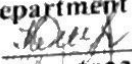
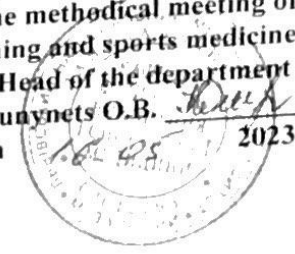


**LVIV NATIONAL MEDICAL UNIVERSITY N.A. DANYLO HALYTSKY**

**Department of Physical Training and Sports Medicine**

Approved at the methodical meeting of  
the department of Physical training and sports medicine  
Head of the department  
k.b.s., associate prof. Kunynets O.B.   
Protocol № 18 from  2023

**GUIDELINES**

in the discipline

**PHYSICAL REHABILITATION AND SPORTS MEDICINE**

for 4th year students

training of specialists of the second (master's) level higher education in the field of  
knowledge 22 "Health" specialty 222 "Medicine" for independent work in  
preparation for practical classes

**Topic 10** "Physical rehabilitation in surgery, traumatology and orthopedics."

Methodical guidelines are made in accordance with the requirements of the curriculum in the discipline "Physical Rehabilitation and Sports Medicine", compiled to train specialists of the second (master's) level of higher education in the field of knowledge 22 "Health" specialty 222 "Medicine".

According to the curriculum, the study of physical rehabilitation and sports medicine at the medical faculty is carried out in the 4th year of study. The program is designed for 75 hours, of which 30 classroom hours (practical classes), 8 hours - lectures and 37 hours of independent work of students (IWS).

Methodical recommendations prepared by assistant of the department of physical education and sports medicine Marusiak S.V., Candidate of Medical Sciences, associate professor of the department of physical education and sports medicine Mahlovana G.M.,

According to the general wording of the head of the Department of Physical Education and Sports Medicine, Candidate of Biological Sciences, Associate Professor O.B. Kunynets.

Reviewers:

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Methodical recommendations were discussed and approved at the methodical meeting of the Department of Physical Education and Sports Medicine

Protocol № 18 from 16 of May 2023

1. **Relevance of the topic:** surgical interventions performed for surgical diseases of the abdominal and thoracic cavities significantly change the activity of many organs and systems, distort various physiological and auto morphological reactions, often accompanied by postoperative complications. Surgery disrupts the compensatory- adaptive reactions, impairs the activity of internal organs, disrupts metabolic processes, may cause disruption of important functions of the cardiovascular, respiratory and other systems.

2. **Class duration:** 4 hours.

3. **Learning goal:**

**To know:**

- clinical and physiological substantiation of the use of means of physical rehabilitation in surgical and traumatic diseases;
- indication and contraindications to the appointment of therapeutic physical culture;
- main tasks and forms of therapeutic exercise in the preoperative and postoperative periods;
- features of application of means of medical physical training at operative measures on bodies of abdominal and thoracic cavities and injuries of different character depending on a motor mode and a course of the postoperative period;
- features of methods of medical physical training at surgical diseases and injuries.

**To be able:**

- to choose the optimal mode of motor activity for patients of surgical and traumatological profile;
- to plan measures of physical rehabilitation and to apply methods of medical fitness at operative interventions on abdominal and thoracic organs in operative and postoperative periods
- to plan measures of physical rehabilitation and to apply methods of medical physical training in traumathology.

**4. Basic knowledge, skills, abilities necessary for studying the topic (interdisciplinary integration).**

*Anatomy, physiology:* anatomical and physiological features of organs in the thoracic and abdominal cavities.

*Pathological anatomy, pathological physiology:* anatomical and physiological disorders in diseases of the thoracic and abdominal cavities.

**5. Student advice.**

**5.1. Questions for self-control:**

1. The main tasks of therapeutic physical culture before surgery.
2. Motor modes that are prescribed to patients after surgery.
3. Indications and duration of a strict bed rest of patients after gastrectomy.

4. Tasks of a strict bed rest after operations on abdominal organs.
5. Which exercises are prescribed to prevent congestion in the abdominal cavity?
6. What forms of therapeutic exercise are used in patient after abdominal surgery during the ward ?
7. Contraindications to the appointment of therapeutic exercise in abdominal surgery and traumatology.
8. Exercises that are recommended for patients on a strict bed rest after thoracic surgery and traumatology.
9. Contraindications to the appointment of therapeutic physical culture in surgery and traumatology.

## **5.2. Topic content**

*Physical rehabilitation in traumatology*

*Comprehensive rehabilitation in traumatology and orthopedics*

Hospital (inpatient treatment) – 1-st period

- Analgetics;
- Novocaine, periarticular, paravertebral blockade;
- Oxygen inhalation;
- Antibiotics, sulfonamides;
- Surgical treatment, reposition, osteosynthesis, skeletal traction, plaster bandages, external fixation devices;
- Physiotherapy;
- Therapeutic gymnastics;
- Massage;
- Diet therapy;
- Transfusion therapy;
- Cryotherapy.

Period of immobilization - 2-nd period

- Reposition;
- External fixation devices;
- Plaster bandage, skeletal traction;
- Analgetics;
- Physiotherapy;
- Therapeutic exercises;

- Massage of healthy tissues;
- Diet therapy;
- Oxygen therapy;
- Classes on exercise machines;
- Dosed walking (with hand injuries);
- Training on an ergometer.

Post mobilization period – 3-d period

- Massage;
- Therapeutic gymnastics;
- Physiotherapy;
- Hydrokinesiotherapy;
- Electrical stimulation;
- Classes on exercise machines;
- Cryomassages and swimming;
- Diet therapy, vitamin therapy;

Sanatorium treatment – 4-th period;

- Sun and air baths;
- Therapeutic exercises, swimming, games;
- Physiotherapy, baths, mud treatment;
- Hydrokinesiotherapy;
- Hydromassage, swimming.

***Comprehensive rehabilitation in the acute period***

1. Position treatment
2. Cryomassage, classical massage
3. Isometric and relaxing exercises
4. Occupational therapy
5. General developmental, breathing exercises
6. Diet therapy, vitaminization
7. Drug therapy, phytotherapy

8. Electrophoresis, phonophoresis, UV irradiation
9. Amortisation exercises.

#### ***Comprehensive rehabilitation in the subacute period***

1. Position treatment
2. Isometric and relaxing exercises
3. Physiotherapy, hydrotherapy
4. Occupational therapy
5. Classical and segmental massage, cryomassage, vibro massage
6. Hydrokinesiotherapy (swimming, exercises in the water)
7. General developmental, breathing exercises
8. Drug therapy, phytotherapy
9. Diet therapy, vitaminization.

#### ***Comprehensive rehabilitation in remission***

1. Position treatment
2. General developmental, breathing exercises,
3. Isometric exercises, electrical stimulation with the bintroduction of adenosinetriphosphate
4. Hydrokinesiotherapy (running in the water, gymnastics with cuffs and vests),cryomassage
5. Drug therapy: intra-artucular administration of arteparon with 20% glucosesolution, analgetics, brufen, voltaren
6. Segmental, classical, vibrating, vacuum massage
7. Cryomassage of joints, swimming
8. Oxygen therapy (oxygen inhalation, oxygen cockteils, intra-articular injection of oxygen)
9. Sauna and swimming
10. Cryomassage, training on simulators in the protective mode
11. Diet therapy, vitaminization.

#### **Mode number 1 strict bed**

*Tasks regime:* Create an operated patient conditions of physical and mental rest, implement and maintain confidence in the favorable consequences of transactions to facilitate the work of cardiovascular and respiratory systems, reduce the degree of concomitant diseases and age of organic and functional alterations, improve the general and local blood and lymph circulation , resume broken mechanism of respiration, prevent the development of stagnation and reflex spasms in the lungs, pelvis, thrombosis, embolism, intra adhesions, intestinal atony, difficulty urinating.

*Summary mode:* permanent stay in bed, lying on his back, side or half-sitting. Change the patient's torso rotation, toilet and feeding conducted by staff. In case of severe patients is mostly static and dynamic breathing exercises average depth. They should be performed at a slow pace during observation of doctor, physical therapist, and independently by the individual classes every 15-20 minutes.

*Indications* for regime assignment and its duration: 1-2 days after gastrectomy, the imposition of gastroenteroanastomosis vagotomy, closure perforated gastric ulcer

1-2 days after appendectomy (breakthrough and gangrenous form), operations on large relapse hernias, volvulus, 1-2 days after removal of the gall bladder surgery for acute pancreatitis, after removal of tumors, removal of kidney, spleen, after operations patients with the presence of severe comorbidities, and operations are accompanied by considerable technical difficulties and great loss of blood.

### ***Mode number 2 - extended bed.***

*Task Mode:* Increase the neuro-muscular and emotional tone of the body, mobilize commitment to patient recovery. Reduce the negative impact of forced rest. Promote the rapid mobilization of the regulatory function of CNS, renew ties between the conditional reflex locomotion, autonomic centers and internal organs, improve the functional status of cardiovascular, respiratory, digestive system, urinary organs, stimulate the metabolism. Prevent the development of secondary complications. To improve venous circulation and prevent the development of thrombosis and embolism. To stimulate the activity of the digestive tract, helping to eliminate the phenomena of paresis of the stomach and intestines, preventing intra-union, and the acceleration of regenerative processes and divert patients from the painful sensations caused by the operation.

*Summary mode:* position the patient prone, half-sitting, sitting. In the first hours after the operation, performed under local anesthesia, allowed active movements of the limbs within complete scope in slow motion. After 2-3 h after surgery possible rotations of the body in the direction of the wound, the 2<sup>nd</sup>- 3<sup>rd</sup> day, provided the relevant parameters allowed 3-4 times a day for 5-10 minutes stay in the sitting position. If a satisfactory general condition and congenial postoperative course allowed to rise from bed in the 1<sup>st</sup> day when there is difficulty in urination lying. The first transition in the sitting position is usually under the supervision and with the help of staff. Switching to a seated position easier after turning in the direction of the wound by hand carts elbow. Important to prevent various complications after operations have targeted the use of breathing exercises.

*Indications* for treatment assignment and its duration: 1-3 days after appendectomy, 1-5 days after radical herniotomy, 1-4 days after gastrectomy, gastroenterostomy, drainage operations, 1-6 days after removal of the gall bladder, kidney, spleen, 1-3 days after suturing perforated gastric ulcers, pancreatitis.

### ***Mode number 3 - ward.***

*Task Mode:* enhance the neuro-muscular and emotional tone, or the rapid recovery of the cardiovascular adaptation. Respiratory systems and body of the patient with moderate exercise. To promote rapid recovery of vital functions. Encourage local and general metabolism, improve the redox processes, elimination of postoperative acidosis to the process of regeneration in the area of surgery. Contribute to the anterior abdominal wall muscles, restore or improve function of the digestive system, eliminate stagnation in the

lungs, abdominal organs, pelvic organs. To promote rapid clinical and functional recovery of the patient after surgery.

*Summary Mode:* stay in a sitting position to 50% of daily time, independent of walking onward, and the corridor to the dining room. Hygienic gymnastics performed mainly in the supine and sitting position using active movements of the limbs full amplitudes, exercises for the muscles of the body with limited amplitude in slow motion.

Individual and group procedures for conducting medical gymnastics instructor, duration 7.12 min 2-3 times a day. Rate movements, moderate and middle. Dosed walking 100- 150 meters to go in 4-5 min. Games: Board and inactive. Elements of Ergotherapy. Air Bath 5-20 min.

*Indications* for treatment assignment and its duration: 2-5 days after apendectomy without postoperative complications, 4-6 days after radical herniotomy, 3-10 days after suturing Perforated gastric ulcer, cholecystectomy, nephrectomy, surgery on intestines.

#### ***Mode number 4 - free.***

*Task mode:* to promote the normalization of the physiological processes of the organism to the extent possible in the presence of primary surgical disease. increase neuro-muscular and emotional tone and reactivity of the body, improve functional status of cardiovascular, respiratory, digestive systems. Promote the fastest and fullest clinical and functional recovery, further improvement of functional adaptation of the cardiovascular, respiratory and other systems to moderately increasing physical activity everyday nature to strengthen the body and rapid rehabilitation.

*Summary Mode:* stay in a sitting position or standing more than 50% of daily time. Hygienic gymnastics duration of 10-15 min. Exercises therapeutic exercises carried out in various positions, duration 15-20 minutes 2-3 times a day. Rate movements, moderate and middle. In case of atony intestines perform abdominal massage. Walking in slow and medium pace in the limits of 2-3 floors, duration 20-30 minutes, 2-3 times a day. Games: Board and inactive. Air Bath 20 minutes to 2 hours. Sunbathing 5-10 min.

*Indications* for treatment assignment and its duration: 6-8 days after apendectomy without postoperative complications, 10-12 days after gastric resection, closure Perforated gastric ulcer, radical herniotomy, 12-15 days after, cholecystectomy, nephrectomy, operations on intestines, gastric resection .

#### **Contraindications to exercise appointment in abdominal surgery:**

Exercise therapy in the preoperative period is not prescribed to patients in serious condition, if the threat of bleeding, septic shock, suspected perforation of ulcers of the stomach or intestine, in the presence of appendicular boil, abscess in the abdominal cavity,



acute inflammatory diseases. After the operation mode of active movements and load during training exercise should be limited in cases of severe general condition of the patient in connection with bleeding, shock, complications during surgery and anesthesia, presence abscesses in the abdominal cavity, widespread peritonitis,, painful pancreatitis, acute hepatic and renal insufficiency and in patients with severe disease and complications.

### **Physical rehabilitation in thorax surgery. Mode**

#### **number 1 - strict bed rest.**

*Task mode:* the physical and mental rest, prevention of complications nearest postoperative period (atelectasis, pneumonia), facilitating the restructuring of the body, forming temporary compensatory reactions, gradual preparation of the patient to self- transition in a seated position.

*Summary mode:* in the first hours after surgery patients should be in a horizontal position. During this period, patients admitted turns aside. It is important to ensure aspiration of sputum, timely emptying of the bladder, prevent inflation abdomen sticky tongue. After waking up sick and absence of hypotension head end of bed gradually lifted. Under the head enclose a low pillow. The patient was encouraged to cough up phlegm. This chest is fixed arms on the side of the wound. Recommend a static diaphragmatic breathing (8-10deep respiratory movements every hour). Gradually, patients provide provisions with a little head up and bent standards. Angle setting of the main functional frame bed should not exceed 15. With the relatively good state of appropriate elementary active movements in the distal extremities, and short-term moderate static tension of major groups of muscles. If normal course focuses stay on standby first hours after surgery.

#### **Mode number 2 - extended bed.**

*Task Mode:* activation of pulmonary blood and lymph circulation to accelerate resorption eksudatu, transudate and prevent complications, prevention of paresis of intestines and bladder, helping to mobilize compensatory reactions, preparation of patients to self- transfer in a standing position to walking.

*Summary Mode:* trunk allowed slow turns, the transition in a seated position, bowed legs, and short-term stay in a sitting position. To activate the function of lung ventilation applying the provisions in bed lying on the healthy side. If patients are concerned about postoperative pain in the area of the seam, the main functional frame bed raised to 35 degrees, which reduces tension operated tissues. The procedure of medical gymnastics in 8-10 minutes. Exercises performed in reclining and sitting positions in slow motion with pauses for rest. The complex is dominated by special breathing exercises, their correlation with other 2:1, 1:1. It is advisable to do them 3-5 times a day. To prepare for getting up and walking perform torso twists, the transition in a seated position using the methodologist, a simulation of walking, lying on his back. To better crushes lung surgery, the patient should swell to 8-10 times oxygen pillow. Apply gentle massage of the limbs, chest and neck, 8-10 min. Approximate time spent on standby 1-2 days after surgery.

#### **Mode number 3 - ward.**

*Task Mode:* improving cross-bronchial tree, smoothing of the lungs, the remaining prevention of pleural adhesions, activation extracardial factors circulatory stabilization mechanisms of compensatory adaptations, restore mobility hand-side operations, prevention and correction of disorders of posture, restore short-term adaptation to walking.

*Summary mode:* 2-3 h after removal of drainage from the pleural cavity allowed rising from bed, short walking within the chamber, and at the end of the day, within the department. If the general condition allows, with 5-6 day after surgery allowed climbing stairs to 1-2 floors to rest on the platforms. Therapeutic exercises carried out 1-2 times a day in the wards. Duration: 15 min. RHH is advisable. Value of respiratory and tonic exercises 1:1, 1:2. Massage the extremities to spend 8-10 minutes. Approximate time spent on standby in case the normal flow of 10.3 days after surgery.

***Mode number 4 - free.***

*Task Mode:* increasing the emotional tone of the patient, the restoration reserve adaptation to low physical activity, the elimination of residual inflammation in the lungs and pleura, increased lung volumes, improved respiratory mechanics and ventilation lung function, correction of deformities of the chest and posture disorders, help the formation of separate units of permanent compensation and gradual preparation for everyday physical activity.

*Summary mode:* allow walking within the hospital, climbing stairs, free visit to the dining room. Assign RHH in the total group for 10-15 min. By the procedure of medical gymnastics include low-intensity exercises 25-30, who perform in slow and medium pace, in a sitting position and standing with items. Breathing exercises used in 2-3 General health exercises. The term procedure that is carried out in the hall for 20 minutes. Rowing Walks 2-3 times a day for 30-40 minutes in slow and medium pace. Approximate time spent on standby 8 day to day discharge.

**Contraindications to exercise prescription in thoracic surgery:**

a difficult condition of the patient, fever, a significant shift of the mediastinum and cardiac arrhythmias, coronary or cerebral circulation, acute period of postoperative pneumonia and thromboembolic complications, intrathoracic bleeding, spontaneous pneumothorax, subcutaneous emphysema accruing, imposing traheostomy, postoperative hypoxic psychosis. Relative contraindications are: bronchial fistula, empyema, of flebotrombosis, aggravation tuberculosis of the lungs, coughing up blood.

**5.3. Tests for self-control**

1. In what ratio the general strengthening and breathing exercises for patients who are on a strict bedrest are combined ?

- a) 1:1;
- b) 1:2;
- c) 1:3;
- d) 1:4;
- e) 3:1.

2. What exercises are used in case of difficult conditions of patient with abdominal surgery?

- a) exercises to tense the muscles of the perineum;
- b) active movements of the upper extremities;

- c) active movements of the lower extremities;
- d) breathing exercises;
- e) exercises for torso muscles.

3. What the approximate duration of the strict bed rest for patients after appendectomy for perforated appendicitis?

- a) 1-3 days;
- b) 1-2 days;
- c) 1-4 days;
- d) 1-5 days;
- e) 1-6 days.

4. What exercises are prescribed to prevent congestions in the abdominal cavity after abdominalsurgery?

- a) breathing exercises;
- b) active movements of the upper extremities;
- c) exercises to tense and relax the perineal muscles;
- d) corrective exercises;
- e) reflex exercises.

5. Rehabilitation of patients with orthopedic and traumatological profile includes:

- a) medical;
- b) social;
- c) professional;
- d) none of the above;
- e) all of the above.

6. For rapid consolidation of bone fragments during gypsum immobilization use the following massage techniques:

- a) stroking;
- b) friction;

- c) kneading;
- d) vibration.

7. The main tasks of exercise therapy in the first immobilization period for fractures of the tibia:

- a) prevention of congestions in the lungs;
- b) prevention of congestions in the pelvis;
- c) normalization of the function of the cardiovascular and respiratory systems;
- d) prevention of bedsores and muscle atrophy;
- e) prevention of the stiffness in immobilization-free joints.

8. The second treatment period for tubular bone fractures begins:

- a) after the appearance of bedsores;
- b) after applying a circular plaster bandage;
- c) after restoring the anatomical integrity of the damaged bones;
- d) after the formation of stiffness in immobilized joints;
- e) after verticalization of the patient.

9. What is the duration of the therapeutic exercise procedure for patients after abdominal surgeries in the ward?

- a) 5-7 min;
- b) 7-12 min;
- c) 10-15 min;
- d) 15-20 min;
- e) 20-30 min.

10. What is the duration of the therapeutic exercise procedure for patients after abdominal surgeries? a) 5-7 min.;

- b) 7-12 min.;
- c) 10-15 min.;
- d) 15-20 min.;
- e) 20-30 min.

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