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BALNEOLOGY AND REHABILITATION

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THE EFFECTIVENESS OF USING MARAL VELVET ANTLERS IN THE CORRECTION OF IMMUNE DYSFUNCTION IN ATHLETES

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Key words: athletes, immune system, maral velvet antlers.

Annotation. The aim of the study is to scientifically substantiate feasibility of the use of maral velvet antler powder in correction of immune dysfunction in athletes of winter cyclic sports in the preparatory period of the annual training cycle. The conducted study proved that using maral velvet antler powder at a dose of 4 grams per day contributes to an increase in phagocytic and metabolic activity of leukocytes, correction of cytokine balance that allows to consider maral velvet antlers as an effective measure to correct immune dysfunction as one of the markers of overtraining syndrome in athletes of winter cyclic sports.

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LABORATORY MARKERS IN PREDICTING THE EFFECTIVENESS OF VELVET ANTLER MEDICATION IN ATHLETES

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Key words: athletes, maral velvet antlers, efficiency prediction.

Annotation. The purpose of the study is to develop models for predicting the effectiveness of velvet antler medication in athletes of winter cyclic sports during the preparatory period of the annual training cycle. In order to justify the use of laboratory markers, a correlation analysis of the relationships between them and indicators of physical performance was carried out. Based on the stepwise discriminant analysis, mathematical models represented by a set of linear discriminant functions that determine the feasibility of prescribing velvet antler preparations have been developed. The highest diagnostic interest was obtained when using biochemical parameters.

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A NEW METHOD FOR ESTIMATING THE MOUNTAIN CLIMATE EFFECT ON HEALTHY AND SICK PEOPLE

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Key words: mountain climate effect, mountain sickness and hypoxia, exponential approximation, lipid profile, vegetative support of activity.

Annotation. The algorithms of a new application of the well-known method of mathematical modeling (approximation of empirical data presented in the form of time series, with a specially selected exponential expression) for assessing the mountain climate effect on the level of lipoproteins and vegetative support of muscle activity are described. The possibilities of applying the new method in other areas of rehabilitation and sports medicine and, more broadly, in the physiology of adaptation are discussed.

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PREVENTION OF PRE-NOSOLOGICAL DISORDERS IN RIVER TRANSPORT PERSONNEL

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Key words: pre-nosological disorders, primary and secondary prevention of occupational diseases.

Annotation. In order to prolong the professional longevity of river transport personnel, the prevention of occupational diseases is most effective at the preclinical stage. The aim of our study was to develop methods for the reduction of pre-nosological disorders and the prevention of vibration white finger and sensorineural hearing loss in river transport personnel. Comprehensive prevention has a positive effect on adaptation capabilities (the number of workers with satisfactory adaptation increased by 1,5-2,0 times), the state of immunoreactivity (activation of both specific and nonspecific links of cell-mediated immunity was noted, as well as stimulation of immune adaptation responses), improves psychoemotional state of employees, reduces the risk of developing occupational diseases.

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EFFECTIVENESS OF EXTERNAL USE OF ELECTROPULSE EXTRACT OF MARAL VELVET ANTLERS IN PATIENTS WITH ARTERIAL HYPERTENSION

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Key words: arterial hypertension, chronic fatigue syndrome, maral velvet antlers.

Annotation. The purpose of this study was to examine the effect of external use of an innovative preparation based on electropulse extraction of maral velvet antlers on clinical signs and main indicators of the regulatory systems of the

organism and indicators of psychological status in patients with arterial hypertension and chronic fatigue syndrome. Against the background of taking velvet antler baths, there was a decrease in the severity of clinical signs, adaptogenic, anti-inflammatory and hypotensive effects, as well as an improvement in psychological status.

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QUALITY OF LIFE OF STUDENTS WITH DISABILITIES DURING THE COVID-19 PANDEMIC ACCORDING TO THE SF-36 QUESTIONNAIRE

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Key words: quality of life, students, health limitations, disability, SF-36, COVID-19 pandemic.

Annotation. 188 students of the Moscow Aviation Institute with health limitations (HL) and disabilities (110 young men and 78 young women) aged 18-20 years studied the quality of life (QOL) during the COVID-19 pandemic (autumn 2020) using the Russian version of the SF-36 questionnaire. It is shown that the values of all studied scales were lower than the standardized population values for this age category, regardless of gender. Female students had better QOL indicators compared to male students ($p<0,05-0,01$). The decrease in the level of mental health in young men is directly correlated with the indicators of vitality ($r=0,728$) and self-assessment of their mental state ($r=0,814$). The study is of practical importance for the organization of psychological support for students with health limitations and disabilities at the university.

SPORTS MEDICINE

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FUNCTIONAL STATE OF THE NEUROMUSCULAR APPARATUS AND HEMODYNAMICS OF THE LOWER LIMBS OF TRACK-AND-FIELD ATHLETES

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Key words: functional state, track-and-field athletes, neuromuscular apparatus, peripheral hemodynamics, electroneuromyography, rheovasography.

Annotation. The aim of the work was to study the functional state of the neuromuscular apparatus and hemodynamics of the lower extremities in elite athletes. It was found that in the process of sports training there are specific changes in the functional state of the neuromuscular apparatus and hemodynamics of the lower extremities in elite athletes. The data obtained as a result of electroneuromyographic studies indicate a large number of muscle fibers involved in contraction during stimulation of the peroneal nerve, and high muscle coordination. In addition, a high velocity of electric pulse conduction along the nerve fiber was recorded. We also noted compensatory changes in the peripheral hemodynamics of the lower extremities in response to systematic physical loads. The data obtained will be used in the future to develop criteria for assessing the functional state of the neuromuscular apparatus and peripheral hemodynamics in elite athletes, as well as to create recovery programs for athletes when intense physical loads are applied.

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CHARACTERISTICS OF STIMULATION AND SURFACE ELECTROMYOGRAPHY OF ELITE WEIGHTLIFTERS AT REST AND WITH SPECIFIC SPORTS LOADS

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Key words: athletes, neuromuscular apparatus, stimulation electromyography, surface electromyography, bioelectric activity of muscles, weightlifting.

Annotation. Aim of this work was to study the functional features of the neuromuscular apparatus of weightlifters according to the data of stimulation and surface electromyography at rest and in case when specific sports loads are applied. The study of the parameters of the M-response in weightlifters revealed low values of latency and residual latency, as well as the M-response's duration. High values of the amplitude, area of the motor response and the spread of excitation velocity along the nerve were noted. The data obtained indicate a substantially high level of the functional state of the neuromuscular apparatus of athletes specialized in weightlifting. Indicators of bioelectrical activity of the trapezius muscles when performing the snatch reflect the phase nature and a high level of neuromuscular coordination, contributing to the timely activation of muscle fibers and regulation of muscle tension during the development of efforts. The obtained data can be used to assess the functional state of the neuromuscular apparatus of weightlifters at various stages of the training process.

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BALANCE TRAINING FOR THE DEVELOPMENT OF PROPRIOCEPTION IN SOCCER PLAYERS IN THE RECOVERY PERIOD AFTER INJURIES AND SURGERY ON THE LOWER EXTREMITIES

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Key words: soccer, injuries, recovery, balance training, training.

Annotation. A method for the formation of physical qualities in soccer players during the recovery period with balance training for the development of proprioception has been developed. It is shown that the use of balance training at the recovery stage of the training process ensures the restoration of lost functions after surgery on the lower extremities and is currently one of the most relevant problems of rehabilitation of athletes, namely amateur soccer players. The obtained results allow us to recommend and apply balance training at the recovery stage of soccer players after injuries and surgery on the knee joints. Balance training provides a gradual application of static and dynamic exercises and takes into account the

functional features of proprioceptors. The inclusion of the technique in the physical rehabilitation program for athletes who have suffered injuries and knee joint surgery contributes to the preservation and improvement of results.

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FEATURES OF PSYCHOLOGICAL EXPERIENCE OF 7-11 YEAR OLD ATHLETES WITH DIFFERENT TYPES OF VEGETATIVE REGULATION

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Key words: children's sports, adaptive reserves, autonomic regulation, heart rate variability, psychoemotional stress, stress.

Annotation. The aim of the study was to examine the specificity of psychological experience of 7-11 year old athletes with various types of vegetative regulation. It was found that only 52,4% of children can be attributed to the III group. This group has a moderate predominance of the parasympathetic and autonomic regulation of the heart rate, which is traditionally favorable for engaging in sports. Athletes of the I, II, IV groups showed stronger psychoemotional stress. It has been proven that the central type of regulation is a risk factor for reduced adaptation and health at the stage of initial sports specialization and in-depth training in the chosen sport. Thus, it is important to create programs for the prevention of psychological disorders, taking into account these characteristics.

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THE BIOFEEDBACK METHOD AS A WAY TO IMPROVE THE ANTIOXIDANT AND IMMUNOMODULATORY POTENTIAL OF REHABILITATION OF ATHLETES AFTER ARTHROSCOPIC MENISCECTOMY

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Key words: elite athletes, arthroscopic meniscectomy, medical rehabilitation, biofeedback method, system of lipid peroxidation and antioxidant protection, immune system.

Annotation. The aim of the study is to scientifically substantiate the feasibility of using the biofeedback training to improve the antioxidant and immunomodulatory potential of complex rehabilitation of athletes after arthroscopic meniscectomy. The conducted study proved that the inclusion of the biofeedback training in the rehabilitation complex contributes to statistically significant reduction of reactive inflammation, increases efficiency of the antiradical and anti-peroxide protection system, optimizes the activity of the cellular link of the systemic immunity, stimulates the absorption and digesting functions of neutrophils.

PHYSIOLOGY

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FEATURES OF HEART RATE VARIABILITY DEPENDING ON THE TYPE OF VEGETATIVE REGULATION IN BOYS AGED 8-12 YEARS WHEN PLAYING SOCCER

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Key words: soccer, schoolchildren, age, physical activity, heart rate variability, types of regulation.

Annotation. The aim of the study is to examine the features of the formation of vegetative regulation of heart rate in male soccer players aged 8-12 years. The dominance of the central mechanism of regulation in beginner soccer players aged 8-9 years was revealed, which reflects the increased tension in the functioning of the growing organism. The number of young soccer players with the dominance of the central regulatory mechanism is 54% at the beginning and 60% at the end of the study. The activity of the autonomic mechanism of heart rate regulation increases in young soccer players aged 10-12 years. It is shown that compensatory and adaptive processes in young soccer players are formed against the background of certain

anatomical and physiological features and heterochronism of the development of functional systems.

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INFLUENCE OF AEROBIC LOADS ON POWER INDICATORS OF DEEP NECK AND BACK MUSCLES IN PREGNANT WOMEN

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Key words: water aerobics, aerobics, pregnant women, aerobic loads, muscle strength indicators.

Annotation. Aerobic exercise during pregnancy helps to reduce the risk of complications, improving the health of the mother and baby. The study of the effect of aerobic exercises on the strength parameters of the deep muscles of the neck and back was carried out in 207 women with an uncomplicated obstetric history and uncomplicated pregnancy. Women were divided into 3 groups: the first (n=100) was engaged in water aerobics in the pool, the second (n=57) – aerobics in the gym, the third (n=50) did not engage in systematic physical culture. The results of the study revealed that aerobic exercise during prenatal preparation of pregnant women has a beneficial effect on strength indicators of deep neck and back muscles. At the same time, the best results were obtained in pregnant women engaged in water aerobics.

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FEATURES OF THE CARDIAC ACTIVITY REGULATION IN ADOLESCENT BOYS IN CONDITIONS OF DISTANCE LEARNING

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Key words: distance learning, cardiovascular system, adolescence, physical inactivity, cardiointervalography.

Annotation. The aim of the study was to analyze the features of the cardiac activity regulation in adolescent schoolchildren of graduating grades who are on distance learning. The article presents the results of assessing heart rate variability of 32 schoolchildren of medical classes of secondary schools in Moscow who do not have chronic diseases, in conditions of full-time and distance learning at rest and with dosed physical activity. As a result of the survey, it was revealed that a significant proportion of boys (60%) after completing distance learning had a state of functional tension of regulatory systems, a shift in the balance of the vegetative nervous system towards its sympathetic division.

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RELATIONSHIP BETWEEN MORPHOFUNCTIONAL PARAMETERS OF THE CARDIOVASCULAR SYSTEM AND SPORTS PERFORMANCE OF SOCCER PLAYERS OF VARIOUS ROLES

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Key words: soccer players, sports performance, game-based sports, game roles, adaptation, cardiovascular system, myocardium, dilatation, hypertrophy.

Annotation. The article presents the physiological features of soccer players' cardiovascular system (studies using tetrapolar rheography and echocardiography), depending on the role and the sports performance level. The dominant type of blood circulation is hyperkinetic. In high-performance soccer players, more significant degrees of cardiovascular system activity’s efficiency, a decrease in afterload and an increase in the heart contractile function were revealed. High-performance forwards have the lowest values of systolic and diastolic pressure, end-systolic volume and end-systolic size, heart rate, double product and have the highest heart contractility indicators among all soccer players (end-diastolic and shock volume, thickness of the posterior wall of the left ventricle).

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ASSESSMENT OF THE PHYSICAL DEVELOPMENT OF SOCCER PLAYERS WITH THE METHOD OF INDICES

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Key words: soccer players, playing roles, anthropometry, physical development, indices of physical development.

Annotation. For an express assessment of the physical development and physique of soccer players using the index method, the players of one of the Moscow soccer clubs of the professional soccer league of the second division were examined. In the surveyed soccer players (n=24, average age – 24,16±0,87 years), on average in the group and in groups, when divided into playing roles, the body mass index values were within the normal range. At the same time, the body mass index value of the goalkeepers in the group was 1,7-1,8 units lower than that of the outfield players. The team was identified as representatives with a well-developed chest (Erisman's index was 8,85±0,9) and with a narrow chest (Erisman's index was 0,94±1,93) were identified. When assessing the level of physical development by BMI, it was shown that 21 soccer players have normal, and 3 soccer players have increased BMI values. According to Chernorutskij's somatotyping scheme, 37,5% of hypersthenics (Pignet's index was 2,5±2,04) with a strong physique and 62,5% of normostenics (Pignet's index was 16,9±1,29) with a good and average physique were identified. Assessment of the degree of somatic sexual differentiation showed that 87,5% of athletes belong to andromorphs (Tanner's index was 97,7±1,3) and 12,5% – to mesomorphs (Tanner's index was 88,0±0,6).

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SOME FEATURES OF BIOMEDICAL SUPPORT OF TRANSGENDER ATHLETES AND NON-BINARY PEOPLE IN SPORTS

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Key words: transgender athletes, strength, endurance, body composition, injury rate.

Annotation. A right of transgender athletes to participate in the competitive process in accordance to their gender identity is a controversial issue. Because of concerns related to potential professional benefits some sports organizations introduce restrictions on participation of transgender athletes in sports. A number of people who identify as transgender constantly grows. It is expected that issues concerning their integration into competitive sports activity would become more relevant. This article presents a review of modern requirements and criteria for inclusion of people, who went through transition, into professional sport and competitive activity. We examine main medical and psychological aspects related to the state of health and the training process organization of such athletes. Development of policy and events for biomedical support of this group, creation of non-discriminatory atmosphere and at the same time – a fair system of evaluating athletes regardless of their gender identity is of great significance.

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FEATURES OF HEART RATE VARIABILITY IN YOUNG VOLLEYBALL PLAYERS OF KHANTY-MANSIJSK AUTONOMOUS OKRUG – YUGRA

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Key words: heart rate variability, cardiovascular system, functional state, youth league, volleyball players.

Annotation. The aim was to identify the features of cardiovascular and heart rate variability among young volleyball players who live and train in the Khanty-Mansijsk autonomous okrug – Yugra. The study involved male volleyball players, who are active players of the Youth Volleyball League (n=22). The comparison group included male students of the Medical Institute (n=22) who do not engage in sports. Statistical characteristics and spectral analysis of heart rate variability were used to assess heart rate variability. The study revealed that young players had high activity of the segmental level of regulation and sufficient reserves for the adaptation of the cardiovascular system. Volleyball players with high activity of the parasympathetic link of regulation need to be examined in order to determine the state of excessive fatigue and stress of regulatory systems.

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FEATURES OF URGENT ADAPTATION OF THE BLOOD CIRCULATION SYSTEM TO THE NEUROFEEDBACK SESSION IN ATHLETES WITH VARIOUS VEGETATIVE CARDIAC ACTIVITIES

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Key words: biofeedback, adaptation, cardiovascular system, athletes.

Annotation. The article presents the effects of urgent adaptation of the athletes' blood circulation system, indicating that the mental-operational work performed for the first time by athletes during a session of neurofeedback according to the beta rhythm of the brain with audio-visual feedback is quite stressful for the organism. At the same time, with varying degrees of intensity, inotropic and chronotropic effects on the heart rate of athletes decrease, the indicators of central and peripheral hemodynamics are significantly shifted. It was noted that the risk of developing hypertensive states in athletes of the studied groups was different for the first session of neurofeedback, as a load stress factor. In the groups of athletes with vagotonia and eutonia, the type of blood circulation was optimized. The index of functional changes in all groups reflected an improvement in the adaptation of the cardiovascular system of athletes. The revealed features expand the diagnostic and correctional-adaptive capabilities of neurofeedback in sports practice.

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COMPONENTS OF PSYCHOPHYSIOLOGICAL STATUS, DETERMINING THE SUCCESS OF STUDENTS IN CONDITIONS OF EDUCATIONAL AND SPORTS ACTIVITY

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Key words: student athletes, dual-career, psychophysiological status, academic success, sports success, risk groups, attention deficit hyperactivity disorder.

Annotation. The purpose of the research was to study the components of students’ psychophysiological status, which determine success in conditions of educational and sports activities. 183 full-time student athletes voluntarily participated in the research. Among the applied methods are the "Self-regulation style of behavior" questionnaire, the simple visual motor response (we analyzed the integral indicator "functional level of the system"), adaptive potential (according to R.M. Baevskij). It was determined that the success in the educational activity of students correlates with the analyzed indicators. The success of sports activity correlates at the average level with the neurodynamic component of the functional level of the system. A weak correlation was registered with the indicators of "self-regulation style of behavior" and adaptive potential.

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MORPHOFUNCTIONAL STATE OF 3-4 YEAR OLD CHILDREN WHO ENGAGE IN PHYSICAL CULTURE WITH BEGINNER JUDO EXERCISES

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Key words: morphofunctional state, pre-school children, physical culture physical development, judo.

Annotation. Implementation of the program that includes elements of sports disciplines into pre-school institutions are aimed towards the enrichment of motor, functional and mental development of children. The aim of this study was to examine morphofunctional features of 3-4 year old children who engage in physical culture with beginner judo exercises. Results of observing these children, according to initial parameters of the functional status, are within limits of age-based physiological standards. 3-year-old girls differ from boys by greater dimensions of their body and vital capacity. After a year of physical culture classes with beginner judo exercises, 4-year-old boys were characterized by greater values of all indicators of the morphofunctional status. The greater positive changes include an increase in following parameters: length of arms and legs, lung capacity. Taking into account the study’s results, we developed scales with standard indicators for evaluating the morphofunctional state of 3-4 year old children who engage in physical culture with beginner judo exercises. These scales were later used in the hardware and software complex “Sports orientation of children to judo classes for comparing and forming test evaluations.

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NEURODYNAMIC FEATURES OF THE 3RD-4TH GRADE PUPILS WITHIN LEARNING DYNAMICS

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Key words: primary school pupils, sensorimotor reactions, hindrance stability, reaction to a moving object, tapping test.

Annotation. The basic neurodynamic indicators of the 3rd-4th grade pupils in the course of two academic years have been analyzed. An increase in the time parameters of the visual-motor reaction and the number of errors during the performance of the tests "simple visual-motor reaction" and "hindrance immunity" were revealed. By the end of the 4th grade, the contingent with a predominance of inhibition of nervous processes increases, mostly in girls. Such specificity of the functioning of the central nervous system reflects a significant decrease in the functional capabilities of the organism against the background of an increase in the effect of fatigue accumulation at the final stage of primary education.

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MAIN PATHOPHYSIOLOGICAL MECHANISMS OF EXTERNAL AND INTERNAL SKIN AGING

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Keywords: skin aging, dermis aging, dermis atrophy, collagen, estrogens, androgens, oxidative stress.

Annotation. Aging of the skin is a multifactorial process that affects all its layers, is characterized by such signs as wrinkles, loss of elasticity, flabbiness and uneven relief and is accompanied by phenotypic changes in skin cells, structural and functional changes in the components of the extracellular matrix (collagen and elastin). This is a natural and irreversible process that can occur both in its physiological and in an accelerated pathological form. The article analyzes manuscripts reflecting the influence of external and internal factors on the pathophysiological mechanisms of skin aging. The PubMed database was analyzed for the following key words: skin aging, dermis aging, dermal atrophy, collagen, estrogens, androgens, oxidative stress. It has been shown that the leading role among the "external" factors of skin aging belongs to ultraviolet radiation, which causes oxidative stress in skin cells, reduces the adaptive resource of the organism's antioxidant system, which leads to alteration and disruption of repair mechanisms. Among the factors of "internal" aging, the main role belongs to endocrine system imbalance. Understanding these mechanisms and developing geroprotective methods of influencing important pathogenetic mechanisms of the chain of age-related changes will slow down the aging process of the skin, which largely determines the psychoemotional state of a person.

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FEATURES OF CARDIAC REMODELING ASSOCIATED WITH SPORTS SPECIALIZATION IN ADOLESCENT ATHLETES

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Key words: cardiac remodeling, sports specialization, adolescent athletes, echocardiography, martial artists, cyclic and acyclic sports, correlation relationships.

Annotation. The article presents the indicators of echocardiographic examination of a sample of adolescent athletes (n=190) with sports experience from 3 to 5 years, which were differentiated by gender, age and orientation of sports. The features of cardiac remodeling in adolescents in groups of martial artists and representatives of cyclic and acyclic sports are shown. The features of cardiac remodeling, revealed in the examined adolescents, are the result of the manifestation of a complex of internal and external factors: the stage of ontogenetic development; the specificity of sports specialization; individual genetic profile of an athlete. The dominance of the influence of one of the factors or their combined effect determines the specificity of "age" and "sports" remodeling of the heart.

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DEVELOPMENT OF COORDINATION ABILITIES OF 8-9 YEARS OLD SOCCER PLAYERS WITH A FOCUS ON REDUCING THE SEVERITY OF MOTOR ASYMMETRY

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Key words: coordination abilities, motor asymmetry, soccer players, coordination training.

Annotation. The purpose of the study is a theoretical and methodological substantiation and tracking of the effects of the application of the methodology for the coordination abilities development in soccer players aged 8-9 years with a focus on reducing the severity of motor asymmetry. The article presents the characteristics of the coordination training methodology for 8-9-year old soccer players, which is aimed at reducing the severity of motor asymmetry. It is built in stages (3 stages), contains a developed algorithm for the use of general and special training means (exercises, games, combinations, situational tasks), performed by the leading and non-leading leg, from the leading and non-leading direction, in a certain combination and sequence of execution, consists in the possibility of effective development of the level of coordination abilities, increasing the effectiveness of technical actions in typical situations of the game (both when performing actions with the leading and non-leading sides of the body). During a 6-month experiment with the participation of 47 football players aged 8-9 years, the effects of the developed approach were monitored.

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EFFECTIVENESS OF DEVELOPING RHYTHMIC ABILITIES IN YOUNG TRACK-AND FIELD ATHLETES

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Key words: rhythmic abilities, track-and-field, tempo, rhythm, running, jumping, throwing, sense of rhythm.

Annotation. The study's purpose is to test by experiment a methodology of developing rhythmic abilities in 9-10 year old track-and-field athletes, as well as to examine a degree of "trainability" of different signs of rhythmic abilities. This article presents results of studies demonstrating data on the level of rhythmic abilities' development in young track-and-field athletes. Different components of rhythmic abilities of 9-10 year old track-and-field athletes were examined. We also gave characteristics of the methodology of developing rhythmic abilities using a combination of means for improving tempo-rhythmic features of movement in local and global movements, an ability to preserve the maximum rhythm of movement and preservation of set tempo-rhythmic indicators when performing movements. The results of an experimental test of the effectiveness of the methodology of developing rhythmic abilities in young track-and-field athletes were presented. The developed approach allows increasing significantly the level of rhythmic abilities of young sprinters due to the use of special methodological approaches and dosing used means. Significantly higher results of used indicators were registered in the experimental group, where an amount of rhythmic exercises was increased by 13-15% by means of decreasing the same amount of strength exercises.

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PHYSICAL CULTURE AND HEALTH-IMPROVING TECHNOLOGIES AS A MEAN TO IMPROVE STRESS RESISTANCE OF STUDENTS

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Key words: health-improving technologies, motor activity, health-improving physical culture, students.

Annotation. This article analyzes the popularity and application of physical culture and health-improving technologies when organizing students' motor activity. Monitoring the stress resistance of students will make it possible to recommend to the younger generation an excellent alternative on how to cope with ever-increasing emotional and intellectual loads. The comparison was carried out between students of physical culture and other specialties in universities of Barnaul. An important criterion for increasing stress resistance is the assumption that the negative reaction to stress in this category of students would inexorably decrease in case of offering them optimal and systematic physical activity.

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FEATURES OF FUNCTIONAL FITNESS OF FIFTH GRADE SCHOOLCHILDREN BASED ON INTERVAL TRAINING

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Key words: interval training, functional test, breath-holding test on inhale, breath-holding test on exhale, schoolchildren, physical education.

Annotation. Effectiveness of interval training is that there is a stimulation of lipid oxidation in the organism, as well as suspension of catabolism due to alternating exercise modes, which allows preserving muscle mass, gained as a result of training. The aim of this study was to justify the effectiveness of using interval training in the process of physical education for increasing functional capabilities of the cardiorespiratory system of fifth grade schoolchildren. Boys of the experimental group performed exercises of artistic gymnastics using the interval training method for 6 months on physical culture classes. Peers from the control group performed physical exercises on classes according to the traditional program. Results of the study demonstrated that implementation of the interval training method for 6 months in the process of physical education allowed fifth grade schoolchildren to improve indicators of the cardiorespiratory system.

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PHYSICAL AND TECHNICAL FITNESS, PSYCHOPHYSIOLOGICAL FEATURES OF SOCCER PLAYERS WITH HEARING LOSS

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Key words: physical fitness, technical fitness, soccer players with hearing loss, futsal, psychophysiological features.

Annotation. The presented article provides data on the study of indicators of physical and technical fitness of soccer players with varying degrees of hearing loss in comparison with those of healthy soccer players. The survey involved 48 male athletes playing futsal: the main group (MG) – 16 people (2 teams) – soccer players with hearing loss, control group (GC) of 16 people (2 teams) – soccer players with hearing loss and comparison group (GC) – 16 soccer players with normal hearing. In the course of the study, it was found that the soccer players of the main group and the control group with hearing loss have lower indices of general, special physical and technical fitness in relation to the indices of soccer players with normal hearing. The psychophysiological features of soccer players with hearing loss are manifested in the formation of a moderately weak and weak type of the nervous system, with reduced indicators of the maximum rate of movements, a reaction to a moving object, a slowed down simple and complex visual-motor reaction.

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ASSESSMENT OF PHYSICAL DEVELOPMENT OF PRIMARY SCHOOL AGE CHILDREN ENGAGED IN KYOKUSHIN KARATE

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Keywords: young athletes, Kyokushin karate, physical development, morphotype, somatometry.

Annotation. To date, there are contradictions in science and practice between the demands of modern sports in the intensification of sports loads for successful performance at competitions and the preservation of health and harmonious development of young athletes. The search for a balance between these two issues lies in the plane of studying the physiological features of adaptation of the athlete's body to specific muscle loads, which served as the basis for this study. The aim of the study was to examine the morphotypological features of primary school age children engaged in Kyokushin karate. With the help of anthropometric methods and caliperometry, to determine the characteristics of the physical development of primary school age children engaged in Kyokushin karate and to identify morphological selection criteria at the stage of sports improvement, the indicators of 58 primary school age children were studied (8 boys aged 7 years, 5 at the age of 8 and 9 years, 20 at the age of 10 and 11 years). The length and mass of the body, total and partial body dimensions, as well as the thickness of subcutaneous fat folds were

determined with the identification of body types. The proportions of the body were established according to the classification of P.N. Bashkirov based on the percentage ratio of the longitudinal and transverse dimensions of the body to its length. The assessment of physical development showed that as young athletes grow and develop, there is a harmonious development of the physique with a predominance of dolichomorphic and dolicho-mesomorphic body proportions, a change in the component composition of the body towards an increase in the muscle component, which indicates adaptive changes in the body composition to systematic physical exertion. The degree of physical development of the examined young athletes corresponds to the morphophysiological norms of the development of children of these age groups. In the studied contingent, physical development is quite active, which allows them to implement complex psychomotor acts necessary for success in their chosen sport, i.e. Kyokushin karate.

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IMPROVEMENT OF GAME ACTIONS IN BEACH VOLLEYBALL

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Key words: beach volleyball, psychomotor apparatus, training, assessment of motor characteristics, choice reaction, concentration of attention.

Annotation. The lack of a differentiated training system for beach volleyball players makes them look for ways to improve. A clear distribution of movements in short intervals of time, one's own efforts in terms of spatial parameters using concentration of attention, which determines the worked out options of positive outcomes through a complex choice reaction, significantly increase the effectiveness. In beach volleyball, the use of the aforementioned psychomotor characteristics at the time of each serve determines the concept of the formation of developmental exercises. It is suggested to use tests as markers characterizing changes in motor criteria. The study was carried out in the open beach stadium located in Angarsk with 13-17 year old boys and girls, as well as adults who regularly participated in the training and playing process during the summer seasons of 2018-2020 in a total of 140 people. The training impact lasted six months and

amounted to 180 hours, including introductory and final testing. The control and experimental groups in 2018 included 22 people each, in 2019 – 25 people each, and in 2020 – 23 people each. The division order is random. As a result of the study, the indicators of characteristics of participants in the experimental group, in regard to the control group, increased in all tested parameters, as evidenced by the calculation of the t-criterion. In the preparation of athletes by specialization, it is effective to apply the training influence on psychomotor parameters prevailing in the given specificity. The interpretation of psychomotor elements in beach volleyball is scientifically novel and qualitatively complements the existing basics of training.

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INTERSUBJECT CONNECTIONS IN THE DEVELOPMENT OF COORDINATING ABILITIES OF PRIMARY SCHOOLCHILDREN WITH MILD INTELLECTUAL DISABILITY

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Key words: physical education, intellectual disability, coordination abilities, social adaptation, inclusive education.

Annotation. The purpose of the research is to experimentally test the possibility of including intersubject connections in the process of developing coordination abilities of schoolchildren in 3-5 grades of the I department of the special needs boarding school. The results of the study showed that for a more effective organization of the process of developing the coordination abilities of primary schoolchildren with mild intellectual disability, it is advisable to use intersubject connections and include in this process, along with the physical education teacher, other specialists working with this category of children, as well as parents (or legal representatives). In this study, the intersubject integration of physical culture was carried out with academic subjects like "Fine Arts", "Literature Reading" and "Mathematics". Within the framework of the pedagogical experiment, we implemented and developed an effective methodology for the development of the coordination abilities of primary schoolchildren with mild intellectual disability based on intersubject connections.