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JOURNAL «MODERN ISSUES OF BIOMEDICINE» AS A VECTOR OF INFORMATIONAL ACTIVITY IN THE DIRECTION OF MEDICAL AND BIOLOGICAL SUPPORT OF PHYSICAL CULTURE AND SPORTS

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Key words: research journal, publication activity, physical culture and sports, recovery, rehabilitation, diagnostics, training.

Annotation. Results of the analysis of scientific research works on the issue of medical and biological support of physical culture and sports, published in the journal "Modern Issues of Biomedicine" in 2018-2020, are presented in this article. Main trends of research and modern tendencies on the usage of innovational technologies during training, medical and biological support of physical culture and sports were defined. As the studies have shown, the strategic direction of the development of sports science is the integration of biological, pedagogical and medical research within the scope of general scientific methodology, the definition of the most relevant directions of cooperation between a coach, a doctor and a physiologist in order to achieve the best results in sports activities, preservation and improvement of health, manifestation of maximum functional capabilities of athletes.

BALNEOLOGY AND REHABILITATION

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EVALUATION OF FUNCTIONAL STATE OF THE CARDIORESPIRATORY SYSTEM IN PATIENTS AFTER THE COVID-19 PNEUMONIA DURING MEDICAL REHABILITATION AT THE RESORT

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Key words: medical rehabilitation, COVID-19 pneumonia, resort, physical performance, cardiorespiratory system.

Annotation. The purpose of this study is to evaluate the efficiency of medical rehabilitation in resort conditions of patients, who were affected by the COVID-19 pneumonia, through the assessment of functional state of the cardiorespiratory system. Rehabilitation measures were conducted on the base of the S.M. Kirov Sanatorium of the FSBI NCFSCC of the FMBA of Russia located in Pyatigorsk for 29 patients affected by the COVID-19 pneumonia. The research program included two-time (at the beginning and at the end of treatment) examination of heart rhythm variability (HRV), degree of dyspnea according to mMRC scale, motor activity in the 6-minute walking test, determining oxygen saturation in blood by the pulse oxymetry method. As a result of two-week complex spa treatment, patients affected by the COVID-19 pneumonia have shown a decrease of vegetative imbalance, an increase of tolerance of cardiorespiratory system to physical loads.

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BALNEOTHERAPY IN POST-SURGICAL RECOVERY FOR PATIENTS WITH BREAST NEOPLASMS AT THE RESORT (LITERATURE REVIEW)

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Key words: breast neoplasms, post-surgical recovery, spa treatment, balneotherapy, heat shock proteins.

Annotation. This literature review is devoted to the conduct of balneotherapy during post-surgical recovery for patients with breast neoplasms at the resort. The article discusses indications and contraindications for spa treatment of this category of patients. Referral to the resort is possible due to post-mastectomy complications and concomitant diseases, which is determined individually after consultation at the oncology centre. The authors assess the role of heat shock proteins in the biological mechanisms of balneotherapy, focusing on the indications and contraindications for balneological procedures.

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PREVENTION MEASURES OF PLACENTAL INSUFFICIENCY DURING HIGH-RISK PREGNANCY

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Key words: feto-placental insufficiency, ozone therapy, limontar, high-risk pregnancy, preventive measures, perinatal outcomes.

Annotation. The purpose of the study is to optimize prevention care of placental insufficiency during high-risk pregnancy by inclusion ozone therapy and limontar antihypoxic drug in the programs according to the features of pregnancy termination, state of the early born, frequency of perinatal complications. There has been conducted research study in maternity welfare center of Out-patient clinic №1 in Vladikavkaz. The study included 75 pregnant women with diagnosed placental insufficiency (the average age was 28.6 ± 2.14 years old). Three groups were formed by random sampling. In the main group the patients received prevention treatment by using ozone therapy and limontar; in the group of comparison they were prescribed only limontar; the pregnant women of the control group did not receive any prophylaxis. The clinical effect of the use of the preventive care of placental insufficiency with pregnant women was assessed by the features of the outcome of pregnancy, the state of the early born, frequency of perinatal complications. After the carried out preventive measures the women who received comprehensive prevention treatment of placental insufficiency had a significant decrease in the incidence of complications of gestation period and perinatal mobidity by 3.5 ($p < 0.01$) times in relation to the indicators in the group of comparison and 4.7

($p < 0.01$) times in relation to the data in the control group. In the main group there was no progression of placental insufficiency, while in the group of comparison the progression was in 31.8% of cases, in the control group – in 56%. Application of medicamentous- and ozone therapy in complex of preventive measures of placental insufficiency in case of high-risk pregnancy contributes to the improvement of perinatal outcomes.

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PHYSICAL REHABILITATION OF PATIENTS AFTER THE JOINT ENDOPROSTHESIS REPLACEMENT USING ACTIVE MECHANOTHERAPY

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Key words: mechanotherapy, joint endoprosthesis replacement, physical rehabilitation

Annotation. One of the most developing areas of modern methods of prevention and rehabilitation is the use of mechanotherapy apparatus systems, the design of which is based on biomechanical laws of joint movement. The aim of the study was the experimental substantiation of the use of active mechanotherapy in the nearest postoperative period in patients after the hip joint endoprosthesis replacement. In all patients, the amplitude of movements in the joint increased, the number of patients with severe and moderate limp almost halved. At the same time, the positive dynamics in the experimental group, which used not only passive but also active mechanotherapy in the nearest postoperative period, was more pronounced, therefore, the process of recovery after the joint endoprosthesis replacement, took less time.

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CHANGES IN EFFICIENCY MARKERS OF THERAPEUTIC PHYSICAL AGENTS AND RATIONAL PHARMACOTHERAPY IN ELDERLY PATIENTS WITH CHRONIC GENERALIZED PERIODONTITIS

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Key words: periodontitis, geriatrics, mud therapy, physical therapy, Hypoxenum, AlfaVit50+, immune status.

Annotation. The main purpose of the study is to evaluate the effectiveness of the combination peloid, physiological and rational pharmacotherapy in elderly patients with inflammatory diseases of the periodontium. The study included 120 patients aged 60 to 75 years with chronic generalized periodontitis. Three groups were formed by simple randomization. The control group received standard therapy, the comparison group received additional vitamin-mineral complexes and antihypoxants; the experimenta; group received mud therapy. To monitor the effectiveness of treatment, an assessment of the parameters of the immune and metabolic status was used. The analysis of the effectiveness of therapeutic measures carried out in a comparative aspect showed that in patients of the main group with combination peloid, physiological, and rational pharmacotherapy, restoration of the immune and metabolic status was noted, which was significantly more significant in relation to the use of only standard therapy. The inclusion of vitamin and mineral complexes, antihypoxants and mud therapy in chronic periodontitis in elderly and senile patients is pathogenetically justified, provides a significant increase in the effectiveness of therapeutic measures.

SPORTS MEDICINE

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RESULTS OF THE INFLUENCE OF THE AUTHOR'S METHOD OF INDIRECT MASSAGE ON THE STATE OF MUSCLES ACCORDING TO SURFACE ELECTROMYOGRAPHY

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Key words: indirect massage, muscles, synergists and antagonists, tone, surface electromyography, electrobiological activity.

Annotation. The author's method of «indirect massage» results influence over a state of skeletal muscles according to surface electromyography are presented in the article. A high corrective effect of the indirect massage technique was revealed. It is shown, that normal indicators of muscle tone maintained this effect in a month after the course (latissimus dorsi and trapezius at rest and in tension), which tend to positive changes either remained at the same level (latissimus dorsi, anterior tibial, pectoralis major – in tension), or improved (pectoralis major, anterior tibialis, gluteus maximus at rest, gastrocnemius, quadriceps femoris and biceps femoris at rest and in tension). However, a number of the obtained results are ambiguous, and it requires further research.

PHYSIOLOGY

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MODERN VIEW ON PHYSIOLOGICAL AND MORPHOLOGICAL SPECIAL FEATURES OF THE ADAPTATION OF ORGANISM OF ATHLETES TO WEIGHTLIFTING EXERCISES

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Key words: weightlifting, adaptation, sex dimorphism, physiology of power sports, cardiorespiratory system, morphological status, neuromuscular apparatus.

Annotation. The purpose of this research is to analyze Russia-based and foreign scientific works dedicated to physiological and morphological special features of the adaptation of organism of athletes to weightlifting exercises. The results have shown that currently extensive data on special features of operation of vegetative functions of athletes during urgent and long-lasting adaptation to weightlifting exercises was collected. There is general representation on the work of the musculoskeletal system and muscles in the process of performing weightlifting exercises. However, with regard to substantial requirements to neuromuscular coordination, versatility and global nature of muscular work performed by an athlete, there is a need for a detailed examination and structuring the work of neuromuscular apparatus of athletes during performance of exercises. A simultaneous analysis of biomechanical and physiological parameters has the most potential in this direction.

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THE IMPACT OF THE HARDWARE POSITIVE OSCILLATORY EXPIRATORY PRESSURE ON THE EXTERNAL RESPIRATORY FUNCTION OF ELITE SWIMMERS DURING THE ACUTE PERIOD OF THE MOUNTAIN ADAPTATION

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Key words: elite swimmers, mountain training, respiratory system, training device of complex impact on respiratory muscles in motion, breathing with positive oscillatory expiratory pressure, spirometry.

Annotation. A relevant scientific purpose of this study was to find measures and methods of training aimed at speeding up the adaptation of the respiratory system of elite swimmers to the middle altitude conditions. Assessment of the effect of positive oscillatory expiratory pressure, implemented by using the "New Breath" training devices on the respiratory system responses of elite swimmers when moving from the plain to the middle altitude and during the “acute period” of mountain adaptation. Indicators of external respiration were evaluated by spirometry in the “Forced exhalation” and “Maximal voluntary ventilation” tests. The study involved

13 male and 14 female swimmers, who formed an experimental and control group. Athletes of the experimental group trained using the "New Breath" training devices. It was found that using the "New Breath" training devices of integrated effects on the respiratory system of athletes in movement during training of elite swimmers in the acute period of mountain training contributes to a more intensive increase in the indicators of forced respiratory maneuvers and bronchial patency, accelerates the adaptation of the respiratory system of elite swimmers, both men and women, to the middle altitude conditions.

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ADAPTATION OF HOCKEY PLAYERS FROM THE PERSPECTIVE OF THE FORMATION OF FUNCTIONAL SYSTEMS

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Key words: hockey players, stages of long-term training, adaptation, functional system

Annotation. This article presents the results of the correlation analysis of the indicators of hockey players at the stages of long-term training from the perspective of the formation of functional systems. The examined hockey players were divided into 5 groups according to age and stage of long-term training: 11-12 years (n = 36), 13-14 years (n = 34), 15-16 years (n = 34), 17-18 years (n = 37) and 19-21 years (n = 31). Indicators of boys and young men, who do not do sports, are presented as control groups. Indicators of physical development and strength capabilities, indicators of external respiration, central hemodynamics and vegetative regulation of heart rhythm were examined. In order to identify the relationship between the examined indicators in each group, the Spearman rank correlation method was used. It was revealed that the coefficient of efficiency of adaptation (CEA) indicates the degree of maturity of functional systems and characterizes the adaptation changes in these systems. The level of favorable adaptation to physical loads is the expansion of the range of reliable correlations. An increase in the number of "rigid" correlations

indicates a maturity of a certain action mechanism of the functional system during muscle activity.

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FEATURES OF THE DYNAMICS OF INDICATORS OF THE MORPHOFUNCTIONAL STATE OF FEMALE STUDENTS OF SURGUT WITH DIFFERENT LEVELS OF MOTOR ACTIVITY

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Key words: morphofunctional state, students, dynamometry, motor activity, Ugra

Annotation. A longitudinal study of indicators of the morphofunctional state of female students of Surgut with different levels of motor activity was carried out. A total of 75 girls were examined, aged 18 to 21 years. The results of the study showed that main morphofunctional indicators of girls with low level of physical activity did not have any statistically profound differences from female athlete students, with back strength being an exception. In girls with additional physical loads, the indicators of dynamometry and back strength were significantly increased by the third year of study in comparison with girls who did not do sports. Regular physical loads had a positive effect on health and adaptation processes of female students of the northern city, which was manifested through the tendency of the HR decrease, increase in body mass due to the development of the muscular system.

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THE IMPORTANCE OF THE MORPHOFUNCTIONAL AND PERSONAL QUALITIES OF HEALTHY YOUNG MEN IN PROVIDING PHYSICAL PERFORMANCE AT THE TREADMILL STAGE PERFORMANCE TEST

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Key words: total muscle work, glucose, lactate, morphofunctional and psychological indicators, young men, treadmill stage performance test

Annotation. Modern methods of load testing can help identify and substantiate the most informative markers of success in the chosen sport. The aim of this study is to assess the indicators of the organism of young male students before and after the stage performance test on the treadmill to failure and to determine the importance of morphological, functional, biochemical and personal characteristics in ensuring performance. 30 young male students without health restrictions at the age of 20±2 years performed a stage test to failure on a treadmill. The initial speed of the stage test was 6 to 8 km/h, depending on the individual heart rate values set during the warm-up. The duration of running on each stage was 3 minutes. The increase in the speed of each subsequent stage was 1 km/h. Blood sampling from the finger to determine the concentration of glucose and lactate was performed during a 30-second pause between stages (and immediately after failure). Morphological indicators (body mass, Ketle index, percent of subcutaneous fat) significantly decreased under the influence of stepwise cyclic loads, however, biochemical indicators of capillary blood (concentration of lactate and glucose), as well as heart rate (HR) increased in male students in relation to the background. There were significant positive correlations between the Ketle index, hand strength, shoulder circumference in tension, lactate concentration in capillary blood, and significant negative correlations between the Pinier index, the level of stress resistance and the degree of negativity, on the one hand, and the total muscle work of young men, on the other hand. The results obtained indicate significant homeostatic changes in healthy young men after intense physical activity, which requires determining the recovery mode. These data make possible to predict the amount of muscular work performed by young men, depending on their individual psychological and morphofunctional characteristics.

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NEUROPSYCHIC STABILITY AND BEHAVIOR STRATEGY OF STUDENTS IN CONDITIONS OF STRESS

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Key words: students, somatic diseases, psychoemotional state, neuropsychic stress, behavioral strategy.

Annotation. As a result of the conducted study, an evaluation of the psychoemotional state of students, who were excused from attending physical culture classes, was conducted. It was shown, that a significant amount of students, due to their neuropsychic instability, would have a hard time to react to the effect of stress factors. Received results indicate, that for those, who have somatic deviations in their state of health, it would be difficult to adapt to rapidly changing situations, new conditions, including educational ones, due to their non-constructive behavioral model. Passive position when a non-standard stressful situation approaches, emotional instability hinders their personal successfulness. Considering received results, it is not recommended to excuse students with somatic diseases from attending physical culture classes. It is recommended to form an individual educational trajectory of physical culture, to construct suitable recreational programs with the use of correct measures of physical culture (respiratory gymnastics, yoga and swimming) for such students. If there is a need, it is also recommended to use technologies of psychophysical regulation, including biofeedback, in order to form abilities to manage your own organism. Integration of various measures and methods in physical education for students, who have state of health deviations, could support a decrease of risks of maladjustment behavior of young people in conditions of complicated modern social situations.

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VEGETATIVE REGULATION OF THE HEART RHYTHM OF CHILDREN LEARNING KARATE

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Key terms: young athletes, vegetative regulation, heart rhythm, karate

Annotation. The problems of adaptation of young athletes to physical loads in karate have been studied. The reaction of the cardiovascular system is reflected to different types of training: speed, technical-tactical, endurance development. Speed training loads cause satisfactory adaptation in all groups, taking into account the initial tone. Training loads associated with the development of the accuracy of technical actions in young athletes cause the asymptotic manner of reactions as a response. Training loads aimed at the development of special endurance were noted with a satisfactory response among "vagotonics" and "normotonics", signs of tension were found among “sympathicotonics”.

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POSSIBILITIES TO CONTROL THE PROLIFERATION OF HEMATOPOIETIC STEM CELLS AFTER IRRADIATION BY NANOSECOND MICROWAVE PULSES

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Key words: hematopoietic stem cells of the red bone marrow, cell culture, proliferation, nanosecond pulses, microwave radiation, laboratory rats

Annotation. The purpose was to study the possibility to control the proliferation of hematopoietic stem cells in vitro using the nanosecond repetitively

pulsed microwave radiation (RPMs). It was found on 9 cultures of hematopoietic cells of the red bone marrow that irradiation with RPMs with a pPFD of 140 W/cm^2 with different pulse repetition rates (8 and 13 Hz) has an effect on proliferative activity. RPM initiates statistically significant stimulation (13 Hz) or inhibition (8 Hz) of proliferation. The data obtained allow us to assume the existence of optimal modes of exposure to RPM, which in specific tasks of regenerative medicine can provide the most effective stimulation of proliferation of stem cells for the rapid production of the required amount or inhibition of cell growth.

PHYSICAL EDUCATION AND SPORTS

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DEVELOPMENT OF ADVANCEMENT METHODS OF SPECIAL PSYCHOMOTOR ABILITIES OF TRACK-AND FIELD SPRINT ATHLETES

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Key words: track-and-field athletes, sprint, psychomotor system, time perception, space perception, movement perception, coordination abilities.

Annotation. The purpose of the study is a development of advancement methods of special psychomotor abilities in track-and-field sprint athletes. The study results showed that the level of sports qualification of track-and-field athletes affects the presentation of special psychomotor abilities in tests for evaluation of precision of time and space perception and motor tests. Athletes of higher qualifications (I degree, in comparison with II and III degrees) perform tasks for evaluation and measuring time and space parameters more precisely. Effective methods for advancement of special psychomotor abilities in track-and field sprint athletes were developed and approved during the 3-stage pedagogical experiment.

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THE HISTORY OF THE EVOLUTION OF MOTOR CULTURE

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Key words: motor culture, culture of movement, culture of motor actions, culture of motor activity, personality.

Annotation. The article presents a historical analysis of the development of «motor culture» from the first mentions up to the present time. The opinions of famous scientists such as Ya.A. Komenskij, P.F. Lesgaft, A.K. Gasteva, Marcel Mauss, André Leroy-Gouran, L.S. Vygotskij, V.M. Vydrina and V.I. Stolyarova, E.V. Bondarenko, N.A. Bernshtein, E.S. Medvedeva, Zh.S. Gorbachev, G.A. Kucherenko, V.B. Korenberg, E.V. Fadeeva, I.E. Sirotkina and others were presented. The analysis between such terms as «motor culture», «culture of movement», «culture of motor actions», «culture of motor activity» and «counter-culture» was carried out.

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SPECIAL FEATURES OF THE SITUATIONAL ANALYSIS OF COMPETITIVE ACTIVITY IN PLAYING AND COMBAT SPORTS

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Key terms: situation, analysis, competition, sports

Annotation. The purpose of this study is to reveal special features of the situational analysis of competitive activity in playing and combat sports. As a result, such components of the situational analysis were defined as the notation recording, video analysis of motor activity with qualitative evaluation of space and time

parameters of movement, observation of accompanying indicators (control of an opponent, intensity of activity, percentage ratio of offensive, defensive and low-intensity actions), key and varying indicators of the situational analysis taking the composition of tactical and technical movements of athletes into account.

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ASSESSMENT OF INFORMATIVITY OF SPRINT TESTS IN THE FORMATION OF SPECIAL PSYCHOPHYSICAL SKILLS OF YOUNG SOCCER PLAYERS

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Keywords: psychophysical skill, sprint test, functional systems, mental abilities, young soccer players, informativity.

Annotation. The article presents the results of studies aimed at studying the informative potential of soccer sprint tests developed by J. Bangsbo (1994) in comparison with a modified version of these tests. The aim of the study was to determine the informativity of the sprint tests under consideration in relation to the manifestation of specific and non-specific components in the formation of special psychophysical skills of young soccer players.

It is revealed that the traditional sprint test is quite informative to characterize the non-specific component of special psychophysical skills, and the modified test characterizes the specific components of the formation of the skills examined in this study.

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THE DEVELOPMENT OF ELECTIVE COURSES OF THE ADDITIONAL PHYSICAL EDUCATION PROGRAM FOR 11-12 YEARS OLD MENTALLY RETARDED SCHOOLCHILDREN IN THE “SKI RACING” PROGRAM

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Key terms: adaptive physical culture, sports for people with intellectual disabilities, ski racing, mentally retarded schoolchildren, physical education.

Annotation. The purpose of this study is the development of the program's elective courses and the annual scheduled plan of the athletic training for 11-12 years old mentally retarded schoolchildren, who participate in ski racing in the first year training group in the program of sports for people with intellectual disabilities. Activities, which were included in the annual scheduled plan, are swimming, speed skating and cycling. In order to improve the learning of the program material of the subject "The world around us", knowledge about environment, which was provided by the subject's curriculum, was included in the content of the "Theoretical training" section.

The approbation (the pedagogical experiment) of developed program's elective courses and the annual scheduled plan of training load distribution among 10 mentally retarded schoolchildren, who were training in the "Ski racing" program of sports for people with intellectual disabilities, has shown an improvement in motion tests. In the average, the growth rate in tests of general physical preparedness was 10,4%, in tests of special physical preparedness – 1,3%. Additional physical culture and sports classes in the "Ski racing" program of sports for people with intellectual disabilities with the use of the developed "Theoretical training" section have improved the students' performance in the "The world around us" subject up to 60%.

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DEVELOPMENT OF TECHNOLOGY OF HEALTH-IMPROVING CLASSES TAKING INTO ACCOUNT THE INDIVIDUAL AND TYPOLOGICAL SPECIAL FEATURES OF MATURE WOMEN

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Key words: health-improving classes, mature women, vegetative regulation, differentiated approach.

Annotation. The article shows the feasibility of developing a technology of health-improving activities for women of the second mature age based on the typological features of autonomic regulation. It has been proved that a necessary component in the development of the technology of health-improving classes is an integrated approach to studying the level of health and functional indicators of the organism of women of mature age. The choice of measures and methods of pedagogical influence, depending on the individual and typological special features of the trainees, will increase the effectiveness of health-improving classes with mature people.

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STUDENTS' ATTITUDE TO THE FORMATION OF PERSONAL MOTOR ACTIVITY

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Keywords: motivation, health level, physical activity, physical culture

Annotation. The purpose of the study was to identify interests and motivations of students, to determine their preferences in the process of physical culture classes. Studies have shown that the majority of students do not realize the importance of practical physical training for maintaining health, and the self-assessment of their motor activity by young people is not evaluated correctly. The main motive for attending physical culture classes at the university is to get a credit.

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PSYCHOLOGICAL READINESS AS A FACTOR OF PERFORMANCE OF SHOOTING ACTIVITY OF POLYATHLON ATHLETES

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Key words: polyathlon athletes, effectiveness of shooting activity, psychological readiness.

Annotation. Ambiguous results of shooting activity of polyathlon athletes revealed the need to study and improve the psychological readiness of athletes using psychological measures. Organization of psychological training sessions with participation of athletes involved in winter polyathlon was carried out taking into account the specificity of shooting activity: abilities of athletes to regulate the psychoemotional state, control of breathing pattern, focus on attention on an object, distracting from interference, and differentiate muscle tension when the trigger is pulled were improved. Positive results were obtained after the experiment, indicating the improvement of individual psychological special features of athletes that determine psychological readiness, which, in turn, contributes to growth of results of shooting activity.

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INFLUENCE OF SKI TRAINING MEASURES ON THE PHYSICAL STATE OF STUDENTS

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Key words: physical state, students, ski training, health, physical fitness.

Annotation. The measures of ski training, which have the greatest health-improving effect, are available at any age, regardless of physical fitness. The purpose of the study is to determine the effect of ski training on the physical state of students. The indicators of the physical state of students were determined. The dynamics and growth rate of the studied indicators in the process of ski training in the system of physical education classes were analyzed. The results of the study indicate a positive effect of ski training on the physical state, which characterizes the level of performance and the work of the respiratory system.