

MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
Educational Institution
BELARUSIAN STATE MEDICAL UNIVERSITY

**Контрольный
экземпляр**

APPROVED

by Vice-rector for academic work

Yu.A.Sokolov

15.11.2023

Reg. # UD-81-33/2324 /edu.



TOPOGRAPHIC ANATOMY AND OPERATIVE SURGERY

**Curriculum of educational institution
in the educational discipline for the specialty:**

1-79 01 01 «General Medicine»

Curriculum is based on the educational program «Topographic Anatomy and Operative Surgery», approved 15.11.2023, registration # УД-01-33/2324/уч.; on the educational plan in the specialty 1-79 01 01 «General Medicine», approved 17.05.2023, registration # 7-07-0911-01/2324/mf.

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RECOMMENDED FOR APPROVAL:

by the Department of Operative Surgery and Topographic Anatomy of the Educational Institution «Belarusian State Medical University»
(protocol # 3 of 22.09.2023)

by the Scientific and Methodological Council of the educational institution «Belarusian State Medical University»
(protocol # 11 of 15.11.2023).

EXPLANATORY NOTE

«Topographic Anatomy and Operative Surgery» is an academic discipline of the Surgical Module # 1, containing systematized scientific knowledge about the layer-by-layer structure of regions of the human body, the topography of organs, the principles and techniques of surgical procedures.

The purpose of the academic discipline «Topographic Anatomy and Operative Surgery» is the formation of specialized competence, which is based on knowledge of human topographic anatomy, acquiring and the development of practical skills to carry out basic medical and surgical procedures.

The objectives of the academic discipline «Topographic Anatomy and Operative Surgery» are for the development students' scientific knowledge about:

layer-by-layer structure of areas of the human body and topography of organs and tissues;

topographic-anatomical methods and surgical techniques;

skills and abilities necessary to provide specialized assistance in case of accidents, injuries, bleeding, poisoning and other conditions that threaten human life and health, performing surgical procedures.

The knowledge, abilities and skills acquired in the study of the academic discipline «Topographic Anatomy and Operative Surgery» are necessary for the successful study of the following academic disciplines: «Surgical Diseases», «Obstetrics and Gynecology», «Traumatology and Orthopedics», «Neurology and Neurosurgery», «Oncology», «Urology», «Otorhinolaryngology», «Ophthalmology», «Anesthesiology and Reanimatology».

A student who has mastered the course contents (educational material) of the academic discipline should have the following specialized competence:

SC. Use knowledge about the human body structure, topography, functions of organs and systems taking into account the age aspect while performing basic surgical manipulations.

As a result of studying the discipline «Topographic Anatomy and Operative Surgery» the student should

know:

anatomical boundaries and topographical landmarks of parts and regions of the human body;

topographic anatomy and layered structure of body regions;

topographic anatomy of internal organs;

topographic anatomy and projection of large vessels and nerves on the surface of the body surface;

purpose and use of surgical instruments and suture materials;

rationale behind topographic anatomy, and principles of carrying out typical surgical procedures;

errors and complications caused by the peculiarities of topographic anatomical structures during surgeries;

legal and ethical rules for performing surgical operations;

principles of medical ethics and deontology;

be able to:

identify boundaries and topographical landmarks of parts and regions of the human body, and the projection of large vessels and nerves on the body surface;

determine the type and purpose of surgical instruments, suture materials and compile sets of instruments for typical operations;

demonstrate on a dummy how to work with surgical instruments and suture materials;

determine the locations of typical incisions for surgical access to organs, vessels and nerves;

perform operations on models, dummies and (or) cadaveric material: conicotomy, tracheostomy, catheterization of vessels, ligation of vessels, laparotomy, revision of the abdominal organs, hernia repair and plastic surgery of the hernial orifice, application of interintestinal anastomosis, suturing of the surgical wound, application of a vascular suture, application of a vascular sutures, application of a tendon sutures;

master (be proficient in):

suture techniques and tying of surgical knots (on models, dummies and (or) cadaver material);

techniques for determining the pulse rates in arteries viable to palpation;

technique of applying a hemostatic clamp and ligation of the vessels (on a dummy).

Total number of hours of studies in the discipline is 196 academic hours.

Classroom hours according to the types of studies: lectures – 20 hours (including 6 hours of guided independent work (GIW)), practical classes – 80 hours, student independent work (self-study) - 96 hours.

Intermediate assessment is carried out according to the syllabus of the specialty in the form of a credit (6th semester) and examination (7th semester).

Form of higher education – full-time.

**ALLOCATION OF ACADEMIC TIME
ACCORDING TO SEMESTERS OF STUDY**

Code, name of the specialty	semester	Number of academic hours						Form of intermediate assessment
		total	in-class	including			out-of-class self-studies	
				lectures (including GIW)	GIW	practical classes		
1-79 01 01 «General Medicine»	6	98	50	10	3	40	48	credit
	7	98	50	10	3	40	48	examination

THEMATIC PLAN

Section (topic) name	Number of class hours	
	lectures	practical
1. Introduction into the discipline «Topographic Anatomy and Operative Surgery»	2	5
1.1. Aims and objectives of topographic anatomy and operative surgery. Surgical instruments		2,5
1.2. Connecting and disconnecting tissues. Suture material. Surgical sutures and knots		2,5
2. Topographic anatomy and operative surgery of the head		5
2.1. Topographic anatomy of the cranial region of the head		2,5
2.2. Topographic anatomy of the facial region of the head		2,5
3. Topographic anatomy and operative surgery of the neck	2	10
3.1. Topographic anatomy of the neck	2	5
3.2. Neck surgery		5
4. Topographic anatomy and operative surgery of the thorax and mediastinum	4	10
4.1. Topographic anatomy and operative surgery of the thorax	2	5
4.2. Topographic anatomy and operative surgery of the mediastinal organs	2	5
5. Topographic anatomy and operative surgery of the abdomen	6	17,5
5.1. Topographic anatomy of the anterolateral abdominal wall	2	2,5
5.2. Surgery of the anterior abdominal wall. Surgical anatomy of the hernias		2,5
5.3. Topographic anatomy of the peritoneum and the abdominal cavity. Topographic anatomy and operative surgery of the small intestine		2,5
5.4. Topographic anatomy and operative surgery of the stomach	2	2,5
5.5. Topographic anatomy and operative surgery of the large intestine		2,5
5.6. Topographic anatomy and operative surgery of the liver, gallbladder, biliary tree, pancreas and spleen	2	5
6. Tutor-led application of practical skills in surgical departments of healthcare institutions	-	2,5
7. Practicing and applying practical skills in the operating room	-	2,5

Section (topic) name	Number of class hours	
	lectures	practical
8. Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space	2	2,5
9. Topographic anatomy and operative surgery of the pelvis and perineum		5
10. Topographic anatomy and operative surgery of the extremities	4	10
10.1. Topographic anatomy and operative surgery of the upper extremity	2	5
10.2. Topographic anatomy and operative surgery the lower extremity	2	5
11. Tutor-led application of practical skills in surgical departments of healthcare institutions	-	5
12. Practicing and applying practical skills in the operating room	-	5
Total hours	20	80

CONTENT OF THE EDUCATIONAL MATERIAL

1. Introduction to the discipline «Topographic Anatomy and Operative Surgery»

1.1. Aim and objectives of topographic anatomy and operative surgery. Surgical instruments

The aim and objectives of the topographic anatomy and operative surgery as a scientifically practical academic discipline, its place in the higher medical educational system.

Medical ethics and deontology. The «doctor-patient» relationships system.

Basic concepts and terminologies of topographic anatomy: topography (holotopy, skeletotopy, syntopy), parts and regions of the body, plains, lines, position, layer, projection. Fascial receptacles (fascial sheath, interfascial cellular space), neurovascular bundle, collateral blood supply. Clinical, projection, relief anatomy. Individual variability, norm, variants of norm, anomalies, congenital malformations, deformities. Research methods in topographic anatomy and operative surgery.

Basic concepts and terminology in operative surgery (surgical procedures, surgical instruments, surgical suture materials, general surgical techniques).

Classification of surgical operations. Requirements for the operation. Basic surgical actions (surgical access, surgical manipulations, completion of surgery). Typical (elementary) surgical techniques. The concept of microsurgical, endoscopic, minimally invasive, endovascular and plastic surgeries.

Principles of vascular surgeries (puncture, venesection, vascular catheterization, vascular suture, balloon dilatation, stenting, bypass surgery, prosthetics, thrombectomy, endarterectomy, rotary atherectomy).

Fundamentals of surgical transplantology. The concept of artificial organs and endoprosthetics.

Classification of surgical instruments, rules for their use. Regulatory legal acts (clinical protocols, standards, instructions, recommendations of the Ministry of Health of the Republic of Belarus).

1.2. Dissecting and connecting tissues. Suture material. Surgical sutures and knots

Suture material: classification, types; requirements for suture materials (biocompatibility, biodegradation ability, atraumatic, strength, lack of capillarity and wicking, sterility, manipulative properties, biological and immunological characteristics); packing and labelling.

Techniques of dissecting tissues and placing surgical sutures.

Surgical sutures: simple interrupted, mattress (U-shaped (horizontal) and vertical (by Donati)). Continuous sutures: simple continuous, mattress, blanket suture (by Multanovsky), screw-in (by Schmieden); purse-string suture, Z-shaped, intradermal (cosmetic) (by Halsted).

Removal of skin sutures.

Surgical knots: simple (granny), square, surgical. Manual and instrumental knot tying techniques.

2. Topographic anatomy and operative surgery of the head

2.1. Topographic anatomy and operative surgery of the cranial part of the head

Boundaries of the cranial and facial parts of the head. Cranial region of the head.

Features of blood supply and innervation of the cranial part of the head.

Topographic anatomy of the fronto-parieto-occipital region. Blood supply and innervations of the scalp soft tissues. Anatomical prerequisites of scalp wounds of the head.

Cranial bone structure.

Brain tunics, spaces. Dura mater, dural sinuses, diploic and emissary veins.

Topographic anatomy of the temporal region.

Topographic anatomy of the mastoid region: boundaries, layer anatomy, Chipault triangle.

Head injuries: closed, open; penetrating and non-penetrating. Extracranial hematomas. Intracranial hematomas. Topographic-anatomical rationale, indications and technique for carrying out primary surgical treatment of head wounds, stopping bleeding in case of damage to the middle meningeal artery.

Topographic-anatomical rationale, indications and principles of operations: stopping bleeding in case of damage to the sinuses of the dura mater; trephination and trepanation (osteoplastic and resection methods); anthrotomy.

Topographic-anatomical rationale, indications and principles of operations for brain compression injuries.

2.2. Topographic anatomy and operative surgery of the facial region of the head

Facial region of the head, boundaries, regions.

Features of blood supply and innervation of the facial region of the head. Facial artery, its anastomosis. Facial vein: tributaries, anastomosis (venous plexuses).

Topographic anatomy of the buccal region: boundaries, layer anatomy, buccal fat pad (Bichat's fat pad).

Topographic anatomy of the parotid-masseteric region: boundaries, layer anatomy.

Topographic anatomy of the parotid gland: capsule structure, parotid duct, blood supply and innervations. Topography of the structures that pass through the gland.

Deep region of the face: boundaries, contents (lateral and medial pterygoid muscles, pterygoid plexus, maxillary artery, mandibular nerve), fat spaces of the deep facial region and connection with other regions of the head and neck.

Incision and drainage of abscesses of the deep region of the face - temporopterygoid and pterygomandibular.

3. Topographic anatomy and operative surgery of the neck

3.1. Topographic anatomy of the neck

Neck: boundaries, external landmarks. Regions and triangles of the neck, boundaries.

Topographic-anatomical features of the neck relevant to operative surgery.

Neck fascia, interfascial cellular spaces (communicating and non-communicating); routes of infection.

Sternocleidomastoid region: boundaries, layer anatomy.

Carotid triangle: boundaries, layer anatomy. Neurovascular bundle of the neck. Carotid sheath.

Topographic anatomy of the subclavian artery, brachial plexus. Topographic anatomy of veins of the neck.

Antescalene and interscalene spaces, scalenovertebral triangle: boundaries, contents.

The anterior neck region: borders, triangles, layer anatomy.

Topography of the submandibular gland, submental and submandibular lymph nodes. Layer anatomy of the oral diaphragm.

Topographic anatomy of organs of the neck: larynx, trachea, pharynx, esophagus, thyroid and parathyroid glands.

Lateral region of the neck: boundaries, layer anatomy, brachial plexus, subclavian artery and its branches.

Posterior region of the neck: boundaries, layered structure, vessels and nerves.

Topographic anatomy of the cervical lymph nodes.

3.2. Neck surgery

Topographic and anatomical rationale, indications and techniques of the operations: tracheostomy, puncture tracheostomy, conicotomy.

Incision and drainage of abscesses and phlegmons of the neck (submandibular abscess, phlegmons carotid sheath, suprasternal space, retropharyngeal space, prevascular space); surgical approaches to the carotid (common, internal, external) artery, vertebral and lingual arteries.

Catheterization of the subclavian vein (Seldinger's techniques).

Thyroid surgery (thyroidectomy, hemithyroidectomy, thyroidectomy with lymphodissection): indications, stages.

4. Topographic anatomy and operative surgery of the thorax and mediastinum organs

4.1. Topographic anatomy and operative surgery of the thorax

Thorax, borders and regions of the chest and back.

External landmarks and boundaries of the thorax, topographic lines.

Topographic anatomy of the thoracic wall. Topographic anatomy of the neurovascular bundle of the intercostal space and the internal thoracic artery.

Topographic anatomy of the diaphragm. Diaphragmatic hernias.

Topographic anatomy of the mammary gland.

Topographic anatomy of the pleura and lungs.

Topographic-anatomical rationale, indications and principles of surgical operations: puncture of the pleural cavity (thoracocentesis), incision and drainage of abscesses and phlegmons of the mammary gland.

Topographic-anatomical rationale, indications and principles of surgical operations: thoracotomy, rib resection, pneumotomy, pneumonectomy, lobectomy, segmental lung resection.

Topographic-anatomical rationale, indications and principles of breast surgery: resection, radical resection, mastectomy, radical mastectomy (Madden, Patey, and Halsteads' operations).

4.2. Topographic anatomy and operative surgery of the mediastinum organs

Topographic anatomy of the mediastinum: boundaries, compartments, contents.

Topographic anatomy of the mediastinum viscera: aorta and its branches, trachea, thymus, brachiocephalic veins, superior and inferior cava veins, brachiocephalic trunk, pulmonary arteries and veins, heart, esophagus, vagus nerve, diaphragmatic nerve, thoracic duct, sympathetic trunk, azygos and hemiazygos veins, internal thoracic artery.

Pericardial puncture (pericardiocentesis) by Larrey's method, parasternal puncture of the pericardial cavity.

Surgeries for congenital (patent ductus arteriosus, coarctation of the aorta, ventricular septal defect, atrial septal defect, tetralogy of Fallot) and acquired heart diseases (commissurotomy, annuloplasty, prosthetics).

Surgical management of coronary heart disease: percutaneous transluminal balloon dilation; stenting; coronary artery and mammarocoronary bypass surgery.

Suturing of heart injuries. Heart transplantation.

5. Topographic anatomy and operative surgery of the abdomen

5.1. Topographic anatomy of the anterior abdominal wall

Abdomen, boundaries, external landmarks of the abdomen. Abdominal cavity, its walls.

Topographic anatomy of the anterolateral abdominal wall (regions of the abdomen, anatomical layers, blood supply and innervation, vascular anastomoses).

Projection of the organs into anterolateral abdominal wall.

Rectus sheath, linea alba, topographic anatomy of the umbilical region.

Weak spots of the anterolateral abdominal wall.

Inguinal region (boundaries, anatomical layers), inguinal interspace.

Inguinal canal, inguinal triangle (Hesselbach's triangle), umbilical folds, inguinal fossae.

Urinary duct, variants of its patency.

Topographic anatomy of the spermatic cord, its elements.

Testicular descent to the scrotum and formation of the inguinal canal.

Topographic and anatomical rationale for cryptorchidism, hydrocele of the testes and spermatic cord.

5.2. Surgery of the anterolateral abdominal wall. Surgical anatomy of hernias

Hernia: definition, classification, components of hernia, stages of hernia repair.

Surgical anatomy of hernias: direct, indirect (oblique) and congenital inguinal, umbilical, linea alba.

Topographic and anatomical rationale, indications and techniques for surgeries: indirect inguinal hernia (hernioplasty by Martynov, plastic surgery according to Girard-Spasokukotsky with Kimbarovsky suture), direct hernia (hernioplasty by Bassini, Shouldice, Desarda). Lichtenstein's method of hernioplasty.

Topographic and anatomical rationale, indications and techniques for surgeries: testicular descent in case of cryptorchidism; in case of hydrocele (surgery according to Winckelmann, surgery according to Bergman).

Surgeries in case of umbilical hernias (hernioplasty by Mayo, Sapezhko, Lexer; plastic surgery using a synthetic patch).

Distinctive features of surgery in case of congenital, strangulated and sliding hernias.

Endoscopic operations for hernias of the anterior abdominal wall (laparoscopic: intraperitoneal and extraperitoneal).

5.3. Topographic anatomy of the peritoneum and abdominal cavity. Topographic anatomy and operative surgery of the small intestine

Peritoneum, peritoneum cavity. Extraperitoneal spaces: retroperitoneal, retropubic, retroinguinal.

Topographic anatomy of the endoabdominal fascia.

Topographic anatomy of the peritoneum: ligaments, fossae and folds, mesenteries, greater omentum, small omentum, omental bursa, recesses of the upper compartment.

Topographic anatomy of the peritoneum in the lower compartment.

Mesenterial sinuses; lateral canals (paracolic grooves), pouches (fossas).

Topographic anatomy of the small intestine and their mesentery. The structure of the small intestine wall.

Vitelline duct, variants of its patency. Meckel's diverticulum.

Intestinal sutures: infected («dirty») and aseptic («clean»), single-row, multi-row, interrupted and continuous, hand-sewn, stapled sutures.

Intestinal sutures techniques: interrupted- according to Mateshuk, Jobert, Lambert suture (serous-muscular suture); continuous – simple continuous, screw-in (according to Schmieden); double-row by Albert.

Surgical approaches to the abdominal cavity organs: open, laparoscopic, minimally invasive surgeries.

Laparocentesis.

Topographic and anatomical rationale, indications and techniques for surgeries: repair of the intestinal injury; small bowel resection, «end-to-end» and «side-to-side» anastomoses, mesentery repair. Artificial fistulas of small bowel (ileostomy, jejunostomy).

Meckel's diverticulum removal.

5.4. Topographic anatomy and operative surgery of the stomach

Topographic anatomy of the stomach.

Topographic and anatomical rationale, indications and techniques for surgeries: gastrostomy-temporary (Witzel's method, Kader's method) and permanent (Toprover's method), percutaneous endoscopic, laparoscopic; gastroenterostomy; anterior antecolica gastroenteroanastomosis and posterior retrocolic gastroenteroanastomosis; repair of the perforated gastric ulcer; duodenoplasty and pyloroplasty, gastric resection (Bilroth I procedure, Bilroth II procedure, Finsterer-Hofmeister modification), gastric resection with intestinal anastomoses according to Braun, gastric resection with intestinal anastomoses according to Roux, gastrectomy, vagotomy (truncal, selective, highly-selective).

5.5. Topographic anatomy and operative surgery of the large intestine

Topographic anatomy of the large intestine.

Appendectomy technique. Surgical approaches to the appendix. Retrograde appendectomy. Surgical management of appendicular abscess.

Laparoscopic appendectomy.

Large intestine resection (hemicolonectomy). Colostomy (sigmoidostomy). Formation of «anus praeternaturalis».

5.6. Topographic anatomy and operative surgery of the liver, gallbladder, extrahepatic bile ducts, pancreas, spleen

Topographic anatomy of the liver, gallbladder, extrahepatic bile ducts, pancreas, spleen.

Typical (anatomical) and non-typical liver resection, liver injury suture (interrupted, Kuznetsov-Penskij, Opper's suture); liver abscess drainage; surgery in case of portal hypertension; liver transplantation; cholecystectomy from the «neck» to the «body» and from the «body» to the «neck», cholecystostomy, endoscopic cholecystectomy (laparoscopic and transluminal); choledochotomy, papillosphincterotomy (endoscopic and transduodenal); biliary drainage (according to Ker, according to Halstead-Pikovskiy, according to Vishnevskiy); drainage of subhepatic space according to Spasokukotskiy; percutaneous transhepatic biliary drainage; biliodigestive anastomosis forming; spleen injury suturing; splenectomy; pancreatoduodenal resection; omental bursa drainage.

6. Tutor-led training and application of practical skills in surgical departments of healthcare institutions

Tutor-supervised students' practical training in wards, dressing rooms, operating rooms, procedure rooms in surgical departments of healthcare institutions and diagnostic rooms.

Analysis of inpatients medical records, studying principles for proper documentation of surgical procedure protocols (appendectomy, cholecystectomy, hernia repair and repair for hernias of the anterior abdominal wall, hiatal hernias, gastrostomy, colostomy, ileostomy, cystostomy, procedures during suppurative (pus) diseases of the skin and subcutaneous tissue, and glandular organs). The study of the description of the local status, taking into account the acquired topographic and anatomical knowledge and skills.

Training and applying practical skills based on the necessary knowledge of topographical anatomy, on the locations and courses of organs on the surface of the body during palpation and percussion, on X-ray examinations and other imaging technologies.

7. Practicing and applying practical skills in the operating room

Rules of conduct in the operating room.

Preparation of personnel for the operation. Hand treatment (scrubbing). A change of clothes(gowning).

Preparation of the operating field. Selection and assembling of general and special instruments, dressings and sutures.

Choice of surgical access and surgery on laboratory animals (rabbit, etc.): exploratory laparotomy; gastric resection with gastroenteroanastomosis; intestinal anastomoses; colostomy; suturing of the intestinal wound; suturing of a perforated gastric ulcer.

Practicing practical surgical skills on cadavers, and virtual simulators.

8. Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space

Lumbar region: boundaries, external landmarks, anatomical layers, weak points of the lumbar region. Fat spaces.

Retroperitoneal space: boundaries, borders, fascia, layers of cellular tissue, their communication with other cellular spaces.

Topographic anatomy of the retroperitoneal organs (kidneys, adrenal glands, ureters).

Topographic anatomy of the abdominal aorta and its branches.

Topographic anatomy of the inferior cava vein and its tributaries. Cava-caval anastomosis.

Lumbar and intestinal lymphatic ducts. Regional lymphatic nodes.

Topographic anatomy of the lumbar plexus, lumbar nodes of the sympathetic trunk and lumbar splanchnic nerves.

Abdominal aortic aneurysms and their surgical treatment.

Topographic and anatomical rationale, indications and principles for surgeries: approaches to the kidneys and ureters, pyelotomy, nephrostomy, nephrectomy, kidney resection; kidney transplantation.

9. Topographic anatomy and operative surgery of the pelvis and perineum

Bones, walls of the pelvis. Perineum, urogenital diaphragm, pelvic diaphragm. Fasciae and cellular spaces of the pelvic cavity.

Topographic anatomy of the urogenital peritoneum. Floors of the pelvic cavity.

Topographic anatomy of the iliac arteries and veins.

Topographic anatomy of the male pelvis organs.

Distinctive features of the topography of female pelvis and its organs. Perineum, sex varieties.

Topographic and anatomical rationale, indications and technique of the urinary bladder puncture.

Topographic and anatomical rationale, indications and principles of the operations: cystostomy, injuries repair, surgery following benign prostatic hyperplasia (transcystic suprapubic adenomectomy and transurethral resection of prostate gland) and malignant pathology of the prostate (radical prostatectomy and transurethral resection of prostate gland); due to paraproctitis, rectal fistula, hemorrhoid, rectal cancer; cesareans section, extrauterine pregnancy.

Topographic and anatomic rationale of the posterior vaginal fornix puncture, pelvic abscesses drainage through the vagina and through the rectum.

Principles of varicocele surgery: operation according to Ivanisevich, operation according to Marmar, endovascular and laparoscopic techniques.

Pilonidal cyst. Principles of surgical treatment.

10. Topographic anatomy and operative surgery of the extremities

10.1. Topographic anatomy and operative surgery of the upper extremity

Boundaries of the regions of the upper extremity. External landmarks.

Topographic anatomy of the deltoid region. Topographic anatomy of the shoulder joint.

Collateral circulation of the scapula region.

Topographic anatomy of the axillary region: boundaries of the region, axillary fossa (walls, vessels, nerves, lymph nodes). Projection of the axillary artery. Connection of the axillary cellular space with other cellular spaces.

Topographic anatomy of the arm region: boundaries, layer anatomy, fascial beds, muscles, topography of the vessels and nerves. Fracture-dislocations involving the proximal, medial and distal aspects of humeral diaphysis.

Projection of the brachial artery.

Topographic anatomy of the elbow region. Elbow joint. Collateral circulation of the elbow joint.

Topographic anatomy of the forearm: boundaries, external landmarks, layer anatomy, fascial beds, muscles, vessels, nerves, neurovascular bundles.

Wrist joint.

Topographic anatomy of the hand: wrist, palm, fingers.

Topographic anatomy of the anterior and posterior regions of the wrist. Carpal canals and its contents.

Topographic anatomy of the metacarpus (prominent of the thumb (thenar), prominent of the little finger (hypothener), palmar depression). Fascial beds and cellular spaces of the hand.

Superficial and deep palmar arterial arches, nerves of the hand. Canavel's zone.

Topographic anatomy of the finger. Synovial and fibrous sheath of the tendons.
Topographic anatomy of the dorsal part of the hand.

Projection points for pulse determination: on the axillary, brachial and radial arteries.

Topographic and anatomical rationale, indications and principles of the procedures: surgical approaches to the axillary and brachial arteries, to the internal iliac and femoral arteries.

Vein puncture and venesection technique.

Whitlow and phlegmon of the hand: types, anesthesia, incisions.

Surgical procedure in case of injury of the large vessels. Vascular sutures: Carrel and Morozova techniques, parachute technique.

Nerve suture.

Cuneo tendon suture.

10.2. Topographic anatomy and operative surgery of the lower extremity

Boundaries of the lower extremity regions, external landmarks.

Topographic anatomy of the gluteal region. Topographic anatomy of the neurovascular bundles and cellular spaces of the gluteal region. Hip joint.

Congenital dislocation of the hip.

Topographic anatomy of the anterior region of the thigh: layer anatomy, fascial beds, vascular and muscular lacunas, femoral triangle, femoral artery, femoral vein and femoral nerve, femoral canal, obturator canal, adductor canal.

Topographic anatomy of the posterior region of the thigh.

Fracture-dislocations involving the proximal, medial and distal aspects of femoral diaphysis.

Topographic anatomy of the knee region. Knee joint.

Topographic anatomy of the popliteal fossa.

Topographic anatomy of the leg: boundaries, external landmarks, fascial beds, muscles, canals, topography of the neurovascular bundles.

Ankle joint.

Topographic anatomy of the foot region: external landmarks, boundaries, layer anatomy. Dorsal and plantar parts of the foot. Blood vessels and nerves of the dorsal and plantar parts of the foot.

Projection points for pulse determination: on the femoral, popliteal, posterior tibial and dorsal pedis arteries.

Topographic and anatomical rationale, indications and techniques of the femoral hernia repair.

Autovenous femoral-popliteal bypass.

Principles of bone surgery: skeletal extension, sequestrectomy, osteoplasty, resection, osteotomy, osteosynthesis, limb prosthetics.

Amputations: indications, types, classification.

Technique of hip-level amputation.

Conception of extremity replantation.

Principles of surgery of the lower extremity varicose vein disease: sclerotherapy, endovenous laser ablation and endovenous radiofrequency ablation, stripping

(phlebectomy according to Babcock), Troyanov-Trendelenburg operation, perforating veins surgery, combine phlebectomies.

11. Tutor-led training and application of practical skills in surgical departments of healthcare institutions

Tutor-supervised students' practical training in wards, dressing rooms, operating rooms, procedure rooms in surgical departments of healthcare institutions and diagnostic rooms.

Analysis of inpatients medical records, studying principles for proper documentation of surgical procedure protocols (femoral hernia repair, diaphragmatic hernia, femur amputation, surgeries for abscesses of the skin and subcutaneous tissue). The study of the description of the local status, taking into account the acquired topographic and anatomical knowledge and skills.

Training and applying practical skills based on the necessary knowledge of topographical anatomy, on the locations and courses of organs on the surface of the body during palpation and percussion, on X-ray examinations and other imaging technologies.

12. Practicing and applying practical skills in the operating room

Rules of conduct in the operating room.

Preparation of personnel for the operation. Hand treatment (scrubbing). A change of clothes (gowning).

Preparation of the operating field. Selection and assembling of general and special instruments, dressings and sutures.

Choice of surgical access and surgery on laboratory animals (rabbit, etc.): brachial artery ligation; femoral artery ligation.

Practicing practical surgical skills on cadavers, and virtual simulators.

ACADEMIC DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	number of hours			Self-studies	Form of control knowledge
		Lectures (include GIW)	GIW	practical		
6 semester						
1.	Introduction into the educational discipline» Topographic Anatomy and Operative Surgery»	2	0,5	5	6	
1.1.	Introduction into the educational discipline» Topographic Anatomy and Operative Surgery».	2	0,5	-	-	
1.2.	Topographic anatomy and operative surgery of the head					
2.1.	The aim and objectives of the topographic anatomy and operative surgery Surgical operations. surgical instruments	-	-	2,5	3	1. Interviews, 2. Control quiz.3. Computer based tests.
1.2.	Dissecting and connecting tissues. Suture material. Surgical sutures and knots	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Assessment using phantoms.4. Computer based tests.
2.	Topographic anatomy and operative surgery of the head	-	-	5	7	
2.1.	Topography of the cranial region of the head	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators. 4.Computer based tests.

2.2.	Topography of the facial region of the head	-	-	2,5	4	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer. 6. Computer based tests.
5.	Topographic anatomy and operative surgery of the abdomen	6	2	17,5	24	
5.1.	Topographic anatomy and operative surgery of the abdominal wall, peritoneum and abdominal cavity and small intestine	2	1	-	-	
5.1.	Topographic anatomy of the anterolateral abdominal wall	-	-	2,5	4	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer. 6. Computer based tests.
5.2.	Operative surgery of the anterolateral abdominal wall. Surgical anatomy of hernias	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment. 5. Computer based tests.
5.3.	Topographic anatomy of the peritoneum and abdominal cavity. Topographic anatomy and operative surgery of the small intestine	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators 5. Computer based tests.
5.4.	Topographic anatomy and operative surgery of the stomach, large intestine	2	0,5	-	-	
5.5.						

5.4.	Topographic anatomy and operative surgery of the stomach	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.
5.5.	Topographic anatomy and operative surgery of the large intestine	-	-	2,5	3	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.
5.6.	Topographic anatomy and operative surgery of the liver, gallbladder, biliary tree, pancreas and spleen	2	0,5	2,5	3	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
5.6.	Final practical class on the section «Topographic anatomy and operative surgery of the abdomen»	-	-	2,5	5	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.

6.	Tutor-led application of practical skills in surgical departments of healthcare institutions	-	-	2,5	2	1. Practical skill at the patient's bedside, 2. Assessment using virtual simulators, 3. Analysis of holo- and skeletopy of internal organs by radiological visualization (X-ray).
7.	Tutor-led application of practical clinical skills in operating room	-	-	2,5	2	1. Assessment practical skills during operations, 2. Assessment using virtual simulators.
8. 9.	Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space, small pelvis organs and perineum	2	0,5	-	-	
8.	Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space	-	-	2,5	2	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.
9.	Topographic anatomy and operative surgery of the small pelvis organs and perineum	-	-	5	5	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.

9.1	Topographic anatomy and operative surgery of the pelvis and perineum. Topographic and anatomical rationale, indications and principles of the operations	-	-	2,5	2	1. Interviews, 2. Control quiz, 3. Case-based assessment, 4. Assessment using cadaver material and virtual simulators.5. Computer based tests.
9.1	Final practical class on the section «Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space, small pelvis organs and perineum». Assessment of practical skills	-	-	2,5	3	Colloquium. Credit
7 semester						
3.	Topographic anatomy and operative surgery of the neck	2	0,5	10	11	
3.1. 3.2.	Topographic anatomy and operative surgery of the neck	2	0,5	-	-	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
3.1.	Topographic anatomy of the neck	-	-	5	5	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
3.2.	Surgery of the neck	-	-	5	6	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
4.	Topographic anatomy and operative surgery of the thorax and mediastinum organs	4	1	10	13	

4.1.	Topographic anatomy and operative surgery of the thorax	2	0,5	5	6	1. Interviews. 2. Control quiz. 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
4.2.	Topographic anatomy and operative surgery of the thorax and mediastinum organs	2	0,5	5	7	1. Interviews. 2. Control quiz. 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.
10.	Topographic anatomy and operative surgery of the extremities	4	1,5	10	14	
10.1.	Topographic anatomy and operative surgery of the upper extremity	2	0,5	5	7	1. Interviews, 2. Control quiz 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests
10.2.	Topographic anatomy and operative surgery of the lower extremity	2	1	5	7	1. Interviews, 2. Control quiz, 3. Assessment using cadaver material and virtual simulators, 4. Case-based assessment, 5. Demonstration on a student volunteer.6. Computer based tests.

11.	Tutor-led training and application of practical skills in surgical departments of healthcare institutions	-	-	5	5	1. Practical skill at the patient's bedside, 2. Assessment using virtual simulators, 3. Analysis of holo- and skeleton of internal organs by radiological visualization (X-ray).
12.	Practicing and applying practical skills in the operating room	-	-	5	5	1. Assessment practical skills during operations, 2. Assessment using virtual simulators Exam
Total hours		20	6	80	96	

INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE

Basic (relevant):

1. Стенько, А. А. Топографическая анатомия и оперативная хирургия = Topographic anatomy and operative surgery: пособие для студентов, обучающихся по спец. 1-79 01 01 «Лечебное дело». – Минск: Новое знание, 2022. - 384 с.

Additional:

2. Lemeschewskij A. Learning Surgical Technique: Basic Skills/Amaz.b, 2020. – 198p.
3. Стенько, А. А. Топографическая анатомия и оперативная хирургия: курс лекций для студентов факультета иностранных учащихся [изд. на англ. яз.] = Topographic anatomy and operative surgery: course of lectures for the medical faculty for the medical faculty for int. st. / А. А. Стенько. - 2-е изд. - Гродно: ГрГМУ, 2016. – 212 с.
4. Tsyhykalo, O. V. Topographical anatomy and operative surgery = Топографическая анатомия и оперативная хирургия textbook for English-speaking foreign students / O. V. Tsyhykalo – 2nd ed. – Vinnytsia: Nova Kniha, 2018. – 528 p.
5. Nicolaev, A. V. Topographic anatomy and operative surgery = Топографическая анатомия и оперативная хирургия: textbook / A. V. Nicolaev. – 3-е изд. испр и доп. – Moscow: Geotar-Media, 2021. – 671 p.
6. Snell, R. S. Clinical Anatomy by regions/Snell, Richard S.- 10th edition – Philadelphia [etc.]: Wolters Kluwer: Lippinkott Williams&Wilkins, 2019. – 814 p.
7. Клюй, Е. А. Топографическая анатомия и оперативная хирургия шеи = Topographic anatomy and operative surgery of the neck: учеб.-метод. пособие. / Е. А. Клюй, С. Д. Денисов. – Минск: БГМУ, 2018. – 20с.

METHODOLOGICAL RECOMMENDATIONS ON ORGANISATION AND IMPLEMENTATION OF STUDENTS' INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

The time for independent (self-study) work can be used by students for:

- preparation for lectures and practical classes;
- preparation for colloquiums, credits and exams in the discipline;
- study of topics (issues) for independent study;
- solving short cases and tests;
- performing research and creative tasks;
- preparation of thematic reports, essays, presentations;
- performing of practical tasks;
- compiling a review of scientific literature;

design of information and demonstration materials (stands, posters, graphs, tables, tables, newspapers, etc.)

compiling a thematic selection of literary sources, internet sources.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF SUPERVISED STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

Main forms of supervised student independent work:

writing and presentation of an essay;

presentation of a report;

computer based tests;

tests creation by students to organize mutual control;

preparation and participation in active forms of training.

Control of supervised student independent work is carried out in the form of:
colloquium;

final class in the form of an oral interview, written work, testing;

essay discussions;

assignment defense;

evaluation of an oral answer to a question, a presentation, a report or a situational task;

checking of essays, written reports;

individual conversation.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

Oral form:

interview;

control quiz;

demonstration on a student volunteer;

practical skill at the patient's bedside;

analysis of holo- and skeletotopy of internal organs by radiological visualization (X-ray);

assessment practical skills during operations;

colloquiums;

credit;

examinations;

Written form:

case based assessment;

Technical form:

computer based tests

Simulation form:

assessment using virtual simulators;

assessment using phantoms;

assessment using cadaver material and virtual simulators.

LIST OF AVAILABLE TEACHING METHODS

Traditional method (lecture, practical classes);
active (interactive) methods:
case-based learning (CBL);
learning based on simulation technologies.

LIST OF PRACTICAL SKILLS

List of practical skills	Form of practical skills control
Topographic anatomy practical skills	
1. Identification of parts and regions of the human body and demonstration their boundaries	Assessment using cadaver material and virtual simulators
2. The name of planes and lines in topographic anatomy and demonstration it	Demonstration of the museum models
3. Identification and demonstration within regions triangles, folds, fossae	Demonstration on a student volunteer
4. Identification and name of the structures that form the relief of the human body in each region by examination and palpation	Assessment using cadaver material and virtual simulator
5. Graphic representation of topographic boundaries of organs, projections of major nerves and vessels on the surface of the body and skeleton	Assessment using cadaver material and virtual simulators Analysis of holo- and skeletotopy of internal organs by radiological visualization (X-Ray)
6. Identification of points to determine the pulse on arteries and finger pressure to temporarily stop bleeding on a human body: superficial temporal artery; facial artery; common carotid artery; subclavian artery; radial artery; femoral artery; dorsalis pedis artery; posterior tibial artery	Case-base assessment Assessment using cadaver material and virtual simulators Practical skill at the patient's bedside
7. Identification of points to perform subclavian vein and femoral artery catheterization on the human body	
8. Identification of points to perform puncture of the pleural cavity, pericardial cavity on the human	

body	
Topographic anatomy practical skills	
1. Identification of the type, purpose and other characteristics of suture material according to the packaging specification.	Assessment using virtual simulator
2. Tying knots (simple (granny), square, surgical)	
3. Identification of the type of surgical instrument and its purpose	
4. Ability use (hold and perform manipulations) surgical instruments correctly	
5. Selection of the sets of special instruments for operations: craniotomy (trepanation); tracheostomy; appendectomy; rib resection amputation of the lower limb; catheterization of the arteries and veins; puncture of the pleural cavity, pericardial cavity, vessels	Assessment using cadaver material and virtual simulators Assessment of operation on the rabbit
6. Explanation and demonstration of a three-lumen oesophageal obturator probe for oesophageal varicose veins bleeding	Practical skill at the patient's bedside
7. Performing surgical manipulations and operations on biological material or simulators: applying hemostatic clamp and ligating of vessel in the wound; applying Bulldog vascular clamp, Gepfner's vascular clamp); Vascular ligation (in the wound, hroughout, with suturing, using a Deschamps and Cooper needle)	Assessment using cadaver material and virtual simulators Operations on the rabbit
venepuncture; scalpel dissection; application of sutures (simple interrupted, Donati suture, U-shaped horizontal, U-shaped continuous (mattress), simple continuous, blanket suture (by Multanovsky), screw-in (by Schmieden), intradermal (cosmetic) (by Halsted).;	Assessment using cadaver material and virtual simulators
tracheostomy; conicotomy; repair of the perforated gastric ulcer; repair of the intestinal injury;	Assessment using cadaver material and virtual simulators Assessment of operation on the rabbit

inguinal canal repair for inguinal hernias; intestinal sutures techniques: interrupted; interrupted Lambert suture; screw-in (according to Schmieden); double-row by Albert. endoscopic sutures vascular suture: interrupted, «parachute», continuous; nerve suture (epineural); tendon suture (Cuneo , Kessler)	Assessment using cadaver material and virtual simulators
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LIST OF LECTURES

6th semester

1. Introduction into the educational discipline» Topographic Anatomy and Operative Surgery». Topographic anatomy and operative surgery of the head.
2. Topographic anatomy and operative surgery of the abdominal wall, peritoneum, abdominal cavity and small intestine.
3. Topographic anatomy and operative surgery of the stomach and large intestine.
4. Topographic anatomy and operative surgery of the liver, gallbladder, biliary tree, pancreas and spleen.
5. Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space, small pelvis organs and perineum.

7th semester

1. Topographic anatomy and operative surgery of the neck.
2. Topographic anatomy and operative surgery of the thorax.
3. Topographic anatomy and operative surgery of the thorax and mediastinum organs.
4. Topographic anatomy and operative surgery of the upper extremity.
5. Topographic anatomy and operative surgery of the lower extremity.

LIST OF THE *PRACTICAL* STUDIES

6th semester

Practical study #1. The aim and objectives of the topographic anatomy and operative surgery Surgical operations, surgical instruments.

Practical study #2. Dissecting and connecting tissues. Suture material. Surgical sutures and knots.

Practical study #3. Topography of the cranial region of the head.

Practical study #4. Topography of the facial region of the head.

Practical study #5. Topographic anatomy of the anterolateral abdominal wall.

Practical study #6. Operative surgery of the anterolateral abdominal wall. Surgical anatomy of hernias.

Practical study #7. Topographic anatomy of the peritoneum and abdominal cavity. Topographic anatomy and operative surgery of the small intestine.

Practical study #8. Topographic anatomy and operative surgery of the stomach.

Practical study #9. Topographic anatomy and operative surgery of the large intestine.

Practical study #10. Topographic anatomy and operative surgery of the liver, gallbladder, biliary tree, pancreas and spleen.

Practical study #11. Final practical class on the section «Topographic anatomy and operative surgery of the abdomen».

Practical study #12. Tutor-led application of practical skills in surgical departments of healthcare institutions.

Practical study #13. Tutor-led application of practical clinical skills in operating room.

Practical study #14. Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space.

Practical study #15. Topographic anatomy and operative surgery of the pelvis and perineum. Topographic and anatomical rationale, indications and principles of the operations.

Practical study #16. Final practical class on the section «Topographic anatomy and operative surgery of the lumbar region and retroperitoneal space, small pelvis organs and perineum». Assessment of practical skills.

7th semester

Practical study # 1. Topographic anatomy of the neck.

Practical study # 2. Surgery of the neck.

Practical study # 3. Topographic anatomy and operative surgery of the thorax.

Practical study # 4. Topographic anatomy and operative surgery of the thorax and mediastinum organs.

Practical study # 5. Topographic anatomy and operative surgery of the upper extremity.

Practical study # 6. Topographic anatomy and operative surgery of the lower extremity.

Practical study # 7. Tutor-led training and application of practical skills in surgical departments of healthcare institutions.

Practical study # 8. Practicing and applying practical skills in the operating room.

**PROTOCOL OF THE CURRICULUM APPROVAL
BY OTHER DEPARTMENTS**

Title of the discipline requiring approval	Department	Amendments to the curriculum of the academic discipline	Decision of the department, which designed the curriculum (date, protocol #)
1. General Surgery	Surgery and transplantology	No adjustments proposed to the curriculum	22.09.2023 protocol # 3

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Curriculum content, composition and accompanying documents comply with established requirements.

Dean of the Medical Faculty for
International Students of the
educational institution «Belarusian
State Medical University»

13.11.2023



O.S. Ishutin

Methodologist of the educational
institution «Belarusian State Medical
University»

13.11.2023



S.V. Zaturanova