic neck of the humerus.

TOPAGRAPHY OF THE ELBOW REGION

Landmarks:

Olecranon of the ulna, brachioradialis muscle, tendon of the biceps brachii muscle, medial and lateral epicondyles of the humerus, sulci cubitales posteriores lateralis et medialis, sulci cubitales anteriores lateralis et medialis. **Borders:**

A horizontal line is drawn 4 cm from the level which connects the medial and lateral epicondyles of the humerus; 2 vertical lines are drawn through the medial and lateral epicondyles of the humerus and divide the elbow region into the anterior region and posterior region.

The elbow-joint is composed of three articulations:

- I. The trochlear surface of the humerus with the greater sigmoid cavity of the ulna.
2. The capitulum of the humerus with the cup-shaped depression on the head of the radius.
3. The lesser sigmoid cavity of the ulna with the circumference of the head of the radius. The first articulation is for flexion and extension, the third is for rotation (pronation and supination), and the second permits not only of flexion and extension, but also of rotation. All three articulations are surrounded by a common lax capsular ligament, which is attached anteriorly above the coronoid and radial

depressions, excluding the epicondyles, and posteriorly above the olecranon fossa, which is also situated within the joint. To either side of the olecranon the capsular ligament forms small diverticula which arch situated beneath the cutaneous depressions visible in this situation in the living subject. The capsular ligament is attached to the edges of the greater and lesser sigmoid cavities of the ulna in such a way that the apex of the coronoid process and the olecranon arc within the articular cavity; this ligament is also inserted into the neck of the radius so that the head of this bone is entirely within the joint. The capsular ligament is reinforced by three other ligaments:

1. *The internal lateral ligament*, which radiates from the internal epicondyle to the edge of the greater sigmoid cavity of the ulna.
2. *The external lateral ligament*, which runs downward from the external epicondyle, some of the fibers surrounding the neck of the radius and being inserted into the anterior and posterior margins of the lesser sigmoid cavity of the ulna.
3. *The orbicular ligament*, which enforces the capsule in a circular manner about the neck of the

radius and is inserted into the anterior and posterior margins of the lesser sigmoid cavity of the ulna. The external lateral and orbicular ligaments form practically one continuous band of connective tissue.

As the large superficial and deep vessels of this region are situated in front of the elbow-joint, it follows that marked subcutaneous or deep extravasations of blood may result from a backward dislocation of both bones, and particularly from that form which is due to hyperextension. In this dislocation the median nerve is necessarily lacerated, as it is also in front of the articulation. The importance of the relation of the ulnar nerve to the joint has been already emphasized.

TOPAGRAPHY OF THE ANTERIOR CUBITAL REGION

Layers:

Skin: it is thin, movable and non-pigmented. It contains sweat glands, sebaceous glands and hair. It is innervated by the lateral and medial cutaneous nerves of the forearm.

Subcutaneous tissue: it contains lymphatic vessels with superficial lymphatic nodes and superficial venous network. It contains the cephalic, basilica and median cubital veins. Superficial cubital nodes are situated at the basilica vein. The connection of the cephalic, basilic and median cubital veins forms an alphabet -N. Superficial fascia: it is connected with the superficial fascia of the arm and forearm, aponeurosis of biceps brachii muscle, it is connected with the deep fascia. *Deep fascia:* fascia of the biceps brachii and brachialis muscles forms the lateral and medial intramuscular septa. These septa are fixed to the medial and lateral epicondyles of the humerus. It forms a covering for the muscles of the arm and forearm. Inferior to the radial tuberosity, the fixation for the tendon of the biceps brachii muscle takes place. Intermuscular septa continue to form the anterior radial intermuscular septa of the forearm.

Muscles:

Lateral: brachioradialis muscle and supinator muscle. Median: biceps brachii muscle and brachialis muscle.

Medial: (1st layer) pronator teres, flexor carpi radialis, palmaris longus and flexor carpi ulnaris muscles

Medial: (2nd layer) flexor digitorum superficialis muscle.

Neurovascular bundles:

2 neurovascular bundles are found between groups of muscles and septa, which are lateral bundle (radial nerve and radial collateral artery) and medial bundle (brachial artery and median nerve).

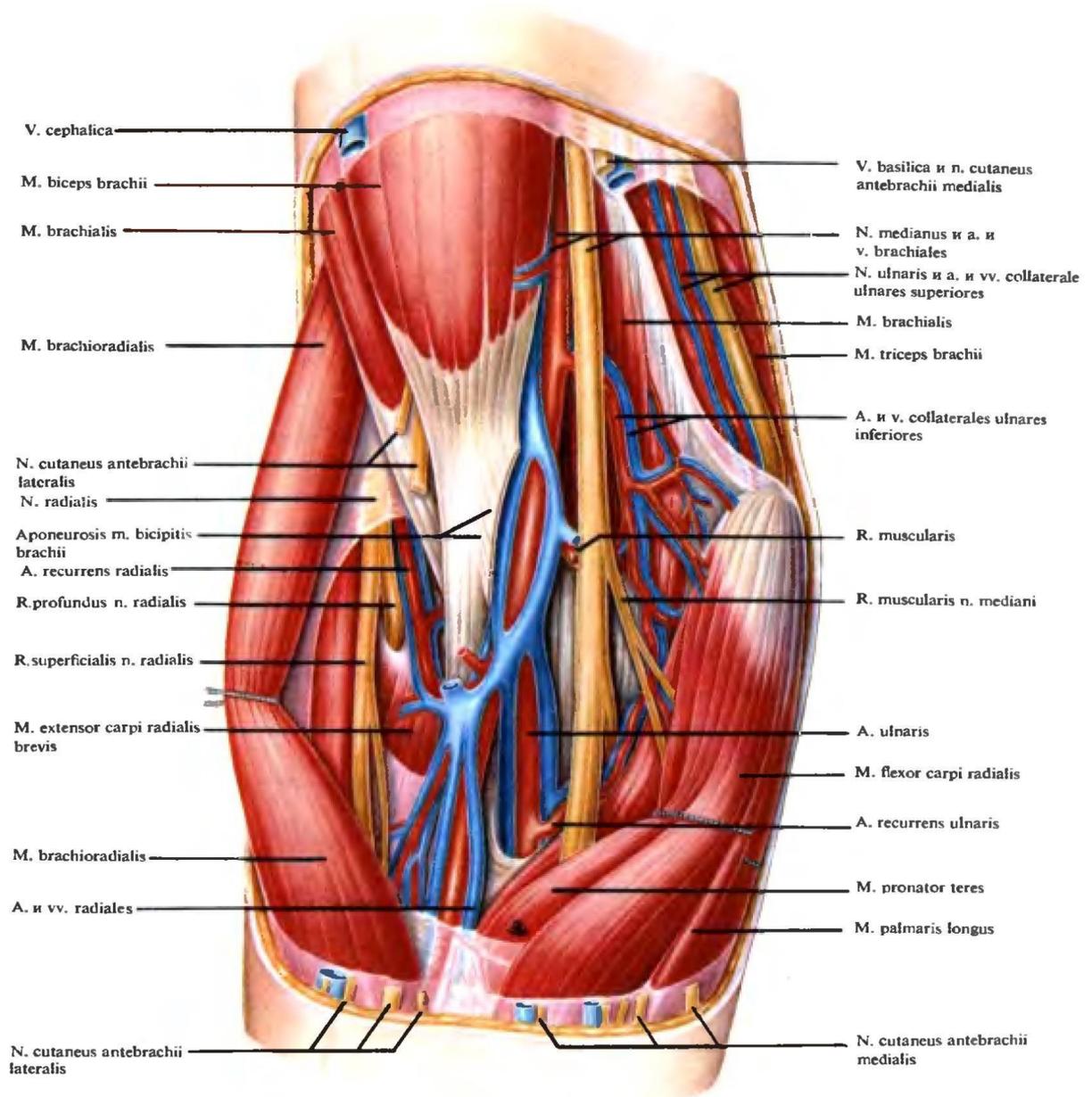
The brachial artery runs beneath the deep fascia in the internal bicipital groove; it is accompanied by two veins, the inner of which receives the basilica vein. Higher up, the veins unite to form a single vein, either before reaching the axilla or, more rarely, after entering into this region. Disregarding the muscular branches, of which the bicipital is particularly large, the main branches of the brachial are:

1. **The superior profunda artery**, which accompanies the musculospiral nerve about the posterior surface of the humerus, in the musculospiral groove, between the outer and inner heads of the triceps muscle. It ends at the outer side of the humerus, where it is accompanied by a cutaneous branch of the musculospiral nerve, and descends behind the external intermuscular septum to reach an anastomotic arch above the olecranon.
2. **The inferior profunda artery**, usually a ling vessel, which accompanies the ulnar nerve to the olecranon, where it empties into the rete cubiti.
3. **The anastomotic magna artery**, which arises near the division of the brachial in the region of the elbow. It runs transversely inward across the brachialis anticus muscle and passes posteriorly to the rete cubiti.

The radial artery: It passes through the tendon of the biceps brachii muscle. It is lodged between

the pronator teres and brachioradialis muscles.

The radial nerve: it is situated between the brachioradialis and brachialis muscles in the upper level. It goes downward and is divided into 2 branches, which are the superficial and deep branches of the radial nerve at the level of the lateral epicondyle of the humerus. Superficial branch innervates the brachioradialis and pronator teres muscles. Deep branch lies laterally and passes through the supinator canal between the superficial and deep layers of supinator muscle.



Сосудисто-нервные пучки передней области локтя (1/2).

TOPOGRAPHY OF THE POSTERIOR CUBITAL REGION

Landmarks:

Olecranon of ulna, sulci cubitales posteriors lateralis et mediales, ulnar nerve passing along the sulcus cubitales posterior medialis, head of the radius is palpated in the middle part of sulcus cubitalis posterior lateralis.

Layers:

Skin: it is thick and movable, it forms skin folds.

Subcutaneous tissue: it contains the superficial arteries(medial collateral artery, radial collateral artery and recurrent interosseous artery); it contains the posterior cutaneous nerve of the arm, medial cutaneous nerve of the forearm. Bursa of the elbow joint is located in the superior part of the olecranon of the ulna. *Superficial fascia*: it is thin layer without fixation.

Deep fascia: it is formed by the aponeurosis; it is fixed to the tendon of the triceps brachii muscle, medial and lateral epicondyles of the humerus and olecranon of the ulna.

Muscles:

Superior – *triceps brachii* and *anconeus muscles*; lateral – *extensor muscle* of the wrist(*extensor carpi radialis longus* , runs to the dorsal surface of the base of the second metacarpal bone, *extensor carpi radialis brevis*, goes to the dorsal surface of the third metacarpal bone, and *extensor carpi ulnaris muscles*, arises from the external condyle, from the deep fascia of the forearm, and from the posterior border of the ulna, and is inserted into the base of the fifth metacarpal bone) and extensor muscle of the digits(*extensor digitorum*, arises from the external condyle and from from the deep fascia of the forearm and is inserted by means of four tendons into the dorsal aponeurosis of the fingers, and *extensor digiti minimi muscles*, arises from the external condyle and furnishes a second tendon to the little finger); deep - *supinator muscle*; medial – *flexor digitorum profundus*, arises from the upper two-thirds of the anterior surface of the ulna and from the interosseous membrane, and by a small muscular slip from the internal condyle and is inserted into the terminal phalanx of the thumb and *flexor carpi ulnaris muscles*, the ulnar origin extends downward to the lower third of the bone, is inserted into the pisiform bone, the inciform process of the unciform bone, and the base of the fifth metacarpal bone.

TOPOGRAPHY OF THE ANTERIOR REGION OF THE FOREARM

Landmarks: brachioradialis muscle, sulci radialis et ulnaris, tendons of the flexor carpi radialis and palmaris longus muscles, styloid process of the ulna and radius. **Borders**:

Upper – horizontal line drawn 4 cm distal to the level of the wrist joint. Lower – transverse line drawn 2 cm proximal to the styloid process of the radius; 2 vertical lines are drawn through the epicondyles and styloid processes, which divide the forearm region into the anterior and posterior regions.

Layers:

Skin: it is thin, it contains sweat and sebaceous glands, it is innervated by the medial and lateral cutaneous nerves of the forearm.

Subcutaneous tissue: it contains the cephalic vein and basilica vein; it contains the lateral cutaneous nerve of the forearm and medial cutaneous nerve of the forearm; intermediate anterbrachial vein passes through the middle line of this region.

Superficial fascia: it is not attached to the bone, it covers all structures in the subcutaneous tissue.

Deep fascia: it forms a covering for muscles, vessels, nerves and bones; it is thicker in the proximal part and thinner in the distal part; it sends two septa to the radius and divides the forearm into 3 parts for muscles(anterior, posterior and lateral) in the upper half of forearm.

Lateral: brachioradialis, extensor carpi radialis longus and extensor carpi radialis brevis muscles. Anterior: pronator teres, flexor carpi radialis, flexor digitorum superficialis, palmaris longus and flexor carpi ulnaris muscles, flexor digitorum profundus and flexor pollicis longus muscles.

Borders of the fascia: anterior – strictly fixed to the deep fascia; posterior – interosseous membrane, ulna and radius; medial – posterior margin of ulna; lateral – sulcus radialis.

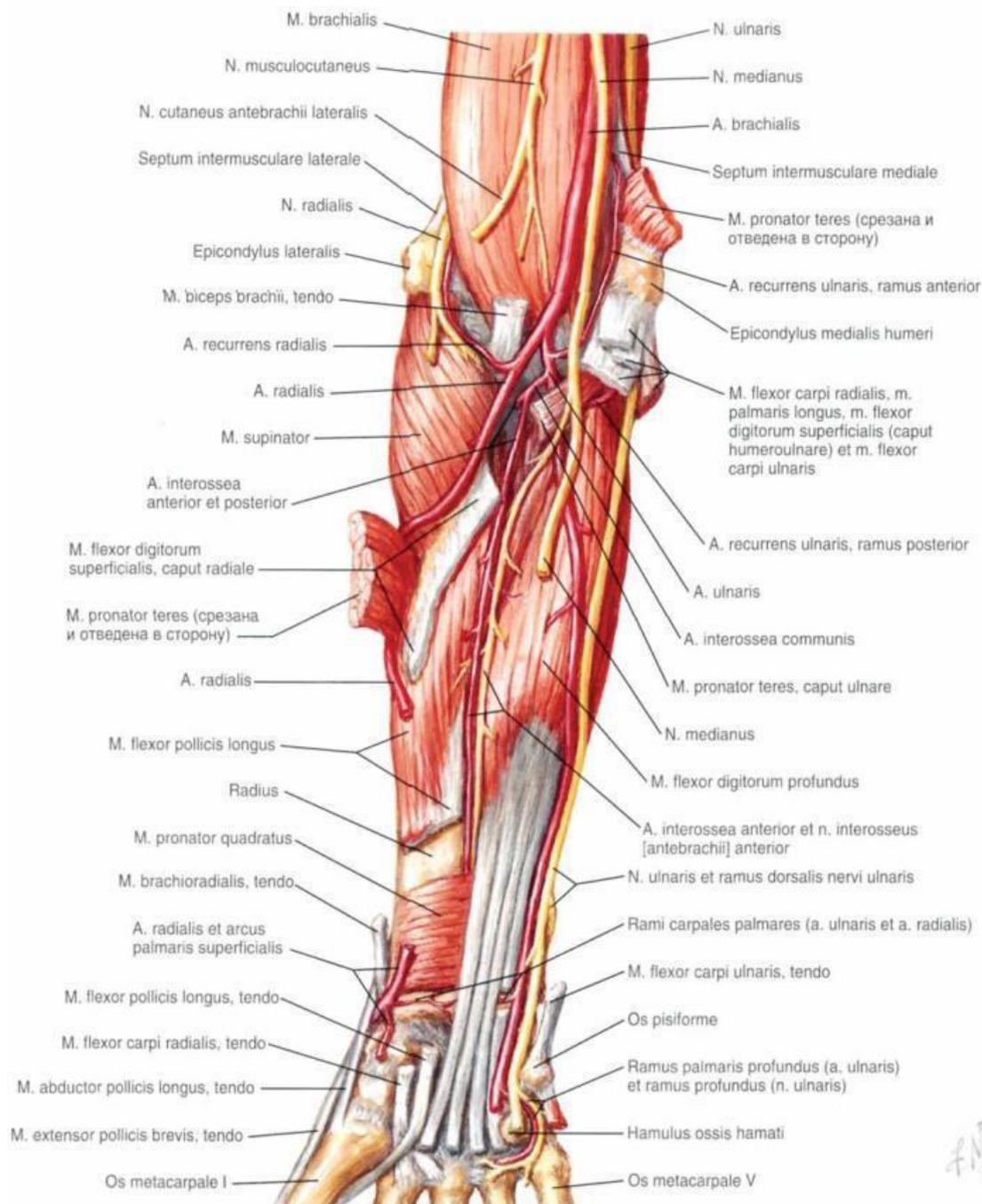
Pirogov's space is situated in the lower half of the deep fascia. Anterior: fascia of the flexor digitorum and flexor pollicis longus muscles. Posterior: fascia of the pronator quadratus muscle.

Muscles:

Medial margin of the deep fascia is bounded to the posterior margin of the ulna and divides the muscles into 4 layers:

- 1) 1st layer: pronator teres, flexor carpi radialis, palmaris longus, flexor carpi ulnaris and brachioradialis muscles.
- 2) 2nd layer: flexor digitorum superficialis muscle.
- 3) 3rd layer: flexor digitorum profundus and flexor pollicis longus muscles.
- 4) 4th layer: pronator quadratus muscle.

The muscles of the forearm should be reviewed in detail from a systematic anatomy. The flexor



group may be subdivided into a superficial and a deep layer, each consisting of four muscles. All of the superficial flexors originate from the internal condyle. *The pronator radii teres* is inserted into the outer surface of the middle of the radius. *The flexor carpi radialis* is attached to the base of the second metacarpal bone. *The palmaris longus radiates* into the palmar fascia. *The flexor carpi ulnaris*, the ulnar origin of which extends downward to the lower third of the bone, is inserted into the pisiform bone, the unciform process of the unciform bone, and the base of the fifth metacarpal bone. There are four deep muscles upon the flexor surface. *The flexor sublimis digitorum* arises by two heads from the internal condyle of the humerus and from the anterior surface of the radius and is inserted by means of four tendons into the second phalanges of the fingers. *The flexor profundus digitorum* arises from the upper two-third of the anterior surface of the ulna and from the interosseous membrane and is inserted by means of four tendons into the terminal phalanges of the fingers. *The flexor longus pollicis* arises from the anterior surface of the radius, from the interosseous membrane, and by a small muscular slip from the internal condyle and inserted into the terminal phalanx of the thumb.

Neurovascular bundles:

Lateral:

Radial artery and vein; superficial branch of the radial nerve: it is located on the sulcus radialis, in the upper 1/3 of the forearm, it is bounded by the brachioradialis muscle laterally and pronator teres muscle medially, in the middle and lower 1/3 of the forearm, it follows the brachioradialis and flexor carpi radialis muscles and passes downward along with radial artery, then it passes through the tendon of the brachioradialis muscle.

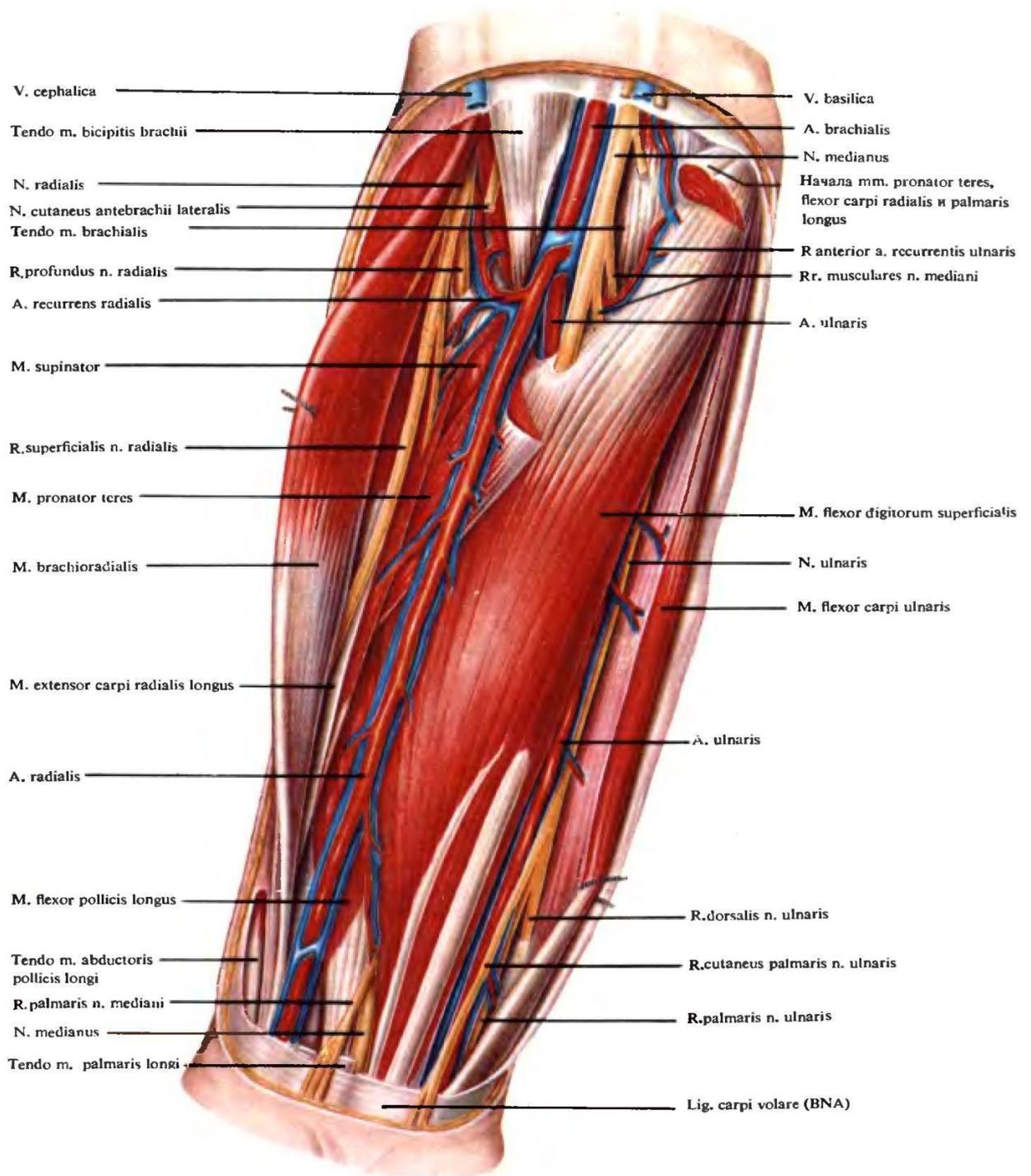
The radial artery: it passes along the middle part of the elbow joint to the styloid process of the radius and enters the anatomical snuffbox.

Medial:

The ulnar artery: it exists inferior to the pronator muscle in the upper part. It is later located between the superficial and deep flexors of the fingers. It passes from the tendon of the biceps brachii muscle, in the middle 1/3 of the forearm, it passes under the pronator teres muscle, flexor digitorum superficialis muscle and sulcus ulnaris, in the lower 1/3 of the forearm, it passes to the medial margin of the styloid process of the ulna and reaches the pisiform bone. *The ulnar nerve*: it passes on the sulcus ulnaris and is bounded medially by the flexor carpi ulnaris muscle and laterally by the flexor digitorum superficialis in the upper 1/3 of the forearm; then it passes from the medial epicondyle of the humerus to the medial margin of the pisiform bone; dorsal branch of the ulnar nerve starts from the middle and lower 1/3 of the forearm and passes under the tendon of the flexor carpi ulnaris muscle, it passes downward and medially to the ulnar artery. Posterior interosseous artery is a branch of the upper part of the ulnar artery and is divided into the anterior and posterior interosseous arteries. Posterior interosseous artery passes through the orifice of the interosseous membrane to the posterior region of the forearm.

Anterior:

The median nerve is the most superficial of the three chief nerves in the upper arm. At first the nerve lies to the outer side of the brachial artery, it then passes in front of the vessel, and, while still above the elbow, takes a position to the inner side of the artery. The nerve consequently crosses the artery, and is to be felt lying upon the vessel, if the panniculus adiposus is not too well marked. The nerve gives off no branches in the upper arm as the median one.



Локтевой и лучевой сосудисто-нервные пучки; вид спереди (2/2).

TOPOGRAPHY OF THE POSTERIOR REGION OF THE FOREARM

Layers:

Skin: it is thick with limited movement; it is innervated by the medial and lateral

cutaneous nerves of the forearm and posterior cutaneous nerve of the forearm. *Subcutaneous tissue*: it contains less fatty tissue; superficial veins from the main trunk of the vein.

Superficial fascia: it is weak layer.

Deep fascia: it is distinguished by its thickness and strictly fixed to the ulna and radius, it is an aponeurosis in the upper half of the forearm, it tends downward and forms the extensor retinaculum and dorsal carpal canal, it forms cellular space which contains deep branch of the radial nerve, posterior interosseous artery, posterior interosseous veins and nerve; deep branch of the radial nerve passes through the canalis supinatorius; posterior interosseous artery passes medial to the posterior interosseous nerve.

Muscles:

Superficial muscles: extensor carpi radialis longus muscle, extensor carpi radialis brevis muscle, extensor digitorum muscle, extensor digiti minimi muscle, extensor carpi ulnaris muscle.

Deep muscles: supinator muscle, abductor pollicis longus muscle, extensor pollicis longus muscle, extensor pollicis brevis muscle, extensor indicis muscle.

TOPOGRAPHY OF THE PALMAR REGION OF THE HAND

Landmarks: styloid processes of the ulna and radius, skin fold of the wrist joint, metacarpal bones, phalanges of fingers.

Borders: 2 cm above the styloid process of the ulna, 2 vertical lines are drawn along the ulna and radius and divide the hand region into the palmar and dorsal regions.

Layer:

Skin: it is thick with limited movement, stratum corneum is well developed in this region, it contains sweat glands and sebaceous glands, it is innervated by the radial nerve, ulnar nerve and median nerve.

Subcutaneous tissue: it contains vessels, nerves and lymphatic vessels with lymphatic nodes, it contains the superficial palmar branch of the radial artery. *Superficial fascia*: it is a continuation of the superficial fascia of the forearm, it is slightly movable and fixed to the bones.

Deep fascia: it stretches from the palmar longus tendon to the ligamentum carpi volare, it forms the palmar aponeurosis, flexor retinaculum, synovial sheaths of the hand and fingers.

Flexor retinaculum: it is the strongest and thickest fascia which is fixed to the bone. Between the eminentia carpi ulnaris and eminentia carpi radialis, flexor retinaculum converts the sulcus carpi into the canalis carpi. Then the flexor retinaculum forms the canalis carpi radialis and canalis carpi ulnaris. *Synovial sheath of the thumb*: it is situated laterally, this long and narrow canal encloses the tendon of the flexor pollicis longus, superiorly this sheath protrudes 1-2 cm proximal to the flexor retinaculum, inferiorly it extends on the tendon to the base of the distal phalanx the thumb.

Synovial sheath of the index, middle and ring fingers: these 3 fingers have common sheaths on the palmar surface; they have separate sheaths in the segment of the distal halves of the metacarpal bones; these sheaths stretch from the line of the metacarpophalangeal joints to the base of the distal phalanges. *Synovial sheath of the little finger*: it covers the flexor digitorum superficialis and profundus muscles; superiorly this sheath protrudes 1-2 cm proximal to the flexor retinaculum; inferiorly it extends on the flexors until the base of the distal phalanx of the little finger.

For all fingers: on the phalangeal shafts, synovial sheaths of the fingers are covered by the dense annular fibrous sheaths; on the phalangeal joints, synovial sheaths of the fingers are covered by the thin cruciform fibrous sheaths; the tendons are connected with the thin mesotendineum,

which transmit blood vessels and nerves. ***Canals of the anterior region of the hand:***

Canalis carpi ulnaris: it is formed by a fascia around the pisiform bone; this canal contains ulnar artery and nerve; then it passes under the palmaris brevis muscle. ***Canalis carpalis:*** it is formed by a fascia between the flexor retinaculum and bones (scaphoid bone, trapezium bone, pisiform bone and hamate bone). This canal contains median nerve, 4 flexor digitorum superficialis tendons and 4 flexor digitorum profundus tendons; there are 2 separate synovial sheaths: 1 for the tendons of the flexor pollicis longus muscle; it forms common synovial sheaths of the flexor tendons medially and a sheath for the tendon of the flexor pollicis longus muscle laterally.

Canalis carpi radialis contains tendon of the flexor carpi radialis muscle.

Muscles:

Thenar muscles: abductor pollicis brevis muscle, opponens pollicis muscle, flexor pollicis brevis muscle, adductor pollicis muscle.

Hypothenar muscles: abductor digiti minimi muscle, opponens digiti minimi muscle, flexor digiti minimi brevis muscle, palmaris brevis muscle.

Median muscle group: lumbrical muscles, palmar interosseous muscles, dorsal interosseous muscles.

TOPOGRAPHY OF THE DORSAL REGION OF THE HAND

Layers:

Skin: it is thin and movable, it contains hair follicles, sweat glands and sebaceous glands, furuncles tend to occur in this region, it is innervated by the ulnar, median and radial nerves.

Subcutaneous tissue: it contains loose connective tissue, the cephalic (radial margin) and basilic vena which then form a vascular network between them, it also contains the radial nerve and ulnar nerve.

Superficial fascia:

It is fixed to the styloid process and bones of the wrist.

Deep fascia: It forms the extensor retinaculum, it has 6 canals which are formed by the extensor retinaculum with the carpal bones.

The 6 canals contain: tendon of the extensor carpi ulnaris muscle, tendon of the extensor digiti minimi muscle, tendons of the extensor digitorum and extensor indicis muscles, tendon of the extensor pollicis longus muscle, tendons of the extensor carpi radialis brevis and extensor carpi radialis longus muscles, tendons of the extensor pollicis brevis and abductor pollicis longus muscles, tendons of the extensor pollicis brevis and abductor pollicis longus muscles. On dorsal part of the fingers, tendons of the extensors consist of 3 parts. Tendons from the median part are fixed to the middle phalanges, while tendons from the medial and lateral parts are fixed to the distal phalanges. Aponeurotic tension is located above the proximal phalanges. Distal suffering from the ulnar nerve palsy may show this pose: extension of the proximal phalanges, flexion of the distal and middle phalanges.

TOPOGRAPHY OF THE WRIST

ANTERIOR COMPARTMENT OF THE WRIST

Landmarks:

Structures passing superficial to the flexor retinaculum: flexor carpi ulnaris tendon, ulnar nerve, ulnar artery, palmar cutaneous branch of the ulnar nerve, palmaris longus tendon, palmar

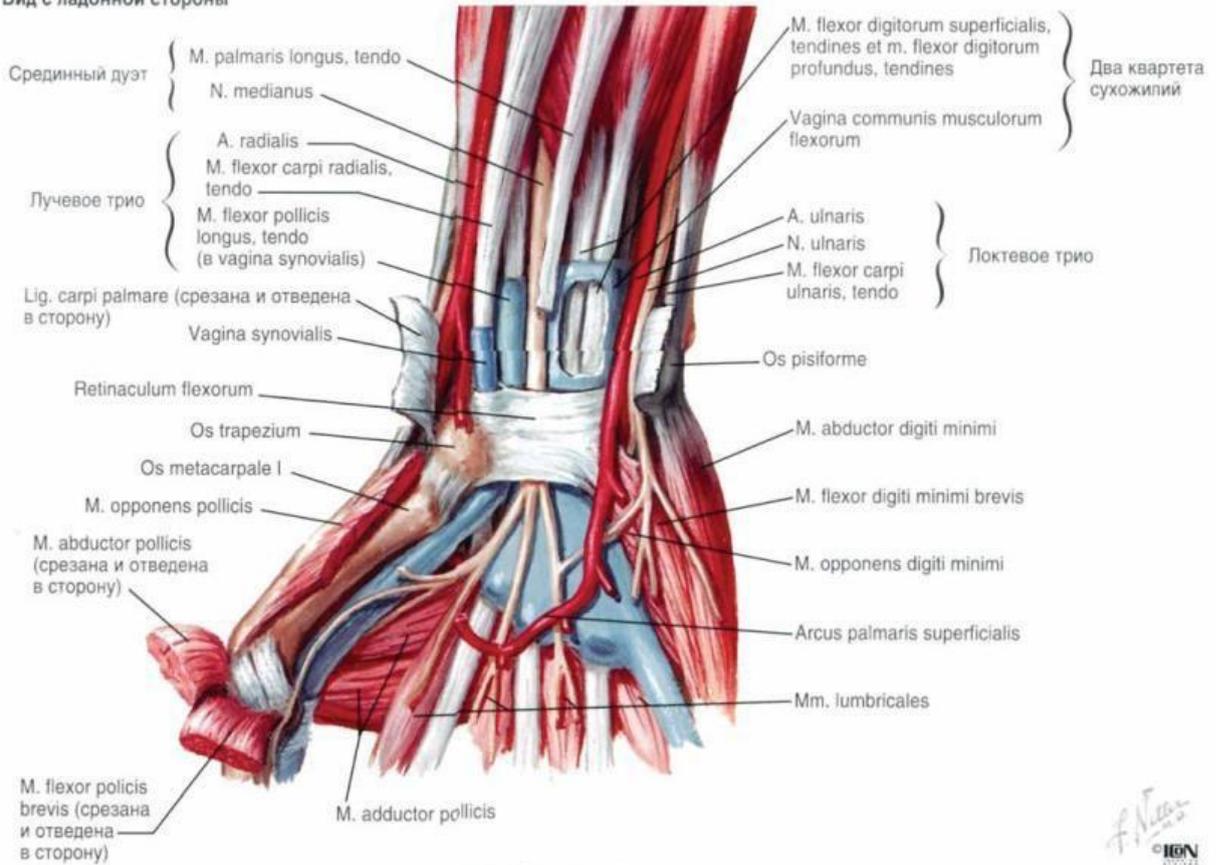
cutaneous branch of the median nerve. Structures passing deep to the flexor retinaculum: flexor digitorum superficialis tendon, median nerve, flexor pollicis longus tendon, flexor carpi radialis tendon.

POSTERIOR COMPARTMENT OF THE WRIST

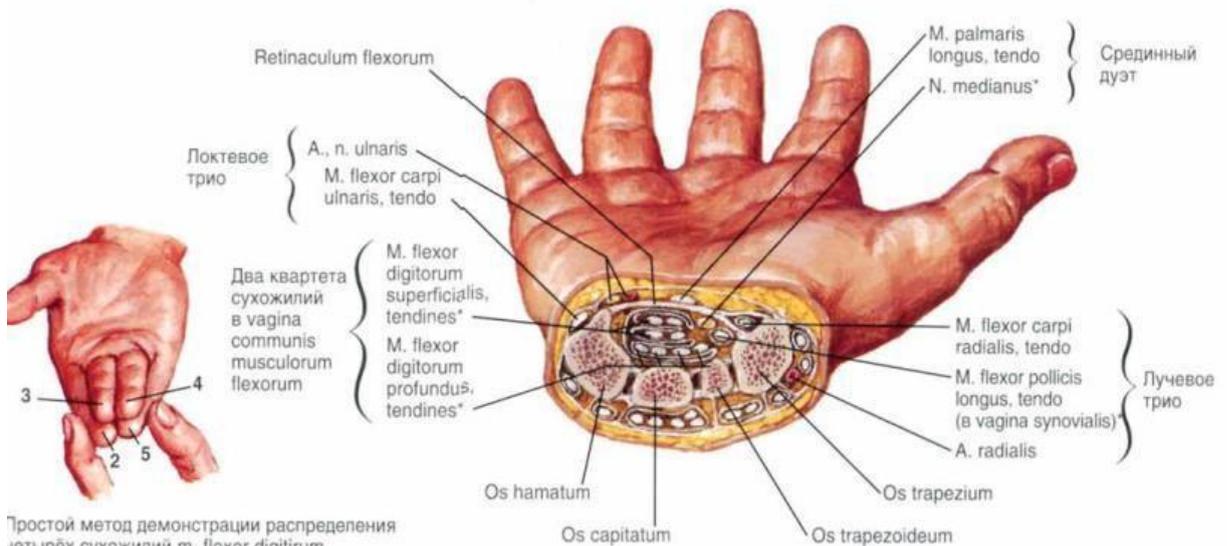
Structures passing superficial to the extensor retinaculum: ulnar nerve, basilica vein, cephalic vein, radial nerve.

Structures passing beneath the extensor retinaculum: tendon of the extensor carpi ulnaris muscle, tendon of the extensor digiti minimi muscle, tendon of the extensor digitorum and extensor indicis muscles, tendon of the extensor pollicis longus tendon muscle, tendon of the extensor carpi radialis longus and extensor carpi radialis brevis muscles, tendon of the extensor pollicis brevis and abductor pollicis longus muscles.

Вид с ладонной стороны



Поперечный срез через канал запястья



Простой метод демонстрации распределения четырёх сухожилий m. flexor digitorum superficialis в канале запястья.

* Структуры, лежащие в канале запястья

The following articulations may be differentiated at the wrist:

1. ***The radiocarpal articulation*** or wrist-joint, between the radius and the distal surface of the interarticular fibrocartilage on one side, and the scaphoid, semilunar, and cuneiform bones upon the other.
2. **The inferior radio-ulnar articulation** between the sigmoid cavity of the radius and the head of the ulna. This joint is completely separated from the preceding one.
3. ***The intercarpal articulations***, between the carpal bones; ***the carpometacarpal articulations***, between the second row of the carpal bones and the metacarpal bones; ***the intermetacarpal articulations***, between the lateral articular surfaces of the bases of the metacarpal bones. These three sets of articulations usually possess a common synovial membrane; the carpal bones are joined together by the tense interosseous ligaments. The synovial cavity of the joint between the unciform and the fourth and fifth metacarpal bones is occasionally separated from the large synovial cavity of the carpus.
4. The articulation between the pisiform and the cuneiform bones.
5. The articulation of the metacarpal bone of the thumb with the trapezium (saddle- joint). In disarticulating at this joint care must be taken to avoid injuring the articulation between the trapezium and the second metacarpal bone, as such an injury would open up the common synovial cavity of the carpus.

TOPOGRAPHY OF THE FINGERS

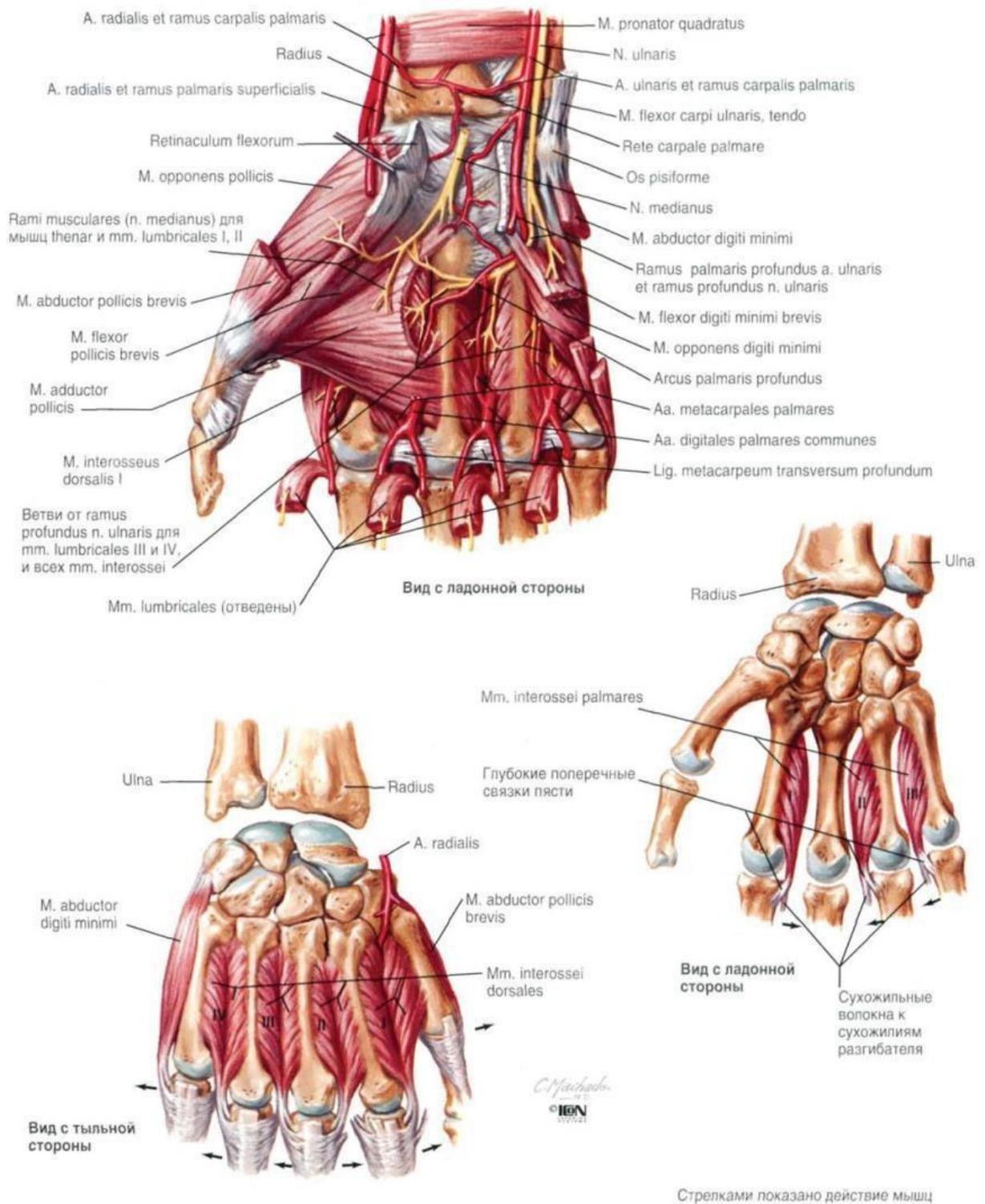
Layers:

Skin: it is thicker in the palmar surface and thinner in the dorsal surface, on the palmar surface, hair follicles and sebaceous glands are absent but sweat glands are present, on the dorsal surface, hair follicles, sebaceous glands and sweat glands are present.

Subcutaneous tissue: it is thin and surrounds the tendinous sheath of the flexor digitorum profundus and flexor digitorum superficialis muscles; the sheath of the index, middle and ring fingers terminates at the level of the metacarpal bones; for the thumb and little finger, it continues to the palm and forms the ulnar and radial bursae connecting with Pirogov's space; on the dorsal surface, tendon of the extensor digitorum muscle does not have any sheath and is connected deep with phalanges.

Superficial fascia: it is almost absent and transformed into the fibrous bundles from the skin to tissue.

Deep fascia: on the phalangeal shafts, synovial sheath of the finger are covered by the dense annular fibrous sheaths; on the phalangeal joints, synovial sheaths of the fingers are covered by the thin cruciform fibrous sheaths.



GROOVES, CANALS AND FATTY TISSUE OF THESE REGIONS

Forearm:

Sulcus radialis: it lies between the brachioradialis and flexor carpi radialis muscles; it contains the superficial branch of the radial nerve, radial artery and vein.

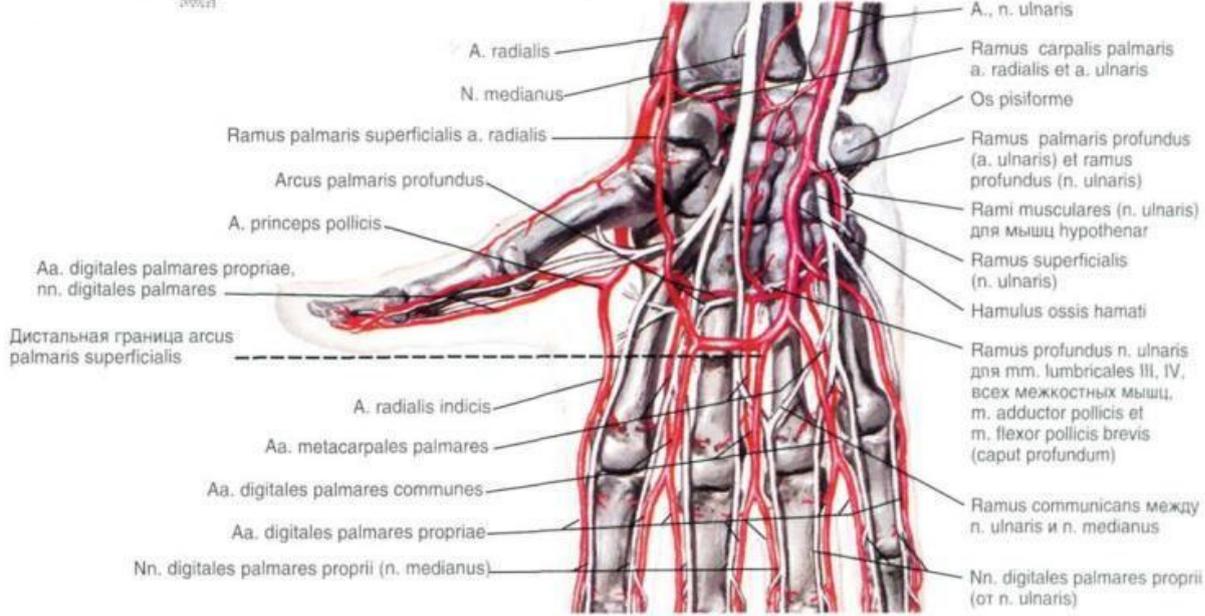
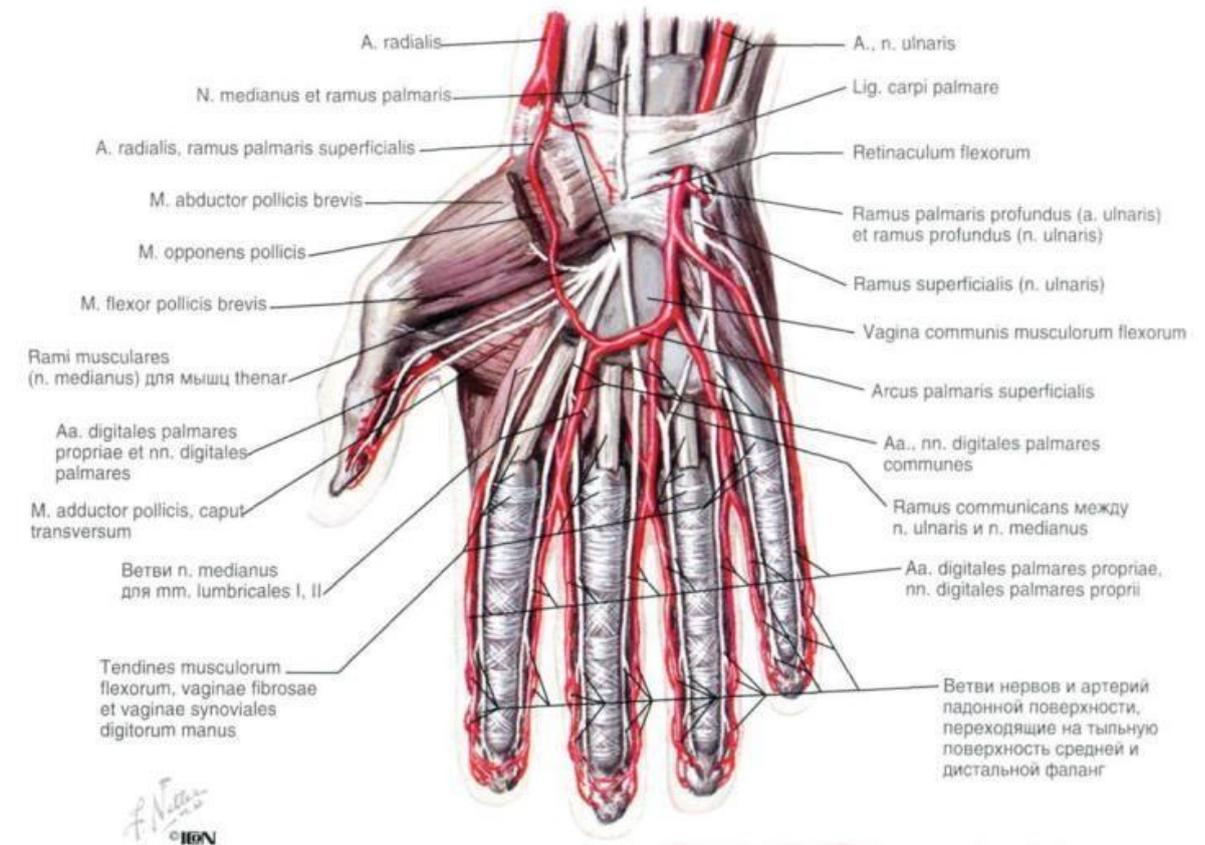
Sulcus ulnaris: it is lodged between the flexor carpi ulnaris and flexor digitorum superficialis muscles; it contains the ulnar artery, vein and nerve.

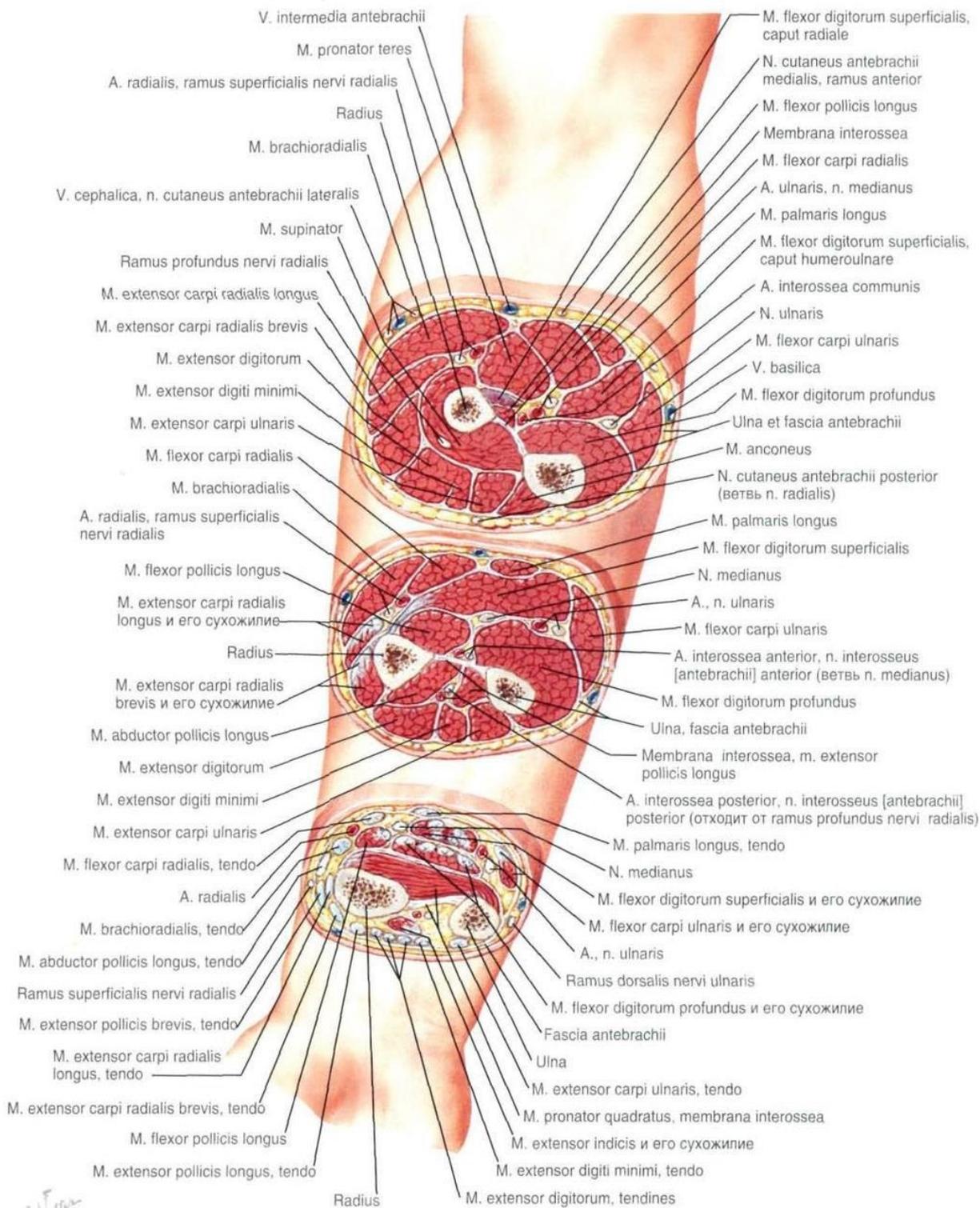
Sulcus medianus: it lies between the flexor carpi radialis and flexor digitorum superficialis muscles; it contains the medial nerve.

Wrist and hand:

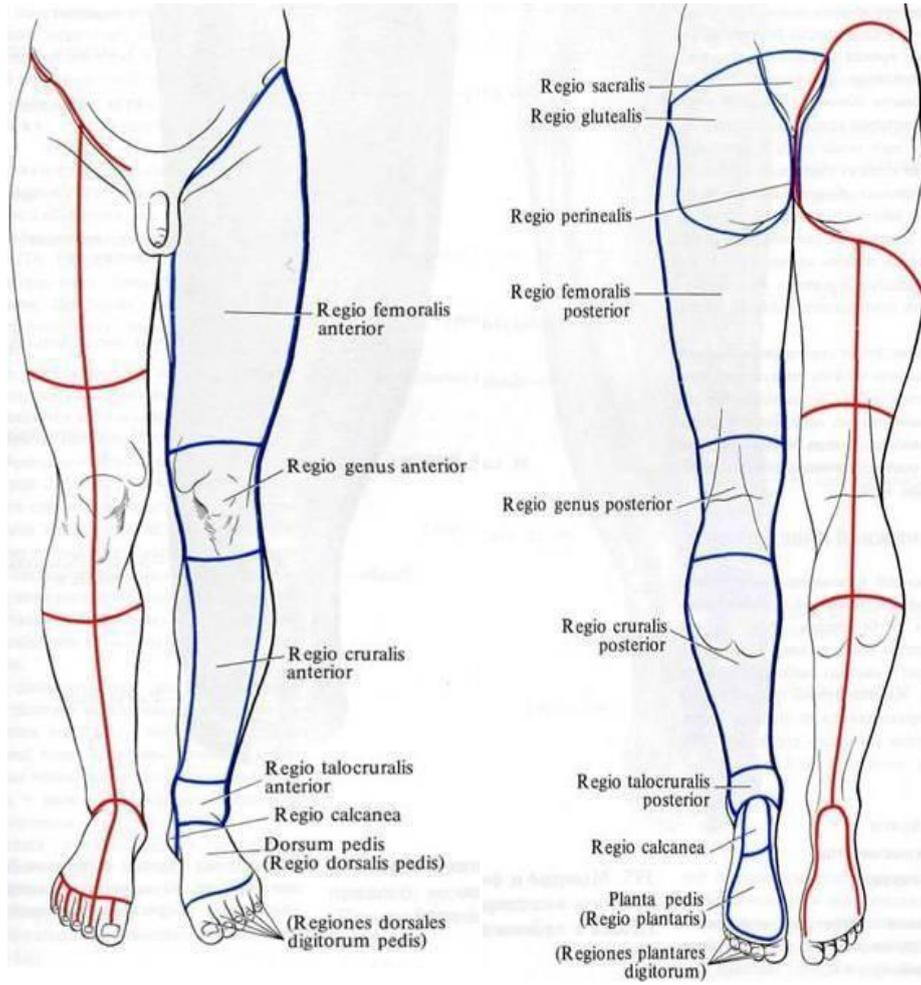
Canalis carpi ulnaris: it contains the ulnar artery, vein and nerve

Canalis carpi radialis: it contains the tendon of the flexor carpi radialis, it contains the superficial branch of the radial nerve and palmar branch of the radial artery.





Topographic anatomy of the main vessels of the lower limb. General characteristics. Clinical anatomy of the gluteal region. Topography of the hip joint.



GENERAL CHARACTERISTICS

Borders of the lower extremity

Anterior: pubic symphysis – pubic tubercle-inguinal ligament – anterior superior iliac spine – iliac crest. Posterior: imaginary line drawn from the posterior superior iliac spine to the middle point between the 2nd and 3rd sacral vertebrae.

The lower extremity is divided into the following regions:

- 1) gluteal region (region glutea)
- 2) anterior and posterior femoral regions (regions femoris anterior et posterior)
- 3) anterior and posterior regions of the knee (regions genu anterior et posterior)
- 4) anterior and posterior regions of the leg (regions cruris anterior et posterior)
- 5) anterior, posterior, lateral and medial regions of the ankle joint (regions articulationis talocruris anterior, posterior, lateralis et mediales)
- 6) dorsal foot region (region dorsi pedis)
- 7) region of the sole (region plantae pedis)

CLINICAL ANATOMY OF THE GLUTEAL REGION

Borders:

Superior: iliac crest. Inferior: gluteal fold. Medial: spinous process of the sacrum and coccyx. Lateral: imaginary line drawn from the anterior superior iliac spine to the greater trochanter.

Layers:

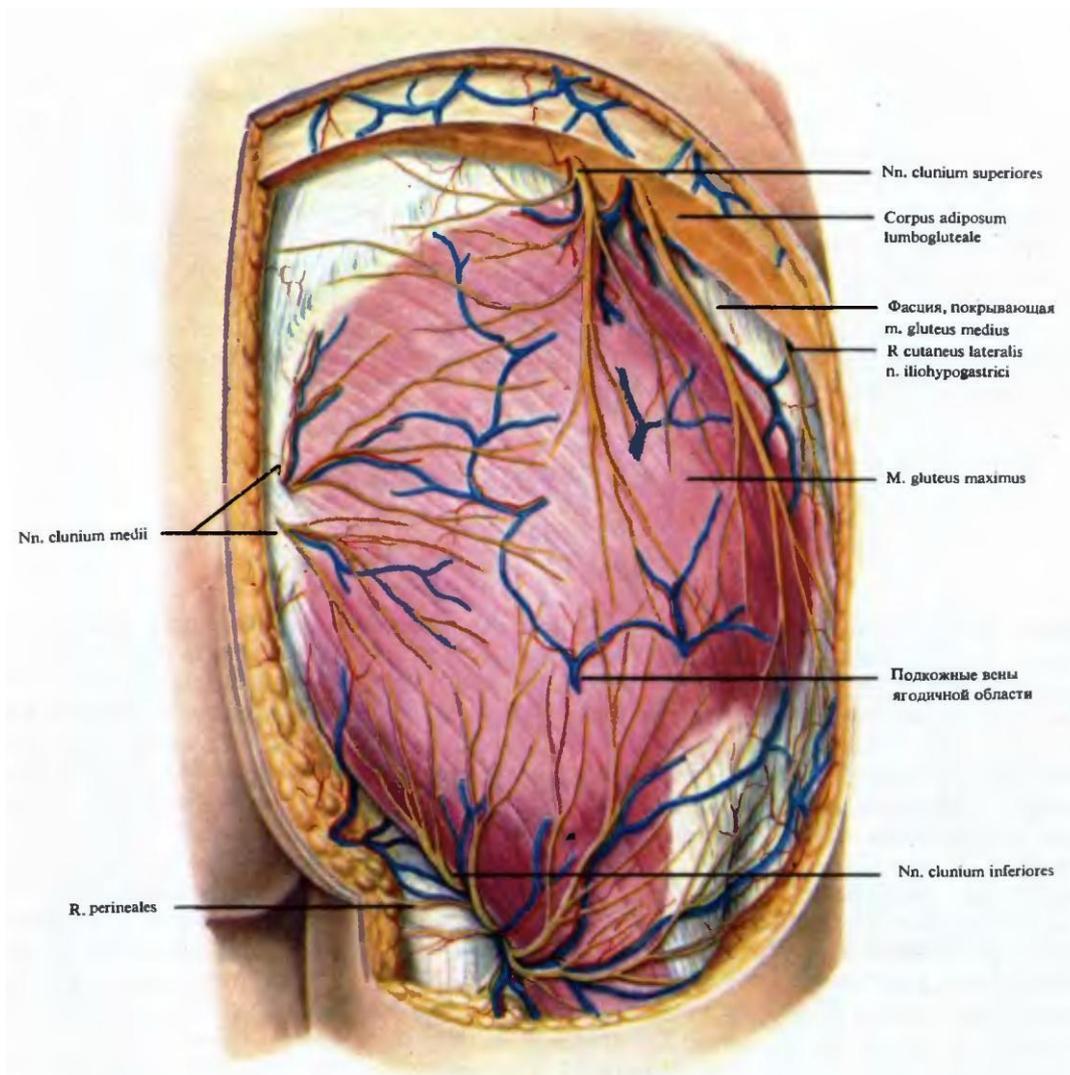
Skin: it's thick, hair follicles are found mainly on the medial side, sweat glands are distributed on the lateral side, sebaceous glands are found mainly on the middle side. *Subcutaneous tissue*: the superficial fascia separates this tissue into 2 layers. The superficial layer is attached to the skin and forms cellular structure. The deep layer is a fatty space which continues to the lumbar region superiorly. It contains branches of the superior and inferior gluteal arteries.

Fascia (fascia glutea): It covers the underlying muscles and inferior gluteal arteries. *First layer*: 1 layer of the gluteus maximus muscle (covers the inferior part of the posterior side of the iliac crest to the greater trochanter), ½ layer of the gluteus medius muscle (covers the iliac crest post).

Second layer: ½ layer of the gluteus medius muscle, full layer of the superior and inferior gemelli muscles, periformis muscle, obturator internus muscle and quadratus femoris muscle.

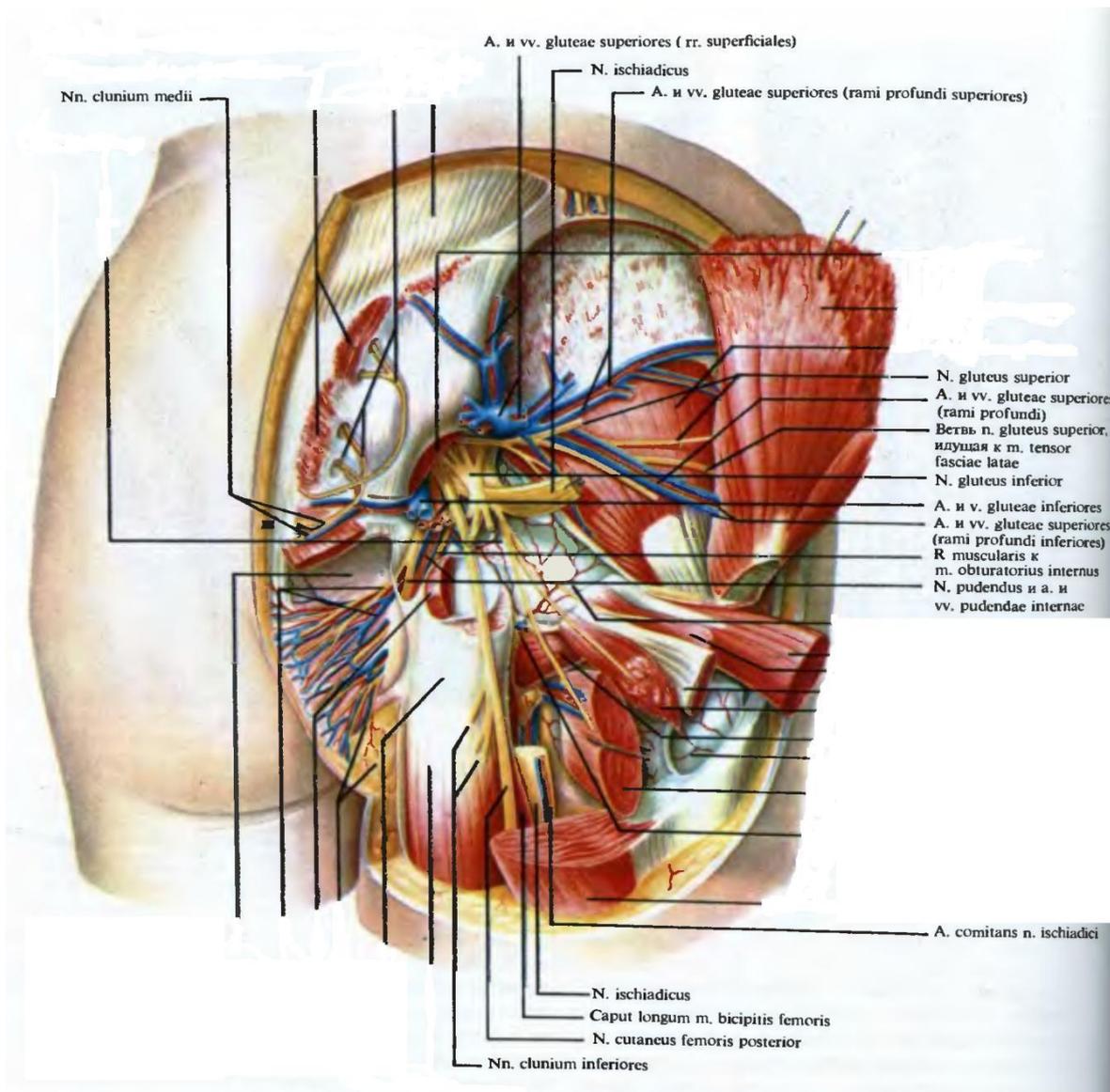
Third layer:

Full layer of the gluteus minimus and obturator externus muscles.



Localization of neurovascular bundles:

The sacrotuberous and sacrospinous ligaments form the greater and lesser sciatic foramina. The greater sciatic foramen is divided into the supra- and infrapiriform foramina by piriformis muscle. The main neurovascular bundles lie in these 2 spaces. **Suprapiriform foramen:** the superior gluteal artery, veins and nerve pass through this foramen. They supply the muscles of the deep layer (2nd and 3rd). **Infrapiriform foramen:** there are 3 neurovascular bundles in this foramen, the 1st bundle consists of the sciatic nerve and arteria contains nervi ischiadici, the 2nd bundle consists of the inferior gluteal artery, inferior gluteal vein and inferior gluteal nerve, the 3rd bundle consists of the internal pudendal artery, internal pudendal vein and pudendal nerve.

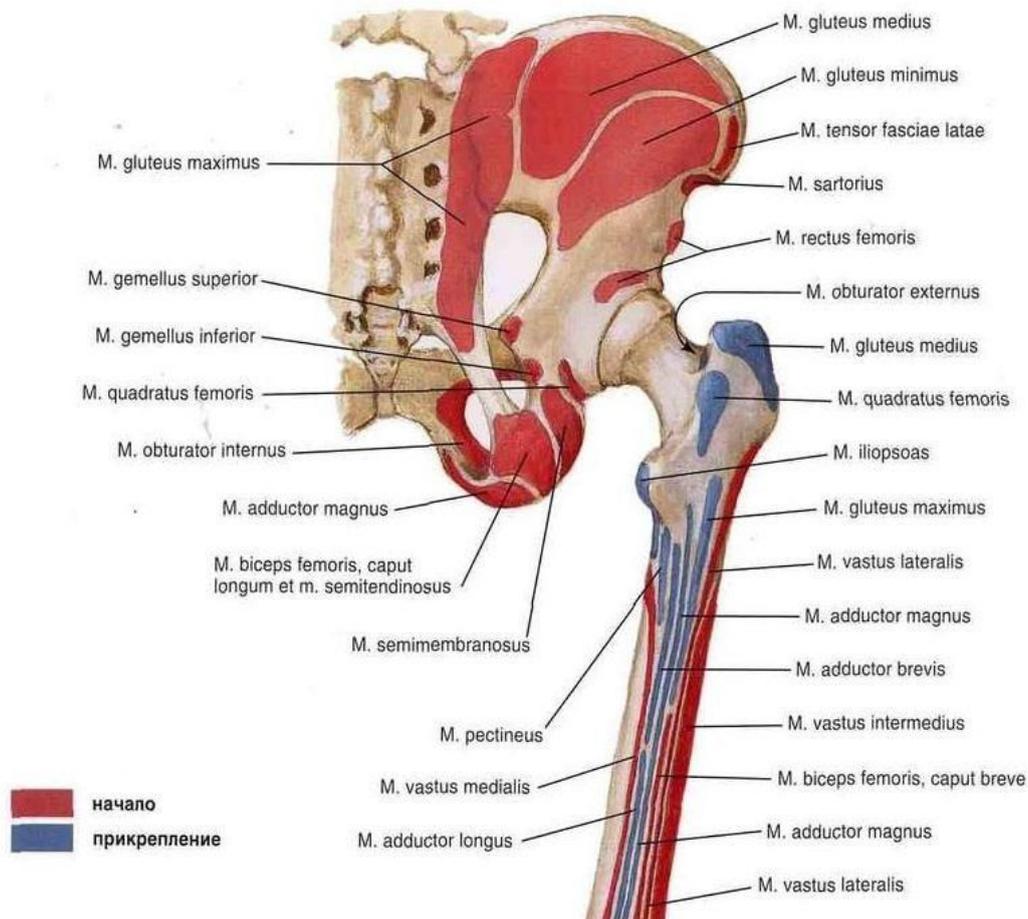


Projection of the neurovascular bundles:

The superior gluteal artery: it passes through the line between the superior and middle 1/3 from the posterior superior iliac spine to the greater trochanter. It's divided into branches, which are the superior and deep branches at the level of the greater sciatic foramen and lie on the periosteum of the wing of the ilium. The short branches run to the piriformis muscle and form an anastomosis with the inferior gluteal artery. The superficial branch is divided on the medial surface of the gluteus maximus muscle. The deep branch goes to the space between the gluteus medius and minimus muscles.

The inferior gluteal artery: it runs from the posterior superior iliac spine downwards and laterally to the medial margin of the ischial tuberosity. It is surrounded by the inferior gluteal veins and nerve. Around the infrapiriform foramen, the sciatic nerve lies lateral to these bundles (artery, veins and nerve) while the pudendal vascular

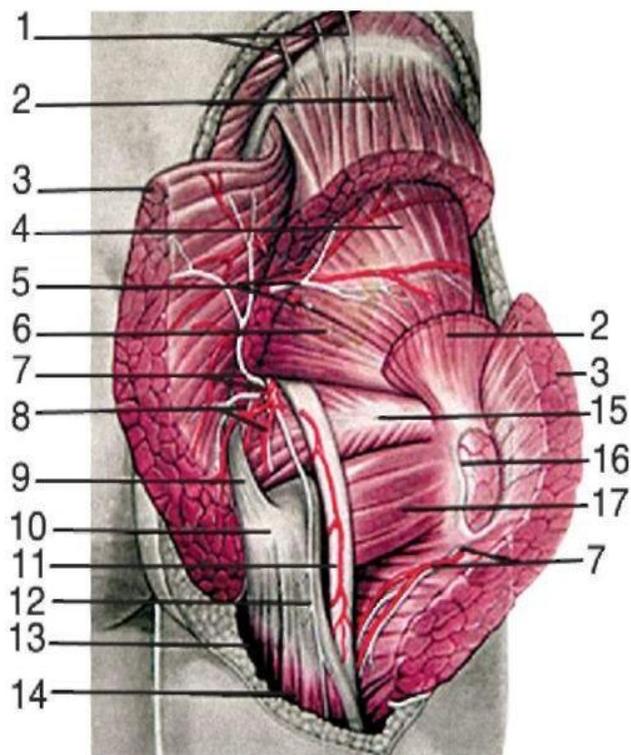
bundles lie medial to them. Lateral these neurovascular bundles penetrate to the fascia and gluteus maximus muscle.



Pudendal neurovascular bundles: they consist of the internal pudendal artery, veins and pudendal nerve. They pass through the infrapiriform foramen medially. Around the infrapiriform foramen, these are the superior margin of the sacrospinous ligament and ischial bone, which form the superior margin of the lesser sciatic foramen. Then these bundles pass through the lesser sciatic foramen inferiorly to the sacrotuberous ligament on the medial surface of the ischial tuberosity. The sacrotuberous ligament covers the obturator internus muscle and fascia. This fascia forms the pudendal Alcock's canal, where the pudendal neurovascular bundles pass through. The pudendal nerve passes downwards and medially from the vessels.

The sciatic nerve: it's situated laterally in the infrapiriform foramen. The posterior cutaneous nerve of the thigh (nervus cutaneus femoris posterior), sciatic artery and arteria comitans nervi ischiadici pass medial to the sciatic nerve. In the lower margin of the gluteus maximus muscle, this nerve is located superficially and is covered by the fascia lata only. Anesthesia of the sciatic nerve is located on the middle point

between the medial margin of the ischial tuberosity and greater trochanter of the femur.



Neurovascular bundles of the gluteal region

- 1 - nn. clunii superiores; 2 - m. gluteus medius; 3 - m. gluteus maximus; 4 - m. gluteus minimus; 5 - a., v., n. glutei superior; 6 - m. piriformis; 7 - a., v., n. glutei inferior; 8 - a., v. pudendae internae et n. pudendus; 9 - lig. sacrotuberale; 10 - tuber ischiadicum; 11 - n. ischiadicus; 12 - n. cutaneus femoris posterior; 13 - m. semimembranosus; 14 - m. semitendinosus; 15 - m. obturatorius internus et mm. gemelli; 16 – край рассеченной bursa trochanterica; 17 - m. quadratus femoris

THE HIP JOINT

The hip joint is the articulation between the acetabulum (os coxae) and head of the femur. It is simple, ball and socket and multiaxial joint: it is reinforced by: intracapsular ligaments (ligamentum capitis femoris, ligamentum transversum acetabulae), extracapsular ligaments (iliofemoral ligament – Bigelow’s Y ligament, pubofemoral ligament, ischiofemoral, zona orbicularis).

The acetabular labrum increases the size of the articular surface. The largest lymph node in this region in the Pirogov’s node. Weak places of the joint capsule. Anterior weak place of this capsule is located between the iliofemoral ligament and pubofemoral ligament. Posterior weak place of this capsule is located under the inferior margin of the ischiofemoral ligament, from the ischial tuberosity and acetabulum to the trochanteric fossa. The obturator externus muscle is located here.

Purulent processes of the paraarticular space may spread to fasciae of the adjacent muscles through these weak places.

Purulent process of the joint capsule may spread to:

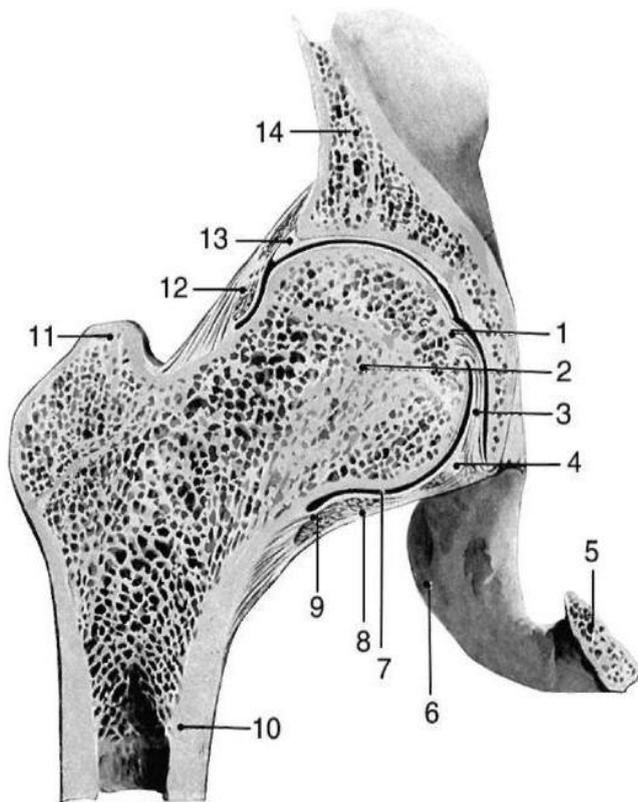
Anterior direction:

- to the medial compartment of the thigh, through the space between the pubic bone and pectineus muscle from the medial margin of the iliopsoas muscle.
- to the suprapatellar bursa from the lateral margin of the iliopsoas muscle (pus sometimes passes between rectus femoris and vastus intermedius muscles).
- to the adductor canal (canalis adductorius) along the femoral vessels (it is more threatening)

Posterior direction:

- to the posterior direction under the gluteus maximus muscle through the fissure between the quadratus femoris and inferior gemellus muscles.
- to the gluteal region along the obturator internus muscle, medial circumflex artery and veins under the gluteus maximus muscle.
- to the gluteal region and fissure between the gluteus medius and minimus muscles along the

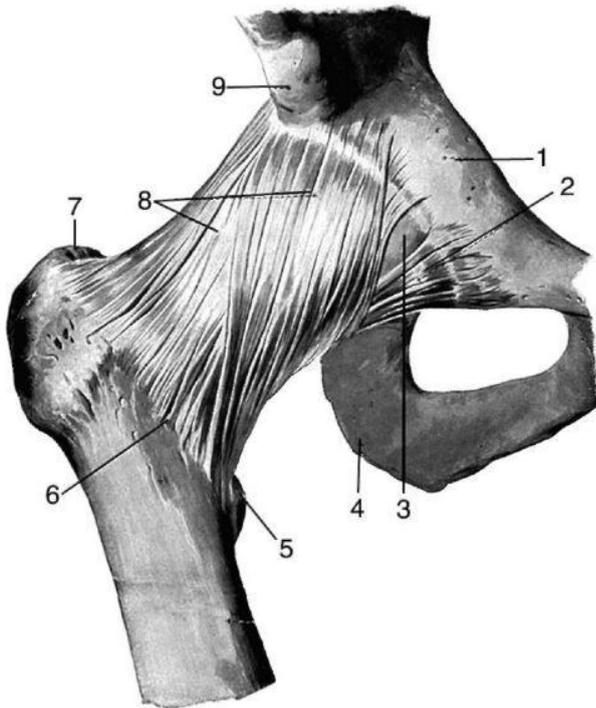
lateral circumflex artery and veins, from the space between the Sartorius and rectus femoris muscles or from the tensor fasciae latae muscle.



Hip Joint

1 - fovea capitis femoris; 2 - caput femoris; 3 - lig. teres femoris; 4 - lig. transversum acetabuli; 5 - ramus inferior ossis ischii; 6 - tuber ischiadicum; 7 - cavum articulare; 8 - capsula articularis; 9

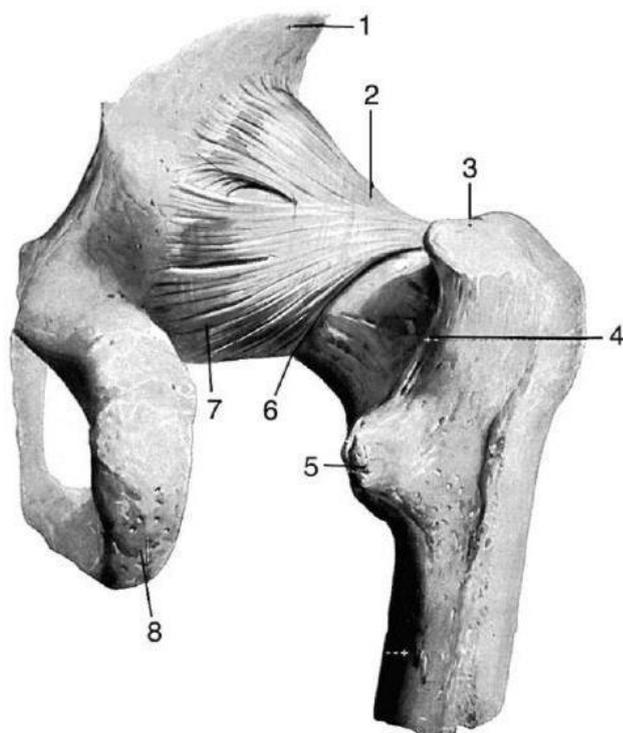
- zona orbicularis; 10 - corpus femoris; 11 - trochanter major; 12
- zona orbicularis; 13 - labrum glenoidale; 14 - os ilium.



Extracapsular ligaments

1 - eminentia iliopubica; 2 - lig. pubofemorale; 3 - anterior weak point; 4 - tuber ischiadicum; 5 - trochanter minor; 6 - linea trochanterica; 7 - trochanter major; 8 - lig. iliofemorale; 9

- spina iliaca anterior superior



Inferioposterior “weak” point.

1 - os ilium; 2 - lig. iliofemorale; 3 - trochanter major; 4 - crista intertrochanterica; 5 - trochanter minor; 6 - заднее «слабое место» капсулы сустава; 7 - lig. ischiofemorale; 8 - tuber

Other directions:

- to the lesser pelvis from the lateral surface of the obturator externus muscle along the obturator artery, veins and nerve through the obturator canal.
- to the medial side of the thigh through the posteroinferior weak place of the hip joint along the fascia of the obturator internus muscle (where the adductor muscle is located here). From here, pus may penetrate to the lesser pelvis along the obturator canal.
- to the posterior thigh and lateral margin of the greater trochanter of the femur (it penetrates to the anterior surface of the thigh and fascia of the gluteus maximus muscle).

TOPOGRAPHY OF THE ANTERIOR AND POSTERIOR FEMORAL REGIONS

Borders:

Anterior- pubic symphysis, inguinal ligament, anterior superior iliac spine, imaginary line between the anterior superior iliac spine and greater trochanter; posterior – gluteal fold, fold between the perineal side fold and medial side of the thigh to the pubic symphysis. Inferior – circular line drawn at the level of 2 fingers above the patella. Lateral – 2 vertical lines drawn till lateral and medial epicondyles.

Layers:

Skin: it is thick and movable. There are more hair follicles and sweat glands in males. *Subcutaneous space:* it contains the superficial epigastric artery, external pudendal artery, superficial circumflex iliac artery and veins of the same name. The great saphenous vein passes to the medial side of the whole lower extremity and enters the femoral vein through the saphenous opening (fossa ovale).

Muscles: anterior compartment of the thigh contains the quadriceps femoris, Sartorius and pectineus muscles; also known as the extensor compartment of the thigh. Posterior compartment of the thigh contains the sciatic nerve, semimembranosus, semitendinosus and biceps femoris muscles; also as the hamstring compartment. Medial compartment of the thigh contains the adductor magnus, adductor longus, adductor brevis and gracilis muscles.

The muscles of the hip are grouped about the external and internal surfaces of the pelvis and run to the trochanteric region of the femur.

The *iliopsoas muscle* consists of the psoas major (arising from the sides of the twelfth dorsal and of

the four upper lumbar vertebrae), of the iliacus (arising from the inner surface of the ilium), and of the inconstant psoas minor; it is inserted into the lesser trochanter. Opposing this muscle, we have the large muscles of the buttocks passing to the great trochanter, and also the external rotators coming from the true pelvis. The muscles of the buttocks are the gluteus maximus, medius, and minimus.

The *gluteus maximus* arises from the posterior surface of the ilium behind the superior curved line, from the outer surface of the sacrum and of the coccyx, and from the great sacrosciatic ligament, and goes to the fascia lata and to the tuberositas, glutea femoris (the rough line leading from the great trochanter to the linea aspera). Between its tendon and the great trochanter is situated the large bursa trochanterica. **The *gluteus medius*** arises from the ilium between the superior and middle curved lines (linea glutea posterior and anterior) and runs to the outer surface of the great trochanter.

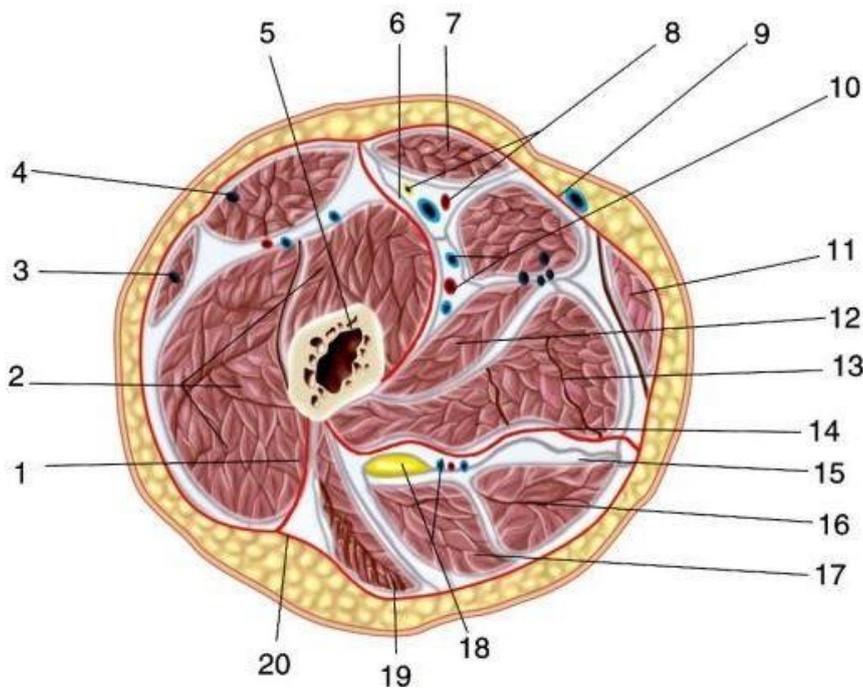
The *gluteus minimus* arises from the ilium between the middle and inferior curved lines (linea glutea anterior and linea glutea inferior) and inserts into the anterior surface of the great trochanter. The external rotators are the piriformis, the obturator internus, the gemelli, the obturator externus, and the quadratus femoris.

The *piriformis*, in relation with the inferior margin of the gluteus medius, passes from the anterior surface of the sacrum through the great sacrosciatic foramen to the trochanteric fossa (foramina suprapiriforme and infrapiriforme).

The *obturator internus* takes origin from the inner surface of the obturator membrane and from the surrounding bones; it leaves the pelvis through the lesser sacrosciatic foramen and passes to the trochanteric fossa, accompanied by the superior and inferior gemelli muscles (arising from the spine and from the tuberosity of the ischium respectively).

The *obturator externus* runs from the outer surface of the obturator membrane to the trochanteric fossa.

The *quadratus femoris* passes from the tuberosity of the ischium to the crista intertrochanterica (linea quadrati).



(upper 1/3 of the thigh)

1 - septum intermusculare laterale; 2 - mm. vastus lateralis, medialis, intermedius; 3 - m. tensor fasciae latae; 4 - m. rectus femoris; 5 - os femur; 6 - septum intermusculare mediale; 7 - m. sartorius; 8 - a. et v. femorales, n. saphenus; 9 - v. saphena magna; 10 - a. et vv. profundae femoris; 11 - m. gracilis; 12 - m. adductor longus; 13 - m. adductor magnus; 14 - septum intermusculare posterior; 15 - m. semimembranosus; 16 - m. semitendinosus; 17 - m. biceps femoris (caput longum); 18 - n. ischiadicus et vasa comitans; 19 - m. gluteus maximus; 20 - fascia lata.

FEMORAL (SCARPA'S) TRIANGLE (TRIGONUM FEMORALE)

It is musculofascial triangle on the anterior region of the thigh.

Borders:

Superior: inguinal ligament. Medial: medial edge of the adductor longus muscle. Lateral: Sartorius muscle.

The femoral triangle contains the femoral artery, vein and nerve. The vascular bundle projection of the femoral artery and vein is from the midpoint of the inguinal ligament to the medial epicondyle of the femur (Ken's line).

The floor of this triangle is formed by the pectineus and iliopsoas muscles. Between the pectineus and iliopsoas muscles, sulcus iliopectineus, femoral artery and veins are lodged in this sulcus.

NEUROVASCULAR BUNDLES OF THE FEMORAL TRIANGLE

Femoral artery (arteria femoralis): it passes from the midpoint of the inguinal

ligament to the femoral triangle. Compression of the midpoint of the inguinal ligament can thus stop bleeding from this artery. It is covered anteriorly by the fascia cribrosa of the saphenous opening. This artery is situated lateral to the femoral vein. **The femoral nerve** (nervus femoralis): it is situated lateral to the femoral artery and separated by the iliopectineal arch and fascia of the iliopsoas muscle. Superficial branches of this nerve pectorate the fascia lata through the sheath of the Sartorius muscle and innervate the skin (rami cutanei anteriores). Deep branches of this nerve intersect with the lateral circumflex femoral artery and innervate the quadriceps femoris tendon and pectineus muscle.

The deep femoral artery (arteria profunda femoris): it has 2 branches called the medial circumflex femoral artery (arteria circumflexa femoris lateralis). **The medial circumflex femoral artery** (arteria circumflexa femoris medialis): it passes posteromedial to the femoral artery and vein. It is divided into superficial and deep branches on the medial margin of the iliopsoas muscle. Superficial branch (ramus superficialis arteriae circumflexae medialis) passes to the gracilis muscle. Deep branch (ramus profunda arteriae circumflexae femoris medialis) penetrates the space between the pectineus and obturator externus muscles. It is then divided into the ascending branches which pass to the posterior surface of the thigh. The ascending branch enters the gluteal region in the space between the obturator externus and quadratus femoris muscles. It anastomoses with perforating branches of the deep artery of the thigh and obturator artery.

The lateral circumflex femoral artery (arteria circumflexa lateralis): it is divided into the ascending and descending branches. The ascending branch (ramus ascendens arteriae circumflexae femoris lateralis) passes to the space between the iliopsoas and gluteus medius muscles. Its branches anastomose with the superior gluteal artery to form an arterial network on the greater trochanter of the femur (rete trochanterica). The descending branch (ramus descendens arteriae circumflexae femoris lateralis) passes under the rectus femoris muscle. It passes between the rectus femoris and vastus intermedius muscles and to the arterial network of the knee joint, where it anastomoses with the branches of the popliteal artery (arteria poplitea).

The femoral artery (arteria femoralis): it passes from the midpoint between the pubic symphysis and anterior superior iliac spine to the tuberculum adductorium femoris (Ken's line).

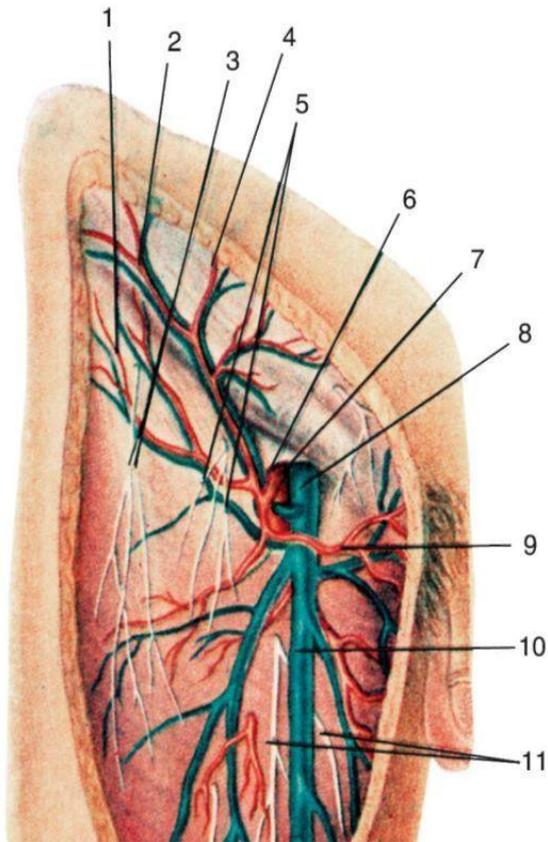
The posterior tibial artery (arteria tibialis posterior): it passes from the point, 1 cm posterior to the medial margin of the medial epicondyle of tibia, to the midpoint between the Achilles tendon and medial malleolus.

The anterior tibial artery (arteria tibialis anterior): it passes from the midpoint between the head of the fibula and tibial tuberosity to the midpoint between the

medial and lateral malleoli.

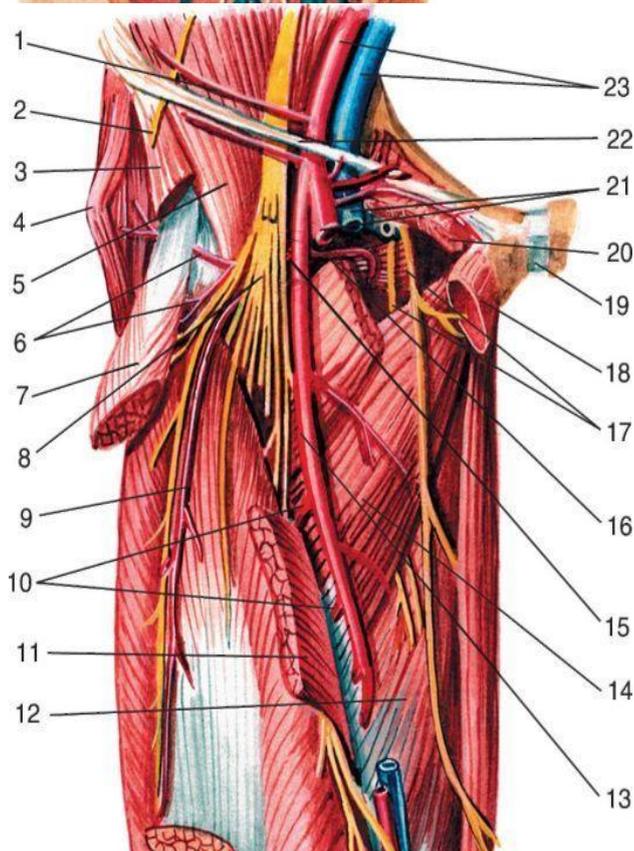
The femoral Vein is to the inner side of the artery above, but gradually passes behind it, so that at the entrance to Hunter's canal the vein is almost entirely concealed by the artery. The nearer we approach to the knee, the firmer becomes the connective tissue between the artery and the vein, for which reason the ligation of the artery in this situation is more difficult on account of the necessary isolation of the vein. **The anterior Crural Nerve**, the motor nerve for the quadriceps and the sartorius muscles, passes to the thigh through the lacuna musculorum to the outer side of the femoral artery and separated from it by the iliopectineal fascia. It is scarcely endangered by the ligation of the artery, and divides just below Poupart's ligament into cutaneous and muscular branches. The longest branch is the cutaneous nerve, designated as the long saphenous, which accompanies the femoral artery to Hunter's canal; the nerve then passes through the anterior wall of the canal, runs beneath the sartorius muscle, perforates the fascia lata behind the insertion of the sartorius, and accompanies the long saphenous vein to the internal malleolus.

The Sciatic Nerve, the motor nerve of the flexors, and often made familiar to the laity by sciatica, leaves the pelvis through the infrapiriform foramen; it lies at first upon the obturator internus and the two gemelli muscles beneath the gluteus maximus, and then upon the quadratus femoris between the great trochanter and the tuberosity of the ischium. It becomes superficial at the lower border of the gluteus maximus muscle and for a short distance is covered only by the skin and fascia. In this situation the nerve is accessible to electric and surgical treatment. In order to expose the nerve the patient is placed upon the abdomen and a line is drawn from the great trochanter to the tuberosity of the ischium; an incision is now made parallel to the inferior margin of the gluteus maximus at the junction of the inner and middle thirds of this line.



Superficial vessels of the femoral triangle:

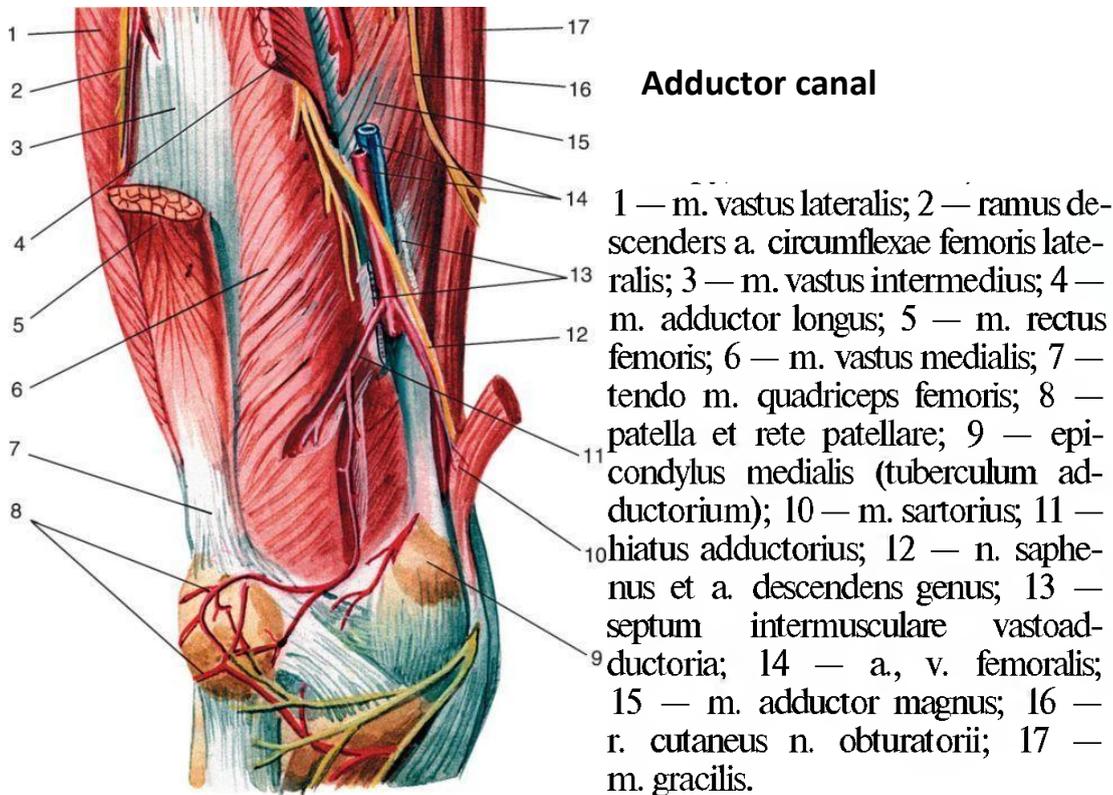
1 - vasa circumflexa ilium superficialia; 2, 4 - vasa epigastrica superficialia; 3 - n. cutaneus femoris lateralis; 5 - n. ilioinguinalis; 6 - hiatus saphenus et margo falciformis; 7 - a. femoralis; 8 - v. femoralis; 9 - vasa pudenda externa; 10 - v. saphena magna; 11 - nn. cutanei femoris anteriores



Vessels and nerves of the femoral triangle

1 - a. circumflexa ilium profunda; 2 - n. cutaneus femoris lateralis; 3 - m. sartorius; 4 - m. tensor fasciae latae; 5 - m. iliopsoas; 6 - rr. ascendens et transversus a. circumflexae femoris lateralis; 7 - m. rectus femoris; 8 - n. femoralis; 9 - ramus descendens a. circumflexae femoris lateralis; 10 - aa. perforantes; 11 - m. adductor longus; 12 - m. adductor magnus; 13 - a. profunda femoris; 14 - m. adductor brevis; 15 - a. circumflexa femoris lateralis; 16 - a. circumflexa femoris medialis; 17 - rr. anterior et posterior n. obturatorii; 18 - m. adductor longus; 19 - symphysis pubica; 20 - m. pectineus; 21 - a., v. femoralis; 22 - lig. inguinale; 23 - a., v. iliaca

The Sartorius muscle, superficial and adductor longus muscles cover this canal. It begins proximally at the inferior angle of the femoral triangle and ends distally at the adductor hiatus. The adductor canal contains 3 foramina: superior foramen – femoral artery and vein pass here and are bounded by the superior margin of the lamina; inferior foramen – popliteal artery and vein pass here (hiatus adductorius); anterior foramen: saphenous nerve and arteria et vena genus descendens pass to the lamina vasoadductoria.



TOPOGRAPHY OF THE ANTERIOR REGION OF THE KNEE

Landmarks: patella, tendon of the quadriceps femoris, patellar ligament, plicae alares, head of the fibula, Gerdy's tubercle, lateral condyle of the femur.

Borders: superior – circular line drawn 6 cm above the patella; inferior – circular line drawn at the level of the tibial tuberosity; medial – line drawn through the posterior margin of the medial epicondyle of the femur.

Layers:

Skin: it is rough, movable, full of folds and contains sweat and sebaceous glands. *Subcutaneous tissue:* it contains less fat. The great saphenous vein nerves and its infrapatellar branches pass here. There are several bursae in this layer, which are the bursa prepatellaris subcutanea, bursa infrapatellaris subcutanea and bursa tuberositas tibiae. There is no superficial fascia.

Fascia: on the anterior surface of the knee joint, it passes from the patella and tendon of the quadriceps femoris muscle to the retinaculum patellae mediale and retinaculum patellae laterale. There are several bursae under this fascia, which are the bursa prepatellaris subfacialis, bursa prepatellaris subtendinea, bursa infrapatellaris profunda and bursa suprapatellaris. The bursa prepatellaris subfacialis and bursa prepatellaris subtendinea are located on the anterior surface of the patella. The bursa suprapatellaris is located under the tendon of the quadriceps femoris muscle. Rete articulare genus is located on the anterior surface of the knee under this fascia. It is an arterial network which is part of the descending genicular artery. Rete patellaris is also located in the fascia of the patellar region.

TOPOGRAPHY OF THE POPLITEAL REGION

Landmarks: on the posterior surface during flexion of the leg on the knee joint, semitendinosus and semimembranosus muscles are palpated medially and superiorly; tendon of the biceps femoris muscle is also palpated superiorly and laterally.

Borders:

Superior – circular line drawn 6 cm above the patella. Inferior – circular line drawn at the level of the tibial tuberosity. Medial – line drawn through the posterior margin of the medial epicondyle of the femur. Lateral – line drawn through the posterior margin of the lateral epicondyle of the femur.

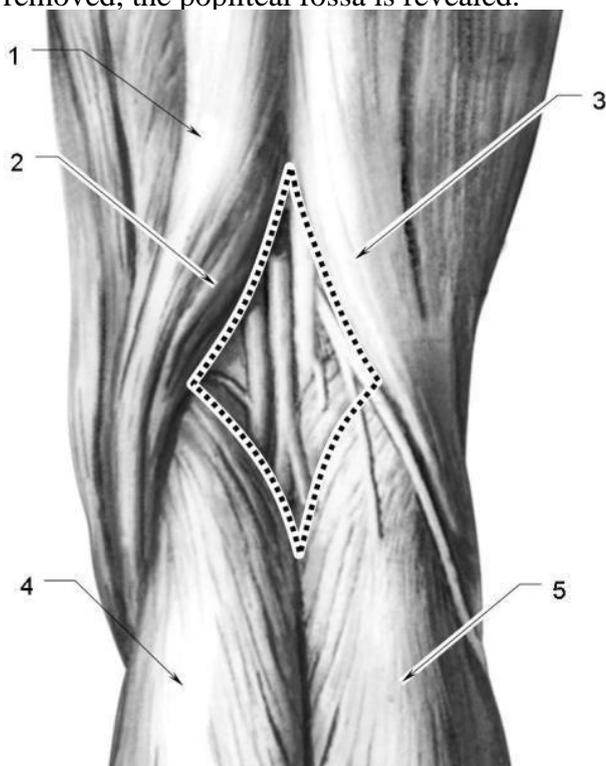
Layers:

Skin: it is thin and forms folds during flexion.

Subcutaneous tissue: it contains lymph nodes (superficial popliteal nodes). It contains the saphenous nerve, lateral sural cutaneous nerve and posterior cutaneous nerve of the thigh.

Superficial fascia;

Deep fascia – it is a continuation of the fascia lata. It serves as an aponeurosis covering the muscles. When this fascia is tensed, pulse from the popliteal artery is felt. When this fascia is removed, the popliteal fossa is revealed.



Vessels and nerves of popliteal region

A – Femoral artery; Б – Femoral vein; В – Tibial nerve; Г – Fibular nerve. 1 – m. semitendineus; 2 – m. semimembranosus; 3 – biceps femoris; 4,5 – m. gastrocnemius

Tibial nerve (nervus tibialis) descends directly through the middle of the popliteal fossa along the popliteal vessels and enters the canalis crurupluteus. It passes downward along with the posterior tibial artery and veins till it reaches the medial malleolus. After passing through the medial malleolus, the tibial nerve is divided into the lateral and medial plantar nerves. In the popliteal fossa, the tibial nerve gives rise to the medial sural cutaneous nerve which innervates the skin of the posteromedial surface of the leg. On the leg, the tibial nerve supplies 3 deep muscles (posterior tibial, flexor hallucis longus and flexor digitorum longus muscles).

Posterior to the medial malleolus, the tibial nerve gives rise to the cutaneous branches (rami calcanei mediales).

The popliteal artery (arteria poplitea) gives off branches around the knee joint, which are the superior medial genicular, superior lateral genicular, middle genicular, inferior medial genicular and inferior lateral genicular arteries.

The superior medial genicular artery passes under the semimembranosus tendon and tendon of the adductor magnus muscle to the superior condyle of the femur.

The superior lateral genicular artery passes under the tendon of the biceps femoris muscle along the knee joint to the superior margin of the lateral condyle of the femur. ***The middle genicular artery*** (unpaired) branches out from the popliteal artery at the level of the fissure of the knee joint and reaches the cruciate ligaments.

The inferior medial genicular artery passes to the medial condyle of the femur. Then it passes under the tibial collateral ligament, tendons of the gracilis, Sartorius and semitendinosus muscles, and medial head of the gastrocnemius muscle.

The inferior lateral genicular artery passes to the lateral meniscus. Then it goes under the fibular collateral ligament. It is covered by the gastrocnemius muscle, compartments of the popliteal artery are distinguished (around the knee joint): The 1st compartment lies in the space between the semimembranosus and vastus medius muscles. The tibial nerve is located 1-2 cm lateral to the popliteal artery.

The 2nd compartment lies in the space between the semimembranosus and gastrocnemius muscles. It gives rise to the arteries of the knee joint and muscles. The 3rd compartment lies on the oblique popliteal ligament. It gives off branches to the muscles.

The 4th compartment is bounded anteriorly by the space between the inferior margin of the popliteus muscle and posterior tibial muscle; posteriorly by the tendineus arch of the soleus muscle.

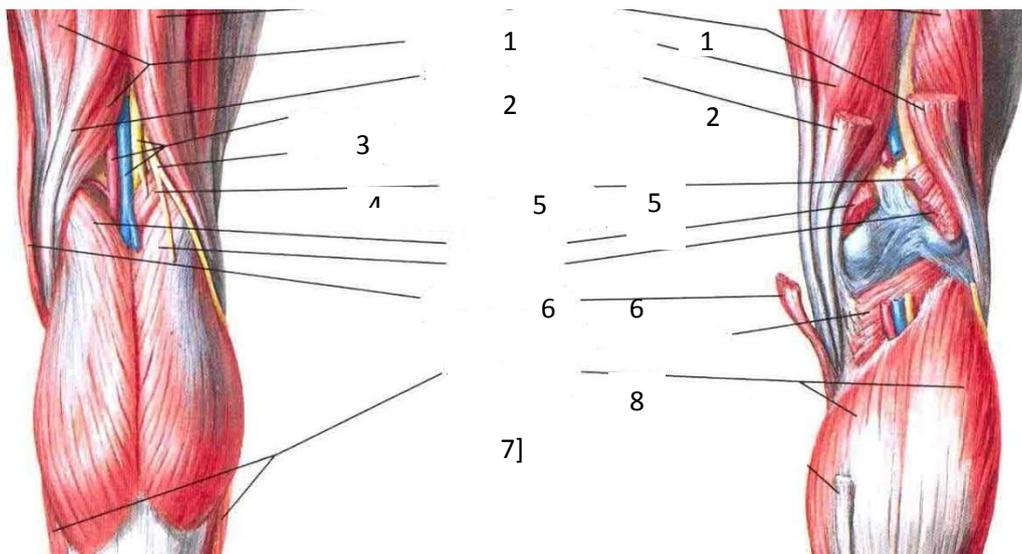
POPLITEAL FOSSA (FOSSA POPLITEA)

It is a shallow depression on the posterior surface of the knee.

Borders:

Superomedial – tendons of the semimembranosus and semitendinosus muscles. Superolateral – tendon of the biceps femoris muscle. Inferior – medial and lateral heads of the gastrocnemius muscle. Its floor consists of the popliteus muscle (constant) and plantaris muscle (inconstant). This fossa contains the fatty tissue in which the deep lymph nodes are lodged.

The neurovascular bundles from the superficial to deep are as follows: tibial nerve, popliteal vein and popliteal artery.



Fossa poplitea

- 1 - m. semimembranosus; 2 - m. semitendinosus; 3- a. et v. poplitea и n. tibialis; 4 - n. peroneus communis; 5 - m. plantaris; 6 - m. gastrocnemius; 7 - m. sartorius; 8 – m. popliteus.

KNEE JOINT (ARTICULATIO GENUS)

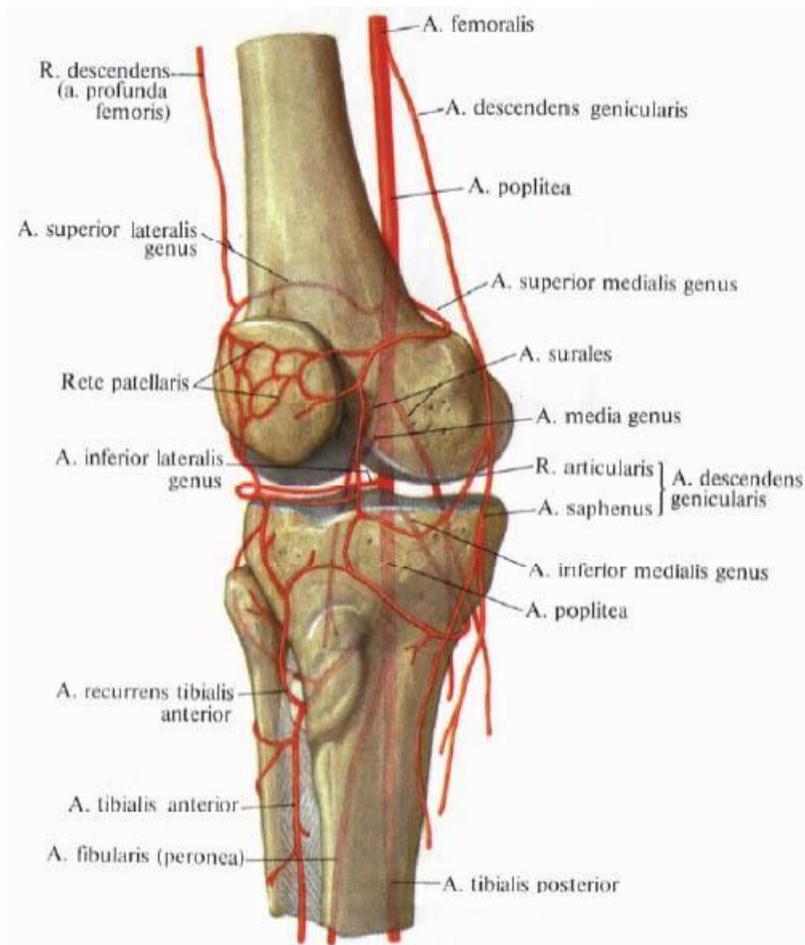
It is the articulation between the medial and lateral condyles of the femur with the medial and lateral articular facets of the tibia. It is a scondylar and biaxial joint reinforced by the intrascapsular ligaments and extrascapsular ligaments: *Intracapsular ligaments*: anterior cruciate ligament – from the lateral condyle to the anterior intercondylar area; posterior – cruciate ligament – from the medial condyle to the posterior intercondylar area; transverse ligament of the knee – between menisci.

Extracapsular ligaments:

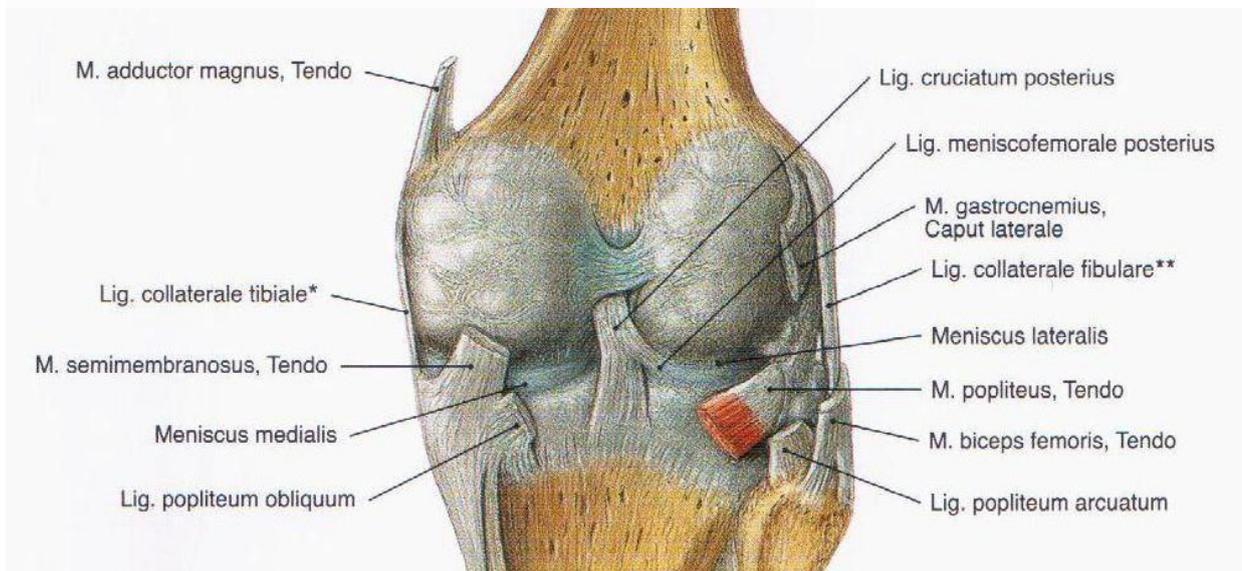
medial – tibial collateral ligament; lateral – fibular collateral ligament; anterior – patellar ligament and tendon of the quadriceps femoris muscle; posterior – oblique popliteal ligament and arcuate popliteal ligament. Medial and lateral menisci are contained within the joint capsule.

The following 3 groups of the arteries participate in the formation of the genicular anastomosis around the knee joint.

1. Descending genicular artery (branch of the femoral artery)
2. Superior medial genicular, superior lateral genicular, inferior medial genicular, inferior lateral genicular, middle genicular arteries (branches of the popliteal artery)
3. Anterior tibial recurrent artery, posterior tibial reccurent artery, circumflex fibular branch (branches of the anterior tibial artery).



Arteries of the knee joint



TOPOGRAPHY OF THE ANTERIOR REGION OF THE LEG

Borders:

Medial – lateral margin of the leg. Lateral – sulcus between the soleus and fibular muscles.

Layers:

Skin: it is thinner on the tibia than other regions.

Subcutaneous tissue: it contains branches of the small saphenous vein, lateral sural cutaneous nerve and superficial fibular (peroneal) nerve laterally. It contains the great saphenous vein and saphenous nerve medially.

Fascia: it is similar to the aponeurosis and covers the extensor muscles of the leg and fibular muscles. It stretches from the periosteum of the anterior surface of the tibia and is attached to the anterior and posterior intermuscular septa and to the fibula. Anterior intermuscular septum is attached to the anterior margin of the fibula and divides muscles of the leg into the anterior and lateral compartments. Posterior intermuscular septum is attached to the posterior compartments.

Muscles and neurovascular bundles:

The muscles of the leg are so arranged that the only portions of the bones which may be distinctly felt are the inner surface, the crest, and the internal malleolus of the tibia, and the head and external malleolus of the fibula.

Anterior compartment: tibialis anterior muscle, extensor hallucis longus muscle, extensor digitorum longus muscle, fibularis tertius muscle, anterior tibial artery and veins, deep fibular nerve.

Lateral compartment: fibularis longus muscle, fibularis brevis muscle, superficial fibular nerve.

The tibialis anticus takes origin from the outer surface of the tibia, from the interosseous membrane, and from the deep fascia, and runs to the inner margin of the sole, where it is inserted upon the plantar surfaces of the internal cuneiform and of the first metatarsal bones.

The extensor longus digitorum arises from the external tuberosity of the tibia, from the interosseous membrane, from the fibula, and from the deep fascia, and inserts by four tendons into the four outer toes; a fifth tendon runs to the base of the fifth metatarsal bone at the outer border of the foot.

The extensor longus hallucis arises at a lower level from the interosseous membrane between the two former muscles and runs to the second phalanx of the great toe. Each of the three muscles possesses an individual synovial sheath in the anterior annular ligament at the ankle.

The peroneus longus. The anterior portion of this muscle arises from the external tuberosity of the tibia, from the head of the fibula, from the anterior intermuscular septum, and from the upper third of the anterior margin of the fibula; the posterior portion arises from the fibula between the head and the lower third of the bone. The tendon runs behind the external malleolus, through the groove of the cuboid bone, and passes obliquely across the sole of the foot to the base of the first metatarsal bone.

The peroneus brevis, which is covered by the preceding muscle, takes origin from the lower two-thirds of the fibula as far down as the external malleolus. The tendon crosses that of the peroneus longus and inserts into the tuberosity of the fifth metatarsal bone. The tendons of both peroneal muscles pass through a common compartment behind the external malleolus, in which situation they are firmly held by two processes of the crural fascia designated as retinacula.

The gastrocnemius arises by two heads from the bone above the femoral condyles; in the middle of the leg the muscle becomes continuous with the tendo calcaneus (Achillis), which inserts into the tuberosity of the os calcis.

The soleus, beneath the preceding muscle, arises from the head and upper third of the fibula and from the oblique line of the tibia and runs downward into the tendo Achillis.

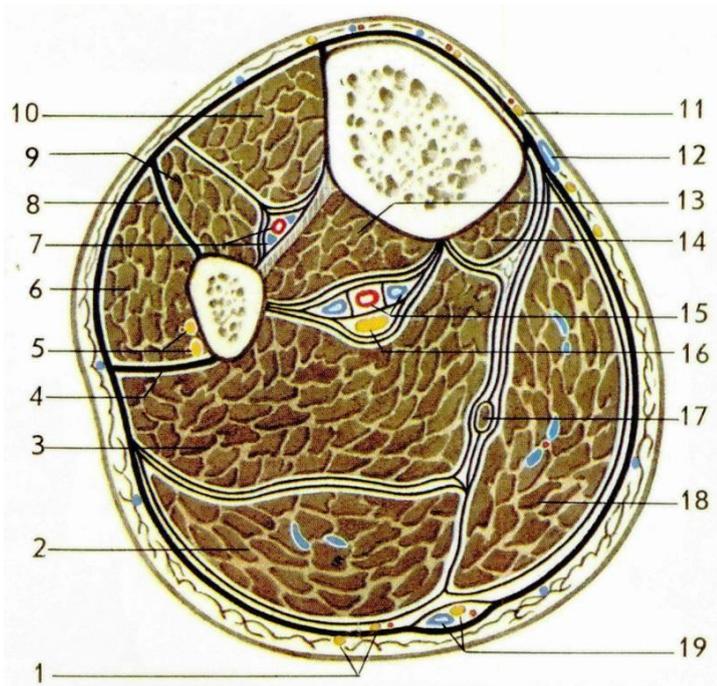
The plantaris, like its analogue in the upper extremity, the palmaris longus, is an inconstant muscle. It arises from the external condyle of the femur above the outer head of the gastrocnemius and its tendon usually runs into the tendo Achillis.

The popliteus runs from the external condyle of the femur and the capsular ligament of the knee-joint to the posterior surface of the tibia as far down as the oblique line. **The flexor longus digitorum** springs from the posterior surface of the tibia. Its tendon crosses to the outer side of the tibialis posticus, enters the sole of the foot, passes beneath and is adherent to the tendon of the flexor longus hallucis, and divides into four tendons for the four lesser toes. These tendons are inserted in a similar manner to those of the flexor profundus digitorum in the hand. **The tibialis posterior** arises from the interosseous membrane and the adjacent portions of the tibia and fibula in the upper portion of the leg between the flexor longus digitorum and the flexor longus hallucis. Its tendon, with that of the flexor longus digitorum, passes behind the internal malleolus to the inner aspect of the sole of the foot, where it is inserted into the internal cuneiform and scaphoid bones. **The flexor longus hallucis** takes origin from the posterior surface of the lower two-thirds of the fibula and from the posterior intermuscular septum. Its tendon runs in the posterior sulcus of the astragalus and Canalis musculoperoneus superior. It is located between the portions of the fibularis longus muscle and fibula. It stretches from the lateral condyle of the femur to the head of the fibula. The common fibular nerve passes through this canal and divides it into the superficial and deep fibular nerves.

Canalis musculoperoneus inferior

Borders:

Anterior – tibialis posterior muscle. Posterior – flexor hallucis longus muscle. Medial – fibula. Superior – peroneus longus muscle. Inferior – peroneus brevis muscle. Contents: fibular artery and its vein.



Upper 1/3 of the leg

- 1 - rami n. cutanei surae lateralis; 2 - m. gastrocnemius (caput laterale);
 3 - m. soleus; 4 - septum intermusculare posterius; 5 - nn. peronei profundus et superficialis; 6 - m. peroneus longus; 7 - vasa tibialia anteriora; 8 - septum intermusculare anterius; 9 - m. extensor digitorum longus; 10 -
 m. tibialis anterior; 11 - n. saphenus; 12 - v. saphena magna; 13 - m. tibialis posterior;
 14 - m. flexor digitorum longus; 15 - vasa tibialia posteriora; 16 -
 n. tibialis; 17 - tendo m. plantaris; 18 - m. gastrocnemius (caput mediale); 19 - v.

saphena parva, n. cutaneus surae medialis.

TOPAGRAPHY OF THE POSTERIOR REGION OF THE LEG

Borders:

Medial – vertical line passing through the medial condyle of the tibia. Lateral – vertical line passing through the lateral condyle of the tibia;

Layers:

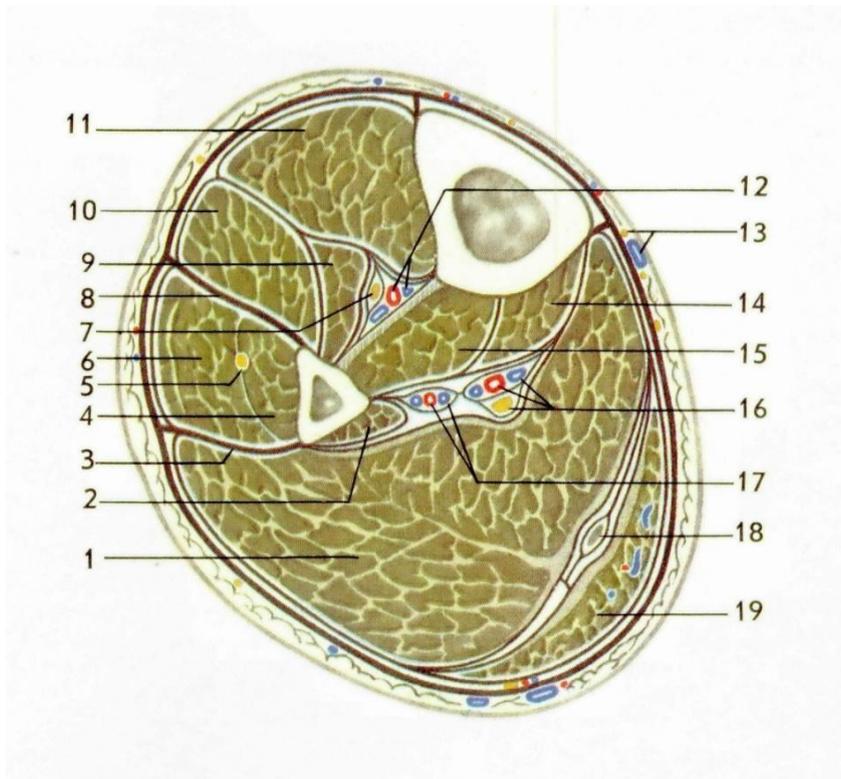
Skin: it is thin and may easily form skin folds. It is innervated by the saphenous nerve.

Subcutaneous tissue: the small saphenous vein, medial sural cutaneous nerve and lateral sural cutaneous nerve pass through this layer.

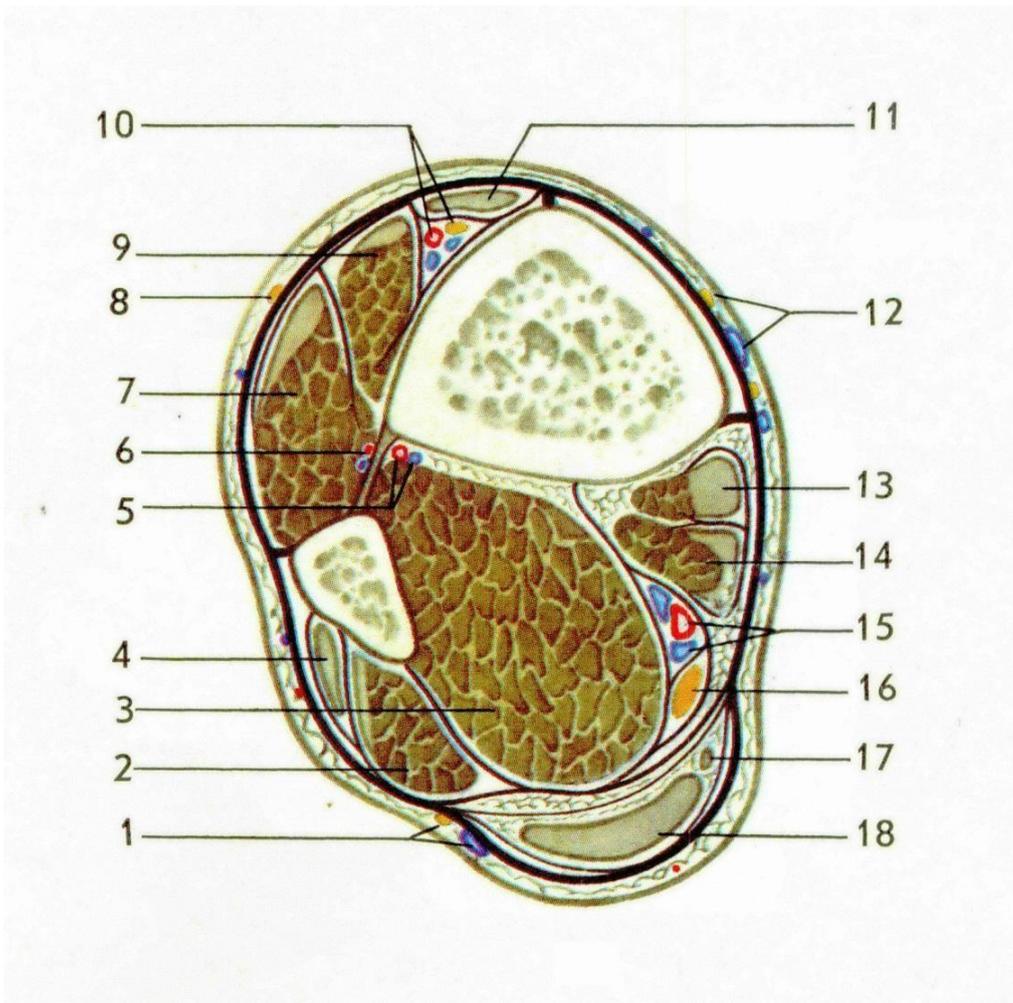
Fascia: it is divided into 2 layers, which are the superficial and deep layers. *Superficial fascia* covers the triceps surae muscle (soleus muscle and gastrocnemius muscle).

Deep fascia covers the deep flexor muscles extensor muscles, which are located in the deep space of the posterior fascial compartment of the knee. This space is bounded anteriorly by the tibia, fibula and interosseous membrane.

Muscles: superficial posterior compartment: triceps surae muscle, plantaris tendon. Deep posterior compartment: flexor digitorum longus muscle, tibialis posterior muscle, flexor hallucis longus muscle, popliteus muscle, posterior tibial artery and veins, tibial nerve, fibular artery and veins.



(Middle 1/3 of the leg) 1 - m. soleus; 2 - m. flexor hallucis longus; 3 - septum intermusculare posterius; 4 - m. peroneus brevis; 5 - n. peroneus superficialis; 6 - m. peroneus longus; 7 - n. peroneus profundus; 8 - septum intermusculare anterius; 9 - m. extensor hallucis longus; 10 - m. extensor digitorum longus; 11 - m. tibialis anterior; 12 - vasa tibialia anteriora; 13 - y. saphena magna, n. saphenus; 14 - m. flexor digitorum longus; 15 - m. tibialis posterior; 16 - vasa tibialia posteriora, n. tibialis; 17 - vasa peronea; 18 - tendo m. plantaris; 19 - m. gastrocnemius.



(Lower 1/3 of the leg) 1 - v. saphena parva, n. suralis; 2 - m. peroneus brevis; 3 - m. flexor hallucis longus; 4 - tendo m. peronei longi; 5 - vasa peronea; 6 - r. perforans a. peronea; 7 - m. extensor digitorum longus; 8 - n. peroneus superficialis; 9 - m. extensor hallucis longus; 10 - a. tibialis anterior, n. peroneus profundus; 11 - tendo m. tibialis anterioris; 12 - v. saphena magna, n. saphenus; 13 - m. tibialis posterior; 14 - m. flexor digitorum longus; 15 - vasa tibialia posteriora; 16 - n. tibialis; 17 - tendo m. plantaris; 18 - tendo Achillis.

NEUROVASCULAR BUNDLES

Posterior tibial artery: a line drawn from the point between the heads of the gastrocnemius muscle to the medial margin of the Achilles (calcaneal) tendon. The initial part of the posterior tibial artery is covered by the superior margin of the soleus muscle which passes above the tendinous arch of the soleus muscle.

It passes to the malleolar canal and space between the tendons of the flexor digitorum longus and flexor hallucis longus muscles. It is divided into the medial and lateral

plantar arteries in the sulcus of the medial margin of the calcaneus. The medial and lateral plantar arteries pass along with the medial and lateral plantar nerves. **The medial plantar artery**, vein and nerve pass to the junction of the fasciae of the median and medial parts. These neurovascular bundles give off branches to the muscles of both parts (median and medial parts) and also give rise to the superficial and deep branches.

The lateral plantar artery passes between the tendons of the flexor digitorum brevis and quadratus plantae muscles.

The medial plantar artery nerve innervates the muscle of the little toe, adductor hallucis muscle, quadratus plantae muscle, 2 lateral lumbrical muscles and all interosseous muscles. This nerve gives rise to nervi digitales plantares propriae, which pass to the little toe and lateral margin of the 4th finger.

The anterior tibial artery: a line drawn from the point between the head of the fibula and tibial tuberosity to the point between the malleoli.

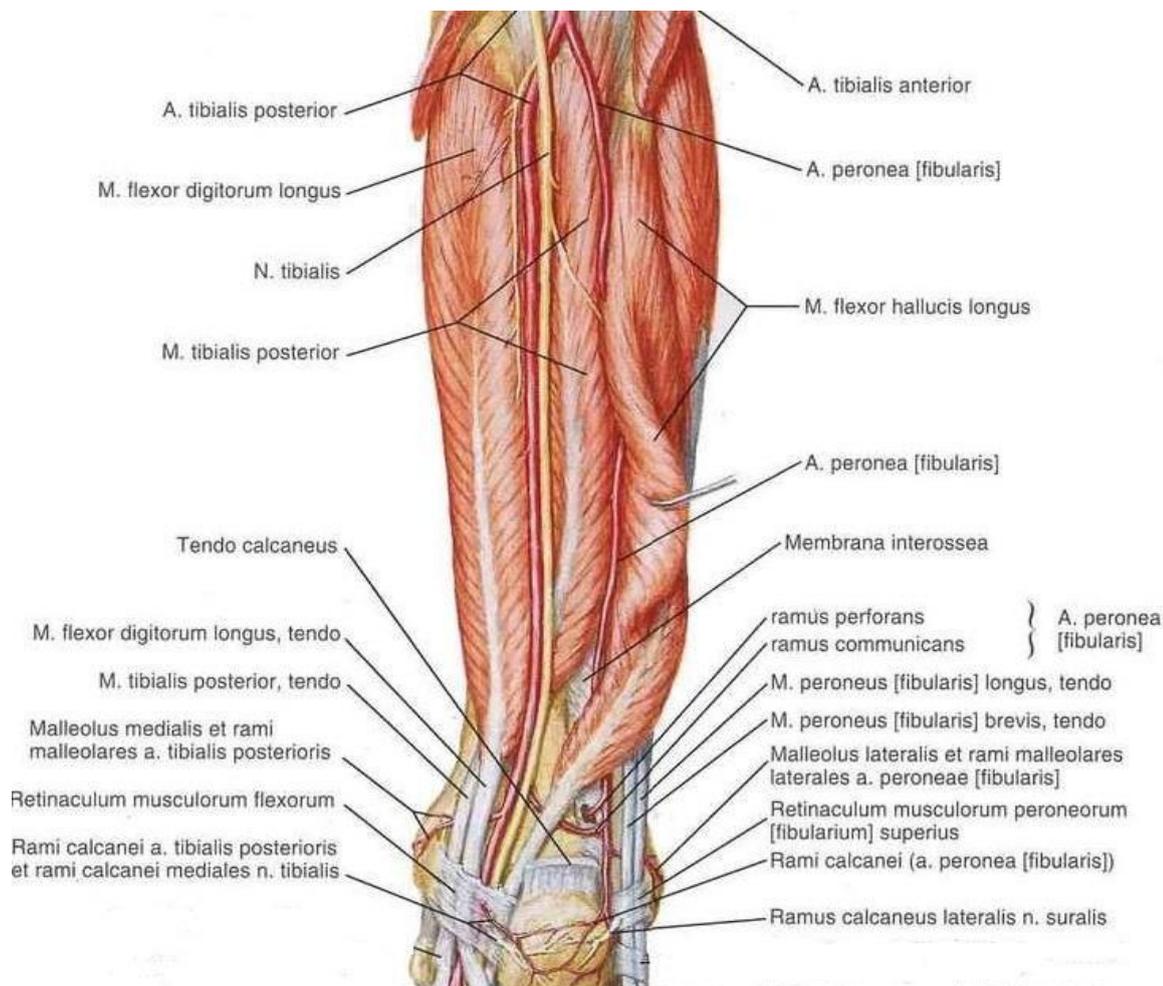
This artery passes to the anterior compartment through the opening of the interosseous membrane and is situated at the medial margin of the fibula 4-5 cm under the head of the fibula. It gives off *arteria recurrens tibialis* anterior and forms an anastomosis with *arteria genus descendens* and *arteria genus inferior medialis*. Then it gives off the *anterior medial malleolar artery* and *anterior lateral malleolar artery*.

The fibular artery: the initial part of this vessel is situated on the posterior surface of the tibialis posterior muscle along the lateral margin of the tibial nerve.

The deep peroneal nerve is located lateral to the vessels on the knee, then penetrates the anterior intramuscular septum and lies lateral to the vessels at first, then crosses anterior to the vessels at the level of the middle point of the malleoli and passes medial to the vessels of the 1st interdigital space. At the level of the intermalleolar line, this nerve gives off a motor branch to the extensor digitorum brevis muscle. It passes with the lateral tarsal artery.

The dorsalis pedis artery is projected from the middle point of the malleolus to the 2nd interdigital space. Then it lies between the fascial coverings of the tendons of the extensor digitorum muscles and fascia interossea.

Before entering the 1st intermetatarsal space, this artery gives rise to the arcuate artery. The arcuate artery gives rise to *arteria metatarsae dorsales*, from which *arteria digitales dorsales* branch off.



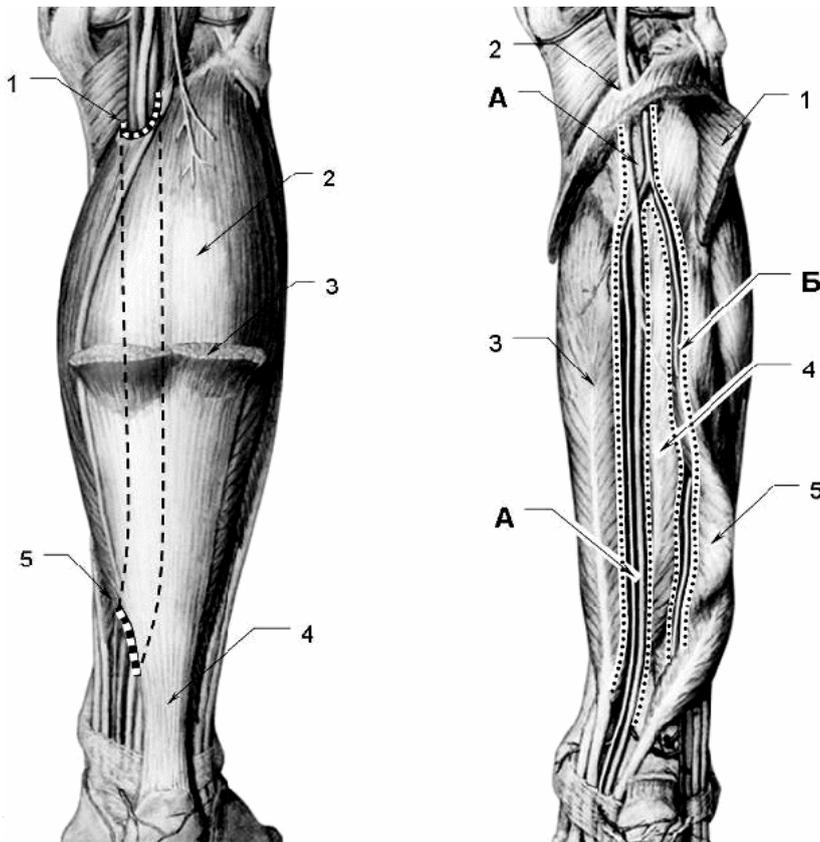
CANALIS CRUROPLOPITEUS

It is bounded anteriorly by the tibialis posterior muscle posteriorly by deep layer of the fascia of the leg and soleus muscle, laterally by the flexor hallucis longus and medially by the flexor digitorum longus muscle.

The entrance of this canal is bounded anteriorly by the popliteus muscle and posteriorly by the tendinous arch of the soleus muscle.

There are 2 exits of this canal which are the superior, anterior and inferior openings. The anterior tibial artery penetrates the anterior compartment of the leg through the anterior opening in the interosseus membrane.

The inferior opening is formed by the tibialis posterior muscle anteriorly and Achilles tendon. The posterior tibial artery, posterior tibial vein and tibial nerve pass to the medial malleolar canal through the inferior opening.



Canalis cruropopliteus Left:

1 – foramen superior; 2 – m. soleus; 3 – m. gastrocnemius; 4 – Achilles tendon.

Right:

1 – m. gastrocnemius; 2 – upper ring; 3 – m. flexor digitorum longus; 4 – m. tibialis posterior; 5 – m. flexor hallucis longus.

A –tibial artery and tibial nerve.

Б – fibular artery.

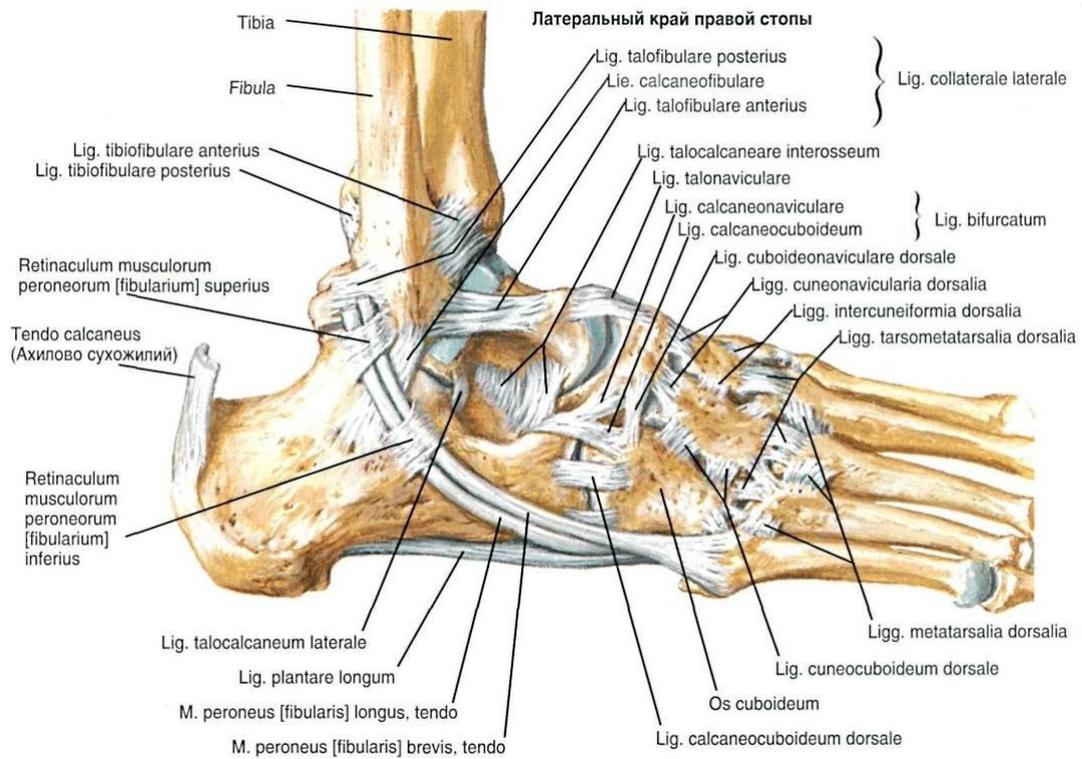
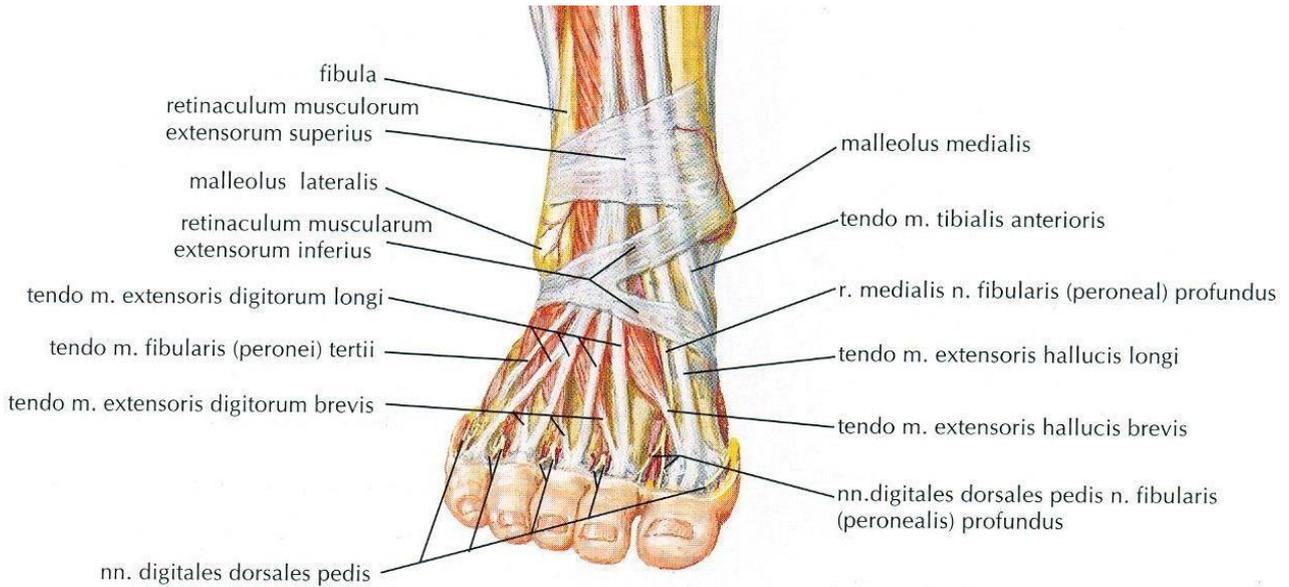
It is the articulation between the distal tibia, medial malleolus of the tibia, lateral malleolus of the fibula and talus.

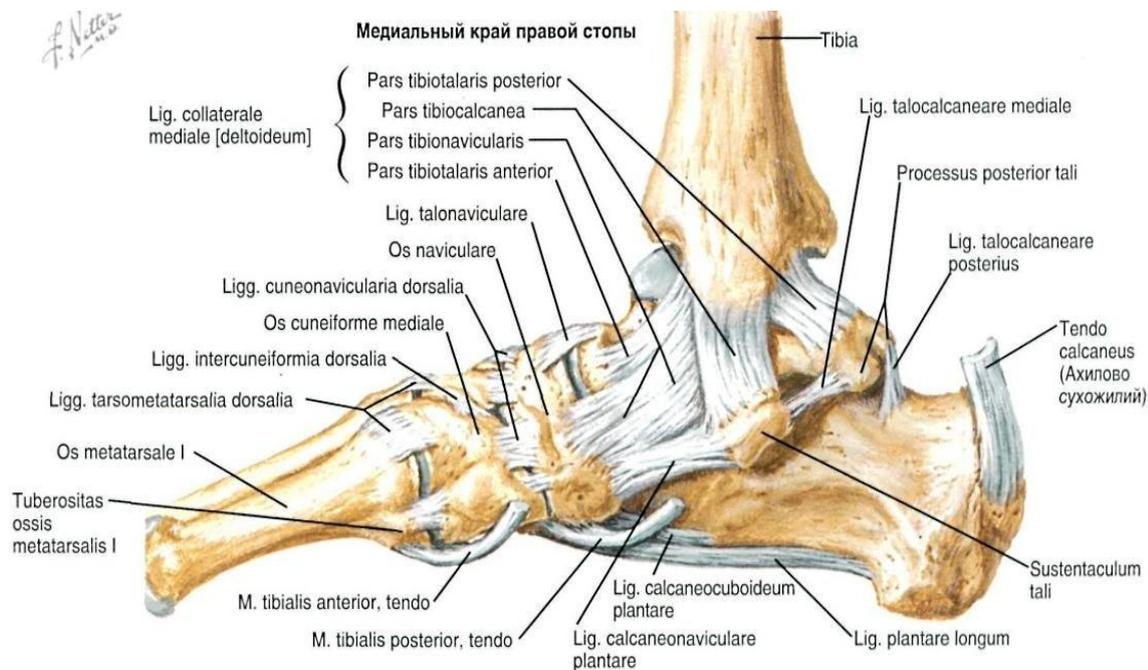
It is a synovial hinge joint; the ankle is reinforced by: deltoid ligament (consists of anterior tibiotalar, tibionavicular, tibiocalcaneal and posterior tibiotalar parts), collateral ligament (consists of anterior talofibular ligament, calcaneofibular ligament and posterior talofibular ligament)

Due to the shape of the talus, the ankle is most stable when the foot is dorsiflexed; the ankle is often injured when the foot is plantar flexed. This lateral surface of the joint is innervated by the sural nerve; medial surface by the saphenous nerve; anterior surface by the deep fibular nerve.

This joint is supplied by 3 arteries, which are the anterior tibial, posterior tibial and fibular arteries.

Articulatio talocruralis





TOPOGRAPHY OF THE PLANTAR REGION OF THE FOOT

Borders:

Medial – middle point of the calcaneus to the head of the 1st metatarsal bone. Lateral

– middle point of the calcaneus to the head of the 5th metatarsal bone. The toes are divided into the plantar and dorsal surfaces by the U-shaped (arch-like) lines. **Layers:**

Skin: it is thick, especially on the tuberosity of the calcaneus and heads of the metatarsal bones.

Subcutaneous tissue: it contains the common plantar digital arteries and nerves, cutaneous branches of the medial plantar arteries and nerves, cutaneous branches of the lateral plantar arteries and nerves.

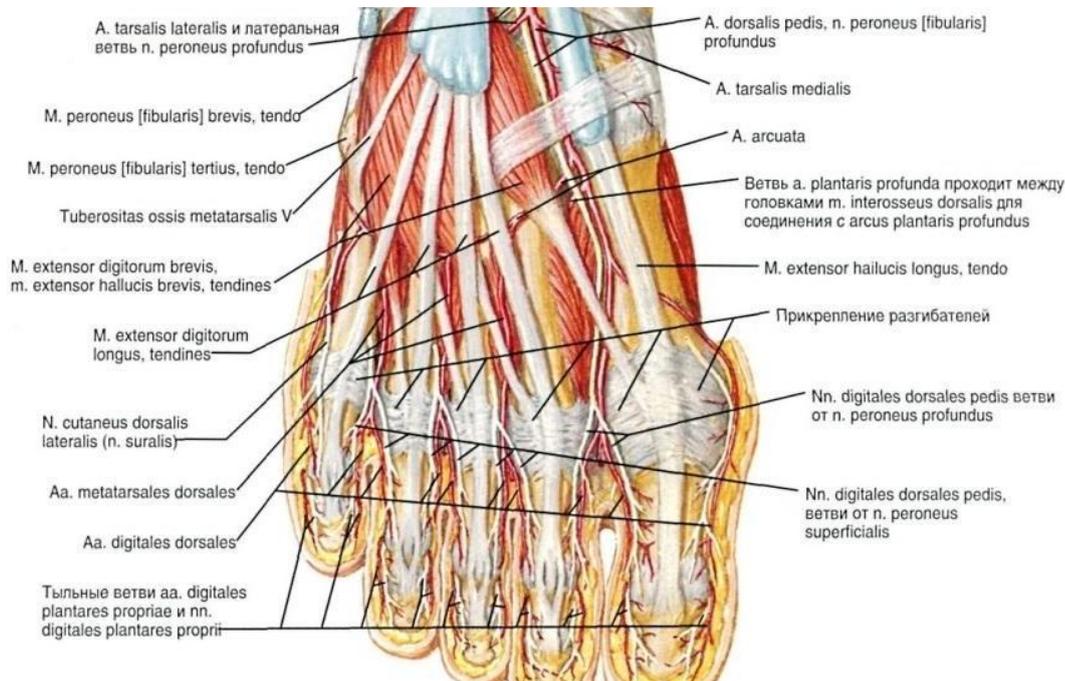
Proper fascia: In the middle part of the sole, this fascia represents the plantar aponeurosis. The plantar aponeurosis is especially dense in the sole, where the fibres of the flexor digitorum brevis muscle begin. In the median part of the sole, these superficial and deep fatty spaces are situated between the tendons of the flexor digitorum longus and flexor digitorum brevis muscles. The deep fatty space is situated between the flexor digitorum longus tendon and flexor digitorum brevis muscle.

The median part of the sole communicates with: subfascial space of the dorsal part of the foot by means of dorsalis pedis artery and lateral plantar artery; interdigital fatty spaces and dorsal surface of the toes along the lubrical muscles; subcutaneous fatty tissue of the sole along the plantar metatarsal arteries and proper plantar digital arteries; medial part of the sole along the tendon of the flexor hallucis longus muscle;

lateral part of the sole along the tendon of the flexor digiti minimi muscle and lateral plantar vessels.; deep space of the posterior part of the knee along the tendon of flexor hallucis longus muscle and neurovascular bundle. The neurovascular bundle passes through the malleolar canal.

The external plantar artery passes into the sole beneath the abductor hallucis and then runs outward between *the flexor brevis digitorum* and *the flexor accessorius*; the vessel then curves to the inner side of the foot and forms the plantar arch by anastomosing with the communicating branch of the dorsalis pedis. *The plantar arch* lies directly upon the bases of the second, third, and fourth metatarsal bones and upon the interosseous muscles. Anteriorly it gives off four digital

branches for the interosseous spaces and the corresponding sides of the toes, while the outer and inner margins of the sole are supplied by separate branches from the arch. The smaller internal plantar artery runs anteriorly to the inner side of the abductor hallucis to the great toe, where it usually anastomoses with the first digital branch. Before entering the sole *the posterior tibial nerve* divides into the external and the internal plantar nerves. The external plantar nerve accompanies the external plantar artery and divides into a superficial and a deep branch. The superficial branch supplies the muscles of the ball of the little toe and gives off three digital nerves to the sides of the little toe and to the outer side of the fourth toe. The deep branch follows the plantar arch into the depth of the sole and supplies *the interosseous muscles* and *the adductor hallucis*. The internal plantar nerve runs to the inner side of *the flexor brevis digitorum*, supplies the muscles of the ball of the great toe and *the flexor brevis digitorum*, and ends in seven digital nerves which supply both sides of the three inner toes and the inner side of the fourth toe.



TOPOGRAPHY OF THE DORSAL REGION OF THE FOOT

Layers:

Skin: it is thin and movable.

Subcutaneous tissue: the fat is less developed here. Edematous fluid tends to accumulate here. It contains a vascular network known as rete venosum dorsale pedis which anastomoses with the dorsal venous arch. They collect the blood from veins in the intermetatarsal spaces. The dorsal venous arch is drained into the great saphenous vein which passes along the anterior surface of the medial malleolus. *Superficial fascia:* it is less developed. It contains the branches of the saphenous nerve. It contains the branches of the sural nerve which innervate the skin of the lateral margin of the foot and little toe. Between these nerves, there are several branches of the superficial fibular nerve. They are medial dorsal cutaneous, intermediate dorsal cutaneous and lateral dorsal cutaneous nerves. *Deep fascia:* it is a continuation of the fascia cruris. The extensor hallucis brevis and extensor digitorum brevis muscles are situated under this fascia. It lies on the metatarsal bones and dorsal interosseous muscles. If the fibularis tertius muscle exists, its tendon is attached to the base of the 5th metatarsal bone.

The dorsalis pedis artery, the continuation of the anterior tibial, passes from the anterior annular ligament along the dorsal surface of the foot in the first interosseous space. It runs anteriorly from a point midway between the two malleoli and divides at the bases of the first and second metatarsal bones into a larger branch, *the plantar digital* (ramus plantaris profundus), passing between the first and second metatarsal bones to the plantar arch, and a smaller branch, *the dorsalis hallucis*, running forward to the web between the great and the second toes. To the outer side, the dorsalis pedis gives off *the tarsal artery tarsea lateralis*, passing beneath the *extensor brevis digitorum* and anastomosing with the next branch, the metatarsal artery, which runs outward upon the bases of the metatarsal bones and gives off the dorsal metatarsal arteries for the second, third, and fourth metatarsal spaces and the corresponding sides of the toes. To the inner side, the dorsalis pedis gives off two or three insignificant vessels, the A. a. tarseae mediales.

The nerves of the dorsum of the foot are:

The musculocutaneous, which divides at a higher level into an external and an internal branch. They supply digital branches for all of the toes except the outer side of the little toe and the adjacent surfaces of the great and second toes. The latter is supplied by *the anterior tibial*; the outer margin of the dorsum of the foot and of the little toe is supplied by the short saphenous, which is known in this situation as the *N. cutaneus dorsi pedis lateralis*. All three nerves inosculate with each other.

For the movements of the foot there are 2 joints which are worthy of particular attention:

1. *The ankle-joint, or talocrural articulation*, between the leg and the astragalus; the trochlea and the lateral surfaces of the astragalus are surrounded by the articular surfaces of the lower end of the tibia and by the two malleoli. The articular cavity communicates with that of the inferior tibiofibular articulation. The movements of the joint are those of dorsal and plantar flexion.

2. *The talotarsal articulation* consists of two separate portions: the posterior calcaneo-astragaloid articulation, between the posterior articular surfaces of the astragalus and of the os calcis, the anterior calcaneo-astragaloid articulation, between the middle and anterior articular surfaces of the astragalus and of os calcis, and also between the head of the astragalus and the scaphoid bone. The movement is chiefly that of pronation and supination.

The remaining joints are:

3. *The calcaneocuboid*, between the corresponding articular surfaces of the os calcis and of the cuboid bone. This joint, together with the astragaloscaphoid, although separate anatomically, forms the so-called Chopart's joint.

4. *The intertarsal joint*, between the remaining tarsal bones.

5. *The tarsometatarsal articulations, Lisfranc's joint*, consists of three separate cavities, of which the middle one communicates with the intertarsal articulations and with the joint between the scaphoid and the cuneiform bones.

6. The metatarsophalangeal and *the interphalangeal articulations*.

TOPOGRAPHIC ANATOMY OF THE HEAD

The head is subdivided into two following departments: the

brain and facial bones. They are shared by line from the glabella to the supraorbital edge along the zygomatic arch to the outer ear canal. The brain part consists of foramen and base of the skull. The foramen is divided into fronto- parieto-occipital region, paired temporal and mastoid area. The facial region consists of frontal and lateral area. Regions of the frontal area include nasal, orbital, oral, mental regions. Regions of the lateral area include buccal and parotidomasseteric regions.

FRONTO-PARIETO-OCCIPITAL REGION

Borders:

- in front– supraorbital edge of the frontal bone;
- behind – external occipital protuberance and the upper nuchal line;
- sideways – superior temporal line.

Layers:

The skin is thick, covered by hair. It has sweat and sebaceous glands. Sebaceous cysts or atheroma are formed by blockage of the sebaceous gland ducts or by swelling of the hair follicle which then disrupts the emptying of the sebaceous gland through the pore. Folliculitis is a superficial infection of single hair follicles. A carbuncle is a deeper skin infection that involves a group of infected hair follicles in one skin location. Skin is firmly adherent to the subcutaneous tissue, m. epicranii and aponeurotic helmet because it has vertical connective tissue septa. Connective tissue septa divide the subcutaneous tissue into separate cells which are filled by fat. (The septa divide fat cells in the subcutaneous layer into columns). Therefore hematoma in this region has the form of limited swelling.

In the subcutaneous tissue of the frontal region are:

- supratrochlearis;
- supraorbitalis;
- ophthalmica-branch of the internal carotid artery system.

A. supratrochlearis comes out of the orbit through the incisura frontalis to the intersection of the supraorbital margin with vertical line drawn through the medial corner of the eye.

A. supraorbitalis comes out of the orbit through the foramen supraorbitalis or incisura supraorbitalis between the middle and medial parts of margo supraorbitalis. Its terminal

branches anastomose with branches of the supratrochlear artery and the superficial temporal arteries. Outflow of venous blood is carried out by the

v. supratrochlearis, v. supraorbitalis that flow into v. angularis. Vessels escort the nerves of the same name, branch n. frontalis from

n. ophthalmicus. There are also rr. temporales from n. facialis, that innervate the venter frontalis of m. epicranium and m. orbicularis oculi, so their damage causes lagophthalmos "rabbit eye" – the eye is open and tearing. The lymphatic vessels of the frontal region are sent to nodi lymphatici parotidei superficialis et profundi.

In the parietal area in the subcutaneous tissue are:

- a/v. temporalis superficialis;
- n. auriculotemporalis.

A. temporalis superficialis is the terminal branch of the external carotid artery. It is located in front of the tragus of the auricle. It can be pressed to the bone to stop bleeding. V. temporalis superficialis is located near the same artery. It flows into v. retromandibularis and accepts v. emissaria parietalis. N. auriculotemporalis is a branch of n. mandibularis. It is accompanied the temporal artery and located in front of the vessels. Lymph flow is carried out in nodi lymphatici retroauricularis.

In the subcutaneous tissue of the occipital region are:

- a/v. auricularis posterior;
- a/v. occipitalis;
- n. occipitalis major/minor;
- n. auricularis posterior.

A. auricularis posterior is projected onto the skin on the posterior edge of the attachment of the auricle. A. occipitalis is projected in the middle of the distance between the mastoid process and occipital protuberance. Arteries are accompanied by the veins of the same name that flow into

v. jugularis externa. The skin of the occipital region is innervated by major and minor occipital nerves. N. occipitalis major is a posterior branch of the second cervical nerve. It

accompanies the occipital artery of n. occipitalis minor from the cervical plexus and passes 3 cm behind from the attachment of the ear. It is located at the rear edge of the m. sternocleidomastoideus, near mastoid process. N. auricularis posterior is a branch of n. facialis. It passes in the subcutaneous tissue behind the auricle and innervates the muscle of the same name, venter occipitalis and m. epicranius. Lymphatic vessels flow into nodi lymphatici occipitales.

PARTICULAR QUALITIES OF BLOOD FLOW

1. The presence of great quantity of anastomoses between these arteries facilitates good regeneration of damaged tissues. Therefore, injuries of the head are healed faster than other parts of the body. It makes possible to accept pieces of scalped wounds of soft head tissues.

2. The blood flow to the area is carried out by branches of the internal and external carotid arteries. At the insufficient blood supply of the brain between the branches of these arteries, for the account of the main way, the back collateral way of blood flow from external carotid artery into internal one is formed supplying the brain. It occurs due to anastomoses between branches of these arteries. Normally, the blood flow in the artery

a. supratrochlearis is sent from the skull to the pool of the external carotid artery. When a patient has stenosis or occlusion of the internal carotid artery it acquires a retrograde direction. We can see it with the help of ultrasonic doplerography.

2. The vessels are in the subcutaneous tissue above the aponeurosis, so they are often injured.

3. Adventitia of vessels is fixed with fibrous membrane. Therefore, the vessels at the time of injury of the cranial vault gape and bleed much.

4. Vessels are directed radially from the periphery to the vertex that must be taken into consideration at incision.

5. The damaged vessel is absent in injury. That's why it can't be captured with the hemostatic clamp. Therefore, we use special neurosurgical clips with pointed ends. The one end of the clamp is applied to the edge of the tendon of the helmet, and the other one – on the wall of the vessel.

PARTICULAR QUALITIES OF VENOUS OUTFLOW

The veins of the head are arranged into three layers:

1. Surface layer – covers veins of head that accompany the arteries of the same name. They carry out venous blood outflow into facialis, v. retromandibularis and v. jugularis externa.

2. The middle layer – intraosseous. It is diploic veins of the cranial vault.

3. The third layer – intracranial – the sinuses are located between the sheets of the dura mater.

All three layers are linked with emissary veins. The largest of them:

- v. emissaria parietalis connects sinus sagittalis superior with v. temporalis superficialis;
- v. emissaria occipitalis connects sinus transversus with vv. occipitales;

- v. emissaria mastoidea connects sinus sigmoideus with v. auricularis posterior.

The links between the superficial and deep veins facilitates the outflow of blood from the brain at increased intracranial pressure or at obstruction to the main way. Besides, they can cause the penetration of infection at injury and diseases of the soft tissue of the cranial vault (furuncle) into the bone with the development of osteomyelitis, on the dura mater with the development of meningitis, brain abscess, sinus thrombosis. Such retrograde (in the reverse way) blood flow with the spreading of infection is possible due to the lack valve head in veins. Next layer is m. epicranius. Venter frontalis and venter occipitalis of m. epicranius connect tendon helmet. This layer of fibrous membranes is strongly linked with the skin. Thus, skin, subcutaneous tissue and tendon helmet are integrated and are a part of the flap at the scalped head injuries. There is subgaleal fiber under the tendon helmet. It doesn't have any membranes. The scalped injuries in the cranial vault are possible due to a strong link of the skin with tendon helmet and with the periosteum. Hematomas and suppurative processes in the subgaleal tissue look like spilled swelling and occupy the entire surface of the cranial vault. The next layer is the periosteum. The periosteum is firmly soldered to the bones in the joints and loose on other sites. One should treat carefully to the periosteum at operations, because it consists of the vessels feeding lamina externa of the skull bones. The subperiosteal tissue is located deeper. The periosteum is easily scaled off, and hematomas are limited with line of bones and joints and are located within the separate bone due to the subperiosteal tissue. The subperiosteal hematomas disrupt the blood flow to the bones and they can lead also to necrosis of the outer part of the cranial vault. Therefore we remove them. All cellular spaces of fronto-parieto-occipital region are linked with each other through the anastomoses of external veins, sinuses of the dura mater and diploic veins through emissary veins. They can serve as pathways of inflammatory processes. Bone basis of the region form the frontal, occipital and parietal bones. They are connected to each other by means of ligamentous joints. The

bones are plane, their inner surface is smooth and it has holes for vessels. Their inner surface is rough, has grooves and recesses from arteries, sinuses of the dura mater, granulation and gyri.

Bones of the skull are composed of three layers.

1. Lamina externa, the outer bone plate, consists of solid substance.
2. The second layer – diploe, in intraosseous diploic channels of which

(Bréchet channels) vv. diploicae are located.

3. The third layer is the inner bone plate – lamina interna. It is more thin and brittle and that's why is called the vitreous – lamina vitrea.

It is broken oftener than the outer lamina. And it is broken with the formation of plenty of fragments. Its fragments often damage the vessels of the dura mater and the substance of the brain causing the epidural or subdural hematomas. Cranial bones regenerate slowly. So, it is possible to observe the bone defects on the X-ray photographs of the skull bones on the former site of fracture. In the frontal region between the outer and inner plates is the frontal sinus. The injury of frontal bone is subjected to a secondary infection of the nasal cavity.

TEMPORAL REGION

Borders:

- from above and behind – superior temporal line;
- from below – zygomatic arch;
- in front – the frontal process of the zygomatic bone and the zygomatic process of the frontal bone.

Layers:

i. The skin is thin. It is covered with hair. The skin is innervated by n. auriculotemporalis, n. zygomaticotemporalis and n. occipitalis minor.

ii. Subcutaneous layer is small. It consist of:

- mm. auricularis anterior et superior;
- a./v./n. temporalis superficialis;
- n. zygomaticotemporalis;
- a./v. auricularis posterior;
- n. occipitalis minor.

Mm. auricularis anterior et superior are innervated by rr. temporales of facial nerve. A. temporalis superficialis is accompanied by the v. temporalis superficialis and n. auriculotemporalis. n. zygomaticotemporalis, a branch of n. zygomaticus from n. maxillaris passes at the outer edge of the

orbit.

A. auricularis posterior, v. auricularis posterior and n. occipitalis minor are behind the auricle. The superficial fascia has the form of a thin plate. It is the extension of the tendon helmet. The superficial fascia forms a fascial sheath for the muscles of the ear, blood vessels and nerves. The own temporal fascia or the temporal aponeurosis splits into superficial and deep plate before the zygomatic arch. The surface plate of the own

temporal fascia is attached to the outer edge of the zygomatic arch. The deep plate of the own temporal fascia is attached to the inner edge of the zygomatic arch. The interaponevrotical temporal space is between the plates, in adipose tissue of which are a. temporalis media, v. temporalis media and n. zygomaticotemporalis. The subaponevrotical tissue is located under the deep plate of the own temporal fascia and passes to the Bichat fat pad behind the zygomatic arch. Hematomas and abscesses of subgaleal space can go down and move to the lateral area of the face. m. temporalis fills the temporal fossa. It is attached to the coronoid process of the mandible. The deep musculoskeletal cellular spaces of the temporal region is located under the temporalis muscle. It contains the deep temporal vessels and nerves: a. temporalis profunda (a. maxillaris), n. temporalis profundus (n. mandibularis).

III. The periosteum is localized deeper than subcutaneous adipose tissue. The subperiosteal cellular space is under the periosteum. The subperiosteal cellular space is involved into the inflammatory process of deep temporal phlegmons. The pus of deep abscesses may penetrate down into the pterygopalatine fossa and infratemporal fossa and then through the lower orbital fissure into the tissue of the orbit. It has a connection with the temporal – pterigoideus cellular spaces of the lateral facial area.

IV. The osteal base consists of the greater wing of the sphenoid bone, scales of the temporal bone, parts of the frontal and parietal bones. Cancellous bone is developed weakly. It is absent in temporal scales. Sulcus arteriosus is located on the inner surface of the temporal bone scales. There is a middle meningeal artery in sulcus arteriosus. The damage of the middle meningeal artery causes the epidural hematomas.

MASTOID REGION

Borders:

- in front – line of attachment of the ear;
- from above – line of the extension of the zygomatic arch;
- from below and sideways – line corresponds to the outline

of the mastoid process, which can be probed through the skin.

Layers:

1. The skin is thin. It is covered with hair in the posterior part of the area. The skin is spliced with the deeper tissues.
2. The subcutaneous tissue.

There are:

- a. auricularis posterior;
- v. auricularis posterior;
- lymphatic vessels and nodes (nodi lymphatici mastoidei, which are linked with lymph from the auricle and parietal area);
- n. auricularis magnus;
- n. occipitalis minor;
- m. auricularis posterior, which are innervated by n. auricularis posterior, branch of n. facialis.

The superficial fascia forms a fascial sheath for m. auricularis posterior. The own fascia is the extension of the tendon helmet. It extends to the neck where is involved into the formation of the sheath for m. sternocleidomastoideus, m. trapezius and venter posterior of m. digastricus. The interfascial cellular space is localized between m. trapezius and venter posterior of m. digastricus. The interfascial cellular space goes into the lateral triangle of the neck and into the sheath of m. sternocleidomastoideus. It is the major pathway for the pus spread at Bezold's abscess. Symptoms of Bezold's abscess are swelling and soreness in the neck.

1. The periosteum is firmly spliced with the bone, especially in the attachment of m. sternocleidomastoideus, m. splenius capitis, m. longissimus capitis and venter posterior of m. digastricus.

2. The subperiosteal tissue is developed weakly.

3. The mastoid process of the temporal bone is located behind and below from the outer ear canal. It has conelike shape. Its lateral surfaces are rough. In the middle of the mastoid process is smooth surface which is called Shypo's trepanation triangle.

The borders of the mastoid process:

- in front – a vertical line from the top of the mastoid process through the mastoid spina suprameatum (spine of Henle) on the posterior edge of the outer ear canal;
- behind – crista mastoidea;

- from above – the horizontal line is the extension of the zygomatic arch.

The cellulae mastoidea are inside the mastoid bone. The upper part of cellulae mastoidea forms the mastoid cave – antrum mastoideum. The mastoid cave communicates with the tympanic cavity through the aditus ad antrum. It opens in recessus epitympanicus. All the cells of the mastoid process open into the antrum mastoideum. Mastoid cells and antrum

mastoideum are covered by the mucous membrane. The mucous membrane is continuation of the mucosa of the tympanic cavity. Thus, the tympanic cavity and its additional cavities form a pneumatic system. This pneumatic system is filled with air through the Eustachian tube. Inflammatory exudate cannot escape through the inner opening of the auditory tube at otitis because it has adhesion oedematous mucosa. As a result, the middle ear cavity forms closed space. The purulent exudate accumulates there. It is directed through aditus ad antrum to the cave and overflows the cells of the mastoid process. It causes mastoiditis. We can remove pus from the middle ear through the posterior wall of the tympanic cavity dissecting the antrum mastoideum, which is projected at the Shypo's triangle. The outer wall of the mastoid cave is about 1.5 – 2 cm. The inner wall separates it from the sulcus sigmoideus and sinus sigmoideus. The upper wall of the cave is a continuation of the mastoid tegmen tympani (roof of the tympanic cavity) and separates it from the middle cranial fossa. The lateral semicircular canal and the facial nerve are located more anteriorly from the cave. Thus, purulent exudate from the tympanic cavity may penetrate to the antrum mastoideum. It destroys the inner wall of the mastoid cave and goes into the cranial cavity or into the sigmoid sinus.

It causes meningitis, sepsis, thrombophlebitis of the sigmoid sinus which are displayed clinically as McKenzie syndrome (dysphagia, aphonia, torticollis). It is caused by damage of IX, X and XI pairs of cranial nerves. The doctors make mastoidectomy in all these cases. The rupture of pus to the area of the triangle of the neck causes Bezold's mastoiditis.

MENINGES

The cranial cavity is lined by dura mater inside which is easily separated from the bones in the fornix and firmly fixed in the skull base. Therefore, at traumas of skull epidural hematomas more prevail in the fornix (vault) of the skull. The dura mater consists of two sheets. Between them are thin layer

of tissue, blood vessels and nerves.

N. Burdenko used this feature of the structure for removal of defect in damaged sinus. The dura mater separates at dural reflections (also known as dural folds), places where the inner dural layer is reflected as sheet-like protrusions into the cranial cavity. There are tentorium cerebelli, falx cerebri, cerebellar falx, sellar diaphragm.

The tentorium cerebelli exists between and separates the cerebellum

and brainstem from the occipital lobes of the cerebrum. It is attached, behind, by its convex border, to the transverse ridges upon the inner surface of the occipital bone, and there encloses the transverse sinuses; in front, to the superior angle of the petrous part of the temporal bone on either side, enclosing the superior petrosal sinuses. At the apex of the petrous part of the temporal bone the free and attached borders meet, and, crossing one another, are continued forward to be fixed to the anterior and posterior clinoid processes respectively. Its anterior border is free and concave, and bounds a large oval opening, the tentorial incisure, for the transmission of the cerebral peduncles. The brain can get pushed down partly through the tentorium. It is very bad for the patient because there are vital centers of respiration and circulation of blood. Therefore it is impossible to produce a large amount of cerebrospinal fluid at lumbar puncture. The sinuses are located in the splitting of the dura mater. The blood from the veins of the brain flows off there. Sinuses are linked with the diploic veins and veins of the fornx and base of the skull. The walls of the sinuses are tight, taut and they don't have valves. Such structure of the venous sinuses provides free outflow of venous blood from the brain, independently from fluctuations of intracranial pressure. If the sinus is damaged it doesn't close, but gapes causing severe bleeding. The neurosurgeons pay special attention to the superior and cavernous sinuses.

The superior sagittal sinus is an unpaired area along the attached margin of falx cerebri. Commencing at the crista galli and the foramen cecum, through which it receives a vein from the nasal cavity, it runs from anterior to posterior, grooving the inner surface of the frontal, the adjacent margins of the two parietal lobes, and the superior division of the cruciate eminence of the occipital lobe. The infections can pass sinus with chronic inflammatory processes in the nasal cavity. The superior sagittal sinus connects with v. temporalis superficialis through v. emissaria parietale and transverse sinus between Trolar's vein. There are blood lakes (small cavities that communicate with the lumen of the sinus) on the both sides

from superior sagittal sinus between the sheets of the dura mater. The veins of the dura mater, the veins of the brain, diploic veins and Pacchionian granulations fall into the lakes. The doctors have to remember about deviation of sinus to the right or to the left, sinus splitting, the presence of blood lakes when they perform craniotomy.

The cavernous sinus is on the base of the skull on both sides of the sella

turcica. Both cavernous sinuses are connected through intercavernous sinuses. The cavernous sinuses and intercavernous sinuses form Ridley's ring. It receives blood from the:

- inferior ophthalmic vein (anastomoses with facial veins through profunda facial vein);
- superior ophthalmic vein (anastomoses with facial veins through the angular vein) (they collect blood from the forehead);
- superficial middle cerebral vein;
- inferior cerebral veins;
- sphenoparietal sinus and occasionally, central retinal vein, frontal tributary of the middle meningeal vein.

Drainage of the cavernous sinus is via:

- superior petrosal sinus to the transverse sinus;
- inferior petrosal sinus directly to the jugular bulb;
- venous plexus on the internal carotid artery to the pterygoid plexus;
- emissary veins passing through the sphenoidal foramen, foramen ovale, foramen lacerum.

The cross section of cavernous sinus has a triangular shape. The cavernous sinus transmits multiple cranial nerves to the superior orbital fissure and foramen ovale.

They are:

In the superior wall:

- oculomotor nerve (CN III)
- trochlear nerve

(CN IV) In the

lateral wall:

- trigeminal nerve (CN V) of ophthalmic branch. Traversing the lateral sinus to the ICA:

- abducent nerve (CN VI) (and a. carotis interna).

The presence of these links explains the rapid spread of the infection from the soft tissues of the skull into the cavernous sinus with the development of severe diseases — meningitis, sepsis, brain abscess. At cavernous sinus thrombosis the Foix syndrome appears. The main symptom of

cavernous sinus thrombosis is ophthalmoplegia (paralysis of the muscles of the eyeball). It is the result of paralysis of the III, IV and VI pairs of cranial nerves. The other symptoms are exophthalmia (exophthalmos), swelling of the eyelids, ptosis (drooping of the upper eyelid), immobility of the eyeball. The damage of sinus occurs with pulsating exophthalmos. Cavernous sinus is connected with the superior sagittal sinus through the Trolar's vein. And it is connected with transverse

sinus through the Labbe's vein. (The Trolar's vein (v. anastomotica superior) connects v. cerebri media superficialis with sinus sagittalis superior, and v. Labbe (v. anastomotica inferior) connects v. cerebri media superficialis with sinus transversus). The doctors can make bandaging of the superior sagittal sinus in its posterior parts due to these links.

The middle meningeal artery branch of the first part of the maxillary artery provides blood supply of the dura mater. It penetrates into the cranial cavity through the foramen spinosum. It lies on the inner surface of the sphenoid, parietal and temporal scales into special bone sulcus (sulci a. menigeae). The artery is divided into a frontal (anterior) and parietal (posterior) branches. The anterior branch goes upwards forming arc. It forms arc. The posterior branch goes backwards or horizontally. Artery passes in the thickness of the dura mater. It is closer to its outer sheet. Artery is accompanied by two veins. The anterior branch of artery is located in the bone canal at "pterion" (place of joint of the frontal, parietal, temporal and sphenoid bones). We must remember this when performing craniotomy. a. meningea media and its branches are often damaged. It causes the formation of epidural and subdural hematomas. The course of the anterior branch corresponds to the position of gyrus precentralis. The course of the posterior branch corresponds to the localization of temporal lobe. It is important for the diagnosis of epidural hematoma.

The symptoms of an intracranial hematoma:

1. Mydriasis is the dilation of the pupil in the region of hematoma, that is anisocoria – condition characterized by an unequal size of the eye pupils. It is the result of brain injury and damage of the III pair of cranial nerves. Mydriasis is accompanied by ptosis of the upper eyelid.

2. Hemiparesis is paresis of the muscles of one half of the body on the opposite side of hematoma. It is the result of compression of the motor cortex and pyramidal tract intersection.

3. Bradycardia is strictly defined in adults as a pulse rate below 60 beats per minute. It is the result of brain stem injury, oedema, hypoxia of the brain, damage of sympathetic fibers,

increase of a vagal tone.

4. The presence of "lucid intervals." The consciousness is gradually suppressed with increasing hematoma.

Innervation of the dura mater is carried by r. tentorii of n. ophthalmicus,

r. meningeus medius of n. maxillaris, r. meningeus (branch of n. mandibularis), which penetrates into the cranial cavity through the foramen spinosum and

r. meningeus of n. vagus, that enters the cranial cavity through the foramen jugulare. Under the dura mater is the arachnoid membrane of the brain –

arachnoidea mater. The subdural space is located between arachnoidea and the dura mater. The superficial veins of the brain go through the subdural space. They pour into the sinuses of the dura mater. Their damage causes subdural hematomas. They are more extensive and grow slowly unlike epidural hematomas. The arachnoid mater covering the brain is referred to as the "arachnoidea encephali," and the portion covering the spinal cord as the "arachnoidea spinalis." There are two subdivisions of arachnoid mater surrounding the subarachnoid space, the dorsal layer and the ventral layer. Cerebrospinal fluid circulates in the subarachnoid space (between arachnoid and pia mater). Cerebrospinal fluid is produced by the choroid plexus. The total amount of liquor in adults ranges from 100 to 150 ml. The pressure in the supine position is 120 – 150 ml of water column. It rises to 200 – 250 ml of water column when it is measured in sitting position. Pressure of cerebrospinal fluid and its composition are examined at lumbar puncture.

Queckenstedt-Stookey test is a test for detecting the blockage of subarachnoid channels in which the jugular vein is compressed; when there is blockage of the channels, compression causes little increase or it is absent in the pressure of the spinal fluid. The opening pressure is measured. Then, the clinician's assistant compresses both jugular veins (if increased intracranial pressure is not suspected then one may exert pressure on both external jugular veins but usually pressure is first exerted on the abdomen, this pressure causes an engorgement of spinal veins and in turn rapidly increases cerebrospinal fluid pressure), which leads to a rise in the intracranial pressure. The intracranial pressure will be reflected as rapidly rising pressure measured from the lumbar needle, within 10 – 12 seconds. The one jugular vein compression can produce an increase in pressure, and compression of the other – does not increase the pressure with Queckenstedt's symptoms. In this case may occur obturation of the jugular vein, transverse or sigmoid sinus (thrombosis) on the side where the pressure is not increased. The majority of

cerebrospinal fluid is produced in the choroid plexus of two lateral ventricles. From here, the CSF passes through the interventricular foramen (of Monro) to the third ventricle, then the cerebral aqueduct (of Sylvius) to the fourth ventricle. The fourth ventricle is an outpouching on the posterior part of the brainstem. From the fourth ventricle, the fluid passes through three foramen to enter the subarachnoid space. It passes through the foramen of Magendie on the midline, and two foramens of Luschka laterally. The subarachnoid space covers the brain and spinal cord. Hydrocephalus is an

abnormal accumulation of cerebrospinal fluid (CSF) in the ventricles of the brain. It causes increased intracranial pressure inside the skull and may cause progressive enlargement of the head if it occurs in childhood, at convulsions, tunnel vision, and mental disability.

SIDE AREA OF FACE

Borders:

- from above – the zygomatic arch and the lower edge of the orbit;
- from below – the lower edge of the lower jaw;
- in front – nasobuccal fold and nasolabial fold;
- behind – the rear edge of the lower jaw.

Side area of face is divided into buccal and parotideomasseteric regions by line of the anterior margin of the masseter muscle.

Layers:

The skin is thin and mobile. It has a lot of sweat and sebaceous glands, blood and lymphatic vessels and nerve endings. The facial muscles, facial artery and veins, branch of the trigeminal and facial nerves, lymph vessels, and parotid salivary gland are localized in the subcutaneous tissue. The superficial fascia forms a fascial sheath for facial muscles and neurovascular structures of the face. Facial muscles begin from bones and are embedded into the skin. They form folds. The folds help surgeons to perform the operation. The surgeons make cuts along the folds, then the postoperative scar will be hardly noticeable. Facial muscles express our emotions. They are involved in the act of eating, breathing and speech. The facial artery and vein are located between the facial muscles. The facial artery lies at the anterior margin of masseter m. on the face. It turns round the edge of the lower jaw. It is pressed to the bone to stop bleeding at wounds of the face. The facial artery arises in the carotid triangle from the external carotid artery a little above the lingual artery and, sheltered by the ramus of the mandible, passes obliquely up beneath the

digastric and stylohyoid muscles, over which it arches to enter a groove on the posterior surface of the submandibular gland. It then curves upward over the body of the mandible at the antero-inferior angle of the masseter; passes forward and upward across the cheek to the angle of the mouth, then ascends along the side of the nose, and ends at the medial commissure of the eye, under the name of the angular artery.

The facial branches:

- inferior labial artery;
- superior labial artery;
- lateral nasal branch to nasalis muscle;
- angular artery – the terminal branch.

The facial vein accompanies the facial artery. It begins at the medial angle of the eye as the angular vein. The facial v. begins after the confluence of supraorbitalis v. and supratrochlearis v. It anastomoses with the ophthalmic veins (vv. ophthalmica superior et inferior). The facial v. connects to retromandibular v., when it passes round the edge of the lower jaw. V. facialis communis is formed in the result of this. It empties into the internal jugular vein. The facial vein anastomoses with ophthalmic vv. and sinus cavernous, and with pterygoid plexus through deep facial vein. These anastomoses are important at the spread of inflammation on face. The retrograde blood flow is possible from facial v. into the angular v., ophthalmic inferior v. and sinus cavernosus at thrombophlebitis or furuncle or from facial v. into the deep facial vein, pterygoid plexus through v. emissaria foraminis laceri into sinus cavernous. The septic embolus penetrates into the cavernous sinus. And it causes thrombosis, meningitis, brain abscess, sepsis. The prognosis of these complications is very serious. Own fascia is a continuation of the temporal aponeurosis. It is divided into superficial and deep layers. The superficial layer forms fascial sheath for cheeks fat. The deep layer of own fascia goes into fascia buccopharyngea and continues in fascia pharyngobasillaris. Bichat fat pad is enclosed in its own capsule and is located at the front edge of the m. masseter and lateral muscle of cheek. It is turned round by ductus parotideus outside and in front of it. The cheeks fat consists of three parts, from which the temporal, orbital and pterygopalatine processes spring. Temporal process penetrates under the zygomatic arch and has a connection with subgaleal cellular space of the temporal region. Orbital process enters the infratemporal fossa. It adheres to fissura orbitalis inferior and often joins adipose body of the orbit. Pterygopalatine process has a connection

with the temporal pterygoid space and penetrates through fissura pterygomaxillaris into the pterygopalatine fossa. It surrounds n. maxillaris and ganglion pterygopalatinum. Often it passes through fissura orbitalis superior in the internal base of the skull reaching the cavernous sinus. Thus the cheeks fat connects subcutaneous tissue of buccal region with temporal pterygoid space, subgaleal space of

temporal region, with cellular tissue of pterygopalatine fossa and orbit. Such joint has great significance at the spread of inflammation. We can say that the Bichat fat-pad is the main conductor of inflammatory processes in the face. The buccinator muscle is located between the jaws. It is covered by bucco-pharyngeal fascia. It begins from the upper and lower jaw and weaves into the facial muscles of mouth opening. Parotid duct permeates the cheeks. Buccinator m. is a sphincter of the duct. It is covered by the mucous inside and supplied by buccal artery from the maxillary artery. It is innervated by rr. buccalis of facial nerve. So at injury of this nerve the cheek muscle atrophy is observed. The upper and lower jaw with the infraorbital and mental foramen (with vessels and nerves of the same name) are localized deeper than facial muscles. The infraorbital neurovascular bundle comes out of the same hole at 0.5 cm below the middle of the infraorbital edge into the soft tissue of canine fossa to the anterior wall of the maxillary sinus. The infraorbital artery is a branch of maxillar a. The suborbital v. empties into v. ophthalmica inferior or pterygoid plexus. The infraorbital nerve is a continuation of n. maxillaris. It is divided into a number of branches outside the front surface of the upper jaw.

The branches:

- rr. palpebrales inferiores innervate the skin of the lower eyelid;
- rr. nasales externi innervate the skin of the nose ;
- rr. labiales superiores innervate the skin of the upper lip, form the so- called small goose leg, pes anserinus minor.

It gives off anterior, middle and posterior alveolar branches on its way to the infraorbital groove and channel. They form the superior dental plexus, plexus dentalis superior, the branches of which innervate the teeth of the upper jaw. The infraorbital regional anesthesia is carried out during operations on the upper jaw and at dental extractions. The mental neurovascular bundle comes out of the mental foramen. Valleix points are places of pain in the projection of the trigeminal

nerve branches. Lymph flow from the buccal region is carried out into the submandibular lymph nodes and nodes under the chin. Their inflammation can cause compression of excretory duct of the parotid gland and stasis of saliva. It is a factor causing the development of inflammation of the parotid gland.

PAROTID-MASTICATORY AREA

Layers:

The skin is thin and mobile. It is covered with hair. The subcutaneous tissue

The branch of the ear nerve, great auricular nerve (n. auricularis magnus) and auriculotemporal nerve (n. auriculotemporalis), the buccal nerve of mandibular nerve, branch of the facial nerve, transverse facial artery (a. transversa faciei) and zygomaticofacial nerve are in the superficial fascia (fascial compartment). The own fascia (fascia parotideomasseterica) is under superficial fascia. It is attached to the zygomatic arch, and to the lower edge side of the lower jaw. It splits into two sheets and forms the capsule of the parotid gland (fascia parotidea). It penetrates into the gland between its segments. Parotid fascia moves to masseter muscle and is called masseteric fascia. In the anterior part of the parotid-masticatory area is located the masseter muscle (it begins from the zygomatic bone and the zygomatic arch and is attached to masseteric tuberosity). The muscle elevates the mandible at contraction and moves it forward. It is located in the bone and fibrous sheath. The inner surface of the muscle is adjacent to the branches of the mandible in the submasseteric space. The submasseteric space is located between the branches of the mandible and masseter muscles. There are masseteric artery, vein, nerve in the submasseteric space. The submasseteric space communicates with temporopterygoid space, interpterygoid space and Bichat fat-pad. The phlegmons can develop here. To the middle from the masseter muscle is a branch of the lower jaw. The condylar process of mandible completes temporomandibular joint. There are main components of the TMJ: caput mandibular fossa and tuberculum articulare. Dislocations of jaw occur when two bones that originally met at the joint detach. The parotid gland is located in the posterior part of the parotid-masticatory area. It is the largest salivary gland of serous type. It is surrounded by sheets of fascia parotis and muscles. It performs parotid space with arteries, veins and nerves.

The borders of parotid space are:

- superior – the ear canal (external auditory meatus);
- inferior – the submandibular salivary gland;
- anterior – rear and outer surface of masseter m., a branch of the lower jaw and medial pterygoid muscle;
- posterior – sternocleidomastoid muscle, posterior belly of the digastric muscle and mastoid process;

- medial – styloid process with muscles of Riolan's bouquet (m. stylohyoideus, m. styloglossus and m. stylopharyngeus) and tissue of the anterior parapharyngeal space. In this place spatium parotideum is not closed. Pharyngeal process of gl. parotis fills the space between the styloid process and medial pterygoid muscle.

It is deprived of fascial compartment (weak spot in the capsule) and is adjacent to the anterior part of the peripharyngeal space. This explains the possibility of penetration of pus from the parotid gland into the peripharyngeal cellular space, when the process is inflamed.

Laterally to the parotid gland is adjacent subcutaneous fat. Fascial capsule is weakly developed. It can break at mumps (purulent parotitis). The inflammatory process spreads to the middle ear.

The parotid gland is supplied with blood from parotid branches of superficial temporal artery. Venous outflow is carried out in retromandibular vein. Lymph flow is carried out in nodi lymphatici parotidiei superficialis et profundi. It is innervated by parotid branches of auriculotemporal n. The secretory parasympathetic preganglionic fibers come to gland from lower salivary nucleus. The secretory parasympathetic fibers consist of n. glossopharyngeus, n. tympanicus, n. petrosus minor to ganglion oticum. The postganglionic fibers are composed of n. auriculotemporalis and reach the gland. Excretory duct of parotid gl. (Stenson's duct) begins from the front edge of the gland. It is directed forward, at a distance of 1 – 1.5 cm below and parallelly to the zygomatic arch on the outer surface of the masseter muscle. It lies on the top of the Bichat fat-pad and passing round front edge of the masseter muscle, turns inward. Excretory duct pierces the buccal muscle, passes under the buccal mucosa and opens in the buccal cavity between 1 and 2 upper molars. Excretory duct is projected on a line drawn from the outer ear canal to a point midway between the wing of the nose and angle of the mouth. The a. carotis externa, v. retromandibularis, n. auriculotemporalis and n. facialis are passed through the parotid gland. The external carotid artery is

divided into terminal branches: a. temporalis superficialis and a. maxillaris. The retromandibular vein is a continuation of v. temporalis superficialis. It passes in front of the auricle, goes down behind the branches of the mandible laterally to the external carotid artery. It completes with facial vein behind of posterior belly of the digastric muscle. Their common trunk – v. facialis communis empties into the internal jugular vein. The auriculotemporal nerve is a branch of n. mandibularis. It begins with two roots which cover a. meningea media and are connected to one trunk. It extends along the inner surface of the

mandibular articular process and penetrates into the gland case. It is located medially from a. temporalis superficialis. The Frey-Baillarger syndrome develops in patients undergoing surgery on the parotid gland as a result of postoperative scarring involving trophic vasomotor fibers of auriculotemporal n. It is a complex of vegetative-vascular disorders. The symptoms of diseases are skin flushing and sweating while eating. The neuralgia of auriculotemporal nerve is manifested by burning pain in the temporal region, the external auditory canal, the temporomandibular joint. The attack is accompanied by flushing of the skin, hyperhidrosis (excessive sweating) and hypersalivation. Nodi lymphatici parotidei superficialis et profundi collect lymph from the frontal, temporal and cheek areas and from periodontal molars. They are located under the fascia on the surface of the gland.

THE FACIAL NERVE

Motor nucleus VII pair is located in the front part of the bridge (pars anterior pontis). The axons of the cells of the nucleus go out in the cerebellopontine angle parallel to the intermediate nerves that carry out afferent fibers from the geniculate ganglion. Both of them come into the internal auditory canal of the pyramid and enter into the facial nerve canal about 3 cm long. The channel has a bend in which the geniculate ganglion is located. The fibers of geniculate ganglion are the main part of intermediate nerve ("nerve of Wrisberg"). They are accompanied with the motor trunk of facial nerve. The intermediate nerve divides the greater petrosal nerve and the chorda tympani. The chorda tympani contains secretory fibers from the submandibular and sublingual nodes. The greater petrosal nerve goes out from the pyramid of the temporal bone through the hiatus for greater petrosal nerve (hiatus canalis n. petrosi majoris). It proceeds towards the foramen lacerum where it joins the deep petrosal nerve to form the nerve of the pterygoid canal which passes over the foramen lacerum. The nerve of the pterygoid canal passes through the pterygoid canal to reach the pterygopalatine ganglion. Chorda

tympani goes out from the pyramid of the temporal bone via the petrotympanic fissure. It is a part of the n. lingualis. It contains flavoring and secretory fibers to the submandibular and sublingual salivary glands. The inflammation of geniculate ganglion is Ramsay Hunt syndrome (RHS). The type 2 is also known as herpes zoster oticus. The symptoms and signs include acute facial nerve paralysis, pain in the ear, taste loss in the front

two-thirds of the tongue, dry mouth and eyes, and eruption of an erythematous vesicular rash in the ear canal, the tongue, and/or hard palate, hearing loss, and vertigo. Part of the motor fibers of the trunk of the facial nerve go to the stapedius muscle. The main trunk emerges from the pyramid through the stylomastoid hole (foramen stylomastoideum) at the attachment of the lower end of the ear. It gives the posterior auricular nerve to the muscle of the same name and venter occipitalis m. epicranii,

r. stylohyoideus and r. digastricus to the posterior belly of the digastric muscle (to the entrance of glandula parotis). The pes anserinus ("goose's foot") is the branch point of the facial nerve (extratemporal) after leaving the stylomastoid foramen. It is also known as the "parotid plexus". This division takes place within the parotid gland. The branches of the pes anserinus are rr. temporales, rr. zygomatici, rr. buccales, r. marginalis mandibulae and r. colli. The upper branch rr. temporales is the most constant. Its projection is a line from the earlobe to the outer corner of the eye. The average branches rr. zygomatici and rr. buccales repeat course of the salivary duct. The most variable in its position is a marginal branch (ramus marginalis mandibulae). It goes at 0.5 – 1 cm below the lower edge of the mandible. This fact must be taken into consideration at operation of submandibular abscesses. The close relationship between the branches of the facial nerve and the parotid gland parenchyma explains the paralysis of mimic muscles at inflammation of the parotid gland. Knowledge of the topography of the facial nerve and its branches has practical importance at operations on salivary gland. In the fallopian canal facial nerve lies at a great distance from the periosteum. The inflammation of the periosteum can cause compression of the nerve, as a result appears ischemia. The leading factor in the development of peripheral facial paralysis (Bell's palsy) is the disorder of its blood supply. The main source of blood supply to the facial nerve canal is stylomastoid artery, branch of posterior auricular artery. Spasm of the artery causes ischemia and degeneration of nerve fibers.

THE DEEP AREA OF THE FACE

The deep face area is named by Pirogov as intermaxillary space. It is accessed by removing the zygomatic arch, the branches of the mandible and the temporal muscle. It is localized in infratemporal fossa.

The borders of intermaxillary space are:

- superior – ala major os sphenoidale;

- inferior – the medial and lateral walls converge;
- anterior – facies infratemporalis tuber maxillae;
- posterior – the parotid gland; medial – lamina lateralis processus pterygoideus.

The contents of the deep areas of the face are pterygoid muscles (mm. pterygoideus medialis et lateralis). The pterygoid venous plexus and adipose tissue surround them. There are the maxillary artery and the mandibular nerve. The lateral pterygoid muscle begins with two heads. The superior head begins from facies infratemporalis os sphenoidale. The inferior one begins from lamina lateralis processus pterygoideus. They are attached to the neck of the mandible to the joint capsule of the temporomandibular joint and the articular disc. Together lateral pterygoid muscles protract (or protrude) and depress mandible. Individually, they move the mandible side to side. The medial pterygoid muscle begins from medial surface of lateral pterygoid plate and palatine bone. The insertion attachments are medial surface of ramus and angle of mandible. Together medial pterygoid muscles elevate and protract (or protrude) mandible. Individually, they move mandible side to side.

The blood supply: aa. pterygoideus medialis et lateralis of maxillary artery. Innervation: nn. pterygoideus medialis et lateralis of n. mandibularis.

Venous outflow is carried out in pl. pterygoideus. There are temporopterygoid space and interpterygoid space in the deep face area.

The temporopterygoid has the borders:

- superior – bottom surface of the greater wing of the sphenoid bone (ala major os sphenoidale);
- inferior – tissue of temporopterygoid space becomes to interpterygoid space;
- anterior – tuber maxillae;
- posterior – processus condylaris mandibulae; medial – medial pterygoid muscle;
- lateral – temporal muscle.

In the temporomandibular pterygoid space are: the deep temporal and chewing nerves, nn. temporales

profundi, n. massetericus of
n. mandibularis, buccal nerve, n. buccalis of n. mandibularis,
outer part of the pterygoid venous plexus, a. maxillaris and its
branches. Pterygoid plexus surrounds pterygoid muscles. It
contains: vv. parotidaeae – from the parotid gland, vv.
temporales profundae of the temporal muscle, veins
accompanying a. sphenopalatina from the nasal mucosa, veins
from mm. pterygoidei, veins from m. masseter, veins
accompanying a. alveolaris

inferior, vv. meningeae mediae. The vv. meningeae mediae carry out blood outflow from the dura mater and diploe. Venous outflow from the pterygoid plexus is carried out by v. maxillaris into v. retromandibularis, and from it into the internal jugular vein. There is maxillary a., the main artery of external carotid artery in the temporomandibular space. The maxillary a. supplies the deep area of the face with the blood. It begins at the neck of the mandible, bends around the medial side, lies between m. temporalis and m. pterygoideus lateralis and reaches fossa pterygopalatina.

On its way a. maxillaris gives a number of branches.

In the first compartment, pars mandibularis, i. e. a. maxillaris is divided into:

- the deep auricular artery (a. auricularis profunda), supplies the temporomandibular joint, the external auditory canal and the eardrum;

- the anterior tympanic artery (a. tympanica anterior) passes through fissura petrotympanica (fissura Glaseri) in the tympanic cavity;

- the inferior alveolar artery (a. alveolaris inferior) enters the channel of the lower jaw through the mandibular foramen, which gives rr. dentales to the teeth of the lower jaw. It sends r. mylohyoideus to the muscle of the same name. It appears from the channel called mental branch of inferior alveolar artery which supplies the muscle of the same name and skin of the chin;

- the middle meningeal artery (a. meningeae media) comes up to the medial surface of the lateral pterygoid muscle (m. pterygoideus lateralis). It passes through the foramen spinosum into the cranial cavity, which is divided into rr. frontalis et parietalis.

In the second compartment, pars pterygium (between m. temporalis and m. pterygoideus lateralis), i. e. a. maxillaris is divided into:

- masseteric artery (a. masseterica) – to the muscle of the same name;
- rr. pterygoidei – to the medial and lateral pterygoid muscle;
- aa. temporales profundae – to the temporalis muscle;

- a. buccalis – to m. buccinator;
- aa. alveolaris superiores posteriors – through the tuber maxillae go back to the upper teeth.

Cellular tissue of temporo-pterygoid space is combined with buccal fat pad, with pterygopalatine fossa through fissura pterygomaxillaris, with cellular tissue of the orbit through fissura orbitalis inferior, with the cavity of the skull and sinus cavernosus through foramen ovale and foramen spinosum. Along the way of a. maxillaris – with the bed of parotid gland, along the way of a. et v. masseterica – with submasseteric space, and

through pharyngeal appendix of parotid gland – with the anterior parapharyngeal space. Downwards cellular tissue of temporopterygoid space turns into cellular tissue of interpterygoid space. Spatium interpterygoideum is located between pterygoid muscles.

It is limited:

- outside – with a branch of the mandible and medium surface of

m. pterygoideus lateralis;

- inside – with lateral surface of m. pterygoideus medialis;
- at the top – with the base of the skull;
- behind – with the parotid gland;
- in front – with tuber maxillaris and buccal fat pad;
- at the bottom – with m. pterygoideus medialis.

There are n. mandibularis, a. maxillaris, plexus pterygoideus in spatium interpterygoid. There is fossa pterygopalatina, pterygopalatine fossa, which contains adipose tissue in which are: a. maxillaris, n. maxillaris, ganglion pterygopalatinum. At the inflammation of the maxillary sinuses (sinusitis) the ganglioneuritis of pterygopalatine node, which is clinically manifested as Sluder's syndrome: burning pain and autonomic dysfunctions (epiphora, ptyalism, rhinorrhea, swelling and redness of the eyelids, swelling of the face) can occur. Inwards from the deep area of the face on the lateral wall of the pharynx the parapharyngeal space is located. It is divided into two compartments: anterior and posterior. The anterior one is limited:

- medially – with mm. levator and tensor veli palatini, m. constrictor pharyngis superior, fascia pharyngobasilaris and tonsils;

- laterally – with m. pterygoideus medialis and pharyngeal appendix of parotid gland;

- behind – with muscles of anatomical Riolan's bouquet (m. styloglossus,

m. stylopharyngeus, m. stylohyoideus) and aponeurosis, which cover the

m. stylopharyngeus (aponeurosis stylopharyngeus);

- in front – with lateral and medial wall which are interconnected;

- at the top – with the base of the skull;

- at the bottom – with submandibular salivary gland capsule

that goes into the tissue of the mouth floor.

There are a. palatina ascendens, the branch of a. facialis which supplies with blood the soft palate; pharyngeal veins, vv. pharyngeae et pl. pharyngeus; v. palatina externa, which drains blood from the tonsil in cellular tissue of anterior parapharyngeal space. It anastomoses with x. pharyngeae and flows into the facial vein. The anterior parapharyngeal space combines with: bed of parotid gland and through

it along the way of artery – with interpterygoid space; with cellular tissue of mouth floor, and through it – with the bed of submandibular salivary glands; along the way of n. tensoris velli palatini – with interpterygoid space; along the way of pl. pharyngeus – with posterior parapharyngeal space. Posterior parapharyngeal space is located between the lateral wall of the pharynx and parotid glands. It is limited:

- on the medial side – with aponeurosis pharyngoprevertebralis that separates the posterior parapharyngeal space from retropharyngeal one;
- on the lateral side – styloid process, m. digastricus (venter posterior),
- m. sternocleidomastoideus;
- behind – fascia prevertebralis;
- in front – styloid process and muscles from it (m. stylopharyngeus,
- m. styloglossus, m. stylohyoideus), fascia stylopharyngeus (aponeurosis stylopharyngeus or Zhonesko's diaphragm) that separates the anterior and posterior parapharyngeal spaces;
- at the top – with the base of the skull with located here canalis caroticus and foramen jugulare;
- at the bottom – transfers through the vessels and nerves into spatium vasonervorum of the neck.

There are: a. carotis interna; behind and at the side of it – v. jugularis interna; between them – n. glossopharyngeus (IX), n. vagus (X),

n. accessorius (XI), n. hypoglossus (XII) in the posterior parapharyngeal space. Behind and medially from the artery under prevertebral fascia is located superior cervical sympathetic node. The internal jugular vein is surrounded by deep cervical lymph nodes.

Posterior parapharyngeal space combines with: upper mediastinum – along the way of vessels; posterior mediastinum – along the n. vagus; spatium vasonervorum of the neck – along the vessels and n. vagus; bed of parotid salivary gland – along the external carotid artery; posterior cranial fossa – along v. jugularis interna; middle cranial fossa – along a. carotis interna; sinus cavernosus – along a. carotis interna; bed of submandibular salivary gland – along the way of a. facialis; cellular tissue of upper back neck area – along the way of a. et

v. occipitales. Inflammation can occur in this tissue (furuncles or carbuncles of the neck) spreading manure into the posterior parapharyngeal space. At the inflammation of the tissue of posterior parapharyngeal space the Villaret's syndrome occurs – Horner's syndrome union (miosis, enophthalmos, stenosis of the optic fissure) with unilateral paralysis of the muscles of the soft palate, pharynx, larynx, vocal muscle with paresis or paralysis of sternocleidomastoid and trapezoid muscles. This symptom occurs at damage of the IX, X, XI and XII pairs of

cranial nerves and the cervical sympathetic trunk.

Retropharyngeal space is a gap which is filled with loose fiber and located behind the pharynx, between the fascia buccopharyngea (covers posterior wall of the pharynx) and fascia prevertebralis. There are: retropharyngeal lymph nodes, inflammation of which leads to the formation of retropharyngeal abscesses, branches a. pharyngea ascendens and plexus venosus pharyngeus.

The space is limited:

at the top – with the base of the skull;

at the bottom – at the level of the VI cervical vertebra transfers into retrovisceral space of the neck;

laterally – with aponeurosis pharyngoprevertebralis (Charpy's partition); in front – with pharynx and fascia buccopharyngea, that covers it; behind – with fascia prevertebralis.

The first symptom of inflammation of the deep tissue of the face are tonic contractions of masticatory muscles (trismus), because into pyoinflammatory process involves the medial pterygoid muscle. In further inflammatory process spreads on all cellular spaces and through round, oval and spinous holes – to the dura mater and through the inferior orbital fissure – into the cavity of the orbit. Purulent inflammation on the face in the form of the furuncle or carbuncles of the upper lip or corner of the mouth, complicated by venous thrombophlebitis of the face, spreads inevitably on the orbit veins, sinus cavernous and pterygoid venous plexus, then through anastomoses reaches dura mater sinuses, and it causes sinus thrombosis followed by meningitis. Inflammatory processes in the area of the face are too complicated, sometimes they end with the death of the patient. The reasons of this are:

- close location of vital formations;
- venous plexus and veins without valves.

The septic emboli spread quickly into the venous sinuses of the dura mater with development of intracranial complications. The most dangerous in this respect are the inflammatory foci in the area of the upper lip. One distinguishes "triangle of death"

between the two nasolabial folds and upper lip, the manipulation on soft tissues of which are carried out with special care.

3) presence of the linked cellular spaces in the lateral face area causes the spreading of inflammation in the neighboring areas of the body (orbit, parapharyngeal space, mediastinum).

ORGANS

OF THE NECK THYROID

GLAND (GLANDULA

THYREOIDEA)

It consists of two lobes (right and left) and the isthmus. The pyramidal lobe is present in 1/3 of cases. The thyroid gland has connective tissue capsule continuous with the septa that make up the stroma of the organ. Externally to the true capsule is more or less welldeveloped layer of fascia derived from the pretracheal (visceral) fascia. The arteries, nerves and the parathyroid gland are located between the capsule and fascia in adipose tissue. Visceral fascia forms ligaments that fixate the gland to the trachea, thyroid and cricoid cartilage.

Median thyrohyoid ligament goes from the isthmus to the cricoid cartilage. The surgeons dissect it at the upper tracheotomy to put down the isthmus and to expose the upper rings of the trachea. The sternohyoid muscle, the sternothyreoid muscle and the omohyoid muscle cover the gland anteriorly. 2–4 cartilages of the trachea are contained behind the isthmus. The lobes cover the trachea, pharynx, larynx and esophagus. The parathyroid gland and the inferior thyroid artery are located behind the thyroid gland. The recurrent laryngeal nerve is located posteriorly and middlely to the gland.

The common carotid artery is located posteriorly and laterally to the gland.

Upper poles of lateral lobes reach the middle of the thyroid

cartilage. Lower pole is at the level of 5–6 rings of trachea. The superior thyroid artery arises from the external carotid artery and gets the upper poles of the right and left lobes. It supplies anterior part of the gland. The inferior thyroid artery arises from the thyrocervical trunk and gets the inferior poles of the right and left lobes. It crosses the recurrent laryngeal nerve at the posterior surface of the gland. The thyroidea ima artery arises from the brachiocephalic trunk and ascends in front of the trachea to the isthmus.

Glandular venous outflow flows by the superior and middle thyroid veins into the internal jugular vein and by the inferior thyroid veins into the brachiocephalic vein.

Lymph vessels of the thyroid gland empty into the deep cervical and paratracheal lymph nodes. It is important to know relation of the recurrent laryngeal nerve with the superior parathyroid gland during consecutive thyroidectomies.

The close relation of these anatomical structures with the thyroid gland poses the potential threat of injury at surgical intervention and the development of serious complications in future.

The superior laryngeal nerve is a branch of the vagus nerve. It is divided into two branches at the level of the large horn of the hyoid bone: external laryngeal nerve and internal laryngeal nerve.

The external laryngeal nerve descends on the larynx, beneath the sternothyroid muscle to supply the cricothyroid muscle. The internal laryngeal nerve descends to the thyrohyoid membrane piercing it together with the superior laryngeal artery and is distributed to the mucous membrane of the larynx. The recurrent laryngeal nerves bend round aorta from below and behind (on the left) and the subclavian artery (on the right), ascend in the furrow between the trachea and esophagus. The tracheal, esophageal and thyroid branches and the inferior laryngeal nerve arise from the recurrent laryngeal nerves. The recurrent laryngeal nerve passes in the thickness of thyroid-tracheal ligament (in 50 % cases). It causes injury due to stretching ligament at surgical operation. The recurrent laryngeal nerve is located between visceral layer of the

fourth fascia and connective tissue capsule. It passes on the posterior surface of the thyroid gland. It intersects with the inferior thyroid artery. The recurrent laryngeal nerve is located anteriorly or posteriorly to it or between its branches. Aphonia is the inability to produce voice. It is caused when the nerve is injured on the one side of the gland.

When the nerve is injured on both sides, it causes paresis (weakness) or paralysis (complete lack of movement) in the vocal fold with the development of asphyxia. (It is a condition of severely deficient supply of oxygen to the body that arises from abnormal breathing. Tracheotomy is an effective measure in controlling asphyxia).

The sympathetic branches arise from the cervical sympathetic nodes. They form plexus with the branches of the vagus nerve. The branches of the vagus nerve are composed of external laryngeal nerve and the recurrent laryngeal nerve. The thyroid hormones are triiodothyronine (T3) and its prohormone, thyroxine (T4) and calcitonin. Iodine is necessary for the production of T3 and T4. It enters the body through food, water and air in the form of organic and inorganic compounds. Too little production of thyroxine by the thyroid gland and iodine deficiency cause hypertrophy and hyperplasia of the thyroid epithelium. As a result, the enlargement of the thyroid gland occurs. It is called goitre. Goitre is associated with hypothyroidism. Regarding morphology, goitres may be classified either as the growth pattern or as the size of the growth:

Growth pattern:

- nodular (struma uninodosa): can be either inactive or a toxic nodule;
- multinodular (struma multinodosa): can likewise be inactive or toxic, the latter called toxic multinodular goitre;
- diffuse (struma diffuse): the whole thyroid appears to be enlarged. Graves' disease, also known as toxic diffuse goiter and Flajani-Basedow-

Graves disease, is an autoimmune disease that affects the thyroid gland. It frequently results in hyperthyroidism and enlarged thyroid.

Signs of hyperthyroidism may include goiter, exophthalmos and tachycardia.

Other signs of hyperthyroidism are:

- *von Graefe's sign* (lid lag sign) is the immobility or lagging of the upper eyelid at downward rotation of the eye;
- *Möbius sign* is a clinical sign at which inability to maintain convergence of the eyes occurs;
- *Stellwag's sign* is a sign of infrequent or incomplete blinking;
- *Dalrymple's sign* is a widened palpebral (eyelid) opening, or eyelid spasm.

The nodular or multinodular goiter, diffuse goiter, acute infectious thyroiditis and thyroid cancer are indications for operation.

Parathyroid glands (gl. parathyroideae)

The parathyroid glands are four tiny glands usually found on the posterior surface of the thyroid gland between thyroid capsule and visceral layer of the fourth fascia of the neck. The superior parathyroid glands are located at the level of cricoid cartilage, at the middle of distance between the upper pole and isthmus of the thyroid gland.

The inferior parathyroid glands are located at the lower pole of the thyroid gland in the place of entry of the inferior thyroid artery. Parathyroid glands have the shape of the oval small bodies, about 7 mm of reddish-brown or yellow colour.

The inferior thyroid artery supplies the parathyroid glands. Venous outflow is carried out into the veins of the thyroid gland. Parathyroid glands receive the sympathetic innervation from the cervical sympathetic nodes. Parasympathetic fibers arise from the vagus nerve. Parathyroid glands are the endocrine glands. These glands produce parathyroid hormone. It controls calcium and phosphate levels in the body.

Hypoparathyroidism develops after injury of the parathyroid gland during the operations on the thyroid gland. Its symptoms are cramps, nervous and mental disorders, and lowering calcium in blood. The cramps capture the muscles of the face and upper extremities. They can spread to the muscles of pharynx and larynx

and cause asphyxia. The stimulating of the peripheral nerves or muscles with high sensibility causes the cramps (symptoms – *Chvostek's sign*: when the facial nerve is tapped at the angle of the jaw (i. e. masseter muscle), the facial muscles on the same side of the face will contract momentarily because of hypocalcemia; *Trousseau's sign* – a sign of tetany at which carpal spasm can be elicited by compressing the upper arm and causing ischemia to the nerves distally).

10 ml of 10 % solution of calcium chloride are injected to remove tetany attack. Further Parathyroidin is injected with calcium chloride to retain level of calcium.

THE LARYNX

The larynx commonly called the voice box, is an organ in the neck involved in breathing, sound production, and protecting the trachea from food aspiration.

There are 6 cartilages, three unpaired and three paired that support the larynx and form its skeleton.

Unpaired cartilages:

- thyroid cartilage forms the Adam's apple;
- cricoid cartilage;
- epiglottis.

Paired cartilages:

- arytenoid cartilages;
- corniculate cartilages;
- cuneiform cartilages.

The cartilages are connected by ligaments. The cricothyroid and cricoarytenoid articulations provide the mobility of cartilages.

The constrictor muscles of the glottis:

- the lateral cricoarytenoid muscles;

- the thyroarytenoid muscle;
- the arytenoid muscle;
- the oblique arytenoid muscle;
- the aryepiglottic muscle.

The dilator muscles of the glottis:

- the posterior cricoarytenoid muscle;
- the thyreoepiglotticus muscle.

The muscles changing of the glottis tension:

- the vocalis muscle;
- the cricothyroid muscle.

The cavity of the larynx looks like an hourglass. The boundaries of the laryngeal inlet are:

- anterior – epiglottis;
- lateral – aryepiglottic fold (*plicae aryepiglottica*);
- posterior – apex of arytenoid cartilages.

The portion of the cavity of the larynx above the vocal folds is called the vestibule. The ventricle of the larynx (also called the laryngeal sinus, laryngeal ventricle or Morgagni's sinus) is a fusiform fossa located between the ventricular and vocal folds on both sides and extending nearly their entire length. The vocal folds are located within the larynx at the upper part of the trachea. They are attached posteriorly to the arytenoid cartilages and anteriorly to the thyroid cartilage. The rima glottidis is the opening between the true vocal cords and the arytenoid cartilages. It is conditionally subdivided into two parts: the part between the arytenoid cartilages is called the intercartilaginous part (or the intercartilaginous glottis, respiratory glottis, or interarytenoid space) and the part between the vocal folds is called the intermembranous part or glottis vocalis. The part of the laryngeal cavity of the larynx immediately below the glottis is called infraglottic cavity.

The larynx is located at the level from the IV to the VI cervical vertebrae. In children it is located more superiorly in the neck (the superior border reaches the III vertebra). The larynx in elderly people is located more inferiorly in the neck (the superior border reaches the VI vertebra).

Location of the larynx changes depending on the position of the head and the functional state of adjacent organs. It can move up, down and sideways. The sternohyoid muscle, sternothyroid muscle and thyrohyoid muscle cover larynx in front.

Posteriorly to the larynx is located pharynx.

Laterally – two lobes of the thyroid gland and common carotid artery.

Superiorly – larynx opens into the cavity of the pharynx. There is hyoid bone. It is connected with the larynx through the thyrohyoid membrane.

Inferiorly – enters the trachea.

The superior laryngeal artery and the inferior laryngeal artery supply the larynx. This artery branches from the superior thyroid artery near its bifurcation from the external carotid artery. It pierces the thyrohyoid membrane and supplies the muscles, mucous membrane and glands of the larynx anastomosing with the branch from the opposite side.

The inferior laryngeal artery arises from the thyrocervical trunk and supplies the posterior part of the larynx. The superior laryngeal artery empties into the superior thyroid artery. The inferior laryngeal artery empties into the inferior thyroid artery.

Lymphatic vessels of the upper part of the larynx pass to the deep cervical lymph nodes. The deep cervical lymph nodes are located along neurovascular bundle of the neck. Lymphatic vessels of the inferior part of the larynx pass to the paratracheal and paralaryngeal lymph nodes.

Innervation of the larynx is carried out by the branches of the vagus and sympathetic nerves. Vagus nerve gives off the superior and inferior laryngeal nerves. The superior laryngeal nerve contains motor fibers for the cricothyroid muscle. It innervates the mucous membrane of the larynx above the glottis. The inferior laryngeal nerve or the recurrent laryngeal nerve innervates the mucous membrane of the larynx below the glottis and contains motor fibers for the other muscles of the larynx. The sympathetic fibers pass to the upper part of the larynx from the stellate ganglion of the sympathetic trunk. They pass as a part of the superior and inferior laryngeal nerves.

THE TRACHEA

The trachea (or windpipe) is a hollow tube that connects the larynx (or voice box) to the bronchi of the lungs. It is lower and inseparable part of the airway of the body. It looks like a cylindrical tube in length of 11–13 cm.

The trachea consists of tracheal cartilages that look like semirings (*cartilagens tracheales*). Circular bands of fibrous connective tissue called the annular ligaments of trachea join the tracheal rings together.

The membranous wall of trachea (*paries membranaceus*) is the part of the tracheal wall which is not reinforced by tracheal cartilages. The membranous wall of trachea is formed by connective tissue and smooth muscle.

The trachea is covered with mucous membrane. The mucosa is the inner layer which consists of ciliated pseudostratified columnar epithelium with many goblet cells. Tracheal mucous glands are located in the submucosal layer. Their excretory ducts open to the surface of epithelium. Tracheal mucosa has a large absorbing effect.

There are two parts of the trachea – cervical and thoracic. They are separated by the margin of the jugular notch. The cervical part consists of 6–8 semirings. It is more movable during breathing, swallowing, talking and coughing. The trachea is located at 1–2 cm from the skin (to 3–4 cm at the level of jugular notch).

The cervical part of trachea is located from the lower margin of the VI cervical vertebrae (in children – at the IV–V) to the second thoracic vertebra. Cervical part of trachea is located in the infrahyoid area. The sternohyoid and sternothyroid muscles are located in front of the trachea. They are connected with the third fascia of the neck. The sheaths of the third fascia anastomose with the second fascia at the midline. It is of 2–3 mm in width and does not reach the sternal notch at 3 cm. The thyroid gland adjoins the anterior tracheal wall.

There are the following structures anteriorly in the inferior half of the cervical part of trachea:

- pretracheal fascia;

- the thyroid ima artery;
- the inferior thyroid veins and unpaired thyroid venous plexus;
- the upper pole of the thymus in children;
- lymph vessels and nodes;
- brachiocephalic veins passing medially;
- from behind – the esophagus;
- the recurrent laryngeal nerve – between the trachea and esophagus. Laterally and to the right is located the right common carotid artery and

subclavian artery joining to form the right brachiocephalic trunk. Laterally and to the left is located the left common carotid artery. The thyroid gland lobes are located on both sides.

The trachea is supplied by the branches of the the inferior thyroid artery. Venous outflow is carried out in the thyroid veins. Lymph outflow – in the pretracheal lymph nodes. The tracheal branches of the recurrent laryngeal nerve and branches of the sympathetic trunk innervate the trachea.

Tracheotomy is a surgical procedure at which a cut or opening is made in the windpipe (trachea). The surgeon inserts a tube into the opening to bypass an obstruction and to allow air to get to the lungs or remove secretions. The term tracheostomy is sometimes used interchangeably with tracheotomy. Strictly speaking, tracheostomy is usually referred to the opening itself while a tracheotomy is the actual operation.

Indications for operation:

- laryngospasm;
- laryngeal edema;
- tumors;
- injuries;
- foreign bodies in the larynx and trachea;
- necessity of prolonged mechanical ventilation;
- necessity of sanitation of tracheobronchial tree during inflammatory diseases;
- traumatic brain injury;

- pulmonary edema.

THE PHARYNX

It is located from the skull base to the VI cervical vertebra. It consists of three structures: nasopharynx (pars nasalis), oropharynx (pars oralis), laryngopharynx (pars laryngea).

There are choanae on the anterior wall of the nasopharynx. On the lateral wall of the nasal part of the pharynx is located the pharyngeal opening of the auditory tube (pharyngeal ostium). The pharyngeal tonsil is located between the superior and posterior walls.

The pharyngeal tonsils are lymphoid tissue structures located in the posterior wall of the nasopharynx at the entrance to the throat. Waldeyer's tonsillar ring is an annular arrangement of lymphoid tissue. From superior and inferior the ring consists of:

- pharyngeal tonsil;
- 2 tubal tonsils;
- 2 palatine tonsils;
- lingual tonsil.

The oropharynx is located at the third cervical vertebra. It is a part of the digestive and respiratory systems.

The laryngopharynx is located at a distance from the entrance to the larynx to the entrance of the esophagus. There are piriform recesses on the lateral wall of the laryngopharynx. The fold of the superior laryngeal nerve is located at the bottom of the piriform recesses. The internal branch of the superior laryngeal nerve is located in the thickness of the fold of superior laryngeal nerve.

The connective tissue (fascia pharyngobasilaris) attaches the pharynx to the base of the skull and surrounding structures. Both circular (the superior, medium and posterior pharyngeal constrictors) and longitudinal muscles (the stylopharyngeus and the palatopharyngeus muscles) are located in the walls of the pharynx.

Muscles are covered by the buccopharyngeal fascia. The boundaries of the pharynx:

- *laterally* – bounded by the parapharyngeal cellular tissue;

- *anteriorly* – nasal cavity, mouth and larynx;
- *posteriorly* – the body of 6 cervical vertebrae, the longus colli muscle covered by the prevertebral fascia, retropharyngeal space;
- *laterally in the inferior parts* – the common carotid arteries and upper poles of the thyroid gland;
- *superiorly* – parapharyngeal cellular tissue and its content (the internal carotid artery, the internal jugular vein, cranial nerves from IX–XII, truncus sympathicus and its superior cervical node, lymph nodes).

Blood supply of the pharynx:

- 1) the ascending pharyngeal artery (a. pharyngea ascendens) from the external carotid artery;
- 2) the ascending pharyngeal artery (a. palatina ascendens) from the facial artery;
- 3) the descending palatine artery (a. palatina descendens) from the maxillary artery;
- 4) the artery of the pterygoid canal (Vidian artery, canalis pterygoideus) from the maxillary artery;
- 5) the superior thyroid artery (a. thyroidea superior) from the external carotid artery;
- 6) the inferior thyroid artery (a. thyroidea inferior) from the thyrocervical trunk.

The venous outflow is carried out into the pharyngeal plexus.

From the upper part of the pharynx – into the internal jugular vein. From the lower part of the pharynx – into the vein of the thyroid gland. *The lymph outflow:* into retropharyngeal and deep cervical lymph nodes.

Innervation: by plexus pharyngeus, branches of the IX and X pairs of cranial nerves and branches of the sympathetic trunks.

The retropharyngeal space is a potential space of the head and neck bounded anteriorly by the buccopharyngeal fascia and posteriorly by the prevertebral fascia. It contains the ascending pharyngeal artery, pharyngeal nervous plexus, pharyngeal venous plexus, retropharyngeal lymph nodes (The inflammation of

retropharyngeal lymph nodes leads to the formation of retropharyngeal abscess).

The boundaries of the retropharyngeal space are:

- superiorly: base of the skull;
- inferiorly: at the level of the VI cervical vertebra, passes into the retrovisceral space;
- laterally: the pharyngoprevertebral aponeurosis;
- anteriorly: the buccopharyngeal fascia;
- posteriorly: the prevertebral fascia.

The retropharyngeal space is divided into two halves by median septum from the pharyngeal tubercle to the VI cervical vertebra. Therefore the abscesses are usually one-sided and located at the side from the midline.

THE CERVICAL ESOPHAGUS

The cervical esophagus is located in the infrahyoid area. The esophagus generally begins at the level from the VI cervical vertebra (C6) to the II thoracic vertebra (T2).

The trachea and cricoid cartilage lie anteriorly to the esophagus. The left inferior thyroid artery passes along the anterior wall of the esophagus in the transverse direction. The left recurrent laryngeal nerve is located in the left tracheoesophageal groove. The right recurrent laryngeal nerve lies on the lateral surface of the trachea. The lower poles of the lateral lobes of thyroid gland and the inferior thyroid arteries are in lateral relation to the esophagus on both sides.

The thoracic duct lies on the left side at the level of the VI cervical vertebra. The right recurrent laryngeal nerve lies on the right side. Posteriorly it is related to prevertebral muscles and prevertebral fascia covering the bodies of the VI, VII and VIII cervical vertebrae. The retrovisceral space is located between the prevertebral fascia and the IV fascia of the neck. It continues into the retropharyngeal space upwards and in mediastinum downwards.

The pharyngeal narrowing is the narrowest place of the cervical

esophagus. It is located in the place of transition from the pharynx into the esophagus. The cricoid cartilage presses the anterior wall of the esophagus in this place. The wall is thickened because of circular fibers of the inferior pharyngeal constrictor.

The supply of the cervical esophagus:

The inferior thyroid artery (a. thyroidea inferior) from the thyrocervical trunk.

The venous outflow: into the inferior thyroid veins.

The lymph outflow: paratracheal and deep cervical lymph nodes.

Innervation: esophageal branches from the recurrent laryngeal nerves and the branches of the sympathetic trunk.

TOPOGRAPHIC ANATOMY

CHEST (pectus)

Chest comprises surface layers, thoracic cage (thorax) and chest cavity (cavum thoracis) where organs are located. The upper border of the chest passes through jugular notch of sternum, then – along the clavicle to acromioclavicular joint. Therefrom – backwards to spinous process of vertebra prominens, or C7 (vertebrae prominens).

Chest is separated from upper limb with the line, which passes from clavicle through deltopectoral groove and then – along the rear edge of deltoid muscle.

The lower border passes along the edge of the rib arch to 10th rib, and then – through the anterior ends of the 11th – 12th ribs, along the inferior border of the 12th rib until spinous process of thoracic vertebra.

In order to determine projection of lungs, heart and abdomen organs we can draw few conditional lines on the chest.

1. Linea mediana anterior – goes through the middle of the sternum.
2. Linea sternalis – goes through the sternum edge.
3. Linea parasternalis – goes to the middle between sternal line and midclavicular line.

4. Linea medioclavicularis – goes through the middle of the clavicle.

5. Linea axillaris anterior.

6. Linea axillaris media.

7. Linea axillaris posterior.

These three lines (5, 6, 7) go through the lateral surface of the chest – from anterior wall, middle and posterior wall of axilla accordingly.

1. Linea scapularis – goes through the scapula bottom corner.
2. Linea paravertebralis – passes between scapula and vertebral line.
3. Linea vertebralis – goes through vertebra transverse processes.
4. Linea mediana posterior – goes through vertebra spinous processes.

Chest is divided into several segments:

1. Anterior superior segment – complies with pectoralis major muscle. This segment comprises subclavian and breast area.
2. Anterior inferior segment – from bottom edge of pectoralis major muscle to costal margin.
3. Sternal segment – complies with sternum contours.
4. Scapular segment.
5. Subclavian segment.
6. Spinal segment.

INFRACLAVICULAR SEGMENT (regio infraclavicularis) is determined: by clavicle – from above; by the 3rd rib – from below; in the middle – by linea sternalis; sidewise – by anterior edge of deltoid muscle.

The skin of the segment is thin and flexible. Subcutaneous layer has nn. supraclaviculares, rr. cutanei anteriores et rr. cutanei laterales (these are branches of the intercostal nerves). The superficial fascia lies deeper which encases platysma muscle (m. platysma).

The fascia pectoralis is located, under the superficial fascia. It forms a fascial sheath for m. pectoralis major.

The sulcus deltoideopectoralis passes, between anterior edge of deltoid muscle and upper external edge of pectoralis

major muscle, where v. cephalica is located. V. cephalica penetrates fascia clavipectoralis and goes into v. axillaris. Sulcus deltoideopectoralis goes up to trigonum deltoideopectoralis (or fossa deltoideopectoralis, Mohrenheim's fossa).

Between the deep lamina of fascia pectoralis and deeper is located fascia clavipectoralis. There is superficial subpectoral space, filled with adipose tissue, where we see branches of a. thoracoacromialis, nn. pectorales medialis et lateralis and Rotter's lymph nodes (nodi lymphoidei interpectoriales).

Fascia clavipectoralis is located between scapula coracoid process, clavicle and the 3rd – 5th ribs. It forms the sheath for m. pectoralis minor, m. subclavius, a. et v. axillaris and plexus brachialis.

Between the posterior surface of m. pectoralis minor and thoracic wall is located a deep subpectoral space, where axilla neurovascular fascicle passes (Fig. A. 1).

Superficial and deep subpectoral spaces join together via cellular tissue, which surrounds the neurovascular fascicle, with axilla, cellular tissue of lateral cervical region and subdeltoid cellular space.

Subpectoral phlegmons should be cut through the line which goes along the posterior edge of pectoralis major muscle.

Two triangles can be considered in this segment:

1. Trigonum clavipectoralis – between the clavicle and upper edge of m. pectoralis minor.
2. Trigonum pectorale – complies with the position of m. pectoralis minor.

These triangles have neurovascular fascicle: a. et v. axillaris and plexus brachialis, which come here from the lateral cervical segment while passing between the clavicle and the

1st rib, and move to axilla.

V. axillaris passes in trigonum clavipectorale downward, up to the middle and forward from a. axillaris. It is bedded to fascia clavipectorale and attaches to it. That is why air epiboly occurs (frequent and dangerous complication of clavicle fracture).

The axillary vein (v. axillaris) is followed by a group of lymph nodes, which are amputated in mastectomy. The v. subclavia is a direct continuation of v. axillaris.

The surgical anatomy of subclavian vein is very important, because it is often needled and catheterized for introducing medications, vein blood pressure measuring, and diagnostic manipulation in the heart cavity.

The border between v. axillaris and v. subclavia is located on the inferior margin of the 1st rib. The vein lays on the upper surface of the 1st rib in spatium antescalenum, then goes to the level of sternoclavicular joint, where it combines with internal jugular vein while creating a brachiocephalic vein.

Subclavian vein goes in obliquity from down to top and from outside to inside. It does not change its position when we move upper limbs, because it is solidly connected to surrounding tissues.

As a result of adhesion of subclavian vein sheath with clavicle periosteum, the 1st rib and fascia clavipectoral, its lumen remains constant even in case of acute fall of circulating blood volume (CBV), when all other circumferential veins are stuck together.

The subclavian vein can be divided into three segments. First segment is located in trigonum clavipectorale, second – behind the clavicle, and third – in spatium antescalenum.

Postclavicular segment of v. subclavia is located on upper

surface of the 1st rib, which separates the vein from cupula of the pleura. Here the vein is located between the clavicle and anterior scalene muscle, which separates it from a. subclavia and trunk of brachial plexus.

Then v. subclavia goes to spatium antescalenum, passes above cupula of pleura while covering a. subclavia.

V. cephalica, v. suprascapularis, v. transversa colli, v. jugularis externa, v. cervicalis profunda, v. vertebralis, and chest or jugular lymphatic trunk fall into v. subclavia from above.

If long-standing fluid maintenance is necessary (peritonitis, major combustion, craniocerebral trauma, heavy loss of blood, etc) when superficial veins are absent, we use a puncture and catheterization of v. subclavia according to the method of Seldinger.

The puncture of v. subclavia is performed by means of subclavian or supraclavicular approach. The vein puncture according to Abaniak technique (1 cm down from the border of middle and internal third of the clavicle) is more useful at subclavian approach. The angle formed by upper edge of the clavicle and lateral crus of sternocleidomastoid muscle is a reference point during the vein puncture when using supraclavicular approach. The needle enters Ioffe's point, a bit upper from the top of the angle.

The puncture of the right vein with subclavian access is more dangerous, because:

a) large veins and lymphatic trunks fall into upper wall of v. subclavia;

b) above the clavicle the vein is located near to cupula of the pleura, and damage of the latter could result in pneumothorax. Below the clavicle the vein is separated from pleura with the 1st rib;

c) in the middle parts of infraclavicular region the vein covers a. subclavia and protects it.

The choice of v. subclavia for catheterization can be explained by its anatomic-functional peculiarities:

1) the vein has its permanent position and clear topographic-anatomical points of reference;

2) the vein lumen is big enough (12 – 25 mm in adults);

3) the vein's wall is fixed with muscular-fascial formations, what ensures its relative immovability and prevents it from collapse even in unexpected hypovolemia (decrease of blood circulation);

4) the high speed of blood circulation is a factor which prevents thrombosis.

Compression of v. subclavia in spatium costoclavicularis on exertion induces hypertrophy of valve wall and results in vein thrombosis. Thus Paget – Schroetter syndrome occurs. The symptoms of Paget – Schroetter syndrome are: progressive limb edema, sharp pain, cyanosis and affection of blood circulation in the limb.

There is a valve in the part of v. subclavia passage, between clavicle and the 1st rib. The damage of cups of the valve results in their thickening and parafunction. The balloon dilatation causes the destruction of thickened cups and improves the vein blood circulation. Thus, the Paget – Schroetter syndrome is successfully treated by means of endovascular surgery (thrombolytic therapy, balloon dilatation and aspiration thrombectomy).

A. thoracica superior springs from a. axillaris in trigonum clavipectorale and provides blood supply of the 1st and the 2nd intercostal spaces, and of a. thoracoacromialis, which penetrates fascia clavipectorale near the internal edge of m. pectoralis minor and gives off:

- rr. pectorales – provide blood supply of major and minor pectoralis muscles;

- r. acromialis – provides blood supply of acromioclavicular joint and participates in forming rete acromiale;

- r. deltoideus – provides blood supply of m. deltoideus.

V. axillaris is located downwards and up to the middle in trigonum pectorale, and a. axillaris is located upwards and outwards.

At this level plexus brachialis bifurcates into 3 fascicles. Fasciculus lateralis is located outwards and upwards from the arteria, fasciculus posterior – behind the arteria, fasciculus medialis – up to the middle and downwards from the arteria, and behind the vein.

Plexus brachialis is formed by anterior branches of four lower cerebrospinal nerves (C5 – C8). The part of anterior branch (C4 and Th1) also participates in forming plexus brachialis. They join together like this: the anterior branch of C5 joins with anterior branch of C6 while forming a truncus superior; the anterior branch of C8 joins with anterior branch of Th1 while forming a truncus inferior; and between them the anterior branch of C7 is located. The anterior branch of C7 forms a truncus medius. Superior, inferior and middle trunks with their short branches form pars supraclavicularis of brachial plexus (Fig. A.2).

Each of abovementioned trunks bifurcate into 2 branches: anterior and posterior one. Due to these branches the fascicles of plexus brachialis are formed at the level of inferior edge of the clavicle, or just in trigonum clavipectorale.

The process of their formation is explained by K. A. Hryhorovych the next way: the posterior divarications are joined together in one trunk and form a posterior cord of brachial plexus (fasciculus posterior). The frontal divarications of upper trunk are joined together with frontal divarications of the middle trunk and form a lateral cord of brachial plexus (fasciculus lateralis).

The frontal divarications of inferior trunk form a medial fascicle of brachial plexus (fasciculus medialis). Fasciculus posterior gives off n. axillaris and then passes into n. radialis. Fasciculus lateralis and fasciculus medialis bifurcate into 2 branches. The middle branch of fasciculus lateralis and lateral branch of fasciculus medialis join almost at the right angle, encircling a. axillaris and forming n. medianus. The outer branch of fasciculus lateralis forms n. musculocutaneus, which enters m. coracobrachialis. Medial branch of fasciculus medialis forms n. ulnaris, n. cutaneus antebrachii medialis and n. cutaneus brachii medialis. The damage of plexus brachialis in adults is observed as complication from inflammation in the result of direct trauma, or during the treatment of dislocation of glenohumeral joint.

The damage of plexus brachialis quite often occurs in obstetric practice during childbirth: in case of fetus head, hand or leg traction, when fetus is overweight (more than 4000 g), or if fetus is in abnormal position (pelvic presentation, breech birth).

Depending on the level of brachial plexus damage we can distinguish the following types of paralysis:

Erb – Duchenne paralysis (superior type) – C5 – C6 – C7 rami or trunks of plexus brachialis;

Dejerine-Klumpke paralysis (inferior type) – C8 – Th1 rami or inferior trunk formed by them.

In case of Erb – Duchenne paralysis the function of m. deltoideus, m. biceps brachii and m. brachioradialis is affected, i. e. n. axillaris and n. musculocutaneus are damaged. A patient is not able to lift and shift his shoulder back, or bend his brachium in elbow joint.

In case of Dejerine – Klumpke paralysis we can observe paralysis phenomena, sensory anesthesia, and pupillary disorders. Dysfunction and atrophy of small muscles of the hand (thenar and hypothenar muscles, muscoli interossei

dorsales, musculi interossei palmares and musculi lumbricales). Sensory anesthesia of skin of the hand (cutaneous branches of n. radialis, ulnaris et medianus), medial surface of shoulder and brachium (n. cutaneus brachii medialis, n. cutaneus antebrachii medialis) occur.

A. thoracica lateralis originates from a. axillaris in trigonum pectorale and follows n. thoracicus longus till m. serratus anterior. Anteriorly a. axillaris is crossed by nn. intercostobrachiales. Having reached the exterior surface of m. serratus anterior, a. axillaris supplies this muscle with blood, and gives off lateral rami (rr. mammarii laterales). Compression of neurovascular fascicle is possible within trigonum pectorale, which results in syndrome of pectoralis minor muscle (Wright syndrome). The symptoms of Wright syndrome are muscle-tonic neurodystrophic disorders of the pectoralis minor muscle and compression of neurovascular fascicle which passes below the muscle. Neurovascular fascicle is pressed behind the pectoralis minor muscle below the processus coracoideus to caput humeri. Compression of these formations may appear in cases of excessive shoulder abduction (immobilization after humerus fracture, sleeping with arms put behind the head). A patient complains of pain in pectoralis minor muscle area when he raises or abducts his arm. We can observe paresthesia, weakness of arm muscles, skin blanching, hand swelling, decrease of pulse in a. radialis.

The axillary vessels and plexus brachialis are surrounded by cellular tissue and located in fascial compartment formed by fascia clavipectorale. The cellular tissue of trigonum clavipectorale while the neurovascular fascicle upwards, joins the deep cellular tissue of trigonum cervicalis lateralis, and fissure anterscalenum. Downwards it joins the cellular tissue of axilla, and along a. et v. axillaris and nerves of plexus brachialis – with

subpectoral cellular space. **THORACIC AREA (regio mammaria)**

Area limits:

- above – the 3rd rib;
- below – the 7th rib;
- medially – linea parasternalis;
- laterally – linea axillaris anterior.

The skin is thin and movable.

In the subcutaneous tissue there are rr. cutanei anteriores et laterales nn. supraclaviculares. There are rr. mammarii laterales et mediales from intercostal nerves, superficial veins and branches of a. thoracoacromialis, a. thoracica interna, aa. intercostales anteriores in women.

Mammary gland (mamma) is covered by superficial fascia which forms a capsula. Fascial septums spring from capsula inside the mammary gland, between its lobules.

The capsule is attached to skin by means of connective tissue bands, and above to clavicle by means of suspensory ligaments of the breast (ligg. suspensorium mammae). The loss of compliance and distortion of connective tissue results in mastoptosis, what makes women to perform plastic surgery (mastopexy).

The thoracic area has three layers of cellular tissue. First layer is located between skin and fascia superficialis (capsule) of mamma. Second layer is located inside the capsule between the lobules of mammary gland. Third layer is located between the deep lamina of fascia superficialis and fascia pectoralis propria.

The mammary gland comprises 15 – 20 radiary placed lobules. Each lobule has its own duct (ductus lactiferous), which forms a distention (sinus lactiferous) near the base of

the nipple.

In the middle of mammary gland there is areola mammae in the center of which the mammilla (papilla mammaria) emerges. The papilla mammaria of a young woman complies with the 5th rib. Montgomery tubercles emerge in the area of areola. On the top of Montgomery tubercles, the excretory ducts of glandulae areolares open, which appear at the end of pregnancy and exist during all the lactation period.

Sulcus intermammarius is located between left and right mammae. Behind the mamma capsule there is a layer of adipose tissue. Fascia pectoralis propria, m. pectoralis major and m. serratus anterior lie deeper.

Blood supply of the mammary gland (Fig. A.3):

1) rr. mammarii mediales from rr. perforantes, from a. thoracica interna system;

2) rr. mammarii laterales from a. thoracica lateralis;

3) rr. perforantes from aa. intercostales.

Venous drainage to superior vena cava system occurs through the homonymous veins.

The lymph outflows from breast in different ways, what has a practical importance in metastastatic spread through these ways in cases of malignant growth (breast cancer) (Fig. A.5). The main direction of lymph drainage from breast is axillary path which begins with 2 – 3 vessels which flow along the inferior border as great vessels of pectoralis major muscle and flow into nodi lymphoidei pectorales (Sorgius nodes). These nodes are located along a. thoracica lateralis on the level of the 2nd – 4th ribs. They are the most frequent focuses of metastasis.

From these nodes the lymph drains to axillary lymph nodes, nodi lymphoidei axillares centrales, and from nodi lymphoidei axillares centrales – to nodi lymphoidei axillares apicales which

are located along v. axillaris. From nodi lymphoidei axillares apicales the lymph drains to deep inferior cervix nodes or to subclavian trunk. The Troisier's lymph node has a clinical relevance which is palpated in metastases above the clavicle beside outer edge of sternocleidomastoid muscle.

From posterior part of mamma the lymphatic vessels go along transpectoral path upwards while passing through m. pectoralis major, go through nodi lymphoidei interpectorales Rotter's lymph nodes and fascia clavipectorale, and fall into nodi lymphoidei axillares apicales or into deep cervix (subclavian) nodes.

Moreover, the sternal path is important as well. It begins from medial sternal segments, goes through m. pectoralis major in intercostal spaces toward nodi lymphoidei parasternales which are located along internal sternal vessels. From nodi lymphoidei parasternales the lymph drains:

- from the left – into the left subclavian trunk and arch of thoracic duct;
- from the right – into the right subclavian trunk, right lymph duct or into nodi lymphoidei prepericardiaci.

Nodi lymphoidei prepericardiaci have connections with tracheal and tracheal-bronchial nodes, as well as with bronchial-pulmonic and infrapulmonary nodes.

Thus, metastasis of cancer from chest to lungs is possible. Along the intercostal lymph vessels, the intercostal lymph nodes anastomose with nodi lymphoidei intercostales and nodi lymphoidei prevertebrales. Thus, metastasis of cancer from chest to corpus vertebrae is possible as well.

The lymph vessels of right and left mammae are connected together as by means of lymphatic reticulum of skin so anastomoses of presternal lymph nodes from both sides.

The metastases of cancerous growths can effuse from

presteral lymph nodes along a. epigastrica superior et inferior into anteperitoneal cellular tissue, perineal lymph nodes, and abdominal cavity and gonads, and along ligamentum teres hepatis – into liver.

Breast innervation (Fig. A.4)

1) rr. mammarii laterales from n. cutanei laterales the 2nd – 7th intersotal nerves;

2) rr. mammarii mediales from r. cutanei anteriores the 3rd – 5th intercostal nerves;

3) nn. supraclaviculares from plexus cervicales.

The main function of mammae is a synthesis and secretion of milk. The structure and functions of mammae are significantly changing depending on different phases of menstrual cycle, pregnancy and lactation. The changes are determined by functionality of endocrine glands.

Among the defects we should mention increase of number of nipples (polythelia), and number of mammae (polymastia). When tissue of mammae loses its elasticity – mastoptosis appears (ptosis of mammae). In case of mastoptosis the plastic surgery is recommended for young women.

The men breast augmentation (gynecomastia) is not dangerous for men health, and the mastectomy is indicated for cosmetic reasons only.

The breast inflammation (mastitis) is frequently observed among lactating mothers. This disease is associated with infection invading the mammae through scratches and fissures from apostasis on skin surface, and through lactiferous ducts, and hematogenic and lymphatic sinuses as well.

According to localization we can distinguish: superficial abscesses, antemammary, abscesses located in the first layer of cellular tissue, abscesses or phlegmons located in the mamma (intramammary), and located behind the mamma

(retromammary).

The operation is performed under general anaesthesia. The intramammary abscesses are lancing according to Angerer method. Fibroadenoma is the most frequent type of benign tumour. Fibroadenomae are slowly growing round nodes of firm or a bit elastic texture, with smooth or a bit lumpy surface, and are well-separated from surrounding tissues. Fibroadenomae are considered as precancer conditions, and are subject to operative treatment. The definitive treatment of mammary cancer is radical mastectomy.

Under the breast fascia there are muscles *mm. pectorales major et minor*, which cover chest cage in front, and *m. serratus anterior* and *m. latissimus dorsi*, which cover it sideways and from behind. The *m. obliquus abdominis externus* spring from lateral surface of thoracic cage and covers external surfaces of ribs and intercostal spaces.

In its turn intercostal spaces are filled with intercostal muscles, blood vessels and nerves. External intercostal muscles (*mm. intercostales externi*) fill intercostal spaces between the head of the ribs to the cartilage. *Membrana intercostalis externa* is their prolongation which looks like bright aponeurotic plates. The direction of muscle is from top to bottom and back to front.

Internal intercostal muscles (*mm. intercostales interni*) fill intercostal spaces from the lateral part of the chest to the costovertebral angle. The direction of muscles is from bottom to top and from the front to back. *Membrana intercostalis interna* is the prolongation of muscles.

There is an intercostal slot between external and internal intercostal muscles bounded with costal sulcus. The slot is filled with adipose tissue where the intercostal neurovascular bundle is located. The elements of neurovascular bundle are

located in the following way: there are a vein on the top, a nerve on the bottom, and the artery is located between the vein and nerve (Fig. A.6; Fig. A.7).

The chest is supplied with blood by aa. intercostales posteriores from the thoracic part of aorta and by anterior intercostal arteries (aa. intercostales anteriores) from a. thoracica interna. The first and the second intercostal spaces are supplied with blood by the a. intercostalis suprema from truncus costocervicalis and a. thoracica superior from the first part of a. axillaris.

There are 10 pairs of posterior intercostal arteries; 9 of them are located in the intercostal spaces and the 10th pair, a. subcostalis is located under the 12th rib.

The right intercostal arteries are longer than the left ones. They go in front of thoracic vertebra and behind esophagus, thoracic duct, azygos vein and sympathetic trunk. Left intercostal arteries go behind the hemiazygos vein and sympathetic trunk. Near the head of the rib each artery divides into two parts: posterior (r. dorsalis) and anterior (r. anterior).

R. dorsalis gives r. spinalis which penetrates through the intervertebral foramina to the spinal canal and supplies the spinal cord and its membranes with blood. Among these branches it's necessary to mark Adamkevych artery which is located on the level of the 10th – 11th thoracic vertebra which is the main source of blood supply for spinal cord. Beside spinal branch, rr. cutanei mediales et laterales follow from the spinal branch to skin and back muscles.

The frontal branch is the prolongation of the main trunk of the back intercostal artery. It goes in the inner surface of m. intercostalis externus, and in front it is covered with fascia endothoracica, pleural tissue and mediastinal pleura.

Between the head of the rib and costovertebral angle the artery is located lower than its rib and can be damaged in thoracocentesis. From the costovertebral angle to the middle inguinal line the vessels go in the subcostal groove. That's why thoracocentesis should be done between scapular and posterior inguinal lines.

At the level of costovertebral angle the artery is located in sulcus costae, goes in the groove between mm. intercostales and in the middle inguinal line it anastomoses with inferior intercostal artery, the branch of a. thoracica interna.

So, in the intercostal space is formed the arterial circle which consists of two arterial systems: thoracic part of aorta and subclavian artery. The circle is located only in the 6 upper intercostal spaces. In 5 inferior intercostal spaces there are only posterior intercostal arteries which go to the muscles of anterior abdominal wall with their frontal ends. They go through the groove between internal oblique and transverse muscles of abdomen. Anterior intercostal arteries branch off from the internal thoracic artery.

A. thoracica interna begins in the inferior semicircle of subclavian artery in its first section (to penetration into spatium interscalenum). It goes behind v. subclavia and then goes down. Through apertura thoracis it goes to the cavitas thoracis and descends parallel the edge of cavitas thoracis at the distance of 1 – 2 cm from this cavitas thoracis edge. It goes behind the costal cartilages and inner intercostal muscles. It is allocated till the level of the 2nd costal cartilage between pleura and endothoracic fascia, and covered with fascia endothoracica. M. transversus thoracis is also covered below the 3rd costal cartilage (cartilago costalis). Near the diaphragm at the level of the 7th costal cartilage (cartilago costalis) it divides into 2 branches: a. musculophrenica and a. epigastrica superior.

A. musculophrenica goes along the line of attachment of the costal part of the diaphragm. It gives off 5 inferior intercostal arteries to the muscles of intercostal spaces. It supplies the diaphragm and abdominal muscles with blood (Fig. A.8).

A. epigastrica superior breaks posterior wall of sheath of rectus abdominis muscle and is located on the posterior surface of the muscle and at the level of umbilicus it anastomoses with a. epigastrica inferior from a. iliaca externa.

There are different branches along the entire length from a. thoracica interna.

1. Rr. mediastinales go to the pleura, cellular tissue and lymph nodes of upper and anterior mediastinum.

2. Rr. thymi go to the thymus.

3. Rr. bronchiales and rr. tracheales go to bronchi and trachea.

4. Rr. intercostales anteriores go to the intercostal spaces.

5. A. pericardiophrenica begins at the level of the 1st rib, accompanies n. phrenicus going along the lateral surface of the heart, branches off its branches to heart and anastomoses with other branches of heart and myocardium.

That is why Fieschi operation and internal thoracic artery ligation in the 2nd intercostal space were performed for myocardial revascularization in ischemic heart disease. In recent years instead of Fieschi operation the mammary-coronary artery anastomosis is performed. Herewith the internal thoracic artery is sutured to one of the coronary arteries.

Venous drainage from the thoracic cage is supplied by:

1. Vv. thoracicae internae – drain blood from the anterior parts of intercostal spaces. They flow into v. brachiocephalica.

2. V. azygos – drains blood from posterior parts of intercostal spaces of the right side. It flows into vena cava.

3. V. hemiazygos – drains blood in the left posterior parts of 4th – 5th inferior intercostal spaces. It flows into azygos vein.

4. V. hemiazygos accessoria – drains blood from the 6th – 7th upper intercostal spaces at the left, and also from the esophagus and cellular tissue of posterior mediastinum. It flows into azygos vein.

Lymph nodes in the intercostal spaces pass along the intercostal neurovascular bundle. From anterior parts of intercostal spaces lymph outflows into the parasternal lymph nodes which are located along internal thoracic vessels; then into the right and left subclavian trunks. From posterior intercostal spaces lymph outflows through intercostal nodes into prevertebral nodes, and then into Van Hoorne's canal (thoracic duct).

Intercostal nerves pass behind subcostal groove, that's why thoracocentesis is made along the superior border of the rib.

Each of 12 pairs of cerebrospinal nerves has:

1. R. meningeus is sensitive and goes to the maters of spinal cord.

2. R. communicans albus contains antenodal sympathetic fibres which go to the nodes of sympathetic trunk.

3. R. dorsalis is mixed and divides into middle and lateral branches which provide innervation of skin and back muscles.

4. R. ventralis of thoracic nerve are called nn. intercostales. Each intercostal nerve having reached costal angle penetrates into the groove between external and internal intercostal muscles.

Six superior intercostal nerves go to the sternum and give branches called rr. cutanei anteriores which innervate skin of anterior thoracic wall. Five inferior intercostal nerves and infracostal nerve go to the anterior wall of abdomen, follow the arteries and lie in the groove between abdominal internal

oblique muscle and transverse muscle of abdomen. They penetrate into the sheath of rectus abdominis muscle, innervate this muscle, skin of anterior abdominal wall, parietal pleura and peritoneum.

Along the entire length from intervertebral foramen to the costal angle the nerve is covered only with endothoracic fascia, subpleural tissue and pleura. It causes pain radiation in pleuritis to the abdomen and muscles of anterior abdominal wall.

THORACIC CAVITY (cavitas thoracis) is the space limited by the internal surface of thoracic cage in front, on the side, from behind, and by diaphragm from below. Cavity walls are covered with endothoracic fascia. There are 2 pleural sacs and mediastinum, in the thoracic cavity.

PLEURA

External, parietal pleura covers thoracic cavity inside and attaches to endothoracic fascia. Parietal pleura is divided into 3 parts: costal pleura (pleura costalis), diaphragmatic pleura (pleura diaphragmatica) and mediastinal pleura (pleura mediastinalis).

At the root of the lung parietal mediastinal pleura goes into abdominal pleura which joins with lung parenchyma and covers it from all sides.

There is pleural cavity between parietal pleura and visceral pleura. It's a very small slot filled with serous fluid (20 ml) which eases pleural rub while breathing. So, naturally pleural cavity almost does not exist. But in lung collapse, inflammatory processes, the volume of cavity can increase and reach big size.

The upper part of pleural sac which protrudes above

thoracic cavity into the triangle of the neck and covers the top of lungs is called cervical pleura.

Syntopy of cervical pleura:

- posteriorly – a. vertebralis, ganglion cervicale inferior and ductus thoracicus from the (left), head and neck of 1st rib (caput costae) and m. longus colli are covered with prevertebral fascia to which the cervical pleura is fixed by lig. transversopleurale (from the transverse process of VII cervical vertebra to the cervical pleura), lig. vertebropleurale (from the anterior surface of 1st thoracic vertebra to the posterior surface of cervical pleura). These ligaments are crossed for mobilization of upper part of lungs;

- outside and anteriorly – mm. scaleni;
- outside – brachial plexus;
- inside from the right – truncus brachiocephalicus;
- inside from the left – a. carotis communis sinistra;
- in front and on the top – a. subclavia;
- in front – v. subclavia;
- posteriorly and outside – trachea and esophagus.

Costal part of pleura adheres to the endothoracic fascia and is separated from it by the layer of subpleural cellular tissue.

It is mostly developed in the posterior parts of spinal column and easily separates together with pleural sac in case of urgent access to the organs of posterior mediastinum.

In the anterior division subpleural tissue is very thin and it's almost impossible to separate it from endothoracic fascia.

Mediastinal part of parietal pleura in the inferior frontal part attaches to the pericard with which it is bound with poorly marked tissue. There is phrenic nerve with a. et

x pericardiophrenicae in the tissue.

The anterior edge of pleura is the transition line of costal part of pleura into mediastinal one. The right anterior edge passes from lesser supraclavicular fossa (fossa

supraclavicularis minor) downwards and to the middle of the right sternoclavicular joint, behind the head and body of sternum and at the level of attachment of 2nd rib cartilage it passes behind the median line to the anterior edge of the left side at the level of 3rd – 4th costal cartilages (cartilago costalis).

From here it goes down to the attachment point of the 6th rib to sternum, and deviates downwards out merging into inferior edge.

The anterior edge from the left begins from the left supraclavicular fossa, goes down and to the middle of left sternoclavicular joint, goes behind the left side of sternum to the 4th rib joint. It turns round the heart discharging downwards and outside then goes to the middle of cartilage of the 6th rib where merges into the inferior edge.

Between the anterior edges of the left and right pleuras the spaces of triangle are formed: in the suprasternal notch and behind the sternum above the 3rd rib there is superior interpleural area (area interpleurica superior) or thymus. The newborns and children have thymus, and the adults have cellular tissue and lymph nodes.

Downwards from the 4th rib with the help of incisura cardiaca the inferior interpleural area or Wojnicz – Sianożęcki triangle of safety is formed. From the side it is limited with parietal pleura and from below – with diaphragm. There is the frontal part of pericardium which is not adjacent to pleura and used by cardiac surgeon as access to the heart which is located beyond pleura and in pericardiocentesis in this space.

The inferior edge of pleura is the transition line of costal parietal pleura into diaphragmal pleura:

- linea parasternalis – the 6th rib;
- linea medioclavicularis – the 7th rib;
- linea axillaris anterior – the 8th rib;

- linea axillaris media – the 9th or the 10th rib;
- linea axillaris posterior – the 10th rib;
- linea scapularis – the 11th rib;
- linea paravertebralis – the 12th rib.

During the maximal deep breath lungs fill the whole pleural cavity. During moderate breath or expiration lungs do not reach the place of transition of pleura parts and they are called recessus pleurales. Angles are the part of pleural cavity in the area of transferring one part of parietal pleura into another.

There are pair recessus costomediastinalis. They are located between anterior parts of costal pleura which pass into pericardium making duplicate, and limiting area interpleurica superior et inferior. During surgery after median sternotomy in extrapleural access to pericardium, heart and great blood vessels these areas can be artificially widen for better access. In extrapleural access there still exists the integration of pleural sacs which helps to avoid the use of apparatus for artificial lung ventilation.

The biggest is costodiaphragmatic recess (recessus costodiaphragmaticus) which is limited by inferior edges of costal and diaphragm parts of parietal pleura. It has the depth to 9 cm along linea axillaris media from the 7th to the 10th ribs. Costodiaphragmatic recess is not filled with pulmonary tissue even deep deep breathing. It is the place of accumulation of exudate or blood and that's why is used for pleurocentesis.

There is the space before diaphragm filled with subpleural tissue which was described by O. V. Melnikov. It is located below costodiaphragmatic recess between diaphragm and thoracic wall. Subpleural tissue gives an opportunity to separate pleura from diaphragm and to have the direct and safe access to diaphragm what is used in extrapleural transthoracic access to subdiaphragmatic abscesses.

The third pair recessus is recessus phrenicomedialistinalis.

Parietal pleura is supplied with blood due to posterior intercostal, anterior thoracic, phrenic and musculophrenic arteries. Pulmonary pleura is supplied with blood due to vessels of lungs (pulmonary and bronchial arteries).

Venous blood is drained from parietal pleura into the system of precava and partially of postcava.

The lymph outflows from the costal part of parietal pleura of anterior thoracic areas into parasternal lymph nodes; from the posterior thoracic areas – into nodi parasternales; from diaphragmal pleura – into superior diaphragmal nodes (nodi phrenici superiores) and prepericardial lymph nodes (nodi prepericardiaci); from the mediastinum – into the lateral pericardium and paraesophageal lymph nodes.

Pleura innervation

The costal pleura is innervated with intercostal nerves. The mediastinal pleura is innervated with phrenic nerves. The diaphragmal pleura is innervated with 6 inferior intercostal nerves and with phrenic nerves.

The pulmonary pleura is innervated from pulmonary plexus which is formed of phrenic nerves, sympathetic trunk and pneumogastric (vagus nerve).

In disease or injury of pleura what leads to exudation, air or blood accumulation, the thoracocentesis is performed.

LUNGS (pulmones)

There is paired respiratory system – lungs in the right and left parts of thoracic cavity.

Lungs have the irregular conical shape with rounded top (apex pulmonis) and wide basis (basis pulmonis). The lung surface is divided into three surfaces: costal surface (facies costalis), diaphragmal surface (facies diaphragmatica) and

mediastinal surface (facies mediastinalis). In adult people the apex of the lung protrudes through upper thoracic aperture to the neck, reaches the acantha of the 7th cervical vertebra from behind and 4 – 5 cm the suprasternal notch above – or 2 – 3 cm above the collarbone in front. The subclavian artery attaches to the apex of the lung at medial surface leaving sulcus on the lung (a. subclavia).

The lung basis attaches to the diaphragm by its diaphragmal surface (facies diaphragmatica). Facies diaphragmatica is concave according to the shape of convex diaphragm: more on the right and less on the left.

The right lung is limited from the liver with diaphragm, the left one – from the spleen, left kidney and adrenal gland, stomach, transverse colon and left part of the liver which adhere to the diaphragm from below.

There is sharp inferior edge which goes into costodiaphragmatic recess between the costal surface (facies costalis) and diaphragmal surface (facies diaphragmatica).

When breathing the inferior edge of the lung shifts 7 – 8 cm down. The sharp anterior edge of the lung penetrates into costomediastinal recess between the thoracic cage and heart and limits the costal surface (facies costalis) of the lung from the mediastinal surface (facies mediastinalis). The mediastinal surface (facies mediastinalis) is turned to the mediastinum and vertebral spine.

There are hila (hilum pulmonis) in the paramedian surface of the lung through which the primary bronchi (bronchi principales) and pulmonary arteries go into the lungs and through which the superior pulmonary vein and lower pulmonary vein go out. Besides primary bronchus, pulmonary artery and pulmonary veins there are lymph nodes (nodi lymphoidei bronchopulmonales), neuroplex and pulmonary

arteries and pulmonary veins in the hila of the lung.

There is a deep cardiac impression (*impressio cardiaca*) in the paramedian surface of the lung anteriorly and lower from the hila which is more expressed on the left lung.

There is a deep sulcus on the top and behind the root of the left lung due to the arch of aorta and descending part of aorta, in front of which there is esophagus attachment near the inferior edge of the lung. There is a recess of precava on the mediastinal surface of the right lung in front of the hila, and behind – there are sulci due to azygos vein and esophagus.

The borders of lungs are as follows:

- anterior and posterior lung borders and pleura coincide.

The inferior edge of the right lung:

- *lin. parasternalis* – the 6th rib;
- *lin. medioclavicularis* – the 7th rib;
- *lin. axillaris media* – the 8th rib;
- *lin. scapularis* – the 10th rib;
- *lin. paravertebralis* – the 11th rib.

SURGICAL ANATOMY OF THE ROOT OF LUNG

The complex of anatomical formations which are located in the hilum pulmonis are the root of the lung (*radix pulmonis*).

The elements of root of the lung are located in the cellular tissue. The root is covered with mediastinal pleura. On the edge of hilum pulmonis the pulmonary pleura passes into pericardium and esophagus as two layers of serous membrane which anastomose and create triangular pulmonary ligament (*lig. pulmonale*). It is located in the frontal surface and stretches between the root of the lung on the top and diaphragm from below.

The width of the root of lung is 6 – 8 cm. Hilum pulmonis is located at the level of the 5th – 7th sternal cartilages posteriorly and anteriorly – at the level of the 2nd – 4th

sternal cartilages.

There is v. pulmonalis superior in the root of the right lung which is located anteriorly. There is a. pulmonalis from above and behind v. pulmonalis superior, and v. pulmonalis inferior passes lower and behind it. There is right primary bronchus behind pulmonary artery which protrudes the artery 2 – 11 mm above (Fig. A.9 (a)).

There is left pulmonary artery in the root of the left lung on the top. The superior pulmonary vein is located anteriorly and below from it. Bronchus is located below and behind pulmonary artery and superior pulmonary vein (Fig. A.9 (b)).

There is bronchus at the hilum of the right lung which is located on the top; the pulmonary artery is located anteriorly and below; and the pulmonary vein is located below. There is an artery at the hilum of the left lung. The bronchus is located below and there is inferior pulmonary vein below from it.

The veins are located anteriorly in the horizontal plane in the hilum of the lung; the pulmonary vein is located behind the veins and the primary bronchus – behind the pulmonary vein.

Bronchial arteries (a. bronchiales) attach to the inferior semicircle of primary bronchi. There are ascending part of aorta, precava, pericardium and the part of the right atrium in front of the root of the lung. There is azygos vein from above and behind the root of the lung.

The arch of aorta attaches to the root of the lung from above, esophagus and descending part of aorta – behind. The both roots (of right and left lungs) are crossed anteriorly with phrenic nerve which is accompanied by a. et

x. pericardiophrenicae. There is n. vagus behind the root.

Each lung is divided into lobes due to interlobar fissurae. Oblique fissure of the left lung (fissura obliqua) divides it into

superior and inferior portions. The projection line of this fissure onto thoracic cage passes from the 3rd thoracic vertebra acantha to the junction of the bone and costal cartilage of the 6th rib. If to lift the hand, the medial border of scapula will show the direction of the fissure.

There is also horizontal fissure (*fissura horizontalis*) in the right lung, which passes along IV costal cartilage from sternum to the projection line of the oblique fissure on the midaxillary line. The middle part is limited from superior part with horizontal fissure.

The lobes of lungs consist of segments. A segment is the part of lung parenchyma which is ventilated with the bronchus of the 3rd branching and has its own branch of pulmonary artery. That is why such parts are called bronchopulmonary segments (*segmenta bronchopulmonales*). Bronchopulmonary segment has the form of pyramid. The top of the segment is directed to the hilum of the lung and its basis – to the external surface of the lung. Each lung has 10 bronchopulmonary segments:

The bronchopulmonary segments in the upper part of the right lung are as follows:

- 1) apical segment (*segmentum apicale* [S_I]);
- 2) posterior segment (*segmentum posterius* [S_{II}]);
- 3) anterior segment (*segmentum anterius* [S_{III}]).

In the middle lobe of the right lung:

- 4) lateral segment (*segmentum laterale* [S_{IV}]);
- 5) mediastinal segment (*segmentum mediale* [S_V]).

In the lower lobe:

- 6) superior segment (*segmentum superius* [S_{VI}]);
- 7) mediastinal cardiac segment (*segmentum basale mediale* (*cardiacum*) [S_{VII}]);
- 8) main anterior segment (*segmentum basale anterius* [S_{VIII}]);
- 9) main lateral segment (*segmentum basale laterale* [S_{IX}]);

10) main posterior segment (segmentum basale posterius [S_x]).

In the upper lobe of the left lung:

1) – 2) apical-posterior segment (segmentum apicoposterius [S_{I+II}]);

3) anterior segment (segmentum anterius [S_{III}]);

4) upper lingular lobe (segmentum lingulare superius [S_{IV}]);

5) lower lingular lobe (segmentum lingulare inferius [S_V]). In the lower lobe of the left lung:

6) upper segment (segmentum superius [S_{VI}]);

7) mediastinal cardiac segment (segmentum basale mediale (cardiacum) [C_{VII}]);

8) main anterior segment (segmentum basale anterius [S_{VIII}]);

9) main lateral segment (segmentum basale laterale [S_{IX}]);

10) main posterior segment (segmentum basale posterius [S_x]).

The pulmonary tissue is supplied with blood mostly due to 2 – 3 bronchial arteries which depart from the thoracic part of aorta and go along bronchi.

A. et vv. pulmonales are the vessels of lesser circulation and have the function of gas exchange between air and blood. The terminal branches of bronchial arteries of greater circulation anastomose with pulmonary arteries. Bronchial veins (vv. bronchiales) go into azygos vein (v. azygos) on the right, and into hemiazygos vein on the left.

Deep and superior lymphatic vessels drain lymph from the lungs. The superficial veins make surface vasculature which is located in visceral pleura. Deep vasculature is located in connective layers between the lung lobes.

Regional lymph nodes make the following groups:

1. Intrapulmonary lymph nodes (nodi lymphoidei intrapulmonales) are located in the lung parenchyma,

mostly in places of bronchial branching.

2. Bronchopulmonary lymph nodes (nodi lymphoidei bronchopulmonales) are located in the hilum. Their draining lymph vessels go to tracheobronchial lymph nodes.

3. The superior and inferior tracheobronchial lymph nodes (nodi lymphoidei tracheobronchiales superiores et inferiores) are connected to trachea and superior and inferior primary bronchi. Their draining lymph vessels go to the nodi lymphoidei paratracheales.

4. Nodi lymphoidei paratracheales are located along the trachea.

From the lung the lymph drains to the root of the lung and before entering lymphatic duct passes through one of these nodes. Most of the lymph is drained into the right lymphatic duct (ductus lymphaticus dexter). From the inferior parts of both lungs the lymph is drained by vessels which go through lobes of pulmonary ligaments to the lymph nodes of posterior mediastinum which are located along esophagus (nodi lymphoidei juxtaoesophageales).

Lung innervation is provided by sympathetic and parasympathic nerves. Sympathetic nerves cause bronchi dilatation and vasoconstriction. Parasympathic nerves contract bronchi, dilatate vessels, and increase secretion of mucous glands.

The branches of vagus nerves and thoracic pulmonary branches of sympathetic trunks form the pulmonary plexus (plexus pulmonalis) in the hila. It is quite important reflexogenic zone which should be blocked by novocaine during operations.

Lung nerves are connected with heart nerves by means of anastomoses.

INTERPLEURAL SPACE (Mediastinum)

It's a complex of thoracic cavity organs located between two (right and left) mediastinal pleuras. The mediastinum is limited anteriorly by corpus and manubrium of sternum.

Behind – by corpuses of thoracic vertebrae.

Below – by diaphragm.

Above – by upper foramen of thoracic cage.

According to the modern opinion (Basle Nomina Anatomica, Ukrainian standard) the mediastinum is divided into two parts: mediastinum superius and mediastinum inferius.

Mediastinum superius is located above the root of the lungs and is separated from mediastinum inferius by conditional surface, which goes through junction point of manubrium of sternum with its corpus, and goes to 4th thoracic vertebra.

Pericardium divides the mediastinum inferius into anterior and posterior segments.

The mediastinum superius comprises:

- thymus or adipose tissue which replaces it;
- venae brachiocephalici;
- vena cava superior;
- aorta ascendens;
- arcus aortae with its branches;
- the upper part of esophagus;
- ductus thoracicus;
- trachea;
- n. phrenicus and n.vagus.

Mediastinum anterius is located between the sternum and pericardium. It comprises internal thoracic vessels (arteries and veins), presternal lymphatic nodes, and inferior segments of thymus.

Middle mediastinum comprises pericardium, heart, intracardiac

segments of large vessels, bifurcation of trachea, main bronchi, lung arteries and veins, and nn. phrenici which follow the pericardiacophrenica vessels, lateral, pericardial and tracheobronchial lymph nodes.

Mediastinum posterius is located between the posterior wall of pericardium and thoracic vertebrae. The mediastinum posterius comprises: esophagus, descending part of aorta, ductus thoracicus, v. azygos and v. haemiazzygos, sympathetic trunks and nerves which depart from them, nn. vagi, periesophageal and prevertebral lymph nodes. Organs of mediastinum are covered with adipose tissue which plays an important role in generalization of purulent inflammatory processes.

We can distinguish: prepericardial, pretracheal and periesophageal cellular spaces. Prepericardial cellular space is located in mediastinum superius between the posterior surface of sternum and organs (thymus, vessels, pericardium). It has two layers separated by retrosternal fascia of Rudnev (fascia retrosternalis). It begins from the posterior wall of the thymus and ascends to the diaphragm. Its size depends on the length of thymus. The first cellulose layer is thinner. It attaches to the posterior surface of sternum and is called retrosternal space of Diakonov.

The second cellular layer is located deeper, between Rudnev fascia and Meier fascia, which is called septum mediastinale. It descends from the posterior part of the capsule of thyroid gland, passes along the anterior surface of trachea, then passes onto posterior surface of pericardium, and ends in tendinous center of diaphragm. This thin fascial plate can be considered as a septum between mediastinum medium and mediastinum posterius.

The abscesses of prepericardial cellular space can spread

along the anterior surface of pericardium to diaphragm, and then through Larrey's cleft (sternocostal triangle) and trigonum sternocostale dexter – to preperitoneal fatty tissue. They can also spread up to pretracheal cellular tissue of cervix. We can also distinguish the pretracheal cellular space in mediastinum superius. It is limited by aortic arch from the left; v. cava superior, v. azygos and right artery of the lung from the right; tracheal bifurcation behind; thymus and posterior wall of pericardium in front.

The periesophageal cellular space is mostly expressed in mediastinum posterius. From above it joins with retropharyngeal space of cervix, and through hiatus aorticus of diaphragm and trigonum lumbocostale (Bochdalek's foramen) – with extraperitoneal space.

Purulent inflammations of mediastinal cellular tissue (mediastinitis) is a severe disease.

Cellular tissue of mediastinum comprises significantly expressed reticulum of arterial and venous vessels. The most important arterial vessels are bronchial arteries which take part in blood supplying of bronchopulmonary complex, trachea, esophagus, pericardium, wall of aorta, superior vena cava, nn. vagi, lymph nodes and cellular tissue of mediastinum. From 2 to 6 bronchial arteries (rr. bronchiales) depart from the anterior semicircular part of aorta, in the point of transition of its arch into descending part. They form a lot of anastomoses with arteries of greater circulation (rr. of a. thoracica interna) and lesser circulation (a. pulmonales).

The veins of mediastinum don't have the valves, their walls are thin. Their damage during the operation results in air embolism.

Organs of mediastinum superius (Fig. A.10)

THYMUS

The thymus is located behind the sternum. In children it descends till the level of 5th costal cartilage. M. sternohyoideus, m. sternothyreoideus and sternum are located in front of the thymus. At the sides it borders on mediastinal pleura.

From behind it borders on the left v. brachiocephalica, superior vena cava, arch of aorta, and pericardium.

The thymus is supplied with blood due to rr. thymici from a. thoracica interna, and rr. of a. thyroidea inferior.

The venous blood drains to the left v. brachiocephalica and v. thyroidea inferior. The lymph drains to mediastinal lymph nodes.

The gland is innervated by rr. of nn. vagi, n. phrenicus and truncus sympathicus. The growths which are formed from the rests of the thymus (thymomas), while overgrowing cause a compression of mediastinal organs which results in mediastinal syndrome. The symptoms of syndrome are: precordialgia, dyspnoea, cyanosis, heart disorders. Thus, the growths should be ablated.

There are left and right brachiocephalic veins behind the thymus in cellular tissue of mediastinum superius. They are formed behind the corresponding sternoclavicular joint by means of junction of subclavian and jugular internal veins.

BRACHIOCEPHALIC VEINS

V. brachiocephalica dextra goes all along over the total length from sternoclavicular joint to sternocostal synchondrosis of the 1st rib where they merge and form v. cava superior.

The mediastinal pleura and right n. phrenicus adhere to its lateral semicircle. Tr. brachiocephalicus and n. vagus are

located behind and to the middle. Thymus is located in front of the left brachiocephalic vein.

The arch of aorta, truncus brachiocephalicus, a. carotis communis sinistra, a. subclavia and n. vagus sinister are located behind vena brachiocephalica sinistra.

SUPERIOR VENA CAVA

V. cava superior goes downwards from the place of formation. It is located behind the right edge of sternum, from the level of the 1st rib to the level of the 3rd rib. On the level of the 2nd intercostal space it goes in pericardial cavity adjoining v. azygos before. The ascending part of aorta is located to the left from the vein. It is covered by mediastinal pleura outwards. There is n. phrenicus dexter followed by a. and vv. pericardiacophrenicae between the vein and pleura. N. vagus dexter goes behind v. cava superior.

The inferior part of vein is located in the cavity of pericardium, in front of root of the right lung. There are anterior mediastinal lymph nodes along the vein.

AORTA

The ascending part of aorta (pars ascendens aortae) is located in pericardial cavity. There is truncus pulmonalis in front. There is auricula dextra of pericardium on the right and in front. A. pulmonalis dextra is located on the right.

The ascending part of aorta (pars ascendens aortae) gives off aa. coronariae dextra et sinistra which originate from sinuses of Valsalva.

The arch of aorta goes throughout the length from the 1st to the 2nd cartilages to the left semicircle of the 4th thoracic vertebra, where it continues in descending part of aorta (pars descendens aortae).

The highest point of aortic arch is located behind the

manubrium of sternum, in the centre, 1 – 2 cm lower from incisura jugularis.

The arch of aorta rounds a. pulmonalis dextra, lung trunk bifurcation and left main bronchus adhering to anteroinferior part of trachea.

The vena brachiocephalica sinistra, n. phrenicus and n. vagus sinister are located in front of aortic arch. Mediastinal pleura adheres to the left lateral surface, and v. cava superior is located on the right. There are trachea, esophagus and ductus thoracicus behind the aortic arch. There is n. laryngeus recurrens sinister below and behind the aortic arch.

Truncus brachiocephalicus, a. carotis communis sinistra, a. subclavia sinistra originate from the bulging part of aorta from right to left.

The truncus brachiocephalicus goes in front and outside from the trachea, then goes up and rightward attaching to the vena brachiocephalica sinistra behind. On the level of articulatio sternoclavicularis it gives off a. subclavia dextra and a. carotis communis dextra.

A. carotis communis sinistra begins on the left and deeper from truncus brachiocephalicus. It goes up and outside crossing trachea in front and from the left. A. subclavia sinistra goes on the left from trachea. Nonspecific aortoarteritis, the aortic arch syndrome (Takayasu's syndrome) is characterized by inflammatory and destructive changes of aortic wall and large vessels which depart from it, their constriction and thrombosis. The syndrome manifests as chronic cerebral and upper limbs ischaemia.

PERICARDIUM

Pericardium is an isolated sack with heart and large blood vessels in it. It consists of two layers: superficial fibrous pericardium (pericardium fibrosum) and inner serous pericardium (pericardium serosum). The pericardium fibrosum passes into vascular layer. The pericardium serosum is divided into two layers: visceral pericardium (lamina visceralis) which is the part of epicardium and covers myocardium, and parietal pericardium (lamina parietalis) which grows together with internal surface of pericardium fibrosum and covers it from inside.

Cavitas pericardiaca is formed between lamina visceralis and lamina parietalis which contains a small amount of serous fluid.

In tuberculosis, rheumatism or injury the amount of fluid (pericardial effusion) in pericardial cavity can increase. Herewith diastole is getting worse, the heart beat is disturbed what results in cardiac tamponade.

The pericardium looks like ill-formed, flattened cone, the basis of which is located on diaphragm, and its top – on ascending part of aorta.

Pericardium has five walls: anterior (sternocostal), two lateral (mediastinal), posterior and diaphragmal.

Sternocostal part of pericardium is directed to the front, adheres to corpus sterni and to the 4th and 5th intercostal spaces. In lateral segments and sometimes from above, the frontal pericardial wall is covered by mediastinal edges of parietal (right and left) pleuras. Free part of pericardium complies with left ribs ends from the 5th to the 7th rib cartilages, left inferior 1/3 of corpus sterni and upper 1/3 of ensisternum. The pericardium can be exposed here without danger of possible pleura damage. It is called “security

triangle” of Wojnicz – Sianożęcki.

The lig. sternopericardiaca go from the frontal part of pericardium to sternum, and are attached to sternum at the level of the 2nd rib.

Lateral parts of pericardium are covered by mediastinal pleuras, in adipose tissue of which n. phrenicus and vasa pericardiacophrenicae are located. The inferior wall of pericardium is located on diaphragm and is fixed with ligaments to it. V. cava inferior penetrates into pericardial cavity through the right segment of inferior wall.

Dorsal wall of pericardium adheres to the inferior part of trachea and organs of mediastinum posterius – esophagus, v. azygos, ductus thoracicus, thoracic part of aorta, n. vagus sinistra, and lymph nodes of mediastinum posterius. The aa. and x pulmonales go through the dorsal wall of pericardium, and aorta and v. cava superior pass from above. The parietal lamina of pericardium serosum passes into visceral lamina (epicardium). In the area of arterial and venous transition zones the recessus of pericardium are formed. Besides them we can distinguish more significant gaps – pericardial sinuses. We can recognize sinus transversus pericardii and sinus obliquus pericardii.

Transverse pericardial sinus (sinus transversus pericardii, Teile) is limited:

- in front and from above – by ascending part of aorta and pulmonary trunk;
- from behind – by parietal lamina of pericardium which covers a. pulmonalis dextra;
- from below and behind – by left and right atriums.

The sinus transversus has left and right foramina. On the right the entrance in sinus transversus is limited:

- behind – by v. cava superior;
- in front – by the right edge of ascending part of aorta;

- below – by the right atrium and its auricula dextra.

On the left the entrance in sinus transversus is limited:

- in front and from above – by truncus pulmonalis and auricula sinistra;

- behind – by fold of the left vena cava (Marshall vestigial fold) which goes from a. pulmonalis sinistra to v. pulmonalis superior;

- below – by auricula sinistra.

Thus, the sinus transversus pericardii is located behind the ascending part of aorta and truncus pulmonalis. If to put the finger in sinus transversus pericardii one can bypass and press the ascending part of aorta and truncus pulmonalis. This technique is used in heart surgery and surgery of large blood vessels.

Oblique pericardial sinus, Haller (sinus obliquus pericardii) is located behind the heart. We can see it if to move the apex of the heart up and right. Sinus obliquus pericardii can be the place of liquid and blood accumulation, and as a rule is drained during the surgery.

The sinus obliquus pericardii is limited:

- in front – by dorsal surface of atrium sinistra;
- behind – by dorsal wall of pericardium between the pulmonary vein entrances;
- on the right side and below – by v. cava inferior;
- on the left and from above – by left pulmonary veins.

The general source of blood supply of pericardium is a. pericardiophrenica, the branch of internal thoracic artery. Apart from it a. thoracica interna, rr. pericardiaci from thoracic part of aorta, branches from thymic artery, and branches from intercostal, esophageal, bronchial and mediastinal arteries take part in blood supply of pericardium.

Internal lamina of pericardium is mainly supplied with

blood due to coronal arteries. There are many inosculation (anastomoses) between vessels of internal and external laminae of pericardium. This fact was used by cardiac surgeons to improve blood supply of myocard in chronic coronary insufficiency (operative treatment according to method of Fieschi – internal thoracic artery ligation in 2nd intercostal space, lower from the level of origin of a. pericardiophrenica).

The drainage of venous blood from pericardium is provided by the veins of the same name.

The lymph is drained from pericardium to nodi lymphatici prepericardiaci, nodi lymphatici pericardiales laterales, nodi lymphatici parasternales, nodi lymphatici tracheobronchiales, nodi lymphatici juxtaoesophageales and nodi lymphatici prevertebrales.

The pericardium is innervated due to cordial, aortal, pulmonary and esophageal nervous plexuses which are formed by means of branches of n. vagus, n. phrenicus, n. intercostalis and thoracic part of truncus sympathicus. They widely inosculate together. Those anastomoses are the reason of pain and reflexory muscular strain in damage or disease of pericardium what sometimes leads to improper laparotomy.

In inflammation of the parietal and visceral pericardium (pericarditis), the large amount of liquid accumulates in pericardial cavity what leads to acute cardiac tamponade.

The acute cardiac tamponade is observed when the heart is damaged. The symptoms of the acute cardiac tamponade (Beck's triad) are: low blood pressure, fast and considerable increase in central venous pressure and absence of pulsus during roentgenoscopy of thoracic cavity organs. On ECG – abnormality of cardiac rhythm. In such cases the pericardiocentesis is performed.

The long-term effusion in pericardial cavity may cause the adherent pericardium which leads to the heart compression and dysfunction. In these cases the puncture and catheterization don't lead to any positive outcome. The pericardiotomy with cardiolysis is necessary.

SURGICAL ANATOMY OF THE HEART

Heart (cor) is a caval muscular organ with four chambers which provides the sanguimotion in vessels of greater and lesser circulation. It is located in the middle mediastinum in pericardial space. It is located asymmetrically in thoracic cavity: $\frac{2}{3}$ – to the left from the middle plane, and $\frac{1}{3}$ – to the right. The longitudinal axis of the heart goes athwart from top to bottom, from right to left, and from back to the front.

The borders of the heart

Right border of the heart belongs to the v. cava superior and right atrium, goes from the upper edge of the 3rd costal cartilage to the lower edge of the 5th costal cartilage, 2 – 2,5 cm outwards from the right sternal line. From the 5th costal cartilage the right border passes into the lower one which complies with the right ventricle. It goes from right to left and downwards through the 5th intercostal space crossing the point of attachment to sternum of the right 4th costal cartilage to the 6th intercostal space leftwards, then crosses 6th costal cartilage and ends in the 5th intercostal space, by projection of cardiac apex 0,5 – 1,5 cm before midclavicular line.

Left border of the heart belongs to the left ventricle, left auricle and truncus pulmonalis. It goes upwards, originating from the 5th intercostal space archwise to the level of the 3rd left rib 2 – 3 cm before the edge of sternum. Then it goes to the 2nd intercostal space (2 cm from the left sternal line).

The heart has a basis directed upwards and backwards, and

apex turned downwards, leftwards and to the front. The basis is formed by right and left atriums and their posterosuperior surfaces. V. cava superior and inferior end by the right atrium of heart basis; the left and right pulmonary veins end by the left atrium. They form together radix cordis and fix the basis together. The apex of the heart is formed by the left ventricle and slightly by the right one. The apex of the heart and two ventricles are located intrapericardially (completely in pericardial cavity). The ascending part of aorta, truncus pulmonalis, and left and right atrial auricles are located in the pericardial cavity.

Vv. cavae and the both atrial auricles are covered by pericardium from 3 sides, i. e. – they are located mesopericardially, as their dorsal side is not covered by pericardium.

Pulmonary veins and two pulmonary arteries are located extrapericardially, that is pericardium covers only their anterior walls.

We can distinguish such surfaces of the heart as: anterior, sternocostal surface (facies sternocostalis), inferior, diaphragmal surface (facies diaphragmatica) and pulmonary one. The anterior and pulmonary surfaces form the blunt edge (margo obtusus) directed to the left, and anterior and inferior surfaces form the acute edge (margo acutus) directed to the right.

There are two compartments in the heart: upper (or superior-right), and inferior (or inferior-left). Atrioventricular sulcus (coronary sulcus of the heart – sulcus coronarius) is the border between the segments. The sulcus passes from left to right, and from up to down. There is the auricle of right atrium which covers v. cava superior and ascending part of aorta. Upwards and leftwards the sulcus coronarius passes under arterial cone which is a part of ventricles passing in aorta (left

ventricle) and trunkus pulmonalis (right ventricle), and passes to the dorsal surface. Truncus pulmonalis is the continuation of arterial cone which penetrates under the inferior surface of ascending part of aorta in the place of its transition into the arch (Fig. A.11).

There is anterior interventricular sulcus (sulcus interventricularis anterior), which is located to the left from the arterial cone and goes along the heart to its top. Turning backwards and upwards it passes into the posterior interventricular sulcus (sulcus interventricularis posterior) which joins coronary sulcus on the top.

The main source of blood supply is the left and right coronary arteries (a. coronaria dextra et a. coronaria sinistra). They originate in the Valsalva sinus at the level of upper layers of left and right semilunar valve. In the phase of systole their holes are closed by aortic valve, that is the heart receives blood during diastole when aortic valves are closed.

The left coronary artery (a. coronaria sinistra) goes from the left aortic sinus to the left part of coronary sulcus and is divided into anterior interventricular branch (r. interventricularis anterior) and circumflex branch (r. circumflexus).

The anterior interventricular branch is located in the anterior interventricular sulcus and goes to the apex of the heart (cardiac apex) alongside v. cordis magna. At the apex of the heart it anastomoses with the posterior interventricular branch from the right coronary artery.

The circumflex branch of the left coronary artery is the continuation of its main trunk, it rounds the heart from the left and is observed in the left part of coronary sulcus and on the posterior surface it anastomoses with the right coronary artery.

The right coronary artery (a. coronaria dextra) originates in the

right Valsava sinus and passes between the pulmonary trunk and right auricle, rounds the heart along the right coronary artery, passes into posterior surface of the heart and anastomoses with circumflex branch of the left coronary artery. The largest branch of right coronary artery is r. interventricularis posterior which is located in the right coronary artery and goes to the apex of the heart alongside v. cordis media.

Each coronary artery and their branches have their branchings. Branches of the left coronary artery supply with blood the left pulmonary atrium, anterior and most part of posterior wall of the left ventricle, part of anterior wall of the right ventricle and anterior part of interventricular septum.

The right coronary artery supplies with blood the right atrium, the conducting system of the heart, posterior wall of right and left ventricles, posterior part of interventricular septum, m. papillaris posterior of the left ventricle.

The branches of left and right coronary arteries anastomose with each other and form in the heart two arterial circles: lateral arterial circle located in the coronary sulcus and longitudinal arterial circle which is located in the anterior and posterior interventricular sulcus.

There are three types of blood supply of the heart: right coronary circulation in (90 % of people), left coronary circulation and balanced circulation. In balanced circulation both coronary arteries are developed and two posterior interventricular branches are observed. In right coronary circulation the branches of right coronary arteries prevail and in left coronary circulation – branches of left coronary arteries. Knowing types of blood circulation helps surgeons to choose correct way in surgical treatment of coronary insufficiency.

Venous drainage

Most of big veins of the heart are merged into one common vein which is called coronary sinus (sinus coronarius) which is

located in the coronary sulcus on the posterior surface of the heart.

It has the following vessels:

- v. cordis magna which begins on the anterior surface of the heart and goes along anterior interventricular septum;
- v. cordis media is located in the posterior interventricular sulcus;
- v. cordis parva is located in the right part of coronary artery;
- v. posterior ventriculi sinistri is located on the posterior wall of left ventricle;
- v. obliqua atrii sinistri is located on the wall of left pulmonary atrium.

The smallest cardiac veins or Thebesius – Vieussens veins (vv. cordis minimae) in the amount of 20 – 30 small vessels go to the right heart cavity. In cardiac strain (respiratory insufficiency) these vessels drain blood to the right pulmonary atrium.

Heart innervation is provided by branches of cervical and thoracic segments of sympathetic trunk and also by branches of vagus nerves (parasympathetic innervation). They form plexus cardiacus on aorta and pulmonary trunk, the branches of which go to the cardiac muscle.

There are many parasympathetic fibres in the ascending part of aorta and pulmonary trunk which are the part of vagus nerves and recurrent laryngeal nerves. Parasympathetic nervous fibres slow down cardiac rhythm and narrow coronary arteries. That is why during the treatment of patients who suffer coronary heart disease plexotomia and coronary artery bypass graft are performed. Plexotomia or cutting of antenodal parasympathetic nervous fibres eliminates coronary arteries spasm. On the other hand cutting of antenodal parasympathetic nervous fibres

eliminates pain syndrome.

Cardiac conduction system plays an important role in physiology and pathology.

Cardiac conduction system (complexus stimulans cordis, s. systema conducente cordis) consists of Keith – Flack node, Aschoff – Tawara node, His bundle which branches in to right and left foot.

Keith – Flack node (nodus sinuatrialis) is atypical cardiomyocytes which are located under the epicardium on anterior surface of right atrium in the place of its merging with v. precava. Its cells are grouped around the central artery of Keith – Flack node. Keith – Flack node is the pacemaker and the source of cardiac automatism, the place of cardiac impulse formation.

Aschoff – Tawara node (nodus atrioventricularis) is located under endocardium of right atrium in its inferior-anterior segment. The node goes into the right fibrous triangle which is located in the place of right tricuspid, bicuspid and aortic valves junction and then it goes into atrioventricular bundle. Atrioventricular bundle goes through membrane of interventricular septum and branches into left and right foot.

A slow rhythm of heart rate (less than 40 beats/min) causes anemia, vertigo and loss of consciousness.

In ineffecient treatment of this condition with antiarrhythmic agents the surgical treatment is prescribed. It is implantation of cardiac pacemaker. It is sewed under hypodermic tissue of infraclavicular part. Electrodes are conducted through the subclavian vein into the right ventricle. From the congenital heart defects ductus arteriosus is mostly observed. It is a vessel through which the pathological conjunction of aorta and pulmonary trunk is observed after birth. The arterial canal branches off from the aortic arch at the left subclavian artery and goes obliquely up and down

entering the branching of the pulmonary trunk branching. Mediastinal pleura covers the arterial canal anteriorly. There are two nerves passing anteriorly to ductus arteriosus: vagus nerve and phrenic nerve. The recurrent laryngeal nerve rounds it behind, goes up and passes between the posterior wall of arterial canal and left main bronchus.

ESOPHAGUS

There is esophagus among the organs of posterior mediastinum. Thoracic part of aorta is located from the left and posteriorly. In the inferior part of posterior mediastinum the esophagus shifts to the left and thoracic part of aorta shifts to the right, and esophagus is located anteriorly to aorta in the diaphragmal part (Fig. A.12).

Vagus nerves follow the esophagus forming plexus around it. The azygos vein (v. azygos) is located behind and to the right from esophagus. There are thoracic duct, right intercostal arteries, terminal sections of hemiazygos and accessory hemiazygos veins between azygos vein and aorta, behind esophagus.

The esophagus begins at the level of the 6th rib and going through the superior and posterior mediastinum ends in abdomen at the level of the 11th rib.

There are three parts of esophagus: pars cervicalis, pars thoracica and pars abdominalis. Esophageal stenosis has an important role. The first narrowing is located in the place of transition of pharynx into esophagus and that is why it is called pharyngeal narrowing. Stenosis is caused by musculation of inferior sphincter muscle of pharynx and cricoid cartilage. It is the narrowest place along the entire length of the esophagus which is located at the level of the 6th cervical vertebra called by Kilian as mouse of esophagus.

The second narrowing is called aortal because it is located in the place of crossing of aortic arch by esophagus. It is located at the level of the 4th thoracic vertebra.

The third narrowing is located at the level of the 5th thoracic vertebra in the place of attachment of esophagus to the left bronchus and is called bronchial stenosis.

The fourth narrowing corresponds to the level of esophageal opening and is caused by bundles of muscles around hiatus oesophageus. It is located at the level of intervertebral disk between the 9th–10th intercostal ribs.

The fifth narrowing is located at the section of transferring esophagus into stomach. It is the place of cardiac sphincter. The narrowing has some features:

- in this section stomach turns around its axis;
- there is sharp angle between esophagus and stomach (His angle);
- there is thickness of cardia muscular layer;
- there is fold of mucous membrane in the gastric cavity;
- cardiac sphincter is under control of vagus nerve and diaphragmal sphincter innervates the phrenic nerve.

Cardiac orifice is closed and opens when eating. It opens reflexly during swallowing. As a result of degenerative changes of Auerbach's plexus cardiospasm or esophageal achalasia occurs. Clinically it manifests as three symptoms: dysphagy, regurgitation and pain. The main method of treatment is cardiodyosis with tube. If it is not effective then the cardiotomy with fundoplication is used.

In the esophagus narrowings the damages of its wall, tumors, and scars in burns can occur. Foreign bodies of esophagus stay at the level of jugular notch that is at the level of the first narrowing of esophagus.

Esophagus forms two curves. From the level of the 6th

cervical vertebra to the 5th thoracic vertebra it declines to the left from median line. From the level of the 5th to the 8th thoracic vertebra esophagus declines to the right and below the level of the 8th thoracic vertebra it declines to the left turning aorta anteriorly. Such anatomic features of esophagus lead to correct surgical treatment.

Access to the cervical esophagus is sinistral, to the middle thoracic part of esophagus – right transpleural and access to the inferior thoracic segment – left transpleural.

Esophagus goes along vertebra to branching of trachea. At the level of branching it forms the bend turning backwards. It forms the second bend at the crossing with aorta declining frontwards.

Thoracic segment of esophagus is located in the posterior mediastinum from the 2nd thoracic vertebra to diaphragm. There is upper third of esophagus (from the 2nd to the 4th thoracic vertebra) and in the thoracic segment – the inferior third of esophagus which is located from the branching of trachea to diaphragm (from the 8th to the 9th – 10th thoracic vertebra).

In the upper third the esophagus shift to the left and is located behind and from the left of trachea. Left recurrent laryngeal nerve and left common carotid artery attach to this segment of esophagus which protrudes to the front.

Mediastinal pleura attached on the right to the upper third of esophagus and is separated from it with the tissue. Due to this tissue, pleura is easily separated.

The thoracic duct and left subclavian artery are attached to the esophagus from the left. The middle third of esophagus is located to the right of median line. The aortic arch is attached to the esophagus anteriorly and on the left at the level of the 4th thoracic vertebra. The tracheal

bifurcation, left primary bronchus and tracheobronchial lymph nodes are attached at the level of the 5th thoracic vertebra. The thoracic duct is attached to the esophagus posteriorly. The descending part of aorta is attached on the left. The right vagus nerve and azygos vein are attached to the esophagus on the right.

Pericardium is located anteriorly in the inferior third of esophagus. Aorta is located posteriorly. Right vagus nerve is located on the right and passes to the posterior surface of esophagus. Mediastinal pleura is also located on the right and covers most surface of the third segment of esophagus and passes to its posterior surface. The left vagus nerve is located on the left and anteriorly.

Externally esophagus is covered with loose connective tissue where the vessels and nerves pass. Mediastinal pleura is attached to the lateral surface of esophagus above the root of the right lung. Near the root of the left lung pleura forms the fold which protrudes between vertebra and subclavian artery.

Esophagus is separated from pleura with azygos vein from the right and thoracic part of aorta from the left.

The mediastinal pleura covers the posterior wall of esophagus below the root of the lung from the right. From the left the wall of the esophagus is separated from the pleura with aorta.

The upper segment of esophagus is supplied with blood by inferior thyroid artery, bronchial arteries and esophageal arteries from thoracic part of aorta.

The middle and inferior segments of esophagus are supplied with blood by bronchial and esophageal arteries from thoracic part of aorta, among them the inferior esophageal artery named after Hovelak is distinguished. It departs from thoracic part of aorta at the level of the 8th costal rib. Aorta does not branch off below from the inferior esophageal artery

to the diaphragm.

The abdominal part of esophagus is supplied with blood by branches of the left gastric artery and arteria phrenica inferior. Bandaging of the left gastric artery or inferior esophageal artery does not break blood supply to the organ. Simultaneous bandaging leads to blood insufficiency.

Venous blood draining is supplied with azygos and hemiazygos veins from the system of prevaca. Venous network of esophageal submucous layer is well developed. In the inferior segment of esophagus its venous network is connected with hepatic portal vein (Fig. A.13).

In hepatic cirrhosis this venous network drain blood from hepatic portal vein to the prevaca. At the same time the veins of inferior segment of esophagus widen and it leads to bleeding. The innervation of the esophagus is provided with azygos nerves (parasympathetic nervous system) and esophageal branches of thoracic part of sympathetic trunk.

Left and right azygos veins which pass along esophagus are available for visual examination and can be easily palpated during surgery.

The lymph is drained from the superior third of thoracic part into the upper tracheo-bronchial lymph nodes. From the inferior third of thoracic part the lymph is drained into periesophageal lymph nodes, coronal lymph nodes and left gastric nodes which are located along the left gastric artery. The immediate lymphatic drainage into thoracic duct is also possible. It explains Virchow's metastases (between the upper edge of the left clavicle and external edge of sternocleidomastoid muscle).

THORACIC DUCT (ductus thoracicus) is the biggest lymphatic vessel into which the lymph from the left part of the body, right lower extremity, right part of the pelvis and abdomen, right

posterior part of thoracic cage is drained. The length of the thoracic duct is 30–40 cm and its diameter is 2 – 4 mm. Over the total length of thoracic duct there are the following valves: one is above the diaphragm, 1 – 2 are located at the level of aortic arch, 1 – 2 are located in the cervical part. The thoracic duct is formed in the retroperitoneal space by joining of right and left lumbar trunks (*truncus lumbalis dexter et sinister*) at the level of the 12th thoracic vertebra and the 2nd lumbar vertebra to the right from aorta.

The initial part of thoracic duct has the dilatation (*cisterna chyli*). To the posterior mediastinum the lymphatic duct goes through the aortic hiatus and passes on the anterior surface of vertebra between the descending part of aorta and azygos vein behind esophagus. There are right posterior intercostal arteries, hemiazygos vein and additional hemiazygos vein behind the thoracic duct.

There is esophagus and *n. vagus* anteriorly. From the right the thoracic duct is covered with mediastinal pleura and can be damaged. The dextral chylothorax occurs. Daily long-term loss of several liters of lymph leads to cachexia and that is why in thoracic duct damage it is necessary to ligate it. After ligation of thoracic duct the lymph is drained through bypath.

At the level of the 5th thoracic vertebra the thoracic duct shift to the left and up, passes behind aortic arch and *a. carotis communis sinistra*, *n. vagus* and *v. jugularis interna*, anteriorly from *a. et v. vertebralis* it is attached to the cupula of the pleura forming the arch and turning *a. subclavia*. It drains into the left venous angle which is formed by *v. jugularis interna* and *v. subclavia*.

AZYGOS VEIN (*v. azygos*) is the continuation of *v. lumbalis ascendens dextra*. It drains into thoracic cavity through the

hiatus in the right crus of diaphragm. It goes up along the right semicircle of thoracic vertebra, anteriorly from the right posterior intercostal arteries, posteriorly and to the right from esophagus, from the side of the thoracic duct and to the middle of the right sympathetic trunk.

At the level of the 4th thoracic vertebra it shifts anteriorly and turning the root of the right lung goes into v. cava superior.

The branches of v. azygos drain into:

- 1) vv. intercostales posterior dextri;
- 2) v. haemiazygos;
- 3) v. haemiazygos accessoria;
- 4) vv. oesophageales;
- 5) vv. bronchiales;
- 6) vv. pericardiacae;
- 7) vv. mediastinales;
- 8) vv. phrenicae superiores;
- 9) pl. vertebrales internus et externus.

The hemiazygos vein (v. haemiazygos) is the continuation of ascending lumbar vein. It goes up along the left semicircle of thoracic vertebra and from the side and behind the thoracic part of aorta, anteriorly and to the middle of sympathetic trunk. At the level of the 6th – 10th thoracic vertebrae it shifts to the middle, goes behind the aorta and sinks into v. azygos.

ACCESSORY HEMIAZYGOS VEIN (v. hemiazygos accessoria) takes blood from the left upper posterior intercostal veins. It can sink into hemiazygos vein or azygos vein or into left brachiocephalic vein.

THORACIC SECTION OF SYMPATHETIC TRUNK is formed by the 9th – 11th ganglia thoracica which are joined with the help of

interganglionic rami communicantes (rr. interganglionares). The upper thoracic node merges with the inferior cervical node forming common ganglion cervicothoracicum or g. stellatum.

Communicating branches (rr. communicantes) branch off from the nodes to the spinal nerves. From the nodes of sympathetic trunk depart many internal branches which are the part of abdominal and thoracic autonomic plexuses (pl. aorticus thoracicus, pl. cardiacus, pl. oesophageus, pl. pulmonalis, pl. coeliacus, etc.). N. splanchnicus major and n. splanchnicus minor are the biggest branches among the ones of sympathetic trunk.

The visceral branches of the 5th – 11th thoracic vertebrae and their interganglionic rami communicantes go downwards and to the middle along the lateral surface of vertebra and connect to each other forming n. splanchnicus major which penetrates into retroperitoneal space through the hiatus in the crus of diaphragm and is the part of abdominal plexus (plexus coeliacus).

N. splanchnicus minor is formed due to 1 – 4 roots from the 9th to the 11th thoracic nodes. N. splanchnicus imus is formed from the 10th – 11th thoracic nodes. Nn. splanchnicus minor are located from the side of nn. splanchnicus major. Having penetrate into retroperitoneal space they go to the renal and abdominal plexuses.

Both sympathetic trunks are located on the heads of the 6th – 7th upper ribs. They are limited from pleural cavity with parietal pleura, subserous layer and endothoracic fascia.

Posterior intercostal arteries and veins cross sympathetic trunks at the posterior surface and v. azygos and hemiazygos are located anteriorly and to the middle of them.

N. splanchnicus major crosses v. azygos on the right, is attached to anteromedial surface and is located on the anterior

surface of thoracic vertebrae. The left n. splanchnicus major crosses v. hemiazygos accessoria, goes downwards and is located between the vein and aorta. Through the diaphragm the sympathetic trunks go behind and to the side of abdominal nerves.

THE THORACIC PART OF AORTA (pars thoracica aortae), or thoracic aorta (aorta thoracica) is the part of descending aorta from the level of the 4th thoracic vertebra to the aortic hiatus (level of the 9th – 10th thoracic vertebrae).

It is located along the anterior surface of thoracic vertebra. There is mediastinal pleura and left sympathetic trunk from the left. There is the root of sympathetic trunk anteriorly, esophagus and nn. vagi anteriorly and to the right, thoracic duct posteriorly and to the right, azygos vein on the right, hemiazygos and accessory hemiazygos veins posteriorly.

To the organs and walls of thoracic cavity the thoracic aorta gives the following branches:

- 1) rr. bronchiales;
- 2) rr. oesophagei;
- 3) rr. pericardiaci;
- 4) rr. mediastinales;
- 5) aa. phrenicae superiores;
- 6) aa. intercostales posteriores.

ANTERIOR ABDOMINAL WALL

Boundaries of the Abdomen:

- **Superior Boundary:** The diaphragm. It extends to ICS-5 superiorly (at the median line; it is more inferior around the edges).
 - Hence the superior limit of the liver is also ICS5 since it push up into the diaphragm.
- **Posterior Boundary:** Lumbar Vertebrae, and Quadratus Lumborum and Transverse Abdominis muscles.
- **Anterolateral Borders:** The muscles of abdominal wall: transversus abdominis, and internal and external abdominal oblique.
- **Inferior Borders:** The **Pelvic Brim**

PELVIC BRIM: Inferior border of the abdomen.

- It consists of the Right and Left **Coxal Bones**.
 - Each coxal bone is made up of an **ilium, ischium, and pubic bone**.
- **Iliac Crest:** The superior portion of the iliac bone. The **Iliac Tubercles** are bony prominences on the iliac crest.
- **Anterior Superior Iliac Spine (ASIS):** The anterior most feature on the iliac crest.
- **Pubic Tubercle:** Lateral edge of pubic bone.
- **Inguinal Ligament:** Found between the ASIS and the pubic tubercle, running in the same direction as the ASIS.
 - The femoral vessels and the inguinal canal are both related to the inguinal ligament.
 - Formed from aponeurosis part of the external abdominal oblique.

UMBILICUS: Found between L3 and L4 in physically fit persons.

Grandparents Like Pediatric Doctors Preventing Kids Sickness: One Transpyloric Plane -- The Transpyloric plane passes through **L1** and contains the following structures:

- Gall-bladder
- Liver
- Pylorus of Stomach
- Duodenal Bulb (Duodenum I)
- Pancreas Body and Tail
- Kidneys

- Spleen

Processus Vaginalis: The portion of peritoneum that remains with the testes when they descend into the scrotum.

- Anything that pushes through the anterior abdominal wall will become invested with peritoneum.
- The testes push through the wall, but normally a piece of peritoneum is left behind as the processus vaginalis.
- When the testes descend, the peritoneum goes with it and then scales back. The portion of peritoneum that remains with the testes is called the processus vaginalis.

7 Layers of the Abdominal Wall:

- **Skin**
 - **Epidermis** -- the part we shed
 - **Dermis** -- contains nerves, capillaries, sweat glands, hair follicles.
 - Has collagen fibers that tend to be horizontal, forming the creasing of the skin. These are called **Langer's Lines**.
 - In surgery, you should cut with Langer's Line, the direction of the collagen, so as to minimize surgical scars.
- **Superficial Fascia** -- Connective tissue that is not aponeurosis, tendon, or ligament. This is the same thing as the hypodermis.
 - **Camper's Fascia:** Fatty layer, first of the two layers. It is found throughout.
 - **Scarpa's Fascia:** Lower layer, found in the lower 1/3 of the anterior abdominal wall. It has a restrictive location, defined by the extent of damage occurring with a **straddle injury**.
 - Limits:
 - The area is restricted to the anterior abdominal wall.
 - Lateral Limit: Basically the inguinal ligament, where it intersects with **fascia lata**, so that fluid does not pass into the thigh.
 - Inferior Limit = the base of the scrotum.
 - Posterior Limit = it goes back to the anus, and fills the pelvis in between.
 - The outlined region is called the **superficial perineal space**.
 - It is called different fascia at different places: *Dartos Fascia* in scrotum / labia majora, and *Colles Fascia* around perineum.
 - **Fundiform Ligament:** The **false suspensory ligament** of the penis or clitoris. It is an extension of superficial fascia.
- **Deep Fascia**
 - A **true suspensory ligament** occurs in the deep fascia layer, which extends into the penis / clitoris. So, we have both a true suspensory ligament (deep fascia) and a false one (fundiform ligament / superficial fascia).
 - Deep fascia encompasses all muscles of the entire body.
- **Muscles** -- Three flat muscles plus the longitudinal rectus sheath muscle.
 - **External Abdominal Oblique** -- muscle fiber direction is antero-inferior (like external intercostals -- hands in pocket).
 - Originate at border of Thoracic ribs T5 - T12
 - Extends to midline and attaches on linea alba. Also attaches to the iliac crest.
 - Again, the **aponeurosis** portion of the externals form the **inguinal ligaments**.
 - Also forms the **superficial inguinal ring**, which allows passage of the **spermatic cord** (male) or **round ligament** (female).
 - Superficial Inguinal Ring is made up of two components, **lateral crus** and **medial crus**. **Intercrural fibers** separate the two.
 - **Internal Abdominal Oblique**

- Also has fibers that attach along the inguinal ligament to the pubic crest.
 - Direction of fibers tends to go outward, from medial to lateral and a little bit inferiorly (inferolaterally).
 - Borders on ribs 7 - 12.
 - The aponeurosis splits and goes both anteriorly (to merge with external aponeurosis) and posteriorly (to merge with transversus aponeurosis)
- **Transversus Abdominis** Deep most layer of flat muscles.
 - Also borders on ribs 7 - 12. Extends down to the pubic crest and medially to the linea alba.
 - It creates a diagonal pathway for the spermatic cord or round ligament to pass through.
 - Fibers run transversely! -- horizontally from lateral to medial.
- **Rectus Abdominis:** Straight muscle.
 - Passes from Xiphoid Process inferiorly to **pubic symphysis** (inferior center of pubic bone).
 - **Rectus Sheath** holds this rectus muscle in place. It is directly shallow to it, formed by the aponeuroses of the three flat muscles. It has a posterior and anterior layer, formed from the aponeuroses of the three flat muscles.
 - Upper 3/4 of Abdominal Wall: All three muscle layers converge on rectus sheath, and pass both anteriorly (external aponeurosis) and posteriorly (transversus aponeurosis).
 - This part of the wall is suturable in surgery.
 - Lower 1/4 of abdominal wall is transversalis fascia. Here, all three muscle layers pass anteriorly. Here it is called transversalis fascia.
 - This part of the wall is not suturable in surgery.
 - **Arcuate Line:** The line that divides the upper 3/4 of abdomen from lower 1/4, by the differences in the aponeurotic layers.
 - **Transversalis Fascia** -- Deep fascia on the interior (deep) surface of the transversus abdominis muscle.
 - Esp. found in the lower 1/4 of the abdomen.
- It has several names, but it is one continuous plane of fascia, just outside the peritoneum.
- As a continuous plane, it is also an avenue for infection.
- **Subserous Fascia**
- **Peritoneum:** A serous membrane that secretes fluid, thus allowing internal organs frictionless movement.

72

Linea Alba: The best place to make a surgical cut and not hit any nerves is straight down the linea alba.

NERVOUS SUPPLY of Anterior Wall: Ventral Rami of T7 - T12, and L1.

- **Dermatomes:** How nerves innervate the anterior abdominal wall -- in sections.
- Referred Pain: Example
 - T10 goes to umbilical region.
 - Appendicitis pain will go to sympathetic nervous system -----> refers back to T10. When rupture occurs, toxins are released and irritate the peritoneum, resulting in a localized effect.
- **Ilioinguinal Nerve:** Goes through the inguinal canal, with the spermatic cord (male) or round ligament (female).
 - Supplies scrotum (or labia majora) and medial aspect of thigh.
- **Iliohypogastric Nerve:** Directly superior to ilioinguinal nerve.
 - Innervates the suprapubic area.

- Both Ilioinguinal and Iliohypogastric may come off as a single nerve and branch later.

McBurney's Point: The point of surgical incision for an appendectomy.

- Is located on a line along the ASIS. The iliohypogastric nerve is right there, about 1cm superior to the ASIS, so that is the nerve that ya gotta be weary of when doing an appendectomy.

ARTERIAL SUPPLY of Anterior Wall:

- **Superior Epigastric Artery** -- Runs directly over rectus abdominis muscle.
- **Inferior Epigastric Artery**
- **Superficial Epigastric Artery**

VENOUS SUPPLY of Anterior Wall: The same as the veins above.

- When using a needle to drain peritoneal fluid, do not hit the Superior or Inferior epigastric veins! The result would be massive bleeding.

INGUINAL REGION

Inguinal Canal: Formed from the aponeuroses of the three flat muscles.

- It a **diagonal passage**. Most tubular structures pass through membranes diagonally, as the ureters and fallopian tubes do.
 - This provides reinforcement on the wall of the structure being entered.
- Contents of Inguinal Canal
 - **Spermatic Cord** (male) or **Round Ligament** (female)
 - **Ilioinguinal Nerve**
 - Genital Branch of the **Genitofemoral Nerve**.

Inguinal Triangle (Hesselbach's Triangle): An area of weakness in the aponeurosis, where direct hernias can occur.

- Borders:
 - The lateral margin of the rectus muscle (aka **semilunaris**)
 - The **Inferior Epigastric Artery**
 - The **Inguinal Ligament**
- **CONJOINT TENDON:** The space of membrane where the transversus abdominis and internal oblique aponeuroses join into one. It is an *area of weakness* in the abdominal wall.

HERNIAS: The protrusion of intraperitoneal guts outside of the peritoneum (i.e. through the peritoneal wall).

- **DIRECT INGUINAL HERNIA:** Gut goes straight through the inguinal triangle, through the conjoint tendon.
 - It will be located *medial to the inferior epigastric artery*
- **INDIRECT INGUINAL HERNIA:** Hernia that passes through the inguinal canal and originates *lateral to the inferior epigastric artery*.
 - **Congenital Indirect:** The weakness was present at birth.
 - **Agnesis:** Absence of growth or closure of some part of the abdominal wall.
 - **Dysgenesis:** Incorrect or dysfunctional growth.
 - **Acquired Indirect:**
 - **Ascites** -- (fluid buildup in peritoneum)
 - Obesity
 - Pregnancy
 - Surgical Incisions
- Diaphragmatic Hernias:
 - **HIATAL HERNIA:** Distal end of the esophagus can draw itself back into the esophageal hiatus, pulling part of the stomach with it.
 - Referred pain from a hiatal hernia occurs in Epigastric region, around T7-T8.
 - **Semilunar Hernias:** Occur along the rectus sheath and arcuate lines, mostly.

The boundaries of the abdomen are: the top- rib's arc, the bottom-iliac crests, inguinal folds (or rather, the inguinal ligament), symphysis pubis. Lateral boundary is the line XI- end rib linked with the iliac crest (line Lesgaft). This line corresponds to the middle axillary line that separates the abdomen from the lumbar region.

For convenience, at patient's examination and at definition the organ projection on the surface of the body is approved to divide the abdominal wall into the area. For this purpose, line two horizontal lines: the upper connecting the lowest point of X ribs and the bottom connecting the front upper iliac spine. These horizontal lines divide the anterior abdominal wall into three areas: epigastric (epigastrium), celiac (mesogastrium) and hypogastric (hypogastrium). The two lines that hold up on the pubic tubercle, respectively, the outer edge of m.abdominis rectus (both sides), each of these region is divided in turn into three divisions, resulting in 9 regions allocated to three paired (lateral) and three unpaired (median): unpaired, in fact epigastrium (regio epigastrica propria), umbilical (regio umbilicalis), suprapubic nadlnonaya (regio suprapubica); paired -hypochondrium (regio hypochondrica dextra et sinistra), lateral (regio abdominalis lateralis dextra et sinistra), ilioinguinal (regio ilioinguinalis dextra et sinistra). The release of these topographic regions facilitates orientation in the topical diagnosis, determining the projection of the abdominal cavity and localization of pathological processes and the choice of operating directions of cuts.

The lateral anterior abdominal wall occupy space on both sides of the costal arch to the top of the iliac crest and inguinal ligament, passing to the middle section in the form of aponeuroses forming rectus sheath. Median anterior abdominal wall consists of two lines of the rectus muscles running from the sternum and V-VII rib's cartilages to the pubic bone to the sites from their pubic tubercle to the symphysis.

Layers: skin, has a comparatively thin mobility, can stretch with increasing pressure from the sides of the abdomen (bloating, pregnancy, hydrocephalus, etc.).

Subcutaneous adipose tissue contains a significant amount of fat, with the exception of navel, where there is no fat and the white line, where it's little. Superficial fascia composed of two layers: surface contains a lot of fat and a change in the hip is not attached to the inguinal ligament. Deep sheet (Thomas plate) is thin, but rich by fibrous filaments, is attached to the leaves of the inguinal ligament. Between sheets are superficial arteries and veins, moving of and flowing into the femoral vessels: a.v.epigastrica superficialis, a.v.circumflexa ilium superficialis, a.v.pudendae externae.

Own abdomen fascia formed by a thin fibrous lamina, attached to the inguinal ligament, has practical importance: these fascial sheets hinder the descent of inguinal hernias following inguinal ligament to front of the thigh.

The side sections are made up of three muscles located in layers.

The most superficial muscle⁷⁴ of the lateral abdominal wall is - m.obliquus externus abdominis, whose fibers pass obliquely downward, anteriorly, ie, the overlap with the internal oblique fibers. This allows for appendectomy operations, for example, to "variables" on-line access without crossing the muscle fibers.

More superficially under the external oblique muscle is m.obliquus internus abdominis, whose fibers pass obliquely upwards and inwards from the outside (from the iliac crest and inguinal ligament to the lower three ribs.) Medially the internal oblique muscle passes in aponeurosis forming the rectus sheath.

M.transversus abdominis is located under the internal oblique muscle has a horizontal grain direction and starts from the cartilage of the lower six ribs, fascia thoracolumbalis, iliac crest and the lateral two-thirds of the inguinal ligament. Transverse muscle medial to lunated, convex outward line (lin. semilunaris Spigeli), go to the aponeurosis, constituting rectus sheath. Between the internal and transverse muscles run blood vessels and nerves of the anterior abdominal wall (6 pairs of lower intercostal vessels and nerves, 4 pairs of lumbar vessels, and nerves of the two-n.iliohypogastricus,

n.ilioinguinalis). This must be borne in mind in the sections under local anesthesia, achieving by good solution infiltration said intermuscular space.

Inside is covered with transverse muscle fascia (fascia transversalis), which is adjacent to a piece of parietal peritoneum. Transverse fascia should be considered as part of the fascia endoabdominalis, barking all abdominal walls from the inside.

Due to the fact that the peritoneum does not extend to the inguinal ligament, between it and the transverse fascia at this site formed cellular space, which contains the external iliac vessels (artery depart from here a. epigastrica inferior, a. circumflexa ilium profunda, n.genitofemoralis or its branches)

Median department of anterior abdominal wall formed by m.rectus abdominis, enclosed in boxes, formed by the aponeurosis of m.obliquus abdominis and m. transversus abdominis. The strength of aponeurotic bed below the navel down to the fact that in this region there is no back wall of the vagina and m.rectus covered only the dense transversal fascia and peritoneum.

In the transition aponeuroses to the vaginal walls at the edges of m.rectus produced a noticeable dip. At this point in the vagina pierce blood vessels and nerves supplying the area of the rectus abdominis muscle.

In some cases, in places of transition layers of muscle fibers in the aponeurosis, especially in spigelian line, holes, through which blood vessels are places going out of hernia - usually "hernia of spigelian line." As the diameter of these holes is small, and they are surrounded by dense aponeurotic tissue, hernias of spigelian line tend to have infringed.

Given an order to determine the anatomical conditions in the pathogenesis of acquired hernias of the abdominal wall, we need a closer look "weak points" of musculo-aponeurotic layer - the usual place of appearance of hernial ring.

As known, monolithic musculoaponeurotic layer of the anterior abdominal wall is not the same everywhere. Thus, in the lower abdominal wall the m.obliquus internus abdominis and m. transversus abdominis do not reach the pubic bone and medial third of the inguinal ligament, so over them is a gap, which is covered by aponeurosis of external oblique muscle, and from behind - only by transverse fascia. This gap is formed a natural repository for the spermatic cord in males or the round ligament of the uterus in women. In the other words, formed inguinal canal. The width of the inguinal canal in normal conditions, depends on the development and the height of the inguinal ligament over the internal oblique and transverse muscles.

By lowering the tone of the muscular-aponeurotic formations of the abdominal wall and the weak development of the muscles of the abdominal wall lateral inguinal gap increases and therefore creates a precondition for the emergence of protrusion of the peritoneum and abdominal organs, ie, the occurrence of hernia.

The form of the inguinal gap can be individually different even in the presence of well-developed muscles of the abdominal wall. It could be triangular, oval, slit-like. These different forms of inguinal gap increased resistance to various conditions intraperitoneal pressure. Thus, the triangular shape of the inguinal gap is most favorable for the appearance of anatomical structure of the hernial protrusion, and slit-like, on the contrary, as part of the anterior abdominal wall above the inguinal ligament, devoid of muscle, here is narrow and the height of the back wall of the inguinal canal, formed by a transverse fascia, is small.

Somewhat different structure consist inguinal canal in women, muscular wall groin in females more advanced than those of men. The lower edge of the internal oblique and transverse muscles in them adjacent to the inguinal ligament over a large area, excluding the formation of a large inguinal gap (the gap).

In addition, Women superficial inguinal opening (anulus inguinalis superficialis) virtually obliterated leaving here with a round ligament of the uterus. This may explain the much smaller number of inguinal hernias in women compared with men.

The weak point in the structure of the anterior abdominal wall can be considered umbilical region and epigastrium. The umbilical opening is essentially reinforced only by fascia umbilicalis from

the abdominal cavity and scar tissue that appear as a result of ligation of the umbilical cord. The diameter of the umbilical ring is determined by the degree of development of the m.rectus and the state of aponeuroses forming a vagina recti. Therefore, umbilical hernia is usually observed in women and children in the presence of under-developed m.rectus abdominis.

In the anatomical structure of the epigastrium (epigastrium) there are prerequisites to the formation of hernial protrusion. In this regard, note the gap between the beams m.rectus, one of the portions which are attached to the edges of the V-VII ribs, and the other - to the xiphoid process. If there are disturbances of tone musculoaponeurotic structures and increase in abdominal pressure preperitoneal fat and peritoneum can penetrate these cracks, which often simulates a denial of the disease the stomach, which can lead to diagnostic errors and even unnecessary surgery for non-existing gastric ulcers.

There are some features of the anatomy of the anterior abdominal wall in children. The musculature of the abdominal wall in children is not well developed, muscular layers difficult to distinguish from each other, sheath broad and subtle, it often gives the barrel-like shape of the abdomen when you cough, swelling, etc. Between spigelian line and the lateral edge of the m.rectus from the groin to the costal arches ligaments stretch thin aponeurotic band width 0.5-2 cm, devoid of muscle cover. These bands are the weakest point in the structure of the abdominal wall and the child may be the site of occurrence of hernias.

Aponeurosis, forming a vagina m.rectus, children are also insufficiently developed, and the transition to the white line (linea alba) in the transverse cracks are observed, devoid of the muscular sheet that can serve as a way for the appearance here hernial protrusion. It is known that hernias of the white line are rare at adult

Inguinal canal in children is short and wide, covered with a thin aponeurosis. External inguinal ring in children is difficult to determine due to the weak development of fibrous bridges (fibrae intercrurales) between the upper and lower legs of the external oblique muscle aponeurosis that attach to the pubic bone. This may explain the unusual appearance of strangulated hernias in children.

It should draw your attention to some developmental defects of the abdominal wall in children, among whom there are often congenital inguinal hernia and fetal umbilical cord hernia.

For a more complete picture of congenital inguinal hernias should be recalled process lowering the testicles into the scrotum.

In the formation of oblique inguinal hernias in children role-peritoneal inguinal process is extremely high and closely related to the lowering of the gonads. As you know, an egg from the end of the third month of intrauterine life is in front of the deep (internal) inguinal ring between the transverse fascia and the peritoneum. Before that, from the abdominal wall is bulging of the peritoneum (processus vaginalis peritonei), which gradually passes into the inguinal canal, capturing the transverse fascia and the fascia own belly.⁷⁶

The plot of the transverse fascia, which sticks out at the same time, peritoneal inguinal appendage, called a funnel-shaped fascia (fascia infundibuloformis). It creates a cavity; the lining is normal inside the deep inguinal orifice, the walls of the inguinal canal and scrotum. At the end of the 6-7th month of fetal testis, directed a bunch of wires (gubernaculum testis, s. Hunteri), begins to descend through the funnel into the fascial inguinal canal and then into the scrotum. The resulting protrusion above the transverse fascia with turns in general vaginal membrane (tunica vaginalis communis) testicle and spermatic cord. Adjacent to the testis-sheet peritoneal inguinal process becomes visceral piece of his own shell. In the normal development of the fetus in the birth of a child-peritoneal inguinal arm heals, obliterating, except for a small area adjacent to the testicle. The presence of the remaining small serous cavity between the shells, in some cases leads to the development of hydrocele. If you violate the processes of reverse-peritoneal inguinal process remains all over the cleft, due to a continuing gap communicating with the abdominal cavity of the location of the testicle and the abdominal organs in this way can be dropped into the scrotum.

However, the appearance of inguinal hernias in children can not be attributed only to the cleft processus vaginalis in the pathogenesis of inguinal hernias in children should be sought first of all underdevelopment oblique abdominal muscles and their aponeuroses. Under these conditions, the wide mouth of the cleft-peritoneal inguinal process can get moving the abdominal organs (most often a loop of small intestine) and the process is thus transformed into an oblique inguinal hernia sac congenital hernia, in which content goes into the scrotum before contact with the egg. There are cases when the peritoneal-inguinal nonclosure process almost all over, but it does not reach the lumen located in the scrotum testicle. With the passage of a peritoneal inguinal-moving process of the abdominal cavity develops funiculus hernia, which is usually not expected to be congenital hernias, since in these cases the testicle is located outside of the hernial sac.

Formation of the umbilicus in the embryonic period is a fairly complex process rate, already at the 6th month of the antenatal period umbilical ring is formed, which gradually decreases in size after birth a few days finally caught up scar locked in place had fallen away the umbilical cord. Nevertheless, the navel is impossible to recognize a strong anatomical structure.

In this area frequently observed congenital malformations anterior abdominal wall and hernia in adults. Even in normal conditions, the navel is covered by fairly flimsy structures: skin, umbilical fascia and peritoneum. With the wide umbilical ring and the weak development of the fascia creates conditions conducive to the emergence of hernial protrusion.

Basically herniorrhaphy of umbilical hernia by suturing incisions of the peritoneum and fascia, moving m.rectus and sutures on the aponeurosis as duplicate (Mayo Sapezhko, P. Dyakonov).

Has been noted that an important condition for the appearance of hernial protrusion is atony of musculoaponeurotic abdominal wall unit and excessive increase in intraperitoneal pressure (labor, cough, constipation, etc.). You can say that a physically healthy man theory is difficult to imagine the appearance of hernias, with the exception of trauma.

To understand the mechanism of inguinal hernias, we must once again recall the anatomical structure of the inguinal canal. Inguinal canal is a gap between the bottom edge of the internal oblique muscle and inguinal ligament, which runs the spermatic cord. Front, this gap is covered by aponeurosis of external oblique muscle, behind - the transverse fascia.

Depending on the extent of the internal oblique muscles inguinal gap may be wider or narrower, for example, people with well developed muscles. The structure of the inguinal canal occupies an important place transverse fascia, through the funnel of a retroperitoneal space in inguinal canal beyond the elements of the spermatic cord. As the rear wall of the inguinal canal, malleable under the influence of intra-abdominal pressure transverse fascia bulges more in the presence of a wide gap groin, and lower - with a narrow crotch slit.

In the etiology of inguinal hernias can not be underestimated and the tone of the front wall of the inguinal canal, ie, the ~~vo~~ltage aponeurosis external oblique muscle. Weak oblique muscle aponeurosis allows more shift knob or content inguinal canal with increasing intra-abdominal pressure, but also enhances the external inguinal ring, formed by fibers of the aponeurosis. Under these conditions, the spermatic cord can serve as an anatomical guide for inguinal hernias.

It should be recalled yet another circumstance, causes the appearance of inguinal hernias in certain places. As you know, on the inner surface of the lower anterior abdominal wall has five peritoneal folds, cover up in the middle of obliterated urachus (plica umbilicalis mediana), on either side of him on both sides, passing in an oblique direction, obliterated umbilical artery (plica umbilicalis media) and more more outward from these folds are located vasa epigastrica inferiora (plicae umbilicales laterales). Lateral and medial to the epigastric fold above the inguinal ligament formed two peritoneal fossa, called fovea inguinalis medialis et lateralis.

By reducing the tone of the transversalis fascia and the abdominal muscles, one or another hole into a cavity, through which gradually begins to extrude the contents of the abdomen. In cases where the protrusion occurs through the lateral hole, there are oblique hernia, because the lateral hole corresponds to the projection of the internal inguinal canal openings and the contents of the hernia

should make their way here in an oblique direction in the course of the inguinal canal to reach the outer inguinal opening. The medial fossa is projected at the level of the external inguinal openings, so hernial protrusion is it right - hence the name "direct inguinal hernia."

Thus, the anatomical structure of the oblique and direct inguinal hernias is significantly different: the first is a long muscular-aponeurotic channel, the second - the channel is short and wide. This affects the methods of reconstructive surgery in an oblique and direct inguinal hernia.

We now turn to the characterization of the anatomical prerequisites for the development of femoral hernias. Under the inguinal ligament is not covered with muscles opening (lacuna vasorum), which pass through the blood vessels of the lower extremity. Medial to the inner hole and located the femoral canal (anulus femoralis), which can go through and hernia. Hernial ring at the same time limited in the lateral side of the femoral vein, in the back - the pubic bone with lig.ileopectineum, front - the inguinal ligament and the medial side - lig.lacunare. Below the inguinal ligament blood vessels are located between the sheets of wide hips fascia, forming the outer wall of the gap length of 2-3 cm, which is called the pelvic canal. It is the external opening of the foramen ovale, covered with a thin leaf laminae cribrosae. At the normal practice channel does not exist: it is made fiber, blood vessels and lymph nodes.

Conditions for the development of femoral hernias are significantly different from the conditions of the inguinal. The main difference can be assumed that the hernia sac at the femoral hernias because of the limitation of hernial ring rigid anatomical structures (with her pubic bone tubercle and inguinal ligament) is unable to expand. Therefore, protrusions in femoral hernias are relatively small, and prone to strangulation.

An important role in the genesis of femoral hernias are a form of the pelvis and therefore the size of the gap under the inguinal ligament, as well as the structure of the inguinal canal. The wider the gap under the crural arch, the greater the possibility of femoral hernias under appropriate conditions, which is observed more often in women as they have a wider pelvis. That is why the femoral hernias occur in women is 2-3 times more often than men. In general, femoral hernias account for 18%, 73%, inguinal, umbilical, 8% of the total. Much rarer occur all the other types of hernias.

Despite the fact that the rear section of the abdominal wall on all sides is covered with thick muscular-aponeurotic formations in its structure, there are "weaknesses" that are the cause of the hernial protrusion. Thus, the hernia can occur in the lumbar region through the triangle of Petit (Petit), limited rear and medial - the edge of a broad back muscles, front and laterally - the external oblique muscle of abdomen, lower - the iliac crest, the bottom of the triangle is the internal oblique muscle, covered by fascia, weakness which may serve as a cause of lumbar hernia.

Hernias can occur with the weakening of the muscle wall of the pelvis and pass through a hole along the sciatic a.glutea inferior and n.ischiadicus. As a result of relaxation of membrana obturatoria hernia may also come out through⁷⁸ the obturator canal.

Thus, the anatomical prerequisite in the form of one or the other channel (the inguinal canal, femoral canal, umbilical ring, obturator canal, etc.) becomes a condition for the appearance of a hernia but in the case when the process begins the expansion of these holes in the connection in violation of muscle tone or with sharp increases in recurrent abdominal pressure.

What should be called a hernia of the abdominal wall? Abdominal wall hernia is protrusion of subcutaneous abdominal cavity through a natural opening in the musculo-aponeurotic layers (inguinal, umbilical, femoral) or tissue through a defect of these layers of the abdominal wall caused by injury, atrophy, or other pathological processes.

Classic elements of the abdominal wall hernia is a peritoneal hernial sac, its contents - the abdominal organs and in $\bar{\text{}}$ hernial company (groin slit the femoral canal, etc.). Along with this there are sliding inguinal hernias, which have different anatomical structure than classical hernias. In these cases, there is no peritoneal hernial sac, and the hernial protrusion is only slipped to a wall hernial cecum or bladder.

The term "herniotomy" for modern plastic surgery to strengthen the abdominal wall to the closure of hernial ring does not reflect the content of this surgery. Dissection of hernial ring is now only one step in the treatment of hernia surgery. Modern methods of surgical treatment of hernias of the abdominal wall, not simply to rid the bodies of the infringement and remove the hernial sac, but also to ensure that the most efficient use of resources anatomic musculo-aponeurotic structures to eliminate the hernial ring, strengthening the weak places of the abdominal wall, which was the one of the causes of hernia bulge. The term "herniotomy" (herniotomia) left us with before-antiseptic period, when the operation in strangulated hernia was reduced only to the dissection restraining ring.

The operation herniotomy has three main stages: removal of the hernial sac, herniorrhaphy and strengthening the abdominal wall during hernia channel. In oblique inguinal hernia with hernial canal long, it is expedient recovery front wall of the inguinal canal along its entire length, except the external inguinal holes that remain for the exit of the spermatic cord. This requirement is in the best method of Girard-Spasokukotskiy in which after the closure of the base of the hernial sac funiculus is laid in place and fasten it over the internal oblique muscle sutures together with the top flap of the aponeurosis external oblique muscle to the crural arch. After that, the bottom flap of the aponeurosis is attached to the upper flap, forming these duplicate of aponeuroses. In the beginning inguinal hernias, as well as children recommended way to A.V. Martynov, limited to the strengthening of the front wall of the inguinal canal by aponeurotic duplicate formation only, without anchoring muscles to the crural arch. This is very important for operations in childhood, since the presence of musculo-aponeurotic sutures retards the growth of muscles, resulting in a subsequent period of the last to atrophy.

However, in the treatment of direct inguinal hernias way Girard-Spasokukotskiy, and especially the way A.V. Martynov, have significant drawbacks - they do not allow to strengthen the back wall of the inguinal stretched the gap in the projection of the external inguinal orifice. As is known, the direction direct inguinal hernia passes from the inner to the outer holes peritoneal inguinal opening, making it difficult to herniorrhaphy without moving the spermatic cord. We believe that direct hernias, especially large, the method of modification Bassini, N.I. Kukudzhanov - a more radical method of treatment, it can take in the entire groin slit up to the mound pubic bone.

The disadvantages of surgery Bassini include movement of the spermatic cord in unnatural conditions, ie, between the sheets of aponeurosis external oblique abdominal muscles, which is associated with excessive traumatization of it after surgery.

For all methods perform herniotomy should pay particular attention to closing the hernial sac and the transverse fascia. Anyway, according to the large statistics, the average number of relapses after surgery herniotomy in inguinal hernias varies from 5 to 10%. This make surgeons look for ways to improve the surgical treatment of inguinal hernias.

What are the main causes of recurrent hernias? The main reasons for the emergence of recurrent hernias are: incomplete removal⁷⁹ of the hernial sac, the lack of closure of the transversalis fascia, strengthening the inept inguinal triangle, and a violation of trophic tissue in old age.

Adopted in surgical practice ligation ligature hernial sac often leaves the funnel, which later serves as a vehicle hydrodynamic shocks from the abdominal cavity and the emergence of a new hernia sac. Therefore, make rational closure of the hernial sac with a transverse fascia in the form of duplicate. The absence of suture, strengthen the back wall of the inguinal canal in a wide inguinal gap is the main cause of recurrence. Such conditions are often created after herniotomy by A.V. Martynov, which produces only the strengthening of the front wall of the inguinal canal through the external aponeurosis duplicate oblique abdominal muscles without narrowing the gap groin.

To strengthen the back of the inguinal canal in oblique hernia is recommended area of the internal (deep) inguinal openings to reinforce the muscle flap (of the internal oblique muscle), which is sutured to the posterior edge of the inguinal ligament under the spermatic cord.

Let us consider the peculiarities of herniotomy in children. When choosing a method of surgery for inguinal hernias should be avoided whenever possible traumatic muscle sutures, as it leads to growth retardation internal oblique and transverse abdominal muscles and partial atrophy of the

anterior abdominal wall. In this regard, it is recommended herniotomy in children limit the removal of the hernial sac and the strengthening of the front wall of the inguinal canal through the external aponeurosis duplicate oblique abdominal muscles. For this purpose, shall elect the least traumatic methods of operations of A.T. Krasnobaeva, Ru (Roux) and A.V. Martynov.

Methods Krasnobaeva and Ru are different in that the aponeurosis of external oblique muscle does not dissect. In operations for congenital inguinal hernias removed the wound hernial sac with egg, emit a shell crossing near their eggs. Without opening the front wall of the inguinal canal, hemming her with 5 - 6 stitches (by Krasnobaeva) or 2.3 U-shaped stitches (by Ru). At older ages, cut through the aponeurosis of external oblique muscle and sutured it in the form of duplicate A.V. Martynov.

Dissatisfaction with the outcomes of such common operations as herniotomy, confirmed by the presence of about 150 surgical treatments of inguinal hernias. And it is mainly in the fact that the surgeon during the operation has no such fabrics that would retain the robust strength after herniorrhaphy, which could result in recurrence of the hernia.

Currently, synthetic materials are often used to strengthen the hernial ring, especially with recurrent hernias in the elderly. Deserves special attention illumination methods of surgical treatment of femoral hernias. A major obstacle to reliable herniorrhaphy is the presence of large blood vessels passing through the lacuna vasorum, which are directly adjacent to the pelvic canal, and consequently, the hernial sac. Passing through the internal femoral ring (anulus femoralis internus) Femoral hernias emerge from under the inguinal ligament medially from the femoral vein. Hernial sac has the following relationship to surrounding blood vessels: outward - v. femoralis, top a.epigastrica inferior; medially - a.obturatoria, if it departs from a.epigastrica inferior. Such variants of vascular ring around the hernial protrusion should be kept in mind during the operation to avoid an erroneous damage of the vessel ("corona mortis"). Anatomical conditions for closing the hernial ring at the femoral hernia is very unfavorable. There is a unique opportunity - to narrow hernial anchoring inguinal ligament to the periosteum of the pubic bone with pectinate ligament.

How to carry out this operation? Bassini suggested for this purpose incision below the inguinal ligament over the hernial protrusion. After removal of the hernial sac impose 4.3 suture, which connects to the inguinal ligament pectinate ligament (lig.pectineum), capturing the periosteum and the pubic bone.

All the same quick access to the hernial ring by Bassini does not provide good conditions for removal of the hernial sac, and the more conditions to the inguinal ligament anchoring lig.pectineum. It can therefore be considered justified proposal Rudji (Ruggi, 1892) and Parlavecchio (Parlavecchio, 1893), recommending access to the hernial ring at the femoral hernia after inguinal canal. This section provides a good anatomical accessibility to separate the hernial sac and closure of the stump with its transverse fascia. After that, begin to overlap the seams between the groin and the pectinate ligament, the pubic bone with the periosteum of the inguinal canal, exposing its rear wall. The operation was complete reconstruction of the inguinal canal by one of the accepted methods.

In conclusion, it should be recalled about the possible dangers and errors in herniotomy. The literature describes cases of transection of femoral vessels, perform duplicate of the front wall of the inguinal canal by a well-developed superficial fascia of aponeurosis rather than the external oblique muscle abdominal injury of the bladder or the cecum with sliding hernias and etc.

PERITONEUM

Spleen: It is actually mesodermal in origin, not endodermal like the rest of the abdominal organs.

Retroperitoneal Space: The area behind (posterior to) the peritoneum. Any organs not completely (or almost completely) covered by peritoneum are considered retroperitoneal organs.

Abdominal Cavity: Everything but the lateral, posterior, and anterior body walls of the abdomen, including both the peritoneal cavity and the retroperitoneal space.

Peritoneal Cavity: That part of the abdomen invaginated by **peritoneum**.

- Peritoneum has visceral and parietal layers, just like the pleural cavity. It is analogous to the organs pushing themselves into the peritoneum, like a fist into a balloon.
 - **Visceral Peritoneum:** Peritoneum directly on the organs.
 - **Parietal Peritoneum:** Peritoneum surrounding the interior lining of the abdominal wall.
- **MALES:** The peritoneal cavity is **CLOSED**.
- **FEMALES:** The peritoneal cavity is **OPEN**. It opens out into the cervix and vagina, making it a potential space for pathogens to enter.
- Peritoneum should be considered a *potential space* for pathogens and fluids to build up.

Subphrenic Recess: The recess where the peritoneum reflects off the liver (right side) on the inferior surface of the diaphragm.

- It contains the **coronary ligament** of the liver.

OMENTA: Peritoneum surrounding the stomach

- **Lesser Omentum:** Peritoneum along the lesser curvature of the stomach, covering the pancreas. It is superior and medial to the stomach and posterior to parts of the liver, and anterior to pancreas.
 - **Lesser Omental Bursa / Lesser Peritoneal Sac:** The space between the stomach and the liver. The space anterior to the lesser curvature of the stomach and posterior to the liver.
- **EPIPLOIC FORAMEN:** A pathway that allows entrance from the lesser peritoneal sac to the greater peritoneal sac.
 - The Inferior Vena Cava goes directly posterior to it (*retroperitoneal*).
 - The portal triad is directly anterior to it, in the peritoneum, along the lesser curvature of the stomach.
- **Greater Omental Bursa:** The space between the stomach and anterior abdominal wall.
 - **Greater Omentum:** The space formed by the peritoneum on the anterior surface of the stomach and the anterior abdominal wall.
 - It attaches to the stomach and to the transverse colon.
 - **Anterior Layer of Greater Omentum:** The parietal peritoneum of the abdominal wall. 81
 - **Posterior Layer of Greater Omentum:** The visceral peritoneum along the greater curvature of the stomach.

Superior Recess: Where the Lesser Omentum stops at the **coronary ligament** of the liver and reflects back onto the liver. Essentially, the space between the stomach and

Inferior Recess: Along the greater curvature of the stomach, where the greater omentum reflects onto the transverse mesocolon. Essentially, the space between the stomach and transverse colon, inferior to the stomach.

Intra-Peritoneal Organs: Organs completely or almost completely enclosed by peritoneum.

- Stomach
- Liver
- Gall Bladder

- Transverse Colon: completely
- Jejunum
- Ileum
- Cecum (very start of ascending colon)

Retro-Peritoneal Organs: Organs that are located mostly or completely behind the posterior parietal peritoneum.

- Duodenum
- Ascending Colon (only 25-50% covered)
- Descending Colon (only 25-50% covered)
- Sigmoid Colon
- Pancreas
- Kidneys
- Great Vessels and their primary branches: Abdominal Aorta and Inferior Vena Cava, Celiac Trunk, and Superior and Inferior Mesenteric arteries and veins.

Mesentery: Two layers of peritoneum opposing each other. Vessels and nerves often lie in the mesentery, where they can easily reach the organ where the peritoneal layers separate and reflect off the organs.

- **THE Mesentery:** The one that connects the small intestine to the posterior abdominal wall.
 - The **root** of the mesentery is where the Mesentery connects to the posterior wall.
- **Transverse Mesocolon:** Specific mesentery connecting the transverse colon to the posterior peritoneum.
- **Sigmoid Mesocolon:** Specific mesentery connecting the sigmoid colon to the posterior peritoneum.

The Anterior Surface of the Diaphragm:

- **Vena Caval Foramen:** Hole for the Inferior Vena Cava, where it passes to the liver.
 - Around **T8**
 - It is located in the **central tendon** (superior most part) of the diaphragm.
 - **Eosophageal Hiatus:** Opening that admits the esophagus, guarded by two muscles **left crus** and **right crus**.
 - **Left Gastric Artery** and **Left Gastric Vein** also pass through the eosophageal hiatus.
 - Passes through at **T10**.
 - **Aortic Hiatus:** Is actually posterior to the diaphragm -- not really a hole in the diaphragm.
 - **Thoracic Duct** ⁸² goes posterior through this opening as well as aorta.
 - About Level 12, at lower most part of diaphragm.
 - **Lumbocostal Arches:** Transversalis Fascia on the posterior wall of the diaphragm. Sympathetic Ganglia come through along these arches.
-

The position of the abdominal cavity is subject to large variations depending on age, physiological and pathological conditions, etc. However, in the abdominal the surgeon has such reference points that help to leave the most difficult situations. At autopsy, the abdomen quite clearly distinguish the upper and lower sections (floors), divided by the mesentery of the transverse colon.

In the upper and lower abdominal cavity contains the following derivatives of the peritoneum:

Packing bag - bursae omentalis

Epiploric foramen -foramen epiploricum

Liver bag-bursa hepatica

Proventriculus bag-bursa pregastrica

The right side of the channel-canal lateralis dexter

The left side of the channel-canal lateralis sinister

Right mesenteric sinus-sinus mesentericus dexter

Left mesenteric sinus-sinus mesentericus sinister

Pockets of the peritoneum:

recessus ileocaecalis superior

recessus ileocaecalis inferior

recessus retrocaecalis

recessus duodenojejunalis

recessus intersigmoideum

Detailed look at the topography of the mentioned derivatives of the peritoneum, first in the upper floor of the abdomen:

1. Packing bag-bursae omentalis-limited:

Front- stomach and small omentum;

Behind - parietal peritoneum covers: the pancreas, left kidney, left adrenal gland, aorta and inferior vena cava;

Bottom- left side of the transverse colon and its mesentery;

Left - spleen and its hilum;

Top- diaphragm and caudate lobe of the liver;

Right-duodenum;

2. Epiploric foramen - foramen epiploricum-limited:

Front - lig. Hepatoduodenale;

Behind - parietal peritoneum covers the inferior vena cava;

Upper - tailed proportion of the liver;

Lower - upper edge of the initial duodenum;

3. Liver bag (subdiaphragmatic space) - bursa hepatica-
limited:

Top-diaphragm;

Bottom-liver (right or left lobe);

Behind -lig.coronarium hepatis;

Medially - lig. falciforme hepatis;

4. Proventriculis bag-bursa praegastrica-limited to:

Top - diaphragm;

Bottom - flexura coli sinistra and lig.phrenicocolicum;

front- anterior abdominal wall;

Behind - the stomach and small omentum;

Right - lig. falciforme hepatis;

Left spleen and its ligaments;

Then go to the survey of the lower floor of the abdomen. To do this, move the greater omentum up with the transverse colon, and then check the condition of lateral canals-canalisis lateralis dexter, canalisis lateralis sinister, formed between the fixed divisions of the colon (ascending and descending) and the side walls of the abdomen, as well as mesenteric sinuses (sinus mesentericus) bounded by the root of mesentery of the small intestine and the medial surface of the colon.

As is known, the root of the mesentery of the small intestine passes obliquely from left to right, top to bottom, starting from the II lumbar vertebra, and ends in the right iliac fossa. Despite the fact that the length of the root of the mesentery is only 15-20 cm, it lasts 5-6 m of the small intestine. The root of the mesentery in an oblique direction separates the two large grooves - left and right mesenteric (mesenteric) sinuses (sinus mesentericus dexter et sinister), which are limited to:

Right mesenteric sinus-sinus mesentericus dexter:

Right - colon ascendens;

Top - mesentery of the transverse colon;

Left and bottom - radix mesenterii;

Left mesenteric sinus - sinus mesentericus sinister:

Right - radix mesenterii;

Top - mesentery of the transverse colon;

Left - colon descendens;

Left and bottom - sigmoid mesentery;

Revision of the side channels and mesenteric sinuses (sinus) is an important technique in the diagnosis of localized perforation or injury of the intestine, as well as determining the concentrations of pus. To check the status of the loop gut, possible accumulation of fluid or pus in the sinuses, the surgeon removes the loop guts and the right or left before it opens mesenteric sinus, bounded behind a piece of the parietal peritoneum, laterally - the wall of the ascending or descending colon, and on top - mesocolon transversum . At the same time attention is drawn to the large size of the left mesenteric sinus.

In the case of encysted peritonitis should try to go only to the affected area, and not seek to examine the entire abdominal cavity, than you can call the generalization of the inflammatory process. It should be borne in mind that the anatomical demarcation of the right sinus more pronounced than in the left sinus, as it closed below the transition of the small intestine (ileum terminale) in the blind. This is to some extent prevents the exit of pus in the pelvic cavity, that there is a sinus mesentericus sinister.

Pockets of the peritoneum, can be a place of constant internal hernias. The most constant are located in the right iliac fossa-recessus ileocaecalis superior, recessus ileocaecalis inferior. recessus retrocaecalis. Not less frequently there are pockets of peritoneum between flexura duodenojejunalis and plica duodenojejunalis-recessus duodenojejunalis, at the base of mesocolon sigmoideum-recessus intersigmoideum.

To focus on examination of the abdominal cavity, it should be permanent, not move anatomical education, which are easy to find: flexura duodenojejunalis, the root of the mesentery of the transverse colon and other famous Russian surgeon V.P. Gubarev proposed for this purpose is very simple and accurate method determining the start of the fine intestine. It suffices to find the root of the transverse colon, push him down a loop of small intestine to the left of the midline at the level of lumbar vertebra body I found the fixed portion of the small intestine - flexura duodenojejunalis, which is the beginning of the jejunum. This is an extremely important key landmark in abdominal surgery, which is used when selecting a loop of small intestine for the imposition of gastrojejunostomy and determining the length of the intestine.

Normally, the demarcation between the upper and lower floors of the abdomen are not available, only swelling of the transverse colon there is some insulation of the upper division, as a result of contact with the bowel wall parietal peritoneum. However, in perforated ulcers of the stomach and duodenum transverse colon and omentum may delay distribution of content in the lower abdomen. But this obstacle has weaknesses. As you know, colon transversum has only commit to the back, so the stomach or duodenum in perforated ulcers of the front wall may extend along the right lateral canal up to the pelvis. Left upper part of the isolation is better expressed thanks to the diaphragm, colonic

ligament - lig.phrenicocolicum, going from the splenic flexure of the colon. The contents of the stomach at perforation of the posterior wall are retained in the omental pouch and the lower floor of the abdomen does not get.

The organs of the lower floor of the abdomen:

Small Intestine - intestinum tenuae divided into jejunum and ileum jejunum intestine. The length of the small intestine, the corpse is male about 7 m, the female -6, 3 m. In human beings, due to tonic contraction of the muscle layer of the wall can be equal to 2.7 - 3 m. **Jejunum** - jejunum is located in the left half of the abdomen, above, within the umbilical region, lateral abdomen and left iliac fossa. In most cases its loops are located horizontal and oblique, its length is about two fifths of the total length of ileum.

Ileum - ileum placed in the right half of the abdomen, bottom, and right within the lateral part of the abdomen and in the umbilical region, hypogastric and pelvic cavity. Gut loops arranged vertically at the bottom and in the pelvic cavity - horizontally.

Syntopy – in the front and top loops of jejunum and ileum adjacent to the transverse colon and its mesentery and to the rear surface of the omentum, and below and laterally to the anterior abdominal wall. Behind adjacent to the parietal peritoneum, laterally ascendens and descendens intestine and sigmoid colon.

Large intestine - intestinum crassum consists of: blind intestine with appendix, ascending, transverse colon descending intestines, sigmoid, and rectum.

From the small intestine large intestine differs larger diameter, fat appendages (appendices epiploicae), longitudinal muscle strips (taeniae coli), a typical wall protrusions (haustra coli).

Departments of the large intestine:

Cecum - caecum-in form can be wide and short, long and narrow or has a funnel-covered form. Covered with peritoneum – intraperitoneal. On the border of the blind and the ascending colon empties into the large intestine ileum.

Appendix – appendix ⁸⁶vermiformis covered by peritoneum, intraperitoneal. Diameter of appendix 6-8 mm, length from 3 to 15 cm Destinations process-medial-48% down, 24%, laterally-15, 5%, or up 12.5% of cases.

Ascending colon - colon ascendens which reached the right hypochondrium region, forms a bend forward and to the left (flexura coli dextra) and passes into the transverse colon. Covered with peritoneum – mesoperitoneal.

Transverse colon - colon transversum-out right hypochondrium region is sent to the left hypochondrium region forming bend (flexura coli sinistra). Covered by peritoneum, intraperitoneal.

Descending colon - colon descendens-comes from flexura coli sinistra at the left iliac crest becomes to sigmoid intestine. Covered with peritoneum – mesoperitoneal.

Sigmoid colon - sigmoideum-is located in the left iliac fossa. Covered by peritoneum intraperitoneal.

The organs of the lower floor of the abdomen supplied with blood by two major branches of the abdominal aorta: a.mesenterica superior, a.mesenterica inferior. Blood pools of the upper and lower floors of the abdomen rather isolated. Almost there are not anastomoses between the celiac trunk systems and mesenteric arteries, with the exception of a small branch of a. pancreaticoduodenalis superior, which is a branch of the gastro-duodenal artery, departing from the celiac artery, anastomosing with a.pancreaticoduodenalis inferior a branch of the superior mesenteric artery. It affects the severity of circulatory disorders, thrombosis of celiac trunk and mesenteric vessels.

It is known that most often affects the upper section of thrombosis mesenteric artery, which is somewhat to the right of flexura duodenojejunalis. For access to the vessel incision recommended by the ground floor of the abdominal cavity through the mesocolon transversum in flexura duodenojejunalis to a depth of 8 - 20 mm. At the same time for tromboembolectomy should seek to dissect the right wall of the superior mesenteric artery, because a lot of leaves left enteric vessels, which makes the operation.

Veins of the abdominal cavity are parallel to the arteries and drain into the portal vein, transporting all the blood from the abdominal organs to the liver. Consequently, in the portal blood circulation disorder, most commonly caused by cirrhosis or compression portal vein by tumor, high blood pressure occurs in the portal system. The difficulty of the venous outflow leads to stagnation of blood in the veins of the stomach, esophagus and intestines, resulting in sweating fluid into the abdominal cavity (ascites), or occur breaks congested veins with subsequent bleeding. First, portal hypertension, causes a dilatation of the esophagus and stomach, which contributes to compensatory increase of venous flow through porto-caval anastomosis between these veins and veins that are tributaries of the caval system. The exhaustion of compensatory possibilities of inter-system begins to develop varicose veins anastomoses, there are gaps venous sites. Stop the bleeding of them is very difficult. Local hemostasis by ligation of the veins, compression of the inflatable probe or cooling esophageal and gastric gives temporary effect. You must create artificial porto-caval anastomosis between the major veins. In general, natural compensatory mechanisms venous system is considerable, and the blood can be reset plenty of portal vein system in the caval system, bypassing the liver. Porto - caval anastomoses are well defined not only in the esophagus and stomach, but also on the anterior abdominal wall between the umbilical vein and placed here vv. paraumbilicales, upper and lower epigastric vein, as well as in the pelvic cavity between the upper and middle hemorrhoidal veins. The development of port caval anastomosis to the umbilicus is characteristic of the name - "Medusa head."

A few words about the lymphatic system. With regard to the lymphatic system of the abdomen, then we will address only the topography of the regional lymph nodes and connections between them as a way of metastasis spread of tumors. In the abdomen are distinguished: 1) parietal or abdominal nodes, which lie around the aorta and inferior vena cava, 2) visceral, which are distributed along the trunk celiac artery, the upper and lower mesenteric artery. The most numerous are the visceral lymph nodes: in the stomach - 4 groups, along the hepatic artery - 5 groups, and finally, the largest group of visceral sites lies in the interior of the mesentery along a.mesenterica superior (300 knots).

Visceral nodes are related to regional I order lymphatic vessels which link with nodes of the III order, located along the aorta and inferior vena cava. The above structure the relationship of regional lymph nodes makes it difficult to identify patterns of localization of the lesion site metastases.

Let me outline the issues affect the innervation of the abdominal cavity.

Abdominal organs have two major sources of innervation: the parasympathetic system - nn. vagi and sympathetic - plexus coeliacus. Vagus nerves give direct branches to the organs of the upper floor of the abdomen (stomach, liver, pancreas), as well as the celiac plexus. To the celiac plexus come also suitable branches of large and small splanchnic nerves (nn. splanchnici), the upper nodes of the lumbar sympathetic nerve trunks, the aortic plexus.

TOPOGRAPHIC ANATOMY OF THE UPPER FLOOR OF THE ABDOMINAL CAVITY.

1. Topography of the liver and biliary tract.
2. Topography of the stomach and duodenum.
3. Topography of the pancreas and spleen.

At the first in the upper part we see the front wall of the stomach and deep bursa praegastrica, located between the front wall of the stomach and diaphragm. Going from bursa praegastrica by hand to the left, find lig.gastrolienale and further spleen below the diaphragm. Lift the edge of the wound of the abdominal wall to the right; find the visceral surface of the liver, gallbladder, pyloric stomach and duodenum. Between the top surface of the liver below the diaphragm above and the medial side of lig. falciforme hepatis is formed peritoneal pocket, called the right subdiaphragmatic space or bursa hepatica. Hepatic bag often becomes a receptacle for perforated ulcers of the gas in the duodenum and pyloric stomach, which is detected by X-ray and rated as one of the hallmarks of perforated ulcers.

88

An important element in the examination of the upper abdomen is the lig. hepatoduodenale, which are elements of the door of the liver: blood vessels and the common bile duct. By palpation can be determined the state of common bile duct for diagnosis stones in it. For this purpose, for the hepatoduodenal ligaments are opening the packing bags - foramen epiploicum, passing a finger into it, determine the state of the bile duct and blood vessels, the porta hepatis. If necessary, this technique can be used for partial examination of the walls bursae omentalis, ie the behind wall of the stomach and the anterior surface of the pancreatic head, concealed by behind peritoneum of omental bursa. The relationship of organs from the peritoneum and the formation of peritoneal pockets can be clearly seen on the sagittal section of the abdominal cavity. By the way, opening the packing bag is used for temporary compression of the fingers of the vascular bundle in the liver of heavy bleeding before the final stop of his suturing the wounds of the liver.

Liver (hepar) - located mostly in his right subdiaphragmatic space, a small part of it goes to the left, located between the stomach and the dome of the diaphragm. In total, anterior projection of the liver has the form of a right triangle, the apex of the right angle is located on the right, but the narrowest part of the acute angle goes over into the left subdiaphragmatic space. The lower boundary of the liver normally does not exceed the hypochondrium, with the exception of a small area in the epigastrium.

Golotopy and skeletopy of the liver:

The highest point of the right lobe:

golotopy -IV-intercostal space on the right nipple line;

skeletopy - intervertebral disc Th8-Th9 or upper edge of the body-Th9;

The highest point of the left lobe:

golotopy - V-intercostal space along the left parasternal line;

skeletopy - intervertebral disc Th9-Th10 or upper edge of the body-Th10;

The lower edge of the liver secondary axillary line:

golotopy - X-intercostal space;

skeletopy to the mid-body of L3

The lower edge of the liver in the middle of the line:

golotopy - midway between the navel and the base of the xiphoid process;

skeletopy - the midpoint of the body-L1

Syntopy of the liver and its relationship with the peritoneum: a growing liver gradually shifts to the right stomach and duodenum, keeping in touch with them by powerful ligaments - lig. hepatogastricum and lig. hepatoduodenale. Thus, the liver becomes an adult mesoperitoneal position, remaining only in posterolateral diaphragmatic part not covered by the peritoneum.

In the transition of peritoneal cover of the liver to the diaphragm behind is formed a powerful coronary ligament, which runs along the median line ahead sagittally located crescent bond. These ligaments are important in the fixation of the liver in the upright position of man. In addition, sickle ligament separates subdiaphragmatic space into two peritoneal pockets: bursa hepatica - right and bursa praegastrica - on the left.

Liver's gate is called the transverse and left longitudinal furrows, covered on all sides by leaves of the hepatoduodenal ligament, between which pass vena porta, hepatic artery and bile ducts.

According to current data in accordance with the intraorganic structure - liver can be divided into two almost equal parts, whose boundary is projected on a line drawn from the bed of the gall bladder to release the inferior vena cava from the corresponding holes of the liver. For this boundary

within the liver, there is little-vascular space that is used in surgery for removal of hepatic lobe. Two lobar structure of the liver is supported by the presence of two branches of the hepatic artery, portal vein and bile duct.

The blood supply of the upper abdomen by the three branches of the celiac trunk: a.gastrica sinistra, a. lienalis, a.hepatica communis.

Perfusion of the liver: The liver passes in 1 min in 1500 ml of blood, one third of which flows through the hepatic artery and 2 / 3 - through the portal vein.

In the portal system passed and filtered by the liver, almost all that is absorbed in the digestive tract, liver artery also supplies blood to the liver-enriched oxygen. Therefore in violation of portal blood flow in the first place come the exchange disorders of liver function, and hemodynamics. Such states are observed in liver cirrhosis or portal vein compression by a tumor, most tumors of the pancreatic head. As a result of this process in the ducts of the portal vein congestion occurs, accompanied by effusion into the abdominal cavity (ascites) and rapid metabolic disorders.

The innervation of the liver - by the solar plexus, both vagus nerves and right phrenic nerve.

Lymph drainage: superficial lymph vessels of the upper surface of the liver and blood deep vessels run into nodes of the chest cavity;

Regional lymph nodes of the first stage for diverting lymph vessels of the liver, sites falling into the abdominal cavity are: 1) nodes located along the a.hepatica communis, a.hepatica propria; 2) nodes are located along the a.gastrica sinistra; 3) nodes are located in circumference of the aorta and vena inferior. Regional lymph nodes for the second phase of the lymphatic vessels of the liver and pancreas are the celiac nodes adjacent to the celiac artery trunk.

Gall bladder and bile ducts.

Gall bladder-(vesica fellae)-lies on the lower surface of the liver, extrahepatic bile ducts-(ductus cysticus, hepaticus, choledochus) laid between sheets of lig. hepatoduodenale.

The bottom of the gallbladder:

Golotomy - the intersection of the outer edge of the right rectus muscle with the costal arch;

Skeletopy - upper edge of the body-L2

Syntopy gall bladder at the top and in front -liver, on the left pylorus, right and bottom flexura coli dextra. Bubble's body rests on the colon transversum, neck on the bulb - duodenum. Bottom is usually about 3 cm adjacent to the anterior abdominal wall. The gall bladder is covered by peritoneum, mesoperitoneal.

Ductus cysticus - covered by peritoneum itroperitoneal, ductus hepaticus is composed of right and left bile duct, ductus choledochus-has a length of 6-8 cm runs along the free edge of the lig. hepatoduodenale. At the level of the middle part of the descending duodenum-ductus choledochus pierces the behind wall of the intestine and opens with the pancreatic duct, a large duodenal (Vater),

papilla-papilla duodeni major (Vateri). There are 4 of ductus choledochus: 1 - pars supraduodenalis; 2 - pars retroduodenalis; 3 - pars pancreatica; 4 - pars duodenalis.

A.cystica - arises from the right hepatic artery and in the field of a discharge is often a so-called triangle of Colo (Colot): the parties which are on the right-ductus cysticus, left-ductus hepaticus, and the base is-a.hepatica dextra. In this place from the last departs - a.cystica, which often forms the base of the triangle, so by ligation a.cystica beware entrainment in a ligature - a.hepatica dextra instead of a gallbladder: a ligature can lead to necrosis of the right lobe of the liver.

Stomach - (ventriculus, s.gaster)-can be divided into two divisions: large cardiac-and small – pyloric. Cardial, in turn, consists of a body, a bottom; of pyloric antrum and arches. Golotopy and skeletopy of the stomach:

Cardia:

golotopy - VII-rib cartilage (left), at a distance of 2.5 cm from the edge of the sternum

skeletopy - upper edge of the body-Th11;

The highest point of the bottom of the stomach:

Golotopy - bottom of the V-ribs on the left nipple line;

Skeletopy - bottom edge of the body-Th9 or upper edge of the body-Th10;

Pyloric:

Golotopy - median line against cartilage VIII-ribs on the right, or midway between the jugular notch of the sternum and the upper edge of the symphysis pubis;

Skeletopy - bottom edge of the body-L1;

Sinotipy - front wall is covered with the right liver, left-costal part of diaphragm, part of the body and pyloric adjacent to the anterior abdominal wall. To the behind wall adjacent pancreas, diaphragm legs, the left kidney and adrenal gland, and is covered by the curvature of the left slszenka. Small curvature longer covered⁹¹ by the left liver, a large curvature of the borders of the transverse colon. Cardiac side and bottom are connected to the diaphragm through lig.hepatogastricum. Buttom of the stomach is associated with the spleen through lig.gstrolienale. Large curvature associated with the transverse colon through lig.gstrocolicum. The stomach is covered with peritoneum -intraperitoneal.

Blood supply to the stomach: A. gastrica sinistra (a branch of the celiac trunk) extends from the cardia to the small curvature, giving branches to the anterior and posterior walls of the stomach. In the pyloric left gastric artery anastomose with a branch of a. gastrica dextra (a branch of the hepatic artery), forming a continuous arc of vascular small curvature. Spleeny artery in the bottom of the stomach gives him a few short branches (aa. gastricae breves), and its final branch is based in the greater curvature of lig.gastrocolicum as a.gastroepiploica sinistra and anastomose with the branch a.gastroepiploica dextra - a. gastroduodenalis departing from common hepatic artery. Thus, at the greater curvature is forming a second round vascular stomach.

Veins and arteries are like the small and large curvature. For small curvature v.coronaria ventriculi, the greater curvature of v. gastroepiploica dextra (inflow v.mesenterica superior), v. gastroepiploica sinistra (inflow v.lienalis); both veins anastomose soboy.Vv. gastricae breves vpvdayut in v.lienalis.

Duodenum (duodenum) is 4 divisions:

Upper-pars superior; downward -pars descendens; lower-pars inferior; upward-pars ascendens;

Golotopy and skeletopy of the duodenum:

Golotopy - conducted two horizontal lines: the upper connecting the lower edges VIII-rib, the lower is held at the navel. From the navel to the bottom line right back down to 6-8 cm, 3-4 cm to the left, from these points is carried out and the vertical lines connecting the horizontal. Formed a square, inside of which is a 12-duodenum.

skeletopy-pars superior-body or intervertebral disc Th12 Th12-L1; pars descendens-away from the body - L1 to the bottom-L3; pars inferior and pars ascendens-from the bottom-L3 to the left edge of L2.

In the best position of the colon refers to the upper abdomen, part-to the bottom.

Syntopy - above the transverse colon, in front duodenum is covered by the liver, gallbladder neck and below the transverse colon loops of small bowel and mesentery root of it, the superior mesenteric vessels. Behind-duodenum is: top-a.gastroduodenalis and ductus choledochus, in downward parts - gate of the right kidney with its vessels, the lower hollow vien. Outwards from the duodenum is placed the hepatic flexure of the colon, medially - head of the pancreas. Duodenum is covered by peritoneum-pars superior and pars inferior-extraperitoneal; pars descendens and pars ascendens - mesoperitoneal.

Duodenum's perfusion by: a.pancreatico duodenalis superior (from a. gastroduodenalis) and a.pancreatico duodenalis inferior (from a. mesenterica superior).

Pancreas-(pancreas)-consists of a head, body and tail, is located in the proper epigastric area and left hypochondrium.

92

Golotopy and skeletopy of the pancreas:

Golotopy - the lower edge 5 cm above the navel, the right edge at 10 cm above the navel;

Skeletopy - head to the right of the body of L1 and L2; body body-L1 midline, tail-Th12 body to the left of the midline.

Syntopy - forward of the behind wall of the cancer is gastric, omental tuber (tuber omentale) of the pancreas reaches the liver's bottom. In front and downward from the body of gland is located flexura duodenojejunalis. To the tail of the pancreas adjacent front spleeny flexure; tail end reaches spleen. Begind pancreas is located: 1) in the head-bottom hollow vien, and the initial division of the portal vein 2) in the body, the superior mesenteric vessels, aorta, part of the solar plexus 3) in the tail-left kidney. The pancreas is covered by peritoneum, extraperitoneal.

Pancreatic duct (ductus pancreaticus) runs in the thickness of the gland, close to its behind surface, the entire length of gland. It opens by a longitudinal fold of mucous membrane of the duodenum-(papilla duodeni major). Uncommon extension duct (ductus pancreaticus accessorius) is separated from the main independent and open hole above the main channel, forming a small mucous duodenum papilla (papilla duodeni minor).

Perfusion - pancreas is richly supplied with blood, delivered through the branches of two systems: the head of the celiac trunk-a.pancreaticoduodenalis superior and the superior mesenteric artery-a.pancreatico duodenalis inferior; body and tail-Lu. lienalis.

Spleen-(lien)-is located in the left upper quadrant.

Golotopy and skeletopy of the spleen:

The long axis of the body:

Golotopy - equal to the long axis of the X ribs on the left (on the back of the chest wall) Upper Pole

Golotopy - (on the shoulder line) on the back of the chest wall-IX-rib on the left;

Skeletopy - body Th10;

Bottom Pole:

Golotopy - (on the anterior axillary line) on the back of the chest wall-XI-rib on the left;

Skeletopy - bottom edge of the body-L1;

Syntopy, the inner surface of the front adjacent to the bottom of the stomach, the back-to lumbar diaphragm, left kidney and left adrenal gland, and the bottom is in contact with the tail of the pancreas and flexura lienalis of the transverse colon, covered by peritoneum intraperitoneal.

Perfusion- by a. lienalis; v. lienalis- artery diameter exceeding its approximately 2-fold, which is located under the artery.

93

The lymphatic system of the abdominal cavity.

In the abdomen are distinguished: 1) parietal or abdominal nodes, which lie around the aorta and inferior vena cava, 2) visceral, which are distributed along the trunk celiac artery, the upper and lower mesenteric artery. The most numerous are the visceral lymph nodes: in the stomach - 4 groups, along the hepatic artery - 5 groups, and finally, the largest group of visceral sites lies in the interior of the mesentery along a.mesenterica superior (300 knots).

Visceral nodes are regional I order related lymphatic vessels to the nodes of the III, located along the aorta and inferior vena cava. The above structure the relationship of regional lymph nodes makes it difficult to identify patterns of localization of the lesion site metastases.

Innervation of the abdominal cavity.

Abdominal organs have two major sources of innervation: the parasympathetic system - nn. vagi and sympathetic - plexus coeliacus. Vagus nerves give direct branches to the organs of the upper abdomen (stomach, liver, pancreas), as well as the celiac plexus. Go to the celiac plexus is also suitable branches of large and small splanchnic nerves (nn. splanchnici), the upper nodes of the lumbar sympathetic nerve trunks, the aortic plexus.

Thus, the celiac plexus in the compound is actually the aortic plexus, the terminal branches and nn.vagi nn.splanchnici. Hence, for large vessels distributed autonomic innervation to the stomach and intestines. The largest sympathetic plexus formed in the truncus coeliacus, extends from sympathetic and parasympathetic innervation of all organs of the upper floor of the abdomen. Such large plexus formed at the base of a. mesenterica superior and in the process reaching the intestine. With celiac plexus are inextricably linked renal nerve plexus lying on a.renalis. Thus, the celiac plexus can be called the brain of the abdominal cavity.

Projection lines or those of other abdominal organs are determined on the basis of anatomical and radiological data on the status of respect to the most constant external reference points. These include the navel, xiphoid, rib arch, pubic area, etc.

In diagnostic practice are important next projection lines of the front wall of the abdomen:

- a) Horizontal held at the V ribs - it is projected on the diaphragmatic surface of the liver on the right, the bottom of the pericardial bags and cardiac part of the stomach on the left;
- b) Horizontal at the VIII ribs (transpiloric line) - it is delayed the projection of the gallbladder, a pylorus, the lower edge of the spleen and flexura lienalis of the transverse colon.

The navel is a good benchmark for determining the level of the arrangement large curvature of the stomach, which is normally determined on the midpoint between the xiphoid process and umbilicus, the domes of the cecum by the scheme Mc Burney, and finally, in the middle of the median line between the navel and pubis projected abdominal aortic bifurcation.

Of great practical importance is the projection of the appendix to the anterior wall of the abdomen. The base of the appendix is usually projected at Mc Burney (MacBurney), corresponding to the boundary between the outer⁹⁴ and middle thirds of a line drawn between the umbilicus and anterior iliac spine. More accurate projection of the base of the appendix should be considered as a point Lanza (Lanz), which is pointed on linea bispinalis on the border between the outer and middle third of it. However projection schemes Mac Burney and Lanza only 20-25% of cases determine the true state of the base of the appendix, since the cecum is moved downward with age (V.N. Shevkunenko, 1952).

TOPOGRAPHIC ANATOMY LUMBAR REGION

Lumbar region and iliac fossa long attracted the attention of surgeons and topographoanatomist in solving problems and improvement of topical diagnosis of the operational accesses in diseases of the retroperitoneal space.

The latter include primarily kidney and ureter, as well as acute suppurative processes of retroperitoneal fat.

As you know, in most cases, surgery of retroperitoneal organs are taken for acute purulent processes or kidney disease involving infection of the urinary tract and surrounding tissue or urinous infiltration. This gives rise to great risk of developing postoperative peritonitis with rapid access to the retroperitoneal space through the abdominal cavity. That's why so many sites devoted to the study of topographic anatomy of the lumbar region as one of the springboards for the development of rational extraperitoneal prompt access to bodies located retroperitoneal.

The boundaries of the lumbar region are: top-XII rib, a bottom-iliac crest, medial - line of the spinous processes, lateral - line from the end of XI-rib to iliac crest (line Lesgaft), corresponding to the middle axillary line.

Retroperitoneal space, located on the part of the lumbar region between the peritoneum and fascia endoabdominalis is part of the abdomen.

It contains the retroperitoneal organs, tissue, fascia and by the length of their much greater than the lumbar region, moving beyond the space in the subdiaphragmatic region of cellular spaces and iliac fossae.

Muscle layers of the lumbar in the lateral parts of layers similar to the anterior abdominal wall, as are formed primarily from the muscles originating from the fascia thoracolumbalis: external and internal obliques and transverse abdominal muscles. Toward the back of they are accompanied by two muscles: mm. latissimus dorsi and m. serratus posterior inferior

Deep in the medial lumbar spine are among the most powerful muscles: extensor back - m. erector spinae, which takes place in bone and fibrous sheath between the sheets of thoracolumbar fascia, lumbar posterior to the plane of the transverse processes, as well as m. quadratus lumborum and m. psoas major, located anterior to the plane on the sides of the lumbar spine. It should also be noted that the solidity of the muscle layer in some places the lumbar region is disturbed due to dehiscence of the abdominal wall muscles.

So, over the iliac crest ⁹⁵ between the outer edge of the m. latissimus dorsi and the inner edge of m. obliquus externus abdominis may be a triangular slit - Pti triangle (trigonum Petiti), whose bottom forms a sheath internal oblique abdominal muscles.

Under the XII rib is defined by another weakness of the abdominal wall - a triangle-Lesgafta Grunfeld (spatium lumbale). Sides of this triangle are:

top - bottom of the m. serratus posterior inferior,

bottom - back edge of the internal oblique,

medial posterior - the edge of erectors spinae.

bottom of the triangle forms the aponeurosis transversus abdominis, it is covered from top to m. latissimus dorsi. Weak muscles cover this area is used by surgeons for low-impact intramuscular access to renal pelvis

Lumbar region of the abdominal cavity

Posterior leaflet of the peritoneum and retroperitoneal fascia front cover bodies located outside the peritoneal sac. These include the kidneys, ureters, abdominal aorta and lower hollow Vienna, as well as some organs of the pelvis, adjacent extraperitoneal surface of the colon.

Borders: - Superior: 12th rib. - Inferior: Iliac crest. - Lateral: Lesgaft's line (vertical line passing through the end of the 11th rib from the midaxillary line). • According to the erector spinae muscle, the lumbar region is divided into the medial and lateral departments. Layers: The skin is thick. Subcutaneous tissue: - It contains the superficial fascia which divides the fatty tissue into 2 to 3 layers - The fat tissue continued in the gluteal region is called massa adiposa lumbo-glutealis (deep fat). Proper fascia: - It forms a sheath for the erector spinae muscle and is called the thoracolumbalis. - It is divided into superficial and deep layers. - Superficial layer: It is fixed to the spinous process. - Deep layer: It is fixed to the transverse process. Muscles: - They are divided into the superficial and deep groups: - Superficial: Latissimus dorsi muscle. - Deep muscles are divided into the medial and lateral groups according to margin of the erector spinae muscle. - Medial: Psoas major, psoas minor and quadratus lumborum muscles. - Lateral: External oblique, internal oblique, transversus abdominis and serratus posterior inferior muscles. Weak places: Petit's lumbar triangle · Borders: - Medial: Margin of the latissimus dorsi muscle. - Lateral: Margin of the external oblique muscle. - Inferior: Iliac crest. - Floor: Internal oblique muscle. - Clinical importance: - Herniation. - This place contains fat, where abscesses and phlegmons tend to occur. Lesgaft-Grunfeld's rhombus: - Borders: - Superomedial: Serratus posterior inferior muscle. - Superolateral: 12th rib. 233 - 1

Inferomedial: Erector spinae muscle. - Inferolateral: Internal oblique muscle. - Roof: Latissimus dorsi muscle. - Floor: Transversus abdominis muscle. - Clinical importance: - Herniation. - This place contains fat, where abscesses and phlegmons tend to occur.

Arterial supply: - Lumbar arteries (branches of the abdominal aorta). Venous drainage: - Lumbar veins: then drained into the inferior vena cava. Nerve supply: - Subcostal nerve. - Posterior branches of the spinal nerve.

TOPOGRAPHIC ANATOMY OF THE RETROPERITONEAL SPACE

Fasciae and fatty layers of the retroperitoneal space

The retroperitoneal space is the area of the posterior abdominal wall that is located between the parietal peritoneum and the internal surface of the transversalis fascia

Boundaries of the Retroperitoneal space:

- Above: Th12 and 12th rib.
- Below: Base of the sacrum, the iliac crest, the upper rami of the pubic bones, and the pelvic diaphragm.
- Lateral: The vertical line between the erector spinae muscle (sacrospinalis) and the three

flat abdominal muscles, or to the lateral border of the quadratus lumborum muscle;

- Medial: The lumbar and sacral vertebrae with the abdominal aorta, the inferior vena cava and their branches; the sympathetic chains and nerve plexuses; and the lymphatic elements.
- Anterior: The anatomic entities related to the anterior wall and parietal peritoneum of the retroperitoneal space are: part of the liver and its bare area, part of the duodenum, part of the ascending colon, part of the descending colon, and much of the pancreas within the lesser sac. The colon, duodenum, and pancreas are intraperitoneal organs during much of their embryologic development, but become fixed in their definitive retroperitoneal positions by fusion of their peritoneal investment with the posterior parietal peritoneum.
- Posterior: The posterior wall of the space is related to several muscles. From lateral to medial, they are: the aponeurosis of the transversalis abdominis; the quadratus lumborum muscle; and, most medial, the psoas muscle. These three muscles are covered by a relatively tough layer of fascia, which is common for the iliopsoas muscles. However, the anterior layer of the thoracodorsal fascia covers the quadratus lumborum. These boundaries form the lumbar area of the retroperitoneal space, which is the home of the right adrenal gland, the right kidney, the ascending colon, the duodenum, the left adrenal gland, the left kidney, and the descending colon.

The retroperitoneal organs are: the pancreas, kidneys and ureters, the suprarenals, the aorta and inferior vena cava and their main branches, the paraaortic lymph nodes and the lumbar sympathetic chain.

Since the retroperitoneal space terminates in the pelvic diaphragm and extends laterally to the posterior half of the iliac crest, two areas must be considered from a surgical standpoint: the iliac fossa and the pelvic brim of the true pelvis. Also, we need to include (or extend the retroperitoneal space anteriorly to include) the multiple regions between the mesenteric leaflets such as the transverse mesocolon, the mesentery of the small bowel, and the pelvic mesocolon.

Nunn et al. (1998) proposed a realistic anatomic division of the retroperitoneal space into three zones for description and decision making in the treatment of retroperitoneal injury. These zones, their boundaries, and their contents are as follows:

Zone I (centromedial):

- Upper: Diaphragmatic, esophageal, and aortic openings;
- Lower: Sacral promontories;
- Lateral: Psoas muscles;
- Contents: Abdominal aorta, inferior vena cava, pancreas, duodenum (partial).

Zone II (lateral):

- Upper: Diaphragm;
- Lower: Iliac crests;
- Medial: Psoas muscles; 97
- Contents: Kidneys and their vessels, ureters and their abdominal parts, ascending and descending colon, hepatic and splenic flexure.

Zone III (pelvic):

- Anterior: Space of Retzius;
- Posterior: Sacrum;
- Lateral: Bony pelvis;
- Contents: Pelvis in toto, pelvic wall, rectosigmoid colon, iliac vessels, urogenital organs (partial).

Retroperitoneal (Extraperitoneal) connective tissue

Hinman (1993) subdivided the retroperitoneal connective tissue into three layers (strata): outer stratum, intermediate stratum, and inner stratum. The outer stratum forms the abdominopelvic fascia, which is the transversalis fascia. The intermediate stratum forms the renal fascia (the fascia of Gerota). The inner stratum is merely the peritoneum and the so-called fusion-fascia present at the junction of an intraperitoneal organ (the pancreas, the duodenum, or the ascending or descending colon) with the undersurface of the primitive celomic epithelium.

Renal fascia:

- It is divided into the prerenal and retrorenal fasciae.
- Between these 2 fasciae, paranephron or adipose capsule of the kidney is located, inferior to the kidney, paranephron continues into the paraureteron. This is a fatty layer surrounding the ureter.
- Toldt's fascia separates the retroperitoneal fat from the paracolon.

236

Retroperitoneal fatty space:

- Borders:
 - Anterior: Parietal peritoneum.
 - Posterior: Endoabdominal fascia.

Paranephron:

- Borders:
 - Anterior: Prerenal fascia.
 - Posterior: Retrorenal fascia.
 - Inferior: Paraureteron.

Paraureteron:

- Borders:
 - Anterior: Preureteric fascia.
 - Posterior: Retroureteric fascia.

Paracolon:

- Borders:
 - Anterior: Retrocolic fascia.
 - Posterior: Retroperitoneal fascia.
 - Superior: Transverse mesocolon.

Topography of the kidney

Morphology:

- 2 histological parts are distinguished, namely the cortex (cortex renis) and medulla (medulla renis).
- 2 poles are distinguished, namely the superior and inferior poles.
- 2 margins are distinguished, namely the medial and lateral margins.

Functions:

- Filtration.
- Reabsorption.
- Excretion.
- Production of erythropoietin for erythropoiesis.
- Participating in renin-angiotensin-aldosterone system by producing renin in the juxtaglomerular apparatus.

Holotopy:

- Superior poles: Projected on the right and left hypochondriac regions.
- Inferior poles: Projected on the right and left lateral abdominal regions.

Skeletopy:

- 12th thoracic vertebra - 2nd lumbar vertebra.
- 12th rib divides the right kidney into superior 1/3 and inferior 2/3.
- the left kidney is divided into 2 halves.

Syntopy:

Right kidney:

- Superior: Right adrenal gland and liver.
- Inferior: Loops of the small intestine and right colic (hepatic) flexure below the hilus.

237

- Anterior: Transverse mesocolon near the hilus.

□ Posterior: Psoas major muscle, quadratus lumborum muscle, transversus abdominis muscle, medial and lateral arcuate ligaments and diaphragm.

□ Medial: Descending part of the duodenum (Fig. 87).

Left kidney:

□ Superior: Left adrenal gland, stomach and spleen.

□ Inferior: Loops of the small intestine.

□ Anterior: Transverse mesocolon, pancreas, left colic (splenic) flexure and loops of the small intestine.

□ Posterior: Psoas major muscle, quadratus lumborum muscle, transversus abdominis muscle, medial and lateral arcuate ligaments, and diaphragm.

Lateral: Spleen and descending colon.

Arterial supply:

- Renal artery.

Venous drainage:

- Renal vein: then drained into the inferior vena cava.

Lymphatic drainage:

- Para-aortic nodes and coeliac lymph nodes.

Nerve supply:

- Renal plexus (branch of the coeliac plexus).

- Sympathetic fibres: Th10 – L1.

- Parasympathetic fibres: Vagus nerve.

Capsules and fixation of the kidney

Capsules of the kidney:

- Fibrous capsule (capsula fibrosa).

- Adipose tissue.

- Renal fascia:

□ Prerenal fascia.

□ Retrorenal fascia.

Fixation of the kidney:

- Renal fascia.

- Psoas major and quadratum lumborum muscles.

- Renal vessels.

- Hepatorenal ligament, phrenicocolic ligament (left kidney only) and duodenorenal ligament.

- Intra-abdominal pressure.

Topography of the ureter

- The ureter is 25 cm long and ⁹⁹comprises the pelvis of the ureter and its abdominal, pelvic and intravesical portions (Fig. 88).

- The abdominal ureter lies on the medial edge of psoas major (which separates it from the tips of the transverse processes of L2 - L5) and then crosses into the pelvis at the bifurcation of the common iliac artery in front of the sacroiliac joint. Anteriorly, the right ureter is covered at its origin by the second part of the duodenum and then lies laterally to the inferior vena cava and behind the posterior peritoneum. It is crossed by the testicular (or ovarian), right colic, and ileocolic vessels. The left ureter is crossed by the testicular (or ovarian) and left colic vessels and then passes above the pelvic brim, behind the mesosigmoid and sigmoid colon to cross the common iliac artery immediately above its bifurcation.

- The pelvic ureter runs on the lateral wall of the pelvis in front of the internal iliac artery to just in front of the ischial spine; it then turns forwards and medially to enter the bladder. In the male it lies above the seminal vesicle near its termination and is crossed superficially by the vas deferens. In the female, the ureter passes above the lateral fornix of the vagina 12 mm lateral to the supravaginal portion of the cervix and lies below the broad ligament and

uterine vessels.

239

- The intravesical ureter passes obliquely through the wall of the bladder for 2 cm; the vesical muscle and obliquity of this course produce respectively a sphincteric and valve-like arrangement at the termination of this duct.

Blood supply:

- The ureter receives a rich segmental blood supply from all available arteries along its course: the aorta, and the renal, testicular (or ovarian), internal iliac and inferior vesical arteries.

The ureter is relatively narrowed at three sites:

- at the junction of the pelvis of ureter with its abdominal part,

- at the pelvic brim,

- at the ureteric orifice (narrowest of all).

A ureteric calculus is likely to lodge at one of these three levels.

Topography of the adrenal gland

Morphology:

- 2 histological parts are distinguished: cortex and medulla.

Functions:

- Secretion of glucocorticoids, mineralocorticoids and androgens in the cortex.

- Secretion of adrenaline (epinephrine) and noradrenaline (norepinephrine) in the medulla.

Holotopy:

- Projected on the right and left hypochondriac regions.

Skeletopy:

- 11th or 12th thoracic vertebra.

Syntopy:

Right adrenal gland:

Superior pole of the right kidney, liver, inferior vena cava and diaphragm.

Left adrenal gland:

Superior pole of the left kidney, stomach and diaphragm.

Arterial supply:

- Superior suprarenal artery (branch of the inferior phrenic artery).

- Middle suprarenal artery (branch of the abdominal aorta).

- Inferior suprarenal artery (branch of the renal artery).

Venous drainage:

- Right suprarenal gland - Drained into the inferior vena cava.

- Left suprarenal gland - Drained into the left renal vein; then into the inferior vena.

Lymphatic drainage:

10

- Lateral aortic node.

Nerve supply:

- Suprarenal nervous plexus.

Topography of the abdominal aorta

- The abdominal aorta is located below the aortic hiatus (hiatus aorticus) and divided into the right and left common iliac arteries at the level of the 4th lumbar vertebra.

- It carries oxygenated blood from the heart to the abdominal organs.

Holotopy:

- Projected on the proper epigastric and umbilical regions.

Skeletopy:

- 1st - 4th lumbar vertebrae.

Syntopy:

- Anterior: Coeliac and aortic plexuses, body of the pancreas, horizontal part of the duodenum, parietal peritoneum and root of the mesentery.

- Posterior: Vertebral column.
- Right: Inferior vena cava, thoracic duct and cisterna chili.
- Left: Ascending part of the duodenum, sympathetic trunk and azygos vein.
- Superior: Left renal vein.

241

Branches:

- Parietal (All are paired):

- Inferior phrenic arteries.
- Lumbar arteries.
- Medial sacral arteries.
- Right and left common iliac arteries.

- Visceral:

a) Paired:

- Middle suprarenal artery (arteria suprarenalis media).
- Renal artery (arteria renalis).
- Testicular artery (arteria testicularis) - In males.
- Ovarian artery (arteria ovarica) - In females.

b) Unpaired:

- Coeliac trunk (truncus coeliacus).
 - 1) Left gastric artery (arteria gastrica sinistra).
 - 2) Common hepatic artery (arteria hepatica communis).
 - 3) Splenic artery (arteria lienalis s. splenica).
- Superior mesenteric artery (arteria mesenterica superior):
 - 1) Inferior pancreaticoduodenal artery (arteria pancreaticoduodenalis inferior).
 - 2) Intestinal arteries (arteriae intestinales).
 - 3) Ileocolic artery (arteria ileocolica).
 - 4) Right colic artery (arteria colica dextra).
 - 5) Middle colic artery (arteria colica media).
- Inferior mesenteric artery (arteria mesenterica inferior).
 - 1) Left colic artery (arteria colica sinistra).
 - 2) Sigmoid arteries (arteriae sigmoideae).
 - 3) Superior rectal artery (arteria rectalis superior).

Topography of the inferior vena cava

- Inferior vena cava is formed by right and left common iliac veins at the level of the 4th vertebra.
- It carries deoxygenated blood from the lower part of the body to the heart.
- It passes through the caval opening (foramen venae cavae) and enters the right atrium.

Holotopy:

- Projected on the proper epigastric and umbilical regions.

Skeletopy:

- Veins are drained into the inferior vena cava at the 4th lumbar vertebra.

Syntopy:

- Anterior: Posterior surface of liver, horizontal part of the duodenum, portal vein, head of the pancreas, right testicular (ovarian) artery, parietal peritoneum, root of the mesentery and hepatorenal ligament.
- Posterior-superior: Right crus of the diaphragm, right renal artery, middle suprarenal artery, inferior phrenic artery and right coeliac ganglion.

242

- Posterior: Vertebral column.
- Right: Right adrenal gland.
- Left: Thoracic duct.

Tributaries:

- Parietal:

- Right and left lumbar veins (venae lumbales dextrae et sinistrae).
- Inferior phrenic vein (vena phrenica inferior).

- Visceral:

- Testicular vein (vena testicularis) - In males.
- Ovarian vein (vena ovarica) - In females.
- Renal vein (vena renalis).
- Right suprarenal vein (vena suprarenalis dextra).
- Hepatic vein (vena hepatica).

Topography of the lumbar plexus

- Lumbar plexus (plexus lumbalis) is formed from Th12 to L4

- It lies anterior to the transverse processes of the lumbar vertebrae and lodges in the psoas major muscle.

- Branches:

1) Muscular branches (rami musculares) supply the psoas major and minor muscles, quadratus lumborum muscle, lateral intertransversarius muscle (musculus intertransversarius lateralis lumborum) and iliopsoas muscle of Hyrtl (musculus iliopsoas).

2) Iliohypogastric nerve (nervus iliohypogastricus) starts from the lateral edge the psoas major muscle and reaches the anterior surface of the quadratus lumborum muscle.

Muscular branches: Supply the external and internal oblique muscles, transversus abdominis muscle, pyramidal muscle and inferior portion of the rectus abdominis muscle.

Anterior cutaneous branches (rami cutanei anteriores): Supply the skin above the pubis symphysis.

Lateral cutaneous branches (rami cutanei laterales). Supply the skin of the superior lateral surface of the thigh.

3) Ilioinguinal nerve (nervus ilioinguinalis) starts from the lateral edge of the psoas major muscle, passes down to the inguinal canal and exits through the superficial inguinal ring.

Muscular branches: Supply the transversus abdominis muscle, external and internal oblique muscle.

Cutaneous branches (rami cutanei). Supply the skin of the pubis symphysis, skin of the superior medial surface of the thigh and skin of the inguinal region.

Anterior scrotal nerves (nervi scrotales anteriores). Supply the skin of the root of penis and anterior part of the ¹⁰scrotum.

Anterior labial nerves (nervi labiales anteriores): Supply the skin of the upper part of the labia majora.

243

4) Genitofemoral nerve (nervus genitofemoralis) pierces the psoas major muscle and is divided into 2 branches.

Femoral branch (ramus femoralis): Supplies the skin below the inguinal ligament of Poupart.

Genital branch (ramus genitalis): Supplies the skin of the upper medial surface of the thigh and superficial inguinal ring in males and females: cremaster muscle and membrane of the testicle in males; round ligament and labia majora in females.

5) Lateral cutaneous of the thigh (nervus cutaneus femoris lateralis) passes from the lateral edge of the psoas major muscle and over the surface of the iliacus muscle and laterally to anterior superior iliac spine. It innervates the skin of the external surface of the thigh.

6) Femoral nerve (nervus femoralis) appears through the lacuna musculorum and travels lateral to the femoral artery.

□ Muscular branches: Supply the quadriceps femoris, sartorius, pectineus and tensor fasciae latae muscles.

□ Anterior cutaneous branches: Supply the skin of the anterior medial surface of the thigh

□ Saphenous nerve (nervus saphenous) travels in the adductor canal (canalis adductorius) and gives rise to:

a) Infrapatellar branch (ramus infrapatellaris): Supplies the skin below the patella, medial surface of the knee above the tibia.

b) Medial cutaneous nerve of the thigh (ramus cutaneus cruris medialis): Supplies the skin of the anterior and posterior surfaces of the leg till the foot angle.

7) Obturator nerve (nervus obturatorius) passes through the obturator canal (canalis obturatorius) and gives rise to:

□ Posterior branch (ramus posterior): Supplies the adductor magnus muscle, adductor minimus muscle, capsule of the hip joint and periosteum of the posterior surface of the femur.

□ Anterior cutaneous branch: Supplies the adductor longus, adductor brevis, adductor minimus, gracilis, pectorius and obturator externus muscles, and skin of the lower half of the medial surface of the thigh.

Retroperitoneal lymphatics

From an anatomic standpoint, the retroperitoneal lymph nodes can be rather difficult to classify. The retroperitoneal lymphatics form a very rich and extensive chain from the inguinal ligament and pelvis to the respiratory diaphragm and posterior mediastinal nodes. Usually, these lymph nodes are located close to the aorta and the inferior vena cava. The right paraaortic lymph nodes are in very close relationship with the left paracaval lymph nodes. The number of abdominal and pelvic lymph nodes is approximately 230.

The following classification is very simple, logical, and anatomic:

Aortic Group:

- Preaortic nodes.
- Retroaortic nodes.
- Paraaortic nodes.

244

Caval Group:

- Precaval (prevenous) nodes.
- Retrocaval (retrovenous) nodes.¹⁰
- Paracaval (laterovenous) nodes.

Pelvic Group:

- Common iliac nodes.
- External iliac nodes.
- Internal iliac (hypogastric) nodes.
- Obturator nodes.
- Sacral nodes.

Aortic Group:

- Preaortic Nodes.

□ One to three celiac nodes are located around the base of the celiac artery. They are very closely related to the celiac ganglion and the lymph nodes of the superior mesenteric artery. These nodes receive lymph from the stomach, liver, pancreas, and superior mesenteric nodes. Efferents from the celiac nodes form the intestinal lymph trunk, which enters the abdominal lymph complex called the cisterna chyli, between the aorta and the

right crus of the diaphragm.

□ Two or three superior mesenteric nodes receive lymph from the small bowel, right colon, part of the transverse colon, and pancreas. They communicate with inferior mesenteric nodes and drain to the celiac nodes. The two nodes of the inferior mesenteric artery receive lymph from the left colon.

- Retroaortic Nodes.

□ The retroaortic lymph nodes provide a station of communication between the pre- and paraaortic lymph nodes in front of the third and fourth lumbar vertebrae. Healey and Hodge stated that the retroaortic lymph nodes are variable in number and are not true regional lymph nodes.

- Paraaortic Nodes.

□ The right lateral paraaortic nodes, together with the left paracaval nodes, form the right lumbar chain of nodes, which can be found intimately related to the inferior vena cava. The left paraaortic (left lumbar) lymph nodes form a group of five to ten lymph nodes drained by the left lumbar trunk posterolateral to the abdominal aorta. The right and left lumbar lymph trunks communicate with the common iliac nodes distally and drain into the abdominal confluence (cisterna chyli) proximally.

Caval Group:

- Precaval Nodes.

□ Precaval lymph nodes are located at the anterior wall of the inferior vena cava. Healey and Hodge stated that two of these nodes, one at the aortic bifurcation and one at the termination of the left renal vein, are constant.

- Retrocaval Nodes.

□ Retrocaval lymph nodes are located on the psoas muscle and the right crus of the diaphragm.

245

- Paracaval Nodes.

□ Paracaval nodes are found at the right lateral side of the cava. One node at the entrance of the right renal vein to the inferior vena cava is the metastatic site for right testicular malignancy. The left paracaval nodes are in close association with the right aortic nodes.

Pelvic Group:

- Common Iliac Nodes.

□ There are four to six common iliac lymph nodes, which are located around the artery. The medial nodes of this group lie against the body of the fifth lumbar vertebra and are called the nodes of the promontory. Efferents pass to the lumbar nodes.

- External Iliac Nodes.

□ There are eight to ten external iliac lymph nodes, which are located laterally and medially, and occasionally, anteriorly to the external iliac artery. The medial group is, essentially, the internal continuation of the deep inguinal lymphatics, receiving lymph from the superficial and deep inguinal nodes. They receive lymph from the glans, clitoris, anterior abdominal wall, the region of the obturator vessels, the neck of the bladder, the prostate, and the internal iliac nodes. The posterior (intermediate) group, situated deep to the external iliac artery near the femoral ring, receives lymph from the bladder, prostate, cervix, and upper part of the vagina.

- Internal Iliac Nodes.

□ The internal iliac lymph nodes are located chiefly at the points of origin of the branches of the internal iliac artery. The nodes receive lymph from the tissues supplied by the respective arterial branches, which pass to the perineum, gluteal region, posterior thigh, and pelvic organs.

- Obturator Nodes.

□ There are one or two obturator lymph nodes. They are located at the obturator foramen close to the obturator neurovascular structures.

- Sacral Nodes.

□ The sacral lymph nodes are located in or near the midline, close to the median and lateral sacral vessels. They receive afferents from the prostate and rectum, and drain to the internal iliac and lumbar nodes.

TOPOGRAPHIC ANATOMY OF PELVIS

Topographic anatomy of the pelvis is a complicated subject for clinical and anatomical analysis of the topical diagnosis – tics of pathological processes and the development of rational operational approaches.

This situation arises because of the relatively small area of concentrated bodies of the various systems that are infected cavity, which hinders the surgery, but particularly – subperitoneal and perineal regions of the pelvis. The presence of strong bones , forming a basin bounded by the surface of the soft tissues of the pelvic floor that contains the anus and urethra, limit the exercise of broad operational approaches.

In addition, the organs of the pelvis are subject to significant changes in volume, shape and position them in different physiological periods (pregnancy, overflowing bladder, etc.).

The presence of different systems in the pelvic cavity, undergoing periodic changes in volume, led to the formation of separating fascial plates with accumulations of fat between them.

In this regard, we wish to draw attention to the characterization of cellular spaces that will help you visualize the regularities –formation of inflammatory processes in the tissue of the pelvis and to determine the correct choice of prompt access to drain them. Knowing topographic pelvic anatomy will help answer the crucial question of clinical surgery, where to look for a rational access to the organs of the pelvis - through the abdominal wall or from the perineum or cross – sample.

The bodies of the pelvic organs¹⁰ are considered to be complex, located in – charged the lower abdomen, mainly between the peritoneum and pelvic floor. The walls of the pelvic fascia lines the common wall (continued endoabdominal fascia), which gives visceral leaf covering the organs of the pelvis, separating them from the side cellular spaces and locking in a median position. Thus, the pelvic fascia is a soft skeleton that supports the pelvic organs.

Musculoskeletal and ligamentous apparatus of the pelvis:

Bony pelvis is the basis of two pelvic bones, sacrum, coccyx and lumbar V vertebra .They linked multiple joints: sacroiliac, symphysis, etc.

Two powerful ligaments link sacral bone with ileum and ischium: lig.sacrospinale, lig.sacrotuberale. Both sciatic ligaments and pelvic spine converted two two-notch large and small sciatic openings through which the parietal muscles, blood vessels and nerves of the pelvis.

Parietal pelvic muscles: m.piriformis, m.obturatorius internus, m.coccygeus.

Visceral muscles of the pelvis: m.sphincter ani externus, m.levator ani, m.transversus perinei profundus, etc.

In the pelvic cavity conventionally divided into three floors: the peritoneum, and subcutaneous subperitoneal, although they contain a unit complex organs.

Peritoneal Department (savum peritoneale) represents the lower abdomen, which are the bodies or parts of the pelvis, covered by peritoneum (rectum, uterus, and upper posterolateral surface of the bladder). Peritoneum, partially covering the rear and side walls of the bladder, passes from men to the rectum, forming the rectal-vesical recess (ehsavatio gestovesicalis). Women with uterus broad ligament separates this gap into two parts: the first between the bladder and the front surface of the uterus - ehstavatio vesicouterina, second, deeper, between the rear surface of the uterus and the front surface of the retroperitoneal rectum - ehstavatio gesrouterina.

Subperitoneal department pelvic cavity (savum relvis subperitone - ale) lies between the peritoneum and pelvic floor. There are departments of extraperitoneal bladder, ureters, and rectum, prostate gland and seminal vesicles, women in the pelvic region are the same parts of the rectal bladder, ureter, apart from them, the vagina and cervix. In the loose tissue between the peritoneum and fascia pelvic floor has abundant vascular and nerve wreath of \neg , which explains the pains that accompany the rapid development of phlegmon of the pelvis.

Subcutaneous Division of the pelvis from above is limited to the lower surface of the pelvic diaphragm and the bottom - superficial fascia and skin of the perineum.

Pelvic diaphragm is a musculo-aponeurotic formation, consisting mainly of m. levator ani, supporting not only the rectum and pelvic organs but also in general. If you look at the pelvic diaphragm in the frontal section, you will see that it forms a hollow, expanding upwards, ie towards the peritoneum. between the edges mm. levatores ani formed urogenital diaphragm, consisting of m. transversus perinei profundus and fascia, through which the urethra in men, and in addition in female and vagina.

To determine the dynamics of the suppurative processes issuing from the pelvis, are important cellular spaces, which should stay in more¹⁰ detail.

Visceral pelvic fascia sheet covering their spurs each organ. Between the fascia and the surface of the organs in subperitoneal department of the pelvis formed with visceral cellular space. In men, these include paravesical, perirectal and tissue around the prostate and seminal vesicles.

In the female pelvis subperitoneal cellular space around the cancer tissue directly into the base of broad ligament and the lateral reaches thereby cellular spaces of the pelvis. Hence it is clear to a special addition to the visceral cellular interlayer between the walls of the pelvic ring and pelvic organs, there is subperitoneal cellular space in which there are blood and lymph vessels, and nerve plexus. These include prevesical space, postphrenicorectal and two lateral, which are the pelvic ureter, as well. and v. iliacae internae, with radiating branches from them, the rich venous plexus, sacral plexus, and lymph nodes that collect lymph from the pelvis and its walls. The most significant of cellular spaces of the pelvis are in its subcutaneous department. They are directly \neg enteric sciatic fossa (fossa ischiorectale),

made of fatty tissue. They are located on both sides of the anal of the rectum, between him and buttocks, ie below the pelvic floor. These cellular space often become an arena of acute susceptibility inflamantory processes (paraproctitis), developing as a result of wounding, fistulas of the rectum, or infection of blood clots, \rightarrow gating the spread of hemorrhoidal veins. Phlegmons of rectal sciatic pits occur with severe septic events by type of anaerobic infections, requiring urgent surgical intervention for evacuation of purulent cavity.

As for the cuts to drain paraproctitis, the choice depends on their depth and spread of the purulent process.

In clinical practice, also occupies an important place prevesical cellular space, which is located between the inner surface of abdominoplasty and pubic bones of the pelvis in front and urinary bladder behind. Prevesical cellular space has a value considerably \rightarrow spread, it extends from the upper surface of the urogenital diaphragm to the navel, the lower semicircle.

In addition, fiber of prevesical space communicates with the fiber femoral canal and through vascular gap with front-internal \rightarrow hip internal surface. From the inner surface of the rectus muscles that vividly prevesical space separates a very thin transverse fascia is, resulting in phlegmon prevesical space is sometimes observed breakthrough of pus through the navel outwards. In other contexts, streaks of pus are found on the inside or front of the thigh. In some cases there is pus in the output side of the pelvis cellular space.

The topography of the male pelvis.

Rectum (rectum) start-II I-crusade vertebra; distinguish 2-of pelvic and perineum .Pelvic consists of ampoules and over ampoules part; perineal also called anal canal .Attitude to the peritoneum of these divisions is as follows: beginning-of over ampoules part - introperitoneal, then- mezoperitoneal, ampoule-extraroperitoneal.

To the front of the rectum in men are prostate, higher - part of the rear wall of the bladder, ampulla, vas deferens, seminal vesicles and part of the front of the last ureter. Behind rectum adjacent to sacrum and coccyx. At sides of the rectum are sciatic- rectal fossas.

The outer pulp of the ¹⁰rectum m.sphincter ani externus is located around the anal orifice. On distance of 3-4 cm from the deeper it is placed on the internal sphincter m.sphincter ani internus, 10 cm-m.sphincter ani tertius

Perfusion is carried out five arteries unpaired-a.rectalis superior; and a pair of two-a.rectalis media and a.rectalis inferior. Veny form plexus venosus rectalis-systems belonging to the inferior vena cava and portal vein (portacaval [postcaval] shunt).

Innervation of the rectum performed by the sympathetic and parasympathetic sensory fibers innervated by the perineal department by n.pudendus containing and motor and sensory fibers.

lymph outflow, sent by main way to the top flight in the main to the site located at the lower mesenteric artery.

Bladder (vesica urinaria). Distinguish-top, body, bottom, and passes into the neck of urinary canal. In the region of the bottom portion triangular forms without submucosa (trigonum vesicae), the top of triangle is urethral opening, the base of the cross-roller (plica interureterica) link mouth of both ureters.

To the front of the bladder and pubic symphysis is the bone, and between the bladder and the bone there is cellular tissue. To the body adjacent the prostate gland, ampulla and seminal ducts, seminiferous vesicles. Above and laterally adjacent part of the small and large intestines.

The arteries of the system of internal iliac artery, venous blood flowing into the internal iliac vein.

Innervation performed by the hypogastric plexus, contain branches of sympathetic and parasympathetic fibers.

Lymph outflow is directed along the external and internal iliac arteries on the anterior surface of the sacrum.

Prostate (prostata)-consists of many glands opening into the beginning department of urethra Gland has a capsule of the pelvic fascia (Pirogov-Rittseya) and connect with bones through lonnyimi ligg.puboprostatica, and consists of 2 x share connections of the isthmus.

Basis of the gland drawn to the top, the bottom of the bladder, the top facing downwards to the urogenital diaphragm, the front is adjacent to the symphysis, laterally-mm.levatoris ani, back-to the ampulla of the rectum.

Pelvic part of the vas deferens (ductus deferens) has 2 departments -parietal and vesical. On his way crosses the iliac vessels are not overgrown with umbilical artery, reaches from the beginning and then the back side of the bladder wall, forming an ampoule. Duct of the ampule and the duct connecting the seminal vesicle forms the vas deferens in recreating pierces the substance of the prostate and seminal opens on the mound.

The seminal vesicles are saccate protrusion vas deferens. In front of the bubble is the bottom of the bladder and ureter end, rear-rectum, hangs above the peritoneum and intestine. Bottom bubbles are based on the prostate gland.

Urethra (urethra)-divided into 3 departments: pars prostatica (3 to 4 cm), pars membranacea (1,5-2,0 cm), pars cavernosus (14-15 cm). The last release of another onion pars bulbosa . Most of the channel is the bottleneck membranous part 2, also narrowed the beginning and the end-of-the external opening. Extensions are also 3-1) in the outer end of the channel for opening (fossa navicularis), 2) a bulbous part 3) in the prostate section. The urethra passes and extensible tool (catheter, bougie, etc.) to 10 mm in diameter. The urethra forms a curving two: subbosom (membranous part of the transition in the cavernous) and prebosom (in the transition to the fixed part of the mobile) is downward anteriorly, passes through the urogenital diaphragm is opened on the eve of the vagina.

The arteries of the system of internal iliac artery, venous blood flowing into the internal iliac vein.

Innervation is performed by branches of the hypogastric plexus contain sympathetic and parasympathetic fibers.

Lymph outflow is directed along the external and internal iliac arteries on the front surface of the sacrum.

The topography of the female pelvis.

Rectum (rectum) anterior to the rectum in women is the back wall of the cervix and posterior vaginal vault. Behind the rectum is adjacent to the sacrum and coccyx. On either side of the rectum is ischiorectal fossa.

The outer pulp of the rectum m.sphincter ani externus is located around the anus. At a distance of 3-4 cm from the deeper it is the internal sphincter m.sphincter ani internus, 10 cm-m.sphincter ani tertius

Perfusion is carried out five arteries unpaired-a.rectalis superior;

and a pair of two-a.rectalis media and a.rectalis inferior. Veny form plexus venosus rectalis systems belonging to the inferior vena cava and portal vein (portacaval [postcaval] shunt).

Innervation of the rectum performed by the sympathetic and parasympathetic sensory fibers innervated by the perineal department by n.pudendus containing and motor and sensory fibers.

Lymph outflow be sent to the main road to the top flight in the main to the site located at the lower mesenteric artery.

Bladder (vesica urinaria) anterior to the bladder and pubic symphysis is the bone, and between the bladder and bone tissue is located. Behind is the adjacent body and bottom of the uterus. The top and sides is adjacent sections of small and large intestines.

The arteries of the system of internal iliac artery, venous blood flowing into the internal iliac vein.

Innervation is performed by branches of the hypogastric plexus contain sympathetic and parasympathetic fibers. 10

Lymph outflow is directed along the external and internal iliac arteries on the front surface of the sacrum.

Uterus (uterus) is composed of body and neck are separated by an isthmus. Peritoneum covering the uterus ligaments form: lig.lata uteri, lig.cardinale uteri, lig.teres uteri, etc.

The uterus is tilted to the main longitudinal axis of the forward (anteversio); addition, the body in relation to the neck is tilted too anteriorly (anteflexio) /

The uterus is fixed sheath, which passes through the urogenital diaphragm and is held firmly in it, as well as the above mentioned connectors.

To the front of the uterus is adjacent bladder, rectum, behind, to the bottom loop of small intestines and sigmoid.

Arterial vessels of the uterus: aa.uterinae, aa.ovaricae. Outflow of the venous blood in the uterine veins

Innervation of the uterus is performed by the branches of a vast uterovaginal plexus (Frankenzyger). Plexus is located near parauterine tissue of the cervix is the anterior continuation of the lower hypogastric plexus.

Venous lymphatic vessels of the uterus are found in lymphatic vessels of the bladder and rectum.

Vagina (vagina) surrounds the upper end of the cervix, the lower end of the open hole in the part of the pudendal region that is limited to small labia (vestibulum vaginae).

The front wall of the vagina is adjacent to the bladder and urethra. The rear wall is adjacent to the rectum.

Urethra (urethra)-length 3 cm. run downwards anteriorly, passes through the urogenital diaphragm is opened on the eve of the vagina.

In front of the urethra and the urogenital diaphragm is located above the venous plexus that connects the bladder with veins of the uterus and vagina, below the diaphragm in front of the urethra is the clitoris. Behind the urethra is adjacent to the anterior vaginal wall and tightly fused with it through a solid wall (septum urethrovaginae).

The arteries of the system of internal iliac artery, venous blood flowing into the internal iliac vein.

Innervation is performed by branches of the hypogastric plexus contain sympathetic and parasympathetic fibers.

Lymph outflow is directed along the external and internal iliac arteries on the front surface of the sacrum.

TOPOGRAPHIC ANATOMY OF THE PERINEUM

TOPOGRAPHY OF THE PERINEUM - Perineum is the pelvic floor with associated structures occupying the pelvic outlet. - ¹¹Borders: – Anterior: Pubic symphysis. – Posterior: Tip of the coccyx. – Lateral: Ischial tuberosities. - It is made up of 2 triangles, which are the urogenital diaphragm and pelvic diaphragm

Urogenital diaphragm (Diaphragma urogenitale):

- It transmits the urethra in males: urethra and vagina in females.
- It is filled with 2 groups of muscles, namely the superficial and deep muscles.
- Superficial muscles:
 - Superficial transverse perineal muscle (musculus transversus perinei superficialis).
 - Bulbospongiosus muscle (musculus bulbospongiosus).

Ischiocavernosus muscle (musculus ischiocavernosus).

- Deep muscles:

Deep transverse perineal muscle (musculus transversus perinei profundus).

Sphincter urethrae muscle (musculus sphincter urethrae).

Pelvic diaphragm (Diaphragma pelvici, anal diaphragm):

- It transmits the anus both in males and females.

- Muscles of the pelvic diaphragm:

Levator ani muscle.

Coccygeus muscle.

External anal sphincter muscle.

Anal triangle:

- The anal triangle of the perineum faces posteroinferiorly and is defined laterally by the medial margins of the sacrotuberous ligaments, anteriorly by a horizontal line between the two ischial tuberosities, and posteriorly by the coccyx. The ceiling of the anal triangle is the pelvic diaphragm, which is formed by the levator ani muscles. The anal aperture occurs centrally in the anal triangle and is related on either side to an ischioanal fossa. The major muscle in the anal triangle is the external anal sphincter.

- The external anal sphincter, which surrounds the anal canal, is formed by skeletal muscle and consists of three parts—deep, superficial, and subcutaneous arranged sequentially along the canal from superior to inferior. The deep part is a thick ring-shaped muscle that circles the upper part of the anal canal and blends with the fibers of the levator ani muscle. The superficial part also surrounds the anal canal, but is anchored anteriorly to the perineal body and posteriorly to the coccyx and anococcygeal ligament. The subcutaneous part is a horizontally flattened disc of muscle that surrounds the anal aperture just beneath the skin. The external anal sphincter is innervated by inferior rectal branches of the pudendal nerve and by branches directly from the anterior ramus of S4.

Urogenital triangle:

- The urogenital triangle of the perineum is the anterior half of the perineum and is oriented

in the horizontal plane. It contains the roots of the external genitalia and the openings of the urogenital system.

- The urogenital triangle is defined: laterally by the ischiopubic rami; posteriorly by an imaginary line between the ischial tuberosities; anteriorly by the inferior margin of the pubic symphysis.

- As with the anal triangle, the roof or ceiling of the urogenital triangle is the levator ani muscle.

- Unlike the anal triangle, the urogenital triangle contains a strong fibromuscular support platform, the perineal membrane and deep perineal pouch, which is attached to the pubic arch.

- Anterior extensions of the ischioanal fossae occur between the deep perineal pouch and the levator ani muscle on each side.

224

- Between the perineal membrane and the membranous layer of superficial fascia is the superficial perineal pouch, and the principal structures in this pouch are the erectile tissues of the penis and clitoris and associated skeletal muscles.

- Structures in the superficial perineal pouch

- The superficial perineal pouch contains:

erectile structures that join together to form the penis in men and the clitoris in women;

skeletal muscles that are associated mainly with parts of the erectile structures attached

to the perineal membrane and adjacent bone.

- Each erectile structure consists of a central core of expandable vascular tissue and its surrounding connective tissue capsule.

- Two sets of erectile structures join to form the penis and the clitoris.

- A pair of cylindrically shaped corpora cavernosa, one on each side of the urogenital triangle, are anchored by their proximal ends to the pubic arch. These attached parts are often

termed the crura of the clitoris or the penis. The distal ends of the corpora, which are not attached to bone, form the body of the clitoris in women and the dorsal parts of the body of

the penis in men.

- The second set of erectile tissues surrounds the openings of the urogenital system:

□ In women, a pair of erectile structures, termed the bulbs of vestibule, are situated, one on each side, at the vaginal opening and are firmly anchored to the perineal membrane.

Small bands of erectile tissues connect the anterior ends of these bulbs to a single, small, pea-shaped erectile mass, the glans clitoridis, which is positioned in the midline at the end of the body of the clitoris and anterior to the opening of the urethra.

□ In men, a single large erectile mass, the corpus spongiosum, is the structural equivalent to the bulbs of the vestibule, the glans clitoridis and the interconnecting bands of erectile tissues in women.

Topography of the male perineum

Layers:

Skin.

Subcutaneous tissue - Camper's fascia.

Superficial membranous fascia:

- Scarpa's fascia (abdominal superficial membranous fascia).

- Colle's fascia:

□ It is continuous with the Scarpa's fascia in the region posterior to the scrotum.

- Darto's fascia (superficial membranous fascia of the penis).

Superficial perineal space:

- Investing fascia (deep fascia, Gallaudet's fascia):

11

□ It is the inferior border of the bulbospongiosus muscle.

- Buck's fascia:

□ It is the superior border of the bulbospongiosus muscle.

- Suspensory ligament of the penis (ligamentum suspensorium penis).

□ It is continuous with the transverse fascia (fascia transversalis) of the anterior abdominal wall.

- Muscles attached to the perineal body:

□ Superficial transverse perineal muscle.

Bulbospongiosus muscle.

Ischiocavernosus muscle.

- Perineal nerves.

Perineal membrane:

- The perineal membrane is a thick fibrous sheet that fills the urogenital triangle. It has a free posterior border, which is anchored in the midline to the perineal body and is attached laterally to the pubic arch.

- Immediately superior to the perineal membrane is a thin region termed the deep perineal pouch, containing a layer of skeletal muscle and neurovascular tissues.

- Among the skeletal muscles in the pouch is the external urethral sphincter. The perineal membrane and deep perineal pouch provide support for the external genitalia, which are attached to its inferior surface.

- Also, the parts of the perineal membrane and deep perineal pouch inferior to the urogenital hiatus in the levator ani provide support for pelvic viscera, above.

Deep perineal space:

- Muscles:

Deep transverse perineal muscle.

Sphincter urethrae muscle.

- Dorsal artery and deep dorsal vein of the penis

- Dorsal nerve of the penis

- Bulbourethral glands (Cowper's glands, glandulae bulbourethrales s. Cowperi).

- Male urethra (urethra masculina)

Superior membrane of the urogenital diaphragm.

Topography of the female perineum

Layers:

Skin.

Subcutaneous tissue – Camper's fascia.

Superficial membranous fascia:

- Scarpa's fascia (abdominal superficial membranous fascia).

- Colle's fascia:

- It is continuous with the Scarpa's fascia in the region posterior to the vagina.

Superficial perineal space:

- Investing fascia (deep fascia, Gallaudet's fascia):

- It is the inferior border of the bulbospongiosus muscle.

- Suspensory ligament of the clitoris (ligamentum suspensorium clitoridis).

- It is continuous with the transverse fascia of the anterior abdominal wall.

- Muscles attached to the perineal body:

- Superficial transverse perineal muscle.
- Bulbospongiosus muscle.
- Ischiocavernosus muscle.

Greater vestibular glands (Bartholin's glands, glandulae vestibulares majores s. Bartolini).

Perineal nerves.

Perineal membrane.

Deep perineal space:

- Muscles:

- Deep transverse perineal muscle.
- Sphincter urethrae muscle.
- Compressor urethrae muscle (musculus compressor urethrae).
- Sphincter urethrovaginalis muscle (musculus sphincter urethrovaginalis).

- Dorsal artery and deep dorsal vein of the clitoris.

- Dorsal nerve of the clitoris.

- Female urethra (urethra feminina).

Pudendal canal (Alcock's canal, canalis pudendalis)

Borders:

- It is formed by the sheath of the obturator internus muscle.

Contents:

- Internal pudendal artery (arteria pudenda interna), internal pudendal vein (vena pudenda interna) and pudendal nerve (nervus pudendus)

Topography:

- It goes out from the greater sciatic foramen; then runs laterally along the ischial spine and sacrospinous ligament; then enters through the lesser sciatic foramen and runs along the medial aspect of the ischiopubic ramus.

Ischiorectal fossa (ischioanal fossa, fossa ischiorectalis)

- It is the space surrounding the anal canal (pars analis recti s. canalis analis) located between the skin of the anal region and pelvic diaphragm (Fig. 82).

Borders:

- Superior: Levator ani muscles.
- Inferior: Perianal skin.
- Medial: Anal canal.
- Lateral: Obturator internus muscles.
- Posterior: Sacrotuberous ligaments and gluteus maximus muscles.

Contents:

- Fatty tissue.

Clinical importance:

- Inflammation of this tissue is called paraproctitis.

Topography of the scrotum 11

Layers (Fig. 83):

Skin of the scrotum:

- It is thin and dark, covered with sebaceous glands.

Superficial fascia (dartos fascia, tunica dartos):

- It is continuous with the inguinal and perineal connective tissue.

External spermatic fascia (fascia spermatica externa):

- It is continuous with the superficial fascia of the abdomen.

Cremasteric fascia (fascia cremasterica):

- It is continuous with the intercrural fascia; covering the cremasteric muscle (musculus cremaster).

Cremaster muscle (musculus cremaster)

Internal spermatic fascia (fascia spermatica interna):

- It is continuous with the transversalis fascia.

Tunica vaginalis:

- It is derived from the peritoneal vaginal process (process vaginalis peritonei).
- It consists of 2 layers, which are the parietal and visceral layers.
- Cavum vaginale is cavity between the parietal and visceral layers. Accumulation of fluid in this cavity is called hydrocele.

Topography of the testis

Morphology:

- The testis is coated by the tunica albuginea.
- The parenchyma of the testis is divided into lobes (lobuli testis) and separated by septa (septula testis).
- The parenchyma is composed of seminiferous tubules. There are 2 parts of them, namely the convoluted seminiferous tubules (tubuli seminiferi contorti) and straight seminiferous tubules (tubuli seminiferi recti). The latter tubules form rete testis in the mediastinum testis.
- The rete testis give rise to the ¹¹efferent ductules (ductuli efferentes), which are continuous with the epididymis. The epididymis is divided into the head, body and tail.

Functions:

- Production of spermatozoa by the seminiferous epithelium of the seminiferous tubules.
- Production of testosterone by the Leydig's interstitial cells.

Arterial supply:

- Testicular artery (arteria testicularis).
- Artery of the ductus deferens.

- Cremasteric artery (arteria cremasterica)

Venous drainage:

- Pampiniform plexus (plexus pampiniformis), then drained into the testicular vein (vena testicularis)

Lymphatic drainage:

- Inguinal lymph nodes; then drained into the lumbar lymph nodes.

Nerve supply:

- Testicular nervous plexus (composed of the sympathetic and parasympathetic fibres).

Topography of the penis

- The penis is composed mainly of the two corpora cavernosa and the single corpus spongiosum, which contains the urethra. It has an attached part (root) and a free part (body)

(Fig. 84):

□ the root of penis consists of the two crura, which are proximal parts of the corpora cavernosa attached to the pubic arch and the bulb of penis, which is the proximal part of the

corpus spongiosum anchored to the perineal membrane;

□ the body of the penis, which is covered entire by skin, is formed by the tethering of the

two proximal free parts of the corpora cavernosa and the related free part of the corpus

spongiosum.

- The base of the body of the penis is supported by two ligaments: the suspensory ligament of

the penis (attached superiorly to the pubic symphysis), and there more superficially positioned fundiform ligament of the penis (attached above to the linea alba of the anterior abdominal wall and splits below into two bands that pass on each side of the penis and unite

inferiorly).

Because the anatomic position of the penis is erect, the paired corpora are defined as dorsal

in the body of the penis and the single corpus spongiosum a ventral, even though the positions are reversed in the nonerect (flaccid) penis. The corpus spongiosum expands to form

the head of the penis (glans penis) over the distal ends of the corpora cavernosa.

Topography of the clitoris

- The clitoris is composed of two corpora cavernosa and the glans clitoris. As in the penis,

has an attached part (root) and a free part (body).

- Unlike the root of the penis, the root of the clitoris technically consists only of the two crura. (Although the bulbs of the vestibule are attached to the glans clitoris by thin bands of erectile tissue, they are not include in the attached part of the clitoris).
- The body of the clitoris, which is formed only by the unattached parts of the two corpora cavernosa, angles posteriorly, and is embedded in the connective tissues of the perineum.
- The body of the clitoris is supported by a suspensory ligament that attaches superiorly to the pubic symphysis. The glans clitoris is attached to the distal end of the body and is connected to the bulbs of the vestibule by small bands of erectile tissue. The glans clitoris is exposed in the perineum and the body of the clitoris can be palpated through skin.

Erection

- Erection of the penis and clitoris is a vascular event generated by parasympathetics carried in pelvic splanchnic nerves from the anterior rami of S2-S4, which enter the inferior hypo-

231

gastric part of the prevertebral plexus and ultimately pass through the deep perineal pouch and perineal membrane to innervate the erectile tissues. Stimulation of these nerves causes specific arteries in the erectile tissues to relax. This allows blood to fill the tissues, causing the penis and clitoris to become erect.

- Arteries supplying the penis and clitoris are branches of the internal pudendal artery; branches of the pudendal nerve (S2 to S4) carry general sensory nerves from the penis and clitoris.

11

Greater vestibular glands

- The greater vestibular glands (Bartholin's glands) are seen in women. They are small, peashaped mucous glands that lie posterior to the bulbs of the vestibule on each side of the vaginal opening and are the female homologues of the bul-bourethral glands in men. However, the bulbourethral glands are located within the deep perineal pouch, but the greater vestibular glands are in the superficial perineal pouch.
- The duct of each greater vestibular gland opens into the vestibule of the perineum along the posterolateral margin of the vaginal opening.
- Like the bulbourethral glands in men, the greater vestibular glands produce secretion during

sexual arousal.

Superficial features of the external genitalia

- In women, the clitoris and vestibular apparatus, together with a number of skin and tissue folds, form the vulva. On either side of the midline are two thin folds of skin termed the labia minora. The region enclosed between them, and into which the urethra and vagina open, is the vestibule. Anteriorly, the labia minora each bifurcate, forming a medial and a lateral fold. The medial folds unite to form the frenulum of clitoris, that joins the glans clitoris. The lateral folds unite ventrally over the glans clitoris and the body of clitoris to form the prepuce of clitoris (hood). The body of the clitoris extends anteriorly from the glans clitoris and is palpable deep to the prepuce and related skin. Posterior to the vestibule, the labia minora unite, forming a small transverse fold, the frenulum of labia minora (the fourchette).
- Within the vestibule, the vaginal orifice is surrounded to varying degrees by a ring-like fold of membrane, the hymen, which may have a small central perforation or may completely close the vaginal opening. Following rupture of the hymen (resulting from first sexual intercourse or injury), irregular remnants of the hymen fringe the vaginal opening.
- The orifices of the urethra and the vagina are associated with the openings of glands. The ducts of the paraurethral glands (Skene's glands) open into the vestibule, one on each side of the lateral margin of the urethra.

Glossary

12

- **abdomen:** Latin abdomen = the belly, the part of the trunk between thorax and the perineum, adjective - abdominal.
- **abducent:** Latin ab = from, and ducens = led, hence, moving from, or effecting separation.
- **abduction:** Latin ab = from, and ductum = led, hence, movement from; verb - abduct.
- **aberrant:** Latin ab = from, and errare = to wander, hence, deviating from normal.
- **accessory:** adjective, Latin accessum = added, hence, supplementary.
- **accommodation:** Latin ad = to, and modus = measure, hence, adaptation of the optical power (focussing) of the eye for shorter distances.

- **acetabulum**: Latin acetum = vinegar (cf. acetic), and abulum = small receptacle, hence, a vinegar cup, hence, the socket for the head of the femur, adjective - acetabular.
- **acoustic**: adjective, Greek akoustikos, related to hearing.
- **acromion**: Greek akros = summit (cf. Acropolis) and omos = shoulder, hence, the tip of the shoulder.
- **adduction**: Latin ad = to, and ductum = led, hence, movement towards; verb - adduct.
- **adenoid**: Greek aden = a gland, eidos = shape or form.
- **adhesion**: Latin ad = to, and haesus = stuck, hence, stuck to, e.g., interthalamic adhesion - variable and functionally insignificant.
- **adipose**: Latin adeps = fat, hence fatty
- **aditus**: Latin ad = to, towards, iter = a way, hence an opening or entrance.
- **adrenal**: Latin ad = towards, at, ren = kidney, hence situated near the kidney (see suprarenal)
- **adrenergic**: adjective, Latin ad = at, ren = kidney, and Greek ergon = work, hence, stimuli which cause the adrenal (suprarenal) gland to produce adrenaline. Used to specify neurons or pathways which use adrenaline as a transmitter.
- **afferent**: adjective, Latin ad = to, and ferent = carrying (cf. ferry), hence, carrying to, e.g., axons carrying information from retina to lateral geniculate nucleus are afferents to that nucleus.
- **agger nasi**: Latin = eminence of the nose.
- **agonist**: Greek agonistes = rival, hence, a muscle in apparent contest with another. Used for a prime mover.
- **ala**: Latin wing, hence a wing-like process; plural - alae.
- **alaeque**: Latin ala = wing (ala of nose), suffix -que = and, hence levator labii superioris alaeque nasi muscles = lifter of the upper lip and ala of nose.
- **alba**: Latin albus = white
- **albicans**: Latin = becoming white; albus = white
- **albuginea**: Latin albus = white, Greek gen = form, hence, like boiled white of an egg.
- **alimentary**: adjective¹², Latin alimentum = food, e.g., alimentary canal.
- **allantois**: Greek allantos = sausage, eidos = like, form.
- **allocortex**: Greek allos = other (than usual), and Latin cortex = bark, hence non-laminated external grey matter. It refers to paleo- or archi-cortex, as distinct from neocortex.
- **alveolus**: Latin a basin, hence any small hollow. Plural - alveoli, adjective - alveolar.
- **alveus**: Latin = tray. The allusion is unclear. The alveus is a layer of fibres on the free surface of the hippocampus.
- **ambiguus**: adjective, Latin = doubtful (nucleus ambiguus).
- **ampulla**: Latin = a two-handed flask, a local dilatation of a tube.
- **amygdaloid**: adjective, Greek amygdala = almond, and eidos = shape or form, hence, amygdaloid body is an almond-shaped mass.
- **amylacea**: Greek amylon = starch, hence, starchy.

- **anaesthesia:** Greek an = negative, and aisthesis = sensation, hence, loss of sensation; adjective - anaesthetic.
- **analgesia:** Greek an = negative, and algesis = pain, hence insensibility to pain; adjective - analgesic.
- **analogous:** Greek ana = up, apart, towards, and logos = word. A part with similar function through different morphology e.g., fish gills and mammalian lungs (c.f. homologous).
- **anastomosis:** Greek ana = of each, and stoma = mouth, hence the end-to-end continuity of 2 vessels; adjective - anastomotic.
- **anatomy:** Greek ana = up, and tome = a cutting, hence cutting up of a body (c.f. dissection).
- **anconeus:** Greek ancon = elbow, hence the muscle attached to the (lateral surface of the) olecranon.
- **aneurysm:** Greek angeion = blood vessel, and eurys = wide, hence a pathological dilatation of a blood vessel.
- **angiography:** Greek angeion (v.s.) and graphe = a record, hence a picture of a blood vessel which has been injected with a dye or radiopaque material.
- **anhidrosis:** (anhydrosis, anidrosis) Greek an = negative, and hidros = sweat, hence absence of sweating, typical of skin deprived of its sympathetic innervation.
- **ankle:** the region between the leg and the foot.
- **annulus:** diminutive of Latin anus = ring, hence little ring.
- **ansa:** Latin a handle or loop. Applicable to nerves.
- **anserinus:** Latin anser = a goose, hence like a goose, plural - anserina.
- **antagonist:** Greek anti = against, and agonistes = rival, hence a muscle which may oppose an agonist.
- **anteflexion:** Latin ante = before, and flexere = to bend, hence anterior angulation between the body and cervix of the uterus.
- **anterior:** comparative of Latin ante = before, in front.
- **anteversion:** Latin ante = before, and versum = turned, hence, the anterior angulation between cervix uteri and the vagina.
- **antidromic:** adjective, Greek a = negative, and dromos = current, hence conducting in the opposite direction to the usual.
- **antrum:** Greek antron - cave, hence a space in a bone or organ.
- **anulus:** diminutive of Latin anus = ring, hence little ring.
- **anus:** Latin = ring, adjective - anal.
- **aorta:** Latin aorta, from Greek aorte = literally 'what is hung up,' from aeirein 'to lift, heave, raise,' of uncertain origin. Originally applied by Aristotle to the great artery of the heart, earlier by Hippocrates to the bronchial tubes.
- **aponeurosis:** Greek apo = from, and neuron = tendon (later applied to nerve cell and its fibres), used for sheet-like tendons. Adjective - aponeurotic.
- **apophysis:** Greek apo = from, and physis = growth, hence, a bony process - reserved for the articular process of a vertebra; adjective - apophysial.
- **appendage:** Latin appendere = to hang on, supplement.
- **appendix:** Latin appendere = to hang on, supplement.
- **apposition:** Latin appositus = placed at, hence, in contact, in juxtaposition.

- **aqueduct:** Latin aqua = water, and ductus = drawn or led off, hence a channel for conducting fluid, e.g. the cerebral aqueduct of the midbrain, which transmits fluid from the 3rd to the 4th ventricle.
- **arachnoid:** adjective, Greek arachne = spider, and eidos = shape or form, hence like a spiders web. This middle layer of the three meninges is spread web-like over the brain when the dura has been removed.
- **arbor vitae:** Latin arbor = tree, and vita = life, hence, resembling the tree of life. This colourful term is used to describe the pattern of cerebellar folia seen in a median section.
- **archaeocerebellum:** Greek archi = first, hence the oldest part of the cerebellum, which is the flocculonodular lobe.
- **archaeopallium:** Greek archi = first, and pallium = cloak, hence the cortex which developed first in vertebrates. Often synonymous with hippocampal formation.
- **archicerebellum:** Greek archi = first, hence the oldest part of the cerebellum, which is the flocculonodular lobe.
- **archipallium:** Greek archi = first, and pallium = cloak, hence the cortex which developed first in vertebrates. Often synonymous with hippocampal formation.
- **archistriatum:** Greek archi = first, and Latin striatum = streaked or fluted.
- **arcuate:** Latin arcuatum = curved or arched.
- **arcus:** Latin an arch, Latin arcuatum = curved or arched.
- **area:** a part of a surface.
- **areola:** Latin small, open space.
- **arm:** the upper limb, between shoulder and elbow.
- **arrector:** Latin adrectus = raised, hence, arrector pili = a hair-raising muscle.
- **artery:** Latin arteria (which originally meant air- or wind-pipe, and later a blood vessel carrying blood away from the heart).
- **articulation:** Latin artus = joint, hence, articulate - to form a joint.
- **arytenoid:** Greek arytaina = pitcher, and eidos = shape or form, hence the arytenoid cartilage because it curves like a spout.
- **aspect:** a view of more than one surface.
- **aspera:** Latin rough.
- **asterion:** Greek asterios = starry.
- **astrocyte:** Greek astron = star, and kytos = cell, hence a star-shaped (neuroglial) cell.
- **ataxia,:** Greek a = negative, and taxis = order, hence inability to co-ordinate the voluntary muscles.
- **atlas:** Greek atlao = I sustain. Atlas was a mythical god who sustained the globe on his shoulders. The 1st vertebra sustains the skull, and its upper surface bears 2 concavities which suggest Atlas' palms, not shoulders.
- **atresia:** Greek a = negative, and tresis = a hole, hence an absence or closure of a body orifice or tubular organ
- **atrium:** Latin = entrance hall, adjective - atrial.
- **atrophy:** Greek a = negative, and trophe = food, hence wasting from starvation.
- **auditory:** Latin audire = to hear, hence, pertaining to the ear.
- **auricle:** Latin auricula = a little ear.

- **auscultate:** Latin ausculto = to listen to, hence, auscultation, the act of listening to a bodily activity.
- **autonomic:** adjective, Greek auto = self, and nomos = law, hence self-regulating.
- **axilla:** Latin armpit.
- **axis:** Latin axis = the central line of a body or part thereof, especially the imaginary line around which rotation takes place.
- **axon:** Latin axis = axis, hence the main process of a neuron conducting impulses away from the cell body.
- **azygos:** adjective, Greek a = negative, and zygos = paired, hence, unpaired.
- **basilar:** adjective, Latin basis = base.
- **basilic:** adjective, Arabic al-basilik = inner; the basilic vein is on the inner side of the forearm and arm. Previously thought to be of Greek origin, basilikos = royal (king-sized).
- **biceps:** Latin bis = double, and caput = head, hence 2-headed, adjective - bicipital.
- **bifid:** adjective, Latin bis = double, and findo = to split.
- **bifurcate:** Latin bis = double, and furco = fork, hence to divide into two.
- **bilateral:** Latin bi = two, lateral = side, hence, pertaining to two (both) sides.
- **bipennate:** adjective, Latin bis = double, and pinna = feather, hence converging from 2 sides.
- **body:** the main part.
- **border:** see margin.
- **brachiocephalic:** Latin brachium = arm, and Greek kephale = head, hence a blood vessel related to the upper limb and head.
- **brachium:** Latin = arm, adjective - brachial.
- **branchia:** Greek = gills, adjective - branchial.
- **bregma:** from a Greek word implying moist, referring to the site of the anterior fontanelle (q.v.), a little fountain, the site of junction of the coronal and sagittal sutures, where the brain can be felt pulsating in infancy.
- **brevis:** Latin = short - cf. brief.
- **bronchiole:** diminutive of bronchus, hence a small bronchus (bronchi have cartilage in their walls, bronchioles have no cartilage).
- **bronchus:** derivation¹² unhelpful - a branch of the trachea, adjective - bronchial.
- **buccal:** adjective, Latin bucca = cheek.
- **buccinator:** Latin = trumpeter - hence the muscle which blows air out from the cheek under pressure.
- **bulbus:** Latin = bulb or onion.
- **bullae:** Latin = bubble.
- **bursa:** Greek = a purse, hence a flattened sac containing a film of fluid.
- **caecum:** Latin = blind.
- **calcaneus:** Latin calx = heel, hence the bone of the heel.
- **calcar:** Latin = a spur.
- **calcar avis:** Latin the spur of a bird, hence a spur-like elevation.
- **calcarine:** Latin calcar = spur, hence spur-shaped.
- **calf:** the soft tissue swelling at the back of the leg.
- **calix:** Latin = a wine-cup (plural - calices).

- **callosum**: Latin callum = hard.
- **calvaria**: Latin calva = bald head, hence the part of the skull containing the brain - i.e. cranium minus the facial skeleton.
- **calyx**: Latin = a wine-cup (plural - calyces).
- **canal**: Latin canalis = a water-pipe or canal.
- **canaliculus**: diminutive of canal.
- **cancellous**: adjective, Latin cancelli = grating or lattice.
- **canine**: adjective, Latin canis = dog.
- **canthus**: Greek kanthos - used at first for rim of eye, then angle between ends of rims.
- **capillary**: Latin capillaris = hair-like, hence a very thin blood vessel.
- **capitate**: adjective, having a caput from Latin capitis = of a head (q.v.).
- **capitulum**: diminutive of caput, Latin = head.
- **capsule**: Latin capsula = box, hence an enclosing sheet.
- **caput**: Latin = head. Capitis - of a head, adjective - capitate = having a head (cf. decapitate).
- **caput medusae**: Latin caput = head, Medusa = Greek mythical female with snake like hair.
- **cardiac**: adjective, Greek kardia = heart.
- **cardinal**: Latin cardinalis = principal, of primary importance.
- **carina**: Latin = a keel.
- **carneae**: Latin carnea = fleshy.
- **carotid**: Greek karoo, to put to sleep (heavy sleep), because compression of the common or internal carotid artery may cause coma.
- **carpus**: Greek = wrist, adjective - carpal.
- **cartilage**: Latin = gristle; adjective - cartilaginous.
- **caruncle**: diminutive of Latin caro = flesh, hence, a small fleshy elevation.
- **cauda**: Latin = tail, adjective - caudate - having a tail.
- **cauda equina**: Latin = a horse's tail.
- **caudal**: Latin cauda = tail, hence toward the tail, inferior (in human anatomy).
- **caudate**: Latin cauda = tail, hence having a tail.
- **cava**: Latin cavum = ¹²cave, hollow.
- **cavernous**: Latin containing caverns or cave-like spaces.
- **cavity**: Latin cavitas = a hollow.
- **cavum**: Latin = cave.
- **cecum**: Latin = blind.
- **celiac**: adjective, Greek koilia = belly.
- **celom**: Greek koilos = a hollow
- **central**: adjective, Latin centrum = centre.
- **centrum**: Latin = centre.
- **cephalic**: adjective, Greek kephale = head. The term cephalic, as applied to the cephalic vein, was a mistranslation of Arabic and interpreted to be from the Greek term kephale = head. Arabic al-kifal = outer; the cephalic vein is on outer side of the forearm and arm (compare to basilic).
- **cerebellum**: diminutive of Latin cerebrum = brain.

- **cerebrum**: Latin = brain, adjective - cerebral.
- **cerumen**: Latin cera = wax.
- **cervical**: adjective, Latin cervix = neck, hence, pertaining to the neck.
- **cervix**: Latin = neck, adjective - cervical.
- **chiasma**: Greek kiasma = cross. (The Greek letter chi = c).
- **choana**: Greek = funnel, plural - choanae.
- **chondral**: adjective, Greek chondros = cartilage.
- **chorda**: Latin = cord.
- **choroid**: adjective, Greek chorion = skin and eidos = shape or form, hence, like a membrane.
- **chyle**: Greek = juice.
- **chyl**: Greek = juice.
- **ciliary**: adjective, Latin cilia = eyelashes.
- **cilium**: Latin = eyelid, hence, an eyelash; adjective - ciliary, or ciliated.
- **cinereum**: Latin cineris = of ashes.
- **cingulum**: Latin girdle or belt, adjective - cingulate.
- **circumflex**: verb and adjective, Latin circum = around, and flexere = to bend, hence, bend or bent around.
- **cisterna**: Latin = a cistern.
- **claustrum**: Latin clausum = closed, hence a barrier.
- **clavicle**: diminutive of Latin clavis = key - old Roman key was S-shaped.
- **cleido**: Greek, cleis = key, a combining form denoting relationship to the clavicle.
- **clinoid**: adjective, Greek kline = bed, eidos = shape or form, hence, like a bed-post.
- **clivus**: Latin = slope (cf. declivity).
- **cloaca**: Latin = a drain, sewer; common opening for intestinal, urinary and genital tracts in lower vertebrates, it is a transitory structure in human embryological development.
- **coccyx**: Greek kokkyx = cuckoo, whose bill the coccyx resembles.
- **cochlea**: Latin = snail, hence the spiral cochlea, adjective - cochlear.
- **coeliac**: adjective, Greek koilia = belly.
- **coeruleus**: adjective, Latin = blue, hence, locus coeruleus, a group of nerve cells in the rostral pons coloured blue or black by melanin.
- **coli**: Latin = of the colon.
- **collateral**: adjective, Latin con = together, and latus = side, hence, alongside.
- **colli**: genitive (possessive case) of collum, Latin = neck
- **colliculus**: diminutive of Latin collis = hill.
- **collum**: Latin = neck (cf. collar).
- **colon**: Greek kolon = large intestine.
- **columna**: Latin = column, or pillar.
- **comitans**: adjective, Latin = accompanying.
- **commissure**: Latin con = together, and missum = sent, hence fibres which cross between symmetrical parts.
- **communicans**: adjective, Latin = communicating.
- **concha**: Latin = shell.
- **condyle**: Greek kondylos = knuckle.

- **confluens**: Latin con = together, and fluens = flowing, hence the meeting of more than one stream.
- **conjunctiva**: Latin con = with, and junctus = joined (cf. junction), hence the continuous bulbar and palpebral lining membrane.
- **conoid**: Greek konoeides = resembling a cone, cone shape
- **constrictor**: Latin con = together, and strictum = drawn tight, hence, producing narrowing.
- **contour**: Greek tornos = lathe, hence a line which turns - an outline.
- **contralateral**: Latin contra = against, latus = side, hence, the opposite side (as opposed to ipsilateral)
- **conus**: Latin = cone, conus medullaris - the lower end of the spinal cord.
- **coracoid**: adjective, Greek korax = a crow, and eidos = shape or form, hence, like a crow's beak.
- **cornea**: Latin cornu = horn, hence, the dense tissue forming the front of the eyeball.
- **corniculate**: Latin = shaped like a small horn.
- **cornu**: Latin = horn.
- **corona**: Latin = crown. adjective - coronary or coronal; hence a coronal plane is parallel to the main arch of a crown which passes from ear to ear (cf. coronal suture).
- **coronal**: Latin corona = crown; hence a coronal plane is parallel to the main arch of a crown which passes from ear to ear (cf. coronal suture).
- **coronary**: adjective, Latin = crown, hence, encircling like a crown.
- **coronoid**: adjective, Greek korone = a crown, eidos = shape or form, hence, shaped like a crown.
- **corpus**: Latin = body, plural - corpora.
- **corpuscle**: Latin = a little body.
- **corrugator**: Latin con = together, and ruga = wrinkle, hence a muscle that produces wrinkles.
- **cortex**: Latin = bark, adjective, cortical.
- **costa**: Latin = rib. adjective - costal.
- **coxa**: Latin = hip, hence os coxae = the hip bone.
- **cranium**: Greek kranion = skull. (In anthropology = skull minus mandible) adjective - cranial. 12
- **cremaster**: Greek = suspender, hence the muscle which suspends the testis.
- **cribriform**: adjective, Latin cribrum = sieve, hence, sieve-like.
- **cricoid**: adjective, Greek krikos = ring, and eidos = shape or form, hence, ring-like, i.e. circular.
- **crista**: Latin = crest, crista galli = the (median) crest of a cock.
- **cruciate**: adjective, Latin crux = cross, hence, crossed like the letter X.
- **crus**: Latin = leg, plural - crura.
- **cubital**: adjective, Latin cubitus = elbow.
- **cuboid**: adjective, Greek kuboides = cube-shaped.
- **culmen**: Latin = summit (cf. culminate).
- **cuneate**: adjective, Latin = a wedge.
- **cuneiform**: adjective, Latin cuneus = wedge, hence wedge-shaped.
- **cuneus**: Latin = a wedge, adjective - cuneate.

- **cupola:** Latin = little dome.
- **cupula:** Latin = little dome.
- **cusps:** Latin cuspis = a pointed elevation.
- **cutaneous:** adjective, Latin cutis = skin.
- **cyst:** Greek kystis = bladder, adjective - cystic.
- **dartos:** Greek = flayed or skinned.
- **declive:** Latin declivitas = slope (cf. clivus).
- **decussation:** Latin decussatus = crossed like the letter X.
- **deep:** further from the surface.
- **deferens:** adjective, Latin = carrying down.
- **deglutition:** Latin deglutire = to swallow, hence the act of swallowing.
- **dehiscence:** Latin de = away, hiscere = to gape, hence, a separation, a splitting away.
- **deltoid:** adjective, Greek delta (D). The capital has a triangular shape (cf. the delta of the Nile river).
- **dendrite:** or dendron, Greek = a tree, hence like the branches of a tree.
- **dens:** Latin = tooth (cf. dentist), adjective - dental.
- **dentate:** Latin dens = tooth, hence, having a toothed margin.
- **denticulate:** Latin dens = tooth, hence, having small tooth-like projections.
- **dentine:** from Latin dens = tooth; the substance of the tooth surrounding the pulp.
- **depress:** Latin de = prefix implying descent, and pressum = pressed, hence to press down, and depression = downward movement or a concavity on a surface.
- **dermatome:** Greek derma = skin, tome = a cutting or division, hence a segment of skin supplied by a single spinal ganglion.
- **dermis:** Greek = skin, adjective - dermal.
- **detrusor:** Latin detrusio = thrust away.
- **diaphragm:** Greek dia = across, and phragma = wall, hence, a partition, adjective - diaphragmatic (see also phrenic).
- **diaphysis:** Greek dia = apart, and physis = growth, hence, the body of a long bone between the growing regions near the ends.
- **diastole:** Greek dia = apart, and stellein = sending, hence sending the walls of the heart apart, i.e. relaxation or dilatation. Adjective - diastolic.
- **diencephalon:** Greek ¹2 dia = between, and enkephalos = brain, hence in general the structures surrounding the 3rd ventricle. adjective - diencephalic.
- **digastric:** adjective, Greek dia = double, and gaster = belly, hence, 2-bellied.
- **digit:** Latin digitus = a finger or toe, usually excepting the pollex (thumb) or hallux (big toe), adjective - digital.
- **diplopia:** Greek diploos = double, and opsis = vision, hence double vision.
- **diplo☞:** Greek = fold, hence the cancellous bone between the inner and outer tables of the skull, adjective - diploic.
- **discus:** Latin = disc.
- **dissection:** Latin dissecare = to cut up, from dis = apart, sectum = cut (c.f. anatomy).
- **distal:** adjective, Latin di = apart, and stans = standing, hence, standing apart, implying farther from a given point, usually the root of a limb.

- **diverticulum:** Latin = by-road, hence a blind tubular process or sac.
- **dorsal:** adjective, Latin dorsum = back.
- **dorsum:** Latin = back.
- **ductus:** Latin = duct.
- **duodenum:** Latin duodenarius = twelve, because it is 12 fingerbreadths long.
- **dura:** adjective, Latin = hard (cf. durable); dura mater, the tough covering membrane of the central nervous system.
- **dysphagia:** Greek dys = difficult, and phagein = to eat, hence, difficulty in swallowing.
- **ectoderm:** Greek ektos = outside, and derm = skin, hence, the outermost germ layer of the embryo.
- **ectopic:** Greek ek = out, and topos = place, hence out of place.
- **edge:** border or margin of a surface.
- **effluent:** adjective, Latin ex = out, and ferens = carrying, hence, conducting from.
- **ejaculatory:** Latin ex = out, and jacere = to throw, hence throwing out.
- **elbow:** the junction between arm and forearm.
- **elevate:** Latin elevatus = raised up, hence, to raise up, and elevation = a raised part.
- **emboliformis:** adjective, Greek embolus = wedge or blocking matter.
- **embryo:** Greek en = within, and bryein = to swell or grow, hence the early stage of intrauterine development.
- **eminence:** Latin eminens = projecting, hence, a projection (usually smooth).
- **emissary:** adjective, Latin e = out, and emissum = sent out; emissary vein, one connecting intra- with extra-cranial venous channels.
- **encephalon:** Greek en = within, and kephalos = head, hence, the brain.
- **endocardium:** Greek endo = within, and kardia = heart, hence, the endothelial lining of the chambers of the heart.
- **endocranium:** Greek endo = within, and kranion = skull, hence, the outer endostial layer of the dura mater.
- **endocrine:** Greek endo = within, and krinein = to separate, hence, the organs that ductlessly secrete their products into the bloodstream.
- **endoderm:** Greek endo = within, and derm = skin, hence, the germ layer of the embryo that gives rise¹² to epithelium of the gastrointestinal and respiratory tracts.
- **endolymph:** Greek endo = within, and Latin lympa = clear water, hence the fluid within the membranous labyrinth of the internal ear.
- **endometrium:** Greek endo = within, and metra = uterus, hence the mucosal lining of the uterine cavity.
- **endothelium:** Greek endo = within, and thele = the nipple; the squamous epithelium lining the heart and blood vessels.
- **ependyma:** Greek = an upper garment. It may refer to a vest or singlet, i.e. an under-garment, hence, the lining membrane of the ventricles of the brain and central canal of the spinal cord.
- **epicanthus:** Greek epi = upon, and kanthos = corner, hence, the fold of skin over the inner angle of the upper eyelid, a normal characteristic in certain races, and a congenital anomaly in others.

- **epicardium:** Greek epi = upon, and kardia = heart, hence, the visceral layer of serous pericardium which covers the heart.
- **epicondyle:** Greek epi = upon, and kondylos = knuckle, hence a prominence on a condyle of the humerus or femur.
- **epicranial:** adjective, Greek epi = upon, and kranion = skull, hence, the epicranial aponeurosis (galea) connecting frontalis to occipitalis muscles.
- **epidermis:** Greek epi = upon, and derm = skin, hence, the most external layer of the skin.
- **epididymis:** Greek epi = upon, and didymos = testis, hence, the organ perched posterosuperior to the testis.
- **epidural:** adjective, Greek epi = upon, Latin dura = tough, hence, external to dura mater.
- **epigastrium:** Greek epi = upon, and gaster = belly, hence, the upper median zone of the abdomen.
- **epiglottis:** Greek epi = upon, and glottis = larynx, hence the uppermost part of the larynx.
- **epimysium:** Greek epi = upon, and mys = muscle, hence the connective tissue surrounding an entire muscle.
- **epiphysis:** Greek epi = upon, and physis = growth, hence, the end of a long bone beyond the cartilaginous growth disc, adjective - epiphysial.
- **epiploic:** adjective, Greek epiploon = a net, which the greater omentum resembles with fat entangled in it.
- **epithelium:** Greek epi = upon, and thele = the nipple; the cell layer lining the internal and external surfaces of the body.
- **erector:** Latin erectus = straight or upright.
- **erigentes:** plural, Latin erigere = to erect.
- **ethmoid:** adjective, Greek ethmos = sieve, and eidos = shape or form, hence, like a sieve; an unpaired skull bone.
- **eversion:** Latin e = out, and versum = turned, hence turned outwards.
- **exophthalmos:** Greek exo = out, and ophthalmos = eye, hence, prominent eyeball.
- **extend:** Latin extendo = extend or stretch out, hence, extension = extended or straightened; the position opposite to the flexed or bent.
- **external:** adjective, Latin externus = outward, hence, further from the inside.
- **extraperitoneal:** adjective, Latin extra = outside, Greek peri = around and teinein = stretched, hence outside the serous membrane stretched around the inside of the abdominal wall and around the viscera.
- **extrapyramidal:** Latin extra = outside, and pyramidal (q.v.), hence descending nerve tracts that do not traverse the pyramids of the medulla.
- **extrinsic:** Latin extrinsecus = from without, hence (usually) a muscle (usually) originating outside the part on which it acts.
- **fabella:** diminutive of Latin faba = a bean, hence, a sesamoid bone found in the lateral head of gastrocnemius.
- **facet:** Latin facies = face, hence a small smooth bony surface, either coated with articular cartilage or the site of a tendinous attachment (cf. a facet on a diamond).
- **facilitate:** Latin facilis = easy, hence, to make easy.

- **falciform**: adjective, Latin falx = a sickle, and forma = form, hence, shaped like a sickle.
- **falx**: Latin = sickle, hence, the sickle-shaped falx cerebri and falx cerebelli, adjective - falciform.
- **fascia**: Latin = band or bandage, hence the fibrous wrapping of muscles - deep fascia, or the subcutaneous layer of fatty connective tissue - superficial fascia, adjective, fascial.
- **fasciculus**: diminutive of Latin fascis = bundle, hence, a bundle of nerve or muscle fibres.
- **fastigius**: Latin fastigium = summit, hence the peak of the 4th ventricle, adjective - fastigial.
- **fauces**: Latin = throat, adjective - faucial.
- **femur**: Latin = thigh, adjective - femoral.
- **fenestra**: Latin = window.
- **fetus**: the developing mammal in utero; in Man, after the 2nd month in utero, adjective - foetal or fetal.
- **fibre**: Latin fibra = a fibre, adjective, Latin fibrosus = fibrous.
- **fibril**: diminutive of Latin fibra = a fibre.
- **fibula**: Latin = brooch, which the tibia and fibula resemble, the fibula representing the movable pin, adjective - fibular.
- **filament**: Latin filamentum = a delicate fibre, adjective - filamentous.
- **filum**: Latin = a thread. Filum terminale - a thread of pia continuous with the lower end of the spinal cord.
- **fimbria**: Latin = a fringe, hence, fimbria hippocampi, a scalloped band of fibres alongside the hippocampus.
- **fissure**: Latin = a cleft.
- **fixator**: Latin fixus = fixed, hence, a muscle which fixes a part.
- **flaccid**: adjective, Latin flaccidus = weak or slack.
- **flavum**: adjective, Latin flavus = yellow.
- **flex**: Latin flexum = bent, hence, flexor, a muscle which bends a part of the body, and flexion = the act of flexing.
- **flexure**: Latin flexura¹³ = a bending.
- **flocculus**: diminutive of Latin floccus, a tuft. Hence resembling a picture of a little cloud, with a woolly top and a flat base, as in flocculus cerebelli.
- **foetus**: the developing mammal in utero; in Man, after the 2nd month in utero, adjective - foetal or fetal.
- **folia**: plural of Latin folium = leaf.
- **follicle**: Latin folliculus = a little bag, adjective - follicular.
- **fontanelle**: French diminutive of Latin fons = fountain, associated with the palpable pulsation of the brain in the anterior fontanelle of an infant.
- **foramen**: Latin = hole.
- **forceps**: Latin = tongs.
- **forearm**: the upper limb between the elbow and the wrist.
- **fornix**: Latin = arch (hence fornication, because the Roman prostitutes plied their profession beneath the arches of the bridges over the river Tiber).

- **fossa**: Latin = a ditch or trench, hence a concavity in bone, or an organ, or on a lining surface.
- **fovea**: Latin = a pit (usually smaller than a fossa).
- **foveola**: diminutive of fovea.
- **frenulum**: diminutive of frenum.
- **frenum**: Latin = bridle or curb.
- **frontal**: adjective, Latin frontis = of the forehead, or coronal.
- **fundiform**: adjective, Latin fundus = bottom or base (cf. fundamental), hence, sling-shaped.
- **fundus**: Latin = bottom or base. (But note that the fundus of the stomach and uterus are at the top, and the fundus of the eye and of the bladder are posterior!).
- **funiculus**: diminutive of Latin funis = cord (used usually for bundles of nerve fibres).
- **fusiform**: adjective, Latin fusus = spindle, hence, spindle-shaped.
- **galea**: Latin = helmet, hence, galea aponeurotica - the aponeurosis of occipitofrontalis muscle.
- **galli**: genitive (possessive case) of Latin = cock, hence, crista galli, the cock's comb.
- **gallus**: Latin = cock, hence, crista galli, the cock's comb.
- **gamma**: the 3rd letter of the Greek alphabet, typically used in a naming sequence - alpha, beta, gamma, delta, etc.
- **ganglion**: Greek = swelling, referring to a peripheral collection of nerve cells, adjective - ganglionic.
- **gastric**: Greek gaster = belly or stomach.
- **gastro**: Greek gaster = belly or stomach.
- **gastrocnemius**: Greek gaster = belly, and kneme = leg, hence, the bulging muscle of the calf.
- **gelatinosa**: Latin gelatus = frozen.
- **gemellus**: Latin diminutive of geminus = twin.
- **genial**: adjective, Greek geneion = chin.
- **geniculate**: Latin geniculare = to flex the knee, hence, a bent knee.
- **geniculum**: Latin geniculare = to flex the knee, hence, a bent knee.
- **genital**: adjective, Latin¹³ genitalis = reproductive, hence, genitalia, the sexual organs.
- **genu**: Latin = knee.
- **gingiva**: Latin = gum (of tooth).
- **girdle**: a ring of bones which may be complete or incomplete.
- **glabella**: diminutive of Latin glaber = bald, hence a smooth bony prominence between the eyebrows.
- **gladiolus**: diminutive of Latin gladius = a sword, hence, hence a small sword, term applied to the body of the sternum.
- **gland**: Latin glans = an acorn, adjective - glandular; a secreting organ.
- **glandula**: diminutive of Latin glans = acorn.
- **glans**: Latin = acorn.
- **glenoid**: adjective, Greek glene = socket, and eidos = shape or form.
- **glia**: Greek = glue, hence, an adhesive connective tissue.
- **globus**: Latin = a globe.

- **glomerulus**: Latin glomerare = to roll up, from glomus = a ball of thread (cf. conglomeration).
- **glossal**: adjective, Greek glossa = tongue.
- **glottic**: adjective, Greek = larynx.
- **glottis**: Greek = larynx, hence, the boundaries of rima glottidis.
- **gluteal**: adjective, Greek gloutos = rump or buttock.
- **gluteus**: Greek gluteos = rump or buttock. One of 3 muscles of the buttock, adjective - gluteal.
- **gonad**: Greek = reproduction, hence a gland producing gametes - ovary or testis, adjective - gonadal.
- **gracile**: adjective, Latin gracilis = slender.
- **gracilis**: adjective, Latin = slender.
- **granulation**: diminutive of Latin granum = a grain.
- **gravid**: adjective, Latin gravida = pregnant.
- **griseum**: adjective, Latin griseus = bluish or pearly grey.
- **gubernaculum**: Latin something which governs or directs, like a rudder (cf. gubernatorial).
- **gustatory**: adjective, Latin gustatio = taste, hence, pertaining to the sense of taste.
- **gyrus**: Greek gyros = circle, hence a coil of brain cortex.
- **habenula**: diminutive of Latin habena = rein.
- **haemorrhoid**: Greek haima = blood, and rhoia = to flow, hence likely to bleed.
- **hallux**: Latin hallex = great toe (hallucis = of the great toe).
- **hamate**: adjective, Latin hamus = a hook, hence, hooked.
- **hamstrings**: the tendons of the muscles of the ham - i.e. of the back of the thigh - felt behind the knee when the leg is flexed against resistance (semimembranosus, semitendinosus and biceps femoris).
- **hamulus**: diminutive of Latin hamus = hook.
- **haustra**: Latin = saccules.
- **helicine**: Greek helix = a coil, spiral.
- **helicotrema**: Greek helix = a coil, and trema = hole, hence the aperture at the apex of the bony cochlea whereby scala vestibuli communicates with scala tympani.
- **helix**: Greek = coil. ¹³
- **hemianopia**: Greek hemi = half, an = negative, opsis = vision, hence loss of half of the field of vision.
- **hemianopsia**: Greek hemi = half, an = negative, opsis = vision, hence loss of half of the field of vision.
- **hemiparesis**: Greek hemi = half, paresis = paralysis, used usually to denote weakness rather than paralysis.
- **hemiplegia**: Greek hemi = half, plegia = stroke, hence, paralysis of one half of the body.
- **hemisphere**: Greek hemi = half, sphaira = ball, hence, half of a sphere.
- **hepar**: Greek = liver, adjective - hepatic.
- **hepatic**: adjective, Greek hepar = the liver.
- **hernia**: Latin = a protrusion, adjective - hernial.
- **hiatus**: Latin = a gap (like that between some people's ears).

- **hilum**: Latin = the point of attachment of a seed, hence the part of an organ where the vessels and nerves are attached; adjective - hilar.
- **hindbrain**: the part of the brain below tentorium cerebelli, comprising medulla oblongata, pons and cerebellum.
- **hip**: the lateral prominence of the hip bone and greater trochanter.
- **hippocampus**: Greek hippokampos = a sea-horse, hence, the curled shape of the hippocampus in coronal section; adjective - hippocampal.
- **homologous**: adjective, Greek homos = same, and logos = word, hence a part with similar morphology but different function.
- **horizontal**: adjective - parallel to the horizon.
- **horn**: a projection, often pointed.
- **humerus**: Latin = the arm-bone.
- **humour**: Latin humor = liquid, hence the aqueous and vitreous humour of the eyeball.
- **hyaline**: adjective, Greek hyalos = glassy.
- **hydrocephalus**: Greek hydor = water, koilos = head. (cf. cephalic).
- **hymen**: Greek = membrane; across the virginal vagina.
- **hyoid**: adjective, Greek = U-shaped.
- **hyperacusis**: Greek hyper = over, and akousis = hearing, hence excessive sensitivity to sound.
- **hypoglossal**: adjective, Greek hypo = under, and glossa = tongue.
- **hypophysis**: Greek hypo = down, physis = growth, hence, a downgrowth (from the brain). However, this is not the whole truth. Part is an upgrowth from the pharynx, adjective - hypophysial.
- **hypothalamus**: Greek hypo = under, and thalamus (q.v.), refers to part of diencephalon.
- **ileum**: Greek eilein = twisted. adjective - ileal.
- **ilium**: Latin the bone of the flank, adjective - iliac.
- **ima**: adjective, Latin = lowest, hence artery thyroidea ima.
- **impar**: Latin = unpaired.
- **incisor**: Latin incisum = cut up.
- **incisura**: Latin = notch.
- **incus**: Latin = anvil, hence the anvil-shaped ossicle of the middle ear.
- **index**: Latin = a pointer, hence, the fore-finger.
- **indicis**: genitive of Latin index = a pointer, hence, of the fore-finger.
- **indusium**: Latin = tunic.
- **inferior**: adjective, Latin = lower down, hence, farther from the head end.
- **infra**: Latin = below.
- **infundibulum**: Latin = funnel.
- **inguinal**: adjective, Latin inguen = groin.
- **inhibition**: Latin inhibitus = restrained, hence, reduction of the excitability of a synapse.
- **innervate**: Latin in = into, and nervus = nerve, hence, to supply a nerve to a part.
- **innominate**: Latin in = not, and nomen = name, hence, without a name.
- **insert**: Latin insertio = to join into, implant, hence, to attach; noun - insertion.

- **inspection:** Latin inspectus = examined, hence, visual examination.
- **insula:** Latin = island.
- **integument:** Latin in = on, tegmen = roof, hence the skin coat.
- **intercalated:** adjective, Latin inter = between, and calatum = inserted, hence interposed.
- **interdigitate:** Latin inter = between, and digitus = a digit. Hence, to interlock like fingers.
- **internal:** adjective, Latin internus = inward, hence, nearer the inside.
- **internuncial:** adjective, Latin inter = between, nuncius = messenger.
- **interstitial:** adjective, Latin inter = between, and sistum = set, hence, set between.
- **intestine:** Latin intestinum = the digestive tube beyond the stomach.
- **intima:** Latin = innermost.
- **intra:** Latin = within.
- **intrafusul:** adjective, Latin intra = within, fusus = spindle.
- **intrinsic:** adjective, Latin = on the inside.
- **introitus:** Latin intro = within, and ire = to go, hence, an orifice or point of entry to a cavity or space.
- **inversion:** Latin in = in, and vertere = to turn, hence to turn inward, inside out, upside down.
- **ipsilateral:** Latin ipsi = self, the same, and latus = side, hence on the same side.
- **iris:** Latin = a rainbow.
- **ischium:** Greek ischion = socket, because the ischium contributes more than either the ilium or pubis to the acetabulum.
- **iso:** Greek = equal.
- **isthmus:** Greek isthmos - a narrow passage.
- **jejenum:** Latin jejunos = empty, adjective - jejunal.
- **joint:** the meeting of 2 or more bones or cartilages, at which movement is possible.
- **jugular:** adjective, Latin jugulum = neck.
- **jugum:** Latin = yoke (cf. conjugal).
- **juxta:** Latin = near.
- **keratin:** Greek keras = horn.
- **kinocilium:** Greek kineo = to move (cf. kinetic), and cilium Latin = eyelash, hence protoplasmic thread of hair process in cupula of crista ampullaris of a semicircular duct.
- **knee:** the junction of the thigh and the leg.
- **koniocortex:** Greek konis = dust, and Latin cortex = bark, hence, sensory cortex containing mostly granular layers.
- **kyphosis:** Greek kyphos = bent or bowed forward.
- **labium:** Latin = lip (plural labia), adjective - labial.
- **labrum:** Latin = rim.
- **labyrinth:** Greek labyrinthos = maze, adjective - labyrinthine.
- **lacerum:** Latin lacer = mangled, hence, lacerated, torn.
- **lacrimal:** adjective, Latin lacrima = a tear (drop).
- **lactation:** Latin lactans = suckling. Hence, the act of secreting milk.
- **lacteal:** adjective, Latin lac = milk, hence, resembling milk.

- **lactic**: adjective, Latin lac = milk.
- **lactiferous**: adjective, Latin lac = milk, and ferre = to carry.
- **lacuna**: Latin lacus = lake, hence, a small pond or gap, adjective, lacunar.
- **lambda**: Greek letter representing a capital 'L' and written as an inverted V.
- **lambdoid**: adjective, Greek lambda, representing a capital 'L' and written as an inverted V; hence, like that letter.
- **lamella**: diminutive of Latin lamina = plate; hence, a small plate.
- **lamina**: Latin = plate, either a layer of nervous tissue, like the laminae of the lateral geniculate body, or a connective tissue membrane, like lamina cribrosa sclerae, or of bone, as in vertebral laminae; hence, laminectomy = lamina + Greek ektome = excision - excision of the vertebral laminae to give access to the spinal cord; adjective - laminar.
- **lanugo**: Latin lana = wool, hence, the fine downy hair on the skin of the foetus, or cheeks.
- **larynx**: Greek = voice-box, adjective - laryngeal.
- **lata**: Latin latus = side.
- **lateral**: adjective, Latin latus = side, hence, nearer the side.
- **latissimus**: superlative of adjective, Latin latus = wide, hence, latissimus dorsi muscle, the widest muscle of the back; earlier name was anitersor - wiper of the anus.
- **leg**: the lower limb between the knee and the ankle.
- **lemniscus**: Greek lemniskos = a band or ribbon (applied to nerve fibres).
- **lens**: Latin = lentil - a transparent body with one or both surfaces curved to re-direct light rays, adjective - lentiform or lenticular.
- **lentiform**: adjective, Latin lens = lentil, and forma = shape, hence, lentil-shaped.
- **leptomeninx**: Greek lepto = delicate, and meninx = membrane. Usually refers to pia and arachnoid. Plural leptomeninges.
- **levator**: Latin = elevator.
- **lien**: Latin = spleen, adjective - lienal.
- **ligament**: Latin ligamentum = bandage, usually tying parts to each other, adjective - ligamentous.
- **limbic**: adjective, Latin limbus = a margin, usually curved.
- **limbus**: Latin = a margin, usually curved, hence, limbus of cornea, its circular junction with the sclera, adjective - limbic; limbic lobe of the brain comprises structures which encircle the junction of the diencephalon and telencephalon.
- **limen**: Latin = a threshold, hence, subliminal - below threshold.
- **linea**: Latin = line.
- **lingua**: Latin = tongue, adjective, lingual.
- **lingula**: diminutive of lingua, hence, a little tongue, adjective - lingular.
- **lissencephalic**: adjective, Greek lissos = smooth, hence, a cerebrum lacking sulci.
- **lobule**: diminutive of lobus.
- **lobulus**: Latin diminutive of lobus, hence, a lobule.
- **lobus**: Greek lobos = lobe, adjective - lobar.
- **locus**: Latin a place (cf. location, locate, dislocate).
- **loin**: Latin lumbus - the part of the back between the ribs and the hip bone.
- **longissimus**: superlative of Latin longus = long, hence, the longest.

- **longitudinal**: adjective, Latin longitudo = length, hence, lengthwise.
- **longus**: adjective, Latin = long, hence, longissimus (superlative) = the longest.
- **lucidum**: Latin lucidus = clear.
- **lumbar**: adjective - see loin.
- **lumbrical**: Latin lumbricus = worm, hence worm-shaped muscles of the palm.
- **lumen**: Latin = opening, hence the space within a tube.
- **lunate**: adjective, Latin luna = moon, hence, crescentic.
- **luteum**: adjective, Latin = yellow.
- **lymph**: Latin lymph - clear spring water.
- **lymphatic**: a vessel carrying lymph.
- **macroscopic**: adjective, Greek makros = large, and skopein = to examine; hence, large enough to be seen with the naked eye, e.g., pertaining to gross anatomy.
- **macula**: Latin = spot (cf. immaculate - spotless); adjective - macular.
- **magna**: Latin = great.
- **malleolus**: diminutive of Latin malleus = hammer, adjective - malleolar.
- **malleus**: Latin = a hammer.
- **mamma**: Latin = breast; adjective - mammary.
- **mammilla**: diminutive of mamma; adjective - mammillary.
- **mandible**: Latin mandere = to chew; hence, the movable lower jaw; adjective - mandibular.
- **manubrium**: Latin = handle; adjective - manubrial.
- **manus**: Latin = hand (cf. manual).
- **margin**: the edge or border of a surface; adjective - marginal.
- **masseter**: Greek = chewer; adjective - masseteric.
- **mastication**: Latin masticere = to chew.
- **mastoid**: adjective, Greek mastos = breast or teat, and eidos = shape or form.
- **matrix**: Latin = a female animal used for breeding, womb; refers to ground substance of connective tissue, and nail bed.
- **maxilla**: Latin = jaw-bone; now used only for the upper jaw; adjective - maxillary.
- **meatus**: Latin = passage; adjective - meatal.
- **medial**: adjective, Latin medius = middle; hence, nearer the median plane.
- **median**: Latin medianus = in the middle.
- **mediastinum**: derivation doubtful, but possibly from Latin medius = middle, and stans = standing; hence, a median vertical partition, adjective - mediastinal.
- **medius**: Latin = middle.
- **medulla**: Latin = marrow; applied to part of an organ deep to its cortex, and to the spinal cord and adjoining part of brain stem, which may have been thought to be the marrow of the vertebral column, adjective - medullary pertains to the medulla of an organ or medulla oblongata.
- **membrane**: Latin membrana = a thin sheet; adjective - membranous.
- **meninges**: plural of Greek meninx = a membrane; adjective - meningeal.
- **meniscus**: Latin menis - a small crescent.
- **mental**: adjective - Latin mentum = chin; or Latin mens = mind.
- **mesencephalon**: Greek mesos = middle, and enkephalos = brain; adjective - mesencephalic.

- **mesenchyme:** Greek mesos = middle, and chymos = juice; the embryonic connective tissue of the mesoderm.
- **mesentery:** Greek mesos = middle, and enteron = intestine; hence, the peritoneal fold which tethers the centrally situated small intestine; adjective - mesenteric.
- **mesial:** adjective - medial, used in dental anatomy.
- **mesoderm:** Greek mesos = middle, and derma = skin; the middle germ layer of the embryo.
- **mesosalpinx:** Greek mesos = middle, and salpinx = tube; hence, the intermediate part of the broad ligament.
- **metacarpus:** Greek meta = after, and karpus = wrist; adjective - metacarpal.
- **metaphysis:** Greek meta = after, and physis = growth; hence, the end of the shaft of a bone alongside the epiphysial or growth cartilage; adjective - metaphysial.
- **metatarsus:** Greek meta = after, and tarsos = ankle; hence, the bones beyond the tarsus, adjective - metatarsal.
- **metencephalon:** Greek meta = beside, behind, or after, and enkephalos = brain; hence the parts of the hindbrain immediately caudal to the fore- and midbrain, namely the pons and cerebellum.
- **metopic:** adjective, Greek metopon = forehead.
- **micturition:** Latin micturare = to desire to pass urine.
- **minimus:** Latin = smallest.
- **miosis:** Greek meiosis = lessening; hence, pupillary constriction; adjective - miotic.
- **modality:** Latin modus = mode; hence, a form of sensation - e.g. touch, pain, sight.
- **modiolus:** Latin a cylindrical borer with a serrated edge; hence, like a screw; the central stem of the bony cochlea.
- **molar:** adjective, Latin mola = mill.
- **mons:** Latin = mountain; mons pubis, the soft tissue bulge over the female pubes.
- **morphology:** Greek morphos = form, and logos = word or relation; hence, study of pattern of structure; adjective - morphological.
- **multifidus:** Latin multus = much, and findere = to split.
- **muscle:** Latin musculus, diminutive of Greek mus = mouse, the body and head of which represent the main belly of a muscle, and the tail, the tendon.
- **mydriasis:** Greek = dilatation of the pupil.
- **myelencephalon:** Greek myelos = marrow (= Latin medulla), and enkephalos = brain; hence the medulla oblongata. See also medulla.
- **myelin:** Greek myelos = marrow; hence, white fatty sheath of an axis cylinder; adjective - myelinated.
- **myenteric:** Greek mys = muscle, and enteron = intestine, hence, pertaining to the muscle of the gut.
- **mylohyoid:** Greek mylo = molar, and hyoeides = U-shaped.
- **myocardium:** Greek mys = muscle, and kardia = heart, adjective - myocardial.
- **myotome:** Greek mys = muscle, and tome = a cutting or division; hence, a group of muscles innervated by a single spinal segment.
- **nares:** plural, Latin naris = nostril.
- **naris:** Latin = nostril, plural - nares.
- **nasal:** adjective, Latin nasus = nose; hence, pertaining to the nose.

- **natal:** adjective, Latin natus = born; hence, relating to birth.
- **navicular:** adjective, Latin navicula = a little ship (cf. naval); hence, the tarsal bone which is concave posteriorly, resembling a boat.
- **neo-:** Greek prefix - neos = new.
- **neonatal:** adjective, Greek neos = new, and Latin natus = born; hence, new-born.
- **neopallium:** Greek neos = new, and Latin pallium = cloak; hence, the cerebral cortex which developed more recently than the archipallium or olfactory cortex.
- **nerve:** Latin nervus = tendon; later reserved for a peripheral bundle of fibres which conduct impulses from or to the central nervous system.
- **neural:** adjective, Greek neuron = nerve.
- **neuroglia:** Greek neuron = nerve, and gloia = glue; hence, the connective tissue of the central nervous system; adjective - neuroglial.
- **neurohypophysis:** or posterior lobe of hypophysis - Greek hypo = down, and physis = growth; hence, the posterior part of the hypophysis evaginated downwards from the diencephalon, and its stalk.
- **neurolemma:** Greek neuron = nerve, and lemma = peel or rind; hence, the covering layer of a nerve.
- **neuron:** Greek = nerve; refers to the nerve cell body, with its axon and dendrites; adjective - neuronal.
- **nigra:** Latin niger = black, dark.
- **node:** Latin nodus = knot.
- **nodule:** diminutive of Latin nodus = knot, hence, a little knot.
- **norma:** Latin = pattern or rule, or aspect; adjective, normal - according to rule.
- **notch:** an indentation in the margin of a structure. Etymology uncertain.
- **notochord:** Greek notos = back, and chorde = cord; hence, the primitive axial skeleton around which the vertebrae develop, parts persisting in the nuclei pulposi.
- **nucha:** French nuque = nape or back of the neck; adjective - nuchal.
- **nucleus:** Latin = kernel or nut; may refer to the vital centre of a cell body, or to a cluster of neuron cells in the central nervous system; adjective - nuclear.
- **nystagmus:** Greek = drowsiness, to nod, hence, involuntary, rapid, rhythmic eye movements.
- **obex:** Latin = barrier;¹³ hence, the coronal fold of ependyma over the lower angle of the 4th ventricle.
- **oblique:** adjective, Latin obliquus; slanting, or deviating from the perpendicular or the horizontal.
- **oblongata:** Latin oblongus = oblong; medulla oblongata.
- **obturator:** Latin obturatus = stopped up; hence, a structure which closes a hole.
- **occiput:** Latin ob = prominent (cf. obvious), and caput = head; hence, the prominent convexity of the back of the head; adjective - occipital.
- **occlusion:** Latin occlusum = closed up; hence, apposition of reciprocal teeth, or the blocking of any tubular structure; adjective - occlusal.
- **oculomotor:** Latin oculus = eye, and movere = to move, hence, pertaining to moving the eye.
- **oculus:** Latin = eye.
- **odontoid:** Greek odous = tooth, and eidos = form, shape, hence, tooth-like.

- **oesophagus:** Greek = gullet (passage from pharynx to stomach); adjective - oesophageal.
- **olecranon:** Greek olene = ulna, and kranion = upper part of head; hence, the upper end of the ulna.
- **olfactory:** adjective, Latin olfacto = smell.
- **olive:** Latin oliva - the oval fruit of the olive tree; oval eminence on medulla oblongata; adjective - olivary.
- **omentum:** Latin = apron; adjective - omental.
- **omohyoid:** Greek omos = shoulder; hence, a muscle attached to the scapula and hyoid.
- **operculum:** Latin = lid or cover; hence, operculum insulae, the cerebral cortex covering and hiding the insula (the 5th lobe of cerebral cortex).
- **ophthalmic:** adjective, Greek ophthalmos = eye.
- **opponens:** Latin = placing against, opposing.
- **oppose:** Latin oppositum = put against; hence, to resist or place in contact with, and opposition - the action of opposing.
- **optic:** adjective, Greek optos = seen; hence, pertaining to sight.
- **ora:** Latin ora = margin or edge.
- **ora serrata:** Latin ora = margin, and serra = saw; hence, the serrated anterior edge of the functional part of the retina.
- **oral:** Latin oris = a mouth, hence, pertaining to the mouth.
- **orbit:** Latin orbis = circle; the name given to the bony socket in which the eyeball rotates; adjective - orbital.
- **orifice:** Latin orificium = opening.
- **os, oris:** Latin os = mouth; plural - ora, adjective - oral.
- **os, ossis:** Latin os = bone; plural - ossa, adjective - osseous.
- **ossicle:** Latin ossiculus, diminutive of os = bone.
- **ossify:** Latin os = bone, and facio = make; hence, to form bone; and ossification, the process of bone formation.
- **osteology:** Greek osteon = bone, and logy = a field of study.
- **ostium:** Latin = a door, an opening, an orifice.
- **otic:** adjective, Greek ¹otos = ear.
- **otolith:** Greek otos = ear, and lithos = stone; hence, calcareous particles in the utricle and saccule of the membranous labyrinth.
- **ovary:** Latin ovum = egg; hence, the organ containing ova (the largest cells in the female).
- **ovum:** Latin = egg, plural - ova.
- **pachymeninx:** Greek pachys = thick, and meninx = membrane; hence, the thick membrane covering the central nervous system, i.e., dura mater.
- **palaeo:** Greek palaios = old; hence, palaeocerebellum, the earliest stage in the evolution of the cerebellum.
- **palate:** Latin palatum = palate, adjective - palatal or palatine.
- **paleo:** Greek palaios = old; hence, paleocerebellum, the earliest stage in the evolution of the cerebellum.
- **pallidus:** adjective, Latin = pale.

- **pallium**: Latin = cloak; hence, the cerebral cortex forming the outer covering of the cerebral hemisphere.
- **palma**: Latin palma = palm; adjective, palmar - Latin palmaris.
- **palpate**: Latin palpare = to touch, and palpatus = touched; hence, to examine by feeling, and palpation, such an examination.
- **palpebra**: Latin = eyelid, probably from palpitare = to flutter.
- **pampiniform**: adjective, Latin pampinus = tendril, and forma = shape.
- **pancreas**: Greek = sweetbread, derived from Greek pan = all, and kreas = flesh; adjective - pancreatic.
- **panniculus**: diminutive of Latin pannus = cloth.
- **papilla**: Latin = nipple or teat; adjective - papillary.
- **paradidymis**: Greek para = beside of near, and didymis = twinned or paired, refers to testes; hence the collection of convoluted tubules in the spermatic cord, above the head of the epididymis.
- **paraesthesia**: Greek para = beside, and aesthesia = sensation; hence, abnormal sensation, usually burning or pricking.
- **paralysis**: Greek para = beside, near, lyein = to loosen; hence loss or impairment of muscle function.
- **parametrium**: Greek para = beside, and metra = womb; hence, connective tissue alongside the body of the uterus, within the broad ligament.
- **paraplegia**: Greek para = beside, and plege = a stroke; hence, paralysis of the lower limbs.
- **pararenal**: adjective, Greek para = beside, Latin ren = kidney; hence, beside the kidney, e.g., pararenal fat, the fatty capsule of the kidney.
- **parasternal**: adjective, Greek para = beside, and sternon = chest; hence, the parasternal line is a vertical line about midway between the sternal edge and the midclavicular line.
- **parasympathetic**: adjective, Greek para = beside, syn = with, and pathos = feeling; hence, the division of the autonomic nervous system complementary to the sympathetic system.
- **parathyroid**: adjective, Greek para = beside, and thyroid; hence, beside the thyroid gland. 14
- **parenchyma**: Greek para = beside or near, en = in, and chein = to pour; hence a general term to designate the functional elements of an organ, as opposed to the framework or stroma.
- **pareisis**: Greek = relaxation, but has come to mean partial paralysis.
- **parietal**: adjective, Latin parietalis, pertaining to paries = wall.
- **parotid**: adjective, Greek para = beside, and otos = of the ear; hence, beside the ear.
- **parous**: adjective, Latin pario = I bear (children); hence, adjective, applied to woman who has borne one or more children (cf. nulliparous, multiparous).
- **pars**: Latin = part.
- **patella**: Latin a small pan; adjective - patellar.
- **pecten**: Latin = comb.
- **pectinate**: adjective, from Latin pecten = a comb; applied to structures having the appearance of parallel teeth arising from a straight back (musculi pectinati), or the

seller appearance of the superior pubic ramus, which may have resembled the body of antique combs.

- **pectineal**: adjective, from Latin pecten = a comb; applied to structures having the appearance of parallel teeth arising from a straight back (musculi pectinati), or the seller appearance of the superior pubic ramus, which may have resembled the body of antique combs.
- **pectineus**: Latin, pecten = a comb; hence the muscle attaching to the pecten (pectineal line) of the pubic bone.
- **pectoral**: adjective, Latin pectoris = of the front of the chest.
- **pectoralis**: adjective, Latin pectoris = of the front of the chest.
- **pedicle**: diminutive of Latin pedis = of the foot.
- **pedis**: Latin = of the foot.
- **peduncle**: variation of pedicle.
- **pellucidum**: adjective, Latin per = through, and lucere - to shine; hence, translucent.
- **pelvis**: Latin = basin, adjective - pelvic.
- **penis**: Latin = tail, the male organ of copulation (cf. appendix, appendage).
- **pennate**: Latin penna = feather; hence, a muscle whose fibres approach the tendon from one direction is unipennate; from two, bipennate, and from more than two, multipennate.
- **pennatus**: (pinnate) - adjective, Latin penna = feather; hence, a muscle whose fibres approach the tendon from one direction is unipennate; from two, bipennate, and from more than two, multipennate.
- **perianal**: adjective, Greek peri = around, and Latin anus = lower opening of alimentary canal.
- **pericardium**: Greek peri = around, and kardia = heart; hence, the membranes enclosing the heart.
- **perichondrium**: Greek peri = around, and chondros = cartilage; hence, the membrane covering cartilage.
- **pericranium**: Greek peri = around, and kranion = skull; hence, the external periosteum of the skull.
- **perilymph**: Greek peri = around, and lympa - Latin = clear water; hence, the fluid in the bony labyrinth¹⁴ surrounding the membranous labyrinth (and continuous with the cerebrospinal fluid).
- **perineum**: Greek the caudal aspect of the trunk between the thighs, or, the region of the trunk below the pelvic diaphragm; adjective - perineal.
- **periodontal**: adjective, Greek peri = around, and odont = tooth.
- **periosteum**: Greek peri = around, and osteon = bone; hence, the membrane around a bone.
- **peripheral**: adjective, Greek peri = around and phero = carry; hence, away from the centre (cf. periphery).
- **peristalsis**: Greek peri = around, and stellein - to constrict; hence, a circular constriction passing as a wave along a tube; adjective - peristaltic.
- **peritoneum**: Greek periteino = to stretch around; hence, the membrane stretched around the internal surface of the walls and the external aspect of some of the contents of the abdomen; adjective - peritoneal.

- **peroneal**: adjective, Greek perone = clasp, brooch - see fibula.
- **pes**: Latin = foot.
- **petrosal**: adjective, Latin petrosus = rocky.
- **petrous**: adjective, Latin petrosus = rocky.
- **phalanx**: Latin = row of soldiers; hence, one of the small bones of a digit, plural - phalanges, adjective - phalangeal.
- **phallus**: Greek phallos = penis.
- **pharynx**: Greek = throat; adjective - pharyngeal.
- **philtrum**: Greek philtron - the median sulcus of the upper lip. Derivation doubtful.
- **phonation**: Greek phone = sound or voice; hence, the production of either.
- **phrenic**: Greek phren = diaphragm or mind; hence, diaphragmatic (cf. schizophrenic).
- **pia**: Latin = faithful, hence, the membrane which faithfully follows the contour of the brain and spinal cord.
- **pilomotor**: Latin pilus = a hair, and movere = to move; hence the action of the arrectores pilorum muscles.
- **pilus**: Latin = a hair.
- **pineal**: adjective, Latin pinea = a pine cone; hence, the pineal gland which is cone-shaped.
- **piriform**: adjective, Latin pirum = a pear; hence, pear-shaped.
- **pisiform**: adjective, Latin pisum = a pea; hence, pea-shaped.
- **pituitary**: Latin pituita = mucous or phlegm, the gland was thought to produce mucous that discharged through the nose.
- **placenta**: Latin = a flat, round cake.
- **placode**: Greek plax = plate or flat, and eidos = shape or form.
- **plane**: Latin planus = flat; hence, a real or imaginary flat surface.
- **planta**: Latin the sole of the foot; adjective - plantar or plantaris.
- **plantar**: adjective, Latin planta = the sole of the foot.
- **platysma**: Greek = flat object; hence, the flat subcutaneous muscle extending from below the clavicle to the mouth.
- **pleura**: Greek = a rib. Later used to name the serous membrane lining the chest walls and the lung on each ¹⁴side.
- **plexus**: Latin = a network or plait.
- **plica**: Latin plicare = to fold; hence, a fold.
- **pneumon**: Greek pneuma = air.
- **pollex**: Latin = thumb.
- **pollicis**: genitive (possessive case) of Latin pollex = thumb; hence of the thumb.
- **pons**: Latin = bridge; adjective - pontine; part of the brain stem.
- **popliteus**: Latin poples = the ham or thigh, and sometimes, the knee; adjective, popliteal, referring to the fossa behind the knee or its contents.
- **porta**: Latin = a gate, also Latin portare = to carry; hence, the portal system carries venous blood from the alimentary tract to the porta hepatis; adjective - portal.
- **porus**: Latin a pore or foramen; hence, the openings of the acoustic meatuses.
- **posterior**: adjective, Latin post = behind (in place or time).

- **posture:** Latin positus = placed; hence, the position of the body as a whole at a given moment, e.g. erect, recumbent, prone, supine, sitting, kneeling.
- **precuneus:** Latin pre = before, and cuneus = wedge; hence, the parietal lobule anterior to the cuneus.
- **prepuce:** Latin praeputium = foreskin (of penis or clitoris).
- **princeps:** Latin primus = chief, and capere = to take; hence chief or principal.
- **procerus:** Latin = slender, elongated; hence, the vertical slip of muscle between the medial part of frontalis and the root of the nose.
- **process:** Latin = going forwards, used to indicate growing out, i.e., an outgrowth, usually of bone, e.g., the zygomatic process of the temporal.
- **processus:** Latin going forwards, used to indicate growing out, i.e., an outgrowth, usually of bone, e.g., the zygomatic process of the temporal.
- **profundus:** Latin pro = before, and fundus = bottom; hence profundus = deep.
- **prominens:** Latin = projecting.
- **promontory:** Latin promontorium = a headland, i.e., part of land jutting into the sea - used for a bony prominence.
- **pronate:** Latin pronatus = bent forwards; hence to pronate = to turn the hand so that the palm faces posteriorly.
- **prone:** Latin pronatus = bent forwards; hence, recumbent face-down posture.
- **proprioceptive:** Latin proprius = one's own, and captum = taken; hence, sensory impulses received by the joints and muscles within one's own body.
- **prosection:** Latin pro = before, and sectum = cut. A dissection prepared for demonstration of anatomic structures.
- **prosector:** Latin pro = before, and sectum = cut. One who prepares a dissection for demonstration.
- **prosencephalon:** Latin pro = in front, and Greek enkephalos = brain; hence, the part of the brain rostral to the midbrain.
- **prostate:** Greek pro = before, and Latin = staturum = stood; hence, something which stands before - the prostate stands before the urinary bladder.
- **protract:** Latin protractus = drawn out; hence, to put forwards (e.g., shoulder or mandible). Protraction - the act of protracting.
- **protrude:** Latin protrudo = thrust forwards, e.g. the tongue; protrusion - the act of protruding.
- **protuberance:** Latin protubero = I bulge out; hence, a bulging bony feature (see tuber).
- **proximal:** adjective, Latin proxime = nearest; hence, nearer to the root of a limb.
- **psoas:** Greek = loin.
- **pterion:** Greek pteron = wing; hence, the region where the tip of the greater wing of the sphenoid meets or is close to the parietal, separating the frontal from the squamous temporal; alternatively the region where these 4 bones meet.
- **pterygoid:** adjective, Greek pteryx = wing, and eidos = shape; hence, wing-shaped.
- **ptosis:** Greek = fall; hence, drooping of an eyelid, or descent of an internal organ.
- **puberty:** Latin puber = adult; hence, the time when hair appears in the pubic region - i.e., near the pubis - as a secondary sexual characteristic.

- **pubes:** Latin = adult or signs of manhood, hence the lower abdominal secondary sexual hair.
- **pubis:** Latin pubes (see pubes)
- **pubendal:** adjective, Latin pudendus = shameful; hence, pertaining to the external genitalia.
- **pulmonary:** adjective, Latin pulmo = lung.
- **pulp:** Latin pulpa = a soft part of the body or tooth.
- **pulposus:** Latin pulpa = a soft part of the body or tooth, hence pulpy or soft.
- **pulvinar:** Latin pulvinus = rounded cushion; the posterior end of the thalamus.
- **punctum:** Latin = a sharp point; hence a very small point or orifice.
- **pupil:** Latin pupilla = the central black orifice in the iris; adjective - pupillary.
- **putamen:** Latin = peel, husk or shell of fruit or seed (the external part of the lentiform nucleus).
- **pyelogram:** Greek pyelos = basin, and gramma = diagram; hence, radiograph of the renal pelvis (and usually of the ureter) after filling with contrast medium.
- **pylorus:** Greek = gate-keeper; hence, the part of the pyloric canal containing the sphincter, which guards the opening into the duodenum; adjective - pyloric.
- **pyramid:** Greek pyramis = a pyramid (solid with 3- or more-sided base, and flat sides meeting at the apex), adjective - pyramidal.
- **quadrangular:** Latin quadri = four and angulus = angle; hence square or rectangular.
- **quadratus:** Latin = square or rectangular.
- **quadriceps:** Latin quadri = four, and caput = head; hence, a 4-headed muscle.
- **quadrigeminus:** Latin quadri = four, and gemini = paired or twinned; hence four-fold.
- **radiation:** Latin radiatus = radiant; hence, divergence from a common centre (cf. radius).
- **radicle:** diminutive of Latin radix = root; hence a small root, adjective - radicular.
- **radius:** Latin = spoke of a wheel, which rotates around the hub; hence, the lateral bone of the forearm, which rotates (though around an almost vertical axis); adjective - radial.
- **radix:** Latin = root.
- **ramify:** Latin ramus ¹⁴a branch; and facere = to make; hence, to branch.
- **ramus:** Latin = branch; hence, a branch of a nerve.
- **raphe:** Greek a seam; hence, the line of junction of the edges of 2 muscles or areas of skin.
- **recess:** Latin recessus = a secluded area or pocket; hence, a small cavity set apart from a main cavity.
- **rectum:** adjective, Latin rectus = straight. (The rectum was named in animals where it is straight - which it is not in Man).
- **rectus:** Latin rectus = straight.
- **recurrent:** Latin re = back, and currere = to run; hence a structure that bends, and runs back toward its source.
- **reflex:** an involuntary response - muscular or secretory - to a stimulus mediated by the central nervous system.
- **renal:** adjective, Latin ren = kidney.

- **rete**: Latin = a net; hence, a network of veins or tubules.
- **reticular**: adjective, Latin reticulum = small net; hence having a network.
- **reticulum**: diminutive of Latin rete = net; adjective - reticular.
- **retina**: derivation uncertain - the innermost of the 3 layers of the eyeball.
- **retinaculum**: Latin = a tether; hence, a thickened band of deep fascia which retains tendons or the patella.
- **retract**: Latin re = back, and tractum = pulled; hence, to pull something back, and retraction - the act of retracting.
- **retro**: prefix - Latin = backwards.
- **retroflexion**: Latin retro = backwards, and flexion = bent; hence, the position of being bent backwards, applied to the angulation of the body of the uterus on the cervix.
- **retroversion**: Latin retro = backwards, and version = turned; hence, the position of being turned backwards, applied to the angulation of the cervix uteri on the vagina.
- **rhinencephalon**: Greek rhinion = nostril, and enkephalos = brain; hence, the part of the brain concerned with smell (relatively large in lower animals).
- **rhombencephalon**: Greek rhombos = rhomboid, and enkephalos = brain; hence, the hind-brain - the medulla oblongata, pons and cerebellum, which enclose the rhomboid fossa (the floor of the 4th ventricle).
- **rhomboid**: Greek rhombus = a figure with 4 equal sides, not at right angles, and eidos = shape or form, hence, the shape of a rhombus.
- **rima**: Latin = chink; hence, e.g., rima palpebrarum = the chink between the free edges of the eyelids.
- **risorius**: Latin risor = scoffer; hence, muscle risorius is the facial muscle which expresses laughter by drawing the corner of the mouth laterally.
- **rostral**: adjective, Latin rostrum = beak, implying nearness to the corpus callosum.
- **rostrum**: Latin beak, which decorated the Roman orator's platform; hence, a platform or beak-like structure; adjective - rostral.
- **rotate**: Latin rota = wheel; hence, to turn, and rotation, the act of turning.
- **rotundum**: Latin rotundus = round.
- **rubro**: prefix, Latin rubrum = red.
- **ruga**: Latin = a wrinkle¹⁴.
- **rugose**: adjective, Latin ruga = a wrinkle, hence, wrinkled.
- **sac**: Latin saccus = a sack.
- **sacciform**: Latin saccus = sac-shaped
- **saccule**: Latin sacculus, diminutive of saccus.
- **sacrum**: Latin os sacrum = sacred, via Greek hieron osteon = sacred bone. Called so either because the sacrum was the part of an animal offered in sacrifice or because of the belief that the soul of the man resides there. A different origin is suggested by an alternate translation of the heron, which can also mean 'strong,' and that the Latin stems from a mistranslation of Galen, who was calling it 'the strong bone.'
- **sagittal**: adjective, Latin sagitta = arrow, because the sagittal suture is notched posteriorly, like an arrow, by the lambdoid sutures.
- **salivary**: adjective, Latin saliva = spit.

- **salpinx:** Greek = trumpet; hence, the uterine or auditory tube, each of which is trumpet-shaped.
- **saphenous:** adjective, Greek saphenes = obviously visible. The saphenous veins become very apparent when varicose.
- **sartorius:** Latin = tailor; hence, sartorius muscles, which produce the posture in which tailors once worked, squatting on the floor.
- **scala:** Latin = stairs; hence the parallel spiral passages which wind up to, or down from, the cupula of the bony cochlea.
- **scalene:** adjective, Greek skalenos = uneven, hence a triangle with unequal sides, an apt description of the shape of scalenus anterior and scalenus medius muscles.
- **scalenus:** adjective, Greek skalenos = uneven, hence a triangle with unequal sides, an apt description of the shape of scalenus anterior and scalenus medius muscles.
- **scaphoid:** adjective, Greek skaphe = skiff, and eidos = shape or form; hence the carpal which is hollowed out on its distal surface for the head of the capitate; also the fossa occupied by tensor veli palatini muscle.
- **scapula:** Greek skapto = I dig, because of the resemblance to a spade.
- **sciatic:** adjective, Greek ischion = hip-joint. Ischiadikos meant pertaining to the ischium or hip - later changed to sciatic. (The ischium earns its name because it forms $> 2/5$ of the acetabulum, whereas the ilium contributes $< 2/5$, and the pubis only $1/5$). The sciatic nerve lies on the ischium.
- **sclera:** Greek skleros = hard; hence the tough, outer layer of the eyeball; adjective - scleral.
- **sclerotome:** Greek skleros = hard, and tome = a cutting.
- **scoliosis:** Greek skolios = crooked or curve, and -osis = condition, hence, the lateral curvature of the spine.
- **scrotum:** possibly derived from Latin scortus = leather; adjective - scrotal.
- **secrete:** Latin secretus = separated; hence, to produce a chemical substance by glandular activity - adjective, secretory; noun, secretion.
- **sella:** Latin = saddle; adjective - sellar, sella turcica = Turkish saddle.
- **semen:** Latin = seed; adjective - seminal (seminal vesicle).
- **semilunaris:** adjective, Latin semi = half, and luna = moon; hence, having a half-moon shape. 14
- **semimembranosus:** adjective, Latin semi = half, and membrana = membrane; hence, the hamstring muscle of which the upper half is membranous.
- **seminiferous:** Latin semen = seed and ferre = to carry, to bear; hence, the sperm-producing tubules in the testes.
- **semitendinosus:** adjective, Latin semi = half, and tendo = I stretch; hence, the hamstring muscle of which the lower half is tendinous.
- **septum:** Latin saeptum = fenced in; hence, a dividing fence or partition.
- **serous:** Latin = like serum.
- **serratus:** adjective, Latin = notched like the edge of a saw (serrate).
- **sesamoid:** adjective, Greek sesamodes, eidos = shape or form; like grains of sesame, hence, small bone in tendon at site of friction.
- **sialogram:** Greek sialon = saliva, and gramma = a diagram; hence, a radiograph of a salivary duct.

- **sigmoid**: adjective, Greek sigma, the form used at the end of a word having an S-shape; hence, S-shaped.
- **sinister**: adjective, Latin = left-sided.
- **sinus**: Latin = a hollow or space which may contain air, venous or arterial blood, lymph or serous fluid; adjective, sinusoid.
- **sole**: the lower surface of the foot - see soleus.
- **soleus**: adjective, Latin solea = flatfish or sandal; hence soleus muscle which does not enter the sole of the foot, but resembles the fish.
- **solitarius**: Latin = solitary, alone.
- **soma**: Greek = the body.
- **somatic**: adjective, Greek soma = the body; hence, pertaining to the body frame but not to its viscera.
- **somite**: Greek soma = body, hence an embryonic body segment.
- **spasm**: Greek spasmos = an involuntary contraction of a muscle; adjective - spastic, or spasmodic.
- **sperma**: Greek = seed or semen, adjective, spermatic.
- **sphenoid**: adjective, Greek sphen = wedge, and eidos = shape or form; hence the unpaired bone which is wedged into the base of the skull between the unpaired frontal and occipital.
- **sphincter**: Greek sphinkter = a tight binder; hence, a circular muscle which closes an orifice; adjective - sphincteric.
- **spine**: Latin spina = a thorn; hence, a sharp process, or a lay term for the vertebral column; adjective, spinous, spinal.
- **splanchnic**: adjective, Greek splanchnon = a viscus or internal organ; hence pertaining to viscera.
- **spleen**: Latin splen = the spleen; hence; adjective - splenic (Latin - lien).
- **splenium**: Greek splenion = a bandage. The splenium of corpus callosum resembles a partly rolled bandage.
- **splenius**: Greek splenion = a bandage. Hence, splenius capitis muscle, with its finely-woven fibres and its quarter-spiral twist from a coronal to a sagittal plane.
- **spongiosum**: adjective, Greek spongia = a sponge.
- **squama**: Latin = a scale (as of fish or reptile); adjective - squamous.
- **squamous**: adjective, Latin squama = a scale (as of fish or reptile), hence scale-like.
- **stapes**: Latin = stirrup; adjective - stapedia, stapedius.
- **stellate**: adjective, Latin stella = star.
- **stereocilia**: Greek stereos = solid, and cilium = eyelash, hence non-motile microvilli.
- **sternebra**: Greek sternon = chest or breast, and -bra = from vertebra, hence the segments of the sternum that fuse in later life.
- **sternum**: Greek sternon = chest or breast; adjective, sternal.
- **stoma**: Greek = a mouth.
- **stomach**: Greek stomachos = gullet or oesophagus, later applied to the wider part of the digestive tract just below the diaphragm; adjective - gastric.
- **strabismus**: Greek strabismos = squinting; hence, inability to focus both eyes on a given point.
- **stratum**: Latin = a covering sheet, or layer.

- **stria**: Latin = furrow, applied to a streak or stripe.
- **striatum**: adjective, Latin striatus = furrowed; hence, corpus striatum, the caudate and lentiform nuclei connected by grey strands which traverse the internal capsule, giving the strands a striated appearance.
- **stroma**: Greek = bed or mattress, deep to the covers; hence, the supporting framework of an organ, as distinct from its special parenchyma.
- **styloid**: adjective, Greek stylos = an instrument for writing, and eidos = shape or form; hence a pen- or pencil-like structure.
- **subclavian**: Latin sub = under or below, and clavis = a key, hence under the clavicle.
- **subiculum**: diminutive of Latin subix = a support.
- **sublimis**: Latin = superficial.
- **substantia**: Latin = a substance.
- **succus**: Latin = juice (succus entericus, the secretion of the small intestine).
- **sudomotor**: Latin sudor = sweat, and movere = to move, hence stimulating the sweat glands.
- **sulcus**: Latin = a groove.
- **superciliary**: adjective, Latin super = above, and cilia = eyelid; hence, pertaining to the eyebrow.
- **superficial**: adjective, Latin super = above, and facies = surface; hence, nearer the surface.
- **superior**: adjective, comparative of Latin superus = above.
- **supination**: the act of turning the back of the hand to face posteriorly; verb - supinate.
- **supine**: adjective, Latin supinus, recumbent on the back. Hence, also, the position of the hand with the dorsum facing posteriorly.
- **supra**: Latin prefix = superior to.
- **suprarenal**: Latin supra = above, over, superior to, and ren = the kidney.
- **sural**: adjective, Latin sura = the calf.
- **sustentaculum**: Latin = a support, which sustains; sustentaculum tali - the ledge on the calcaneus supporting part of the talus.
- **suture**: Latin sutura = a seam; the fibrous joints between cranial bones.
- **sympathetic**: Greek ¹⁴syn = with, and pathos = feeling; hence, the peripheral part of the autonomic nervous system which arises in the thoracolumbar region of the spinal cord and communicates with other nerves.
- **symphysis**: Greek syn = with, and physis = growth; hence a joint where union between the bones is by fibrocartilage - used for median joints. (Symphysis of the mandible is exceptional, the 2 halves fusing before the age of 2).
- **synapse**: Greek syn = with, and aptein = to join; hence, the zone through which an impulse passes from one neuron to another.
- **synchondrosis**: Greek syn = with, and chondros = cartilage; hence, the union of 2 bones by cartilage.
- **syncytium**: Greek syn = with, and kytos = cell, hence a multinucleate mass of protoplasm, formed by the merging of cells.
- **syndesmosis**: Greek syn = with, and desmos = a band; hence, the union of 2 bones by fibrous tissue.

- **syndrome:** Greek syn = with, and dromos = running; hence, a group of signs and symptoms which is characteristic of a certain pathology.
- **synergist:** Greek syn = with, and ergon = work; hence a muscle which cooperates with others in producing a given movement.
- **synovia:** Greek syn = with, and ovum = egg; hence the fluid in freely movable joints resembling egg-white; adjective, synovial.
- **synovial:** adjective, Greek syn = with, and ovum = egg; hence pertaining to the fluid in freely movable joints resembling egg-white.
- **systole:** Greek = contraction; hence the contraction of cardiac muscle.
- **taenia:** Latin = a tape or ribbon.
- **talus:** Latin = ankle-bone; hence, the tortoise-shaped tarsal of the talocrural (ankle) joint.
- **tapetum:** Latin = a carpet or coverlet; hence the roof of the posterior horn of the lateral ventricle.
- **tarsus:** Greek tarsos = a flat surface; hence the flat part of the foot, and later, the bones of the foot behind the metatarsals, adjective, tarsal.
- **tectorial:** adjective, Latin tectorium = an overlying surface like plaster, a covering or roof.
- **tectum:** Latin = roof; hence the roof of the midbrain.
- **tegmen:** Latin = covering (cf. integument = the skin).
- **tegmentum:** Latin = covering.
- **tela:** Latin = a web; e.g., a fold of pia mater containing a choroid plexus.
- **telencephalon:** Greek telos = end, and enkephalos = brain; hence the rostral part of the developing brain. (With the diencephalon, it makes up the prosencephalon).
- **temporal:** Latin tempus = time; hence, the temporal area of the scalp, where grey hair first appears, marking the progress of ageing.
- **tendon:** Latin tendo = I stretch out.
- **tenia:** Latin = a tape or ribbon.
- **tensor:** Latin tensus = stretched; hence a muscle which produces tension.
- **tentorium:** Latin = tent; tentorium cerebelli.
- **teres:** Latin = rounded, cylindrical.
- **testicle:** Latin testiculus = the male gonad (see testis).
- **testis:** Latin testiculus = the male gonad. From Latin testis = a witness. Under Roman law, no man could bear witness (testify) unless he possessed both testes. Plural - testes.
- **tetralogy:** Greek tetra = four, and logos = discourse, hence a combination of four elements e.g., symptoms or defects.
- **tetrology:** Greek tetra = four, and logos = discourse, hence a combination of four elements or symptoms.
- **thalamus:** Greek = bedroom - derivation obscure, though the posterior end of the thalamus is rounded and named pulvinar = cushion.
- **theca:** Greek theka = a capsule, sheath.
- **thenar:** Greek = palm of hand; hence, the ball of the thumb.
- **thorax:** Greek = the chest, adjective, thoracic.
- **thrombus:** Greek = a clot.

- **thymus:** Greek = sweetbread.
- **thyroid:** Greek thyreos = shield, and eidos = shape or form; hence, shaped like a shield (which shields the glottis).
- **tibia:** Latin = the shin-bone, adjective, tibial.
- **tonsil:** Latin tonsilla = tonsil (e.g., palatine tonsil).
- **torus:** Latin = a bulge.
- **trabecula:** diminutive of Latin trabs = a beam; hence the supporting fibres of a structure.
- **trachea:** Greek tracheia = rough, referring to its corrugations.
- **tract:** Latin tractus = an elongated strand of wool or dough; hence a pathway for nerve fibres.
- **tragus:** Latin = goat, because of the beard-like tuft of hair on its internal aspect.
- **transverse:** perpendicular to the long axis.
- **trapezium:** Greek trapezion = a trapezium - a quadrilateral with 2 sides parallel.
- **trapezius:** Greek trapezion = a trapezium - a quadrilateral with 2 sides parallel; hence, trapezius muscle, the diamond-shape of both trapezii muscles together.
- **trapezoid:** Greek trapezion = a trapezium - a quadrilateral with 2 sides parallel, and eidos = shape or form, hence resembling a trapezium.
- **triceps:** Latin tres = 3, and caput = head; hence a 3-headed muscle.
- **trigeminal:** Latin trigeminus = triplets; hence, cranial nerve V, with 3 large divisions.
- **trigone:** Latin trigonum = a triangle.
- **triquetral:** Latin triquetrus = 3-cornered.
- **triticea:** Latin triticum = a grain of wheat; hence, the tiny cartilage in the lateral thyrohyoid ligament.
- **trochanter:** Greek = a runner; hence, the bony landmark, the greater trochanter, which moves so obviously in running.
- **trochlea:** Greek trochilia = a pulley.
- **truncus:** Latin = trunk (of a tree).
- **tuber:** Latin tuber = a swelling or lump.
- **tubercle:** Latin diminutive of tuber, a small prominence, usually bony.
- **tuberculum:** Latin ^{diminutive} of tuber, a small prominence, usually bony.
- **tuberosity:** Latin tuber = a swelling or lump, usually large and rough.
- **tunica:** Latin = shirt; hence a covering.
- **turbinate:** Latin turbo = a child's (spinning) top; hence shaped like a top. Old term for nasal conchi.
- **tympanum:** Latin = a drum.
- **ulna:** Latin = elbow or arm; hence, the medial bone of the forearm.
- **umbilicus:** Latin = the navel.
- **umbo:** Latin = the boss on the centre of a shield, umbo of tympanic membrane.
- **uncinate:** Latin uncinatus = hooked.
- **uncus:** Latin = hook; adjective - uncinata.
- **ungual:** pertaining to Latin unguis = finger-nail.
- **urachus:** Greek ouron = urine, and echein = to hold, hence the canal connecting the bladder and umbilicus in the foetus.

- **ureter:** Greek oureter = passage from kidney to bladder.
- **urethra:** Greek ourethra = passage from bladder to exterior.
- **uterus:** Latin = womb.
- **utricle:** diminutive of Latin uterus = womb.
- **uvea:** Latin uva = grape. The pigmented vascular layer of the eyeball (iris, ciliary body and choroid).
- **uvula:** diminutive of Latin uva = grape.
- **agina:** Latin = sheath; hence, invagination is the acquisition of a sheath by pushing inwards into a membrane, and evagination is similar but produced by pushing outwards.
- **vagus:** Latin = wandering; hence, cranial nerve X, which leaves the head and neck to traverse the thorax and upper part of the abdomen.
- **valgus:** Latin = knock-kneed.
- **vallate:** Latin vallatus = walled; hence, the large papillae on the tongue which are depressed below the surface and are surrounded by a groove which is itself bounded by a wall.
- **vallecula:** diminutive of Latin vallis = a fossa.
- **valve:** Latin valva = the segment of a folding-door.
- **valvula:** diminutive of Latin valva.
- **varicocoele:** Latin varix = vein and Greek kele = tumour, hernia, hence a varicose condition of the veins of the pampiniform plexus.
- **varus:** Latin = bow-legged.
- **vas:** Latin = vessel (plural = vasa).
- **vascular:** Latin vasculum, diminutive of vas; hence, pertaining to blood vessels.
- **vastus:** Latin = great, vast, extensive.
- **vein:** Latin vena; adjective - venous.
- **velum:** Latin = curtain; veli = of a curtain.
- **vena cava:** Latin vena = vein + Latin cava, from caves = hollow. It is unclear why the vein was classically termed **hollow**.
- **venter:** Latin = belly; hence, ventral, pertaining to the belly side.
- **ventricle:** diminutive of Latin venter = a small belly.
- **vermiform:** Latin ¹⁵vermis = a worm, and forma = shape; hence, worm-shaped.
- **vermis:** Latin = worm; hence, the segmented median part of the cerebellum.
- **vertebra:** Latin verto = I turn; hence, one of the movable bones of the backbone which seems to be shaped for rotation.
- **vertex:** Latin = summit; hence the highest point on the skull.
- **vertical:** perpendicular (at a right angle) to the horizontal.
- **vesica:** Latin = bladder, adjective - vesical.
- **vesicle:** diminutive of Latin vesica = bladder, hence a little bladder.
- **vesicula:** diminutive of Latin vesica = bladder; seminal vesicle.
- **vestibule:** Latin vestibulum = entrance hall.
- **vibrissa:** Latin vibrare = to vibrate; hence, the hairs in the nasal vestibule which vibrate in the current of air.

- **villus:** Latin a hair; hence, a vascular, hair-like process, usually projecting from a mucous surface.
- **vincula:** Latin = fetters (singular - vinculum); hence, the delicate vascular synovial bands passing to a tendon in the digits.
- **visceral:** adjective, Latin viscus = an internal organ.
- **viscus:** Latin = an internal organ, plural - viscera, adjective - visceral.
- **vital:** Latin vita = life.
- **vitelline:** Latin vitellus = yolk.
- **vitreous:** Latin vitreus = glassy.
- **vocal:** adjective, Latin vox = voice.
- **vomer:** Latin = plough-share; hence, the bone of the nasal septum which is split in two at its upper edge.
- **vorticosae:** Latin vortex = whirl; hence the whirl-like arrangement of the 4 venae vorticosae leaving the eyeball.
- **vulva:** Latin = the external female genitalia.
- **xiphoid:** Greek xiphos = a sword, and eidos = shape or form; hence, sword-shaped.
- **zona:** Latin = a belt; hence, a circular band.
- **zonule:** diminutive of zona.
- **zygapophysis:** Greek zygon = yoke, apo = from, physis = growth; the articular process of a vertebra. The downward "growth" of the vertebra above articulates with the upward "growth" of the vertebra below, forming a zygapophyseal joint.
- **zygoma:** Greek zygon = yoke; hence, the bone joining the maxillary, frontal, temporal and sphenoid bones.
- **zygomatic:** adjective, Greek zygon = yoke; hence, pertaining to the bone joining the maxillary, frontal, temporal and sphenoid bones.
- **zygote:** Greek zygon = yoke; hence the fusion of the male and female gametes.

INDEPENDENT WORK OF STUDENTS

Calendar-themed plan of independent work

№ topics	The title of the topic	The number of hours
1	Surgical anatomy of the great vessels of the upper limb.	5
2	The structure of the parts of the main vessels of the upper limb	5
3	Surgical anatomy of the great vessels of the upper limb.	5
4	Cellular spaces of the space of the palm.	5
5	Aneurysms and nontraumatic hemorrhages.	6

6	Aneurysms of the common carotid artery.	6
7	Congenital and acquired defects of the chest wall and diaphragm. Diaphragmatic hernia.	6
8	Violation of the coronary circulation.	6
9	Stenosis, atresia of the esophagus and tracheoesophageal fistula in children.	6
10	Topographic anatomy of congenital anomalies of the abdominal wall, surgery.	6
11	Hernias of the umbilical cord and umbilical fistula (urinary and biliary) and postoperative internal hernias of the abdomen.	6
12	Meckel diverticulum	6
13	Intestinal obstruction, congenital stenosis and atresia of the intestine.	6
14	Hirschsprung's disease and megacolon	6
15	Congenital atresia of the biliary tract	6
16	The particular location of the kidney, the renal pelvis in infants and children: congenital and acquired dystopias of the kidneys.	6
17	The anomaly of the urinary tract: congenital narrowing the doubling revided the teachings and congenital hydronephrosis.	6
18	Congenital anomalies of pelvic organs: bladder extrophy, bladder diverticulum, atresia of the rectum and anus.	6
19	Fistulas of the rectum and external genitalia. Hydrocele of the seminal ducts, and shell eggs, epispadias, hypospadias.	6
20	Spinal hernias.	6
	Total	116

Regulation on the rating system

I. General rules

The purpose of this system is to control, improve, systematize and deepen the existing knowledge, training highly qualified specialists.

The main objectives of the rating system:

A) the formation of a certain range of knowledge, skills and abilities in accordance with the requirements of the program.

B) assessment of students' knowledge according to the criteria of rating.

C) the promotion of the assimilation of objects by students.

D) the organization of work in the classroom visual, abilities.

E) ensuring the systematization of knowledge by students.

F) assessment of students' knowledge in each semester.

G) ensure the conditions for the computerization of the organization of the educational process

II. Types of control

Assessment of students' knowledge on the subject during the semester is carried out on the basis of the table of rating control and evaluation criteria.

Evaluation should be carried out by the following types of work

- 1) Initial test.
- 2) Verification
- 3) The final test.
- 4) The total score of students' knowledge for the semester is 100 points, which are distributed as follows:

follows:

- 1) Current control - 45 b
- 2) Independent work– 5 b
- 3) Intermediate control - 20 b
- 4) Final control - 30 b

Types of control	Maximum score	Coefficient	Passing score
Current control	45 b	0,45	24,75
Independent work	5 b	0,05	2,75
Intermediate control	20 b	0,2	11,0
Final control	30 b	0,3	16,5
Итого:	100	1	55,0

Current control

The current control of the subject is determined by the knowledge of each topic and practical skills. Students' skills are determined during the period of practical seminars and practical work. Current control can be carried out in the form of an oral survey, tests, conversation, test work, colloquium, homework tests and other ways.

Independent work of student (IWS)

1) Independent work of a student is carried out in accordance with the order of the Ministry of Higher and Secondary Education of the Republic of Uzbekistan dated February 21, 2005 No. 34 by 100 point current control system and in accordance with other types of control

2) the topics of independent work of students on the subject “Human Anatomy” are compiled in accordance with the program ¹⁵ approved by the Ministry of Health from 2014 and reviewed at the meeting of the department.

3) independent work on the subject is possible by carrying out the following work on relevant topics: writing notes, making test questions, creating crossword puzzles, and presentations.

In the educational journal of a teacher after the last practical lesson of this academic year, there is one column in which the average points of students for independent work are entered.

Intermediate control.

Intermediate control is carried out on several topics of the subject or after passing theoretical lessons on topics. At the same time, the ability to solve problems by a student or by answering certain questions is determined, and given the above, an assessment is derived. Intermediate control is carried out orally 1 time per semester, but given the extensive material on human anatomy, the department decided to carry out intermediate controls in 3-4 sections in each semester. Intermediate control is

carried out orally during the year on a 100 point rating system. An interim control pass is given only to those students who have passed all practical work topics and are not in arrears.

Final control.

On the final control assess the knowledge and skills of the student, acquired in all topics of the subject. The final control is carried out at the end of the II and III semester. At the final control on human anatomy, students are allowed to have a positive assessment (at least 55%) for current and intermediate control, as well as CPC. The final control is carried out orally (in writing) and in the form of tests and is assessed on a 100 point rating system. In case of unsatisfactory delivery of the final control, re-retake is possible only with the permission of the dean's office.

Evaluation of responses is carried out according to the following criteria.

№	Performance	Evaluation	Level of students' knowledge.
1	90-100	Excellent "5"	-able to make independent decisions and conclusion -has creative thinking -can independently think -can apply interactive games more actively -solves situational problems with a full justified answer -understands the meaning of the question and answered with confidence -has a full understanding
2	70-89	Good "4"	-may apply in practice interactive games more actively -solves situational problems, but completely unable to explain -understands the meaning of the question and answered with confidence -has a full understanding
3	60-69	Satisfactory "3"	-solves situational problems ,but can't justify the answer -knows can answer -on certain issues has an idea
4	0-60	Unsatisfactory "2"	-has no representation on this topic -doesn't know the subject

15

In surveys, it is recommended to rate the student in whole grades.

Student knowledge of human anatomy is assessed by the following formula: $R1 = V * O / 100$

where V is the total number of hours allotted for the semester. O- level of achievement in the subject.

The procedure for the certification of students in subjects.

CC (51 lessons) C= 0,45	Average CC $(65+73+78+85+86+87) / 6=79$ Ball CC = $79 \times 0,45= 35,5$
IWS (34) C = 0,05	Average IWS $(90+85+86) / 3=87$ Ball IWS = $87 \times 0,05 = 4,35$

IC C = 0,2	Orally $76 \times 0,2 = 15,2$
FC orally or in writing Test	FC (orally or in writing) = $80 \times 0,15 = 12$ FC (test) = $84 \times 0,15 = 12,6$
Total ball	$35,5 + 4,35 + 15,2 + 12 + 12,6 = 79,6$ (good)

Intermediate and final controls are carried out in accordance with the approved calendar and thematic plan based on the rating system. The final control is carried out during the last 2 weeks of the 2 and 3 semesters.

Students who have not received enough points or are absent for a good reason during the intermediate control are given a time limit to re-pass the last current and intermediate control to the final control.

Students who do not pass the current, intermediate and final control before the deadline due to illness, given a 2-week period for delivery with the permission of the dean of the faculty.

A student who has not collected 55% of current or intermediate control and is in arrears is considered an academic debtor and is not allowed to take final control. Academic debtors are given a period of one month for liquidation of debts and re-transfer (with the permission of the dean's office).

If a student does not agree with the results of controls, then after announcing grades over the next day, he may turn to the dean of the faculty with a statement. In this case, after the permission of the dean of the faculty, on the basis of the order of the rector, an appeal commission consisting of at least 3 members is organized. On the same day, the appeal commission reviews the student's application and summarizes the results.

IV. The procedure for recording rating results

The results of students' test papers are recorded in the rating book in whole numbers. In the rating book in a certain column for the selected hours of the curriculum is recorded the number of hours for the subject. And in the grading graph of the subject is rated on a 100 point system. The score below the passing score is not recorded in the rating book.

The results of examinations on the subject are also recorded in educational journals and announced to students on the same day (if the examinations were carried out in writing, they are announced within 2 days)

The teacher of the subject according to the results of the final control of the students determines the rating and writes in the required column of the rating book.

Students rating points are announced at the end of each semester and school year.

The results of the current, intermediate and final controls are discussed at the department meetings and the corresponding decisions are displayed.

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List the layers of the subclavian region in the correct sequence

+ Leather, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle subpectoral space
clavicular pectoralis fascia pectoralis minor

- the skin, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle clavicular pectoralis
fascia subpectoral space pectoralis minor

- the skin, subcutaneous tissue, superficial fascia, own fascia clavicular pectoralis fascia pectoralis
major, subpectoral space pectoralis minor

- the skin, subcutaneous tissue, superficial fascia, breast clavicular fascia own fascia pectoralis major,
subpectoral space pectoralis minor

- the skin, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle clavicular pectoralis
fascia pectoralis minor, subpectoral space

In the upper third of the shoulder is medially from a.brahialis

+ N.ulnaris

- n.medianus

- n.radialis

- n.musculocutaneus

- v.cephalica

15

The deepest layer of the front shoulder bed in its upper third is M.coracobrachialis

+ caput m.bicipitis brachii

- caput longum m.bicipitis brachii

- m.brachialis

- m.tricipitis brachii

The deepest layer of the front bed in his shoulder is lower third

+ M.brachialis

- m.coracobrachialis

- caput breve m.bicipitis brachii

- caput longum m.bicipitis

- m.tricipitis brachii

The lower third of the shoulder is medially from a.brahialis

+ N.medianus

- n.ulnaris

- n.radialis

- n.musculocutaneus

- ramus superficialis n.radialis

What nerve may be damaged fracture of surgical neck of the humerus?

- n.medianus

- n.musculocutaneus

+ N.axillaris

- n.radialis

16

- plexus brachialis

What nerve may be damaged with a broken shoulder bone in the middle third?

+ N.radialis

- n.musculocutaneus

- n.ulnaris

- n.medianus

- plexus brachialis

What nerve can be damaged at the opening of the rear division of the shoulder joint?

- + N.axillaris
- n.medianus
- n.radialis
- n.musculocutaneus
- plexus brachialis

Enter syntopy median nerve within the cubital fossa

- + Located medial to the brachial artery
- located in front of the brachial artery
- goes around the back of the brachial artery
- located laterally from the brachial artery
- goes around the brachial artery in the front

What nerve passes in the canalis supinatorius?

- + Ramus profundus n.radialis
- ramus superficialis n.radialis
- n.medianus
- n.interosseus communis
- n.radialis

16

Between the head of pronator teres muscle passes

- + N.medianus
- r.prophundus n.radialis
- n.ulnaris
- n.interosus communis

- n.radialis

What nerve accompanies the radial artery in the upper third of the forearm?

+ R.superficialis n.radialis

- n.cutaneus antebrachii lateralis

- r.profundus n.radialis

- n.cutaneus antebrachii medialis

- n.radialis

The middle third of the forearm is placed under n.medianus

+ M.flexor digitorum superficialis

- m.palmaris longus

- m.brachioradialis

- m.flexor pollicis longus

- m.flexor digitorum profundus

Relationship a.radialis and r.superficialis n.radialis in the lower third of the forearm

+ Radial nerve extends from the rear of the arteries in the forearm

- nerve lies medially of the artery

16

- nerve lies posterior to the artery

- nerve crosses the artery inside outwards

- radial nerve extends from the artery medially

What is communicated via commissural opening palmar fascia subcutaneous tissue palm?

- subtendon cellular spaces with palm

- with synovial sheaths II IV fingers

- with cellular spaces Pirogov Parona

- with synovial sheaths of fingers I and V
- + subaponeurosis cellular spaces palm

What goes through the back channel 3 the wrist?

- + Tendon extensor hallucis longus
- muscle tendon long thumb abductor and short extensor of the thumb
- tendon short and long radial wrist extensors
- finger extensor tendon and extensor of the index finger
- little finger extensor tendon

Bypass vessels is

- + Creating new bloodstream
- Connect vascular side to side
- Connect vessels end to side
- Connect vessels end to end
- creation of new blood vessels

What collateral circulation?

- + Blood flow in the side branches after the cessation of blood flow through the main vessel
- reduced blood circulation in the limb after the simultaneous ligation of the arteries and veins
- blood movement in an upward direction
- reduced blood circulation in the limbs
- blood flow in the side branches, bypassing the main trunk of the vessel after the injury or damage

Projection line is drawn from the radial artery

- + Inner edge of the tendon of the biceps to the pulse point
- the medial epicondyle to the medial shoulder styloid process

- the middle of the elbow to the medial ulnar styloid
- the middle of the elbow to the middle of the distance between the styloid process
- the middle of the cubital fossa to the middle of the wrist

What access to expose the axillary artery most rational?

- + Padding on the projection line at 1.5 cm anteriorly
- on the projection line
- some distance from the projection line at 1.5 cm posteriorly
- on the medial surface of the shoulder
- on the lateral surface of the shoulder

What access to expose the brachial artery in the middle third of the shoulder is the most rational?

- + Padding on the projection line at 2 cm anteriorly
- on the projection line
- some distance from the projection line at 2 cm posteriorly
- on the medial surface of the shoulder
- on the lateral surface of the shoulder

What access to expose the radial artery in the lower third of the forearm the most rational?

16

- + On the projection line
- some distance from the projection line at 2 cm medially
- some distance from the projection line at 2 cm outwards
- on the medial surface of the forearm
- on the lateral surface of the forearm

What access to expose the median nerve in the lower third of the forearm the most rational?

- + On the projection line

- some distance from the projection line at 2 cm medially
- some distance from the projection line at 2 cm outwards
- on the medial surface of the forearm
- on the lateral surface of the forearm

What anatomical tissue finger determine the spread of pus deep subcutaneous panaritiums nail phalanx?

- the thickness of the skin of a finger
 - poorly pronounced subcutaneous fat
 - especially the neurovascular supply of tissues with fingers
 - the linkages between the skin and bone
- + Connective septum, skin connecting with the periosteum

What caused the existence of "forbidden zone" to the cuts on the hand?

- + Location of the median nerve motor branches
- arrangement of superficial palmar arch
- arrangement of motor branches of the ulnar nerve
- arrangement of common digital nerve
- the general location of the finger vessels

16

How is the flat line of the sciatic nerve?

- + From the middle of the distance between the ischial tuberosity and the greater trochanter to the middlepopliteal fossa
- from the ischial tuberosity to the medial epicondyle of the femur
- from the greater trochanter to the lateral epicondyle of the femur
- from the middle of the distance between the ischial tuberosity and the greater trochanter to the outer epicondyle of the femur
- from the middle of the distance between the ischial tuberosity and the greater trochanter to the medial epicondyle of the femur

In the adductor canal is v.femoralis

- + Outside and behind a.femoralis
- ahead of a.et n.femoralis
- inwards from a.et n.femoralis
- + Outside and behind a.femoralis
- between a.femoralis and n.saphenus
- inwards from a.femoralis and behind n.saphenus

Medial femoral triangle limited

- m.rectus femoris
- m.sartorius
- + M.adductor longus
- m.adductor magnus
- m.gracilis

The top peroneal muscular canal passes

- + Common peroneal nerve
- the deep peroneal nerve and the peroneal artery
- peroneal artery and superficial peroneal nerve
- small thigh Vienna
- peroneal artery

Front wall forms canalis cruropopliteus

- + M.tibialis posterior
- m.soleus et arcus tendineus m.solei
- m.gastrocnemius

- m.popliteus
- membrana interossea c m.popliteus

The knee channel lateral popliteal lies

- N.tibialis
- a.tibialis posterior
- v.tibialis posterior
- a.poplitea
- n.peroneus communis

The canalis musculo-peroneus inferior located

- + A.peronea
- m.peroneus superficialis
- v.saphena parva
- m.peroneus profundus
- v.saphena magna

Skin I rear foot supplies the interdigital spaces

- + N.peroneus profundus
- n.saphenus
- n.suralis
- n.plantaris lateralis
- n.peroneus superficialis

16

Bottom canalis plantaris demarcates

- + Fascia plantaris profundus
- septum lateralis

- lig.plantaris longus
- septum medialis
- m.abductor hallucis

The medial wall of the vascular lacuna forms

- + Lig.lacunare*
- lig.pectineale
- lig.inguinale
- arcus iliopectineus
- v.femoralis

The rear wall of the deep femoral ring forms

- lig.lacunare
- lig.inguinale
- + Lig.pectineale
- v.femoralis
- arcus iliopectineus

The fossa poplitea most surface lies

16

- + N.tibialis
- n.ischiadicus
- a.poplitea
- v.poplitea
- n.peroneus superficialis

Lateral edge of the rear foot is innervated skin

- + N.suralis

- n.peroneus profundus
- n.saphenus
- n.tibialis
- n.peroneus superficialis

Key Lisfranc joint is

- + Lig.cuneometatarsium interosseum
- lig.talocalcaneum interosseum
- lig.bifurcatum
- lig.cuboideonaviculare plantare
- lig.calcaneonaviculare

Use the line Nelatona determined Roser

- + Fracture of the femoral neck
- a broken reed in the middle third of the offset
- dislocation of the knee
- hip fracture in the lower third offset
- hip fracture in the upper third with an offset

16

With the defeat, the nerve of the foot takes a pathological situation, which is called "horse foot"?

- + N.peroneus communis
- n.tibialis
- n.obturatorius
- n.ischiadicus
- n.peroneus superficialis

What nerve can be damaged at the opening of bloat posterolateral knee joint?

+ N.peroneus communis

- n.ischiadicus

- n.saphenus

- n.tibialis

- n.femoralis

What position should be given limb to determine the pulsation of the popliteal artery?

+ Leg bent at the knee joint

- foot to straighten the knee

- foot rotate outwards

- foot to rotate inwards

- lift at an angle of 30 degrees

How access advisable to expose the femoral artery in the upper femoral triangle?

+ On the projection line

- retreat to 2 cm outward from the projection line

- retreat to 2 cm medially from the projection line

- the inner edge of the sartorius

- the inner edge of the quadriceps

17

When phlebectomy held at Linton

+ Subfascial ligation of communicating veins with plastic fascia

- suprafacial ligation of communicating with the removal of the saphenous veins

- percutaneous ligation of saphenous veins

- ligation of the great saphenous vein at its mouth

- vein removal using the probe in three stages

Deep peroneal nerve is exposed at the projection line

- + A.tibialis anterior
- a.poplitea
- a.tibialis posterior
- a.peronea
- a.plantaris prophundus

According to the projection line a.tibialis posterior bare

- + N.tibialis
- n.peroneus superficialis
- n.peroneus communis
- n.tibialis posterior
- n.peroneus prophundus

Projection line a.tibialis anterior held

- + From the middle line between the caput fibula and tuberositas tibiae to interankle point
- from caput fibulae to the middle of the distance between the ankles
- from the patella to the medial malleolus
- by tuberositas tibiae to the medial malleolus
- from the middle line between the caput fibula and tuberositas tibiae to the medial malleolus

17

What anatomical structures is a benchmark for the performance of the front of the shoulder joint puncture?

- + Scapula coracoid process

Acromion process of the scapula

- greater tuberosity of the humerus

- a small bump of the humerus
- foot sternocleidomastoid muscle

What anatomical structures is a benchmark for the performance of the back of the shoulder joint puncture?

- + Acromion process of the scapula
- scapula coracoid process
- greater tuberosity of the humerus
- a small bump of the humerus
- the intersection with the trapezius muscle latissimus dorsi

At what point is projected onto the main stem of the middle meningeal artery scheme Kronleyna Bryusovi?

- + On the intersection of the front vertical and horizontal bottom
- at the intersection of the front vertical and horizontal top
- at the intersection of the back vertical and horizontal top
- at the intersection of the middle and upper horizontal vertical
- at the intersection of the middle and lower horizontal vertical

Call layers fronto parietal occipital region?

- + Leather, subcutaneous tissue, musculoaponeurotic layer subgaleal tissue, periosteum, subperiosteal tissue, bone
- the skin, subcutaneous tissue, musculoaponeurotic layer, the periosteum
- skin musculoaponeurotic layer, the subcutaneous tissue, the periosteum, the bone
- the skin, subcutaneous tissue, subgaleal fiber, musculoaponeurotic layer, the periosteum, subperiosteal tissue, bone
- the skin, subcutaneous tissue, musculoaponeurotic layer subperiosteal tissue, bone

What connect veins graduates?

- + Veins covers, diploeticheskie veins, venous sinuses of the dura mater
- diploetic veins, venous sinuses of the dura mater, brain veins
- cerebral veins, venous sinuses of the dura mater
- covers veins, venous sinuses of the dura mater
- venous sinuses of the dura mater, cisterns and ventricles

At otitis media pus in the mastoid penetrates by

- + Aditas at antrum
- porus acusticus internus
- porus acusticus externus
- foramen jugulare
- grids mastoid

The occipital region is a.occipitalis

- + B subcutaneous tissue
- in the thickness m.epicranii
- under the aponeurotic helmet
- under the periosteum of the occipital bone
- in subgaleal tissue

17

In the rear lower quadrant mastoid projected

- + Sinus venosus sigmoidei
- antrum mastoideum
- canalis n.facialis
- fossa cranii media
- canales semicirculares

Where is point the finger pressing the facial artery?

+ On the mid height of the body of the mandible at the anterior margin of the masseter muscle

- 1 cm below the tragus of the ear

- 0.5 - 1 cm below the middle of the lower edge of the eye socket

- behind the angle of the mandible

- 1 cm below the middle of the zygomatic arch

Online access in the treatment of cellulitis pterygopalatine mandibular space is a cross sectional

+ submandibular region

- front of the tragus of the ear

- in the chin area

- for a transitional fold of the lower jaw in the causal tooth

- parallel to the edge of the lower jaw arc shape from corner to corner

Deep area of the face is

+ Communications between the inner surface of the branches of the mandible and maxilla hill

- between the inner surfaces of the body of the mandible

- between the inner surface of the body of the mandible and the front surface of the body of the upper jaw

- between the inner surface of the ¹⁷branches of the lower jaw and orbital surface of the body of the upper jaw

- between the inner surface of the branches of the mandible and the pterygoid process of the sphenoid bone

Enter the interposition of vessels and nerves deep facial area from the surface deep into the

+ Plexus venosus pterygoideus, a.maxillaris, n.mandibularis

- a.maxillaris, plexus venosus pterygoideus, n.mandibularis

- n.mandibularis, plexus venosus pterygoideus, a.maxillaris

- plexus venosus pterygoideus, n.mandibularis, a.maxillaris
- a.maxillaris, n.mandibularis, plexus venosus pterygoideus

Pharyngeal spinal fascial spur of shares

- + Fiber retropharyngeal and rear peripharyngeal cellular spaces
- retropharyngeal tissue and cellular spaces peripharyngeal
- fiber peripharyngeal cellular spaces at the front and rear sections
- fiber retropharyngeal and front peripharyngeal cellular spaces
- fiber peripharyngeal space from the cellular spaces of deep facial area

Fiber, no spaces separates schylodiafragm?

- + Front office peripharyngeal space from the rear division peripharyngeal space
- cellular spaces of the retropharyngeal space peripharyngeal
- retropharyngeal cellular spaces of the rear division peripharyngeal space
- Front peripharyngeal space from submasticate cellular spaces
- the front and rear sections peripharyngeal space from cellular spaces of deep facial area

Cellular spaces in a possible breakthrough of pus through the medial spur of the parotid gland in the case of purulent mumps?

- + Anterior lateral space peripharyngeal¹⁷
- in the parotid masticatory cellular spaces
- in interpterygium and temporomandibular pterygium cellular spaces
- in the posterior part of the lateral space peripharyngeal
- in retropharyngeal cellular spaces

Vienna nasal anastomose with

- + Sinus sagittalis superior

- v.jugularis externa
- v.jugularis anterior
- v.jugularis interna
- diploetic veins

Describe where produce of injection needle when performing cervical vagosympathetic blockade on Vishnevsky?

- is the intersection of the rear edge of the sternocleidomastoid muscle on the outside of Jugular vein
- between the legs of sternocleidomastoid muscle
- in the corner formed by the outer edge of the clavicle and the sternocleidomastoid muscle
- in the jugular notch of the sternum 3 cm above the middle of the clavicle
- the intersection of the front edge of the sternocleidomastoid muscle to the external jugular vein

What reportedly slit main neurovascular bundle of the medial triangle of the neck?

- + anterior mediastinum
- with pericardial
- to the posterior mediastinum
- with prevertebral cellular spaces
- with forefoot peripharyngeal space

17

What fascia neck advantageously vagina to the main neurovascular bundle of the medial triangle of the neck?

- + Piece of parietal visceral fascia
- prespinal fascia
- superficial fascia
- visceral piece of visceral fascia
- own a piece of deep fascia

What triangles isolated suprahyoid area?

- sleepy delta and lateral triangle
- submental triangle sleepy triangle
- lateral submandibular triangle and triangle
- submental triangle and scapular tracheal triangle
- + Submandibular triangle submental triangle

Where can spread purulent processes of retrovisceral cellular spaces of the neck?

- + In the posterior mediastinum
- in the anterior mediastinum
- the pleural cavity
- in a blind pouch Gruber
- in the retroperitoneal space

Between what fascia neck is interaponeurotic suprasternal cellular spaces?

- between the superficial fascia and the superficial fascia of the neck piece of their own
- + Communications between the superficial and deep fascia leaflets own neck
- between the superficial fascia and the deep fascia of the neck piece of their own
- between deep fascia and own a piece of fascia pre-spinal
- between the surface sheet of its own fascia and a parietal layer of fascia interneck

17

Which cellular spaces neck communicates with the anterior mediastinum?

- + Previsceral
- suprasternal interaponeurotic
- retrovisceral
- pre-spinal
- cellular spaces of the neck with fiber anterior mediastinum were not disclosed

Arcus venosis juguli located in

- + Spatium interaponeuroticum suprasternale
- between II and V in the fascia trigonum omotrapezoideum
- spatium pretracheale
- between II and V in the fascia trigonum omoclaviculare
- between I and II fascia of the neck

Call nerve, located in the esophageal tracheal sulcus?

- + N.laringeus recurens
- n.vagus
- n.frenicus
- n.splanchicus major
- n.hypoglossus

Respect to which anatomical structures distinguish the upper, middle and lower tracheostomy?

- + With respect to the isthmus of the thyroid gland
- in relation to the cricoid
- in relation to the thyroid cartilage
- in relation to the hyoid bone
- in relation to the rings of the trachea

Return nerves innervate

- + Pharynx, larynx, trachea and esophagus (upper section)
- larynx and trachea
- larynx and pharynx
- pharynx and esophagus

- thyroid, larynx and pharynx (lower part)

Under the mucous membrane of the pharynx the bottom of the pear shaped pocket passes

+ N.laryngeus superior

- n.glossopharyngeus

- n.vagus

- n.symphaticus

- n.laryngeus reccurens

«Danger Zone" of the thyroid gland is located

- on the isthmus of the thyroid gland

- on the front surface side lobes gland

- in the upper pole of the side lobes cancer

- on side surfaces of gland

+ On the rear surface side lobes gland

Parathyroid glands located

+ Under the fascial sheath of the thyroid gland

+ over the fascial sheath of the thyroid gland

- between the sheets vnutrishey⁴⁷ fascia

- behind the thyroid between intraneck prespinal and fascia

- own capsule of the thyroid gland

Within sleepy triangle missing

+ Lamina profunda f.colli propria

-f.superficialis colli

- f.endocervicalis

- lamina superficialis f.colli propria
- f.prevertebralis

Core muscles extender glottis innervated

- + N.laryngeus inferior
- n.laryngeus superior
- n.phrenicus
- n.hypoglossus
- all the answers wrong

What nerve may be damaged during resection of the thyroid gland?

- + N.laryngeus recurens
- truncus simpaticus
- n.vagus
- n.frenicus
- n.hypoglossus

Under what fascia is cervical sympathetic trunk?

- lamina parietalis f.endocervicalis
- lamina profundus f.colli propriae
- lamina visceralis f.endocervicalis
- lamina superficialis f.coli propriae
- + F.prevertebralis

What nerve passes through the anterior surface of the anterior scalene muscle?

- + N.phrenicus
- n.vagus

- n.laringeus reccurens
- rami descendens n.hypoglossus
- truncus simphaticus

What form vein venous angle Pirogov?

- + V.subclavia, v.jugularis interna
- v.jugularis interna, v.jugularis externa
- v.subclavia, v.jugularis externa
- v.jugularis externa, v.jugularis anterior
- v.subclavia, v.jugularis externa

After spatium interscalenum passes

- + A.subclavia
 - n.phrenicus
 - a.transversa colli
 - a.vertebralis
- n.vagus

After spatium antescalenum passes

- + N.phrenicus
 - plexus brachialis 18
 - a.subclavia
 - a.transversa colli
 - a.vertebralis

In the staircase vertebral triangle of schytho cervical trunk moves

- + A.cervicalis ascendens
- a.thyroidea superior
- a.intercostalis suprema
- a.vertebralis
- a.cervicalis descendens

What form vein venous angle Pirogov?

+ V.subclavia, v.jugularis interna

-v.jugularis interna, v.jugularis externa

- v.subclavia, v.jugularis externa

-v.jugularis externa, v.jugularis anterior

-v.subclavia, v.jugularis externa

Base staircase vertebral triangle formed

+ Dome of the pleura

- the transverse processes of the cervical vertebrae

- anterior scalene muscle

- collarbone

- subclavian vein

When retromammary mastitis affected

+ Fiber located behind the breast capsule

- subcutaneous tissue

- fiber between the sheets supporting ligaments of the breast

18

- fiber under the pectoralis major muscle

- fiber under the pectoralis minor

Explain why puncture the pleural cavity is made on the upper edge of the ribs?

+ Out of the possibility of damage to the intercostal neurovascular bundle*

- because of the possibility of pneumothorax

- because of the potential damage to the intercostal muscles

- due to the structural features of the periosteum

- to facilitate anesthesia

Specify the location of the lymph node Zorzi, one of the first affected metastases in breast cancer?

+ Under the outer edge of the pectoralis major muscle level III rib

- above the collarbone behind the outer edge of the sternocleidomastoid muscle

- in the course of the internal thoracic artery

- in the center of the axilla

- under the edge of the latissimus dorsi muscle

What is adjacent to the internal thoracic artery behind the lower ribs III rd?

+ M.transversus thoraci

- f.endothoracica

- mm.intercostalis interna

- pleura mediastinalis

- spatium parapleuralis

What part intercostal space no external intercostal muscles?

+ On the cartilage of the ribs over

- by linea scapularis to the linea axillaris media

- from the spine to the rib angle¹⁸

- by linea medioclavicularis up linea axillaris media

- over from the corner to the costal cartilage of the ribs

What part intercostal space no internal intercostal muscles?

+ From the spine to the rib angle

- from the shoulder to the middle axillary line

- for a cartilage of the ribs

- from middle clavicle to the middle axillary line
- from the spine to the middle axillary line

On what part of the intercostal space intercostal vessels are covered by an edge?

- + From the linea scapularis to the linea axillaris posterior*
- anterior linea medioclavicularis
- from the spine to the linea scapularis
- for a cartilage of the ribs
- by linea scapularis to the linea axillaris anterior

At what point it is advisable to perform a puncture of the pleural cavity to remove fluid?

- + In VIII IX intercostal space on the linea axillaris posterior
- in II intercostal space linea medioclavicularis
- in the IV intercostal space on the linea axillaris anterior
- in X intercostal space linea scapularis
- in VIII IX intercostal space linea medioclavicularis

At what point it is advisable to carry out a puncture to remove the air from the pleural cavity?

- + In II III intercostal space linea medioclavicularis
- in the IV intercostal space on the linea axillaris anterior
- in VIII IX intercostal space on the linea axillaris posterior
- in the IX intercostal space linea scapularis
- in the III IV intercostal space linea medioclavicularis

In some cases a subperiosteal resection of the ribs?

- in the drainage of the pleural cavity in children
- + For pleural drainage in adults

- + At thoracotomy through the bed of the ribs
- puncture the pleural cavity in children
- puncture the pleural cavity in adults

The order of the components of the intercostal neurovascular bundle from the bottom up

- + N.intercostalis, a.intercostalis, v.intercostalis
- a.intercostalis, v.intercostalis, n.intercostalis
- v.intercostalis, a.intercostalis, n.intercostalis
- n.intercostalis, v.intercostalis, a.intercostalis
- v.intercostalis, n.intercostalis, a.intercostalis

Between the middle and the outer legs of the diaphragm is located

- + Truncus sympathicus
- v.hemyazygos
- ductus thoracicus
- nn.splanchnici
- v.azygos

Left between the medial and middle legs of the diaphragm passes

18

- + V.hemyazygos
- n.vagus sinister
- ductus thoracicus
- v.cava inferior
- v.azygos

To expose the cervical esophagus section of wire

- + On the inner edge of m.sternocleidomastoideus sinistra

- on the outer edge m.sternocleidomastoideus dextra
- the inner edge m.sternocleidomastoideus dextra
- incision Kocher
- on the outer edge m.sternocleidomastoideus sinistra

Left dome of the diaphragm is projected onto the front

+ V edge

- III rib
- V edge
- IV rib
- VI rib

After sternocostal slit diaphragm passes

+ A.thoracica interna

- v.cava inferior
- ductus thoracicus
- v.azygos
- truncus symphaticus

18

Sternum located at the corner

- body Th,III
- body Th,V
- intervertebral disc Th,III, IV
- + Intervertebral disc ThIV- V
- body Th,II

Right dome of the diaphragm is projected onto the rear

- VII rib
- + VIII intercostal space
- VI rib
- VII intercostal space
- V edge

Between the inner legs of the diaphragm passes

- + Ductus thoracicus
- a.thoracica interna
- v.hemiazygos
- nn.splanchnici
- v.cava inferior

Esophagus passes through the diaphragm at the level

- lower edge Th,VIII
- + Th,X
- Th,IX
- Th,XII
- Th,XI

18

Lower blade angle is at

- Th,VI
- Th,VIII
- Th,V
- + Th,VII
- ThI,X

Deeper hilar fascia located

+ Parapleural fiber

- parietal pleural leaflet

- visceral pleura leaf

- internal intercostal membrane

- pleural cavity

Chest cavity is the space

- limited hilar fascia and the parietal pleura

- limited part of the parietal pleura

+ Limited chest and diaphragm

-between the mediastinum and chest

- between the parietal and visceral pleura

Parapleural tissue located between

-pleura parietalis and pleura visceralis

- pleura parietalis and m.intercostalis interna

- m.intercostalis externa and m.intercostalis interna

+ F.endothoracica and pleura parietalis

18

- m.intercostalis interna and f.endothoracica

For a lower boundary edge comes easy for the middle axillary line during quiet breathing?

+ On the VIII th

- at the X th

- at the XI th

- in the VII th

- in the IX e

Whose name is portion of the pericardium in the anterior heart, not covered by the pleura?

- V.F.Voyno Yasenetsky
- A.Yu.Sozon Yarashevich
- Pirogov
- + A.R.Voynich Sianojensky
- Morgagni

Front adjacent to the bifurcation of the trachea

- + A.pulmonalis dextra
- a.pulmonalis sinistra
- tr.brachiocephalicus
- ductus thoracicus
- v.cava inferior

At what level are located the roots of the lungs of an adult?

- + On the level ThV, VII
- at Th,III, V
- at Th,VII ,X
- at Th,II, IV
- at Th,VII, VIII

18

What anatomical structures that are part of the roots of the lungs occupy the forward position?

- + V.pulmonale
- a.pulmonare
- bronchus principis
- a.bronchialis
- n.vagus

To mediastinal surface of the left lung behind his gate adjacent

- + Aorta thoracica
- truncus vertebralis
- oesophagus
- v.hemiazygos
- ductus thoracicus

#What nerve was used as an anatomical landmark during surgery to patent ductus arteriosus?

- +N.reccurens laryngeus sinistra
- n.intercostalis III
- n.splanchnicis minor
- n.splanchnicis major
- truncus sympathicus

Where is lig.arteriosum?

- + Communications between the aortic arch, the left pulmonary artery and the pulmonary trunk
- between the arch of the aorta and the superior vena cava
- arc between the aorta and inferior vena cava
- between the aortic arch and descending aorta
- between the aortic arch, the right pulmonary artery and the pulmonary trunk

The posterior interventricular sulcus of heart lie

- +Vienna middle of the heart and interventricular branch of the right coronary artery
- the coronary sinus and the circumflex branch, right coronary artery
- Vienna great heart and interventricular branch of the right coronary artery
- Vienna great heart and interventricular branch of the left coronary artery

- the coronary sinus and the circumflex branch of left coronary artery

Upper hollow vienna is adjacent to the left

+ Aorta ascendens

- n.vagus dexter

- truncus brachiocephalicus

- n.phrenicus dexter

- a.pulmonalis dextra

After sinus transversus pericardi carried out

+Temporary clamping of large vessels

-opening the pericardial cavity

- puncture of the pericardial cavity

- access to the arterial duct

- access to the coronary arteries

Internal benchmark for access to the arterial duct

+ N.phrenicus sinister

-n.vagus dexter

19

- v.azygos

- n.phrenicus dexter

- truncus brachiocephalicus

When mitral commissurotomy finger inserted through the

+ Tab on the left heart

-the anterior wall of the left atrium

- the anterior wall of the right ventricle

- anterior wall of the left ventricle
- right ear of the heart

Based heart arranged from right to left

- + Top hollow Vienna, aorta, pulmonary trunk
- aorta, pulmonary trunk, the upper hollow Vienna
- pulmonary trunk, the upper hollow Vienna, aorta
- upper hollow Vienna, pulmonary trunk, the aorta
- aorta, superior vena Vienna, pulmonary trunk

Jam food mitral stenosis explained

- + Compression of the esophagus left atrium
- esophageal diverticulum
- compression of the esophagus increased left ventricle
- compression of the gas bubble stomach
- reflex spasm of the esophagus

Lies behind the ascending aorta

+ A.pulmonalis dextra

19

- v.cava superior
- trunsus pulmonalis
- right ear of the heart
- n.phrenicus dexter

Right adjacent to the ascending aorta

- + V.cava superior
- n.vagus dextra

- truncus pulmonalis
- n.vagus sinistra
- a.pulmonalis dextra

V.azygos flows into

- V.cava superior
- v.brachiocephalica sinistra
- v.cava inferior
- v.brachiocephalica dextra
- v.hemiazygos

In the lower part of the posterior mediastinum behind the esophagus passes

- + Aorta thoracica
- truncus sympaticus dexter
- v.hemiazygos accessoria
- n.vagus dexter
- v.cava inferior

At the level of ThVIII IX thoracic aorta separates from the pericardium

19

- + Oesophagus
- ductus thoracicus
- v.hemiazygos
- sinus costomediastinalis dexter
- v.azygos

Below the gate light ductus thoracicus covered

- + Right edge mediastinal pleura sine

- posterior section of the pericardium
- the right side of the department of the pericardium
- the left edge mediastinal pleura sine
- the left lateral part of the pericardium

Thoracic esophagus is exposed

- + Side thoracotomy in V VI intercostal space on the right
- lateral thoracotomy in the V intercostal space on the left
- longitudinal sternotomy
- posterolateral thoracotomy in the III intercostal space on the left
- transverse sternotomy

Operation Dobromyslova Toreka performed at

- + Esophageal cancer
- stomach cancer
- diverticula of the esophagus
- esophageal bleeding
- all the answers are correct

19

The hernial sac formed in congenital inguinal hernia?

- + Processus vaginalis of peritoneum
- parietal peritoneum
- mesentery
- egg shells
- the bladder wall

Specify which hernia front side of the abdominal wall is an indication for emergency surgery?

+ Disadvantaged

- birth
- moving
- nevpravimye
- all of the above

What is inguinal gap?

+Space bounded by the inguinal ligament, the lower edges of the internal oblique and transverse muscle and lateral margin of the rectus sheath

- distance between the outer and inner rings of the inguinal canal
- the space between the inguinal ligament and lateral fascia
- the space between the front and rear walls of the inguinal canal
- space bounded by the lower edges of the internal oblique and transverse muscles, the edge of the rectus sheath and the inner surface of the external oblique abdominal muscles

What is the most important prerequisite for the formation of anatomical direct inguinal hernia?

- + Plus the existence of a high inguinal gap
- extension of the internal opening of the inguinal canal
- slotted oval inguinal gap
- an increase in cross sectional area of the inguinal canal
- traumatic anterior lateral abdominal wall

How is the front wall of the fibrous rectus sheath above the navel?

- + Due to the external oblique fascia and front plate internal oblique aponeurosis abdominal muscles
- all the broad aponeurosis of the abdominal muscles
- aponeurosis of the external and internal oblique abdominal muscles
- transverse muscle and transverse abdominal fascia

- by the external oblique fascia, front fascia plate the internal oblique and transversus abdominis aponeurosis

The front wall is formed by fibrous rectus sheath 5 cm below the navel?

+ All the broad aponeurosis of the abdominal muscles

- aponeurosis of the external oblique abdominal muscles

- transverse muscle and transverse abdominal fascia

- external oblique aponeurosis and the internal oblique abdominal muscles

- aponeurosis of the internal oblique and transverse abdominal muscles

The rear wall is formed by the rectus sheath below the semicircular line?

+ The transverse abdominal fascia

-aponeurosis transversus abdominis

- aponeurosis of the internal oblique and transverse abdominal muscles

- all the broad aponeurosis of the abdominal muscles

- external oblique aponeurosis and the internal oblique abdominal muscles

Communications, public umbilical region saphenous veins in portal hypertension can serve as a porto caval anastomoses

+ C vv.paraumbilicalis

-with vv.epigastricae superior¹⁹ et inferior

- with v.epigastrica superficialis

- with vv.thoracoepigastricae

- with v.thoracica interna

What links saphenous veins umbilical region may serve as cava caval anastomosis?

+ C vv.thoracoepigastricae, epigastricae superficialis, epigastricae superiores et inferiores

- with v.epigastricae superficialis

- with v.umbilicalis
- with vv.paraumbilicalis
- with vv.thoracoepigastricae, epigastricae superficialis, paraumbilicalis, umbilicalis et epigastricae inferiores

At what level of the linea alba usually has the greatest width?

+The navel

- under the xiphoid process
- 4 cm below the navel
- above the pubic symphysis
- 4 cm above the navel

Which of the following anatomical structures iliac groin did not participate in the formation of the inguinal canal?

+ Fascia Thompson

- aponeurosis of the external oblique abdominal muscles
- internal oblique and transversus abdominis
- inguinal ligament
- transverse fascia

19

Enter the projection of the internal opening of the inguinal canal towards the middle of the inguinal ligament

- + 1.5 cm above the
- respectively middle of the inguinal ligament
- lateral
- 1.5 cm below
- medial

Between what anterolateral muscles of the abdominal wall in the side areas are the main nerve trunks?

+ Communications between the internal oblique and transverse

- between the external oblique and internal oblique
- between the transverse muscle, and intra abdominal fascia
- in the preperitoneal tissue
- between internal and transverse muscles

For a topographic anatomical weak point can serve as a hernia gate with direct inguinal hernia?

+ Medial inguinal fossa

- lateral inguinal fossa
- suprapubic fossa
- oval fossa
- deep femoral ring

In what direction it is advisable to dissect hernial when infringement oblique inguinal hernia at the internal opening of the inguinal canal?

+ Outwards

- medially
- down
- up
- does not matter

19

What anatomical structures should be cut to eliminate any infringement of inguinal hernia in the external opening of the inguinal canal?

+ Aponeurosis of the external oblique abdominal muscles

- inguinal ligament
- Grebeshkov bunch

- internal and lateral abdominal muscles
- aponeurosis of the internal oblique abdominal muscles

In what direction should be cut infringing ring when strangulated femoral hernia?

- + Medially
- outwards
- anteriorly
- backwards
- does not matter

When dissection infringes ring, a hernia are important individual differences in the shape of the branch inferior epigastric artery and obturator?

- + Femoral
- direct inguinal
- oblique groin
- umbilical
- obturator

Enter, in which the vein occurs outflow of blood from the stomach?

- + V.portae
- v.cava superior
- v.cava inferior
- v.mesenterica superior
- v.umbilicalis

Call benchmark for determining the boundary between the stomach and duodenum

- + Front pyloric Vienna Mayo

- liver gastric ligament
- hepatoduodenal bunch
- a sharp drop of the local thickness of the wall of the digestive tube
- furrow between the pyloric stomach and duodenum

Vessels pinching the lower part of the duodenum and is violating its permeability is

- + Top mesenteric artery and Vienna
- superior mesenteric artery and inferior mesenteric Vienna
- average artery colon
- left colon artery
- gastroduodenal artery

Major duodenal papilla is located

- + On the middle or between the middle and lower third of the inner rear wall of the downward abdominal muscles
- on the border of the upper and middle third of the posterior wall of the descending part of the duodenum 12
- in the middle of the front side wall of the lower horizontal part of the intestine
- on the border of the upper third of the anterior part of the inner wall of the descending colon
- between its upper and middle third of the front wall of the duodenum

Explain what is dangerous acute circulatory disorders in celiac trunk?

- acute renal failure
- acute intestinal obstruction
- acute ischemia of the pelvic organs
- acute adrenal insufficiency
- + Necrosis of the upper abdomen

Who developed a special reception palpation to determine the duodenal jejunal flexure in the audit of the abdominal cavity?

- + Gubarev
- Kocher
- Billroth
- Lambert
- Gofmayster

Which of the following sections of the abdominal cavity can be detected in the food mass perforated ulcer of the posterior wall of the stomach?

- + Omental
- in front gastric bag
- in left subdiaphragmatic space
- in the right subdiaphragmatic space
- in the upper ileocecal recess

In gastric ulcer bleeding more likely to occur

- + From the right gastric artery
- from the left gastric artery
- from the gastro omental artery₂₀ right
- from gastro duodenal artery
- from the left gastro omental artery

With sides fiber itself becomes retroperitoneal

- + B preperitoneal tissue
- in the pelvic tissue
- has not yet posted
- Bochdalek through an opening in communication with the pleural cavity

- in retroperitoneal fiber

After a vessel leans right ureter at the boundary line?

-testicular vessels in men and ovarian vessels in women

+ External iliac artery

-the obturator artery, vein and nerve

- common iliac artery

- internal iliac artery

Call fold of peritoneum, which is necessary to pull up with immediate access to the bladder to perform its high section?

+ Transverse

- round

- medial umbilical

- lateral umbilical

- median umbilical

What passes through the thickness of the prostate?

+ Urethra

-Ureter

20

- internal iliac Vienna

- internal iliac artery

- genitofemoral nerve

Explain how the access is puncture abscess recto vesical recess?

+ Via the front wall of the rectum

- through the rear wall of the rectum

- through ischiorectal hole
- through the abdominal wall
- through the obturator canal

Which vein empties into the upper rectal vein?

- in the common iliac vein
- in the internal genital vein
- + In the inferior mesenteric vein
- in the internal iliac vein
- in the external iliac vein

As covered by peritoneum prostate gland?

- + I have no relation to the peritoneum
- one hand
- on three sides
- all sides
- both sides

What separates the capsule from the capsule Amyssa Pirogov Retz?

20

- + Peritoneum perineal aponeurosis
- piece of parietal pelvic fascia
- piece of visceral pelvic fascia
- piece of peritoneum
- muscle lifting the anus

The limited subperitoneal floor pelvic cavity below?

- + Muscle lifting the anus and pelvic fascia

- the plane of the entrance to a small basin formed by the bones of the pelvis
- the peritoneum and pelvic fascia
- integuments
- peritoneum perineal aponeurosis

Enter the pudendal nerve branch

+ N.rectalis inferior

- rami muscularii
- n.obturatorius
- n.genitofemoralis
- n.cutaneus femoris posterior

Douglas space it

+ Excavatio rectouterina

- excavatio vesicouterina
- excavatio rectovesicalis
- excavatio rectalis anterior
- excavatio rectalis posterior

20

The blood supply of the rectum is involved

- a.obturatoria
- a.pudenda externa
- a.umbilicalis
- + A.pudenda interna
- a.testicularis

How many pieces isolated vas deferens

-2

- 3

+ 4

- 5

- 6

The uterus was isolated

+ The bottom of the body, isthmus, cervix and two surfaces

- bottom, body, neck and two surfaces

- the bottom of the body, isthmus, neck and three surface

- bottom, body, neck and three surfaces

- bottom body ampoule neck and the two surfaces

What ligaments are involved in fixing the vertebrae?

+ Front and posterior longitudinal ligament

- round ligaments vertebrae

- spinal disc ligament

- nuchal ligament

- yellow ligament

20

Where is the epidural space of the spinal cord?

+ Communications between the hard shell of the spinal cord and vertebral periosteum

-between the firm and the arachnoid spinal cord

- between the arachnoid and soft shells of spinal cord

- under the pia mater

- under the dura

Give the definition of "kyphosis."

+ Curvature of the spine bulge posteriorly

-anterior curvature of the spine bulge

- curvature of the spine bulge in the side

- convex curvature of the vertebral body anteriorly

- convex curvature of the vertebral body posteriorly

How is the anterior longitudinal ligament of the spine?

+ From the foramen magnum to the coccygeal vertebrae in the form of a tape

- from the foramen magnum to the sacral spine

- from the foramen magnum to the cervical spine

- from the foramen magnum to the thoracic spine

- from the foramen magnum to the lumbar spine

Give the definition of "spondylolisthesis".

+ Slippage of the vertebral body, together with the overlying vertebral column

-complete absence of one of the vertebrae in any of the sections of the spinal column

- cleft in the area interarticular vertebral arch in the region of its isthmus

- the total or partial absence of one of the vertebrae in any of the divisions of the spinal column

20

- flattening of the vertebral bodies

Give the definition of "spondylolysis".

+ Cleft in the area interarticular vertebral arch in the region of its isthmus

-cleft of the vertebral body

- the dissolution of the vertebral body

- complete absence of one of the vertebrae in any of the sections of the spinal column

- the total or partial absence of one of the vertebrae in any of the divisions of the spinal column

Anatomy studies

- + Age differences in size, shape and location of organs
- surrounding anatomical structures of the body in pathological conditions
- variations in the structure and location of the bodies
- morphological structure of certain regions of the human body
- organs and systems of the human body alone

Disadvantage is continuous seams

- + Poor circulation in the area of the weld
- the closure of leaking defects and injuries
- difficulties in applying
- slow doing(making)
- high consumption of suture

List the layers of the subclavian region in the correct sequence.

- + Leather, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle subpectoral space clavicular pectoralis fascia pectoralis minor
- the skin, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle clavicular pectoralis fascia subpectoral space pectoralis minor
- the skin, subcutaneous tissue, superficial fascia, own fascia clavicular pectoralis fascia pectoralis major, subpectoral space pectoralis minor
- the skin, subcutaneous tissue, superficial fascia, breast clavicular fascia own fascia pectoralis major, subpectoral space pectoralis minor
- the skin, subcutaneous tissue, superficial fascia, own fascia pectoralis muscle clavicular pectoralis fascia pectoralis minor, subpectoral space

In the upper third of the shoulder is medially from

- a.brahialis

- n.medianus
- N.ulnaris
- n.radialis
- n.musculocutaneus
- v.cephalica

The deepest layer of the front shoulder bed in its upper third is

- + M.coracobrachialis
- caput breve m.bicipitis brachii
- caput longum m.bicipitis brachii
- m.brachialis
- m.tricipitis brachii

The deepest layer of the front bed in his shoulder is lower third

- + M.brachialis
- m.coracobrachialis
- caput breve m.bicipitis brachii
- caput longum m.bicipitis brachii
- m.tricipitis brachii

20

The lower third of the shoulder is medially from a.brahialis

- n.ulnaris
- + N.medianus
- n.radialis
- n.musculocutaneus
- ramus superficialis n.radialis

What nerve may be damaged fracture of surgical neck of the humerus?

- + N.axillaris
- n.medianus
- n.musculocutaneus
- n.radialis
- plexus brachialis

What nerve may be damaged with a broken shoulder bone in the middle third?

- n.musculocutaneus
- n.ulnaris
- n.medianus
- + N.radialis
- plexus brachialis

What nerve can be damaged at the opening of the rear division of the shoulder joint?

- + N.axillaris
- n.medianus
- n.radialis
- n.musculocutaneus
- plexus brachialis

20

Enter syntopy median nerve within the cubital fossa

- + Located medial to the brachial artery
- is located in front of the brachial artery
- goes around the back of the brachial artery
- located laterally from the brachial artery
- goes around the brachial artery in the front

What nerve passes in the canalis supinatorius?

- + Ramus profundus n.radialis
- ramus superficialis n.radialis
- n.medianus
- n.interosseus communis
- n.radialis

Between the head of pronator teres muscle passes

- + N.medianus
- r.prophundus n.radialis
- n.ulnaris
- n.interossus communis
- n.radialis

What nerve accompanies the radial artery in the upper third of the forearm?

- n.cutaneus antebrachii lateralis
- + R.superficialis n.radialis
- r.profundus n.radialis
- n.cutaneus antebrachii medialis
- n.radialis

21

The middle third of the forearm is placed under n.medianus

- + M.flexor digitorum superficialis
- m.palmaris longus
- m.brachioradialis
- m.flexor pollicis longus

- m.flexor digitorum profundus

Relationship a.radialis and r.superficialis n.radialis in the lower third of the forearm

+ Radial nerve extends from the rear of the arteries in the forearm

- nerve lies medially of the artery
- nerve lies posterior to the artery
- nerve crosses the artery inside outwards
- radial nerve extends from the artery medially

What is communicated via commissural opening palmar fascia subcutaneous tissue palm?

- with synovial sheaths II IV fingers
- + subgaleal cellular spaces palm
- podsuhozhilnymi cellular spaces with palm
- with cellular spaces Pirogov Paron
- with synovial sheaths of fingers I and V

What goes through the back channel 3 the wrist?

- muscle tendon long thumb abductor and short extensor of the thumb
- tendon short and long radial wrist extensors
- + Tendo extensor hallucis longus²¹
- finger extensor tendon and extensor of the index finger
- little finger extensor tendon

How should impose a hemostat Billroth at the end of the bleeding vessel?

- + Along the course of the vessel
- across the course of the vessel
- 45 degrees

- how it is important to stop the bleeding
- across the course of the vessel with the capture of the surrounding tissues

Bypass vessels is

- Connect vessels end to side
- + Creating new bloodstream
- Connect vascular side to side
- Connect vessels end to end
- creation of new blood vessels

What collateral circulation?

- + Blood flow in the side branches after the cessation of blood flow through the main vessel
- reduced blood circulation in the limb after the simultaneous ligation of the arteries and veins
- blood movement in an upward direction
- reduced blood circulation in the limbs
- blood flow in the side branches, bypassing the main trunk of the vessel after the injury or damage

Projection line is drawn from the radial artery

- + Inner edge of the tendon of the biceps to the pulse point
- the medial epicondyle to the medial shoulder styloid process
- the middle of the elbow to the medial ulnar styloid
- the middle of the elbow to the middle of the distance between the styloid process
- the middle of the cubital fossa to the middle of the wrist

What access to expose the axillary artery most rational?

- + on the projection line
 - Padding on the projection line at 1.5 sm anteriorly
 - some distance from the projection line at 1.5 sm posteriorly

- on the medial surface of the shoulder
- on the lateral surface of the shoulder

What access to expose the brachial artery in the middle third of the shoulder is the most rational?

- + Padding on the projection line at 2 sm anteriorly
- on the projection line
- some distance from the projection line at 2 sm posteriorly
- on the medial surface of the shoulder
- on the lateral surface of the shoulder

What access to expose the radial artery in the lower third of the forearm the most rational?

- some distance from the projection line at 2 sm medially
- some distance from the projection line at 2 sm outwards
- on the medial surface of the forearm
- + On the projection line
- on the lateral surface of the forearm

What access to expose the median nerve in the lower third of the forearm the most rational?

- + On the projection line
- 21
- some distance from the projection line at 2 sm medially
- some distance from the projection line at 2 sm outwards
- on the medial surface of the forearm
- on the lateral surface of the forearm

In a drainage layer should be at tenosynovitis II IV fingers?

- + Communications between the parietal and visceral leaflets synovium
- through the subcutaneous tissue

- between tendon and bone
- between the tendon and the parietal layer of the synovium
- between tendon and skin

For what is permissible panaritiums perform arcuate incision in the terminal phalanges?

- subcutaneous
- perifinger
- Hyponychial
- + Bone
- cutaneous

What anatomical tissue finger determine the spread of pus deep subcutaneous panaritiums nail phalanx?

- the thickness of the skin of a finger
- poorly pronounced subcutaneous fat
- especially the neurovascular supply of tissues with fingers
- the linkages between the skin and bone
- + Connective septum, skin connecting with the periosteum

What caused the existence of "forbidden zone" to the cuts on the hand?

- + Location of the median nerve motor branches
- arrangement of superficial palmar arch.
- arrangement of motor branches of the ulnar nerve
- arrangement of common digital nerve
- the general location of the finger vessels

What is V shaped abscess?

- + Festering tendobursit I and V fingers
- purulent tenosynovitis II IV fingers
- purulent tenosynovitis II and III fingers
- purulent lesion elevation intermuscular intervals I and V fingers
- all the above

What explains the need for an urgent surgical intervention in purulent tenosynovitis of the flexor tendon II, III, IV fingers?

the possibility of the spread of pus in the cellular spaces Pirogov Paron

- the possibility of the transition process in the bone tissue
- the possibility of sepsis
- + Possibility of necrosis of the tendons due to compression of the mesentery
- the possibility of rising spread of pus cellular spaces of the upper limb

Specify on which surfaces the middle and proximal phalanx II IV fingers make the cut at tenosynovitis?

- on the palm
- + On the side
- on the back
- cross shaped incision on the palmar surface
- all possible options

When purulent tenosynovitis I toe except for the cuts in the phalanx should be drained

- + Space Pirogov Parona
- subgaleal space palm
- supraaponeurotic space palm
- subtenton space palm
- ulnar bursa

Where you want the scar with amputation of the phalanges III IV fingers patchwork ways?

- + On the back surface of the finger
- on the lateral surface of the finger
- on the medial surface of the finger
- on the palmar surface of the finger
- on the lateral and medial surface of the finger

In the adductor canal is v.femoralis

- + ahead of a.et n.femoralis
- +Outside and behind a.femoralis
- inwards from a.et n.femoralis
- between a.femoralis and n.saphenus
- inwards from a.femoralis and behind n.saphenus

Medial femoral triangle limited

- + M.adductor longus
- m.rectus femoris
- m.sartorius
- m.adductor magnus
- m.gracilis

21

The top peroneal muscular canal passes

- + Common peroneal nerve
- the deep peroneal nerve and the peroneal artery
- peroneal artery and superficial peroneal nerve
- small subcutaneous thigh Vienna

- peroneal artery

-

Front wall forms canalis cruropliteus

-M.tibialis posterior

- m.soleus et arcus tendineus m.solei

- m.gastrocnemius

- m.popliteus

- membrana interossea c m.popliteus

The knee channel lateral popliteal lies

+ N.tibialis

- a.tibialis posterior

- v.tibialis posterior

- a.poplitea

- n.peroneus communis

The canalis musculooperoneus inferior located

-m.peroneus superficialis

- v.saphena parva

+ A.peronea

21

-m.peroneus profundus

- v.saphena magna

Skin I rear foot supplies the interdigital spaces

+ N.peroneus profundus

-n.saphenus

- n.suralis

- n.plantaris lateralis

- n.peroneus superficialis

Bottom canalis plantaris demarcates

+ Fascia plantaris profundus

- septum lateralis

- lig.plantaris longus

- septum medialis

- m.abductor hallucis

The medial wall of the vascular lacuna forms

- lig.pectineale

+ Lig.lacunare

- lig.inguinale

- arcus iliopectineus

- v.femoralis

The rear wall of the deep femoral ring forms

+ Lig.pectineale

- lig.lacunare

21

- lig.inguinale

- v.femoralis

- arcus iliopectineus

The fossa poplitea most surface lies

+ N.tibialis

- n.ischiadicus

- a.poplitea

- v.poplitea
- n.peroneus superficialis

Lateral edge of the rear foot is innervated skin

- + N.suralis
- n.peroneus profundus
- n.saphenus
- n.tibialis
- n.peroneus superficialis

Key Lisfranc joint is

- + Lig.cuneometatarsium interosseum
- lig.talocalcaneum interosseum
- lig.bifurcatum
- lig.cuboideonaviculare plantare
- lig.calcaneonaviculare

Use the line Nelaton determined Roser

- a broken reed in the middle third of the offset
- 21
- dislocation of the knee
- + Fracture of the femoral neck
- hip fracture in the lower third offset
- hip fracture in the upper third with an offset

With the defeat, the nerve of the foot takes a pathological situation, which is called "horse foot"?

- + N.peroneus communis
- n.tibialis

- n.obturatorius
- n.ischiadicus
- n.peroneus superficialis

What nerve can be damaged at the opening of bloat posterolateral knee joint?

- + N.peroneus communis
- n.ischiadicus
- n.saphenus
- n.tibialis
- n.femoralis

What position should be given limb to determine the pulsation of the popliteal artery?

- + Leg bent at the knee joint
- foot to straighten the knee
- foot rotate outwards
- foot to rotate inwards
- lift at an angle of 30 degrees

How access advisable to expose the femoral artery in the upper femoral triangle?

22

- + On the projection line
- retreat to 2 cm outward from the projection line
- retreat to 2 cm medially from the projection line
- the inner edge of the sartorius
- the inner edge of the quadriceps

When phlebectomy held at Linton

- + Subfascial ligation of communicating veins with plastic fascia

- suprafascial ligation of communicating with the removal of the saphenous veins
- percutaneous ligation of saphenous veins
- ligation of the great saphenous vein at its mouth
- vein removal using the probe in three stages

Deep peroneal nerve is exposed at the projection line

- a.poplitea
- a.tibialis posterior
- + A.tibialis anterior
- a.peronea
- a.plantaris prophundus

According to the projection line a.tibialis posterior bare

- + N.tibialis
- n.peroneus superficialis
- n.peroneus communis
- n.tibialis posterior
- n.peroneus prophundus

22

Projection line a.tibialis anterior held

- + From the middle line between the caput fibula and tuberositas tibia to intraankle point
- from caput fibulae to the middle of the distance between the ankles
- from the patella to the medial malleolus
- by tuberositas tibiae to the medial malleolus
- from the middle line between the caput fibula and tuberositas tibiae to the medial malleolus

Punction front shoulder joint by inserting a needle between

- + Processus coracoideus and caput humeri
- outwards from the caput humeri
- caput humeri and the glenoid cavity of the blade
- acromion and the caput humeri
- processus coracoideus and acromio

When osteoplastic amputation Pirogov bone sawdust close

- patella
- talus
- tibial tuberosity
- + Calcaneus
- fibula

Resection arthroplasty is

- + Remove all or part of the joint
- securing the joint in complete immobility
- all the answers wrong
- joint opening
- artificial joint replacement material

22

«Scalloped" incision on the back of the foot is held with

- + Disarticulation of the fingers on Goranzho
- amputation Sharpe
- disarticulation of the joint Chopart
- the isolation in the Lisfranc joint
- osteoplastic amputation Pirogov

What segments of the bones of the cranial vault damaged the greatest trauma of the skull, accompanied by fractures?

- + Internal compact disc
- external compact disc
- all the layers
- cancellous
- there is no law

At what point is projected onto the main stem of the middle meningeal artery scheme Kronleyna Bryusovy?

- + On the intersection of the front vertical and horizontal bottom
- at the intersection of the front vertical and horizontal top
- at the intersection of the back vertical and horizontal top
- at the intersection of the middle and upper horizontal vertical
- at the intersection of the middle and lower horizontal vertical

Call layers fronto parietal occipital region?

- the skin, subcutaneous tissue, musculoaponeurotic layer, the periosteum
- + Leather, subcutaneous tissue, musculoaponeurotic layer subgaleal tissue, periosteum, subperiosteal tissue, bone

- skin musculoaponeurotic layer, ²²the subcutaneous tissue, the periosteum, the bone
- the skin, subcutaneous tissue, subgaleal fiber, musculoaponeurotic layer, the periosteum, subperiosteal tissue, bone
- the skin, subcutaneous tissue, musculoaponeurotic layer subperiosteal tissue, bone

What connect veins graduates?

- + Veins covers, diploetic veins, venous sinuses of the dura mater
- diploetic veins, venous sinuses of the dura mater, brain veins
- cerebral veins, venous sinuses of the dura mater
- covers veins, venous sinuses of the dura mater

- venous sinuses of the dura mater, cisterns and ventricles

Otitis media pus in the mastoid penetrates

+ Aditus at antrum

- porus acusticus internus

- porus acusticus externus

- foramen jugulare

- grids mastoid

When mastoidectomy used

+ Chisel Voyachek

- saw Gigli

- cutting pliers with oval jaws

- brace

- Clippers Dahlgren

The occipital region is a.occipitalis

+ B subcutaneous tissue

-in the thickness m.epicranii

22

- under the aponeurotic helmet

- under the periosteum of the occipital bone

- in subgaleal tissue

In the rear lower quadrant mastoid projected

-antrum mastoideum

+ Sinus venosus sigmoidei

- canalis n.facialis

- fossa cranii media
- canales semicirculares

Where is point the finger pressing the facial artery?

- + On the mid height of the body of the mandible at the anterior margin of the masseter muscle
- 1 sm below the tragus of the ear
- 0.5 1 sm below the middle of the lower edge of the eye socket
- behind the angle of the mandible
- 1 sm below the middle of the zygomatic arch

Online access in the treatment of cellulitis Pterygopalatine mandibular space is a cross sectional

- + submandibular region
- front of the tragus of the ear
- in the chin area
- for a transitional fold of the lower jaw in the causal tooth
- parallel to the edge of the lower jaw arc shape from corner to corner

Deep area of the face is

- + Communications between the inner surface of the branches of the mandible and maxilla hill
- between the inner surfaces of the body of the mandible
- between the inner surface of the body of the mandible and the front surface of the body of the upper jaw
- between the inner surface of the branches of the lower jaw and orbital surface of the body of the upper jaw
- between the inner surface of the branches of the mandible and the pterygoid process of the sphenoid bone

Enter the interposition of vessels and nerves deep facial area from the surface deep into the

- + Plexus venosus pterygoideus, a.maxillaris, n.mandibularis
- a.maxillaris, plexus venosus pterygoideus, n.mandibularis
- n.mandibularis, plexus venosus pterygoideus, a.maxillaris
- plexus venosus pterygoideus, n.mandibularis, a.maxillaris
- Fiber retropharyngeal and rear peripharyngeal cellular spaces
- a.maxillaris, n.mandibularis, plexus venosus pterygoideus

Pharyngeal spinal fascial spur of shares

- + retropharyngeal tissue and cellular spaces peripharyngeal
- fiber peripharyngeal cellular spaces at the front and rear sections
- fiber retropharyngeal and front peripharyngeal cellular spaces
- fiber peripharyngeal space from the cellular spaces of deep facial area

Fiber, no spaces separates schylodiafragm?

- + Front office peripharyngeal space from the rear division peripharyngeal space
- cellular spaces of the retropharyngeal space peripharyngeal
- retropharyngeal cellular spaces of the rear division peripharyngeal space
- Front peripharyngeal space from submasseter cellular spaces
- the front and rear sections peripharyngeal space from cellular spaces of deep facial area

22

Cellular spaces in a possible breakthrough of pus through the medial spur of the parotid gland in the case of purulent mumps?

- + Anterior lateral space peripharyngeal
- in the parotid masticatory cellular spaces
- in mezhkrylovidnoe and temporomandibular pterygium cellular spaces
- in the posterior part of the lateral space peripharyngeal
- in retropharyngeal cellular spaces

Vienna nasal anastomose

+ v.jugularis externa

-v.jugularis anterior

- v.jugularis interna

+ Sinus sagittalis superior

- diploetic veins

Describe where produce of injection needle when performing cervical vagosympathetic blockade on Vishnevsky?

+ is the intersection of the rear edge of the sternocleidomastoid muscle on the outside of jugular vein

-between the legs of sternocleidomastoid muscle

- in the corner formed by the outer edge of the clavicle and the sternocleidomastoid muscle

- in the jugular notch of the sternum 3 cm above the middle of the clavicle

- the intersection of the front edge of the sternocleidomastoid muscle to the external jugular vein

What reportedly slit main neurovascular bundle of the medial triangle of the neck?

+ anterior mediastinum

-with pericardial

- to the posterior mediastinum ²²

- with previsceral cellular spaces

- with forefoot peripharyngeal space

What fascia neck advantageously vagina to the main neurovascular bundle of the medial triangle of the neck?

+ Piece of parietal visceral fascia

- prespinal fascia

- superficial fascia

- visceral piece of visceral fascia
- own a piece of deep fascia

#What triangles isolated suprahyoid area?

- sleepy delta and lateral triangle
- Submandibular triangle submental triangle
- submental triangle sleepy triangle
- lateral submandibular triangle and triangle
- submental triangle and scapular tracheal triangle

Where can spread purulent processes of retrovisceral cellular spaces of the neck?

- + In the posterior mediastinum
- in the anterior mediastinum
- the pleural cavity
- in a blind pouch Gruber
- in the retroperitoneal space

Between what fascia neck is intraaponevrotic suprasternal cellular spaces?

- + Communications between the superficial and deep fascia leaflets own neck
- between the superficial fascia ~~and~~ the superficial fascia of the neck piece of their own
- between the superficial fascia and the deep fascia of the neck piece of their own
- between deep fascia and own a piece of fascia prespinal
- between the surface sheet of its own fascia and a parietal layer of fascia intraneck

Which cellular spaces neck communicates with the anterior mediastinum?

- + Previsceral
- suprasternal intraaponeurotic

- retrovisceral
- prespinal
- cellular spaces of the neck with fiber anterior mediastinum were not disclosed

Arcus venosis juguli located in

- spatium pretracheale
- between II and V in the fascia trigonum omoclaviculare
- Spatium interaponeuroticum suprasternale
- + between II and V in the fascia trigonum omotrapezoideum
- between I and II fascia of the neck

Call nerve, located in the esophageal tracheal sulcus?

- + N.laringeus recurens
- n.vagus
- n.frenicus
- n.splanchicus major
- n.hypoglossus

Respect to which anatomical structures distinguish the upper, middle and lower tracheostomy?

- + With respect to the isthmus of the thyroid gland
- in relation to the cricoid 22
- in relation to the thyroid cartilage
- in relation to the hyoid bone
- in relation to the rings of the trachea

Return nerves innervate

- + Pharynx, larynx, trachea and esophagus (upper section)
- larynx and trachea

- larynx and pharynx
- pharynx and esophagus
- thyroid, larynx and pharynx (lower part)

Under the mucous membrane of the pharynx the bottom of the pear shaped pocket passes

+ N.laryngeus superior

-n.glossopharyngeus

- n.vagus

- n.symphaticus

- n.laryngeus reccurens

«Danger Zone" of the thyroid gland is located

- on the isthmus of the thyroid gland

+ On the rear surface side lobes gland

-on the front surface side lobes gland

- in the upper pole of the side lobes cancer

- on side surfaces of gland

Parathyroid glands located

23

+ Under the fascial sheath of the thyroid gland

-over the fascial sheath of the thyroid gland

- between the sheets intraneck fascia

- behind the thyroid between intraneck prespinal and fascia

- own capsule of the thyroid gland

Within sleepy triangle missing

-f.superficialis colli

- + Lamina profunda f.colli propria
- f.endocervicalis
- lamina superficialis f.colli propria
- f.prevertebralis

Core muscles extender glottis innervated

- + N.laryngeus inferior
- n.laryngeus superior
- n.phrenicus
- n.hypoglossus
- all the answers wrong

What nerve may be damaged during resection of the thyroid gland?

- + N.laryngeus recurens
- truncus simpaticus
- n.vagus
- n.frenicus
- n.hypoglossus

23

Under what fascia is cervical sympathetic trunk?

- + F.prevertebralis
- lamina parietalis f.endocervicalis
- lamina profundus f.colli propriae
- lamina visceralis f.endocervicalis
- lamina superficialis f.coli propriae

What nerve passes through the anterior surface of the anterior scalene muscle?

-n.vagus

- n.laringeus reccurens

+ N.phrenicus

-rami descendens n.hypoglossus

- truncus simphaticus

What form vein venous angle Pirogov?

+ V.subclavia, v.jugularis interna

- v.jugularis interna, v.jugularis externa

- v.subclavia, v.jugularis externa

- v.jugularis externa, v.jugularis anterior

- v.subclavia, v.jugularis externa

After spatium interscalenum passes

+ A.subclavia

- n.phrenicus

- a.transversa colli

- a.vertebralis

- n.vagus

23

After spatium antescalenum passes

-plexus brachialis

+ N.phrenicus

- a.subclavia

- a.transversa colli

- a.vertebralis

In the staircase vertebral triangle of shchito cervical trunk moves

- + A.cervicalis ascendens
- a.thyroidea superior
- a.intercostalis suprema
- a.vertebralis
- a.cervicalis descendens

What form vein venous angle Pirogov?

- + V.subclavia, v.jugularis interna
- v.jugularis interna, v.jugularis externa
- v.subclavia, v.jugularis externa
- v.jugularis externa, v.jugularis anterior
- v.subclavia, v.jugularis externa

Base staircase vertebral triangle formed

- the transverse processes of the cervical vertebrae
- anterior scalene muscle
- + Dome of the pleura
- collarbone
- subclavian vein

23

When retromammary mastitis affected

- + Fiber located behind the breast capsule
- subcutaneous tissue
- fiber between the sheets supporting ligaments of the breast
- fiber under the pectoralis major muscle
- fiber under the pectoralis minor

Explain why puncture the pleural cavity is made on the upper edge of the ribs?

- + Out of the possibility of damage to the intercostal neurovascular bundle
- because of the possibility of pneumothorax
- because of the potential damage to the intercostal muscles
- due to the structural features of the periosteum
- to facilitate anesthesia

Specify the location of the lymph node *Zorgiusa*, one of the first affected metastases in breast cancer?

- + Under the outer edge of the pectoralis major muscle level III rib
- above the collarbone behind the outer edge of the sternocleidomastoid muscle
- in the course of the internal thoracic artery
- in the center of the axilla
- under the edge of the latissimus dorsi

What is adjacent to the internal thoracic artery behind the lower ribs III rd?

- + M.transversus thoraci
- f.endothoracica
- mm.intercostalis interna
- pleura mediastinalis
- spatium parapleuralis

23

What part intercostal space no external intercostal muscles?

- by linea scapularis to the linea axillaris media
- from the spine to the rib angle
- by linea medioclavicularis up linea axillaris media
- over from the corner to the costal cartilage of the ribs

+ On the cartilage of the ribs over

What part intercostal space no internal intercostal muscles?

+ From the spine to the rib angle

- from the shoulder to the middle axillary line

- for a cartilage of the ribs

- from mid clavicle to the mid axillary line

- from the spine to the mid axillary line

On what part of the intercostal space intercostal vessels are covered by an edge?

+ From the linea scapularis to the linea axillaris posterior

- anterior linea medioclavicularis

- from the spine to the linea scapularis

- for a cartilage of the ribs

- by linea scapularis to the linea axillaris anterior

At what point it is advisable to perform a puncture of the pleural cavity to remove fluid?

- in II intercostal space linea medioclavicularis

+ In VIII IX intercostal space on the linea axillaris posterior

23

- in the IV intercostal space on the linea axillaris anterior

- in X intercostal space linea scapularis

- in VIII IX intercostal space linea medioclavicularis

At what point it is advisable to carry out a puncture to remove the air from the pleural cavity?

+ In II III intercostal space linea medioclavicularis

- in the IV intercostal space on the linea axillaris anterior

- in VIII IX intercostal space on the linea axillaris posterior

- in the IX intercostal space linea scapularis
- in the III IV intercostal space linea medioclavicularis

In some cases a subperiosteal resection of the ribs?

- + At thoracotomy through the bed of the ribs
- in the drainage of the pleural cavity in children
- For pleural drainage in adults
- puncture the pleural cavity in children
- puncture the pleural cavity in adults

The order of the components of the intercostal neurovascular bundle from the bottom up

- + N.intercostalis, a.intercostalis, v.intercostalis
- a.intercostalis, v.intercostalis, n.intercostalis
- v.intercostalis, a.intercostalis, n.intercostalis
- n.intercostalis, v.intercostalis, a.intercostalis
- v.intercostalis, n.intercostalis, a.intercostalis

Between the middle and the outer legs of the diaphragm is located

+ Truncus sympathicus

23

- v.hemyazygos
- ductus thoracicus
- nn.splanchnici
- v.azygos

Left between the medial and middle legs of the diaphragm passes

- n.vagus sinister
- ductus thoracicus

- v.cava inferior
- + V.hemyazygos
- v.azygos

To expose the cervical esophagus section of wire

- + On the inner edge of m.sternocleidomastoideus sinistra
- on the outer edge m.sternocleidomastoideus dextra
- the inner edge m.sternocleidomastoideus dextra
- incision of Kocher
- on the outer edge m.sternocleidomastoideus sinistra

Left dome of the diaphragm is projected onto the front

- III rib
- V edge
- + V edge
- IV rib
- VI rib

After sternocostal slit diaphragm passes

23

- v.cava inferior
- + a.thoracica interna
- ductus thoracicus
- v.azygos
- truncus symphaticus

Sternum located at the corner

- body ThIII

- body ThV
- + Intervertebral disc Th IV ,V
- intervertebral disc ThIII IV
- body ThII

Right dome of the diaphragm is projected onto the rear

- + VIII intercostal space
- VII rib
- VI rib
- VII intercostal space
- V edge

Between the inner legs of the diaphragm passes

- + Ductus thoracicus
- a.thoracica interna
- v.hemiazygos
- nn.splanchnici
- v.cava inferior

23

Esophagus passes through the diaphragm at the level

- + Th,X
- Lower edge Th VIII
- ThIX
- ThXII
- ThXI

Lower blade angle is at

- + ThVII
- ThVI
- ThVIII
- ThV
- ThIX

Deeper hilar fascia located

- + Parapleural fiber
- parietal pleural leaflet
- visceral pleura leaf
- internal intercostal membrane
- pleural cavity

Chest cavity is the space

- + Limited chest and diaphragm
- limited hilar fascia and the parietal pleura
- a limited part of the parietal pleura
- between the mediastinum and chest
- between the parietal and visceral pleura

23

Parapleural tissue located between

- + F.endothoracica and pleura parietalis
- pleura parietalis and pleura visceralis
- pleura parietalis and m.intercostalis interna
- m.intercostalis externa and m.intercostalis interna
- m.intercostalis interna and f.endothoracica

For a lower boundary edge comes easy for the mid axillary line during quiet breathing?

+ On the VIII th

- at the X th

- at the XI th

- in the VII th

- in the IX e

whose name is portion of the pericardium in the anterior heart, not covered by the pleura?

+ A.R.Voynich Syanozhensky

- V.F.Voyno Yasenetsky

- A.Yu.Sozon Yarashevich

- Pirogov

- Morgagni

Front adjacent to the bifurcation of the trachea

+ A.pulmonalis dextra

- a.pulmonalis sinistra

- tr.brachiocephalicus

- ductus thoracicus

- v.cava inferior

24

At what level are located the roots of the lungs of an adult?

+ On the level ThV VII

- at ThIII, V

- at ThVII, X

- at ThII, IV

- at ThVII, VIII

What anatomical structures that are part of the roots of the lungs occupy the forward position?

+ V.pulmonale

- a.pulmonare

- bronchus principis

- a.bronchialis

- n.vagus

To mediastinal surface of the left lung behind his gate adjacent

+ Aorta thoracica

- truncus vertebralis

- oesophagus

- v.hemiazygos

- ductus thoracicus

What nerve was used as an anatomical landmark during surgery to patent ductus arteriosus?

+ N.reccurens laryngeus sinistra

- n.intercostalis III

- n.splanchnicis minor

- n.splanchnicis major

24

- truncus sympathicus

Where is lig.arteriosum?

+ Communications between the aortic arch, the left pulmonary artery and the pulmonary trunk

- between the arch of the aorta and the superior vena cava

- arc between the aorta and inferior vena cava

- between the aortic arch and descending aorta

- between the aortic arch, the right pulmonary artery and the pulmonary trunk

The posterior interventricular sulcus of heart lie

- Vienna middle of the heart and interventricular branch of the right coronary artery
- + the coronary sinus and the circumflex branch, right coronary artery
- Vienna great heart and interventricular branch of the right coronary artery
- Vienna great heart and interventricular branch of the left coronary artery
- the coronary sinus and the circumflex branch of left coronary artery

Upper hollow Vienna is adjacent to the left

- truncus brachiocephalicus
- n.phrenicus dexter
- a.pulmonalis dextra
- + Aorta ascendens
- n.vagus dexter

After sinus transversus pericardi carried out

- + Temporary clamping of large vessels
- opening the pericardial cavity
- puncture of the pericardial cavity
24
- access to the arterial duct
- access to the coronary arteries

Internal benchmark for access to the arterial duct

- + N.phrenicus sinister
- n.vagus dextev.
- v.azygos
- n.phrenicus dexter

- truncus brachiocephalicus

When mitral commissurotomy finger inserted through the

- the anterior wall of the left atrium

+ Tab on the left heart

- the anterior wall of the right ventricle

- anterior wall of the left ventricle

- right ear of the heart

Based heart arranged from right to left

+ Top hollow Vienna, aorta, pulmonary trunk

- aorta, pulmonary trunk, the upper hollow Vienna

- pulmonary trunk, the upper hollow Vienna, aorta

- upper hollow Vienna, pulmonary trunk, the aorta

- aorta, superior vena Vienna, pulmonary trunk

Jam food mitral stenosis explained

+ Compression of the esophagus left atrium

- esophageal diverticulum

24

- compression of the esophagus increased left ventricle

- compression of the gas bubble stomach

- reflex spasm of the esophagus

Lies behind the ascending aorta

+ A.pulmonalis dextra

- v.cava superior

- trunsus pulmonalis

- right ear of the heart
- n.phrenicus dexter

Right adjacent to the ascending aorta

- + V.cava superior
- n.vagus dextra
- truncus pulmonalis
- n.vagus sinistra
- a.pulmonalis dextra

V.azygos flows into

- v.brachiocephalica sinistra
- + V.cava superior
- v.cava inferior
- v.brachiocephalica dextra
- v.hemiazygos

In the lower part of the posterior mediastinum behind the esophagus passes

- truncus sympaticus dexter
- v.hemiazygos accessoria
- n.vagus dexter
- v.cava inferior
- + Aorta thoracica

24

At the level of ThVIII IX thoracic aorta separates from the pericardium

- + Oesophagus
- ductus thoracicus

- v.hemiazygos
- sinus costomediastinalis dexter
- v.azygos

Below the gate light ductus thoracicus covered

- + Right edge mediastinal pleura sine
- posterior section of the pericardium
- the right side of the department of the pericardium
- the left edge mediastinal pleura sine
- the left lateral part of the pericardium

Thoracic esophagus is exposed

- + Side thoracotomy in V VI intercostal space on the right
- lateral thoracotomy in the V intercostal space on the left
- longitudinal sternotomy
- posterolateral thoracotomy in the III intercostal space on the left
- transverse sternotomy

Operation Dobromyslova Toreka performed at

24

- stomach cancer
- diverticula of the esophagus
- esophageal bleeding
- Esophageal cancer
- all the answers are correct

The hernial sac formed in congenital inguinal hernia?

- + Processus vaginalis of peritoneum

- parietal peritoneum
- mesentery
- egg shells
- the bladder wall

Specify which hernia front side of the abdominal wall is an indication for emergency surgery?

+ Disadvantaged

- birth
- Moving
- nevpravimye
- all of the above

What is inguinal gap?

+ Space bounded by the inguinal ligament, the lower edges of the internal oblique and transverse muscle and lateral margin of the rectus sheath

- distance between the outer and inner rings of the inguinal canal
- the space between the inguinal ligament and lateral fascia
- the space between the front and rear walls of the inguinal canal
- space bounded by the lower edges of the internal oblique and transverse muscles, the edge of the rectus sheath and the inner surface of the external oblique abdominal muscles

24

What is the most important prerequisite for the formation of anatomical direct inguinal hernia?

- extension of the internal opening of the inguinal canal
- slotted oval inguinal gap
- an increase in cross sectional area of the inguinal canal
- traumatic anterior lateral abdominal wall
- + Plus the existence of a high inguinal gap

How is the front wall of the fibrous rectus sheath above the navel?

- Due to the external oblique fascia and front plate internal oblique
- + aponeurosis abdominal muscles
- all the broad aponeurosis of the abdominal muscles
- aponeurosis of the external and internal oblique abdominal muscles
- transverse muscle and transverse abdominal fascia
- by the external oblique fascia, front fascia plate the internal oblique and transversus abdominis aponeurosis

The front wall is formed by fibrous rectus sheath 5 cm below the navel?

- + All the broad aponeurosis of the abdominal muscles
- aponeurosis of the external oblique abdominal muscles
- transverse muscle and transverse abdominal fascia
- external oblique aponeurosis and the internal oblique abdominal muscles
- aponeurosis of the internal oblique and transverse abdominal muscles

The rear wall is formed by the rectus sheath below the semicircular line?

- aponeurosis of the internal oblique and transverse abdominal muscles
- all the broad aponeurosis of the abdominal muscles
- external oblique aponeurosis ~~and~~ the internal oblique abdominal muscles
- + The transverse abdominal fascia
- aponeurosis transversus abdominis

Communications, public umbilical region saphenous veins in portal hypertension can serve as a porto caval anastomoses

- + vv.paraumbilicalis
- with vv.epigastricae superior et inferior
- with v.epigastrica superficialis

- with vv.thoracoepigastricae
- with v.thoracica interna

What links saphenous veins umbilical region may serve as cava caval anastomosis?

- with v.epigastricae superficialis
- + C vv.thoracoepigastricae, epigastricae superficialis, epigastricae superiores et inferiores
- with v.umbilicalis
- with vv.paraumbilicalis
- with vv.thoracoepigastricae, epigastricae superficialis, paraumbilicalis, umbilicalis et epigastricae inferiores

At what level of the linea alba usually has the greatest width?

- + The navel
- under the xiphoid process
- 4 sm below the navel
- above the pubic symphysis
- 4 sm above the navel

Which of the following anatomical structures iliac groin did not participate in the formation of the inguinal canal?

24

- aponeurosis of the external oblique abdominal muscles
- + Fascia Thompson
- internal oblique and transversus aabdominis
- inguinal ligament
- transverse fascia

Enter the projection of the internal opening of the inguinal canal towards the middle of the inguinal ligament

+ 1.5 cm above the

- respectively middle of the inguinal ligament

- lateral

- 1.5 cm below

- medial

Between what anterolateral muscles of the abdominal wall in the side areas are the main nerve trunks?

- between the external oblique and internal oblique

- between the transverse muscle, and intra abdominal fascia

+ Communications between the internal oblique and transverse

- In the preperitoneal tissue

- between internal and transverse muscles

For a topographic anatomical weak point can serve as a hernia gate with direct inguinal hernia?

+ Medial inguinal fossa

- lateral inguinal fossa

-supravesical fossa

- oval fossa

- deep femoral ring

24

In what direction it is advisable to dissect hernial when infringement oblique inguinal hernia at the internal opening of the inguinal canal?

+ Outwards

- medially

- down

- up

- does not matter

What anatomical structures should be cut to eliminate any infringement of inguinal hernia in the external opening of the inguinal canal?

- inguinal ligament
- Grebeshkova bunch
- internal and lateral abdominal muscles
- aponeurosis of the internal oblique abdominal muscles
- + Aponeurosis of the external oblique abdominal muscles

Which of the following methods of plastic inguinal canal involves strengthening the posterior wall?

- Bassini
- Martynov
- Girard
- Kimbarovsky
- Spasokukotsky

In what direction should be cut infringing ring when strangulated femoral hernia?

- anteriorly
- backwards
- does not matter
- Medially
- outwards

25

When dissection infringes ring, a hernia are important individual differences in the shape of the branch inferior epigastric artery and obturator?

- + Femoral
- direct inguinal
- oblique groin

- umbilical
- obturator

Enter, in which the vein occurs outflow of blood from the stomach?

- v.cava superior
- + v.portae
- v.cava inferior
- v.mesenterica superior
- v.umbilicalis

Call benchmark for determining the boundary between the stomach and duodenum

- + Peripyloric Vienna Mayo
- liver gastric ligament
- hepatoduodenal bunch
- sharp drop of the local thickness of the wall of the digestive tube
- furrow between the pyloric stomach and duodenum

Vessels pinching the lower part of the duodenum and is violating its permeability is

- + Top mesenteric artery and Vienna
25
- superior mesenteric artery and inferior mesenteric Vienna
- average artery colon
- left colon artery
- gastroduodenal artery

Major duodenal papilla is located

- on the border of the upper and middle third of the posterior wall of the descending part of the duodenum 12

- in the middle of the front side wall of the lower horizontal part of the intestine
- + On the middle or between the middle and lower third of the inner rear wall of the downward abdominal muscle
- on the border of the upper third of the anterior part of the inner wall of the descending colon
- between its upper and middle third of the front wall of the duodenum

Explain what is dangerous acute circulatory disorders in celiac trunk?

- + Necrosis of the upper abdomen
- acute renal failure
- acute intestinal obstruction
- acute ischemia of the pelvic organs
- acute adrenal insufficiency

Who developed a special reception palpation to determine the duodenal jejunal flexure in the audit of the abdominal cavity?

- Kocher
- Billroth
- Lambert
- Gofmayster
- + Gubarev

25

Doing a technical device prevents wicking of food into the free abdominal cavity during the gastrostomy?

- + Gastropexy
- creation of an artificial valve
- the right gastric artery ligation
- greater omentum tamponade
- creating muscular sphincter

Which of the following sections of the abdominal cavity can be detected in the food mass perforated ulcer of the posterior wall of the stomach?

- in peripyloric bag
- in left subdiaphragmatic space
- in the right subdiaphragmatic space
- in the upper ileocecal recess
- + Omental

In gastric ulcer bleeding more likely to occur

- + From the right gastric artery
- from the left gastric artery
- from the gastro omental artery, right
- from gastro duodenal artery
- from the gastro omental artery Left

With sides fiber itself becomes retroperitoneal

- + Preperitoneal tissue
- in the pelvic tissue
- has not yet posted 25
- Bochdalek through an opening in communication with the pleural cavity
- in retroperitoneal fiber

After a vessel leans right ureter at the boundary line?

- testicular vessels in men and ovarian vessels in women
- the obturator artery, vein and nerve
- common iliac artery

- internal iliac artery
- + External iliac artery

Call fold of peritoneum, which is necessary to pull up with immediate access to the bladder to perform its high section?

- + Transverse
- round
- medial umbilical
- lateral umbilical
- median umbilical

What passes through the thickness of the prostate?

- + Urethra
- ureter
- internal iliac Vienna
- internal iliac artery
- genitofemoral nerve
-

Explain how the access is puncture abscess recto vesical recess?

- + through the rear wall of the rectum
- through ischiorectal hole
- through the abdominal wall
- through the obturator canal ²⁵
- Via the front wall of the rectum

Which vein empties into the upper rectal Vienna?

- + In the inferior mesenteric vein
- in the common iliac vein
- in the internal genital vein
- in the internal iliac vein

- in the external iliac vein

As covered by peritoneum prostate gland?

- one hand

- I have no relation to the peritoneum

- on three sides

- all sides

- both sides

What separates the capsule from the capsule Amyussa Pirogov Retz?

+ Peritoneum perineal aponeurosis

- piece of parietal pelvic fascia

- piece of visceral pelvic fascia

- piece of peritoneum

- muscle lifting the anus

The limited subperitoneal floor pelvic cavity below?

- the plane of the entrance to a small basin formed by the bones of the pelvis

+ Muscle lifting the anus and pelvic fascia

25

- the peritoneum and pelvic fascia

- integuments

- peritoneum perineal aponeurosis

Enter the pudendal nerve branch

- rami muscularii

+ N.rectalis inferior

- n.obturatorius

- n.genitofemoralis
- n.cutaneus femoris posterior

Douglas space it

- + Excavatio rectouterina
- excavatio vesicouterina
- excavatio rectovesicalis
- excavatio rectalis anterior
- excavatio rectalis posterior

The blood supply of the rectum is involved

- a.obturatoria
- a.pudenda externa
- a.umbilicalis
- + a.pudenda interna
- a.testicularis

How many pieces isolated vas deferens?

- 2
- 3
- + 4
- 5
- 6

25

The uterus was isolated

- the bottom of the body, isthmus, neck and three surface
- bottom, body, neck and three surfaces

- bottom body ampoule neck and the two surfaces
- + The bottom of the body, isthmus, cervix and two surfaces
- bottom, body, neck and two surfaces

What ligaments are involved in fixing the vertebrae?

- + Front and posterior longitudinal ligament
- round ligaments vertebrae
- spinal disc ligament
- nuchal ligament
- yellow ligament

Where is the epidural space of the spinal cord?

- between the firm and the arachnoid spinal cord
- between the arachnoid and soft shells of spinal cord
- under the pia mater
- + Communications between the hard shell of the spinal cord and vertebral periosteum
- under the dura

Give the definition of "kyphosis"

25

- + Curvature of the spine bulge posteriorly
- anterior curvature of the spine bulge
- curvature of the spine bulge in the side
- convex curvature of the vertebral body anteriorly
- convex curvature of the vertebral body posteriorly

How is the anterior longitudinal ligament of the spine?

- from the foramen magnum to the sacral spine

- + From the foramen magnum to the coccygeal vertebrae in the form of a tape
- from the foramen magnum to the cervical spine
- from the foramen magnum to the thoracic spine
- from the foramen magnum to the lumbar spine

Give the definition of "spondylolisthesis".

- + Slippage of the vertebral body, together with the overlying vertebral column
- complete absence of one of the vertebrae in any of the sections of the spinal column
- cleft in the area interarticular vertebral arch in the region of its isthmus
- the total or partial absence of one of the vertebrae in any of the divisions of the spinal column
- flattening of the vertebral bodies

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- the dissolution of the vertebral body
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What is V shaped abscess?

- + Festering tendobursit I and V fingers
- purulent tenosynovitis II IV fingers
- purulent tenosynovitis II and III fingers
- purulent lesion elevation intermuscular intervals I and V fingers
- all the above

What explains the need for an urgent surgical intervention in purulent tenosynovitis of the flexor tendon II, III, IV fingers?

- + Possibility of necrosis of the tendons due to compression of the mesentery
- the possibility of the spread of pus in the cellular spaces Pirogov Parona
- the possibility of the transition process in the bone tissue
- the possibility of sepsis 26
- the possibility of rising spread of pus cellular spaces of the upper limb

Specify on which surfaces the middle and proximal phalanx II IV fingers make the cut at tenosynovitis?

- on the palm
- + on the side
- on the back
- cross shaped incision on the palmar surface

- all possible options

When purulent tenosynovitis I toe except for the cuts in the phalanx should be drained

+ Space Pirogov Parona

- subgaleal space palm

- supraaponeurotic space palm

- subtendon space palm

- ulnar bursa

Where you want the scar with amputation of the phalanges III IV fingers patchwork ways?

- on the lateral surface of the finger

+ On the back surface of the finger

- on the medial surface of the finger

- on the palmar surface of the finger

- on the lateral and medial surface of the finger

What method is used in the isolation of the operation II and V of thumb?

+ Farabeuf method

- method Malgenya

26

- method Lyuppi

- method of "racket"

- guillotine method

Which operation is performed when isolating I finger?

+ Malgenya method

- method Lyuppi

- method farabeuf

- method of "racket"
- guillotine method

The protect the soft tissues during sawing bones?

- + Retractor
- spatula Buyalsky
- acute 4 and 6 teeth hooks
- hooks farabeuf
- mirrors

To patchwork method relates

- 3 Torque amputation Pirogov
- disarticulation III IV fingers of Lyuppi
- operation Krukenberg Albrecht
- + Shoulder amputation of farabeuf
- I toe disarticulation of Malgenyu

Amputation of the forearm is conducted by the method

+ Cuff

26

- Krukenberg Albrecht
 - farabeuf
 - Pirogov
 - cone
2. Operation phalangization made after
 - amputation of forearm
 - Disarticulation of Malgenyu*
 - disarticulation nail phalanx
 - amputation Sharpe
 - disarticulation of Goranzho
 3. Important point for the isolation of the I toe is Malgenyu
 - Save thenar muscle fixation to the sesamoid bones*
 - palmar shearing and rear triangular flaps
 - removal of articular cartilage base of the proximal phalanx
 - dressing superficial palmar arterial arch

- shearing skin flap in the form of a racket
In the adductor canal is v.femoralis

+ Outside and behind a.femoralis

- ahead of a.et n.femoralis

- inwards from a.et n.femoralis

- between a.femoralis and n.saphenus

- inwards from a.femoralis and behind n.saphenus

Medial femoral triangle limited

- m.rectus femoris

+ M.adductor longus

- m.sartorius

- m.adductor magnus

- m.gracilis

The top peroneal muscular canal passes

+ Common peroneal nerve

- the deep peroneal nerve and the peroneal artery

- peroneal artery and superficial peroneal nerve

- small subcutaneous thigh Vienna

- peroneal artery 26

Front wall forms canalis cruropopliteus

+ M.tibialis posterior

- m.soleus et arcus tendineus m.solei

- m.gastrocnemius

- m.popliteus

- membrana interossea c m.popliteus

The knee channel lateral popliteal lies

- a.tibialis posterior
- v.tibialis posterior
- a.poplitea
- + n.tibialis
- n.peroneus communis

The canalis musculo-peroneus inferior located

- + A.peronea
- m.peroneus superficialis
- v.saphena parva
- m.peroneus profundus

v.saphena magna Front wall forms canalis cruro-popliteus

- m.soleus et arcus tendineus m.solei
- m.gastrocnemius
- m.tibialis posterior
- m.popliteus
- membrana interossea c m.popliteus

26

The knee channel lateral popliteal lies

- + n.tibialis
- a.tibialis posterior
- v.tibialis posterior
- a.poplitea
- n.peroneus communis

The canalis musculoperoneus inferior located

- m.peroneus superficialis
- v.saphena parva
- + a.peronea
- m.peroneus profundus
- v.saphena magna

Skin I rear foot supplies the interdigital spaces

- + n.peroneus profundus
- n.saphenus
- n.suralis
- n.plantaris lateralis
- n.peroneus superficialis

Bottom canalis plantaris demarcates

- + Fascia plantaris profundus
- septum lateralis
- lig.plantaris longus
- septum medialis
- m.abductor hallucis

26

The medial wall of the vascular lacuna forms

- lig.pectineale
- lig.inguinale
- arcus iliopectineus
- v.femoralis

+ Lig.lacunare

The rear wall of the deep femoral ring forms

+ Lig.pectineale

- lig.lacunare

- lig.inguinale

- v.femoralis

-arcus iliopectineus

The fossa poplitea most surface lies

+ N.tibialis

- n.ischiadicus

- a.poplitea

- v.poplitea

- n.peroneus superficialis

Lateral edge of the rear foot is innervated skin

- N.suralis

- n.peroneus prophundus

26

- n.saphenus

- n.tibialis

- n.peroneus superficialis

Key Lisfranc joint is

+ Lig.cuneometatarseum interosseum

- lig.talocalcaneum interosseum

- lig.bifurcatum

- lig.cuboideonaviculare plantare
- lig.calcaneonaviculare

Use the line Nelaton determined Roser

- a broken reed in the middle third of the offset
- dislocation of the knee
- hip fracture in the lower third offset
- + Fracture of the femoral neck
- hip fracture in the upper third with an offset

With the defeat, the nerve of the foot takes a pathological situation, which is called "horse foot"?

- n.tibialis
- n.obturatorius
- + N.peroneus communis
- n.ischiadicus
- n.peroneus superficialis

What nerve can be damaged at the opening of the posterolateral knee joint?

- n.ischiadicus
- + n.peroneus communis
- n.saphenus
- n.tibialis
- n.femoralis

26

What position should be given limb to determine the pulsation of the popliteal artery?

- + Leg bent at the knee joint
- foot to straighten the knee

- foot rotate outwards
- foot to rotate inwards
- lift at an angle of 30 degrees

How access advisable to expose the femoral artery in the upper femoral triangle?

- + On the projection line
- retreat to 2 cm outward from the projection line
- retreat to 2 cm medially from the projection line
- the inner edge of the sartorius
- the inner edge of the quadriceps

When phlebectomy held at Linton

- suprafascial ligation of communicating with the removal of the saphenous veins
- percutaneous ligation of saphenous veins
- + Subfascial ligation of communicating veins with plastic fascia
- ligation of the great saphenous vein at its mouth
- vein removal using the probe in three stages

Deep peroneal nerve is exposed at the projection line

26

- + A.tibialis anterior
- a.poplitea
- a.tibialis posterior
- a.peronea
- a.plantaris prophundus

According to the projection line a.tibialis posterior bare

- n.peroneus superficialis

- n.peroneus communis
- + n.tibialis
- n.tibialis posterior
- n.peroneus profundus

Projection line a.tibialis anterior held

- + From the middle line between the caput fibula and tuberositas tibiae to intraankles point
- from caput fibulae to the middle of the distance between the ankles
- from the patella to the medial malleolus
- by tuberositas tibiae to the medial malleolus
- from the middle line between the caput fibula and tuberositas tibiae to the medial malleolus

Punction front shoulder joint by inserting a needle between

- outwards from the caput humeri
- caput humeri and the glenoid cavity of the blade
- + Processus coracoideus and caput humeri
- acromion and the caput humeri
- processus coracoideus and acromion

26

When osteoplastic amputation Pirogov bone sawdust close

- patella
- talus
- tibial tuberosity
- + calcaneus
- fibula

Resection arthroplasty is

- securing the joint in complete immobility
- all the answers wrong
- + remove all or part of the joint
- joint opening
- artificial joint replacement material

«Scalloped" incision on the back of the foot is held with

+ Disarticulation of the fingers on Goranzho

- amputation Sharpe

- disarticulation of the joint Chopart
- the isolation in the Lisfranc joint
- osteoplastic amputation Pirogov
-

What segments of the bones of the cranial vault damaged the greatest trauma of the skull, accompanied by fractures?

+ Internal compact disc

- external compact disc

- all the layers

- cancellous

- there is no law

At what point is projected ²⁷ onto the main stem of the middle meningeal artery scheme KronleynaBryusovy?

+ On the intersection of the front vertical and horizontal bottom

- at the intersection of the front vertical and horizontal top

- at the intersection of the back vertical and horizontal top

- at the intersection of the middle and upper horizontal vertical

- at the intersection of the middle and lower horizontal vertical

Call layers frontoparietaloccipital region?

- the skin, subcutaneous tissue, musculoaponeurotic layer, the periosteum
- + Leather, subcutaneous tissue, musculoaponeurotic layer* subgalealtissue, periosteum, subperiosteal tissue, bone
- skin musculoaponeurotic layer, the subcutaneous tissue, the periosteum, the bone
- the skin, subcutaneous tissue, subgaleal fiber, musculoaponeurotic layer, the periosteum, subperiosteal tissue, bone
- the skin, subcutaneous tissue, musculoaponeurotic layer subperiosteal tissue, bone

What connect veins graduates?

- diploetic veins, venous sinuses of the dura mater, brain veins
- cerebral veins, venous sinuses of the dura mater
- covers veins, venous sinuses of the dura mater
- + veins covers, diploetic veins, venous sinuses of the dura mater
- venous sinuses of the dura mater, cisterns and ventricles

Otitis media pus in the mastoid penetrates

- + Aditus at antrum
- porus acusticus internus
- porus acusticus externus
- foramen jugulare
- grids mastoid

27

When mastoidectomy used

- + Chisel Voyachek
- saw Gigli
- cutting pliers with oval jaws
- brace
- Clippers Dahlgren

The occipital region is a.occipitalis

+B subcutaneous tissue

- in the thickness m.epicranii

- under the aponeurotic helmet

- under the periosteum of the occipital bone

-in subgaleal tissue

In the rearlower quadrant mastoid projected

- antrum mastoideum

- canalis n.facialis

+ Sinus venosus sigmoidei

- fossa cranii media

- canales semicirculares

Where is point the finger pressing the facial artery?

+ On the midheight of the body of the mandible at the anterior margin of the masseter muscle

- 1 sm below the tragus of the ear

- 0.51 sm below the middle of the lower edge of the eye socket

27

- behind the angle of the mandible

- 1 sm below the middle of the zygomatic arch

Online access in the treatment of cellulitis Pterygoplatinemandibular space is a crosssectional

- front of the tragus of the ear

+ submandibular region

- in the chin area

- for a transitional fold of the lower jaw in the causal tooth

- parallel to the edge of the lower jaw arc shape from corner to corner

Deep area of the face is

+ Communications between the inner surface of the branches of the mandible and maxilla

- between the inner surfaces of the body of the mandible

- between the inner surface of the body of the mandible and the front surface of the body of the upper jaw

- between the inner surface of the branches of the lower jaw and orbital surface of the body of the upper jaw

- between the inner surface of the branches of the mandible and the pterygoid process of the sphenoid bone

Enter the interposition of vessels and nerves deep facial area from the surface deep into the

+ Plexus venosus pterygoideus, a.maxillaris, n.mandibularis

- a.maxillaris, plexus venosus pterygoideus, n.mandibularis

- n.mandibularis, plexus venosus pterygoideus, a.maxillaris

- plexus venosus pterygoideus, n.mandibularis, a.maxillaris

- a.maxillaris, n.mandibularis, plexus venosus pterygoideus

Pharyngeal spinal fascial spur of shares

+ Fiber retropharyngeal and rear peripharyngeal cellular spaces²⁷

- retropharyngeal tissue and cellular spaces peripharyngeal

- fiber peripharyngeal cellular spaces at the front and rear sections

- fiber retropharyngeal and front peripharyngeal cellular spaces

- fiber peripharyngeal space from the cellular spaces of deep facial area

Fiber, no spaces separates sphenoidiafragm?

+ Front office peripharyngeal space from the rear division peripharyngeal space

- cellular spaces of the retropharyngeal space peripharyngeal
- retropharyngeal cellular spaces of the rear division peripharyngeal space
- Front peripharyngeal space from submasseter cellular spaces
- the front and rear sections peripharyngeal space from cellular spaces of deep facial area

Cellular spaces in a possible breakthrough of pus through the medial spur of the parotid gland in the case of purulent mumps?

- + Anterior lateral space peripharyngeal
 - in the parotidmasticatory cellular spaces
 - in mezhkrylovidnoe and temporomandibular pterygium cellular spaces
 - in the posterior part of the lateral space peripharyngeal
 - in retropharyngeal cellular spaces

Vienna nasal anastomose

- v.jugularis externa
- v.jugularis anterior
- + Sinus sagittalis superior
 - v.jugularis interna
 - diploetic veins

27

Describe where produce of injection needle when performing cervical vagosympathetic blockade on Vishnevsky?

- between the legs of sternocleidomastoid muscle
- in the corner formed by the outer edge of the clavicle and the sternocleidomastoid muscle
- in the jugular notch of the sternum 3 cm above the middle of the clavicle
- + is the intersection of the rear edge of the sternocleidomastoid muscle on the outside of jugular vein
- the intersection of the front edge of the sternocleidomastoid muscle to the external jugular vein

What reportedly slit main neurovascular bundle of the medial triangle of the neck?

- + anterior mediastinum
- with pericardial
- to the posterior mediastinum
- with prevertebral cellular spaces
- with forefoot peripharyngeal space

What fascia neck advantageously vagina to the main neurovascular bundle of the medial triangle of the neck?

- + Piece of parietal visceral fascia
- pre-spinal fascia
- superficial fascia
- visceral piece of visceral fascia
- own a piece of deep fascia

What triangles isolated suprahyoid area?

- sleepy delta and lateral triangle
- submental triangle sleepy triangle
- + Submandibular triangle submental triangle
- lateral submandibular triangle and triangle
- submental triangle and scapular-tracheal triangle

Where can spread purulent processes of retrovisceral cellular spaces of the neck?

- + In the posterior mediastinum 27
- in the anterior mediastinum
- the pleural cavity
- in a blind pouch Gruber
- in the retroperitoneal space

Between what fascia neck is interaponeurotic suprasternal cellular spaces?

- between the superficial fascia and the superficial fascia of the neck piece of their own
- + Communications between the superficial and deep fascia leaflets own neck
- between the superficial fascia and the deep fascia of the neck piece of their own
- between deep fascia and own a piece of fascia pre-spinal
- between the surface sheet of its own fascia and a parietal layer of fascia in-traneck

Which cellular spaces neck communicates with the anterior mediastinum?

- + pre-vertebral
- suprasternal interaponeurotic

- retrovisceral
- prespinal
- cellular spaces of the neck with fiber anterior mediastinum were not disclosed

Arcus venosis juguli located in

- between II and V in the fascia trigonum omotrapezoideum
- spatium pretracheale
- + Spatium interaponeuroticum suprasternale
- between II and V in the fascia trigonum omoclaviculare
- between I and II fascia of the neck

Call nerve, located in the esophagealtracheal sulcus?

- + N.laringeus recurens
- n.vagus
- n.frenicus
- n.splanchnicus major
- n.hypoglossus

Respect to which anatomical structures distinguish the upper, middle and lower tracheostomy?

- in relation to the cricoid
- in relation to the thyroid cartilage
- + With respect to the isthmus of the thyroid gland
- in relation to the hyoid bone
- in relation to the rings of the trachea

Return nerves innervate

- + Pharynx, larynx, trachea and esophagus (upper section)
 - larynx and trachea
 - larynx and pharynx
 - pharynx and esophagus
 - thyroid, larynx and pharynx (lower part)

Under the mucous membrane of the pharynx the bottom of the pearshaped pocket passes

- n.glossopharyngeus
- n.vagus
- + n.laryngeus superior
- n.symphaticus
- n.laryngeus reccurens

27

«Danger Zone" of the thyroid gland is located

- + On the rear surface side lobes gland
- on the isthmus of the thyroid gland
- on the front surface side lobes gland
- in the upper pole of the side lobes cancer
- on side surfaces of gland

Parathyroid glands located

- + Under the fascial sheath of the thyroid gland
- over the fascial sheath of the thyroid gland
- between the sheets intraneck fascia

- behind the thyroid between intraneck pre-spinal and fascia
- own capsule of the thyroid gland

Detect 2 sides of Shipo's triangle

- Interior
- + Upper
- + Front
- + Outside

Which 2 elements form sides of Shipo's triangle

- + In front spina supra meatum
- + Behind crista mastoidea
- In front spina infra meatum
- Behind tuberositas mastoidea

Which 2 formations can be damaged if go beyond the limits of Shipo's triangle

- In front n. trigeminus
- Behind a. facialis
- + In front n. facialis
- + Behind sinus sigmoideus

From which 2 bones anterior cranial fossa consist

- + ala minor ossis sphenoidalis
- corpus ossis ethmoidalis
- + lamina cribrosa ossis ethmoidalis
- ala major ossis sphenoidalis

Which 2 holes are located in anterior cranial fossa

- + foramen caecum
- + lamina cribrosa
- foramen ovale
- fissura orbitalis superior

What transits through a blind hole and hole of cribriform plate

- Through a blind hole emissarium vein
- + Through holes of cribriform plate filamenta olfactoria, a.v. ethmoidalia anteriora
- Through a blind hole n. olfactorius
- + Through holes of cribriform plate a.v. ethmoidalia posterior

Which 2 symptoms comes up at olfactory nerve damage

- Amaurosis
- + Hyperosmia
- + Hyposmia
- Amblyopia

Which 2 symptoms can be observed at the damage of anterior cranial fossa

- + Bleeding from a nasopharynx
- + Hemorrhage in to the orbit cavity
- Dysphagia
- Anaesthesia in a frontal part

Which 2 holes are located in middle cranial fossa

- + canalis opticus
- + foramen rotundum
- fissure orbitalis superior
- foramen caecum

Through which 2 holes transit three branches of trigeminal nerve

- foramen spinosum
- foramen lacerum
- + foramen rotundum
- + foramen ovale

Which 1 vessel and 1 nerve transit through the canalis opticus

- + a.ophtalmica
- + n.opticus
- v.ophtalmica
- n.olfactorius

Identify first 2 layer till bone in frontoparietaoccipital field

- + Aponeurotic galea
- Hair
- + Skin
- Superficial fascia

Identify 2 layers of fat located in frontoparietaoccipital field

- Interfascial fat
- Interaponeurotic fat
- + Subcutaneous fat
- + Subgaleal fat

What is the difference between hematomas located in 2 fat layers in frontoparietaoccipital field

- + Hypodermic hematomas are restricted and have knob shape
- + Subperiostal are restricted to boundaries of separate bones
- Hypodermic hematomas can be²⁷ poured
- Subgaleal have knob shape

Identify 2 sheaths of brain

- + dura mater encephali
- + arachnoidea encephali
- dura mater srinali
- subarachnoidea encephali

Which 2 types of hematomas can be observed inside of skull

- + Subdural
- Epiarachnoid
- + Epidural
- Subcostal

Which 2 major sinuses of pachymeninx you know

- + sinus sagittalis superior
- + sinus occipitalis
- sinus petrosus inferior
- sinus petrosus superior

List 2 sinuses of brain which can be located in the field of occipital inion

- sinus cavernosus dexter
- + sinus sagittalis superior
- + sinus occipitalis
- sinus cavernosus sinister

List 2 sinuses of brain which can not be located in the field of occipital inion

- sinus sagittalis inferior
- sinus cavernosus sinister
- + sinus transversus dexter
- + sinus transversus sinister

Blood of the inferior sagittal sine, transiting through which 2 sinuses, runs in to the jugular vein

- + sinus rectus
- + sinus transversus
- sinus sagittalis superior
- sinus cavernosus dexter

Blood of the upper sagittal sine, transiting through which 2 sinuses runs in to the jugular vein

- sinus sagittalis inferior
- + sinus transversus
- + sinus sigmoideus
- sinus rectus

Which 2 constant emissariums you know, which bridge sinuses of brain to veins of integuments of a head

- + Mastoid
- Frontal
- + Parietal
- Cavernous

27

From which 2 layers skull bones consist

- lamina lateralis
- + lamina externa
- + lamina interna
- lamina medialis

Which 2 arteries blood supply calvaria integuments

- + a.supratrochlearis
- + a.occipitalis
- a.temporalis
- a.parietalis

Which 2 arteries blood supply integuments of frontal and temporal fields

- + a.supratrochlearis
- + a.temporalis superficialis
- a.auricularis posterior
- a.temporalis inferior

Which 3 arteries blood supply integuments of temporal and occipital fields

- + a.temporalis superficialis
- + a.auricularis posterior
- a.occipitalis major
- a.occipitalis minor

Which 3 symptoms are observed at the damage of oculomotor (III cranial) nerve

- Convergent strabismus
- + Mydriasis
- + Divergent strabismus
- Blindness

Which 2 symptoms are observed at the damage of II and III branches trigeminal (V cranial) nerve

- + Anaesthesia of medial and inferior thirds of face
- + Paralysis of masseters
- Anaesthesia of the upper third of face
- Paralysis of mimic muscles

Which 2 nerves transit through an internal auditory foramen

- + n.facialis
- + n.intermedius
- n.mandibularis
- n.accessorius

Identify 2 peripheric branches of facial nerve

- + ramus temporales
- + ramus zygomatici
- ramus orbitales
- ramus nasales

28

Identify 2 symptoms arising at the damage of VII and VIII pairs of cranial nerves

- + Anacusis
- + Ataxia
- Dysphagia
- Tortycolos

From which 2 symptoms consist Mackenzie syndrome

- Ataxia
- + Aphonia
- + Dysphagia
- Glossolysis

Which 2 holes are located in posterior cranial fossa

- + foramen jugulare
- + canalis hypoglossus
- foramen rotundum
- foramen ovale

Which 2 branches of external carotid artery blood supply field of the face

- + a.temporalis superficialis
- + a.facialis
- a.mandibularis
- a.auricularis magnus

List 2 branches of trigeminal (V cranial) nerve located in one vertical line

- Frontal
- + Infraorbital
- + supraorbital
- Supramental

List 2 basic masseters

- + m.pterygoideus medialis
- + m.pterygoideus lateralis
- m.styloideus lateralis
- m.styloideus medialis

Temporally alary gap (interstitium temporoptyerygoideum) the deep field of the face is concluded between 2 muscles

- + m.temporalis
- + m.pterygoideus lateralis
- m.zygomaticus
- m.styloideus medialis

Interalary gap (interstitium interptyerygoideum) deep field of the face is concluded between 2 muscles

- + m.pterygoideus lateralis
- + m.pterygoideus medialis
- m.styloideus lateralis
- m.styloideus medialis

28

Which 2 arteries depart from a maxillar artery in temporally alary and interalary spaces in deep field of the face

- a.meningea medialis
- a.temporales superficialis
- + aa.temporales profundi
- + a.palatina descendens

Which 2 branches depart from a mandibular nerve in temporally alary and interalary spaces in deep field of the face

- + n.buccalis
- n.alveolaris superior
- + n.auriculotemporalis
- n.facialis

With which 2 solutions handle a head skin round a wound at skull wounds

- + Aether
- + Iodine
- Brilliant (ethyl) green
- Chlorhexidine

List 2 indications for suboccipital puncture

- Introduction of colorants
- Introduction of haemostatic materials
- + Introduction of contrast mediums
- + Introduction of medicinal materials

At which 2 types of medial artery of dura mater hematomas perform ligation

- + Epidural
- + Subdural
- Subarachnoid
- Ventricular

List 2 method of hemostasis which are applied at wounds of dura mater sines

- + Suture
- + Sine ligation
- Draining
- Coagulation

Which 2 flaps are formed at craniotrypsis by Olivecron:

- Periostoponeurotic
- + Dermoaponeurotic
- + Osteoperiosteal
- Osteoaponeurotic

In which 2 fields of head craniotrypsis is often carried out:

- + Occipital
- + Temporal
- Supraorbital
- Auriculomasticator

28

Plasty of skull handicap can be carried out by 2 methods

- Plate homoplasty osteal plates taken from corpses
- + Plate alloplasty organic plates (plexiglass, Polyethyliums, etc.)
- + Plate autoplasty osteal plates taken from the patient
- Heteroplasty osteal plates taken from animals

Which 2 types of operation are applied at brain abscesses:

- + Abscess cavity drainage
- + complete excision of an abscess with capsule
- Drainage of the next areas adjoining to an abscess
- Abscess currettage

List 2 purposes for puncture of cerebral cavities:

- + Examination of ventricles fluids
- + Oxygen introduction
- Introduction of antibiotics
- Lavage of ventricles by antiseptics

List 2 purposes for a mastoidotomy:

- Process excision
- + Evacuation of a purulent exsudate
- + Excision of granulations
- Introduction of considerable quantity of fluid in to vacuity

List 2 basic reference spotting points an upper bound of a neck

- mandibula bottom edge
- + porus acusticus externus
- + mandibulatop edge- porus acusticus internus

List 2 basic reference spotting points of inferior boundary of a neck

- + incisura jugularis
- + clavicula
- incisura clavicularis
- scapula

List 2 basic reference spotting points of inferior boundary of a neck in front

- + incisura jugularis
- + clavicula
- incisura clavicularis
- scapula

List 2 basic reference spotting points of an upper bound of a neck from behind

- + processus mastoideusbasis
- + linea nuchae superior
- processus mastoideusapex
- linea nuchae inferior

List 2 fascias of a neck

- faqscia colli profunda 28
- + faqscia colli superficialis
- + lamina superficialis faqsciae colli propriae
- lamina externa faqsciae colli propriae

List 2 deep located fascias of a neck

- + lamina profunda faqsciae colli propriae
- + faqscia endocervicalis
- faqscia precervicalis
- faqscia retrovertebralis

Identify from which leaves consist 2 and 4 neck fascias

- + Second superficial and deep
- + Fourth parietal and visceral
- Second forward and back

- Fourth superficial and deep

List 2 muscles for which form a vagina 1 and 2 neck fascias

- m.sternothyroideus
- + m.platyzma
- + m.sternocleidomastoideus
- m.thyreohyoideus

List 2 muscles for which form a vagina 2 neck fascias

- + m.sternocleidomastoideus
- + m.trapezius
- m.platyzma
- m.sternohyoideus

List 2 muscles for which forms a vagina 2 a neck fascia

- m.sternohyoideus
- m.sternohyoideus
- + m.sternocleidomastoideus
- + m.trapezius

List 2 muscles for which forms a vagina 3 a neck fascia

- + m.sternothyroideus
- + m.thyreohyoideus
- m.platyzma
- m.digastricus

List 2 muscles and 1 neurovascular fascicle for which forms a vagina 5 neck fascia

- + .scalenus posterior
- + lateral neurovascular fascicle
- m.sternohyoideus
- m.sternothyroideus

In formation of which 2 fat spaces participate 2 and 3 fascias of a neck

- + spanium interaponeuroticum suprasternale
- +saccus caecus retrosternocleidomastoideus
- spanium previscerale ²⁸
- spanium pretracheale

Which 2 fat spaces are formed between leaves of 2 fascias of a neck

- + saccus caecus sternocleidomastoideus
- + saccus caecus retrosternocleidomastoideus
- + saccus caecus submandibularis
- spanium previscerale
- saccus caecus presternocleidomastoideus

In formation of which 2 fat space sparticipate leaves of 4 fascia of a necks

- + spanium previscerale
- + spanium retroviscerale
- spanium interaponeuroticum suprasternale
- saccus caecus retrosternocleidomastoideus

In formation of which 2 fat spaces participates 5 fascia of a neck

- + spanium retroviscerale
- + spanium vasonervorumlateral a neurovascular fascicle
- spanium previscerale
- spanium pretracheale

From which 2 elements consists medial neurovascular fascicle of a neck

- + v.jugularis interna
- + n.vagus
- a.subclavia
- v.subclavia

From which 2 elements consists lateral neurovascular fascicle of a neck

- v.jugularis interna
- + a.subclavia
- + v.subclavia
- n.vagus

Which 2 jugular vein are located in the field of a neck

- + v.jugularis externa
- + v.jugularis anterior
- v.jugularis superior
- v.jugularis inferior

Which 2 nerves leave from under back edge of sternocleidomastoid muscle

- n.cervicalis profundus
- + n.transversus colli
- + nn.supraclaviculares
- n.thoracicus minor

Which 2 trigones located in suprahyoid areas

- + trigonum submandibulare
- + trigonum submentale
- trigonum caroticum
- trigonum scalenovertbrale 28

How formed 2 parties of mental trigone

- On each side v.posterior m.digastricus
- + On each side v.anterior m.digastricus
- + From below os hyoideus
- + From below m.stylohyoideus

How formed 2 parties of carotid trigone

- + In front v.superior m.omohyoideus
- In front m.sternothyreoideus
- + Behind m.sternocleidomastoideus
- Behind m.thyreohyoideus

How formed 2 parties of submandibular trigone

- + Back v.posterior m.digastricus
- + Upper mandible edge
- Front back edge m.mylohyoideus
- Back os hyoideus

Which 2 trigones are located in infrahyoid areas

- + trigonum caroticum
- + trigonum scalenovertbrale
- trigonum submandibulare
- trigonum submentale

Which 2 vessels are located in the carotid trigone area

- + a.carotis communis
- + v.jugularis interna
- a.carotis externa
- v.jugularis externa

Which 2 vessels intercross a submandibular trigone

- + a.lingualis
- + v.lingualis
- a.carotis externa
- v.jugularis externa

How formed 2 parties of N.I.Pirogov's trigone

- + n.hypoglossus
- + tendo m.digastricus
- v.posterior m.digastricus
- Edge m.hyoglossus

By which 2 muscles formed bottom of a submandibular trigone

- + m.mylohyoideus
- + m.hyoglossus
- m.stylohyoidus
- m.digastricus

By which 2 arteries blood supply thyroid gland

- + a.thyreoidea superior dextra
- + a.thyreoidea superior sinistra
- a.thyreoidea inferior sinistra
- a.thyreoidea imae

From which 2 parts consists thyroid gland

- + lobus dexter
- lobus anterior
- + lobus sinister
- lobus posterior

Which 2 parts distinguish in cavity of the larynx

- front epiglottis
- + Middle regio glottica

- + Inferior regio subglottica
- Back recessus piriformis

Which 2 knots are formed by cervical parts of boundary trunk of sympathetic nerve

- + ganglion cervicale intermedium
- + ganglion stellatum
- ganglion cervicale anterius
- ganglion cervicale posterius

List 2 major types of neck phlegmons

- + Previsceral spatia phlegmons
- + Retrovisceral space phlegmons
- Phlegmons of submandibular sialaden
- Phlegmons of sublingual sialaden

List 2 indications to ligation of an external carotid artery

- + Injury of vessel and its branches
- + Aneurysms
- Artherothrombosis
- Erysipelas of the face

External carotid artery should be ligated between the following departing from it 2 arteries

- + a.thyreoidea superior
- + a.lingualis
- a.thyreoidea inferior
- a.facialis

List 2 basic indications to application of vagosympathetic blockage by A. V. Vishnevsky

- + Pleuropulmonary shock
- + For shock prevention at thoracal and abdominal cavity wounds
- Neck and its organs wounds
- Head and neck wounds

List 2 variations of vagosympathetic blockage

- By N.I.Pirogov ²⁸
- + By Aleksndrin
- + By A.G.Mirzamuhamedov
- By T.V.Belyaevoy

Define novocainum volume, introduced at novocainic blockage methods by Vishnevsky, Aleksndrin, Mirzamuhamedov

- + By Aleksndrin 20 ml
- + By Mirzamuhamedov 40/510 ml
- By Vishnevsky 30 ml
- By Aleksndrin 40 ml

List 2 basic indications to application pre and paratracheal novocainic blockage by A. G.Mirzamuhamedov

- + Cerebral contusion and brain bruises

- + Esophagus burn disease
- Neck traumas
- Foreign bodies in esophagus

List 2 basic indications to an emergency tracheotomy

- + Stenosis of larynx because of inflammatory processes
- + Foreign bodies in larynx and tracheas
- Benign tumors of larynx and trachea
- Malignant neoplasms in larynxes or tracheas

Which 2 basic types of tracheotomies are being distinguished

- + Middle
- + Inferior
- Front
- Back

Which 2 special instruments are used at tracheotomy operations

- + Tracheostomy cannula
- single shank blunt retractor
- + Trachea expander
- Sharp retractor for a thyroid gland

List 2 possible complications bound to tracheotomy operation

- + Large vessel damages
- + Blood flowing to bronchi and asphyxia
- Recurrent nerve damage
- Damage of phrenic nerve

List 2 basic indications for denudation of esophagus in the neck field

- + Esophagus damages
- + Esophagus tumours
- Bleedings from an esophagus
- Caustic esophageal injury

To which 2 scientists possess huge role in development of operative treatment of struma

- Pirogov
- Feodorov
- + Martynov
- + Nikolaev

List 2 complications observed at strumectomy in operational process

- + Aerial embolisms at cervical veins damage
- + Harsh breath disturbance
- Gland innervation disturbance
- Occlusion of cervical veins and their fall

By which 2 symptoms express the phenomenon of Bazedevizm after strumectomy operation

- + Substantial temperature increase
- + Disturbing
- Voice timbre change

- Gastrointestinal disorders

Specify 2 receptions guided to preventive maintenance of postoperative thyrotoxicosis at strumectomy operations

+ Repeated bathings of wound by Novocainum solution

+ Most perfect anaesthesia

- Minimum trauma of neck fascias

- Minimal tissues coagulation

Which 2 superficially located muscles are coated with a prepreal fascia of a chest

- m.obliquus internus abdominis

+ m.obliquus externus abdominis

+ m.latissimus dorsi

- m.serratus posterior superior

Which 2 muscles coat a thorax except muscles of scapular area

+ m.serratus anterior

+ m.obliquus externus abdominis

- m.serratus posterior superior

- m.serratus posterior inferior

Which 2 nerves innervate superficially located muscles of chest

+ n.thoracodorsalis

- n.infraclavicularis

+ n.thoracicus longus

- n.supraclavicularis

Specify 2 anatomical elements located in intercostal space

+ m.intercostalis internus

+ a.v.n. intercostalis

- m.intercostalis anterior

- m.intercostalis posterior

List 2 reference spotting points boundaries of mammary gland at women

+ Above third rib

+ Below seventh rib

28

- Above second rib

- Below sixth rib

Blood supply of mammary gland basically is carried out by following 2 arteries

+ a.thoracica lateralis

+ a.thoracica interna

- a.thoracoacromialis

- a.thoracica anterior

Skin of mammary gland innervate by following 2 nerves

- n.thoracicus anterior

+ n.supraclavicularis

+ n.infraclavicularis

- n.thoracica lateralis

Lymph outflow from mammary gland is carried out to following 2 area lymph nodes

- + Subclavial area lymph nodes
- + Supraclavicular area lymph nodes
- Scapular area lymph nodes
- Subcostal area lymph nodes

List major 2 branches of internal thoracic artery

- + a.musculophrenica
- + a.epigastrica superior
- a.gastrophrenica
- a.musculoepigastrica

Muscular part of a diaphragm consists from which 2 parts

- + pars lumbalis
- + pars costalis
- pars abdominalis
- pars thoracica

Which 2 legs are formed by lumbar part of diaphragm

- + crus intermedius
- + crus lateralis
- crus anterior
- crus posterior

Which 2 holes are formed between medial legs of diaphragm

- hiatus v.cava
- + hiatus aorticus
- + hiatus oesophageus
- hiatus musculophrenicus

Which 2 anatomical formations transit through a hole formed by medial legs of a diaphragm

- + aorta abdominalis
- + oesophagus
- aorta thoracica
- v.cava inferior

29

Which 2 formations transit through an esophageal hole of a diaphragm

- + n.vagus dexter
- + n.vagus sinister
- v.hemiazygos
- v.azygos

Which 2 formations transit through an aortal hole of a diaphragm

- oesophagus
- + aorta abdominalis
- + ductus thoracicus
- n. phrenicus

Which 2 formations transit in the cleft between interior and medial legs of a diaphragm

- + v.azygos
- + nn.splanchnici
- truncus sympaticus dexter
- truncus sympaticus sinister

Which 2 clefts of a diaphragm are described by three authors, where directly adjoin pleura to a peritoneum through fat

- + Bohdalek's clefts (right and left)
- Pirogov clefts (right and left)
- + Morgani cleft
- Bobrov's cleft

From which 2 pairs of arteries diaphragm blood supplies

- + aa.phrenicae superiores
- + aa.intercostales
- aa.thoracicae externae
- aa.phrenicae anteriores

From which 2 pairs of nerves diaphragm innervates

- nn.splanchnici
 - + nn.vagi
 - + nn.sympatici
 - nn.intermusculares

Which 2 parts of parietal pleurae are distinguished

- + pleura diaphragmatica
- + pleura mediastinalis
- pleura intercostalis
- pleura muscularis

List 2 boundaries of right and left mediastinal pleural pouches

29

- + linea scapularis a XIrib
- + linea a paravertbralisXIIrib
- linea a medioclavicularisVIrib
- linea axillaris mediaVIII a rib

Identify pleura boundaries on the following 2 lines: parasternal, axillaris anterior, axillaris posterior

- + linea axillaris anteriorVIII a rib
- + linea axillaris a posteriorXrib
- linea a parasternalisVrib
- linea axillaris anteriorVII a rib

Which 2 pleural sinuses exist in a parietal pleura

- + recessus costomediastinalis
- + sinus phrenicomediastinalis
- recessus costovertebralis
- recessus costomedioclavicularis

Which 2 surfaces distinguish in each lung

- pars sternalis
- + pars mediastinalis
- + pars diaphragmatica
- pars thoracica

List inferior boundaries of lungs on paravertebral, scapular and axillaris posterior lines

- + linea axillaris posterior IX rib
- linea paravertebralis X rib
- + linea scapularis X rib
- linea scapularis IX rib

List inferior boundaries of lungs by 2 axillary lines

- + linea axillaris anterior VII rib
- + linea axillaris media VIII rib
- linea axillaris anterior VIII rib
- linea axillaris media IX rib

List inferior boundaries of lungs by following 2 lines: parasternal, medioclavicularis and axillaris anterior

- + linea medioclavicularis upper edge of VII rib
- + linea axillaris anterior VII rib
- linea parasternalis V rib
- linea medioclavicularis upper ²⁹edge of VIrib

From which 2 zones consists each lung

- + Anterior
- + Back
- Lateral
- Middle

To which 2 vertebrae skeletonotopically corresponds root of lung

- + VI
- + VII

- III
- IV

What is 2 segments of the upper lung lobe are called

- + Back segment (posterior)
- + Forward segment (anterior)
- Lateral segment (lateralis)
- Medial segment (medialis)

What is 2 segments of the inferior lung lobe are called

- + Basal lateral (basalis lateralis)
- + Basal back (basalis posterior)
- Inferior segment of the inferior lobe (inferior)
- Basal superficial (basalis superficialis)

List 2 vessels which blood supply and innervating lungs

- + aa.bronchiales
- + aa.pulmonales
- aa.tracheales
- aa.intercostales

Which 2 arteries depart from an aortic arch

- + a.carotis communis sinistra
- truncus brachiocephalicus sinistra
- + a.subclavia sinistra
- a.carotis communis dextra

29

Which 2 anatomical formations are located at the right of descending aorta

- + ducnus thoracicus
- + v.azygos
- trachea
- ducnus brachiocephalicus

Which 2 indications for a puncture of a pleural cavity you know:

- + Pneumothorax
- + Hydrothorax
- For anaesthesia
- For a lung drainage

Indicate 2 needles shot points at a pleural cavity puncture:

- + Back axillary line 8 intercostal space
- + Scapular line 8 intercostal space
- Forward axillary line 9 intercostal space
- Paraspinal line 8 intercostal space

At which 2 indications yield a pleural cavity drainage:

- + Inefficiency of puncture treatments at pneumothorax
- + Posttraumatic empyema of a pleura
- Dry pleuritis with solderings of pleural leaves
- Fracture of ribs with pleura damage

Which 2 instruments are necessary for a pleural cavity drainage:

- + Trocar
- + Drainage tube
- Scissors
- Electrocoagulator

List 2 indications for a costotomy

- + Lesion of ribs by tumour
- + For a drainage at empyema
- At a thoracostomy
- At pleuraplasty

Which 2 instruments use for a subperiostal costotomy:

- + Doyen's rib rasp 29
- + Costal scissors
- Scissors
- Deschamps' needle

By which 2 complications thorax wounds are accompanied:

- + Hemothorax
- + Pleuropulmonary shock
- Increased airiness of a lung because of bronchiectasias
- Bronchial asthma

Which 2 types of anaesthesia use at suture ligation of lung:

- + preparatracheal blockage by A.G.Mirzamuhamedov
- + Intratracheal narcosis
- Spinal anaesthesia
- Lumbar anaesthesia

In which 2 places purulent processes in a mammary gland can be formed at mastites:

- + Between a fascia of a gland and a thoracal fascia
- + Between ribs
- In gland lobes
- In a deep subpectoral cavity

Identify 2 indications for a sectoral resection of a mammary gland

- + Benign tumor
- + Retention cyst
- Malignant tumour
- Intramammary a mastitis

Which 2 bunches of anatomical formations remove together with the mammary gland at a radical mastectomy:

- + Lymph nodes
- + Fatty tissue of axillary, infrascapular and subclavial areas
- Other mammary gland
- Vessels and nerves going to a mammary gland

Which 2 points are reference points for a medial incision at a mastectomy:

- Medial 1/3 of clavicle
- + reast bone middle
- + Costal arc
- Breast bone handhold

29

For achievement of which 2 purposes thoracoplasty is carried out

- + For touch of a parietal and visceral pleura
- + For liquidation of residual pleural cavities
- For making of a pliable field of a mediastinum
- For touch of a parietal and visceral fascia

Specify 2 indications to a thoracoplasty:

- + Pulmonary tuberculosis
- + Solitary caverns of the upper lung lobe
- Lung cancer
- Pheumothorax

Which 2 types of a thoracoplasty you know:

- + Extrapleural
- + Intrapleural
- Suprapleural
- Dextrapleural

Which 2 types of manipulations are carried out at initial handling of chest wall with an open pneumothorax

- + Applying of a hermetic bandage
- + Avivement
- Compressing bandage applying
- Dilating of edges of a wound

Which 2 types of operations are carried out at a valving pneumothorax

- + Intercostal drainage by Bjulau
- + Active aspiration by waterjet pump
- Abdominal wall puncture
- Drainage pleural cavity by Petrovsky

Which 2 illnesses are indications for carrying out of radical operations on lungs:

- + Bronchoectatic disease
- + Bronchial asthma
- Pulmonary tuberculosis
- Tracheobronchitis

Which 2 anatomical formations are have to be necessary additionally infiltrated by 0,5 % Novocainum solution, except an²⁹ inhalation narcosis, at operations on lungs:

- + Aortic arch
- + Intercostal nerves
- Cava venas
- Lung segments

Which 2 types of incision are used to access to lungs:

- + Lateral
- + Postero lateral
- Longitudinal anterior
- Traversal posterior

Which 2 indications for lung excision you know:

- + Widespread bronchiectasias
- + Lung tuberculosis
- Pneumonia
- Lung abscess

Which 2 indications for lung lobe excision you know:

- + Tumours within one lobe
- + Tubercular caverns
- Acute inflammatory processes
- Tumours within one lung

Specify 3 indications for pericardium dissecting :

- + Heart wound
- + Foreign bodies in pericardium
- Myocardites
- Cardiosclerosis

By which 2 types of manipulations can be reached disrapture of walls between cusps of bicuspid valve at operations concerning a mitral commissurotomy

- + Disrapture of solderings by an index finger
- + Disrapture of solderings commissurotom
- Disrapture of solderings by air introduction
- Disrapture of solderings commissuroectom

Localisation of arterial (Botallo's) ductis spotted by following 2 reference points

- + From below truncus pulmonalis
- + From behind n.laryngeus recurrens
- From above aorta descendens₂₉
- From below v.cava superior

List 2 muscles of first stratum of scapular area

- + m.trapezius
- + m.latissimus dorsi
- m.supraspinatus
- m.infraspinatus

List which 2 muscles form the second stratum of scapular area

- + m.teres major
- m.subscapularis

- + m.teres minor
- m.latissimus dorsi

List 2 arteries forming anastomoses and participating in blood supply of scapular area

- + ramus descendens a.transversa colli
- + a.circumflexa scapule
- a.subscapularis
- ramus ascendens a.transversa colli

List which 2 muscles form the parties of a trilateral hole

- + m.teres major
- + caput longum m.tricipitis
- m.subscapularis
- m.infraspinatus

Which 2 muscles and 1 bone form the parties of the quadrilateral hole

- + caput longum m.tricipitis
- + collum chirurgicum os humeri
- m.trapezius
- m.latissimus dorsi

Which artery and a nerve transit through quadrilateral and which artery transits through trilateral hole.

- + Quadrilateral a.circumflexa humeri posterior and n.axillaris
- + Tripartite a.circumflexa scapule
- Quadrilateral a.circumflexa scapule and n.radialis
- Tripartite a.subscapularis

29

How formed 2 parties upper, inferior and medial parties of clavipectoral triangle

- + Edge m.pectoralis minor
- + Edge sternum
- Edge costae
- Edge m.pectoralis major

How formed 2 parties upper, inferior and medial parties of inframammary triangle

- + Inferior by edge of m.pectoralis major
- + Base by edge of m.deltoideus
- Upper by edge of clavicula
- Inferior by edge of sternum

List first 2 stratum of subclavial area

- + fascia superficialis
- + fascia propria
- m.pectoralis major
- m.pectoralis minor

List 2 consecutive stratum of subclavial area after proper fascia

- + fascia clavipectoralis
- + m.pectoralis minor
- fascia superficialis
- Hypodermic fat

From which 2 parts consist a deltoid muscle and which 1 nerve innervates it

- + Tail
- + n.axillaris
- Upper
- Bottom

How formed forward and back boundaries of axillary area

- + Front edge of m.pectoralis major
- + Back edge of m.latissimus dorsi
- Front edge of m.deltoideus
- Back edge of m.pectoralis minor

List first 2 stratum of axillary area

- + fascia propria
- spatium axillaris
- + fascia superficialis
- m.pectoralis major

29

From which 2 elements consists neurovascular fascicle of axillary area

- + v.axillaris
- + plexus brachialis
- a.subscapularis
- v.subscapularis

Spot mutual relation of a neurovascular fascicle in area clavipectoral triangle

- + Laterally plexus brachialis
- + Medially v.axillaris

- Laterally v.axillaris
- Medially a.axillaris

Which 2 arteries depart from an axillary artery in the field of clavipectoral and thoracal triangle

- + a.thoracoacromialis
- + a.thoracica lateralis
- a.thoracica superior
- a.thoracodorsalis

Which 2 arteries depart from an axillary artery in the field of thoracal and

- inframammary triangle
- + a.circumflexa humeri posterior
- + a.circumflexa humeri anterior
- a.thoracica medialis
- a.circumflexa scapula

Which 2 arteries depart from an axillary artery in inframammary triangle area

- + a.subscapularis
- + a.circumflexa humeri posterior
- a.circumflexa scapula
- a.thoracica lateralis

Spot relationship in neurovascular fascicle at the field of the thoracal triangle

- + Medially v.axillaris
- + Behind a.axillaris
- Behind v.axillaris
- Laterally brachial plexus fascicles

30

Which 2 fascicles are formed by a brachial plexus in the field of a thoracal triangle

- + fasciculus lateralis
- + fasciculus medialis
- fasciculus inferior
- fasciculus superior

Which 2 nerves depart from a medial fascicle of a brachial plexus

- + n.ulnaris
- + n.cutaneus brachii medialis
- n.musculocutaneus
- radix lateralis n.medianus

Which 2 nerves depart from lateral and back fascicles of a brachial plexus

- + n.axillaris
- n.cutaneus antebrachii medialis
- + n.radialis
- radix medialis n.medianus

Which 2 nerves depart from a back fascicle of a brachial plexus

- + n.radialis
- + n.axillaris
- n.musculocutaneus
- n.ulnaris

Which 2 nerves depart from medial and back fascicles of a brachial plexus

- + n.ulnaris
- + n.cutaneus brachii medialis
- n.brachialis
- n.medianus

From which fascicle of a brachial plexus departs a radial nerve and what surface of upper extremity it innervates

- fasciculus lateralis
- + fasciculus posterior
- + Back surface
- Lateral surface

Which 2 muscles are located in the field of shoulder

- + m.coracobrachialis
- + m.biceps brachii
- m.pectoralis major
- m.pectoralis minor

30

From which 6 components consist the vascularexcitatory fascicle in the upper third of shoulder

- + a.brachialis
- + v.brachialis
- n.axillaris
- n.musculocutaneus

List 2 nerves innervating forearm skin

- + n.cutaneus brachii medialis
- + n.cutaneus antebrachii medialis

- n.cutaneus antebrachii posterior
- ramus superficialis n.radialis

Which 2 muscles participate in formation of a radial and medial sulcus

- + m.brachioradialis
- + m.flexor carpi radialis
- m.flexor carpi ulnaris
- m.palmaris longus

Which 2 elements located in a radial sulcus

- + a.radialis
- + v.radialis
- n.cutaneus antebrachii medialis
- a.ulnaris

By which 2 muscles the ulnar sulcus is restricted

- m.flexor carpi radialis
- m.palmaris longus
- + m.flexor carpi ulnaris
- + m.flexor digitorum superficialis

Which neurovascular fascicle transits in an ulnar sulcus

- + v.ulnaris
- v.radialis
- + a.ulnaris
- n.radialis

Which 2 muscles form first stratum of front area of forearm

- + m.brachioradialis
- + m.pronator teres
- m.palmaris brevis
- m.flexor pollicis longus

Which 2 muscles form the second, third and fourth stratum of front area of forearms

- + m.flexor digitorum superficialis
- + m.flexor digitorum profundus
- m.flexor carpi ulnaris
- m.pronator teres

Which tendons of two muscles transit through the carpal canal

- + m.flexor digitorum superficialis
- + m.flexor digitorum profundus
- m.flexor carpi ulnaris
- m.palmaris longus

With which 2 nerves forearm muscles innervates

- + n.medianus
- + n.ulnaris
- n.cutaneus brachii medialis
- n.cutaneus antebrachii lateralis

Between which 2 muscles located PirogovParon's space

- + m.flexor digitorum profundus
- + m.flexor pollicis longus
- m.flexor carpi radialis
- m.pronator teres

From which 2 muscles consist the hypotenor

- + m.palmaris brevis
- + m.flexor digiti minimi
- m.adductor pollicis
- m.opponens pollicis

From which 2 muscles formed tenor

- + m.abductor pollicis brevis
- + m.flexor pollicis brevis
- m.abductor digiti minimi 30
- m.opponens digiti minimi

At the expense of which 2 nerves innervates skin of palmar and back surfaces hand

- + n.radialis
- + n.medianus
- ramus profundus n.radialis
- n.cutaneus antebrachii lateralis

Which two fat spaces are available on a palm

- + Lateral
- + Medial

- Superficial
- Intermediate

By which 2 restricted parties of subligamentous (subinguinal) spaces

- + lig.inguinale
- + ossis ilium et pubis
- arcus ileopectineus
- m.pectineus

List 2 elements forming the parties of muscle compartment

- + lig.inguinale
- + os ilium
- os pubis
- arcus ileopubis

List 2 elements transiting through a muscle compartment

- + n.femoralis
- + a.femoralis
- m.iliopsoas
- n.cutaneus femoris posterior

List 2 elements forming the parties of vascular lacuna

- + lig.inguinale
- + Lig.lacunare
- os ilium
- fascia lata

List 2 elements transiting through a vascular lacuna

- a.epigastrica inferior
- + a.femoralis
- + v.femoralis
- ramus genitalis n.genitofemoralis

Specify 2 parties of an interior hole of the femoral canal

- + lig.inguinale
- + lig.lacunare
- m.pectineus
- os pectineus

List elements forming 2 parties of the femoral canal

- + margo falciformis fossa ovalis
- + lig.pectineale
- v.saphena magna
- lig.inguinale

List 2 parties of a femoral (Skarpovsky) triangle

- + lig.inguinale
- + m.adductor longus
- m.pectineus
- m.iliopsoas

List 1 muscle forming a bottom and 1 ligament forming the base of femoral (Skarpovsky) triangle

- + lig.pectineale
- + m.iliopsoas
- m.sartorius
- lig.lacunare

List 2 muscles forming medial group of hip muscles

- + m.pectineus
- + m.gracilis
- m.vastus medialis
- m.vastus intermedius

List 2 muscles forming back group of hip muscles

- + m.semimembranosus 30
- + m.biceps femoris
- m.vastus lateralis
- m.vastus medialis

List 2 muscles of a hip located out of three fascial compartments

- + m.sartorius
- + m.tensor fasciae latae
- m.semimembranosus
- m.iliopsoas

List 2 elements forming walls of Hunter's (adducing) canal

- + Laterally m.vastus medialis
- + Medially m.adductor magnus
- Medially m.adductor longus
- In front septum intermusculare laterale

List 2 branches of femoral artery

- + a.epigastrica superficialis
- + a.circumflexa ilium superficialis
- a.genus ascendens
- a.perforantes

Which 2 vessels and 1 nerve enter in Hunter's (adducing) canal

- + v.femoralis
- a.profunda femoris
- + a.femoralis
- v.profunda femoris

At the expense of which 2 nerves innervates forward, back and medial bunches of hips muscles

- n.genitofemoralis
- + n.ishiadicus
- + n.femoralis
- n.ilioinguinalis

At the expense of which 2 nerves innervates hip skin

- + n.femoralis
- + n.obturatorius
- n.ilioinguinalis
- n.ishiadicus

30

Which muscles form 2 parties of popliteal space

- + m.biceps femoris
- + m.semimembranosus et m.semitendinosus
- m.flexor digitorum longus
- m.tibialis posterior

Which 2 arteries depart from popliteal artery

- a.genus inferior anterior
- + a.genus superior lateralis

- + a.genus superior medialis
- a.genus inferior posterior

List 2 muscles forming forward bunch of shin muscles

- + m.tibialis anterior
- + m.extensor digitorum longus
- m.flexor digitorum longus
- m.flexor hallucis longus

List 1 muscle of lateral bunch and 1 nerve which innervates them

- + m.peroneus longus
- + n.peroneus superficialis
- m.tibialis anterior
- n.peroneus profundus

List 1 shin back area superficial muscles and 1 nerve which innervates them

- m.flexor hallucis longus
- + m.gastrocnemius
- + n.tibialis
- n.peroneus communis

List 1 shin back area deep muscles and 1 nerve which innervates them

- + m.tibialis posterior
- + n.tibialis
- m.extensor hallucis longus
- n.peroneus profundus

List 2 muscles forming walls of popliteoshin canal

- m.peroneus Longusmedially
- + m.soleusbehind
- + m.tibialis Posteriorin front
- m.peroneus brevislateral

At the expense of which 2 nerves innervates shin skin

- n.peroneus profundus
- n.peroneus superficialis
- + n.saphenus
- + n.cutaneus sure lateralis

Which 1 nerve and 1 vein located in hypodermic fat of shin

- ramus cutaneus n.tibialis
- v.peronea
- + n.saphenus
- + v.saphena magna

Which 2 intermuscular septums participate in separation of three muscular bunches of shin

- + Forward intermuscular septum
- + Back intermuscular septum
- Medial intermuscular septum
- Lateral intermuscular septum

Which tendon of 2 muscles transit through medial malleolar canal

- + m.tibialis posterior
- + m.flexor digitorum longus
- m.peroneus longus
- m.peroneus brevis

Which tendon of 2 muscles transits through forward part of talocrural area

- + m.peroneus brevis
- + m.extensor digitorum longus
- m.peroneus brevis
- m.plantaris

Which tendon of 1 muscle and which 1 artery transits through lateral part talocrural area

- m.flexor hallucis longus
- a.tibialis anterior
- + m.peroneus longus
- + a.peronea

30

Which 2 nerves innervates skin of stack dorsum

- + n.saphenus
- + n.suralis
- n.cutaneus sure medialis
- n.dorsalis pedis

Which 2 nerves innervates skin and muscles of sole

- + n.plantaris lateralis
- n.peroneus profundus
- + n.plantaris medialis
- n.peroneus superficialis

Which elements includes plantar canal

- + m. quadratus plantae
- + a.v.n. plantaris lateralis
- tendo m. extensor hallucis longus
- a.v.n. peroneus profundus

From which two elements neurovascular fascicle of stack back consists

- + a. dorsalis pedis
- + n. peroneus profundus
- v. peronea
- n. peroneus superficialis

Which 2 points are a reference points at carrying out of subclavial artery projection line

- + Middle of back edge of a sternocleidomastoid muscle
- + Middle of clavicle
- Lateral third of clavicle
- Front edge of a deltoid muscle

Which 2 vascular sutures you know

- Korning's
- + Correl's
- + Gorsel's
- Plastic suture

List 2 basic reference points at three definition method of projection lines of an axillary arteries

- + Boundary of forward and medial thirds of axillary fossa
- + Front edge of hair growth
- Back edge of hair growth 30
- Up continuation of shoulder lateral sulcus

Spot top and bottom points of humeral artery projection line

- Front edge of hair growth on axillary fossa
- + Centre of axillary fossa
- + Middle distance between medial condyle of humer and biceps muscle of arm
- Middle of ulnar fossa

Identify top and bottom points of radial artery projection line

- + Interior edge of biceps muscle of arm tendon or middle of ulnar fossa
- External edge of biceps muscle of arm tendon
- + Pulse spot
- Medial edge of radial bone

List 2 points of ulnar artery projection line

- + Interior epicondyle of humerus
- + External edge of pisiform bone
- Middle of ulnar fossa
- External edge of navicular bone

Spot top and bottom points of femoral artery projection line(Ken's line)

- + Middle of inguinal fold
- + Medial condyles adductor tubercle of femur
- Boundary of interior and medial thirds of inguinal ligament
- Apex of Skarpovsky's triangle

Spot top and bottom points of anterior tibial arteries projection line

- + In midway between head of fibular bone and tuberosity of tibia
- + In midway between malleoluses
- In midway between head of a hip and tuberosity of tibia
- Medial edge of lateral malleoluses

Spot top and bottom points of posterior tibial arteries projection line

- + Above point on one diameter of finger inside from medial edge of tibial bone
- + Below In midway between an Achilles tendon and an interior malleolus
- Above medial edge of tibial bone
- Below back edge of an interior malleolus

Spot 2 points of dorsal artery of foot and deep fibular nerve projection lines

- + In midway between malleoluses
- + First interdigital gap
- External edge of interior malleolus
- Second interdigital gap

Spot basic 2 methods of operative treatment of varicose phlebectasia

- + Madelung's method
- + Bebkok's method
- Djanelidze's method
- Bobrov's method

31

Spot basic 2 methods of aneurysms operative treatment

- Frumkin's method
- + Antiluss's method
- + Filagrius's method
- Kocher's method

Which 2 operations are yielded on joints

- Arthroraphy
- + Puncture
- + Arthrotomy
- Joint transplantation

List 2 types of ablation on extremities

- Medial ablation

- Low ablation
- + Primary ablation
- + Secondary ablation

List 2 defects which are indication to reamputation

- + Conical stump
- + Clubshaped stump
- Ulcerative process of stump
- Bleeding from stump

Which 2 types of flap amputations you know

- + Fascioplastyc
- + Myoplastic
- monoplastic
- polyplastic

Detect 3 sides of Shipo's triangle

- + Upper
- + Back
- Inferior
- + Front
- Interior
- Outside

Which 3 elements form sides of Shipo's triangle

- + In front spina supra meatum
- + Behind crista mastoidea
- + In front spina infra meatum
- Behind tuberositas mastoidea
- From above horizontal line made over an auricle

Which 3 formations can be damaged if go beyond the limits of Shipo's triangle

- + In front n.facialis
- + Behind sinus sigmoideus
- + From above semicircular canals
- In front n.trigeminus
- Behind a.facialis
- From above middle ear

From which 3 bones anterior cranial fossa consist

- + os frontalis
- + lamina cribrosa ossis ethmoidalis
- + ala minor ossis sphenoidalis
- corpus ossis ethmoidalis
- os sphenoidalis
- ala major ossis sphenoidalis

Which 3 symptoms comes up at olfactory nerve damage

- + Anosmia

- Amaurosis
- Amblyopia
- + Hyposmia
- + Hyperosmia
- Dysphagia

Which 3 symptoms can be observed at the damage of anterior cranial fossa

- + Bleeding from a nasopharynx
- + Hemorrhage in to the orbit cavity
- + Pneumocephalus
- Anaesthesia in a frontal part
- Paralysis or paresis of the upper mimic muscles
- Hypodermic hematoma

Which 3 holes are located in middle cranial fossa

- + canalis opticus
- + foramen rotundum
- + foramen ovale
- foramen jugulare
- porus acusticus internus
- fissure orbitalis inferior

Through which 3 holes transit three branches of trigeminal nerve

- + fissure orbitalis superior
- fissure orbitalis inferior
- foramen spinosum
- + foramen rotundum
- + foramen ovale
- foramen lacerum

Identify first 3 layer till bone in frontoparietaoccipital field

- + Skin
- + Hypodermic fat
- + Aponeurotic galea
- Deep leaf of a superficial fascia
- Proper fascia 31
- Deep leaf of proper fascia

Identify 3 layers of fat located in frontoparietaoccipital field

- + Subcutaneous fat
- + Subgaleal fat
- + Subperiostal fat
- First layer of fat
- Interfascial fat
- Interaponeurotic fat

What is the difference between hematomas located in 3 fat layers in frontoparietaoccipital field

- + Hypodermic hematomas are restricted and have knob shape
- + Subperiostal are restricted to boundaries of separate bones
- Hypodermic hematomas can be poured

- + Subgaleal can be poured
- Subgaleal have knob shape
- Subperiostal – poured

Identify 3 sheaths of brain

- + dura mater encephali
- + arachnoidea encephali
- + pia mater encephali
- dura mater srinali
- subarachnoidea encephali
- pia mater srinali

Which 3 types of hematomas can be observed inside of skull

- Epiarachnoid
- Subcostal
- + Epidural
- + Subdural
- + Subarachnoid
- Epicardial

Which 3 major sines of pachymeninx you know

- + sinus sagittalis superior
- + sinus sagittalis inferior
- + sinus rectus
- sinus longus
- sinus brevis
- sinus superior

List 3 sines of brain which can be located in the field of occipital inion

- + sinus sagittalis superior
- + sinus transversus sinister
- + sinus transversus dexter
- sinus sigmoideus
- sinus sagittalis inferior
- sinus petrosus superior

List 3 sines of brain which can³¹ not be located in the field of occipital inion

- + sinus sagittalis inferior
- + sinus sigmoideus dexter
- + sinus sigmoideus sinister
- sinus rectus
- sinus occipitalis
- sinus sagittalis superior

Blood of the inferior sagittal sine, transiting through which 3 sines, runs in to the jugular veinn

- + sinus sigmoideus
- sinus sagittalis superior
- sinus cavernosus dexter
- + sinus rectus
- + sinus transversus
- sinus cavernosus sinister

From which 3 layers skull bones consist

- + lamina externa
- + diploë
- + lamina interna
- lamina lateralis
- duralis
- lamina medialis

Which 3 arteries blood supply calvaria integuments

- + a.temporalis superficialis
- a.mastoidea
- + a.supratrochlearis
- + a.suprorbitalis
- a.auricularis superior
- ophtalmica

Which 3 arteries blood supply integuments of frontal and temporal fields

- + a.supratrochlearis
- + a.suprorbitalis
- + a.temporalis superficialis
- a.parietalis
- a.auricularis posterior
- a.temporalis inferior

Which 3 arteries blood supply integuments of temporal and occipital fields

- + a.temporalis superficialis
- + a.auricularis posterior
- + a.occipitalis
- a.parietalis
- a.occipitalis major
- a.occipitalis minor

31

Which 3 symptoms are observed at the damage of oculomotor (III cranial) nerve

- + Blepharoptosis
- + Divergent strabismus
- Convergent strabismus
- + Mydriasis
- Blindness
- Objects appearing double

Which 3 nerves transit through an internal auditory foramen

- + n. facialis
- + n. intermedius
- + n. vestibulocochlearis
- n. mandibularis
- n. accessorius
- n. vestibularis

Identify 3 peripheric branches of facial nerve

- + ramus temporales
- + ramus zygomatici
- + ramus buccales
- ramus oris
- ramus parietalis
- ramus auricularis

Identify 3 symptoms arising at the damage of VII and VIII pairs of cranial nerves

- + Anacusis
- + Ataxia
- + Paralysis of mimic muscles
- Dysphagia
- Tortycolos
- Anaesthesia of face

From which 3 symptoms consist Mackenzie syndrome

- Ataxia
- + Aponia
- + Dysphagia
- + Tortycolos
- Glossolysis
- Paralysis of mimic muscles

Which 3 holes are located in posterior cranial fossa

- + foramen occipitale magnum
- + porus acusticus internus
- + foramen jugulare
- foramen ovale
- foramen spinosum
- foramen lacerum

Which 3 branches of external carotid artery blood supply field of the face

- + a.temporalis superficialis
- + a.maxillaris
- a.mandibularis
- + a.facialis
- a.auricularis magnus
- a.ophtalmica

List 3 branches of trigeminal (V cranial) nerve located in one vertical line

- + Supraorbital
- + Infraorbital
- + Mental
- Frontal
- Supramental
- Lateral nerve of a nose

List 3 basic masseters

- + m.temporalis
- + m.masseter
- + m.pterygoideus medialis 31
- m.styloideus medialis
- m.zygomaticus
- m.orbicularis oris

Which 3 arteries depart from a maxillar artery in temporally alary and interalary spaces in deep field of the face

- + a.meningea media
- + a.alveolaris superior
- + a.alveolaris inferior
- a.palatina ascendens
- cerebri superior
- a.cerebri inferior

Which 3 branches depart from a mandibular nerve in temporally alary and

interalary spaces in

- + n.alveolaris inferior
- + deep field of the face

- + n.lingualis
- n.auricularis magnus
- n.occipitalis minor
- n.occipitalis major