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BASES OF PHYSICAL REHABILITATION IN MEDICINE

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The textbook provides a history of the emergence of physical rehabilitation in the world and in Ukraine, sets out modern views on physical rehabilitation, presents, likewise, information as to the basic means of physical rehabilitation, highlights the purpose, tasks and timing of their application. Based on clinical and physiological positions, the necessity of using physical therapy, therapeutic massage, physiotherapy, mechano-therapy, occupational therapy in hospital and post-hospital period of rehabilitation in the physical rehabilitation of patients. In accordance with the requirements of the WHO, there is a sequence and methodology for the use of physical rehabilitation facilities. Indications and contraindications regarding the use of physical rehabilitation facilities are provided.

The material outlined in the textbook creates a complete picture of the use of physical rehabilitation in the complex treatment of patients.

This educational and methodical manual is designed for students of higher educational institutions of education and science of Ukraine of III-IV level of accreditation in which the subject "Physical rehabilitation" is taught, teachers and specialists on medical physical training, sports medicine and physical rehabilitation.

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CONTENT

INTRODUCTIONS

INTRODUCTION

Physical rehabilitation occupies an important place in the society and is used in social and professional rehabilitation as a therapeutic and prophylactic means for the purpose of comprehensive restoration of physical health and working capacity of patients and invalids. The main forms of its application are physical exercises and natural factors.

Specially selected exercises are able to restore optimal mobility and balance of nerve processes, which improves regulatory properties, activates the activity of the endocrine glands and stimulates autonomic functions and metabolism through the mechanism of motor-visceral reflexes, the tonic effect of physical exercises, the more muscle is involved in motor activity and the higher the muscular effort.

Muscular activity stimulates metabolism, oxidation-reduction, regenerative processes in the body, etc. Due to this, the products of inflammation are rapidly dissolved, spastic processes and atrophy are prevented.

Physical rehabilitation is an integral part of medical rehabilitation and is used in all its periods and stages. The purpose of the means of physical rehabilitation, the sequence of the application of its forms and methods is determined by the nature of the course of the disease, the general condition of the patient, the period and stage of rehabilitation, motor regimen, etc.

However, the teaching and methodological support of the educational process for the training of specialists in physical rehabilitation is significantly behind the modern needs of higher education. Today practically there are no educational references in the official language, which in the end reflect on the quality of information provision of specialists and their competitiveness in the labor market. In the qualitative training of rehabilitation specialists, timely provision of educational and methodological references based on the latest advances in science and technology in the development of new methods, forms and means of physical rehabilitation of patients and disabled persons plays an important role. Students of higher education institutions require qualitatively new views on the processes of restoration of physical health with the use of physical exercises and types of massage, especially for disabled people of different nosological groups.

For the first time the book provides information about the basic means of physical rehabilitation. The consistency and methodology for its application is outlined in accordance with the periods and stages of medical rehabilitation proposed by WHO experts. Indications and contraindications regarding the use of physical rehabilitation facilities are provided. The material outlined in the book creates a complete picture of the student's use of physical rehabilitation in the complex treatment of patients.

Taking into account the above mentioned facts and based on the desire of almost all citizens, without exception, to a healthy lifestyle and active participation in the processes of socio-economic development of Ukraine, this book is an attempt to bring the main provisions, methods, forms and means of physical rehabilitation to students, teachers and concerned persons.

Chapter 1

HISTORY OF THE USE OF PHYSICAL EXERCISES AND MASSAGE AS TREATMENT METHODS. ORGANIZATION OF THE REHABILITATION TREATMENT.

Physical exercises and massage were used since ancient times for curative aim (Fig. 1.1). In manuscripts written in China and India in the course of 3000-2000 years BC, the questions of the use of breathing exercises, passive movements, massage in time of internal and musculoskeletal system diseases are set forth.

Fig. 1.1. A papyrus with a depiction of the use of massage in Ancient Egypt.

In ancient Greece, physical exercises were considered as a compulsory component of preventive and curative medicine. Herodikusa (484-425 BC) considered to be the creator of medical gymnastics, treated patients with metered walking, jogging, gymnastics, massage. The prominent physician Hippocrates (459-377 BC), who is called the father of medicine, described in details the effect of physical exercises, the method of their use during illnesses of the lungs, heart, metabolism, in surgery, and began to use massage as a therapeutic agent. In the system of physical education of the Greeks there is a sports massage.

Roman medicine has made a significant contribution to improving the techniques of therapeutic gymnastics and massage and the spread of their use. Doctor Tselie prescribed physical exercises and massage for paralysis, using devices that became the prototype of block machines in mechanotherapy. A well-known doctor of the school of gladiators Galen (131-210 AD) described the technique of therapeutic exercises in combination with massage in diseases and injuries of the muscular system, laid the foundations of dynamic anatomy, first introduced occupational therapy. The Romans widely used hydrotherapy, building comfortable baths (thermal baths) with pools and baths.

In the sixth century, in China, for the first time in the world, a state medical institute was established in which students, as a compulsory discipline, were taught massage therapies. In all provinces of the country there were medical and gymnastics schools, which trained doctors, "taos", who used massage and medical gymnastics.

In the following centuries, due to the general decline of the natural sciences, there is no information about the use of physical exercises in medical practice. And only in the XI century the most prominent physician and philosopher of the East Abu Ali Ibn Sina (Avicenna, 980-1037 biennium) began to study again the effect of physical exercises on human health. He categorized them from a medical point of view, insisted on the use of their people of all ages and proved that the person engaged in physical exercise, meets hygiene requirements for nutrition and sleep, and healed, does not require any other treatment.

The Renaissance is characterized by the development of biological sciences. Among the numerous works of that time is the treatise of the Italian scientist Mercuryulus "The Art of Gymnastics" (1556), in which he considered physical exercises as part of medicine and divided the gymnastics into three types: true (medical), military and false (athletic). He deepened the idea of the therapeutic effect of massage, described its new techniques.

In the XVIII century more attention is paid to treatment by movements and medical gymnastics appears. The full-length works of "Medical Gymnastics" (1750), F. Hoffmann "The Treatise on Orthopedics" (1771) and J. Tisso "Medical and Surgical Gymnastics" (1780) are published. The latter belongs to the well-known saying: "The movement, as such, is capable of

replacing any medium by its action, but all the cures of the world are not capable of replacing the action of the movement."

At that time, there are works in Russia that reveal the value of physical exercises in the struggle for the health of the younger generation (M.V. Lomonosov, P.N. Maksimovich-Ambodik, I.I. Bezsky, A.P. Protasov) . Works of S.G. Zibelina (1777), Peter Bogdanovich (1792) substantiated the use of physical exercises not only from clinical, but also from hygienic and physiological positions.

XIX century was marked by the formation of the Swedish system of medical gymnastics P. Ling (1776-1839), which founded in 1813 in Stockholm, the first in Europe gymnastics and massage institute, where trainers of physical education and physicians-managers of medical gymnastics were trained. The content of the system was the treatment of diseases, mainly musculoskeletal system, with strictly limited, dosage movements. However, for the mechano-localistic, narrowly biological, monotonous nature of movements, for the non-use of natural exercises in sports and games, especially in the treatment of children, it was substantially criticized by P.F. Lesgaft (1837-1909), who is the founder of the scientific system of physical education and dynamic anatomy He in 1905 organized courses for leaders of physical education in St. Petersburg. It was the first Russian educational institution that trained staff of physical education teachers. After 1917, on the basis of the courses was created Institute of Physical Culture, bearing his name. Despite the drawbacks, P. Ling's gymnastics prompted the spread of the method of treatment and massage not only in Europe, but also on other continents, and the emergence of new systems of medical gymnastics Branting, Cartelius, Murray and others. Follower of P. Ling - physician G. Tsander in 1857 proposed mechanotherapy: the treatment of physical exercises with the help of special devices. He believed that they would allow to localize and dosage movements more accurately. The development of mechanotherapy was undertaken by Krukenberg, Body, Caro and others, who offered many devices for physical exercises, including for vibrating massage.

The first office of therapeutic gymnastics was opened in Mandelien in 1830 in Moscow, and in 1838 the training of specialists in medical gymnastics was started at the Orthopedic Institute. The founders of therapeutic and surgical schools M.J. Mudrov, Pirogov and their followers: S.P. Botkin, V.A. Manasein, P.I. Dyakonov and others made a significant contribution to the development and substantiation of medical gymnastics, massage, ergotherapy and hydrotherapy..

In the 60's and 80's of the last century, scientific thought and practical implementations of domestic scientists moved forward in the field of medical gymnastics. This is confirmed by: a fundamental report by a student of M.I. Pirogov prof. H.Yu. Gubbeneta introduced the work in Kiev University in 1854 "On the importance of gymnastics in the life of man and peoples"; in 1865 the newspaper edition devoted the issues to medical gymnastics; in 1870 the first in Europe a medical-gymnastic society was founded in St. Petersburg and the first in the continent (1878) outpatient clinic for the treatment of wounded soldiers with the help of medical gymnastics.

In 1887 the Petrograd Institute for the Upgrading of Physicians opens a course, and later the Department of Physical Methods of Treatment and Non-Therapeutic Therapy, which was headed by prof. V.A. Stange is an outstanding scientist, author of a well-known functional test with respiratory depression.

In the last decades of the last century, the foundation of the scientific substantiation of the influence of massage on the body was laid, a system of its methods was created, indicators were developed and contraindications for its use, including in sports. F. Grebner creates the institute of mechanotherapy and medical gymnastics in Odessa. The practical confirmation of this was the introduction of the indicated facilities into the medical process of the resorts of Odessa estuaries and Sak.

At the end of the XIX and the beginning of the 20th century, there were systems of gymnastics that were used to treat various diseases. In 1864, Swede Brand offered a system of therapeutic exercises and massages for the treatment of gynecological diseases. Munich Professor Ertel (1881) developed a method of treating the diseases of the cardiovascular system by climbing in mountainous terrain (Terenokur), and Swiss Frenkel in 1889 - compensatory gymnastics for the treatment of diseases of the nervous system. The prominent Russian surgeon P.I. Dyakonov first

introduced in the world in 1896 the technique of early movements and early emergence after surgery. In 1903, A.O. Scherbak developed a technique of segmental reflex massage. Singer and Hofbauer (1910) applied therapeutic exercises during diseases of the respiratory system, and Clapp (1927) developed a technique of corrective exercises for patients with spinal curvature.

At the beginning of the XX-th century physiotherapy was formed as a medical science, and in 1905 in France in Liège a medical congress of physiotherapists took place.

Works of great importance in substantiating general ideas about the use of means and methods of physical culture in restorative treatment were presented by physicians of the Kharkiv Medical-Mechanical Institute. The first developed the doctrine of "motor therapy" and used it together with natural factors and labor, which by that time was absent in all systems of medical gymnastics. This complex of physical therapy has become the basis of the future system of rehabilitation (rehab).

Doctors of the Kharkiv Medical and Mechanical Institute A.N. Geymanovich, V.D. Chaklin, F.V. Lukashevich and others under the guidance of M.I. Sitenko, based on the experience of treating physical exercises with physiotherapy and occupational therapy, treated 3892 patients with industrial and military personnel injuries, in 1910-1916. The method of modern treatment of injuries by physical methods was introduced in 1921 by M.L. Sitenko, who headed the institute in Kharkiv and opened the first children's orthopedic dispensary in the country, where physical methods of treatment were widely used.

A significant contribution to the theory and practice of restorative methods of treatment was made by the Ukrainian professor V.K. Kramarenko, who published the "Manual on Massage and Medical Gymnastics" in 1911, and collaborators of the Institute of Physical Methods of Treatment in Sevastopol. The institute was founded by the Zemstvo in 1914, and its main task was to treat invalids of the First World War.

The issue of restoring the health and working capacity of the invalids of the First World War was published in England at the same time. For this purpose, there were special orthopedic hospitals, in which the main method of treatment was occupational therapy.

Similar hospitals appear in France and the United States. It is worth noting the experience of the American Mackenzie, who, using sports and medical gymnastics, returned to extend the military service to 50% of the disabled, who were to be released from the army. Methods of treatment in the named medical institutions and the Kharkiv Medical-Mechanical Institute laid the foundation for a modern system of rehabilitation.

The history of the use of physical exercises with curative purpose in Soviet times was closely linked with the development of the prophylactic direction in medicine, the complex functional treatment and the rehabilitation of physical education. The widespread use of physical culture for the treatment and prevention of diseases, the theoretical and clinical justification of their use, the use of pedagogical and methodological principles of physical culture and the historical experience of the use of physical exercises led to the formation of a new medical discipline - therapeutic physical culture. This term was proposed in 1929 by B.Ya. Shimselevich and entered the scientific References and practice, replacing the terms "medical gymnastics", "kinesitherapy", "ergotherapy", "motor therapy", "myokinezotherapy" and others, which determined mainly the narrow-biological essence of the discipline. Subsequently, the term "therapeutic physical culture" acquired the status of a state. In medical institutes and institutes of physical culture, specialists who acquired a specialty have started to train: a physician of medical physical training, an instructor of medical physical education.

The number of establishments were opened in Ukraine as a former Soviet republic (Chernihiv, Feodosia). Intensive development of scientific research and training of physiotherapy staff. In 1923 the scientific and practical magazine "Kurortnoe delo" begins to be published, which later changes its name to "Questions of spa therapy, physiotherapy and therapeutic physical education". In 1928 a two-volume manual on physical methods of treatment was issued. In 1921, a state resolution was passed on the organization of rest homes, which indicated the need for widespread use of physical education in order to rehabilitate the working people. This gave impetus

to the introduction into the medical practice of spa-sanatorium establishments of medical physical training. V.V. Gorinevsky, I.M. Sarkizov-Serazin, I.A. Bogashev issued in 1923 and in 1926 the manuals on the therapeutic use of physical culture.

The advanced thought, traditions and experience of the Kharkiv Medical and Mechanical Institute became a prerequisite for the organization of the first scientific-research institute of physical culture in Kharkiv in 1921, far ahead of the creation of a similar scientific institution in Moscow (1932).

The fruitful work of experts in Slavic is T.R. Nikitin, in Odessa - Ya.Y. Kaminsky. The latter in 1924 publishes a book on medical gymnastics and three years later organizes a research laboratory that later turns into a branch of the Ukrainian Institute of Physical Education. In 1932 Y.Y. Kaminsky begins to pursue a course of medical physical education at the medical institute, which in 1934. is reorganized into the first department in this discipline in Ukraine. Academician A.E. Schterengerts, author of more than a thousand scientific works, who created a school of physicians and methodologists from the medical physical education, was the continuation of his work.

With the opening of the departments of medical control, physiotherapy and massage in physical education institute in Kharkiv (1928) and other medical institutes, departments in specialized research institutions, the purposeful training of methodologists and doctors is being developed. In 1935, I.M. Sarkozov-Serazin issued the first textbook for students of medical physical education. The teaching of therapeutic massage in medical colleges and athletics is introduced in technical schools and physical education institutes.

Deep and comprehensive scientific researches and clinical observations allowed to reveal mechanisms of therapeutic action of physical exercises and massage and to develop scientifically grounded separate methods of their application in complex treatment. This is a great merit of I.M. Sarkisov-Serazin, V.M. Meshkova, E.F. Dreving, V.V. Gorinevsky, B.A. Ivanovsky, V.K. Dobrovolsky, O.F. Kaptelin and others. Ukrainian scientists O.O. Shainberg, A.E. Shterengerts, O.V. Kocharovska, L.I. Fink, as well as employees of the Research Institute of Physical Education in Kharkiv, made their significant contribution. Scientists and practitioners develop a course on the study and use of a complex, most effective treatment with the use of therapeutic physical culture, therapeutic massage, physiotherapy and climatological and therapeutic procedures.

The experience gained during the peacetime became the basis for the order for compulsory use in medical hospitals of medical physical education during the Great Patriotic War. Along with other therapeutic methods, it provided not only a reduction in the duration of treatment, but rather a resumption of combat capability and a reduction in the disability of the wounded.

In the postwar years, the use of therapeutic physical culture during such diseases as myocardial infarction, surgical interventions on the heart, lungs, vessels, brain, and burn disease expanded. In 1950 medical and health clinics are being established. The theory is enriched by the works of professors V.M. Moshkov, S.M. Ivanova, V.E. Vasilyeva, S.M. Popova, S.V. Khrushov (Moscow), D.A. Vinokurova, O.G. Dembo, V.K. Dobrovolsky, V.P. Pravosudov (Leningrad), A.E. Schterengerts (Odessa), V.M. Maksimova (Kharkiv), T.O. Tretilova (Lviv), O.V. Kocharovskaya, V.T. Stovbun, G.Y. Krasnoselsky (Kyiv). The latter founded a post-graduate course on medical physical education and medical control at the Kyiv Medical Institute (1959). Scientific and Methodological Society for Medical Control and Therapeutic Physical Culture in Ukraine. Professor G. I. Krasnoselsky has prepared many scientists for this specialty. The most striking among them is the organizer of the Kyiv Scientific-Research Institute of Medical Problems of Physical Education prof. I.V. Muravov and Honored Worker of the Higher School of Ukraine prof. G.V. Polesia. 30 dissertations in Therapeutic physical culture (under the supervision of prof. G.V. Polesia), for the PhD degree were written and defended in the Institute of Physical Education in Kyiv.

"Traumatic epidemic", which according to figurative expression of M.I. Pirogov is a war that created after the Second World War unprecedented in the history of mankind the number of invalids, which had to be treated not only, but also to restore to work or self-service and thus not to delete them from the life of society for which they gave their health. These circumstances led to the

creation of a new direction in the recovery process - rehabilitation, which, besides actually medical methods, used social and socio-economic measures. The very term "rehabilitation" was first used by F.Y. Ritter von Busch in 1903 for the restoration of health and adaptation to life of people with physical disabilities.

In 1950, the issue of rehabilitation was considered by the Organization of United Nations (UN). The first meeting of the World Health Organization (WHO) Committee on Medical Rehabilitation was held in 1958, which emphasized the need for rehabilitation to reduce negative physical, mental and social diseases.

In the United States, England, France, Canada and former GDR and NDP, rehabilitation centers are being organized, where psychologists, instructors in training, educators, sociologists, and lawyers work with doctors and specialists in physical therapy and physiotherapists. Rehabilitation significantly reduced the timing of treatment, facilitated the return of patients to active life, reduced the number and size of assistance due to disability, as a result of the restoration of the working capacity of patients.

The rehab has gained worldwide recognition, and in 1960 an international organization for the rehabilitation of disabled people has been formed, which spanned around 60 countries from all continents. It collaborates with the United Nations Organization (UNO), the World Health Organization (WHO), the World Labor Organization (WLO).

Rehabilitation begins to be taught at higher medical institutions. Warsaw Medical Academy was one of the first in the world to open the department and rehabilitation clinic in 1961. Intermediate rehab team specialists began to prepare in England, Denmark and other countries.

In the republics of the former USSR, including in Ukraine, there has been a lot of restorative treatment, organization of work and assistance to the disabled and the infirm. The work was conducted at the state level under the direct supervision of the Ministry of Health and Welfare. Profile research institutes worked out issues of examination of the disability and work organization of the disabled, prosthetic manufacturing and orthopedic workshops. A unique academic institute of gerontology was opened in Kyiv, the most authoritative institution in the world for studying the problems of aging and treatment of the elderly and the elderly. Hospitals, schools for infantry, boarding schools, specialized sanatoria, prosthetic manufacturing, and staff for work in these institutions were created for disabled in war and labor. The state taught and provided work for the blind, deaf, and other people with congenital or acquired defects.

In 1966 a decision was made to organize large restorative centers for the treatment of patients with traumatic-orthopedic, neurosurgical and neurological diseases. In the year of 1970, a specialized sanatorium for the rehabilitation of patients operated on the heart opens near Kiev, where after 15-30 days after the operation a 30-50 day rehabilitation course was conducted. As of 01/01/1989 the rehab took place in it -19827 and a positive result was achieved at 93,7 %. In 1970, a scientific and medical society for the rehabilitation of patients and invalids was set up in Moscow. G.S Yumashev and K. Renke published a monograph "Basics of Rehabilitation" in 1973. The central institute of resorts, physiotherapy and medical physical education in 1988 is reorganized into the center of medical rehabilitation and physical therapy.

In Ukraine, in 1971, a plenary session of the Society of Therapists of the Republic was held on the issues of rehabilitation of patients with cardiovascular diseases. Academician M.M. Amosov and prof. Ya. A. Wendet (1969) after heart surgery, prof. V.N. Dzyak (1970) with cardiovascular pathology, prof. G.V. Karepov (1985) with spinal cord injuries develop methods for rehabilitation of these patients. Sanatorium rehabilitation facilities are being developed in sanatoria of Ukraine.

In 1969, the Scientific-Research Institute for Medical Problems of Physical Culture, which existed until 1986, was opened in Kyiv in 1969, and in 1993 it was restored and reorganized into the State Research Institute of Physical Education and Sports Problems. The Kyiv Institute for the Improvement of Physicians opens the Department of Physical Rehabilitation and Manual therapy (headed by Prof. L.E. Pelech), and in the regions - rehabilitation hospitals, centers and departments. As an important measure for the further development of medical physical education, in general, rehabilitation in Ukraine, training of highly skilled specialists was the creation in 1994 of the

specialized Council for the protection of doctoral dissertations (prof. V.V. Klapchuk) at the Dnipropetrovsk State Medical Academy and the foundation of the journal "Medical rehabilitation, spa therapy, physiotherapy".

In 1992, the National Sports Committee of Invalids of Ukraine was created, and in a year, in all regions of our country, there were organized centers of invasation, in which 9.1 thousand athletes with disabilities are engaged in 27 kinds of sports. In 1996, the team of Ukrainian athletes the first took part in X Paraolympics in Atlanta and won one gold, four silver and three bronze medals. This testifies to the high efficiency of the work of rehabilitation specialists, the talent of trainers and the courage of athletes who overcame established stereotypes about the inability of disabled people to engage in sports.

In 1994, the Ukrainian State University of Physical Education and Sport and Physical Education Institutes of Ukraine, the departments of medical physical education and medical control were reorganized into the departments of physical rehabilitation, where students of this discipline were trained. This was done in order to improve the system of education in physical education and sport, bringing in accordance with international standards of education and specialist classifications, modern needs of the community in specialists in physical rehabilitation and invasories that one.

In 1997, the qualification characteristic of the profession "Specialist in Physical Rehabilitation" was developed at the Lviv Institute of Physical Culture. A year later, a specialist in physical rehabilitation in Ukraine was added to the classification of specialties (Standards Information Index, State Standard of Ukraine K / "Standards" - Gosstandart of Ukraine, 1998, No. 5, p. 86) Thus, a specialist in physical rehabilitation with a higher physical education gained official status.

Chapter 2

ESSENTIALS OF THE REHABILITATION

2.1. Some common rehab questions

Rehabilitation, originates from Latin “rehabilitare” means restoration, and has a broad sense of understanding and is used in all spheres of human activity - political, legal, mental, in sports, and others. In medicine, this term is defined as the process of restoring the health and working capacity of patients and invalids.

The Committee of Experts on Rehabilitation of the WHO (1963) emphasized that rehabilitation is a process "aimed at preventing disability in the treatment of the disease and helping the patient to achieve the maximum physical, psychological, professional, social and economic full value to which he will be able to within existing illness ". The realization of this goal is possible provided that the state and social and public institutions are involved in the rehabilitation process.

So, REHABILITATION – IS A FUNCTIONAL AND SOCIAL AND LABOR REHABILITATION OF PATIENTS AND DISABLED, WHICH IS CONDUCTED BY COMPREHENSIVE MEDICAL, PSYCHOLOGICAL, EDUCATIONAL, PROFESSIONAL, LEGAL, GOVERNMENTAL, SOCIAL AND OTHER ACTIVITIES IN WHICH YOU CAN RETURN AN INJURED PERSONS TO NORMAL LIFE AND WORK, ACCORDING TO THEIR STATE.

The priority of the medical aspect of rehabilitation is indisputable in view of the fact that, taking into account the health of a certain person, the social authorities and public organizations continue to carry out their rehabilitation activities. The latter include: designing and manufacturing of technical devices, prostheses, vehicles; construction of sanatorium and other establishments, production workshops; legal and social support of life, work and life of rehabilitated people. This is done by specialists from universities, technical and other educational establishments. Therefore, in the further presentation of the educational material, the medical aspects of rehabilitation which are included in the program of training students of higher educational establishments in physical culture and sports and medicine in the direction of application of physical exercises, natural factors, massages for treatment purposes, restoration of health and physical efficiency of patients, the prevention or reduction of manifestations of disability and the prevention of diseases by means of physical culture will be discussed.

Physical rehabilitation is provided to patients with injuries and deformations of the supporting motor apparatus, cardiovascular, neurological and mental illnesses; acquired and congenital defects; after surgical interventions; infectious and chronic diseases and, in general, those who require gradual adaptation to the physical and mental loads of professional and everyday nature, work with the less scope of loading or requalification, development of self-service skills, and the development of permanent compensation in the event of irreversible changes.

A complex of rehabilitation measures in one form or another begins after the patient arrives in the hospital. They are conducted according to the individual program during treatment in hospitals and continue after discharge in a rehabilitation centers, a specialized sanatoria, clinics, during the dispensary supervisions.

The most effective physical rehabilitation is carried out in specialized rehabilitation centers (orthopedic, neurological, vascular and others), which are staffed with doctors of the corresponding specialties, instructors from the medical physical training and occupational therapy, physiotherapists, psychologists, speech therapists, educators, sociologists, prosthetics and lawyers. In such centers, patients are transferred from the hospital to complete the treatment and achieve rehabilitation within the existing disease.

A physician appoints the type of physical rehabilitation to a patient. The physician, depending on the therapeutic or surgical treatment, the general condition of the patient, the course of the disease or injury and its consequences, stage, age, occupation, functional capacity and physical

ability of the organism, determines indications and contraindications to the use of the types of the rehabilitation, assigns a motor mode, time, volume, type, period and stage of the rehabilitation, the sequence of procedures, involves the relevant specialists, coordinates their mutual activities.

Among them, in restorative treatment, a specialist in physical rehabilitation who graduated from a higher educational institution in physical culture occupies one of the leading places. Performing the appointment of a doctor, he selects means and forms of medical physical training, develops a technique for the use of physical exercises in the early stages of treatment, outlines and performs the program of further functional recovery and physical capacity of the patient, identifies and extends the reserve capacity of the body, trains him and prepares for physical activity at work and in the living conditions, returns to active participation in society. In cases of disability, the specialist in physical rehabilitation helps the disabled person to develop new movements and compensatory skills, teaches him to use prostheses and other technical devices and trains the patient to perform holistic types of work, helps to master the new profession and, in general, adapts a person to life in the changed circumstances.

2.2. Tasks, purposes and principles of the rehabilitation

The main tasks of physical rehabilitation are:

- *functional restoration (full or compensatory in case of insufficient recovery or its absence);*
- *adaptation to everyday life and work;*
- *involvement in the labor process;*
- *dispensary supervision for rehabilitated persons.*

The realization of these tasks solves the main goal of the rehabilitation - adaptation to work in the previous workplace or reapplication, that is, work with less neuropsychological and physical activity at the new workplace but at the same enterprise. In other cases, the purpose of the rehabilitation will be retraining and work at the same enterprise, and if this is not possible, then retraining in the rehabilitation center and employment in accordance with the new profession and the status of a person. Regarding a pediatrician, the purpose of the rehabilitation is not limited to the return of the child and his family to the condition existing before the disease, but also physical and mental development of the child according to his age.

The rehab will be effective in keeping with its basic principles:

- *Early rehabilitation measures. This principle will contribute to faster restoration of the body's functions, prevention of complications and in the event of development of disability - efeective use of rehabilitation measures in the early stages of treatment.*
- *Continuity of rehabilitation measures. This principle lies in the basis of the effectiveness of the rehabilitation, because only continuity and sequence of the rehabilitation measures by phases are the keys to reducing the time of the treatment, reducing disability and the cost of the rehabilitation, long-term sustentation of the disabled.*
- *Complexity of the rehabilitation measures. Under the supervision of a doctor, rehabilitation is carried out with the involvement of other specialists - sociologists, psychologists, teachers, lawyers, etc.*
- *Individuality of rehabilitation measures. Rehabilitation programs are planned for each patient or disabled and depend on the general condition, the characteristics of the course of the disease, the initial level of physical and functional status, the personality of the patient, age, sex, profession, etc.*

- *The necessity to carry out the program of physical rehabilitation in the team. Physical rehabilitation, along with other patients or invalids, forms the patient's sense of a member of the team, supports a person morally, alleviates the discomfort associated with the consequences of the disease. Positive influence and good example of other members gives the re-convalescent the necessary strength and confidence in faster recovery.*
- *Returning a sick or disabled person to active work. This is the achievement of the main goal of the rehab, which makes a person materially independent, morally satisfied, mentally stable, active participant in public life.*

2.3. Types, periods and stages of rehabilitation

Rehabilitation is divided into three interconnected types that have their branches and their specific tasks:

• *Medical;*

• *Social or household;*

• *Professional or industrial rehabilitation*

Medical rehabilitation is the foundation of the rehabilitation process.

From its effectiveness depends the use of further types of rehabilitation, their extents and duration.

Medical rehabilitation is aimed at restoring health, eliminating the pathological process, preventing complications, restoring or partial compensation of disturbed functions, fighting with disability, preparing the recovering and disabled people for everyday life at home and in the society. The rehabilitation, in general, is completed in medical institutions.

An integral part of medical rehabilitation is physical rehabilitation. It mobilizes the resources of the organism, activates its protective and adaptive mechanisms, prevents complications, accelerates the restoration of functions of various organs and systems, cuts down the terms of clinical and functional recovery, adapts a person to physical activity, trains and strengthens the body, restores the opportunity to work. Depending on the nature, course and the consequences of a disease or injury, the period of the first stage of rehabilitation, physical rehabilitation is used for preventive or curative purposes and occupies the main or additional place in the complex of complementary therapeutic measures of medical rehabilitation.

Simultaneously with physical rehabilitation, the psychological preparation of the patient for overcoming the difficulties associated with the disease and its possible consequences to the necessary adaptation, re-adaptation or re-training is carried out. This training is preceded by occupational therapy, which begins during medical rehabilitation.

Two periods can be distinguished – hospital and post-hospital care in medical rehabilitation, according to the recommendations of WHO experts, in each of them there are definite stages, in the first hospital stage - hospital (stationary) and the second post-hospital period. In the II stage rehabilitation itself, period of time in a sanatorium and dispensary care.

I stage of rehabilitation. Hospital stage of rehabilitation: after diagnosis, the physician makes a patient's rehab program. It includes therapeutic or surgical methods of treatment. It is aimed at eliminating or reducing the activity of the pathological process, preventing complications, developing temporary or permanent compensations, restoration of the functions of organs and systems affected by the disease, gradual physical activation of the patient. At this stage, the therapeutic physical means of treatment are used: restorative body massage, therapeutic massage, physiotherapy, elements of occupational therapy. The functional state of the patient, the body reserves are being corrected at this stage.

II stage of rehabilitation (outpatient supervision, sanatorium) is carried out when the patient leaves the hospital, that is, at the clinic, rehabilitation center or the sanatorium, when patient's condition is improved and stabilized and his motor activity increases. At this stage, physical rehabilitation prevails. All types of procedures are used. The main focus of the rehabilitation program is made on the gradual increase of physical activity, general training, increased functional capacity, strengthening of the organism with activation of its reserves, preparation to work, mastering of self-service devices (Fig. 22) and means of travel.

At the end of this period, the patient is examined, with the obligatory testing of the physical condition. Accordingly, the person returns to his former working place and life with less physical and mental stress. In the case of essential residual functional disorders and anatomical defects, work at home is offered to the patient, and, in case of deep, severe and irreversible changes - further expansion of the self-service zone and household skills.

III stage of rehabilitation is called dispensary supervision. The main purpose of this stage is to supervise rehabilitated person, support and improve his physical condition and cope with a disability during the life process. The program includes preventive measures, periodic visits to the sanatoria, independent exercises in the cabinets of medical physical education, independently and in groups "Health", medical examinations with carrying out tests on physical activity to determine the functional capabilities of the organism. The latter provides objective indicators for substantiated recommendations on the adequacy of the work being performed to changes in the conditions for the retraining and, in general, way of life.

At the stages of rehabilitation, especially during the II-III stages, the role of psychologists, educators, sociologists, and lawyers on the adaptation of a patient to the state in which he appeared to be is very important. Questions of professional ability, employment, conditions of work and life, providing disabled people with technical equipment, joining societies and associations, including sports are decided. Specialists in rehabilitation, regardless of the stage of rehabilitation, continue to work with a patient, periodically reviewing programs, taking into account the achieved effect.

Consequently, the principal scheme of the modern system of medical rehabilitation looks like a hospital – out-patient department or rehabilitation center, sanatoria and dispensary care. This system is used in the case of severe diseases and injuries that can lead to disability. Undoubtedly, depending on the type of pathology, the above mentioned stages have their own peculiarities, and not always all of them will be present in the process of restorative treatment, it is related to the severity, nature and clinical course of the disease or injury, therapeutic or surgical treatment, etc.

Social or household rehabilitation. These are public and social activities aimed at the return of a person to active life and work, legal and material protection of its existence. Appropriate specialists carry out measures to restore the social status of a person by organizing an active lifestyle, restoring the weakened or lost social ties, creating moral and psychological comfort in the family and at work, ensuring cultural needs of the person, recreation, sports, and others.

The main purpose of social rehabilitation of patients with severe injuries, amputees, with mental illness, damage to the nervous system and some other diseases is the development of self-service skills. In this process, the coordinated work of the rehabilitation specialist, occupational therapist and psychologist is very important. Patient has to use standard or specially developed devices that facilitate self-service. Along with that, consultations with lawyers, employers, sociologists, way of transportation, communication and other spheres of quality life allows an disabled person to preserve identity and don’t feel outside the society.

Professional rehabilitation. The main goal is to prepare the patient for work. Its implementation depends on the nature and course of the disease, the functional state and physical capacity of the patient, his profession, qualifications, length of service, position, working conditions and the desire to return to work. Depending on this, the rehab, specialist in occupational therapy, a psychologist, a teacher, a sociologist, an attorney conduct work on adaptation, rehabilitation or re-training of the disabled person with his subsequent employment.

The decision on the return of the patient to his previous work or the creation of conditions with reduced working skills (exemption from lifting difficult things, the implementation of accurate

and coordinated movements) is adopted by the Medical Advisory Commission (LCC). In case of significant disability, the commission directs patients to the Medical and Social Expert Commission (MSEC) to establish disability and resolve the opportunity to work. Conclusions of the LAC and MSEC on the conditions and nature of labor, temporary or permanent disability in our state are mandatory for the administration of enterprises, institutions and organizations, regardless of the form of ownership.

The peculiarity of these types of rehabilitation is that each of the following does not begin only after the end of the previous one, and originates in it before and gradually becomes basic at a particular stage of rehabilitation. The main requirement is continuity of the stages of rehabilitation. It is not expedient to continue unnecessarily this or that type of rehabilitation, because this reduces the confidence of patients, especially the disabled, to restore their ability to work

It should be emphasized that all types of rehabilitation contain physical means of rehabilitation, restoration of lost movements, what provides temporary or permanent compensation, forms new conditional reflexes, trains and prepares the body for the perception of physical loads of different natures.

Chapter 3
PHYSICAL REHABILITATION

Physical rehabilitation is an application of physical exercises and natural factors with therapeutic and prophylactic purposes in the complex process of restoration of health, physical condition and working capacity of patients and invalids.

It is an integral part of medical rehabilitation and is applied in all periods of the first stage. Physical rehabilitation is used as the social and professional rehabilitation. The main types of therapeutic physical rehabilitation are therapeutic massage, physiotherapy, mechano-therapy, labor therapy. The purpose of physical rehabilitation is determined by the nature and course of the disease, the general condition of the patient, the period and stage of rehabilitation, motor regimen.

3.1. Therapeutic physical culture (training)

Therapeutic physical training - a method of treatment that uses the means and principles of physical trainings for the treatment of diseases and injuries, prevention of their exacerbations and complications, the restoration of health and working capacity of patients and invalids.

The main means of therapeutic physical trainings (TPT) are physical exercises, which are the basis of muscular activity, whose biological role is extremely important in human life. There is a direct dependence and a close relationship between muscle work and the activity of internal organs, the normal functioning of the central nervous system (CNS), which has developed and evolved during the evolution. Decrease in motor activity (hypo-dynamia) leads to violations of the functional state of an organism and the appearance of painful changes in the cardiovascular, respiratory, digestive and other systems.

Normal lifestyle and functional state of the organism are disturbed during a disease, its adaptation to changes in the environment decreases, muscular contractions and the desire to perform physical work weaken. In order to create conditions for recovery, to prevent complications and exacerbations of the illness, the patient is primarily prescribed the rest regime. However, long-term non-active condition causes changes in the activity of the systems of the organism as a whole, increases the disturbances caused by the disease. This can lead to a number of complications that significantly impair the course of the disease and may endanger the life of the patient. Therefore, in modern medicine, in case the patient's condition allows, it is common practice to combine the rest regime with physical exercises.

Therapeutic physical trainings (TPT) reduce the negative effects of the enforced rest, increases the tone and activates the body, mobilizes its protective and compensatory reactions, prevents complications, restores and expands the functional capabilities of the body, and approximates the functional recovery, reduces the timing of treatment. Depending on the nature of the clinical course of illness or injury, it is possible to purposefully influence and mainly change certain functions of the body by restoring damaged systems, adapting the patient to the physical loads of domestic and industrial nature. Gradually increasing dosed physical loads provide the general training of the organism, which is the basis for the recovery of the patient's health. Therefore, TPT exercise is a compulsory medical device and an integral part of the rehabilitation process.

The exercise therapy is part of a comprehensive treatment method that is used in modern medicine. Its essence is to combine the positive effects on the body of different means and treatments that complement each other. This ensures rapid recovery and rehabilitation of patients within the limits of the existing disease or the consequences of trauma. Distinguish therapeutic, surgical and orthopedic methods of treatment, diet therapy, psychotherapy.

The main feature that distinguishes exercise therapy from all other methods of treatment is conscious and active participation of the patient in the process of his treatment by physical exercises. The patient, having understood the aim of physical exercises, deliberately performs prescribed movements, sometimes forces the will to overcome itself simply laziness or unpleasant

feelings that may occur during exercise, especially after surgery, injuries, burns. During all other methods of treatment, the patient is relatively passive and the medical treatment is performed by the medical staff of the injection, surgery, physiotherapy, massage, and others.

Exercises therapy is shown to be effective practically for almost all diseases and patients of any age. Contraindications: general difficult condition of the patient, acute period of the disease and its progressive course, severe pain, threat of thromboembolism, bleeding or the possibility of its appearance in connection with movements, high temperature and increase erythrocyte sedimentation rate (ESR) over 20-25 mm / h., intoxication, malignant tumors.

3.1.1 Mechanisms of therapeutic action of physical exercises

The beneficial effect of exercises therapy on the body is carried out through the interaction of the nervous and humoral immune systems, motor-visceral reflexes. Any contraction of the muscles irritates numerous nerve endings laid in them, and the flow of impulses from them, as well as from proprioceptors of other support apparatus (as foot and others) are sent to the central nervous system. They change its functional state and through vegetative centers provide regulation and reorganization of the activity of internal organs. At the same time, this regulatory process involves a humoral system in which the metabolic products produced in muscles get into the blood and influence the nervous system (directly to the centers and through chemoreceptors) and the glands of the internal secretion, causing the release of hormones.

Consequently, information on the work of the muscles through the nerve and humoral paths enters the central nervous system and the endocrine system (hypothalamus), integrates, and helps these systems to regulate the function and trophy of the internal organs.

There are four main mechanisms of curative action of physical exercises on the patient's body (V.K. Dobrovol'skii, 1976):

- tonic (restorative) influence;
- trophic (trophe - power) influence;
- compensation;
- normalization of functions.

Tonic (restorative) effect of physical exercises. Specially selected exercises enhance the processes of inhibition or excitation in the central nervous system and thus contribute to the restoration of normal mobility and the balance of nervous processes. It improves the regulatory properties, activates the activity of the endocrine glands and stimulates autonomic functions and metabolism by the mechanism of motor-visceral reflexes. The more muscle and muscular effort involved in motor activity, the greater is the tonic effect of physical exercises. Patients doing exercises, experience positive emotions, have better mood and develop confidence in a quick recovery.

Trophic effect of physical exercises. In the process of physical movement there are proprioceptive impulses that go to the higher parts of the nervous system and vegetative centers and rebuild their functional state, which contributes to the improvement of the trophy of the internal organs and tissues by the mechanism of motor-visceral reflexes. Muscular activity stimulates oxidation-reduction and regenerative processes in the body. In the working muscle, there is an expansion and an increase in the number of functioning capillaries, an increase in the influx of oxygen saturated and venous blood flow, increase of the velocity of blood current, lymph circulation improves. Due to the release of inflammation products, conglutination processes and development of atrophies are prevented.

Formation of compensation mechanisms. Physical exercises contribute to the earliest recovery or replacement of the affected organ function or system. The formation of compensation is due to reflex mechanisms. Physical exercises help to increase the size of the segment of the body or the paired organ,

increasing their functions and functions of the affected system as a whole. They influence the muscles that previously did not participate in the performance of movements that are not specific to them.

Depending on the nature of the disease, the compensation may be temporary or permanent. The first occurs during the illness and disappears after recovery, and the second - in the case of irreversibly lost or limited function.

Normalization of functions. Restoration of the anatomical integrity of the organ or tissues, the absence of the signs of the disease after treatment is not yet evidence of a functional recovery of the patient. Normalization of functions arises under the influence of constantly increasing physical activity, resulting in gradually improving the regulatory processes in the body, eliminating temporary compensation, restoring motor-visceral connections and the quality of functions.

All of the above-listed mechanisms of therapeutic action of physical exercises can determine the therapeutic physical culture as:

- *a method of non-specific therapy, which draws the whole organism into an appropriate reaction at all its levels;*
- *method of pathogenetic therapy, which affects the general reaction of the organism and the mechanisms of development and course of the pathological process;*
- *a method of functional therapy that stimulates and restores the function of the organ or system in general of the whole organism;*
- *a method of supportive therapy, which maintains and develops adaptive processes, while maintaining the function of the affected system and human activity;*
- *therapeutic and pedagogical process, which involves the conscious and active participation of the patient in the treatment, thus solving certain tasks of self-education and use of acquired skills by the physical activity of the patient in the subsequent everyday life.*

3.1.2. Means of therapeutic physical culture

Physical exercises and natural factors are included in physical therapy. The main among them are physical exercises, which in the therapeutic physical culture are used as follows (Scheme 3.1):

- gymnastic exercises;
- idea-motor exercises;
- sports and applied exercises;
- games as exercises.

Often, in hospitals and clinics, gymnastic exercises are easy to administer. This allows you to change the load on the patient in the process of training in different periods of treatment.

Gymnastic exercises in therapeutic physical culture are classified:

- anatomically (for muscles of the head, neck, trunk, arms and legs);
- according to the activity of execution (active, active with the help and with effort, passive, active-passive);
- according to the nature of exercises (respiratory, corrective, coordination of movements, ordinal, preparatory, etc.);
- according to the use of items and appliances (without, with them, on them).

Idea-motor exercises. Idea-motor exercises are performed only in the imagination and exercises in sending impulses to the contracted muscles. Ideo-motor exercises with the correct application of them can significantly increase the "muscle sensitivity", working capacity and ability to perform complex exercises and actions.

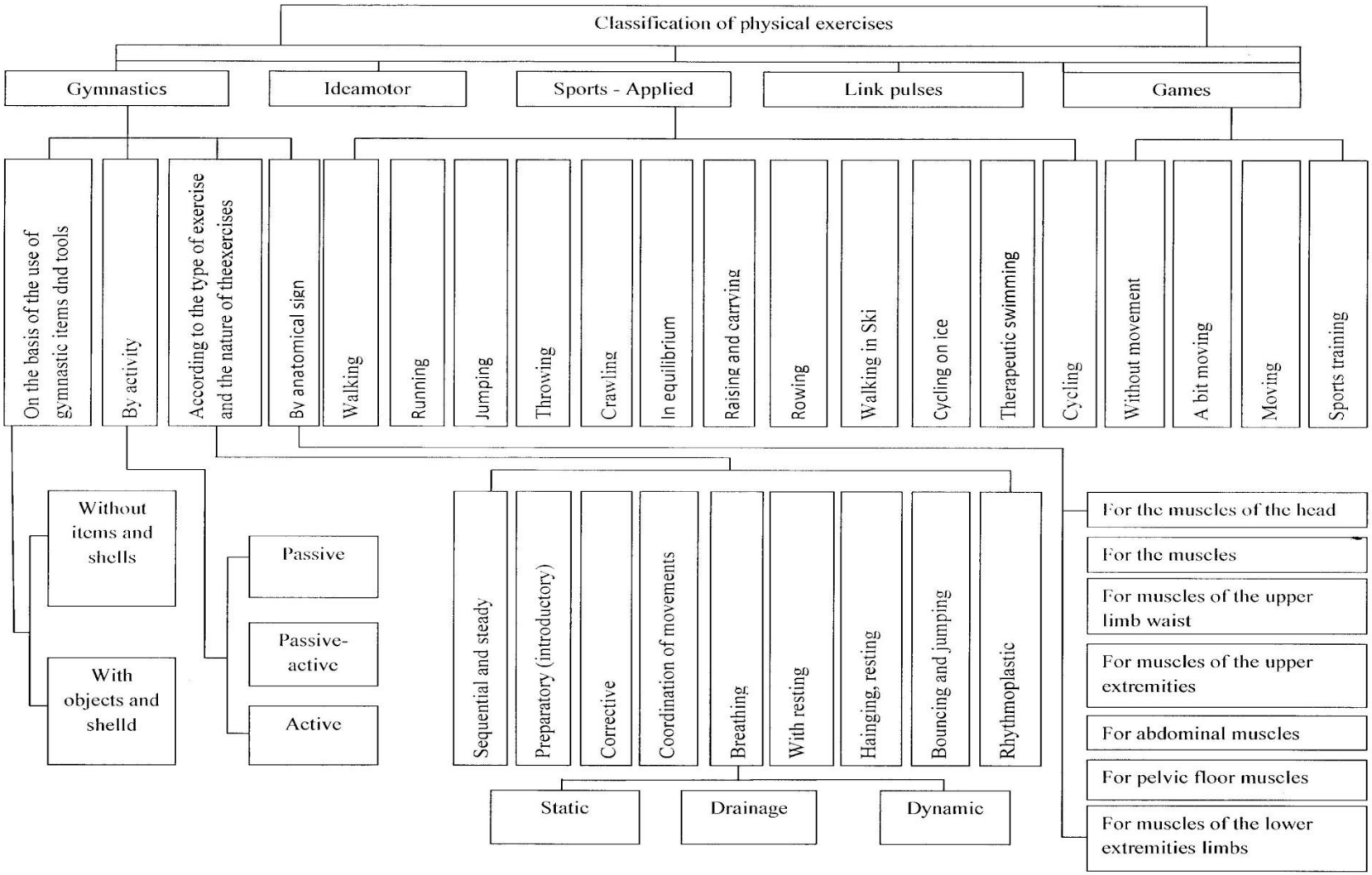
They are used mainly in the hospital rehabilitation period for persons with paralysis and paresis, during immobilization, when the patient is not able to perform movements actively. During this period, such exercises support the stereotype of movements, reflexively enhance the activity of the cardiovascular, respiratory and other systems of the body, reduce the effects of prolonged hypo-dynamics.

One can distinguish exercises that have a predominantly general effect on the body - general developmental exercises and those, operating locally, on a diseased or injured organ – special exercises. The correlation of these two types of exercises in the therapeutic gymnastics complexes should not be constant, but vary depending on the nature and severity of the disease, the clinical course, the sex and age of the patient, the motor regimen and the period of exercise therapy, the stage of rehabilitation.

Sports and Applied Exercises. These include: walking, running, jumping, climbing, crawling, throwing elements and holistic actions at home and at work; skiing, swimming, watercraft, cycling, skating, walks, excursions, tourism. These sports-applied exercises are assigned mainly in the post-hospital period in the II and III stages of rehabilitation, during the restoration of complex motor skills, physical qualities and psycho-emotional state of patients; working out and fixing of permanent compensations, general fitness of an organism. They can be a kind of stage for further regular sports, including sport activities for disabled persons.

Walking is an integral part of practically all parts of exercises therapy and is widely used to treat the vast majority of diseases and injuries in the hospital and after-hospital periods of rehabilitation. Depending on the tasks, it can be both a special and general development exercises, to be a means of unloading, and gradual training of the body to increase physical activity.

Scheme 3


Classification of physical exercises
Gymnastics
Ideamotor
Sports - Applied
Link pulses
Games
On the basis of the use of gymnastic items dnd tools
By activity
According to the type of exercise and the nature of theexercises
By anatomical sign
Walking
Running
Jumping
Throwing
Crawling
In equilibrium
Raising and carrying
Rowing
Walking in Ski
Cycling on ice
Therapeutic swimming
Cycling
Without movement
A bit moving
Moving
Sports training
Without items and shells
With objects and shelld
Passive
Passive-active
Active
Sequential and steady
Preparatory (introductory)
Corrective
Coordination of movements
Breathing
With resting
Hainging, resting
Bouncing and jumping
Rhythmoplastic
Static
Drainage
Dynamic
For the muscles of the head
For the muscles
For muscles of the upper limb waist
For muscles of the upper extremities
For abdominal muscles
For pelvic floor muscles
For muscles of the lower extremities limbs

Running essentially affects the metabolism of the cardiovascular and respiratory systems. As a rule, it is used in a sanatorium and resort conditions, in the initial stages of some diseases, as well as in the stage of recovery, as a means of preparing for different loads at home and at work. In the classes of therapeutic exercises, jogging is alternated with walking and is strictly dosed.

The jumps belong to the exercises of high intensity and put significant demands to the organism of the patients. They help to improve coordination of movements and speed of motor reactions, strengthen the musculoskeletal system. They are often prescribed in the form of jumps and exercises with a rope. Jumps are used for indications in clinics, sanatoria, health groups and special medical groups.

Riding on a horizontal, vertical and inclined plane, ladder, rope is used to strengthen the arms, legs and torso, for the development of mobility in the joints of the upper and lower extremities, and to improve coordination of movements. It is included in the complexes of medical gymnastics and, in particular indicated for orthopedic and neurological patients.

The creep is applied in different positions, the emphasis being put on the position standing on the knees (knee-carpal, crustaceans), which helps to unload and improve the mobility of the spine. It is used in corrective gymnastics in the case of some disorders of posture and trauma of the spine, diseases of the gastrointestinal tract and gynecological sphere.

The throwing exercises consist of throwing of small balls into the target, transfering of inflatable and stuffed balls to the partner. These exercises contribute to the development of muscle strength of the shoulder girdle, increase the mobility of joints, improve musculoskeletal sensitivity, coordination of movements, cause positive emotions in patients. Throws are used to solve general and special tasks of exercise therapy.

Holistic domestic and labor actions and their elements are made by repeated repetitions of physical exercises, first in the form of separate motor elements, and then integrated actions on self-service and use of various devices, adaptations and devices. Such exercises are used in violation of movements in paralysis, after injuries, amputations. Self-care education should begin at the early stages of rehabilitation.

Skiing is used most often in sanatorium and polyclinic conditions. It contributes to the overall strengthening of the whole body, increases the strength of large muscle groups, influences positively on patients with functional disorders of the nervous system.

Swimming is indicated during diseases of the cardiovascular and respiratory systems, in the case of metabolic disorders, posture disorders, scoliosis in children, as well as after injuries of the bone and muscles. Swimming helps to improve thermoregulation of the body. Walks, excursions, tourism, health resort are used mainly in sanatoria and resorts conditions during diseases of the cardiovascular, respiratory and nervous systems, musculoskeletal system in order to improve the general physical and psycho-emotional condition.

Game Exercises. Gaming exercises are divided into on-the-go games, slow games, mobile and sports games. They are aimed at improving coordination of movements, speed of motor reaction, development of attention, distraction of the patient from thoughts about illness, increase of emotional tone. On-site games and slow games are used in the introductory or final part-sessions of the medical gymnastics, in the free motor regimen, during the hospital rehabilitation period. Moving and sports games can be part of a group exercise with a therapeutic gymnastics or an independent form in post-hospital stages of rehabilitation.

When applying all of the above listed therapeutic physical exercises, important role is put to the natural factors - the sun, air and water. They are used in the process of applying various forms of exercise therapy to increase the body's resistance to the negative effects of the environment, and in order to heal and quench the organism. Natural factors are used, mainly in the post-hospital period of rehabilitation, especially at the sanatorium-resort stage.

3.1.3. Forms of therapeutic physical culture

Therapeutic physical culture is used in the following forms:

- morning hygienic gymnastics;
- therapeutic gymnastics;
- independent classes;
- therapeutic walking;
- a health resort;
- sports exercises;
- exercise exercises;
- hydro-therapy.

Morning hygienic gymnastics is carried out after a night's sleep in tents, in the gymnasium. In the post-hospital period of rehabilitation it is recommended to spend it outdoors, with musical accompaniment, combined with walks and water procedures. The main tasks of the morning hygienic gymnastics are: revival of the body after night sleep, raising the overall tone of the patient, giving him a cheerful mood and bringing the body to the active state. The complexes of morning hygienic gymnastics consist of general developmental exercises. Its duration is from 5 to 20 minutes.

Therapeutic gymnastics - the main form of exercise therapy. It solves the main tasks of the therapeutic exercise of physical exercises. The complex of therapeutic exercises includes general development and special exercises. Their correlation depends on the nature of the disease or injury, the method of treatment, the clinical course of the disease and the state of the patient, motor regimen and the period of exercise therapy, the stage of rehabilitation.

Special exercises require accurate performance and concentration of the patient. This is of particular importance in the treatment of patients with injuries, burns, after operations, because improper exercise may cause an increase in pain and unpleasant sensations and as a result – patient's refusal of further treatment by physical exercises.

Gymnastics training consists of three parts: introductory, main and final.

The introductory part is 10-20 percent of the time of the whole lesson and solves the task of preparing the body for the exercises of the main part. It includes walking, elementary gymnastics exercises for the upper and lower extremities, breathing exercises, exercises for attention.

The main part takes 50-70 percent of the time of training gymnastics. It solves the main tasks of rehabilitation. During this period general developmental exercises are alternated with special ones. In sanatorium-resort conditions, in addition to other exercises, this part of gymnastics training includes sports-applied exercises.

The final part of the therapeutic gymnastics takes 10-20 percent of the time, its task is to reduce the physical activity and bring the body to its original state. This is achieved by breathing exercises, walking, exercises for relaxation.

- During the exercises on medical gymnastics following guidelines should be observed: The nature of exercise, physiological load, dosage and starting positions should be adjusted with the general condition of the patient, his age and degree of training readiness.
- Physical exercise should give an effect to the whole body.
- Both, general developmental and special exercises should be used during the lesson.
- Principles of consistency in increasing and reducing physical activity, while maintaining the optimal physiological load curve should be planned ahead.
- When selecting and performing exercises, it is necessary to keep the order of the muscle groups that are involved in their implementation.
- In a medical course it is necessary to modify and complicate exercises every day. In gymnastics classes, 10-15 per cent of new exercises should be introduced, and already known before should be repeated in order to ensure the consolidation of motor skills
- The last 3-4 days of the course are devoted to the acquaintance of patients with the gymnastic exercises that will be recommended in the following classes at home.

- The volume of the methodological material, the intensity and complexity of physical exercises in the classroom should be in accordance with the motion regime that is intended for the patient.

Methods of medical gymnastics depend on the nature of the disease or injury, the stage of treatment, motor regimen, period (three periods) of physical exercises: individual, small group, and independent group.

In the first period (sparing period), gymnastics classes are conducted by an individual method, and at the end of it, patients with the same diseases and clinical course of the disease, the functional capabilities of the organism are united into groups of 3-4 persons.

In the II period (functional period) classes on therapeutic gymnastics, work with small groups. Some patients, however, according to the appointment of a doctor, can continue training individually.

In the III period (training period) preference is given to the work in groups with medical gymnastics trainings. It is used in post-hospital stages of rehabilitation. At this time, the method of independent occupations can be applied, in case the patient, for various reasons, is not able to attend a medical institution. In such cases, there is a special complex of exercises, and the ability to execute them correctly independently is checked.

For individual and group classes certain time for rehab is given (Table 3.1.)

Table 3.1. Estimated timing rules for conducting trainings for medical physical education

No	Contingent of patients	Method of training	Time standards; min.
1	Therapeutic patients	Individual	15
	- acute and semi-acute periods of the disease	Individual	25
	- recovery period or chronic form of the disease	group	35
2	Patients after surgical operations	Individual	15
		group	20
3	Patients with trauma - the period of immobilization	Individual	15
	- after immobilization	group	25
		Individual	25
		group	35
	- spinal injury	Individual	35
		group	45
4	Neurological patients	Individual	30
		group	45
5	Pregnant women in special clinics and out-patient departments	індивідуальна	15
		group	30
6	Children of school age (in schools)	Individual	30
		group	45
7	Children of school age (in kindergartens)	Individual	25
		group	30

Independent classes (individual tasks) by medical gymnastics are recommended in the form of a set of special physical exercises performed by patients independently several times during the day. They are studied by the patient in the presence of a rehab and are used initially to prevent complications, the development of compensatory movements, and subsequently to restore motor skills, physical qualities and functions of the body. Individual lessons significantly improve the effectiveness of therapeutic exercises. This form of exercise therapy is of particular importance in

the treatment of damages of the musculoskeletal system, the central and peripheral nervous system, in the postoperative period.

Therapeutic walking. It is used at the stationary stage of rehabilitation in the free motional mode, for restoration of walking after injuries, diseases of the nervous system, musculoskeletal system, for adaptation of the cardiovascular and respiratory systems to physical activity; normalization of motor and secretory function of the digestive system; metabolism and, in general, to restore the functional state of the body after a long bed regime. Post-hospital stages of rehabilitation, medical walking is used to gradually increase the level of physical efficiency, general training of the body. The length of the distance and time, the pace and length of steps, the terrain should be calculated easily and precisely. The pace of walking 60-80 steps per minute is considered slow, 80-100 - average, 100 -120 - fast.

Note: the calculation rules take into account the time required for carrying out the preparatory work, filling out the documentation and carrying out the training directly.

Terrain climbing is a climb in mountains or mountainous areas, which is metered on special routes.

The terrain course, depending on the length of the distance and steepness of the slope, is divided into:

- route N 1 - 500 m, 2 – 5°C
- route N 2 -1000 m, 5 - 10°C
- route N 3 - 2000 m, 10 - 15°C
- route N 4 - 3000-5000 m, 15 - 20°C

In addition to these indicators, exercises are classified by the pace of walking and the number of stops for rest. Terrain climbing is a method of therapeutic therapy and is indicated for diseases of the cardiovascular and respiratory systems, metabolic disorders, damage to the supporting-motor system, lesions of the nervous system. This method is assign in the post-hospital rehabilitation period, starting with easier complex routes.

Sports and games exercises. They are used in rehabilitation centers, sanatoria, and outpatient clinics in special medical groups of educational institutions with the aim of improving coordination of movements, physical qualities, professional skills, training of the body; increase of general working capacity and psycho-emotional tone.

Hydro-kinesis-therapy. Hydro-kinesis-therapy is the treatment of movements in water. It is used in the form of gymnastics exercises, stretching in water, posture correction, underwater massage, swimming, mechano-therapy and games in the water.

The use of the hydro-therapeutic complex is based on the properties of water (the mechanical action of the aqueous medium, its expelling force and hydrostatic pressure) and the peculiarities of its effects on the body. Due to the first property, the weight of a human body in water is reduced by 9/10, that is, with a weight of 80 kg, it will have 8 kg. This greatly facilitates the exercises and allows, with minimal muscular effort, to perform active movements, increase their amplitude, restore the supporting-motor function, which was impossible to carry out with high voltage, under normal conditions. At the same time, the factor of the temperature is also beneficial. Warm water improves lymph circulation, strengthens muscle relaxation, softens tissues, reduces the pain, improves muscles elasticity.

However, with the help of water, it is possible to increase the load on the muscular system by overcoming its resistance, which progressively increases with the acceleration of the rate of change of direction and amplitude of movements, exercises sequence in water and beyond, the depth of immersion. In case of need to restore normal tone and muscle strength, physical exercises are performed in cool water, which harden the organism of the patient.

Hydrostatic pressure of the aqueous medium has a positive effect on the respiratory and cardiovascular systems. When the patient is plunged in the water to the neck, pressure on the chest and abdominal cavity increases. During breathing, the breathing muscles of the patient are forced to overcome the resistance of the water. Such breathing gymnastics trains and strengthens the

respiratory muscles, improves pulmonary ventilation and gas exchange, oxygen transport function of the cardiovascular system. Compression of superficial vessels, muscle contraction facilitates lymphatic flow, accelerates the flow of venous blood to the heart, stimulate hemodynamics in general.

Hydro-kinesis-therapy also has a beneficial effect on the nervous system. It enhances the psycho-emotional tone, improves the state of health and strengthens patient's confidence in an entire healing process.

Exercises in the water can be carried out in medical and general swimming pools, in regular or special baths with extended legs and head, providing sufficient amplitude of limb movements. The exercises for tibia and small joints of the hand and foot often are done in small baths at home conditions. The course of treatment with hydro-kinesis-therapeutic methods consists of, 10-14 procedures on average.

Indications for use of hydro-therapy are: injuries and diseases of the nervous system, musculoskeletal system and their effects (paresis and paralysis, radiating pain syndromes, muscle atrophy, neurosis, contracture, adhesive disease, scapular scars, etc.); abnormal posture, asthenic conditions, weak physical development; hypo-kinesis; diseases of the respiratory and cardiovascular system, diseases of the digestive system and metabolism, etc. Contraindications: acute and chronic diseases of the skin, ears, eyes; open wounds, ulcers, incontinence of urine and feces, epilepsy and diseases of the peripheral nervous and cardiovascular systems in the phase of exacerbation; venereal diseases.

Gymnastic exercises in the water are performed at different depths of plunging: to the waist, to the shoulders, to the chin. Active and passive exercises are used, facilitated and obstructed, with objects and devices, for stretching and relaxation, breathing exercises, types of walking, with the mechano-therapy devices. The temperature of the water in the diseases of musculoskeletal system, the consequences of injuries and some diseases of the nervous system should be 36-38 °C. Gymnastics in water is often combined with manual and underwater massage, which increases the therapeutic effect. It can be used as an independent occupation, as well as a preparatory procedure for the subsequent extension of the body or correction of the situation in the water. Extension in the water is carried out, mainly, for the spine and extremities, and it is used most often to eliminate the pain syndrome. This is achieved by the cumulative effect of pulling out and relaxing effect of warm water. Thus, in diseases of the spine, the therapeutic effect is possible due to the unloading of the intervertebral discs and joints, which reduces the pressure on the spinal cord of the spinal nerves, and has the simultaneous analgesic and relaxing action of warm water. An underwater vertical pull-out of the spine and horizontal pulling of the spine and limbs in the pool and bath can be used.

Vertical pulling of the spine in the pool is carried out with a belt with a load of 5-20 kg, dressed on a patient who is immersed in the water to the shoulders. The patient is kept in the water in a suspended position behind the head, which is fixed by a special device. It is helpful in case of the localization of the pathological focus in the lower or upper chest regions of the spine.

In the case of the displacement of the thoracic and lumbar vertebrae, the patient’s position is fixed with the help of an inflatable circle, conducted under the armpits. The first procedure of extension is carried out without or with a minimum load, in the following - the weight gradually increases. Duration of the procedure is 15-20 minutes, course 12-14 procedures. Before each procedure it is necessary to perform a set of preparatory exercises aimed at increasing the mobility and elongation of the spine. For a better relaxation of the muscles of the back, an underwater massage is used. A kind of vertical stretching is an underwater stretching on an inclined plane, which is used in a hospital in difficult cases.

Horizontal stretching of the spine in the bath is made on the shield with the lowered bottom end. Position of the patient is lying on the back with a load of 5-25 kg, located outside the bath. Stretching begins with a weight of 5 kg, during 4-5 minutes, and is increased gradually to a maximum and at the end of the procedure the load is gradually reduced. Duration of the procedure is 20-30 minutes, their number being 10-12. After each procedure, the patient should rest for 1.5

hours. It should be emphasized that the previous underwater massage increases the efficiency of stretching.

Stretching of the spine is also received by dipping the trunk of a patient in the water, that is, due to the weight of the patient's body. In this case, the upper shoulder belt is fixed under the armpits, and the lower extremities do not touch the bottom of the bath and sags in it (outside the "hammock"). Procedures last from 5 to 15 minutes. Course of treatment is 12-20 procedures.

Stretching of the extremities in the water can be used to reduce pain in patients with deforming arthrosis of the large joints of the lower extremities. A cuff with a load of 0.5-3 kg is fixed on the treated leg, and a healthy one stands on a stand 20-25 cm high. From this starting position, the patient performs oscillations of small amplitude with a foot, trying to relax the muscles as much as possible. Duration of the procedure is 10-20 minutes and it ends with the implementation of a set of physical exercises in the water.

Correction of the position is accompanied by stretching of the tissues of the skin, connective-articular apparatus, muscles. This method is used, more often, in patients with limitation of movements in joints and contractures. It is the final procedure, done after exercises in the water, underwater massage, stretching, which have prepared the tissues for further intense action. Special devices, loads of different weights, fixing tires, straps, which hold the desired segment in the required position, creating a certain pressure on this area within 15-20 minutes are used for correction of the position in the water.

During the procedure, it is necessary to monitor the patient's response to the corrective action of the effort. They should not be accompanied by pain, be excessive in time or intensity, because it can cause the opposite effect - the reflex tension of the muscles, and sometimes the refusal of the patient being treated by this method.

Swimming and swimming in fresh, mineral or sea (thalassotherapy) water is widely used for therapeutic and prophylactic purposes in post-hospital rehabilitation period, mainly during the treatment in the sanatorium. The influence of the air and sun beams, in addition to the temperature, mechanical and chemical effects of the water during these hydro-kinesis-therapy procedures has an additional positive effect. As a result of the combined effects of all these natural factors, the activity of the organism is stimulated, it’s vital tone increases.

Usual swimming and swimming with loads - boards, circles, inflatable rubber items is especially recommended. Different water games are used: elements of volleyball, water polo, etc. The duration of swimming depends on the temperature of water, the state of health, age of patient, motor regimen. In the course of sea bathes (in the Black and Azov Seas of Ukraine) the state of the sea and the level of solar radiation should be taken into consideration.

Bathing is used more often in order to increase nervous and muscular tone, overall resistance of the body, removing fatigue. Bathing is recommended from 9 to 12 hours, in 1-1,5 hours after breakfast at the temperature of the water not lower than 21-23 °C (trained individuals can swim also at lower temperatures). The duration of the first stay in the water is 2-3 minutes, which later gradually increases to 10-15 minutes, without waiting for signs of cooling (trembling, pale and "goose" skin). After bathing it is necessary to wipe out with the tower, and the appearance of a pleasant sensation of heat throughout the body indicates a positive effect of the procedure.

Swimming has versatile effect on the body. It enhances the training of the cardiovascular and respiratory systems, stimulates the gastrointestinal tract and metabolism. It is possible to differentiate load and strengthen those or other muscle groups, using a definite swimming style.

Indications for swimming: compensated diseases of the cardiovascular system, changes of metabolism, chronic respiratory diseases, period after acute diseases, the stomach and intestines atony, inactive phase of tuberculosis, neurasthenia, residual effects after traumas and diseases of the supporting-motor apparatus and nervous system, posture disturbances, scoliosis, etc.

Contraindications: increased nervous-psychic anxiety, tendency to loss of consciousness; organic diseases of the brain and spinal cord, heart and circulatory disorders, pronounced atherosclerosis and coronary deficiency, depletion.

3.1.4. Periods of application of therapeutic physical exercises

Complex treatment gradually changes clinical course of the disease and the general condition of the patient what demands constant adaptation of the forms and methods of exercising.

Thus, there are three periods of exercise therapy, each of which is characterized by the corresponding anatomical and functional state of the damaged organ and the whole organism.

The first period (introductory) – sparing period. It is characterized by pronounced anatomical and functional disorders of the damaged organ, the corresponding system and the body in general, the symptoms of the disease or injury, induced by a decrease in motor activity, including immobilization. Tasks of this period are as follows: improvement of the nervous and mental state of the patient, prevention of complications, stimulation of trophic and compensatory processes, training of self-service skills. The exercise therapy is used in the form of therapeutic and morning hygienic gymnastics, independent exercises. Complexes consist of about 75 per cent of general development and respiratory exercises in the ratio 1: 1 and up to 25 per cent of special exercises. They are performed mainly from the original position lying down. The intensity of exercises is low, and at the end of the period - moderate. The duration of the therapeutic exercises is 5-12 minutes. The physiological load curve is one-stroke in the middle of the main part of the class.

The II period (basic) – functional period. It is characterized by the improvement of the clinical condition of the patient, restoration of the anatomical integrity of the organ or tissues, while simultaneously substantially impairing their function. Thus, in case of the fracture of the bone, after healing of the defect and removing of the immobilization, muscle strength and joint movements are reduced. The main tasks of the period is the restoration of the functions of the damaged body and systems of the body, preparation for increasing physical loads and changes in the motor regime. The forms of exercise therapy of the previous period and sports-applied exercises in the form of walking, throwing, elements of domestic movements and professional activity are used. The classes include about 50 percent of general and respiratory exercises in the ratio 2: 1 and special exercises, the proportion of which increases to 50 percent. Exercises are performed in the original position by lying, sitting, standing with moderate intensity. Duration of medical gymnastics is 15-25min. The physiological load curve is two-three-quadruple.

The III period (final) – training period. It is characterized by the completion of the recovery process, the restoration of functions, but the ability to withstand life-time loads is still insufficient. Residual effects of the former disease are present: reduction of strength, endurance, speed, ability to carry physical activity in full volume. The main tasks of the period are: training of confidence in the full recovery and full return to work, increase of the functional and physical capacities of the body, preparation of the organism to the physical loads of everyday life; restoration of work capacity or improvement of substitute functions and adaptation of the patient to the changed conditions of life. All forms of exercises are used in this period. Exercises of high intensity are performed and, exercises of maximum intensity can be used in case the patient's organism is well adapted to the loads. The complex of medical gymnastics includes about 25 percent of general and respiratory exercises in the ratio 3 - 4: 1 and 75 percent of special exercises. Duration of the trainings is 30-45 minutes.

The physiological load curve is multiverse. I and II periods of medical rehabilitation are carried on during inpatient treatment of patients, and the last stage of the rehabilitation – in special centers, sanatoria, or clinics.

3.1.5. General requirements for the methodology of conducting trainings

The method of therapeutic physical rehabilitation is determined by the tasks, means and forms of therapeutic physical trainings, which are selected according to the stages of rehabilitation. The method can be modified depending on the general condition of the patient, the course of the disease, the motor regimen, organism's reactions to the gradual increase in physical activity. Its magnitude depends on the nature of the total number of exercises and the number of their repetitions, starting

positions, rhythm and amplitude of movements, complexity and degree of power stresses, intensity of physical exercises, duration of procedures, of the patient's emotional level (Scheme 3.2).

Scheme 3.2.
Dosage of physical activity

<table>
<tr><th colspan="2">Methodical methods of dosage of physical exercises</th></tr>
<tr><td>Selection of starting positions</td><td>Breathing exercises</td></tr>
<tr><td>Volume of muscle groups involved in the movement</td><td>Number and nature of exercises (active, passive, etc.)</td></tr>
<tr><td rowspan="2">Turning muscle</td><td>The pace of exercise</td></tr>
<tr><td>Amplitude of movements</td></tr>
<tr><td>Degree of complexity of exercises</td><td>Degree of strength of muscle tension</td></tr>
<tr><td>Increase or decrease the number of repetitions of each exercise</td><td>The presence of an emotional factor</td></tr>
</table>

Application of physical exercises should correspond to the basic didactic principles (consciousness and activity, visibility, accessibility and individualization, systematic and gradual increase of requirements). Particular care should be taken to the distribution of the load, alternate stress with relaxation of the muscles and combine movements with the phases of breathing. During breathing, patient should pay attention to the fact that the breath corresponds to straightening or bending of the trunk, lowering or raising of the hands, breathing in at the moment of the slightest effort in exercise, and exhale - flexing the body or legs.

The method involves the selection of low, moderate, large and maximum intensity and, depending on the motor regime, the period of use of therapeutic physical exercises at the stages of rehabilitation.

Exercises of low intensity include movements of small muscle groups, performed mainly at a slow pace, static breathing exercises and muscle relaxation exercises. Physiological changes during these exercises are insignificant.

In exercises of moderate intensity, the middle and large muscle groups of the extremities, trunk, dynamic respiratory exercises, walking in the slow and average pace, and slow-moving games are used. In this case, the physiological parameters of the cardiovascular and respiratory systems are restored to the normal state within 5-7 minutes.

Exercises of high intensity force a large number of muscle groups and they are performed on an average and fast pace. These are, first of all, gymnastic exercises on devices, with medical balls, fast walking, jogging, motor and sports games, etc. After performing these exercises, the duration of the recovery period in the indicators of frequency heart rate (HR), blood pressure, pulmonary ventilation is more than 10 minutes.

Exercises of maximum intensity are characterized by the simultaneous work of a large number of muscles, which are performed at a rapid pace, which causes significant changes in the activity of the cardiovascular and respiratory systems, metabolism. These exercises are mainly used in the rehabilitation of athletes.

3.1.6. Motional regimens of medical physical training

Appointments and applications of various forms of medical physical exercises and other means of physical rehabilitation are closely related to the motor regimen, which regulates motor activity of the patient during treatment ***in the hospital and post-hospital periods of rehabilitation*.** Exercises, are prescribed by the treating physician and varies depending on the course of the disease, the stage of treatment, the reaction of the organism to the prescribed regime.

Other specialists, including those from physical rehabilitation who are involved in the complex process of medical rehabilitation, select and use their means and methods of treatment in accordance with the assigned motor regimen.

Hospital rehabilitation period.

In the hospital rehabilitation period, the following regimes are distinguished:

- *strict bed regime;*
- *bed regime;*
- *half-bed (ward) regime;*
- *free regime.*

Strict bed regime. In this case, the motor activity of the patient is strictly limited. Auxiliary movements, standing up are carried out with the help of medical personnel. Breathing exercises and movements in the distal parts of the extremities are allowed.

Bed regime is characterized by active behavior of the patient in bed, independent standing up (sitting position, then – standing). The basic initial position when performing complexes of morning hygienic and medical gymnastics is lying in bed. Exercises of low intensity are used at the end of the moderate regime.

The half-bed regime implies that the patient is staying in bed half of the daytime, and in the second period of time patient is sitting, walking, etc. In this mode morning hygienic gymnastics, independent classes, therapeutic walking, elements of occupational therapy are used, at the end of this period patient is allowed to climb the stairs, walk and exercise moderately. The physiological load curve is two-three-four peaks.

Free regime. The patient most of the daytime is outside the bed. In addition to the main exercises, other activities (sports and applied exercises, labor therapy, exercises on simulators, hydro-therapy) are indicated. Moderate intensity and to some extend – intensive exercises are used.

Post-hospital period of rehabilitation. During this regime the following activities are applied: motor regimes in clinics, rehab centers, sanatoria, aimed at further improving the functional state of the fitness of the organism, adaptation to the loads of everyday life.

In post-hospital rehabilitation period, the following regimes are distinguished:

- *sparing regime;*
- *gentle and training regime;*
- *training regime.*

Intensive-trained regime can be used in the last stage of rehabilitation in some diseases. The general regime in physical exercises is almost like a free regime in a hospital. The distance and the time of walking as well as the use of natural factors are increased in sanatoria. Training regime requires the use of all forms of exercise therapy. Games, walks, excursions, jogging, skiing, cycling, air and sun baths, water treatments, mass entertainment, dancing are widely used. The intensity of exercises is from moderate to high.

Practicing regime allows the fullest possible use of means and forms of exercise therapy and participation of the patient in all activities conducted in the sanatorium. Exercise intensity is high. In rehabilitation of athletes exercises of maximum intensity are applied.

3.1.7. The effectiveness of the use of therapeutic physical trainings

It is necessary to determine its effectiveness of exercise therapy in the complex treatment of patients. This allows a trainer to control the correctness of the selection of physical exercises and the expediency of the chosen methodology, to make adjustments to the classes and the course of exercise therapy if necessary. Methods of studying its effectiveness depend on the nature of the disease, surgical intervention, injury. Commonly accepted is the definition of the physiological load curve in the process of occupational therapy.

There are following types of control:

- express control;
- current control;
- continuing step-by-step control.

***Express control* is used to assess the effectiveness of one class (urgent effect).** For this purpose, the immediate response of the patient to physical activity is studied. Conducted medical and pedagogical observations, determined by heart rate, respiration and blood pressure before, during and after the training. The obtained data allow us to build a physiological load curve, which, when properly planned, gradually increases in the introductory part, reaches its maximum in the middle and decreases in the final part of the lesson. In the case of quick control, it is recommended to use radiometric methods of investigation (tele-electro-cardiology, electrocardiogram, etc.), which are especially important for cardiovascular pathology.

Current control is carried out during the entire treatment period not less than once in 7 days, as well as when changing the motor regime. It makes possible time adjustments to the methodology of classes, the program of physical rehabilitation. Clinical data, results of functional tests, indicators of instrumental research methods, anthropometry are used.

Stage control is conducted with the aim of assessing the course of treatment in general (cumulative effect). Full examination of the patient at the hospital is carried on before the beginning and at the end of an exercise therapy. Anthropometric measurements are used and, depending on the nature of the pathology, functional tests and special methods of research are conducted, which check the condition of cardiovascular, respiratory, nervous systems, support motor system, and others. So, to determine the functional state of the cardiovascular system, dynamic tests are used with different physical activity: squatting, walking on the spot, running, jumps, exercises on the hygrometer, treadmills (moving track), climbing the steps. According to the reaction of heart rate, blood pressure, time of recovery of these indicators after loading, a conclusion is made on the functional state of the cardiovascular system and an assessment of physical performance at the present time.

It is also necessary in clinical practice to determine the tolerance to physical activity, that is, the ability of the body to withstand exercises without violating its condition. It is important to be able to compile an individual motor regime and to assess the effectiveness of physical rehabilitation. It was determined by the gradual increase of loads with simultaneous electrocardiographic control that with the appearance of the first signs of deterioration of coronary blood flow, recorded on the electrocardiogram it is important to stop the procedure, fixing the heart rate. The moment of appearance of signs of an adverse reaction is called the threshold of tolerance to physical activity. It gives an opportunity to objectively assign the optimal level of physical activity during exercise classes and thus helps to determine the level of preparation for physical labor. Point of tolerance is compared with professional power consumption.

3.1.7.1. Measuring movements in the joints

Measuring movements in joints is one of the main methods for assessing motor capabilities of the patient in many diseases, injuries and deformations of the musculoskeletal system. Comparing the amplitude of active and passive movements in the examined patient, with the amplitude of identical movements of a healthy person, one can judge both the violation and the restoration of the volume of movements in the treatment process, to evaluate the effectiveness of occupations exercise therapy and other means of physical rehabilitation.

Measurement of movements in joints is carried out with the help of special tools of different complexity. Universal goniometer is the device most widely used in practice. It consists of a conveyor with a scale of 180 °, to which two shoulders (branches) are attached at 30-40 cm each. One of the branches is mobile. The axis of the angle-meter is combined with the axis of the joint, and the branches are arranged along the axis of the proximal and distal segments that are articulated. It is necessary to use the same measurement methods as those given in Table 3.2 and

shown in Figures 3.1 and 3.2 to exclude errors, and for the purpose of continuity, unification and the possibility of objective comparison of measurement results.

Table 3.2. Measurement of the amplitude of movements in some joints

Movement in the joint	Position of the axis rotation angle meter (in the drawing, the point "a")	**Position of the gauge branch**	
		first branch (in the picture line a-b)	second branch (in the picture line a-c)
Bending, withdrawal in the shoulder joint (see Figure 3.8 a, b, c, d)	Head of the humerus	The acromion is the highest point of the iliac bone	Acromial process - shoulder growth
Bending and bending in the elbow joint (see Figure 3.8a, b, c, d)	Growth of the shoulder acromial process	Growth of the shoulder - acromion	Growth of the shoulder along the radial bone
Bending and extension in the coxal joint (see Figure 3.8., w, c)	Greater trochanter	Greater trochanter - middle of the armpit	Greater trochanter lateral process of hip joint- lateral growth of the humerus
Bending and extension in the wrist joint (see Fig. 3.9a)	growth of the styloid process of the elbow bone	On the outer edge of the elbow bone	On the outer edge of the fifth wrist bone
Bending and extension in the radio carpal articulation (see Figure 3.9 b	Between the distal ends of the forearm bones	In the middle between the elbow and the radius of the bones	In the middle between the 3rd and 4th fingers
Abduction and adduction in the knee joint (see Fig. 3.9. C, d)	Lateral process of the femur	Lateral process of the femur greater trochanter	Lateral surface of the femur lateral ossicle
Bending and extension in the crurotalar articulation(see Figure 3.9 d, e)	Medial ossicle	Medial process of the femur	Medial ossicle is the middle of the 1-st metacarpophalangeal joint

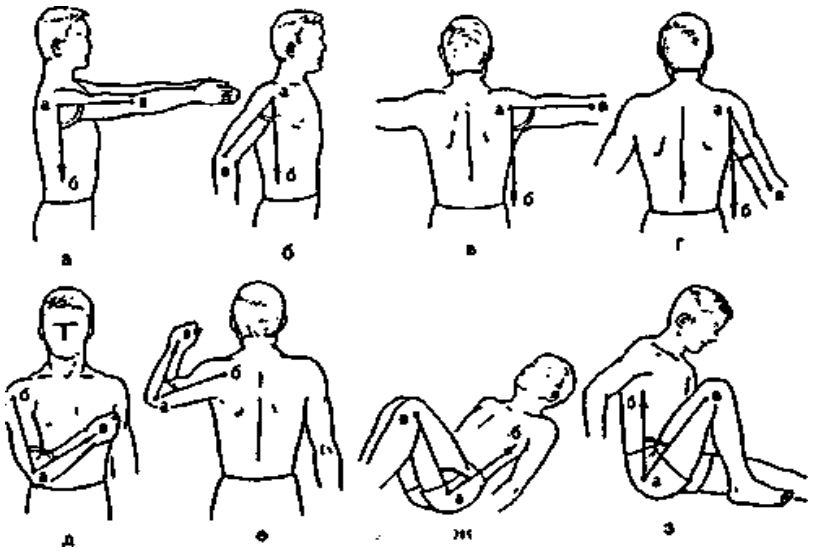


Fig.3.1. The position of the angle meter during the measurement of mobility in the shoulder (a, b, c, d), elbow (d, e) and hip (z, c) joints

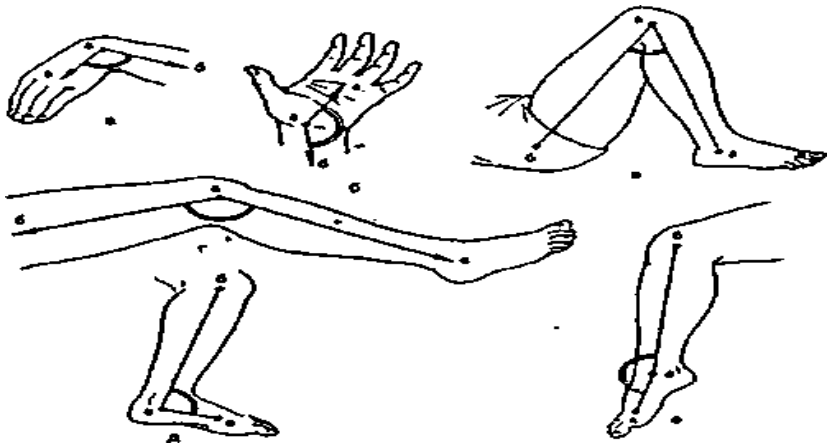


Fig. 3.2. The position of the angle meter during the measurement of mobility in the radial (a, b), knee (in, g) and ankle (d, e) joints

When measuring movements in the shoulder joint for the starting value, take 0 ° with the lowered arm and closed branches of the angle meter. Measuring movements in the elbow, radial, hip and knee joints for the starting value is taken 180 °, and the ankle -90 °. The average normal displacement in the joints of the limbs is given in Table 3.3.

Table 3.3. Average mobility in some joints of the limbs (in degrees from the starting position)

The name of the joint	Bending -excitation	Bring-out	Inner-outline rotation
Brachial	180-60	0-180	90-90
Elbow	145-0	-	-
Radial	-	-	90-90
Radial-wrist	90-80	20-45	-
Hip	125-15	10-45	45-45
Knee	130-0	-	-
Tibia-foot	45-20	-	-

Measurement of the volume of movements in separate parts of the spine is carried out with the help of a combined angle meter, and in general practice - visually with maximum movements in parts of the vertebral column. In the cervical region of the spine, the flexion normally occurs before the chest movements, the extensions go up to the horizontal position of the neck, the inclination to the side - to the collision of the auricle with the shoulder, with the maximal rotation, when the chin contacts the chest. With normal movements in the lumbar part of the spine, the patient can touch the floor with the tips of the fingers in front of the body and the bending curve indicates the distance in cm from the end of the thumb to the lumbar surface. Extension of the trunk is measured by distance from the VII cervical vertebra to the beginning of the intercourse fold in the standing position and at the maximum possible bending. The slope in the side is considered good if the patient slides with a hand along the same side of the thigh and his fingers reach the knee.

Normal volumes of movements in the cervical spine are assumed to be: expansion - 70°, bending 60°, turning sideways by 75°, inclination toward 45°C, inclination towards the chest and lumbar parts together are equal to 50° The overall amplitude of flexion and extension in the lumbar spine reaches 80°. Total movements of the entire vertebral column are within the limits: up to 160° - bending, 145° - extension, the total amplitude of movements in the front plane - up to 165° and turns in each side - up to 120°.

3.2. Therapeutic massage

Massage, used for the treatment of various diseases and injuries, is called therapeutic. It is an effective remedy for functional therapy and is therefore used at all stages of medical rehabilitation of patients. Massage is recommended for adults and children in the complex restorative treatment of diseases of the cardiovascular, respiratory and nervous systems, musculoskeletal system, internal organs, and skin. It is used after injuries, in surgery, gynecology, and also for preventive purposes.

The therapeutic effect of massage is achieved by mechanical actions on the patient's body using the same methods (Table 3.4, V. Mukhin, 2006), which are used in other types of massage: hygienic, cosmetic and sports. Methodology and technique of the basic methods of massage are: stroking, rubbing, kneading, vibration, each of which holds a number of auxiliary actions, studied during the course of sports massage.

Table 3.4. Basic and auxiliary techniques of therapeutic massage

Basic reception	Types of basic reception	Auxiliary reception
Stroke	Plane: superficial, deep Captivating: continuous fragmentation	stroking, combing ridge-shaped, tongue-shaped cruciform
Friction		combing, sawing hatching, planing crossing, pinch-shaped
Sweating	Continuous Partly	squeezing, rolling, rolling, offset, pinching (twisting), stretching (pulling out), compression (pushing)
Vibration	Continuous	shaking, shaking pushing
	Partly	punching, chopping, patting tapping, quitting

3.2.1. Mechanisms of therapeutic action of massage

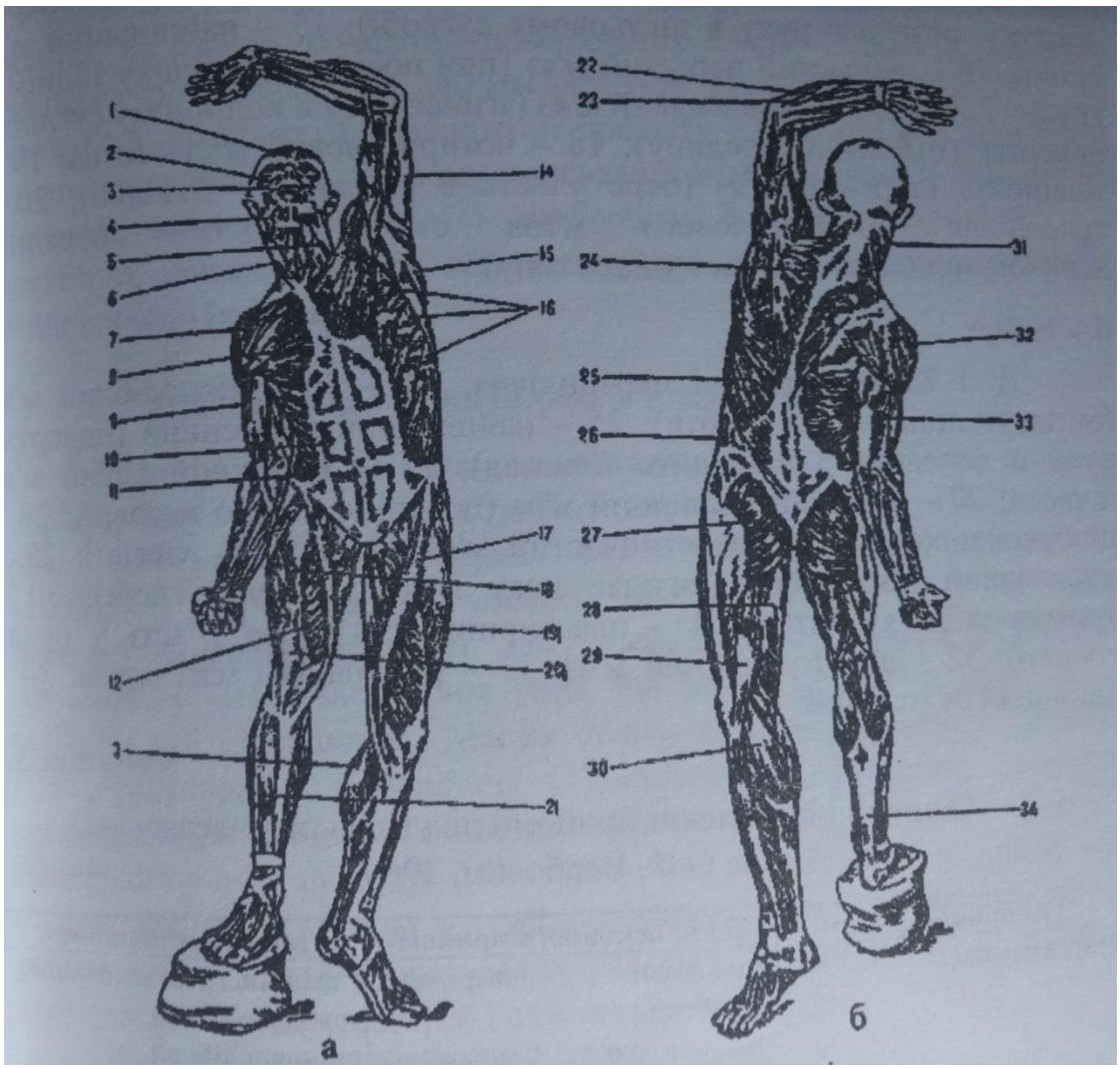


Fig. 3.3. The location of the muscles in the body

a – front group: 1 - frontal muscle (collects the skin of the forehead in the transverse folds); 2 - circular muscle of the eye (closes eyes); 3 - circular muscle of the mouth (closes the mouth); 4 - chewing muscles (take part in the chewing process); 5 - subcutaneous muscles of the neck (involved in the mechanism of respiration); 6 – sternocleidomastoid muscles (reduced muscle on both sides of the head tilted forward); 7- deltoid muscle (removes the hand); 8 - large thoracic muscle (lowering the arm, leading it forward); 9 - two-headed muscle of the shoulder (bends the hand); 10 - direct muscle of the abdomen (flexes the trunk forward and lowers the chest); 11 - the outer oblique muscles of the abdomen (tilts forward and turns towards the body); 12 - Medium wide muscle (involved in the expansion of the legs); 13 - triglyceride muscle of the calf (flexes the ankle joint, lowers the front and raises the back of the foot); 14 - shoulder muscle (moves the shoulder forward, extends the arm in the elbow joint); 15 - the wide muscle of the back; 16 - serrated muscle (breathing movements); 17 - the muscle which flexes the leg in the knee joint and turns the it into the middle; 18 - four-head muscle of the thigh; 19 - the outer wide muscle (involved in the movement of the legs apart); 20 - tendons of the quadriceps of the thigh; 21 - anterior tibia (extends the foot).

b – back group: 22 and 23 – extensor or forearms; 24 - trapezius muscle (draws the shoulder blade to the spine); 25 - the widest muscle of the back (turns the hand in the middle and draws it back); 26 - external oblique muscle of the abdomen; 27 - large sphincter muscle (turns the thigh outwards); 28 - half-tangential and semi-articular muscle (leading to thigh); 29 - double-head muscle of the thigh; 30 muscles of the calves; 31 - the neck muscle (takes part in the movements of the head); 32 - deltoid muscle; 33 – shoulder muscles; 34-Achilles tendon.

The metered mechanical stimulation of the human body (Fig. 3.3), which is applied by the hands of a masseur or with the help of special apparatus, causes local and general neuro-humoral changes in the body due to reflex reactions and the emission of biologically active substances. Three main mechanisms in the complex massage on the human body are distinguished: neuro-reflexive, humoral and mechanical.

Neuro-reflexive mechanism of action of massage consists of mechanical irritation of various receptors, localized in the skin (external receptors), tendons, ligaments, fascia, muscles (proprioceptors), vessels (angio-receptors), internal organs (internal receptors). The flow of impulses from the excited receptors passes to different parts of the central nervous system (CNS), and cause the functional reactions of systems and internal organs of the body by the type of motor-visceral reflexes. Massage intensity can be reduced or increased, depending on the purpose and method of massage, the course of the disease, the initial level of functional state of the nervous system which contributes to the formation of adaptive reactions.

The humoral mechanism of action of massage is due to the emission of biologically active substances, which are formed in the skin under direct mechanical and thermal action of massage - histamine, acetylcholine, products of the decomposition of protein (amino acids and polypeptides) into the blood. It is very important that they do not accumulate only in the area of massage, but with the flow of the blood and lymph spread throughout the body. Biologically active substances expand blood vessels and increase their permeability, improve blood supply and metabolic processes, transfer nervous impulses to the muscles, stimulating their activity.

Mechanical action of massage consists in displacement and stretching of tissues, removal of extraneous superficial skin cells, increase of temperature of the mass of the body part; the appearance of biologically active products, the disclosure and expansion of the lumen of the capillaries; extrusion, pushing and further promoting of tissue fluid, blood and lymph; intensification of blood and lymph circulation. All this contributes to the elimination of the edema, increasing the mobility of tissues and joints, and restoring their functions.

3.2.2. Influence of massage on separate systems of an organism

Influence of massage on the nervous system. Massage operates in a variety of ways, both peripheral and central nervous system. Irritation of various receptors is transmitted to the nerve centers, changing, depending on the nature of the massage, the level of excitation and the rate of flow of nervous processes. Stroke movements remove increased excitability of the central nervous system, soothes fluttering. Massage stimulates the functional capacity of the CNS, strengthens its regulatory and coordinating function, stimulates regenerative processes, restores the function of the peripheral nerves, preventing vascular and trophic disorders, in general, it acts as a painkiller. Together with gymnastic exercises, it accelerates the formation of motional conditioned reflexes. Massage has a toning up effect on the body, raises the mood and health of the patient.

Influence of massage on the skin. The effect of massage is not limited to cleaning the skin from peeled cells of the epidermis, dust, microbes, improving the function of sebaceous and sweat glands. It enhances blood supply and circulation of the skin, stimulates lymph circulation, metabolic processes and activates skin respiration and skin muscle tone. As a result, the skin becomes more elastic, dense, what affects positively its resistance to the effects of adverse factors. Positive changes in the body start with the massage of the skin. It changes reflexively the functional state of organs and systems. The type of therapeutic massage depends on the nature of the disease or injury, the general condition of the patient.

Influence of massage on the muscular system. The action of massage on the muscular system lies in the increase the strength, contractile ability, the velocity of the restorative processes in muscles, normalization of their tone, resorption of hemorrhages and edema, acceleration of the processes of regeneration; restoration of elasticity of muscles. The basis of these changes happen due to stimulation of receptors, improvement of blood circulation and oxidation-reduction processes

in the muscles because of the greater inflow of oxygen to them and the removal of metabolic products, local and general reflex reactions.

Influence of massage on the joints. The massage contributes to improving the elasticity and strength of the ligaments and tendons, mobility in the joints. By improving blood supply to the joints and surrounding tissues, the massage stimulates the formation and circulation of synovial fluid, preventing swelling and wrinkling of the articular bags, changes and damage to the cartilages. All these processes accelerate resorption of hemorrhages and effusions, help to eliminate the pathological products and restore the function of a joint.

Influence of massage on the circulatory and lymphatic system. The effect of massage is manifested, first of all, in the expansion and increase in the number of functioning capillaries. The number of open capillaries in 1 mm^2 cross-sectional muscle increases 45 times, and their total capacity is 140 times higher. The speed of blood accelerates, venous blood circulation improves, peripheral resistance decreases. In parallel, there is an increase in the amount of lymph outflow from the massaging area, thus movement in the vessels is accelerated and the lymph flow increases 6-8 times. All this contributes to the elimination of edema, stagnant phenomena, improvement of blood and lymph circulation, not only in a certain place of the body, but also in tissues and organs remote from the site of massage. Due to the neuro-reflex and humoral ways of hemodynamic regulation, the blood supply to the heart increases, its contractile function is activated, the number of stagnant phenomena in the large and small circles of the blood decreases, the delivery of oxygen to the cells and absorption by tissues improves, the oxidation-reduction processes are stimulated.

Influence of massage on the respiratory system. The effect of the massage is associated with local action on the respiratory muscles and general reflex effects, which reduce or increase the frequency of breathing, its depth, improve pulmonary ventilation and gas exchange. Massage intensifies blood circulation in a small circle, promotes the elimination of congestive products in the lungs and in connection with the general increase in blood flow, improves the delivery of gases by the blood.

Influence of massage on metabolism. The massage intensifies the delivery of nutrients and oxygen to the tissues and the elimination of products of decomposition and carbon dioxide. Activation of oxidative-reducing and metabolic processes, lead to more effective extraction of mineral salts with sweat, and nitrogenous organic substances with urine. Massage promotes rapid removal of lactic acid from the body after exercises. By improving metabolic processes in the tissues, a massage accelerates the disintegration of inflammation products and stimulates regenerative processes, tissue growth, including bone.

Thus, massage acts on various systems and organs of a sick person and, importantly, - purposefully changes their functional state, contributing to the restoration of normal activity of the organism. Therefore, massage, as an effective method of functional therapy, is used in various diseases and injuries in the hospital and post-hospital periods of rehabilitation of patients, both adults and children.

Contraindications to the use of therapeutic massage are, in general, the same as for exercise therapy, but there are some additional precautions: diseases of the skin and its damage, allergic rash, inflammation of the lymphatic vessels, purulent processes, sexually transmitted diseases. Do not The massage of an abdomen is contraindicated in case of hernia, the presence of stones in the bile and urinary bladders, during periods of menstruation and pregnancy.

3.2.3. Forms and methods of therapeutic massage

Therapeutic massage is performed in the form of general and local massage by hands (manual) or with the help of special appliances, or combined, that is, using the first and second methods.

The massage could be performed by a specialist or, as well, in the form of self-massage.

Manual massage is the main method because it can be used in simple conditions, in the hospital and at home, in the early stages of treatment, and, what is very important, the masseur is able to control the patient's response to various types of massages. Therapeutic massage technique

is applied differentiated, what increases its efficiency. Manual therapeutic massage can be segment-reflex and point.

Segmental-reflex massage is a massage of certain areas of the body, through which you can influence the internal organs. Its action is based on the anatomical-physiological segmentation of the body, where the same segments of the spinal cord innervate the areas of the skin and certain internal organs (Table 3.5, according to O. Glezer and AV Dalicho, 1965).

Table 3.5. Segmental innervation of the internal organs

Human body	Segments* spinal cord	
Heart, the ascending part of the aorta	C_{3-4}	D_{1-8}
Lungs and bronchi	C_{3-4}	D_{3-9}
Stomach	C_{3-4}	D_{5-9}
Guts	C_{3-4}	$D_9 – L_1$
Rectum	D_{11-12}	L_{1-2}
Liver, gall bladder	C_{3-4}	D_{6-10}
Pancreas	C_{3-4}	D_{7-9}
Spleen	C_{3-4}	D_{8-10}
Kidneys, ureter	C_1	D_{10-11}
Bladder	D_{11}	$L_3 – S_{2-4}$
Prostate gland	D_{10-11}	$L_5 – S_{1-3}$
Uterus	D_{10}	L_3
Ovary	D_{12}	L_3

* C - cervical, D / Th / - chest, L – lumbar, S - sacral spinal segments

In diseases of the internal organs in the acute stage or in the period of exacerbation of the disease, the pathological process involves reflexively the skin, muscles and other tissues that are inverted by the general segments of the spinal cord. In these superficial areas of the body, which are called zones Zahar "in-Geda in honor of scientists who first described such phenomena, increases the sensitivity of the skin (hyperesthesia), pain (hypersalgesia) arises. Applying different massage techniques in the appropriate zones, it is possible to reduce these manifestations and cause changes in the function of the internal organs, the motor apparatus, trophic and metabolic processes.This is very important in the clinic of internal diseases, in the early stages after the trauma when it is impossible to directly massage the diseased organ or damaged t anyn as the classical massage.

The greatest reaction on the organs and tissues is caused by massage of skin areas, which are especially rich in vegetative innervation with broad interconnections. These areas include cervical and occipital and the upper part of the throat and lumbar-sacral regions. The back surface of the neck, shoulder, the upper part of the breast formed, so called, the collar zone. The entire skin zone is connected with the cervical and upper chest segments of the spinal cord (C_4 - B_2) and the cervical formations of the autonomic nervous system, which play an important role in the innervation of the brain, heart, lungs and other organs, as well as tissues of the head, neck, upper chest, back and upper extremities. That is why, the massage or physiotherapeutic influence in the collar zone are able to lower blood pressure in patients with hypertension, take off a headache, are helpful in neurosis, fatigue, etc.

The lumbar sacral region covers the lumbar region, the buttocks, the lower abdomen and the upper third of the front of the thighs. This entire skin zone is closely related to the lower limb (D_0 – D_{12}), lumbar and sacral segments of the spinal cord and the lumbar formation of the autonomic nervous system. The massage of the skin in this area causes functional shifts in organs and tissues of small pelvis, intestines and in lower limbs.

All basic techniques of classical massage (stroking, rubbing, kneading and vibration) are used in the segmental-reflex massage. Auxiliary techniques (hatching, sawing, crossing, rubbing, squeezing and stretching of the chest, pelvis, etc.) are also recommended. In addition to the generally accepted directions

of massage movements, segmental-reflex massages allows to perform motion-specific techniques that are determined by the functional structure of the segments and neuro-reflex bundles of spinal cord. The massage of the reflexo-genic regions of the back is carried out in the direction from the lower to the upper spinal segments.

Point massage: ─ it is massaging narrowly defined "point" areas. He is subject to biologically active points ("points of action"), which are topographic correspond to the projection of nerve trunks and vascular-nerve bundles, passing in tissues. They differ from the surrounding tissues with greater temperature and electrical conductivity, and their location is determined by the portable apparatus of a toboscope. The main techniques are rubbing, pressure, vibration, drilling, which are performed with one or more fingers or a vibrating device. A set of points for massage is determined by their functional purpose, the symptoms of the disease and therapeutic tasks in each particular case. Duration of action for each point from 1-1,5 to 2,5-3 min. Spot massage selectively acts on internal organs, reflexively changing their functions. This type of massage is used as a method of reflex rehabilitation for spastic paralysis of different origins.

A kind of hand massage is an ice massage (cryomassage). Under the influence of cold blood vessels decrease, blood flow slows down, vascular insensiveness decreases, edema decreases, excitability of nerve endings and pain of tissues decreases. Cryomassage is used for sores, stretching, some diseases of the musculoskeletal system and the nervous system. It is carried out using a cellophane bag filled with ice, which is carried out by circular or zigzag-shaped rubbing. The duration of cryomassage is no more than 5 minutes.

Hardware massage is carried out by special apparatuses by direct contact with the skin or through air or water media. Its main types are vibrating, vacuum (pneumatic) and hydromassage. Vibrating massage transmits directly to the body a mechanical vibration that acts on the skin, muscles and other tissues using various forms of massage tips (vibrate). There are devices for shaking the entire body (vibration chair, bed, cycling, etc.) and for local vibratory action (car massager Tonus, Babi apparatus, Vibromassage, etc.).

Vibrating massage causes general and local changes in the tissues and functions of the body, improves metabolism, the activity of the neuromuscular apparatus; performs an anesthetic effect, increases efficiency and recovery after physical activity.

It is shown in diseases and injuries of the peripheral part of the nervous system; some chronic diseases of the lungs, gastrointestinal tract, and others. Duration of vibration massage from 3 to 15 min.

Vacuum (pneumatic) massage operates due to the rhythmic alternation of elevated and reduced air pressure through a special device that is applied to the body surface. Due to the suction action, local blood circulation improves, the blood flow is accelerated, tissue trophy rises. The combination of rhythms of pulses of pressure on tissue with the rhythm of heart contraction stimulates the contractile function of peripheral vessels, which is used in syncardial vacuum massage. With the help of the device Kulazhenko masses gums, baroque chambers Kravchenko treated vascular and other diseases of the limbs. The principle of operation of the latter is based on the alternation of the difference in barometric pressure: compression (up to 850 mm Hg) and decompression (up to 500mm Hg).

When using machines that can simultaneously influence the body with vibration and vacuum, indications for such a vibratory-vacuum massage are expanding. It is prescribed for injuries and diseases of the musculoskeletal system for the elimination of pain, resorption of hemorrhage, removal of tongue in the joints and edema of tissues, for the treatment of injuries and diseases of the peripheral ICSI.

In the segmental-reflex massage all the basic techniques of classical massage are used - stroking, rubbing, kneading and vibration. Auxiliary techniques such as hatching, sawing, crossing, rubbing, squeezing and stretching of the chest, pushing, shivering of the chest, pelvis, etc. are used more widely and varied. In addition to the generally accepted directions of massage movements, segmental-reflex massages perform specific motion-specific techniques that are determined by the functional structure of the spinal cord segment and its neuro-reflex bundles. The massage of the reflexogenic regions of the back is carried out in the direction from the lower spinal segments to the above located.

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Hydro massage or water massage is based on the combined use of mechanical, thermal, chemical action of water and massaging manipulations with hands or apparatus.

There are underwater shower massage, water jet shower massage, underwater vibrating massage:

- *underwater shower-massage; carried out in a bath with a water temperature of 34-37°C with a water jet pressure of 2-3 atm with the use of basic techniques. The exhausting power of water minimizes tension, and the heat of the water provides relaxation of the muscles. It enhances the blood supply to the skin and deep tissues and hemodynamics in general; activates metabolism and trophic processes; promotes resorption of hemorrhages, edema and effusion in the joints; increases mobility in the joints of the extremities and the spine; Helps to lengthen contractures, scars and adhesions. The duration of the procedure does not exceed 10-15 minutes. A variety of this underwater massage is swirling and pneumatic massage under water;*

- *the water-massage shower-massage is carried out by a jet of water or several jets simultaneously in the air. To the named kind of hydromassage belong to showers Sharko - massage with a water jet pressure from 1,5 to 3 atm at a distance of 3-4 m; Scottish shower - alternating effect of jets of hot and cold water; circular or circular shower, rain and needle shower; cascading shower - a drop in water mass from a height of 2.5 m. This group of hydroprocesses depending on the temperature and force of the water jet, the duration of the procedure acts soothing or tonic. They are shown in functional disorders of the central nervous system and to raise the overall tone of the body. The duration of the procedure is 1-3 minutes. To the last group of hydromassage can be attributed fluid duplex (hydrunkunk) - stimulation of acupuncture points with a stream of water with the help of a special device, which provides a discontinuous jet of water under the pressure of 1.86 atm. Duration of the procedure is 2 minutes. It is believed that this method is more physiological than pricking with needles during acupuncture and therefore it is recommended for the treatment of chronic injuries, diseases of the musculoskeletal system, the restoration of sports performance, the removal of fatigue after training sessions;*
- *underwater vibrating massage: - carried out using the apparatus "Wave", which forms vibration waves, which accurately dumped by pressure and frequency of oscillations. It takes precedence over other vibration devices because water fluctuations are more adequate stimuli than mechanical vibrations, and water waves simultaneously cover large areas of the body. Duration of procedure is 8-15 min.*

Massage can also be carried out in water by manual method, and its therapeutic effect will be provided by the total effect of massage and water properties, especially when it is added to special impurities. Massage in the bathroom can be brushed, causing severe hyperemia of the skin and acts on the body in general stimulating. Duration of massage is 10-15 minutes. At home, it is carried out in the form of self-massage.

The course of therapeutic massage consists of 8-I 0 to 16-20 procedures, depending on the nature of the disease or injury, the period of treatment and the type of massage. If necessary, it can be repeated with a break between courses from 10 days to several months. The course of massage is divided into 3 periods: introductory, main and final. The first consists of 1-3 procedures, which are spontaneous. During the introductory period, the masseur meets and adapts to the features of the massaging area, it turns out the portability of individual receptions, the body's response to the massage. In the main period, the intensity of the massage increases and the differentiated massage technique is used, which corresponds to the nature and clinical course of the disease or injury; Attention is drawn to functional changes in the body and areas that are massaged. In the final period of 2-3 procedures before the end of the course, the intensity of the massage is reduced, the duration of procedures decreases, patients are taught to receive self-massage, if there is evidence for this. The procedure of massage itself is carried out according to the principles of the practice of medical gymnastics. It consists of the introductory, main and final parts, in which the intensity of the massage gradually increases to the main part and decreases in the final. Massage treatments are carried out every day or every other day. The duration of their individual, which depends, in addition to general and clinical parameters, on the features of the massaged area, and the number of prescribed massages. For one conditional unit take a direct massage for 10 minutes. Estimated time standards in these units for performing massage procedures are given in Table. 3.6.

Table 3.6. Estimated time limits for performing massage procedures

№/№	Name of the massage procedure	Conventional massage units
1.	Head massage (frontal-temporal and occipital parietal area)	1,0
2.	Massage of the face (frontal, occlusive upper and lower limb)	1,0
3.	Neck massage	1,0
4.	Massage of the collar area (the back surface of the neck, back to the level IV of the thoracic vertebra, the anterior surface of the chest to n rib)	1,5
5.	Massage of the upper limb	1,5
6.	Massage of the upper limb, shoulder and shoulder area	2,0
7.	Massage of the shoulder joint (upper third of the shoulder, shoulder joint and shoulder arms of the same name)	1,0
8.	Massage of the elbow joint (the upper third of the forearm, the areas of the elbow joint and the lower third of the shoulder)	1,0
9.	Massage of the wired joint (proximal brush, articular and articular areas and forearm)	1,0
10.	Massage of the hand and forearm	1,0
11.	Massage of the chest area (the anterior surface of the chest from the anterior margin of the shoulder to the edge arches in the back of the vii cervical to the lumbar vertebra)	2,5
12.	Back massage (from the vii cervical to the lumbar vertebra and from the left to the right middle axial line in children, including the lumbar sacral region)	1,5
13.	Massage muscles of the anterior abdominal wall	1,0
14.	Massage of the lumbar sacral region (from the lumbar vertebra to the lower spine folds)	1,0
15.	Segmental massage of the lumbar sacral region	1,0
16.	Massage of the back and lumbar (from the vii cervical vertebra to the sacrum, from the left to the right middle axillary line)	1,5
17.	Massage of the cervical and thoracic spine (areas of the back of the neck and back areas to the lumbar vertebra from the left to the right axial axial line)	2,0
18.	Segmental massage of the cervical and thoracic spine	2,0
19.	Massage of the spine area (areas of the posterior surface of the neck, back and lumbar sacral area from left to right axial axial line)	3,0
20.	Massage of the lower limb and lower back (legs, legs, hips, buttocks and lumbar sacral area)	2,5
21.	Massage of the lower extremity	2,0
22.	Massage of the hip joint (upper third of the thigh, hip joint and buttocks of the same name)	1,5
23.	Massage of the knee joint (upper third of the leg, knee joints and lower third of the thigh)	1,0
24.	Massage of the ankle joint (proximal foot, ankle joint and lower third of the shin)	1,0
25.	Foot and leg massage	1,0
26.	General massage (for children of infant and younger preschool age)	1,0

During medical massage, a prerequisite and a mandatory rule is the massive massage along the lymphatic vessels to the closest of their nodes and maximal relaxation of the muscles. In order not to counteract or restrict the progression of lymph in vessels, massaging movements should be

made on their course. The directions of massaging the body, which are determined by these same requirements, are shown in the same figure below.

To relax the muscles, the limbs bend at a certain angle, which is called the average physiological position or the position of physiological rest. So, lying on the back or sitting at the massage table with an average physiological position for the hands is the removal of the shoulder from the body at 45°C, bending of the forearm in the elbow joint at an angle of 110°C and the brush in the radial joint in the palm- Rear direction at an angle of 9°C somewhat earmarked at an angle of 15°C, fingers half curved.

The average physiological position for the muscles of the lower limb is slightly curved (35°C) in the hip joint and is set at 35°C in the thigh and bent at an angle of 145°C to the knee. The optimum position that provides relaxation of the muscles of the back is beyond the abdomen with elongated along the trunk and somewhat turned inside hands with the palms up. Relaxation of the muscles of the chest and abdomen is achieved in the position lying on the back, the leg is bent in the knees and slightly diluted. Body massage and lower limbs are usually carried out on massage tables (couches) of various designs, Massage of hands - on massage tables. For massage, the shoulder, neck and head are used chairs with brackets to support the head, which provides relaxation of the muscles of these areas of the body.

No less important condition for the proper performance of the massage is not only the relaxation of the muscles and the position of the body part of the massaging, but also conveniently selected outside the masseur. It counteracts the rapid tiredness of it, increasing the quality of the massage and the effectiveness of treatment. The provisions of a masseur and a patient during massaging of various parts of his body are given in Table 3.7., according to VI Dubrovsky, 1995.

Table 3.7. The position of the patient and masseur during the massage

Massage body area	The position of the patient's body	Masseur position	Methodical instructions
During the massage of the upper limbs and shoulder girdle			
Fingers, brush and ray waist	Sitting, forearms and brush are lying on the massage table	Sitting to the patient	Massage with one hand, and the second fix a brush or massage with two hands
	Sitting, forearms and a brush lie on the throat of a masseur	Sitting on the side of the massage brush	Massage with one or two hands
	Lying on the back, hands along the trunk are slightly curved in the elbow joints	Sitting on the side of the hand that is massaging	The same
Forearm (flexor muscles)	Sitting, the forearm lies at the massage table in the position of supination	Sitting on the side of the hand that is massaging	The same
	Lying, hands along the trunk in the position of supination	The same	The same
	Sitting, the forearm is on the throat of a masseur	The same	The same
Forearms (extensors)	Sitting, forearm lying on the massage table, the limb slightly curved in the elbow, in the position of supination	The same	The same
	Sitting, the forearm is on the throat of a masseur	Sitting next to a massaging hand	Massage with one hand, and the second fix the hand of the hand that is massaged
	Lying, hands along the trunk in the position of the nation	Sitting on the side of the massaging hands	Massage with one or two hands
Elbow joint	Sitting, the arm is lying on the massage table, slightly curved in the elbow joint	Sitting or standing sideways from the patient	The same

Massage body area	The position of the patient's body	Masseur position	Methodical instructions
	Sitting, the forearm lies on the patient's thigh	Sitting on the front of the lining is on the patient's thigh	The same
	Lying down, the hand along the trunk in the position of the promontory during the massage of the outer surface of the joint (or spinitis during the massage of the inner surface of the joint)	Sitting on the side of the hand that is massaging	The same
Shoulder and forearm	Sitting, the arm is bent in the elbow and loosely lying on the massage table	Sitting sideways and behind the patient	Massage with two hands
	Lying on the back or abdomen, the arm is slightly curved in the elbow joint	Sitting on the side of the massaging area	The same
Shoulder joint	Sitting, the arm is bent in the elbow joint and lies on the massage table or on the patient's thigh	Sitting or standing behind and to the side of the massaging area	Massage with one or two hands
	Lying on your back or stomach	Sitting on the side of the massaging joint	The same
During the massage of the nerve trunks of the upper limb			
Elbow nerve	Sitting, the arm lying on the massage table in the position of supination	Sitting in front of his arm	Massage with one hand and fix the second with a brush
Radiation Nerve	Sitting, the arm lying on the massage table in the position of supination	The same	The same
Middle nerve	Sitting, the arm lays on the massage table at the position of supination	The same	The same
During the massage of the lower extremities			
Fingers, stop	Lying on the back, under the knee joint lined roller	Sitting in front of the stop	Massage one hand with your fingers, and the second fix the foot. With two hands, massage the feet
Hip joint	The same	Same and side of the patient	Massage with one hand or two hands
Front of the leg muscles	Lying on the back, under the knee joint lined roller	Sitting on the side of the massaging limb	The same
	Lying on the back, the leg is bent in the knee joint	The same	Massage with one hand, and another fix for the knee
Back side of the group of leg muscles and heel tendons	Lying on the abdomen, under the rear of the foot is a roller	Sitting or standing on the side of the massaging limb And behind the foot during the massage of the hemic tendon	Massage with one or two hands
Knee joint	Lying on the back, the leg is bent in the knee joint	Standing from the side of the massaging limb	Massage alternately right, and then left hand. One at a time fix the knee joint
	Sitting, the leg is bent in the knee joint, the foot rests in the stand or the floor	Squats with a stomp knee in the floor, under the knee to put a pad	Massage with two hands
Knee joint	Lying on the back, under the knee joint lined roller	Sitting or standing on the side of the massaging joint	Massage with one or two hands
	Sitting, leg bent in knee joint	Squat with emphasis on the right (left) knee	The same

Massage body area	The position of the patient's body	Masseur position	Methodical instructions
Front muscle group	Lying on the back, under the knee joint lined roller	Sitting or standing from the side of the limb that is massaging	The same
	Sitting, the leg is somewhat outward	Standing or squatting with the emphasis on the right (left) knee on the floor	The same
Medial group of hip muscles	Lying on the back, under the knee is a lined roll, the thigh slightly deployed outside	Sitting or standing on the side of the massaging limb	The same
	Sitting, the leg is somewhat outward	Sitting or squatting with a knee-bend on the floor	The same
Back side of the group of hip muscles and gluteus muscles	Lying on the abdomen, under the ankle joint is lined roller	Sitting or standing on the side of the limb, which is massaged	The same
Lumbar area	Lying on the abdomen, hands along the trunk or bent in the elbow joints, the brush touches the forehead; under the shin to the bottom of the joints, lined roller	Standing or sitting on the left or right side	The same
Hip joint	Lying on the abdomen or side	Standing or sitting on the side of the massaging joint	Massage with one hand
	Sitting on a chair, the leg is bent in the knee joint	Sitting or sitting with a focus on the knee	Massage with one hand, and another fix a knee
ibial nerve	Lying on the stomach, under the tight leg joint is lined roller	Sitting or standing on the side of the massaging area	Massage with one hand
Sciatic nerve	Lying on the abdomen, under the ankle joint is lined roller	The same	Massage with one or two hands
During a massage of the face, head, neck, back, chest and abdomen			
Face	Sitting on a chair, his back rests in the chest of a masseur	Standing behind the patient	Massage with two hands
Head	Sitting, head slightly tilted back	Standing, behind and on the side of the patient	Massage with one or two hands
Neck and trapezoid are similar muscles	Lying on the abdomen, hands along the trunk or bent and put under the forehead	Standing, sideways from the patient	The same
	Sitting, arms bent and lie on the massage table	Standing behind the patient	The same
The widest and longest back muscles, the subcutaneous area	Lying on the abdomen, arms along the trunk, under the ankle joint, throbbing roller	Sitting to the left or right of the patient	The same
	During the massage of the subcutaneous area, the arm is laid behind the back	The same	Massage with one hand, and the other fix the shoulder
Between the ribs of muscles	Lying on the stomach	Standing, sideways from the patient	Massage with one or two hands
	Lying on the back	The same	The same
Pectoral muscles	The same	The same	The same
	Sitting, arms bent in elbow joints and lie on their knees	Standing to the left or right of the patient	Massage with one hand

Massage body area	The position of the patient's body	Masseur position	Methodical instructions
Abdominal muscles	Lying on the back, legs bent	Sitting or standing	Massage with one or two hands

3.3. Physiotherapy

Physiotherapy, translated from Greek means treating natural forces, is widely used in the complex of physical rehabilitation facilities for the treatment of various diseases and for preventive purposes. Distinguish natural physical therapeutic factors - the sun, air, climate, water (fresh, marine, mineral), medical mud (peloids) and preformed (artificial), which are obtained using special apparatus by transforming mainly electrical energyand various forms and forms.

3.3.1. Mechanisms of curative action of physical factors

Radiation, temperature, electrical, mechanical, chemical and other types of energy act on the body through the skin, respiratory tract, mucous membranes, irritating in them numerous receptors.

The cell's energy absorbed by the stimulus changes their physico-chemical status, intracellular exchange, energy potential and penetration of cellular and intracellular structures, and gives rise to interrelated neuro-reflex and humoral mechanisms of action on the body. In addition, this action exists not only during the direct influence of the physical factor, but also after its termination within a few minutes, hours of the day, and sometimes even more.

Physical therapeutic factors, as well as other means of physical rehabilitation, cause a polysystem reaction in the body. They affect blood and lymph circulation, vascular tone, microcirculation processes, enzyme activity and metabolism, immunity, CNS and internal organs, musculoskeletal system. Some physical factors whose energy during transformation into tissues is transformed into heat, in addition to vascular reactions, the disclosure of nonfunctional capillaries, the acceleration of blood circulation, the improvement of the delivery of oxygen to tissues, stimulate the processes of thermoregulation, strain the body, act anti-spastic, and painkiller. They increase the body's defenses, its resistance to the effects of adverse environmental factors, relieve fatigue, accelerate recovery, can act on the body as calming and exciting. All of this positively affects the psyche of the patient, giving him confidence in recovery.

Physical therapeutic factors contribute to the resorption of edema, hemorrhage, infiltrates, scars, adhesions, stimulate reparative processes in bedsores and trophic ulcers, prevent and treat contracture; improve muscle tone; act anti-inflammatory, bactericidal. The essential property of physical factors is the ability of painless penetration through the skin or mucous membranes of drugs, chemical components, water, peloids, ozocerite and other substances.

Thus, physical therapeutic factors cause the local and general reaction of the organism, similar to the effects of other physical means of rehabilitation, but the ways of its formation are different. The starting mechanism for the development of these reactions is not the physical factor itself, but the products of its interaction with different tissues. It is proved that each of the physical factors has only its specific, selective effect on the tissue, which is determined by its physical properties and the ability of cell structures to absorb this or that form of energy. So, the energy of the UHF electric field is more strongly absorbed by tissues with dielectric properties (bone, fat, etc.), and microwaves - tissues with high water content and electrolytes (muscle, blood, lymph, etc.). Accordingly, the physician prescribes certain physiotherapeutic methods, determines the dose, duration, number of procedures and intervals between them, the sequence of application and the compatibility of procedures in the complex of therapeutic agents. The procedures are performed, preferably daily or every other day. The course of physiotherapy consists of an average of 12-15 procedures.

Physiotherapy may be contraindicated temporarily or permanently. The general contraindications to the use of physiotherapy include: malignant neoplasms, general difficult

condition of the patient, bleeding or suspicion, active format of tuberculosis, systemic diseases of the blood, acute and infectious diseases, organic diseases of the nervous system. In addition to the above, there are specific contraindications to the use of individual therapeutic methods, as well as individual adverse physical factors. In the following, in order to avoid repetition, only specific contraindications for a particular physical method of treatment will be given, not mentioning the general ones.

3.3.2. Classification of therapeutic physical factors

Modern physiotherapy in its arsenal has about 80 therapeutic methods. Depending on physical properties and biological actions, there are 10 groups of artificially obtained and natural medical factors (Table 3.8.).

Table 3.8. Classification of therapeutic physical factors

№ groups	Therapeutic facts	Methods and means of application factors
I	Electric currents of low voltage	galvanization, drug electrophoresis, electrostimulation, diadynamic therapy, amplipulse therapy, electrosleep
II	Electric currents of high voltage	darsonvalization
III	Electrical and magnetic fields	inductothermy, UHF therapy, microwave therapy, magnetotherapy
IV	Light	infrared, visible, ultraviolet and monochromatic radiation infrasound, ultrasound
V	Mechanical fluctuations	electro-aerosols
VI	Artificial air environment	aeroions, hydro aeroions, aerosols, electro-aerosols
VII	Variable air pressure	barotherapy
VIII	Radioactive factors	radon water, alpha-applicators
IX	Water-treatment factors	hydrotherapy, balneotherapy
X	Therapeutic factors	peloids, clay, sand, paraffin, ozokerite

3.3.3. Characteristics of therapeutic physical factors

I group. Electric currents of low voltage. This group includes galvanization and medicated electrophoresis, impulse currents of the constant and alternating direction.

Galvanisation is the treatment of a constant current of low voltage and low power. It causes the directed movement of positively and negatively charged ions in tissues and fluids between two electrodes applied to the patient's body. It changes the physical and chemical properties of cells, increases their permeability, local blood and lymph circulation, tissue absorption capacity, stimulates metabolic and trophic processes, secretory function of the glands, acts as a painkiller.

Medicinal electrophoresis - drug administration through the skin through galvanization. If a solution of drugs is placed under the electrode, they penetrate the thickness of the skin and create a depot, from which the drugs will slowly, gradually be carried by lymph and blood. With this method you can enter antibiotics, enzymes, vitamins, vaccines, etc. With a medicated electrophoresis, the effect of the direct current and the therapeutic substance is combined.

Indications for electroplating and medicated electrophoresis: injuries and diseases of the peripheral nervous system, neurosis; diseases of the gastrointestinal tract with impaired motor and secretory functions; hypertonic illness (stages I and II), etc.

Contraindications: acute purulent inflammatory diseases, hypertonic illness of stage III, circulatory failure, II-A degree, damage and skin diseases in the places where electrodes are applied and if the patient does not tolerate any drugs.

Impulse currents of low voltage and low frequency act on the body in the form of individual pulses of impulses of various forms, duration and frequency, which pass through the skin and penetrate deeply into the tissue. They greatly irritate the neuromuscular apparatus, causing muscle contractions, exhibit anti-spastic, analgesic, ganglion blocking and vasodilating effect, stimulate the trophic function of the autonomic nervous system. In this case, pulsed methods of electrotherapy act with minimal stress on the body, they can be directed to a specific organ or system. Each of them has a specific therapeutic effect. Here are some of them that are more often used in physical rehab.

Electrostimulation - a method of enhancing the activity of organs and systems of the body, in which an artificial electrospray irritates them instead of the natural nerve impulse and stimulates their activity. She was most widely used as a method of electro-gynatics of transversal muscle in order to maintain their contractile ability and strength; prevention of atrophy and restoration of muscle function, improvement of their functional status, including those of athletes.

Indications for use of electrostimulation: hypodynamia, muscular atrophy after injuries and diseases of the nervous system and musculoskeletal system, atony of smooth muscles of the internal organs. Contraindications', fractures to their consolidation, thrombophlebitis, spastic states of muscles, guts; suture nerve, vessels, tendons during the month after surgery, pregnancy.

Liadinamotherspiyya - a method of treatment with constant half-sinusoidal currents frequency of 50 and 100 Hz for 1 s. Apply ir'h both individually and in annual combinations. The main effect of diadynamic currents (Bernard currents) is anesthetious. Along with this, they increase the lability of the neuromuscular apparatus, operate anti-spasmodically, vasodilating, contributing to the improvement of lymph and blood circulation, metabolic processes, softening scar tissue, and accelerating regeneration.

Indications, to the use of diadynamic currents: pain syndrome and disorders of circulation and trophics, diseases of the peperipheral nervous system, joints and spine; fresh traumatic damage to soft tissues; treatment of muscle contracture and keloid scars, peripheral circulation disorders, dyskinesia of the stomach, biliary tract, intestine, and others.

Contraindications: the presence of purulent infection, hemorrhages, thrombophlebitis, renal and cholelithiasis.

Amplipulsotreatment - the use of variables sinusoidal modulated currents (CMC), whose high frequency (5000 Hz) is modulated by low frequency oscillations (from 10 to 150 Hz). Differing from low frequency currents, which excite acting on the neuromuscular and vascular systems, high frequency currents penetrate deeply into the tissue due to the small counteraction of their skin. They have anesthetic, anti-edema, anti-inflammatory properties, improve the functional state of the nervous and muscular apparatus. Combining frequency modulation, duration of the link of current and pause, receive four modes, each of which has its own peculiarities and benefits in action on the body.

Indications and contraindications to the use of amplipulsoterapii, basically, are similar to those having diadynamic currents. However, it is better tolerated by patients, because it does not cause skin irritation and unpleasant sensations under electrodes and other side effects, gives a small load on the cardiovascular system, which allows it to be widely used in the treatment of children.

The electrosleep is a state close to the physiological state that occurs under the action of the low frequency and low power constant pulse current on the brain. It causes protective braking in the cortex and subcutaneous stem structures of the brain, positively acting on the function of higher nervous activity; normalizes the work of internal organs and systems; improves state of health and mood, relieves nervous tension and fatigue, calms down; promotes the increase of neuro-psychological and physical ability to work. Therefore, the electrospin can be used in virtually all branches of medicine.

Contraindications: eye disease, skin on the face; acute period of myocardial infarction, cerebral stroke, hysteria.

Group II Electric currents of high voltage. It involves darsonvalization.

Darsonvalization - a method of treatment of variable high-frequency impulse current of high voltage and low power. Apply it mainly locally. The current, acting on receptors of the skin and mucous membranes, Intensively affects the autonomic nervous system, expands peripheral vessels, improves tissue trophism, reduces spasms of smooth muscle, sphincter; causes pain-causing, anti-inflammatory, antispastic effect

Indications for local darsonvalization: varicose veins of the legs of the legs and hemorrhoids, trophic ulcers, burns, frostbite, itching of the skin, hair loss, psoriasis, eczema, pain in the area of the heart, migraine.

Contraindications: bleeding, hysteria, state after a heart attack for six months.

Group III Electrical and magnetic fields. This group includes: a constant electric field of high voltage, a constant magnetic field of low frequency, an alternating magnetic field of high frequency, an alternating electric field of ultrahigh frequency, an electric field of ultrahigh frequency.

Inductothermia is an action on an organism of an alternating magnetic field of high frequency, resulting in induced (induced) vortex currents in the tissues whose energy is transferred to heat. It penetrates: to a depth of 5-8 cm and causes hyperemia; improves trophy, processes of resorption, regeneration and healing, thermoregulation; reduces excitability of the nervous system, muscle tone; operates analgesic, anti-inflammatory, anti-spastic for sphincter, intestine, bronchi, vessels, biliary tract.

Indications for inductothermia: subacute and chronic inflammatory diseases of the internal organs, joints, spine, genitourinary system, peripheral nervous system with pain syndrome; fresh fractures of the tubular bones; nose, throat and muscle hypertonia.

Contraindications: purulent processes, violations of thermal sensitivity, fever conditions, pulmonary tuberculosis, pregnancy.

UHF therapy is a method of treatment of an alternating electric field of ultrahigh frequency. It has a great penetrating ability and is absorbed, primarily, by subcutaneous tissue, nervous, bone, adipose tissue, tendons, bonds that have dielectric properties. Therefore, the UHF electric field causes the greatest thermal effect in these tissues, as compared with tissues that are conducting good electrical current. The action of this current, like all high-frequency currents used in electrotherapy, is not limited to heat formation but is accompanied by an oscillatory (oscillatory) effect due to changes in the oscillation of particles and tissue molecules. This non-thermal effect causes distinctive fichiko-chemical processes in the cellular and molecular structure of tissues , which change the excitability and conduction of nerve cells, the activity of exchange-restorative functions of tissues, etc.

UHF-Therapy Masses Chirazyp 'effect on inflammatory processes: reduces swelling and exudation, reduces the vital activity of bacteria and their toxic properties, increases the activity and intensity of phagocytosis, stimulates the function of the reticuloendothelial system, enhances the processes of the formation of a protective barrier from the elements of the connective tissue that separates the inflammatory A fire from healthy tissues. It acts anti-spastic on smooth muscles of the gastrointestinal tract, bronchi and bronchioles, enhances blood circulation, reduces arterial pressure.

Indications for UHF therapy: acute inflammation in organs and systems, purulent inflammatory diseases; injuries of the spinal cord and peripheral nerves; radiculitis, neuralgia, encephalitis, poliomyelitis, bronchitis, pneumonia, bronchial asthma, bronchoechatic disease, stomach ulcer and duodenal ulcer, cholecystitis, pancreatitis; myositis in the period of subacute and chronic course, obliterating endarteritis, etc. Contraindications: systemic blood diseases, hypotension, angina pectoris, aneurysm of the aorta, pregnancy.

Microwave therapy or microwave therapy is a method of treating an ultrahigh frequency electromagnetic field. Use centimeter microwaves (SMH) and decimeter microwaves (DMX). The first penetrate into the tissue to a depth of 5-6 cm, the second - to 7-9 cm.

Radiation provides a local effect of microwaves on a defined area of the body, which is a significant advantage over other methods of high-frequency treatment. Microwaves cause a thermal

and oscillatory effect, the intensity of which is greater in tissues of various physical factors: tissues and environments rich in water. An increase in temperature in the irradiated area of the body extends the vessels, improves microcirculation, activates oxidation-reduction processes, metabolism, stimulates regeneration. Microwave therapy has analgesic, anti-inflammatory, bacteriostatic effect, positively affects the synthesis of adrenal cortex hormones, the main processes of the central nervous system.

Indications for microwave therapy: degenerative-dystrophic diseases of the joints of the extremities and the spine, muscle ruptures, stretch ligaments, damage to meniscus, bursitis, exacerbation of chronic sinusitis, contracture; peripheral nerves; hypertonic disease of the I-II stage; obliterating vascular diseases, diseases of the intestines, liver, kidneys, prostate; acute purulent inflammation, osteomyelitis, postoperative infiltrates.

Contraindications: circulatory failure II-W degree, active tuberculosis, thyrotoxicosis, febrile condition, tissue edema, presence of metal objects (splinters, bullets) in the place of action, pregnancy.

Magnetotherapy is a method of treatment of alternating and constant magnetic field of low voltage. Magnetic field enhances the processes of braking in the brain, reduces chronic, but not acute pain, especially inflammatory; positively acts on neurovegetative processes of microcirculation, immunity, causes antihypertensive, anti-edema effect, stimulates regenerative processes, consolidation of bone tissue.

Indications for magnetotherapy: diseases of the peripheral nervous system and musculoskeletal system, traumas, hypertonic illness of the I-II stage, trophic ulcers and peptic ulcer of the stomach and duodenum, vascular diseases of the spinal cord, asthenic neuroses. Contraindications: hypotension, predisposition to hemorrhage, blood diseases, pregnancy.

IV group Light. This group includes light radiation in three main bands: infrared, visible, ultraviolet (Scheme 3.3.), monochromatic (coherent) radiation. Their source is the sun and artificial emitters. When the radiation energy is absorbed by tissues, it is converted into other types of energy, primarily thermal and chemical. Therefore distinguish thermal (caloric) and nonthermal (luminescent) sources of light radiation.

Infrared and visible rays have a thermal property and penetrate into the depths of tissues: the first of 3-5 cm, the second - a few millimeters.

Scheme 3.3.

Spectrum of electromagnetic oscillations used in phototherapy

<table>
<tr><td rowspan="2">Infra red radiation is 760-10 000 nm</td><td rowspan="2">Red</td><td rowspan="2">Orange</td><td rowspan="2">Yellow</td><td rowspan="2">Green</td><td rowspan="2">light-blue</td><td rowspan="2">Blue</td><td rowspan="2">Violet</td><td colspan="4">Ultra violet radiation is nm</td></tr>
<tr><td>Long</td><td>Medium</td><td>Short</td><td></td></tr>
<tr><td>760</td><td colspan="6">Visible radiation</td><td>400</td><td>320</td><td>280</td><td>180</td><td>100</td></tr>
</table>

The radiation source can be heated by a current of up to 500 °C with a metal wire thread, a filament lamp or a solute (3600 °C), a reflector of the Minin with a bulb of blue glass, a light-water bath. Irradiation causes the thermal effect and hyperemia of the skin, sweating; accelerates peripheral circulation, enzymatic processes, metabolism, resorption of infiltrates; increases phagocytosis, stimulates the processes of regeneration and repair. Visible light in different ways acts on the psycho-emotional state of man: green and yellow - balance the processes of excitation and inhibition, red-excites cortical activity, the blue inhibits neuro-psychic activity.

Indications for treatment with infra-red rays: subacute and chronic non-inflammatory inflammatory processes, burns and frostbites, poorly healing wounds and ulcers, contractions, adhesions, irrigation, pain syndromes (myositis, myalgia, neuralgia). Jaundice of newborns is treated with the help of blue light.

Contraindications: acute inflammatory purulent processes, active tuberculosis of the lungs, diseases of the brain and its membranes, pregnancy.

Ultraviolet rays short-, medium- and long-wave cause not thermal, but chemistry-physical reaction in tissues. They penetrate the surface layers of the skin and this property increases from shortwave to long-wave rays, respectively, from 0.1 to 1 mm. An artificial source of ultraviolet rays is luminescent devices: selective, which emit one type of wave (erythemal and bactericidal lamps) and integral generating the entire spectrum of waves (mercury-coffer lamps). Long-wave radiation activates metabolism, pigmentation, converts provitamin, contained in the skin into vitamin D, improves the absorption of phosphorus and calcium by bone tissue. Waves of shorter lengths have a clear bactericidal action and destroy not only bacteria but also some toxins: diphtheria, tetanus, dysenteric ultraviolet rays, increase blood and lymph circulation, trophic tissues, promote the regeneration of the epithelium and the formation of connective tissue, change the permeability of capillaries and cell membranes, form biologically active substances, affect the nervous and endocrine systems.

A characteristic manifestation of ultraviolet irradiation (UV) with the appearance of erythelt (reddening) of the skin, the intensity and duration of which will depend on the wavelength, dose, time, size and location of the irradiation area, age, general human condition, seasons. Ultraviolet erythema occurs after 2-8 hours. after mid-wave irradiation and corresponds to aseptic inflammation of the skin: it has clear borders, even color saturated-red color, accompanied by slight edema, pain, fever. The process reaches its maximum for the second day, after which it gradually decreases and on 7-9th day disappears, leaving behind itself the pigmentation of the skin - tan.

The formation of erythemal skin reaction is accompanied by complex biological processes: elimination or reduction of the increased sensitivity of the organism (desensibilization), increased activity of hormones and vitamins, increased phagocytic activity of cells, mobilization of protective functions of the skin. Therefore, local irradiation is used in the treatment in erythematous doses as in diseases of the internal organs, skin, nerves, musculoskeletal system, and in surgical diseases. Contraindicated this method in the case of predisposition to bleeding, hyperthyroidism, red lupus erythematosus, blood diseases, active pulmonary tuberculosis, Addison's disease. Ultraviolet irradiation is widely used in subtherimic doses, that is, those that do not cause skin edema. A general irradiation with gradually increasing subtherimic doses is carried out in order to maintain normal functioning of the body, correction of insufficiency, sun exposure, hardening, disinfection.

Indications for general ultraviolet irradiation in subtherimic doses: prophylaxis of solar insufficiency and hypo-or avitaminosis caused by it in children, pregnant and adult; increase of the general resistance of the organism to various infections, treatment of rickets; diseases of the lungs, gastrointestinal tract, metabolism, musculoskeletal system; general healing and hardening. Contraindications: an active form of tuberculosis of the lungs, kidneys, hyperthyroidism, dermatitis, smallpox, insufficiency of blood circulation of II-III degrees, hypertonic illness of stage III, diseases of the nervous system with depletion.

Heliotherapy - the use of solar radiation with therapeutic and prophylactic purpose. The sun radiates all of the above-described rays, reaching the earth in the following ratio: infrared and visible rays by about 99 percent and about 1 percent of the ultraviolet rays. The intensity of solar radiation is greatest during the highest standing of the sun above the horizon - at noon. The person has solar radiation that comes directly from the sun (direct radiation), from the heavenly slope (diffused radiation) and from the surface of various objects (reflected radiation). This means that the therapeutic or health effect of a nastup is not only when a person is in the sun , but also under a tent, in darkened places.

The energy of sunlight acts on a person in two ways: through the eyes and through the skin. The processes occurring in the body are the result of the total action of visible, infrared and ultraviolet rays. The local reaction is manifested in the consistent development of skin hyperemia

caused by heat rays and ultraviolet eritma. On the 4th and 5th day after the inflammation, the skin begins to blend, the epidermis thickens, and the tan is caused by the effect of the skin melanin pigmentation. This pigment has a protective function: melanin granules absorb visible and short infra-red rays, preventing overheating of deep tissues of the body.

At the same time, a significant number of biologically active substances (histamine, acetylcholine, etc.) are formed at the site of irradiation, many skin receptors are irritated, which are trigger mechanisms of complex humoral and reflex reactions. This leads to changes in metabolic processes, the activity of almost all systems of the body.

Especially sensitive to solar radiation is the nervous system. Under the influence of visible rays and afferent impulses from skin receptors, the CNS excitability increases, the tonus of the sympathetic department of the autonomic nervous system increases and the neurohumoral function of the pituitary-adrenal system, immunological reactivity of the organism.

However, excessive exposure to solar radiation will, on the contrary, lead to negative consequences: reduced immunity, exacerbation of chronic inflammatory processes, stimulation of tumors; cause some skin diseases, burns, sunshine. Therefore, heliotherapy is dosed and carried out in the form of general and local solar-air baths.

Solar-air baths are calibrated in calories and biodoses, or by the length of the procedure in minutes. The last method to forgive, but it can be used because it is based on the exact caloric method, according to which the initial therapeutic dose is equal to 5 calories per 1 cm2 or 210 kJ / m2. For most of Ukraine, the intensity of sunlight is almost 1 calorie per cm2 per minute. According to this initial time of total irradiation 5 minutes: 2 min.ZOSec. on the front and back of the body. Then add daily for 5 minutes and bring to an hour. The duration of the solar-air bath in children is initially 2-3 minutes, and in the future - for 2-3 minutes, larger, reaching 30-50 minutes.

With the advent of signs of overdose of sunlight in the form of general weakness, headache, palpitations, insomnia, loss of appetite, bright redness and pain in the skin, increase in body temperature, the solar-air baths are abolished.

Helium therapy is shown to all healthy people and, in the first place, to those who pray or live in conditions of prolonged absence of sunlight, as well as during most diseases. Contraindications: acute stage and period of exacerbation of the disease, exhaustion, bleeding, tumors, blood diseases, photodermatosis, thyrotoxicosis, organic lesions of the central nervous system.

Monochromatic (coherent) radiation. Its source is optical quantum generators or lasers. They differ from other types of artificial radiation by the fact that lasers have a constant wavelength (monochromaticity) and coincidence of frequency characteristics (coherence). These laser properties make it possible to get high-intensity radiation, enormous power of energy, and an exclusive beam of light. Low-energy helium-neon lasers are used in physiotherapy. Radiation enhances the processes of microcirculation, tissue metabolism, operates vascular expanding and has anti-ulcer and anti-inflammatory properties. It stimulates the processes of regeneration in bone fractures, nerve damage, skin, mucous membranes.

Indications for the use of laser radiation: pain syndrome in orthopedic diseases, diseases of the peripheral nervous system, fractures of the bones, ulcers and wounds that slowly heal, burns. Contraindications: general.

***V group Mechanical vibrations*: infrasound, ultrasound.** These sound waves are very low frequency (less than 16 Hz) - infrasound and too high frequency (more than 20,000 Hz) - ultrasound, which is the result of fluctuations in the elastic medium and not perceived by the human ear. Infrasound is used as a device for vibrating massage.

Ultrasound penetrates the tissue to a depth of 4-6 cm and is absorbed by them. The physiological action of ultrasound is based on the mechanical and thermal factors and on the changes that they cause. At the place of application, vessels expand, blood and lymph circulation improves, oxidation-reduction processes, edema reduces, regeneration accelerates, an anesthetic and anti-inflammatory effect occurs. Ultrasound increases the permeability of the skin, cellular and tissue membranes, and this property made it possible to introduce medicines using it - ultraphonophorez.

Indications for ultrasound treatment: degenerative-dystrophic and inflammatory diseases of the joints and the spine, injuries of the musculoskeletal system; diseases of the peripheral nervous system, scars and adhesions of superficial and deep tissues; chronic diseases of the lungs, peptic ulcer of the stomach and duodenum, dyskinesia of the intestines and biliary tract, and others. Contraindications: acute infectious diseases, pronounced neurosis and atherosclerosis, cerebrovascular accident, blood diseases and predisposition to bleeding, pregnancy.

VI Group. Artificial air environment. This group includes aeroions, hydroAeroions, aerosols and electro aerosols.

Aerosions are particles of atmospheric air molecules that carry a different electric charge: positive or negative. They are a permanent factor in the environment. Above the surface of the earth in each 1 cm3 of air they are about 1500, of which about 750 positive and 650 negative air ions. The person has favorable aero ions.

The source of aeroions is a short-wave part of ultraviolet and cosmic rays, lightning bursts, and radioactive soils of the soil. The number of aeroions and y'h ratio varies depending on the season and time, meteorological and geophysical factors, air purity. Especially they are many on the slopes of the mountains and in the valleys, near the waterfall, the seashore. Therefore, these areas are used for recreation and spa treatment. Hydroaeriony - arise during contact of aeroions with water molecules, resulting in negative ions in the air.

Artificial aerionotherapy devices are able to change the ratio and contraception of ions in the air in tens and hundreds of times compared with natural content. The source of ionization of air is a constant electric field of high voltage (franklinization), radioactive radiation, spray water. Hydro- and aeroionizers produce from 150 thousand to 5-6 million negative air ions in 1 cm3 of air.

Aerosions act on humans mainly through the airways and the skin. Irritating number of receptors of the skin, broncho-pulmonary apparatus, mucous membranes, they cause a complex neuro-reflex reaction. Under the influence of negative aeroions, the amount of absorbed oxygen and carbon dioxide is increased, the oxidation-reduction processes are activated, the rate of erythrocyte sedimentation decreases, the blood coagulates, the content of the form elements normalizes in it. The general condition is improved, appetite increases, sleep is deepened, elevated pressure decreases, physical and mental fatigue decreases, physical capacity increases.

Positive aeroions act on the body in the opposite direction and slow down the flow of oxidation-reducing processes in the tissues.

Indications for deoryonotherapy application: acute and chronic inflammation of the respiratory tract, bronchial asthma and hypertonic disease of the 1st and 2nd stage, functional disorders of the central nervous system, burns, trophic ulcers, wounds. Contraindications: severe form of bronchial asthma, emphysema, coronary insufficiency, active pulmonary tuberculosis, general exhaustion.

Aerosol (air solution) is a very small liquid or solid part dissolved in the air. In the form of aerosol in the body by inhalation, medicines, oils, infusions, decoctions can be administered. To improve the effectiveness of treatment with aerosols apply electro-aerosol therapy, in which the body additionally operates an electrical charge. Thus, the mechanism of action of aerosols and electro aerosols is reduced to three main factors: the pharmacological properties of drugs, electric charge and temperature of aerosols. They act on the mucous membranes of the nasopharynx and airways, increase the activity of the flashing epithelium, the level of oxyhemoglobin in the blood, the capacity of inhalation and exhalation; reduce high blood pressure; Irritate the interoreceptors of the bronchus of the opioid system, affecting reflexively on the organs and body systems. Indications for aerosol therapy: acute and chronic inflammatory diseases of the upper respiratory tract, bronchi and lungs, bronchospasm at bronchial asthma; hypertonic illness of the 1st and 2nd degree; occupational diseases of the bronchi and lungs, pulmonary tuberculosis, obesity, etc. In recent times, one more direction in aerosol therapy has been intensively developed - spelotherapy, that is, the method of treatment for prolonged stay in the microclimate of karst caves, salt mines and mines, characterized by saturation of sodium or potassium salts, constant temperature and pressure of air, gas and ionic composition, increased content and the advantage of

negative ions, the purity of the air and the lack of allergens. Such a natural place in Ukraine is in the Transcarpathia in Solotvyno, where there is a morphology clinic that uses salt mines to treat chronic bronchial asthma. This method of treatment is being carried out now and in general hospitals and clinics in the offices of artificial spasmotherapy (artificial microclimate), the basis of treatment of which is aerosol sodium chloride, sprayed in a room with constant temperature and humidity.

Group VII Variable air pressure. This is an application for therapeutic purposes alternating high and low atmospheric pressure with the help of a special apparatus baroque chambers. Preferably, local baro therapy is used on the leg or hand, which is contained in the airtight barometric chamber Kravchenko. Fluctuations of pressure give rise to the effect of vacuum massage and lead to changes in peripheral circulation, skin respiration and metabolism. If oxygen is added to the chamber, oxygen and blood oxygenation (hyperbaroxygenotherapy) will be improved during compression.

Indications for barotherapy: obliterative limb disease, Raynaud's disease. Contraindications: varicose veins and trophic ulcers, thrombophlebitis, ischemic heart disease, hypertension.

Group VIII Radioactive factors: radon water and alpha-applicators. Radon water is used mainly in the form of baths. The main active component of water is radioactive radon and products of its decay, which penetrate the body through the skin, mucous membranes, and respiratory tract. Under their influence, oxidation-reduction processes, metabolism are intensified, the activity of the endocrine system is stimulated; the functions of the central nervous and cardiovascular system are normalized; The pain-suppressive action is manifested in diseases of joints, mucous membranes, peripheral nerves.

Indications for the application of radon water: arthritis non-specific origin; diseases of the cardiovascular and nervous system, the gastrointestinal tract; diabetes mellitus, thyrotoxicosis in the initial stages, gout.

Contraindications: pregnancy, tumors, purulent processes, blood diseases, epilepsy.

Group IX Water-treatment factors: fresh water (hydrotherapy), natural and artificially prepared mineral water (balneotherapy).

Water-treatment factors act on the body by temperature, mechanical and chemical irritations. Their correlation in different methods of hydropathy can be purposefully changed and thereby cause the desired reactions of tissues, organs and systems of the organism.

Depending on the water temperature, the healing procedures are divided into: cold - below 20°C, cool 20-33°C, indifferent - 34-36°C, warm - 37-39°C, hot above 40°C. Water easily passes to the body warmly and quickly takes it off, reflexively changing the lumen of the vessels. In this case, the effect is manifested both in the area of its use, and in the organs that are inverted by the same segments of the spinal cord as the skin. For example, the warming of the lumbar region causes dilation of the renal vessels, and the cooling of the skin of the breasts is a narrowing of the vessels of the lungs.

Cold or warm water causes significant displacement and redistribution of blood in the body. At the base of this lie reflex responses from the side of the vessels of the skin and internal organs, which react in opposite way. At a time when the vessels of the skin narrow, the vessels of the internal organs expand and, on the contrary. Exceptions to this rule are the blood vessels of the kidneys and the brain that react irrespective of the vessels of the skin.

Water changes the skin temperature and internal temperature of the body, the processes of thermoregulation and metabolism, the activity of the vascular, respiratory, endocrine, muscular systems. The thermal factor forms a qualitatively different nerve afferent impulse that acts on the excitability of the central nervous system: thermal procedures increase the processes of inhibition, cold - processes of excitation.

Cold procedures cause phase changes in blood vessels. In the first phase, the vessels of the skin reflexively narrow, the blood moves to the internal organs, the skin becomes pale and cold, there is a local anemia. Approximately a minute later the second phase - active hyperemia, on the irritated area of the vessel extends, the skin becomes pinkish-red color, it becomes warm. And, finally, for the long-term effect of the cold, which should not be proved, the third phase - passive

hyperemia "comes. capillaries and small veins remain enlarged, and arterioles narrow. The speed of blood flow decreases, venous stagnation occurs, the skin becomes reddish-red, cyanotic color, becomes cold to the touch.

If you apply cold procedures properly, then they act tonically, increase the excitability of the nervous system, muscles, metabolism and gas exchange, slow down the amount of heart rate, frequency and depth of breath, increase, and then reduce blood pressure. Cold procedures harden the person, slow down the development of inflammatory processes. At the same time, their improper use disrupts the functional state of the organism, its ability to work and resistance to diseases. If during the procedure the skin stacks: pale and cold, and it affects the cyanosis of the lips, hands, tremors and "goose skin" due to the contraction of the muscles that raise the skin of the skin, the effect of the cold should be stopped.

Thermal procedures, especially hot, cause short-term spasm of the vessels of the skin, which rapidly changes with their expansion (active hyperemia). In these expanded skin capillaries and arterioles, a significant amount of blood from the internal organs is mixed. Blood pressure decreases, heart rate and respiration increases; muscles relax; increased sweating, secretory activity of the stomach, pancreas, adrenal glands; improves kidney blood circulation and urination; slow down peristalsis of the intestine.

Thermal procedures have anti-spastic and analgesic effect, promote the resorption of traumatic edema and hemorrhages. However, long-term hot tub can bring to passive hyperemia, overheating of the body, and with subsequent incorrect application of them to the determination of the mechanisms of thermoregulation, reducing the resistance to the effects of environmental factors.

Hydrotherapy is a freshwater treatment. Apply it in the form of general and local procedures. The common ones include showers, watering, rubbing, wrapping, baths, and to the local ones - manual, soft and seated baths, irrigation, warmer, compress, etc. To enhance the action of fresh water, often add a variety of aromatic and therapeutic substances, using brush rubbing the skin.

Shower - action on the human body of the current of water of the appropriate pressure and temperature. Types of it, mechanisms of action, indications for use - when considering the hydromassage.

Rubbing, rubbing - there are general and partial. The action is due to water temperature, which in the course of the following procedures is gradually reduced and reduced by the time, and mechanical stimuli that arise due to the intense rubbing of the body or its part. Apply these procedures mainly in functional diseases of the nervous system and to temper the organism (Table 3.8).

Wrapping (wrapping) is carried out with moistened water and a twisted sheet. The surface of the patient is covered with a blanket. The wrapping can be general and partial and, depending on the desired result, cool, warm and hot wraps are used. Cool wrap is prescribed as a tonic procedure for patients with neuroses, as well as in feverish conditions; warm - effective in insomnia, excited states; hot - with some acute inflammatory diseases, obesity, and also for forced weight reduction in sports practice. When inflammation of the lungs, acute bronchitis use partial thoracic wraps of the chest. In cases where a person does not tolerate wet wrap, use dry.

Table 3.8. Approximate scheme of quenching with water

Days of quenching	Water temperature, °C	Duration of the procedure, seconds
1-3	36-34	180-150
4-7	33-30	150-120
8-11	30-28	120-100
12-15	27-25	90-60
16-20	24-23	60-45
21-25	22-21	60-45
26-30	20-19	45-35
31-35	19-18	35-25
36-40	17-16	35-25
41-45	15	25
46-50	14	25
51-55	13	20
56 and further	12	20-15

Compresses are wet dressings that are used locally. They can be cold, hot, warming and medicated. Cold compresses impose on the place of influence for 3-4 minutes and often change. Its total duration is from 10 to 40-60 minutes. They are shown with fresh faces, nasal bleeding, the initial stages of acute inflammation. Hot compresses have a positive effect on renal, hepatic, intestinal colic.

A warming compress - the most popular homemade hydration procedure. It consists of four layers.

The first layer - attached to the body, using a gauze napkin or other well absorbing water, which is well moistened in water, squeezed and imposed on the place of influence.

The second layer - an insulating, waterproof (oilcloth, parchment paper), which must, from all sides, act 2-3 cm outside the edge of the first layer.

The third layer - insulating make a larger insulating layer of wool, woolen fabric, which should provide warming and counteract heat transfer.

The fourth layer - fixing (bandage, towel). Duration of a warming compress is 6-8 hours. It acts as a resorbing agent in inflammatory processes and edema, relieves muscle cramps and cramps of the internal organs, affects the painkiller. It shows warming compresses on the second or third day after injuries and nails, with local inflammatory processes. Contraindications: acute inflammatory processes of the skin and its other diseases.

A variety of warming compresses are alcohol and medicated. In these cases, the first layer is wetted with dilute alcohol or vodka, menthol or anthrax alcohol, bile, warm camphor oil, dimethoxide, ointment of Vishnevsky, etc., which significantly increase the therapeutic effect of the warming compress.

Baths are hydrotherapy procedures in which the patient (the common bath) or part of his body (local bath) is immersed in the water of the appropriate temperature and composition. Apply them with hygienic, therapeutic and prophylactic purpose. At water temperature (see above) baths are divided into cold, cool, indifferent, warm and hot. In addition, contrast baths are used and with a gradual increase or decrease in water temperature. The composition of the bath are fresh, medicinal, aromatic, gas, mineral.

Fresh baths. These baths come from the tap water of the appropriate temperature. The latter determines the length of the procedure: cold and hot baths - from 2 to 5 minutes; Indifferent and warm - from 10-15 to 20-30 minutes. The level of water in the common bath should not be higher than the middle of the lumbar chest, so as not to impair breathing and do not affect the heart. After cool and cold baths it is necessary to rub the body, and after hot and warm it is recommended to cool the shower or pouring one or two buckets of water at a temperature of 32-30°C. The influence

of fresh baths on the body is mainly due to the temperature of water, as well as its mechanical pressure (hydrostatic) to the body at the expense of a water column of about 0.5 m.

Cold (below 20° C) and cool (20-33°C) baths are exciting, activating the central nervous system, processes of thermoregulation and metabolism. Therefore, they are used as a tonic and tightening procedure, and also used in disorders of fat metabolism. Cold sedentary baths are indicated with atonic constipation, bladder weakness.

Indifferent temperature (34-36°C) baths lasting 10-15 minutes have a refreshing and boosting effect, and a duration of 15-25 minutes. - soothing. They are shown in functional disorders of the nervous system, vegetative vascular dystonia, the initial stages of hypertension.

Warm (37-39°C) baths are soothing, reduce pain and cramps, stimulate resorption and urination. They are shown in diseases of the joints, central and peripheral nervous system, kidneys, spastic paralysis, myositis, myalgia, contracture.

Hot (40°C and above) baths excite the nervous and cardiovascular systems, increase metabolism, act spasmolytic and painkiller. Apply them to diseases of metabolism, and in the form of a sedentary bath-in case of attacks of renal stone disease, inflammatory processes in the area of the small pelvis. In sports practice, hot baths use swimmers, skiers, skates to normalize muscle function, prevent overloads and injuries, as well as in cases of overcooling. Duration of the procedure - up to 10 minutes.

Contrast baths are based on the alternate use of two baths with water of different temperatures: one – 38-42°C, another 10-24°C. At first, the patient is immersed for 2-3 minutes. in hot water, and then for 1 min in cold. During the procedure, make 3-6 of such changes. In local contrast baths, hands or feet are immersed in hot water (42-45°C) for 30-60 seconds, and 10-20 seconds in cold (15-20°C), repeating such changes 4-5 times. The effect of contrast baths consists of the action of water of the appropriate temperature on the organs and body systems, the processes of exchange and thermoregulation, and especially on the nervous system and vascular reactions. Therefore, they are used in vegeto-vascular dystonias, sweating, acocypanosis, varicose veins, in order to harden.

Baths with a gradual increase in water temperature (according to Gauff) begin at 37-38°C, which for 15-20 min. increased by watering hot water to 41-42°C. In local baths for arms and legs, or for all the limbs of the patient wrap a sheet and put on his head a towel moistened with cold water. Gradually within 10 minutes. add hot water to the bath and initial temperature of water in them increase to 44-45°C, and with the appearance of sweat on the face continue for another 10-15 minutes. After the procedure, the person is wiped, wrapped in a heated sheet and placed for 30-40 minutes. These baths act like general but are relatively easy to transfer, because most of the body does not come in contact with hot water and the evaporation of sweat comes from its surface without any obstacles, which positively affects the process of thermoregulation and the general state of the organism. Baths reduce the amount of heart contractions, improve the function of the heart, reduce blood pressure, increase metabolism. They are shown in hypertonic disease of the I-II stage, disorders of the cerebral circulation and lower extremities, the initial manifestations of atherosclerosis. Foot baths are shown during peak blood flow to the head, headaches, insomnia, acute colds of the respiratory tract, bronchial asthma, angina pectoris.

Steam baths with a water steam temperature of 45-65°C and above are used for the treatment of chronic traumas of the locomotor apparatus, mainly for athletes, as well as for the enhancement of oxidation-reducing processes after training and for relaxation of muscles. The advantage of this procedure in front of a steam bath or sauna is that the patient does not directly act on the patient's head because she is outside the bath and the person has no difficulty breathing.

Steam (Russian) and Dry Air (Finnish, sauna) bath are powerful water treatment treatments. They differ in that the first has a relatively low air temperature to 45-70°C and high humidity - up to 90-100 percent. The dry air bath is characterized by a high temperature of air to 90-140°C and a relatively low humidity - 10-15 per cent. In multi-faceted action on their body combines the reaction to the action of heat, water, steam and repeated sharp changes in heat and cooling of the body. All of this activates physical thermoregulation, stimulates sweating and water-salt

metabolism, eliminates metabolic products; cleanses the skin from extinct and old cells, which increases its tone and elasticity. Baths trains the cardiovascular and respiratory systems, enhances the processes of inhibition in the central nervous system and activates the activity of the autonomic nervous and endocrine systems, increases the reactivity of the organism, acts anti-inflammatory. It should be emphasized that the steam bath causes more than a sauna load on the main body systems and the processes of thermoregulation. Therefore, it is suitable for hardened and physically strong people, and the sauna for the elderly, children and patients with chronic colds, peripheral circulation disorders, chronic disorders of the gastrointestinal tract and fat metabolism, degenerative and chronic inflammatory diseases of the musculoskeletal system, psychosomatic dys functions.

To use a bath more often once in 6-7 days is not desirable. In the case of improper use of the steam and dry air baths, there are signs of a negative effect in the form of insomnia, irritability, loss of appetite, headaches, lethargy and, in some cases, possible fainting or heat stroke. Contraindicated the bath at infectious and parasitic diseases, severe hypertension, thrombophlebitis, epilepsy, psychoses.

Medicinal baths - this is when fresh water is added to medicinal water, herbs and other substances of plant origin, which often have a fragrant smell. They act on the body with its ingredients, irritating the receptors of the skin and can penetrate through it in the middle. Aromatic volatile substances affect the olfactory analyzer, which together with other factors increase the mood and cause a positive psychotherapeutic effect. Most often used conifers, salsify, turpentine and mustard baths, rarely - soda, starch, manganese, honey and others.

Coniferous baths (35-37°C) have a pleasant smell of needles and a color of water. They act soothing and are recommended for neuroses with increased irritability and fatigue, poor sleep, the initial stages of hypertension.

Salt baths (35-37°C) stimulate trophic processes, have anti-inflammatory and painkiller properties. They are shown in inflammatory and degenerative-dystrophic diseases of the joints, muscle damage and bag-ligament apparatus, traumas of the peripheral nerves, and some gynecological diseases.

Skepeter baths (37-39°C) stimulate the receptor apparatus of the skin, improve peripheral blood circulation, affect the vascular tone, act analgesic, anti-inflammatory, stimulate trophic processes. These baths are shown for diseases of the musculoskeletal system, the peripheral nervous system, hypertension, and obliterating diseases of the vessels of the extremities. Contraindications: chronic diseases of the liver and kidneys, increased sensitivity of the skin to turpentine.

Mustard baths are used in the form of general (36-38°C) and local (39-40°C) baths. The first ones are used in acute and chronic diseases of the respiratory system, acute respiratory diseases. Showing foot baths with neuroses, high blood pressure. Mustard baths for hands are shifted in the initial forms of coronary heart disease, bronchial asthma, chronic respiratory diseases. Contraindications for treatment with general baths: insufficiency of blood circulation above II degree, hypertonic illness of stage III, severe form of angina, acute inflammatory processes, pulmonary tuberculosis in the active phase, malignant neoplasms, predisposition to bleeding, thyrotoxicosis and severe form of diabetes, epilepsy, second half of pregnancy .

Balneotherapy is a natural or artificial mineral water treatment. It differs from fresh water in that it contains in its increased concentration mineral components, organic matter and has the corresponding physical properties. Used mineral water inside for drinking and externally in the form of baths: mineral and gas.

Mineral baths. These are baths of natural water or artificial mineral analogues. Dissolved in water minerals cause a specific chemical reaction in the body. Mineral baths include chloride, sodium, iodide-bromine, sulfide, radon.

Sodium chloride (salt) baths. These are the waters of the seas, salt lakes, underground springs and their salts, which dissolve in fresh water. The concentration of minerals in them is different. Waters with high salt content - more than 10 kg per bath are called racy. Chloride sodium water is used not only externally, but also internally. Natural waters in Ukraine are in Odessa, Mirgorod, Truskavets, Morshyn, Slavyansky. The peculiarities of the action on the body of these baths are

associated with the accumulation of mineral salts on the skin in the form of a thin shell - "salt mantle", which is stored for several hours after the bath and is a source of prolonged irritation of the receptors of the skin and reflex reactions from the side of many body systems.

Salt baths significantly increase blood circulation in the skin, increase the oxidative processes, normalize the activity of the central nervous system, stimulate the sympathic-adrenal system, cause immunological reorganization in the body, affect the analgesic, anti-inflammatory, hyposensitization. Indications for salt baths: diseases of the internal organs, spine and joints, central and peripheral nervous system, skin. Salt baths are used when the muscles are "clogged", joint pains after training on a solid ground. Contraindications - common for baths.

Iodine-bromine baths. The active basis is biologically active substances iodine and bromine, which, in the first place, affect the nervous and endocrine systems. Iodine-bromine baths help to rebuild the processes of excitation and inhibition in the cerebral cortex, have analgesic action, normalize tendon reflexes, sensitivity and muscle tone. They positively affect the thyroid and gonadal glands, activate the processes of metabolism, especially lipid, and microcirculation. Indications for iodine-bromine baths: atherosclerotic vascular lesions, heart defects, endocrine-metabolic diseases, functional disorders and diseases of the nervous system with pain syndrome, as well as after extensive physical and mental stresses, neurotic conditions. Contraindications: General for baths, as well as hypersensitivity to iodine and bromine.

Sulphated baths. The main active ingredient is hydrogen sulfide and its salts. Because of high water solubility, the gas does not form bubbles and therefore the main effect on the body of sulfide baths - chemical Hydrogen sulfide acts on the skin, mucous membranes, respiratory tract, gets into the bloodstream and leads to significant changes in the body. It causes more active skin hyperemia in comparison with carbonic baths, stimulates the activity of the heart, hemodynamics, blood circulation in the kidneys, liver, brain, metabolism. Baths reduce the excitability of the nervous system, improve the enzymatic and reparative processes, exhibit anti-inflammatory, resorbing, trophic effect. Natural hydrogen sulfide springs are in Ukraine in Lviv (Luben Veliky, Nemyriv) and Transcarpathian (Synyak) regions.

Indications for sulphide baths: diseases of the cardiovascular system, atherosclerosis; chronic inflammatory and metabolic-dystrophic diseases of the joints, spine; diseases of the nervous system; some diseases of exchange and skin, as well as normalization of the functions of the autonomic nervous system during intensive training; treatment of chronic traumas of the musculoskeletal system. Contraindications: kidney disease, liver, bronchial asthma, acute inflammation in the joints.

Gas baths. The main active component is one or another gas that exhibits physical, mechanical and chemical effects on the body. There is gas in the water in the form of bubbles. They cover most of the body of the patient, irritate the tactile skin receptors and abruptly micromassage it, they get inhalation in the lungs. Gas is absorbed into the bloodstream, causing a specific chemical action. Gas chapes include carbon dioxide, oxygen, pearl, nitrogen and others.

Carbonic baths. The main operating factor is carbon dioxide. It definitely acts on the cardiovascular system: it causes prolonged expansion of the vessels of the skin and the transfer of blood from the depot to the periphery; increases the amount and speed of circulating blood; slows down the heart rate and amplifies the strength of its contractions; normalizes arterial pressure and stimulates the development of collateral circulation, affects the respiratory center: CO, directly enhances and reduces the number of respiratory movements, increases ventilation capacity of the lungs. Carbonic baths increase the excitability of the nervous system, intensify the metabolism. In Ukraine, sources of natural carbonic waters are in Transcarpathia (Svalyava, Polyana).

Indications for carbonic baths: diseases of the cardiovascular and respiratory systems, functional disorders of the nervous system, metabolic diseases, hypofunction of the genital organs; fatigue and sleep disturbance after heavy physical activity. Contraindications: inflammatory diseases, epilepsy, second half of pregnancy.

Oxygen baths. Oxygen quickly dehydrates from the water and he inhales the patient. It saturates the body with oxygen, eliminates oxygen debts, has a beneficial effect on the central nervous, cardiovascular and respiratory systems, the oxidation-reduction processes, the subjective

state of patients. Indications for oxygen baths: diseases of the cardiovascular system, myocardial dystrophy, asthenic conditions, as well as for restoration of sports performance after training, fatigue, with chronic injuries and diseases of the musculoskeletal system. Contraindications for these baths are common.

Pearl or air-gas baths. The air is fed into the bath because of a large number of thin tubes under pressure that causes water perturbation and the formation of bubbles that pour over into pearls, for which these baths are called "pearl". Baths have a positive effect on the central nervous system and are therefore shown with its functional disorders, heart defects, hypertension, climacteric psychosis, chronic alcoholism. Contraindications for pearly baths are common.

Nitrogen baths. Bubbles of nitrogen cover the thick layer of the skin and cause mechanical and thermal irritation of the nervous apparatus, changes in the vascular tone. Nitrogen baths have sedative, analgesic and desensitizing effect. They reduce the amount of heart rate, reduce blood pressure, slow down and deepen breathing. These baths are indicated for the treatment of hypertonic diseases of the 1st and 2nd degree, neurodystrophic skin diseases, infectious-allergic lesions of the joints, thyrotoxicosis. Contraindications - common for baths.

Group X. Therapeutic factors: mud (peloids) and peat, clay, sand, paraffin, ozocerite (Table 3.9). They have high heat capacity, poor thermal conductivity and high heat retention capacity, and therefore their effect on the body is primarily due to the action of heat, as well as mechanical and chemical stimuli.

Table 3.9 Properties of the main heat-treatment environments

Environment	Heat capacity dung	Coefficient of thermal conductivity	Heat-holding ability, s
Water	1	0,00148	—
Mud	0,50-0,80	0,0018	450
Sapropeli	0,73-0,94	0,0011	850
Peat	0,80	0,0018	880
Clay	0,55	0,0018	380
Paraffin	0,77	0,0006	1190
Ozocerite	0,80	0,0004	1875

Mud cure or peloidotherapy is the use with therapeutic and prophylactic purpose of medical mud (peloidip). These natural formations consist of water, mineral and organic substances. Depending on the origin, distinguish the mud, sapropel, peat and soot muds.

Mud mud is formed in seas and salty or fresh water in the process of slow disintegration of animal organisms and plants and the interaction of these products with soil, water, salts with the help of mud-forming bacteria.

Sapropel (rotting mull) is formed in fresh water and differs from the mud mud with a significant content of organic matter, a small amount of mineral salts and the fact that the microbes are producers of antibiotics.

Peat muds (peat) are formed in marshy places in the process of decay of plant organisms, and sopchnye - in gas and oil fields under pressure of carbohydrate gases. The basis of sopochnyh mud is clay.

Mud cure affects the body through the action of temperature, mechanical and chemical stimuli. Due to the physical properties of the mud during treatment, it is possible to apply a relatively high temperature (42-44°C, 46-50°C), which is prolonged with a slight decrease. Depending on the chemical composition of the peloids (organic and inorganic acids, salts, trace elements, biologically active substances, etc.) in the body there is one or another specific effect in the treatment.

Medical mud is used in the form of general and partial procedures. Peloidids irritate the thermo-, chemo- and mechanoreceptors of the skin and mucous membranes and, due to the reflex

and neurohumoral mechanism, affect various organs and systems of the organism. They change thermoregulation, expand peripheral vessels, activate metabolic processes, adsorption and trophic functions, enhance respiration and the activity of the cardiovascular system, the inhibitory processes of the cerebral cortex. Procedures act bacteriostatic, anti-inflammatory and absorbing, stimulate regeneration of tissues.

Indications for mud treatment: diseases and effects of injuries of the musculoskeletal system, peripheral and central nervous system; chronic inflammatory processes of the organs of the abdominal cavity, genital organs; some skin diseases.

Contraindications: acute inflammatory processes, tumors, infectious diseases in the acute and contagious stages.

Clinical treatment is an effective and flexible method. For this purpose, plastic and fat clay are used: yellow, gray, green. By their physical properties, they became closer to mud mud and peat and therefore successfully used in the absence of peloids. Clay is usually used in the form of pelvis with a temperature of 40 - 46°C, which is imposed on the corresponding areas of the body for a duration of 20 - 30 min.

Indications for clay treatment: chronic diseases of the muscles, joints, spine, peripheral nerves, gallbladder, pelvic organs. Contraindications for cloning are the same as for the treatment of mud.

Sand treatment (psamotherapy) is performed in the form of general, local baths and hotplates. For therapeutic use, clean, sifted river or sea sand. It has a lower than mud or clay heat retention capacity, but has a high hygroscopicity and therefore easily absorbs sweat, due to which it is possible to lose a mass of 0.5-2 kg in the total bath. During this procedure, in natural or artificial conditions, the body is covered with a layer of hot (45-50°C) sand in the thickness of 8-10 cm, and the breast and abdomen - by 4-5 cm, leaving the free area of the heart, neck and head. The duration of the procedure is 20-30 minutes, after which it is necessary to take a warm shower. In the local baths for hands and feet use sand at a temperature of 52-55°C, and for hotplates - up to 60°C, which is poured in the bags of matter and impose on the affected areas.

Indications for the treatment of the sand: tightness of the joint in the joints, contracture and those diseases in which the clay is used. Contraindications for psammotherapy are the same as for the use of clay.

Treatment with paraffin. This substance is a product of distillation of oil and is widely used in connection with the possibility of its use at high temperatures - 55-60°C. Due to the physical properties of paraffin, the temperature slowly decreases and therefore it lasts (60-90 minutes) keeps the heat and gradually gives it fabrics. It is combined with the compression effect of paraffin: when cooled, it decreases in volume, compresses and compresses fabrics, surface vessels. Blood flow in them slows down, decreases heat dissipation, which contributes to a deeper warming up of tissues, increased metabolism, resorption of inflammatory infiltrates and effusion, muscle relaxation and pain relief.

Apply paraffin to treat the local in the form of pills, in which the outer surface is freezing, and in the middle it is stored in the gummy state. It is possible to use layered overlays of hot paraffin wipes, which consist of several layers of gauze and cotton wool, as well as baths or sacs where brushes or feet are immersed. Popular method of stratification of several layers of paraffin to a total thickness of 1-2 cm. The first layer quickly gives heat to the skin and creates a protective layer, which allows you to apply the following layers of a higher temperature - up to 60°C. The duration of the first procedures - 30-40 minutes, and then it is brought to an hour or more. Regardless of the methods of paraffin treatment, it is not allowed to allow any water to come into contact with paraffin, nor apply it to a wet or damp skin, as the thermal conductivity of water is much higher than that of paraffin. This means that at one and the same temperature, for example 50 - 55°C, a drop of water will cause burns, and paraffin, which has low thermal conductivity, will cause a pleasant warmth.

Indications for paraffin treatment: subacute and acute diseases of joints, muscles; sores, stretching, dislocations, fractures, wounds, burns, trophic ulcers; chronic diseases of the peripheral nerves and the female genital area; skin diseases of the gastrointestinal tract, and others.

Paraffin therapy is contraindicated in all diseases in which heat therapy can't be used. Treatment with ozocerite is very similar to paraffin therapy because they have similar physical characteristics, therefore, the same type of treatment is used. Ozokerite (mountain wax) -natural substance is found in the western regions of Ukraine. The therapeutic effect of ozocerite is similar to paraffin, but is more pronounced due to the fact that it has specific chemical components that additionally act on the body. Indications and contraindications for ozokeritotherapy are the same as for pains of athenotherapy.

3.4. Mechanotherapy

Mechanotherapy - treatment of physical rights with the help of special vehicles. They are performed precisely directed and strictly dosed movements, whose purpose is to restore movement in the joints and strengthen muscle strength. By acting locally on tissues, they enhance lymph and blood circulation, increase the elasticity of the muscles and ligaments, turning the joints into a peculiar function. Different types of mechanic therapy of ethical devices are used, the principle of which is based on the biomechanical features of movements in the joints: swing and block type and system of the lever.

The devices of the pendulum type (Krukenberg, Karo-Stepanov) are based on the principle of a balancing pendulum, which, due to the force of inertia, is provided with swing movements in the joints, which leads to an increase in the amplitude of movements in them. Each pendulum device is adapted only for one single joint and one kind of movement. The muscle effort is loaded with a load, the place of its stretching on the pendulum, the duration and rate of exercise. During the session, you must ensure that the exercises do not cause the patient to increase the pain and increase the tension of the muscles. Block-type devices (Body) are based on the block principle with loads, which increases the strength of the muscles. In cases of significant reduction of muscle strength, movements can be made easier, provided that the balance of the limb is balanced by an accurately selected load. Changing the initial position of the patient, one can differentiately strengthen certain muscle groups. Apparatus acting on the principle of eu (Zandera) use the day of individual muscle groups. Variable with the length of the lever, you can increase or decrease the resistance, which ensures the complication or relief of movements, the restoration of muscle strength and mobility in the joints.

Indications for the application of mechanotherapy: contractions of different origin, arthrosis, arthritis, tiredness of joints after injuries, prolonged immobilization. It is contraindicated in reflex contracture, a sharp weakening of muscle strength, progressive edema, insufficient consolidation of bony callus in fractures; presence of synergies, pain syndrome and increased reflex excitability of the muscles.

Hospital rehabilitation period. Mechanotherapy is used, preferably, in free motor mode. In traumatology, it begins after the removal of immobilization, the complete formation of scars after injuries of soft tissues, including burns. Exercises are performed on pendulum type vehicles with the use of minimal load, at slow pace, with a small amplitude of motion, frequent pauses for rest, adhering to the principle of sparing the affected joint or tissue and gradual training. The main purpose of the period is to provide the maximum full range of motion in the joints. The emergence of minor pain is not a contraindication to the use of exercises. In some cases, it is necessary to reduce the amplitude of movements, and in the case of increased pain, the occupation should be temporarily stopped. To calm the pain, a heat treatment is prescribed. The first lessons last 5-7 minutes, increase daily and at the end of the course is 20-25 minutes.

Post-hospital period of rehabilitation. Classes on mechano-therapeutic devices of block type and a lever are continuing, the purpose of which is the complete restoration of muscle strength and mobility in the joints. Exercises become active, complicated by the pace, amplitude, duration and

resistance of the intact limb. In the absence of signs of overcoming the class can be repeated two or three times a day.

Mechanotherapy in the system of physical rehabilitation is used as an independent means and is included in the complexes of therapeutic gymnastics in its main part. In the first case, before the movements on the device, be sure to perform exercises for all joints of the damaged limb or massage. In general, therapeutic exercises, massage and. Mechanotherapy can be used without interval between procedures. In addition to these therapies, mechanotherapy is well combined with physiotherapeutic procedures such as decimetro-wave (DMX) therapy, ultraviolet irradiation, mud applications, paraffin and ozokerite treatment, chloride-sodium and hydrogen sulfide baths. Mechanotherapy devices are used in hydrocolonotherapy.

The mechano-therapeutic apparatuses, generally of general effect, include treadmills of various structures. They, by dosed physical activity and targeted action on certain muscle groups, can selectively influence the support muscle, cardiovascular, respiratory and nervous systems, increase physical activity.

Depending on the design and technical characteristics of the simulators, one or another motor quality can be developed separately or simultaneously several. Exercise bike, jogging track, rowing simulator develops general, high speed and speed-strength endurance. Exercises with expanders, rollers - strength and flexibility, and on mini trampoline - improve coordination of movements. With the help of universal simulators such as "Health" you can develop almost all motor quality. Indications for the use of simulators: diseases of the cardiovascular system without blood circulation, coronary heart disease, chronic non-specific diseases of the lungs, arthritis, arthrosis, disorders of fat metabolism. Contraindications: insufficiency of blood circulation, exacerbation of chronic insufficiency, thrombophlebitis, myocardial infarction in antiquity less than 12 months, the possibility of bleeding, myocarditis, acute infectious diseases, significant myopia, obesity of the PI-IU degree, kidney disease, pregnancy more than 22 weeks.

Exercises on the simulators supplement the classes of medical gymnastics and contribute to a complete upgrade of physical capacity. They are used in after-hospital stages of rehabilitation. During exercises on simulators, one should adhere to such basic right-handed: a) physical activity should be interrupted; b) physical exertion should increase gradually during the treatment process. Each patient individually determines the power of work on the simulators, time and number of classes per week, duration of the course.

3.5. Labor therapy

Labor therapy - treatment by labor. It is aimed at the restoration of impaired functions and disability of patients, that is to achieve the main goal of rehabilitation. Labor therapy concentrates on the achievement of medical and social rehabilitation, including exercise therapy, massage, physiotherapy and mechanotherapy.

The main tasks of restoration of work in accordance with the recommendation of the Committee of Experts WHO (1964) are: to restore the patient's independence in everyday life; return it to your previous job, if possible; prepare the patient to complete another full-time job, according to his ability to work, or, if that is not possible, to prepare for work part-time, or to work in a special institution for the disabled, or, finally, for unpaid activity.

The realization of these tasks will depend on the nature of the disease or injury and their release, the functional capabilities of the patient, the physical ability to perform certain labor operations, the effectiveness of professional and previous types of rehabilitation; qualifications, length of service, position, sex, age and desire of the patient to work; coordinated work of the medical advisory committee, medical and social expert commission, social security bodies, trade union organizations, management of enterprises and state institutions.

The means of occupational therapy are labor movements and various labor processes, and not motions and exercises in general. They are selected taking into account the profession and everyday activities. They must be known to the patient, natural and normal to him, and should be taken to

work damaged by a trauma or muscle disease or weakened during long-term bed rest. The consequence of occupational therapy is the purposeful elaboration of a product of labor or the fulfillment of the task. This is distinguished, mainly, by occupational therapy and its means from exercise therapy.

Labor therapy stimulates physiological processes, restores or increases joint mobility and muscle strength, improves coordination of movements, and in cases of residual functions, adapts and coaches the patient to use them with the maximum possible effect. When irreversible loss of movement, labor operations develop constant compensation, which replaces the functional effect. Labor therapy with a powerful psychotherapeutic disciple. It mobilizes the will, focuses attention during work and its consequences, turns the patient away from unpleasant sensations and thoughts about illness, inspires hope for recovery. Labor excite mental activity, direct it to a purposeful, conscious, productive activity that benefits the person and society. The combination of mental, physical effort while working with social expediency returns a person's confidence in his strength, makes him a full member of society.

Indications for the use of placetheria: injuries and diseases of the musculoskeletal system, wounds of soft tissues, burns, contractions, surgical interventions and reconstructive operations; diseases of the cardiovascular, respiratory, nervous system, metabolism; mental illness. Contraindications: illness in the acute stage, inflammatory diseases in the phase of exacerbation, predisposition to bleeding, malignant neoplasms.

They use occupational therapy, mainly "rehabilitation centers, departments of occupational therapy of hospitals, centers of professional rehabilitation and combined (medical and professional) centers. After some injuries, surgical interventions, in pediatrics, the elements of occupational therapy in the hospital rehabilitation period may be appointed.

Distinguish restorative (tonic) restorative and professional occupational therapy.

Remedial (toning) labor therapy. Its main goal is to distract the patient from unpleasant feelings and thoughts, to cause positive emotions, to rationally fill the time. increase the nervous-psychic and vital tone of the patient. Under the influence of general-purpose occupational therapy psychological preconditions are laid for the subsequent restoration of work capacity.

Restorative labor therapy is aimed at preventing motor disorders or restoring the temporarily reduced function of the motor apparatus in the patient, adapting it to the physical loads of the industrial and everyday nature. In this case, they find such labor movements and acts that require participation in the movement of muscles and joints, which were dressed in the pathological process.

Professional occupational therapy. Its purpose is to restore the motor production skills and performance that existed before and were disturbed during or after the injury; facilitate the patient's return to previous work. Professional occupational therapy is conducted at the final stage of rehabilitation, in which the professional abilities and professional ability of the patient to perform the previous work in full or in part are estimated. In case of loss of professional capacity or partial permanent decrease of the patient, the patient is trained to study a new profession. In occupational therapy, first of all, labor processes that provide self-service, everyday and everyday activities, use of devices and prosthetics are used. Weave, knitting, cardboard work (making cardboard boxes, envelopes, toys, etc.). embroidery, weaving, sewing, carpentry and joinery, carving on wood, work with clay and in greenhouses, gardening, sawing and bunching of firewood, agricultural work with skew, forks, rake, shovel, work in professional production workshops.

Dosage of physical activity, labor regime are set individually. Specialists in occupational therapy. physiology of labor, medical and labor expertise developed special tests of physical activity, which show the energy capacity of the patient to work in the range of energy consumption in a particular work activity. This, together with the direct supervision of the patient's response to physical activity, is based on the conclusion that there is a possibility to resume work in full or in part, changes in the conditions of work and occupation, the transition to temporary or permanent disability.

3.6. A combination of physical rehabilitation means

Comprehensive treatment involves the use of a variety of tools and methods that are aimed at achieving the most profitable term of maximum effect. However, not always their number contributes to a quick recovery, often they can overload the patient, to counteract each other or to be all incompatible. Therefore, in the process of rehabilitation of a rehab, it is necessary to know how to combine and what sequence of physical rehabilitation means to supplement and enhance each other's actions and to be combined with other methods of treatment.

Therapeutic physical culture is combined with all means of physical rehab and is combined with the most frequent and therapeutic massage and physiotherapy, both in the hospital and post-hospital periods of rehabilitation. For most patients, there are two types of combination of these therapeutic agents: the first one - initially to exercise physical exercises, then - mass - and through 30-90 ha - physiotherapeutic procedure; the second - the first performed physiotherapy procedure, after 2-3 hours - physical exercise, and then-massage.

In some diseases, these physical rehab means are combined in a different way. So when treating injuries and diseases of the musculoskeletal system and the peripheral nervous system, heat treatments are initially applied, and then the warmed area is massaged and after that physical exercises are applied. In cardiovascular patients it is recommended to initially massage, after 30-60 minutes - therapeutic exercises, then in 1-1,5 hours - a balneotherapy procedure.

Therapeutic massage is organically fitted with physical exercises. In the course of its conduct, movements that are characteristic of a gooy or another joint are performed. Used passive and excise movements, exercises with resistance, for stretching, relaxation.

Passive movements are performed by a masseur from the starting position, which ensures maximum relaxation of the muscles. The direction and amplitude of passive movements is determined by the anatomical structure of the joint and the state of its function. Movements are performed slowly, without jerks and force pressure) ', without causing pain. gradually increasing the amplitude to the maximum possible. They are favorably active muscles. Collapse-joint apparatus of the joint, circulation of synovial fluid, blood and lymph circulation; well cared for massagers. contracture, hemorrhage, edema.

Active moves are performed by the person who is massaging. In cases where the patient is not able to do this, active motions with third-party help are used. The rehabilitant pre-develops joints and muscles, combining massage with passive movements, selects the facilitated conditions for them and starting positions and then moves with the patient together. During these movements, one must take into account the rapid depletion of the damaged primary muscle and therefore the process of recovery is not recommended.

Resistance exercises are introduced into the massage procedure in order to influence the individual muscle groups, to restore their function and strengthen muscles. Resisting, the rehabist should monitor the patient's efforts for this exercise and make appropriate adjustments. Stretching exercises are conducted to increase the mobility of truncated and wrinkled muscles, ligaments, tendons and functionally beneficial scar formation and adhesions. They are performed by patients using the force of inertia of active motions or with the help of a massage therapist, which in the final phase of motion increases its amplitude. Exercises for stretching should be limited to the appearance of pain because it causes reflex protective tension of the muscles and reduces the amplitude of motion.

Exercises for relaxation counteract the sluggishness and retardation of motor reactions, relieve tension and fatigue of the muscles and increase their elasticity, intensify blood supply and metabolic processes, have a positive effect on TSNS.

Therapeutic massage can be combined with physiotherapy in a variety of sequences. He often precedes physiotherapy procedures, which increases their effectiveness, in particular the penetration of drugs. Therefore, phonophoresis of drugs in the treatment of osteochondrosis, arthrosis and

arthritis, scar-adhesion processes is carried out after massage. The same sequence is maintained in cases of use of medicated electrophoresis of medicinal substances and massage.

Therapeutic massage is recommended before using diadynamic currents, ultrasound, ultraviolet radiation and solar radiation, before the electrostatic procedure. In any combination before or after aeroso- and hydro-aeronation, aerosol therapy and oxygen inhalations, massage is used.

Physical therapy is practically always used with physical exercises and massage. The vast majority of physiotherapeutic procedures can be prescribed in one day with therapeutic exercises: galvanization, medicated electrophoresis, electrostimulation, high-frequency and pulsed therapy, thermal therapy, balneotherapy. However, it is necessary to take into account the essential effect of some physiotherapeutic procedures, especially the last two, on the cardiovascular system. Therefore, the load during exercise should be small. Significantly increased the effectiveness of occupations exercise therapy after physiotherapy procedures, which will reduce the flow. Often combine physiotherapy with massages. In the treatment of diseases and injuries of the musculoskeletal system and the peripheral nervous system, such as tightness of joints, scarring contracture, sore, stretching, neuritis, neuralgia, etc.). First, heat treatments (soluks, paraffin, ozokerite, mud, etc.), which prepare the tissue for mechanical actions, and after a brief pause, massage the warmed area of the body. On the contrary, thermal procedures should be performed after massaging during tissue edema, lymphostasis and other vascular disorders due to the possibility of traumatising superficial vessels.

Electrostimulation is often combined with a massage. Recovery massage for 3-5 minutes removes mucosal fatigue, positively affects the functions of paractic and weakened mimesis. High-frequency electrotherapy and massage are usually prescribed on different days, and if necessary use of these factors in one day, massage is carried out in 2-3 hours. after induction therapy, microvascular therapy, and others.

A variety of guys, fresh and mineral, can be used on one day with. Massage. It is recommended to do it for CI minutes before balneotherapy or 1-2 hours after baths. Electrotherapy, baths and massage alternate: on the first day electroprocesses are performed. and the next one - baths and massage.

During quenching after all cold procedures massage or self-massage is recommended using grinding techniques, kneading, vibration alternating with strokes. When staying in a sauna that is not contraindicated in stretching, scars, dislocation, osteochondrosis, gout, etc., massage is done right after leaving the steam room, after which it is recommended to take a warm shower. Mechanotherapy becomes more effective if it is combined with therapeutic exercises, exercises in water, electrostimulation, thermal procedures, therapeutic massage. All these factors prepare tissues for stretching, reduce the likelihood of pain occurring in the development of joints or contribute to the elimination in case of its occurrence.

Labor therapy first of all commits with exercise therapy, which strengthens muscles, restores their endurance and coordination, productive and everyday movements, improves the functional capacity of the body, trains it and prepares for physical labor loads., Maintains efficiency. After worker therapy for quick restoration of the body after work, massage or self massage is applied. Permanent companions of occupational therapy in post-hospital stages of rehabilitation are diverse physiotherapeutic factors that work during outdoor work, in the garden, private plots, as well as after work in the form of swaddling, wiping, showering, bathing, etc. Sometimes, in rehabilitation centers and specialized sanatoria, pre-occupational therapy uses mechanotherapy that reduces motor mobility in the joints and increases the strength and endurance of the muscles and thus makes it possible to apply more complex production and living processes.

The given combinations of application of means of physical rehabilitation are the most optimal and, as practice shows, do not cause undesirable total reaction in patients, promote convergence of clinical and functional recovery, restoration of professional and household capacity, rather adapt the disabled to changed conditions of existence.

3.7. General concepts of sanatorium and spa treatment.

A resort is an area that has certain natural healing factors. For this reason, the resorts are divided into climatic, balneological and mud.

Many resorts are mixed, that is, they contain not only one, but more therapeutic factors: climatological, balneological, climatological mud.

Climatic factors. Climatic features distinguish seaside, plains (forest, steppe, forest steppe), mountain resorts. The main specific therapeutic means of climatic resorts are the climate, aerotherapy, heliotherapy, bathing in the sea (thalassotherapy).

lakes and rivers. Seaside resorts in Ukraine are resorts on the southern coast of Crimea: Yalta, Alushta, Alupka, Gurzuf, Livadia, Miskhor, Simeiz and others. Steady, warm and sunny weather, moderate frosts and dry summers, gum and long autumn, short mild winters, early spring allow year-round use of aerotherapy and heliotherapy, swim in the sea from May to October.

The high content of ultraviolet rays, ozone, oxygen, aeroions, hydroAeroions and sea salt in the open air increases the secretion of mucous membranes, glands, respiratory tract, improves ventilation and gas exchange in the lungs. This leads to an optimum saturation of arterial blood with oxygen, a decrease in tissue hypoxia, an improvement in metabolic processes, the stimulation of system functions and immunological reactivity of the organism, its quenching. Indications for treatment in seaside resorts: chronic bronchitis and pneumonia, pulmonary and bone tuberculosis, ear, throat and nose disorders, initial stages of hyperthermia, compensated heart defects, myocardial dystrophy, illness, metabolism, neuroses.

To seaside mixed resorts belongs to the well-known children's climatic, mud and balneological resort of Yevpatoria and climatogenic seaside resort Berdyansk, which is located on the shores of the Sea of Azov. The children with respiratory diseases, musculoskeletal system, peripheral nervous system, rheumatism, and tuberculosis are being treated and strengthened in their health.

Climatological balneological resorts are also in Feodosia and Odesa region. They combine a mild sea climate with a steppe. In this group of resorts, many sanatoria have a cardiological profile.

Plain forest resorts, steppe and forest steppe are located in the zone of moderate climatic zone, where the majority of the population lives. It is characterized by continental climate with mostly moderate warm summers and mild winters. Steppe resorts, which include the steppes of southern Ukraine, are characterized by summer dry weather, high temperature and air purity, a large number of sunny days, low humidity.

The latter makes it easier to tolerate high temperature and facilitates thermoregulation by strengthening the function of sweat glands, evaporation of mucous airways and lungs. Therefore steppe resorts are shown in chronic diseases of the upper respiratory tract, nose and throat, bronchiectasis, tuberculosis, chronic kidney disease.

Plain forest resorts and forest-steppe have lower temperatures than steppe, greater humidity, air saturation with oxygen, light aerines, aromatic substances, phytoncides, which have a bacteriocidal property. All of this increases the tone, improves external breathing, gas exchange and lung function, tissue respiration, cardiovascular system, thermoregulation processes. Therefore, at these resorts, it is recommended to treat patients not only with pulmonary pathology, but also with diseases of the cardiovascular system, functional disorders of the central nervous system, curative and weakened patients. Such resorts are located in the Kyiv region, Polissya in the Carpathian zone.

Mountain resorts in Ukraine are low-altitude (up to 1000 m above sea level) and middle-high (up to 1600 m). They are located in the foothills of the Carpathians, Transcarpathia and directly in the Carpathians. Depending on the altitude of the resort above sea level, atmospheric pressure, partial oxygen pressure, temperature and humidity are reduced, but solar radiation and ionization of air are increasing. Under the influence of the climate of these resorts initially accelerated heart rate and respiration, and then after adaptation they are slowing down; increases the number of red blood cells and hemoglobin in the blood; increases mineral and basic metabolism, general and psycho-emotional tone. Therefore, physicians recommend treating and improving their health in patients

with pulmonary pathology, throat and nasal diseases, metabolic disorders, early stages of cardiovascular disease, anemia, tuberculosis of the lungs, bones and joints in low and middle heal resorts.

Balneological resorts. The main therapeutic factor is mineral water, and depending on how it is used - in the form of baths or casting - the resorts are divided, respectively, into balneological and balneopittsvy. To the most famous in Ukraine balneological resorts belongs Lubin the Great (Lviv region.), Where the main therapeutic factor is gas sulfur water baths; Khmelniki (Vinnytsia region), where radon baths are used. However, most resorts are combined-balloons. These are the resorts of Prykarpattya - Truskavets, Morshyn, Shkl, where people with diseases of the kidneys, liver, stomach, urinary and biliary tract, digestive system are treated; Transcarpathia - Polyana, Svalyava, mineral waters which are effective in diseases of the gastrointestinal tract; the middle part of Ukraine Mirgorod. Berezovsky mineral waters. In the Carpathian sanatoria, in addition to mineral waters, ozokerite is used, which is supplied from the only one in Ukraine in the Boryslav region (Lviv region).

Mud Resorts. The resorts of this profile, in which the main means of treatment with mud (peloidotherapy) include Saki (Crimea), Kuyalnik (Odesa region), Slavyansk (Donetsk region). There are resorts where peloid therapy is used as an additional treatment factor: Svpatoria, Truskavets. Morshyn, Lubin Great, some Odessa resorts and others.

The main therapeutic and preventive institution of the resort with a sanatorium. In it complex treatment uses specific resort factors in the form of climatotherapy, balneotherapy or pedootherapy and nonspecific, common to all sanatoria, which play an important, and often a major role in the treatment of many diseases and rehabilitation of patients. These are means of physical rehabilitation, diet therapy, medical treatment, sanatorium and resort regime. However, regardless of the benefits of these or other factors, the effect of the sanatorium stage of rehabilitation will consist of their total effect on the body.

In the resort area not only sanatoria, but also establishments of rest: boarding houses, rest homes, children's health resorts, sports and health camps and training bases, which are mainly for health and preventive purposes.

The basis of sanatorium treatment is the sanatorium-resort regime. It involves a specially selected way and rate of life of patients during their stay in a sanatorium; thought-out application of physical training and rest, nutrition, sleep; proper alternation of physiotherapeutic procedures and other therapeutic factors; a gradual total load on the body with its sparing.

There are such sanatorium-resort modes: weak, moderate and intense action.

Mode number 1 - a weak act, appointed in the first 3-5 days during acclimatization and adaptation to new living conditions. All medical measures are aimed at the gradual adaptation of the patient and are sparing. Climatotherapy is carried out in the form of stay on verandas, air baths, walks. Balneotherapy is prescribed most often from the third day. Motor activity is based on spontaneous mode.

Mode number 2 - moderate act, provides for a moderate training effect of climate therapy procedures: air and sun baths, sea bathing, hydrotherapy procedures, gas and mineral baths, short-term and small concentrations of ingredients. Motor activity is expanded and carried out according to a gentle training regimen, except for medical physical training, therapeutic massage according to indications, mechanotherapy and occupational therapy can be used.

Mode 3 - intense act is final and the last 10-12 days prescribe klimatobalneo- and hydroprocesses in the training mode: an increase in the time of action and concentration of the ingraders in water, more often their application. Driving mode - training and allows you to apply almost all means of physical rehabilitation. Exercises of high intensity are used, cycling training, intensive walking programs, swimming, tourism, skiing, sports games, and entertainment activities. Stay in a sanatorium significantly affects the nervous and psychic sphere of patients. Exceptions to everyday household and service environment or hospital conditions; the peculiarities of the climate and the favorable influence of beautiful prominent-landscape factors, walks and tourism, swimming and hydroprocesses, sports games, entertainment events, etc. cause positive emotions, turn away

from unpleasant thoughts and inspire confidence in the bright future. All this together with autotraining, hypnosis, music therapy, psychopharmacological preparations and other psychotherapeutic means promote mental rehabilitation.

The use of spa treatment and rest at the resort maintains or restores efficiency, reduces the temporal disability, alleviates or reduces disability, provides productive and social rehabilitation. The term of stay of patients in sanatoria, in the majority. 24 days, and in some specialized ones - 28-53 days and more (tuberculosis, spinal patients). The patient directs to this or that sanatorium the attending physician, depending on the disease and the age (children, teenagers, adults). The following profiles of sanatoria were established for treatment of patients with diseases: cardiovascular system, digestive organs, non-tuberculous origin breathing organs, female genital area, organs of motion, skin, kidneys and urinary tract, metabolism). There are sanatoria for the treatment of tuberculosis, spastic paralysis of cardiac patients, etc.

Upon completion of the sanatorium treatment, the patient is given a resort book, which specifies what treatment he has taken, what results and what is recommended to him in his later life. In cases where sanatorium treatment is an intermediate stage in the rehabilitation of a patient, it is necessary to give him a recommandation concerning the expansion of motor regimen, the regime of work, nutrition and the continuation of rehabilitation at the dispensary stage.

Contraindications to sanatorium treatment: internal illnesses with severe organ and systemic deficiency, chronic diseases in the stage of exacerbation, parasitic and infectious diseases, cachexia, pregnancy complicated by gynecological diseases, mental illnesses, drug addiction.

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