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Theory & Practice of Physical Culture

Athletic training | Sport psychology | Academic physical education | Sport physiology

The Russian Spartakiad is a new format of competitive activity in winter sports

In the global sports space, Russian athletes are traditionally associated, as a rule, with achievements in winter sports. At the 2022 Olympic Winter Games in Beijing, Russia took ninth place in the unofficial medal standings, winning 32 medals, six of which were gold. It should be noted that the most awards at these Winter Games – eleven – were brought by athletes and skiers. The Russian national team has won four gold, four silver and three bronze medals. According to the Olympic medal standings, Russian sport is also a leader in figure skating, where athletes have won two gold, three silver and one bronze medals.

Winter sports are an integral part of the social institution of modern Russian sports. With the growth of their popularity and mass appeal, the demand for new formats of competitive activity is becoming more relevant. Under the conditions of sanctions pressure, when Russian athletes are limited in their participation in the Olympic and international sports movement, there is an urgent need to expand the internal calendar of sports competitions through the development of the Spartakiad movement.

In 2023, a new format for Russian competitions was proposed in the form of the All-Russian Winter Sports Contest, organized as part of the implementation of the national Demography project. The Spartakiad was held from February 9 to 18, 2024 in five regions of Russia: Chelyabinsk, Tyumen, Sverdlovsk regions, Krasnoyarsk and Krasnodar Territories, where 107 sets of awards were awarded. The program included competitions in 14 Olympic sports. 2,500 of the country's best athletes took part in the competition.

Anticipating further sanctions pressure on Russian sports, the Winter Spartakiad was organized as the largest tournament of the winter season-2023/2024 and in fact was an analogue of the Olympic Games. The competitions were held according to the same program as the upcoming 2026 Games in Italy.

The Spartakiad is not a new tournament in the history of our country. Seven similar winter tournaments were held in Soviet times. In the history of modern Russia, the Winter Sports Contest was held for the first time.

For athletes, this competition format became an important domestic start, where it was possible to assess the level of training of athletes and competition with the strongest participants.

The rules of the Spartakiad provide qualification characteristics for the participation of athletes in competitions, the quantitative composition of the national team of the subject of the Russian Federation, as well as other information in accordance with the specifics of the sport.

For highly qualified athletes, the continuation of competitive practice, even at the Russian level, is of great importance. The updated format of the competitions within the framework of the Spartakiad allows you to maintain financial incentives. Athletes, coaches and specialists of sports teams of the Russian Federation in sports included in the program of the Olympic, Paralympic, Deaflympic Games and the World Games have been awarded monetary compensation for high results or for setting European or world records, including at the revived All-Russian Spartakiad.

The country's leadership assured that the program of the Spartakiad and the geography of the host cities will be expanded over time. Holding status competitions in different cities of Russia will allow updating the sports infrastructure, which will become an incentive for mass involvement of the population in winter sports. On the other hand, there will be additional motivation and interest of small businesses to create new productions of sportswear and equipment for athletes of the highest achievements.

The Spartakiad movement is the basis of the national sports system, within which the main vector of activity is aimed at the development of high-performance sports, mass and youth sports, improving infrastructure and training professional personnel. In addition, the Spartakiad format, an alternative to the Olympic one, can be useful for the younger generation of athletes who will still have the opportunity to compete at subsequent Olympiads.

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

Editor-in-Chief of TPPC, Honored Worker of Physical Culture of the Russian Federation
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Theory and Practice of Physical Culture

Contents

Methodological approach in the development of the cognitive-volitional component of e-sportsmans

UDC 159.99

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Abstract

Objective of the study was to justification for the use of a scientific and methodological approach in the development of the cognitive-volitional component of cybersportsmen.

Methods and structure of the study. The development of the cognitive-volitional component was carried out within the framework of integral training, based on the developed scientific and methodological approach. The experiment, which lasted 18 months, involved 52 e-sportsmen aged 18-25. Control testing of the level of cognitive-volitional indicators of the subjects was carried out every six months according to the following indicators: index of volitional self-regulation, perseverance, self-control, cognitive errors in sports based on situational awareness, awareness, control.

Results and conclusions. The use of a scientific and methodological approach in the educational and training process of e-sportsmen involved in various disciplines of computer sports makes it possible to increase the level of development of the cognitive-volitional component, which is confirmed by experimental studies. During the experiment, the level of volitional self-regulation of those involved in various disciplines of computer sports increased to 12,3%, self-control – to 10,8%, perseverance – to 15,5%, the number of cognitive errors decreased, based on situationality – to 20,4%, awareness – up to 23,4%, control – 28,7%.

Keywords: *computer sports, cognitive-volitional component, situational ability, perseverance, self-control, cognitive errors.*

Introduction. In foreign literature, cybersportsmen are considered as cognitive athletes, since their competitive activity largely depends on the level of development of cognitive skills. Theoretical analysis revealed the lack of objective data assessing the impact of psychological activities on the level of development of the cognitive-volitional component of e-sportsmen, from the point of view of training and competitive performance. The development of the cognitive-volitional component in computer sports is an important aspect that requires in-depth analytical and scientific research, careful selection of tools and their integration with all types of sports training [1].

Objective of the study was to justification for the use of a scientific and methodological approach in the development of the cognitive-volitional component of cybersportsmen.

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Results of the study and discussion. In order to substantiate the use of a scientific and methodologi-

cal approach in the development of the cognitive-volitional component of cybersportsmen, a formative experiment was conducted. 52 e-sportsmen aged 18-25 years took part in the study («battle arena» - 15 people, «tactical 3D combat» - 15 people, «competitive puzzles» - 12 people, «real-time strategy» - 10 people) . The development of the cognitive-volitional component was carried out within the framework of integral training.

Table 1. Results of testing volitional self-control of cybersportsmen

Period	M±m	p-value	Shift %
Index of volitional self-regulation			
Combat Arena			
Before	21,1±0,5	**<0,05**	5,7
After	22,3±0,4		
Tactical 3D combat			
Before	21,1±0,5	>0,05	6,2
After	22,4±0,4		
Competitive puzzles			
Before	20,3±0,6	<0,05	8,9
After	22,1±0,5		
Real-time strategy			
Before	20,4±0,7	<0,05	12,3
After	22,9±0,6		
Self-control index			
Combat Arena			
Before	10,7±0,4	**>0,05**	6,5
After	11,4±0,3		
Tactical 3D combat			
Before	11,3±0,4	**>0,05**	7,1
After	12,1±0,3		
Competitive puzzles			
Before	11,1±0,5	<0,05	10,8
After	12,3±0,2		
Real-time strategy			
Before	10,8±0,6	>0,05	7,4
After	11,6±0,4		
Perseverance Index			
Combat Arena			
Before	12,9±0,4	**>0,05**	6,2
After	13,7±0,5		
Tactical 3D combat			
Before	12,8±0,4	**<0,05**	13,3
After	14,5±0,3		
Competitive puzzles			
Before	13,0±0,5	**<0,05**	10,8
After	14,4±0,5		
Real-time strategy			
Before	12,9±0,6	**<0,05**	15,5
After	14,9±0,5		

The developed scientific and methodological approach included: software and methodological support, differentiation of special tools and methods for solving local problems, sets of warm-up exercises, training devices, educational and training portals, formation of groups taking into account the level of adaptability and organization of the technical training process in real and virtual environments in the mode of conjugate influence [2].

Testing of the studied indicators (index of volitional self-regulation, index of perseverance, index of self-control according to A.G. Zverkov E.V., cognitive errors in sports, based on situational awareness, awareness, control according to A.Yu. Girinskaya) was carried out every six months.

The volitional self-regulation index in eSports reflects the athletes ability to control his thoughts, emotions and behavior in order to achieve his goals. The Perseverance Index measures the level of perseverance, resilience to stress, and willingness to overcome difficulties in achieving athletic goals. A high self-control index indicates a high level of emotional stability, focus and discipline, which contributes to the achievement of optimal athletic performance. A high level of cognitive abilities facilitates adaptation to rapidly changing game conditions, allows you to quickly assess the situation, make informed decisions and formulate an effective response to the rapidly changing conditions of the playing space.

The results of testing volitional self-control in the studied computer sports disciplines are presented in table 1.

The use of a scientific and methodological approach in the development of the cognitive-volitional component of cybersportsmen made it possible to significantly ($p<0,05$) increase: the index of volitional self-regulation - from 20,7±0,7 to 22,9±0,6 and the index of perseverance - from 12,9±0,6 to 14,9±0,5 for those involved in «real-time strategy». The self-control index for those involved in «competitive puzzles» ranges from 11,1±0,5 to 12,3±0,2 points. In the discipline «tactical three-dimensional combat», significant differences were revealed in the indicator of perseverance, “combat arena” in the self-regulation index.

In table 2 presents the results of testing the cognitive resource of cybersportsmen.

During the experiment, the number of cognitive errors based on situationality in those involved in the

«battle arena» decreased from 23,5 ± 1,1 to 18,7 ± 0,9 and based on awareness - from 19,4 ± 1,6 to 15,7 ± 0,9. Based on the control, the number of cognitive errors decreased in all disciplines studied: «combat arena» - from 15,7 ± 1,8 to 11,3 ± 1,4, «tactical three-dimensional combat» - from 16,1 ± 1,6 to 13,2±1,1, «competitive puzzles» - from 17,8±1,6 to 12,7±1,2, in «real-time strategy» - from 16,3±1,8 to 13,6± 1,2, the differences are statistically significant (p<0,05).

Table 2. Results of testing the cognitive resource of e-sportsmen

Period	M±m	p-value	Shift %
Situational			
Combat Arena			
Before	23,5±1,1	**<0,05**	-20,4
After	18,7±0,9		
Tactical 3D combat			
Before	20,6±0,9	>0,05	-6,8
After	19,2±0,7		
Competitive puzzles			
Before	20,3±1,2	>0,05	-7,9
After	18,7±0,7		
Real-time strategy			
Before	20,7±1,3	>0,05	-7,7
After	19,1±0,7		
Mindfulness			
Combat Arena			
Before	19,4±1,6	**<0,05**	-19,1
After	15,7±0,9		
Tactical 3D combat			
Before	20,9±1,8	**<0,05**	-22,5
After	16,2±1		
Competitive puzzles			
Before	15,8±2,1	>0,05	-23,4
After	12,1±1,1		
Real-time strategy			
Before	21,1±2,2	>0,05	-18,5
After	17,2±1,2		
Control			
Combat Arena			
Before	15,7±1,8	**<0,05**	-28,0
After	11,3±1,4		
Tactical 3D combat			
Before	16,1±1,6	**<0,05**	-24,8
After	13,2±1,1		
Competitive puzzles			
Before	17,8±1,6	**<0,05**	-28,7
After	12,7±1,2		
Real-time strategy			
Before	16,3±1,8	**<0,05**	-27,0
After	13,6±1,2		

The «awareness» scale in this test includes questions about repeated technical errors in training and competitions, understanding the correctness of elements performed after instructions from the coach, as well as thoughts about winning while performing movements or elements. It is based on continuous monitoring of current experiences and focusing on the present moment, without involving thoughts about the past or future. A high score indicates an athlete's tendency to focus on past events or future prospects, making it difficult to comprehend current events. The «control» indicator when studying the cognitive resources of athletes reflects the ability to rationalize thinking.

Conclusions. The use of a scientific and methodological approach in the educational and training process of e-sportsmen involved in various disciplines of computer sports makes it possible to increase the level of development of the cognitive-volitional component, which is confirmed by experimental studies. During the experiment, the level of volitional self-regulation of those involved in various disciplines of computer sports increased to 12,3%, self-control - to 10,8%, perseverance - to 15,5%, the number of cognitive errors decreased, based on situationality - to 20,4%, awareness - up to 23,4%, control - 28,7%.

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The effectiveness of using a set of static exercises in the process of training figure skaters specializing in singles and pairs skating at the educational and training stage and the stage of improving sportsmanship

UDC 796.912

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Abstract

Objective of the study is to develop and experimentally test the effectiveness of using a set of static exercises in order to increase the level of physical fitness of figure skaters at the educational and training stage and the stage of improving sportsmanship in single and pair skating using static exercises.

Methods and structure of the study. The pedagogical experiment was carried out from September 2022 to May 2023 on the basis of the State Budgetary Institution «Moscow Academy of Figure Skating» at the Medvedkovo Ice Palace. 44 skaters took part in it. Representatives of single and pair skating, the educational and training stage and the stage of improving the sportsmanship of training. Boys and girls, girls and boys aged 11-13 years old with sports qualifications - I sports category and candidate master of sports.

Results and conclusions. As a result of sports and pedagogical testing, an assessment of the initial level of development of physical abilities was carried out according to the norms of the current Federal Standards of 2022 [4]. Using the method of expert assessments, the level of technical preparedness of single and pair skating skaters was determined according to the criteria of the ISU international judging system. The research results made it possible to determine the level of technical preparedness of figure skaters before the start of the experiment, to evaluate the effectiveness of using the developed experimental complex, and also to obtain the final data after the pedagogical experiment.

In the current Olympic cycle 2022-2026, the process of gradually increasing the age limit for admission of athletes to participate in the adult category of competitions of the International Skating Union (ISU) continues based on the decision of the 58th ISU Congress, which is reflected in the latest edition of the Federation Figure Skating Rules Russian figure skating. Changing the age range of athletes in single and pair skating upward, from 17 years in the pre-Olympic season and the 2026 Olympic season. The adopted changes require updating the process of searching and testing the effectiveness of the use of technical, general and special physical training in order to optimize the training system for figure skaters in order to adapt to the new requirements of international regulations [3].

Keywords: *figure skating, single skating, pair skating, educational and training stage, static exercises*

Introduction. At the present stage, in the process of training figure skaters specializing in single and pair skating, the process of searching and testing the effectiveness and specificity of the use of means of increasing and maintaining the level of technical, general and special physical fitness of figure skaters at the educational and training stage and the stage of improving sportsmanship, taking into account modern requirements of the international rules (ISU) for the admission of participants from 17 years of age in the new Olympic cycle. Currently, in the scientific and methodological literature there is not enough relevant information about the results of using static exercises as a means of various types of training in the educational and training process of figure skaters, taking into account the specific features of the motor activity of types of figure skating [1, 19 p.].

Objective of the study is to develop and experimentally test the effectiveness of using a set of static exercises in order to increase the level of physical fitness of figure skaters at the educational and training stage and the stage of improving sportsmanship in single and pair skating using static exercises.

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Results of the study and discussion. As a result of sports and pedagogical testing, an assessment was made of the initial level of development of physical abilities according to the standards of the current Federal Standards of 2022 [4]. Using the method of expert assessments, the level of technical preparedness of single and pair skating skaters was determined according to the criteria of the ISU international judging system. The research results made it possible to determine the level of technical preparedness of figure skaters before the start of the experiment, to evaluate the effectiveness of using the developed experimental complex, and also to obtain the final data after the pedagogical experiment. The effectiveness of the experimental complex was assessed by comparing the results shown by the skaters based on the results of all tests performed. After passing sports-pedagogical testing, which assessed initial indicators, the skaters were divided into:

12 people – control group, representatives of single skating at the educational and training stage and the stage of improving sportsmanship;

10 people – control group, representatives of pair skating at the educational and training stage and the stage of improving sportsmanship;

12 people - experimental group, representatives of single skating of the educational and training stage and the stage of improving sportsmanship;

10 people - experimental group, representatives of pair skating at the educational and training stage and the stage of improving sportsmanship.

Using the analysis of scientific and methodological literature and pedagogical observations, an experimental set of static exercises was compiled, which was included in the preparation of the experimental group after the initial sports and pedagogical testing - at the general preparatory stage of the preparatory period.

The experimental complex was used in the main part of the special physical training class 3 times a week. This complex contains 10 basic exercises, on which significant emphasis is placed on training sessions, and there are also 7 unloading exercises that are used to relieve tonic and coordination tension, excessive muscle stiffness and confinement, for psychological and emotional stability, as well as switching attention. The complex reflects the number of exercises, approaches, series, rest intervals and the main methodological aspects of the technique for performing them.

As a result, Figure 1 shows a diagram of the average values of the increase in indicators for general physical fitness of representatives of singles and pairs

Fragment of a set of static exercises

1.	Maintaining the «Attitude» position	3 sets of 15 s	30-40 s	The athletes position when performing the «Attitude» is as follows: arms extended to the sides, back straight, head looking forward, supporting leg straightened at the knee, free leg raised back, knee bent.
2.	Lying back support - lying back support on one leg	5 times on each leg. Reverse plank hold 30 s Holding free leg on weight - 7s	60 s	In this exercise, skaters need to move from one position to another. The first position is lying behind you, legs together, knees straight, do not bend your elbows. Second position: lying back on one leg. The free leg is turned out and raised up (we alternate legs at the coach's signal)
3.	Lying on bent arms	5 times for 10 s	90 s	Starting position: lying position. At the coach's signal, athletes take the position lying on bent elbows: knees are straight, pelvis is twisted, back is straight, elbows are directed to the side, palms are parallel to each other, gaze is directed downward.
Unloading exercises				
1.	Holding the tightening position to the side	5 times for 10 seconds on each leg	10-15 s	At the coach's signal, the athletes take a tightening position to the side - the supporting knee is straightened, the pelvis is twisted, the back is straight, the free arm is extended to the side, the second hand extends the leg to the side, by the heel.
2.	Maintaining position in the Charlotte spiral	5 times for 12 seconds on each leg	30 s	Starting position: main stance. At the coach's signal, athletes assume the Charlotte spiral position—simultaneously lowering the body down toward the supporting leg and raising the free leg up, toes extended, both knees extended, hands clasping the ankle of the supporting leg.

skating of the control group (CG) and experimental group (EG) at the educational and training stage of preparation.

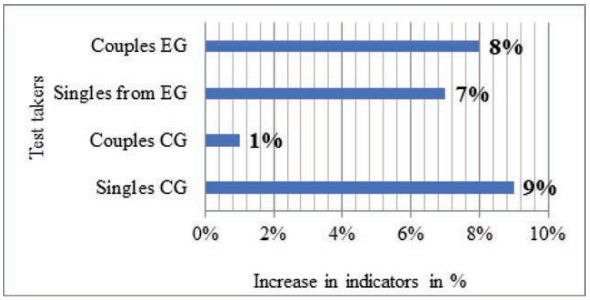

Figure 1. Diagram of average values of the increase in general physical fitness indicators of representatives of single and pair skating from the CG and EG at the educational and training stage and the stage of improving sportsmanship training

The results shown by athletes of both groups during general physical fitness testing, presented in the figure above, indicate that the groups experienced an increase in the scores obtained. Thus, after passing the current and final testing, the difference in results was 10% for the CG in the single skating group and the pair skating group of the educational training stage, and for the EG – 15%.

As a result, Figure 2 shows a diagram of the average values of the increase in indicators for general physical fitness of representatives of singles and pairs skating of the control group (CG) and experimental group (EG) at the stage of improving sportsmanship.

The results shown by athletes of both groups during general physical fitness testing, presented in the figure above, indicate that the groups experienced an increase in the scores obtained. Thus, after passing the current and final testing, the difference in results was 16% for the CG in the single skating group and the pair skating group at the stage of improving sportsmanship, and for the EG – 35%.

Figure 3 shows a diagram of the average values of the increase in indicators for special physical training of representatives of single and pair skating of the control group (CG) and experimental group (EG) at the educational training stage of preparation.

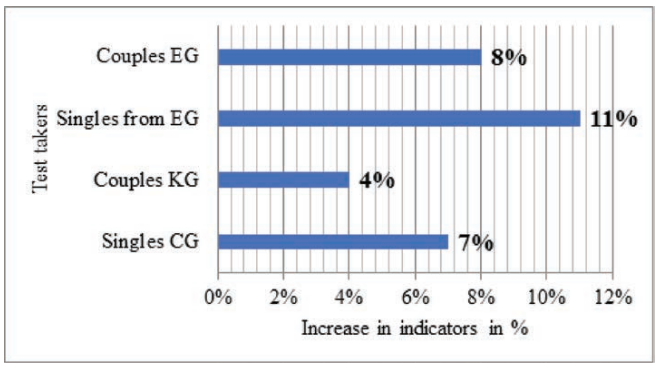

Figure 3. Diagram of the average values of the increase in indicators on TFP among representatives of single and pair skating from the CG and EG at the educational and training stage and the stage of improving sports skills of training

Figure 4 shows a diagram of the average values of the increase in indicators for special physical training of representatives of single and pair skating of the control group (CG) and experimental group (EG) at the stage of improving sports skills of training.

The results shown by athletes of both groups during sports-pedagogical testing on SFP, presented in the figure above, indicate that the groups also experienced an increase in results. So, after passing the current and final testing, the difference in indicators was 13% for the CG in the single and pair skating group of the educational training stage, and 19% for the EG.

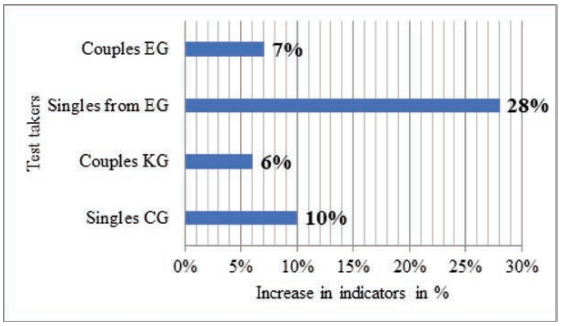

Figure 2. Diagram of average values of the increase in general physical fitness indicators among representatives of single and pair skating from the CG and EG at the educational and training stage and the stage of improving sportsmanship training

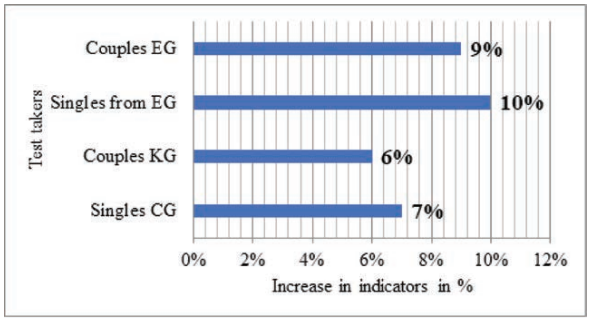

Figure 4. Diagram of the average values of the increase in indicators on TFP among representatives of single and pair skating from the CG and EG at the educational and training stage and the stage of improving sports skills of training

Figure 5 shows a diagram of the average values of indicators for general and special physical training of representatives of single and pair skating of the control group (CG) and experimental group (EG) at the educational and training stage and the stage of improving sports skills of training.

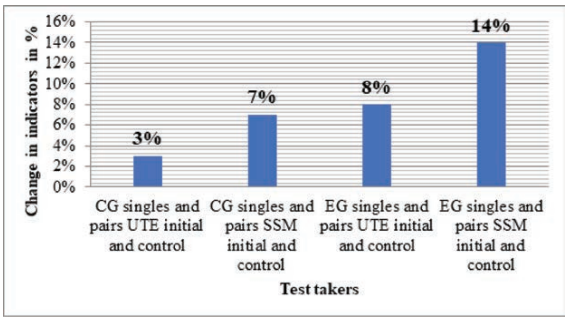

Figure 5. Diagram of the average values of the increase in indicators for general physical fitness and physical fitness among representatives of single and pair skating from the CG and EG at the educational and training stage and the stage of improving sportsmanship training

After the introduction of the developed set of exercises into the educational and training process of the experimental group of the educational and training stage and the stage of improving sportsmanship, the average result for passing tests in general physical training and physical training increased by 22%. In the control group, the situation was somewhat worse: the average score for the general physical training and physical training tests increased by 10%.

To summarize the results of the pedagogical experiment and compare the results shown in the control and experimental groups, an assessment of technical readiness was made.

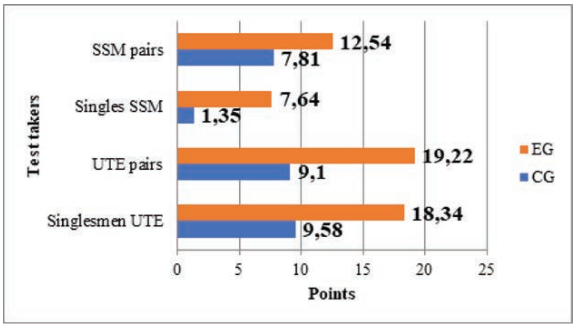

Figure 6. Diagram of changes in free program skating scores in points for representatives of single and pair skating from the CG and EG of the educational and training stage and the stage of improving sportsmanship training

Comparing the results between the two groups in the final testing, we observe that the performance of the program among single skaters of the educational and training stage of the EG improved by 18,34 points, and among the CG – by 9,58 points. The result of pair skating skaters from the EG improved by 19,22 points, and from the CG by 9,1 points. The results of single skaters at the stage of improving sportsmanship in the EG improved by 7,64 points, and in the CG – by 1,35 points. The result of pair skating skaters from the EG improved by 12,54 points, and from the CG by 7,81 points.

Conclusions. Thus, the information obtained during the experiment allowed us to conclude that both the control (CG) and experimental (EG) groups were able to increase the level of their performance. However, the increase in the control group was achieved through the use of traditional means of preparation. And the experimental group showed the most active increase in indicators, thanks to the introduction of a developed set of static exercises into educational training sessions. In the process of comparing the final indicators, the effectiveness of using static exercises in the process of training figure skaters, representatives of single skating, at the educational and training stage was proven.

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Formation of a system for selection and further support of sportsly gifted children, taken into account of continuity and consistency of sports training

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Abstract

Objective of the study was to development of proposals for the formation of a system of selection and further support of sports gifted children, taking into account the continuity and consistency of sports training.

Methods and structure of the study. The protocol of expert analytical work included: purpose, objectives, methods (theoretical analysis and synthesis of scientific and methodological literature and documentary sources, a survey of regional executive authorities in the field of physical culture and sports, qualitative PESTEL and SWOT analysis), planned results, and also the scope of application of these results. The study was conducted during 2023 and covered 84 regions of the Russian Federation. More than 1,000 scientific articles in journals listed by the Higher Attestation Commission, dissertation research contained on the information portal of the Russian State Library, as well as publications in collections of conference materials were studied.

Results and conclusions. The expert-analytical assessment of the individual components of the selection system and the analysis of their mutual influence made it possible to formulate proposals for the formation of a system of selection and further support of sports gifted children, taking into account the continuity and consistency of sports training.

The technological feasibility of improving the selection system presupposes: the use of the achievements of modern functional diagnostic hardware and software systems; methodological support and practical application of model characteristics of young athletes preparedness in sports; introduction of scientifically based profiles of competitive exercises, providing for the possibility of differentiating control and transfer standards for retardants, mediants and accelerators; development of methodological recommendations on mechanisms and criteria for selecting gifted children in sports; distribution of functions of performers of each of the events in accordance with the level of organization of the performer, providing for the inclusion of these functions in the charter of performers; regulatory support.

Keywords: *sports selection, sports orientation, sports gifted children, stages of sports training, formation of a system of sports orientation and selection.*

Introduction. The relevance of a comprehensive analysis of the System is due to the task of increasing the efficiency of searching, selecting and supporting athletes at each stage of sports training, the corresponding direction and target indicators of the Strategy for the Development of Physical Culture and Sports in the Russian Federation until 2030 [2] and the Concept for the Development of Children's and Youth Sports in the Russian Federation. Federation until 2030 [1]. Given a sufficiently large array of scientific data on the structure, content and methods of the System, this strategic task is mainly solved within the framework of implementing the requirements of federal standards of sports training for sports (hereinafter referred to as FSSP).

Objective of the study was to development of proposals for the formation of a system of selection and further support of sports gifted children, taking into account the continuity and consistency of sports training.

Methods and structure of the study. The protocol of expert analytical work included: purpose, objec-

tives, methods (theoretical analysis and synthesis of scientific and methodological literature and documentary sources, a survey of regional executive authorities in the field of physical culture and sports, qualitative PESTEL and SWOT analysis), planned results, and also the scope of application of these results. The study was conducted during 2023 and covered 84 regions of the Russian Federation. More than 1,000 scientific articles in journals listed by the Higher Attestation Commission, dissertation research contained on the information portal of the Russian State Library, as well as publications in collections of conference materials were studied.

Results of the study and discussion. Monitoring and analysis of the current state of regulatory legal acts and methodological materials in terms of methodological support and organization of work to identify, select and support gifted children in sports made it possible to identify a fairly large list of conceptual documents at the federal level and a long period of time during which the problems of the System are highlighted in them , which indicates great attention to it from the state. The list of methodological documents in the designated area is also quite extensive and contains both highly specialized and more general documents (the latter, as a rule, regulate other activities indirectly related to the problems of selection and support).

A survey of regional executive authorities in the field of physical culture and sports showed that the FSSP, by default, is the main, and in a number of regions, the only regulatory legal act regarding the organization of work to identify, select and support gifted children in sports.

An analysis of scientific and methodological literature containing pedagogical, medical-biological, biomechanical, psychological and instrumental aspects of approaches to the development of methods for selecting and further supporting gifted children in sports has shown that scientific interests in these aspects, as well as in sports, are distributed disproportionately.

The information and analytical materials obtained as a result of monitoring and analysis, as well as the qualitative PESTEL and SWOT analysis of the System, provided the basis for the development of technology for targeted search and selection of promising athletes to achieve high sports results, which includes a list of measures to identify individuals who are most corresponding to the model characteristics of the stage and purpose of the long-term training process, as well as the methods of sports orientation and sports selection, depending on the tasks of the stage of training the sports reserve (hereinafter referred to as the Technology). Quantitative qualitative PESTEL and SWOT analysis of the System was not carried out due to the insufficient volume of relevant source data in open sources.

At the final stage of the work, a PESTEL analysis of the Technology was carried out again using 18 factors. Positive and negative scenarios of the influence of each factor were analyzed, as well as the expected actions of the System coordinator under positive and negative scenarios. The results of the SWOT analysis provide the basis for further development of a set of measures, in terms of quantitative parameters for the proposed items.

Proposals for the formation of a system of selection and further support of sports gifted children, taking into account the continuity and consistency of sports training, including the introduction of Technology, are as follows:

1. Justification, development and implementation of methodological and instrumental approaches using the achievements of modern science and technology, modern medical or functional diagnostic hardware and software systems.

2. In-depth study of the fundamental and theoretical aspects of the development of model characteristics of competitive activity, methodological support and practical application of model characteristics of preparedness for young athletes in sports, their use in selection, and in the future, their inclusion in the FSSP.

3. Justification, development and implementation of scientifically based profiles of competitive exercises and test profiles to assess the level of development of physical abilities. Adjustment of the FSSP in terms of introducing changes to the standards of general physical and special physical training for enrollment and transfer from stage to stage of the long-term educational and training process, in order to bring the structure and level of physical fitness of athletes into line with the model characteristics of competitive activity in the sport, providing for the possibility differentiation of control and transfer standards for retardants, mediants and accelerators.

4. Development of methodological recommendations on the mechanisms and criteria for selecting sports gifted children, including: 1) procedures for sports orientation and sports selection and responsible executors; 2) a set of criteria for assessing the

level of preparedness of an athlete at each stage of the long-term educational and training process, correlating with the model characteristics of the athlete at the corresponding stage in the sport.

5. Introduction of the Technology, distribution of functions of performers of each event in accordance with the level of the performing organization, as well as methods depending on the tasks of the sports reserve preparation stage, into the System, providing for the inclusion of these functions in the performers charter.

6. Development of a standard comprehensive structure of the regulatory, legal and methodological support of the System and recommendations for their adaptation, taking into account the traditions and capabilities of the region due to the different priorities of the task in the regions and, at the same time, the importance of this task for the country as a whole.

7. Addition of the FSSP with the section «Model program for sports orientation and selection by sport», establishing the Technology, taking into account the fact that they are the main document regulating the System.

Conclusions. Forecast assumptions about the development of the research object are that the system of selection and further support of sports gifted children, taking into account the continuity and consistency of sports training, will be regulated mainly by introducing changes and additions to the FSSP.

To develop the System, as well as ensure a sufficient number of sports reserves of sports teams of the Russian Federation, it is necessary to implement a set of measures that imply economic efficiency and significance of the work, expressed in increasing the safety of the contingent at the stages of a long-term educational and training process while simultaneously reducing financial costs.

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High-intense training for swimmers: features of planning and organization

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Abstract

Objective of the study was to identify the possibility of increasing the effectiveness of the training process of swimmers through the use of high-intensity training.

Methods and structure of the study. The experiment, which lasted 18 weeks, involved 15 swimmers aged 17-18 years. All athletes trained according to a special program with reduced volume and high intensity.

Results and conclusions. During the training process with the introduction of «high-intensity training», results were improved at all analyzed distances. In this case, the average result was determined as the arithmetic mean of the results of the swimmers of the research group.

Keywords: *high-intensity training, swimmers, training process.*

Introduction. A high level of physical activity during training entails using the maximum capabilities of the human body. Therefore, it is necessary to have a clear program in which the rhythm of training is traced by day, week and month, and the obligatory alternation of load and rest is observed. The importance of these principles increases with increasing training loads. If a few years ago swimmers who swam more than 3 km a day were considered an exception, now the load has increased 10 times.

Most trainers prefer to stick to the traditional training method: twice a day with high volume (about 9-10 km in total); the main nature of the work is swimming a series of distance segments of varying lengths and intensity. The experiment explores one of the possible deviations from the traditional method of training (twice a day with a high volume) - high-intensity training, in which the volume performed (kilometers) is reduced by two to three times, while the intensity of the work increases. It should be noted that this is not the first time that this option for training swimmers has attracted the attention of specialists, although a sufficient amount of research has not been conducted in this area.

Objective of the study was to identify the possibility of increasing the effectiveness of the training process of swimmers through the use of high-intensity training.

Methods and structure of the study. During the pedagogical experiment, a technique was used, the essence of which was that the swimmer participating in the experiment swam the planned sections of the distance at a speed that, if possible, exceeded the competition speed. At the same time, the length of the swimming sections was planned to be much shorter than the competition sections in order to avoid the athletes being overtrained.

The experimental group included 15 student swimmers aged 18-20 years (10 boys and five girls). Before the experiment, they trained according to the traditional method, swimming an average of 12 km per day [1]. Their competitive experience ranged from 5 to 8 years. All athletes trained according to a special program with reduced volume and high intensity. The

experiment lasted 18 weeks, its beginning coincided with the beginning of the school year, and ended before the swimmers started in the last major competition of the year - the student championship, the results of which were to be the result of the experiment.

During the pedagogical experiment, athletes trained twice a day, five days a week, for a maximum of 1.5 hours. At the same time, about 60% of the training time was devoted to recovery. The volume of work performed was about 3.5 km per day. The weekly training plan is presented in Table 1.

From Table 1 it can be seen that swimmers from Monday to Thursday swam a series consisting of 50 short sprint segments and 20 of the same segments on Fridays. Swimmers had to swim the next segment at a speed exceeding the speed of the previous one. This part of the program was considered high-intensity training - it was the main part of the overall experimental program.

Swimmers who specialized in breaststroke, butterfly and backstroke swam at least 50% of the volume of high-intensity training in their own way, and 50% in freestyle. Freestyle swimmers swam almost all 50 segments in freestyle. On Tuesdays and Thursdays, anaerobic work was also performed - swimming a series of segments at high speed with short rest intervals.

Two weeks before the competition, during the tapering period, work was done to maintain the required level of endurance with the least amount of work. The narrowing is carried out mainly before the main competitions of the season.

The tapering period varies from two to six weeks, its duration depending on how intensively and successfully the work was completed in previous periods. On average, the mileage during this period is no more than 1500-2000 km per day, and in the last week the volumes are reduced to a minimum, however, these figures can vary, in some weeks reaching almost zero, which again depends on the general condition and level of preparedness of the swimmers in each specific case. It is advisable that during this period a certain variety be introduced into the training every week to better maintain the swimmer's emotional spirit and relieve fatigue immediately before the competition. In addition, during this period, most of the time is devoted to «fractional» swimming. There is virtually no high-intensity training that causes a significant increase in blood lactate levels.

In addition, during these two tapering weeks, half the volume of high-speed training was performed in a 25 m pool. However, swimmers were still required to exert maximum effort and not slow down.

Despite the fact that almost the entire training program during the experiment consisted of the same repetitions, the athletes did not experience fatigue from the monotony. Of great importance was the behavior of the coach, who made comments at various, sometimes unexpected times, held discussions about previous training sessions, swims, etc.

Results of the study and discussion. At the student championship, which coincided with the completion of the study, all swimmers who participated in it showed their best results of the season. In addition, all athletes (with the exception of those who special-

Table 1. Weekly training program for swimmers using the intensive training method

Work performed	Monday	Tuesday	Wednesday	Thursday	Friday
Warm-up, m	600 m – special exercises to develop style 500 m – swimming with footwork	600 m – swimming any way 400m – swimming with footwork	600 m – special exercises to develop style 500 m – swimming with footwork	600 m – swimming any way 500 m – swimming with footwork	500m – swimming any way 400m – swimming with footwork
Competitive swimming, m	5×50 m		5×100 m		5×200 or 5×500 (optional, alternating every other week)
Speed swimming, m	5×25 10×12,5	50×25 (footwork for every 8 cycles of movement)	40×25 20×12,5	50×25	20×25
Anaerobic swimming with short rest intervals, m		500		500	
Total volume, m	3000	3500	3500	3000	2000 или 3500

Table 2. Comparison of the results shown by swimmers before and after the experiment, group averages

Distance, m	Best result before the study	Best result after the study
50	26,55	25,54
100	58,42	57,09
200	132,22	125,76
400	299,57	277,42

ized in swimming only at one distance) set personal records.

At the same time, the data presented in table. 2 show that the sports results of swimmers have been improved at all four distances (Table 2 gives the average value for each distance, which was determined by summing the indicators of all swimmers and taking the arithmetic average). Only the data for the 400 m distance was taken from the training log during the experiment and compared with the best results shown by the swimmers previously, since none of them participated in the 400 m race in this competition.

Conclusions. The experiment explores one of the possible deviations from the traditional method of training (twice a day with a high volume) - high-intensity training, in which the volume performed (kilometers) is reduced by two to three times, while the intensity of the work increases.

The experimental group included 15 student swimmers aged 18-20 years (10 boys and five girls). Before the experiment, they trained according to the traditional method, swimming an average of 12 km per day. Their competitive experience ranged from 5 to 8 years. All athletes were informed that they would be training according to a special program with reduced volume and high intensity. The experiment lasted 18 weeks, its beginning coincided with the beginning of the school year, and ended before the swimmers started in the last major competition of the year - the student championship, the results of which were to be the result of the experiment.

The results of the experiment showed that during the training process with the introduction of «high-intensity training» the results were improved at all three analyzed distances. In this case, the average result was determined as the arithmetic mean of the results of the swimmers of the research group.

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Physiological and motor characteristics of long distance running depending on the level of preparedness

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Abstract

Objective of the study is to substantiate the relationship between the physiological and motor characteristics of long-distance running and the growth of sports achievements.

Methods and structure of the study. The study involved 20 students involved in athletics and qualifying for long-distance running (group A (n=10) – II adult category, group B (n=10) – I adult category and above). The experiment used running tests on a treadmill, during which a complex of cardiorespiratory, metabolic and motor characteristics were recorded. Long-distance running is characterized by maximum mobilization of body systems. The study made it possible to establish that an increase in most of the studied physiological indicators indicates an increase in the functional capabilities of those involved, and with an increase in the preparedness of athletes, the energy cost of running decreases and the ratio of aerobic and anaerobic components of energy supply changes towards an increase in the share of the anaerobic component.

Results and conclusions. The maximum values of a number of physiological parameters recorded during the 3000 m run were compared with the corresponding data obtained in tests on a treadmill, which made it possible to determine maximum aerobic and anaerobic capabilities. An increase in most of the studied indicators indicates an increase in the functional capabilities of the body of those involved. During the study, the following pattern was revealed: with increasing fitness of athletes, energy consumption during running decreases, and the ratio of aerobic and anaerobic energy supply modes changes towards an increase in the share of the anaerobic component.

Keywords: *athletes, running, physiological functions of the body, motor functions of the body, energy supply.*

Introduction. The study of physiological and motor functions directly in the process of performing physical exercises is one of the promising directions in assessing the special performance of those involved in physical culture and sports. The information obtained under such conditions makes it possible to judge the gradients of the functions under consideration, the individual maximum level of physical fitness and performance, as well as the ability to maintain this level.

It is believed that running is one of the most popular, but also quite complex types of physical activity [3, 63 p.; 6, 82 p.]. Running is included not only in the school and university curriculum, but also in the list of exercises for performing the All-Russian Physical Culture and Sports Complex «Ready for Labor and Defense» (VFSK «GTO») [2, 15 p.; 5, 39 p.]. Many scientific studies have been devoted to the study of physiological and motor characteristics in running, including long-distance running, but in almost all of them only one or two functional characteristics are studied, most often heart rate (HR) [3, 64 p.; 5, 38 p.; 9, 14 p.].

Objective of the study is to substantiate the relationship between the physiological and motor characteristics of long-distance running and the growth of sports achievements.

Methods and structure of the study. The study involved 20 students involved in athletics and qualifying for long-distance running. The students were divided into 2 groups depending on their level of pre-

paredness: group A – II adult category (n=10); group B – I adult category and above (n=10). In the preparatory and competitive period from 2021 to 2023, using running tests on a treadmill, maximum aerobic performance was determined in subjects of both groups (test with a stepwise increasing speed from 4 m/s to 6 m/s, the increase occurred every 2 minutes by 0,5 m/s) and anaerobic capacity (uphill run test, elevation angle 3°, speed decreased from 6,5 m/s to 6 m/s). In both tests, the athletes under study continued to move until failure. A distance of 3000 m was chosen as the distance under study [7].

During running, a complex of cardiorespiratory, metabolic and motor characteristics was recorded: oxygen consumption (VO_2), carbon dioxide emission (VCO_2), minute pulmonary ventilation (VE), oxygen pulse (O2p), carbon dioxide excess ($ExCO_2$), oxygen debt (O_2 debt), depth (D) and frequency (RR) of breathing, heart rate (HR), step frequency (SF), step length (LS) [1; 4; 8].

Results of the study and discussion. The maximum values of a number of physiological indicators recorded during the 3000 m run were compared with the corresponding data obtained in tests on a treadmill, which made it possible to determine maximum aerobic and anaerobic capabilities (Table 1).

During the study, it turned out that most of the considered indicators in the 3000 m run reach the values recorded in the treban tests. High values of Exc CO-2max and oxygen debt indicate that long-distance running takes place under conditions of significant O_2 deficiency, which indicates the intensity of anaerobic glycolytic processes. VO_2 consumption reached its maximum at approximately 3–4 minutes, remaining constant throughout the entire distance.

Analysis of the results obtained revealed the following dynamics: during the first 2–3 minutes of running, heart rate increases to 180±5,8 beats/min, and VE increases to 90±10,2 l/min, while this phenomenon is not associated with a change in speed movements. Long-distance running is characterized by maximum mobilization of the body's functional systems that ensure performance at this level. High values of both aerobic and anaerobic metabolism indicate the activation of both sources of energy supply.

Comparative data for a number of physiological and motor indicators recorded during the 3000 m run at different stages of preparation are given in Table. 2. They indicate that not all of the indicators under consideration change with the growth of sports results at a given distance.

As can be seen from table 2, no significant increase in VO2max is observed. There is a tendency towards a restructuring of the structure of external respiration due to a slight increase in RR and GD at RRmax. The maximum indicators of oxygen utilization (% O_2) and carbon dioxide emissions (% CO_2) remain practically unchanged.

Despite the improvement in sports results, only a slight change in the maximum indicators of SN and DS

Table 1. Comparative data of maximum cardiorespiratory and metabolic parameters recorded in the 3000 m run and special tests on the treadmill

Indicators	Indicators of maximum aerobic capacity (stepwise increasing speed test)	Indicators of maximum anaerobic capacity (uphill running test)	Indicators recorded in the 3000 m run	Level of statistical significance of differences (P)	
				between 1 and 3	between 2 and 3
VO_2 (ml/min-kg)	69,7±1,2	–	68,8±0,9	>0,05	–
VCO_2 (ml/min-kg)	76,8±1,6	–	72,8±1,3	<0,001	–
VE (l/min)	128,8±2,7	–	123,4±3,0	<0,001	–
GD (% of vital capacity)	44,4±1,3	–	45,1±1,3	>0,01	–
RR (breaths/min)	63,4 ±1,2	–	62,0±1,8	>0,05	–
GD at RR (% of vital capacity)	39,8±1,2	–	39,7±1,7	>0,05	–
Heart rate (bpm)	194±1,2	178±1,3	192±1,6	>0,05	<0,001
O_2p (ml/beats/kg)	0,369±0,007	0,364±0,007	0,374±0,006	>0,05	<0,01
Exc CO_2 (ml/kg)	26,0±1,4	21,0±1,5	22,6±1,0	<0,001	>0,05
O_2 debt (ml/kg)	–	1,8±63	130±7,5	–	<0,01
BRS (step/s)	3,14±0,05	–	3,2±0,03	>0,05	–

Table 2. Maximum values of physiological and motor indicators when running 3000 m at different stages of preparation in the annual cycle (preparatory - competitive periods)

Indicators	Preparatory period	Competitive period	p
t run 3000 m (min)	9.32,0±9,1	9.13,0±8,8	<0,05
VO_2max (ml/min-kg)	68,4±1,3	69,4±1,0	>0,05
VCO_2max (ml/min-kg)	69,0±1,4	76,7±1,7	<0,05
VEmax (l/min)	118,1±2,6	132,1±3,9	<0,05
O_2 debt (ml/kg)	115,2±6,4	147,9±2,3	<0,05
Exc CO_2max (ml/kg)	19,9±1,2	26,0±0,9	<0,05
RRmax (breaths/min)	60,9±2,5	63,6±2,4	<0,05
GDmax (% of vital capacity)	46,6±2,3	45,6±2,1	>0,05
HD at RRmax (% of vital capacity)	39,2±1,6	40,3±1,9	>0,05
Heart ratemax (bpm)	190,5±1,8	190,8±2,3	>0,05
O_2p (ml/stroke/kg)	0,372±0,008	0,376±0,008	<0,05
% O_2	4,9±0,07	4,81±0,13	>0,05
% CO_2	4,4±0,9	4,46±0,11	> 0,05
ChSh at max LSh	3,08±0,4	3,14±0,04	<0,05
LSh at max ChS	159,4±9,6	173,0±3,5	<0,05
HR max (step/s)	3,19±0,05	3,21±0,05	<0,05
LH max (cm)	178±3,2	178±3,5	>0,05
ChSh (average)	3,11±0,04	3,16±0,02	>0,05
DS (medium)	169,1±2,1	172±2,3	<0,05

was revealed. The data obtained indicate that changes in the stride structure to maintain increased running speed mainly follow the path of increasing the average values of SN and DS due to a longer retention of high values of SN and DS. With an increase in sports performance at a distance, VEmax significantly increases, which is primarily associated with a change in the breathing structure: an increase in RRmax and GD at RRmax. There is a significant increase in p VCO_2max, Exc CO_2max and oxygen debt during the competitive period. During the annual training cycle in the preparatory and competitive periods, there are no significant differences in the level of efficiency.

In table Table 3 presents comparative data on some of the studied cardiorespiratory, metabolic and motor indicators in athletes of various levels of prepar-

Table 3. Comparative data of physiological and motor indicators during 3000 m running among athletes in the study groups

Indicators	Group A	Group B	p
t run 3000 m (min)	9.46,0±5,8	8.58,0± 6,4	<0,01
VO_2max (ml/min-kg)	67,6±1,1	70,1±1,2	<0,01
VCO_2max (ml/min-kg)	70,6±1,7	75,6±1,6	<0,01
VEmax (l/min)	126,2±3,4	123,0±4,5	>0,05
RRmax (breaths/min)	63,0 ±1,0	61,4±3,0	>0,05
GDmax (% of vital capacity)	42,7 ±1,1	48,1±2,2	<0,01
GDmax RR (% of vital capacity)	36,4 ±1,2	43,3±1,8	<0,01
Heart ratemax (bpm)	192±1,7	188,6±2,2	>0,05
% O_2max	4,87±0,1	4,84±0,1	>0,05
O2p (ml/stroke/kg)	0,365±0,006	0,383±0,009	<0,01
O_2 debt (ml/kg)	118,6±7	144,1±12,6	<0,01
Exc CO2max (ml/kg)	21,5±1,5	24,3±1,2	<0,05
HR max (step/s)	3,14±0,04	3,26±0,05	<0,05
LW max (cm)	174±2,8	182±3,5	>0,05
LH at max BH (cm)	161±3,6	172±3,9	<0,05
ChS at check DS (step/s)	3,97±0,05	3,14±0,03	<0,05

edness. The growth of most of the indicators under consideration indicates an increase in the functional capabilities of the body systems.

As athletes become more prepared, there is a tendency towards a decrease in the energy cost of running. Also, no significant changes were found in the growth of maximum external respiration performance, but there was a restructuring in the RR/GD ratio. Subjects in group B maintain approximately the same VEmax with a larger GD and a smaller RR. An increase in running speed is accompanied by an increase in SNmax and DSmax; over time, stability of the running step is noted, characterized by long-term maintenance of a high SN at DSmax and DS at CSmax.

Conclusions. Based on the fact that long-distance running is characterized by maximum mobilization of vegetative and metabolic functions, as well as the achievement of maximum levels of aerobic and anaerobic capabilities, an increase in athletic performance was identified at the studied distance (3000 m) during the preparatory-competitive period. In group B athletes, the increase in athletic performance was accompanied to a greater extent by an increase in the level of anaerobic capacity and stabilization of the running stride. An increase in most of the studied indicators indicates an increase in the functional capabilities of the body of those involved. During the study, the following pattern was revealed: with increasing fitness of athletes, energy consumption during running decreases, and the ratio of aerobic and anaerobic energy supply modes changes towards an increase in the share of the anaerobic component.

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Informativeness of biomechanical criteria in assessing the competitive efficiency of highly qualified cross-country skiers

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Abstract

Objective of the study was to assessment of the influence of competitive conditions on the biomechanical characteristics of the technique of simultaneous single-step skating skiing (SSS).

Methods and structure of the study. The biomechanical indicators of the OSH technique of highly qualified cross-country skiers were determined using Dartfish Pro 10 software based on video footage of the athletes' movements on the flat sections of the sprint, 10 km race and in the roller ski test. The free development environment «RStudio» was used for data analysis and visualization.

Results and conclusions. A statistically significant negative correlation was found between the speed on the first lap and the angles in the knee and hip joints at the time of placing the poles (-0.552 (<0.05) and -0.573 (<0.05)) in men. In sprinting, skiers' speed was associated with the magnitude of the hip angle (-0.558 (<0.05)). In all other cases, there was no relationship between the values of joint angles and the speed of movement in competitions. The absolute values of the joint angles in the key phases of GSHP depend on the exerted effort and change as a result of a controlled change in the intensity of movement or an unintentional decrease in speed as a result of fatigue, which makes it possible to use these indicators to assess the level of preparedness in races and intensive training. The amplitude of movements in the ankle, knee and hip joints during the push-off in the GSHS is not related to the speed of movement under competition conditions.

Keywords: *cross-country skiing, biomechanical characteristics, simultaneous one-step skating, highly qualified ski racers, assessment of competitive activity.*

Introduction. In cross-country skiing, competitions and training are held on trails with varied terrain and lap lengths, in changing snow and weather conditions, and athletes adapt the technique of multiple modes of movement to external conditions and their own capabilities with varying degrees of efficiency. All these factors complicate the objective assessment of the technical and physical preparedness of athletes, preventing the establishment of accurate model indicators of special preparedness. In skiing, there are no absolute criteria that allow comparison between athletes who do not participate in the same competitions, which creates problems for predicting the performance of cross-country skiers. Studies of the factors that determine the result in competitions are carried out in laboratory conditions, which makes it possible to increase the validity and reliability of tests for assessing the performance and functional state of athletes [3]. The development and use of skiers' readiness indicators in the field is necessary to assess the ability to demonstrate functional capabilities in real conditions. In particular, attempts are being made to standardize the conditions for testing the technical readiness of athletes in skiing, using for this purpose the measurement of kinematic indicators of the technique of simultaneous one-step skating when moving on the plain [1]. The use of 2D video recordings for subsequent measurement of kinematic characteristics, including joint angles, has significant limitations. Firstly, only the analysis of the positions of body links located parallel to the plane of the video camera matrix can be correct. Secondly, measuring angles and dis-

tances in video analysis programs is a labor-intensive and time-consuming process, and the data obtained does not always justify the effort expended. Electrogoniometers are often used to measure angles [4], but this requires intervention in the training process and is not possible in competitions.

It seems obvious that factors such as the length of the distance and sliding conditions, skill level, morphological structure, level of preparedness and degree of fatigue of athletes, the location of the flat area where video shooting is carried out, and the tactics of its passage significantly influence the parameters of the technique. We hypothesized that studying the relationship between the biomechanical indicators of cross-country skiers and the speed of movement on flat sections of competitive distances and in a standard test will allow us to assess the specific influence of competitive conditions on technique and identify informative criteria of preparedness.

Objective of the study was to assessment of the influence of competitive conditions on the biomechanical characteristics of the technique of simultaneous single-step skating skiing (SSS).

Methods and structure of the study. Video recording of the movement of ski racers at the Russian Cup distances of the 2023-24 season. was carried out during the sprint qualification on November 25, 2023 and at a distance of 10 km freestyle on December 1, 2023 as part of scientific and methodological support for the Russian national cross-country skiing team. In both cases, a flat section of the route was chosen, the video camera was installed motionless, perpendicular to the movement, so that at least two cycles of movements were captured in the frame. At the sprint distance, filming was carried out at the beginning of the lap after the starting acceleration, the air and snow temperature was -2°. At a distance of 10 km, a flat section was chosen after an ascent, shooting was carried out on both circles, the weather conditions were stable, air temperature -7-8°, snow temperature -6°. The biomechanical indicators of the 20 best athletes in the sprint and the 18 best athletes at 10 km distances among men and women were calculated in the DartfishPro 10 program. The «stride length» indicator characterizes the athlete's movement in one cycle of movements (from the beginning of pushing off with poles until the next moment of placing the poles). Squat time is the time from the moment the poles are placed until maximum bending of the leg at the knee joint. Take-off time is the time from the moment the knee of the swing leg moves forward of the knee of the supporting leg until the ski lifts off the snow. Statistical processing of the research results was carried out in the RStudio program [5]. For comparison, similar indicators of athletes (6 men, 5 women) were calculated when performing a standard test on roller skis, conducted in September 2023 as part of scientific and methodological support for the Russian national cross-country skiing team.

Results of the study and discussion. High speed in sprint qualifying for men and women was ensured by a larger step length and frequency of movements (Tables 1, 2). However, if the speed of female skiers in the sprint depended to a large extent on the frequency of movements, then for men, the speed of movement was positively related to the length of the step in the sprint (ρ=0,801) and on the first lap of the race (ρ=0,585, p<0,01). The increase in the frequency of movements in sprints in women occurred due to a decrease in the time of repulsion and the time of free

Table 1. Biomechanical indicators of female cross-country skiers' technique at the Russian Cup distances

Biomechanical indicators		Sprint, n=20	1 lap race, n=18	2 lap race, n=18	p
Speed, m/s		7,03±0,35	4,90±0,29	4,90±0,20	<0,0001
Step length, m		5,44±0,35	4,46±0,31	4,43±0,30	<0,0001
Movement frequency, cycle/min		77,88±0,06	65,99±3,59	66,71±4,78	<0,0001
Foot push-off time, s		0,23±0,02	0,28±0,03	0,27±0,03	<0,0001
Sit-down time, s		0,15±0,03	0,16±0,02	0,16±0,04	>0,05
Push-off time with sticks, s		0,23±0,02	0,30±0,02	0,31±0,02	<0,0001
Free sliding time, s		0,39±0,05	0,47±0,04	0,47±0,05	<0,001
The angles at the moment of placing the poles, degrees.	Shin tilt	71,54±4,39	71,09±2,88	72,31±3,74	>0,05
	Knee	136,75±7,71	141,18±7,12	142,69±7,09	>0,05
	Hip	**113,67±4,30**	**118,34±5,96**	119,12±8,36	<0,05
The magnitude of the angles at the moment of sitting down, degrees.	Shin tilt	68,85±3,10	67,08±3,67	67,25±2,76	>0,05
	Knee	120,2±4,83	123,42±4,08	124,15±4,99	>0,05
	Hip	91,97±3,97	95,25±5,68	96,10±8,03	>0,05

Table 2. Biomechanical indicators of the GS technique of cross-country skiers at Russian Cup distances

Biomechanical indicators		Sprint, n=20	1 lap race, n=18	2 lap race, n=18	p
Speed, m/s		8,01±0,28	5,63±0,17	5,50±0,22	<0,0001
Step length, m		6,76±0,46	5,44±0,27	5,30±0,26	<0,0001
Movement frequency, cycle/min		71,34±3,15	62,14±2,45	62,31±3,60	<0,0001
Foot push-off time, s		0,23±0,02	0,26±0,03	0,27±0,03	<0,01
Sit-down time, s		0,14±0,02	0,19±0,03	0,18±0,02	<0,001
Push-off time with sticks, s		0,22±0,01	0,29±0,01	0,30±0,02	<0,0001
Free sliding time, s		0,47±0,04	0,51±0,02	0,52±0,04	<0,01
The angles at the moment of placing the poles, degrees.	Shin tilt	68,62±2,74	68,69±4,65	67,02±3,56	>0,05
	Knee	138,12±6,59	139,70±7,13	138,36±6,91	>0,05
	Hip	114,88±6,92	117,29±6,59	115,85±9,62	>0,05
The magnitude of the angles at the moment of sitting down, degrees.	Shin tilt	67,06±2,54	66,61±3,21	66,05±2,85	>0,05
	Knee	118,60±5,13	120,91±5,71	118,98±5,09	>0,05
	Hip	91,06±6,79	91,45±7,00	90,22±7,63	>0,05

sliding. In men, in addition, the duration of sit-ups was significantly reduced.

The speed of movement on the plain, step length and all time indicators remained stable over two laps of the distance in both men and women, despite progressive fatigue.

At the moment of placing the poles, the angles in the hip joint were significantly different in the sprint and on the first lap of the race for women. In other cases, significant differences were identified between the performance in the sprint and in each of the two laps of the distance for men and women.

In women, at the time of placing the poles in the sprint, the average values of the angles in the knee and hip joints were less than at a distance of 10 km. This may be due to the high frequency of movements and advanced bending of the legs before placing the poles. On the second lap of the distance, there is a tendency for the angles in the knee and hip joints of skiers to increase, which apparently reflects the accumulated fatigue of some athletes.

When comparing average values, changes in individual values can be leveled out, therefore, to identify the relationship between angular indicators and movement speed, a linear Pearson correlation was determined on all segments. A statistically significant negative correlation of medium strength was found between the speed on the first lap of the distance and the angles in the knee and hip joints at the time of placing the poles (-0,552 (<0,05) and -0,573 (<0,05)) in men. In sprinting, high speed of skiers was associated with the magnitude of the angle in the hip joint (-0,558 (<0,05)). Interpretation of the data in Figure 1 shows that in all other cases there is no relationship between the values of joint angles and the speed of movement (middle and bottom rows of diagrams).

The speed of movement of athletes can be influenced not by the absolute values of joint angles in key phases of the skiing cycle, but by the amplitude of movement in the knee and hip joints [1].

The parameters of the simultaneous one-step technique, determined in competitive conditions, differ significantly from similar indicators recorded in the standard test on roller skis. According to the conditions of the test, conducted in accordance with the technical specifications of the Analytical Directorate of the Center for Sports Teams of the Russian Federation sports teams, athletes were asked to overcome a flat area five times with a simultaneous one-step skating stroke, increasing the speed to maximum, but maintaining the structure of movements. In Fig. Figure 2 clearly illustrates that such a targeted and controlled increase in speed was accompanied in men and women by a decrease in the angle of the hip joint at the time of placing the poles and a decrease in the angles in the knee and hip joints during the squat. The range of motion in all three joints remained stable and did not depend on the speed of movement.

The data obtained indicate that the values of the joint angles in the key phases of the joint movement change as a result of a controlled change in the intensity of movement or an unintentional decrease in speed as a result of fatigue, that is, they do not depend on the speed of movement, but on the exerted effort. This allows us to consider the dynamics of individual kinematic parameters of highly qualified skiers during competitions or intense loads as an indicator characterizing the level of physical fitness and current performance, but not technical skill. An effective tool for

visual assessment of technique and an effective way of technical improvement remains the automated construction of kinematic diagrams based on the angular characteristics of athletes at key moments of skiing [2]. Visualization of key skiing positions in the form of simplified diagrams contributes to a better awareness of technical errors and understanding of the coach's requirements.

C**onclusions.** An increase in the speed of simultaneous one-step walking over a short distance was ensured by an increase in step length and frequency of movements; in men, a correlation between step length and movement speed in the sprint and on the first lap of the distance was determined.

A statistically significant negative correlation was found between the speed on the first lap of the distance and the angles in the knee and hip joints at the time of placing the poles (-0,552 (<0,05) and -0,573 (<0,05)) in men. In sprinting, high speed of skiers was associated with the magnitude of the angle in the hip joint (-0,558 (<0,05)). In all other cases, there was no relationship between the values of joint angles and the speed of movement under competition conditions. Visualization of the angular characteristics of the joint angles during competitions and during a standard test made it possible to identify a tendency towards a decrease in the absolute values of joint angles in the case of a controlled increase in intensity. The amplitude of movements in the ankle, knee and hip joints during the push-off in a simultaneous one-step skating stroke was not related to the speed of movement in any case.

Correct kinematic analysis of skating skiing techniques requires strict adherence to video recording conditions and high labor costs. A promising direction of research may be the automation of determination of kinematic characteristics by using computer vision methods. The information content of biomechanical indicators can be improved by studying relationships with the individual anthropometric characteristics of athletes, since, according to observations, it is this factor that can explain the large scatter of indicators and deviations from the general tendencies of the technique of individual successful athletes.

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Current problems of running training of qualified track and field jumpers

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Abstract

Objective of the study was to identifying current problems in the running training of highly qualified track and field jumpers specializing in the running triple jump, identifying areas for improvement in this jumping discipline.

Methods and structure of the study. A survey of the competitive activity of track and field jumpers in four jumping disciplines for men and women was carried out at all-Russian competitions in the period 2003-2023. Highly qualified jumpers and jumpers (6 athletes in each jumping discipline) took part in the study.

Results and conclusions. After conducting a survey of the competitive activity of leading Russian triple jumpers with registration of the speed parameters of the run-up sections, as well as the implementation of the run-up speed indicators in the support-flight part of the jump, it was concluded that among jumpers, running and technical training in the run-up phase are the main problem limiting the growth of sports jumper skills.

An analysis of the competitive activity of leading Russian triple jumpers showed that low speed in the last section of the run-up, which is a consequence of imperfect running structure and technical training in the run-up phase, is the main problem limiting the growth of sportsmanship in this jumping discipline of athletics.

Keywords: *athletics, triple jump, long jump, highly qualified track and field jumpers, running training.*

Introduction. The Russian jumping school continues the glorious traditions of the Soviet track and field jumping training system, marked by numerous victories in the Olympic arenas and the setting of many world records. Russian track and field jumpers continue the glorious traditions established by outstanding jumpers and vaulters of the Soviet period [1].

The undoubted successes of Russian jumpers in recent years in the high jump and women's pole vault cannot cover the obvious problems that exist in horizontal jumps, where, after the end of their sports careers, the leaders - T. Lebedeva, T. Kotova, I. Simagina, L. Kolchanova, A. Pyatykh, D. Burken, I. Spasovkhodsky, it became clear that besides E. Sokolova, D. Klishina, A. Menkov, there are no worthy successors in these types, and the successes of the latter date back to 2012-2017 [3].

This study is devoted to identifying the reasons for the decrease in performance in one of the jumping types of athletics - the triple jump, and determining the direction of improvement in this discipline.

Objective of the study was to identifying current problems in the running training of highly qualified track and field jumpers specializing in the running triple jump, identifying areas for improvement in this jumping discipline.

Methods and structure of the study. Scientific work included video recording of the athletes competitive activity with video analysis (DARTFISH software) and photodiode electronic timing of run-up sections in horizontal jumps (Smartspeed, Brower systems). A survey of the competitive activity of track and field jumpers in four jumping disciplines for men and women was carried out at all-Russian competitions in the period 2003-2023. Highly qualified jumpers and jumpers took part in it (6 athletes in each jumping discipline).

Results of the study and discussion. To solve in detail the problems of training track and field jumpers

and identify the reasons for the decline in the performance of Russian athletes in the last decade, the dynamics of the main indicators of the competitive activity of track and field jumpers specializing in horizontal jumps over a 20-year period was studied. As an example, an analysis of the indicators of competitive activity over the past period of the leading triple jumpers of the Russian Federation is given. The dynamics of the main average statistical indicators of the competitive activity of triple jumpers in the period 2003-2023 are presented in Table 1, as well as in the form of a graph in Figure 1.

The dynamics of the average competitive result of the first 6 finalists of the Russian Championships in the triple jump in the period 2003-2023 is presented in Figure 1. The regression equation reflecting the dynamics of the competitive result in the mens triple jump by year:

Y = - 0,035X + 87,31, where

Y – competitive result, m

X – years

During the study period, a significant decrease in the average result of the leading six finalists of the Russian Championship (CR) by 55 cm (3,3%) is associated with a drop in the speed indicator in the last run-up section of the finalists of the CR (2003 – 10,07 + 0,21 m /s, 2023 – 9,94+0,19 m/s, the difference was 1.3%), and with a decrease in the rate of speed implementation in the support-flight phases of the jump (Krs), which amounted to 1,8% (2003 – 1,70+0,03 m/s, 2023 – 1,67+0,04 m/s). The rate of increase in speed before take-off (the difference in speed in the last and penultimate 5th run-up sections) did not change significantly, and the average statistical indicator for male jumpers fluctuated around the model values for triple jump jumpers (+0,17 m/s), in the range of values from +0,13 to +0,23 (m/s).

Table 1. Average statistical indicators of competitive activity of jumpers-finalists of the Russian Championships in the triple jump in the period 2003-2023.

Years	CR	V6-11	V1-6	ΔV
2003	17,15	9,84	10,07	0,23
2008	17,25	9,92	10,15	0,23
2013	16,68	9,81	10,01	0,21
2018	16,60	9,68	9,81	0,13
2023	16,60	9,77	9,94	0,16

The dynamics of the speed indicator on the last 5th section of the runway in the triple jump (TJ) of male finalists at the Russian Championship in the period 2003-2023 is presented in Figure 2. The regression equation reflecting this dynamics:

Y = - 0,0123X + 34,81, where

Y – take-off speed, m/s

X – years

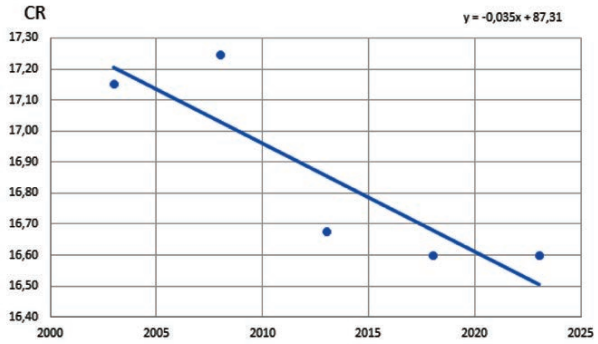

Figure 1. Dynamics of the average competitive result of the finalists of the Russian Championships in the triple jump in the period 2003-2023.

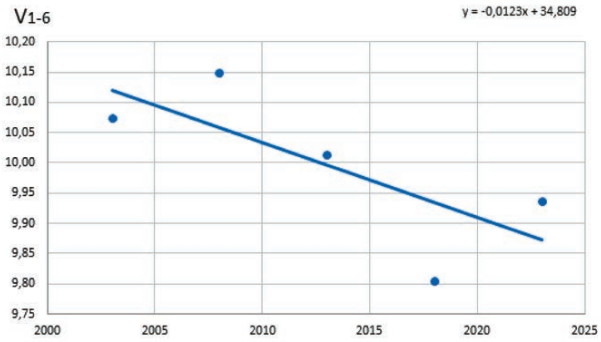

Figure 2. Dynamics of the run-up speed in the triple jump of finalists of the Russian Championships in the period 2003-2023.

A significant drop in performance in the triple jump among men over the past period is associated, first of all, with a drop in the speed indicator in the last section of the run before take-off [2]. The identified problem of low speed performance of leading Russian triple jumpers, which limits the competitive performance of athletes, undoubtedly requires an early solution, which is located both in the plane of sprint training of jumpers (insufficient speed preparedness of athletes) and in the plane of technical training (low implementation of speed readiness in speed take-off run, which for triple jumpers is only 94-95% of the maximum speed capabilities, while the model is 97-98%).

The irrationality of the structure of technical training in the macrocycle is proven by analyzing the dynamics of one of the main indicators of technical

readiness of jumpers, a triple one - an indicator of the increase in speed before take-off. This indicator is determined by the difference in speed in the last and penultimate 5-meter run-up sections using electronic photodiode timing (accuracy 0,001 s). Conducted studies of the competitive activity of the finalists of the All-Russian competitions showed that having negative parameters of the increase in speed before take-off (actual braking before the bar) at the beginning of the sports season (Team Championship in May), athletes only achieve model run-up indicators of 0,15 – 0,20 m/s by the end of the sports season (July-August).

The analysis of the special preparedness and competitive activity of triple jump jumpers over a long period allowed us to identify the main directions for improving the special technical preparedness of jumpers:

1. The effectiveness of the tempo version of the run with a rapid increase in pace and speed, which gives an advantage in speed by 2-3% compared to the run with a smooth increase in speed and active running up in the last 6-8 steps of the run. A «tempo» version of the run with a rapid increase in speed from the first steps (in a motor structure close to the starting run of sprinters, but from a high start) must be developed in young athletes already at the stage of initial specialization [4].

2. The next direction for increasing speed before take-off is to increase the length of the run-up - up to 21-24 run-up steps for male jumpers. A comparative analysis of the number of running steps among the finalists of the Russian Championship and the finalists of the World Championship showed that for our athletes this figure is lower than that of the best athletes in the world by approximately two steps – 18,5 and 20,5 running steps, respectively [6].

An increase in the efficiency of equipment is possible only with technical work at high speed, close to the maximum speed capabilities of the jumper. At the same time, increasing the take-off speed requires a certain restructuring of the take-off technique, and the entire jump as a whole [5].

For this purpose, the following technical training tools are used:

- increasing the take-off run with the inclusion of run-ups increased by 2-4 running steps, performed with and without push-off, this will make it possible to increase the stability and reliability of the run-up, and most importantly its speed parameters;

- increasing the percentage of fast running in the run-up structure. Particular attention should be paid to such means of running and technical training as sprint running with pushing through 5-7 running steps over segments of 60-100 m;

- increasing the speed qualities of jumpers will be facilitated by an increase in sprint training of running in the 96-100% MAX mode and an increase in competitive practice in sprint running.

3. The rational idea, in our opinion, is to shift the emphasis in sprint training to the early stages of long-term training with the target of achieving model run-up speed indicators by the end of junior age, at the stage of sports improvement. At the same time, it is advisable to focus the emphasis on the sprint training of triple jumpers at the stages of initial specialization and in-depth training with reaching model indicators of sprint readiness by the age of 19-20.

4. In technical training, in the early stages of long-term training, it is advisable to master the high-speed version of the triple jump technique with low trajectories of flight phases and a «jump-dominant» technique and an emphasis on the length of the «step + jump» combination.

Conclusions. An analysis of the competitive activity of leading Russian triple jumpers showed that low speed in the last section of the run-up, which is a consequence of imperfect running structure and technical training in the run-up phase, is the main problem limiting the growth of sportsmanship in this jumping discipline of athletics.

Directions for solving this problem have been identified based on improving both sprint training and the run-up phase:

- increasing the run-up length to 21-24 running steps;

- use of a rational «tempo» take-off option with a rapid increase in the speed and tempo of running take-off steps;

- an increase in sprint training for running in the 96-100% MAX mode, as well as an increase in competitive practice in sprint running;

- increasing the percentage of fast running in the run-up structure.

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Filming fast sports movements and problems associated with it

UDC 796.021

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Abstract

Objective of the study was to justify the possibilities and problems of using modern light-recording equipment for recording fast sports movements.

Methods and structure of the study. Recommendations for the appropriate use of the wide technical capabilities of modern light-recording equipment in solving current pedagogical problems of sports are considered.

Results and conclusions. The most difficult to distinguish and poorly eliminated geometric distortions of images of fast sports movements require special control and subsequent correction due to a possible decrease in the quality of assessment of motor actions during the judging process. Such distortions, which are a technical defect in filming, can be assessed by a coach or athlete as an imperfection in motor action. A possible violation of the geometry and shapes of the images negatively affects the work of the coach, who, guided by «distorted» factual information when analyzing the video recording, cannot objectively evaluate either the aesthetics or the sports technique of performing a fast motor action, which interferes with the formation of pedagogical recommendations. A possible sequence of practical actions is shown to obtain high-quality visual information of sporting events using equipment of various classes.

Keywords: *minimization of geometric distortions, optimization of the trainer's work, light registration, fast process.*

Introduction. One of the modern trends in many sports is to increase the speed of performing various motor actions. The information obtained during speed control is sometimes invaluable for coaches and allows them to significantly increase the effectiveness of athletes training.

When shooting fast movements, a special place is occupied by the so-called spatio-temporal distortions, i.e. violation of geometric similarity (homothy) [1, 2]. This is due to serious contradictions that are generated by the fantastic technical capabilities of modern light recording equipment, on the one hand, and the lack of objective criteria for assessing the resulting geometric distortions of the resulting images, on the other. The correct selection of shooting modes, ensuring the minimization of geometric distortions, is necessary to optimize coaching work and objectify refereeing.

Objective of the study was to justify the possibilities and problems of using modern light-recording equipment for recording fast sports movements.

Methods and structure of the study. Recommendations for the appropriate use of the wide technical capabilities of modern light-recording equipment in solving current pedagogical problems of sports are considered.

Results of the study and discussion. The desire of manufacturers of modern electronic equipment to «saturate» it as much as possible with all possible "brands" is obvious, therefore all photo and video equipment, including the advanced option of most smartphones, has high-speed shooting modes. On the other hand, high frequency of shooting, in addition to great advantages for solving a wide range of sports problems, also creates serious problems [1, 2].

Any sensory system operates on the principle of feedback based on deviation from a conditional reference value. Thus, vision, following this principle, forms a visual image based on the same law. It is possible to assess the quality of visual information by the degree of sharpness of the boundaries of a moving object (the so-called blurring) or to determine the degree of detail and usefulness (information content) of images even without the presence of special skills. On the other hand, a person cannot estimate the amount of distortion of the geometric shapes of bodies when filming fast movements due to the lack of information about the «reference» shape in his consciousness. These distortions depend on the speed and direction of movement, so they have an unpredictable, bizarre shape, and under certain conditions they bring the image to "unrecognizability", which leads to the impossibility of establishing whether this is caused by errors in sports equipment or is associated with imperfections in the production process itself. - toregistration.

This contradiction has no formal solution; only recommendations based on a speculative analysis of the results of filming fast sports movements are possible. To analyze geometric distortions, an object of «reference» shape was used - a symmetrical three-blade propeller of a household fan, the choice of rotation speed of which was associated with the known limiting values of the speed characteristics of the movements of highly qualified athletes, regardless of the type of sport (impact movements in acyclic or cyclic sprint sports: such as running, cycling, skating, etc.). In particular, the maximum values of the speed characteristics of human movements in terms of angular ones are no more than 3-5 revolutions per second (hereinafter referred to as rps), which determines the propeller rotation frequency chosen with some margin for the experiment - 6-8 r/s.

When using traditional line scanning, which is used today in all light detection systems, the image frame is formed line by line from top to bottom. To operate any light recording system, you also need a device that will regulate the exposure (shooting) time of each frame (individual image), the so-called shutter, which today comes in two types: global (shutter) and horizontal (electronic). rolling shutter) [1, 4].

The global shutter is an attribute of professional and very expensive equip-ment; it allows you to expose the entire area of the frame at once, which eliminates the occurrence of geometric distortions. The method of limiting the exposure time can be different: from optical-mechanical and electro-optical to magneto-optical (such as a Kerr cell or Faraday gate) operating principles [2, 3, 4, 5].

In amateur and semi-professional equipment (for example, the CASIO line of devices [6]), as well as in smartphones, a simplified electronic rolling shutter is used. The operating principle of this shutter is that exposure (shooting) of individual lines of the image is carried out in a sequential manner, that is, there is a significant time delay between the lines of one frame [1, 2, 4], which leads to the appearance of geometric distortions.

The time for forming a full frame, determined by the shooting frequency, must be commensurate with the time intervals of the shortest phases of the ana-lyzed sports movement, therefore the time interval between the upper (initial) and lower (final) lines of the frame is also commensurate with the time of the move-ment phase for which There is a significant movement of the object being photo-graphed, which leads to the appearance of geometric distortions in the form of changes in the shape and size of moving bodies.

To illustrate possible distortions, the well-known effect of a rotating propel-ler was used (test mode): the multi-directional movement of the propeller blades imitates the counter-directional movement of the limbs of a runner or the hands of a player. Figure 1 shows three single images

Figure 1. Images (still frames) of rotating blades of a symmetrical fan at different shooting frequencies and standard (automatic) mode settings

(freeze frames) of a symmetrical three-blade propeller rotating at the same speed (6-8 rps), shot at different frame rates and standard (automatic) shooting modes.

At a frequency of 30 fps, a strong «smear» is observed, which masks geo-metric distortions. However, in the presented freeze frame, it is easy to notice the difference in the degrees of «blur» for all three blades.

At a frequency of 120 fps, blurring becomes less, but geometric distortions in the form of curvature of the shape and linear dimensions of the blades increase noticeably, which, unfortunately, is quite expected during sports photography. Such distortions are a technical defect in filming, and can be assessed by a coach or athlete as an imperfection in motor action. A judge may find himself in a similar situation when he makes an erroneous decision.

At 240 fps, blur and distortion are visually reduced.

Typically, the ratio of horizontal and vertical scanning times are interrelat-ed, so increasing the frame rate has a positive effect on both the sharpness of single images and the reduction of their geometric distortions, as demonstrated in Figure 1.

Increasing the frame rate, as studies show [1, 2], is advisable up to a certain limit (in particular, up to 300-500 fps for most sports movements). In addition, in practice, increasing the frame rate leads to difficulties associated with increasing the volume of analyzed material, although there is no need to obtain additional visual information - it already becomes redundant.

Thus, as a result of using line scanning in amateur equipment and smartphones, the image will consist of sharp and high-quality individual lines, but, taking into account the relatively larger time interval between them, the resulting image of a fast moving object will have significant geometric distortions (Figure 2).

Figure 3 presents summary comparative information in the form of single images of a symmetrical three-blade propeller rotating at the same speed during burst and video shooting performed with a CASIO camera [6]. Qualitative analysis of the resulting images and their geometric distortions (Figure 3) allows us to draw attention to obvious features:

1. Geometric distortions depend on the mutual direction of the velocity vectors of the object being photographed and the frame scan. In our case, the device was positioned horizontally, the frame scan forms the frame from top to bottom, the propeller rotates clockwise. Under these conditions, the following is obvious: the blade located to the left of the axis of rotation moves upward, i.e. against the direction of the frame scan, which leads to «flattening» of the latter; the blade - to the right of the axis of rotation, on the contrary, «stretches», as a result, the geometry of the object being photographed is disrupted. With other positions of the blades, a more complex curvature of their geometry occurs, which fundamentally deprives the information of objectivity.

Figure 3. Influence of burst and video shooting parameters on shape distortion: horizontal rows – influence of shooting frequency; vertical columns – influence of exposure durations (shutter)

1. Geometric distortions are almost unnoticeable (fan rotation speed is constant, equal to 6-8 rps) only for video recording mode at frequencies above 200 fps.

2. With the same (close) parameters for the serial and video shooting modes, the geometric distortions of single video frames are much smaller compared to burst shooting images. This is due to the time it takes to form single frames, which is an order of magnitude longer for serial shooting, since high quality single frames are required (volume in MB) [3, 5], but, unfortunately, it creates conditions for the appearance of noticeable geometric distortions.

To analyze the training and competitive processes in modern sports, approaches are needed that allow coaches and judges to obtain detailed «prepared» in-formation about the various movements and actions of athletes. Such operational control over the high-speed actions of athletes, which sometimes last a fraction of a second, in conditions of tough competition can only be ensured by modern methods and non-standard approaches. Video recording equipment today has the widest capabilities and is suitable for implementing the mentioned tasks, but informed decisions are required on the optimality of its use [1].

Figure 2. Examples of deformation of symmetrical images three-blade propeller rotating at a speed of 6-8 rps (shooting was done with a short shutter speed of 1/2000 s)

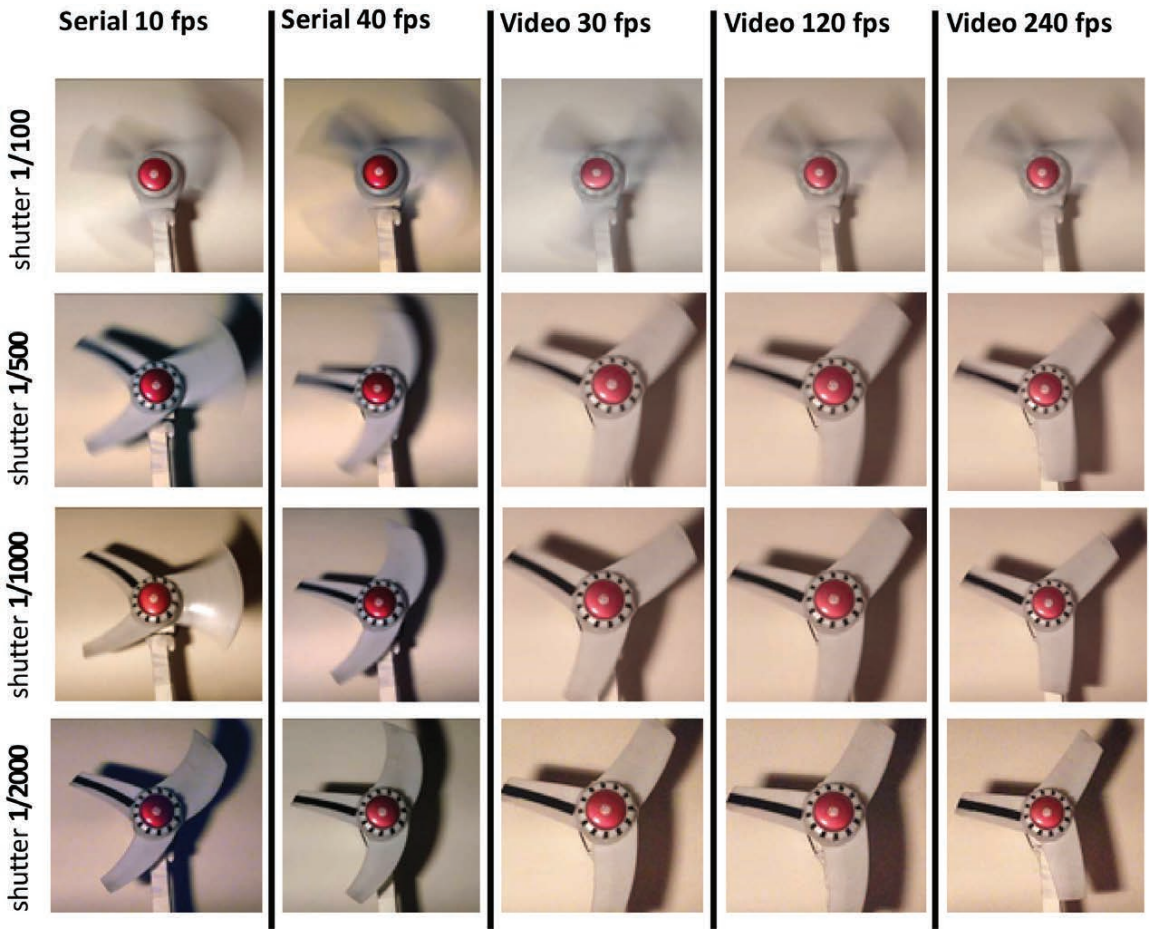

Figure 2. Examples of deformation of symmetrical images three-blade propeller rotating at a speed of 6-8 rps (shooting was done with a short shutter speed of 1/2000 s)

Conclusions. The experience of using high-speed shooting modes within the framework of current and operational control, in particular in basketball, presented in the above material, allows us to draw a number of practical con-clusions:

When filming fast sports movements, high-speed cameras are necessary; however, it is recommended to choose the minimum possible shooting frequency that ensures the necessary completeness and reliability of the visual information received. In this case, undistorted visual information is ensured by minimizing geometric distortions, which can be achieved already at a shooting frequency of 200-250 fps, regardless of the shutter type.

In case of noticeable geometric distortions when using an electronic rolling shutter, which can be established during the test mode of light detection with previously known body shapes, it is recommended to increase the shooting frequency.

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Specification of the "coach-teacher" model as a condition for implementing the process of integration of educational, scientific and sports activities in physical education universities

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Abstract

Objective of the study was to design a “coach-teacher” model that provides conditions for the implementation of the process of integration of educational, scientific and sports activities of students of physical education universities when mastering basic professional educational programs in the direction of «Sport».

Methods and structure of the study. The requirements of professional standards in the field of physical education and sports, which are the basis for the development and implementation of educational programs for the professional training of sports teachers at a physical education university, are analyzed. Comparison of professional competencies formed in accordance with educational standards with the professional functions of a sports teacher at a physical education university, ensuring the process of integration of educational, scientific and sports activities, made it possible to specify the components of the structure of the «coach-teacher» model.

Results and conclusions. It has been revealed that the formation of professional competencies of physical education university students in the process of implementing the main professional educational program «Sport», on the one hand, presupposes compliance with a professional standard, and, on the other hand, necessitates the integration of educational, scientific and sports activities of a teacher of higher professional education. The substantive basis of the multifunctional activity of a sports teacher at a physical education university is revealed by the «coach-teacher» model, which is a condition for the implementation of integration processes in the professional training of students at physical education universities and determines prospects, forecasts and innovative ways for the further development of areas of sports training.

Keywords: *universities of physical education, professional standard, competencies, focus of training, integration of educational, scientific and sports activities, «coach-teacher» model.*

Introduction. Designing the process of developing the competence of physical education university students is impossible without a detailed study of professional standards that make it possible to specify the main components of the scientific and practical nature of the sports teacher model: professionally significant qualities of the subject of labor and personality traits. At the same time, the possibility of combining educational, scientific and sports activities when students master basic professional educational programs is ensured by the unity of the pedagogical influences of the trainer-teacher, aimed at the formation of professional competencies consisting of specific knowledge, skills and abilities.

Objective of the study was to design a “coach-teacher” model that provides conditions for the implementation of the process of integration of educational, scientific and sports activities of students of physical education universities when mastering basic professional educational programs in the direction of «Sport».

Methods and structure of the study. The requirements of professional standards in the field of physical education and sports, which are the basis for

the development and implementation of educational programs for the professional training of sports teachers at a physical education university, were analyzed. Comparison of professional competencies formed in accordance with educational standards with the professional functions of a sports teacher at a physical education university, ensuring the process of integration of educational, scientific and sports activities, made it possible to specify the components of the structure of the «coach-teacher» model.

Results of the study and discussion. The process of integration of educational, scientific and sports activities assumes that the development and implementation of work programs takes into account the need for the associated formation of competencies that correspond to the Federal State Educational Standard VO 49.03.04 Sports and the labor functions of the professional standard. A comparison of the competencies formed within the framework of the main professional educational program «Sport» and the generalized labor functions of the professional standard confirmed that achieving the effectiveness of the process of professional pedagogical training is impossible without combining educational, scientific and physical culture and sports activities that allow systematically and comprehensively solving professional problems.

The correlation between the professional competencies formed in students and the generalized labor functions of the coach who carries out their sports training at a physical education university indicates the implementation of broad, multifunctional activities that involve the integration of educational, scientific and sports components.

Thus, the competence «Able to plan, record and analyze the results of the training process and competitive activity at the stages of sports training», which is formed among students, is focused on the implementation of training for those involved at the training stage, at the stages of improving sportsmanship, highest sportsmanship in a sport, to perform functions of planning, accounting and analysis of the results of sports training of those involved. At the same time, familiarity with and practice of using methods of accounting, analysis, and evaluation of the effectiveness of the training process is only possible by immersing directly in the real sports pedagogical process, carried out on the basis of analytical activity.

The competence formed among female students, which consists in the ability to implement an individual approach in the process of sports training, involves the preparation of those involved at all stages of sports training in the sport, the formation of versatile general and special physical, technical-tactical, psychological and theoretical preparedness of those involved in accordance with sports programs preparing and conducting training sessions with those involved in the stage of improving sportsmanship, the highest sportsmanship in the sport, according to individual plans for training athletes. Which, in turn, is impossible without creating conditions for problem-based learning.

A similar feature is observed in the formation of the ability to organize the participation of those involved in medical-biological, scientific-methodological and anti-doping support of sports training. This competence in female students can only manifest itself in contact work with female athletes and direct participation in these events.

The competence «Able to manage the competitive activities of athletes» is focused on training those involved in the stages of improving sportsmanship, the highest sportsmanship in a sport, as well as managing the systematic competitive activities of those involved. It involves the creation of conditions that allow not only to evaluate knowledge of the rules of competitions, but also the effectiveness of developing sportsmanship in accordance with them.

That is, the qualifications of teachers (coaches-teachers) who implement programs of academic disciplines and solve the problems of sports training of students must not only meet the professional standard [1], but also ensure the improvement of competencies developed as part of the development of the BOP, as well as the conduct of empirical research in within the framework of qualifying work.

At the same time, the stage of sports training implemented at the university presupposes the presence of appropriate sports qualifications of the contingent, experience in sports and coaching activities of the teacher, as well as fulfillment of the criteria for scientific, methodological and logistical support of the process.

It is necessary to take into account that trainers-teachers who carry out sports training for students must, in their own way, have a previously existing level of sports qualifications that is at least one step higher than the level of students at the Sports Training Center. For example, for the stage of improving sportsmanship - have a sports title of at least master of sports. In addition, in the process of sports training, teachers

and scientific and pedagogical workers of the university must provide consulting support and methodological assistance to coaches and athletes at all stages of sports training.

The formation of student sports teams at the stages of sports improvement and higher sports excellence in sports implemented at Sports Training Centers is carried out taking into account information about sports qualifications and the level of sports excellence. The occupancy and volume of workload in groups of students must comply with the regulatory requirements of the federal standard of sports training for the chosen sport. At the same time, at the stage of improving sportsmanship and higher sportsmanship, it is possible to unite highly qualified athletes into one group, regardless of the course. At the moment, the quantitative composition of training groups is determined in accordance with the recommendations for the formation of training groups. Exceeding occupancy standards reduces the possibility of high-quality sports training

Structure of the «trainer-teacher» model

General characteristics of the profession
Draws up an individual training program, monitors the progress of training; masters training methods and professional communication skills with athletes; has knowledge of the physiological foundations of the training process, as well as the characteristics of the corresponding sport; educates, instructs, advises.
Contents of work
Educational and training work in physical education and health groups and sports sections; preparing students for competitions; taking measures to increase the role of physical culture in improving the health of workers and members of their families, preventing morbidity and preserving their health; development of proposals for improving work and rest regimes, instructions, recommendations and other methodological materials on the use of various forms and methods of physical education for the prevention of possible diseases; organizing shows, competitions and other sporting events; implementation of professional and physical training; formation of professional competencies among students
Working conditions
Work indoors or outdoors; noise, vibration, lighting, temperature, work and rest hours; monotony and pace of work; possibilities of industrial injuries, occupational diseases: medical indications; benefits and compensation
Personal qualities
Speed of reaction; vestibular sensitivity and stability; discipline and responsibility; long-term and operational memory; visual and sound orientation; kinesthetic and tactile sensitivity; communication and organizational skills; coordination of movements; arm muscle strength; visual-figurative practical thinking; low anxiety; general physical hardening; RAM; visual and hearing acuity; spatial orientation; developed hand-eye coordination; developed memory for movements; distribution and switching of attention; risk appetite; coordination of movements of arms and legs; stress resistance; creative imagination; precision of movements; perseverance; stability of attention; physical strength and endurance; well-developed sense of intuition; determination; honesty; emotional-volitional stability; empathy
Desirable Character Traits
politeness; attentiveness; excerpt; goodwill; interest in sports, profession; correctness; observation; persistence; resourcefulness; courtesy; insight; self-control; restraint; courage; tact; patience; confidence; ability to withstand heavy loads; energy; erudition
Career
Training of top level athletes. Combines his activities with teaching at higher educational institutions and scientific work
Requirements of the profession for a person
Must have pronounced cognitive activity, observation (a fairly large amount of attention), stability of attention, high performance, low fatigue of the relevant sensory organs, show a firm position, adherence to principles in conclusions

and increased performance in competitive activities.

Focusing on the professional competencies listed above, in conjunction with the professional standard «Trainer-teacher» [2], the structure of the «trainer-teacher» model was developed, complementing the teacher's professional profile.

Conclusions. Thus, the basis for staffing the integration of educational, scientific and sports activities at a physical education university in the implementation of the main professional educational program «Sport» is the multifunctionality of pedagogical activity, which, in accordance with the professional standard, involves the integration of professional functions of a trainer-teacher (teacher-trainer) in sports reserve training system. In this regard, the «coach-teacher» model is a condition for the implementation of integration processes in the system of professional training of a sports teacher.

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Effectiveness of integrating sports training of students into the educational process of physical education university

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Abstract

Objective of the study was to to evaluate the effectiveness of the conditions for integrating sports training of students at physical education universities into the process of implementing the basis of a professional educational program in the direction of «Sport».

Methods and structure of the study. Based on a generalization of monitoring data on the effectiveness of competitive and educational activities of students at the sports training center of NSU named after. P.F. Lesgafta, St. Petersburg in 2023, an assessment was made of the effectiveness of combining activities and the possibility of achieving high performance in solving pedagogical problems of a professional orientation.

Results and conclusions. It has been established that increasing the effectiveness of professional training of sports teachers is achieved through the combination of activities that involve the development of both general and specific competencies of the future professional pedagogical activity of a sports teacher. Using the example of training female student athletes in rhythmic gymnastics, it was proven that the complementarity of functions performed by students when solving problems of educational, scientific and sports activities allows them to achieve high results in sports without reducing the quality of mastering the professional training program.

Keywords: *physical education universities, students, competencies, sports training, performance.*

Introduction. Training a competent specialist is a process of professional development of the student's personality, due to the high level of professionalism and skill of scientific and pedagogical personnel, innovative technologies in education, the students own educational activity, his ability to self-organize and competitiveness [1]. Based on the above, the main advantages of the development of vocational education, including in the field of physical culture and sports, within the framework of integration processes are seen in its connection with the labor market [2]. It is through the connection of training with practical testing of acquired knowledge in sports activities that the required level of professional competence of the graduate is achieved. The possibility of implementing this approach in the process of fulfilling the state assignment for sports training of students in 2023 made it possible to evaluate the effectiveness of the model for integrating educational and sports activities in physical education universities [3].

Objective of the study was to to evaluate the effectiveness of the conditions for integrating sports training of students at physical education universities into the process of implementing the basis of a professional educational program in the direction of **«Sport».**

Methods and structure of the study. Based on a generalization of monitoring data on the effectiveness of competitive and educational activities of students at the sports training center of NSU named after. P.F. Lesgafta, St. Petersburg in 2023, an assessment was made of the effectiveness of combining activities and the possibility of achieving high performance in solv-

ing pedagogical problems of a professional orientation.

Results of the study and discussion. An analysis of the regional affiliation and qualifications of students at Sports Training Centers (STC) specializing in rhythmic gymnastics showed that the athletes represent 18 regions of the Russian Federation and are Masters of Sports of Russia. That is, they passed the appropriate sports selection upon entering the university.

At the time of enrollment in the University CSP, rhythmic gymnastics athletes were studying in the second year of a bachelors degree in the main professional educational program 49.03.04 Sports, profile «Coaching and teaching activities in a chosen sport (rhythmic gymnastics)».

The success of the chosen approach to integrating sports training into the educational activities of NSU. P.F. Lesgafta, St. Petersburg and the possibility of implementing integration processes of educational, scientific and sports activities were confirmed by the results of training and performance of student-athletes at competitions at various levels. Thus, an analysis of the results of the intermediate certification of students enrolled in sports training programs showed that 80% of students successfully combine studies in basic educational programs with preparation and performances in competitions in their chosen sport. 66,7% of students are «excellent students» and have the highest grades on the interim certification.

One of the main conditions for success, given the complexity of combining educational programs, is the creation of individual educational routes for student-athletes in the conditions of obtaining higher education at the Faculty of Individual Educational Sports Technologies, that is, with the provision of an individual training schedule. The sports activities of students consisted primarily of educational and training events and competitions. Students of the sport «rhythmic gymnastics» as part of different sports groups per-

Table 1. Results of the performances of members of the national teams of NSU named after. P.F. Lesgafta, St. Petersburg in the sport «rhythmic gymnastics», studying at the Center for Training in 2023 (n = 21)

Name of the event, date	Preparation stage, group	Program type	place
St. Petersburg Championship, February 09-11, 2023	VSM – 1 (1)	Group exercise	5, 7
	VSM – 1(2)		8, 12
	VSM – 1(1)	Individual all-around	37
Regional competitions in group exercises, in memory of Yu.N. Shinkareva, April 28, 2023, St. Petersburg	VSM –1(2)	Group exercise	3
Cup of Clubs of St. Petersburg, 05.24-26.2023	VSM – 1(1) + SSM – 1	Group exercise	1
«Constellation Hopes» dedicated to Children's Day, St. Petersburg, 02-04.06.2023	SSM – 1	Couple	1
Interregional competitions in rhythmic gymnastics «XXIV Tournament in memory of the Blessed Prince Alexander Nevsky», 10-12.03. 2023, Pskov,	VSM – 1 (1) + VSM – 1(2)	Group exercise	1
Pearl of St. Petersburg April 14-16, 2023	VSM – 1(1)	Group exercise	2, 3, 5
«Constellation of Talents» in rhythmic gymnastics, Suzdal.	VSM – 1(2)	Group exercise	1
	SSM – 1		6
«The Future of Russia», Ulyanovsk, Ulyanovsk region, June 07-12, 2023	SSM – 1		9
Russian Rhythmic Gymnastics Championship (group exercise), 02/23-03/05/2023, Moscow	VSM – 1(1)	Group exercise	15
International competitions in gymnastic sports "Legends Challenge Games-2023", 03/28-04/02/2023 Ekaterinburg	VSM – 1(1)	Group exercise	8,8
International competitions in rhythmic gymnastics «Cup of the Strongest, 1st stage», 04-10.05.2023	VSM – 1(1)	Group exercise	6
International competitions in rhythmic gymnastics «Cup of the Strongest, 3rd stage», 08/14-22/2023	VSM – 1(1)	Group exercise	6
International University Sports Festival, 08/25-08/31/2023, Ekaterinburg	VSM – 1(1)	Group exercise	3,3,3
International University Sports Festival, 08/25-08/31/2023, Ekaterinburg	VSM – 1(1)	Group exercise	1,1,3

formed at four city competitions, five visiting competitions at the All-Russian level, as well as at the main competition of the country - the Russian Championship in rhythmic gymnastics. In addition, gymnasts participated in international competitions: «Legends Challenge Games, 2023»; «Cup of the strongest, first and third stages»; International University Sports Festival (hereinafter referred to as MFUS) in Yekaterinburg, organized instead of the previously canceled World Summer Universiade.

An analysis of the sports results shown by gymnasts in 2023 showed that they are progressive in nature and are improving every quarter (Table 1).

So, if at the championship of St. Petersburg in February, team No. 1 of group exercises of rhythmic gymnastics took 5th and 7th place out of 26 teams from various regions of Russia, then three months later (in May) at the 1st stage of the International competitions in rhythmic gymnastics «Cup» The Strongest», the students took 6th place, three months later (in August) two participating teams in the International University Sports Festival became prize-winners, taking 1st and 3rd places. Providing individual training plans for basic professional educational programs when enrolling student-athletes in the TsSP allows you to successfully combine study and sports, without loss of quality in both types of activities in the short term.

Student-athletes representing 36 countries that are part of BRICS, SCO and the CIS took part in the International University Sports Festival. The total number of participants was 2202 student-athletes from 270 universities (135 foreign and 135 universities from 59 constituent entities of the Russian Federation). During the competition, 197 sets of medals were played in 14 sports. NSU team P.F. Lesgafta, St. Petersburg, was represented at the IFUS in the amount of 71 athletes in nine sports.

Based on the results of their performance at the competition, students representing NSU named after. P.F. Lesgafta, St. Petersburg, took first place among all educational organizations of the SCO, BRICS and the CIS, having won 72 awards of various denominations, significantly ahead of their closest competitors from the RUS "GTSOLIFK", which received a total of 44 medals. Third place went to PGUFKSiT with 40 awards. It is noteworthy that the nearest university representing a foreign country, the University of Physical Culture and Sports Sciences (Cuba), took only 9th place, winning only 13 medals of various denominations (Table 2, see figure).

The analysis of the effectiveness of the implementation of an innovative project to create a sports training center at the university allows us to state that in universities with a physical education orientation, the integration of educational, scientific and sports activities provides every opportunity for students to continue their sports career.

Unofficial medal ranking of educational organizations that took part in the International University Sports Festival (first 10 places)

The results of the unofficial medal count of performances at the IFUS testified to the advantage of teams from physical education universities subordinate to the Russian Ministry of Sports among educational organizations of the BRICS, SCO and CIS countries, which is associated, first of all, with targeted work on the integration of sports work in their activities. At the same time, NSU showed the greatest success. P.F. Lesgaft, significantly ahead of its competitors.

Table 2. Results of the unofficial medal count among universities of the SCO, BRICS and CIS countries that took part in the International University Sports Festival

Place	University	Gold	Silver	Bronze	Total
1	NSU named after. P.F. Lesgafta, St. Petersburg	24	22	26	72
2	The Russian University of Sport «GTSOLIFK», Moscow	11	13	20	44
3	Volga Region State University of Physical Culture, Sports and Tourism, Kazan	10	7	23	40
4	Ural State Mining University	8	8	2	18
5	Kuban State University of Education, Sport and Tourism, Krasnodar	7	4	2	13
6	The Ural State University of Physical Culture, Russia	6	4	11	21
7	Russian State Vocational Pedagogical University	6	4	1	11
8	Moscow State Academy of Physical Education, Russia	6	2	7	15
9	University of Physical Education and Sports Sciences, Cuba	5	3	5	13
10	Ural Federal University	4	9	4	17

Conclusions. Thus, the performance of student athletes representing NSU named after. P.F. Lesgafta, St. Petersburg, at the International University Sports Festival, proves the high efficiency of the work being carried out to integrate sports work into the activities of an educational organization. At the same time, the key factors for ensuring the success of self-realization both as a student and as an athlete are training in the basic educational programs of higher education, which form the competencies of the future coach-teacher in the chosen sport and the opportunity to master the OPOP with the provision of an individual training schedule for CSP athletes.

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Volunteering and mentoring as prosocial strategies for professional training of a future physical education teacher

UDC 378.1

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Abstract

Objective of the study was to identifying the experience and prospects for including prosocial strategies of volunteering and mentoring in the professional training of future physical education teachers.

Methods and structure of the study. The online survey method «Prosocial strategies in teacher training» was used (E.I. Eroshenkova, D.I. Mikhaylova). The sample consisted of 67 students of 1-4 years of study at the Faculty of Physical Education of Belgorod State National Research University.

Results and conclusions. Multidirectional university experience in volunteering and mentoring at the faculty was identified. A number of prospects and recommendations for the implementation of prosocial strategies in the professional training of future physical education teachers have been identified: 1) inclusion of students in volunteer practice; 2) providing students with a variety of volunteering experiences; 3) support for traditional and alternative mentoring at the university; 4) expanding the boundaries of pedagogical mentoring and correlating it with the needs of the individual, family, state and society.

Keywords: *prosocial behavior, prosocial strategies, volunteering, mentoring, future teacher, physical education.*

Introduction. The ongoing changes in the world order and the determination of value priorities in various areas of the development of society, science and production coincided with the period declared in the Russian Federation, the year of the teacher and mentor (2023). In our opinion, this is due not only to the need to increase the prestige of the teaching profession, but also to an awareness of the role of teachers and mentors in long-term goal setting, education, development and formation of professionals, responsible citizens and patriots of the Motherland. In this regard, there is a rethinking of the teacher's mission as an ambassador of Russian traditional national spiritual and moral values and as a specialist in subject areas, in particular in the field of physical culture and sports. It is physical education teachers who have special potential in nurturing a culture of health in modern students, in shaping their value attitude towards a healthy lifestyle, readiness for physical activity of various types for the benefit of the individual, family, society and the state.

A long-term vision of the results of a teacher's work determines the need to clarify goals, revise the content, forms and methods of professional training of future physical education teachers. One of the tools in solving these problems is to involve students in various types of volunteer practices through mentoring and other prosocial strategies (voluntary, aimed at the benefit and benefit of society) [2].

Objective of the study was to identifying the experience and prospects for including prosocial strategies of volunteering and mentoring in the professional training of future physical education teachers.

Methods and structure of the study. The theoretical basis of the study was the work of scientists in the field of organizing prosocial pedagogical education [1], volunteering practices [3] and mentoring [4]. Reliance on the methodology of the prosocial ap-

proach [1] in the analysis of the identified works made it possible to identify key aspects that formed the basis for conducting an online survey.

The questionnaire "Prosocial strategies in teacher training" (E.I. Eroshenkova, D.I. Mikhailova) included two sets of questions to identify: 1) experience of including students in various types of prosocial volunteer activities; 2) facts of mentoring in relation to students in their professional development by other subjects of the university. The study, which was conducted in April-May 2023, involved 463 students from six faculties of the Pedagogical Institute of the Belgorod State National Research University (BelSU). The sample for the purposes of the article consisted of 67 students (41 boys and 26 girls) of the 1st-4th years of study at the Faculty of Physical Education of the National Research University «BelSU». Data analysis was carried out using Microsoft Excell.

Results of the study and discussion. As a result of conducting an online survey on the above sample, results were obtained for two blocks of questions. Within the 1st block, the question «Did you have to participate in any helping or volunteer activities during your studies at the university?» Results were obtained indicating that 95.5% of respondents acquired similar experience at the university. Moreover, when analyzing the answers to the question about the consistency and frequency of participation in this kind of prosocial practices, incl. on helping other people, practices of patronage, tutoring, volunteering, volunteering, etc., it was found that only 6,58% of students «participate often, on an ongoing basis»; «participate to a sufficient extent» – 25%; «sometimes» – 41,6%. The remaining students – 23,68% – either «rarely participate» in volunteering or «almost never». In terms of the direction and content of volunteer activities, future physical education teachers are involved more often and have relevant experience in such areas of volunteering as: sports – 33,13%; social – 21,88%; pedagogical – 16,25%; patriotic – 13,75%; environmental – 5%; event-based – 9,38%; corporate – 0,61%.

Unfortunately, the university practically does not involve future physical education teachers (according to the respondents answers) in cultural, inclusive volunteering. In addition, as the results of the study showed, respondents do not have volunteering experience in the field of supporting public safety, media and animal volunteering. No one chose the «other» option with the possibility of specifying the direction of volunteering.

Despite the small gaps identified based on the data obtained, we believe that future physical education teachers receive a fairly diverse pedagogical, prosocial, and strategically significant experience.

In order to determine the prospects in the designated context, let us turn to the idea of O.A. Polyushkevich that «volunteering and volunteerism at the moment is a socially approved strategy of behavior, serving as a kind of resource, social capital for subsequent social, personal, professional development» [3, 50 p.]. Such a resource is important in the professional development of future teachers and is considered by us as one of the effective long-term prosocial strategies.

The indicated strategy, as the study showed, correlates with interaction with «significant others» and is reinforced when implementing various types of mentoring at a university. Analysis of respondents answers to the second block of the questionnaire made it possible to identify the main subjects of mentoring activities carried out in relation to future physical education teachers. In accordance with the respondents answers, these include (in order of importance): student group supervisor – 26,67%; classmates – 23,08%; subject teacher/trainer – 14,36%; dean – 10,77%; scientific supervisor – 9,23; head of the graduating department – 8,21%; Deputy Dean – 6,15%; psychologist – 1,54%.

Note that the distribution of results obtained on this issue at other faculties has significant differences. For the Faculty of Physical Education, the leading answer options relative to other faculties were the supervisor of a student group (in one of the faculties the values were closer, but lower); head of the department (values are 2-2,5 times higher than other faculties); dean (at three more faculties the values were close, but had a lower indicator).

Analysis of the data obtained, observation, understanding of the specifics of the Faculty of Physical Culture of the National Research University «BelSU», its traditions, pro-social strategies led us to the conclusion about the importance of the mentors personality, his personal experience and example (traditional mentoring); as well as the role of alternative mentoring with the possibility of interaction «with a change of roles», «without hierarchy», «without strict boundaries» [4, 141 p.] on involving students in professionally significant, volunteer and other types of socially useful, socially approved activities. We believe that such experience should be

considered as one of the necessary practices and prospects in the preparation of a future physical education teacher.

Continuing the study to identify the mentoring functions of the designated subjects, their focus was determined: educational – 33,33%; educational – 22,67%; sociocultural – 18%; professionally oriented – 11,33%; research – 8%; design – 5,33%; the other – 1,33%. The «other» option suggested versions – health-oriented, moral-volitional. Analysis of the answers, their interpretation in the context of building prospects in the training of professional students, allows us to draw a conclusion, which is confirmed in the study of D.A. Stepanova: «mentoring is a complex process of interaction between two or more subjects, without clear boundaries, associated with professional and personal development» [4, 139 p.].

Studying the specifics and content of mentoring in professional development, the majority of students (95,5%) noted that they associate mentoring with pedagogical assistance and support. To a greater extent, students need emotional (29,85%) and organizational (20,9%) support; mentors provide more informational (23,88%) and intellectual (22,39%) support. Based on the data obtained, it is advisable to correlate mentoring practices with the needs of the individual, family, state and society.

Conclusions. Thus, the identification of multidirectional experiences of volunteering and mentoring using the example of one of the faculties of a regional university made it possible to identify a number of prospects and recommendations for including the indicated strategies in the professional training of future physical education teachers:

1) inclusion of all students in volunteer practice;

2) developing students diverse experience of volunteering as a socially approved strategy of behavior and a resource for social, personal, and professional development;

3) support for traditional and alternative mentoring practices;

4) expanding the boundaries of pedagogical mentoring and correlating them with the needs of the individual, family, state and society.

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Increasing the level of methodological training of physical education university students in a student fitness club

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Abstract

Objective of the study was to substantiate the possibilities of organizing a student fitness club during extracurricular hours in a university environment and the conditions for undergoing industrial teaching practice, developing professional competencies, increasing methodological preparedness, and developing the pedagogical skills of students.

Methods and structure of the study. To achieve the goal, theoretical methods (analysis of scientific and methodological literature, programs, design) and empirical methods (questionnaires, expert assessment, self-assessment) were used. The study took place on the basis of the Institute of Physical Culture and Sports of the Russian State Pedagogical University named after. A. I. Herzen (IFKiS). It was attended by 1,358 1st-4th year undergraduate and 1st-2nd year master's students of full-time and part-time studies in various areas of training, 350 specialists and students of advanced training courses in physical education and fitness.

Results and conclusions. Analysis of studies by many authors (N.V. Kazakevich, 1999; T.S. Lisitskaya, L.V. Sidneva, 2002; V.A. Rostova, M.O. Stupkina, 2003; Yu.V. Streletskaya, 2007, etc.) made it possible to identify a number of main difficulties that students and specialists have encountered since the late 1990s in conducting classes in various areas of aerobics and fitness. According to many authors, the most typical difficulties of physical education teachers and students include: selection of exercises to compose them into combinations, complexes and musical accompaniment for them; methods of teaching new exercises; pedagogical control over the well-being of students and an individual approach. Aerobics experts note that the most significant group of difficulties includes a lack of practical experience, the ability to improvise (lack of motor reserve), and regulate physical activity. Other authors identify a group of problems associated with the level of musical and rhythmic training of specialists, their ability to select music in accordance with the objectives of the lesson, and insufficient knowledge of verbal and non-verbal forms of communication (voice, gestures and facial expressions). The effectiveness of the participation of students and undergraduates in the activities of the SFC will be determined by increasing the level of their theoretical knowledge, methodological training, practical skills, and the formation of their professional competencies.

Keywords: *students, fitness club, self-government, methodological training, teaching practice, professional competencies, additional specialty.*

Introduction. The problem of improving the educational process in domestic universities is the main one for the entire system of Russian physical education. At the same time, it is obvious that its solution determines the updating of the content of the educational process with the priority use of innovative teaching methods, which requires, to a significant extent, the formation and maintenance of the functioning of the appropriate innovation infrastructure.

In this regard, there is a need to train a specialist teacher of a new type, possessing the necessary competencies, high culture and degree of readiness for professional creativity, capable of effectively realizing their internal potential, competitive in the labor market conditions, due to significant changes taking place in modern society [1, 5]. Thus, in particular, there is a constant reversal in the demand for specialties in the labor market, replacing old professions with new ones. At the same time, the high demand for modern wellness areas and the formation of a healthy lifestyle trend contributes to the development of the fitness industry in Russia, creates a certain social demand for

fitness specialists, which actualizes new directions in training and retraining in universities in this area [2].

At the Pedagogical University of the Russian State Pedagogical University named after. A.I. Herzen Institute of Physical Culture and Sports (IFKiS) has been training fitness specialists for more than 15 years. Fitness as an academic discipline is included in all areas of training for bachelors and masters implemented at IFKiS. The profiles «Fitness Management in Physical Education» and «Fitness Technologies in Physical Education» (direction of masters programs «44.04.01 - Pedagogical Education») deserve special attention. Fitness is studied in the form of various curriculum disciplines and elective courses.

In order to successfully conduct fitness classes, it is necessary not only to know its content and theory well, but also to constantly study related sciences: anatomy, kinesiology, physiology, psychology, management, etc., as well as to be able to competently master teaching methods and organizational methods , conducting classes; be able to apply an individual and differentiated approach to students, know methods of load regulation, test indicators of the development of motor abilities, physical fitness and health status of students, i.e. have theoretical knowledge, practical skills and, what is very important, be methodologically prepared [4, 5].

In this regard, for the training of specialists, it is important to know what difficulties students face in the process of conducting fitness classes, in particular, in teaching practice in educational institutions. All this will allow us to simulate various pedagogical situations and focus on ways to overcome the main difficulties.

In 2024, a survey was conducted among 1st-2nd year masters students and 4th-year undergraduate students (135 people) on their self-assessment of theoretical, practical and methodological training in the academic disciplines of fitness. You had to evaluate your preparedness on a scale from 1 to 5 points.

As a result of the study, the highest score was obtained for self-assessment of theoretical knowledge (4,4b.). Practical (motor) training was rated by respondents at 3,9 points. The analysis of the curricula revealed that the number of hours allocated to practical fitness classes is not enough, especially for master's degree students. The fitness industry is actively developing, new technologies and fitness programs appear every year, which there is not enough time to get acquainted with in the educational process. Apparently, this is why students note that they do not feel entirely confident during practical classes. The lowest score (3,2) was obtained for methodological training (ability to teach, conduct, organize, etc.). Methodological training is the process of mastering special knowledge and skills through the targeted inclusion of future teachers in methodological practical activities; its insufficiency is critical for the professional activity of a fitness specialist.

In this regard, there is a need to improve professional skills and methodological training of students and undergraduates in this aspect.

Objective of the study was to justify the possibilities of organizing a student fitness club during extracurricular hours in a university setting and the conditions for undergoing industrial teaching practice, developing professional competencies, increasing methodological preparedness, and developing students pedagogical skills.

Table 1. Difficulties that arise when conducting classes in various areas of aerobics and fitness

List of difficulties	
Pedagogical control	Well-being, regulation of physical activity, general and motor density, testing
Exercise technique	Competent demonstration, culture of movements, mastery of voice, gestures, artistry, emotional positive background of classes, coordination of music and movement, mastery of movement techniques, ability to lead oneself, motor reserve, improvisation
Methodology for composing exercises	Composition of exercises according to the objectives and parts of the lesson, musical accompaniment, the ability to combine exercises into bundles, blocks, compositions, selection of exercises in accordance with the age of those involved, physical fitness, and health status
Teaching Methodology	Selection of introductory and preparatory exercises, identification and correction of errors, the ability to organize sets of exercises into parts, blocks, ligaments, teach from simple to complex in accordance with methodological principles
Methodology for organizing classes	Rational distribution of time for solving assigned tasks, managing students, observing safety precautions, rational use of organizational methods and methods of conducting exercises, preparing for classes, etc.
Individual approach	The ability to find contact with each student and take into account his psychophysical and health status

Methods and structure of the study. To achieve the goal, theoretical methods (analysis of scientific and methodological literature, programs, design) and empirical methods (questionnaires, expert assessment, self-assessment) were used. The study took place on the basis of the Institute of Physical Culture and Sports of the Russian State Pedagogical University named after. A. I. Herzen (IFKiS). It was attended by 1,358 1-4 year undergraduate and 1-2 year master's students studying full-time and part-time in various areas of training, 350 specialists and students of advanced training courses in physical education and fitness.

Results of the study and discussion. Analysis of studies by many authors (N.V. Kazakevich, 1999; T.S. Lisitskaya, L.V. Sidneva, 2002; V.A. Rostova, M.O. Stupkina, 2003; Yu.V. Streletskaya, 2007, etc.) made it possible to identify a number of main difficulties that students and specialists have encountered since the late 1990s in conducting classes in various areas of aerobics and fitness [3]. According to many authors, the most typical difficulties of physical education teachers and students include: selection of exercises to compose them into combinations, complexes and musical accompaniment for them; methods of teaching new exercises; pedagogical control over the well-being of students and an individual approach. Aerobics experts note that the most significant group of difficulties includes a lack of practical experience, the ability to improvise (lack of motor reserve), and regulate physical activity. Other authors identify a group of problems associated with the level of musical and rhythmic training of specialists, their ability to select music in accordance with the objectives of the lesson, and insufficient knowledge of verbal and non-verbal forms of communication (voice, gestures and facial expressions).

During 2009-2016 A survey was conducted of teachers, teachers, students, fitness instructors and students of advanced training courses, and on children's fitness. A total of 350 people were interviewed [3]. As a result of the survey and analysis of dissertation research, a list of difficulties was compiled and ranked by respondents (Table 1).

In 2024, a similar survey was conducted among 3rd and 4th year master's and bachelor's students at the Faculty of Physical Education and Science for a comparative analysis of the difficulties encountered in the process of teaching practice in various areas of aerobics and fitness, as well as specialists with different work experience (Figure 1).

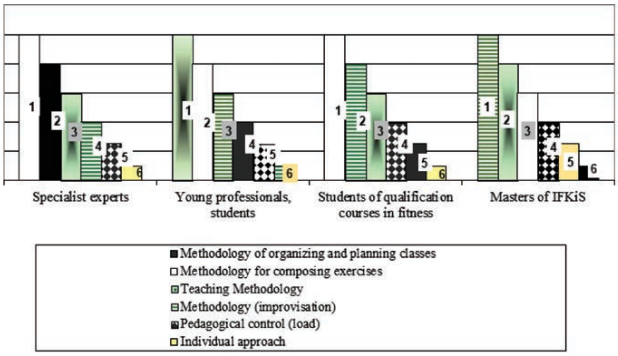

Figure 1. Ranking of difficulties in the professional activities of specialists and students in fitness and health-improving physical culture

Based on the survey results, it follows that the greatest difficulties are caused by the methodology of compiling sets of exercises and the selection of musical accompaniment; difficulties were identified in the methods of conducting and teaching, but their ranking is unequal in different strata. The issue of difficulties with the methods of organizing classes became controversial. So, if experts put it in second place, then less experienced specialists, as well as students, undergraduates and students of courses on childrens fitness give it significantly less importance. Pedagogical control and individual approach also do not cause any particular difficulties for them, which, in our opinion, is due to a lack of teaching experience, which is indirectly confirmed by L.V. Sidneva [6], who established a high correlation between lack of experience between difficulties in implementing pedagogical control over a group and an individual approach ($r = 0.690$), with the problem of composing compositions ($r = 0,918$) and difficulty in selecting exercises and composing complexes ($r = 0,828$).

The results of a survey of experts and specialists made it possible to determine the main reasons for the listed difficulties. These include: lack of opportunity for timely acquisition of fitness knowledge and familiarization with modern fitness technologies; lack of knowledge on fitness theory and lack of modern practical skills necessary for a fitness specialist, lack of educational and methodological literature on fitness (especially for children). Young professionals and students cited the lack of practical experience and methodological training as the main reasons.

The identification of difficulties made it possible to develop and further adjust professional training programs for fitness specialists, as well as to develop a project for a student fitness club (SFK) based on self-government for additional practical fitness classes during extracurricular hours and the formation of professional competencies of IFKiS students in the context of teaching practice.

In this regard, a questionnaire of 24 questions was developed and an online survey was conducted among students of the A.I. University. Herzen (1358 respondents), in order to determine their attitude towards the creation of a fitness club at IFKiS, as well as to identify the possibility of their participation in various club events, which would make it possible to draw up a plan for its work, organize teaching practice and work to attract students from other faculties of the university to classes fitness. The main results of the survey are presented in table 2.

To the question: «For what purpose would you like to take part in the work of a fitness club?» 53,8% of respondents answered that they wanted to get acquainted with new programs, 41,3% of respondents indicated a desire to consolidate acquired knowledge in practice, replenish their motor reserve, and overcome uncertainty in conducting classes. Based on the responses received from the students, it was decided to create a fitness club. The structure of the SFC is shown in Figure 2. The club has two main areas of work: 1 «Practical classes» and 2 – «Advanced training courses».

The first direction consists of two blocks: block 1 is teaching practice for bachelors and masters of IFKiS, which includes conducting various training sessions on fitness, performing methodological tasks and much more; block 2 is «Physical and recreational

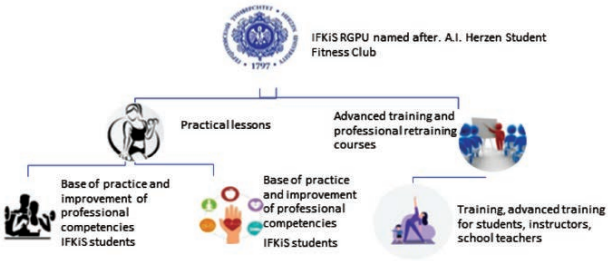

Figure 2. Structure of the student fitness club

work with students of the Russian State Pedagogical University named after. A.I. Herzen», this block unites those who want to engage in fitness and take part in various events of the fitness club, regardless of their training area.

The second direction is headed by IFKiS teachers. They conduct classes with senior and undergraduate students, physical education and fitness specialists as part of advanced training courses. Training is provided in various areas of fitness. Courses have different durations, including short-term ones (from 20 hours). After completing the training, depending on the level of education, students can receive documents of various types (certificate, ID). To improve the methodological training of students and undergraduates, 3 programs have been developed.

The active staff of the student fitness club consists of a chairman, three deputy chairmen responsible for different blocks and areas of work, as well as curators - IFKiS teachers. The work plan of the SFK includes the work of all directions and blocks, which includes a wide range of both methodological and organizational activities. These include: conducting classes in various areas of fitness, master classes, contests, competitions, developing and maintaining pages on social networks VK, etc., developing a website, video programs, organizing advertising events, working with

Table 2. Attitude of IFKiS students to the organization of a fitness club

Criterion indicators	Students of other faculties	IFKiS	
		Bachelors	Masters students
The number of students supporting the opening of a fitness club	**93,4 %**	**94%**	**93,7%**
The number of students who want to become a member of his fitness club	**69,5 %**	70,9%	66,7%
The number of students are ready to acquire additional knowledge (on methods of conducting fitness classes, etc.)	**58%**	**75,6%**	**6 9,8%**
The number of students who would like to take a course in a mixed format and receive a certificate	**67%**	**63,9%**	**48,1%**
Number of students who want to be fitness instructors	**27%**	**72,5**	**57,1**

regulatory documents for the implementation of the club's activities and etc.

C**onclusions.** The effectiveness of the participation of students and undergraduates in the activities of the SFC will be determined by increasing the level of their theoretical knowledge, methodological training, practical skills, and the formation of their professional competencies. The advantages of student participation in the club are also: developing the skill of self-organization, gaining additional knowledge, obtaining documents on advanced training, gaining practical experience in conducting fitness classes, creating a group of like-minded people, gaining management experience, the opportunity to demonstrate their leadership qualities, etc.

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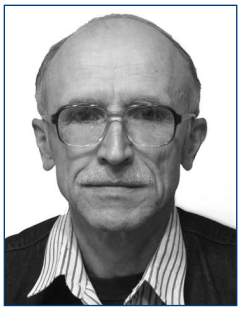
Criteria for the correctness of familiar terms

UDC 7967012.68



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Abstract

Objective of the study was to substantiate the criteria for the correctness of familiar terms in the field of physical culture and sports.

Methods and structure of the study. As a result of the analysis of popular names of directions, comparing them with direction indicators for movements in choreography, criteria for determining the directions of circles and circular movements used for more than one cycle of such movements were identified.

Results and conclusions. Since 1938, domestic gymnastic terminology, in the course of its development, has acquired a clear structure, principles and rules. The practice of using terms shows that the problem of application is not only that popular figurative expressions are used instead of system terms. In the specialized literature on terminology, there are currently no clear rules for determining the direction of circular movements. The rules given in gymnastics textbooks for indicating the directions of arcuate movements are not always applicable to circles and circular movements. The popular names of the directions of these movements, which are accepted by the majority of teachers, coaches and lovers of physical education, do not have criteria for their justification.

The authors proposed criteria for determining the directions of circular movements, as well as a new principle for determining circular movements and circles by body parts.

Keywords: *system terms, principles of terminology, circles, circular movements, the top and front point of the trajectory.*

Introduction. Many years of work on training future physical education teachers have shown that, as school students, they learn the usual figurative names for certain movements and positions, sometimes grossly erroneous. For example, you will often hear the forward hand position referred to as hands in front of you, which means a completely different hand position.

For directions of circles and circular movements, it is popular to indicate directions of movements that do not comply with the rules of gymnastics terminology. But from the point of view of habitual perception, they are often more adequate than the directions designated according to the rules applicable to arcuate movements, despite the fact that separate rules have not yet been developed for the directions of circles and circular movements.

This practice of using familiar terms requires, on the one hand, to pay attention to the correction of the most popular errors in the use of terms, and on the other hand, to develop criteria for justifying or rejecting the usual terms of directions of circles and circular movements.

Objective of the study was to substantiate the criteria for the correctness of familiar terms in the field of physical culture and sports.

Methods and structure of the study. The practice of training future physical education teachers in gymnastic terminology has made it possible to identify the most popular errors that appear from year to year with each new course of students recruited [7]. During the educational process, teachers pay special attention to the highlighted errors.

An analysis of the use of terms to indicate the directions of circles with arms, forearms, hands and circular movements with other parts of the body showed that these terms are popular with the vast majority of

students, and gymnastics teachers are guided by the rules prescribed for the directions of arcuate movements, which in mass perception are less consistent with the described actions .

As a result of the analysis of popular names of directions, comparing them with direction indicators for movements in choreography, criteria for determining the directions of circles and circular movements used for more than one cycle of such movements were identified. The lack of justification for the division into circles and circular movements also led to the conclusion about the introduction of such a criterion [10, pp. 67-72], which changes the list of circles and circular movements.

Results of the study and discussion. Conventional terms, despite their popularity, can be incorrect if they are figurative expressions. Even if they are not slang, but quite literary, they cannot be classified as systemic terms, i.e. created and applied according to the rules of gymnastic terminology. The most striking and popular examples of figurative names: plank, power-up, feet shoulder-width apart.

Plank is a typical figurative name for a family of lying supports. It should be realized that this is not a gymnastic term. Power-up is a popular name for a power move from a hang to an emphasis position, and according to gymnastics terminology, is referred to as a power-up. The term exit means an element of exercise on a horse with handles.

Legs wide is a popular expression that comes from morning and industrial gymnastics on the radio. The leading specialist of GTSOLIFK N.L. Gordeev, who conducted it, understood that the term «leg stand apart» could cause difficulties for students and instructors conducting exercises in the absence of a visual broadcast of the exercises. This expression has become so popular that it is widely used not only by physical educators, but also by teachers and physical education teachers in non-gymnastics departments [7].

A more complex case is the popular distortion of system terms, such as the names of the splits and sitting legs apart on parallel bars. The terms longitudinal and transverse define the position of the axis in question relative to the axis of the arms. Splits are usually called contrary to this rule. To eliminate this contradiction, you should not use these terms, but call the splits as straight (legs to the sides) and right/left split (along the leg in front) [1, 40 p.].

The term sitting legs apart usually denotes a position that is essentially a support while sitting legs apart (support with hands behind by default) [9, 91 p.], [1, pp. 37-38], [5, 271 p.] and others. Only G.B. Rabil [6, pp. 152-153] uses a term corresponding to the structure of the provision. However, the shorter term is no longer appropriate for recording the less difficult position often used in beginner exercises. The leading principle of terminology, which is brevity, allows us to deviate somewhat from precision while maintaining accessibility and a noticeable abbreviation of the term.

A real sit with the legs apart with a vertical position of the body, without supporting the hands on the poles, resembles a straight split, but not with the maximum, but with the usual spread of the legs. This gives grounds to designate this position by the term straight saddle, since the previously proposed term saddle up [4, pp. 82-84] contradicts the amendments of the Presidium of the USSR Gymnastics Federation of 1965, one of which states that the terms curtain and top have been abolished [3, 16 p.].

Circles with arms, forearms and hands are performed in various planes, and with legs in horizontal or close to it planes. For movements of other parts of the body, the term circular movements is used. Movements along a closed trajectory, however, are fundamentally different in another way - the movement of a link with a free end and the middle joint of two links. According to this criterion, it is proposed to also refer to movements of the head and torso, as well as the lower leg from the knee, as circles, while movements along the circular trajectory of the pelvis, as well as the knee and foot of the leg placed on the toe remain as circular movements [10, pp. 67-72].

The directions of circles and arcuate movements (more than 90º, but less than 360º in an arc) are determined by the direction of the initial withdrawal, and if in relation to A.T. Brykin [2, 30 p.] and [1, pp. 34-35] avoids this issue, then according to G.B. Rabil [6, 47 p.] a circle performed from a hand-down position with an initial forward movement is a circle with arms forward. Some authors do not indicate criteria for determining the directions of circles with hands at all [8,. 70 p]. But if you perform several such circles, you will see that this is the direction in which turns, circles and back flips are performed.

In practice, the principle of initial withdrawal is applied to single circles, but when performing more than one circle, their direction is determined by the direction of rotation by analogy with the direction of the rotational movement of the whole body [10, 71 p.]. The same questions arise when performing circles with the

forearms in the frontal plane from the position of the arm to the sides. Initially, the forearms can be brought up or down [8, 70 p.], but many people habitually call several circles performed in these directions, respectively, inward and outward.

You can see that the usually indicated directions of several circles with the hands or forearms correspond to the directions of the passage of the upper point of the trajectory of the closed movement. The directions of the slopes are determined exactly by the same principle, which makes it possible to define this direction criterion as invariant for slopes and circles.

In the third, horizontal plane, circles with legs/legs and circular movements with other parts of the body can be performed. In order not to use clockwise or counterclockwise directions in terminology, we will consider choreographic terms for performing leg movements in an arc. These movements begin from a position in which one leg is brought forward or backward on the toe, and according to gymnastic terminology, both movements begin with an outward arc.

French choreographic terms distinguish between front and back leg movements (rond de jambes) as rond en dehors and en dedans respectively. It can be seen that the outward movement is carried out from the front, and the inward movement also ends from the front. According to this criterion, i.e. Using the front point of a closed horizontal trajectory, it is advisable to determine the direction of circles with legs and circular movements. Circles with two legs counterclockwise are thus defined as circles to the left, and circles with clockwise legs are defined as circles to the right, which is also consistent with the usual view of the average observer.

Conclusions. It is necessary to achieve compliance of terms with the rules of gymnastic terminology, allowing in exceptional cases deviations from accuracy while maintaining accessibility and a noticeable abbreviation of the term. When determining the directions of multiple circles or circular movements, criteria must apply that are different from those for single circles and circular movements, as well as for arcuate movements. The directions of a number of circles in the frontal or lateral planes are determined by the initial movement from the top point, and in the horizontal plane - from the front point of the closed trajectory of movement.

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Assessment of the functional state of boxers by complex results of rhythmocardiographic analysis

UDC 612.172.2

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Abstract

Objective of the study was to identify the functional state of boxers using complex indicators calculated on the basis of HRV, with an assessment of the feasibility of their use for qualified athletes.

Methods and structure of the study. Qualified boxers aged 21-26 years (n=14) participated in the experiment a week before the competition, with a sports experience of 9 years. We used the «Varicard 2.52» complex for processing cardiointervalograms and analyzing heart rate variability.

Results and conclusions. According to the value of the tension index, two boxers revealed a predominance of centralization of heart rhythm control, psycho-emotional tension and a high degree of stress, while others showed optimal tension in regulatory systems. Based on the value of the indicator of activity of regulatory systems, one athlete's functional state was determined to be optimal, three boxers – a state of moderate tension of functional regulatory systems, two – a state of pronounced tension, and the rest – overstrain of regulatory systems. Assessment of the condition based on the location of the degree of tension of regulatory systems and functional reserves in the phase plane indicated that one boxer has a high probability of developing a premorbid state, while five athletes have a probability of transition to a prenosological state. Complex indicators calculated on the basis of HRV analysis data are sensitive in assessing the current state of an athlete, in dynamic control and allow predicting the development of pathological abnormalities even before the appearance of the first symptoms of the disease.

Keywords: *functional state, heart rate variability, complex indicators, boxing.*

Introduction. At the stage of improving sportsmanship, there is an urgent need for rapid assessment of the athlete's response to loads within the framework of training and competitive activities. A methodology and technology for studying and assessing the functional state of an athlete's body that has been in demand in recent decades is the analysis of heart rate variability (HRV). The mathematical model of the functional state of the body uses indicators of the degree of tension of regulatory systems and their functional reserve, which are calculated according to HRV analysis data [2]. The main methods of HRV analysis: statistical, variation pulsometry, autocorrelation and spectral analysis, provide up to 40 different parameters recommended by Russian and European-American standards. Each of the indicators allows one to study and evaluate the state of autonomic regulation of the physiological mechanisms of body functions [2]. Assessing each indicator and comparing it with the statistical average and functional optimum for a specific age, gender, occupational and regional group requires significant time.

Objective of the study was to identify the functional state of boxers using complex indicators calculated on the basis of HRV, with an assessment of the feasibility of their use for qualified athletes.

Methods and structure of the study. The experiment involved boxers in the welterweight and middle

weight categories of Master of Sports (n=4) and candidates for Master of Sports (n=10) 1-2 weeks before the competition, the age of those examined was 21-26 years, sports experience 9-13 years. We used the «Varicard 2.52» complex for processing cardiointervalograms and analyzing heart rate variability. Heart rhythm registration was carried out in compliance with the conditions necessary to obtain reliable primary materials. Processing, analysis and substantive study of research materials were carried out using statistical software packages «Statistics 6.0».

Results of the study and discussion. The tension index of regulatory systems characterizes the activity of sympathetic regulation mechanisms and the state of the central regulatory circuit [5]. During physical activity, activation of the central circuit of heart rhythm regulation and increased sympathetic activity is manifested by stabilization of the rhythm, a decrease in the spread of cardiointerval durations, and an increase in the number of intervals of the same type in duration (an increase in the amplitude of the mode) [2]. Fluctuations in the values of IN in the range of 80-150 c.u. are taken as the norm. in a state of relative muscle rest. Physical activity typical for sports activities can cause growth by 5-10 times.

There is evidence that against the background of stress, increased attention, in a state of readiness for strenuous activity, but still without load, the tension index can reach 200-300 units. The values of this indicator in the group of boxers are 122,14±58,02 c.u., in the group of welterweight boxers – 117,4±41,5 c.u., in the middle weight category boxers 124,8±67,9. The personal values of boxers have a wide range - figure 1.

It should be noted that differences in the values of the stress index are not related to weight category, age, or qualifications (correlation coefficient up to 0,121). We assume, based on anamnesis data, that the tension index increases as the battle approaches. In Figure 1 two boxers (gray bars) have a voltage index over 250 c.u., fights should take place in 4-6 days. For non-athletes the values are 50-150 c.u. are interpreted as optimal tension of regulatory systems, and values of 150-500 can signal physical stress, systematic lack of sleep, decreased reserve capacity, and the presence of chronic fatigue syndrome [4].

At the same time, there is information that values in the range from 150 to 299 indicate moderate tension in regulatory systems, and this accompanies a state of readiness to realize one's potential in competitions [1], values 300-599 c.u. indicate a pronounced tension in regulatory systems (a state of pronounced distress, excessive activity of stress-implementing systems) [5].

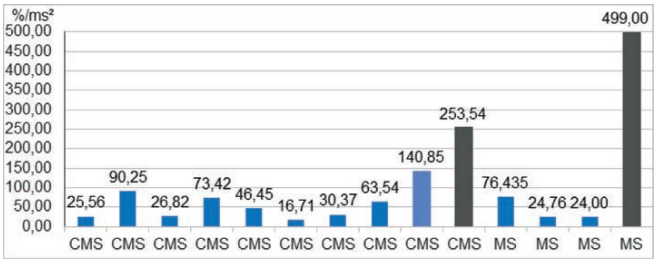

Figure 1. Tension index values in boxers (n=14)

One of the methods for diagnosing functional states (non-nosological diagnostics) is to calculate the indicator of activity of regulatory systems (PARS) [2]. This indicator is calculated in points using an algorithm that takes into account statistical indicators, histogram indicators and data from spectral analysis of cardiointervals. PARS allows you to differentiate different degrees of tension in regulatory systems and assess the adaptive capabilities of the body [3].

The calculation of PARS is based on a number of criteria. These are: the total effect of regulation in terms of heart rate; the total activity of regulatory mechanisms by standard deviation or by the total power of the spectrum; vegetative balance according to a set of indicators; the activity of the vasomotor center, which regulates vascular tone, according to the power of the spectrum of slow waves of the 1st order, and the activity of the cardiovascular subcortical nerve center or suprasegmental levels of regulation according to the power of the spectrum of slow waves of the 2nd order [2].

Correlation analysis of the relationship between the tension index and the indicator of activity of regulatory systems established a weak connection (correlation coefficient 0,417 at $p<0,05$, n=14). The result is expected, since the values of the stress index provide urgent information about the current state of the athlete based on statistical indicators of HRV, characterizing the degree of centralization in the control of heart rate, the calculation of PARS is carried out according to an algorithm that takes into account, in addition to the method of variational pulsometry, both the stress index, statistical, spectral methods of mathematical analysis and HRV histogram indicators. The optimal PARS value is from 1-2 points, which was stated in only one athlete; in three boxers, a state of moderate tension of functional regulatory systems was observed

(blue bars in Figure 2). The remaining athletes have a state of varying degrees of tension in the regulatory systems from pronounced (5 points) to overstrain (6 points and above).

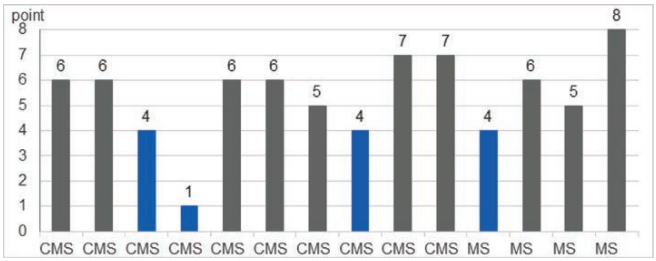

Figure 2. Values of the activity indicator of regulatory systems in boxers (n=14)

In recent years, in space medicine, a probabilistic approach has been proposed for assessing the functional state of a person and the level of adaptive risk based on HRV analysis data [7] with the calculation of integrative indicators of functional reserves and the degree of tension of regulatory systems. We used this approach to determine the likelihood of developing pathological abnormalities in boxers during the training period when the greatest total impact of various stress factors is noted.

The chosen approach makes it possible to establish the likelihood of the development of pre- and pathological conditions even before the appearance of the first symptoms of the disease [4]. On the phase plane (Figure 3), the classes of functional states are located so that the physiological optimum is characterized by positive values of functional reserves and negative values of the degree of tension of functional systems - this is the lower right rectangle.

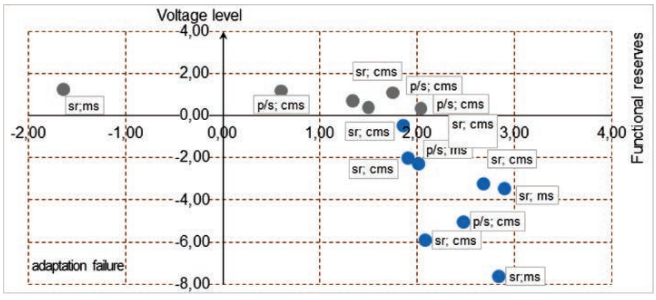

Figure 3. Distribution across the space of functional states formed based on HRV results for boxers (n=14). sr – average weight category; semi-middleweight; Candidate for Master of Sports; MS – master of sports

In Figure 3, in the upper right square there is a prenosological state of overfatigue, in the upper left - a state of overstrain, in the lower left - a pathological state (failure of adaptation). In the context of the paradigm of the likelihood of developing pathological abnormalities based on the results of HRV analysis using a mathematical model, we can assume that in one of the boxers the current functional state indicates a high probability of developing a premorbid state, and the condition of five more athletes is assessed as prenosological (in Figure 3 their data is highlighted gray). The data of other boxers are in the functional optimum segment with a fairly wide spread.

Выводы. Assessing the functional state of boxers using complex indicators calculated on the basis of heart rate variability analysis data allows us to ascertain the athlete's current state, use them in dynamic control and predict the development of pathological abnormalities even before the first symptoms of the disease appear.

According to the integral indicator, which reflects the degree of centralization of heart rate control, psycho-emotional stress and the degree of involvement of the body in stress, it is possible to track the dynamics of the athletes bodys reaction to specific physical loads and other impacts that accompany them.

The indicator of activity of regulatory systems (PARS) allows you to differentiate the degree of tension of these systems and assess the adaptive capabilities of the body, but provides only a discrete assessment of the functional state, which reduces its value in daily monitoring of the athletes condition.

Assessing the athletes condition by the location of the degree of tension of regulatory systems and functional reserves in the phase plane, forming the space of functional states, makes it possible not only to «award» the class of the functional state, but also the trends in the transition of functional states from optimum to pathology.

We believe that the use of the described complex indicators in sports practice will ensure individualization of the management of the training process.

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Organization of circadian rhythms of sex hormone secretion in female students with vegetative-vascular dystonia of the hypertensive type involved in fitball gymnastics

UDC 796.41

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Abstract

Objective of the study was to determine the effect of a course of additional fitball aerobics classes on the circadian rhythms of sex hormones in female students with vegetative-vascular dystonia of the hypertensive type.

Methods and structure of the study. The scientific work was carried out on the basis of the North Caucasus Federal University. Sex hormones in saliva were analyzed using a highly sensitive competitive immunological method. Collections were made at 8.00, 12.00, 16.00, and 20.00 at the beginning of the school year and at the end. Cosinor analysis was carried out using a computer and the Cosinor Ellips 2006 program installed on it. The study involved female students with hypertensive VSD (n=58), female students with hypertensive vegetative-vascular dystonia, and female students with hypertensive vegetative-vascular dystonia who practice fitball. -gymnastics (n=50), and practically healthy female students of the main group (n=50).

Results and conclusions. In female students with vegetative-vascular dystonia of the hypertensive type, engaged in fitball gymnastics, positive changes were revealed in stabilizing the circadian rhythm of estradiol concentration, rhythmostasis of testosterone concentration was still not detected.

Keywords: *vegetative-vascular dystonia of the hypertensive type, sex hormones, estradiol, testosterone, circadian rhythms, cosinor analysis.*

Introduction. Among students involved in physical education in a special medical department, there are still people diagnosed with vegetative-vascular dystonia (VSD), approximately half of which are of the hypertensive type.

In the modern scientific literature there is very little information about the circadian organization of rhythms in young people with vegetative-vascular dystonia. With persistent changes in students with VSD towards sympathicotonia, irreversible pathological changes may occur, in the form of a syndrome of vegetative-vascular-trophic disorders, which will lead to arterial hypertension, which in turn can cause a more unfavorable prognosis for the development of the disease. At the same time, some researchers classify VSD as a disease associated with disruption of the processes of regulation of the body's natural biological rhythms [2, 5], among which the circadian rhythms of the functioning of the body's leading adaptive systems are the most significant [1, 3, 8, 9].

The fact that disturbances in the temporal coordination of body functions are among the first evidence of the development of a pathological process makes studies of changes in biorhythms important in assessing the development of the pathological process, at the initial stage, pre-pathological conditions, diagnosing pre-diseases already present in the body in order to organize preventive measures, and also predicting pathological processes and disease outcome [1, 6, 7]. At the same time, in modern literature there is insufficient information about the influence of sex hormones as the leading link of the hypothalamic-pituitary-gonadal system (HPGS), which, in addition to its main function - the regulation of reproductive pro-

cesses - considers the importance of the HPGG in the body's resistance to environmental factors, which is certainly an important functional task (Milashechkina, Dzhandarova, 2020 ChSM). Based on the characteristics of the chronostructure of the secretion of sexual hormones, it will be possible to predict some complications in certain pathological changes in the body, which is completing its final formation.

Objective of the study was to determine the effect of a course of additional fitball aerobics classes on the circadian rhythms of sex hormones in female students with vegetative-vascular dystonia of the hypertensive type.

Methods and structure of the study. The study involved female students of the main department - control group (n=50), students of a special medical department with hypertensive vegetative-vascular dystonia (n=58), students with hypertensive vegetative-vascular dystonia, engaged in fitball gymnastics (n=50). The concentrations of estradiol and testosterone levels in human salivary plasma were determined using a highly sensitive competitive immunological method. Collections were made at 8.00, 12.00, 16.00, and 20.00 at the beginning of the school year and at the end. To analyze wave processes and process chronobiological data, we used cosinor analysis, proposed in 1965 by F. Halberg (Halberg F., 1965). Cosinor analysis was implemented using a computer and the Cosinor Ellips 2006 program installed on it (Koryagina Yu.V., Nopin S.V., 2006) (Registration Certificate No. 2006611345). The main parameters of the rhythm were studied: mesor (the value of the average level of the sinusoid), the amplitude of the sinusoid, acrophase (the time of the onset of the maximum function). The North Caucasus Federal University acted as the base for the research.

Results of the study and discussion. Cosinor analysis of the secretion of the female sex hormone estradiol at the beginning of the academic year showed that students with vegetative-vascular dystonia of the hypertensive type did not have a circadian rhythm (Figure 1). In the students of the control group, the average acrophase was recorded at 17,04 hours, the mesor was 36,08 pmol/l, the average amplitude was 5,24. At the same time, in female students with vegetative-vascular dystonia of the hypertensive type, the largest average amplitude of fluctuations in estradiol secretion was revealed and amounted to 15,19 pmol/l; an excess of estradiol levels in the evening hours was recorded by 1,8 times (77,61 pmol/l, $p<0,01$), compared to the control group (42,58 pmol/l).

Cosinor analysis showed that circadian rhythms of testosterone were not identified in female students with vegetative-vascular dystonia of the hypertensive type. The average acrophase of testosterone concentration in girls of the control group in the daily rhythm occurs at 9,01 hours, the average amplitude was 0,68 pmol/l, the mesor was 8,05 pmol/l (Figure 1).

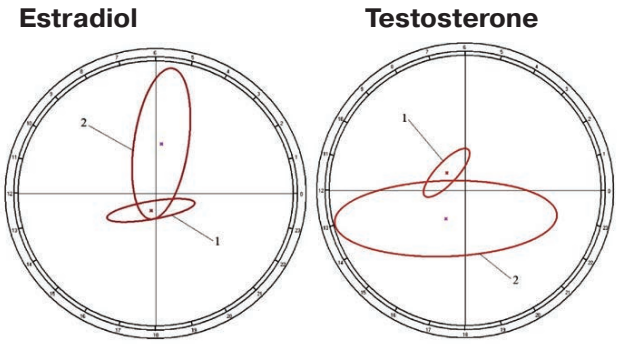

Figure 1. Cosinor analysis of the circadian rhythm of sex hormone secretion in female students with vegetative-vascular dystonia of the hypertensive type

Note: 1 – control group; 3 – VSD of the hypertensive type.

When repeating the cosinor analysis of estradiol secretion, it was revealed that students with vegetative-vascular dystonia of the hypertensive type did not have a circadian rhythm (Figure 2). At the same time, in the morning, the concentration of cortisol is still 1,2 times higher than that of the control group, the maximum value is recorded at 20 o'clock and amounted to 77,61 pmol/l ($p<0,01$), exceeding the control group by 1,8 times.

In female students with a disorder of the autonomic nervous system of the hypertensive type, after a course of fitball gymnastics, the rhythm was determined with an average acrophase of 12,26 hours, an amplitude of 2,16 and a mesor of 47,60 pmol/l. In female students of the control group, the average acrophase of estradiol concentration occurs at 16,30 hours, the amplitude is 4,42 and the mesor is 40,25 pmol/l.

Cosinor analysis of testosterone secretion showed that in girls with vegetative-vascular dystonia of the hypertensive type, as well as in the group doing fitball gymnastics, the circadian rhythm is not defined (Figure 2). At the same time, girls in the control group observed a daily rhythmic organization of T secretion: the average acrophase was 8,09 hours, the mesor was 8,35 pmol/l, the amplitude was 0,71 pmol/l.

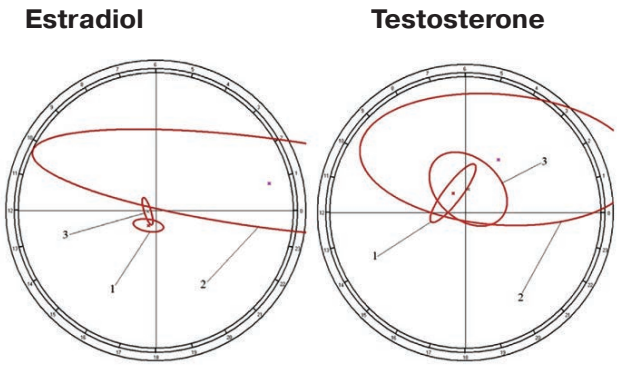

Figure 2. Cosinor analysis of the circadian rhythm of sex hormone secretion in female students with vegetative-vascular dystonia of the hypertensive type, engaged in fitball gymnastics

Note: 1 – control group; 2 – VSD of the hypertensive type; 3 – VSD of the hypertensive type, fitball-gymnastics

Conclusion. In female students with vegetative-vascular dystonia of the hypertensive type, engaged in fitball gymnastics, positive changes were revealed in the stabilization of the circadian rhythm of estradiol concentration; the rhythmostasis of testosterone concentration was still not detected, while a decrease in fluctuations in its amplitude during the day was observed.

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Types of destructive attitude of parents to the child's and adolescent's sports activity

UDC 159.9

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Abstract

Objective of the study was to determining the trend of changes in the severity of the types of destructive attitudes of parents towards the child and teenager's sports activities in order to clarify the constructive model of their behavior in the structure of psychological support for the sports reserve.

Methods and structure of the study. The main toolkit is «Methodology for studying parents attitudes towards their child's sports activities» by E.E. Khvatskaya, N.E. Latysheva. Parents of young athletes took part in the study (2018 – n=56, 2019 – n=176, 2022 – n=87). The participation format is anonymous. To assess the significance of differences, Fishers test was used.

Results and conclusions. The severity of the destructive attitude of parents towards the child and teenagers sports activities as a source of excessive/inappropriate difficulties for the latter revealed a tendency for the number of parents with an established «model» of behavior to increase (2018 – 46,4%; 2019 – 45,45%; 2022 – 46%), more often compensating. The situational «model» in 2022 is more typical for the negative type of attitude of parents towards their child and teenagers sports activities. At the trend level, the number of parents without a certain model of behavior (type of attitude) decreased by 8,7% (according to the φ* criterion - Fishers angular transformation: φ*amp = 1,321 p>0,05). A constructive «model» of parental behavior has been identified, aimed at creating and maintaining a healthy sports environment. The number of parents with a destructive attitude towards their childs and teenagers sports activities, especially with an established «model» of behavior (often compensatory type, then negative and indifferent), is quite stable (according to data from 2018, 2019 and 2022). There was a decrease at the trend level in the number of parents with an uncertain «model» of behavior, and its increase with the situational manifestation of a negative attitude (one of the significant adults). A constructive «model» of parental attitudes and behavior in the context of a healthy sports environment is presented.

Keywords: *young athletes, types of destructive attitudes towards child and adolescent sports, psychological support, healthy sports environment.*

Introduction. If in the early 2010s. establishing interaction with parents, or rather relationships in the triangle «coach – young athlete – athletes parents» and, if necessary, adjusting parents attitude towards classes was considered one of the tasks of psychological assistance to young athletes, today this is the principle of psychological support for the sports reserve, the implementation of which is associated with the formation of a healthy/resource sports environment.

Determining the severity of one of the three types of «problematic» attitude of parents to the child's sports activities, namely compensating, negative or indifferent (methodology - E.E. Khvatskaya, N.E. Latysheva) [1], as well as determining the types of behavior of childrens parents who go in for sports (methodology - I.O. Smoldovskaya) [3], types of parental attitudes in psychological support of a child athlete (methodology - O.G. Lopukhova, L.G. Nurkhamitova) [2], appropriate for helping the coach, and a psychologist (psychologist-educator) in organizing interaction with absolutely significant adults for a young athlete.

The coach needs to understand that no matter how «problematic» the parents may be, it is more important for him that the parents do not become «problematic» for young athletes, creating for the latter additional or inadequate/excessive difficulties in solving the problems of age-related and sports development and their implementation of «double» careers. At the same time,

the younger the athletes, the more important it is to support the micro- and mesosystem in the context of creating and maintaining a healthy sports environment.

But the compensating attitude determines the dependence of parents emotional support on childrens sports results. The negative attitude of parents (usually one) is associated with a lack of emotional support on his part. The indifferent attitude of parents – in general, with a lack of emotional support and external motivation [1, 4, 5]. Therefore, the use of a diagnostic procedure with parents can be considered as a means of psychoprophylaxis and education. Comparison of one's own behavior and the nature of interaction with types of «problem» behavior creates the prerequisites for correcting one's methods of interaction with an athlete.

Objective of the study was to determining the trend of changes in the severity of the types of destructive attitudes of parents towards the child and teenagers sports activities in order to clarify the constructive model of their behavior in the structure of psychological support for the sports reserve.

Methods and structure of the study. The main toolkit is «Methodology for studying parents attitudes towards their child's sports activities» by E.E. Khvatskaya, N.E. Latysheva. Parents of young athletes took part in the study (2018 – n=56, 2019 – n=176, 2022 – n=87). The participation format is anonymous. To assess the significance of differences, Fishers test was used.

Results of the study and discussion. The «Parents attitude towards their child's sports activities» method was first presented in 2019 [4]. According to the study, 56 – almost half of the parents have a formed «model» of behavior (46,4%), with a predominance of a compensating type of attitude, then negative and indifferent (53,8; 30,7; and 15,4%, respectively); approximately every third participant does not have a specific «model» of behavior (35,7%), and approximately every fifth participant does not have a situational «model».

In 2019, with an increase in the sample (up to n=176), the initial picture was confirmed (see table): almost half of the parents have a formed «model» of behavior (45,45%), of which more often compensatory, then negative and indifferent (respectively 68,75; 18,75; and 12,5%). Approximately every fourth participant does not have a specific «model» of behavior (28,4%) or a situational «model» (26,5%); compared to the primary data (n=56), the number of «compensating» parents increased and, accordingly, the percentage of parents with an established negative and indifferent «model» of behavior decreased; There are fewer parents with an uncertain «model» of behavior and more with a situational one.

This trend in relation to the «formed» behavior model continued in 2022 - 46% of parents (out of n=87) with a predominance of a compensating attitude (60,0%) (according to the φ* criterion - Fishers angular transformation, the differences are not significant for all three types «problematic» attitude: compensating – φ^*_{emp} = 0,435, negative – φ^*_{emp} = 0,136, indifferent – φ^*_{emp} = 0,912 (p>0,05) «negative» and «indifferent».

Comparison with 2018 data does not seem correct due to a technical error discovered [4] and corrected in the rating scale [1].

Parents of young athletes (potential and actual) with the absence of a behavior model can be considered as the most favorable contingent in terms of readiness to perceive psychological knowledge for the formation of a constructive model of behavior in a given social role.

Based on data from 2019 and 2022. (n=176 and n=87, respectively), one can note an unreliable decrease in the number of such parents by 8,7% from 26,1% (46 people) to 17,2 (15 people) (according to the φ* criterion - Fishers angular transformation : φ^*_{amp} = 1,321 p>0,05).

The basis of a constructive «model» of parental behavior is made up of three provisions that can be presented within the framework of recommendations on the «in order to» principle based on fair group norms: 1) motivational orientation «towards the task»: a successful athlete - who solves the task, and not the one

Comparative analysis of the severity of types of «problematic» attitude of parents towards their child's sports activities – «formed» (A) and «situational» (B) models, % (number of people)

Type of «problematic relationship»	n=56 2018		n=176 2019		n=87 2022	
	A n=26	B n=10	A n=80	B n=50	A n=40	B n=32
Compensatory	53,8 (14)	40,0 (4)	68,7(55)	42,0 (21)	60,0 (24)	37,5 (12)
Negative	30,7 (8)	30,0 (3)	18,75 (15)	32,0 (16)	20,0 (8)	34,4 (11)
Indifferent	15,4 (4)	30,0 (3)	12,5 (10)	26,0 (13)	20,0 (8)	28,1 (9)

who is better than the other; 2) the athlete needs your support, regardless of the result of his training or competition, you are on his side; 3) an athlete - he is an athlete both in sports and in studies (organized, controlling, solving assigned tasks, etc.).

These provisions are specified in detail in the «cross-cutting» tasks of psychological support for sports reserves [6] and «working» recommendations for parents of young athletes, including recommendations for building a «dual» career [1, 5].

Conclusions. Parents, as a social resource in the sports environment, influencing the success of athletes (especially young ones) in solving problems of age-related and sports development, have shown a stable tendency in the severity of types of destructive attitudes towards the child and adolescents sports activities. The number of parents with a formed «model» has increased, especially of the compensating type, and the percentage of its situational manifestation has also increased (comparing data from 2019 and 2022).

Parents of young athletes (potential and actual) with a lack of a behavioral model are the most favorable contingent in terms of readiness to perceive psychological knowledge for the formation of a constructive model of behavior. But the percentage of this category of significant adults has decreased unreliably, which confirms the expediency and necessity of the tasks of psychological support for the sports reserve («for parents»), a psychodiagnostic procedure with a correctional focus, recommendations from the coach at the beginning of interaction on the principle «in order to» in the context of fair group norms for the formation and maintenance of the socio-psychological component of the sports environment.

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Relationship of deviant behavior and value orientations of athletes from the sports reserve

UDC 796.011

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Abstract

Objective of the study was to identify the relationship between deviant behavior and value orientations of athletes from the sports reserve.

Methods and structure of the study. Pedagogical experiment, sociological research (distribution survey) in sports schools in St. Petersburg (November 2022 - August 2023), correlation analysis, analysis and generalization of research results.

Results and conclusions. A predisposition to socially determined behavior was established in a significant part of the subjects, as well as a situational predisposition to dependent, aggressive and self-harming behavior.

A relationship has been identified between a predisposition to various manifestations of deviant behavior and the value orientations of athletes from the sports reserve. The recorded relationships show the existing contradictions between the presence of positive life guidelines and non-normative ways of achieving them, and also reveal the lack of formed socially approved models of behavior to achieve set goals, which leads to manifestations of deviant behavior of athletes from among the sports reserve.

Keywords: *questionnaire, athletes from the sports reserve, deviant behavior, value orientations, relationship of characteristics.*

Introduction. The study of deviant behavior in the scientific space is carried out from the point of view of the influence of factors in various spheres of life, including the value sphere of the individual. «The social behavior of an individual is formed on the basis of the values and norms he has acquired, existing at various levels of the organization of society» [3, 58 p.]. The concept of «value» is defined as a basic component in the analysis of social processes and behavioral phenomena in adolescents. Value orientations are considered as a set of rules determined by society when a particular individual is directed towards values that are significant to him. Both of these concepts manifest themselves in various aspects of human activity and are reflected in the behavior of a particular person, his actions and motivations for actions [4, 5, 7].

Objective of the study was to identify the relationship between deviant behavior and value orientations of athletes from the sports reserve.

Methods and structure of the study. Pedagogical experiment, sociological research (distribution survey) in sports schools in St. Petersburg (November 2022 - August 2023), correlation analysis, analysis and generalization of research results.

Results of the study and discussion. In the process of a pedagogical experiment, an experimental group was formed, consisting of athletes aged 14-16 years old who showed signs of deviant behavior (n=14). Research has been carried out: diagnostics of the tendency to deviant behavior (method of E.V. Leus, A.G. Solovyov [1]), study of value orientations (method of M. Rokeach [2]) of athletes from the sports reserve.

Table 1. Recorded level of propensity for deviant behavior (n=14)

No.	Behavior	Degree of propensity for deviant behavior, %			Average	Standard error of the mean	Standard deviation
		No signs	Light degree	Expressed			
1	SOP	0	92,9	7,1	2,1	0,1	0,3
2	DP	42,9	57,1	0	1,6	0,1	0,5
3	ZP	78,6	14,3	7,1	1,3	0,2	0,6
4	AP	21,4	57,1	21,4	2,0	0,2	0,7
5	SP	35,7	50,0	14,3	1,8	0,2	0,7

Diagnosis of deviant behavior establishes a predisposition to: socially conditioned (SOP); pre-unlawful (DP); dependent (ZP); aggressive (AP); self-harmful (SP) behavior [6]. For each block of questions you can get from 1 to 30 points (0-10 – no signs, 1-20 – mild degree, 21-30 – pronounced tendency). The obtained indicators were analyzed and presented for the group as a whole (Table 1).

The respondents answers revealed a predisposition to socially determined behavior (socially desirable) in almost all respondents (92,9%). In 57,1%, a mild degree of predisposition (situational) to pre-illegal behavior was established. No pronounced pattern of antisocial behavior was recorded.

A situational predisposition (mild degree) (14,3%) to dependent behavior, a situational (57,1%) and pronounced predisposition (21,4%) to aggressive behavior were found. According to the block, self-harmful behavior (the desire to cause pain and/or physical harm to oneself) was found in: 50,0% - a mild degree of the symptom, 14,3% - a pronounced predisposition to auto-aggressive behavior.

When studying value orientations, subjects were asked to rank values (terminal and instrumental) on a scale from 1 to 18. Significant (1 to 6), less significant (7-12), and insignificant (13-18) ranks were determined. The results obtained are grouped by degree of significance and presented as a percentage.

It is noted that the peculiarities in the behavior of the athletes of the experimental group are manifested in the desire to demonstrate the strength and courage that they develop in the process of training activities, to win recognition from their environment, and to achieve material well-being. Through deviant behavior, young athletes try to assert themselves in their environment and achieve material well-being by any means, denying socially approved norms and values.

A correlation analysis of the relationships between signs of deviant behavior and value orientations (terminal, instrumental) was carried out (Table 2).

Conclusions. A relationship has been established between the predisposition to various manifestations of deviant behavior and the value orientations of athletes from the sports reserve. As a result of the cor-

Table 2. Correlation analysis between signs of deviant behavior and values of athletes from the sports reserve (n=14)

Variables	Spearman correlation coefficient (r)	Link strength level
«Predisposition to AP» and «possibility of expanding education»	0,665	average positive relationship (r>0,30≤0,69) high degree of significance (p≤0,01)
«Predisposition to SP» and «active life activity»	0,592	average positive relationship (r>0,30≤0,69) (p≤0,05)
«Predisposition to DP» and «lack of financial difficulties (financially secure life)»	-0,613	moderate negative relationship between indicators (p≤0,05)
«Predisposition to AP» and «executiveness (discipline)»	0,734	strong positive relationship (r>0,70≤1,0) high degree of significance (p≤0,01)
«Predisposition to DP» and «self-control (restraint, self-discipline)»	0,577	average positive relationship (r>0,30≤0,69) (p≤0,05)
«Predisposition to SP» and «tolerance (the ability to forgive others for their mistakes and delusions)»	0,558	average positive relationship (r>0,30≤0,69) (p≤0,05)
«Predisposition to AP» and «ability not to retreat in the face of difficulties (strong will)»	-0,570	moderate negative relationship between indicators (p≤0,05)

relation analysis of manifestations of deviant behavior and value orientations of athletes from the sports reserve, the following positive relationships between the variables were recorded: «predisposition to self-harming behavior» and «active life» (rs = 0,592); «predisposition to aggressive behavior» and «possibility of expanding education» (rs=0,665); «predisposition to aggressive behavior» and «executiveness (discipline)» (rs=0,734); «self-control (restraint, self-discipline)» and «predisposition to pre-illegal behavior» (rs=0,577); «self-control (restraint, self-discipline)» and «predisposition to pre-illegal behavior» (rs=0,577); «tolerance (the ability to forgive others for their mistakes and delusions)» and «predisposition to self-harming behavior» (rs = 0,558). The recorded relationships revealed the existing contradictions between the presence of positive life guidelines and non-normative ways of achieving them, which may indicate the absence of formed socially approved models of behavior to achieve set goals, which leads to manifestations of deviant behavior.

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Pedagogical model for implementing drone racing into the sports life of a university

UDC 796

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Abstract

Objective of the study was to develop and scientifically substantiate a pedagogical model for the use of innovative pedagogical technologies for the introduction of drone racing into the inclusive physical education and sports environment of the university.

Methods and structure of the study. The comparative analysis and synthesis of special documentation and information sources; modeling organizational and methodological support for the introduction of drone racing into the physical education and sports space of the university; structuring and integration of pedagogical technologies; formulation of conclusions.

Results and conclusions. The pedagogical model for the use of innovative pedagogical technologies for the effective implementation of drone racing in inclusive student sports has been developed and scientifically substantiated in order to involve student youth in the system of sports training and participation in competitions.

Keywords: *students, drone racing, technology, pedagogical model.*

Introduction. The higher education system, including physical education, updates its development taking into account the country's state policy (national goals) and the interests of students (high-tech and intellectual sports) [6].

The virtual life of modern students (communication, learning, recreation, entertainment) leads to a decrease in physical activity and deterioration of health. The current situation actualizes the search for new methods, forms and means to attract young people, including those with disabilities to a sports lifestyle through the introduction of innovative types of physical activity into the inclusive physical culture and educational environment of the university [5].

Experts believe that the inclusion of a technologically advanced, innovative sport, Drone racing (drone racing), into the university space will contribute to the formation of universal and professional competencies in students, health-saving competencies and readiness to use the experience of operating drones in future professional activities [4].

The introduction of innovative high-tech sports into student sports and physical education of students with different levels of health determines the updating of the content, methods and forms of training through the use of innovative pedagogical technologies.

Purpose of the study: to develop and scientifically substantiate a pedagogical model for the use of innovative pedagogical technologies for the introduction of drone racing into the inclusive physical education and sports environment of the university.

Methods and structure of the study. The study was conducted on the basis of the Plekhanov Russian University of Economics. The research work included: comparative analysis and synthesis of special documentation and information sources; modeling organizational and methodological support for the introduction of drone racing into the physical education and sports space of the university; structuring and integration of pedagogical technologies; formulation of conclusions.

Results and conclusions. One of the important goals of domestic higher education is the education of a future specialist with innovative thinking in approaches, not only to professional activities, but also to personal health, which determines a new vector of

additional (continuous) education for students, taking into account student-oriented tasks and national goals of Russia in the condition's modern challenges.

The high-tech sport of "Drone racing" includes speeding through specially equipped tracks through FPV racing, and improving drone models. Drone racing is actively supported by the state, since this sport not only promotes the intellectual and psychophysical development of those involved, but also opens up enormous personnel potential for the development of new high-tech technologies.

Modern youth of the digital society are attracted to virtual technologies in communication, entertainment, including learning, which determined the search for effective pedagogical technologies (interactive methods, forms and means) to support the introduction of a technological sport (Drone racing) into the university environment. Innovative pedagogical technology (a system for the development and implementation of scientifically based innovations) consists of innovative components: content, methods, infrastructure. Table 1 presents penetrating pedagogical technologies (elements are present in other technologies), which the authors consider the most effective for introducing drone racing into the inclusive physical education and sports life of a university [1, 2, 3, 6].

The pedagogical model for introducing drone racing into inclusive student sports has been developed based on the use of complex innovative pedagogical technology (elements of monotechnologies and innovations in methods, forms and means of teaching) (Figure 1). The conceptual position is the concept of personality-oriented education for the development of young people's readiness for self-education and self-realization in personal and professional activities. The target component includes approaches: a systematic method of creating and applying both the teaching process and students' acquisition of knowledge; interdisciplinary approach to solve new problems taking into account scientific directions; an inclusive approach to organizing education accessible to all. And also, principles: relevance (content to real practice); multimedia (technical teaching aids); differentiation and individualization (creating conditions for the development of individual abilities).

Since physical education and sports training at a university are interconnected, innovations (educational material) have been introduced into the content component of the presented model, which must be included (developed and implemented) in the physical culture and sports environment of the university [3]:

1. The program of the discipline "Physical Education" includes theoretical and methodological-practical courses ("Drone racing").

2. The program of the discipline "EDPhCa" includes a practical block on developing the physical, moral and volitional qualities necessary for those involved in drone racing.

3. In the educational and training process – the "Drone Racing" sports training program for students with different levels of health.

Table 1. Types of technologies and their characteristics

Type of technology	Characteristics
Large block	Combining educational material into large blocks, increasing their information capacity, saves time and space through diagrams and diagrams (reference signals), changes the organizational structure of the lesson to another unit (day)
Pedagogy of cooperation	Small group training, peer assessment, responsibility for the success of the team, equal opportunities. Penetrating technology (problem-search, creative, dialogical and gaming)
Information communication	Penetrating technology in the modernization of existing methods and forms of teaching (multimedia, virtual environment); models the processes of the knowledge monitoring and assessment program; trains skills, communication
Virtual	Simulation using game methods, simulation equipment, virtual simulators. Types of simulations: developing the ability to quickly analyze and manage information; speed of response and ability to effectively solve problems [2]
STEM technology	Technology based on an interdisciplinary approach to study problems in one discipline using knowledge from science, technology, engineering, mathematics
STEAM-technology	Uses natural sciences, technology, engineering, creativity, mathematics to solve practical problems, develop critical thinking, and research competencies
Multimodal learning technology	VARK framework: the use of modal channels of information transmission (V - visual, A - auditory, R - Reading / Writing - reading and writing, K - kinesthetic) and directions (Case-Based Learning, multimedia projects, Think, Pair, Share) [1]
Internet oriented technologies	Individual training "Mentoring"; paired learning (rehearsal, review); problem lecture; streaming video

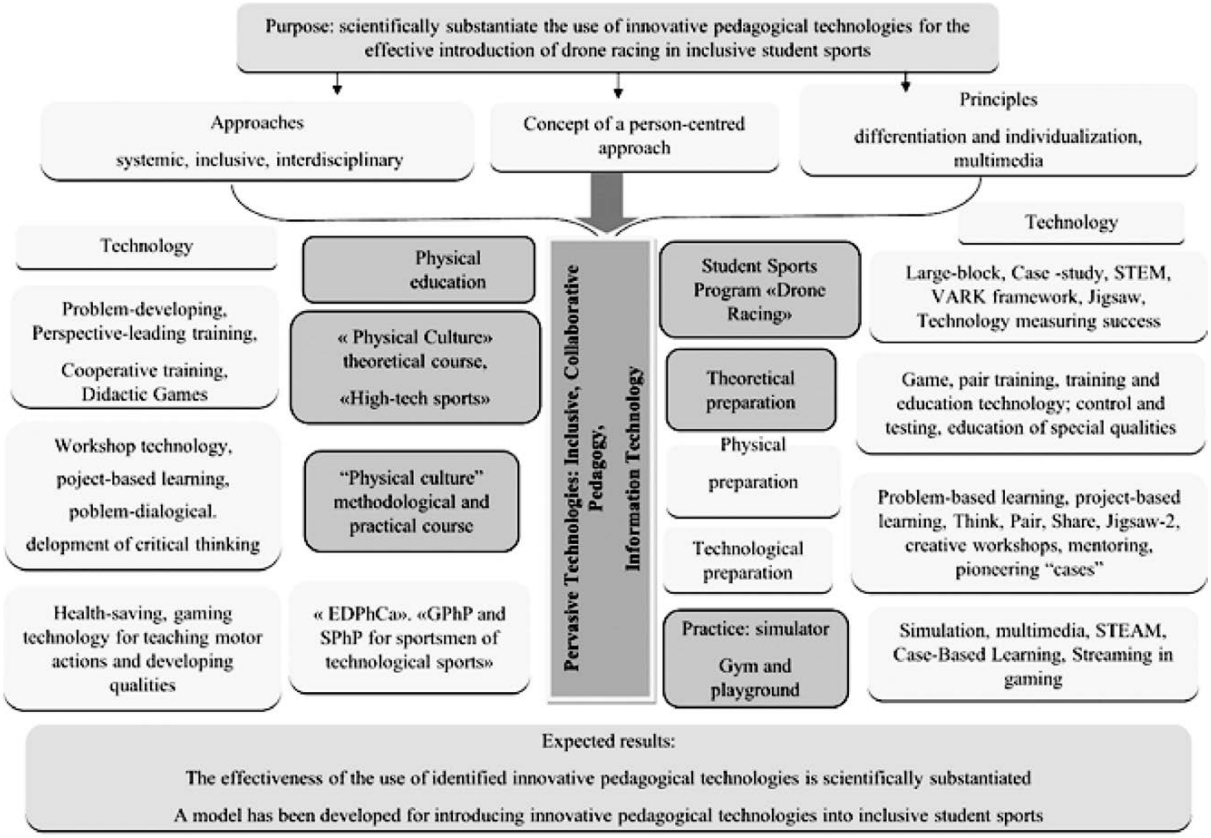

Figure 1 – Model for introducing drone racing into inclusive student sports

The final, control and analytical component of the pedagogical model determines the assessment of innovative technology based on the effectiveness of the total constituent components (innovative content, methods and infrastructure) for the development and implementation of educational courses and programs in the physical culture and sports environment of the university, including inclusive ones.

Conclusions. The introduction of "Drone racing" at a university will promote health promotion, successful socialization of young people, and the formation of universal competencies in managing UAVs for self-realization in professional activities. The use of innovative technologies in the physical culture and sports environment of a university must be built comprehensively and systematically: innovative updating of the content of classes using digital, multimedia and simulation teaching methods; personal and professionally oriented nature of training, taking into account the educational needs, health, intellectual and physical preparedness of each student.

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Sociological analysis of children's attitudes at the age of 11-15 years old physical education and healthy lifestyle

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Abstract

Objective of the study *is to conduct a sociological analysis of the attitude of children aged 11-15 years to physical education, on the basis of which to draw certain conclusions and give suggestions to specialists.*

Methods and structure of the study. *53 schoolchildren of Krasnoyarsk aged 11-15 years took part in the sociological survey. A questionnaire was developed that included 15 questions that respondents had to answer, on the basis of which the sociological picture of adolescents' attitudes to physical education was determined.*

Keywords: *physical culture, healthy lifestyle, sociological analysis, children.*

Introduction. The formation of a healthy and athletic nation is one of the primary strategic objectives of the Russian state. Such an important social process is possible when, at all stages of the formation and development of society, the population develops a need for physical education and sports.

The most important stages of human development and the formation of the need for motor culture are: preschool, school and student periods of life, when the foundation of mental and physical development is laid, the content of the trajectories of the individuals future activity is built and filled. Of particular social importance is the formation of children aged 11-15 years, the most sensitive period in the development of a young person, when it is necessary to systematically and holistically manage and direct the developing organism in the necessary social direction. The content and purpose of sociological research are built in this direction.

Objective of the study is to conduct a sociological analysis of the attitude of children aged 11-15 years to physical education, on the basis of which to draw certain conclusions and give suggestions to specialists.

Methods and structure of the study. 53 schoolchildren of Krasnoyarsk aged 11-15 years took part in the sociological survey. A questionnaire was developed that included 15 questions that respondents had to answer, on the basis of which the sociological picture of adolescents' attitudes to physical education was determined.

Results of the study and discussion. The sociological analysis carried out allows us to state that at the age of 11-15 years, children have not developed the necessary need for physical education and sports, there is not sufficient knowledge about the impact of sports on human health, and goal-setting has not been built both at school and in the family for a healthy lifestyle.

Conclusions. The block of questions formed in the questionnaire determining the attitude of children aged 11-15 years to physical education showed the following results: only 40% of adolescents independently engage in physical education and sports; perform morning exercises – 10.5%; attend academic classes in physical education - 52.8%; carry out systematic walks in the fresh air - 21.8%; Only 30% of children adhere to the diet.

All this in general allows us to state the need to revise the current system of developing the need for physical education and sports in modern adolescents.

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Physical and sports activities of students of universities in eastern Siberia (Krasnoyarsk region): analytical aspect

UDC 796

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Abstract

Objective of the study is to conduct a theoretical analysis of the state of physical culture and sports activity of university students in Eastern Siberia (Krasnoyarsk Region), to identify trends and dynamics of the functioning of this process.

Methods and structure of the study. An analysis of the physical culture and sports activities of university students in Eastern Siberia was carried out during 2023. The main research methods were: observations, conversations, questionnaires, surveys, analysis of reports on the sports activities of university sports clubs, visits to student physical education and sports events held at universities and in the region, participation in reporting conferences and meetings of student sports Union of the region, etc. A total of 15 universities in the Krasnoyarsk Region were analyzed for physical education and sports activities.

Results and conclusions. The analysis of physical culture and sports activities of university students in Eastern Siberia showed the following statistical results:

1. There are 15 universities and branches operating in the region, of which 6 universities operate on the basis of budgetary funding, 10 universities - on extra-budgetary funding.
2. The number of student sports clubs in universities in the region is 5.
3. The total number of students studying at universities is 65,967 people, including 43,689 full-time students, 18,987 part-time students, 291 full-time and evening students. 2,350 people are systematically involved in sports, which is 5.5% of the total number of students.
4. Only 4 universities (SibFU, Siberian State University, Krasnoyarsk State Medical University and Fire and Rescue Academy) have proper sports facilities (stadium, swimming pool, gym, ski lodge).
5. The annual Regional Student Spartakiad among universities in 21 sports is held, which is losing its popularity and mass appeal every year. In the region, the following sports are cultivated among students: athletics, cross-country skiing, football, volleyball, basketball, swimming, table tennis, rugby, orienteering, etc. These results allow us to state the insufficient activity of city and regional departments for physical culture and sports, as well as the leadership of universities and sports clubs to improve the results of physical education and sports activities among students in the region.

Keywords: *student youth, universities, Eastern Siberia, physical education and sports activities, analysis.*

Introduction. The President and Government of the country have set an important state task aimed at attracting up to 80% of Russian students to mass physical education and sports by 2030. Only active, physically developed future young specialists with an established culture of systematic physical education and sports are able to quickly, effectively and purposefully solve socio-economic and other problems of the state. The basic basis for activating student youth in systematic physical education and sports is a correct system of mass sports and recreational activities and forms that contribute to the formation of student motivation for a systematic increase in motor culture, the realization of individual physical abilities in a university

environment. All this as a whole determined the target orientation of this theoretical work.

Objective of the study is to conduct a theoretical analysis of the state of physical culture and sports activities of university students in Eastern Siberia (Krasnoyarsk Region), to identify trends and dynamics of the functioning of this process.

Methods and structure of the study. An analysis of the physical culture and sports activities of university students in Eastern Siberia was carried out during 2023. The main research methods were: observations, conversations, questionnaires, surveys, analysis of reports on the sports activities of university sports clubs, visits to student physical education and sports events held at universities and in the region, participation in reporting conferences and meetings of student sports Union of the region, etc. A total of 15 universities in the Krasnoyarsk Region were analyzed for physical education and sports activities.

Results of the study and discussion. The results of theoretical and statistical analysis are systematized in a table according to the following indicators: the number of universities in the region, the number of functioning student sports clubs, cultivated sports among students in the region, the number of team sports participating in student All-Russian competitions, the total number of students studying in universities in the region, the number of students systematically involved in sports, etc.

This table clearly shows the pressing problems of physical culture and sports activities of students at universities in the Krasnoyarsk Region, where there is a decrease in the number and activity of students in physical culture and sports.

Conclusions. The analysis of the physical culture and sports activities of student youth in Eastern Siberia shows that it is necessary to search for new forms and technologies for activating students in the university environment for systematic physical education and sports, improving the activities and status of sports clubs, increasing the responsibility of university leaders for the development of mass physical culture in their educational institutions, expanding the material and technical base for students to engage in sports, adjusting the system and strategy for youth physical education and sports activities.

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Statistical indicators of physical culture and sports activities of student youth at universities in Eastern Siberia (Krasnoyarsk Region)

Performance indicators	Statistical indicators
Number of universities and branches in the region	15
Number of functioning student sports clubs	5 (33,3 %)
Cultivated sports among students in the region, number	17 (football, sports tourism, cross-country skiing, athletics, chess, swimming, underwater sports, powerlifting, table tennis, rugby, orienteering, curling, volleyball, basketball, freestyle wrestling, judo, sambo)
Number of sports teams participating in student All-Russian competitions	5 (33,3 %)
Number of hours for physical education in universities	240 (in 2000 there were 408 hours, a decrease over the past period by 42%)
Number of students systematically involved in sports at universities in the region	2350 people (5,4%)
Number of students studying full-time at universities in the region	43688 people
Regional Student Universiade, number of sports	19
Number of universities participating in the Universiade	10 (66,7 %)
Number of universities participating in all sports of the Universiade	5 (50 %)
Material and technical support for physical education and sports classes for students at universities in the region, namely: the number of universities in the region that have a swimming pool, stadium, play gyms and playgrounds	4 (27% of the total number of universities and branches in the region)

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FROM SLUSHPILE

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

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Keywords: *aesthetic gymnastics, execution, elite athletes, Spearman correlation analysis*

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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Formation of motivation of older generation citizens for active longevity by means of adaptive physical culture

UDC 796

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Abstract

Objective of the study was to scientific substantiation of proposals for the use of adaptive physical culture means to create motivation for active longevity in older citizens (taking into account sensory, motor and mental disorders).

Methods and structure of the study. To obtain the necessary information, an analysis of documentary materials and literary data on the current state of the problem of motivation for active aging among older citizens in the Russian Federation was used. In addition, the level of motivation among older citizens to engage in physical education was monitored.

Results and conclusions. Studying the problem of developing motivation among older citizens (taking into account sensory, motor and mental disorders) for active longevity using pedagogical means of adaptive physical culture involves the use of an interdisciplinary approach that takes into account pedagogical, sociological, psychological, physiological and other aspects of this process.

The need for a multidimensional study of issues related to the formation of motivation among representatives of older age groups of the population for systematic physical education and sports, stated in the study, is due to the high heterogeneity of the studied population - elderly people of various nosological and age groups, the variability of spheres and social institutions that implement work in the interests of elderly citizens.

Keywords: *active longevity, older generation, adaptive physical culture, motivation formation, All-Russian Sports Complex GTO.*

Introduction. Currently, the problem of extending the active longevity of the population of our country has acquired national importance. One of the most environmentally friendly and socially approved options for solving this problem is to create conditions for increasing interest among older people in extending the active period of life through their involvement in various types of activities (physical education, educational, creative and others). This, in turn, requires building a constructive dialogue and developing flexible forms of cooperation between structures working in the interests of older citizens from various fields: physical culture and sports, social protection of the population, education, healthcare.

This research is planned as part of a state assignment to carry out research work on the topic: «Development of scientifically based proposals for developing motivation among older citizens (taking into account sensory, motor and mental disorders) for active longevity through adaptive physical culture».

Objective of the study was to scientific substantiation of proposals for the use of adaptive physical culture means to create motivation for active longevity in older citizens (taking into account sensory, motor and mental disorders).

Methods and structure of the study. To obtain the necessary information, an analysis of documentary materials and literary data on the current state of the problem of motivation for active aging among older citizens in the Russian Federation was used. In addition, the level of motivation among older citizens to engage in physical education was monitored.

Results of the study and discussion. The analysis of a number of regulatory documents allows us to say that today government structures are aimed at increasing life expectancy, reducing the mortality rate of the older population, and increasing the proportion of citizens, including the elderly, who systematically engage in physical education and sports.

However, in the process of implementing measures to develop motivation in older citizens for active longevity, it is necessary to take into account their psychophysical characteristics, capabilities and specific perception of reality at different age periods, which certainly influences the choice of means and methods for influencing the motivational structures of an elderly person. This age-related feature is provided for in the Strategy of Actions in the interests of older citizens in the Russian Federation until 2025 [2, 2 p.], where for the purposes of its implementation (taking into account the characteristics of life expectancy, health status and the pension system), citizens of the older generation are conventionally divided into 3 age subgroups: from 60 to 64 years old - a group of representatives of the older generation who, as a rule, continue their professional activities ; from 65 years to 80 years – people of this age are more often characterized by less activity and with more pronounced deviations in health; over 80 years of age are elderly citizens who require close attention from the social service and healthcare systems. However, even among this category of people there are people who are quite active socially [2, 2 p.].

Adaptive physical culture is the most attractive for people of the older generation due to the characteristics of the biological and socio-biological needs of a person that are satisfied with its help and allows creating conditions for active longevity, the motivation for which, according to researchers, should be formed throughout a person's life [1, 4 p.].

In this regard, as domestic experience shows, it is advisable to use the All-Russian physical culture and sports complex «Ready for Labor and Defense» (VFSK GTO). In 2020 and 2022 working group of researchers from NSU. P.F. Lesgafta, St. Petersburg, within the framework of the terms of reference in accordance with the Order of the Ministry of Sports of Russia dated December 14, 2018 No. 1034 to carry out research work on the topic: «Research of means and methods aimed at developing motivation in persons with disabilities (with taking into account sensory, motor and mental disorders) to systematic physical education and sports using the example of the All-Russian physical culture and sports complex «Ready for Labor and Defense» (GTO) for people with disabilities (2020-2022), a survey was conducted of people with disabilities health of pre-retirement and retirement age (from 55 to 70 years and above), the purpose of which was to identify their motivation to participate in the physical culture and sports complex of the GTO. 479 people from 26 regions (subjects) of the Russian Federation took part in the survey. The respondents were distributed by age in accordance with the stages (from IX to XI) of the VFSK GTO.

Distribution of respondents answers to the question regarding the systematicity of physical education and sports. Thus, 240 respondents (50,0%) answered that they were engaged in physical activity in an independent format at home or in the park, 156 people (32,5%) answered that they were engaged in health groups, clubs or sports centers, and only 83 respondents – 7,5% of the total number of survey participants - gave a negative answer.

At the same time, with a high percentage of respondents regularly involved in physical education, half of those who carry out physical activity in an independent format were not satisfied with its quality. Most of them argue this fact by the lack of experience and knowledge in this area. In addition, the survey results revealed that after 65 years of age, interest in physical activity decreases.

When asked about the participation of respondents in the All-Russian Sports Complex of the GTO, it was revealed that starting from 60-69 years old, the percentage of those who did not take part in the physical education and sports complex increases, that is, they have not yet passed the test standards. The number of people who fail tests is also increasing. Moreover, from 27,7% to 39% of them no longer plan to take part in this type of activity. Most likely, this is due to a number of objective reasons, including health status.

In general, at this stage of the study, it was revealed that in the practice of working with representatives of the older generation to develop their motivation for active longevity, a wide variety of means of adaptive physical culture are used, including means and methods with the help of which students prepare to meet the standards of the All-Russian Sports Complex GTO, including including VFSK GTO for disabled people and persons with limited health capabilities. However, they require scientific justification, taking into account the characteristics of the nosological group and differen-

tiation of the contingent depending on the age of older citizens (60-64 years old, 65-80 years old, over 80 years old). Moreover, the age subgroup over 80 years old requires the most attention in this regard.

Conclusions. Studying the problem of developing motivation among older citizens (taking into account sensory, motor and mental disorders) for active longevity using pedagogical means of adaptive physical culture involves the use of an interdisciplinary approach that takes into account pedagogical, sociological, psychological, physiological and other aspects of this process.

The need for a multidimensional study of issues related to the formation of motivation among representatives of older age groups of the population to systematically engage in physical education and sports, stated in the study, is due to:

- high heterogeneity of the studied population - elderly people of various nosological and age groups,

- variability of spheres and social institutions that implement work in the interests of older citizens.

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The popularity of winter sports in Russia according to television broadcasts of the 2018 and 2022 Olympic winter games

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Abstract

Objective of the study was to identify the most popular winter sports in Russia based on television broadcasts of the 2018 and 2022 Olympic Winter Games. on public Russian state television channels.

Methods and structure of the study. The study included an analysis and synthesis of data from specialized and scientific-methodological literature, as well as a comparison of the main indicators of sports television broadcasts.

Results and conclusions. Largely thanks to the interaction of the International Olympic Committee (IOC) with television, the Olympic Games (OG) have become the main sporting event in the world and a global phenomenon, and television has become one of the key partners of sports, providing its financing by purchasing rights to television broadcasts and displaying television advertising of sponsors, providing financial support to sports. Athletes of the USSR, and then Russia, won more than 80% of all medals won at the Olympic Winter Games (OSG) in competitions in cross-country skiing, speed skating, figure skating, biathlon and hockey. It has been established that it is competitions in these sports that have the highest ratings and arouse increased interest among television viewers on state Russian television channels when broadcasting the 2018 and 2022 Olympic Winter Games.

Keywords: *winter sports, Olympic winter games, Russian television, TV broadcast ratings.*

Introduction. Pursuant to Rule 7 of the Olympic Charter [1], the IOC owns all rights and information relating to the modern Olympic Games (OG) and has sole control over the use of the Olympic base television signal. The rights to televise Olympic competitions were first sold to SBC at the 1960 Olympic Winter Games (OWG-60). This event became a turning point in the history of modern Olympic Games, as television turned sport into a commodity, the value of which increased sharply after the admission of professionals to the Olympic Games [2-4].

In the USSR, television broadcasts of international competitions at the level of Olympic Games, Olympic Games, World and European Championships were carried out on the first state television channel, the signal of which most fully covered the territory of the state. Due to the lack of data on television broadcast indicators at that time, it is difficult to judge which sports were a priority for Soviet television viewers. But it can be assumed that in the winter the most popular were television broadcasts with the participation of the Soviet hockey team, as well as performances by figure skaters, cross-country skiers, biathletes and speed skaters.

After the USSR ceased to exist in 1991, sports on Russian television almost disappeared and only at the beginning of the 21st century gradually began to return to television screens. First, the 7 TV channel was able to see the Biathlon World Cup competitions, and later the Sport and Russia-2 television channels began broadcasting competitions in various sports. In 2015, the state sports channel «Match!TV» was created, which broadcasts many international and Russian sports competitions. Thanks to this TV channel, the

leading positions in the winter competitive seasons in Russia are occupied by the ratings of biathlon television broadcasts [5].

Objective of the study was to identify the most popular winter sports in Russia based on television broadcasts of the 2018 and 2022 Olympic Winter Games. on public Russian state television channels.

Methods and structure of the study. The study included an analysis and synthesis of data from specialized and scientific-methodological literature, as well as a comparison of the main indicators of sports television broadcasts.

Results of the study and discussion. In Russia, television broadcasts of all competitions at OWG-18 and OWG-22 were carried out by leading state (federal) TV channels: «Channel One», «Russia-1» and «Match!TV» (hereinafter referred to as «First», «Russia» and «Match»). Broadcasts in the most successful sports, namely hockey, figure skating, biathlon and cross-country skiing, were shared by the countrys two main channels – «First» and «Russia».

Today, there are technologies that can determine television broadcast indicators, which may indicate the interest of television viewers in various programs and broadcasts, including sports. Therefore, when determining the popularity of winter sports on Russian television during OWG-18 and OWG-22, data from the technological research company Mediascop was used. Studies of television content were carried out in cities of the Russian Federation with a population of 100 thousand or more, and the studied audience was a population of four years and older. In our case, the rating and the share of television broadcast were taken into account. The rating was determined as the ratio of the number of television viewers watching a particular program to the total population of the country; and the share is the ratio of the number of television viewers watching a broadcast to the entire television audience at the moment [6].

Mediascop weekly ranks television programs, both in various areas (news, sports, entertainment, children's, educational, etc.), and in the category «100 most popular programs among Russians aged 4 years and older» (hereinafter referred to as TV-100), which takes into account the indicators of all television programs on 23 federal television channels.

Table 1. Indicators of TOP-12 television broadcasts from OWG-18 and OWG-22

Date	Type of sport	Competitive discipline	TV channel	r.(%)	d.(%)
OWG-18					
25.02	Hockey	Men. OAR – Germany	First	12,8	52,3
23.02	Hockey	Men. OAR – USA	Russia	8,7	29,7
17.02	Hockey	Men. OAR – Czech Republic	Russia	7,4	27,6
25.02	Ski race	Women. Mass Start	First	5,3	20,7
23.02	Figure skating	Women. Free program	Russia	4,8	18,4
24.02	Snowboarding	Women. Parallel slalom	First	3,6	15,9
11.02	Figure skating	Women. Com. tour. Cor. prog.	Russia	3,6	15,6
10.02	Speed skating	Women. 3000 m.	First	3,6	13,9
11.02	Figure skating	Sp. couples. Com. tour. Free prog.	Russia	3,6	12,8
18.02	Ski race	Men. Relay race	First	3,5	16,9
13.02	Ski race	Men. Sprint	Russia	3,3	17,7
11.02	Ski race	Men. Skiathlon	Russia	3,3	17,7
OWG-22					
15.02	Figure skating	Women. Short program	First	7,1	35,3
17.02	Figure skating	Women. Free program	Russia	6,7	35,1
13.02	Biathlon	Women. Pursuit	First	5,9	24,8
13.02	Ski race	Men. Relay race	First	5,6	26,1
19.02	Figure skating	Sp. couples. Free program	Russia	5,6	24,5
18.02	Hockey	Men. ROC - Sweden	Russia	5,2	23,2
20.02	Hockey	Men. Finland – OKR	First	5,1	37,5
5.02	Biathlon	Mixed relay	First	4,8	21,8
18.02	Figure skating	Sp. couples. Short program	First	4,7	24,4
6.02	Ski race	Men. Skiathlon	First	4,5	22,8
19.02	Ski race	Men. Mass Start	Russia	4,3	22,8
7.02	Figure skating	Women. Com. tour. Free program	First	4,3	13,6

Table 1 presents data from the 12 most rated television broadcasts (TOP-12) from OWG -18 (Pyeongchang, South Korea) and OWG-22 (Beijing, China).

The maximum broadcast ratings on two OWG were recorded in three matches of the OWG-18 hockey tournament with the participation of Russians, and the absolute values: rating – 12,8% and share – 52,3% were in the victorious final, which was held on the last day and where the last set of awards for OWG-18. Against the backdrop of unsuccessful performances in other sports (only one gold in figure skating competitions), the whole country was waiting for this victory of Russian hockey players, united in front of television screens. In addition to hockey, the TOP-12 at OWG-18 included broadcasts in cross-country skiing - 4, in figure skating - 3, and one each in snowboarding and speed skating. In five cases, TV ratings were above 4%, and in seven – in the range from 3,3 to 3,6%.

At OWG-22, the maximum ratings were recorded in women's figure skating competitions, and TOP-12 included broadcasts in the following sports: figure skating - 5, cross-country skiing - 3, biathlon and hockey - two each. Ratings ranged from 4.3 to 7,1%, which is significantly higher than at OWG-18 (with the exception of the games of the Russian hockey team), which may indicate an increase in fan interest in the performances of Russian athletes at OWG-22.

Now lets look at how the successes of Russian athletes in various sports influenced the indicators of television broadcasts. The OWG-18 and OWG-22 programs included competitions in 15 sports, in which 102 and 109 sets of awards were awarded. According to the results of OWG-22, Russian athletes performed better than four years ago, winning 32 awards and losing only to Norway (37 medals). Medal achievements of Russian athletes and the number of broadcasts included in TV-100 in each sport are presented in table. 2.

Table data 2 indicate a direct relationship between the medal achievements of Russians in various sports and the number of television broadcasts in these sports included in TV-100. Thus, at the OWG-18, Russian athletes successfully performed in hockey, figure skating, cross-country skiing and freestyle skiing, and, as a result, broadcasts of Olympic competitions in these sports (as well as in biathlon and short track) had high indicators, which means that sports were of interest to television viewers in Russia. Of all 53 broadcasts included in TV-100, 48 (or almost 91%) are from these six sports.

At OWG-22, the Russians performed most successfully in cross-country skiing, figure skating and biathlon. Therefore, television broadcasts in these sports (12, 13 and 10 respectively), as well as in hockey, short track and freestyle (8, 6 and 4) accounted for 53 (or 81%) of all 65 television broadcasts that were included in TV- 100 according to the results of OWG-22.

Conclusions. Live broadcast of Olympic competitions on federal Russian television channels revealed an increase in the number of television broadcasts that are included in the «100 most popular programs»

Table 2. Medals of Russian athletes and the number of broadcasts included in TV-100 in each sport at OWG-*18 and* OWG-*22*

Types of sports	OWG-18					OWG-22				
	I	II	III	∑	TV	I	II	III	∑	TV
Ski race	---	3	5	8	**9**	4	4	3	11	**12**
Figure skating	1	2	---	3	**21**	2	3	1	6	**13**
Biathlon	---	---	---	---	**5**	---	1	3	4	**10**
Skating	---	---	1	1	**1**	---	1	1	2	**3**
Short track	---	---	1	1	**4**	---	1	1	2	**6**
Hockey	1	---	---	1	**5**	---	1	---	1	**8**
Ski jumping	---	---	---	---	---	---	1	---	1	**3**
Freestyle	---	---	2	2	**4**	---	---	3	3	**4**
Luge	---	---	---	---	**1**	---	---	1	1	**3**
Snowboarding	---	---	---	---	**2**	---	---	1	1	---
Curling	---	---	---	---	**1**	---	---	---	---	**2**
Skeleton	---	1	---	1	---	---	---	---	---	---
Nordic combined	---	---	---	---	---	---	---	---	---	**1**
Skiing	---	---	---	---	---	---	---	---	---	---
Bobsled	---	---	---	---	---	---	---	---	---	---
TOTAL:	**2**	**6**	**9**	**17**	**53**	**6**	**12**	**14**	**32**	**65**

- from 53 on OWG-18 to 65 on OWG-22. Of these 118 television broadcasts, 83 (or 70%) are for four sports: figure skating – 34, cross-country skiing – 21, biathlon – 15 and hockey – 13. The remaining 35 television broadcasts are for eight sports: short track speed skating - 10, freestyle – 8, speed skating and luge – 4 each, ski jumping and curling – 3 each, snowboarding – 2 and Nordic combined – 1. Television broadcasts of bobsleigh, skeleton and alpine skiing were not included in TV-100.

The TOP-12 television broadcasts from the last two Olympic Games on state Russian television channels included: figure skating – 8, cross-country skiing – 7, hockey – 5, biathlon – 2, snowboarding and speed skating – one each. The maximum TV ratings were recorded at OWG-18 in the final of the hockey tournament between Russia and Germany: rating – 12,8% and share – 53,2%. These figures are significantly higher than those of the highest-rated broadcast of figure skater competitions in the short program with OWG-22: rating – 7,1% and share – 35,3%.

Currently, television ratings are the main criteria for the success or failure of certain sports competitions and the popularity of sports. TV broadcasts of OWG-18 and OWG-22 give grounds to assert that increased interest and popularity on public Russian state television channels is caused by the performances of domestic athletes in cross-country skiing, figure skating, hockey and biathlon.

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Values of health and sports achievements in the structure of social identity of modern Russian youth

UDC 37.062

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Abstract

Objective of the study was to determine the place of the values of sports achievements and health in the structure of social identity of student youth.

Methods and structure of the study. Students of the humanities and technical fields of universities in St. Petersburg (n=200) participated in the scientific work. The average age is 20 years, boys – 31%, girls – 69%. The work included the questionnaire «Value Orientations-36» (V.N. Kunitsyna); ISSP civic identity scales (adapted by L.K. Grigoryan); scale for express assessment of feelings associated with ethnicity (N.M. Lebedeva); multifactorial personality questionnaire «STEEL» (V.N. Kunitsyna).

Results and conclusions. The values of sports achievements and health are a basic part of the social identity of young people. On their basis, young people realize their own involvement in culture, inclusion in the course of its historical time. Pride in sports achievements, as an element of civic identity, forms a semantic vector connecting youth with the older generation and traditions. The value of health sets a benchmark for a more responsible construction of interpersonal relationships, in particular, love relationships, and actualizes the ability to measure one's strengths with one's aspirations. The obtained result opens up space for improving educational work with university students, reflecting more targeted targets for pedagogical influence.

Keywords: *value orientations of health, sports personality development, social identity, civic identity.*

Introduction. In modern Russia, special attention is paid to the formation of a persons civic identity, raising a person with an active life position, which also includes an attitude toward a healthy lifestyle and longevity. Health, sports activity and achievements seem to be one of the leading value categories of a mature personality. This issue is reflected in a number of scientific studies [5, 6, 7, 8].

The authors emphasize current contradictions in this area. Thus, in the current context of higher education in Russia, students may have a high orientation towards the values of a healthy lifestyle [1], but do not realize these aspirations in practice for a number of reasons, in particular due to low awareness of sports technologies [6], the lack of a structured system of physical activity in educational institutions [9]. As a result, we can talk about insufficient reflection by students of health values and the unstable nature of their motivation for systematic sports activities [4]. At the same time, in a number of universities, students may not consider health to be something important for themselves, being more concerned about material security [7].

In this context, it seems appropriate to look at this problem in line with the theory of social identity, where an individuals acceptance of certain values appears as a complex and multi-level process based on such socio-psychological mechanisms as social categori-

zation, social comparison, internalization, symbolization. Considering the key constructs in the structure of social identity, N.L. Ivanova identified their basic, individual-personal and professional-business associations. For an individual, one of these groups may be leading. Thus, the first includes signs of identity associated with family, ethnicity, relatives and friends. The second includes signs of traditions and culture, moral norms. The third includes characteristics related to education and profession [1]. According to N.V. Kazantseva, playing sports is an effective tool for the formation of civic identity [3]. At the same time, the question remains open about what structures of social identification (basic, individual-personal or professional) the values of sports development are correlated with and what, based on this, should be the main targets of educational influence.

Objective of the study was to determine the place of the values of sports achievements and health in the structure of social identity of student youth.

Methods and structure of the study. 200 people took part in the scientific work - students of humanitarian and technical fields of universities in St. Petersburg. The average age is 20 years, boys – 31%, girls – 69%. The work included the methodology for diagnosing value orientations «TsO-36» (V.N. Kunitsyna; involves assessing the significance of 36 values, where the maximum score = 12); civic identity scales from the International Social Survey (ISSP adapted by L.K. Grigoryan; pride in sports achievements is included in one of the subscales of this methodology, maximum score is 4); scale for express assessment of feelings associated with ethnicity (N.M. Lebedeva); multifactor personality questionnaire «STEEL» (V.N. Kunitsyna). Data were checked for normal distribution. Correlation analysis (Pearsons-r) was used. Statistical package IBM SPSS Statistic 22.0.

Results of the study and discussion. Analysis of the general distribution of value orientations of young people showed that health (as taking care of one's physical and mental state) is in the top three most significant values (M=8,91; SD=1,91) after protecting the family (M=10,91; SD=1,88), understanding and trust in the family (M=9,08; SD=1,81). The values of self-care (M=8,91; SD=1,78) and self-esteem (M=8,90; SD=1,75) have approximately the same importance. In the structure of civic identity, pride in the country's sporting achievements (M=3,44; SD=0,63) is also one of the three most significant value categories, along with pride in art and literature (M=3,45; SD=0,64) and history of the country (M=3,40; SD=0,68). Thus, we can say that, in general, the youth we surveyed have a pronounced orientation toward active self-determination in the categories of a healthy, full-fledged personality and toward finding their place in life. These trends are consistent with the results of other authors [1, 6].

Correlation analysis allows us to draw a more clear picture of the relationships between the analyzed parameters. Thus, we can say that pride in the country's sporting achievements is an important element in the general structure of social identity and is part of its basic part (associated with positive feelings about one's belonging to the people). Connections with other value orientations form a semantic vector, one of the poles of which correlates with the awareness of belonging to a culture and the continuity of generations, and the general adequacy of self-esteem. At the other pole of this vector is a complex of hedonistic values, as well as traits of a dependent personality. The more young people are proud of the country's sporting achievements, the more adequately they evaluate themselves, the more respect they have for the experience of their elders, they feel the greater importance of traditions in their lives, and they are proud of the history of their people. On the contrary, indifference to sporting achievements is associated with the actualization of the egocentric position of the individual, expressed in the values of momentary pleasures, and negative feelings about one's own importance (in this case, this is characterized by the personal qualities of dependence and increased feelings of guilt). Such young people are more sensitive to criticism, are afraid of being rejected, and tend to fixate on negative emotional experiences.

The value of health also turned out to be at a high level of significance associated with a sense of ethnicity, but it characterizes a different semantic vector in self-determination. The higher the importance of this value for students, the more they are focused on mature care for themselves and their loved one. On the contrary, low health relevance is associated with an increased desire for achievement and independence, which can often come at the expense of one's own health.

Conclusions. The values of sports achievements and health are a basic part of the social identity of young people. On their basis, young people realize their own involvement in culture, inclusion in the course of its historical time. At the same time, pride in sports achievements, as an element of civic iden-

tity, forms a semantic vector connecting youth with the older generation and traditions. The value of health sets a benchmark for a more responsible construction of interpersonal relationships, in particular, love relationships, and actualizes the ability to measure one's strengths with one's aspirations. The obtained result opens up space for improving educational work with university students, reflecting more targeted targets for pedagogical influence. Thus, familiarization with the values of sports achievements presupposes correlation with the traditions of culture as a whole, and the actualization of motives for improving health can be based on meanings that are more personal for young people. Taken together, familiarization with the values of sports and health contributes to the formation of a more mature civic position of future graduates.

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Social factors influencing on the popularization of aesthetic group gymnastics in Russia

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Key words: *applied research, expert survey, aesthetic group gymnastics, social factors, popularization.*

The purpose of the study is to identify the main social factors that should stimulate interest in group classes in aesthetic gymnastics in Russia, which, therefore, should lead to the popularization of this sport.

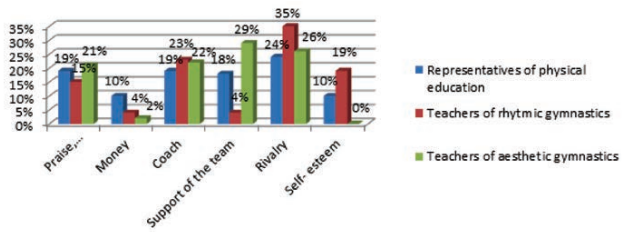
Methodology and organization of the study. To assess the situation with the modern development of aesthetic group gymnastics in our country, 7 experts were involved: representatives of physical education – 2 experts, coaches-teachers – 5 experts.

We found out how many years the specialists have worked in their positions - this is extremely important in our survey, since one of the control signs is the work experience in the field of physical culture and sports for managers - at least three years; for the coaching staff - at least 10 years. 7 out of 7 experts have higher education in the field of physical culture and sports.

To solve this problem, a questionnaire was developed in which experts expressed the following opinion.

To the question: "What do you think influences girls more when choosing a sport?" half of the experts (50%) noted that the choice of a sport is influenced by the advice of friends, teachers, and supervisors. 35% believe that the final choice is influenced by imitation of athletes and the desire to be like them. And only 15% of experts refer to the popularity of the sport itself.

Evaluating the results of the survey to the question: "What do you think girls strive for when doing sports?", 68% of experts replied that they "maintain good physical shape, improve the body." 16% of experts believe that one of the main goals of sports is to achieve high results in competitions. The remaining 16% are of the opinion that the goal of gymnasts is to spend their free time in an interesting way.



Factors influencing motivation for sports.

To the next question: "Is motivation one of the important reasons for playing sports?" the experts unanimously answered "yes" (100%).

After answering this question, the experts were asked to select the most important factors affecting motivation to exercise, as well as to note the less important ones. Representatives of physical education, coaches-teachers of rhythmic gymnastics and coaches-teachers of aesthetic group gymnastics noted the most important factors: praise, encouragement of the coach and rivalry, and rivalry, according to coaches-teachers of rhythmic gymnastics, far exceeds all other factors (35%), which is explained by the specifics of this sport.

The same cannot be said about the representatives of aesthetic group gymnastics, where team spirit, coach's instructions and, again, encouragement play an important role. The opinions of all experts agreed on the choice of a factor related to material indicators (money and awards): all 7 experts noted that money is an unimportant factor for motivation to play sports.

Conclusions. Thus, in the course of our survey, experts identified a certain set of important objective social factors, which, in their opinion, influence the popularization and promotion of aesthetic group gymnastics. However, experts believe that this process is more influenced by the formation of personal interest and motivation for practicing this sport among modern girls.

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