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Theory & Practice of Physical Culture

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Two models for the development of international sports in the context of politicization of modern society

Sports have long been affected by the difficult situation that has developed in the relations between some countries. In conditions of intensified confrontation, it is sport that has been chosen as a means, method or instrument of forcing a number of states to comply with the rules developed by those who are trying to position themselves as a hegemon in the arena of world civilization. This circumstance leads to the emergence of global inequality, which is only intensified by the introduction of sanctions that limit the participation of athletes from individual countries in the Olympic movement.



Today's political reality in sport is characterized by the following features: extreme politicization of sport as a social institution; polarization of international sports policy; involving sport as a participant in political discourse and media space; the formation of ideologically defined norms of international sports policy in the interests of individual states; the use of historical sports symbols as an effective mechanism for the politicization of modern sports.

Thus, a new social reality is being created, in which the classical model of "sport outside of politics" no longer works.

Currently, in the international sports arena, as a counterweight to the Olympic Games, new mega-sports events are being designed, which include the World Friendship Games, which are gaining political weight. The main feature of this project is its non-politicized content. The World Friendship Games are conceived as a harmonious addition to the already existing international competition calendar. For Russian athletes who have been excluded from major international competitions, the World Friendship Games are intended to become the most important sporting event in recent years and provide an opportunity to compete in a representative international sports forum with the strongest foreign athletes, as well as provide motivation and support to continue an active professional career. In turn, a significant prize fund and comfortable conditions for participation make the Friendship Games commercially attractive for athletes from all continents, who are guaranteed to perform with the flag and anthem of their country without any restrictions or conditions.

Today, the IOC, designed to unite the best athletes from all over the world, is making every effort to ensure that Russian athletes are excluded from participation in international competitions and accept the conditions for restricting admission to the Games in Paris 2024 (hereinafter referred to as the Games). In addition, the IOC takes on police functions, prohibiting athletes from realizing their potential in other competitions. In this regard, the question arises: is the IOC developing international sport, or, on the contrary, is it beginning to destroy it for the sake of its politicized ambitions?

As it became known, the IOC has now decided to admit Russian athletes to the Games in Paris 2024, while presenting a large list of requirements: athletes can compete exclusively in a neutral status, that is, without specifying the country (the team can be called "individual neutral athletes"); Russians do not have the right to participate in team competitions; Only those who pass the qualifying competitions will be able to get to the Games; Russian symbols (including the flag and coat of arms) will be prohibited at all official events of the Games; Russian officials subject to sanctions will not be able to attend the Games; athletes who publicly supported a special military operation will not be able to take part in the Games; Athletes related to Russian security forces will not be allowed; athletes must agree to an updated charter that emphasizes the peaceful goals of the Olympic movement.

Modern sport has become a tool of manipulation by political actors, forming new sociocultural meanings and values. In this regard, the question arises: what content will they be filled with, what will be the division of positions of states on the world sports arena?

However, in conditions of limited participation in the Olympic Games, Russia is developing and implementing many sports projects aimed at developing mass, children's and youth sports in order to preserve and increase the health of the nation.

You can be sure that the World Friendship Games will become an alternative promising sports project that will unite different countries on the terms of peaceful political cooperation, fair play, and winning victories based on objective judging.

We invite scientists to publish the results of scientific research aimed at finding and studying the value meanings of physical culture and sports.

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Polyfunctionality of hydrogenic locomotion as motor substrates of applied swimming

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Abstract

Objective of the study was to develop and substantiate a technological and pedagogical model for improving the applied swimming skills of rescue technicians in the water area by replacing hydrogen locomotion.

Methods and structure of the study. At the first stage, technical elements preferred for replacement were identified. The integral expert assessment of the effectiveness of locomotor movements was calculated using the arithmetic mean method based on the use of qualimetry algorithms. At the second stage, the productivity of using replacement exercises with the participation of rescue technicians in the water area at the age of 32.5 ± 0.5 years was assessed.

Results and conclusions. New possibilities for programming neuromuscular structures that ensure the functional implementation of hydrogenic locomotion in existing swimming combinations were achieved by generating a higher power regime for strokes; structural-kinetic coupling of rowing movements with the performance of the respiratory function during swimming; reducing hydrodynamic resistance forces; maintaining a stable body position in the water. The effectiveness of the replacement impact model is due to the structural and functional modification of the training of rescue service specialists in water areas, achieved through the use of transformative and integrating exercises.

Keywords: *hydrogen locomotion, rescue techniques, water-supported strokes, economization of equipment, replacement exercises.*

Introduction. The concept of hydrogenic locomotion is associated with the elementary movements of a person, ensuring his retention on the surface of the water in an active way, movement in the aquatic environment and the implementation of various professional functions in water-environmental conditions [1, 4]. As a rule, the formation of such actions occurs spontaneously under the influence of external circumstances that are not related to the purposeful pedagogical process of teaching sports methods of swimming. Failure to comply with pedagogical principles leads to unpredictability of learning outcomes [5].

Direct contact with the aquatic environment determines the water-environmental essence and genesis of the origin of hydrogenic locomotion. The structure of emerging technical actions, as a rule, manifests itself in individual motor reactions to the properties of

water and is characterized by a high energy cost of movements [2, 3, 7].

The didactic process of teaching applied swimming, based on the replacement of hydrogenic locomotion, includes the study of systemic connections of the elements of the structure of technical swimming; selecting the locomotion to be converted based on locomotor weight coefficients; synthesis of operational accents of programming a technical element; integration of the transformed element into the structure of the technical swimming combination [6].

Objective of the study was to develop and substantiate a technological and pedagogical model for improving the applied swimming skills of rescue technicians in the water area by replacing hydrogen locomotion.

Methods and structure of the study. At the first stage, technical elements preferred for replacement



were identified. The criterion indicator of the contribution of hydrogenic locomotion to swimming productivity is the value of locomotor weight, calculated as the arithmetic mean of the significance coefficients of individual kinematic characteristics. The integral expert assessment of the effectiveness of locomotor movements was calculated using the arithmetic mean method based on the use of qualimetry algorithms.

The diagnostic process of parametric assessment of locomotor weight included two stages of sequential diagnostic actions.

Stage I. Assessment of individual characteristics of locomotion: measurement of the values of quantitative indicators; selection within the optimal boundaries of quantitative indicators that are informative for assessing locomotor weight; calculation of significance coefficients of quantitative indicators; selection within the optimal boundaries of quality indicators that are informative for assessing locomotor weight; justification of scales for measuring quality indicators; calculation of coefficients of significance of qualitative indicators; translation of numerical values into points in accordance with the scales used.

Stage II. Final assessment of locomotor weight: choosing a method for combining points into an integral assessment of locomotor weight; calculation of the integral assessment of locomotor weight; study-

ing the calculated values and justifying the decision to replace locomotion.

According to the data obtained, a didactic model for the replacement of ineffective elements has been developed, reflecting the multifunctional orientation of hydrogenic locomotion.

At the second stage of the study, the productivity of using replacement exercises of a transformative and integrating nature was assessed with the participation of two study groups of rescue technicians in the water area at the age of 32.5 ± 0.5 years - experimental (EG) and control (CG). The structure of the content of the study includes 20 lessons focused on the multifunctional development of hydrogen skills.

Based on the predicted result, the structure of the experimental model of training rescuers for actions in natural waters includes three levels of mastering the content functionality: mastering special technical exercises on land; transformation of irrational hydrogen locomotion into technical elements that effectively ensure the performance of supporting and locomotor functions; formation of specialized skills for rescuing human and material resources in conditions of hydrogen disasters. The accentuated phase of the load ensured the manifestation of connections between the development of rational stroke movements, the duration of flotation on the surface of the water, orientation

Table 1. Empirical combinations of hydrogen locomotion of rescuers

Description	Conditional name	Empirical variations in the combination of locomotion
Hand movements		
Simultaneous downward strokes with arms	P ₁	P ₁ -H ₁ ; P ₁ -H ₂ ; P ₁ -H ₄ P ₂ -H ₁ ; P ₂ -H ₂ ; P ₂ -H ₄ P ₃ -H ₁ ; P ₃ -H ₂ ; P ₃ -H ₃ ; P ₃ -H ₄ P ₄ -H ₁ ; P ₄ -H ₂ ; P ₄ -H ₃ ; P ₄ -H ₄ P ₅ -H ₄ P ₆ -H ₄ P ₇ -H ₃ ; P ₇ -H ₄
Simultaneous frequent hand strokes	P ₂	
Simultaneous wide strokes with arms to the sides	P ₃	
Simultaneous hand strokes to the sides - downwards	P ₄	
Variable hand strokes without lifting out of the water	P ₅	
Alternating hand strokes, carrying them above the water, head in a position above the water	P ₆	
Alternating hand strokes, taking them out of the water, head in the water	P ₇	
Leg movements		
Synchronized leg strokes with the outside of the foot	H ₁	
Synchronized foot strokes with sole	H ₂	
Multidirectional leg stroke	H ₃	
Alternating kicks in a vertical plane	H ₄	



in natural waters while afloat, crossing water and wetlands by swimming and using the skills of diving while holding the breath.

The nature of adaptive reactions in mastering the hydrogen functionality of movements was assessed based on the results of performing verification tests of professional readiness.

The participants in the experiment, who made up the CG, were trained in swimming according to the training program for lifeguards in the water area.

Results of the study and discussion. Empirically, 18 combined combinations of hydrogenic locomotion were identified, representing an independent method of swimming. Locomotor movements were conventionally marked as follows: P – locomotion performed by the upper limbs; H – locomotion performed by the lower limbs with the designation of a serial number in the assignment sequence.

Table 1 presents the labeling of empirical combinations of hydrogen locomotion in the practice of applied swimming.

The directions for improving irrational technical actions were:

- synchronization of the breathing function with the swimmer's locomotor movements;
- technical economization of movements performed in order to create propulsive forces in conditions of dynamic swimming;
- reducing the overall hydrodynamic resistance, maintaining horizontal streamlining of the body in water;
- optimization of the coordination structure of the hydrogenic functional.

New possibilities for programming neuromuscular structures that ensure the functional implementation of hydrogenic locomotion in existing swimming combinations were achieved by generating a higher power regime for strokes; structural-kinetic coupling of rowing movements with the performance of the respiratory function during swimming; reducing the forces of frontal, wave and vortex resistance; maintaining a stable body position in the water.

The phenomenality of phase transitions to the optimization of hydrodynamic characteristics when using substituting means of transformative and integrating orientation indicates the resonant nature of structural and functional rearrangements that form a fundamentally new structure of locomotor movements in swimming and performing special rescue actions in water areas (Table 2).

When performing the exercise of staying afloat for a long time using water-supported strokes, the greatest intergroup differences were recorded. According to the data obtained, accentuated training in water-supported strokes stimulates reserve capabilities in the duration of staying afloat in uniform.

It is obvious that synchronizing rational breathing with locomotor movements in the swimming cycle increases the efficiency of managing the current and cumulative effects of technical economization of the work of body parts involved in the creation of propulsive forces of dynamic swimming. This is evidenced by the increase in the length of the distance in swimming with rescue equipment.

The concept of the optimization factor of the technical and functional structure of swimming methods has identified several vectors of transformation of the hydrogenic functional, ensuring the study, transformation, integration and coordination of elements of the rescuers' swimming technique. In the structure of the factor, the emphasis is placed on the specific extraordinary nature of the pedagogical impact on the irrational structures of hydrogenic locomotion of students. Structural and functional modulation of individual elements and their integration into a holistic stereotype of swimming techniques ensured the complexity of the application of swimming and diving skills with orientation on the water surface.

Conclusions. The pedagogical meaning of the method of replacing hydrogen locomotion is revealed in the systematic transformation of swimming movements without violating the existing dynamic stereotype of swimming.

Table 2. Test results based on training results

Index	EG	CG	t	p
Duration of staying afloat in uniform (min)	25,7±4,3	18,3±0,4	2,4	< 0,05
Swimming with rescue equipment to maximum distance (m)	185,7±3,8	177,5±3,6	2,7	< 0,05
Swimming underwater after jumping from a tower while holding your breath, (m)	13,7±0,7	8,4±0,5	3,7	< 0,05
Deviation in a complex exercise in swimming and diving 50 m in a given direction (m)	2,8±0,3	5,6±0,5	4,8	< 0,05



The effectiveness of the replacement impact model is due to the structural and functional modification of the training of rescue service specialists in water areas, achieved through the use of transformative and integrating exercises.

The representativeness of positive transformations in the hydrogenic locomotion of rescuers is expressed in the achievement of high levels of professional activity, an increase in the implementation efficiency of swimming techniques and the implementation of special techniques and actions in water environmental conditions.

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Sports metaverses: theory and practice

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Abstract

Objective of the study was to identify the current state of the problem of developing a sports metaverse in the digital space based on a theoretical analysis of information sources, as well as cases of holding sporting events in metaverses.

Methods and structure of the study. Scientific work was carried out during 2021-2024. and included a set of methods for collecting information (analysis of literary sources and content analysis of specialized Internet resources; conversations with heads of IT companies; participant observation at competitions in digital sports; testing of domestic VR games; participation in thematic scientific conferences of various levels and etc.).

Results and conclusions. Based on the analysis, the authors propose the creation of sports metauniverses, which, based on artificial intelligence technologies, allow us to customize the choice of sport and the process of sports training, depending on the level of individual preparedness. In the future, the user himself can create sports and physical activities based on his own preferences with consulting support from the platform, as well as the possibility of implementation using current technologies.

Keywords: *sports, metaverse, digitalization of sports, digital sports, e-sports, physical sports, games of the future.*

Introduction. In the theory of sports and the practice of holding competitions, digital technologies are increasingly being used, which allow us to talk about a new phenomenon - sports metaverses. The multi-disciplinary tournament "Games of the Future", which took place in Kazan and initiated by the Russian Federation, shows the relevance of working with audiences in digital environments. Today, the topic of sports metaverses is not the subject of scientific discussion among domestic scientists and, as a result, is not at the stage of practical implementation. Around the world, IT companies create innovative platforms (like prototypes of metaverses) and test their digital services in all industries, including sports, as a developed social institution. Therefore, it is important to study the prospects for the development of metaverses in sports.

Objective of the study was to identify the current state of the problem of developing a sports metaverse

in the digital space based on a theoretical analysis of information sources, as well as cases of holding sporting events in metaverses.

Methods and structure of the study. Scientific work was carried out during 2021-2024. and included a set of methods for collecting information (analysis of literary sources and content analysis of specialized Internet resources; conversations with heads of IT companies; participant observation at competitions in digital sports; testing of domestic VR games; participation in thematic scientific conferences of various levels and etc.).

Results of the study and discussion. Futurologists describe metaverses as a logical transformation of the medium of mass communication, which is currently carried out in instant messengers and social networks: "Metaverse technology is aimed at creating a virtual world parallel to the real one and integrated with it. This is the most advanced form of development



Comparative and comparative analysis of metaverses that are used in the practice of holding sporting events

Metaverse name/ resource	Genre	Platform	Application in sports
Zwift https://www.zwift.com	Sports simulator	Windows, Android, iOS, tvOS, Mac OS	In 2020, due to the COVID-19 pandemic and the restrictions it caused, part of the Tour de France cycling race was held on the Zwift platform. Its developers specialize in creating virtual platforms and holding virtual events. One of these orders was a virtual platform for cycling racing, which was connected to exercise bikes
Roblox https://www.roblox.com	FPS, Simulation, Platformer	Windows, macOS, PlayStation 4, Xbox One, iOS, Android, Meta Quest	Nike has teamed up with teen gaming platform Roblox to create a virtual world called Nikeland. Nikeland is modeled after the company's real headquarters (located in Oregon). Users can dress their digital doubles in sneakers and company clothing
Decentraland https://decentraland.org	Virtual Reality	Browser	A large number of sporting events are held here, including in an inclusion format. For example, the virtual marathon Degree Metathon with an emphasis on inclusion. It also hosts major sporting events using NFTs. For example, the Australian Open tennis tournament with unique tokens. Each token was tied to a specific area of the Melbourne Park tennis complex. Therefore, along with a unique NFT ball, a fan of the tournament also bought a virtual piece of the court. This metaverse also hosts physical health events. For example, "Decentraland Wellness Week" took place from January 24 to 26, 2024
LootMogul https://metaverse.lootmogul.com	Virtual Reality	Browser	This is a virtual space for professional athletes to live. Many sports stars have bought virtual real estate here for real money. There are currently over 181 registered professional athletes, as well as 15 sports leagues from the NBA, WNBA, NFL, MLB, UFC, etc. Platform owners allow gaming organizations or companies to own or lease NFT stadiums, seats, banners, celebrity avatars, gaming experiences, wearables, and users can host special events during NBA All-Star Weekend, NFT Superbowl, and the World Cup featuring real-life sports celebrities
DRL Metaverse https://metaverse.drl.io	Virtual Reality	Browser	The Drone Racing League is the first organization to spend an entire season in the metaverse. The event does not require the community to have special equipment - you can access the link to the sporting event from mobile devices and/or PCs.
LegionFarm https://legionfarm.com/	Communication platform	Browser	Platform for training gamers and athletes. It allows you to have cooperative sessions with experienced players, as well as go through different levels of the game with them in online multi-player games. Used for online competitions
gangwon-2024 https://xrgw.kr/en	Virtual Reality	Windows, Android, iOS	The first official metaverse for fans of the 2024 Gangwon Winter Youth Olympic Games (held from January 19 to February 1, 2024). After creating their avatar, users navigate through a virtual 3D world. Viewers were also able to virtually experience some winter sports using simulators, graphic panels and a virtual reality kit. Creators: International Olympic Committee (IOC), Gangwon 2024 Organizing Committee (YOGOC) and Gangwon Province with support from the Ministry of Science and Information and Communications Technology (MSIT)



of Internet technologies, which has broad application prospects, which will inevitably lead to significant changes in social and cultural life. Metaverse technology will develop and integrate many high-tech advances such as VR, AR, XR, AI, game engines, blockchain, cloud computing, etc., which will be quickly copied and updated, and then give rise to and promote the rapid development of various sciences and “comprehensive governance” [1].

It should be noted that researchers, when determining the component composition of the digitalization of sports, identify semantic parts and means of digitalization that are different in orientation. The very definition of what is a metaverse, a virtual world, or just a computer game today is not clearly defined [9].

Scientists call the first metaverse “CitySpace” and after it the number of metaverses grew, for example, such as “Active Worlds” and “There”. The most popular is considered “Second Life”, developed by Linden Lab in 2003. The Metaverse was an alternative world where you can create avatars and choose their features. In this world, a person could communicate, buy real estate, engage in design, and even get a university education. Second Life had its own economy, even its own currency - the Linden Dollar. There are examples of government representation in metaverses - for example, the government opened an embassy in SL, where many cities, universities, artists and individuals created virtual assets [8].

There are other examples in the academic world of exploring metaverses for educational purposes, such as Roblox, Minecraft, and Fortnite. A significant number of works on the use of metaverses in education touch on the natural science block of disciplines, describing the functionality [2, 11, etc.]. A significant part of the work is devoted to economic problems; generating income in the virtual world and ownership of content are discussed. Problems of marketing, regulation of trade activities and currency control in metaverses, including the success of investments [13]. Individual works were devoted to various forms of self-expression, including art, and the conclusion was made about the emergence of a new form of art, where the viewer is an accomplice of the work of art. This feature can also be transferred to sports activities. Questions were raised about the relevance of cyberpsychology and the interaction of the human personality with several of its (different) avatars. The problem of virtual reality churches and the activities of their missions is also being developed [6].

Separately, we can highlight studies on the popularity of metaverses among athletes.

The first works on metaverses in sports were devoted to the problems of designing online arenas, and also discussed the social, political, economic and ethical consequences of online games.

There are examples in sports where virtual reality is already used to teach certain sports; this has become especially popular during the pandemic. Thus, there are examples of basketball training [12]. Another example is training in sport climbing - augmented reality is used when the avatar shows the athlete the next position to complete the route and in this case the athlete can choose the route he wants to learn and can train for as long as he wants without the help of an instructor [4]. A review of golf simulators using metaverse technologies includes four actively selling models, where the player can not only compete and train in the virtual world, but also receive advice from an avatar coach [3]. It has been shown that such an interaction with data control is significant for people whose physical activity is not simply associated with socialization, but is determined by the desired result, like sports [5]. The users of these platforms themselves tend to make decisions based on data and listen to professional opinion about their health status [10].

Current trends in sports metaverses, according to the latest data from researchers, are shifting from simple user enjoyment during physical exercise to improving sports results with the help of new technological solutions [7].

An analysis of foreign scientific literature allows us to state the following: sports metaverses have firmly entered the orbit of scientific research and currently there is a discourse not only from ontological, but also from axiological and anthropological perspectives. However, there is no scientifically based consensus on the content and technical implementation. Therefore, it is important to study the topic comprehensively, including trying to study and systematize practical solutions.

Practical cases of implementing sports events in metaverses are characterized by a great variety of both technological solutions and the range of social impact. For example, on February 12, 2022, an army of fans watched two former UFC champions - Russian Khabib Nurmagomedov and American Max Holloway. This fight was memorable not only because Khabib became an undefeated fighter in the digital world, but also because fans bought \$3.2 million worth of tokens in the Legionfarm metaverse.



To illustrate the diversity of sports metaverses, a comparative analysis of the metaverses that are used in the practice of holding sporting events was carried out (see table).

It should be emphasized that the presented analysis does not claim to be a complete coverage of all sports metaverses that currently operate. The last two years have seen the rise of metaverses related to the wellness and beauty industry. In these worlds, a lot of attention is paid to sports as an important part of a healthy lifestyle.

In the Russian Federation, there are scattered practices of holding competitions in an online format (including in virtual reality), and there are also breakthrough technical solutions for sports.

The most interesting, from the point of view of interactive interaction with fans, is the “virtual stadium” from the company “Electronic Mashroom” LLC. Also technologically advanced, in terms of providing a unified mass competitive virtual space without signal delays even in remote areas, is the “virtual airsoft” product from Game Systems LLC. However, it is too early to say that popular domestic sports metaverses have been created.

Conclusions. Promising, in our opinion, is the creation of sports metaverses, which, based on artificial intelligence technologies, allow us to customize the choice of sport and the process of sports training, depending on the level of individual preparedness. In the future, the user himself can create sports and physical activities based on his own preferences with consulting support from the platform, as well as the possibility of implementation using current technologies.

Provisions up for discussion:

- sports metaverses require study and scientific and methodological support;
- digital environments significantly change not only the format of sporting events, but also create new channels of communication with fans, which is associated with the ability to interact with digital assets;
- when training personnel for the sports industry, primarily managers, it is necessary to develop the competence to work with sports metaverses.

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Theoretical foundations of movement control in the process of training athletes in combat sports

UDC 796.8



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Abstract

Objective of the study was to develop theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports.

Results and conclusions. It has been established that movement control mechanisms ensure the implementation of elements of dynamic posture, main and corrective control movements. To increase the effectiveness of competitive exercise techniques, it is necessary to form and improve movement control mechanisms in a certain sequence, determined by the interrelation of elements in the movement system.

Based on the relationship in the motor action of the elements of posture and control movements (main and corrective), the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of technical and tactical training of athletes in combat sports have been developed. An algorithm has been determined for the development of methods for the formation and improvement of movement control mechanisms in the process of training wrestlers, taking into account the technique being mastered and in relation to a specific movement situation.

Keywords: *technical and tactical training, movement control mechanisms, coordination abilities, combat sports.*

Introduction. One of the currently actively developed areas for the development of sports theory is increasing the effectiveness of teaching athletes the technique of motor actions based on the development of coordination abilities [1; 2]. It has been established that in the process of training athletes in combat sports, significant attention is paid to the development of complex (wrestlers' abilities associated with solving known motor problems) and super complex coordination abilities (athletes' abilities associated with solving unknown motor problems under conditions of spatio-temporal restrictions and associated with the factor unexpectedness and lack of time) [3]. The developed methods for developing coordination abilities are based on the targeted formation and improvement of movement control mechanisms (stabilizing, rigid, flexible and tracking (controlling)) and their relationships [3, pp. 78-90].

The biomechanical features of the construction of movements and the pedagogical aspects of such features are studied in parallel with studies of human coordination and coordination abilities. Thus, the theory of movement construction was developed V.T. Nazarov [4], who established that the internal basis of motor actions consists of posture, main and corrective (auxiliary) control movements. The researcher also established a connection between these elements, which must be taken into account at the initial stage of teaching motor action techniques: At the beginning, the first phase of motor action is formed (elements of posture are mastered, then the main control movements and their relationship with the elements of posture, and then corrective control movements and their relationship with the mastered part of the motor action). In a similar sequence, the second phase of the motor action and its relationship with the first phase are mas-



tered, etc. Developing the theory of V.T. Nazarov [4] it is established that in the process of improving the technique of physical exercises, the formation of elements of posture and control movements can be carried out within the framework of the annual cycle at any stage of preparation for the main starts of the sports season, but taking into account the patterns of development of the motor potential of athletes. Improving the connection between the elements of posture and control movements at these stages of training has the same order as at the initial stage of training [5].

A comparative analysis of the scientific provisions of the theory of coordination and coordination abilities [3] and the theory of movement construction [4] showed [5] that on their basis integral scientific provisions for the development of coordination abilities in the process of training athletes can be developed. In this regard, the study of issues related to increasing the effectiveness of technical and tactical training of wrestlers based on the development of coordination abilities and taking into account the biomechanical patterns of movement construction is relevant.

Objective of the study was to develop theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports.

Methods and structure of the study. The principles of the theory of functional systems by P.K. Anokhin, theories of movement construction by V.T. Nazarov, the theory of coordination and coordination abilities of V.I. Lyakh, S.D. Boychenko and others are the methodological basis of the study.

Results of the study and discussion. At the first stage of research, a connection between the mechanisms of movement control, considered within the framework of the theory of coordination abilities [3], and the internal composition of physical exercises (elements of posture and control movements) [4; 5] has been established:

1) stabilizing mechanisms ensure the implementation of posture (static posture in a constant force field while maintaining posture and balance, or dynamic posture (its elements) in a variable force field when performing dynamic exercises), i.e. they fix the links in the joints with a certain degree of efficiency and create supports for active movements when performing motor actions);

2) rigid mechanisms ensure the implementation of the main control movements, subject to the effective operation of stabilizing mechanisms;

3) flexible mechanisms ensure the implementation of corrective control movements, adapting movement parameters to the conditions of the external environment (motor situation) and the internal state of the body;

4) tracking (controlling) mechanisms ensure the receipt of urgent information about changes in the external environment, as well as about the parameters of one's own motor actions and the parameters of the activity of body components that ensure their implementation.

It has been established that the effectiveness of the interaction of stabilizing, rigid, flexible and tracking (controlling) mechanisms is determined by the interrelation of the elements of posture and control movements [4; 5].

At the second stage of research, taking as a basis the composition and structure of the process of training wrestlers in technical and tactical skills (stages of training conditioned, deliberate, deliberate impromptu and impromptu motor actions) [6], taking into account the patterns of movement construction [4; 5], the procedure for forming and improving the movement control mechanisms of wrestlers in the process of their technical and tactical training has been determined.

At the stage of learning conditioned motor actions, the formation of stabilizing, rigid and flexible mechanisms for controlling movements and their connection is carried out with the participation of tracking (controlling) mechanisms in the following sequence: the first phase of motor action («stabilizing mechanisms» – «rigid mechanisms and their connection with stabilizing mechanisms» – «flexible mechanisms and their connection with stabilizing and rigid mechanisms») – the second phase of motor action («stabilizing mechanisms and their connection with elements of the first phase» – «rigid mechanisms and their connection with stabilizing mechanisms and with elements of the first phase» – «flexible mechanisms and their connection with stabilizing and rigid mechanisms and with elements of the first phase»), etc. If the model parameters of the motor action are observed, the formation of several successive elements at the same time is allowed.

At the stages of training in deliberate and deliberate-impromptu motor actions, improvement of movement control mechanisms can be carried out within the framework of a yearly cycle at any stage of preparation for the main starts of the sports season, but taking into account the patterns of development of the



motor potential of athletes [5]. Improving the connection between movement control mechanisms at these stages of learning has the same order as at the stage of learning conditioned motor actions (see above).

At the stage of training wrestlers in impromptu motor actions, methods for developing highly complex specific and special coordination abilities are used, which is due to the need to teach the athlete, under time limits, to find optimal options for the development of unknown motor situations and to effectively solve the corresponding motor problems.

In the process of practical activity, the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports are filled with practical content, taking into account the technique being mastered and in relation to a specific motor situation: 1) the phase composition of the motor action is determined; 2) the internal composition of each of the phases of motor action is established (elements of posture and control movements); 3) control movements are differentiated into main and corrective (auxiliary) movements; 4) an algorithm is being developed for the formation and improvement of movement control mechanisms at the stages of technical and tactical training of wrestlers; 5) the means and methods of technical and tactical training, the magnitude of loads and their distribution at the stages of preparation, as well as forms of control are determined.

Conclusions. The methods for developing coordination abilities in wrestlers are based on the targeted formation and improvement of movement control mechanisms (stabilizing, rigid, flexible and tracking (controlling)) and their connection. It has been established that movement control mechanisms ensure the implementation of elements of dynamic posture, main and corrective control movements. To increase the effectiveness of competitive exercise techniques, it is necessary to form and improve movement control

mechanisms in a certain sequence, determined by the interrelation of elements in the movement system.

Based on the connection in the motor action of the elements of posture and control movements (main and corrective), the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of technical and tactical training of athletes in combat sports have been developed. An algorithm has been determined for the development of methods for the formation and improvement of movement control mechanisms in the process of training wrestlers, taking into account the technique being mastered and in relation to a specific movement situation.

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Monitoring the activities of sports reserve training institutions on the example of the municipal formation “Yekaterinburg city”

UDC 796.012.1



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Abstract

Objective of the study was to study the process of monitoring municipal institutions for training the sports reserve of the municipal formation “Ekaterinburg City”.

Methods and structure of the study. The work uses methods of criterion and comparative analysis. The activities of 29 municipal institutions for training sports reserves in 56 sports were analyzed.

Results and conclusions. Criteria and tools for monitoring the activities of sports reserve training institutions have been defined. The results of the study can be used by governing bodies in the field of physical culture and sports, and by the management of sports reserve training institutions.

Keywords: *preparation of sports reserve, monitoring, institutions for training sports reserve, governing bodies in the field of physical culture and sports.*

Introduction. In the Russian Federation, the Concept for the development of children’s and youth sports in the Russian Federation until 2030 has been approved and is being implemented [2]. One of the main directions and activities for the implementation of the Concept regarding the preparation of sports reserves is the modernization of the system for training sports reserves and the development of unified approaches to its scientific and methodological support, taking into account the development trends of world sports, new opportunities of science and digital technologies. N.Yu. Maslennikova points out that effective management of a complex and dynamic system, forecasting its changes is possible only on the basis of collecting and analyzing a continuous flow of information about its condition, as well as the patterns of the entire set of processes occurring in it. For effective and high-quality management of any processes, constant real-time monitoring and monitoring of the system state is necessary. Today, the most important tool for observation, analysis and forecasting, as well as a factor in

making informed and most effective decisions, is the monitoring system [1].

Objective of the study was to identify the structure and content of the process of monitoring municipal institutions for training the sports reserve of the municipal formation “Ekaterinburg City”, as well as to justify the results obtained.

Methods and structure of the study. Preparing a sports reserve is a management process, as it includes defining goals and objectives, planning, organizing, controlling and managing resources (people, time, finances, information, etc.) to achieve these goals and objectives. To assess the activities of municipal institutions for the preparation of sports reserves and make management decisions, we have developed a special monitoring system for municipal institutions for the preparation of sports reserves in Yekaterinburg. The system is based on an analysis of the activities of institutions within the framework of fulfilling federal standards of sports training and performance within the framework of the indicators of the federal statis-



tical observation form No. 5-FC "Information on the preparation of a sports reserve."

As part of the monitoring, criterial and comparative analysis methods are used.

To conduct a criterion analysis, the following criteria were selected: volume of training load in accordance with federal standards of sports training by sport; volume of competitive load in accordance with federal standards of sports training by type of sport; the number of sports categories and titles of sports reserve training institutions; the number of prizes in competitions for sports reserve training institutions; number of members of the national teams of the Sverdlovsk region and the Russian Federation; Expenses of the institution for training the sports reserve.

In order to collect information for filling out by institutions, a table has been developed that includes the following sections: "Royal composition", "Assignment of ranks", "Participation in competitions", "Competitive load", "Training load", "Financing of competitions", "Financing of equipment".

To visually present monitoring results, highlight trends, dependencies and patterns, and compare data with each other, tools for creating graphical representations of data are used: Microsoft Power BI for analyzing annual results, used by the Department of

Physical Culture and Sports of the Yekaterinburg City Administration since 2020 and Google Looker studio for operational analysis of the current activities of sports reserve training institutions, used by municipal sports reserve training institutions since 2023.

Monitoring has been used by the Department of Physical Culture and Sports of the Yekaterinburg City Administration since 2020. The activities of 29 municipal sports schools and Olympic reserve sports schools in 56 sports are analyzed. Based on monitoring data and statistical reports in form No. 5-FC "Information on the preparation of sports reserves," an interactive report (dashboard) of the Department was generated containing data from 2015 to 2022. A summary report for all institutions in the period from 2017 to 2022 is presented for analysis gg., 3 years before the introduction of monitoring and 3 years after the introduction.

Results of the study and discussion. There are 28,127 athletes training in 29 municipal institutions (Fig. 1). The number of students increased until 2020 (by a total of 309 people). According to the distribution of those involved in the stages of sports training, there is a decrease in the share of those involved in the educational and training stage and an increase in the share at the sports and recreational stage.

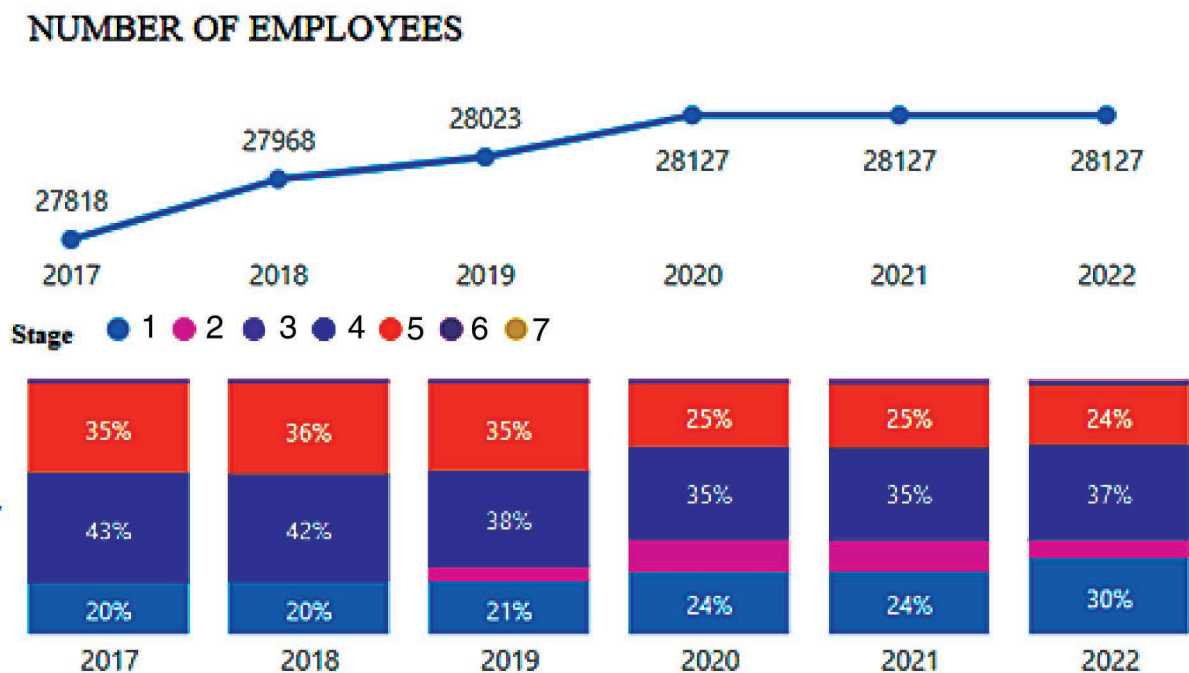
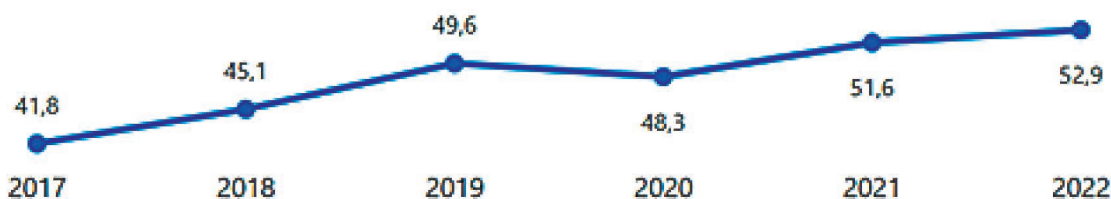


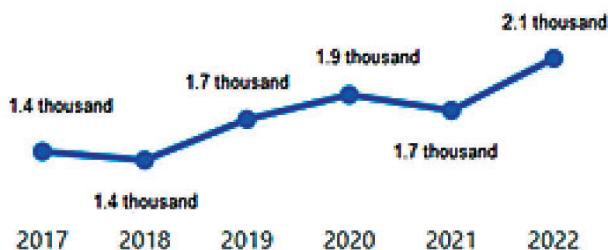
Figure 1. Structure of municipal institutions involved in training the sports reserve of the city of Yekaterinburg – 1. Sports and recreational stage; 2. Stage of basic level of training complexity; 3. Stage of advanced level of training; 4. Initial training stage; 5 Training stage (sports specialization stage); 6. Stage of improving sportsmanship; 7. Stage of highest sportsmanship.

ACHIEVEMENTS

Proportion of athletes with a sports category or sports title



Number of members of Sverdlovsk region teams



Number of members of Russian national teams

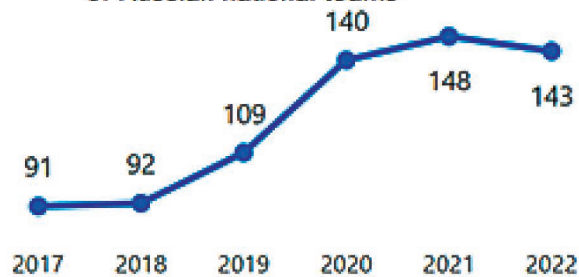


Figure 2. Dynamics of the number of athletes with a sports category or sports title who are members of the national teams of the Sverdlovsk region and the Russian Federation

The indicator “The share of athletes with a sports category or sports title” showed negative dynamics only in 2020. In other periods, a positive trend can be observed (Fig. 2). The number of members of the Sverdlovsk region national team has its highest figure in 2022, 33% more than in 2017. For members of the Russian Federation team, the highest figure was reached in 2021, 38% more than in 2017.

In terms of the number of prize places at national and international competitions, the lowest figure was found in 2020 (Fig. 3), which, in our opinion, is due to the restrictions on the movement of people and public events in force at that time due to the COVID-19 pandemic. In other periods, we observe systematic growth, the highest indicators were achieved in 2022. Thus, the previously noted decrease in the proportion of athletes involved in the training stage did not lead to a general decrease in the effectiveness of sports reserve training institutions, perhaps this is due to sys-

tematic efforts to harmonize the distribution involved in the stages of sports training.

In terms of financing, expenses for sports training have been increasing annually since 2019 and amount to more than 100 million rubles at the end of 2022. The municipal budget has the largest share of expenditures since 2020, and the largest share is also made up of expenditures from extra-budgetary sources. It is possible to increase the share of expenses from extra-budgetary sources by increasing the income of sports reserve training institutions. In our opinion, the increase in expenses for training the sports reserve is one of the factors in increasing the performance of athletes.

Based on performance indicators (the proportion of athletes with a sports rank or sports title, the number of members of the national team of the Sverdlovsk region and the Russian Federation, the number of prize places in all-Russian and international competi-

Number of prizes in competitions

● All-Russian competitions ● International competitions

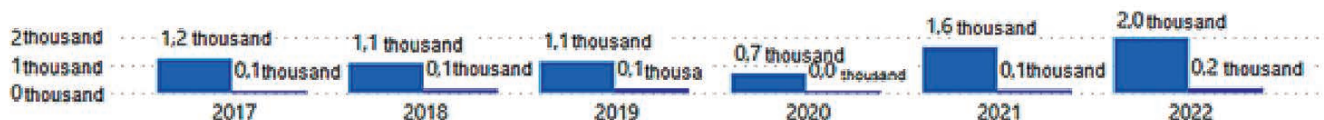


Figure 3. Number of prizes at national and international competitions



Establishment	Dynamics of the engaged	Dynamics of the number of athletes with a sports category or title	Dynamics of members of the Sverdlovsk region team	Dynamics of members of the Russian national team	Dynamics of the number of prizes at all-Russian competitions	Dynamics of the number of prizes at international competitions
Sports school "Victoria"	83	119	69	7	59	-1
Sports school "Children's Stadium"	-5	71	13	-6	-58	13
Equestrian Sports School	0	64	3	0	3	0
Sports school "Dynamo"	0	62	42	-11	14	-6
Sports school "Yunist"	0	48	73	-4	56	38
Sports school for technical sports	0	38	7	0	4	3
Sports school "Uralochka" for volleyball	0	34	-14	-1	10	-1
Sports school "Fakel"	0	28	0	0	6	0
Sports school of mountain sports	0	26	8	-1	-1	-6
Sports school "Ural" for football	0	25	0	0	0	0
Sports school "Rostock"	0	20	5	1	-10	0
Olympic Reserve Sports School No. 1	0	18	1	2	-44	-9
Sports school "Intellekt"	0	12	14	0	7	1

Figure 4. Heat map of the dynamics of indicators of sports reserve training institutions

Rating of sports schools based on 2022 indicators	Rating of sports schools based on performance dynamics in 2022 and 2021
Sports school "Yunist" 20 Final rating 2022	Sports school "Victoria" 26 Final rating
Sports school No. 19 "Children's stadium" 30 Final rating 2022	Sports school "Yunist" 37 Final rating
Sports school of mountain sports 30 Final rating 2022	Taekwondo sports school 39 Final rating
Olympic Reserve Sports School No. 1 31 Final rating 2022	Sports school "Intellekt" 50 Final rating
Sports school "Dynamo" 32 Final rating 2022	Sports school for technical sports 52 Final rating
Sports school No. 16 33 Final rating 2022	Sports school No. 18 for bandy 53 Final rating
Sports school "Victoria" 43 Final rating 2022	Sports school "Lokomotiv-Izumrud" 57 Final rating
Sports school No. 18 for bandy 51 Final rating 2022	Sports school No. 16 58 Final rating

Figure 5. Ratings of the activities of sports reserve training institutions

tions), using visualization tools, a heat map was developed to evaluate the activities of sports reserve training institutions, in which green positive dynamics of the indicator in comparison between 2022 and 2021 are indicated, yellow – no dynamics, red – negative dynamics (Fig. 4). Based on the results of the performance assessment, various ratings of the institutions' performance were formed: based on the results of the calendar year, based on the results of the dynamics of the indicators of the current year compared to the previous one (Fig. 5).

Conclusions. As a result of the implementation of monitoring, the collection of information has been unified. All information is filled out in only one source for each institution, which reduces the number of errors and inconsistencies, thus increasing the correctness of the information provided.

Due to the regularity of monitoring, control over the activities of sports reserve training institutions has been increased. The effectiveness of sports reserve training institutions has been increased in terms of assigning categories, performing at competitions, and joining national teams of the Sverdlovsk region and the Russian Federation.

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Relation of powers in gymnastics in the pre-olympic season in light of international sanctions against russian athletes

UDC 796.41

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Abstract

Objective of the study was to conduct a comparative analysis of the results shown by the strongest national teams at the 2023 World Championships and Russian gymnasts at the Russian Cup to determine competitiveness in the international arena under sanctions.

Methods and structure of the study. Analysis of information materials on websites: IOC (olympics.com), FIG (gymnastics.sport), Russian Artistic Gymnastics Federation (sportgymrus.ru). Expert assessment of video materials from the World Championship and the Russian Cup 2023 on the channels: Match, allgymnastics.tv, FIG Channel. The research process included two stages - analytical and prognostic. At the first stage, an analysis was carried out of the regulatory documents of the IOC and FIG on the exclusion of Russian gymnasts from international competitions; information materials (format and program of competitions, statistics of results). At the second stage, a comparison of the results of the competition was carried out to predictably determine the model composition of the Russian national team, which could be currently competitive in the international arena.

Results and conclusions. The pre-Olympic World Championship showed the absolute superiority of the US team with their leader S. Biles - the main contenders for winning the majority of gold medals at the XXXIII Olympiad in 2024. The sanctions imposed on Russian athletes did not allow Russian gymnasts, who would be the only team, to win a team license for the Olympic Games, which can compete with the US team in international competitions. Only in one all-around event are Russian gymnasts inferior to their foreign rivals - vault.

Keywords: *Olympic Games, women's artistic gymnastics, team and individual championships, international sanctions.*

Introduction. From September 30 to October 8, 2023, the World Artistic Gymnastics Championships took place in Antwerp. Based on the results of this tournament, the teams that will participate in the 2024 Olympic team competition in Paris were determined [4]. The gymnasts from the USA, Great Britain and Canada, who have already won this right in 2022 (at the previous World Championships), were joined by the teams of China, Brazil, Italy, the Netherlands, France, Japan, Australia, Romania and Korea. As is known, on the recommendation of the IOC, the International Gymnastics Federation, in accordance with the amendments to the Charter adopted in 2022, did not allow the Russian team to participate in the 2022 and 2023 World Championships. [5]. Thus, Russian gymnasts, the 2021 Olympic champions, will not be

able to take part in the upcoming Olympics. There is also a "theoretical" opportunity for individual gymnasts to qualify based on their performances at the World Cup stages in 2024, but the issue of admitting Russian athletes to these competitions has not yet been determined. A number of authors express the opinion that Russian athletes will not take part in the Olympic Games in Paris and in the future it is necessary to reconsider the future model of the international development of Russian sports [1, 2].

Objective of the study was to conduct a comparative analysis of the results shown by the strongest national teams at the 2023 World Championships and Russian gymnasts at the Russian Cup to determine competitiveness in the international arena under sanctions.



Methods and structure of the study. Analysis of information materials on websites: IOC (olympics.com), FIG (gymnastics.sport), Russian Artistic Gymnastics Federation (sportgymrus.ru). Expert assessment of video materials of the 52nd World Championship and the Russian Cup 2023 on television and Internet channels: Match, allgymnastics.tv, FIG Channel.

The research process included two stages - analytical and prognostic. At the first stage, an analysis was carried out of the regulatory documents of the IOC and FIG on the exclusion of Russian gymnasts from international competitions; information materials (format and program of competitions, statistics of results). At the second stage, a comparison of the results of the competition was carried out to predictably determine the model composition of the Russian national team, which could be currently competitive in the international arena.

Results of the study and discussion. At the pre-Olympic 52nd World Championships in 2023, US gymnasts demonstrated absolute dominance. In total, they won four gold, one silver and two bronze medals. The greatest success was achieved by S. Biles, who resumed her performances on the world stage after a two-year break. In addition to the team gold, she won the individual, beam and floor exercises and won silver in the vault. Gymnasts from other teams managed to win only two gold medals in individual events - R. Andrade (Brazil, vault) and Qiu Qian (China, uneven bars). In qualifying for the team championship, the US team, scoring 171.395 points, confidently surpassed the second-place team of Great Britain by 5.265 points. In the final, the US gymnasts were inferior to their qualifying result, but this did not prevent them from getting ahead of the silver medalists, the Brazil-


ian team - 2.199 points (Table 1). In the final of the individual championship, S. Biles, having performed a vault of low difficulty, won the gold medal with a great advantage (Table 2). Thus, based on the results of the 2023 World Cup, we can conclude that at the 2024 Olympics, the main contenders for gold medals in the team and individual championships, as well as in three separate events, are US gymnasts. Gymnasts from Brazil, France, China, Italy and Great Britain will be able to compete for prizes.

Almost a month before the 2023 World Cup, the Russian Cup was held on the Sirius Federal Territory, which was the final start for the strongest gymnasts. To predict the model composition of the Russian national team, we were guided by the best results shown by gymnasts during the tournament: A. Melnikova (1st place in qualifying) – 57.150; D. Kustova (2nd place in qualifying) – 55.250; L. Vasilyeva (2nd place in the all-around final) – 55.600. Separately, the winner of the competition, V. Listunova, should be highlighted. She showed the best result, performing on all apparatus in the tournament in individual all-around events, - 58.166 [3]. In accordance with the regulations, the three best scores of gymnasts count towards the team championship in each type of qualification. According to our “model”, the results of A. Melnikova and V. Listunova were taken into account in all four types; D. Kustova – on uneven bars and beam; L. Vasilyeva - in vault and floor exercise.

As a result of the comparative analysis, it can be assumed that the Russian team, subject to participation in the 2023 World Cup, could be ahead of the US team in qualification and compete for team gold in the final.





In the individual championship, V. Listunova could compete with S. Biles for the title of absolute world

Table 1. Comparison of the results of the World Championship team championship and Russian gymnasts (predictive model) based on the results of the 2023 Russian Cup.

Country					Sum
52nd World Championship 2023 (Antwerp, Belgium, 30.09-08.10.2023)					
1 USA (qualification)	43.998 (1)	43.366 (2)	41.965 (2)	42.066 (1)	171.395
1 USA (final)	42.966 (1)	43.265 (1)	39.600 (6)	41.898 (2)	167.729
2 Brazil (final)	42.666 (2)	41.299 (5)	39.399 (8)	42.166 (1)	165.530
3 France (final)	41.966 (3)	41.399 (3)	41.066 (2)	39.633 (5)	164.064
Russian Cup 2023 (FT “Sirius”, Sochi, 08.28-09.04.2023)					
Russia (model)	41.333	44.483	42.900	42.700	171.416

Note: the team's position on this apparatus is indicated in parentheses.

Table 2. Comparison of the results of the individual championship of the World Championship and the strongest Russian gymnasts based on the results of the 2023 Russian Cup.

Gymnast, country					Sum
Russian Cup 2023 (FT "Sirius", Sochi, 08.28-09.04.2023)					
Listunova V. Difficulty (D)	13.533 (3) 5.0	15.133 (1) 6.6	14.800 (1) 6.6	14.700 (1) 6.0	58.166 24.2
Melnikova A.	14.150	14.550	14.350	14.100	57.150 (1)
52nd World Championship 2023 (Antwerp, Belgium, 30.09-08.10.2023)					
1 Biles S. (USA) Difficulty (D)	15.100 (1) 5.6	14.333(6) 6.0	14.433 (1) 6.4	14.533 (1) 6.5	58.399 (1) 24.5
2 Andrade R. (BRA) Difficulty (D)	14.700 (2) 5.6	14.500 (5) 6.1	13.500 (10) 5.8	14.066 (2) 6.2	56.766 (2) 23.7
3 Jones S. (USA) Difficulty (D)	14.233 (3) 5.0	14.633 (4) 6.3	14.066 (2) 5.9	13.400 (5) 5.6	56.332 (3) 22.8

Note: the team's position on this apparatus is indicated in parentheses.

champion, and A. Melnikova could compete for the prize in the all-around. As follows from the table 1, 2, the lagging event among Russian gymnasts is the jump.

Conclusions. The pre-Olympic World Championship showed the absolute superiority of the US team, the main contenders for winning the majority of gold medals at the 2024 Olympics. The sanctions imposed on Russian athletes did not allow our gymnasts, who would have been the only team that could compete with the US team, to win a team license for the Olympic Games. At the same time, only in one all-around event, vault, are Russian gymnasts inferior to their foreign rivals.

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Optimization of training loads at the pre-competition stage of preparation in cyclic sports

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Abstract

Objective of the study was to increase the efficiency of pre-competition preparation management in cyclic sports based on optimizing the ratio of special loads.

Methods and structure of the study. An analysis of the ratio of special loads was carried out, ensuring the attainment of peak sports form. The testing involved 48 athletes, men aged 18-20 years, 16 middle-distance runners, 18 kayakers and 14 freestyle swimmers. 41% of the subjects are masters of sports (MS) and 59% are candidate masters of sports. An information and analytical platform has been developed that allows monitoring changes in mechanical productivity, biodynamic parameters and oxygen transport functions.

Results and conclusions. At this stage, an increase in competitive speed and an improvement in functional state is achieved by optimizing the tempo SR, the length of the "step" SL, the rhythm R, and the power WR. The effectiveness of the regulator is confirmed by a statistically significant improvement in results in rowing K-1 1000 m, running at a distance of 800 m and swimming at a distance of 200 m h/s.

Keywords: *algorithmization, customization, metabolism, power, propulsion, resistance, taxonomy.*

Introduction. Increasing the reliability of pre-competition preparation, where the cost of an error in resource allocation is high, is one of the most important tasks of elite sport (A.P. Bondarchuk, 2007) [1]. Interest in this area of research in rowing, athletics and swimming is due to the search for a ratio of loads that would ensure the readiness of athletes for maximum realization of the psychophysical potential of athletes in competitions [5].

The historical maximum of competitive success of Soviet sports in the 1970-1980s was ensured by the implementation of the ideas of program-targeted management (L.P. Matveev, 2005). The change in the balance of power in the international arena in the 1990s led to a revision of the basic principles of managing the training of Russian athletes. V.B. Issurin actively promotes the ideas of block-modular concentration of training resources, which complement and expand the functionality of the L.P. model. Matveeva. Since the 2000s, hybrid models have been introduced to minimize the gap between the expected and actual

results achieved under conditions of competitive hyperstress (N.Zh. Bulgakova, 2009) [2].

The problem area is the parametric regulation of motor skills (step length L, rhythm R, power WR, pace SR), associated with the personalized preparation of athletes for major competitions [6].

Objective of the study was to increase the efficiency of pre-competition preparation management in cyclic sports based on optimizing the ratio of special loads.

Methods and structure of the study. At the first stage, an analysis of training stimuli and resources that increase special performance and readiness for competitions was carried out. 48 athletes were observed, men aged 18-20 years, 16 middle-distance runners, 18 kayakers and 14 freestyle swimmers. 41% of the subjects had the qualification of a master of sports and 59% were a candidate master of sports.

The resource base for training intermediate athletes has been analyzed, including tracks 8x300 m; 2x (6x200) m. Kayakers' resistance to single loads was as-

sessed: 50 m, 100 m, 200 m, 500 m, 1000 m; 3x(10x50 m); 3x (10x100 m). On G. Razumov's tensodynamic platform, speed V_{max} , tempo SR, stroke length SL, force F_{max} , front of force increase T_f , expended W_s and propulsive power W_p were recorded. Similar studies in a group of swimmers were supplemented by monitoring F_{max} (N) and average cycle effort F_{cycle} , power W_t and power in the working phase P_{pull} phase. VO_2 testing was carried out on a Beckman gas analyzer. Blood lactate La was measured by the Lactate-Pro gadget. Pulse responses to loads and SR rate were recorded by Polar RS300X. The cardiac output was calculated using the Fick formula. Analysis of visual-motor reactions VOD, RDO (reaction to a moving object) The load test made it possible to maintain the quality of training [3].

Based on discriminant analysis of 246 aggregated variables, an information and analytical platform has been developed that allows tracking the growth of mechanical productivity, biodynamic parameters and oxygen transport functions [6].

Observations carried out during a 6-week pre-competition training cycle, allowing us to assess the effectiveness of the regulator. Verification of making adjustments is determined by deviation from the planned results in the 800 m run, rowing at the K-1 1000 s distance and in swimming 200 m high/s. The stability of connections was determined based on correlation analysis using Microsoft Access, Excel, BIostat.

Results of the study and discussion. The current condition of the athletes was assessed according to parameters V , L , SR, R . Training in the AP-1 - AP-2 mode (in the zone of the first - second lactate threshold) in the amount of 16-18% in the preparation of kayakers, middle-distance runners and swimmers is aimed to synchronize kinesiological, physiological and metabolic functions within the boundaries of the energy minimum. Within one iteration, coordination of speed V 2.9 ± 0.2 m/s, amplitude-frequency variables SR 2.8 ± 0.1 m/s, step length L and vertical oscillations is achieved. The adequacy of the effect is indicated by the parameters VO_2 1.8 ± 0.02 l/min, heart rate 104.2 ± 2.1 beats/min, cardiac output 12.8 ± 0.1 l/min ($t=2.4$ $p<0.05$) and MVR (minute volume of respiration) 34.0 ± 1.1 l/min ($t=2.7$ $p<0.05$). Maximizing the impact of aerobic training in a group of kayakers is achieved by regulating energy expenditure 500-560 kcal/hour, heart rate 122.2 ± 2.1 beats/min, La 1.1 ± 0.01 mmol/l, VO_2 2.7 ± 0.04 l/min, arteriovenous difference $a-vO_2$ for CO_2 ($r=0.456$).

Iterations of loads in the anaerobic threshold (AnT)

zone (11-14%) are associated with controlled adjustment of motor parameters and functional state [2]. The specificity of kayakers' training increases at each new turn when setting the speed mode V 5.1 ± 0.1 m/s, SR 3.1 ± 0.2 sh/s and rolling ($r=0.521$). Calculation of the volume and intensity of the load is carried out within the boundaries of adaptation reserves, oxygen pulse heart rate 178.2 ± 1.1 beats/min., cardiac output 24.2 ± 0.3 l/min. Changes in $a-vO_2$ for CO_2 of 148.1 ± 1.9 ml/l, achieved in groups of kayakers and swimmers, show the tension of tissue metabolism and an increase in the lactate threshold La to 5.1 ± 0.2 mmol/l ($r = 0.461$) [4].

Combining loads of submaximal power WR 262.4 ± 21.1 W (4-6%) is aimed at resonances of neurophysiological and biochemical changes. Accordingly, proactive adjustment of urgent effects of running on 6x600 m tracks; 2x800 m in V mode 6.8 ± 0.2 m/s, SR 3.7 ± 1.1 b/s and heart rate 187.6 ± 2.1 beats/min is aimed at resonances of motor skills and energy functionality. The target of corrective efforts is the threshold parameters of gas exchange, cardiac output 29.1 ± 0.1 l/min, CO 152.1 ± 1.1 ml, La 9.8 ± 0.1 mmol/l, energy consumption 620.4 ± 22 , 1 kcal/hour (EC 0.36 ± 0.1 kcal min/l) ($t=2.7$ $p<0.05$). As can be seen from Fig. 1 Interval training of intermediate athletes in the 8x300 m mode is associated with an increase in motor functions SR 3.1 ± 1.1 w/s, WR, activation of metabolic processes that stimulate an increase in the mechanical efficiency of maximum work ($r = 0.671$) [6].

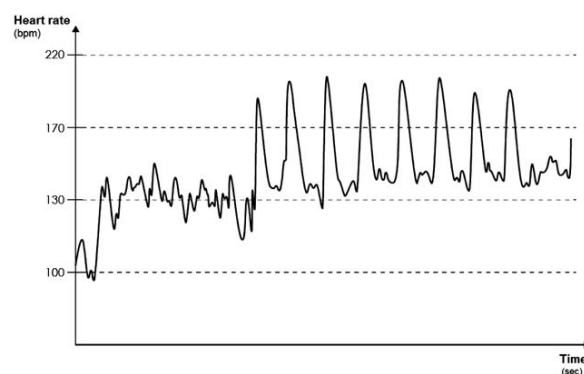


Figure 1. Heart rate kinetics during 8x300 interval training

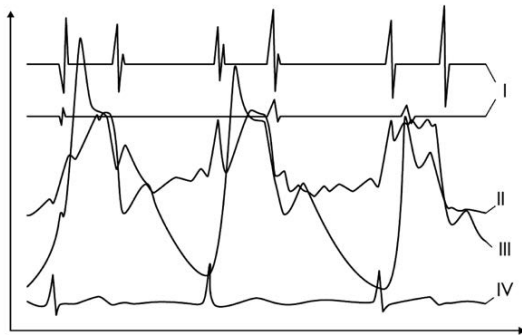
Positive factors include achieving peak heart rate values of 201.21 ± 1.16 beats/min and muscle acidification La 11.2 ± 0.1 mmol/l ($r=0.473$), characteristic of extreme work. Training leads to optimization of oxidative stress, neuromuscular potentiation, growth of structural and enzymatic proteins. This expresses the



relationship between speed and energy consumption of 676.2 ± 41.1 kcal/hour, (EC 0.3 ± 0.01 kcal min/l), respiratory rate 39.4 ± 0.2 cycle/min, $a\text{-vO}_2$ for CO_2 148.2 ± 1.6 ml/l within the physiological norm ($r=0.521$).

Speed training on 6x100 m tracks; 8x150 m in the mode 7.7 ± 0.2 m/s, SR 3.4 ± 0.1 w/s (1.5-2%) put forward new requirements for programming biodynamic parameters. Speed training stimuli regulate the speed of acquiring a state of athletic fitness and competitiveness [2]. Loads provide adaptive reactions HR 198.1 ± 1.2 beats/min, La 6.3 ± 0.2 mmol/l, WR 386.2 ± 17.2 W, energy expenditure 681.3 ± 21.1 kcal/hour (EC 0.3 ± 0.01 kcal min/l). In the groups of intermediate athletes and kayakers, synchronization of muscle metabolism and elastic muscle energy during high-intensity training was noted ($r=0.501$). Against this background, the swimmers showed an improvement in the psycho-emotional state of the SAN ($r = 0.461$), the speed of visual-motor reactions of the RMO ($r = 0.420$), T-t ($r = 0.406$), characteristic of transitional states.

The key results of training kayakers on sections K-1 200 m at a speed $V_{\max} 5.1 \pm 0.12$ m/s, SR 137.1 ± 0.1 g/min., is the expansion of motor and functional limits. Operation in a given speed mode stimulates an increase in the force on the blade $F_{\max} 20.1 \pm 1.2$ kg and the force increase front Tf 0.13 ± 0.01 s. The load causes an increase in alactic anaerobic productivity (energy consumption 675.1 ± 26.1 kcal/h. EC 0.38 ± 0.1



kcal min/l).

Figure 2. Fragment of a polycardiogram recording: I – phonocardiogram; II – apical cardiogram; III – carotid sphygmogram; IV – electrocardiogram in lead II

The regulatory platform of the 2-week cycle is aimed at the resonances of cumulative effects achieved by narrowing the volume of the load. The advantage of the proposed approach, along with the ability to synchronize the main and auxiliary processes of the management chain, is risk diagnostics. This is indicated by changes in heart rate within the limits of $\Delta\text{RR} 0,21 \pm 0,01$ s and the

absolute value of the mode M_0 up to $0,91 \pm 0,032$ ($t=2,4$ $p \leq 0,05$). The time limits for isometric contraction (IC) were recorded to be 0.035 ± 0.002 s and the myocardial tension index to be $24.1 \pm 0.3\%$ (Fig. 2). An increase in readiness is indicated by the optimization of visual-motor reactions of RMO by 0.02 s ($t=2.21$ $p \leq 0.05$), a decrease in VOD by 0.11 s and an increase in T-t by $6.2 \pm 0.3\%$ ($t=2.34$ $p \leq 0.05$).

Conclusions. The results obtained confirm the feasibility of individual adjustment of the parameters of the motor, energy and cardiac systems when getting into sports shape. The representativeness of the proposed approach is indicated by the maximum results in competitions achieved through an increase in competitive performance, improvement of technique and functional state. Thanks to the mobilization of reserves and morphofunctional settings, 86% of the subjects in the three groups were at the peak of their form and increased their individual achievements by 3.1-3.9%. The model has predictive potential and creates new points of support for the theory of sports.

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Comparative analysis of the levels of difficulty of spins in the competitive programmes of women's singles figure skating representatives in the 2022-2023 season

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Abstract

Objective of the study was to determine the content of features and levels of complexity of rotations in the competitive programs of women's single figure skating in the 2022-2023 season.

Methods and structure of the study. At the 58th Congress of the International Skating Union (ISU), held on May 4, 2022 in Lausanne (Switzerland), the requirements of the competition rules for the difficulty levels of elements in figure skating were traditionally updated. The changes adopted were the most significant since the beginning of the modern judging system for awarding difficulty levels in spins and came into effect from the 2022-2023 season. For the first time, a separate group was allocated, consisting of six additional traits to achieve a maximum fourth level of difficulty (level 4), and Previously, it was enough to fulfill any features from the list. In accordance with the requirements for the content of programs in figure skating, in the short and free programs of single skating, the execution of three different rotations is prescribed, and therefore, in order to comply with the requirement prohibiting the counting of repeated features, in all three rotations it is necessary to show mastery of three features from list of those required to obtain the highest possible level 4. Thus, many athletes were faced with the task of mastering new complex variations for all rotations of high coordination complexity.

Results and conclusions. The article presents the results of a comparative assessment and analysis of the frequency of use (%) of mandatory features for level 4 rotations in free programs of representatives of women's single skating in the 2022-2023 season. at the I and II stages of the Grand Prix among juniors, in the Final of the Grand Prix series among adults and juniors, as well as at the Russian Championship.

Keywords: *single figure skating; free programs; coordination complexity of rotations; features used to evaluate difficulty levels.*

Introduction. The level of technical preparedness of the leading representatives of women's single skating is steadily growing, which is reflected in all components of the assessment, and the density of results is so high that every hundredth of a point often affects the position of athletes in the final standings. In the Women's Grand Prix Series Final in the 2022-2023 season. the difference between 2nd and 3rd places was 0.88 points, and between 3rd and 4th places – 0.34 points. At the Russian Championships 2023, the difference between 1st place (249.74 points) and 2nd place (247.32 points) in women's single skating was more significant, but also small, and amounted to 2.42 points. The difference in the base value of three level 3 spins and three level 4 spins can be up to 1 point, de-

pending on the type of spins. It should be emphasized that even leading figure skaters are not always able to perform spins to the highest possible level in competitive programs, as happened at the above-mentioned Russian Championship. In the short program, Elizaveta Tuktamysheva, who took 2nd place, performed one of the three rotations only at level 3, and for Sofia Muravyova, who took 3rd place, two of the three rotations did not reach the maximum level 4, and were determined to be performed at level 3. The winner of the free program Kamila Valieva's program also 2 spins out of three did not reach the maximum level, remaining at level 3. In the Final of the Grand Prix series among adults, even the winner Kaori Sakomoto in the short program also had a spin jump at level 3 (FCSp3).



The junior girls perform rotations much more consistently, both in the short and free programs of the Grand Prix Finals; the skaters who were among the top three performed all rotations at level 4.

Objective of the study was to determine the content of features and levels of complexity of rotations in the competitive programs of women's single figure skating in the 2022-2023 season.

Methods and structure of the study. Based on the data obtained from official competition protocols, details of judges' scores and video recordings of the performance of 106 free programs at the I and II stages of the Grand Prix among juniors, in the Final of the Grand Prix series among adults and juniors, as well as at the Russian Championship among women, an analysis was carried out 318 spins performed by competitors in the 2022-2023 season.

Results of the study and discussion. Based on the results of the first season, which was held according to the updated requirements, it was necessary to identify a tendency to use traits of difficulty levels in rotations in women's single skating to determine a further strategy for constructing the training process in terms of choosing the most rational traits for performance for learning. In the group of rotation elements, at the above competitions, a total of 721 features of difficulty levels were presented: at the first stage of the Grand Prix 2022 (juniors) (Courchevel) - 361 features (32 participants); at the II stage of the Grand Prix 2022 (juniors) (Ostrava) - 404 features (35 participants); at the Grand Prix Series Final 2022 (juniors) (Turin) - 77

traits (6 participants); at the Grand Prix Series Final 2022 (adults) (Turin) - 78 traits (6 participants) and at the Russian Championship 2023 - 205 traits (17 participants).

The dynamics of two indicators were studied: the frequency of use of a trait (frequency of use, %) - the percentage ratio of the number of uses of a trait to the total number of used traits, and the level of reliability of trait execution (reliability, %) - the number of scored traits from all attempts to execute it, expressed as a percentage. Of the identified 6 traits required to obtain level 4, the most frequently performed were "complex variation of jump approach" (41.1% of the studied traits), "change of edge" (34.8%), which on average were scored in 90% and 86 % of cases, respectively, "difficult exit" was performed in 25.5% and was counted in 89% of cases. The traits "obvious increase in speed" and "rotation in both directions" are practically not used (Table 1), however, they are performed only by athletes who have good command of these movements.

The performance of the remaining features of the difficulty levels had the following distribution: the feature "at least 8 revolutions without any changes of position/variation, leg and edge (leave, tilt, complex variation of any basic position or, for combinations only, not a basic position)" was performed in 26 .1% of cases; "an obvious change in the position of leaning back - to the side" - 19.5%, "change of legs with a jump" in women's skating was performed the least number of times of all possible features - in 1.6% of

Table 1. Frequency and reliability of execution of the required six traits to obtain level 4 in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
Complex jump approach variation	7,8	85,7	7,2	96,6	7,8	100	9	85,7	9,3	84,2
Changing rib	6,1	50	6,4	88,5	7,8	100	7,7	100	6,8	92,9
Difficult exit	3,9	92,9	3,7	86,7	6,5	100	5,1	75	6,3	92,3
Difficult position change on the same leg	4,7	88,2	3,2	100	5,2	100	1,3	100	1,5	100
Clear increase in speed	0,3	100	1	100	-	-	1,3	100	0,5	100
Rotation in both directions	-	-	-	-	-	-	-	-	1	100

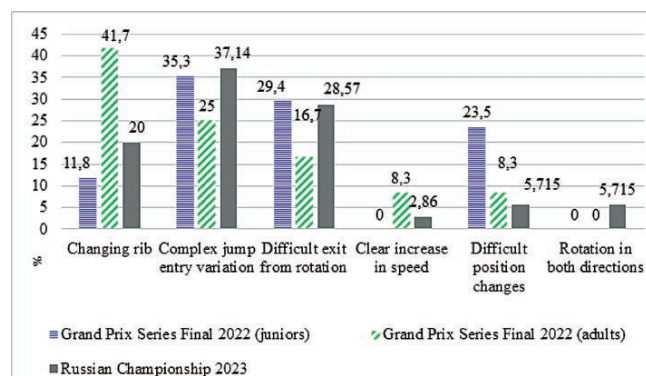
Table 2. Frequency and reliability of execution of traits of difficulty levels in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
8 turns	3,6	84,6	5,5	91	5,2	100	6,4	100	5,4	100
An obvious change in the position of leaning back - to the side	5,3	57,9	6,2	96	2,6	100	-	-	5,4	100
Difficult entry into rotation	3,6	30,8	1,5	83,3	2,6	50	-	-	1	50
Change of legs with a jump	-	-	0,3	100	-	-	1,3	100	-	-
Jump while spinning without changing legs	1,4	80	0,5	100	-	-	-	-	0,5	100

cases. Almost all features are counted in more than 88% of executions, except for the complex entry into rotation, the execution of which was counted in only 53% of executions (Table 2).

Complex variations of positions are performed in the range from 2.34% of cases (“Standing” position - UF, leaning the body forward) to 8.78% (“Libela” - CF, leg grip, shoulders parallel to the ice). The stability of execution ranges from 76.2% for the “Libela” position – CU (shoulders turned up) to 98.56% in the “Standing” position – UF (body bending forward). Detailed data on the performance features of the remaining complex variations are presented in Table 3.

The figure shows the results of a comparative assessment of the use of additional features for level 4 spins performed in free programs of juniors and adults in women’s single skating in the 2022-2023 season, which showed that the maximum percentage of execution was achieved when performing the “change of edge” feature in rotations in the Final of the Grand Prix series among adults, where the strongest foreign single figure skaters participated. When performing this trait, there is a strong correlation between the number of attempts and the success of their execution ($r=0.8$). Attempts to perform a complex variation of a jump entry are scored least often; the relationship is negative ($r=-0.72$). There is no relationship observed between the number of attempts to perform the remaining four additional features for level 4 and their successful execution ($r<0.36$).



The ratio of executed features in rotations required to obtain level 4 (in %) relative to all executed features at the studied competitions of the season

Russian figure skaters most successfully perform the trait “complex variation of jump entry,” which is also the most successful among leading foreign juniors.

Conclusions. When choosing a strategy for teaching the traits of difficulty levels for spins, you should rely on the following experience of athletes: of the 6 required traits for obtaining a level 4 spin, the most successfully implemented were the change of edge, a complex variation of jump entry, a complex exit from a spin and a complex change of position. Explicit acceleration in rotation and change in direction of rotation are extremely rare. This is due to the frequent obvious loss of quality of performance, which immediately leads to the fact that technical specialists do not



Table 3. Frequency and reliability of execution of the trait "Complex position variations" in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
"Standing" (body tilt forward – UF)	3,8	92,8	3,5	100	2,6	100	1,3	100	0,5	100
"Standing" (free leg above 90° – US)	5,5	90	6,2	92	5,2	100	7,7	83,3	6,8	100
"Billman" (UB)	4,4	100	5,4	91,3	6,5	100	5,1	100	6,8	100
"Standing" (UL, with leg hold)	6,9	80	6,2	100	5,2	100	5,1	100	7,3	93,3
"Sitting" (leg forward, body in fold - SF)	6,9	92	7,7	87,1	7,8	83,3	6,4	60	4,9	70
"Sitting" (leg to the side, body turn - SS)	6,9	88	6,7	85,2	2,6	100	7,7	100	4,9	60
"Sitting" (with leg back – SB)	7,2	88,5	6,9	82,1	6,5	80	6,4	100	4,4	88,9
"Libela" (CU, shoulders turned up)	3	72,7	3	83,3	3,9	100	5,1	25	4,4	100
"Libela" (CS, leg grab, shoulders vertical)	3,3	91,7	4,2	76,5	5,2	100	7,7	100	4,9	90
"Libela" (CF, leg grab, shoulders parallel to the ice)	7,8	82,1	8,4	88,2	10,4	75	9	71,4	8,3	82,4
Non-basic position	5	100	4,5	94,4	5,2	100	5,1	100	6,3	92,3

count the line and reduce the level of rotation accordingly; At the same time, participants lose points in the evaluation of the quality of execution of the element (GOE). Representatives of Russia possess the entire arsenal of traits identified to achieve level 4, which was successfully confirmed by the results of the Russian Championship. The largest number of errors were made when performing a difficult entry into the rotation, which leads to the loss of the maximum possible level 4. Taking into account the trends in the development of criteria for assessing the level and quality of rotations of competitive programs of figure skaters, it is possible to conclude that such a feature as uniqueness will appear in the next Olympic cycle or the originality of a complex variation of spin positions.

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Analysis of training means for jumpers and jumpers in horizontal jumps

UDC 796

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Abstract

Due to the difficult geopolitical situation in the world, Russian sport is going through a critical period. Currently, Russian athletes are under sanctions imposed by the Olympic Committee. In conjunction with the above, there is a decline in sports achievements and sports performance of highly qualified jumpers, since they cannot compete at the Olympic Games and World Championships. To improve technical preparedness, and therefore the effectiveness of competitions, experts strive to develop new training methods. The purpose of the study was to analyze the means of preparing jumpers and jumpers in horizontal jumps.

Keywords: *jumpers, horizontal jump, triple jump.*

Introduction. The physical indicators of women are associated with the characteristics of the female body, namely: the content of adipose tissue is significantly higher than that of male athletes, and accordingly, muscle tissue in the overall body composition is less as a percentage. Also, female athletes have a smaller cross-sectional cross-section of muscle fibers. In terms of anthropometric indicators, women have 10-12 cm less height and 10-15 kg less weight, shorter limbs and a longer torso. [1] If we consider the spine, the parts of the spine are more mobile, and the lumbar lordosis is more pronounced. The hemoglobin content in women is lower compared to men, by an average of 10%. Female athletes also have a lower rate of oxygen consumption: in absolute terms by 50%, in relative terms by 30%. [1] When working with women, it is necessary to differentiate the principles of training in connection with the above-mentioned characteristics of the female body, namely: under no circumstances should female athletes be trained according to the same principles of training as male athletes.

One of the main tasks of a jumper in the support phases of a triple jump is the ability to transition horizontal speed and shift the overall center of mass by

30-35 degrees during the take-off period. In this regard, the key points of the triple jump are the large shock loads on the athlete's musculoskeletal system in the support phases of the triple jump, which can reach up to 1000-1200 kg [1] in the second and third take-off. These loads can contribute to the development of hip, knee, and ankle injuries in triple jumpers.

Methods and structure of the study. Research was carried out by members of a comprehensive scientific group at training camps and competitions at the Russian Athletics Championships (jumping group). Highly qualified jumpers and jumpers (20 people) took part in the study.

The work used the method of analyzing literature sources in this field, competition protocols since 2003 in the triple jump (male/female).

A statistical method was also used to analyze the obtained data. Data from control measurements were obtained using PD timing and video analysis.

Results of the study and discussion. A comparison of the information content of the main indicators of technical readiness in the triple jump for men and women did not reveal any fundamental differences in these indicators (Table 1). In the table presented,



one can observe a significant negative correlation between the competitive result and the % share of the “jump” in the length of the triple jump. We associate these changes with an increase in the qualifications of jumpers. Based on the above, it can be argued that the “jump-dominant” technique and the “high-speed” version of the triple jump are promising. [1]

Noteworthy are the significant differences (about 30%) in the parameter of the vertical component of the speed of departure of the second repulsion be-

tween men and women (Table 2). It is in the efficiency of performing the second take-off that female jumpers lag significantly behind male jumpers. A change in the velocity vector by 30-35 degrees in 0.13-0.16 [4] s is associated with large impact loads on the musculoskeletal system of athletes and requires the highest level of development of special strength. It is in this phase that women experience the greatest difficulty, and it is here that the most promising area of improvement in the women’s triple jump is found.

Table 1 Indicators of technical readiness in the triple jump for men and women

indicators	Competition result, m	V before the last 5 m of the run, m/s	V before the last 5 m of the run, m/s	T total supports, s	T total flight, s	L jump, %	L leap, %	L step, %	V average horizontal, m/s	Power factor	Speed realization coefficient
woman n=42	1,00	0,81	0,82	-0,53	0,72	-0,32	0,13	0,16	0,75	0,70	0,66
men n=46	1,00	0,7	0,75	-0,42	0,62	-0,29	0,22	-0,04	0,67	0,57	0,67

Table 2 Horizontal and vertical components of takeoff speed in three phases of the triple jump (World Cup finalists)*

Options V, m/s	V horizontal jump	V vertical jump	V horizontal step	V vertical step	V horizontal leap	V vertical leap
men	9,77 ± 0,15	2,40 ± 0,16	8,61 ± 0,27	1,95 ± 0,22	7,02 ± 0,33	2,79 ± 0,26
woman	8,40 ± 0,23	2,34 ± 0,25	7,58 ± 0,27	1,52 ± 0,27	6,46 ± 0,29	2,53 ± 0,13

Table 3 Comparative characteristics of triple jump parameters for men and women - World Cup finalists*

indicators	men	woman	difference, %
L _{run-up, step} , m	20,3±2,4	18,8±2,3	-7,4
V _{before repulsion} , m/s	10,41±0,24	9,37±0,21	-10,0
Result, m	17,42±0,38	14,57±0,42	-16,4
t _{first repulsion} , ms	126±15	129±17	+2,4
t _{second repulsion} , ms	140±27	151±29	+7,9
t _{third repulsion} , ms	157±17	163±23	+3,8
t _{flight in a jump} , ms	543±35	539±43	-0,7
t _{flight in step} , ms	460±43	371±52	-19,3
t _{flight in a leap} , ms	689±48	656±53	-4,8
t _{total jump} , ms	1692±111	1566±113	-7,6
L _{jump} , m	6,41±0,17	5,41±0,23	-15,6
L _{step} , m	5,21±0,22	4,09±0,27	-21,5
L _{leap} , m	6,11±0,22	5,27±0,26	-13,7
L _{jump} , % of average	36,1±0,9	36,6±1,2	+0,5
L _{step} , % of average	29,4±1,2	27,7±1,7	-1,7
L _{leap} , % of average	34,5±1,2	35,7±1,1	+1,2



Table 4 Comparative characteristics of the angular parameters of the second take-off of the triple jump among men and women – finalists of the World Cup

Options	men	woman	difference	P
£ settings, degrees	58,1±3,2	63,4 ± 6,7	5,3	>0,05
Repulsion amplitude, degrees	60,0 ± 4,2	55,4 ± 4,6	4,6	>0,05
£ between the thighs when standing on a support, degrees	49,7 ± 10,3	47,4 ± 13,3	2,3	>0,05
£ flexion in the knee joint in the depreciation phase, degrees	132,6 ± 7,6	130 ± 5,1	2,6	>0,05
£ flexion at the hip joint in the depreciation phase, degrees	143,1 ± 9,5	140,1 ± 6,0	3,0	>0,05
£ repulsion, degrees	61,9 ± 5,3	61,1 ± 4,8	0,8	>0,05
Mach amplitude, degrees	151,6 ± 10,4	151,9 ± 15,7	0,3	>0,05
t supports	0,155 ± 0,110	0,153 ± 0,095	0,002	>0,05
£ between the thighs at lift-off, degrees	101,9 ± 7,5	104,4 ± 5,3	2,5	>0,05
Repulsion power	3,70 ± 0,30	3,48 ± 0,19	0,22	>0,05
V takeoff run, m/s	10,48 ± 0,17	9,39 ± 0,16	1,09	<0,01
Competition result, m	17,41 ± 0,38	14,70 ± 0,29	2,71	<0,01

G.V. Samoilov comes to similar conclusions, on the basis of studies of technical features of triple jumpers, can be identified: a smaller percentage of the “step” in the rhythmic structure of the triple, when compared

with male indicators (by 1.7%) (Table 3). Triple jumpers do not always ineffectively perform the second take-off of a triple jump and perform a “step” along a low trajectory, as if “overshooting” this phase of the

Table 5 Level of specialization of outstanding jumpers and triple jumpers Jumpers men

Name	triple jump	L	Special (Tj/L)
Benks V.	17,97	8,11	2,22
Konli M.	18,17	8,46	2,15
Simkins Ch.	17,86	7,35	2,43
Markov Kh.	17,92	8,23	2,18
Protsenko O.	17,69	8,01	2,21
Kovalenko A.	17,77	8,06	2,20
Edvards D.	18,29	7,41	2,47
Kapustin D.	17,86	7,68	2,33
Kharrison K.	18,09	8,04	2,25
Kesada I.	17,85	7,88	2,27
Average	17,95	7,92	2,27
Stan. deviation	0,18	0,33	0,10
P	P > 0,05		

Jumpers woman

Kravets I.	15,50	7,37	2,10
Lebedeva T.	15,36	7,01	2,19
Kasparkova	15,20	6,56	2,32
Marinova T.	15,20	6,46	2,35
Pranzheva I.	15,18	6,97	2,18
Mateesku R.	15,16	6,43	2,36
Khansen A.	15,16	6,43	2,36
Lasovskaia I.	15,09	6,71	2,25
Biriukova A.	15,09	6,56	2,30
Chen I.	15,03	7,22	2,08
Average	15,20	6,78	2,25
Stan. deviation	0,13	0,32	0,10
P	P > 0,05		



triple jump, reducing the time of the flight phase of the “step”, which is 19.3% less than men - jumpers. And the angular parameters of the second take-off of the triple jump are the same for women and men athletes (Table 4). [1]

A comparative analysis of the indicator of specialization in the triple jump of the strongest jumpers and female jumpers in the world shows that the best female triple jumpers have reached the level of specialization of male jumpers ($P > 0.05$; Table 5). [2,3]

In the process of training jumpers and triple jumpers, the special preparation means are no different. The differences and differences are due to the volume and intensity measures of existing remedies. For male jumpers, training means are more intense than for women.

Conclusions. There is a decrease in the take-off speed in the last section in the experimental group for men and women. It is necessary, while maintaining the traditionally high level of technical and jumping readiness of Russian jumpers, to pay special attention to improving running training with the target task of increasing the speed capabilities of jumpers and transferring increased sprinting readiness to take-off speed.

As a result of the study, an area in which it is necessary to work to improve the performance of athletes in the triple jump was identified. It is necessary to improve the efficiency parameters of the vertical component of the second repulsion departure speed. To do this, it is necessary to differentiate the load taking into account the morpho-functional, anthropometric and other characteristics of the female body. The in-

tensity of running training in female jumpers, as well as in male jumpers, should be within 95-100% of MAX, which will contribute to the development of speed qualities of athletes, in which there is a significant gap in the training of athletes in horizontal jumps.

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Improvement of physical training of young weightlifters in microcycles at the initial stage

UDC 796.88



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Abstract

Objective of the study was to increase the efficiency of physical training of young weightlifters in microcycles at the initial stage with the predominant use of the circular training method.

Methods and structure of the study. Classes in the control group were held in accordance with the approved program of initial training in weightlifting for 2023-2024, and in the experimental group, mainly using exercises using the circuit training method.

Results and conclusions. Wave-like alternation and gradual increase in load from cycle to cycle and from session to session within a cycle formed the basis of training for young athletes from the experimental group, which ultimately contributed to an increase in the level of physical fitness. Thus, the presented method and means of circular training in theoretical significance can be recommended for inclusion in the general base of the training system in weightlifting for the development of training plans for physical training at the initial stage in order to increase the effectiveness of training in microcycles of young weightlifters.

Keywords: *physical training, circuit training method, microcycle, young weightlifters.*

Introduction. Weightlifting is an Olympic sport, the basis of competitive activity of which is the motor actions of lifting a barbell above the head (jerk and push). Due to the technical complexity of the two main weightlifting exercises, unlike other strength sports, in weightlifting it is important not only the optimal manifestation of strength abilities, but also flexibility, speed, coordination and special endurance. It is also important to note that the effectiveness of competitive activity of weightlifters directly depends on the expedient construction of the training process and the content of the training system, especially at the initial stage, where the foundation of sportsmanship is laid [3].

It was found that at the initial stage, in most cases, predominantly game and repeated methods are used, the use of which does not always have a versatile effect on the body and a pronounced training effect in those involved, which is the reason for the insufficient physical preparedness of young weightlifters before enrolling in the stage of sports specialization [2, 5].

In this aspect, the need to improve traditional forms of physical training of weightlifters at the initial stage becomes a pressing issue. One of the most promising ways to improve physical abilities in microcycles seems to be the inclusion in the training program of young weightlifters of exercises using the circuit training method, which solves the problem of achieving high performance and increasing the functional state due to a complex and versatile effect on the athletes' body.

Objective of the study was to increase the efficiency of physical training of young weightlifters in microcycles at the initial stage with the predominant use of the circular training method.

Methods and structure of the study. The experimental study was carried out at the Vishnevskaya secondary school No. 2 in the village of Mokry Batai, Rostov region, as part of additional education in the period from September 2023 to February 2024. 12 young weightlifters aged 11-12 years of primary training groups took part in the pedagogical experiment. The number of students was 6 boys in the control and experimental groups, respectively.



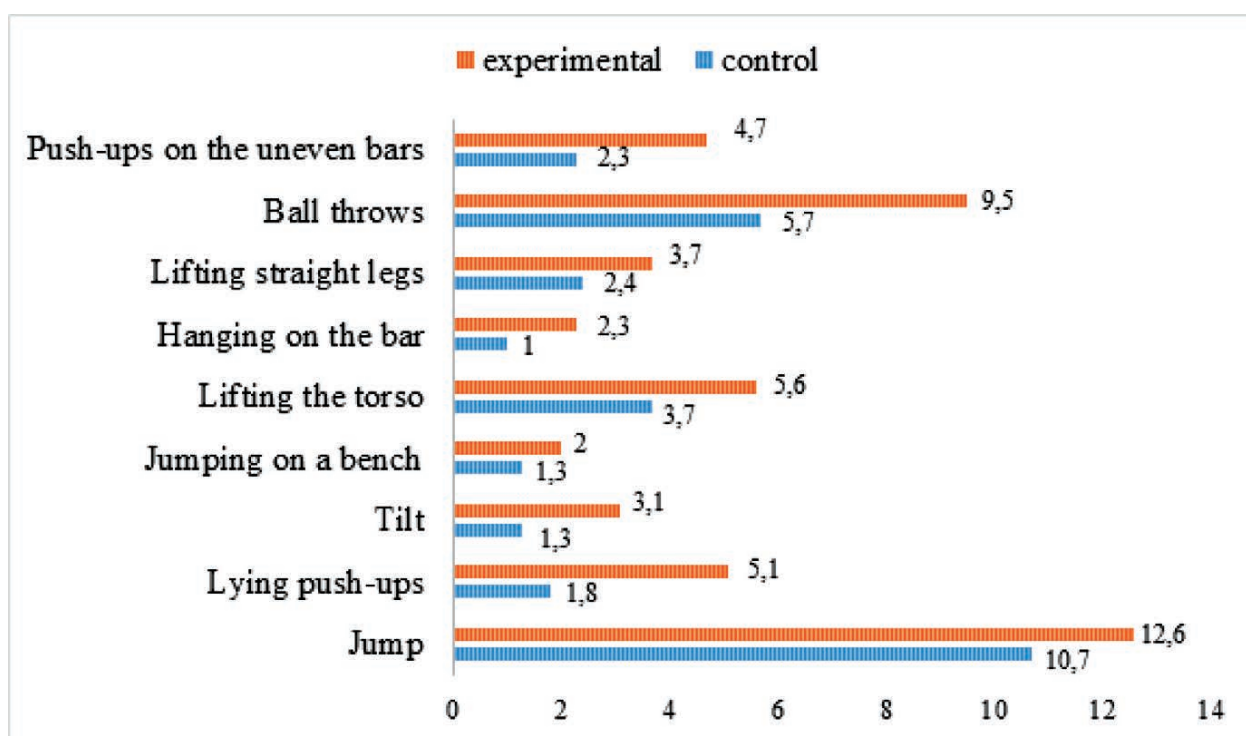
Tests to control physical qualities included: standing long jump with a push with two legs, lifting the body from a supine position, hanging on a high bar with bent arms at the elbow joint 90 degrees, bending forward from a standing position, jumping on a gymnastic bench, bending and extension of arms while lying on the floor, raising and lowering straight legs from a supine position, throwing a medicine ball against a wall, bending and extending arms on parallel bars.

Classes in the control group were held in accordance with the approved program of initial training in weightlifting for 2023-2024, and in the experimental group, mainly using exercises using the circuit training method.

Results of the study and discussion. Weekly training cycles were compiled at each stage of preparation of the training cycle and varied depending on the

training objectives, which gave us the opportunity to more accurately determine the content of each training session, use various means and correctly alternate physical activity. Cyclicity was determined by the regular repetition of classes with a certain focus over several weeks. Wave-like alternation and gradual increase in load from cycle to cycle and from session to session within the cycle formed the basis of training for young athletes from the experimental group (Table 1).

When implementing this microcycle, the individual characteristics of the participants in the experimental group, established based on the results of passing physical fitness tests at the beginning of the experiment, were taken into account. Solving the tasks and goals of each training session in the microcycle, we selected physical exercises mainly developing strength,



Dynamics of growth of average results in groups

Table 1. Weekly training microcycle of the experimental group of weightlifters at the initial stage

Types of training	Days of the week					
	No. 1 Tuesday	Load size	No. 2 Thursday	Load size	No. 3 Saturday	Load size
Speed-strength training	+	Average	+	Small	+	Average
Strength training	+	Average	+	Average	+	Average
Development of strength endurance			+	Large	+	Average
Development of flexibility	+	Small				
Increased aerobic capacity	+	Large	+	Small		
Complex (speed and aerobic capabilities)			+	Small	+	Small



Table 2. Test results at the beginning of the experiment

Test	Unit	Average value		Difference, %
		Control	Experimental	
Standing long jump	cm	129,6±4,8	130,6±3,8	0,8
Flexion and extension of the arms while lying down	Number of times	11,8±1,7	11,9±1,7	0,1
Incline	Number of times	4,3±1,2	3,9±1,7	9,4
Jumping on a gymnastic bench	Number of times in 10 s	5,3±1,3	5,5±1,5	3,7
Raising the body from a supine position	Number of times in 30 s	21,1 ±3,9	22,0±3,6	4,1
Hanging on the bar at a 90 degree angle at the elbow joint	C	7,1±1,4	7,8±1,5	9,0
Raising and lowering straight legs from a supine position	Number of times in 30 s	16,6±0,9	17,2±1,7	3,4
Throwing a 2kg medicine ball against a wall	Number of times in 40 s	23,9±2,7	23,1±2,4	3,3
Bending and extending arms on parallel bars	Number of times	16,0±1,5	16,5±1,4	3,0

speed and strength qualities in young weightlifters, which are the most significant in this sport.

At the beginning of the experiment in September 2023, a comprehensive assessment of indicators of the development of physical qualities in both groups was carried out using nine physical fitness tests (Table 2).

According to the test results obtained, the initial data on the level of physical fitness of young weightlifters in the control and experimental groups did not have significant differences. Testing was carried out on an open sports ground during the daytime.

At the end of the pedagogical experiment, after the implementation and use in the training process of the experimental group of the compiled sets of exercises performed by the circular training method, with the aim of a comprehensive impact on the motor qualities of weightlifters and a subsequent increase in physical indicators in comparison with the control group, we re-tested similar tests in end of February 2024. The results of repeated testing for the level of physical fitness after the experiment showed a significant superiority of the experimental group over the control group in almost all indicators presented in the figure.

Conclusions. In weightlifting, at the initial stage of preparation, the foundation is laid for further mastery of sportsmanship and achievement of the highest results, and therefore the main task of the training process of young athletes is comprehensive, integrated physical development, where the effectiveness of the competitive activity of weightlifters directly depends on the expedient construction of the training process and the content of the training system.

In the presented research work, the predominant use of the circular method in microcycles of training during weightlifting classes in initial training groups proved its effectiveness, which ultimately contributed to an increase in the level of physical fitness of young weightlifters from the experimental group.

Thus, the presented method and means of circular training in theoretical significance can be recommended for inclusion in the general base of the training system in weightlifting for the development of training plans for physical training at the initial stage in order to increase the effectiveness of training in microcycles of young weightlifters.

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Relationship between indicators of internal aggression and age categories of athletes in the context of the problem of moral verballity in sports

UDC 316.614.5



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Abstract

Objective of the study was to determine the dominant aggressiveness of various age categories of athletes as a potential factor in their asocialization.

Methods and structure of the study. 36 former athletes (2 international masters of sports, 13 masters of sports, 12 candidates for master of sports, 9 first-class athletes) of various age categories took part in the scientific work. Based on a questionnaire survey (questionnaire by L.G. Pochebut), the magnitude of aggression was determined and its direction was assessed.

Results and conclusions. Based on the data obtained, a hypothesis was formulated about the cause-and-effect relationship between the age of former and current athletes and physical and verbal aggression. No statistically significant connections were found between the age of athletes and emotional and objective aggression.

To compensate for the effect of the factor of verbal aggression in the process of socialization of active athletes, the authors proposed a method of socio-psychological mentoring, which is based on coaching pedagogical cultivation of positive verballity and control over the acquisition of positive social experience.

Keywords: *types of aggression, age categories of athletes, asocialization of athletes.*

Introduction. Sports activity is the most active social phenomenon. In addition to victories and achievements, it solves a number of vitally important specific issues. One of the main ones is the education of a young person's personality for full integration into the social system [2]. The solution to the educational problem is carried out through the direct interaction of all participants in training and competitive activities. The mutual exchange of semantic information enriches athletes with norms of behavior, verbal expressions and mutually binding connections [4].

Taking into account the law of normal distribution, the process of socialization in sports cannot be treated unambiguously only from the positive side. The main motivation for all sports activities is the

long-term goal: "to be stronger and faster than your opponents at all costs." The incentive to action in this case, as a rule, does not have the power of suggestion without intense emotions and "strong" expressions of mentors. Long-term experience of such motivation does not so much generate a positive effect in the socialization of athletes, but exposes them to the danger of taking the path of psychological destruction [7]. This is facilitated by the unconscious adoption of negative roles and attitudes, which can lead to personality deformation in relation to generally accepted social norms. Moreover, antisocial experience is an event extended over time. It is closely related to the age periods of human development and is the cause of irreversible phenomena under the influence of the phenomenon of psychodynamic



transfer [2]. The unconscious transfer of emotions previously experienced in sports into subsequent life can distort the attitude towards professional and personal reality after the end of a career. The likelihood of mental discomfort with deviant tendencies, which often manifest themselves in aggressive behavior, increases. Thus, deviation in the form of aggression, as a type of psychological dominant, indicates an internal conflict between personal beliefs and external requirements, between one's desire and external obligation.

The relevance of studying the causes of aggression in athletes and its relationship with age increases if this information helps to create a system for protecting young people from the influence of psychological determinants of professional destruction during training and competitive activities [5].

Objective of the study was to determine the dominant aggressiveness of various age categories of athletes as a potential factor in their asocialization.

Methods and structure of the study. Based on a review of literary sources, a hypothesis was formulated that the instrumental aggression of athletes is the cause of social destruction [2, 4, 7]. Determining the features of this process, in our opinion, will make it possible to identify those methods of psychological support that will increase the effectiveness of the socialization of young people for a fruitful life after their career.

To confirm the hypothesis, a study was conducted in which 36 former athletes of various age categories took part: 21-30; 31-40; 41-50; 51-60 and over 60 years old. The contingent of subjects was represented by two masters of sports of international class, thirteen masters of sports, twelve candidates for master of sports and nine athletes of the 1st category. The values of aggression were determined based on a questionnaire survey. In addition to the magnitude, its direction was assessed. Data were obtained using a questionnaire from L.G. Pochebut [3]. Four scales allowed the distribution of results into categories: verbal aggression (verbal hostility); physical (use of physical force); subject (using household items); emotional (alienation with elements of hostility).

The hypothesis of a relationship between the age variables of former athletes and aggression was tested based on the correlation coefficient of bivariate descriptive statistics for a quantitative measure of interaction [5, 6].

Results of the study and discussion. As a result of the correlation analysis of the survey data, some patterns were identified, which are presented in the table.

The closeness of correlations between types of aggression and the age of athletes

Types of aggression	Correlation coefficient with age
Verbal	0,60
Physical	-0,88
Emotional	0,24
Subject	-0,04

Of the four types of aggression, only physical and verbal have a relationship with the age of athletes. A negative, very strong connection was found ($r=-0.88$) between the factor ("age of athletes") and performance characteristics ("physical aggression"). At the same time, a direct moderate connection was revealed between indicators of verbal aggression and the age of athletes ($r = 0.6$).

According to the results of the correlation analysis, no statistically significant connections between the age of former and current athletes and emotional and objective aggression were found.

Based on the obtained data from the correlation analysis, it is possible to formulate a hypothesis about the cause-and-effect relationship between the age of athletes with physical and verbal aggression, excluding emotional and objective ones. After a career ends, physical aggression decreases over the years, while verbal aggression increases. Thus, verbal-logical (verbal) thinking in the process of sports activity is most likely a psychological determinant of professional destruction. It is the "word", as a means of expressing negative thoughts, that creates the necessary conditions for the formation of behavioral stereotypes with elements of aggression. Insults, abuse, shouting, threats and the like are the beginning and basis of social destruction. The initiative of negative verbalization can be implemented during the interaction of a coach with a student, in a group of athletes, as well as in the competitive struggle of opponents at competitions. It should be noted that if verbal aggression is the root cause of social destruction, then words with positive content can become the beginning and basis for positive socialization.



Conclusions. 1. Of all four types of aggression studied, only physical and verbal have a relationship with the age of athletes. Physical aggression decreases with age, while verbal aggression increases.

2. The dominance of verbal aggression during sports activities and the increase in its manifestations with the age of athletes, in contrast to other types of aggression, suggests that it is the main cause of social destruction.

3. Insults, swearing, shouting, threats and the like activate and provoke physical, emotional, as well as objective aggression.

4. Words with negative content are the beginning and basis of social destruction. Words with a positive focus create conditions for positive socialization of athletes.

5. The solution to the problem of socialization of athletes depends on the educational initiative of the coach, who has the authority to limit negative and cultivate positive verballity, as well as enrich athletes with speech patterns with positive content.

6. The development and practical application of verbal ethics for all participants in sports activities will eliminate instrumental aggression as a factor in victory over an opponent and will allow identifying the strongest, fastest and most technical athletes without using psychological pressure.

7. If we realize the educational potential of sport and form positive verbal language of a highly moral nature among millions of athletes in the country, then their active life position will have a healing effect on the speech state of our youth. Conversely, thousands of former athletes who are accustomed to verbal aggression can cause degradation of the verbal skills of young people in modern society.

Practical recommendations. To resolve the issue of positive socialization of young athletes, it is necessary to create an educational structure of verbal ethics for all participants in sports activities. This requires a training program, which should be based on the foundation of the best examples of Russian literature, and also filled with positive affirmative statements for various situations of training and competitive activity. The degree of mastery of verbal ethics can serve as a marker for assessing the

professional suitability of a coach as an educator of young athletes with a view to their full integration into the social system.

If the destructive influence of aggressive verballity in modern sports cannot be ruled out, then it is necessary to organize a separate sports space in which the potential of all subjects and means of influence will be realized in order to positively socialize young athletes who do not perceive "harsh expressions" in the process of coaching leadership and interaction with partners. team. This will increase the popularity of sports activities, since the alternative sphere of sports will include people whose inner world is based on the principles of highly moral verballity.

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Resilience of national team student football players with different life values

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Abstract

Objective of the study was to identify the multidimensional relationship between the levels of life values and resilience of student football players.

Methods and structure of the study. Students of the national football team took part in the empirical study. The methods of "Vitality Test" by S. Maddi were used in the Russian adaptation by D.A. Leontyev and E.I. Rasskazova, "Morphological test of life values" V.F. Sopov and L.V. Karpushina.

Results and conclusions. The systematic involvement of students in sports activities actualizes the development of values and determines personal meanings. The results obtained allow us to conclude that the development of student sports and the involvement of students in active sports activities is one of the conditions for the formation of a stress-resistant personality. Social support, common activities, and joint solution of problem situations in a sports game mutually determine a high level of resilience.

Keywords: *football team, college sports, life values, resilience, involvement, control, risk taking.*

Introduction. Student sports is one of the forms of development of mass sports and training of sports reserves, allowing students to maintain athletic shape and orientation in a certain way. Students combine obtaining a profession with active sports activities. The development of student sports is supported by the government of the Russian Federation: "... on the completion of the creation of student sports clubs in ... educational organizations of higher education by 2024, as well as the participation of such clubs in sports competitions held by student sports leagues..." [4, p. 21]. At the present stage, there is a whole range of problems in the development of student sports - from logistical and technical to psychological aspects of athletes. In the presented study, we focus on the personality of the athlete and, in particular, on the specifics of the relationship between indicators of vitality and life values. In the case of a semi-professional's sports activity in the status of a student, a peculiar disposition arises between what the student is already

oriented towards (sports activity) and what he is just mastering (professional activity). In addition, the high pace of life and the variability of living conditions impose special demands on the student. The ability to maintain one's psychological health in such conditions is characterized by vitality [1-3]. Many researchers confirm [3, 5, 6, 8] that a decrease in the level of resilience of students becomes not only a personal, but also a social problem; they have fewer resources for self-regulation and control, which leads to disruptions in communication and activity. These facts allow us to consider sports activity as a trigger for increasing resilience and differentiation of values in the minds of young people actively involved in sports activities. S. Maddi [8] defined resilience as a component of the resource state of the individual, contributing to active overcoming of difficulties and good adaptation, allowing one to cope with the feeling of helplessness and loss of meaning. A "resilient person" has a willingness to learn from existing situations and act in situations

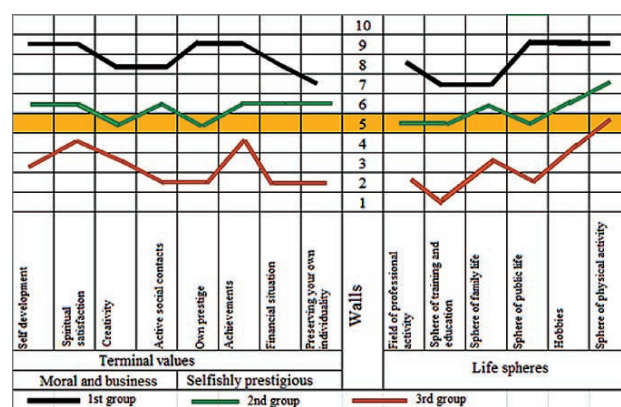
of uncertainty. S.A. Bogomaz notes that resilience is an important personal resource that helps overcome stress and achieve a high level of mental and physical health [1]. D.A. Leontyev [3] believed that resilience as a personality trait is characterized by the degree to which a person overcomes given circumstances, the degree to which a person overcomes himself. Generalizing approaches to the concept of “resilience”, G.A. Fofanova [7] notes different aspects of the characteristic: the key resource of the individual, to act in spite of, the ability to overcome oneself, the ability to transform problematic situations into new opportunities. Modern psychology presents a large number of areas of research into factors that contribute to the successful adaptation of an individual to changes and overcoming difficult life situations: “personal stability”, “personal adaptation potential”, “personal potential”, “resilience” [1-4, 8]. In a study by D.A. Tuvysheva and G.I. Atamanova [5] found that the more a person is convinced of the effectiveness of his own influence on life, the higher the tendency to consider material well-being as a life value. In addition, the more developed is the individual’s conviction that involvement in the events that happen to him provides valuable experience, allows him to enjoy the activity, and satisfy his interest, the higher the developed value of activity in socio-political activities. “Values determine a person’s experience of the meaning of a life situation. In turn, in overcoming difficult situations, the choice of values and “life support” is relevant, on the basis of which various options for overcoming the difficulties that have arisen can already be formed” [5, p. 86]. G.A. Fofanova suggests that life values are one of the factors of resilience: “The further development of society and the state as a whole depends on what interests, views, and values prevail among young people. It is important to study the associated psychological parameters of students’ life values - for example, resilience in order to determine the optimal ways for the development of educational and educational character” [7, p. 85], including student sports. Therefore, this problematic area of research seems to us relevant from both scientific and practical points of view.

Objective of the study was to identify the multi-dimensional relationship between the levels of life values and resilience of student football players.

Methods and structure of the study. The empirical study aims to determine the resilience of students with different life values. 21 athletes from football teams of two universities in Surgut took part in the study. The age of the football players ranges from 18 to 28 years. Athletes have been passionate about this sport for 5 to 10 years. Research method: questionnaires, cluster analysis in SPSS 23.0.

Results of the study and discussion. Football student athletes are characterized by a high level of resilience (80.95%) (see table).

The development of student sports, the involvement of students in active sports activities is one of the conditions for the formation of a stress-resistant personality. To determine the general trends of similar personality profiles among members of the national team, a cluster analysis was carried out. As a result, the respondents were divided into 3 groups: group 1 (G1) – 5; Group 2 (G2) – 11; Group 3 (G3) – 5 people. The results of the assessment of life values were presented in graphical form (see figure). The range of average values for this age group is highlighted in yellow. The following trend was observed: in G1 – high level of value orientations – high level of resilience (100%); in G2 – from high to reduced level; G3 – a high level of vitality prevails (60%).



Results of the “Morphological test of life values” method (V.F. Sopova, L.V. Karpushina)

Level of resilience among football players of student teams (number of people, %)

Indicators	Engagement	Control	Acceptance risks	Vitality indicator
High level	47%	33%	23%	80,95%
Average level	48%	67%	70%	14,29%
Low level	5%	0%	70%	4,76%



Thus, a high level of resilience is characteristic of student-athletes with high and low levels of value orientations. Moreover, in the second case (G3), a high level of resilience is determined by such personal characteristics as distance, isolation, focus on the majority, which indicates either a person's formed position - indifference, deliberate belittling of the significance of events, phenomena of one's own life, or a crisis period ("diffusion of identity"). In G1, high indicators of life values and areas are observed. We focus on the first positions in the hierarchy: the spheres of "social life", "hobbies", "physical activity"; values "self-development", "spiritual satisfaction", "own prestige", "achievement". Paying attention to the relationship between these areas and the prevailing values, we state the desire of athletes to be realized in all significant activities, to improve themselves, and to focus on moral satisfaction from the results. They are characterized by clear planning of their activities, specification of goals, orientation towards the majority, we are not talking about conformism, but about the search for productive strategies for building communication. The described subgroup is the core of the football team - highly motivated, focused on development and learning. G2 is characterized by average indicators for all parameters studied, with the exception of the "physical sphere", for which the indicators are above average. Sport for them is a moral satisfaction, and they are attracted by the process of the game, and not just the results. G3 is characterized by reduced indicators on the studied parameters, with the exception of the spheres of "physical", "hobbies" and terminal values: "spiritual satisfaction" and "achievement". It is common for football students to enjoy the process of playing sports; due to comparison with others, there is motivation to improve their achievements, but in the absence of long-term planning, motivation decreases. The physical sphere is the context for the development of values, while the motives for playing sports can be purely personal - from building personal contacts to receiving bonuses in educational activities.

Conclusions. Among football players, a high level of vitality prevails, and with an average level of expression of terminal values, low to high levels of vitality are stated, and with high and reduced indicators of values, a high level of vitality is stated. If a student-athlete is characterized by a contradictory personality orientation, then sports activity is the context for stabilizing personal experiences and stressful situations. And with an uncertain personality orientation, without an

expressed preferred goal setting, sports activity can become a context for expressing oneself in social reality. Thus, the development of student sports and sports activities is one of the conditions for the formation of a stress-resistant personality. Social support and joint solution of problem situations in a sports game determine a high level of resilience. Let us note that one of the problems of student sports is the lack of long-term planning and dynamics of development of amateur sports in the regions. The organization of this direction, along with high-performance sports, will contribute to the development of students' resilience.

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Using time intervals in sports training

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Abstract

Objective of the study was to justify the feasibility of using a time interval of 12.36 seconds and its multiples in sports training.

Methods and structure of the study. The experiment was carried out in several stages. In the period from 2016 to 2018, the first stage, the dynamics of the level of development of special endurance of runners was studied using a time interval of 12.5 seconds and its multiples in the training process of marathon athletes. At the second stage in 2021, the dynamics of the accuracy of perception of the duration of a time interval of 12.5 seconds in amateur athletes was revealed, depending on age. At the third stage in 2023, the stability and variability of the perception of two time intervals was studied: an individual minute - 60 s and a time interval lasting 12.36 seconds and its multiples: 24.7; 37.1; 49.4 seconds. In addition, the objectives of the study included assessing the feasibility of using the time interval under consideration in training children aged 7-11 years old doing taekwondo.

Results and conclusions. The rhythmic ordering of loads set in time ensures the passage of the most important processes in the body of athletes with the least energy costs, and therefore increases the effectiveness of the training process. This conclusion is confirmed by the relationship of the time interval of 12.36 with the golden ratio.

Keywords: *time interval 12.36 s, golden ratio, feasibility and effectiveness of use in sports training.*

Introduction. The current level of sports achievements is a consequence of a significant increase in the volume and intensity of training loads, which today have reached their maximum values. We believe that further growth in sports results can be achieved through the use of achievements in related areas of knowledge that have not previously found wide application in sports practice.

Our attention was drawn to the time interval, which in psychology is called "present time" or "internal measure of the present." William James, in his work "Principles of Psychology," published in 1890, called this time interval "the visible present" [6, p. 180]. Then, in the laboratory of Wilhelm Wundt, the duration of the "visible present" was experimentally established, which did not exceed 12 seconds.

In 1991 N.I. Moiseeva, considering time as an internal category of perception, gave a definition of "present time". She called the present tense "the period of

time during which the surrounding world is perceived without involving memory mechanisms, is perceived as a holistic image" [7, p. 4]. Scientists examined the duration of the "internal measure of present time" and determined its duration, which was 12.5 seconds.

Objective of the study was to justify the feasibility of using a time interval of 12.36 seconds and its multiples in sports training.

Methods and structure of the study. The scientific work was carried out in several stages. In the period from 2016 to 2018, the first stage, the dynamics of the level of development of special endurance of runners was studied using a time interval of 12.5 seconds and its multiples in the training process of marathon athletes [1]. As the results of the study showed, the dynamics were positive.

At the second stage, which was conducted in 2021, the study was aimed at identifying the dynamics of the accuracy of perception of the duration of a time inter-



val of 12.5 seconds in amateur athletes depending on age. 47 people aged from 18 to 62 years took part in the experiment. When determining the accuracy of perception of the studied time interval, its duration was clarified, which amounted to 12.36 ± 0.12 s. It was also found that the accuracy of perception of a given time interval does not depend on age and gender [2].

At the third stage - 2023, the stability and variability of the perception of two time intervals was studied: an individual minute (60 s) and a time interval lasting 12.36 seconds and its multiples: 24.7; 37.1; 49.4 seconds. It was found that the error in perceiving the duration of an individual minute is 2.5% higher than the error in perceiving the time interval of 12.36 seconds and its multiples [3].

In addition, the objectives of the study included assessing the feasibility of using the time interval under consideration in training children aged 7-11 years old doing taekwondo. As is known, the ability of an athlete to maximally maintain the duration of muscle activity, where the dominant source of energy is the alactic anaerobic process, is also 10-12 seconds [5, 10].

Results of the study and discussion. The results of the study showed the effectiveness of using time intervals: 12.36; 24.7; 37.1; 49.4 when develop-

ing speed-strength abilities and special endurance in young taekwondo athletes [8, 9].

In addition, world records in cross-country athletics were analyzed and revealed that at distances of 800 m, 2000 m, 5,000 m, 10,000 m, 21 km 97 m and 42 km 195 m, the record time is a multiple of 12.36 seconds. Moreover, the time difference between women's and men's records is also a multiple of this time interval. The results of the analysis of world records are presented in table 1.

The multiple of world records with a time interval of 12.36 seconds and the multiple of this difference between women's and men's records allows us to conclude about the stability and functionality of this time interval. In addition, its rhythmic repetition indicates the rhythmicity of a number of processes in the body of athletes, on which the sports result depends.

The stability and functionality of the manifestation of this time interval in the athlete's body can be confirmed by its relationship with the golden ratio (with the Fibonacci constant): $0.618 \cdot 20.0 = 12.36$; $12.36 \times 1.618 = 19.99...$

The Fibonacci constant is 1.618. Because of its unique mathematical properties, it was called the

Table 1. World records in cross-country athletics and their multiple times over a time interval of 12.36 seconds

Distances (m/km)	Result (s)	Multiplicity (number of times)	Difference (s)
Men 800 m	1.40,91	$100,91 \div 12,36 = 8,16$	12,36
Women 800m	1.53,28	$113,28 \div 12,36 = 9,16$	
Men 2000 m	4.44,79	$284,79 \div 12,36 = 23,04$	3×12,36
Women 2000 m	5.21,56	$321,56 \div 12,36 = 26,02$	
Men 5000 m	12.35,36	$755,36 \div 12,36 = 61,1$	7×12,36
Women 5000 m	14.00,21	$840,21 \div 12,36 = 67,98$	
Men 10,000 m	26.11	$1571 \div 12,36 = 127,1$	13×12,36
Women 10,000 m	29.13,3	$1741,3 \div 12,36 = 140,9$	
Men 21 km	57.31	$3451 \div 12,36 = 279,2$	26×12,36
Women 21 km	62.52	$3772 \div 12,36 = 305,2$	
Men 42 km	2:00.35	$7235 \div 12,36 = 585,4$	54,8×12,36
Women 42 km	2:11.53	$7913 \div 12,36 = 640,2$	

Table 2. World records in swimming and their multiple times for a time interval of 12.36 seconds (50 m pool)

Distances (m/km)	Result (s)	Multiplicity (number of times)	Difference (s)
Men's 200 m freestyle	1.42,00	$102,00 \div 12,36 = 8,3$	10,85
Women's 200 m freestyle	1.52,85	$112,85 \div 12,36 = 9,1$	
Men's 200 m backstroke	1.51,92	$111,92 \div 12,36 = 9,06$	11,43
Women's 200 m backstroke	2.03,35	$123,35 \div 12,36 = 10,98$	
Men's 200 m breaststroke	2.05,48	$125,48 \div 12,36 = 10,15$	12,07
Women's 200 m breaststroke	2.17,55	$137,55 \div 12,36 = 11,13$	
Men's 200 m butterfly	1.50,34	$110,34 \div 12,36 = 8,9$	11,47
Women's 200 m butterfly	2.01,81	$121,81 \div 12,36 = 9,9$	



golden ratio, and the reciprocal value of the constant, 0.618, was called the Phidias number [4].

We have analyzed world records in other cyclic sports where endurance is demonstrated. However, such almost one hundred percent accuracy in multiples as in running was not found, which is due to the naturalness of running and the environment in which it is carried out. However, the identified pattern is found with less accuracy in multiples in swimming at a distance of 200 m.

If we take into account that swimming methods were developed by people and they are not as natural as running movements, including the specificity of turning, then we can also talk about the orhythmic nature of the manifestation in the body of swimmers of a given time interval.

Conclusions. Based on the conducted research, we can conclude that it is advisable to use the time interval of 12.36 and its multiples in sports training.

The rhythmic ordering of loads set in time ensures the passage of the most important processes in the body of athletes with the least energy costs, and therefore increases the effectiveness of the training process. This conclusion is confirmed by the relationship of the time interval of 12.36 with the golden ratio.

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Dynamics of biochemical indicators in the mesocycle of training in highly qualified weightlifters

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Abstract

Objective of the study was to study the dynamics of changes in biochemical parameters in the blood of weightlifters and to identify the magnitude and direction of individual changes in biochemical markers within the mesocycle of the training process before and after participation in international competitions.

Methods and structure of the study. Biochemical control was carried out at the final stage of preparation for the Asian Championships against the backdrop of peak training loads and immediately after participation in competitions. Weightlifters (8 women) ($n=8$), who were members of the national team of the Republic of Kazakhstan, took part in the study. Control was carried out 4 and 2 weeks before participation in the championship and immediately after it.

Results and conclusions. During training, weightlifters successfully coped with high training loads with a pronounced focus on activating the creatine phosphate mechanism for energy supply to muscle work. The majority of subjects were characterized by low values of metabolic biomarkers, such as CPK and AST, which indicates a high level of adaptive potential in athletes during the entire training period. Low levels of CPK and muscle tissue damage index had a positive impact on the effectiveness of the training process of weightlifters and made it possible to achieve high rates of growth in sports and technical indicators. As a result, the women's team performed successfully at the Asian Championships and won 2 gold, 1 silver and 2 bronze medals.

Keywords: *highly qualified weightlifters, creatinine, creatine phosphate mechanism of energy supply, creatine phosphokinase indicators, aspartate aminotransferase indicators, muscle tissue destruction index, mesocycle of the training process, training load.*

Introduction. In elite sports, an important problem is the systematic search for effective means and methods of sports training, as well as the development of new technologies and models of the training process. To improve the quality of management of the training process, means of objective monitoring of biochemical processes are often used, in particular those associated with measuring the concentration of creatinine, aspartate aminotransferase (AST), creatine phosphokinase (CPK) activity in the athlete's blood [1, 2, 5, 7, 12, 13].

Objective of the study was to identify the dynamics of changes in biochemical parameters in the blood of weightlifters and to identify the magnitude and direction of individual changes in biochemical markers

within the mesocycle of the training process before and after participation in international competitions.

Methods and structure of the study. The study involved highly qualified female weightlifters who were members of the national team of the Republic of Kazakhstan during the preparation for the Asian Weightlifting Championships. The athletes' own weight and level of sportsmanship in absolute values (points) were determined using the coefficients of the Sinclair table.

Laboratory examination of athletes to determine biochemical markers in the blood was carried out during the training camp, after intense physical activity, a night's rest (sleep), and the next morning, on an empty stomach. Blood was drawn from the ulnar vein.



Laboratory studies were performed on an automatic biochemical express analyzer.

Laboratory analysis determined the values of creatinine, unit of measurement $\mu\text{mol/l}$ and $\mu\text{mol/l/kg}$, creatine phosphokinase (CPK), aspartate aminotransferase (AST), unit of measurement U/L, Unity/Litre, units/liter, (u/l). The muscle tissue damage index (CPK /AST) was determined. The mathematical and statistical analysis program SPSS was used to process the data. During the analysis, the following statistical indicators were determined: group average-M, standard deviation-S. The significance of differences was determined by Student's t-test for dependent samples. The subjects trained according to traditional programs [8]. The training process took place in the conditions of a training camp for the Asian Championship. Blood sampling was carried out at the peak of athletic fitness, 4 and 2 weeks before the main start, and the third measurement was carried out immediately after the completion of the competition.

Results of the study and discussion. Analysis of the obtained empirical data on the value of one's own weight and personal result in the sum of double events in glasses, as well as biochemical parameters showed that the group average values of creatinine concentration were $M = 99.9 \mu\text{mol/l}$; $S=10.83$. The values of creatinine per kg of weight were $M=1.26 \mu\text{mol/l/kg}$, $S=0.34$. The average group value of creatinine is higher than the reference values [7], which may indicate the high efficiency and focus of the training load on developing the power of the creatine phosphate mechanism for providing energy for muscle contraction. Calculations of the partial correlation coefficient between creatinine per kg of weight and the level of sportsmanship in absolute values, excluding the influence of one's own body weight, have a significant relationship - $r = 0.73$ ($p < 0.05$).

CPK activity indicators in this group of subjects were $M = 270.3$ units/l; $S=164.1$. In almost all subjects, CPK activity did not exceed physiological norms, and the group average value was no more than 1.5 times higher than the reference values [7]. Empirical data suggests that the athletes managed to maintain a high level of adaptive potential, which was the key to successful performance at the Asian Championships. It is important to note that in most subjects the muscle tissue damage index (CPK /AST) was no more than 10, which indicates the absence of critical damage to muscle fibers [7]. Great importance in the biochemical monitoring of athletes is given to the study of the activity of intracellular transaminases - AST (diagnosis of heart conditions) [1, 7]. The group average values

of the activity of these enzymes in the subjects were within the normal range [7].

The values of the obtained biochemical parameters reflecting the concentration level of creatinine, creatine phosphokinase (CPK), aspartate aminotransferase (AST) in the blood of the subjects (absolute values) at the beginning and end of the training mesocycle, as well as the magnitude and direction of the group average changes are presented in the table. The group average creatinine value is higher than the reference values [7]. There is a significant increase in creatinine levels against the background of peak loads for two weeks by $11.34 \mu\text{mol/l}$ ($p < 0.05$). At the same time, during the systematic reduction of the training load two weeks before the start of the championship and during the period of participation in competitions, the group average creatinine values sharply decreased by $22.2 \mu\text{mol/l}$ ($p < 0.001$). The empirical data obtained can indicate the high sensitivity of the creatine phosphate mechanism for providing the energy of muscle contraction to the action of training loads of varying magnitude and direction. These facts are important to consider when constructing various sports training cycles in weightlifting.

As a result of the study, it was found that during the mesocycle the dynamics of changes in the group average biochemical parameters of creatine phosphokinase were statistically unreliable. The range of CPK values among the subjects ranged from 132 to 544 U/L against the background of maximum loads. These facts indicate an adequate individual reaction of the body of female athletes to the impact of maximum high training loads.

Such data may be evidence that in a large volume of muscle mass there was no negative effect on the recovery processes associated with inhibition of the synthesis of "nucleic acids and proteins" [6], and this, as a consequence, could have a positive effect on the rate of increase in myofibril mass, which will directly influence the overall effectiveness of the training process according to such a criterion as the increase in sports and technical indicators of athletes [9].

The results of the data obtained can be considered as the boundary values of CPK, at which athletes will achieve the highest rates of growth in sports results in preparation for competitions.

An analysis of the scientific literature revealed that, for example, among highly qualified athletes (men, women) in orienteering, the CPK values averaged 475.74 units. at a norm of 473-483 units. [eleven]. In comparison with the results of our studies, it is clear that weightlifters have significantly lower CPK values according to the results of all three measurements.



Dynamics of changes in biochemical parameters in weightlifters during the period of maximum load before the Asian Championships and immediately after the competition (n=8)

Statistical indicators	1st dimension	dimension 2nd	3rd dimension
	Creatinine $\mu\text{mol/l}$ per kg body weight		
M	1,14	1,26	0,99
S	0,38	0,34	0,32
Difference		0,12	-0,27
t		3,23	4,31
Creatinine $\mu\text{mol/l}$			
M	88,5	99,9	77,7
S	10,67	10,83	9,06
Difference		11,34	-22,2
t		3,4	5,7
Creatine phosphokinase (CPK) units/l			
M	227,75	270,3	243,1
S	66,81	164,1	120,65
Difference		42,5	-27,13
t		0,95	1,4
Aspartate aminotransferase (AST) units/l			
M	20,81	23,4	21,49
S	8,05	8,0	5,29
Difference		2,55	-1,87
t		3,44	1,29
Muscle tissue destruction index (CPK /AST) (MTDI)			
M	11,72	11,95	11,95
S	4,02	7,6	6,5
Difference		0,23	0
t		0,12	0

Note: t value = 2.37; $p < 0.05$; $t = 3.50$; $p < 0.01$; $t = 5.41$; $p < 0.001$

It is important to note that in most subjects the muscle tissue damage index (CPK/AST) was no higher than 10, which indicates the absence of critical damage to muscle fibers [7]. The dynamics of MTDI indicators was in the range of 11.72-11.95. A slight increase in enzyme activity may be associated with the absence of metabolic stress and signs of overtraining [7].

An important result of the study is that at the experimental level it was shown that it is possible to influence the quantitative indicators of biomarkers within one mesocycle through individual correction of the training load and, thereby, control intracellular processes in muscle fibers, achieving the best balance between destruction and synthesis "nucleic acids and proteins" [6]. And this can be one of the significant factors that determines the rate of increase in sports results, determining the overall effectiveness of the entire system of training athletes and successful performance in important competitions.

The results of the study indicate that during training, weightlifters successfully coped with high training loads with a pronounced focus on activating the creatine phosphate mechanism for energy supply to muscle work.

The majority of subjects were characterized by low values of metabolic biomarkers, such as CPK and AST, which indicates a high level of adaptive potential in athletes during the entire training period. Low levels of CPK and muscle tissue damage index had a positive impact on the effectiveness of the training process of weightlifters, which made it possible to achieve high rates of growth in sports and technical indicators. As a result, the women's team successfully performed at the Asian Championships and won 2 gold, 1 silver and 2 bronze medals. One participant was recognized as the best athlete of the championship, and another athlete became the winner of the Asian Championship in the overall classification (according to the Sinclair system). This athlete attempted to set a new world record in this exercise in the clean and jerk.

The greatest importance for diagnosing muscle tissue damage is given to changes in the enzyme creatine phosphokinase in the blood. Practice shows that CPK values of more than 500 U/L may indicate under-recovery of the athlete; more than 1000 U/L indicate serious disorders in the body, significant damage to myocytes, which can cause a decrease in the athlete's performance and increase the risk of injury [10]. The

trainer can use the obtained laboratory information to rationally structure the training process, establish optimal recovery periods, as well as to assess the compliance of physical activity with the functional state of the body, timely identification of signs of overtraining and overstrain of the musculoskeletal system.

To achieve a high training effect in weightlifting, training loads should be performed short in time and with high intensity. To achieve large volumes of high-intensity training work, you should increase the number of workouts to two or three during the day. To avoid the accumulation of excess lactate concentrations, it is necessary to include periods of passive rest for 15-20 minutes between exercises [12]. This time is enough to reduce lactate by 50-60% [10]. Knowledge of the laws of functioning and adaptation of the human body to training loads of various types makes it possible to increase the effectiveness of training athletes at all stages of the development of sports and technical skills [11].

Conclusions. Biochemical control of creatinine and creatine phosphokinase indicators is an informative indicator of the athletes' body's response to the training load, and can be used to manage the educational and training process in weightlifting.

The results of the study indicate that during training, weightlifters successfully coped with high training loads with a pronounced focus on activating the creatine phosphate mechanism for energy supply to muscle work.

The majority of subjects were characterized by low values of metabolic biomarkers, such as CPK and AST, which indicates a high level of adaptive potential in athletes during the entire training period. Low levels of CPK and muscle tissue damage index had a positive impact on the effectiveness of the training process of weightlifters, which made it possible to achieve high rates of growth in sports and technical indicators. As a result, the women's team performed successfully at the Asian Championships and won two gold, one silver and two bronze medals.

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Comparative assessment of physical activity and sports motivation indicators of physical education university students in Russia and China

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Abstract

Objective of the study was to conduct a comparative assessment of the level of physical activity and sports motivation of students at physical education universities in Russia and China.

Methods and structure of the study. Scientific work was carried out among 223 students of physical education universities: Russian students 96 people (56 women and 40 men), Chinese students 127 people (57 women and 70 men). To achieve the goal, the following were used: a short version of the International Physical Activity Questionnaire (IPAQ), and the "Sports Motivation Scale" questionnaire. The results were analyzed separately among male and female students.

Results and conclusions. There are significant differences in the time spent on high-intensity physical activity ($p \leq 0.01$) and walking ($p \leq 0.01$), these indicators are higher among Russian male students compared to Chinese male students. No significant differences were found among female students. The data obtained indicate a certain difference in the lifestyle of students from different countries and in preferences for types of physical activity. A study of sports motivation proved that it is significantly higher among Chinese students, both men and women ($p \leq 0.01$). The data prove the high role of the cultural factor in the formation of sports motivation of students.

Keywords: level of physical activity, sports motivation, students, physical education universities, Russia, China.

Introduction. The development of cultural, educational and sports ties between Russia and China creates new opportunities for improving the system of professional training of students at physical education universities in both countries [4].

To create a better learning environment focused on the educational experience of two countries, cross-cultural research is required, since a monocultural approach does not allow identifying cultural differences in the lifestyle of students, their motivational attitudes, personal and professional qualities [2, 3].

Objective of the study was to conduct a comparative assessment of the level of physical activity and sports motivation of students at physical education universities in Russia and China.

Methods and structure of the study. The sample consisted of 96 Russian students (56 women and 40

men) of the Institute of Physical Culture, Sports and Youth Policy (Ural Federal University), average age of respondents 20.1, as well as 127 Chinese students (57 women and 70 men) of the Institute of Physical Culture (Baoding University), average age of respondents 20.3. To determine the level of physical activity (PA), a short version of the International Physical Activity Questionnaire (IPAQ) was used [1]. The questionnaire includes 7 questions regarding the number of days in the week and the amount of time spent in high-intensity physical activity (HIPA), moderate-intensity physical activity (MIPA), as well as walking and time spent sitting. The questionnaire results require a score from 0 to 7 for each question; the higher the score, the higher the level of physical activity. To assess sports motivation, an adapted version of the "Sport motivation scale" questionnaire was used [5], the authors of

the questionnaire consider motives based on complementarity. Using the sports motivation scale, one can determine internal motivation and external regulation, as well as introjected regulation, which reflects students' internal beliefs that arose in them in the process of accepting external demands.

Results of the study and discussion. Tables 1 and 2 present data on the level of physical activity of Chinese and Russian students.

According to the results, it was established that physical activity among students has its own characteristics. Significant differences relate, first of all, to high-intensity physical activity, which is higher among Russian male students ($p \leq 0.01$). It can be noted that if the number of days spent on high-intensity physical activity practically does not differ in the samples, then the amount of time spent on high-intensity physical activity is significantly higher among Russian male

students. Russian male students spend on average 60–90 minutes during the day, while Chinese students spend 40–60 minutes. This fact can be explained by the fact that Russian students of physical education universities are more involved than Chinese students in the active training and competitive process, and specifically in competitive sports. In turn, Chinese students of physical education universities engage not only in competitive sports, but also in Chinese sports (Wushu, Baduanjin, Taijiquan, etc.), in which more time is devoted to moderate physical activity.

Table 2 presents the results, which indicate that Russian male students spend more time walking than Chinese male students ($p \leq 0.01$). This fact is associated with the lifestyle of students, the peculiarities of movement during the day to the institute, to training, and home. Chinese students living on a university campus, where academic and sports buildings are

Table 1. Comparison of indicators of high-intensity physical activity and moderate-intensity physical activity in Russian and Chinese male students

Indicators	Chinese students – men n=70	Russian students – men n= 40	Chinese students – men n=70	Russian students – men n= 40
	HIPA	HIPA	MIPA	MIPA
Number of days (days/points)	3,37± 1,68	3,7± 1,69	3,5± 1,99	3,37± 2,27
Number of minutes, hours, (in points)	3,4±1,64	5,57±2,09	3,82±2,41	3,65±2,50
Total score	8,11±3,29	9,30±3,35	7,32±3,51	7,02±4,14
t -criterion	p≤0.01		–	

Legend: HIPA – high-intensity PA, MIPA – moderately intense PA, arithmetic mean (points), SD – standard deviation.

Table 2. Comparison of “Walking” and “Sitting” indicators among Russian and Chinese male students

Indicators	Chinese students – men n=70	Russian students – men n= 40	Chinese students – men n=70	Russian students – men n= 40
	Walking	Walking	Sitting	Sitting
Number of days (days/points)	5,81± 1,98	6,15± 1,68	–	–
Number of minutes, hours, (in points)	2,64±2,29	3,97±2,43	3,48±2,01	3,82±1,76
Total score	8,45±3,21	9,87±3,25	3,48±2,01	3,82±1,76
t -criterion	p≤0.01		–	

Table 3. Comparison of indicators of high-intensity and moderately intense physical activity among Russian and Chinese female students

Indicators	Chinese female students n=57	Russian female students n=58	Chinese female students n=57	Russian female students n=58
	HIPA	HIPA	MIPA	MIPA
Number of days (days/points)	3,35 ± 1,95	3,58± 1,90	3,61±1,8	3,65± 1,94
Number of minutes, hours, (in points)	3,87±2,29	4,36±2,40	2,85±2,42	3,41±2,33
Total score	7,43±3,74	7,94±3,39	6,25 ±3,69	7,06±3,11
t -criterion	–		–	

Legend: HIPA – high-intensity PA, MIPA – moderately intense PA, arithmetic mean (points), SD – standard deviation.



Table 4. Comparison of “Walking” and “Sitting” indicators among Russian and Chinese female students

Indicators	Chinese female students n=57	Russian female students n=58	Chinese female students n=57	Russian female students n=58
	Walking	Walking	Sitting	Sitting
Number of days (days/points)	5,89±1,74	6,13± 1,41	-	-
Number of minutes, hours, (in points)	2,78±2,32	3,36±2,75	3,35±1,93	3,94±1,82
Total score	8,68±3,34	9,49±3,33	3,35±1,93	3,94±1,82
t -criterion	-		-	

Table 5. Comparison of sports motivation among students of physical education universities in Russia and China

Groups	Respondents	Motivational scales		
		Internal motivation	External regulation	Introjected regulation
Chinese students	men n=70	23,32±5,70	21,86±5,07	21,60±4,67
Russian students	men n= 40	17,05±5,80	12,65±6,50	17,07±6,37
t -criterion		p≤0,01	p≤0,01	p≤0,01
Chinese students	women n= 57	21,96±5,69	20,94±6,39	21,19±5,88
Russian students	women n= 58	15,43±5,57	10,18±5,13	15,34±5,63
t -criterion		p≤0,01	p≤0,01	p≤0,01

located almost on the same territory, spend less time moving around, and therefore spend less time walking. In addition, Chinese male students have in recent years opted to use electric bicycles and mopeds to travel between dormitories, sports and educational institutions, reducing their walking time.

It should be noted that the involvement of students in both countries in the educational process is reflected in the “Sitting” indicator and the data obtained allow us to assert that students spend on average 5-6 hours studying due to lack of physical activity.

The following analysis concerns a comparison of the physical activity of Russian and Chinese female students (Tables 3, 4).

When analyzing the physical activity data of Russian and Chinese female students, we did not find significant differences in the levels of intense and moderate physical activity, which indicates that female students of physical education universities in the two countries, on average, spend the same amount of time on high-intensity physical activity and moderate physical activity. It can be assumed that this is due to the fact that female students of physical education universities are less involved in training and competitive activities than males, and their physical activity is more related to academic activities in sports.

When comparing data on the time devoted to “Walking” and “Sitting,” we can conclude that there are no differences between Chinese and Russian female students, as well as between Chinese and Rus-

sian male students. These results confirm the similarity in the lifestyle and organization of the educational process of students from different countries.

The second study was aimed at studying the motives for playing sports and physical activity among Russian and Chinese students of physical education universities in Russia and China. The results of the study were analyzed in the same way as in the first study separately in samples of male and female students (Table 5). The Cronbach’s reliability coefficient test value was 0.968, which is greater than 0.9, indicating the high quality of the data reliability.

The data reflected in table 5 show that Chinese students, both men and women, are characterized by a higher level of motivation for all types (external, internal, introjected).

Significant differences for each of the motivational orientations were found both among Russian and Chinese male students ($p \leq 0.01$) and Russian and Chinese female students ($p \leq 0.01$). These facts indicate, first of all, cultural differences in the perception of motives for playing sports and physical activity. It can be assumed that Chinese students of physical education universities are more emotionally involved in the process of playing sports and physical activity, while Russian students of physical education universities are more rational about their sports motivation. It is in the motivational attitudes that the phenomenon of Eastern and Western sports culture is manifested, since Eastern sports culture prioritizes psychophysi-



cal self-improvement, while Western culture prioritizes superiority over competitors.

Conclusions. The conducted research proves the important role of the cultural factor in influencing the sports motivation of students at physical education universities in Russia and China; this is expressed in a higher level of sports motivation among Chinese students than among Russian students. At the same time, differences in the level of physical activity of students in both countries are largely associated not with the cultural factor, but with the lifestyle of students and the choice of types of physical activity.

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Activating the problem of forming flexible skills in student-athletes

UDC 37.013.42+ 796.011.1



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Abstract

Objective of the study was to identify the demand for developing soft skills among student-athletes of the Ural Federal University (UrFU) as a model university in terms of organizing work with student-athletes.

Methods and structure of the study. The experiment was conducted in November–December 2023 using an online questionnaire (Yandex form). 150 student-athletes took part in the survey: 55% boys and 45% girls.

Results and conclusions. The educational organization of UrFU has a fairly developed sports base, which satisfies not only the needs of amateur athletes, but also professionals. This gives students a sense of care and interest in developing their sporting achievements. Student-athletes, receiving professional education, are focused on the quality of education and are ready to make additional efforts for self-development. Students are aware of the importance of soft skills for professional growth and self-development; most of them are focused on the development of communication, cognitive and organizational skills. Student-athletes assign priority soft skills to a specific sport.

Keywords: *student-athlete, soft skills, student sports, mass sports, high-performance sports, extracurricular activities.*

Introduction. The higher education system is the main social institution for improving the intellectual resource of society. Since the training of highly qualified specialists is aimed at realizing their professional potential in a certain structure of society, one of the optimal approaches to education involves the formation of narrowly professional and supraprofessional (flexible) skills. The latter make it possible to fully realize the student's potential, both professional and personal, in various sociocultural spheres. "The educational space of the university provides the creation of special opportunities and conditions for activating their potential, demonstrating their intellectual, creative, organizational abilities..." [5, p.48].

The formation of soft skills at a university is realized not only in the learning process, but also in the process of extracurricular work, through sports. A communicative, critical, organized, responsible professional who is able to interact in a team of like-minded people is in demand in the sports field at various levels. Student

sports is an extracurricular educational activity of students popularized in higher educational institutions. In the process of sports activities, students develop physically, which allows them to prepare for active work and form healthy lifestyle habits. Structuring student sports at the levels of "elite student sports, elite student sports and mass student sports" has significant heuristic potential [5, p. 34–35] in the educational space of the university.

This classification allows you to design the necessary elements of extracurricular activities in accordance with the specifics of sports activities. Grassroots sport reaches the maximum number of students, promotes physical health, social integration, builds positive interpersonal relationships, develops leadership skills and improves quality of life. Elite sports are aimed at achieving results in national and international competitions. The achievements of athletes are not only their personal success, but also a source of national pride and help strengthen the country's authority in the international arena.



The relevance of a differentiated approach in the educational space of student-athletes is confirmed by a number of studies. The parity of professional and soft skills is discussed in [10]. Flexible skills allow you to navigate not only professional activities, but also in a rapidly changing social environment.

The importance and necessity of developing flexible skills in educational organizations is proven in research [3, 9]. They view the development of soft skills as an important task for universities; believe that it is possible to develop the ability for communication, diplomacy, cooperation, relationship building, leadership, as well as the formation of team, public, “thinking” skills, the ability to present your ideas, creatively solve complex problems (including social ones), and make decisions in the process of participation in extracurricular cultural and sports activities of the university.

In the study [2], soft skills are presented within the framework of communication, cognitive and emotional intelligence, self-organization and management. Other authors include communication, management, self-organization, and effective thinking skills in the group of soft skills [1]. Pedagogical research has developed tools for the development of soft skills for students in general, which include master classes, TED conferences, case games, public events in the Open Microphone format [6], etc. In work devoted to the demand for soft skills with positions of students, teachers and employers, there is a similarity in positions regarding the importance of communication and organizational skills among all respondents, and discrepancies are recorded in the understanding of the degree of importance of managerial and effective thinking skills [7]. The few studies of soft skills in physical education have identified the components and technologies that facilitate their development and inclusion in educational courses [8]. Works are emerging that justify the need to include soft skills in student-athlete curricula and professional standards [4].

However, such studies are fragmentary. Research into students’ understanding of the need to develop soft skills seems very relevant. The results of reflection will allow us to determine the forms and methods of extracurricular activities to develop soft skills.

Objective of the study was to identify the demand for developing soft skills among student-athletes of the Ural Federal University (UrFU) as a model university in terms of organizing work with student-athletes.

Methods and structure of the study. The target group is student-athletes who have results of no lower than I sports category in individual sports and no lower than II sports category in team sports, as well as those who have the Candidate Master of Sports category and the titles Master of Sports, Master of Sports of International Class, Honored Master sports having the right to receive this status in accordance with the Regulations on the status of “UrFU Student-Athlete” adopted at UrFU.

The study was conducted in November-December 2023 using an online questionnaire (Yandex form). 150 student-athletes took part in the survey: 55% boys and 45% girls. Based on the duration of sports activities, three groups were identified: those involved in sports from 10 to 15 years (56% of the sample), from 5 to 10 years (31% of respondents) and from 1 to 5 years (13% of the sample). In quantitative terms, by type of sport, respondents were distributed as follows: team sports (hockey, volleyball, basketball, football) – 72.6%; individual sports (judo, swimming, tennis, skiing, athletics, chess, e-sports) – 27.4%. Among the students surveyed, 44% are professional athletes whose careers are on the rise; the remaining 56% believe that their sports achievements are not progressing, but they continue their sports activities at the amateur level.

Results of the study and discussion. Active, responsible, organized, creative young people who are capable of transmitting positive energy and the spirit of patriotism to the youth environment, traditional values and a healthy lifestyle are in demand more than ever at the present stage of social development. In this regard, athletes are a reference group for youth audiences. The majority of student-athletes do not connect their professional strategy with sports. This follows from a decrease in the intensity of professional sports over the years of study: in the 1st year – 39%; 2nd year – 31%; 3rd year – 20%; 4th year – 10%. We believe that this is due not so much to the stagnation of sports results, but to a change in life priorities. This confirms the thesis that the development of soft skills in student-athletes has a deep semantic meaning.

There is a closeness between the positions of the university and the athletes themselves. 91% of respondents believe that soft skills help in their sports and professional careers. 93% of respondents said that the university is interested in developing their sporting achievements. Sports competitions of vari-



ous levels held by the university were rated quite highly by 73% of students. In addition to sports activities and activities as part of the curriculum, 64% of students regularly receive additional education in related areas of professional training, the remaining 29% only when there is a need, of which 48% see positive results.

Assessing their own skills, students believe that intellectual skills are developed at a sufficient level in 42%, communication skills – 26%, emotional intelligence – 18%; self-organization and activity planning – 11%, project and team management – 9%. We tend to view such results as a critical attitude towards ourselves and the results of our own activities.

Students believe that the first place in demand for soft skills is teamwork, communication skills, activity planning and self-organization; on the second - intellectual skills: critical and creative thinking, emotional intelligence and cognitive flexibility; on the third – management skills: project and team management.

Our expectations were based on the fact that team sports develop communication skills and were surprised when eSports came out on top. He is much more successful than others in forming planning activities. According to respondents, basketball, volleyball, football, hockey, as well as chess, contribute to the development of creative and critical thinking, and cognitive flexibility. Survey participants believe that individual sports build self-organization, management skills and emotional intelligence.

Certain difficulties in UrFU are associated with the sufficiency of resources and tools for personal development. Survey participants rated their satisfaction with their condition as follows: 58.6% – completely satisfied, 22% – partially satisfied, 5% – not satisfied and 14% – did not answer this question.

New data has been obtained on the interaction with artificial intelligence in the formation of soft skills. More than half (56% of respondents) believe that artificial intelligence will not be able to compete with humans in the areas of communication, creative thinking and emotional intelligence, but can easily cope with project management.

Additionally, a survey was conducted among the coaching staff about the importance of soft skills for athletes. Team sports coaches indicated the following gradation of soft skills for athletes: 1) activity planning and project management; 2) creative thinking and cognitive flexibility; 3) communication, teamwork and emotional intelligence. Coaches of individual sports prioritize: managing their own development; then cre-

ative thinking, cognitive flexibility, communication and emotional intelligence.

Conclusions. The educational organization of UrFU has a fairly developed sports base, which satisfies not only the needs of amateur athletes, but also professionals. This gives students a sense of care and interest in developing their sporting achievements. Student-athletes, receiving professional education, are focused on the quality of education and are ready to make additional efforts for self-development. Students are aware of the importance of soft skills for professional growth and self-development; most of them are focused on the development of communication, cognitive and organizational skills. Student-athletes assign priority soft skills to a specific sport.

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Structure of adaptive physical education classes for children with cerebral palsy based on heart rate indicators

UDC 376.2

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Abstract

Objective of the study was to determine the structure of classes for children with cerebral palsy based on the analysis of heart rate indicators.

Methods and structure of the study. Scientific work was carried out at the Center for Adaptive Physical Culture of Petrozavodsk State University for 12 months. The experimental group consisted of 13 people aged 12-22 years with a diagnosis of cerebral palsy. Throughout the study, during adaptive physical education classes, heart rate indicators were recorded using a chest heart rate monitor with each change in the direction of physical exercises, as well as their order.

Results and conclusions. Analysis of the results showed that a uniform heart rate response to a change in the direction of exercise was not observed, but two variants of the structure of the exercise were identified, in which the physiological curve of the study participants lined up as close as possible to the reference values. In the first option (according to 60% of participants), exercises alternate in the following sequence: strength exercises (heart rate from 80 to 95 beats/min), cyclic exercises (heart rate 120 beats/min), statokinetic stability exercises (heart rate 131), joint gymnastics (heart rate 75 beats/min). In the second option (according to 40% of participants), the exercises alternate as follows: joint gymnastics (heart rate 65 beats/min), statokinetic stability exercises (heart rate 124 beats/min), aerobic exercises (heart rate 131 beats/min), strength exercises (heart rate 74 beats/min).

The results of the study are recommended to be used when planning the structure of classes for children with cerebral palsy.

Keywords: *physiological curve, structure of classes, heart rate, cerebral palsy, adaptive physical culture.*

Introduction. Children with cerebral palsy, as a rule, lead a sedentary lifestyle, which leads to delays in physical and functional development, difficulties in self-care and communication. Insufficient understanding of the need to expand motor activity and stimulate a disabled child to move delays the realization of his motor potential. At the same time, well-organized regular classes that allow disabled children to be involved in physical activity contribute to the effective development of their motor skills, stimulate them to independently perform movements, and improve their quality of life. [1] The most difficult task is to determine adequate physical activity for disabled people with cerebral palsy, since the limiting link is the low functional capabilities of the body [2]. Due to significant difficulties in coordination when performing or changing motor actions, the dynamics of heart rate during one session is not predictable.

There is no data on the norm for measuring or monitoring the functional state in disabled children, designed to determine the level of motor activity for children with cerebral palsy, which is complicated by the nature of the disease and the lack of research in this direction [3].

The simplest method of studying the response to physical activity of a child with cerebral palsy is to measure the heart rate (HR), carried out over time [1].

Long-term studies confirm the importance of monitoring the functional capabilities of the body of children with cerebral palsy, which provides invaluable information about their individual capabilities for the well-founded construction of an adaptive physical education program.

Objective of the study was to determine the structure of classes for children with cerebral palsy based on the analysis of heart rate indicators.



Methods and structure of the study. Scientific work was carried out at the Center for Adaptive Physical Culture of Petrozavodsk State University for 12 months. The experimental group consisted of 13 people aged 12-22 years with a diagnosis of cerebral palsy (7 people - spastic diplegia, 5 - spastic tetraparesis, 1 - hyperkinetic form), motor functions in 10 participants correspond to the third level according to the GMFCS classification, in three participants - to the fourth level according to the GMFCS classification. Most participants cannot move independently, have difficulty maintaining balance, and have contractures in the elbow and knee joints. All participants regularly engage in adaptive physical education 2 times a week.

Throughout the study, during adaptive physical education classes, heart rate indicators were recorded using a chest heart rate monitor with each change in the direction of physical exercises, as well as their order. Heart rate indicators were recorded for sixteen options for the structure of classes. Over the next five sessions, control heart rate measurements were taken to confirm the data obtained. The standard for heart rate dynamics was the traditional physiological curve of a physical education lesson, but taking into account the characteristics of the physical and functional state of the participants and according to the recommendations described in similar studies [1, 4], changes in heart rate were allowed no more than 25% of the previous value. The structure of the lesson included cyclic exercises aimed at developing endurance, strength exercises aimed at strengthening the extensor muscles of the upper and lower extremities,

exercises for statokinetic stability and joint gymnastics (Table 1).

The duration of the lesson was 40 minutes, the exercises changed every 7-10 minutes.

Results of the study and discussion. Analysis of the results showed that a uniform heart rate response to a change in the direction of exercise was not observed, but two variants of the structure of the exercise were identified, in which the physiological curve of the study participants lined up as close as possible to the reference values.

In the first option (according to 60% of participants), exercises alternate in the following sequence: strength exercises (heart rate from 80 to 95 beats/min), cyclic exercises (heart rate 120 beats/min), statokinetic stability exercises (heart rate 131), joint gymnastics (heart rate 75 beats/min) (Table 2).

In the second option (according to 40% of participants), the exercises alternate as follows: joint gymnastics (heart rate 65 beats/min), statokinetic stability exercises (heart rate 124 beats/min), aerobic exercises (heart rate 131 beats/min), strength exercises (Heart rate 74 beats/min) (Table 3).

Despite the fact that the time for performing cyclic exercises is not long, the target heart rate is achieved from 1 to 5 minutes of continuous work, i.e. quite quickly, because participants experience difficulties in performing them. Exercises aimed at statokinetic stability have the same effect on the cardiovascular system. Those. By combining cycling and statokinetic stability exercises, heart rate targets can be achieved to provide an aerobic effect.

Table 1. Options for exercises in the structure of adaptive physical education classes for children with cerebral palsy

Cyclic exercises	Walking on a treadmill, walking in a Gross simulator, pedaling on a simulator for active-passive mechanotherapy "Ortovent-moto",
Strength exercises	Exercises on block machines with a load of 10-12% of the maximum, exercises with your own weight (squats, leg extensions), exercises with free weights (dumbbells 0.5-1 kg), walking on a stepper with resistance
Exercises for statokinetic stability	Overcoming an obstacle course in a Gross simulator, with unstable equipment, with Nordic walking poles, "Heron" exercise
Joint gymnastics	Wide-amplitude movements aimed at preventing contractures in the elbow, shoulder, knee, hip and ankle joints (flexion-extension, pronation-supination, circumduction)

Table 2. Heart rate indicators of the first version of the lesson structure for children with cerebral palsy

No.	Exercises	Execution start time	Completion time	Heart rate indicator (average value)
1	Strength exercises	00'00''	09'33''	89±5,2
2	Cyclic exercises	11'00''	21'00''	120±5,9
3	Exercises for statokinetic stability	22'30''	31'50''	131±2,8
4	Joint gymnastics	32'25''	38'58''	75±4,4

*Table 3. Heart rate indicators of the first variant of the lesson structure for children with cerebral palsy*

No.	Exercises	Execution start time	Completion time	Heart rate indicator (average value)
1	Joint gymnastics	00'00''	10'24''	65±5,2
2	Exercises for statokinetic stability	11'25''	18'00''	124±3.0
3	Cyclic exercises	18'53''	28'53''	131±0,8
4	Strength exercises	32'25''	39'22''	74±3,8

Conclusions. Based on the analysis of heart rate indicators, two optimal sequences of exercises in the structure of the lesson for children with cerebral palsy were determined, which may be one of the conditions for the rational distribution of physical activity for the development of the functional capabilities of the child's body.

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Application of the concept of tancegrity in the rehabilitation of children with intellectual disabilities

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Abstract

Objective of the study was to identify postural disorders in children with mental retardation and to develop a method of physical rehabilitation based on the positions of the tancegrity model.

Methods and structure of the study. The scientific work involved 80 children born in 2008-2009, evenly distributed into 2 groups: with mild mental retardation and healthy schoolchildren. It was proposed to use three tests: scoliometry, measurement of flexibility in forward bending and a test of visual assessment of functional shortening of muscles and muscle imbalance, to determine existing disorders according to the theory of myofascial chains of T. Myers and the concept of the **tancegrity model**.

Results and conclusions. Rehabilitation training, developed using the TRX system to correct identified disorders, showed positive results and the effectiveness of the physical rehabilitation technique. In particular, scoliometry indicators improved in 25% of children with mental retardation, flexibility increased by 5.39 cm (before the experiment -5.14 ± 2.01 , after two courses of rehabilitation 0.25 ± 1.82), functional shortening of muscles in the form of lateral deviation corresponded to scoliometry data: when compared with the initial data, in 25% of children after the experiment there was no movement of the body beyond the midline when bending forward.

Keywords: *posturological disorders, mental retardation, rehabilitation, tancegrity, trx training.*

Introduction. The term "tancegrity" was coined by the architect Buckminster Fuller in 1962 in a statement about "integrated tension." This term refers to structures whose integrity is maintained due to the balance between constant tension forces acting simultaneously on the entire structure. "Tancegrity reflects the principle of interaction of structures in which the shape of an object is preserved due to the finite general and continuous forces of compression within the system, and not to the point forces of the components of such a structure" [2, 3].

Thomas Myers proposed applying this model to the human body, creating in 1997 the concept of anatomical trains and myofascial meridians.

This concept is based on the assumption that the muscles of the human body do not function as in-

dependent units. Instead, they are viewed as part of a tancegrity-like network spanning the entire body, with fascial structures serving as connecting components. Since fascia can transmit tension [4] and taking into account its proprioceptive and nociceptive functions, the presence of myofascial meridians may be a response to both posturological changes in the body and the irradiation of pain to distant anatomical structures of the body. The central rule for choosing meridian components is a direct linear connection between two muscles [5]. Using this structure, Myers creates 11 lines of myofascial anatomical trains that regulate movement.

According to various data and systematic reviews of domestic and foreign studies, the presence of 6 myofascial lines (meridians) is confirmed:



superficial posterior, superficial anterior, posterior functional, anterior functional lines, spiral and lateral lines.

Considering the postural characteristics of children with intellectual disabilities and analyzing the coordination and synchronization of motor actions, we built our research and methodological work around three myofascial lines: the superficial posterior line, the spiral and the lateral lines, due to the fact that the vertical position of a person is formed and maintained by adjusting the anterior imbalance, stabilization of the “front tilt” of the body, this determines the importance of the dorsal fascia in maintaining postural balance.

Objective of the study was to identify postural disorders in children with mental retardation and to develop a method of physical rehabilitation based on the positions of the tansegrity model.

Methods and structure of the study. 80 children born in 2008-2009 took part in the scientific work. from Yekaterinburg, who were divided into 2 groups: 40 children with mild mental retardation from correctional educational institutions and 40 healthy children from a comprehensive school. Physical rehabilitation was carried out in a 2-month course, once every six months, with systematic classes 2 times a week throughout the year (2 courses were conducted).

When organizing the study, written consent was obtained from parents to conduct it. To analyze postural disorders, each participant underwent 3 tests:

1. Scoliomety (Fig. 1) – assessment of spinal deformities and disorders of the musculoskeletal system in forward bending using a scoliometer. A scoliometer is a device designed to measure the angle of lateral inclination of the torso and rotation of the vertebrae during examination of a patient in a forward tilt position, allowing quantitative assessment of body deformation in the horizontal plane.

Scoliometer measurements were carried out in three zones: in the upper thoracic region (Th3–Th4), mid-thoracic region (Th5–Th12) and in the thoracolumbar region (Th12–L1 or L2–L2). A scoliometer measurement of 0 was defined as symmetry of the area under study. From 0° to 3° – borderline values, from 3° – asymmetry of the area.

2. Measuring flexibility in forward bend (Fig. 2). The goal was to lean forward as low as possible with your legs straight. First, the participant was asked to perform two preliminary bends; during the third bend, the participant had to bend forward as much as possible and record the result for 2 seconds. The amount of flexibility was measured in centimeters.

3. Test for visual assessment of functional muscle shortening and muscle imbalance (Fig. 3). When bending forward with straightened knees, the presence of rotation of the body and the movement of the upper body beyond the midline of the tilt was assessed. If it is available, as, for example, shown in Fig. 3, muscle shortening was recorded in the direction of inclination along the posterior or lateral myofascial lines. The results obtained were correlated with test 2 and received additional confirma-



Figure 1. Scoliomety testing



Figure 2. Flexibility testing



Figure 3. Visual assessment



Scoliometry test results, (persons)

Group	Before the experiment	After 2 stages of correction work
Schoolchildren with intellectual disabilities	32	24
Healthy schoolchildren	19	15
Forward bend test results (flexibility), (cm)		
Schoolchildren with intellectual disabilities	-5,14±2,01	0,25±1,82*
Healthy schoolchildren	3,80±1,34	5,07±1,19

tion, if available, in the case of a change in the angle of inclination on only one side across all assessment zones.

Results of the study and discussion. The presence of an angle of lateral inclination of the torso of more than 3° and rotation of the vertebrae during examination of the patient in the forward bending position in the majority of tested schoolchildren. In the context of the topic under consideration in this article, of greatest interest is the change in angle on one side of the body, which indicates muscle imbalance along the posterior myofascial lines and linear functional shortening of muscles. Thus, before the experiment, 32 out of 40 schoolchildren with intellectual disabilities had these changes on one side, while in 19 out of 40 healthy schoolchildren (see table). These changes were correlated and confirmed by visual assessment in the third test.

Testing from a standing forward bend with straight legs showed a lack of flexibility in schoolchildren with mental retardation, in average values the inability to reach the floor with their fingertips (see table), which indicates reduced functioning of the muscular-ligamentous apparatus and possible

causes/consequences of posturological disorders.

It is proposed to build rehabilitation work using a multifunctional tool for working with your own weight - the TRX loop. This simulator has many advantages: training on it allows you to help strengthen and develop muscles, their endurance, improve coordination abilities, work with motor control, proprioception; and while hanging, stretch the muscles in different positions. The variability of the program can be varied; the balancing component and the absence of a specified movement along the axis of execution allow you to create exercises of a different nature.

It is proposed to formulate methodological features of training on TRX loops, including the following provisions:

1. Lesson duration 40-60 minutes.
2. Training exercises are performed with changing modes of muscle work: in a concentric mode and with a static delay of up to 5 seconds during work (for example, in one execution 10 times with a delay and 5 times without a delay; in another execution - 15 times without a delay).
3. In one lesson, 10-12 exercises are performed,

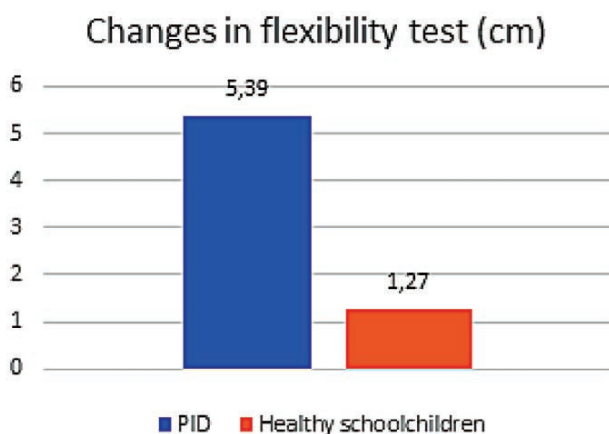


Figure 4. Changes in flexibility indicators after correctional work

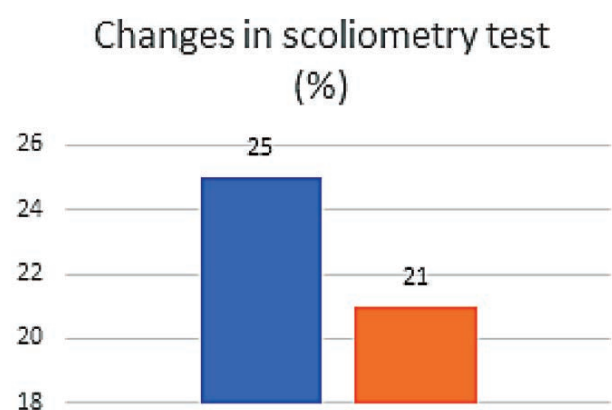


Figure 5. Changes in scoliometry parameters after correctional work



which, as training progresses, are repeated 2 approaches in the formed combinations.

4. Exercises are combined based on following functional lines, 3 exercises each. Each subsequent exercise complements the previous one according to the anatomical group of synergistic functioning. Examples of combinations of exercises:

- latissimus dorsi, rhomboids, triceps brachii;
- calf muscle, hamstring muscles, gluteal muscles;
- abductor muscles, gluteal muscles, quadratus lumborum muscle;
- trapezius muscle, deltoid, biceps brachii;
- back extensor muscles in combination with balancing exercises.

5. Combinations of exercises for antagonist muscles for switching and alternating between main exercises (grouped in 2-3 exercises). Examples:

- exercises on the abdominal muscles, the front surface of the thigh;
- exercises for the pectoral muscles, biceps brachii.

6. At the end of the session, stretch all myofascial lines for 10 seconds in each position: 8-10 exercises.

7. Mandatory lesson variability: each subsequent lesson should contain 30-40% of new exercises from the previous lesson.

After two courses of classes, schoolchildren with intellectual disabilities increased flexibility in bending forward by an average of 5.39 cm, and healthy schoolchildren by 1.27 cm (Fig. 4). According to scoliometry indicators, the number of cases of the angle of lateral inclination of the torso on the side of

the same name decreased (Fig. 5) both in persons with mental retardation and in healthy schoolchildren.

Conclusions. Thus, the use of TRX training, based on the positions of the tansegrity model in the method of physical rehabilitation of children with mental retardation, has effective results in reducing posturological disorders, increases flexibility, reduces muscle asymmetries and better motor control of movements.

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Politicized mediatization of a sports incident in conditions of information confrontation

UDC 32.019.5



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Abstract

Objective of the study was to identify the speech means of defense rhetoric in Russian state media in line with the mediatization of a sports incident using the example of the Kamila Valieva doping scandal during the 2022 Beijing Olympics.

Methods and structure of the study. The empirical base included media texts of Russian federal media from 10.02.2022 to 20.02.2022, collected by the Semanticforce.net system using the keyword “Kamila Valieva” in the text, title or subtitle. In the selected texts, metaphors of war are highlighted, since “metaphoricality is one of the most important features of modern propaganda and political speech”.

Results and conclusions. The authors found that during the information confrontation, Russian state media used communication strategies largely based on military rhetoric. The media strategy of the domestic mass media was to formulate in the audience an idea of the war declared by the Western world against Russian sports and the country as a whole. The authors conclude that in the context of global political confrontation, any incident involving athletes of the opposing sides is highly likely to be mediatized using a communication algorithm similar to that discussed in this article.

Keywords: *politicization, mediatization, information confrontation, military metaphor, mass media, Olympics, sports incident.*

Introduction. In conditions of international tension, local incidents, the actors of which are not associated with political activity, are drawn into the process of mediatization and become subjects of the political agenda, and the event, as a result of public resonance, acquires socio-political consequences.

Researchers characterize the phenomenon of mediatization as a two-way process in which media become part of other social institutions and change the norms and methods of their activities [12, 13], and have a determining and formative mutual influence on each other [4]. D.P. Gavra rightly clarifies the characterization of mediatization as “the process of expanding the social area of awareness and complicating the discourse of an event with the simultaneous expansion and complexity of the audiences involved in this discourse” [3, p. 60].

The multimillion-dollar media influence puts sporting incidents on the international agenda, and the athletes themselves become media actors in the confrontation between powers and blocs. In sociology and political science, the concepts of “sport” and “war” are often placed side by side [11]. L.V. Balashova argues that in the arsenal of metaphors, the association “sport/war” is the most representative” [1, p. 778]. The politicization of sports is updated in conditions of global instability, cold or hot confrontations and permanent value transformations [14]. Therefore, world sports competitions are symbolized in the media environment, reflect international conflicts, turn into a platform for economic, political and mental confrontation between the “forces of good and evil, and become a tool for suppressing representatives of the parties to the conflict with



the help of personal sanctions, disqualification and non-admission to high-status international competitions under a variety of prepositions [2]. Information about the technicality of the execution of a sports program becomes a tool for manipulating public opinion to discredit athletes by media strategists of international confrontations.

The goal of information warfare of an offensive or defensive nature is to ensure the interests of the subject in the information-psychological sphere [7] through psychological manipulation, propaganda, ideologization, and disinformation [6]. In ours, a media actor (sports commentator, journalist, expert, sports official) can impose on the mass audience his vision of the course and results of a sports competition in line with the rhetoric of confrontation.

Objective of the study was to identify the speech means of defense rhetoric in Russian state media in line with the mediatization of a sports incident using the example of the Kamila Valieva doping scandal during the 2022 Beijing Olympics.

Let us note that this incident and its media reflection took place even before the start of the Special Military Operation on February 24, 2022. This means that the influence of the SMO factor on the nature of media discourse during this period can be excluded.

Methods and structure of the study. Achieving the goal of information warfare in the digital environment is carried out in full accordance with the principles of cognitive combat information influences [8]. The cognitive impact strategy consisted of generalizing the interpretation of the incident. The goal of the information attack was to discredit the potential champion of the 2022 Olympics and discredit Russian sports, Russia and its leadership. The strategy included a number of tactical stages: to involve public opinion leaders on social networks in criticism of what is happening [1]; circulate accusations against the leadership of Russian sports of corruption and promotion of doping [2]; introduce into media discourse suspicions of mass sanctioned use of prohibited substances by Russian athletes [3], turn to biasedly selected experts [4].

Hypothesis. To repel information aggression, the Russian media updated the mathematics of military discourse to form public opinion for a patriotic audience: Russian sport is a victim of the aggression of Russia's enemies.

The empirical base included media texts of Russian federal media from 02/10/2022 to 02/20/2022, collected by the Semanticforce.net system us-

ing the keyword "Kamila Valieva" in the text, title or subtitle. In the selected texts, metaphors of war are highlighted, since "metaphoricality is one of the most important features of modern propaganda and political speech" [9, p.4].

Results of the study and discussion. Russian patriotically oriented media presented the sports incident of Kamila Valieva in the context of a military confrontation with the actualization of value narratives: Kamila Valieva became an object of aggression and a victim of a behind-the-scenes anti-Russian conspiracy. To implement a defensive strategy, Russian media used metaphors to influence the cognitive and behavioral activity of the addressee [5, 10]. Let's consider the main means of influence.

1. Labeling: *"but there are also those who harshly criticize WADA for the "anti-doping circus." (NG, 02/16/2022); "So far, the grandiose doping scandal around the strongest figure skater on the planet...has acquired new detective details..." (RIA, 02.17.2022); What is happening now... can be described in only one word: madness (RIA 02.12.2022); "Now, probably, even the most stubborn people have realized that there was no doping... officials from the IOC, WADA and their inspirers and supporters decided to deprive us of our character (RIA, 02/15/2022).*

2. Humiliation: *"the war on doping and other chants that are carried across the American, British and pan-European media fields. But this chatter, this "white noise" can no longer mislead us. (RIA, 02/15/2022).*

3. Binary opposition: *us - them, ours - strangers: "There has always been a struggle, because we are competitive, we are strong, rivals. And everyone is waiting for us to go beyond some line somewhere, fall somewhere or make a mistake" (KP, 02/10/2022); "After all the doping scandals, many years of humiliating deprivation of our athletes of the anthem and flag, the Russians never give up" (RIA, 02.12.2022); "What's great for a Russian is death for a German!" (RIA, 02/15/2022).*

4. Generalization: *"Stop Camila. Stop Russia" (RIA, 02/15/2022); "As always, not knowing the essence, everyone started screaming left and right" (RG 02/10/2022); "Everything is obvious: the Russians are sure that the rumors about Valieva's doping test are an ordinary provocation (CP 02/10/2022).*

5. Historical and subject analogies: *"It is worth noting that practically the same thing and in the*



same expressions the most rabid wrote about Russian ballet. They say that Grigorovich, with his dictatorial habits, does not take into account the mood and preparedness of the dancers for the rehearsal marathon" (RIA 02/15/2022); "Sporting competitions have been turned into gigantic shows like in Ancient Rome. But even the Romans could not imagine children as gladiators. This did not harm anyone's professional career among those people who trained with champion Lipnitskaya" (KP 02/16/2022).

6. Appeal to emotions: "Poor child. Hold on, girl, the world is so unfair" (KP 02/10/2022); "A positive doping test...now, like the sword of Damocles, hangs frighteningly not only over the heroic victory of our skaters in the team tournament of the Olympics, but also over Kamila's entire future career" (RIA, 02.12.2022); "to take hostage a young girl who is not even sixteen" (RIA, 02/15/2022).

7. Irony, sarcasm: "Having received a postcard, so to speak, from the grown-ups from the IOC, they, with difficulty hiding their dissatisfaction... hastened to declare that... the award ceremony will not take place" (RIA, 02/15/2022); "What a coincidence" (RIA 02/12/2022); "Now IOC officials will hang medals on their own necks and give each other bouquets... an excellent motivation for fighting for prizes, to say the least" (RIA, 02/15/2022).

Federal media formed the perception of the incident with Kamilla Valieva as an episode of a complex hybrid war of the generalized West against Russia, which proves the use in the texts of lexemes that form a military semantic field: aggression, attack, provocation, battle, fighting spirit, fighting character, partisans, heroic victory. Separately, we should highlight the verbs used in the texts with a military meaning: take up arms, torpedo, take hostages, storm, conquer, fight, survive the battle, take revenge, win, etc.

Kamilla Valieva's nominations are updated in line with military rhetoric in ascending order from the victim of aggression to the winner who overcomes the enemy: a victim of execution, a tormented young girl, a Russian partisan taken hostage, a hero and a winner.

Conclusions. The analysis of media texts confirmed the formulated hypotheses. The case of K. Valieva became a forerunner, a kind of harbinger of the war of narratives and information aggression against Russia, which took place even before the start of the Northern Military District. This confirms

the thesis that, unfortunately, in a divided world, political actors continue to use sport as another channel of global confrontation, which contradicts the basic philosophy of Olympism as an institution that unites and not divides peoples. Analysis of media materials confirms the thesis that in the current conditions of political confrontation, any incident in which athletes of the opposing sides are involved will be mediatized according to a similar scheme. This means we must be prepared for such challenges.

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Students' awareness about the features of the modern labor market in the sports field

UDC 796



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Abstract

Objective of the study was to identify the level of students' awareness of the professional labor market in the sports field.

Methods and structure of the study. In the course of scientific work, the most promising directions for the development of the sphere of physical culture and sports were identified; to study the level of awareness of students of the Institute of Physical Culture, Sports and Tourism (IPCS&T) of Petrozavodsk State University (PetrSU) about the representation of the spheres of physical culture in the economic space of Russia, their (spheres) demand and prospects. When conducting the study, the authors used general scientific approaches and research methods: description, generalization, systematic and comparative analysis and questioning. 142 IPCS&T students from 1st to 4th years in the following areas of training took part in the survey: physical education, life safety and physical education and adaptive physical education.

Results and conclusions. It has been established that the most popular areas of services in the field of physical culture and sports are services in the field of medicine and healthcare, but the most profitable currently is the information sector. The survey results showed that only 6.3% of respondents would choose this field to build a future career, while the largest proportion of students plan to work in the field of education, although they recognize it as the least profitable. Analysis of the answers makes it possible to identify the competencies that are missing for more successful professional activities of a graduate of a physical education university, which can serve as the basis for modernizing and updating basic educational training programs.

Keywords: *physical culture and sports, economics, business, employment, professional activity.*

Introduction. Currently, the field of physical culture and sports (PCS) has a separate section for the classification of budget expenditures; physical culture and sports are one of the significant factors not only influencing the well-being of society, but also the formation of the country's GDP. This suggests that physical culture and sports occupy a significant place in the Russian economy and in order to solve the problem of increasing the effectiveness of sports as an economic sphere, appropriate specialists are needed who have knowledge not only in the subject area "Physical culture and sports", but also in the fields of economics and entrepreneurship.

Objective of the study was to analyze the level of students' awareness of the professional labor market in the sports field.

Methods and structure of the study. The research methodology was as follows: to evaluate the most promising areas of physical culture and sports for doing business and profitable employment, to compare the identified areas with the level of awareness (awareness) of students of the IPCS&T of PetrSU about these areas.

Results of the study and discussion. The variety of areas of application of professional knowledge and skills in the field of sports services has varying



degrees of profitability. It can be argued that each professional unit affecting the field of physical education and sports has its own weight, but not each has a sufficient degree of profitability. According to the data (based on information from https://rosstat.gov.ru/labor_market_employment_salaries), it can be noted that the most profitable in the field of physical culture is the information sector (95,875.0 rubles), followed by the healthcare sector (50,612.5 rub.), then – education (43,349.5 rub.).

Figure 1 (according to ROSSTAT) [1-3] shows average monthly salaries in the field of information and communications. According to the presented graph, it can be observed that the trend line is increasing, which indicates that the demand for professions in the field of information and communications is growing.

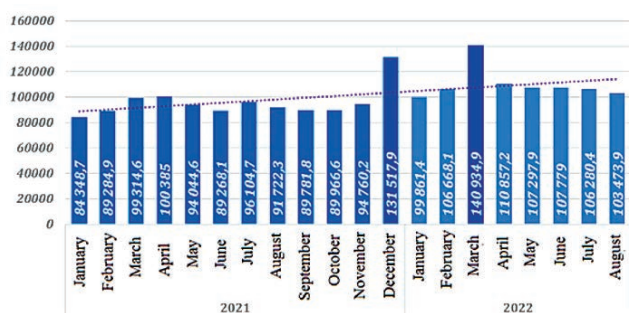


Figure 1. Salaries in the field of information and communications for 2021-2022, rub.

The next stage of the study was a survey of IPCS&T students in order to identify awareness of the professional labor market in the sports field. 142 students from 1st to 4th year took part in the following areas of training: physical education, life safety, physical education and adaptive physical education. The size and qualitative characteristics of the sample are presented below (Fig. 2.)

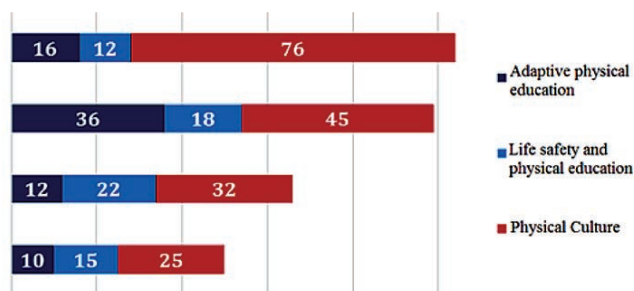


Figure 2. Number of students surveyed by field of study, people.

Students were asked questions regarding the features of training in the areas of training and future professional activities. Let us present for discussion the answers to only some questions affecting the research problem. For example, respondents were asked the question: “What areas of activity, in their opinion, could their professional training overlap with?” The answer implied the choice of several options, shown in Figure 3.

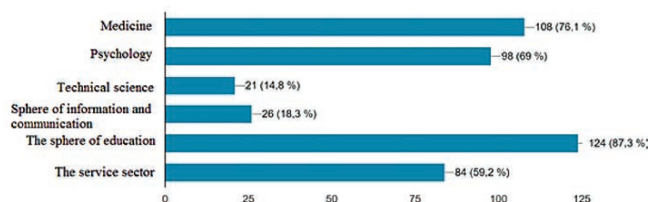


Figure 3. Areas of professional activity

An interesting and even paradoxical fact is that indicating the service sector as the area with the highest income (49.7% of respondents), and only 1.4% chose the education sector as the most profitable (Fig. 4).

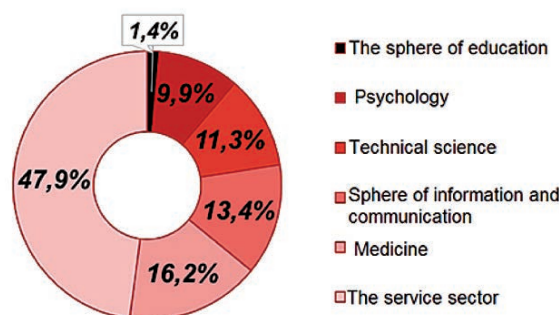


Figure 4. The most profitable areas according to respondents

The majority of respondents see their future professional activity in the field of education (68.3% – trainer or instructor; 9.9% – teacher or lecturer), recognizing and perceiving it as the least profitable area (Fig. 5).

Also, respondents were asked to select areas that they lack in the educational program for developing a professional career (Fig. 6).

As can be seen, the majority noted the medical (49.3%) and psychological areas (43.7%).

Conclusions. The field of physical culture and sports can be combined with various industries, such as medicine and psychology, technical sciences, education, the service sector, the field of informa-

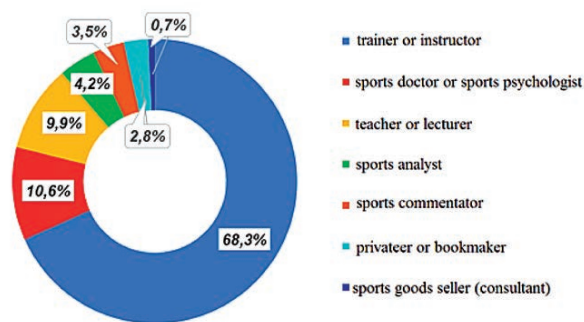


Figure 5. My future profession

tion and communications and others. Potentially, each of the above industries can be quite profitable. According to the study, the most profitable sector is information and communication. The survey results showed that only 6.3% of respondents would choose this field to build a future career, while the largest proportion of students plan to work in the field of education, although they recognize it as the least profitable. Analysis of the answers makes it possible to identify the competencies that are missing for more successful professional activities of a graduate of a physical education university, which can serve as the basis for modernizing and updating basic educational training programs.

What competencies (from which area) do you lack for a successful professional career?

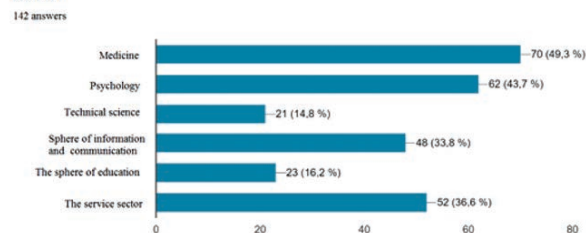


Figure 6. Professional career scope

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Patriotic values of young men of military age involved in sports in the aspect of sociological analysis

UDC 378.17

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Abstract

Objective of the study was to identify the features of the development of patriotic values, the formation of civic consciousness and attitudes towards military service and defense of the Fatherland among young men of military age involved in sports.

Methods and structure of the study. Step-by-step empirical work was carried out on the basis of the Kaliningrad military commissariat with young men of military age (310 people 17-18 years old), students of educational institutions in Kaliningrad. Diagnosis was carried out using questionnaires of constructive patriotism (S.V. Vasilyeva, A.V. Miklyaeva), attitudes towards military service and defense of the Fatherland, and methods for assessing the level of formation of civic consciousness.

Results and conclusions. The diagnostic results obtained made it possible to identify the features of the development of patriotic values, the formation of civic consciousness and attitudes towards military service and defense of the Fatherland among young men of conscription age who are and are not involved in various sports. Sports have a positive impact on the development of patriotic values, the formation of civic consciousness and attitudes towards military service and defense of the Fatherland among young men of military age.

Keywords: *patriotic values, attitude towards military service, civic consciousness, sports, young men of conscription age.*

Introduction. Patriotic and civic education of young men of conscription age in modern conditions acquires particular relevance and significance, because is one of the most important components of the national idea of the Russian state. At all times in the development of the Russian state, the patriotic idea and civil patriotism were of great importance for instilling fighting spirit and the formation of moral and volitional qualities of young conscripts. The study of the problem of finding effective ways and means of forming patriotic and spiritual-moral values of young people of military age in the face of external threats seems timely and in demand, since ensuring the national defense and security of Russia, the functioning of the Armed Forces and giving them a promising appearance in a situation of increased likelihood of external threats to the security of citizens, society and the state

are impossible without a targeted, long-term system of preparing young people to serve the Fatherland.

Experts emphasize that over the past ten years, everywhere in the Russian Federation there has been a deterioration in the indicators of physical development, physical fitness and health status of people of military age. According to experts, 80% of secondary school graduates are unfit for military service, 60-70% have poor physical fitness and abnormal health conditions. They cannot meet control standards for physical fitness [1, 4]. A study by specialists of the physical condition of 17-18 years old boys showed only 10% of healthy young people, "practically healthy" - 42%, and 48% of young men in need of constant medical monitoring. According to M.N. Aliyev, conscripts who arrived for military service cannot receive a "satisfactory" rating in pull-ups on



the horizontal bar - 40-45%, in 1000 m cross-country - 65-70%, in grenade throwing - 50-55% [2]. Conducted studies [5, 6] state that in most educational institutions, insufficient attention is paid to the issues of physical training, the development of patriotic and spiritual and moral values of young people of military age, despite the fact that physical culture and sports have enormous potential for the formation of patriotic values and increasing physical and motivational readiness of young people for military service. In the context of confronting external threats, service

in the Armed Forces requires young men to experience great neuro-emotional stress and good physical fitness. The ability of young people to cope with enormous physical and mental stress during military service is becoming today one of the decisive conditions for the effectiveness of military operations, and therefore the security of our country.

Objective of the study was to identify the features of the development of patriotic values, the formation of civic consciousness and attitudes towards military service and defense of the Fatherland among young

Table 1. Sports categories

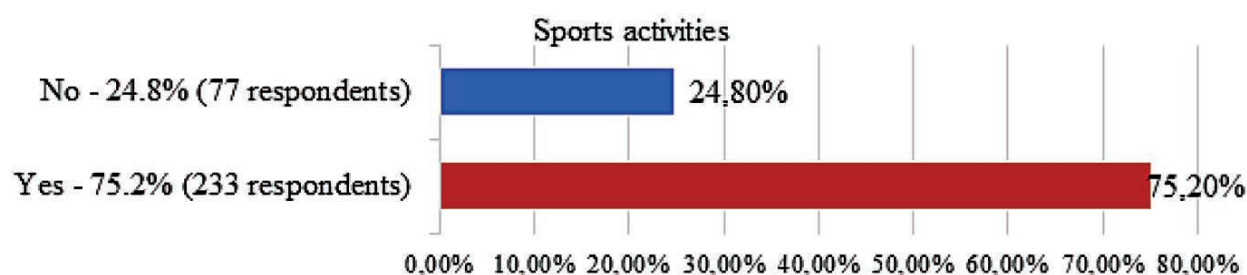
Kinds of sports		Frequency (number of respondents)	Percentages
Valid	Doesn't play sports	77	24,8
	Combat	66	21,3
	Individual	33	10,6
	Power	23	7,4
	Cyclic	44	14,2
	Game team	45	14,5
	Individual gaming	22	7,1
	Total	310	100,0

Table 2. Distribution into groups

Group number	Name/characteristics	Number of respondents	% of the entire sample
1	No sports	77	24,8%
2	Combat and power	89	28,7%
3	Individual and cyclical	77	24,8%
4	Gaming (all types)	67	21,7%

Table 3. Descriptive statistics of the "Constructive Patriotism Questionnaire" method

Data	«Blind» patriotism	Constructive patriotism
Valid	287	254
Missed	23	56
Average	18,03	27,41
Median	18,00	29,00
Moda	28	31
Standard Deviation	7,235	6,496
Minimum	7	5
Maximum	30	35



Sports activities among respondents



men of conscription age who are and are not involved in sports.

Methods and structure of the study. The study was carried out on the basis of the military commissariat with young men of military age, students of educational institutions in Kaliningrad. The respondents were 310 young men of military age (17-18 years old). Diagnosis was carried out using questionnaires of constructive patriotism (S.V. Vasilyeva, A.V. Miklyayeva), attitudes towards military service and defense of the Fatherland, and methods for assessing the level of formation of civic consciousness.

Results of the study and discussion. The sample of respondents consisted of 310 young men of military age. The presence of sports in their lives is 75.2%, see figure.

Table 1 presents the types of sports that respondents are involved in:

All respondents were divided into the following groups 1, 2, 3, 4.

Let us present an analysis of data from the “Constructive Patriotism Questionnaire” method among the entire sample. So, let’s look at descriptive statistics in Table 3:

Table 4. Statistics of the “Constructive Patriotism Questionnaire” methodology by group

Group	«Blind» patriotism				Constructive patriotism			
	Average	Moda	Minimum	Maximum	Average	Moda	Minimum	Maximum
1	15,57	23,00	10	28	23,20	24,00	13	33
2	20,00	22,00	8	30	25,50	24,00	20	35
3	17,33	18,00	5	28	26,83	24,00	19	30
4	19,30	23,00	7	30	30,34	28,00	22	34

Table 5. Mann-Whitney U calculations using the “Constructive Patriotism Questionnaire” method

Comparison line	Mann–Whitney U test		Statistician significant differences	
	«Blind» patriotism	Constructive patriotism	«Blind» patriotism	Constructive patriotism
Group 1 and 2	1996,500	1875,500	0,027	0,164
Group 1 and 3	1573,000	1633,500	0,203	0,000
Group 1 and 4	1947,000	918,500	0,232	0,000
Group 2 and 3	2546,500	1958,000	0,894	0,249
Group 2 and 4	1947,000	1918,500	0,232	0,221
Group 3 and 4	2178,000	1391,500	0,140	0,025

Table 6. Results of the “Formation of civic consciousness” methodology

Question	Yes (%)	More likely yes than no (%)	Difficult to answer (%)	More likely no than yes (%)	No (%)
I know the flag, coat of arms and anthem of the Russian Federation	100%	-	-	-	-
I have a civil position	81,9%	3,9%	7,1%	3,5%	3,5%
I express and defend my civic position	57,1%	21,3%	10,6%	11,0%	-
Ready to cooperate with people of a different race, nationality, religion, etc.	78,7%	14,2%	3,5%	3,5%	-
Ready to take responsibility in difficult situations	68,1%	17,7%	7,1%	7,1%	-
I actively participate in the life of a group, school, college, university	42,9%	21,3%	10,6%	17,7%	7,4%
I often carry out public errands	35,5%	32,3%	17,7%	-	14,5%
Ready to take care of my parents (older generation) and children	92,6%	7,4%	-	-	-
Ready to take responsibility for my actions	92,9%	3,5%	-	3,5%	-
I always behave in society in accordance with accepted standards of behavior	61,0%	28,4%	10,6%	-	-
I always keep order in public places	75,2%	21,3%	-	3,5%	-
I always follow the traffic rules	60%	29%	7,1%	-	3,5%



Analyzing Table 3, we note that among the entire sample of respondents:

- on the “blind patriotism” scale Moda = 28 points (above average level);
- on the “constructive patriotism” scale Moda = 31 points (high level).

Let us present the descriptive statistics of the “Constructive Patriotism Questionnaire” method by group:

To compare the significance of differences between groups, we used the Mann–Whitney U method. Let us present the Mann–Whitney U calculations using the “Constructive Patriotism Questionnaire” method in Table 5:

A comparative analysis of data on the indicators “blind patriotism” and “constructive patriotism” between groups showed statistically significant differences:

– Blind patriotism (U=1996.500, p=0.027). Thus, the formation of blind patriotism is significantly higher among respondents of group 2 (combat/strength sports) than among respondents of group 1 (no sports);

– Constructive patriotism (U=1633.500, p=0.000). Thus, the formation of constructive patriotism is significantly higher among respondents in group 3 (individual/cyclic sports) than among respondents in group 1 (no sports);

– Constructive patriotism (U=918.500, p=0.000). Thus, the formation of constructive patriotism is significantly higher among respondents in group 4 (game sports) than among respondents in group 1 (no sports);

– Constructive patriotism (U=1391.500, p=0.025). Thus, the formation of constructive patriotism is sig-

Table 7. Mann–Whitney U calculations using the “Formation of civic consciousness” method (by group)

Question	Groups 1-2		Groups 1-3		Groups 1-4	
	Mann–Whitney U test	Meaning	Mann–Whitney U test	Meaning	Mann–Whitney U test	Meaning
1	3426,500	1,000	2964,500	1,000	2579,500	1,000
2	2552,000	0,000	2964,500	1,000	2211,000	0,001
3	2854,500	0,050	2359,500	0,021	737,000	0,000
4	2579,500	0,000	1694,000	0,000	2156,000	0,000
5	3173,500	0,288	1996,500	0,000	2326,500	0,167
6	1523,500	0,000	2057,000	0,001	1034,000	0,000
7	1644,500	0,000	2480,500	0,068	1655,500	0,000
8	2964,500	1,000	2326,500	0,167	2579,500	1,000
9	3426,500	1,000	2117,500	0,000	2579,500	1,000
10	3426,500	1,000	2326,500	0,167	2964,500	1,000
11	2871,000	0,009	2541,000	0,031	1925,000	0,002
12	3206,500	0,359	2816,000	0,613	1166,000	0,000

Table 8. Contingency table using the “Formation of civic consciousness” method (by groups)

Question	More likely no than yes (number of respondents)				No (number of respondents)			
	Group 1	Group 2	Group 3	Group 4	Group 1	Group 2	Group 3	Group 4
I have a civil position	11	0	0	0	11	0	0	0
I express and defend my civic position	21	5	5	3	0	0	0	0
Ready to cooperate with people of a different race, nationality, religion, etc.	11	0	0	0	0	0	0	0
Ready to take responsibility in difficult situations	22	0	0	0	0	0	0	0
I actively participate in the life of a group, school, college, university	22	11	11	11	11	4	4	4
I often carry out public errands	23	10	4	8	12	11	11	11
Ready to take responsibility for my actions	10	1	0	0	0	0	0	0
I always keep order in public places	11	0	0	0	0	0	0	0
I always follow the traffic rules	11	3	4	4	3	3	3	2



Table 9. Spearman correlation analysis (entire sample)

Formation of civic consciousness/constructiveness of patriotism and attitude towards military service		«Blind» patriotism	Constructive patriotism	Attitude to military service
I express and defend my civic position	Pearson correlation	-0,175**	0,067	0,003
	Meaning	0,003	0,287	0,962
Ready to cooperate with people of a different race, nationality, religion, etc.	Pearson correlation	0,235**	0,250**	0,067
	Meaning	0,000	0,000	0,287
Ready to take responsibility in difficult situations	Pearson correlation	0,295**	0,233**	0,147**
	Meaning	0,000	0,000	0,010
I actively participate in life groups, schools, colleges, universities	Pearson correlation	0,159**	0,090	0,148**
	Meaning	0,007	0,154	0,009
I often carry out public errands	Pearson correlation	0,395**	0,022	0,446**
	Meaning	0,000	0,728	0,000
Ready to take care of my parents (older generation) and children	Pearson correlation	0,194**	0,295**	-0,017
	Meaning	0,001	0,000	0,765
Ready to take responsibility for my actions	Pearson correlation	0,311**	0,735**	-0,089
	Meaning	0,000	0,000	0,119
I always behave in society in accordance with accepted standards of behavior	Pearson correlation	0,380**	-0,017	0,518**
	Meaning	0,000	0,765	0,000
I always keep order in public places	Pearson correlation	0,333**	-0,089	0,890**
	Meaning	0,000	0,119	0,000
I always follow the traffic rules	Pearson correlation	0,308**	-0,152*	1
	Meaning	0,000	0,015	

nificantly higher among respondents in group 4 (game sports) than among respondents in group 3 (individual/cyclic sports).

Let us present the results of the “Formation of civic consciousness” method among the entire sample in Table 6.

Analyzing Table 6, we note that among the respondents, about a third often carry out public assignments, less than half actively participate in the life of the group/school/college.

Let us present the Mann–Whitney U-calculations using the “Formation of civic consciousness” method in Table 7:

Analyzing Table 7, we note that respondents from group 1 (those not involved in sports) demonstrate less maturity of almost every component of the formation of civic consciousness compared to groups 2-4 (involved in various sports). For clarity, let’s compare the occurrence of negative answers in the contingency table:

Next, we conducted a correlation analysis for the entire sample between indicators of achievements in sports, “attitude towards military service,” “formation of civic consciousness,” and “constructiveness of patriotism.” For this purpose, the Spearman correlation analysis method was used.

Analyzing Table 9, we note that:

- all elements of civic consciousness, except for “defending one’s civic position,” have a significant positive correlation with the formation of “blind patriotism.” “Standing up for your civic position” has a negative significant correlation. That is, the more formed the defense of one’s civic position, the lower the “blind patriotism”;

- such elements of civic consciousness as “readiness to cooperate with another nationality/race”, “readiness to take responsibility”, “readiness to care for elders” have significant positive correlations with the formation of “constructive patriotism”. That is, the higher the readiness for cooperation, responsibility, and care, the more “constructive patriotism” is formed;

- such elements of civic consciousness as “readiness for responsibility”, “activity in participating in the life of a university/college/school”, “following assignments”, “compliance with rules and order” have significant positive correlations with the formation of a positive attitude towards military service. That is, the higher the readiness for responsibility, activity in business, diligence and compliance with norms and rules, the more positive the attitude towards the service.

Conclusions. The study made it possible to identify the features of the development of patriotic values, the formation of civic consciousness and attitudes to-



wards military service and defense of the Fatherland among young men of military age involved in various sports. Sports have a positive impact on the development of patriotic values, the formation of civic consciousness and attitudes towards military service and defense of the Fatherland among young men of military age.

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The interconnection between individual components of technical value and competitive results of the best aesthetic gymnastics groups in the world

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The purpose of the research is to determine the interconnection between technical and artistic value, execution of the competition programs and the final score of the best aesthetic gymnastic groups in the world.

Research methods and procedure. Pedagogical observations were undertaken during the World Championship 2023 in Almaty. The study involved top six senior aesthetic gymnastics groups (three groups from Russia, two groups from Bulgaria and one from Japan).

Research results and discussion. The maximum score in aesthetic gymnastics is 30 points, consisting of three components with the maximum of 10 points for each component. To determine the interconnection between the individual components and the competitive results, the rank correlation analysis was conducted, which allowed to identify the degree of influence of each component on the final score. According to the results of the conducted rank correlation analysis, we obtained rank correlation coefficients

equal to 0,97; 0,70; 0,93 indicating strong and moderate association between the individual components of execution and competitive results.

Conclusions. The correlation analysis revealed strong association between technical value and the competitive result $r=0,97$; between execution and the competitive result $r=0,93$; moderate association between artistic value and the competitive result $r=0,70$.

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