

**BALNEOLOGY AND REHABILITATION**

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**FEATURES OF PATHOGENESIS AND PREVENTION OF EARLY CHILD CARIES**

**A.R. Baroeva, S.Ch. Mamieva**

Institute of Biomedical Research – the branch of the Vladikavkaz Scientific Centre of the Russian Academy of Sciences, Vladikavkaz, Russia

**Annotation.** Childhood caries is one of the most serious health problems and the most uncommunicable disease in the world, affecting the immediate and long-term quality of a child's life. It manifests itself not only in a dysfunction of chewing, but also in speech, smile, psychosocial environment, the quality of life of the child and family. Children's caries causes mouth pain and dental abscesses, difficulty when eating, and a decrease in weight and body mass index compared to healthy children. Therefore, even at an early stage, a dentist or pediatrician is able to identify the cause of the development of caries and the habits of parents that contribute to the formation of a pathological process. The aim of the study was to theoretically analyze literature sources, devoted to the study of the development and prevention of caries in childhood. It has been proven that damage of milk teeth in comparison with permanent ones occurs more often due to a number of features: anatomical and physiological, oral microbiota, type of nutrition (excess of carbohydrates). Scientific research data of recent years confirm that regular preventive medical supervision, the formation of correct eating habits (reducing frequency of meals, no snacks, excluding foods that contain refined, easily digestible carbohydrates, balanced nutrition), social and psychological well-being, high-quality oral hygiene will not only help to maintain healthy baby teeth, but also will allow the child's dentition to form in a physiologically correct way.

**Key words:** early child caries, prevalence of caries, development factors, prevention.

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**DYNAMICS OF IMMUNITY INDICATORS IN CHILDREN WITH OBSTRUCTIVE BRONCHITIS**

**N.K. Kajtmazova**

Institute for Biomedical Research – the branch of the Vladikavkaz Scientific Center of the Russian Academy of Sciences, Vladikavkaz, Russia

**Annotation.** Obstructive bronchitis occupies one of the leading places in the structure of bronchopulmonary pathology in children. It is known that an unfavorable environment, allergens, infectious agents can provoke immunological changes in the human organism. The aim is to determine the dynamics of immunoglobulin A in saliva in children with obstructive bronchitis. Immunological examination of children was carried out. In the acute period of obstructive bronchitis, a decrease in the synthesis of immunoglobulin A in saliva was revealed, which indicates a decrease in the local immunity of the mucous membranes. After the therapy, carried out according to the classical scheme, a tendency towards the normalization of this indicator was revealed. The use of immunomodulators showed a significant increase in immunoglobulin A in saliva.

**Key words:** children, bronchitis, treatment, immunity, immunomodulators.

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### **MITOCHONDRIAL DYSFUNCTION OF HEPATOCYTES IN EXPERIMENTAL MODELING OF METABOLIC SYNDROME**

**V.V. Kozlova<sup>1</sup>, D.I. Pozdnyakov<sup>2</sup>**

<sup>1</sup>Pyatigorsk Scientific and Research Institute of Balneology, the Branch of the FSBI “North-Caucasian Federal Research-Clinical Center of FMBA of Russia”, Pyatigorsk, Russia

<sup>2</sup>Pyatigorsk Medical and Pharmaceutical Institute – the branch of the Volgograd State Medical University of the Ministry of Health of Russia, Pyatigorsk, Russia

**Annotation.** According to the indicators of the state of the respiratory function of rat liver mitochondria, the study of mitochondrial dysfunctions developing during the modeling of metabolic syndrome in two variants was carried out: using a diet-induced model with a fructose solution, and as a result of a combination of a high calorie diet (fat, fructose) and streptozotocin at a sub-diabetic dose. Both variants of pathology modeling led to a significant change in the respiratory function of mitochondria in terms of changes in the maximum oxygen consumption rate, under conditions of utilizing various oxidation substrates: glucose, pyruvate, lactate, and glutamate.

**Key words:** experiment, rats, mitochondria’s respiratory function, metabolic syndrome.

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### **THE EFFECT OF COURSE INTAKE OF “MASHUK-19” MINERAL WATER AND L-CARNITINE ON THE METABOLISM OF HEALTHY ANIMALS IN THE EXPERIMENT**

**M.E. Kotova, L.A. Pigunova**

Pyatigorsk Scientific and Research Institute of Balneology – the branch of the FSBI “North-Caucasian Federal Research-Clinical Center of FMBA of Russia”, Pyatigorsk, Russia

**Annotation.** The purpose of the study was to evaluate the effect of the course intake of the “Mashuk-19” mineral water and L-carnitine on the metabolism of healthy animals in the experiment. Course intake of the “Mashuk-19” mineral water separately and in combination with L-carnitine had a unidirectional effect on the body of healthy animals in terms of body mass gain, reduced glycemia, thyroid hormone and cortisol levels and increased insulin levels. We have revealed a more significant increase in insulin levels by 1,5 times in the “Mashuk-19” + L-carnitine group compared to the “Mashuk-19” group. Both courses have a lowering effect on the level of C-peptide. In the L-carnitine group, the C-peptide was 12% lower than the intact values, in the “Mashuk-19” group – only 3,5% lower.

**Key words:** mineral water, “Mashuk-19”, metabolism, hormones, L-carnitine, rats, experiment.

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### **STRATIFICATION OF RISK FACTORS FOR RECURRENT GENITAL PROLAPSE IN WOMEN IN THE MENOPAUSAL PERIOD AFTER SURGICAL CORRECTION (LITERATURE REVIEW)**

**A.V. Nadtochij, V.A. Krutova, K.V. Gordon, F.E. Filippov**

Federal State Educational Institution of Higher Education "Kuban State Medical University" of the Ministry of Health of Russia, Krasnodar, Russia

**Annotation.** The article is devoted to the analysis of the distinctive features of the health of patients of the menopausal period of life, who have undergone surgical treatment for genital prolapse and who do not receive pharmacological support via hormone replacement therapy. The authors reflect the relevance of stratification of risk factors for recurrent pelvic organ prolapse in order to optimize measures for the prevention of adverse outcomes after surgical correction of genital prolapse and repeated surgical treatment for this in the future. Particular attention is paid to predicting the gynecological health of women with severe combined urogynecological conditions at the menopausal age, which often develop against the background of serious extragenital diseases complicating the course of both the surgical procedure itself and the prognosis of a favorable course of the postsurgical period.

**Key words:** genital prolapse, risk stratification, menopause, pelvic floor surgery.

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### **PSYCHOPHYSICAL TRAINING IN THE TREATMENT OF ADOLESCENTS WITH PRIMARY ARTERIAL HYPERTENSION COMBINED WITH OVERWEIGHT**

**N.N. Nezhkina, O.V. Kuligin, O.L. Nasonova, G.N. Mitrofanova**

Ivanovo State Medical Academy, Ivanovo, Russia

**Annotation.** The aim of the work is to establish the dynamics of the body component composition and vegetative regulation in adolescents with primary arterial hypertension combined overweight under the influence of psychophysical training. 60 patients aged 12-17 years with this pathology were examined. With the help of bioimpedance, the body composition was determined, and heart rate variability was analyzed to assess vegetative regulation. 20 teenagers underwent a standard set of therapeutic measures, 40 had psychophysical training included in it. It is established that this health-improving technology contributes to the improvement of the body composition. This is manifested by a decrease in the waist-hip index, an improvement in the body composition. The use of psychophysical training leads to a decrease in sympathetic tone and an increase in the activity of the cholinergic system, as a result of which blood pressure indicators decrease.

**Key words:** arterial hypertension, overweight, adolescents, psychophysical training.

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### **STATOKINETIC EXERCISES IN IMPROVING THE PHYSICAL STATUS OF STUDENTS OF A SPECIAL MEDICAL GROUP**

**N.N. Nezhkina, O.V. Kuligin, O.L. Nasonova, G.N. Mitrofanova**

Ivanovo State Medical Academy, Ivanovo, Russia

**Annotation.** The aim of the study is to evaluate the effectiveness of psychophysical training as a method of correcting disorders of the functional state of the vegetative nervous system in adolescents. 80 adolescents aged 15-17 years with vegetative dystonia syndrome were examined according to vagotonic (n=40) and sympaticotonic (n=40) types before and after the course of psychophysical training. The high efficiency of this technology in the correction of disorders of the functional state of the vegetative nervous system has been established. This resulted in a decrease in excessive reactivity and maintenance of activity, a distinct tendency to equalize the sympathetic-parasympathetic balance, which is accompanied by a decrease in the frequency of clinical manifestations of autonomous dysregulation.

**Key words:** psychophysical training, vegetative nervous system, adolescents.

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### **EFFECT OF STIMULATION OF HEALING OF BURN WOUNDS IN RATS WITH NANOSECOND MICROWAVE PULSES**

**A.V. Samojlova<sup>1,3,4</sup>, A.A. Gostyukhina<sup>1,2,4</sup>, M.A. Bol'shakov<sup>1,4</sup>, V.V. Rostov<sup>1</sup>**

<sup>1</sup>Institute of High-Current Electronics, Siberian Branch of the Russian Academy of Sciences, Tomsk, Russia

<sup>2</sup>Siberian Federal Scientific and Clinical Center of the FMBA of Russia, closed city Seversk, Russia

<sup>3</sup>Siberian State Medical University, Tomsk, Russia

<sup>4</sup>Tomsk State University, Tomsk, Russia

**Annotation.** A study of the effects of the influence of nanosecond repetitively-pulsed microwave radiation (10 GHz, pulse duration – 100 ns, maximum power flux density – 140 W/cm<sup>2</sup>) on the healing of burn wounds in rats in real time after irradiation with pulse repetition rates of 8 and 13 Hz was carried out. Comparison of the results of the 4-fold local irradiation of wounds showed that repetitively-pulsed microwave radiation with an intensity of 140 W/cm<sup>2</sup> at a pulse repetition rate of 8 Hz more effectively accelerates wound healing processes in comparison with exposure to a pulse repetition rate of 13 Hz. This conclusion is based on a more rapid decrease in the area of the wound surface in animals. The obtained result gives grounds to consider the use of repetitively-pulsed microwave radiation in medical practice as promising.

**Key words:** burn wounds, nanosecond microwave pulses, laboratory rats.

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### **CORRECTION OF COORDINATION DISORDERS IN PATIENTS WITH MULTIPLE SCLEROSIS USING NORDIC WALKING**

**Ya.K. Yasinskaya**

Russian State University of Physical Education, Sport, Youth and Tourism, Moscow, Russia

**Annotation.** Multiple sclerosis is a progressive autoimmune disease. According to a number of authors, 40% of patients with the detection of the primary progressive form of the disease have coordination disorders of different spectrum. With the progression of the disease, coordination disorders of varying degrees are found in 80-85% of patients. This article considers the possibility of including Nordic walking in a complex of rehabilitation measures to correct coordination disorders of patients. We conducted a pedagogical experiment with two groups (control and experimental) and established the effectiveness of the proposed rehabilitation programs (with and without the inclusion of Nordic walking).

**Key words:** multiple sclerosis, Nordic walking, coordination disorders, coordination, equilibrium, balance.

### **SPORTS MEDICINE**

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### **APPLICATION OF ELECTROMYOGRAPHY TO STUDY THE FUNCTIONAL STATE OF THE NEUROMUSCULAR APPARATUS OF ATHLETES WITH DIFFERENT DIRECTIONS OF THE TRAINING PROCESS**

**S.M. Abutalimova**

FSBI “North-Caucasian Federal Research-Clinical Center of the Federal Medical and Biological Agency”,  
Essentuki, Russia

**Annotation.** The study of the features of the long-term adaptation of the neuromuscular apparatus of athletes to physical loads, as well as the study of the parameters of the correlation between the neuromuscular transmission and the study’s direction the is a relevant issue among scientists and specialists in the field of sports medicine, physiology, restorative medicine, functional diagnostics, biomechanics. The purpose of the research was to study and compare the parameters of the functional state of the neuromuscular apparatus of athletes with different directions of the training process. The experiment involved 49 male athletes specialized in weightlifting, track-and-field, triathlon, field hockey, fencing, volleyball and martial arts. The results obtained in the research demonstrate that motor response parameters, registered in weightlifters and track-and-field athletes, are higher than those in athletes of other sports. Moreover, weightlifters have higher speed of impulse conduction along nerve fibers. Therefore, we have revealed that athletes, who mainly train speed-strength qualities (weightlifting, track-and-field), have higher indicators of motor response and speed of excitation distribution through neuromuscular fibers, compared to athletes engaged in situational sports (volleyball, field hockey, fencing, martial arts) and athletes, who train endurance (triathlon). When analyzing the data received, we can draw conclusion about a direct effect of the sports training direction on the functional state of the athlete’s neuromuscular apparatus.

**Key words:** neuromuscular apparatus, stimulation electroneuromyography, athletes.

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## **HEART RHYTHM DISORDERS AS A MANIFESTATION OF THE PATHOLOGICAL ATHLETIC HEART AT DIFFERENT STAGES OF SPORTS TRAINING**

**E.A. Gavrilova, O.A. Churganov, E.V. Bryntseva, O.S. Larintseva**

North-West State Medical University named after I.I. Mechnikov, St. Petersburg, Russia

**Annotation.** The article deals with the problem of exercise-induced heart arrhythmias in athletes as a manifestation of the pathological athletic heart. The data from literature and our own data from researching 2245 athletes at three stages of sports training are presented. Electrical instability of the myocardium in athletes as a manifestation of the pathological athletic heart is more common at the stage of improving sports training in comparison with the stage of higher sportsmanship, in men more often than in women. Ventricular premature beats and bradyarrhythmias lead in the structure of cardiac arrhythmias of athletes.

**Key words:** athletes, exercise-induced heart arrhythmias, pathological sports heart, stages of sports training.

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## **SCREENING OF THE PSYCHOEMOTIONAL STATE OF EXTREME SPORTS ATHLETES WITH ELECTROENCEPHALOGRAPHY**

**V.I. Pustovojt**

SRC FMBC named after A.I. Burnazyan of the FMBA of Russia, Moscow, Russia

**Annotation.** Objective of the study is to develop a model for predicting the level of psychoemotional state of athletes participating in extreme sports. In dynamics, 30 male athletes, participating in extreme sports, were examined during the training and competition periods. The study was performed using electroencephalography, heart rate variability, and high-performance liquid

chromatography-mass spectrometry. Mathematical and statistical processing was performed in KNIME 4.1.2 and Statistica 7 programs. Analysis of the results obtained during the examination of athletes using high-performance liquid chromatography-mass spectrometry and heart rate variability methods revealed a strong ( $r > 0,70$ ;  $p < 0,05$ ) and average ( $0,30 < r < 0,69$ ;  $p < 0,05$ ) correlation with the forecast of the linear discriminant function (LDF). Mathematical data processing made it possible to determine statistically significant ( $p < 0,05$ ) predicative features that were included in the LDF. The developed model ensures that the predicted level of psychoemotional state of athletes coincides with the real result in 88,1% of cases with LDF8, 88,9% – with LDF7, 95,4% – with LDF6, 91% – with LDF5, 85% – with LDF4, 95,2% – with LDF3, 86,6% – with LDF2 and 76,6% of cases with LDF1. Significant ( $p < 0,05$ ) predictive electroencephalography indicators (Delta 1U, Alpha U; Alpha K; Theta K; Delta 2K; Delta 1K; EEG POLY; Beta 2U; PS; Beta 1U; Beta 1K) were determined, the values of which must be substituted into the developed formulae in the linear discriminant function. This mathematical model has a high information capacity (89,1%) and allows you to timely and reliably ( $p < 0,05$ ) predict the level of psychoemotional state of athletes participating in extreme sports.

**Key words:** athletes, extreme sports athletes, psychoemotional state, electroencephalography, linear discriminant analysis.

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## **INTERRELATIONS OF THE REGULATORY AND EXECUTIVE APPARATUS OF THE NEUROMUSCULAR SYSTEM OF ATHLETES IN THE STUDY OF REACTIVITY**

**N.V. Lunina<sup>1</sup>, Yu.V. Koryagina<sup>2</sup>**

<sup>1</sup>Russian State University of Physical Culture, Sports, Youth and Tourism, Moscow, Russia

<sup>2</sup>FSBI “North-Caucasian Federal Research-Clinical Center of the Federal Medical and Biological Agency”, Essentuki, Russia

**Annotation.** This article describes features of the interaction between the regulatory and executive apparatus of the neuromuscular system in the study of the athletes' reactivity. The functioning of the regulatory apparatus is represented by parameters of the brain bioelectric activity in the alpha, beta and theta ranges. The functioning of the executive apparatus was evaluated by the motor response characteristics when studying the reactivity in visual-motor tests of varying complexity. The consistency of the functioning of the regulatory and executive apparatus of the neuromuscular system of athletes in the implementation of the motor response was studied by means of correlation analysis, determining the direction and strength of the interaction. Positive interactions of average strength between the regulatory and executive apparatus in response speed in simple and complex visual-motor responses were revealed, despite the different structural and functional levels of the brain in ensuring their execution. A number of erroneous motor responses shows the development of fatigue. An absence of motor response reactions implicates direct correlation of great strength with the beta and theta ranges and stress of mimic muscles, as well as a decrease of strength in interaction with the alpha range, which demonstrates generalized nature of fatigue in both apparatuses. The received data on character and strength of such interaction would allow identifying promptly an appearance of unfavorable psychophysiological changes, related to fatigue, and will serve as a basis for choosing means of fatigue prevention and correction in the neuromuscular system of athletes within the process of their professional activity.

**Key words:** bioelectric activity of the brain, neuromuscular system, reactivity, interrelations of body systems, athletes.

## PHYSIOLOGY

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### INDICATORS OF HEART RATE VARIABILITY IN TEACHERS OF SECONDARY SCHOOLS OF YUGRA, DEPENDING ON THE SEVERITY OF THE EMOTIONAL BURNOUT SYNDROME

E.A. Bagnetova<sup>1</sup>, T.I. Malyukova<sup>1</sup>, O.G. Litovchenko<sup>2</sup>

<sup>1</sup>Surgut State Pedagogical University, Surgut, Russia

<sup>2</sup>Surgut State University, Surgut, Russia

**Annotation.** The article presents the features of the heart rate variability indicators of teachers from the northern region, depending on the severity of the emotional burnout syndrome. 150 female teachers were examined. The results of the study revealed that the severity of emotional burnout symptoms (which were experienced by teachers) was accompanied by changes in heart rate variability indicators, manifested in an increase in sympathetic tone in the circulatory system regulation. There was a significant increase in the mode and mode amplitude indicators in the regulation of the cardiovascular system and a decrease in the degree of influence of the parasympathetic division of the vegetative nervous system. In the group of teachers with a low level of emotional burnout, the average values of mode indicators were  $851,81 \pm 21,01$  ms, which significantly differed from the same indicators of teachers with a high level of emotional burnout ( $783,20 \pm 21,21$  ms). The group of teachers with a high level of burnout syndrome had a significant decrease in RMSSD from  $36,10 \pm 2,62$  ms, female teachers a low level of burnout syndrome manifestation had a decrease to  $24,82 \pm 2,58$  ms. The group of teachers with a high level of burnout syndrome had significantly higher SDNN values in comparison with similar data of female teachers in the group with a low level of professional burnout.

**Key words:** Khanty-Mansiysk Autonomous Okrug – Yugra, burnout syndrome, heart rate variability, female teachers, cardiovascular system.

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### ROLE OF REACTIVE ANXIETY IN TOLERANCE OF ADDITIONAL RESPIRATORY RESPIRATION

Yu.Yu. Byalovskij, I.S. Rakitina

Ryazan State Medical University named after Academician I.P. Pavlov of the Ministry of Health of the Russian Federation, Ryazan', Russia

**Annotation.** The aim of the study was to examine the role of reactive anxiety of subjects in the tolerance of different values of additional respiratory resistance. It was found that the tolerance of additional respiratory resistance in subjects with low anxiety was significantly higher than that in subjects with high anxiety. The lower tolerance of resistive respiratory loads in subjects with high anxiety is accompanied by less work of the respiratory muscles to overcome this resistance. When breathing in conditions of additional respiratory resistance, high-anxious subjects experienced a higher level of dyspnea on the Borg scale than participants with low situational anxiety on the same resistance values.

**Key words:** additional respiratory resistance, tolerance, reactive anxiety.

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## HEALTH LEVEL OF ATHLETES, ENGAGED IN POWERLIFTING, WITH MUSCULO-SKELETAL DISABILITIES

I.N. Kalinina<sup>1</sup>, I.N. Fedorova<sup>1</sup>, M.G. Polovnikova<sup>1</sup>, A.Ya. Chamokova<sup>2</sup>

<sup>1</sup>Kuban State University of Physical Culture, Sports and Tourism, Krasnodar, Russia

<sup>2</sup>Majkop State Technological University, Majkop, Russia

**Annotation.** This study is devoted to the examination and evaluation of health components in athletes with musculoskeletal disabilities, engaged in powerlifting, compared with healthy athletes. The study involved 48 highly qualified (master of sports, candidate for master of sports) and qualified (1 grade and below) athletes aged 18-25 years old, of different gender, who were engaged in powerlifting. Group 1 consisted of 12 qualified athletes with musculoskeletal disabilities; group 2 – 12 highly qualified (Master of Sports, Candidate for Master of Sports) athletes with musculoskeletal disorders; group 3 – 12 qualified healthy athletes; group 4 – 12 highly qualified healthy athletes. Respondents were interviewed using the SF-36 questionnaire with questions about the subjective state of health. The study allowed standardizing and calculating indicators of the scales depending on the athlete's qualification. Analysis of data on the subjective state of athletes, engaged in powerlifting, revealed that highly qualified athletes, regardless of the state of health, had better indicators according to the SF-36 questionnaire in comparison with low-qualified athletes. The results obtained can serve as a foundation for developing appropriate options of training loads.

**Key words:** health, powerlifting, athletes, athletes with disabilities, sports for people with musculoskeletal disabilities.

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## CHRONO-NUTRITION AS A TOOL FOR OPTIMIZING THE ADAPTIVE POTENTIAL OF ATHLETES

I.V. Kobel'kova<sup>1,2</sup>, M.M. Korosteleva<sup>1,3</sup>, M.S. Kobel'kova<sup>4</sup>, D.B. Nikityuk<sup>1</sup>

<sup>1</sup>Federal Research Center for Nutrition, Biotechnology and Food Safety ("Federal Research Center for Nutrition and Biotechnology"), Moscow, Russia

<sup>2</sup>Academy of Postgraduate Education of the FSBI FSCC of the FMBA of Russia, Moscow, Russia

<sup>3</sup>Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia", Moscow, Russia

<sup>4</sup>Outpatient Clinic №20 of the Directorate of the President of the Russian Federation, Moscow, Russia

**Annotation.** Chrono-nutrition is a developing area based on the relationship between interval feeding patterns, circadian rhythms of metabolic processes. Evidence from both animal and human studies demonstrates the adverse effects of circadian rhythm disturbances. Conversely, there is a growing body of research showing that distributing food intake over time intervals, in which circadian chronotype, circadian rhythms, endurance, athletes, resting energy expenditure, adaptive potential. metabolic rhythms are optimized for nutrition, can be effective in improving metabolic health. Circadian rhythms, which affect glucose and fat homeostasis, insulin sensitivity, energy expenditure, and diet-induced thermogenesis can enhance adaptive capacity and improve endurance and athletic performance.

**Key words:** chrono-nutrition, chronotype, circadian rhythms, endurance, athletes, resting energy expenditure, adaptive potential.

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## **ECOLOGICAL AND PHYSIOLOGICAL ASPECTS OF HEALTH PROTECTION OF THE YOUNG YUGRA POPULATION**

**O.G. Litovchenko<sup>1</sup>, E.A. Bagnetova<sup>2</sup>, A.V. Tostanovskij<sup>2</sup>**

<sup>1</sup>Surgut State University, Surgut, Russia

<sup>2</sup>Surgut State Pedagogical University, Surgut, Russia

**Annotation.** The article presents a brief overview of research papers on environmental physiology. The issues of preserving the health of the young population living in hypo comfort climatic conditions of the Khanty-Mansijsk Autonomous Okrug – Yugra were considered. There is a brief description of the morphofunctional and psychophysiological status of young northerners. The article presents literature data on the features of regulatory processes among residents of the northern region. The need to consider the regional features of the functional state of the Yugra's young population when organizing educational and training processes in various educational organizations is emphasized. The importance of educating a culture of a healthy lifestyle in the younger generation is substantiated.

**Key words:** newcomer northern population, climatic and geographical factors of the environment, health protection, healthy lifestyle, Khanty-Mansijsk Autonomous Okrug – Yugra, northern region.

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## **INDIVIDUALLY DIFFERENTIATED APPROACH TO PHYSICAL ACTIVITY OF STUDENTS BASED ON PSYCHOPHYSIOLOGICAL ADAPTATION**

**O.N. Moskovchenko<sup>1,2</sup>, O.A. Katsin<sup>2</sup>, D.A. Shubin<sup>2,3</sup>, T.S. Ivanova<sup>2</sup>**

<sup>1</sup>Krasnoyarsk State Pedagogical University named after V.P. Astaf'ev, Krasnoyarsk, Russia

<sup>2</sup>Krasnoyarsk State Agrarian University, Krasnoyarsk, Russia

<sup>3</sup>V.F. Vojno-Yasenetskij Krasnoyarsk State Medical University of the Health Ministry of Russia, Krasnoyarsk, Russia

**Annotation.** The article discusses the issues of an individually differentiated approach to the dosing of first-year students' physical activity, taking into account their physical fitness and psychophysiological adaptation. Psychophysiological adaptation is determined not only by the ratio of mental and physiological processes, but also by the formation of psychomotor functions. Based on this, the psychomotor functions that characterize the mobility and lability of nervous processes, the stability of mental processes are examined. The experimental material presented in the article clearly characterizes the adaptive capabilities of 1st year students, which should be considered as one of the indicators ensuring the quality of the educational process in physical culture at the university.

**Key words:** 1st year students, psychophysiological adaptation, heart rate variability, individually differentiated approach to physical activity.

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## **FUNCTIONAL ASYMMETRY OF EMG ACTIVITY AND DYNAMIC FEATURES IN ELITE WEIGHTLIFTERS WHEN PERFORMING THE COMPETITIVE SNATCH**

**S.V. Nopin, Yu.V. Koryagina**

FSBI “North-Caucasian Federal Research-Clinical Center of Federal Medical and Biological Agency”, Essentuki, Russia

**Annotation.** The relevant issue of biomechanics and sports physiology, as well as sports medicine, in the aspect of injury prevention, is to identify the asymmetry of sports movements. The aim of the study was to identify functional motor asymmetry manifested in the power and electromyography parameters of the leading muscles when performing the competitive snatch by elite male and female weightlifters. In the study, using the developed methodology for biomechanical and electromyographic evaluation of weightlifting exercises, the functional asymmetry of electromyographic activity and dynamic characteristics in male and female weightlifters during the performance of the snatch were determined. The research results revealed small right-sided functional asymmetry of the vertical component of the efforts, made on the support by the foot, both in male and female weightlifters. The asymmetry of the average electromyography amplitude of the muscles was insignificant and had the following features: left-sided asymmetry for the trapezius muscle and right-sided asymmetry for the leg muscles (quadriceps femoris, biceps femoris, and gastrocnemius). The greatest manifestations of asymmetry were revealed in the snatch phase, which, apparently, is associated with the partially unsupported position of the body. According to electromyographic activity, dominance of the right leg was revealed in all weightlifters. The symmetrical performance of the exercise testifies to the good technical fitness of the studied elite weightlifters and appropriate muscle balance.

**Key words:** functional asymmetry, motor asymmetry, biomechanics, electromyography, weightlifting exercises, weightlifting snatch.

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## **NEURODYNAMIC CHARACTERISTICS OF SENSORIMOTOR PROCESSES IN ATHLETES OF VARIOUS SPORTS**

**S.V. Nopin**

FSBI “North-Caucasian Federal Research-Clinical Center of Federal Medical and Biological Agency”, Essentuki, Russia

**Annotation.** The aim of the work was a comparative study of simple and complex sensorimotor responses in athletes of various sports. The study of neurodynamic characteristics, manifested in simple and complex sensorimotor responses, made it possible to identify sports with a definite combination of physiological characteristics that contribute to the manifestation of different levels of sensorimotor responses. For simple sensorimotor responses, the highest level of manifestation was revealed for sports with a cyclic structure of movements and leading motor qualities of speed and endurance, for complex sensorimotor responses – situational sports with leading speed-strength qualities. We also discovered that athletes do not differ in the best indicators of reaction time from those actively engaged in physical culture. Men differ from women in the best values of a simple sensorimotor response. The worst values of sensorimotor responses were found in athletes with disabilities. Considering the data obtained from the standpoint of the plasticity of the nervous system and neurodynamic properties, one can state that they are more pronounced in athletes with a higher level of complex sensorimotor responses, i.e. in situational sports with leading speed-strength qualities.

**Key words:** neurodynamics, sensorimotor responses, psychophysiology, athletes, gender differences.

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## **INFLUENCE OF THE COURSE APPLICATION OF THE AUTHOR'S METHOD OF VIBROACOUSTIC MASSAGE WITH SINGING BOWLS ON THE DISORDER AND QUALITY OF SLEEP**

**V.O. Oguj**

Ural State University of Physical Culture, Chelyabinsk, Russia

**Annotation.** The article deals with the problem of physical education of students in higher education. The study of physical culture of students of higher educational institutions in the process of out-of-class wide-scale sports project was carried out in accordance with the components and criteria of physical culture defined at the level of theoretical analysis. The research was carried out with I-II year students of several pedagogical universities at extracurricular physical education classes in the main department of sports improvement, general physical training classes and independent physical exercises, physical culture events. The results of a diagnostic study of the intellectual and personal qualities of I-II year students are considered. According to the results obtained, quantitative and qualitative features are observed.

**Key words:** insomnia, Pittsburgh questionnaire, Ya.I. Levin scale, vibroacoustic massage, singing bowls, vibromassage.

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## **FEATURES OF THE HEART RATE VEGETATIVE REGULATION WHEN USING THE AUTHOR'S METHOD OF VIBROACOUSTIC MASSAGE WITH SINGING BOWLS**

**V.O. Oguj**

Ural State University of Physical Culture, Chelyabinsk, Russia

**Annotation.** Heart rate variability parameters reflect the functioning of many body systems, and the sympathetic and parasympathetic parts of the vegetative nervous system have the greatest influence on their formation. Any external influence changes the vegetative regulation of cardiac activity. One of these effects can be vibroacoustic massage using singing bowls, the healing effect of which is reported in a number of studies. The purpose of this study was to examine the effect of the author's method of vibroacoustic massage with singing bowls on the parameters of heart rate variability. The study involved 20 people: 15 women and 5 men aged 19-58 years. The average age of the participants was  $30,36 \pm 13,94$  years. All of them underwent a course of 8-12 procedures of vibroacoustic massage with singing bowls according to the author's method. Assessment of heart rate variability was carried out before the start of the course, immediately after it and after 2 weeks. Significant changes in some indicators were observed immediately after the end of the course, but were not registered 2 weeks after. During the active orthostasis test, there was an increase in the activity of suprasedgmental structures (very low frequency – from  $27,20 \pm 14,73$  to  $36,23 \pm 15,62$ ,  $p=0,014$ ) compared with the data before the course. We have found that exposure to the author's method of vibroacoustic massage with singing bowls led to activation of the suprasedgmental level of regulation under orthostatic load conditions, which can be considered as an adaptive response to changing conditions during an active orthostatic test.

**Key words:** heart, heart rate variability, vegetative nervous system, vibroacoustics, singing bowls, massage.

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**OPERANT AND CURRENT CONTROL WITH THE METHOD OF VARIATIONAL BEAT-TO-BEAT DETECTION OF THE FUNCTIONAL STATE OF 1ST YEAR STUDENTS WITHIN PROCESS OF PHYSICAL CULTURE AND HEALTH-IMPROVING CLASSES**

**A.E. Ponomarev, I.A. Ponomareva**  
Southern Federal University, Rostov-on-Don, Russia

**Annotation.** The recommendations developed on the basis of the kinetic and ergonomic approach for optimizing physical loads of a health-improving direction provide an increase in the level of the functional state of the students, normalize regulatory effects on the cardiovascular system and contribute to the formation of students' motivation for health protection and skills of implementing methods and means of health-improving physical culture for the formation, preservation and strengthening of health. Variational beat-to-beat detection is an affordable non-invasive method of medical and pedagogical control. It allows not only to assess the overall dynamics of changes occurring in the organism during physical activity, but also to carry out operant control to make corrections in the sports and wellness process.

**Key words:** physical culture and health-improving classes, students, functional state, beat-to-beat detection.

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**INDICATORS OF HEART RATE VARIABILITY OF SKI RACERS IN THE CONDITIONS OF TRAINING CAMPS USING TRANSCRANIAL ELECTRICAL STIMULATION**

**E.A. Rul', O.N. Kudrya**  
Siberian State University of Physical Education and Sport, Omsk, Russia

**Annotation.** The purpose of the research was to study the effect of transcranial electrical stimulation on the heart rate variability of ski racers in the conditions of training camps. Timely diagnosis of signs of overstrain and, if necessary, the use of restorative means is of particular importance in the conditions of training camps of ski racers. The analysis and synthesis of the research results presented in the article contributed to the study of transcranial electrical stimulation as an out-of-training mean and its effect on the functional state of the cardiovascular system of skiers. The assessment of the state of the cardiovascular system was carried out using a modern method of diagnosing heart rate variability. It has been revealed that the use of the transcranial electrical stimulation course favors an increase in savings in the cardiovascular system's activity.

**Key words:** ski racing, cardiovascular system, transcranial electrical stimulation, recovery, heart rate variability.

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**AGE AND GENDER FEATURES OF CARDIORESPIRATORY ENDURANCE WHEN WALKING ON A TREADMILL WITH INCREASING SPEED**

**A.S. Snigirev<sup>1</sup>, A.S. Kintyukhin<sup>1</sup>, S.I. Loginov<sup>2</sup>**

<sup>1</sup>Surgut State University, Surgut, Russia

<sup>2</sup>Vladimir State University named after Aleksandr and Nikolaj Stoletovs, Vladimir, Russia

**Annotation.** The aim is to test the possibility of using the pulmonary ventilation indicator to assess the state of the human cardiorespiratory system when walking at different speeds depending on gender and age in the conditions of the Siberian north. Three groups of healthy volunteers of young, middle and elderly age performed treadmill walking at a speed of 2-7 km/h for 5 minutes at each speed. Metabolograph FitMetPRO K4b 2 (COSMED, Italy) was used to measure the respiratory rate (RR, exp/min), ventilation ( $V_e$ , l/min), oxygen consumption ( $VO_2$ , ml/min), heart rate (HR, beats/min), as well as leg length (cm), height (m), weight (kg), body mass index ( $kg/m^2$ ). Regression equations for the dependences of  $V_e$  on  $VO_2$  and HR on  $VO_2$  were obtained in young women:  $V_e=0,19+0,028VO_2$  ( $r=0,94$ ) and  $HR=70,1+0,05VO_2$  ( $r=0,72$ ); young men:  $V_e=2,20+0,024VO_2$  ( $r=0,97$ ) and  $HR=74,1+0,032VO_2$  ( $r=0,72$ ); middle-aged women:  $V_e=5,34+0,022VO_2$  ( $r=0,80$ ),  $HR=67,5+0,035VO_2$  ( $r=0,74$ ) and men:  $V_e=2,67+0,024VO_2$  ( $r=0,92$ ),  $HR=52,6+0,04VO_2$  ( $r=0,83$ ); elderly women:  $V_e=12,7+0,016VO_2$  ( $r=0,74$ ),  $HR=0,84,4+0,022 VO_2$  ( $r=0,67$ ) and men:  $V_e=7,6+0,025VO_2$  ( $r=0,84$ ) and  $HR=65,6+0,025 VO_2$  ( $r=0,59$ ) at  $p<0,001$  (here and everywhere), respectively. In all age groups of participants, the correlation coefficient of oxygen consumption with the rate of respiratory ventilation is higher than with the heart rate. Thus, the ventilation value can be used to assess cardiorespiratory endurance as an alternative indicator when the metabolimeter is not available.

**Key words:** cardiorespiratory endurance, walking speed, oxygen consumption, pulmonary ventilation, 18-75 years, gender differences, Siberian north.

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## ASSESSMENT OF THE FUNCTIONAL STATE OF THE CENTRAL NERVOUS SYSTEM IN WRESTLERS OF VARIOUS QUALIFICATIONS

**N.Yu. Tarabrina**

Moscow Aviation Institute (National Research University), Moscow, Russia

**Annotation.** The article is devoted to the study of the process of long-term adaptation of the central nervous system to physical loads in the aspect of neurodynamics of sensorymotor responses in wrestlers. The manifestation of extrareceptive and intrareceptive reactions, as well as the neurodynamic characteristics of muscle tone of the upper and lower extremities were compared in 16 judo wrestlers aged 19-20 years with the qualification of I-II degree (group 1,  $n=9$ ) and with the qualification of a Candidate for Master of Sports and Master of Sports (group 2,  $n=7$ ). It is shown that the afferent and efferent components of motor skills are implemented on average 1,5 times more accurately in wrestlers with high qualifications than in wrestlers with low qualifications ( $p<0,01$ ). Significant differences in organizing neuromuscular coordination were found in the muscles of the upper extremities of athletes in both groups (from 10 to 40% ( $p<0,01$ )). In the muscles of the lower extremities, the neurodynamic characteristics of the formation of muscle tone have no significant differences ( $p>0,05$ ).

**Key words:** central nervous system, sensorimotor response, athletes, wrestlers.

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## CORRELATION BETWEEN POSTURAL BALANCE INDICATORS AND THE EFFECTIVENESS OF PLAYING ACTIVITY IN BADMINTON PLAYERS

**E.V. Tarasova, E.R. Rummyantseva**

Volga Region State University of Physical Culture, Sport and Tourism, Kazan', Russia

**Annotation.** The work assessed the quality of postural balance and determined the correlation between the stabilographic indicators and the effectiveness of playing activity in badminton players of different age groups: second childhood, adolescence and young age. We carried out two series of studies: during the transitional and the preparatory periods of the one-year training cycle of preparation. It is revealed that the quality of postural balance improves with age during the preparatory period. In addition, we revealed medium and strong correlations between the studied stabilographic indicators and the effectiveness of playing activity in badminton players.

**Key words:** badminton players, postural balance, correlation analysis.

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## **GENDER AND AGE FEATURES OF AUTOPHAGY ACTIVITY AMONG HEALTHY PEOPLE**

**I.A. Tkhakushinov, S.P. Lysenkov**

Majkop State Technological University, Majkop, Russia

**Annotation.** The article presents the results of a study of autophagy activity in relatively healthy individuals (50 women and 17 men) in different age categories (28-69 years). Autophagy activity was assessed by the concentration of the marker protein Beclin-1. It was found that the levels of beclin-1 concentration in both men and women are highly variable. Comparative statistical analysis of indicators of autophagy activity by gender and age did not reveal significant differences. However, in men with normal weight, in contrast to women, direct correlations were revealed ( $r=0,96$ ;  $p<0,01$ ) with the amount of extracellular water, and in obese men with the content of lean muscle mass ( $r=0,62$ ;  $p<0,05$ ) and the total amount of water ( $r=0,62$ ;  $p<0,05$ ). The common thing was the presence in men and women of a direct correlation with the number of eosinophils. Young women and middle-aged men demonstrated a negative correlation between HDL cholesterol ( $r=-0,63$ ;  $p<0,05$ ) with the level of beclin-1, as well as a direct relationship in middle-aged men and obese men with triglyceride levels ( $r=0,65$ ;  $p<0,05$ ). In women with normal weight, there was a direct correlation with the level of hemoglobin ( $r=0,55$ ;  $p<0,01$ ) and the number of erythrocytes ( $r=0,68$ ;  $p<0,01$ ).

**Key words:** autophagy, Beclin-1, men, women, age, body mass, lipid metabolism.

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## **INFLUENCE OF MORPHOFUNCTIONAL INDICATORS AND PHYSICAL TRAINING ON SPORTS RESULTS IN ELITE TENNIS PLAYERS AGED 17-20 YEARS**

**E.Z. Kharisova, A.A. Nabatov**

Volga Region State Academy of Physical Culture, Sport and Tourism, Kazan', Russia

**Annotation.** The article considers the relationship between the central hemodynamics indicators, body composition, and physical fitness and sports results in tennis players. The work was carried out in Kazan' during years 2015-2017, in the Kazan' Tennis Academy. The experiment involved 40 people aged 17-20 years (20 boys and 20 girls). According to the obtained correlation relationships, we discover that for male and female tennis players, who have the title of Candidate for Master of Sports and Master of Sports, the characteristic feature that affects the sports result are the central hemodynamics indicators, flexibility and speed-strength endurance. For male tennis players, who have a sports category, a specific feature manifested itself in the indicators of central hemodynamics. For female tennis players, who have a sports category, these are indicators of the

body composition.

**Key words:** sports result, tennis players, youthful age, body composition, central hemodynamics, physical training.

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## **DYNAMICS IN ANGULAR MOVEMENT VELOCITY IN KINEMATIC CHAINS OF THE MUSCULOSKELETAL SYSTEM OF ELITE ATHLETES WHEN PERFORMING FINAL EFFORT OF THE JAVELIN THROWING TECHNIQUE**

**K.D. Chermit, A.G. Zabolotnij, M.V. Abakumova**

Adyghe State University, Majkop, Russia

**Annotation.** This study is dedicated to the generation of angular movement velocity in kinematic chains of the musculoskeletal system of elite athletes. Registration of the angular movement velocity was made by using an optical system of movement video analysis. We have established two basic types of actions to generate angular movement velocity in links of the kinematic chain of the human's musculoskeletal system: actions for simultaneous generation and actions for consecutive generation of angular movements. Moreover, we have found specific features in actions of throwers in case of performing actions without support, amortizing actions and actions for taking a final position.

**Key words:** kinematic features of the javelin throwing technique, final effort of the javelin throwing technique.

## **PHYSICAL CULTURE AND SPORTS**

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## **THE ISSUE OF PHYSICAL EDUCATION OF HIGHER EDUCATION STUDENTS**

**D.N. Abramov**

A.F. Mozhajskij's Military-Space Academy, St. Petersburg, Russia

**Annotation.** The article deals with the problem of physical education of students in higher education. The study of physical culture of students of higher educational institutions in the process of out-of-class wide-scale sports project was carried out in accordance with the components and criteria of physical culture defined at the level of theoretical analysis. The research was carried out with I-II year students of several pedagogical universities at extracurricular physical education classes in the main department of sports improvement, general physical training classes and independent physical exercises, physical culture events. The results of a diagnostic study of the intellectual and personal qualities of I-II year students are considered. According to the results obtained, quantitative and qualitative features are observed.

**Key words:** analysis of upbringing, research results, physical education, physical development.

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## **DEVELOPMENT OF COORDINATION ABILITIES IN FUTSAL PLAYERS AT THE INITIAL TRAINING STAGE**

**S.Yu. Al'kova**

Surgut State University, Surgut, Russia

**Annotation.** The article presents the results of implementing the methodology for the development of coordination abilities in futsal players at the initial training stage. As the leading groups of exercises, we used summing, developing, focused on improving the level of formation of coordination skills in futsal and those that improve specialized perceptions ("sense of the ball"). The efficiency of the developed methodology was tested using the dynamics of the level of coordination abilities' development in athletes.

**Key words:** coordination abilities, futsal, methodology, stage of initial training of athletes.

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#### **DEVELOPMENT OF COORDINATION ABILITIES OF PRIMARY SCHOOL-AGED CHILDREN BY MEANS OF FUTSAL**

**S.Yu. Al'kova, O.V. Bulgakova**  
Surgut State University, Surgut, Russia

**Annotation.** The article presents the results of the use of futsal tools for the development of coordination abilities in primary school-aged children on physical education classes. Experimental means of futsal have been designed in such a way as to be able to use combinations of individual sets of exercises and vary them. From futsal exercises, blocks were formed, taking into account the direction of development of certain types of coordination abilities: leading, special and training. These tools contributed to the formation of new skills and therefore, were a stimulant for the development of coordination abilities in relation to the motor experience of younger schoolchildren, effectively affected the motor, visual, tactile analyzers. The dynamics of the level of coordination fitness of children of 1-4 grades was chosen as a criterion for checking the effectiveness of the developed use of futsal tools. The obtained results proved the effectiveness of the developed tools. In the experimental group, both boys and girls had significant and reliable gains in results, which showed an effective effect on the formation of the following abilities: related to holistic motor actions, orientation in space, coordination (communication) of actions.

**Key words:** futsal, coordination abilities, primary school-aged children.

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#### **METHODS OF IMPROVING VESTIBULAR STABILITY IN YOUNG SOCCER PLAYERS**

**Bagayoko Dugufana, Al Shikh Mkhd. Wisam, L.I. Kostyunina, A.N. Katenkov**  
Ul'yanovsk State Pedagogical University named after I.N. Ul'yanov, Ul'yanovsk, Ul'yanovsk, Russia

**Annotation.** Modern soccer is characterized by a high intensity of loads, the speed of players' response to stimuli, the need for a clear distribution and redistribution of muscle efforts, an accurate differentiation of spatio-temporal and spatio-power efforts. The purpose of the study is due to the need to develop a methodology for increasing the vestibular stability of young soccer players, taking into account the sensitive periods and characteristics of age-related development. In the course of the study, the features of the manifestation of vestibular stability in playing activity were analyzed, the means and methods of its directed development in young soccer players were considered. The results of the pedagogical experiment confirm the effectiveness of the proposed approaches.

**Key words:** soccer, initial sports training, methodology, coordination qualities, vestibular stability, balance.

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## PHYSICAL AND FUNCTIONAL DEVELOPMENT OF YOUNG SOCCER PLAYERS AGED 8-9 YEARS

A.V. Bakin<sup>1</sup>, S.A. Zabarovskij<sup>2</sup>, M.V. Krysin<sup>3</sup>

<sup>1</sup>Omsk Academy of the Ministry of Internal Affairs of the Russian Federation, Omsk, Russia

<sup>2</sup>Branch of the Military Logistics Academy, Omsk, Russia

<sup>3</sup>Far-Eastern Law University of the Ministry of Internal Affairs of the Russian Federation, Omsk, Russia

**Annotation.** The aim of the study is a comparative analysis of the indicators of physical and functional development of young soccer players aged 8-9 years, as well as the development of criteria for their assessment. The results of the study showed positive constitutional changes in morphofunctional development during the adaptation of children to soccer. According to the data obtained, 9-year-old athletes are characterized by great length-based, but smaller girth-based body dimensions and lower anthropometric indices. Indicators of the functions of the external respiration system and strength indicators also increase in this age period. Based on the materials of the work, criteria for assessing the indicators of physical and functional development for male soccer players aged 8-9 years are developed and presented. They are recommended for the stage-by-stage control of the morphofunctional state of young soccer players.

**Key words:** soccer, young athletes, physical development, functional state, morphofunctional status.

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## THE NEED TO CONTROL THE PHYSICAL FITNESS OF 8-9 YEARS OLD GIRLS ENGAGED IN CHOREOGRAPHY

Yu.V. Barkova<sup>1</sup>, I. Yu. Gorskaya<sup>1,2</sup>, T.A. Lindt<sup>1</sup>

<sup>1</sup>Siberian State University of Physical Culture and Sports, Omsk, Russia

<sup>2</sup>Omsk State Transport University, Omsk, Russia

**Annotation.** This article presents a description of the theoretical and empirical component of the methodology, which allows a comprehensive control of the general and special physical fitness of 8-9 years old dancers during health-improving choreography classes. In the course of the research, test tasks were developed and successfully introduced into the practice of choreographic schools, which help to reliably determine the level of general and choreographic fitness of the dancers. This article also offers a description of the differentiated assessment criteria for an appropriate control of the components of the dancers' fitness. An example of building an individual profile of general and choreographic fitness for those engaged in choreography within the framework of health-improving classes is given. The proposed testing program (traditional, modified, as well as specially designed tests) and the interpretation of the results obtained (using the construction of an individual profile of the level of development of general and special (choreographic) fitness) during health-improving choreography classes with girls of primary school age makes it possible to control fitness, conduct analysis of the data obtained and recommend the results of the research for their use in the practice of the work of choreographic groups. The prospects of using the developed methodology for assessing the level of physical fitness of 8-9 years old dancers are stated and practical guidelines for the work of specialists of choreographic groups are given.

**Key words:** fitness, young dancers, methodology, classes, choreography.

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UDC 796.42

### **TYOLOGICAL FEATURES OF THE NERVOUS SYSTEM OF ELITE ATHLETES IN DIFFERENT DISCIPLINES OF TRACK-AND-FIELD**

**I.Yu. Gorskaya, A.S. Belyakova, A.G. Karpeev**

Siberian State University of Physical Culture and Sports, Omsk, Russia

**Annotation.** The aim of the study is to study the typological characteristics of the nervous system of elite female athletes in different disciplines of athletics. During the study, we identified the type of nervous system in elite athletes. It was revealed that among women specializing in short-distance running and individual jumping types, sportswomen with types of the nervous system belonging to the weak group predominate. Athletes with a strong nervous system predominate in middle and long distance running. Athletes with weak and moderately weak types of nervous system prevail in throwing.

**Key words:** track-and-field, individual typological features, type of the nervous system.

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### **COMPARATIVE ANALYSIS OF MORPHOFUNCTIONAL INDICATORS OF GIRLS AGED 17-18 YEARS, LIVING IN URBAN AND RURAL AREAS**

**I.Yu. Gorskaya<sup>1</sup>, O.V. Krizhivetskaya<sup>2</sup>, A.A. Klimenko<sup>2</sup>**

<sup>1</sup>Siberian State University of Physical Culture and Sports, Omsk, Russia

<sup>2</sup>Omsk State Transport University, Omsk, Russia

**Annotation.** The purpose of the study is a comparative analysis of the morphofunctional indicators of girls – 1st year students (on the example of female students of the Omsk State Transport University). The morphological indicators and indicators of the functional state of girls aged 17-18 years, living in urban and rural conditions, were studied. It was revealed that, according to most of the studied indicators, there are no statistically significant differences between girls living in different environmental conditions, which indicates a decrease in the influence of the urban factor on the morphological and functional status of a person. Some indicators for girls, living in rural conditions, exceed the values of urban peers, which is due to differences in the m of life (nutrition, physical activity), as well as an environmental factor that is more favorable in rural regions.

**Key words:** physical development, morphological and functional indicators, functional state, female students.

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### **USING PRINCIPLES OF THE SITUATIONAL APPROACH IN SPORTS GAMES WHEN FORMING PHYSICAL CULTURE AND SPORTS ELECTIVE COURSE**

**V.V. Kozin, L.P. Pygaj**

Omsk State Agrarian University, Omsk, Russia

**Annotation.** The purpose of this study was to examine a possibility to implement the specificity of the situational approach in sports games when forming discipline modules “Physical culture

and sports elective course". We assume that the situational approach in sports games, which consists of forming visual and informational images of athletes, taking into account the game situation structure, would allow integrating views on the specificity for different sports situations by underlying a field of knowledge, qualitative and quantitative features of ways to implement motor moves in the educational process of students.

**Key words:** situation, sports, integration, elective course.

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## SEMANTICS OF TACTICS AND TECHNIQUE OF ATHLETES IN MODERN TECHNOLOGIES OF REGISTERING AND ANALYZING SPORTS ACTIVITY

V.V. Kozin<sup>1</sup>, D.V. Fedoseev<sup>2</sup>, V.V. Sumina<sup>1</sup>, I.G. Eremin<sup>1</sup>

<sup>1</sup>Omsk State Agrarian University, Omsk, Russia

<sup>2</sup>Southern Federal University, Rostov-on-Don, Russia

**Annotation.** The aim of this study was to examine features of modern technologies of registering and analyzing sports activity in team and game sports from the position of semantics and interpretation of data on motor activity of athletes. The examined problem of digitizing the field of sports is becoming more popular, since a great volume of information, obtained through hardware and informational technologies, does not always allow trainers and experts to objectively interpret data in the training process or during competitions. Technology and information are ahead of a man's ability to interpret and use them. However, systems of obtaining and processing information are not perfect. Trainers understand that, especially in case when it is time to make a decision.

**Key words:** statistics, tactics, technique, semantics, analytics.

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## ASSESSMENT OF PHYSICAL HEALTH OF SCHOOLCHILDREN AS AN ANALYSIS OF ADAPTIVE CAPABILITIES

E.N. Pashutina<sup>1</sup>, N.A. Garskaya<sup>2</sup>

<sup>1</sup>State University of Humanities and Technology, Orekhovo-Zuevo, Russia

<sup>2</sup>Luhansk State Pedagogical University, Luhansk, Ukraine

**Annotation.** The adaptive capabilities of an organism and its ability to balance with the environment is one of the fundamental properties of a living system. Therefore, the adaptive potential is considered as an integrative dynamic characteristic, which is the basis of human health. At the age of 11, the pupil's body is at the stage of physiological changes. As a result of the research, it was found that the adaptive potential of the cardiovascular system in boys is under greater stress than in girls. It is noted that schoolchildren, regardless of gender, have a weak physique with a dominant sympathetic nervous system. Almost every third examined child, regardless of gender, is in a state of school maladaptation.

**Key words:** adaptation, health, cardiovascular system, nervous system, children.

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### **THE INFLUENCE OF COMPREHENSIVE PHYSICAL DEVELOPMENT CLASSES ON THE PRIMARY SCHOOL CHILDREN'S COORDINATION ABILITIES**

**S.S. Udelov, E.V. Bykov, E.A. Sazonova, M.A. Pyatykh**

Ural State University of Physical Culture, Chelyabinsk, Russia

**Annotation.** This article presents the results of the influence of classes, developed under the author's program of comprehensive physical development and Wushu-sanda, using the main elements of this system for the development of primary school children's coordination abilities. The study was carried out using the force plate with biofeedback "Stabilan-01" (a three-stage version of computer stabilography). It has been established that regular classes in the course of three years significantly increase the level of this quality's development: the indicators of the length and area of the statokinesigram in the Romberg's test (with eyes open and closed) decrease. The energy efficiency of the balance and its effectiveness, as well as the energy efficiency of management in the "Target" test increase. The results obtained indicate the effectiveness of the proposed program for the development of coordination abilities of children and their preparation for classes in the sports section.

**Key words:** comprehensive physical development, children, primary school age, coordination, balance, stabilography.

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### **PHYSICAL EDUCATION IN CONDITIONS OF DISTANCE LEARNING**

**E.A. Safronova<sup>1</sup>, Yu.I. Sirenko<sup>2</sup>, A.S. Grechko<sup>2</sup>**

<sup>1</sup>Omsk Pedagogical University, Omsk, Russia

<sup>2</sup>Dostoevskij Omsk State University, Omsk, Russia

**Annotation.** This paper deals with issues of scientific, methodological and organizational support of the "Physical Culture" discipline to study motivation of students to learn more about values of physical culture and sports in case of implementing one of the most important disciplines of any direction of specialty's curriculum, including those related to compulsory distance learning. Answers of students (n=530) to the traditional quiz were analyzed. They were also compared with results obtained a year earlier. The study's results can be considered as preliminary, since we suggest carrying on research in order to reveal tendencies related to a change in an attitude of youth to their health in pandemic conditions or to a change in an amount of time taken for the discipline – 12 classroom hours with a teacher.

**Key words:** physical education of students, competencies and competence, needs, motivation, online learning.

**MATERIALS FROM THE VI SCIENTIFIC AND PRACTICAL CONFERENCE  
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**AIKIDO AS A MEAN OF INCREASING THE ADAPTIVE CAPACITY OF THE BODY  
OF SENIOR PRESCHOOL CHILDREN**

**I.M. Belousova, O.V. Khomyakova, R.A. Shitov**

V.I. Vernadskij Crimean Federal University, Simferopol’, Russia

**Annotation.** The purpose of the study is to identify the effectiveness of the impact of aikido classes on the level of motor abilities’ development, increasing the adaptive capabilities of the body of children of senior preschool age. For the study, we have selected a group of 10 children (boys) aged 5-7 years, who attended aikido training and health-improving classes 3 times a week, 60 minutes each, with a load dosage depending on the stage of the program. Before and after the end of the study, by the method of indices, the physical development level was determined, the functional state of the cardiorespiratory system was evaluated, motor qualities and physical performance were tested. The study revealed that aikido classes develop endurance, physical strength, and increase the level of movements’ coordination. These classes also contribute to the improvement of cardiovascular and respiratory systems, the expansion of the level of adaptation capabilities of the body.

**Key words:** aikido, senior preschool age, physical development, physical fitness, adaptation possibilities.

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**STATOKINETIC EXERCISES IN IMPROVING THE PHYSICAL STATUS OF STUDENTS OF A SPECIAL MEDICAL GROUP**

**N.G. Georgieva**

V.I. Vernadskij Crimean Federal University, Simferopol’, Russia

**Annotation.** The purpose of the article is to evaluate the effectiveness of the use of statokinetic exercises in increasing the functional resources of the central nervous system in the process of physical education of students of a special medical group. With the help of psychological and pedagogical methods, the positive dynamics of the body's ability to involve the resources of the nervous system, switching and concentration of attention during work has been revealed. The balanced work of nervous processes ensures the preservation of the cumulative effect of the central nervous system’s adaptive potential.

**Key words:** statokinetic exercises, special medical groups, students.

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### **IMPROVING THE FUNCTIONAL STATE OF THE RESPIRATORY SYSTEM OF ELDERLY MEN BY MEANS OF RECREATIONAL AND HEALTH-IMPROVING PHYSICAL CULTURE**

**N.G. Georgieva, N.S. Safronova**

V.I. Vernadskij Crimean Federal University, Simferopol', Russia

**Annotation.** The article offers a program of increasing the vital potential of the elderly. The program is based on the using recreational and health-improving physical culture. Recreational activity has a proven high potential to meet the basic motor and psycho-emotional needs of the elderly. The aim of the research was to study the influence of means of recreational and health-improving physical culture on the increase in functional reserves of the organism of elderly men. It was proven that dosed aerobic physical loads within the recreational and health-improving program contributes to the increase of functional reserves of the organism of the elderly.

**Key words:** men, old age, recreational and health-improving motor activity, functional state.

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### **IDENTIFYING PHASOGRAPHIC FEATURES OF THE CARDIAC ELECTRICAL ACTIVITY AS A PREDICTIVE METHODOLOGY AT THE BOUNDARY OF NORM AND PATHOLOGY IN SPORTS MEDICINE**

**E.I. Minina<sup>1</sup>, A.G. Lastovetskij<sup>2</sup>, Yu.V. Bobrik<sup>1</sup>**

<sup>1</sup>V.I. Vernadskij Crimean Federal University, Simferopol', Russia

<sup>2</sup>Central State Medical Academy of the Presidential Administration of the Russian Federation, Moscow, Russia

**Annotation.** This research investigates the possibility of using the phaseographic analysis of a digital single channel electrocardiogram in assessing features of the cardiac electrical activity on various models as a predictive methodology at the boundary of norm and pathology in individuals with different levels of functional reserves. Solving the issues of medical prediction of cardiac activity, the phaseography method, aimed at identifying the general patterns of the dynamics of changes in various signals, reliably presented a possibility to restore the overall picture and predict future situations by observing only parts (fragments) of the signals being studied, and not to state the already occurred pathological changes. Such approach can form a predictive methodology at the boundary of norm and pathology.

**Key words:** cardiac electrical activity, phasography, predictive diagnostics.

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### **CHANGES IN BALANCE INDICATORS IN YOUNG TRACK-AND-FIELD ATHLETES UNDER THE INFLUENCE OF SPECIALIZED MOTOR-COGNITIVE TASKS**

**E.I. Nagaeva, E.A. Biryukova, D.N. Zaharov, E.S. Tkach**

V.I. Vernadskij Crimean Federal University, Simferopol', Russia

**Annotation.** The purpose of the research was to study the dynamics of postural stability indices in young male track-and-field athletes under the influence of special motor-cognitive tasks. It was revealed that a motor-cognitive dynamic test conducted for 5 days led to an increase in the balance

efficiency coefficient, and changes in the Romberg coefficient values indicate an increase in the contribution of the proprioceptive system to maintaining balance in the standing position in young track-and-field athletes. The results of the study show that training with biofeedback according to stabilometric parameters is highly effective and leads to an increase in balance stability.

**Key words:** stabilometry, postural stability, standing balance, Romberg test, biological feedback, track-and-field.

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## **WAYS TO INCREASE THE EFFECTIVENESS OF KINESITHERAPY IN CHILDREN WITH CYSTIC FIBROSIS**

**N.S. Safronova<sup>1</sup>, D.V. Mashkovskaya<sup>2</sup>, E.V. Kozel'ko<sup>2</sup>**

<sup>1</sup>V.I. Vernadskij Crimean Federal University, Simferopol', Russia

<sup>2</sup>Republican Children's Clinical Hospital, Simferopol', Russia

**Annotation.** Kinesitherapy is the most important component of rehabilitation of children with cystic fibrosis and largely determines the quality of life and maintenance of respiratory function. The aim of the study was to evaluate the effectiveness and expediency of the use of individually-oriented kinesitherapy programs in children aged 8-12 years with cystic fibrosis in hospital treatment conditions. The study involved 10 patients, who underwent a course of basic kinesitherapy, expanded by innovative technologies. When choosing the means and methods, the physical and emotional state of the child, their motivation were taken into account. The results revealed an increase in the indicators of peak exhalation rate and respiratory tests, the value of the distance traveled in the 6-minute walk test. The level of physical and emotional functioning, the overall indicator of quality of life has increased.

**Key words:** kinesitherapy, cystic fibrosis, children, quality of life, bronchopulmonary system.

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37.013.42

## **OPTIMIZING MOTOR ACTIVITY TO PRESERVE A LEVEL OF WORKING CAPACITY OF MIDDLE-AGED WOMEN**

**I.A. Sukhareva, N. Khait**

V.I. Vernadskij Crimean Federal University, Simferopol, Russia

**Annotation.** Currently, one of the relevant medical and social problems, accompanied by high economic expenses in case of loss of working ability, is a growth of anxiodepressive states. The purpose of this study was to identify a significance of motor activity in middle-aged working women within evaluation of their psychomotor and physical capacity and level of health. We examined 49 mature women (36±1,1 years) with a working week of not less than 40 hours. The first group included women with lower physical activity, the second – those, who engaged in physical culture. It was revealed that an increase in motor activity up to 5 hours a week, including regular sessions in an aerobic mode, allows significantly increase the level of psychomotor and physical capacity, lower the level of anxiety. These changes influence greatly the risk component of losing working ability of middle-aged women.

**Key words:** motor activity, psychomotor and physical capacity, women of working age.

**INCREASING THE LEVEL OF FUNCTIONAL STATE OF THE BODY OF FRE-  
QUENTLY ILL CHILDREN WITH MEANS OF PHYSICAL REHABILITATION**

**O.V. Khomyakova, I.M. Belousova**

V.I. Vernadskij Crimean Federal University, Simferopol', Russia

**Annotation.** The aim of the study is to assess the effectiveness of means of physical rehabilitation in increasing the level of functional state of the body of frequently sick children. The examination involved 12 boys aged 7-8 years with recurrent bronchitis. The results were evaluated before and after rehabilitation measures (therapeutic and respiratory gymnastics, therapeutic massage, inhalations with weak alkaline mineral water "Borjomi" using a compressor-type nebulizer of the Rossmax model). The results of the study prove the effectiveness of the integrated application of therapeutic and respiratory gymnastics, lymphatic drainage massage of the chest, inhalations with weakly alkaline mineral water, which contributed to the improvement of physical development indicators, physical health level, impaired function of the external respiratory system, and the increase of reduced oxygenation indicators.

**Key words:** frequently ill children, rehabilitation, cardio-respiratory system, physiotherapy, inhalation, massages.