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1. Physical education of different population groups.
2. Improving the training of athletes of different qualification.
3. Biomedical Aspects of Physical Education and Sports.
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Substantiation of methodological approaches to compiling complex recreational programs

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Purpose: *substantiation of methodological approaches to compiling up recreational programs, as a form of activity of a specialist in the field of physical education.*

Material & Methods: *analysis of available literature and system analysis.*

Results: *analysis of the peculiarities of recreation and health improvement allowed substantiating the content of the corresponding recreational and recreational programs.*

Conclusions: *the core of these programs should be a modified mode of the day, a significant place in them occupies food and motor activity. The organization of recreation and health improvement of children belonging to 1–2 groups of health also needs to make changes and additions that take into account the state of health, the fulfillment of hygiene requirements, and the correction of the main components of recreational and recreational systems. This will ensure adequate and effective optimization of schoolchildren's health.*

Keywords: *recreation, rehabilitation, schoolchildren, comprehensive programs.*

Introduction

Formation of the foundations of the health of the younger generation is one of the priority directions of the development of society. This is due to the fact that today's children in 10–15 years will determine the economic, cultural, scientific and social potential of the state, and the level of their health will largely determine the possibility of their self-realization. Currently, the state of health of the children's population of Ukraine is unsatisfactory, there is a significant increase in the prevalence of chronic non-infectious diseases such as hypertension, neuroses, obesity, and during school education the incidence rates of schoolchildren are increasing in almost all nosologies [4]. In the conditions of an unfavorable ecological situation, social and economic tension, diminishing the role of moral values, deepening the tendency to reduce the level of health, a special role in the training of a physically and spiritually healthy generation, belongs to physical education [5; 6].

The current situation in society is characterized by the increasing complexity of economic and social relations in the labor market, which in turn necessitates the improvement of the quality of training of specialists in higher education, especially when it is related to the preservation and promotion of public health [2; 8]. The solution of this problem can be achieved primarily by giving practical training to the training, mastering the skills and abilities that enable us to apply the theoretical knowledge obtained in real conditions, which necessitates a certain restructuring of education [8]. Changes in the health status of the population make it necessary to improve the level and quality of training specialists in the field of recreation.

Socio-economic prerequisites for this restructuring are primarily due to the fact that the deterioration in the health status of the population, including children, causes the urgency of creating a network of recreational and recreational facilities with different focus and patterns of ownership. The combination of recreation and recreation in their field of activity requires qualified personnel who have both medical (clinical and preventive) and physical education and training. Moreover, the level of knowledge of experts in the field of physical culture should be expanded through issues of recovery, prevention and recreation, that is, practically have an intermediate character with medical qualifications. It is the presence of such specialists that can significantly improve the effectiveness of these institutions by supplementing medical rehabilitation and rehabilitation with the means and methods of physical culture, fitness, etc.

The need to create special recreational programs is beyond doubt. So, in the USA for more than 30 years the "Schoolchild's Health" program has been operating, in which physical culture occupies a large place [13]. It is noted that regular exercise interferes with the development of heart disease, lungs, hypertension and obesity; facilitate diabetes, asthma, epilepsy, and, in addition, are an antidote to physical stress in the modern world. The main ways to develop the habit of regular, during life, playing sports are sports games, which take all the time 3 times a week. Much attention is paid to individual, conscious, choice of games (contact, contactless, stressful or calm). Sports games have a beneficial effect on the formation of personality: in games a person acquires skills to settle conflicts, to find constructive compromises, to feel the collective as an absolutely necessary condition for existence. It is assumed that there are 3 types of motor activity regimes, to some extent similar to the domestic "groups of occupations" – basic, preparatory and special medical.

A. Yu. Aghyppo, G. P. Artemyeva, N. V. Buren and others [1] note the importance of constructing a system of physical fitness on the basis of taking into account the individual characteristics of physical development and physical condition of the population.

A. G. Platonova, L. V. Podrigalo, K. M. Sokol [11] emphasize that the leading criterion for the effectiveness of recreation should be the level of motor activity, which is interrelated

with many indicators of physical development and functional state.

Given the high efficiency of nutrition as a factor in health effects, analysis of nutritional status can also be used as a criterion for recreation. Monitoring of vitamin status, conducted by L. V. Podrigalo, A. G. Platonova, M. Cieślicka [12], confirmed the validity of this conclusion.

Developed by A. Yu. Aghyppo [2], the model of attracting schoolchildren and young people to physical culture and recreational activities is based on the formation of positive motivation, the creation of a favorable public opinion regarding the conduct of a healthy lifestyle.

Alexandr Aghyppo, Sergij Tkachov, Olena Orlenko [10] emphasize the importance of physical training in the formation of a healthy lifestyle.

The available data in the literature and determined the relevance of this study.

Purpose of the study: substantiation of methodological approaches to the formulation of recreational programs, as a form of activity of a specialist in the field of physical education.

Material and Methods of the research

The main methods used were analysis of available literature and system analysis [9].

Results of the research and their discussion

In accordance with the Law of Ukraine "On the improvement and recreation of children" [3], recreation is defined as a complex of special social, educational, hygienic, sporting activities that ensure the organization of children's free time, restore the physical and mental functions of the child's body, promote the development of spirituality and social activity of children carried out in the children's health and recreation center during the rest period (not less than 14 days). Wellness is also defined as a complex of special social, educational, medical, hygienic and sporting measures aimed at improving and strengthening the physical and mental state of children, carried out in a children's health and recreation center during a health-improvement session (at least 21 days).

The basis of any recreational or recreational system is the regime of the day. The use of different options for the regime makes it easier to adapt to the conditions of stay, ensures that the intensity of the applied natural and performing factors corresponds to the functional capabilities of children. However, the shortening of the rest period practically does not allow to apply different variants of the regime, in this case for practically healthy children only a training regimen having a significant effect on the functional state can be recommended. Observance of the general hygienic requirements in this case allows to provide an effect due to formation of a dynamic stereotype.

In conditions of recovery, they use sparing and training options, replacing each other. So, the first 3–5 days the children are on a sparing schedule, which is characterized by the restriction of motor activity, quiet games, the prohibition of staying in the open air during the hyperinsolation period (11–15 hours), the minimum duration and load of physical education. Under the condition of normal adaptation, children are transferred to a training regimen, which is maintained throughout the rest of the period. It includes the whole complex of medical and recreational activities, tempering procedures, games and excursions. Changing the components of the regime most often consists of lengthening the rest time (both night and daytime sleep), switching to a fractional diet and reducing outdoor exposure during the period of hyperinsurance, including recreational and recreational procedures as a separate component.

Proceeding from the basic functions of food, the alimentary factor becomes essential. In practically healthy children, nutrition should correspond to the basic principles of rational nutrition. Energy consumption increases by 10–15% compared with physiological norms, the diet regime is usually 4–5-times, with the distribution of caloric content according to hygienic requirements.

The nutrition of the preventive orientation, used in the recreation and rehabilitation of schoolchildren in the state of donosology, is also based on the observance of the principles of rational nutrition. The diet is enriched with biologically active substances, to eliminate the deficiency of vitamins and microelements. With the improvement of children living in ecologically unfavorable areas, the consumption of dietary fiber and pectin for the excretion of xenobiotics and fecal passage increases, additional injection of a liquid is provided to stimulate urinary excretion [7]. To normalize the intestinal microflora, the diet includes lactic acid products, functional foods. Given the key importance of activation of free radical oxidation in the mechanism of most unfavorable factors, the diet is given antioxidant and adaptogenic orientation [7]. This is achieved due to the additional intake of multivitamins and premixes, the use of plant adaptogens, the use of phytodetics and phytoergonomy, the alkalizing diet, the widespread use of salads dressed with unrefined oils and citric acid, dishes from seedlings of grain, green tea.

To reduce the load on the gastrointestinal tract, the so-called sparing diet is used [7]. The provision of physical, chemical and mechanical shining is achieved through the consumption of dishes of optimum temperature, the exclusion of sharp, irritating foods and dishes, the lack of such culinary methods as frying, the use of dishes in puree form, etc.

As already noted, motor activity (MA) belongs to one of the key places in rest, rehabilitation and rehabilitation [11]. The level of MA should be the maximum in practically healthy children, and its duration in the period of recreation is at least half the time of wakefulness. In case of recovery, a motor optimal is recommended, which corresponds to the functional possibilities, including morning hygienic gymnastics (MHG), mobile games, regular physical culture and health classes.

It is physical education (PE) that is the main form of MA implementation, which is due to its training influence on organs and systems. The main tasks of PE are harmonization of physical development, increasing reactivity and resistance. Achieving the maximum MA in the period of recreation is realized by the maximum variety of forms, the use of loads in full, sufficient in intensity [11].
During the period of recovery, the basic hygiene principles of

PE remain valid. In the sparing period, the loads are reduced, especially those having a "ragged pace" (sports games, etc.). Based on the need to eliminate ecotoxicants, as well as to enhance the functional state of the main organs and systems responsible for their removal from the body, special exercises are used [7]. So, to activate and train HR apply exercises for the muscles of the hands and feet, isometric stresses of 3–5 seconds duration, exercises for the muscles of the back of small intensity, performing exercises in the sitting and lying positio.

Tempering, as an integral part of PE, also has its own characteristics, depending on the health of children. His organization is closely connected with the use of natural and preforming factors of recovery and rehabilitation, which have a pronounced effect on reactivity, resistance and resistance. In the period of recreation, their use is maximum, the volumes and intensities allow providing a sufficient quenching effect and practically the only limitation is the reduction of the impact during the adaptation period. During recovery, the conditions of application are more stringent. In addition to limiting the stay in the open air, during the period of increased insolation, the duration of bathing is regulated, the greater specific gravity takes the hardening by the air factor.

The use of occupational therapy makes it possible to provide additional physical activity, promotes the development of skills and abilities. The main principles of its construction should be compliance of the loads with the functional capabilities of children and the prohibition of activities potentially hazardous to health.

The use of psycho-hygiene and psycho-prophylaxis in the period of recreation is most often limited to its individual elements, aimed at the formation of a positive psycho-emotional mood. In case of recovery, the main purpose of this factor is prevention and correction of borderline mental states. The main method of achieving the goal is psychological potentiating (strengthening the effect of real curative factors with the help of direct or hidden suggestion), for which personnel and children are taught the simplest methods of psycho prophylaxis.

Evaluation of the effectiveness of ongoing activities is the main task of specialists engaged in recreation and recreation. However, depending on the state of health, the indicators used for this will differ. Thus, in practically healthy children, the effect of rest is traditionally evaluated according to the dynamics of physical development indices (body weight, vital capacity, muscle strength, etc.). At the present time, shortening the rest period leads to the fact that these criteria simply do not have time to change, which makes it necessary to search for new, informative and adequate ones. The conducted researches made it possible to propose for this purpose the level of MA, as a dynamic indicator, which is in interrelation with many indicators characterizing health, and most importantly, quite easily managed in the process of recreation [11].

In children who are in a condition of donosology, the evaluation of the effect of recovery is aimed at examining the manifestation of nonspecific manifestations. For this purpose, it was proposed to study the characteristics of the antioxidant and vitamin status [12].

Conclusions

The analysis of the peculiarities of recreation and health improvement allowed to substantiate the content of the corresponding recreational and recreational programs. The core of these programs should be a modified mode of the day, a significant place in them occupy food and motor activity. The organization of recreation and health improvement of children belonging to 1–2 groups of health also needs to make changes and additions that take into account the state of health, the fulfillment of hygiene requirements, and the correction of the main components of recreational and recreational systems. This will ensure adequate and effective optimization of schoolchildren's health.

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Improving the composition of voluntary programs in the category of Women in fitness

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Purpose: *to reveal the basic directions of perfection of construction of compositions of voluntary programs in the category of Women in fitness.*

Material & Methods: *judges-experts analyzed the structure and content of voluntary competitive programs of performances of six female athletes'-finalists of the championship of Ukraine on bodybuilding and fitness in 2016.*

Results: *voluntary programs include elements of structural groups of varying complexity: "acrobatic", "choreographic", "strength" and "flexibility"; female athletes with better indicators in the quantitative analysis of competitive compositions received higher grades for performance; the results of athletes for an arbitrary program are directly proportional to the number of complex elements in the composition.*

Conclusions: *in an voluntary program in women's fitness for a competitive result affects the saturation of the program, the variety and complexity of the elements.*

Keywords: *fitness, bodybuilding, competitions, composition, women, evaluation.*

Introduction

The main functional purpose of fitness is to improve the physical health of the broad masses of the population in the process of familiarizing them with a healthy lifestyle by increasing the motor activity [5; 12]. Modern fitness industry offers a variety of physical exercise systems to improve the level of health of those involved [11]. For those wishing to demonstrate and evaluate the level of their physical condition, the federation of bodybuilding and fitness of Ukraine holds various competitions [8]. Carrying out of competitions promotes development of a kind of sports, gives the chance to reveal the strongest athletes, the strongest commands, to define the best training methods [9; 10]. Also, competitions are an effective advertising for involving new participants in sports training. Now in Ukraine under the auspices of the IFBB (International Bodybuilding and Fitness Federation) competitions are held in various areas: male and classical bodybuilding, masculare and mens physicist, bodyfitness, fitness bikini, male and female fitness, wumens physicist, wellness, etc. Specificity of the sport provides assessment of athletes athletic build, muscle proportionality, physical attractiveness, charisma, charisma. The basis in training for bodybuilding is the process of building muscle mass, the formation of a beautiful body with the help of a power complex of exercises and a special diet with a protein diet [8; 10; 12].

The competitive program and preparation in the direction of "fitness", which arose relatively recently in the framework of competitive bodybuilding, and includes competition in the performance of motor elements in the form of an arbitrary program, is significantly different. According to the rules of the competition, an arbitrary program in fitness does not have mandatory movements, but must include elements of strength, flexibility, acrobatics and choreography, performed preferably in a dynamic mode [8; 12]. Thus, a competitive fitness program involves not only demonstrating harmonious proportions of the body, but also performing exercises that require good motor preparation, the availability of skills for performing acrobatic elements, various equilibria, racks, swing, jumps, turns, combined into a complete artistic composition.

At the present time, programs for improving one's body with strength training have been developed in sufficient detail [10]. Experts develop recommendations on the training of athletes in the "fitness" class, but to date there are no studies devoted to the content of arbitrary competitive athlete's fitness programs [12].

Relationship of research with scientific programs, plans, themes. The research was carried out in accordance with the initiative theme of the scientific research of the Department of Dance Sports, Fitness and Gymnastics of KSAPC: "Theoretical and methodological bases of development of system-forming components of physical culture (sport, physical recreation, fitness) for 2018–2020.

Purpose of the study: to reveal the basic directions of perfection of construction of compositions of voluntary programs in the category of Women in fitness.

Objectives of the study: 1. To analyze the structural components and content of arbitrary competitive programs in women's fitness. 2. Identify the leading factors that affect the competitive result in an arbitrary program in women's fitness.

Material and Methods of the research

An analysis was made of the video footage of the performances of six female finalists of the Ukrainian Bodybuilding and Fitness Championship in 2016 [8]. With the help of qualified expert judges, the structure and content of random competitive fitness programs in the category "women" were analyzed, and estimates for the performance of each component of the program from five points [4; 6; 7].

Results of the research and their discussion

Competitions in fitness are spectacular. Judging is carried out in three rounds: a bikini, an arbitrary program and a final. In the second round the athletes represent an arbitrary program with a musical accompaniment lasting up to two minutes. In a competitive composition, contestants must demonstrate elements of strength, flexibility, acrobatics and choreography, and also display their artistic abilities, that is, reflect the plasticity of movements and manner of execution, the intended image and chosen style of music [1; 2; 3].

All the elements included in the composition of athletes, the experts were ranked into two categories of complexity, namely: to category A were attributed to simple elements, to category B – complex elements [6]. The content and complexity of the exercises of an arbitrary program of each athlete are reflected in Table 1, the numbers of the athletes correspond to the results of the performance in the second round.

In their competitive programs athletes actively used various acrobatic elements: "bridge stand", flip flops, coups, rumblings, stances on the head. To demonstrate the strength of the athletes performed various stops: the angle of the legs apart, high angle of the legs apart, horizontal supports with support on the elbows. In various endeavors, from complex static positions, the athletes performed various "push-ups", including "push-up" in the Wenson rest. Elements of flexibility of the girl demonstrated the performance of swings, twines, jumps with maximum amplitude of motion by various links of the body. Arbitrary compositions contained various choreographic elements: equilibria, turns, jumps and dance movements corresponding to the nature of the music.

Table 1

Classification of elements of an arbitrary program

No.	Acrobatic	Power	Flexibilities	Choreographic
1.	1) "bridge stand" from the lying position (A) 2) falling forward at the stop lying (B) 3) the roll is bent in the support lying (B) 4) standing on his legs, rolling back over the head to the floor and balance on the hips, hands up (B) 5) flip forward (B)	1) angle in the support of the foot apart (A) 2) "push-up" in an emphasis lying on one leg (A) 3) horizontal foot rest apart with support on elbows (B) 4) high angle in the support, legs apart (B) 5) "push-up" in the stop Wenson (B)	1) jump into the twine with the torso bending backwards (A) 2) jump into the ring with a torso bending backwards (B) 3) a transverse jump – "Pike" (A) 4) jump with a turn of 360° in the twine (B)	1) equilibrium in the ring without the help of hands (B) 2) equilibrium is sideways to 90° (A) 3) equilibrium "Swallow" (A) 4) turning the "compass" (B) 5) turn attitude (A) 6) jump into the twine (A) 7) three jumps in a row with a step change with a change of legs (B) 8) jump "Cossack" (B)
2.	1) three "wheels" to the right (A) 2) stand on the head, bending your legs (A) 3) back flip (B) 4) the "bridge stand" is tilted backward (B)	1) "push-up" in the support lying (A) 2) "push-up" in an emphasis lying on one leg (A) 3) "push-up" in an emphasis lying on one leg and one arm (B) 4) "push-up" in the stop Wenson (B)	1) swing forward (A) 2) swing backwards (A) 3) the transverse jump (A) 4) leap into the twine with the torso bending backwards (A) 5) jump into the ring with the torso bending backwards (B)	1) equilibrium is forward-90° (A) 2) the equilibrium-backward by 90° "Swallow" (A) 3) twist forward (B) 4) turn attitude (A) 5) turning jump (A) 6) jump into the twine with a turn of 360° (B) 7) jump into the twine (A) 8) three jumps in a row with a step change with a change of legs (B)
3.	1) roll forward (A) 2) stand on head bending legs (A)	1) angle in the support of the foot apart (A) 2) high angle in the support of the foot apart (B) 3) horizontally the foot rest apart with the support on the elbows (B) 4) horizontal foot rest apart with support on the elbow of one hand (B)	1) the front twine, the trunk parallel to the floor (B) 2) the back twine, the trunk parallel to the floor (A) 3) a transverse jump – "Pike" (A) 4) jump into the ring with the torso bending backward (B)	1) the equilibrium "letter T" (A) 2) turning the "compass" (B) 3) cross rotation and wave by trunk (A) 4) turn in the "gun" (A) 5) jump "Cossack" (B) 6) jump into the twine (A)
4.	1) flip forward (B) 2) the "bridge stand" from the lying position (A) 3) "wheel" to the left (A) 4) the "bridge" is tilted backward (B) 5) the roll is bent in the support lying (B)	1) "push-up" in the support lying (A) 2) jump in the grouping (A)	1) jump into the twine with the torso bending backward (B) 2) jump into the ring with a torso bending backwards (B) 3) a jump with a turn on 360° in a twine (B)	1) equilibrium "letter T" (A) 2) balance is a forward step with the help of hands (A) 3) equilibrium in the ring with the help of hands (A) 4) equilibrium is to the side with the help of the hand (A) 5) turning into the ring without the help of hands (B) 6) jump into the twine (A) 7) jump with a turn of 360° (A)
5.	1) swing in the support lying (A) 2) a flip forward (A) 1) roll forward with change of legs (A) 2) the roll is bent from the rack on the lap (B)	1) angle in the support of the foot apart (A) 2) "push-up" in the stop Wenson (B)	1) swing forward (A) 2) swing backwards (A) 3) transverse jump of the "Pike" (A)	1) equilibrium of the "swallow" (A) 2) equilibrium "letter T" (A) 3) jump "Cossack" (B) 4) jump "fue" (B) 5) jump into the string (A) 6) jump with a turn of 360° (A)
6.	1) "bridge stand" from the lying position (A) 2) roll back (A) 3) headstand (A)	1) angle in the support of the foot apart (A) 2) horizontal foot rest apart with support on elbows (B) 3) horizontal foot rest apart with support on the elbow of one hand (B)	1) jump into the ring with a torso bending backwards (B)	1) turning the "compass" (A) 2) jump "Cossack" (A) 3) chete an tunnan – a jump in the string (A)

An analysis was made of the number and complexity of elements of different structural groups in the composition of arbitrary programs of athletes. It was revealed that the composition of an athlete's free program with the best result includes the largest number of elements – 22, of which the largest number – 13 elements – are classified as more complex. The scores of athletes for an arbitrary program are directly proportional to the number of complex elements in the composition (from 13 to 3 elements of group B) (Table 2).

At the next stage of the study, a detailed analysis of the performances of female athletes was conducted. With the expert judges, the evaluation criteria were preliminarily discussed [1; 4; 6; 8]. The performance of the elements of each structural group was estimated from five points; the final result for execution of an arbitrary program was calculated. The scores received by the athletes according to all the refereeing criteria are shown in Figure 1, the numbers of the athletes correspond to the results of the performance in the second round.

It was revealed that the scores for the performance of the competition program exhibited by the expert judges are interrelated with the results of the earlier analysis of the quantitative indicators of the competition compositions that are shown in Table 2. Therefore, the athletes with the best performance for their competitive compositions in quantitative ratio received higher assessment for their implementation (from 4,9 points to 4,2 points). Thus, we can conclude that athletes prefer to include in an arbitrary program those elements that they have well mastered. The content of competitive athletes' compositions is largely limited by the level of their motor readiness. When judging the performance of arbitrary fitness programs by judges, the logic of the composition, the variety and complexity of the elements, as well as the technical performance of the elements, artistry, plasticity and musicality [2; 3; 8].

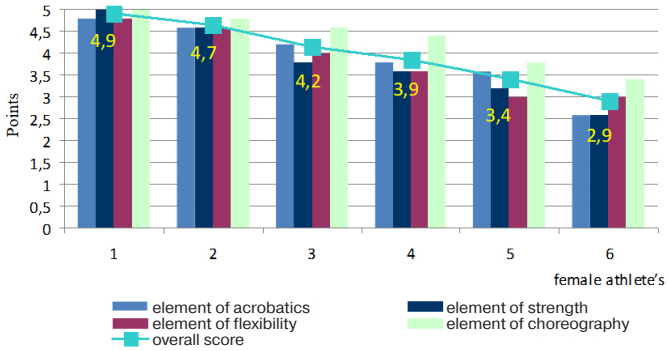

Figure 1. Expert evaluation of female athlete's performances in an arbitrary program

Conclusions

1. Compositions of arbitrary competitive exercises in women's fitness include elements of different structural groups: "acrobatic", "choreographic", "power", "flexibility", differing in different levels of complexity.

2. Saturation of the program, the diversity and complexity of the elements in the aggregate affect the competitive result in an arbitrary program in women's fitness.

Prospects for further research in this direction, they are supposed to consider issues related to improving the technical preparedness of female athletes in women's fitness.

Table 2

Quantitative indicators of elements of different structural groups and categories of complexity in arbitrary programs of female athletes

Athletes	Complexity Categories	Structural groups				
		Acrobatics	Power	Flexibilities	Choreographic	Total sum
	All	5	5	4	8	22
1	A	1	2	2	4	9
	B	4	3	2	4	13
	All	4	4	5	8	21
2	A	2	2	4	5	13
	B	2	2	1	3	8
	All	2	4	4	6	16
3	A	2	1	2	4	9
	B	0	3	2	2	7
	All	5	2	3	7	17
4	A	2	1	3	6	12
	B	3	1	0	1	5
	Всего	4	2	3	6	15
5	A	3	1	3	4	11
	B	1	1	0	2	4
	All	3	3	1	3	10
6	A	3	1	0	3	7
	B	0	2	1	0	3

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Peculiarities of self-governing students of a higher education institution of a sports profile

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Purpose: *determine the features of student self-government higher education institution of a sports profile.*

Material & Methods: *120 students of the Kharkov State Academy of Physical Culture. The theoretical-methodological analysis, the analysis of normative legal documents, the system analysis, the survey (questioning) are held.*

Results: *motivational number of students-athletes to participate in student self-government including needs: in prestige, self-improvement, recognition; achieving success and avoiding failures; show power over others; in communication, the establishment of emotional ties with others; participation in the cognitive process. The organizational structure of the bodies of student self-government of the Kharkiv State Academy of Physical Culture includes the student parliament, the student council of the hostel, the student trade union committee and the student scientific society, which interact with each other and have their leaders.*

Conclusions: *the main motivations for participation in student self-government are 67% of the students surveyed who consider the possibility of self-realization, through public work and its importance for the educational institution. The main body of student self-government is the Student Parliament, the election of the heads of the organization takes place by secret ballot during the general conference of students, and all other decisions are taken by open voting.*

Keywords: *students, higher educational institutions, self-government bodies, student self-government bodies.*

Introduction

In the conditions of the rise of the wave of social activity of Ukrainian youth, the state course on decentralization of power, democratization of the system of higher education and the desire for its reformation, changing tendencies in the country's youth policy, an important direction of activity is the organization of student self-government in institutions of higher education.

Student self-government operates at different levels of educational institutions, their structural subdivisions and is an integral part of the public self-government of educational institutions; this was noted in their works by such modern authors as K. Denisenko, Yu. Kraschenko, K. Potopa, A. Romanik, G. Trotsko and others, who studied the history of formation and development, the organizational structure, the regulatory and legal foundations of student self-government in Ukraine and abroad.

Relationship of research with scientific programs, plans, themes. The research was carried out within the framework of the implementation of the fundamental scientific project for 2015–2017. "The theoretical and methodological foundations of the non-Olympic sport" (state registration number 0115U002372) (the author took part in the implementation of this project as the executor of the subtopic "Organizational, managerial, economic and humanitarian bases for the development of non-Olympic sport in Ukraine" 0115U006861C), and according to the thematic plan scientifically The research work of the Kharkiv State Academy of Physical Culture for 2015–2017. on the topic 1.5. "Methodological foundations of strategic development of physical culture and sports in the region" (state registration number 0113U004615).

Purpose of the study: determine the features of student self-government higher education institution of a sports profile.

Objectives of the study:

1. Consider the main motives of student-athletes for participation in student's self-government of higher education institution.
2. To characterize the organizational structure and mechanism of formation of the bodies of student self-governance of the institution of higher education of the sports profile.

Material and Methods of the research

120 students of the Kharkiv State Academy of Physical Culture took part in the study. To substantiate the relevance of the topic, a theoretical and methodological analysis of the problem was carried out. For the study of organizational and managerial features of the activity of student self-government organizations, analysis of normative legal documents and system analysis is used. In order to study the motivational factors of student athletes for public activities in the bodies of student self-government of higher education institutions, a survey (questionnaire).

Results of the research and their discussion

Modern legislation defines student self-government as the right and opportunity for students (cadets, other than cadets-military personnel) to solve the problems of studying and living, protecting the rights and interests of students, and also take part in the management of the institution of higher education. The first mention in the normative documents of independent Ukraine regarding student self-government was in

Art. 49 Regulations on the State Higher Educational Institution (1996), later – in the Provisional Regulations on the Student Self-Government Bodies (2001) and the Law of Ukraine "On Higher Education" (2002). These normative documents today regulate the activities of student self-government bodies, determine the basic principles of work, determine the boundaries of their powers and activities, determine the main aspects of the process of organizing student self-government. However, today there is not yet a complete organizational system of student government - there are some of its elements. Most often, the organization of activities occurs spontaneously, according to monotonous structures and directions [6; 8].

If we consider the bodies of student government as a management system, it can be found that the law [1] regulates: technical elements (availability of own premises, furniture, office equipment, Internet access, etc.), technological elements (election procedure), organizational elements (principles of activity, variations in the structure and forms of organization, rights and responsibilities of student self-government bodies), economic elements (financial basis of activities, disposal of funds, budgeting), however, the social elements that are an important part of the student's self-government organization are less well regulated, therefore they require detailed study.

The term "social elements" should be understood as the set of relations between objects and subjects: relations within the structure, between leaders and the asset of student self-government; external and internal relations; collective and individual relations; temporary and permanent relationships, etc. [10]. The absence of such regulation at the state level is due to the psychological characteristics of students, depending on the age, structure and form of organization of student government, the specialization of education, and therefore, can not be unified for all higher education institutions.

Considering the students as "a special social category, a specific community of people organized in an organized way by the higher education institution", I. Zimnya singles out the main characteristics of the student's age in her studies, distinguishing him from other groups of the population by a high educational level, high cognitive motivation, the highest social activity and enough a harmonious combination of intellectual and social maturity [2].

Psychologists call the period of students – youth, as a rule, focusing on the age characteristics of young people. However, I., Konnoted that "the age categories in many, if not all languages, at first designated NOT so much chronological as the social status, social position" [3]. So, it should be noted the influence of student government as a social system on the development of the individual, because in the process of activity, students learn new knowledge, acquire new social roles.

The specifics of the institution, in particular the direction and scale of the institution of higher education itself, as well as the motivation of students who are included in the ranks of self-governing bodies, greatly influences the process of organizing student government [5]. It should be noted that students-athletes have stable motives of activity, self-confidence, understand the ratio of resources spent with the results obtained, which, with the right organization, can be successfully used for work in the bodies of student government.

Motivational series G. Murray [4] highlights the needs of athletes, they satisfy in sports, but can fully realize in student self-government:

1. The need for prestige, self-improvement, recognition, achievement, ambition, the desire to prove oneself. Participation in student government gives the student-athlete a certain social status, so he can achieve recognition among students of his own institution of higher education, to prove himself as a student leader in the territory of Ukraine.

2. The need to achieve success and avoid failures. Satisfaction of this need may be the factor that will ensure greater effectiveness of student self-government bodies, increase the competitiveness of the student council.

3. The need to show power over others, to dominate or to obey others. Many athletes become members of teams to meet this need. Same team is trying to build (become part of it) and student activists in the bodies of student government.

4. The need for affiliation (the need for communication, the establishment of emotional ties with others, the manifestation of goodwill, cooperation). This motif is well known to athletes "for the benefit of the team", "for their native country" – these very often are used by trainers. This motive largely influences the organization of the activity of the student's asset, in particular, interaction with the management of the educational institution. After all, in this context, students perceive the entire educational institution as a single mechanism, "one team", so are ready to act in its interests, and not just satisfy their own needs.

5. The need for participation in the cognitive process, the desire to satisfy one's curiosity, to receive answers to the questions of interest. The variety of social roles in the bodies of student self-government enables students to satisfy this desire, and the liability of the structure will allow them to try themselves in several roles, choosing the most appropriate one.

A survey among students of the Kharkiv State Academy of Physical Culture showed that the majority of students, namely 67% of respondents, consider self-actualization, through social work and its importance for the educational institution, 24% – to feel part of the "team", 6% want to increase the circle of communication and help other students solve their problems, and only 3% have joined public activities in order to acquire new knowledge and skills. At the same time, 75% of the students surveyed are ready to give their free time daily to participate in the public life of the Academy, which also confirms the high level of motivation of students-athletes for public activities in the bodies of student government.

In studies Yu. Kraschenko describes some features of the organization of the system of student self-government at the university level. He notes that in higher educational institutions heads of student self-government are elected by secret ballot. This choice is made by a representative conference of students or all members of a student society. Conference is organized in different ways: a) delegates from each academic group; b) the quota of representation from each faculty (institution) is determined (for example, 1–5% of the student population). If the heads of student government have the opportunity to choose all students of the university, the problem of establishing the legitimacy of the electoral process. Then,

in the opinion of the author, it is necessary to fix the border of the appearance of students for elections to declare them valid. In a significant number of leading universities in Ukraine, graduate students are recruited to work in the bodies of student government and have the opportunity to be elected to their management team. The subordination and interaction of bodies of student government (student councils, student trade unions, student scientific societies, student councils of hostels) takes place in each educational institution in different ways: some operate structures coordinating the activities of student self-governing organizations; in others, they are all subordinated to the student council or, conversely, to the student trade union committee; in the third – they compete among themselves or sometimes have hostile attitudes. On the basis of some bodies of student self-government, the same-name youth public organizations operate, which allows them to act as subjects of grant-making relations [4].

The conducted research has revealed the following features of the organization of student self-government of the Kharkiv State Academy of Physical Culture:

1) Student self-government is carried out by the authorized body – public organization "Student Parliament of the Kharkiv State Academy of Physical Culture SPAR", which is a non-profit organization and acts on the basis of the community of students' interests for the realization of the set goals and tasks.

2) Elections of heads of the organization occur by secret voting during the general conference of students, however all other decisions are made by open voting.

3) All bodies of student self-government – the Student Parliament and Student Council of the KSAPC hostel interact with each other, but are independent, have a separate structure and leaders. Separate subdivisions of student self-government are the student trade union committee and the student scientific society [9].

Conclusions

1. A motivational row of students of a higher education institution of a sports profile to participate in student self-government includes the following needs: in prestige, self-improvement, recognition; achieving success and avoiding failures; show power over others; in communication, the establishment of emotional ties with others; participation in the cognitive process. At the same time, 67% of the students surveyed consider that the main motivations for participating in student self-government are the possibility of self-realization, through public work and its significance for an educational institution.

2. The organizational structure of the bodies of student self-government of the Kharkiv State Academy of Physical Culture includes the Student Parliament, the student council of the dormitory, the student trade union and the student scientific community, which interact with each other and have their leaders. The election of the leaders of the organization takes place by secret ballot during the general conference of students, all other decisions are made by open vote.

Prospects for further research in this direction are the study and comparative analysis of personal characteristics of leaders and representatives of bodies of student self-government of higher education institutions.

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Some results of physical rehabilitation of victims with consequences of mine-blast injury of lower extremities

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Purpose: *increase the effectiveness of physical rehabilitation of victims with the consequences of mine-explosive injury of the lower limbs at the polyclinic stage.*

Material & Methods: *a study of the effectiveness of the physical rehabilitation of the victims with the consequences of the mine-explosive injury of the lower extremities at the polyclinic stage was carried out at the clinic of the Dorra-Center Medical Center in Belbek (state of Lebanon) on the basis of the physical rehabilitation department.*

Results: *results of use in the study of the Minor sample, Schober's test, and the modified S. D. Tumyan technique are presented and indicate the effectiveness of the proposed program of physical rehabilitation of victims after a mine explosion injury.*

Conclusion: *the analysis of the results of the study showed that with positive dynamics of changes in the functional state of the victims of both clinical groups, the best results were obtained precisely from the victims of the main group who underwent physical rehabilitation according to the program proposed by us. In addition, in the affected main group at the same time and volume of observation, these indicators were better than the control group.*

Keywords: *mine-blasting injury, physical rehabilitation, polyclinic stage, lower extremities, oriental massage, Arab bath.*

Introduction

In military operations in modern local military conflicts, the most common means of destruction are explosions of various origins. According to statistics, they are also decisive damaging factors [1; 2].

In recent decades, damage from explosive devices and ammunition has been among the top ten leading causes of death from the use of weapons in the World. And this process continues to grow progressively in armed confrontations around the world.

A special feature of an explosive (mine-explosive) injury is a significant severity of bone and surrounding soft tissue injuries, primary microbial contamination of the wound, the presence of foreign bodies in the wound and a high incidence of early and late complications [4; 5].

For doctors, mine-explosive lesions represent an increased complexity due to the presence of distinctive features of pathogenesis, diagnosis, treatment of such patients, and for rehabilitation specialists of such victims, due to a combination of disruptions in several body systems, the problem of creating complex physical rehabilitation programs, physical recovery [6; 7; 8].

As many authors note, the consequences of a mine-blast injury are particularly difficult to accurately diagnose, they are characterized by high lethality (67,8–79,3%), frequent complications (69,3–77,3%), disability of the victims. In 85,7% of the victims of mine and blast injury, it is the lower limbs that are injured [9; 10].

The main objective of physical rehabilitation, as an integral part of medical rehabilitation, is an integrated approach to the restoration of health and the maximum possible working capacity of victims after a mine blast injury [12; 13]. The need to return the wounded soldiers and officers of the security services to perform their official duties, and the civilian population to active work, is necessary both in the military and in peacetime. At the same time, the improvement of the system of organization of medical and sanitary measures and the improvement of the mandatory complex of rehabilitation measures at all stages of treatment and especially in the early period after the provision of specialized medical care can really reduce the human losses and material costs of the state [3; 6; 11].

Therefore, to date, the problem of effective organization and conduct of medical and physical rehabilitation of victims with the consequences of mine explosion injury is one of the most urgent issues of extreme medicine, physical and psychological rehabilitation.

Purpose of the study: increase the effectiveness of physical rehabilitation of victims with the consequences of mine-explosive injury of the lower limbs at the polyclinic stage.

Material and Methods of the research

The study was conducted in the clinic of the Dorra-Center Medical Center in Belbek (state of Lebanon) on the basis of the physical rehabilitation department. The overwhelming majority of the victims were residents of rural areas and suburbs. Belbek.

All the victims were male at the age of 23 to 44 years. Among

the victims were persons of working age, servicemen and law enforcement officers of the state of Lebanon.

A total of 48 men participated in the study, which were divided into two equivalent clinical groups – the main group and the control group (24 victims each). The duration of the trauma ranged from 6 months to 3 years, while the victims of both clinical groups underwent a course of rehabilitation treatment for the first time. By localization of the injuries received, age and manifestations of functional disorders, the main and control groups were identical.

The victims of group I (control) received a complex of rehabilitation measures under the traditional program of physical rehabilitation, accepted in the clinic of the Medical Center "Dorra-Center". The victims of group II (main) complex of rehabilitation measures received according to the program proposed by us.

Each victim from both groups underwent primary and re-examination before rehabilitative treatment and at the end, 30 days after the beginning, which allowed to obtain data on the dynamics of the parameters of the musculoskeletal and other body systems, changed during the treatment according to the traditional and original complex program of physical rehabilitation of victims after a mine-blast injury of the lower extremities at the out-patient stage of treatment. Also for the victims of both groups, there was ongoing monitoring of the somatic state during exercise therapy and during physiotherapeutic procedures.

Analyzing some results of the study, within the framework of this article, the dynamics of the measurement parameters of the amplitude of movements in the joints of the lumbar spine with the Minor test and the Shober test was examined, and the effectiveness of rehabilitation treatment of the victims after the mine explosion was analyzed according to the data of the technique of S. D. Tumyan 1983) in the modification.

Since the patients were referred to the rehabilitation center for the first time, all physio-functional measures were conditionally divided into 4 phases for all clinical cases. Each phase corresponds to a weekly protocol of rehabilitation measures and schedule. The schedule of rehabilitation measures for the affected control group is presented in Table 1.

Table 1
Schedule of treatment for patients in the control group

Weekday	Treatment
Monday	Exercise therapy, magnetotherapy
Tuesday	Therapeutic massage (back, leg), laser therapy
Wednesday	Exercise therapy, magnetotherapy
Thursday	Therapeutic massage (back, leg), laser therapy
Friday	Exercise therapy, magnetotherapy
Saturday	Therapeutic massage (back, leg), laser therapy
Sunday	Rest

The tasks of exercise therapy in the affected groups were: optimization of tissue function, gradual increase in cardiovascular load, increase in static and kinematic loads on the musculoskeletal system as a whole, and purposefully on the muscles of the back and lower limbs, exercises to restore proprioception, exercise with an open and a closed kinematic chain, exercises to restore proper posture and gait, training a rapid change in direction and coordination.

The injured control group was prescribed a therapeutic massage of the spine muscles, taking into account the main and special parts. It should be noted that 18 patients had muscular hypertonicity in the paravertebral and remote zones of the affected segment, 6 myogloeoses and myofibrosis sites were detected. The therapeutic massage of the affected limb was intended exclusively in the regime of the main part, activation of blood and lymph flow was due to the involved technique of lymphatic drainage massage.

Magnetotherapy in the control group was intended for 3 sessions with magnetic field induction up to 30 mT. Laser therapy in this phase was used for all patients 3 times in view of the type of monochromatic radiation on the knee or ankle and reflexogenic zones, but, as a rule, in a constant mode with a power of up to 25 mW for 15–30 seconds each, the total time of the procedure was 3 minutes.

It should be noted that the curative gymnastics program, the selection of exercises and their dosages, as well as the technique of therapeutic back massage, which were used in the main group, did not differ from the program that was used in the control group.

For the victims of the main group, the protocol of each phase consisted of therapeutic gymnastics, classical back massage for local elimination of the primary manifestations of spinal osteochondrosis, a modified technique for oriental massage of the injured limb and an Arab-based oriental bath procedure. Physiotherapeutic treatment was not used – it was replaced by the above-mentioned hydrobionic procedures.

The protocol of each phase was different from the complex of exercise exercises and met all the general provisions of the physical rehabilitation program.

The criteria for the transition to the second phase of treatment in both groups were: complete passive flexion and extension in the ankle joint, complete passive extension and flexion to 130 degrees in the knee joint, minimized pain syndrome and edema of the limb, restoration of functional activity of the quadriceps femoris muscle.

The criteria for the transition to the third phase were: full axial load, correct posture, full active flexion and extension in the ankle joint, complete active extension in the knee joint without resistance and complete passive flexion, there is no pain syndrome and swelling of the limb.

By the fourth phase passed after the restoration of the walking stereotype, full active flexion and extension in the ankle joint with resistance, full active extension and flexion of the knee joint, restoration of muscle strength to 80% of the strength of the healthy limb and in the absence of manifestations of pain syndrome.

A comprehensive program of physical rehabilitation for the affected groups was also developed, consisting of 4 phases, each of which corresponded to a protocol that was implemented in accordance with the schedule for all phases (Table 2).

Table 2

Schedule of treatment for patients in the main group

Weekday	Procedure
Monday	Bath + oriental massage
Tuesday	Exercise therapy (classical back massage)
Wednesday	Bath + oriental massage
Thursday	Exercise therapy (classical back massage)
Friday	Bath + oriental massage
Saturday	Exercise therapy (classical back massage)
Sunday	Rest

The transition criteria for the next phase of rehabilitation were the same as for the affected control group.

Results of the research and their discussion

Long-term and progressive violation of motor stereotype and supporting function of one lower extremity lead to the appearance of pronounced and persistent orthopedic disorders (diseases of the intervertebral joints and active development of osteochondrosis of the spine), which in turn leads to a deterioration in the quality of life and manifestations of the clinical picture of osteochondrosis syndromes [9; 13].

Measurement of the results of the Minor sample in the control group showed that the initial indices were 18,79±3,35 cm ($p<0,05$), and indicate a compensatory increase in muscle tone in the lumbar spine, which results in limited flexion of the spinal column.

When the control group was re-examined, it was found that on average 16,88±3,07 cm ($p<0,05$). The findings indicate a decrease in muscle tone in the lumbar spine, which is manifested by a moderate increase in the amplitude of flexion of the spine.

Determination of the mobility of the spine in the lumbar region was carried out in the control group using the Schober test (Table 3).

Table 3

Results of the Schober test in the affected control group after a mine explosion injury

Indicators	Baseline	After treatment
Distance, cm	3,13±0,63 ($p<0,05$)	3,88±0,49 ($p<0,05$)

Table 3 shows that a moderate increase in the amplitude of flexion of the spine led to a slight increase in the distance between the spinous processes of the lumbar spine.

Amplitude of movements in the lumbar spine during the study of the main group was also determined with the Minor test. The measurement showed that the initial values have an average value 18,21±2,55 cm ($p<0,05$).

In a repeated study, the average data of 14,58±2,60 cm ($p<0,05$) were recorded in the affected group of the main group, that is, the positive dynamics of the studied parameters was revealed, which indicates an increase in the amplitude of the lumbar spine movements.

The determination of spinal mobility in the lumbar region was performed in the main group using the Schober test (Table 4).

The increase in the amplitude of flexion of the trunk forward led to an increase in the distance between the spinous processes of the lumbar spine.

Table 4

Results of the Schober test in the affected main group after a mine explosion injury

Indicators	Baseline	After treatment
Distance, cm	3,06±0,57 ($p<0,05$)	4,39±0,65 ($p<0,05$)

Comparing the data of studies of mobility of the spine in the lumbar region, it can be seen that in a second study in the affected patients of both clinical groups, the functional state and the distance between the spinal outgrowths of the lumbar spine were improved. But in the affected group, the improvement of these indicators was more pronounced, which indicates the greater effectiveness of the proposed tactic of physical rehabilitation.

The effectiveness of the rehabilitation treatment of the victims after the mine explosion trauma according to the traditional and proposed schemes was evaluated according to the methodology of S. D. Tumyan (1983) in our modification.

The essence of S. D. Tumyan's methodology is based on the assessment of the main clinical-radiological signs (total 6), each of which is estimated by the numerical expression 0; 1 or 2 points. In this case, 2 marks are signs that are considered to be quite positive, 1 point correspond to a satisfactory value, which is satisfactory only in the estimation of the nearest results. 0 points – the importance of anatomical and functional criteria, are evaluated unsatisfactorily.

Considered such criteria as the volume of movements in adjacent joints, shortening, limb deformation, X-ray data, the presence of neurodistrophic disorders and purulent-necrotic complications.

The results were considered good, in which there was no restriction of movements in adjacent joints, there is no neurodystrophic syndrome on the background of complete consolidation of the fracture, fully restored axis and segment length, absence of purulent-necrotic complications.

Satisfactory were the results in which there were contractures in adjacent joints that needed further rehabilitation and moderate neurodistrophic manifestations-edema, muscle atrophy up to 2 cm. At the same time, fracture fusion occurred, restoration or slight violation of the length and axis of the limb.

The results were unsatisfactory in which stable contractures were found in adjacent joints that needed the following surgical treatment, neurodystrophic syndrome in the form of paresis or paralysis of the muscles, revealed violations of osteorecorrection in the form of false joints, fractures of fracture or bone defect, consolidation of the fracture in functionally disadvantageous situation, the presence of purulent-necrotic complications.

All the victims who participated in the study at the time of the onset of physical rehabilitation determined the complete fusion of bone fractures, there were no purulent necrotic lesions and neuro-dystrophic disorders were expressed.

One of the most significant indicators of the quality of rehabilitation is the restoration of movements in the joints. To more accurately estimate the volume of movements, objective numerical data in degrees were used. The shortening of the segment and the degree of muscle atrophy are measured in centimeters, the deformation in degrees.

We did not take into account the social rehabilitation of the victims and the restoration of working capacity as one of the criteria for evaluating the results of treatment.

Cosmetic limb defect, pain, increased fatigue as independent criteria were not considered, because they are subjective, and the factors that lead to them are taken into account in other features.

The score in the range of 10–12 was considered as a good result, within 8–10 – as satisfactory, the indicator less than 8 points was attributed to the unsatisfactory result.

The results of treatment of the injured *control group* after a mine explosion injury according to the method of S. D. Tumyan are presented in Table 5.

Table 5

Assessment of anatomical and functional results of treatment of the affected control group after a mine explosion injury according to S. D. Tumyan

Results of treatment	Initial level		After the course of treatment	
	abs.	%	abs.	%
Good	8	33,3	15	62,7
Satisfactory	10	41,7	6	25
Unsatisfactory	6	25	3	12,3
Total	24	100	24	100

Analyzing the data obtained, it can be seen that after using the program of physical rehabilitation according to the traditional program, the results improved, namely, the number of unsatisfactory (by 12,7%) and satisfactory (by 16,7%) results was improved by increasing the good (by 29,4 %).

The results of treatment of the affected main group after a mine explosion injury according to the method of S. Tumyan are presented in Table 6,

The obtained data show that after using physical rehabilitation according to the program proposed by us, the results have significantly improved, namely – the number of good results (by 54,2%) has significantly increased due to a decrease in the number of satisfactory (by 25,1%) and, especially, unsatisfactory on 29,1%) of results.

From the data presented, it can be seen that the average value of this indicator in the affected group, whose results were assessed as good and satisfactory, not only increased in comparison with the control group, but also the number of

Table 6

Evaluation of anatomical and functional results of treatment of the patients of the main clinical group according to S. D. Tumyan

Results of treatment	Initial level		After the course of treatment	
	abs.	%	abs.	%
Good	7	29,1	20	83,3
Satisfactory	9	37,6	3	12,5
Unsatisfactory	8	33,3	1	4,2
Total	24	100	24	100

victims, whose results were assessed accordingly, increased. Although the number of victims whose rehabilitation results were assessed as unsatisfactory decreased by 5 times, the percentage of the maximum function increased, but did not differ significantly in the main group from that in the control group (41,25±1,25% та 40±5,18% respectively).

Thus, in the affected groups of the main group, there is a clear improvement in the efficiency indicators of the rehabilitation treatment, which is indicative of the severity of the effect obtained, and consequently of the pronounced positive dynamics after the physical rehabilitation program.

The analysis of the presented results of the study forms a reliable fact that, with a positive dynamics of changes in the functional state of the affected, both clinical groups are more pronounced and significantly better results were obtained in the affected group, who were physically rehabilitated according to the program proposed by us. In addition, in the affected main group we observed significantly better control group indicators of our methods and scales of results in the same time frame and scope of observation.

Conclusions

1. For physicians and rehabilitation specialists, mine-blasting lesions represent an increased complexity due to the presence of complex pathogenesis features, diagnosis, treatment of such patients due to a combination of disruptions in several body systems, which requires the creation of effective integrated programs for physical rehabilitation and psycho-physical recovery.

2. The use of the proposed program of physical rehabilitation with the consequences of mine explosion injury significantly improved the condition of the spine of the affected main group compared to the control according to the results of the Minor test and the Schober test.

3. The proposed program of physical rehabilitation was more effective for the victims of the main group according to the indices of the technique of S. D. Tumyan, which is confirmed by a significant increase in the number of good results (by 54,2%) and a significant decrease in the number of unsatisfactory (by 25,1%) compared to control group (29,4% and 12,7%, respectively).

Prospects for further research. The introduction of the proposed program of physical rehabilitation of victims with the consequences of mine-explosive trauma of lower extremities in the profile institutions of Ukraine.

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Author's program from combined shaping as a means of improving the physical preparedness of female students

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Purpose: *to improve the level of physical preparedness of female students aged 17–20 by means of combined shaping.*

Material & Methods: *the following research methods were used: analysis and generalization of literary sources, pedagogical experiment, pedagogical testing, methods of mathematical statistics. The experiment involved 30 female students aged 17–20 years of non-special faculties of the Central State Pedagogical University named after Vladimir Vinnichenko.*

Results: *the author's program of sectional sessions on combined shaping for students of 17–20 years is developed. The positive effect of combined shaping on the physical fitness of female students has been revealed.*

Conclusions: *the program of sectional sessions on combined shaping on the dynamics of the basic indicators of the physical readiness of female students.*

Keywords: *physical education, physical preparedness, program, students, combined shaping.*

Introduction

Physical education is one of the important means of diversifying and harmonious development of student youth, increasing physical fitness, preserving health and socialization in modern life. Therefore, the priority of physical education in universities is to create conditions for students to master the basic means of increasing physical performance and their functional state [11].

One of the main problems of increasing the level of professional capacity of students of different specialties is to ensure an appropriate level of physical condition, which consists of such components as the level of physical development, physical preparedness and health status of future specialists. However, at the moment the level of both general and special physical preparedness of university students is constantly decreasing [8].

Studying the dynamics of the above indicators for the entire period of students' training at the university shows that the rates of growth in physical fitness indicators are slowing down after the second course, and on the fourth and fifth even noticeably decrease. In undergraduates who do not attend compulsory physical education classes and do not do their own physical exercises and sports, clearly manifested physical fitness, performance and health deterioration.

Since many university students have deviations in health status, physical development and physical fitness (excess weight, insufficient or disproportionate development of muscles, stoop, insufficient development of motor abilities, etc.), there is a need to monitor their physical development, physical readiness and health status [4; 11].

A sharp decrease in the level of physical preparedness and physical condition leads not only to a decrease in the productivity of student activity and the appearance of a number of characteristic violations in the state of physical health of students, but also to a further decline in productivity and the duration of their professional activity, causing significant damage to the economic level of society. Issues of improving the physical preparation of students in recent years have been considered in the work of researchers [1]. Insufficient motor readiness is especially characteristic for students of faculties of nonphysical education [3].

Recently, a lot of scientific research has been devoted to optimizing the educational process of physical education in order to improve the level of development of the motor qualities of students. For this purpose, experts propose to use various means, forms and methods of physical education (T. Yu. Krutsevich, 2008, S. A. Abramov, 2012; N. S. Malyar, 2015; T. V. Malenyuk, A. V. Kosovskaya, 2015, etc.).

Scientists (E. V. Biryuk, 1986; V. K. Balsevich, L. I. Lubysheva, 1995, etc.) consider that in physical education programs the harmonious development of the intellectual and motional qualities of female students is facilitated by the use of the most popular types of physical exercises among students due to new possibilities of the emotional factor [9].

Shaping is one of the most popular types of motor activity. The shaping system is an unconventional healing system aimed at shaping the perfect figure, increasing muscle tone, strengthening the musculoskeletal system and improving the functioning of the body's functional systems.

Combined shaping, in our opinion, is one of the most accessible and effective systems of physical education and an effective means of harmonious development of the individual, strengthening of health, involving students in a healthy lifestyle, physical training and sports, and improving the physical preparedness of students, and conditioned the development and introduction of the experimental author's program from combined shaping in the teaching and educational process of students of non-special faculties the Central State Pedagogical University named after Vladimir Vinnichenko with the aim of improving their physical readiness.

Relationship of research with scientific programs, plans, themes. The work was carried out in accordance with the research plan of the Department of Physical Education and Recreational Physical Culture of the Central State Pedagogical University named after Vladimir Vinnichenko.

Purpose of the study: to improve the level of physical preparedness of female students aged 17–20 by means of combined shaping.

Objectives of the study: 1. To develop the author's program of sectional sessions on combined shaping for students of 17–20 years. 2. Identify the positive impact of combined shaping on the physical fitness of students. 3. To increase the effectiveness of the program of sectional sessions on combined shaping on the dynamics of the basic indicators of the physical readiness of female students.

Material and Methods of the research

The study used the following research methods: analysis and generalization of literary sources, pedagogical experiment, pedagogical testing, methods of mathematical statistics.

The study was conducted on the basis of the Central State Pedagogical University named after Vladimir Vinnichenko. In the experiment, 30 female students aged 17–20 years of non-special faculties of this institution participated.

Pedagogical testing was conducted for three years (2013–2016) and contains six stages of the study. At the beginning and at the end of each academic year, pedagogical testing determined indicators of the level of general physical preparedness of female students (Table 1). For this purpose, part of the state tests and standards for assessing the physical preparedness of the Ukrainian population for student youth and the corresponding organization and methodology for their conduct [2].

Table 1

Indicators characterizing the level of general physical preparedness of female students

Complex of motor performance indicators		
Test	**Indicators**	**Units of measurement**
Running 30 m	speed	s
Walking 1200 m	endurance	min
Standing long jump	explosive power	cm
Push-ups	power endurance	times
Lifting the trunk into the sediment from the supine position for 1 min	power endurance	times
Squats on two legs	power endurance	times
Body tilt forward sitting	flexibility	cm
Shuttle Run 4x9	coordination of movements	s

In the course of the research, the author's program of sectional sessions on combined shaping was developed and introduced into the educational process of physical education of students of the Central State Pedagogical University named after Vladimir Vinnichenko. In this paper, the term "combined shaping" was used, which provides a rational combination of exercises with shaping with elements of aerobics, exercises with fit-bol, dumbbells, skipping ropes and stretching exercises. That is, the main condition of the author's program is the combination of exercises with shaping with other types of physical activity, successfully complement and strengthen each other's actions, and make the lessons interesting and original. A methodical feature of building classes with combined shaping is the consistent performance of work of a power nature, aerobic orientation and stretching.

Separate trainings of the author's program have a predominantly combined character, that is, they provide for the application of several sets of exercises of various orientations. For example, in one training session it is possible to influence the development of general endurance and improve the flexibility and mobility of the joints of the whole body, in another training – to influence the development of coordination abilities and dexterity and improve the strength abilities of individual muscle groups with appropriately selected exercises from the complexes proposed in the program. There are various combinations.

But there can be training and one specific direction, namely:

– strength training;
– aerobic training;
– vitrolis training;
– training of restorative nature, etc.

The choice, combination, amount and orientation of the exercises (sets of exercises) for a separate training depends on the tasks set by the coach, the overall training plan and the stage of training athletes. According to the regulation and the magnitude of the load and the intensity of training. The duration of an individual workout is 60–80 minutes.

The positive influence of such training on the organism involved has been proved several times and is covered in scientific and methodological literature. Thanks to the training with combined shaping, there is an increase in the general level of physical fitness and its individual indicators, an improvement of the morpho-functional parameters of those involved is observed, which indicates a health effect on the state of the organism as a whole [5–7].

In order to determine the effectiveness of the introduction of the author's program of health-training sessions on combined shaping and its impact on the physical preparedness of female students, the dynamics of the change in the average group indicators of physical readiness during three years of study and comparison of the indicators of the first and sixth stages of the study was analyzed.

The results obtained during the study were processed using mathematical-statistical methods and included calculations of the following parameters:

1. Span of the arithmetic mean($\bar{X}$).
2. Mean square deviation (σ).
3. Coefficient of variation (V).
4. Average error of the arithmetic mean (m).
5. Reliability of the changes (P) was determined on the basis of the t-test of the Student.

Results of the research and their discussion

At six stages of the study, conducted at the beginning and at the end of each academic year, based on the results of pedagogical testing, individual indicators of the physical preparedness of the female students of the experimental group were identified and attended classes on combined shaping. Using the methods of mathematical statistics, the average group indices of the physical readiness of the students of the experimental group were calculated. In order to determine the effectiveness of the developed author's program and determine the percentage increase in the studied indicators, the indicators of the first and sixth stages of the study were compared.

Table 2 and Figure 1 show the dynamics of changes in the average group indicators of physical preparedness of female students aged 17–20 over three academic years.

Analysis of the dynamics of changes in the average group indicators of the physical preparedness of female students during the three academic years revealed a general tendency to improve.

So, the students' high-speed abilities increased by 10,1%, that is, the time to overcome the distance by 30 m was less than in the first stage. This increase in the indicator is reliable (P<0,05), but compared to other indicators is insignificant, because the program of training exercises on combined shaping has not been developed, it did not contain exercises aimed at developing the students' speed abilities. In addition, according to a number of specialists (P.V. Volkov, V. N. Platonov, B. M. Shiyan, V. P. Filin, etc.), the development of speed capabilities is largely genetically determined.

The general endurance of female students showed a tendency to increase, the shift of the results of walking for walking at 1200 m turned out to be not very significant (10,1%), but reliable (P<0,05). The result is due to the fact that, within the framework of the developed method for shaping, there was no provision for cross training, lengthy cyclical exercises that contribute to improving the level of development of general endurance.

Analyzing the indices of the explosive power of female students, it was found that they significantly improved (P<0,05), the result of long jump increased by 14,8%. To justify a slightly minor change in the indicator, in our opinion, it is possible to research specialists. Thus, in scientific works V. N. Platonov identifies three types of force: maximum, explosive and strength endurance, and the developed method of training in shaping basically contained exercises aimed at developing strength endurance (both with the weight of his own body and with additional burdening) during lessons from combined shaping and this fact had its positive consequences. Strength endurance significantly (P<0,05) increased during the study period. Thus, the results of the push-ups exercise improved by 367,4%, and the lifting of the trunk into the sediment from the prone position by 45,8%. More significant changes were observed in the power endurance of the muscles of the upper humeral girdle as opposed to the muscles of the trunk. The results can be explained by the characteristics of the female body and the presence of problem areas.

Flexibility indicators significantly (P<0,05) improved during the period under study. After all, in the sixth stage of the study the result of the exercise, the inclination of the trunk forward from the sitting position increased by 117,7%. This fact is quite natural, because the technique of training exercises on shaping contained a sufficient number of exercises aimed at developing flexibility (stretching).

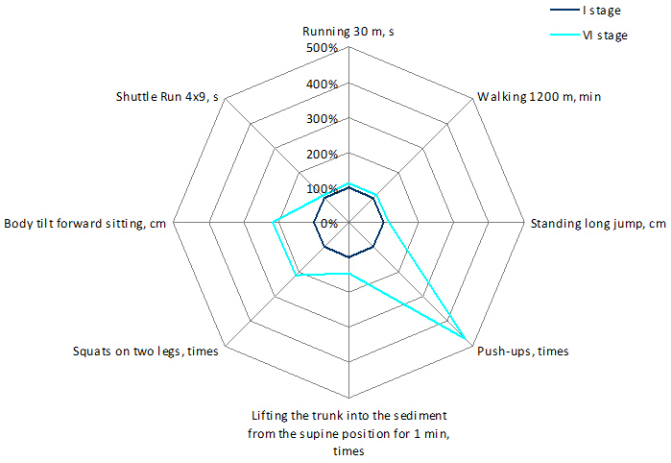

Figure 1. Dynamics of changes in the average group indicators of physical readiness of female students

Conclusions

1. The priority of physical education in universities is to create conditions for students to master the basic means of increasing physical performance and their functional state.

2. Combined shaping is one of the most accessible and effective systems of physical education and an effective means of harmonious development of the individual, promoting health, involving students in a healthy lifestyle, physical train-

Table 2

Dynamics of changes in the average group indicators of physical readiness of female students

No.	Tests	$\bar{X}\pm m$		ΔX,%	P
		I stage	VI stage		
1.	Running 30 m, s	5,47±0,04	4,92±0,02	10,10	<0,05
2.	Walking 1200 m, min	9,39±0,07	8,44±0,05	10,10	<0,05
3.	Standing long jump, cm	149,60±3,39	171,70±2,63	14,80	<0,05
4.	Push-ups, times	8,13±1,19	38,00±1,03	367,40	<0,05
5.	Lifting the trunk into the sediment from the supine position for 1 min, times	29,50±0,92	43,00±0,49	45,80	<0,05
6.	Squats on two legs, times	25,17±0,87	54,00±0,62	114,50	<0,05
7.	Body tilt forward sitting, cm	14,70±1,50	32,00±0,39	117,70	<0,05
8.	Shuttle Run 4x9, s	11,90±0,07	10,76±0,02	9,50	<0,05

ing and sports, and improving the physical preparedness of students.

3. In the course of the research, the author's program of sectional sessions on combined shaping for students of non-specialized to physical education of faculties was developed and introduced into the teaching and educational process of physical education of the Central State Pedagogical University named after Vladimir Vinnichenko.

2. The effectiveness of the program of sectional sessions on combined shaping on the dynamics of the basic indicators of the physical readiness of students is proved. All the studied indicators of the physical preparedness of female students significantly and significantly improved after three years of classes developed by the author's program. So, the improvement in the level of physical preparedness of female students aged 17–20 is confirmed.

Prospects for further research. In future studies, we plan to confirm the effectiveness of this author's program on the basis of the dynamics of changes in morpho-functional indicators of female students during three academic years.

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Improvement of special physical training of athletes 9–10 years old engaged in rhythmic gymnastics

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Purpose: *to substantiate the effectiveness of using the author's methodology for improving the special physical training of athletes 9–10 years old engaged in artistic gymnastics.*

Material & Methods: *in the study, during the year, took part 16 athletes 9–10 years old, engaged in rhythmic gymnastics. To identify the effectiveness of the author's methodology, analysis and generalization of literary sources, pedagogical observation, testing, pedagogical experiment, methods of mathematical statistics.*

Results: *based on the results of the experiment, the improvement of practically all the studied indicators was revealed, namely, the results of the implementation of equilibrium varieties (15–39%) and jumps (20–42%) were significantly improved.*

Conclusions: *the obtained results showed the effectiveness of the developed author's methodology aimed at improving the special physical training of athletes during the preliminary basic training.*

Keywords: *rhythmic gymnastics, gymnasts 9–10 years, testing, special physical training*

Introduction

It is well known that the effectiveness of the training process in rhythmic gymnastics is directly dependent on the funds used in the classes with athletes [1; 2]. In modern conditions for the development of rhythmic gymnastics, there is a need to develop effective methods aimed at improving the special physical training of young athletes, especially at the stage of basic training – the most important stage in the formation of future gymnasts. Artistic gymnastics as a sport by the nature of motor activity refers to complex co-ordinates, and requires athletes to display a wide range of motor skills, skills and qualities [3–5]. Exercises of rhythmic gymnastics are complex combinations of movements of individual parts of the body with the manipulation of various objects that are performed under musical accompaniment and require high-level athletes to demonstrate specific special motor qualities [3; 5–7]. In connection with the constant complication of competitive programs and increasing requirements for the performing skills of gymnasts [7], special requirements are imposed on the level of special physical training of athletes. The results of the analysis of the special literature have shown that at the present time the problems connected with the method of improving the special physical training of athletes at the stage of specialized basic training [2–4; 8]. It should be noted that the leading experts in the field of rhythmic gymnastics also emphasize the importance of finding effective techniques for the improvement of special physical training as a prerequisite for the successful competitive activity of young gymnasts [2; 3; 8].

Purpose of the study: to substantiate the effectiveness of using the author's methodology for improving the special physical training of athletes 9–10 years old engaged in artistic gymnastics.

Material and Methods of the research

In the course of the research, the following methods were used: theoretical analysis and generalization of literary sources; pedagogical observations; testing; methods of mathematical statistics; pedagogical experiment. To assess the effectiveness of the author's methodology for improving the special physical training of young gymnasts, a pedagogical experiment was conducted, in which 16 athletes aged 9–10 years. Based on the results of the initial and repeated testing, a comparative assessment was made of the level of development of special physical fitness of young gymnasts. The quality of the tests was assessed on a 10-point scale in accordance with the curriculum for rhythmic gymnastics [9]. According to the curriculum, 75% of the training time is given to exercises of special physical and technical training [9]. In the framework of the developed methodology, the above exercises were conditionally divided into special groups: "basic" technical actions – 40% and SPP exercises – 35%. In turn, the SPP exercises were divided as follows: "narrow special focus" exercises – 20% and "combination" exercises – 15%. The developed complexes of exercises "of a narrow special orientation" were divided into several subgroups: exercises that develop imaginative thinking and its motor expression; rhythmoplasty exercises; differentiating exercises; group exercises and dance choreographic exercises. "Combined" exercises were developed in the following subgroups: narrow orientation; wide or complex impact; model combinations that meet the adversary requirements and are used as fractional ones, that is, are part of a competitive composition. Specificity of the developed complexes of "narrow special orientation" and "combination" exercises was determined by a significant number of motor tasks and the corresponding versatile influence on the gymnasts. At the end of the sequential experiment, according to the data of repeated testing of the level of development of special physical fitness of young athletes, the effectiveness of the author's method was tested by comparing the results of the study before and after the experiment.

Results of the research and their discussion

To test the effectiveness of the developed author's method-

ology, repeated testing of young gymnasts was carried out and a comparative analysis of changes in the level of special physical preparedness of athletes during the study period (Table 1).

According to the results of the pedagogical experiment, it was revealed that in the "Bridge stand test with capture ankle joints, the standings of the legs apart", the athletes showed an average result of 5,6±0,4 s and 7,6±0,4 s The difference between these indicators is statistically significant, since t_p=3,7>t_{gr}=2,97. This means that after the experiment the results of this test objectively improved and their increase was 36%. When performing the next exercise "Holding the foot forward, standing sideways to the support" gymnasts showed the average score on the right – 5,6±0,3 s, on the left – 5,5±0,4 s before the experiment and 7,8±0,4 s and 6,9±0,4 s after. A comparison of these results by the Student's test shows that the difference between the mean group values is statistically significant (p<0,01 on the right leg and p<0,05 on the left one). The obtained indicators, with the help of which the test exercise "Holding the foot to one side, standing sideways to the support" was evaluated, there was a statistically significant (p<0,05) improvement in the results for the right leg and an unreliable (p>0,05) on the left leg. After using the developed technique, the increase in the result on the right leg was 26%, on the left –17%. The results of the study also indicate that, while performing the "Holding the leg back, standing sideways to supports" exercises after the experiment, the gymnasts showed a statistically unreliable (p>0,05) improvement in the results on the right and left legs. The increase in the result at the end of the experiment was 23% on the right foot and on the left 22%. When performing the next test task "Raise the leg forward, translate to the side and back" the female athletes showed the average group result of 5,8±0,5 s on the right; and 6,8±0,5 s on the left to the experiment and 6,8±0,5 s (right leg) and 6,3±0,5 s (left leg) after it was performed. The results of the study indicate an unreliable (p>0,05) improvement in the result of the right and left legs. The increase in the result of testing the translation of the right leg in comparison with the initial one was 17%, in contrast to the left translation result, where the average result of the exercise decreased by 7% (Table 1). In the process of comparative analysis of the results of the "High balance" test, a reliable improvement in the results t_p=2,2>t_{gr}=2,14 only on the right foot. Improving the result on the left is statistically not significant, since t_p=1,1<t_{gr}=2,14 (Table 1). The results of the introduction of the developed methodology for improving the special physical training in rhythmic gymnastics also indicate that the highest improvement in the result (42% increases) was observed in the test "Jump by the jog with two hands on the belt". Thus, at the beginning of the experiment, the gymnasts showed an average result of 25,9 cm, at the end of 36,9 cm. The difference between these indices is statistically significant, since t_p=13,3>t_{gr}=2,97. In the next test "10 jumps with the dilution of the legs back and forth by jerking the two" the gymnasts showed the average result on the right leg 4,7±0,3 times at the beginning of the experiment and 5,8±0,6 times at the end. Because the t_p=2,2>$t_{gr.}$=2,14, then we can conclude that the difference between these indicators is statistically reliable. This indicates that the introduction of the proposed methodology contributed to improving the result of the test "10 jumps with the dilution of the legs back and forth by jerking the two" on the right foot, where the increase was 23%. And although the improvement of the result of this exercise on the left leg is 20% with the average group results of 4,5±0,6 times to the experiment and 5,4±0,5 times after their comparison by the Student's test showed that the difference between them is statistically unreliable (t_p=1,2<$t_{gr.}$=2,14). The average results of the test "Bending back lying on the stomach for 15 s" suffered significant changes during the study period. If at the beginning of the experiment the maximum number of times the correct performance of this test was 7,4 times, then at the end of the experiment this result increased to an average of 9,1 times. So, the increase in the results of young athletes of the In the course of the study, the results shown by the athletes during the test "Bending body back in the rack on one, the second bend forward, sideways to the support", allow us to affirm the effectiveness of the proposed

Table 1

Dynamics of indicators of special physical training of young gymnasts during the period of pedagogical experiment (n=16)

No.	Name of test		Before exp. $\bar{X}$±m	After exp. $\bar{X}$±m	$t_{p.}$	p	Increase in results, %
1.	"Bridge stand" with capture ankle joints beginning position stand the legs apart. Hold (s)		5,6±0,4	7,6±0,4	3,7	<0,01	36
2.	Holding the leg forward, standing sideways to the support (s)	right	5,6±0,3	7,8±0,4	4,0	<0,01	39
		left	5,5±0,4	6,9±0,4	2,5	<0,05	25
3.	Holding the leg to one side, standing sideways to the support	right	6,2±0,4	7,8±0,5	2,5	<0,05	26
		left	5,8±0,3	6,8±0,5	1,7	>0,05	17
4.	Holding the leg back, standing sideways to supports (s)	right	5,6±0,5	6,9±0,4	2,05	>0,05	23
		left	5,8±0,5	7,1±0,5	2,02	>0,05	22
5.	Raise the leg forward, translate to the side and back. Hold for 2 s	right	5,8±0,5	6,8±0,5	1,4	>0,05	17
		left	6,8±0,5	6,3±0,5	2,09	>0,05	-7
6.	High balance in right (left). Hold for 10 s	right	6,0±0,6	7,5±0,4	2,2	<0,05	25
		left	5,3±0,5	6,1±0,5	1,1	>0,05	15
7.	Jump by the jog with two hands on the belt (cm)		25,9±0,6	36,9±0,5	13,3	<0,01	42
8.	10 jumps with the dilution of the legs back and forth by jerking the two (times)	right	4,7±0,3	5,8±0,6	2,2	<0,05	23
		left	4,5±0,6	5,4±0,5	1,2	>0,05	20
9.	Bending back lying on stomach for 15 seconds (times)		7,4±0,6	9,1±0,5	2,06	>0,05	23
10.	Bending body back in the rack on one, the second bend forward, sideways to the support – 10 s (times)	right	5,9±0,6	7,4±0,4	2,07	>0,05	25
		left	5,3±0,5	6,1±0,4	1,4	>0,05	15

methodology. Improvement of the results on the right leg was 25%, on the left 15%. In accordance with the Student's test, the difference between the mean group results of this test is statistically unreliable both on the right and left legs

Thus, positive changes in the level of development of special physical preparedness of gymnasts of the study group were due to the multi-dimensional influence of the introduced author's technique, which is confirmed by the results of repeated testing (Figure 1).

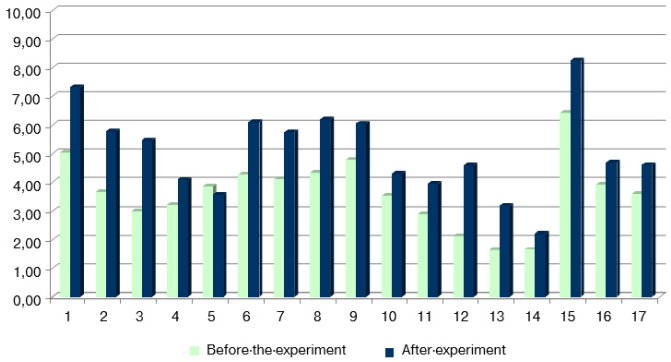

Figure 1. Assessment of test questions of gymnasts of the experimental group before and after the introduction of the author's technique (in points): "Bridge stand" with capture ankle joints beginning position stand the legs apart. Hold (3 s); Holding the foot forward, standing sideways to the support (*5 s);* Holding the leg to one side: right *(No.4);* left *(No.5) (hold 5 s);* Holding the leg back: right *(No.6);* left *(No.7) (hold 5 s);* Raise the leg forward, translate to the side and back: right *(No.8);* left *(No.9) (hold 2 s);* High balance: right *(No. 10);* left *(No. 11) (hold 10 s);* Jump by the jog with two hands on the belt *(No. 12) (cm);* Jumps with the dilution of the legs back and forth: right *(No. 13); лівою (No. 14) (10* times*);* Bending back lying on stomach for 15 *(No. 15) (кількість разів);* Bending body back in the rack on one, the second bend forward: right *(No. 16);* left *(No. 17) (10 s,* times*)*

Conclusions

1. The analysis of scientific and methodical literature showed that the modern state of development of rhythmic gymnastics requires the development of effective techniques aimed at improving the special physical training of young athletes, especially at the stage of basic training – the most important stage in the formation of the future gymnast.

2. To improve the level of special physical preparedness of young gymnasts, the author's method was developed, the essence of which was to distribute exercises of rhythmic gymnastics to special groups: "Basic", "narrow special orientation" and "combination" and their percentage ratio in the training process (40%; 20%, 15%, respectively).

3. The results of the whole complex of conducted studies have proved the effectiveness of the developed author's methodology aimed at improving the special physical training of young athletes engaged in rhythmic gymnastics.

Prospects for further research consist in the introduction of the developed author's methodology for improving the special physical fitness of athletes in the training process of the Youth Sports School, Specialized Youth Sports School, clubs and specialized educational institutions for further improvement.

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Phenomenology of non-verbal communication as a representation of sports activities

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The priority of language professional activity in sports is such non-verbal communication as body language.

Purpose: *to delete the main aspects of non-verbal communication as a representation of sports activities.*

Material & Methods*: in the study participated members of sports teams, individual athletes, in particular, for such sports: basketball, handball, volleyball, football, hockey, bodybuilding.*

Results: *in the process of research it was revealed that in sports activities such nonverbal communication as gestures, facial expressions, physique, etc., are lapped, and, as a consequence, the position "everything is language" (Lyotard) is embodied.*

Conclusions: *non-verbal communication is one of the most significant forms of communication in sports. Additional means of communication through the "language" of the body help the athletes to realize themselves and self-determination.*

Keywords: *non-verbal communication, gestures, facial expressions, athletes, linguistic and social context.*

Introduction

Body language as the world of symbols assimilated in the human body is one of the most significant forms of expressing the essence of human existence. Telesnost becomes a topical topic of scientific research, one of which is the body language. It is worth noting that world philosophers are arguing about the relationship between sport and corporality, which are mainly viewed from the standpoint of phenomenology and existentialism. The phenomenology of corporeality has become the subject of research by Ukrainian philosophers. In particular, V. Kebuladze turns to the theoretical analysis of bodily experience, A. Gomilko – to the metaphysics of corporality, L. Gaznyuk – to the somatic existence of the personal world of personality [1], V. Kosyak – to the epistemology of human corporeality.

One of the most common types of communication is nonverbal communication of body parts. There is a significant amount of non-verbal units where parts of the body play a role, among which, in particular, gestures. They are internally complex and multifaceted linguistic bodily phenomena. Gestures have not only anthropological, linguistic, psychological and social aspects of research, but also a certain philosophical meaning. By forming a peculiar language of the body, they, together with verbal speech, are a means and an attribute of communication, reflecting social, cultural, ethical and other features. The culture of non-verbal communication of this or that people is a unique unity of historically formed characteristic signs and specific ways of their use in social practice. This, first of all, stereotyped actions, which have a landmark character. Shakespeare said about these signs with the mouth of the main hero of the tragedy "The Type of Andronicus": "From the gestures you need to enclose the alphabet and learn to understand all the thoughts." Gestures fill the semantic content of the concept of "body language".

The gesture, basically, we understand as the expressive movement of the body, mainly accompanies the speech, that is, it is a complement to the verbal actions and more or less depends on the original word, replaces it, or simply acts as a wordless action. That is why different approaches to the analysis of the functional significance of gestures.

Let us dwell first on the gesture as an expression. Gesture as an expression acts primarily as an expressive medium and means for externalizing the inner state of the self, including emotions, reactions and meaning, which the body's speech should communicate to others. It can be said that gesture is an external movement of the body, one of the primary expressions of the senses with which a person is gifted from nature. Nature is conceived here as what is put in the foundation, creates a connection and acts as a symbolic "being for another and being another for it". In this case, the body rises, giving it to the inner world. Due to its primary function – an expression established primarily by the laws of nature, the gesture adds more opportunities to the person in communication, where he can both fulfill the main role, and supplement verbal communication, enriching it and, finally, becomes an integral part of it. Gesture as a sign carries a certain essence, which a person tries to express. The gestural movements form a peculiar body language, is the first sign both in the process of historical and individual development of man. They form a system of cultural-sign orientation, which is a system for organizing interpersonal interactions. These movements have their meaning, and it involves communication.

As we see, each of the forms of human communication, including the means of non-verbal communication, is of a social nature, and therefore, in order to adequately understand the sign language, the subject who perceives them must understand the meaning of these conventional signs.

Purpose of the study: to delete the main aspects of non-verbal communication as a representation of sports activities.

Task:

– to find out the main sports gestures as determining factors of non-verbal communication of athletes;

– demonstrate sports activities as an existential aspect of the language;

– to determine the virtual-real through the corporeal world of man.

Material and Methods of the research

The author's methodological research program was developed on the basis of such methods as analysis and generalization, as well as phenomenological and hermeneutic methods.

Results of the research and their discussion

Analysis of the results of the study allows us to assert that sport presents itself in several planes: as an activity, as anthropotechnology and as training. Language training of specialists in sports and physical culture is related to an important feature: intellectual training, unlike others (for example, humanities, physics and mathematics, etc.), is combined directly with body techniques, which include gestures, facial expressions, etc.

Specificity of sports activities requires mandatory knowledge of official refereeing, coaching and other gestures [2; 5]. Not understanding the meaning of these "linguistic" phenomena, it is impossible to explain their essence.

Almost every sport has its official and unofficial gestures [3].

Among official gestures, a significant part of the judiciary. For example, in the volleyball, the displays of certain situations are transmitted by such gestures: "permission to serve" – "to move the hand, showing the direction of submission"; "Break" – "place the palm of one hand over the fingers of the other, raised vertically like the letter "T"; "The ball is not thrown when performing the serve" – "raise, extend the hand with the palm of the hand".

In general, gestures in sports can be distinguished by such parts of the body:

1) head (tilts in the direction of transfer – please "submit" the transmission wider than the boundary of the grid or give a lumbago transmission, tilting the head, agreeing with the received message, etc.);

2) with your fingers (for example, the index finger raised upwards – please apply a balanced transmission, the movement of a fist clenched with the hand extended to the side with the thumb – the requirement of a blind transmission, returned downwards – a request to reduce the transfer);

3) hands (most often in basketball and handball: movement by hand indicating the direction of submission – permission to feed);

4) forearm (both forearm rises: one in front of the chest, the rest behind the back followed by a change in the position of the hands) – changing sides of the site.

Almost every sport assumes its own specificity of gesticulation [6]. As an example, we give examples of gestures in football and basketball (Figures 1, 2).

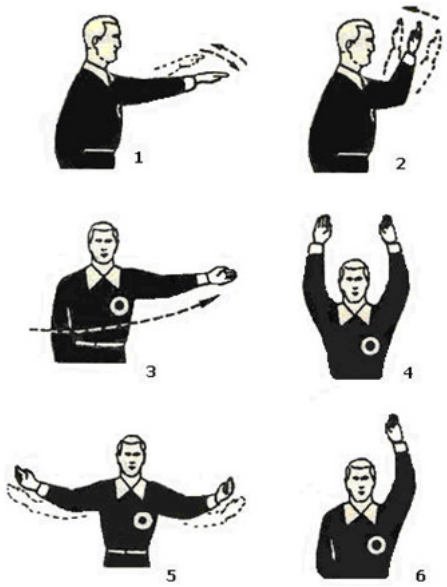

Figure 1. Gestures of referees on football [9]

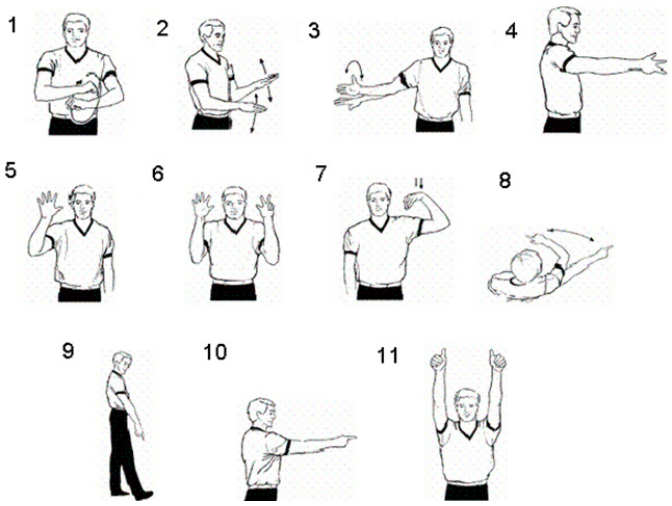

Figure 2. Gestures of referees on basketball [8]

Often judges use non-verbal communication with relevant subjects. These can be flags, cards. For example, for incorrect behavior the judge warns the player with a yellow card, and uses red to remove it.

In the volleyball, hand gestures are used less often than in handball and basketball, where they are used to attract the attention of partners who are at a distance. Undoubtedly, the conditions and requirements of the activity influence the choice and specificity of the means of communication. After all, it was in volleyball that gestures would attract the attention of rivals and unmask the intentions of the participants in the interaction.

Another of the most common gestures in the sport is facial

expressions. In particular, we distinguish such movements:

1) eyes – a wink as a way of designating a specific combination (used in planning certain attackers' actions), proposing to play together, acknowledging the received message and agreeing with the partner's proposal;

2) eyebrows – fast lifting of eyebrows upwards as a signal – the requirement to give a high transfer;

3) lips – the position of the lips, as when pronouncing the letter "o". This means "a fraudulent move has been made".

Quite often in practice, gestures are combined with facial expressions (for example, nodding to the side with a simultaneous wink – the requirement to give a cross pass).

Basically, such a gesture is agreed upon by the entire team instructed by the coach, and the player with the first number (this must be an intelligent person) directs this process. Sometimes there is a group, and not a collective arrangement: two players agree among themselves about a particular "language". It is pertinent to note that in each specific game, athletes in different ways can transmit their "language game" with the help of gestures, which helps to deceive the opponent and, at last, significantly influences the positive outcome of fights. Therefore, not only training and other qualities of athletes, but also non-verbal communication can also be a significant, and sometimes decisive factor in achieving the desired results of "non-linguistic" activity.

The use of non-verbal means of communication in sports, mainly gestural-mimic, is due to the need to conceal the transfer of information in conditions of direct contact with the rival, during strong noise, the inability to approach the partner closer, for convenience, disguise, etc.

According to Gardner, bodily speech is closely connected with bodily-kinesthetic intellectuality, on the basis of which the body differentiated and manipulated in ways expresses the intended purpose. Bodily intellectuality implies the art of using the body for both a functional and an emotional purpose. According to Gardner, expressiveness and emotionality are clearly expressed in the activities of dancers and swimmers who develop high skill in the movements of their bodies, achieving improvements in body practice.

Unlike dancers and athletes who use their body as a "clean" object, representatives of other sports use their body, especially their hands, head to manipulate, systematize and transform objects in the world.

As you can see, nonverbal communication is one of the most significant forms of communication in sports. Additional means of communication through the "language" of the body help the athletes to realize themselves and self-determination. Body language includes the intention of the principle possibility of man, his creativity, self-sufficiency, involvement in others, etc. The question arises of the multiplicity of sociocultural specialist practices and their representations. The intensified attention to language in its various human modes indicates the presence of the linguistic-social context, that is, the subject of educational reality, in its various manifestations, is considered first of all as a man manifested in the language, and, moreover, manifested in the language. This situation also occurs in the educational and professional activities of physical culture and sports, which includes training, work on a specialty, professional competence and culture, education. That is why the analysis of the linguistic representation of educational and professional activities becomes important not only as evidence of the intellectual maturity of a specialist, but also its ability to create this language.

Emphasizing these guidelines, we consider it necessary to focus on another very important aspect: the existential cut of the tongue. Nonverbal language is associated with a certain activity, with a certain time and space, with a certain form of life, and it can not be evaluated by criteria for other life forms. Sport is a special sociocultural specialized practice, anthropotechnics. The experience of presence in it presupposes a certain existential participation, an existential pattern. Sports competitions as a special kind of cultural practice represent a lot of emotional states both of the participants in these competitions and of the subjects themselves. It is during the competition that the athlete demonstrates his body of many people.

Important for research and discussion of this topic is that this or that state of educational and professional actions, events can be expressed in language in different ways, and thus, as A. Yarosh notes [7, p. 193], each such statement has only inherent properties that create a unique configuration, such as "object-language-subject".

So, it can be confidently asserted that in sports educational and professional activity there is such a direction as the philosophy of sport, but its component – the speech of sports sociocultural practice, sport as a special kind of human activity – has not been sufficiently explored yet. Language becomes meaningful only in the practical context of activity, and in this sense, it is important for J. Lacan's thesis that man is a linguo-social deterministic individual [4].

Through the body language, sports activities are represented, including sports such as bodybuilding (bodybuilding) or bodybuilding (culturisme, English Physical culture – body culture) – the process of building and developing muscles during classes physical exercises with weights, high-energy nutrition with increased protein content, sufficient for hypertrophy of muscle fibers. Modern athletic trends also demonstrate such bodybuilding nominations as bodyfitness (accentuates aesthetics – beautiful in combination with an athletic build), a mens physicist (competitions among men with a preference for moderate muscle mass, athletic and aesthetic build), bikini (demonstration by women of athletic and aesthetic beautiful physique), etc.

Over the years, sport has been shaping the person physically perfect. A feature of the body language of sports professionals is that it demonstrates visuality to a certain type of activity, and this is achieved for education, is one of the tasks of educational reality.

In the sports game reveals the human's physical world, its physiological strength and beauty.

Discussion for today is the question of the virtual reality of body language as non-verbal communication. If before nonverbal communication was transmitted by classical means (gestures, facial expressions), today it acquires virtual signs.

For virtual reality, there is a lack of physical representation and a number of other features, one of which is the anonymity of participants, sometimes based on delusion, manipulation, falsity. Thanks to computer technology, a person can represent himself by modifying the body. In sport, a person demonstrates his body directly in action, and on the Internet, with the help of media technologies, a virtual image is created that is distributed through the Internet and the media. Today, it is common to transfer the female to the male, and the male to the female. And this is one of the directions, which leads to the emergence of new strategies related to body language. A change in the physiology of a person causes a change in the body language. It is no accident that at the exhibitions of abstract art such a change in the physiology and language of the body of subjects is designated as "it". There is a transformation of the corporeality itself, and from here the body language also changes. In the body language, its modifications are made, which are achieved by surgical, genetic, plastic, biological correction, besides, such types of modifications as tattoo, tattoo and piercing look like the least traumatic. Such aspects reflect new trends in the transformation of both the body and its language.

Conclusions

The data of the analysis made allow us to conclude that one of the means of representing a professional activity is the language. Therefore, the appeal to the analysis of language in sports activities, as an indicator of the level of education, becomes a significant problem of modern vocational education. The experience of work in the sphere of education allows to distinguish language features in sports activities. They appear often enough in such a aspect as non-verbal communication, denoting the realities of the sports industry, and at the same time outlining the state of speech culture. The priority of linguistic professional activity in sports is such non-verbal communication as the language of the body. Here the position "everything is a language" (Lyotar) is most vividly embodied: gaze, gesture, flashing, physique, laughter, sight, tears. The body always represents the unity of the word, image and action.

If before non-verbal communication was transmitted by gestures, mimicry, then today it acquires virtual signs. The body language is transformed. Thanks to the capabilities of modern media and communication media, non-classical body language presentation tools are distributed.

In the **future**, further research is planned to expand the study of speech reality, in which language is presented as an activity, as a producer of information and knowledge.

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Quality of implementation of structural components of competitive programs of qualified athletes, as a factor determining the sporting result in acrobatic rock and roll

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Purpose: *to analyze modern competitive programs of "B" class athletes specializing in acrobatic rock and roll, and to determine the most informative indicators of the contents of these programs.*

Material & Methods: *during the study, video footage of the speeches at the Ukrainian Championship in acrobatic rock and roll of sports pairs of class "B" and electronic protocols of these competitions were analyzed. To assess the relationship between the most informative indicators of the content of competitive programs, a correlation analysis.*

Results: *it is determined that the most informative indicators of the content of the competition composition of qualified athletes of the "B" class, specializing in acrobatic rock and roll, are "elements of acrobatics and combinations", "main move", "dance figures", and in the block "choreography" "changes on the main move", "variation of the main move", "dance pair figures without the main move".*

Conclusions: *a strong correlation was found between "acrobatics" and "acrobatic combinations" (0,95), between "changes in the main move" and "main move" (0,89), between "variations in the main move" and "main move" (0,91), between "variations of the main move" and "changes in the main move" (0,93), between "dancing pair figures without the main move" and "dance figures" (0,94).*

Keywords: *acrobatic rock and roll, competitive programs, qualified athletes, class "B".*

Introduction

Acrobatic rock and roll is one of the most spectacular sports that is developing intensively in Ukraine and abroad. The high social significance of this type of sport necessitates the study of various aspects of the process of preparation of athletes. The efforts of many scholars are aimed at this. So, in a number of scientific studies highlights the actual problems of the preparation of athletes in acrobatic rock and roll [8] and the modern definition of acrobatic rock and roll is given, and a general strategy for the development of the theory of this sport is singled out [9]. Studies [2; 5] disclose features of the construction of competitive programs of qualified athletes, and article [4] focuses on the contradictions existing in the evaluation of acrobatic elements that are used in competitive programs of qualified athletes. A number of publications highlight the problems of technical training for athletes specializing in acrobatic rock and roll [6], and the dependence of the qualitative performance of basic exercises in acrobatic rock and roll on special physical fitness of athletes [1]. The results of the analysis show that modern trends in the development of acrobatic rock and roll are associated with the increasing complexity of competitive programs and an increase in the performing skills of athletes [2; 3]. They are conditioned by modern international competition rules [7], which focuses on the complexity of acrobatic elements and combinations that are performed by athletes, on the technique of their "main move", as well as on the increase in the number of dance figures that are included in the competition program [4; 6]. This raises a number of practical tasks to improve the process of training qualified athletes in acrobatic rock'n'roll, namely: acrobatic elements used in competitive programs, how to combine acrobatic elements and combinations with dance series.

This aspect of the process of training qualified athletes of class "B" in acrobatic rock and roll, as shown by the analysis of scientific and methodological literature, is still insufficiently studied.

Purpose of the study: to analyze modern competitive programs of "B" class athletes specializing in acrobatic rock and roll, and to determine the most informative indicators of the contents of these programs.

Objectives of the study:

1. To highlight the most informative indicators of the contents of competitive programs of qualified athletes of class "B" in acrobatic rock and roll.

2. Estimate the strength of correlation relations between the most informative indicators of the contents of competitive programs of sports couples of class "B".

3. Characterize the dependence of the competitive result in acrobatic rock and roll from deduction, which are due to errors in the technique of performing athletes competitive exercises.

Material and Methods of the research

To determine the most informative indicators of the content of competitive programs and to identify their relationship to the competitive result, an analysis of the video footage of the performances of sports couples of class "B", finalists of the championship of Ukraine in acrobatic rock and roll. The content of the competitive program was evaluated on the basis

of the analysis of the videograms by a specially developed method that reflects the structure of the competition program and includes the introduction (intro), 6 main blocks (in each of which the sports pair demonstrates the dance series and acrobatic elements and combinations) and the final pose (outro) . In the course of the analysis, the conformity of the competitive programs of the championship participants to the requirements for the construction of programs, which are described in the rules of the acrobatic rock and roll competition [7] and the catalog of acrobatic elements for the sports pairs of class "B".

Results of the research and their discussion

The analysis of the video materials of the competitive programs showed that sports pairs of the "B" class, specializing in acrobatic rock and roll, perform dance series and acrobatic elements in 6 blocks. Dance series include: six full competitive moves, variation of the competitive course, dance tracks, elements and movements of modern choreography, classical (andorhane, andedan) and rock and roll (use of an accented spring on the "re-le-ve"), jumps , dynamic changes in the positions of partners and specific dance figures and expressive poses, which successfully emphasize the accents of musical accompaniment. The acrobatic elements include: 4 groups of obligatory acrobatic elements (somersault forward, back somersault, "Todes", rotation) and two or more combinations.

To determine the most informative indicators and establish reliable links between the sport result and quantitative indicators of the content of competitive programs, a special correlation analysis was conducted. Its results are presented in the table. They show that among the structural indicators that determine the content of the competitive composition, there are strong ties between the nine. Thus, a strong correlation was found between the elements of acrobatics and acrobatic combinations (r=0,95), between the main move and the dance figures (r=0,78), between changes in the main move and the main move (r=0,89) between the changes in the main move and the dance figures (r=0,78), between variations of the main move and the main move (0,91), between variations of the main move and changes in the main move (0,93), between the dancing pair figures the main course and acrobatic combinations (0,85), between the dancing pair figures E without the basic stroke and dance iguramy f (0,94), between the elements and the dance choreography paired basic shapes without stroke (0,73). The received results testify that the selected connections should be taken into account in the process of assembling or correcting competitive programs of qualified "B" class athletes in acrobatic rock and roll.

The results of the research also showed that, in acrobatic rock and roll, the high result of a sports pair in the performance of a competitive program is significantly affected, firstly, by the qualitative performance of the "main move" with observance of the swing rhythm, which, as was shown above, has a strong correlation dependence on dance figures, as well as changes in the main move and variations in the main move. Secondly, the qualitative performance of dance figures with elements of choreography by sports couples, as, according to the results of the analysis, there is a strong correlation between dance figures, changes in the main move and variations in the main move.

The competitive result in acrobatic rock and roll is also significantly dependent on deduction, which are due to errors in the technique of performing athletes competitive exercises. To determine this relationship, mistakes were made in the technique of performing athletes' acrobatic elements and combinations, dance series and their deduction. In the technique of performing acrobatic elements and combinations by athletes, seven groups of deduction are allocated: deduction for the quality of performance; deduction for the amplitude of performance; speed deduction; deduction for the integrity of the implementation; deduction for partner control; deduction for security; deduction for the quality of landing. The weight of these deduction can reach from 5% to 100% of the total evaluation for a specific element of the program.

The analysis also showed that between the "elements of acrobatics and combinations" there are interrelations between the average (deduction for landing quality, partner control and security) to high (deduction for performance, amplitude, speed and integrity of performance). Thus, "elements of acrobatics and combinations" strongly correlate with deduction for "quality of the technique of execution" (r=0,97), with deduction for "amplitude" (r=0,88). The average correlation dependence is revealed between "acrobatics and combination elements" and deduction for "speed of completion" (r=0,74), "integrity" (r=0,73), "safety of execution" (r=0,68), "Partner control" (r=0,65) and "landing quality" (r=0,68).

In the technique of performing the dance series, three groups of deduction are singled out: for the technique of performing the "main move", for the technique of performing dance figures, for performing the choreography.

The weight of these deductions can reach from 5% to 100% of the total evaluation, which can be exposed for this item. As

Correlation between the indicators that determine the content of the competition program

No.	Indicators that determine the content of the competition program	1	2	3	4	5	6	7	8
1.	elements of acrobatics	**1**							
2.	acrobatic combinations	**0,95***	**1**						
3.	main move	0,56	0,63	**1**					
4.	dance figures	0,54	0,55	**0,78**	**1**				
	Choreography:								
5.	Changes in the main move	0,47	0,41	**0,89**	**0,78**	**1**			
6.	Variations of the main move	0,43	0,40	**0,91**	**0,64**	**0,93**	**1**		
7.	Dance paired figures without the main course	0,52	**0,85**	0,44	**0,94**	0,47	0,56	**1**	
8.	Other choreographic elements	0,45	0,42	0,49	0,51	0,54	0,58	**0,73**	**1**

Remark. ** – high and statistically significant (p<0,05) values of correlation coefficients.*

a result of the correlation analysis, reliable interrelationships between the average (deduction for choreography) and high (deduction for performing the "main course" and dance figures) between the dance series and the overall evaluation for the performance of the sports program "Acrobatics" were revealed. Thus, a strong correlation dependence of the "dance series" was revealed with deduction for "dance figures" (r=0,83) and for "main move" (r=0,98). The average correlation dependence is revealed between "dance series" and "choreography" (r=0,71).

Conclusions

1. The results of the research showed that "the elements of acrobatics and combinations", "main move" and "dance figures" are the most informative indicators of the content of the competitive composition for qualified "B" class athletes specializing in acrobatic rock and roll. In the block "choreography" – "changes in the main move", "variation of the main move", "dancing pair figures without the main move".

2. As a result of the study, a strong (close to functional) correlation between "acrobatics" and "acrobatic combinations" (r=0,95), between "changes in the main move" and "main move" (r=0,89) between "variations of the main move" and the "main move" (0,91), between "variations of the main move" and "changes in the main course" (0,93), between "dancing pair figures without the main move" and "dance figures" (0,94).

3. The results of the study indicate a high correlation of "acrobatics and combination elements" with discounts for "quality of the execution technique" (r=0,97), with discounts for "amplitude" (r=0,88). Also, a strong correlation dependence of the "dance series" with discounts for "dance figures" (r=0,83) and "main move" (r=0,98).

Prospects for further research are a more detailed definition of the relationship between the structural indices of the content of the composition and the special physical preparedness of qualified "B" class athletes specializing in acrobatic rock and roll.

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Model characteristics of physical development and special physical preparedness of swimmers 12–15 years old

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Purpose: *to develop model characteristics of indicators of physical development and special physical preparedness of young athletes of 12–15 years.*

Material & Methods: *analytical generalization of scientific literature data, pedagogical testing, anthropometry, spirometry, methods of mathematical statistics.*

Results: *established criteria for young athletes of different ages on the basis of indicators of physical development and special physical preparedness for the purpose of increasing the effectiveness of the intermediate selection in the acquisition of training groups.*

Conclusions: *the use of the proposed model characteristics of physical development and special physical fitness of young athletes at the stages of preliminary basic and specialized basic training makes it possible to determine their prospects for further sports development.*

Keywords: *athletes, swimmers, physical development, preparedness, model characteristics.*

Introduction

Each stage of a multi-year sports training has its own set of criteria that determines the prospects for achieving the heights of sportsmanship. Therefore, the central place in the training of swimmers is sport selection and the orientation of their training [1; 2; 8; 9; 10].

Continuous growth of world achievements in women's swimming, against the backdrop of the current socio-economic conditions for the development of sports in Ukraine, points to the need to improve the selection and preparation of the sports reserve. In the program for Youth Sports School and Sports School, which is still active in Ukraine [7], the control-transfer standards are given basically without quantitative indicators. In this regard, for effective implementation of the process of long-term preparation, it is necessary to revise the program and regulatory provisions, clarify the regulatory requirements for the physical condition of the body of young swimmers of different age groups in the selection and current pedagogical control.

In earlier studies, model characteristics and regulatory requirements for the level of physical development and special preparedness of swimmers of various qualifications [1; 2; 4; 5; 6; 11; 12 and etc.]. However, to date, the previously developed regulatory indicators, as criteria for selecting young swimmers, are somewhat outdated. Therefore, there is a need to supplement the scientific knowledge of quantitative regulatory criteria, based on the model characteristics of physical development and physical fitness of young athletes 12–15 years, in order to improve the efficiency of selection at the stages of preliminary basic and specialized basic training.

Purpose of the study: to develop model characteristics of indicators of physical development and special physical preparedness of young athletes of 12–15 years.

Objectives of the study:

1. Determine the level of sports qualification of young swimmers, depending on age.

2. Identify features of morphofunctional characteristics and special physical preparedness of young athletes aged 12–15 years old.

3. To develop step-by-step model characteristics of physical development and physical preparedness of female swimmers 12–15 years old.

Material and Methods of the research

Research methods: analytical generalization of scientific literature data, pedagogical testing, anthropometric measurements, spirometry, methods of mathematical statistics.

Morphofunctional indicators of physical development, their correlation, and also testing of special physical fitness of athletes. Data collection was carried out during training camps, as part of the CRG of the Federation of Swimming of Ukraine. A total of 36 female athletes aged 12–15 years, with different qualifications (MS, KMS, I and II sports categories), who were in the preliminary basic stage (12 years) and specialized basic training (13–15 years) were examined. The sports experience of the girls was from 3 to 9 years.

Results of the research and their discussion

A questionnaire survey of female swimmers aged 12 to 15 allowed to establish the level of their sports qualification (Figure 1). So, from the age of 13, the athletes fulfill the CMS standard (33,3%), and from the age of 14 – MS (21,4%). At the same time, the training of athletes began in the age range from 7 to 9 years, which is the most optimal age for starting swimming.

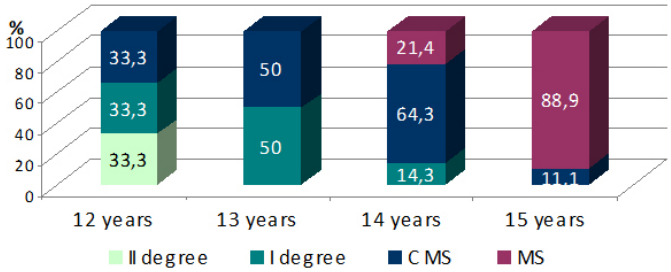

Figure 1. Level of sports qualification of women female swimmers 12–15 years

One of the main criteria of physical development is anthropometric indicators, which are largely genetically determined and determine the hydrodynamic qualities of the swimmer, on which the sports achievements at a particular distance depend substantially [1; 2].

In the course of the study it was found that at the current stage of development of women's swimming, the body lengths of individual champions and Olympic Games prize winners averaged 179,37±5,35 cm, and body weight – 66,56±5,29 kg. At the same time, the growth of the strongest athletes sometimes exceeds 185 cm. Therefore, when picking up teams and intermediate selection, preference should be given to athletes with specific physique, in particular, high values of total body size.

As a result of the comparative analysis of the features of the physique of young female athletes, it was revealed that the length of the body during the age development from 12 to 15 years increases by approximately 5% (Table 1, Figures 2, 3). The most intensive increase in body length takes place in the zone from 12 to 13 years (3,2%), and after 13 years the growth rate is somewhat slowed down.

At the age from 12 to 13 years, the greatest peak in the increase in the total body size is observed, such as arm length (3,2%), shoulder length (5,0%), brushes (3,5%), trunks

Table 1

Model characteristics of physical development of young female swimmers, $\bar{X}\pm\sigma$

No. i/o	Parameters	12 years (n=6)	13 years (n=12)	14 years (n=10)	15 years (n=8)
1.	Body length, cm	164,03±3,61	169,17±8,40	170,14±6,70	171,63±5,68
2.	Body weight, kg	49,10±5,41	52,86±5,91	53,50±4,74	57,38±4,47
3.	Arm span, cm	166,50±5,29	169,75±9,16	171,27±7,48	171,38±7,13
4.	Arm length, cm	72,50±2,18	74,79±3,77	75,18±3,49	76,19±3,26
5.	Length of brush, cm	18,33±1,26	18,98±1,50	19,09±1,14	19,13±1,46
6.	Length on the forearm, cm	23,83±1,76	23,63±1,45	24,23±1,27	24,26±1,99
7.	Shoulder length, cm	29,33±1,53	30,79±1,63	30,82±2,27	31,00±2,95
8.	Length of foot, cm	87,33±1,53	88,54±5,22	89,86±3,73	91,88±3,35
9.	Shank length, cm	39,15±1,09	40,25±3,86	39,59±3,31	40,69±2,12
10.	Length of the foot, cm	25,17±0,29	25,46±1,44	25,27±1,63	25,28±1,57
11.	Length of trunk, cm	52,17±1,44	55,42±3,29	55,23±4,34	55,13±2,37
12.	Shoulder width, cm	35,25±1,83	36,08±2,02	35,64±2,00	36,63±2,81
13.	Pelvic width, cm	25,33±1,53	25,46±1,30	25,82±1,25	25,50±1,20
14.	Width of brush, cm	7,50±0,50	8,19±0,41	8,00±0,45	7,88±0,99
15.	Circumference of chest. cells at rest, cm	83,17±2,84	84,21±3,41	86,55±4,66	89,25±4,19
16.	Circumference of chest. cells on inspiration, cm	88,33±3,33	90,92± 3,50	91,82±3,60	94,75±4,41
17.	Circumference of chest. cells on exhalation, cm	80,33±3,25	79,96± 3,17	81,82±4,38	85,25±4,81
18.	Shoulder girth (strained)	26,08±2,18	26,46± 1,53	26,50±1,64	28,06±1,61
19.	Shoulder girth (relaxed)	23,83±2,08	24,54± 1,25	24,14±1,50	26,13±1,53
20.	Girth of forearm, cm	20,83±1,04	21,96± 0,66	21,68±0,93	23,19±1,25
21.	Circumference of wrist, cm	14,50±0,50	14,96±0,69	14,64±0,60	14,94±1,24
22.	Waist circumference, cm	64,05±5,29	64,54±2,23	65,32±3,20	69,44±3,25
23.	Girth of buttocks, cm	84,57±2,18	86,17± 4,69	87,55±4,18	91,00±3,47
24.	Hip circumference, cm	47,17±2,36	47,88±2,76	47,95±2,82	51,63±2,52
25.	Circumference of knee, cm	33,17±1,04	33,42±1,28	33,36±1,45	35,44±2,11
26.	Chest circumference, cm	32,33±2,25	32,38±1,68	32,68±1,86	33,81±1,58
27.	Ankle circumference, cm	21,50±1,06	20,83±1,09	21,18±1,06	21,00±1,89
28.	VC, l	3,86±0,42	3,97±0,47	4,20±0,59	4,52±0,15
29.	MVC, ml·kg^{-1}	78,62±3,25	75,10±8,85	78,50±9,22	78,77±4,54
30.	Excursion of the chest, cm	8,00±0,02	10,96±1,41	10,00±2,42	9,50±1,04
31.	Chest circumference / length of body, cond. units	0,51±0,01	0,50±0,02	0,51±0,03	0,52±0,02
32.	Length of legs / body length, cond. units	0,53±0,01	0,52±0,01	0,53±0,01	0,54±0,01
33.	Arm length / body length, cond. units	0,44±0,01	0,44±0,01	0,44±0,01	0,44±0,01
34.	Shoulder width / pelvis, cond. units	1,39 ±0,09	1,42±0,08	1,38±0,10	1,47±0,16
35.	Shoulder width / body length, cond. units	0,21±0,01	0,21±0,01	0,21±0,01	0,21±0,02
36.	Pelvic width / body length, cond. units	0,15 ±0,01	0,15±0,16	0,15 ±0,01	0,15±0,01
37.	Quetelet index, kg·m^{-}l	18,26±1,23	18,22±1,0	18,72±1,47	19,47±1,08
38.	Absol. area. of bodies, ml	1,53±0,09	1,63±0,14	1,63±0,10	1,69±0,09

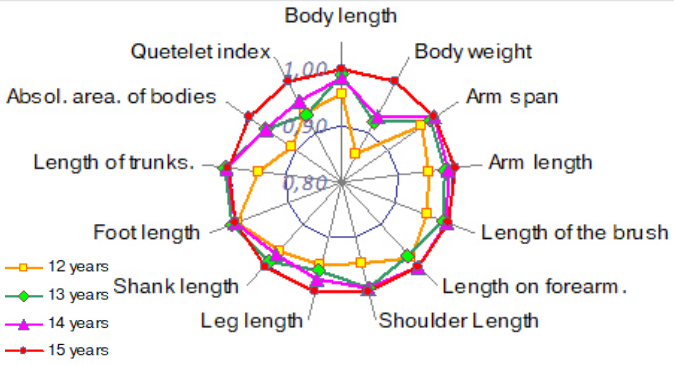

Figure 2. Ratio of the total body size of female athletes 12–15 years

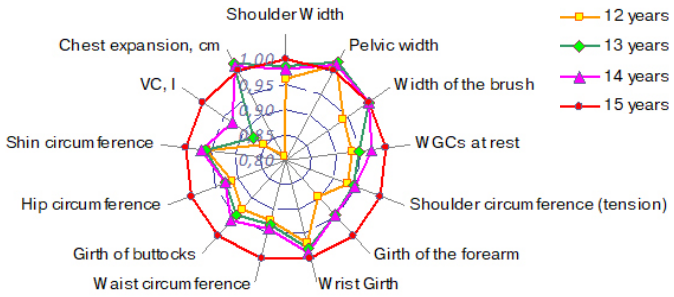

Figure 3. Ratio of circumference indicators of female athletes 12–15 years

(6,2%) and shin (2,8%), as well as the width of the shoulders (2,3%) and the brushes (9,2%).

Body mass indexes from 12 to 15 years increase by 16,9%, with the highest increase in the 12–13 age group (7,7%). At 13–14 years, the rates are slightly reduced and in 15 years reach 57,38±4,47 kg. The absolute surface area of the body increases significantly from 13 years (6,5%) and 15 years (3,7%). Among the indices of the Quetelet index, the greatest increase is observed in 14 (2,74%) and in 15 years (4,01%).

In the age zone from 14 to 15 years, the girls have a significant increase in girth body size. Thus, chest circumference (CC) is increased at rest (3,1%), CC are inhaled (3,2%) and exhaled (4,2%), and shoulder circumference (5,9%), forearm (7,0%), waist (6.3%), buttocks (3.9%), thighs (7,7%), knees (6,2%) and lower legs (3,5%).

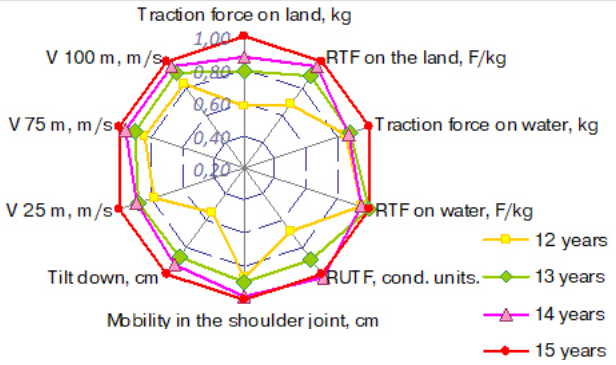

Figure 4. Ratio of special physical preparedness of female athletes 12–15 years

Under the influence of large training loads, mainly aimed at the development of endurance, in girls from 12 to 15 years, the indicators of VC increase from 3,86 to 4,52±0,15 l (17,1%). The highest peak in the VC is in the 13–14 age group (5,8%) and 14–15 years (7,6%). The size of the chest excursion (CE) from 12 to 15 years increases by 18,7%. It should be noted that the remaining anthropometric indicators of young athletes of different age groups do not significantly differ.

To study the structure of the strength preparedness, the maximum traction force on land and the thrust in the water on the leash were measured, on the basis of which the relative traction force to the body mass (RTF) was calculated, as well as the ratio of the use of the traction force (RUTF) (Table 2, Figure 4). For girls from 12 to 15 years, the strength of traction on land is significantly increased (89,9%). The maximum increase occurs in 13 years (49,4%) and further increases. Less intensive rates of increase in draft in the water than on land, in girls aged 12 to 13 years (10,7%) and from 14 to 15 years (15,8%). The difference between 12 and 15-year-olds is 26,4%. At the same time, the strength of the draft in the water is somewhat inferior to the normative requirements reflected in the program for the Youth Sports School [3].

The insignificant transfer of the effect of force development of muscles on land has been clearly observed for its realization in specific conditions in water. The analysis of the RUTF indicators showed that, from 12 to 15 years, they on average decrease from 64,02 to 42,63 on 33,5%. The traction force on land increases more intensively than in the water, as it is complementary to the basic swimming preparation, within which the proportion of spe-

Table 2

Model characteristics special physical readiness of young female swimmers

Parameters	12 years (n=6)		13 years (n=12)		14 years (n=10)		15 years (n=8)	
	$\bar{X}$	±σ	$\bar{X}$	±σ	$\bar{X}$	±σ	$\bar{X}$	±σ
Traction force on land, kg	14,67	3,06	21,92	3,42	24,36	3,93	27,86	3,53
RTF on the land, F·kg^{-1}	0,30	0,03	0,42	0,07	0,45	0,06	0,47	0,05
Traction force on water, kg	9,33	1,53	10,33	1,83	10,18	1,47	11,79	1,58
RTF on water, F·kg^{-1}	0,18	0,02	0,20	0,04	0,19	0,03	0,20	0,02
RUTF, cond. units.	64,02	2,79	47,80	7,99	42,27	5,66	42,63	5,51
t 25 m, s	18,53	2,81	16,51	1,88	15,43	1,50	14,44	1,74
V 25 m, m·s^{-1}	1,37	0,21	1,53	0,16	1,57	0,23	1,75	0,18
t 75 m, s	60,07	9,09	54,97	6,07	51,79	3,82	47,28	1,95
V 75 m, m·s^{-1}	1,26	0,19	1,37	0,14	1,45	0,11	1,51	0,16
t 100 m, s	77,67	10,60	69,98	6,51	66,50	5,20	64,03	4,57
Mobility in the shoulder joint, cm	36,00	6,08	34,83	11,23	31,68	12,28	31,00	7,81
Tilt down, cm	10,67	0,58	17,64	2,73	18,79	4,81	20,33	1,53

cialized training strength exercises gradually increases.

Under the influence of specific training loads with age and qualification, girls of 12–15 years have improved flexibility indicators. According to the results of the "tilt down" test, the difference reaches 90,5%, and the average absolute swimming speed (V, $m \cdot s^{-1}$) on distance 25 m (27,7%), 75 m (19,8%) and 100 m (21,3%).

Conclusions

1. As the age increases, the girls notice an increase in the level of sports achievements. So, from the age of 13, the athletes fulfill the CMS standard (33,3%), and from the age of 14 – MS (21,4%). Age of the beginning of swimming is in the range of 7–9 years.

2. As a result of the study, differences in physical fitness and preparedness among athletes' swimmers of 12–15 years old, which gradually increase depending on the age and level of athletic skill, were revealed. Along with the sporting success, which is now in fact the only indicator of the swimmer's perspective, it is necessary to take into account other scientifically grounded selection criteria, such as body proportions, length and body weight, VC, the level of special physical readiness.

3. The developed step-by-step model characteristics can be used as reference points for the intermediate selection and monitoring of the physical condition of the body of swimmers to identify the most promising athletes, and can be recommended for use in the work of the coaches of the Children's Sports School and the Sports School specializing in sports swimming.

Prospects for further research are related to the development of model characteristics of physical development and preparedness of young swimmers taking into account distance specialization.

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Modern principles of physical rehabilitation of patients with Osteochondrosis of the cervical-thoracic spine

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Presents the results of the use of physical rehabilitation program (therapy) patients with Osteochondrosis of the cervical-thoracic spine.

Purpose: *to research and develop and substantiate, evaluate the effectiveness of program for the physical rehabilitation of patients with Osteochondrosis of the cervical-thoracic spine.*

Materials & Methods: *medical-biological, instrumental, hardware, medical-pedagogical observation, evaluation of motor function, conducting trials and tests methods of mathematical statistics.*

Results: *the study posited clinico-functional examination of 57 patients with Osteochondrosis of the cervical-thoracic spine, which conducted rehabilitation using the diagnostic-therapeutic training apparatus "David".*

Conclusions: *the use of physical therapy program, which included a complex of mechanotherapy (developed on software DavidSpineConcept) and classic massage, contributed to the positive dynamics of clinical manifestations of the disease, the normalization of the State of the cardiovascular system.*

Keywords: *Osteochondrosis of the cervical-thoracic spine, physical therapy, rehabilitation, belongs to the diagnostic-therapeutic simulators "David".*

Introduction

Osteochondrosis (OC) is one of the most common degenerative-dystrophic diseases of the musculoskeletal system. It affects people of any age and profession [1; 2]. Often it occurs after work in an uncomfortable position, physical stress, hypothermia, prolonged stay in a standing or sitting position. Such a pain quickly passes after rest. However, prolonged or recurring lumbar pain is already a symptom of the disease. Osteochondrosis affects from 75% to 95% of the population of Ukraine. According to many authors, this disease manifests itself in X-ray examinations, even in 12–26% of children 10–15 years of age [3].

Disease of the OC becomes more and more important due to the continuous increase in the number of patients. He occupies one of the first places in the structure of diseases with temporary disability and disability of the population of Ukraine. So, according to the Kharkiv regional center of medical and social expertise, in the Kharkov region, for the osteochondrosis of the spine for the first time disability occurred: in 2014 – 430 people, among them in able-bodied age – 404; in 2015, 490 people, of whom 471 are of working age, and 476 in 2016, of whom 459 are of working age. The primary disability measure was 2,5 to 2,9 per 10000 population. Diagnosis and treatment of this severe form of lesion of the spine has been devoted to many scientific works of clinical, neurological and radiological orientation [4].

In the course of treatment and for the prevention of OC, lately both conservative and surgical methods of treatment are used [3]. Physical culture plays a leading role in the prevention of OC spinal cord, and therapeutic physical culture (physical therapy) is very important for the treatment of such patients. The choice of a complex of therapeutic actions is based on a differentiated approach to treatment tactics depending on the stage of the disease, the intensity of the pain syndrome, the nature and degree of neurological disorders, the causes of functional impairment. Data from recent years on the effectiveness of treatment and in the OC of the spine have shown that with the help of an integrated approach to physical rehabilitation, one can not only resist OC, but also successfully treat it [5]. Physical rehabilitation includes exercise therapy, therapeutic massage (TM), physiotherapy, hydrokinetic therapy, reflexology, manual therapy, mechanotherapy etc. [5; 6].

All of the above stipulated the urgency of developing a new comprehensive physical rehabilitation program for patients with OC of the cervicothoracic spine, which will reduce the incapacity for work, improve the overall performance of patients, will contribute to a more complete recovery of the functions of the spine.

Relationship of research with scientific programs, plans, themes. The work was carried out in accordance with the priority thematic area 76.35. "Medico-biological justification for the implementation of recovery measures and the appointment of physical rehabilitation to young people of different levels of fitness" Number of state registration – 0116U004081.

Purpose of the study: to scientifically justify, develop and evaluate the effectiveness of the physical rehabilitation program for patients with OC of the cervicothoracic spine in the recovery period.

Objectives of the study:

1. On the basis of the study of the special scientific literature, to analyze the etiology, pathogenesis, clinical characteristics, diagnosis and modern approaches to the appointment of

physical rehabilitation in OC of the cervicothoracic spine.

2. To determine the functional state of patients with OS of the cervicothoracic spine before the onset of rehabilitation effects.

3. To develop a comprehensive program of physical rehabilitation for patients with OC of the cervicothoracic spine using the complex of diagnostic and therapeutic simulators "David".

4. To evaluate the effectiveness of our comprehensive program of physical rehabilitation for patients with OS of the cervicothoracic spine based on the study of the dynamics of certain parameters of the functional state of patients.

Material and Methods of the research

Methods of research: analysis of special scientific and scientific methodological literature (theses, abstracts of dissertations, monographs, educational and methodical literature, articles in collections of scientific papers and periodicals, as well as theoretical provisions and practical recommendations that exist in the medical, pedagogical and related fields) medical and biological methods and medical and pedagogical observations (analysis of histories and outpatient maps of patients, namely: analysis of the results of the study of the function of the cervicothoracic posture onochnika) determining the power and dynamic possibilities cervical-thoracic spine muscles using complex diagnostic and treatment simulators "David" [7]; methods of mathematical statistics.

The study was conducted from November 2017 to January 2018 on the basis of Kharkiv Medical Center "Fortis".

Results of the research and their discussion

At the first stage of the study, the analysis and processing of literature sources was carried out, the etiology, pathogenesis and clinical manifestations of the disease were studied, and the available physical rehabilitation programs were examined for OS of the cervicothoracic spine. At the same stage, the author's comprehensive program of physical rehabilitation.

At the second stage, a primary examination of patients with OC of the cervicothoracic spine was carried out on the basis of Kharkiv Medical Center "Fortis". We observed 57 patients under our supervision. The age of the patients is 35–45 years. Patients were randomly assigned to a main group (MG) consisting of 29 males and a control group (CG) consisting of 28 males in accordance with the principles of bioethics. All patients were examined at the beginning and at the end of the study, were under the supervision of the center's doctors. The formulation of the clinical diagnosis was carried out in accordance with the national recommendations of the Ministry of Health of Ukraine.

All patients underwent testing on the diagnostic and therapeutic simulators "David" twice – before and after the physical therapy complex, after 3 months (Figure 1).

MG patients underwent a complex of mechanotherapy, which was compiled on the "David" software package for 6 simulators and a classic massage of the cervicothoracic spine.

Patients of CG underwent a complex of physical therapy, which included exercises of exercise therapy (static exercises, as a load – their own body weight and dumbbells or other weights that were performed while standing, sitting and lying, dynamic exercises, during which the contraction of muscles was carried out on average tempo and alternated with relaxation) and classical massage of the cervicothoracic spine.

Figure 1. Conducting diagnostic and rehabilitation activities on diagnostic and therapeutic simulators "David"

At the third stage, a second examination of the patients of the main and control groups was conducted, which allowed to analyze the dynamics of the studied parameters under the influence of rehabilitation measures and compare the results obtained in both groups of patients. Scientific conclusions and practical recommendations were made.

When re-examining patients x-cervical-thoracic spine, which was carried out in 3 months of application of means of physical rehabilitation, the general state of patients in both groups have been positive developments, namely the number of complaints of patients has decreased. Thus, the number of people complained about:

– general weakness – in the MG decreased by 39,7%, in the CG – by 28,6%;
– periodic pain in the region of the heart – in MG decreased by 41,0%, in CG – by 28%;
– periodic pain in the cervicothoracic segment of the spine – in the MG decreased by 76,0%, in the CG – by 64,3%;
– paresthesia of the upper extremities – in the exhaust gas decreased by 19,6%, in the CG – by 10,7%;
– periodic headaches – in the MG decreased by 48,3%, in the CG – by 42,0%;
– dizziness – in MG decreased by 20,0%, in CG – on 17,0%.

Comparing hemodynamic parameters in patients with MG and CG, we came to the conclusion that in a second examination the heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) in the MG patients after the author's program of physical rehabilitation were better (Table 1).

As a result of the use of complex physical rehabilitation programs for 3 months, the test parameters for the David complex significantly changed in patients of both groups (Table 2).

It is proved that out of 15 indicators – 9 patient indices in the main group of patients are much better than the parameters in the control group ($p<0,05$), which indicates the effectiveness of the rehabilitation program for patients with OS of the cervical thoracic spine using a complex of diagnostic and therapeutic simulators "David".

Table 1

Dynamics of hemodynamic parameters in patients of both groups in primary and secondary studies

Parameters	Norm	Periods of study		t	p
		Primary studies	Secondary studies		
Main group (n=29)					
HR beats·min^{-1}	60–84	89,67±0,98	73,63±0,82	12,77	<0,001
SBP, mm Hg.	100–139	140,26±2,56	134,71±1,69	5,32	<0,005
DBP, mm Hg.	60–89	82,66±1,99	73,49±0,96	4,15	<0,005
Control group (n=28)					
HR beats·min^{-1}	60–84	88,98±1,23	79,66±0,92	6,01	<0,001
SBP, mm Hg.	100–139	139,92±3, 61	136,37±2,80	1,86	<0,05
DBP, mm Hg.	60–89	82,52±2,12	76,91±1,40	2,20	<0,05

Table 2

Comparison of the results of the survey before and after the rehabilitation program on the diagnostic and therapeutic simulators "David"

Parameters	Machine number	Name of test	Test 1–2 MG in %	Result, %	Test 1–2 CG in %	Result, %	Difference between groups, %
Mobility	110	extension	+1/+26	+25	+1.5/+13	+11,5	13,5
	110	flexion	–24/–6	+18	–25/–20	+5	13
	120	rotation right	+77/+93	+16	+82/+86	+4	12
	120	rotation left	+77/+95	+18	+82/+86	+2	16
	150	tilt right	+37/+47	+10	+30/+30	0	10
	150	tilt left	+42/+50	+8	+32/+35	+3	5
Strength	110	extension	+31/+42	+11	+34/+36	+2	9
	110	flexion	+10/+43	+33	+2/+12	+10	23
	120	rotation right	+20/+32	+12	+14/+18	+4	8
	120	rotation left	+6/+21	+15	0/+12	+12	3
	150	tilt right	–10/+9	+19	–12/–9	+3	16
	150	tilt left	–7/+5	+12	–5/–2	+3	9
Strength ratio	Flexion / extension		–17/0	+17	–30/–20	+10	7
	Rotation left / right		+13/+9	–4	+15/+5	–10	6
	Right / left tilt		–3/+4	+7	–7/–8	–1	6

Conclusions

1. Based on the analysis of scientific and scientific-methodological literature, it was determined that the OC of the cervicothoracic spine is one of the most common degenerative-dystrophic diseases of the musculoskeletal system. It affects people of any age and profession. Osteochondrosis affects from 75% to 95% of the population of Ukraine. According to many authors, this disease manifests itself in X-ray examinations, even in 12–26% of children 10–15 years of age.
2. Disease of the spinal column becomes more and more important due to the continuous increase in the number of patients. He occupies one of the first places in the structure of diseases with a temporary loss of ability to work and disability of the population of Ukraine.
3. When primary testing of patients with OC of the cervicothoracic spine with the help of the complex of diagnostic and therapeutic simulators "David", significant decreases in the indexes of the movements of the cervicothoracic spine on flexure (25%), a decrease in the muscle strength with tilts to the right and left (–10%). A violation of the flexion-extension (–20%), a right-to-left tilt (–5%) was also diagnosed.
4. The use of the developed complex program of physical rehabilitation caused positive changes in the general condition of patients, which indicates an improvement in the functional state of the musculoskeletal system, cardiovascular and muscular systems.
5. We analyzed 15 indicators that were studied in patients of both groups. It is proved that out of 15 indicators – 9 patient indices in the main group of patients are much better than the parameters in the control group ($p<0,05$), which indicates the effectiveness of the rehabilitation program for patients with OC of the cervical thoracic spine using a complex of diagnostic and therapeutic simulators "David".

Prospects for further research in this area we see in the use of a set of diagnostic and therapeutic simulators "David" for the physical rehabilitation of patients with various diseases of the spine and muscles of the trunk.

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Risk factors for the onset of arterial hypertension in women of the first adulthood in the period of manifestation of the disease

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Purpose: *to carry out lifestyle studies of women of 35–40 years with the manifestation of arterial hypertension.*

Material & Methods: *the results of answers of 65 women aged 35–40 with the manifestation of arterial hypertension were analyzed using the questionnaire "Subjective assessment of lifestyle and physical health".*

Results: *only 42% of women lead a healthy lifestyle and their health status can be assessed as good. Indicators of 33% of women say that the state of health is still good and the way of life is close to healthy. In 17% of women, the state of health can be assessed as satisfactory, but the lifestyle requires change. And in 8% of women the attitude to HLS can be assessed as unsatisfactory, that is, these women have a disregard for their own health.*

Conclusions: *the test contingent of women and mature age there is an increase in body weight, lack of physical activity, non-compliance with diet, the presence of bad habits, which requires appropriate lifestyle adjustments and optimization of physical activity.*

Keywords: *arterial hypertension, women and adulthood, healthy lifestyle.*

Introduction

Arterial hypertension (AH) is an important medical and social problem of modern healthcare, as it is an independent factor in the development of most clinically manifested cardiovascular diseases (CVD), such as coronary heart disease and its complications – myocardial infarction, cerebral stroke, heart failure, diseases peripheral arteries (Franco, O. H. et al., 2005) [1; 2]. In most economically developed countries, cardiovascular diseases rank first among causes of morbidity, disability and mortality, although their prevalence varies considerably between regions. Previously, these were diseases of the elderly, but now more often such diseases are detected at a young age and lesions occur more in young women than in men [2; 3]. Since the age of 30, women have been experiencing a decline in a number of indicators of physical development and the level of physical potential. And the body weight, respiratory rate, systolic pressure changes in the direction of increase, and the indicator of physical readiness decreases [3; 4].

The onset and course of hypertension are closely related to the presence of some risk factors: heredity – a close correlation between close relatives (parents, siblings) is revealed – the correlation between body weight and blood pressure level is direct, significant and stable. Excess weight is associated with a 2–6-fold increase in the risk of developing AH; alcohol – the use of alcohol directly correlates with the level of blood pressure, both episodic and chronic; smoking – nicotine dramatically increases blood pressure even in heavy smokers. The effect of each cigarette lasts about 30 minutes. Already on the 1st minute after its burning, the SBP increases by 15 mm Hg. and on the 4th – by 25 mm Hg; psychosocial factors – stress contributes to blood pressure; physical activity – in people with a sedentary lifestyle, the risk of developing hypertension is 20–50% higher than that of physically active ones. Physical stress during the performance of professional duties contribute to an increase in blood pressure, and physical activity during leisure hours – on the contrary [1].

Due to the fact that persons of working age die from CVD, the early identification of persons with AH determines the importance and validity of preventive programs, in connection with the growing not only medical, but also economic consequences. This can be achieved, on the one hand, with the help of an educational program aimed at promoting healthy lifestyles and the need for regular monitoring of their health, on the other - thanks to the joint active work of the doctor and the teacher with patients: selection of adequate antihypertensive therapy and physical exertion, adherence of patients to treatment and rehabilitation activities [5–7].

Relationship of research with scientific programs, plans, themes. The work was carried out in accordance with the priority thematic area No. 76.35 "Medical and Biological Substantiation for the Conduct of Recovery Measures and the assignment of physical rehabilitation to persons of different age of preparedness". Number of state registration – 0116U004081.

Purpose of the study: to carry out lifestyle studies of women of 35–40 years with the manifestation of arterial hypertension.

Material and Methods of the research

The study involved 65 women aged 35–40 years with manifestation of hypertension (history of arterial pressure from 140/90 mm Hg periodically arises up to 155/95 mm Hg). To achieve the goal and objective of the work, a study was conducted using the questionnaire "Subjective assessment of lifestyle and physical health", developed by Professor G. S. Nikiforov. Using the key to the questionnaire, the obtained values were converted into points. Summing up all the scores, a conclusion was drawn about the character of the way of life and the mature age on a scale: 88–60 points: perhaps without think-

ing - you are leading a healthy lifestyle. 59–50 points: Your attitude to HLS can be assessed as good. 49–35 points: Your attitude to HLS can be assessed as satisfactory. We must think about what can be changed. 30 or less points: Your habits and behavior are far from healthy, you neglect your health [8–10].

Results of the research and their discussion

An analysis of the results of the questionnaire survey found that most of the women tested negatively relate to their lifestyle, do not comply with the rules of HLS. Analyzing the answers to questions related to the risk factors for hypertension, it was found that the question: "How many times a week do you practice physical training for 20 minutes or more?" 65% of women answered "SOMETIMES"; 75% of women are overweight; only 40% of women have never smoked.

The results of the questionnaire of women aged 35–40 with the manifestation of hypertension are given in the table.

After the study, we can conclude that only 42% of women lead a healthy lifestyle and their health can be assessed as good. Indicators of 33% of women say that the state of health is still beautiful and the way of life is close to healthy. In 17% of women, the state of health can be assessed as satisfactory, but the lifestyle requires change. And in 8% of women the attitude to HLS can be assessed as unsatisfactory, that is, these women have a disregard for their own health.

Thus, the foregoing gives grounds to state that the test contingent of women and adulthood has an increase in body weight, lack of physical activity, non-compliance with the diet, the presence of bad habits, which requires appropriate lifestyle adjustments and optimization of physical exertion.

According to WHO, the prevention of hypertension, aimed at lifestyle changes, is a universal "vaccine" against hypertension, and the use of preventive measures helps reduce its new cases by 50%. Preventive measures for arterial hypertension are aimed at introducing a healthy lifestyle and correcting identified risk factors. They include: limiting the use of table salt; decrease in body weight with excess; restriction of the use of alcoholic beverages; Reduction of intake of saturated fats, sweets and cholesterol; to give up smoking; increased physical activity during leisure hours; psychoemotional unloading and relaxation.

Conclusions

According to the results of the study, it can be argued that only 42% of women aged 35–40 with the manifestation of hypertension support a healthy lifestyle. Non-medicamentous treatment of hypertension is also called lifestyle modification, because its basis is the elimination of bad habits (smoking, excessive drinking), increased physical activity, etc.

Prospects for further research are related to the assessment of the dynamics of the adaptive potential in women aged 35–40 years with stage I stage AH.

Results of the questionnaire of women aged 35–40 with the manifestation of hypertension

Can you relax in a stressful situation without resorting to alcohol, smoking or tablets:			
Yes – 41%	No – 51%		Sometimes – 8%
How much your real weight exceeds adequate?			
exceeds by more than 50% – 5%	on 15–24% – 35%	on 4–10% – 35%	not more than 3% – 25%
Do you apply any method of recovery in everyday life?			
Yes, regular – 10%	Yes, not regularly – 55%		No – 35%
How many times a week do you practice physical training for 20 minutes or more?			
3 times – 3%	2 times – 32%		Sometimes – 65%
How long is your dream (per day)?			
5–6 hours – 69%	7–8 hours – 28%		9–10 hours – 3%
How often do you eat during the day?			
3–4 times – 50%	2 times – 39%		1 time – 11%
How many times a week do you have breakfast?			
Never – 19%	From time to time – 28%		Every day – 53%
How often do you miss work due to illness?			
I am ill very rarely, every few years – 30%	sick 1–2 times a year – 50%		sick every 6 months – 20%
How often do you smoke?			
	never – 40%, very rarely, no more than 1–2 times a month – 12%, sometimes (for the company) – 25%, every day for 5–6 cigarettes – 8%, every day a 0,5–1 pack of cigarettes – 15%		
How often do you drink alcohol?			
I do not drink – 20%	50–70 g dry or strong wine once a week – 60%		very rarely, a maximum (50 g of spirits) 1–2 times a month – 20%

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Efficiency of the use of mobile games in water at the stages of primary teaching for children of primary school age

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The article offers the results of the study of the effectiveness of various programs for teaching the swimming of children of primary school age with the use of mobile games in water.

Purpose: *to establish the effectiveness of various methodological approaches in the education of children of primary school age in the process of physical preparedness and swimming.*

Materials & Methods: *analysis and generalization of the data of scientific and methodological information, analysis of the methods of teaching the swimming of children of primary school age and organization of lessons in the health groups of the basins of Kharkov, pedagogical observation, experiment, mathematical statistics.*

Results: *it was established that physical culture and health-improving swimming classes for children of primary school age in accordance with the training programs in the EG and CG groups contributed to mastering the swimming skill and mastering the technique of sporting methods of crawl on the chest and back. In the process of comparative pedagogical experiment it was proved that swimming by the program, providing for the use of specially selected outdoor games in water during the main part of each of 36 classes, contributed to more expressed intra-group growth of the majority of indicators of swimming preparedness in comparison with the lessons in the program, where the games were allocated only 35% of the time.*

Conclusions: *it is determined that the application of the program with extensive use of games in the main part of the lesson makes the classes more interesting, emotional and enables children to get rid of their uncertainty in their abilities.*

Keywords: *swimming, learning, children, primary school age, playing in the water.*

Introduction

Everyone should be able to swim, because swimming is a sport that helps to strengthen health, and at times preserving a person's life. Bathing, swimming, playing in the water are beneficial for the comprehensive physical development of both adults and children. Swimming exercises have a positive effect on tempering a child's body. Thanks to the improvement of the thermoregulation mechanism, the child's immunological properties increase, adaptation to various environmental conditions improves [3; 6]. In addition, systematic swimming exercises lead to an improvement in the work of the circulatory and respiratory organs. In the water, the static tension of the body decreases, the load on the child's spine, which is not yet strengthened and supple, decreases, which in this case is correctly formed, a good posture is developed, and the active movement of the legs in the water in an unsupported position strengthens the baby's feet and prevents the development of flat feet. Thanks to health-improving swimming, the child's nervous system is strengthened, sleep becomes stronger, appetite is improved, the general tone of the body is improved, movements are improved, stamina is increased [1; 7].

Swimming has a beneficial effect not only on the child's physical development, but also on the formation of his personality. Not all children have fun and joy with the water, some are afraid to enter the water, afraid of depth. Psychologists have established that the main danger on the water is not action in it, but a sense of fear and fear of depth. That is why the first steps in swimming training are aimed at helping the child overcome this unpleasant and harmless feeling. Swimming classes develop such personality traits as dedication, perseverance, self-control, determination, courage, discipline, the ability to act in a team, to show independence [2; 3; 7; 8].

Learning to swim is never too late. However, swimming instruction should be started at an early age. This is due to the possibility of more fully and probably earlier use the health and educational opportunities that are laid in swimming. If you can not teach a child to swim at preschool age, you should do this at the first opportunity, for example, at the age of 6–8 (elementary school), because at this age the children are very mobile, energetic, curious and brave enough (the latter circumstance extremely important). The earlier the children learn to swim, the more guarantees from accidents on the water [4].

Features of learning swimming movements are determined primarily by the features of the aquatic environment in which the body moves. There are many factors that affect the student of swimming, which he does not encounter in ground movement, in which he is not able to immediately learn. This is primarily the switching of the usual reactions associated with a solid support and movement in a heterogeneous ground-air environment, adaptation with a new method of supporting water and moving in a homogeneous aquatic environment; the absence of antigravity reflexes and the transition to action under conditions of relative weightlessness; restructuring of breathing; replacement of locomotions in an upright position on locomotion in a horizontal position, etc. [3–5; 7; 8].

Widespread use of games in classes with children is a man-

datory methodological requirement of physical education. Games in the water, except for health value, have great cognitive significance: in the process of playing a person can learn completely new sensations and, first of all, get used to water, learn some element of the technique of swimming. With the help of games are solved a variety of tasks: 1) repetition and consolidation of previously learned exercises and movements; 2) increased emotionality in swimming lessons; 3) strengthening of contacts in the team, education of the partnership; 4) education of independence, initiative, determination [4]. When conducting lessons on teaching children to swim, games for the best performance of a particular movement or mode of navigation in general are of particular importance. This achieves a great deal of emotionality and attention shifting from studying the element to the game. As a result, the exercise is performed with greater ease. Although in the process of playing, the performers perform rather intensive physical work, however, due to their high emotionality and the enthusiasm for the game, they are easily tolerated by large loads. Water games in swimming training also contribute to the mobilization of memory, motor experience, the comprehension of what is happening and the evaluation of their actions (A. I. Ptushko, 2005), the education of courage, determination, self-reliance, initiative (T. I. Osokina, 1991, L. V. Sheiko, 2016, 2017). It is known that games most valuable for achieving educational goals are those in which students use movements that are close to those used in mastering the techniques of sports movements (T. A. Protchenko, 2003). The authors believe that these actions are easily transferred later with a more detailed study of the techniques of sporting methods of navigation and even facilitate their mastery.

Our experience also shows that games are effective from the very first steps in the water. The implementation of specific exercises in the development of water, only facilitated or accelerated, if children will play. Games help to avoid monotony, restore psychological status, develop tactical thinking, culture of communication and prepare for specific professional activities. From this perspective, training programs for swimming are being revised. These programs increase the time and number of games used, which become the dominant means of teaching children to swim. Taking into account the importance of this problem, at the Department of Water Sports of KSAPC there were developed complexes of mobile games in water for mastering with an aquatic environment and for mastering the techniques of sporting methods of swimming that can be widely used in the main part of the session. The proposed game complexes can be used by trainers in the training of swimming children and students during the coaching period.

Relationship of research with scientific programs, plans, themes. The work was carried out in the framework of the initiative theme of the Department of water sports of the KSAPC "Science-methodical basis of the vigor of the healthful swimming in the middle of the local populations".

Purpose of the study: to establish the effectiveness of various methodological approaches in the education of children of primary school age in the process of physical culture and health training by swimming.

Main objectives of the study: to reveal the positive effect in the formation of the swimming skill in children of primary school age as a result of the wider application of the game method of instruction in the main part of each lesson; determine its effectiveness for the formation of volitional activity to overcome negative emotional reactions in the process of elementary learning to swim.

Material and Methods of the research

To solve the main tasks of the study, we used the following methods: analysis and generalization of data from scientific and methodological literature, analysis of the methods of teaching children in primary school age swimming and organizing lessons in recreational groups in the polls of Kharkiv, pedagogical observation, experiment, mathematical statistics.

As a result of the analysis of literary sources; study of existing programs for teaching children's swimming; acquaintance with work experience in children's groups for swimming training in various basins of Kharkiv, we developed a program aimed at developing a swimming skill in children of primary school age by using a wide range of mobile games in the main part of the lesson. In October 2016 the program was proposed for use in the health groups of the Author's School of Swimming Yu. V. Bliznyuk (Kharkov). To solve the research problems, a pedagogical experiment was conducted. The study involved children 6–8 years (boys and girls) of two groups (control group – CG and experimental – EG) for 15 people in each group. The swimming training course included 36 lessons. Children came to classes 3 times a week. The total duration of the classes is 60 minutes. The first 15 mines that children spent in the dry swimming hall included an explanation and demonstration of new material, general exercises such as warm-ups, preparatory exercises for mastering the techniques of swimming in the ways of crawling on the chest and back. The remaining 45 minutes the children spent in the pool, repeating what they learned in the hall.

The tasks, the content of the lessons, as well as the test requirements in the groups were equal. In the first nine lessons, preparatory exercises for water development were conducted: immersion and floating, exhaling into water, lying on water and sliding (*first stage of training*). In the tenth lesson, it was necessary to fulfill the control standards on the water: "swimming", glide on the chest and on the back, jump into the water down with your feet – head down. For the performance of each exercise, the guys received an assessment (from 1 to 5 points).

Beginning with the eleventh lesson, a parallel study of the elements of the technique of swimming in the manner of the crawl on the back and the crotch on the chest (*second stage of training*). At the end of the training cycle, everyone had to pass the standard for evaluation. To get 5 points, you had to swim 25 m in any of two ways, showing a good technique, 3–4 points – 15 m taking into account the technique, 1–2 points – 15 m without taking into account the technique.

The differences in training in swimming consisted of the methods of conducting lessons: the children of the CG were engaged in a program according to which the main part of each lesson included most exercises for learning the elements of swimming techniques (65% of the total time of the lesson) and only 35% of the time were mobile games. In EG children were engaged in a program, the essence of which was the use of mobile games in the water throughout the main part of each

lesson. According to the proposed program at the first stage of training (from 1 to 9 lessons, 10 – control), which begins with familiarizing the child with water and its properties, with the acquisition of skills and skills to stay on the water; independently, arbitrarily perform the exercise breathing in and out into the water several times in a row (at least 10 times). During the EG classes, in the main part of the lesson, such mobile games in water as:

– "Small and large legs", "Net", "Fish are frolicking", "Crossing", "Find a house", "Find a pair", "Carousels", "Bring the ball", etc., which help those familiar with properties of water;

– "Fountain", "Sea fight", "Pump", "Fishing rod", "Carp and pike", "Hide under water", "Get the toy", "Dive into the hoop" – games aimed at teaching children not to be afraid spray, dive under the water and open your eyes;

– "Sharp ball", "Swing", "Who has more bubbles", "Train to the tunnel" – games aimed at the formation of a specific skill in the respiratory apparatus (breath retardation during inspiration and exhalation, inhale over water, exhale under water);

– "Who will last longer in the position on the back?", "Who will last longer in the position on the chest?", "Fiddles with a float", "Spots with an asterisk" – games for surfacing, lying, sliding on the surface without moving their legs;

– "Jump on", "Jump in a circle", "Whirligig in the air", "Catch the ball during the jump" – games that bring courage and confidence, contribute to faster mastery of technique at first simple jumps, and then prepare for the successful mastery of the starting jump and elements of applied navigation.

Great importance was attached to mobile games in water, based on physical exercises, movement for coordination. Performing them, the guys overcome a number of obstacles, strive to achieve a certain, pre-set goal. Such games as "Torpedo on the rocks", "Arrow", "Motor boat", contributed to the education of will, perseverance and, most importantly, created an emotional mood, which is especially important in the first lessons, when it is necessary to overcome uncertainty.

In the second stage of training (from 11 to 35 lessons, 36 – control), the children of EG, as well as those engaged in CG, mastered the sports ways of swimming, the crotch on the chest and the crawl on the back. Since sporting methods of swimming are complex motor skills, each method of navigation has been studied in such a methodical sequence: movements by feet – movements by hands – breathing – a combination of movements by hands and feet and only after that – the method of swim as a whole [2–5]. At the second stage of the training in the EG, during the main part of the lesson, mobile games were widely used, which were aimed at mastering slip along the surface of the water with movements of the feet on the chest and back, with movements of the hands in these methods. The category of such games include: "I'm swimming", "Crucians and carp", "Frog-cuckoo", "Swimmers"; games that develop and consolidate swimming movements: "Seals", "Swimmers", "Fountains", "A flock of dolphins", "Whose link is likely to meet?", "Frog-cuckoo", "Fish in the grid," "Polar bears, "With the letter swim".

Results of the research and their discussion

After the completion of the first stage of the training, control tests were conducted in both groups (10th lesson). In the EG, where games were used throughout the main part of the lesson, testing revealed higher results compared to the CG, where only 35% of the time was spent on games (Table 1).

As can be seen from Table 1, the average indicator of the implementation of exercises for development with water at a high level in the CG was 40,0%, in the EG – 60,0%; the rates of exercise at the average level in both groups were almost equal: in CG – 46,7%, in EG – 40,0%; implementation at a low level in the CG was 13,3%, while in the EG – 0%. When conducting a jump in the water in the CG from doing a jump upside down from the standing position, bending (high level) was abandoned by everyone involved, while in the EG such a jump was performed by 6 people (40,0%); a jump from the position of the grouping (average level) in the CG was performed by 4 people (26,6%), EG – 5 people (33,4%); decided to jump down in CG – 11 people (73,4%), in EG – 4 people (26,6%). Based on the results of the first stage of training, the eligible standards for all indicators in the EG at a high level were fulfilled by 50,0% of those engaged; on the average – 36,7%; at a low – 13,3%. In the CG these indicators were respectively: high level – 20,0%, medium – 36,6%, low – 43,4%.

At the end of the second stage of the training, control tests were also conducted in both groups (36th lesson). The final results of this stage of training showed that the quality of learning material in the EG was also higher than in the CG. This is evidenced by the data of the passage of control segments by the method of crotch on the chest and the crotch

Table 1

Performance of credit standards for children of 6–8 years of age who are studying swimming (the first stage)

Benchmarks	Control group (n=15)						Experimental group (n=15)					
	Levels, scores											
	High, 5 points		Average, 3–4 points		Low, 1–2 points		High, 5 points		Average, 3–4 points		Low, 1–2 points	
	NP	%	NP	%	NP	%	NP	%	NP	%	NP	%
Technique of doing exercises for development with water	6	40,0	7	46,7	2	13,3	9	60,0	6	40,0	0	0
jump into the water upside down - downside down	0	0	4	26,6	11	73,4	6	40,0	5	33,4	4	26,6
The average for all performance standards		20,0		36,6		43,4		50,0		36,7		13,3

Remark. *NP – number of people.*

on the back at the range, taking into account the technique of navigation (Table 2).

Analyzing the data of Table 2, it can be stated that the level of development of the technique of swimming on the back crawl in the EG and CG is approximately the same: at the high level the technique in the EG was mastered by 5 people (33,3%), in the CG – 4 people (26,6). An equal number of children in both groups passed this standard to assessments corresponding to the average level, for 8 people (53,4%). A small number of children coped with this standard for assessments corresponding to a low level: in EG – 2 people (13,3%), in CG – 3 people (20,0%). When mastering the technique of the front crawl, some difficulty is caused by the development of the inspiration-exhalation technique. In this regard, the number of people who mastered this method at a high level in both groups is less, in comparison with the development of the technique of the back crawl: in EG – 4 people (26.6%), in CG – only 2 (13,3%). Almost the same number of participants received grades corresponding to the average level: in EG – 8 (53,4%), in CG – 7 (46,7%). In CG, the number of children who received the evaluation for the technique of a front crawl corresponding to a low level was 6 people (40,0%), whereas in the EG only 3 people (20,0%) had low grades. A high level of assessments for the technique of mastering 2 methods of navigation also prevails in EG (5 people – 33,3%). In CG, there were only three (20,0%). Average level in EG swim – 7 (46,7%), in CG – 5 (33,3%), low: in EG – 3 (20,0%), in CG – 7 (46,7) .

It should be noted that even before the beginning of the pilot lessons, the survey revealed that some children of both groups had pronounced negative emotional reactions, manifested in insecurity and fear of doing water. During the experiment, observing the children of both groups, it was observed that during the lessons in the EG, there was a greater interest in the exercises, and the negative reactions to performing the exercises in the water were not so pronounced and in fewer cases than in the CG.

Summarizing all of the above, we can draw the following conclusions:

1. Physical culture and health-improving swimming classes for children of primary school age in accordance with the training programs in EG and CG groups contributed to mastering the swimming skill and mastering the technique of sporting techniques. crawl on the chest and back.

2. In the process of comparative pedagogical experiment it was proved that, at the same time expenses, swimming by the program, providing for the use of specially selected mobile games in the water during the main part of each of 36 lessons, contributed to more expressed intra-group growth of most indicators of swimming preparedness in comparison with lessons on the program, where games were given only 30–35% of the time.

3. Application of the program with the extensive use of games in the main part of the lesson makes the classes more interesting, gives the chance to get rid of uncertainty in their abilities, stimulates the formation of children in volitional activity aimed at reducing the emotional tension caused by the specific conditions of training in the water.

Prospects for further research are related to the development of programs for physical preparedness and swimming for children of secondary and senior school age.

Table 2

Performance of credit standards for children of 6–8 years of age who are studying swimming (second stage)

Benchmarks	Control group (n=15)						Experimental group (n=15)					
	Levels, scores											
	High, 5 points (25 m taking into account the technique)		Average, 3–4 points (15 m taking into account the technique)		Low, 1–2 points (15 m without taking into account the technique)		High, 5 points (25 m taking into account the technique)		Average, 3–4 points (15 m taking into account the technique)		Low, 1–2 points (15 m without taking into account the technique)	
	NP	%	NP	%	NP	%	NP	%	NP	%	NP	%
Swimming front crawl	2	13,3	7	46,7	6	40,0	4	26,6	8	53,4	3	20,0
Swimming back crawl	4	26,6	8	53,4	3	20,0	5	33,3	8	53,4	2	13,3
Swimming in two ways	3	20,0	5	33,3	7	46,7	5	33,3	7	46,7	3	20,0

Remark. *NP – number of people.*

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Fitness clubs activities in Kharkiv

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Purpose: *to analyze the fitness clubs activities in Kharkiv.*

Material & Methods: *analysis of literary sources; analysis of documents; survey (questionnaire) methods of mathematical statistics. The study was conducted on the basis of 12 fitness clubs in Kharkiv among their clients.*

Results: *the study identified the main differences and competitive advantages of fitness clubs in Kharkiv; the preferences of club customers for choosing a fitness club, popular fitness programs, additional services, as well as effective sources of information about the club and the main reasons for leaving the fitness club.*

Conclusions: *found that the market of fitness services in Kharkov is characterized by 297 fitness establishments and the main leaders in the local market are network fitness clubs. The ways of increasing the effectiveness of fitness clubs in Kharkiv are determined.*

Keywords: *fitness, services, clients, analysis, market.*

Introduction

Modern requirements of society to the level of development of the physical qualities of man, his need for motor activity and the pursuit of health and well-being, have caused the wide spread of fitness all over the world. In Ukraine, fitness has developed over the past 15–20 years. Today in all cities of our country, including in the city of Kharkiv, there is a variety of special health-improving fitness centers and clubs, beauty and health studios that provide a range of services, including popular fitness programs and technologies. They are based on the latest scientific developments and modern technologies in the field of physical culture and sports, aimed at satisfying the various physical culture and sport interests of each client of the club.

Analysis of modern literature suggests that scientific research on fitness in recent years has been given a lot of significance. The study of the history, ideology and methodological principles of fitness is presented in the works of Yu. V. Menchin and A. V. Menchin [10], T. A. Kudri [9], Yu. I. Belyak [1] and other scientists. The role of fitness in the system of health-improving physical culture was considered by A. K. Kornosenko [8]. Trends in the development of group fitness programs are defined by A. Blagoi, N. Lysakov [2].

At the same time, an analysis of recent research and publications shows that the activity of fitness clubs is of scientific interest. In particular, the authors of [4, 7, 14; 15] considered the state, background and prospects for the development of the fitness industry in the world and in Ukraine. The segmentation of the market of sports and health services for the purpose of identifying potential consumers of these services is carried out in the work of Yu. Dutchak [6]. Problems of management of organizational and managerial and marketing activities of fitness-oriented organizations were considered in the works of V. Vavilov [3], S. Demekhy, V. Gayevoy [5]; N. V. Sereda, K. A. Moshkina [11].

However, up to the present time, due attention has not been given to the study of the problems of functioning and development trends in the activity of fitness clubs in Kharkov, with the exception of certain works by N. Sereda and S. Stadnik [12; 13]. The relevance of this work is determined by the need to explore possible ways to improve the effectiveness of fitness clubs in the city of Kharkiv, taking into account the preferences, interests and wishes of the clients themselves.

Relationship of research with scientific programs, plans, themes. The research was carried out within the framework of the initiative topic of the Department of Management of KSAPC for 2016–2018. "Methodological bases of strategic development of the sphere of physical culture and sports in the region" (state registration number 0113U004615).

Purpose of the study: to analyze the fitness clubs activities in Kharkiv.

Objectives of the study: 1) to characterize the market of fitness services in Kharkiv; 2) identify ways to improve the effectiveness of fitness clubs.

Material and Methods of the research

The study used the following research methods: analysis of literature sources; analysis of documents; survey (questionnaire) methods of mathematical statistics. Analysis of the literature sources was used to interpret the obtained data when comparing different points of view on the problem under study. In the course of the study, 102 literary sources were analyzed. The analysis was also carried out administrative and administrative documents fitness clubs in the city of Kharkov, which allowed determining the features of the activities and competitive advantages of each fitness club. A survey of clients of 12 fitness clubs in Kharkov was carried out according to the author's questionnaire with the help of questions that characterized the respondents as to age and sex; experience of fitness; preferences for choosing a fitness club and fitness areas, additional services; sources of information about the club and the reasons for leaving the fitness club. The total number of respondents – 120 people, which ensured a sufficient proximity of the sample of respondents to the general population. The study used Excel.

Results of the research and their discussion

Today in the market of Kharkiv, according to the results of our calculation, there are about 297 fitness facilities. For the analysis of the market of fitness services offered by representatives of the fitness market of the city of Kharkiv, we used the following criteria for the activity of fitness facilities: location; marketing events; equipment and inventory, their suppliers; service personnel: basic and additional; commercial terms – the form of payment for services to clients; image of the club; unique offers.

Firstly, based on the criteria outlined, from the point of view of the strategic management and marketing policy, the city's fitness clubs can be divided into network fitness clubs and individual fitness clubs.

It was found out that the network of fitness clubs in the city of Kharkov is the majority, the main number of them is concentrated in the sleeping areas of the city with developed infrastructure. In this category, we considered fitness clubs: "Malibu", "Pheromone", "Safari", "PULSE GYM".

The network of fitness clubs "Malibu" in the market of fitness services has been operating since 2003. It includes 28 establishments in 6 cities of Ukraine, including 14 clubs "Malibu" in Kharkiv. The network of sports clubs "PULSE GYM" in the city of Kharkiv is represented by 9 institutions. The history of the network of fitness clubs "Safari" began in 2009 with a five-story complex in the center of Kharkiv, and now in the city it is represented by 9 institutions. The "Pheromon" network in Kharkiv is represented by 5 fitness clubs.

A feature of the network fitness clubs is that the network acts as a single organization, that is, has a system strategy, economic guidelines, and, unlike a single fitness club, has the maximum coverage of the market. Due to its wide network, the possible financial losses of some fitness clubs are offset by the success of other.

Secondly, from the point of view of the quality of equipment and inventory, the uniqueness of trade offers for basic, additional services and the image of the club in the city of Kharkov can separately be distinguished such fitness clubs as "Tetra", "Aura", "EGOISTE". This is a fitness establishment with a wide range of basic and additional services, targeted at paying customers who appreciate stylish design, exclusive technologies and an individual approach to each client.

Fitness club "Tetra" is one of the largest fitness clubs in Eastern Ukraine. On its territory there are four indoor hard courts and 6 outdoor tennis courts, a squash center, a gym, three swimming pools of various sizes, a children's fitness club. Fitness clubs "Aura" (2 places in the city) – this is an option for those who want to go to the gym and pool. The difference between clubs is that the services are offered in the complex: swimming pool and sauna, as well as a gym and group lessons. "EGOISTE" is a modern fitness club in the very center of the city with a charming panorama of the historical center of Kharkiv. "EGOISTE" is distinguished by a qualitative and individual approach to each client.

The competitive advantages of the above-mentioned clubs include: spacious gyms; comfortable climatic conditions; modern professional power and cardio equipment from leading world manufacturers; a wide range of fitness programs, including for children; wide range of additional services; presence of club system; qualified staff.

Third, in terms of the form of payment for services by clients, the city's fitness clubs can be divided into fitness clubs with a club system and clubs with a subscription system.

Among the fitness clubs with a clearly distinguished club system, we considered the clubs "Tetra", "Aura", "EGOISTE". Features of visiting these fitness clubs: on the club system – unlimited number of times, only cards are presented for six months or for a year. The cost of such cards from 11000 UAH to 33400 UAH per year.

Among fitness clubs with a subscription system there are both network and individual fitness clubs. The form of payment in these clubs – a one-time visit or a subscription for a month, six months, a year. Fitness clubs "Pheromone", "PULSE GYM", "Olympus", "Territory Fitness", "Forma-T" offer different types of season tickets: morning, afternoon, evening, for 2 visits y week, 3 visits a week, subscription – espirit, weekend, school, student, etc. The average price for one lesson in the gym is 70–80 UAH, for eight classes – 300–350 UAH, 12 lessons – 400–450 UAH. The average price of one group session on fitness can reach 70–80 UAH, 8 classes – 350–400 UAH., 12 lessons – 450–500 UAH. The cost of a subscription for six months can range from 1700 to 2500 UAH, per year from 2600 to 9000 UAH. It should be noted the uniqueness of the fitness clubs of the Malibu network, as they present both club and subscription systems, as well as a school of trainers.

Fourthly, from the point of view of fitness programs offered to clients, among all fitness clubs it is necessary to separate clubs with a swimming pool. According to our own estimates, the share of fitness facilities with swimming pools in the city of Kharkov is 24% of the total number of clubs. In the course of the study, we considered fitness clubs "Tetra", "Aura", "Malibu", "Safari", "Pheromone", where there are swimming pools and in connection with this, additional fitness programs are provided: aquafitness, aqua-steppe, classes for future moms and toddlers and the like. Thanks to the presence of a swimming pool, such fitness clubs will always be determined by a high degree of attendance. After all, the pool is a unique trade offer and a competitive advantage in the market of fitness services.

In the course of the study, we identified the features of services, the main differences in self-positioning and the benefits of 12 fitness clubs in Kharkiv in competition. We summarized and presented the data obtained in Table 1.

In the course of solving the second task of our study, we interviewed clients of 12 fitness clubs in Kharkiv. 65% of women and 35% of men were involved as respondents. This ratio is justified by a greater motivation for women to practice in fitness clubs than men. By age, respondents were divided into groups based on the main phases of the life cycle of a person: persons aged 17 to 25 years – 20% of respondents; persons aged between 26 and 35 years – 65%; persons aged 36 to 45 years – 15%. The experience of fitness in 40% of clients is more than 3 years, from 1 to 3 years – 45% of respondents and less than a year are engaged in fitness 15% of respondents.

Table 1
Comparative characteristics of fitness clubs in Kharkiv

Characteristics	Fitness clubs		
	"Malibu", "Pharemont", "Safari", «PULSE GYM»	«Tetra», «Aura», «EGOISTE»	"Territory Fitness", "Forma-T", "Aphrodite", "Olympus", "Salamander"
Focus on the consumer (self-positioning in the market of fitness services)	mass consumer orientation	exclusive audience (solvent and fastidious consumer)	orientation towards the youth / "family group" of consumers
Size of organization	Medium / small / large	large	small
Price policy	affordable price, system of season tickets / club cards	high price, only club system	affordable price / subscription systems
Organizational structure of management	multilevel thanks to an extensive network of institutions, the existence of a system strategy	branched thanks to a large number of units and management units	simplified structure due to the lack of some units (marketing, service management, etc.)
Resource support	qualified staff high/average quality of equipment and inventory; high or medium level of comfort	highly qualified staff modern professional equipment; impeccable service; original design	qualified staff average quality of equipment and inventory; small size of halls, dressing rooms
Marketing events	minimum set of additional services; "Aggressive" marketing policy	unique trade offers on the provision of basic and additional services; stable marketing activities	minimum set of additional services; inadequate use of marketing tools

As it turned out, the majority of the interviewed clients of fitness clubs (85%) believe that the use of outdoor advertising (flyers, billboards, city lights) will inform the public about the services provided by the fitness club; 60% of respondents received information about the fitness club from relatives, friends and acquaintances; 45% – learned about this or that fitness institution from Internet resources.

In the course of the study, it was determined which characteristics influence the choice of the fitness club by the consumers of physical culture and health services, namely: the convenient location of the club (95%); highly qualified and professional trainers (75%); affordable price for services and flexible system of discounts (60%); modern fitness equipment and inventory (55%); diversity of group programs (50%); Individual approach to each client (45%); high level of service (40%); favorable atmosphere in the club (35%) and a spacious classroom (30%);

As we can see, the most convenient location of the club is the greatest influence on the choice of the fitness club by the consumers of physical culture and health services. At the same time, the management of fitness clubs should pay special attention to the organization of a continuous process of professional development of fitness trainers, instructors, consultants who work directly with clients to fully meet their fitness and health interests.

Pursuing the above goal, the city's fitness clubs provide a range of services, including popular fitness programs and fitness technologies. In our study, we found that the clients of the fitness clubs prefer pilates (65%), fitness mix (60%), stretching (50%), callanetics and MIX-intensive (45%), TRX and strip plastic (35% %), Zumba and a gym (30%), yoga (20%). We believe that it is very important to improve the effectiveness of fitness clubs is to ensure the diversity and constant updating of fitness programs, taking into account the world trends in the development of health-improving fitness programs and technologies.

The attraction of as many customers as possible is also facilitated by the availability in the fitness club of additional services, namely: massage, sauna, SPA-procedures, beauty salon, fitness bar, etc. As the results of the survey show, (65%), SPA-procedures (40%), beauty salons (25%) and saunas (20%) are more likely to be offered to customers in the fitness club. So, in our opinion, the range of additional services that the fitness club offers can be attributed to its competitive advantages in the market of fitness services.

As it turned out, among the reasons for leaving the fitness club, respondents define: financial difficulties (45%), frequent business trips (40%), health problems (35%), transition to another fitness club (30%), change in work schedule (15%), laziness and lack of will power (5%), pregnancy (5%). So, a significant number of respondents (35%) noted the cause of the "health problem". Therefore, in order to improve the efficiency of fitness clubs, special attention should be given to trainers and instructors to diagnose and monitor the physical condition of those involved, as well as individual approach to each client. The received results also testify to the need to develop service management for working with clients, after all, almost a third of respondents (30%) noted among the reasons for leaving the club moving to another fitness club.

Conclusions

1. It is established that the market of fitness services in the city of Kharkov is characterized by 297 fitness establishments (clubs, centers, complexes, studios, etc.). Competitive advantage in the market of fitness services is enjoyed by fitness institutions with a swimming pool, whose share is 24% of the total in the city. It has been established that the main leaders among Kharkiv fitness clubs are network fitness clubs.

2. Researches that were conducted among the clients of 12 fitness clubs of Kharkov show that the greatest influence on the choice of the fitness club by the consumers of physical culture and health services is provided by: the convenient location of the club (95%); highly qualified and professional trainers (75%); affordable price for services and a flexible system of discounts (60%). The majority of respondents prefer pilates (65%), fitness mix (60%), stretching (50%) and additional services: fitness bar (65%), SPA-procedures (40%).

It is determined that the organization of a continuous process of professional development of fitness staff, providing diversity and continuous updating of fitness programs and additional services; application of marketing tools for advertising and promotion of fitness services in the market; further development of service management; application of modern methods of diagnosis, control and individual approach to each client – are ways to improve the effectiveness of fitness clubs in the city of Kharkiv.

Prospects for further research should be linked with the development of strategic directions for the development of the fitness industry in the city of Kharkiv.

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Changes in the technical readiness of volleyball players 10–11 years under the influence of visual perception of movement parameters

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Purpose: *increase in the level of technical preparedness of volleyball players at the stage of initial training under the influence of visual perception of the parameters of movements.*

Material & Methods: *36 female athletes from the initial training group aged 10–11 years old participated in the study in Kharkov. In the course of the study, the following methods were used: analysis of scientific and methodological literature; pedagogical testing pedagogical experiment, methods of mathematical statistics. The pedagogical experiment lasted 8 weeks and was built with the participation of two groups: a control (18 players), the training process of which corresponded to the contents of the Youth Sports School's volleyball program, and an experimental (18 players), the content of the training was supplemented by a program using the technique of technical training, on the basis of visual perception by athletes of the specifics of performing technical techniques. The pedagogical experiment lasted 3 months, after which the changes in the level of technical preparedness of volleyball players of both groups.*

Results: *after the pedagogical experiment, there were established significant improvements in the performance of two test exercises at the athletes of the experimental group. Changes in the results of the volleyball players in the control group were unreliable.*

Conclusions: *our proposed technique of technical training, which is based on the visual perception of athletes of biomechanical peculiarities of performing technical techniques, is effective and can be used by trainers of initial training groups.*

Keywords: *female volleyball players, technical preparedness, preparation of female volleyball players, visual perception.*

Introduction

One of the central problems of the theory and methods of sporting coaching is the attentiveness of the process of technical preparation, the elements of how to realize in the minds of sports discipline [1; 2; 5; 8]. In particular, the problem is represented in such variative types of activities, as well as sporting, de-elementary ruches, motor, and psychic processes, which are often not interchanged, and are not repartitioned by people in the time-and-space-time structure [6; 10].

In the scientific literature there is a lot of information that emphasizes the importance of creating an athlete's correct idea of the action he must perform. Thus, in their studies, Lucy Parrington, Kevin Ball & Clare MacMahon (2015) found that the kinematic characteristics of handball movements affect the performance of individual techniques, which underscored the need to improve technical techniques with regard to ergonomic parameters of movements [11]. Zh. L. Kozina, A. Pugunets argue that for a correct understanding of all the details of the technique of performing certain tricks in sports games, the athlete needs static and dynamic models of elements of technology and tactics that are reproduced by multimedia technical devices [3].

At present, multimedia computer technologies are being actively implemented in many sports, which simplify the learning and improvement of various theoretical and practical knowledge [3; 4; 7; 9], but similar techniques for the technical improvement of young athletes have not been widely used among volleyball players, which determined the direction of our research.

Relationship of research with scientific programs, plans, themes. The research was carried out in accordance with the theme of the research plan of the Kharkov State Academy of Physical Culture "Psycho-sensory regulation of the motor activity of sportsmen of situational sports" (2016–2018). And "Scientific and methodical foundations of using information technologies in the training of specialists in the field of physical culture and sports" (No. 0113U001207).

Purpose of the study: to increase the level of technical preparedness of volleyball players at the stage of initial training under the influence of visual perception of the parameters of movements.

Objectives of the study:

1. Analyze the scientific and methodical literature on the chosen subject.

2. Determine the level of technical preparedness of volleyball players of the second year of training.

3. Prepare special video fragments for the implementation of technical methods of the game, exercises for training him and experimentally test the effectiveness of their use in the training process.

Table 1

Technical preparedness of volleyball players of the control and experimental groups at the beginning of the experiment, the number of times, (n_1=n_2=18), $\bar{X}$±m

Groups, statistical indicators	Second serve from the top with both hands(from 10 attempts)	Transfer of the ball with two hands for the hoop (from 10 attempts)	Transfer of the ball 2 hands with a jump (from 5 attempts)	Transfer of the ball with two hands from below in the pair (from 10 attempts)	Transfer of the ball after the targeted serve (from 5 attempts)	Serve in the right and left, near and far parts of the site into a zone of 3x3 m (from 8 attempts)
Control group	4,81±0,22	3,50±0,21	0,36±0,13	8,13±0,31	0,69±0,13	1,94±0,20
Experimental group	5,25±0,36	3,94±0,27	0,44±0,13	8,19±0,10	0,93±0,18	2,06±0,26
t	1,04	1,26	0,34	0,19	1,16	0,38
p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05

Material and Methods of the research

The study involved 36 female athletes from the initial training group at the age of 10–11 years old. In the course of the study we used the following methods and techniques: analysis of scientific and methodological literature; pedagogical testing pedagogical experiment, methods of mathematical statistics.

Examining the level of technical preparedness of volleyball players for 2 years of training, we used the test tasks recommended by the curriculum for the Youth in volleyball, namely: the second transfer of the ball with 10 attempts, the transfer of the ball with two hands through the hoop with 10 attempts, the transfer of the ball with both hands in a jump with 5 attempts, passing the ball with two hands from below in pair with 10 attempts, transfer the ball after the targeted feed with 5 attempts and feeding to certain areas of the site with 8 attempts.

Based on the results of the initial testing, a group of female volleyball players was divided into a control group (n=18) and an experimental (n=18), taking into account the lack of reliability of differences in the indices of technical fitness of athletes. Both groups of young athletes were trained in the same training program, which met the requirements of the Youth Volleyball School. The difference in the training method was that during the training sessions for the experimental group athletes, specially prepared video fragments were provided for viewing before the work on the technique, which provided a visual representation to the volleyball players about the biomechanical characteristics of the performance of a technical serve.

After the pedagogical experiment, which lasted three months, we again conducted pedagogical testing of the technical preparedness of female volleyball players of both groups and analyzed the data. After the pedagogical experiment, which lasted three months, we again conducted pedagogical testing of the technical preparedness of female volleyball players of both groups and analyzed the data.

Results of the research and their discussion

The conducted preliminary testing of the technical fitness of volleyball players for 2 years of training (Table 1) established that the test exercises recommended by the program Youth Sports School did not match the physical capabilities of athletes.

In such test exercises as the transfer of the ball by 2 hands in a jump – 50% of the female athletes failed to perform any successful attempt, 23,8% of the athletes participating in our studies did not perform any successful transfer of the ball after the targeted feed and 2,6% athletes failed to correctly deliver the ball to certain areas of the site.

The pedagogical experiment lasted 8 weeks, during which the athletes of the experimental group were provided with specially prepared video fragments of the standard performance of a certain technical technique before the work on the technique. On the days of rest, the experimental group was asked to view a video clip (determined by the technical coach, studied at the last training session) determined by the trainer at home in the morning and evening one time. For this purpose, a video was uploaded to the electronic medium of the trainer-instructor and students of the experimental group, which was structured according to the name of the technical methods. The video fragment was constructed as follows: playing the performance of the reception in the game, then performing the reception in specially created conditions, then repeating at a slow pace, then performing the reception in training conditions. Performing one technical technique in one training session, periodically reviewing the corresponding video fragment within the training, lasted 20–25 minutes of time.

The plan for the distribution of training aids, we applied in a weekly microcycle of training, is given in Table 2.

Table 2

Distribution of training aids in the weekly training cycle

Day of microcycle	Means of education			
	Visual preparatory	Preparatory exercise	Imitations exercises	Basic exercises
1	X	X	X	X
2	X	X	–	X
3	X	–	–	–
4	–	X	X	X
5	X	–	–	–
6	X	X	X	X
7	–	–	–	–

After 3 months of classes on the method we proposed, the newly obtained indicators of technical preparedness of volleyball players of the control and experimental groups (Table 3).

Analyzing the changes in the results of the test exercises performed by volleyball players in the experimental group, it

Table 3

Technical preparedness of volleyball players of the control and experimental group before and after the pedagogical experiment, (n_1=n_2=18), $\bar{X}$±m

Groups, duration of the experiment, statistical indicators	Second serve from the top with both hands	Transfer of the ball with two hands for the hoop (from 10 attempts)	Transfer of the ball 2 hands with a jump (from 5 attempts)	Transfer of the ball with two hands from below in the pair (from 10 attempts)	Transfer of the ball after the targeted serve (from 5 attempts)	Serve to certain areas of the site
Indicators of the experimental group						
At the beginning of the experiment	5,25±0,36	3,94±0,27	0,44±0,13	8,19±0,10	0,93±0,18	2,06±0,26
At the end of the experiment	7,00±0,38	4,56±0,19	0,50±0,13	9,88±0,09	1,00±0,13	2,44±0,21
t	2,04	0,92	0,12	3,85	0,11	0,55
p	<0,05	>0,05	>0,05	<0,05	>0,05	>0,05
Indicators of the control group						
At the beginning of the experiment	4,81±0,22	3,50±0,21	0,36±0,13	8,13±0,31	0,69±0,13	1,94±0,20
At the end of the experiment	5,13±0,38	3,81±0,40	0,44±0,13	8,75±0,20	0,75±0,12	2,00±0,19
t	0,72	0,69	0,34	1,69	0,37	0,23
p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05

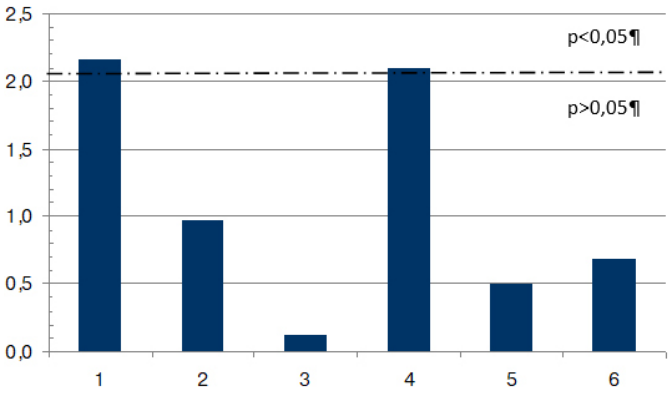
can be seen that significant improvements in the results were made in two test exercises (p<0,05), in contrast to the results of athletes in the control group, where no significant improvement was observed (p<0,05).

Comparing the results of the test exercises of the athletes of both groups after the pedagogical experiment, it is seen (Figure 1) that in 2 problems of the volleyball player of the experimental group had significantly higher indices (p<0,05) than the athletes of the control group.

Conclusions

Summarizing, it can be recognized that the technique of technical training that we have proposed, which is based on the visual perception by athletes of the biomechanical features of the implementation of technical methods, is effective and can be used by the coaches of initial training groups.

The prospect of further research in this area is considered in the creation of an electronic textbook with a detailed exposition of underwater, imitation exercises and media-free books for training technical techniques for playing volleyball athletes and testing it in practice.



1 – second serve from the top with both hands,
2 – transfer of the ball with two hands for the hoop,
3 – transfer of the ball 2 hands with a jump,
4 – transfer of the ball with two hands from below in the pair,
5 – transfer of the ball after the targeted serve,
6 – serve to certain areas of the site

Figure 1. Numerical values of the t-test and the probable level (p) of the technical readiness of young female volleyball players of the control and experimental groups after the pedagogical experiment (n_1=n_2=18).

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Analysis of gaming actions of the central blocking in competitive activity of women's volleyball amateur teams

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Purpose: *determine the quantitative indicators of the game actions of the central blocking amateur teams in competitions under the aegis Volleyball Federation of Kharkiv region.*

Material & Methods: *an analysis of statistical data obtained as a result of pedagogical observations of the execution of blocks in 36 games (116 games) by 10 players of this role was carried out. The following methods were used: analysis of scientific methodological literature; pedagogical observation, methods of mathematical statistics.*

Results: *quantitative indicators of gaming actions of players related to the execution of blocks, in particular, the distribution of loading of game zones by attacks, the distribution of the number of blocks of different species by zones, the distribution of the number of fines of their attackers are determined. The evaluation of the effectiveness of the actions of the players during blocking in various defense zones was carried out.*

Conclusions: *the results can be used to solve the problem of increasing the effectiveness of the game of central blocking volleyball teams in the process of training and competition.*

Keywords: *block, defense, zone, distribution, indicator, performance, volleyball.*

Introduction

With the introduction of changes in the rules for conducting competitions in volleyball by the International Federation (FIVB) in 1992. Specialization of players has increased. If before volleyball players were mostly universal, recently thanks to innovations, a bright trend in the development of modern volleyball is the division of team players into binders, central blocking, diagonal, wing-spiker and libero [2; 3; 7].

As for the central blocking (attackers of the first tempo), then from the name of the line you can already draw a conclusion about his main tasks on the court during the game. First of all, it must reliably block the opponent's attack, while always being in the center of the grid. If the attack is the first tempo, then at the time of the transfer of the linking player, he is already in the jump. At the same time, the connecting player quickly gives the transfer central exactly to the hand, which causes a very fast attack, and the opponent can be ready to put the block or build a defense properly. These players do not participate in the reception, in the defense on the back line they play usually only in one placement after their own submission. And only in this location both central blockers are on the site at the same time [5; 6].

With the advent of the players in the teams of libero, the game functions of the central blockers were somewhat limited, which, in particular, allowed to reduce their game load due to the frequent replacement of libero on the team's back line of defense. This allowed coaches to pay more attention to the performance of their direct functions in the training process.

In modern volleyball, when analyzing the results of the game players' actions, the latest computer technologies. Computer data analysis of competitive activities make it possible to use operational information to make appropriate adjustments to the process of preparing volleyball players, as well as organizing the game teams. Most national teams and leading volleyball clubs use different methods and computer programs to assess the effectiveness of competitive activities. The most widespread is the Italian computer program "Data Volley", which is widely used by volleyball clubs of the highest echelon in many countries of the world. In Ukraine, leading clubs also use this program to obtain relevant statistical reports of matches of the national championship. Perspective is the method based on the system of scoring characteristics of the elements of competitive activity on the scale of assessments, objectively determine the effectiveness of the appropriate technical technique [1; 3; 4]. In the framework of this technique, the recording of game actions is performed using code records during the pedagogical observations of the matches. The results of the corresponding statistical data are analyzed using mathematical statistics using computers. For the purpose of monitoring and evaluating the results of the volleyball team's competitive activity, it is possible to determine the corresponding indicators of the effectiveness of the team's game actions in general and of each player individually.

Trainers and volleyball specialists are interested in obtaining as much information as possible about various aspects of performing game actions of players, which makes it possible to check the various options for the opponent's actions in game situations and the selection of appropriate technical and tactical options for the game. It should be noted that in the technical reports on the results of the matches, which are published in a special sports press, there is rather limited information about the performance by players of various game techniques. Trainers of amateur teams almost do not have access to computer programs that are designed to evaluate the results of their players' competitive activities, for the lack of

CRG and adequate funding.

Carrying out of the detailed analysis of quantitative parameters of performance of game actions of volleyball players Role of the central blocker determined the direction of this research.

Relationship of research with scientific programs, plans, themes. The direction of research corresponds to the subject of the Consolidated Plan of Research in the field of Physical Culture and Sports for 2014–2019. Ministry of Ukraine for Family, Youth and Sports 2.4.12 1п on "Optimization of training and competitive activities in sports games" (state registration number No. 0114U002659).

Purpose of the study: to determine the quantitative indicators of gaming actions of the central blocking amateur women's volleyball teams under the auspices of the FVKhR.

Material and Methods of the research

In the work the analysis of the statistical data received as a result of pedagogical observations of the execution of locks in 36 games (116 games) by 10 players of this line is made. The following methods were used: analysis of scientific methodological literature; pedagogical observation, methods of mathematical statistics.

Results of the research and their discussion

Blocking is one of the most important technical and tactical methods of the game, which is the main means of protecting the team in the process of solving gaming problems in countering the enemy's attacking actions. In modern volleyball, the successful use of the unit largely determines the effectiveness of the team's play [5; 6].

In the processing of data by the execution of locks, it was found that the blocking players in different parties are unevenly performing defensive actions. It was found that the quantitative indicators of the performance of technical and tactical actions on the block depend on the number of attacking actions of the opposing team. That is, in the event of a decrease in the reception efficiency of the feed, the number of attacking game actions was reduced, and as a result of the blocking.

Analysis of the relevant statistics showed that in the total amount of technical methods of the game that used the central blockers in games, the percentage values of the performance of the various elements in percent, which are shown in Figure 1.

As can be seen from Figure 1, these players took part in defensive actions, determined by the following ratios: block – 58% and defense – 5%. To the defensive actions, the attacker performs and the pace includes the insurance of his attacking teammate, who was blocked by a rival, a single block of his extreme first-line attackers and "self-insurance", that is, backing balls after "bounces" from his own unit.

The table shows the results of the calculations of the average quantitative indicators of the I pace attaker during one batch in the performance of the feed, in the attack, the defensive actions in the first and second lines of defense.

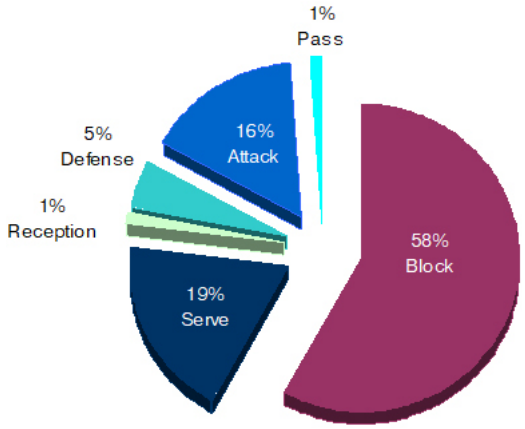

Figure 1. Distribution of the number of basic technical elements performed by the central blockers during the game, relative to their total volume

Table 1

Quantitative indicators of the performance of game actions by I pace attaker during a single game (n=10)

Statistical indicator	Actions in the attack		Actions in defense	
	Serve	Attacking strikes and transfers	Defense actions in the first line of defense	Defense actions in the second line of defense
$\bar{X}\pm\sigma$	7,84±0,52	7,46±0,64	23,93±2,07	2,02±1,38

The I pace attaker performs basically defensive actions in the first line of defense, that is, blocks enemy attacks from the central zone near the grid. In the second line of defense, he serves as a defender, insuring his attackers, whose strokes have blocked the opponent. This occurs when you organize your attack "from scratch" or "upgrade", the corresponding share of the total amount of defensive actions is 89%, or when the attacker and the pace does not succeed in organizing the group block of his team position of its location – 11%. In this case, he is compelled to insure the unit unit of the extreme attacking teammate.

As a result of the research, it was found out that in modern volleyball, a characteristic feature of the team's defense is the presence of a single block, as well as a group one, in which two or three players (double or triple block) take part as the first echelon of defense. In the group block, the main blocking player is always selected, whose task is to neutralize the "dangerous" point for the opponent's attack.

As the main blocking player may be:

- central blocking (when an opponent rushes from zone 3), which can move from the center to the edge of the grid (in accordance with zones 2 and 4) in case of an attack from these zones;
- one of the wingers who take part in the organization of the defensive actions of the team (zones 2 or 4), that is, they are responsible for neutralizing the attack of the attacking opponent according to the zones 4 and 2 of his site.

Blocking of the opponent's strikes, performed at different heights and different distances from the grid, have certain features. So, with a skilful attack from distant grids, block-

ing retaliatory strikes is somewhat more difficult. In this case, there are increased requirements to the ability of blocking players to provide for the direction of the flight of the ball after the strike as soon as possible (on the impact of the attacker's arm, but not on her assassination attempt) and the ability to move hands appropriately to block the opponent's attacks.

According to the code records of the results of the pedagogical observations of games, the most "loaded" zones were identified, that is, the proportion of the number of attacks of an opponent from these zones relative to their total volume. Out of zone 4, 40% of attacks were performed; with 3 – 18% of attacks; from 2% to 28%; because of the three-meter line ("pipe") – 14%.

From a practical point of view, this information is important for team coaches, first, because it also indicates the loading of different zones by the block, since, as a rule, blocking players specialize in the execution of the unit in certain zones. It gives a real possibility to assume, even program the actual workload of each player on the block.

We have determined the relative shares of the number of locks by players of different roles of strikes made from different zones of the opponent's attack. Thus, the attacker of 1 tempo in zone 3 performs blocking more than his teammates, since he takes part in blocking in all three zones. His share in the block is significant and reaches up to 50%. As for zone 2, the corresponding share is 30–35%, since the number of rivals' attacks from zone 4 for various reasons significantly exceeded their number from other zones, the share corresponding to participation in the block of players of the 4 zones was 15%.

Players who perform blocking attacks in zone 4 have less load, because half of the rivals have attacks in situations where there is a connecting player in zone 2. Recently, the number of locks of these players has increased, since attacks from the back line of the playing field occur more often from the first zone.

In our opinion, the reason for such a "lag" players of zone 4 is, as a rule, a smaller number of attacks against them. While the central blockers in the third zone operate under more difficult conditions, they must control the attacks of the attacker of the 1st tempo, and depending on the actual situation, switch to participating in group blocking of the opponent's strikes from other zones. According to the conducted research, the I pace attaker playing in the 3 zone, performs the actions in the following ratio: in the group - 81% and single blocking – 19%.

The load in the game actions on the block requires from the attacker And the tempo is not any speed in the movements along the grid and, as a rule, a high level of speed endurance.

We also determined the distribution of the number of positive locks, directly accompanied by winning points by blocking players. Thus, in the total amount of such locks, 32% are accounted for the proportion corresponding to the actions of the central blockers (zone 3), zone 2 players – 43%, and the zone 4 outside hitter – 25% (Figure 2). The resulted results can be considered some degree as the certain indicators of productivity of actions on the block.

Analysis of statistical data showed that in the struggle against the grid of attacking teams of the opponent and players who perform blocking of their strikes, the number of points that were obtained by the actions of attacking players is noticeably dominated by the corresponding results obtained by the blockers. One of the reasons for this advantage of the corresponding results (almost fourfold) is due, in our opinion, to the secondary nature of the block compared to the attack, since the attacking player himself chooses the method, direction, power of the strike, and the unit must act only in accordance with the initiative of the scorer. Of great interest is the definition of the role of other factors that can affect the difference in the lag of the above results.

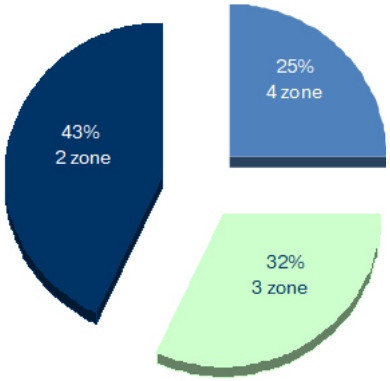

Figure 2. Effectiveness of actions when blocking attacks of attacking opponents by players located in different protection zones

Conclusions

The analysis showed that in the total volume of effective blockage of the opponent's blows, which were completed directly by winning the point, the share of the central blocking (zone 3) is 32%. Summarizing, it can be recognized that the use of the results of this study will help trainers in choosing objective values of quantitative indicators of gaming actions of blocking players in each zone. This will allow to optimize the training and training process for preparing attackers of the first tempo to participate in competitive activities.

Prospects for further research. From the practical point of view, the objective evaluation of quantitative indicators of the effectiveness of blocking by players of different roles is very important for team coaches. Such indicators determine the combined probability of winning a point after the corresponding game actions of the opposing team that occur on the court after the blocking of the attacking blows of its attackers. The methodology for determining the relevant indicators was developed by the authors [1; 4] and further work is needed to perform their calculations.

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Interrelation of psychophysiological indicators and physical readiness of qualified wrestlers

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Purpose: *to establish the features and degree of interrelation of psychophysiological indicators and physical readiness among qualified wrestlers.*

Material & Methods: *analysis of scientific and methodological information, generalization of best practical experience, psychophysiological methods of research, pedagogical testing, methods of mathematical statistics. Thirty qualified wrestlers took part in the research, at the age of 19–22.*

Results: *the results of the study indicate the uniformity of the indices of simple and complex reactions, since the coefficient of variation lies in the range from 6,04% to 10,94%. The indicators of specific perceptions have a high coefficient of variation (from 15,56% to 48,82%), this is because specific perceptions more individually reflect the psychophysiological state of qualified wrestlers.*

Conclusions: *it is determined that the most informative indicators of physical readiness are the tests of the wrestler's strength abilities, which have reliable connections with 11 psychophysiological indicators, followed by tests characterizing the strength endurance, with five statistically significant interrelations.*

Keywords: *qualified wrestlers, correlation, psychophysiological indicators, physical readiness.*

Introduction

Modern sports of higher achievements make high demands on all sides of the athlete's preparedness, in addition, the main problem of the sport of higher achievements is the impossibility of an infinite increase in training loads, which leads to the need for further searching for new, more effective pedagogical tools and methods in the system of training highly qualified athletes [4; 8; 9; 23].

Ability to conduct a large number of complex technical and tactical actions, taking into account possible actions of an opponent in a duel, making bold and instant decisions in extreme situations against the impact of confounding factors – all this is a prerequisite for success in the competitive activity of wrestlers and reflects the level of their psychological preparedness [14–16, 22].

Psychophysiological functions of a person depend on the characteristics of the higher nervous system, characterizing the process of formation and improvement of special motor skills in conditions of sports activity [3; 10; 19; 21].

Also, the physical preparedness of wrestlers is one of the most important basis for the overall structure of their preparedness, which determines the level of special working capacity, on which depends the reliability of the implementation of technical actions [2; 5; 11; 20].

Relationship of research with scientific programs, plans, themes. The work was carried out according to the plan of research of the Kharkov State Academy of Physical Culture.

Purpose of the study: to establish the features and degree of interrelation of psychophysiological indicators and physical readiness of qualified wrestlers.

Objectives of the study:

– to determine the psychophysiological indicators and the level of physical fitness of qualified wrestlers;

– establish the degree of correlation between psycho-physiological indicators and the level of physical readiness of qualified wrestlers.

Material and Methods of the research

Research methods: analysis of scientific and methodological information, generalization of best practical experience, psychophysiological methods of research, pedagogical testing, methods of mathematical statistics.

Results of the research and their discussion

Based on the analysis of scientific and methodological information and generalization of best practical experience, it has been established that one of the main tasks of the training process of qualified wrestlers is the development of physical qualities and the enhancement of psychological resistance to confounding factors [12; 17; 18].

Pedagogical testing was carried out to determine and establish the features of the relationship between psycho-physiological indicators and physical preparedness.

Evaluation of sensorimotor reactions and specific perceptions was performed using a set of tests developed for tablet PCs [1; 21]. These tests were divided into three groups: simple sensorimotor reactions, complex sensorimotor reactions, specific perceptions.

Table 1 presents the parameters of sensorimotor responses and specific perceptions of the development of qualified wrestlers.

The coefficient of variation was used to determine the homogeneity of the sample observations. It is believed that if the coefficient of variation does not exceed 10%, then the sample can be considered homogeneous [7]. The received data testify to homogeneity of indicators of simple and complex reactions of the examined athlete, as the coefficient of variation is in the range from 6,04% to 10,94%. The indicators of specific perceptions have a high coefficient of variation (from 15,56% to 48,82%), this is because specific perceptions more individually reflect the psychophysiological state of qualified wrestlers (Table 1).

Physical training of wrestlers has its own specific features, which must be taken into account in the construction of the training process and the distribution of the load [6; 13]. It is necessary to take into account the capabilities of the athlete's body and the development of special physical qualities when selecting the means and methods of training. Analysis of the literature [5; 6; 11] on the development of special physical qualities in wrestlers shows that the level of speed-strength preparedness of an athlete is of great importance in performing a variety of technical actions. Thus, the ability to selectively show significant muscle effort allows the wrestlers to successfully perform a combination of techniques, timely use countermeasures. With spurs, throws, and holdings, special endurance is important, as well as for quick recovery during short-term rest between periods (30 s) and between fights (the closer to the final meetings, the shorter the rest intervals).

In this regard, to assess the physical preparedness of wrestlers, we used various methods of testing the coordination abilities, power endurance, speed-strength qualities, general and special endurance. On the basis of these test methods, the following indicators of the physical readiness of qualified Greco-Roman wrestlers were obtained (Table 2).

The peculiarity and degree of interrelation of psychophysiological indices and the results of physical readiness was determined by the method of correlation analysis (Table 3). According to the indicators of the table, the critical value of the sample correlation coefficient for the sample n=30 is equal to r=0,361 [7].

The correlation analysis of the relationship between psychophysiological indicators and physical readiness showed that simple motor skills interact with speed-strength abilities in the test, throwing a stuffed ball (3 kg) from behind the head forward with both hands (r=0,40).

Stability to the knocking factors has statistically significant interrelationships with the speed-strength abilities, standing long jump (r=–0,37), back arch throw (r=0,45) and throws roll (r=0,52), push-ups for 20 s (r=–0,36); with power endurance in the tests: the maximum number of sit-ups with the partner (r=–0,38), the maximum number of pull-ups on the crossbar (r=–0,43).

The selection reaction from static objects has an interrelation with the speed-strength abilities shown in the test: throwing a printed ball (3 kg) from behind the head forward with two hands (r=–0,37).

An analysis of the response rates to a moving object revealed a statistically significant relationship with the maximum amount of push-ups (r=0,39), characterizing the strength endurance of the wrestlers.

The discrimination reaction is reliably associated with the speed-strength abilities in the pull-up test for 20 seconds (r=–0,44) and with the coordination abilities shown in the test of 15 coups on the "bridge stand" (r=0,37).

The speed of reproduction of a given line is influenced by such indicators of physical readiness as speed-strength qualities (run test at 30 m (r=0,43), turn rolls (r=0,40) and deflection (r=0,46), climbing on the 5 m rope without the help of the feet (r=0,49)) and strength endurance (the maximum number of sit-ups with the partner (r=–0,40), the maximum number of pull-ups on the crossbar (r=–0,40)).

Table 1

Model parameters of sensorimotor reactions and specific perceptions of qualified wrestlers (n=30)

No. i/o	Indicators of sensorimotor reactions and specific perceptions	$\bar{X}$	δ	V, %	m
	Simple reactions				
1.	Simple motor skills (number of clicks per 10 s)	25,50	1,54	6,04	0,28
2.	Resistance to knock-down factors (%)	80,00	6,37	7,96	1,16
3.	Simple visual-motor reaction (ms)	230,00	15,45	6,72	2,82
4.	Simple auditory motor reaction (ms)	212,40	14,54	6,85	2,66
	Complicated reactions				
5.	Selection reaction from static objects (ms)	636,30	63,34	9,95	11,56
6.	Reaction to a moving object (ms)	26,60	2,91	10,94	0,53
7.	Reaction discrimination (ms)	281,20	18,16	6,46	3,32
8.	Selection response from dynamic objects (ms)	366,40	35,72	9,75	6,52
	Specific perceptions				
9.	Assessment of the sense of tempo (80 beats min^{-1}) (ms)	38,00	13,34	35,11	2,44
10.	Evaluation of line accuracy reproduction (mm)	0,50	0,12	24,00	0,02
11.	Playback speed of the preset line (mm s^{-1})	103,50	50,53	48,82	9,22
12.	Assessment of the perception of the change in the size of the object (s)	0,90	0,14	15,56	0,03

Table 2

Model indicators of physical readiness of qualified Greco-Roman wrestlers (n=30)

No. i/o	Test	$\bar{X}$	δ	V, %	m
	Speed-strength abilities				
1.	Running on 30 m (s)	4,98	0,31	6,23	0,06
2.	Leap in height (cm)	50,97	4,79	9,40	0,87
3.	Leap in length (cm)	219,20	8,94	4,08	1,63
4.	Throwing jerks 10 times (s)	28,13	2,22	7,89	0,40
5.	Throws roll 10 times (s)	30,90	2,29	7,41	0,42
6.	Throw the printed ball (3 kg) back with both hands (cm)	9,89	0,72	7,28	0,13
7.	Throw a printed ball (3 kg) forward from behind the head (cm)	8,89	0,67	7,54	0,12
8.	Climbing a rope without the feet (s)	6,70	0,72	10,75	0,13
9.	Pulling on the crossbar for 20 seconds (number of times)	15,57	1,15	7,39	0,21
10.	Push-ups for 20 s (number of times)	30,90	2,33	7,54	0,43
11.	Flexion of the trunk lying on the back for 20 s (number of times)	18,77	1,33	7,09	0,24
	Strength endurance				
12.	Lifting the legs on the gymnastic wall (number of times)	18,47	1,50	8,12	0,27
13.	Squatting with a partner of equal weight (number of times)	22,23	2,38	10,71	0,43
14.	Pulling on the crossbar (number of times)	30,43	4,06	13,34	0,74
15.	Push-ups number of times)	64,43	4,34	6,74	0,79
16.	Flexion-extension of hands in the rest on the uneven bars (number of times)	49,83	4,44	8,91	0,79
17.	Partner's uplift of the trunk from behind (number of times)	15,90	1,35	8,49	0,25
	Coordination abilities				
18.	Running on the "bridge stand" (5 – to the left, 5 – to the right) (s)	15,09	1,35	8,95	0,25
19.	10 somersaults forward (s)	12,15	1,17	9,63	0,21
20.	Turnovers on the "bridge stand" 15 times (s)	34,83	2,06	5,91	0,38
	General endurance				
21.	Running on 800 m (s)	155,83	5,65	3,63	1,03
22.	Running 2x800 m (1 min rest) (s)	320,33	10,27	3,21	1,88
	Special endurance				
23.	1 series of 15 back arch throw (s)	32,13	3,34	10,40	0,61
24.	2 series of 15 back arch throw (s)	32,83	4,06	12,37	0,74
25.	3 series of 15 back arch throw (s)	35,97	5,46	15,18	1,00
26.	Sum of three series of back arch throw (s)	100,93	12,09	11,98	2,21

The perception of the change in the size of the object has an interrelation with the overall endurance, manifested in running at 800 m (r=0,42) and running 2x800 m (r=0,38).

The parameters of a simple visual-motor reaction, a simple auditory motor reaction, a selection reaction from dynamic objects, an appreciation of the sense of tempo, and an estimation of the reproduction of the accuracy of a given line do not have statistically reliable connections with physical readiness.

The analysis revealed a number of shortcomings in the physical preparedness of the athletes under study and made it possible to establish that when planning training loads it is necessary to increase the requirements for the level of development of the special working capacity of wrestlers taking into account the measure of manifestation of psychophysiological indicators in conditions of competitive activity.

Conclusions

The results of the study indicate the homogeneity of the indices of simple and complex reactions, since the coefficient of variation lies in the range from 6.04% to 10.94%. The indicators of specific perceptions have a high coefficient of variation (from 15,56% to 48,82%). This is due to the fact that specific perceptions reflect, to a greater extent, an individual, genetically conditioned, characteristic for a particular athlete's psychophysiological state.

The materials of the research showed that the most important indicators of physical readiness are the tests of the fighter's speed-strength abilities, which have connections with 11 psychophysiological indicators, followed by tests showing force endurance, with 5 statistically significant interrelations.

It is revealed that the indices of physical readiness of qualified wrestlers are characterized by predominantly low variability in testing the speed-strength qualities, coordination abilities, general and strength endurance, and the average in the results of special endurance. This gives grounds to argue that in the training process of qualified Greco-Roman wrestlers it is necessary to devote more time to the development of special endurance.

Further research will be aimed at determining the relationship between physical development and psychophysiological indicators of wrestlers.

Table 3

Interrelation of psychophysiological indicators and physical readiness of qualified wrestlers (n=30)

Indicators		Simple reactions			Complicated reactions				Specific perceptions				
		1	2	3	4	5	6	7	8	9	10	11	12
Speed-strength abilities	13	0,16	0,17	0,29	0,08	–0,14	–0,03	0,01	–0,02	0,02	–0,06	**0,43**	–0,28
	14	0,16	**–0,37**	–0,04	0,07	–0,12	–0,28	–0,15	0,12	–0,10	0,02	–0,29	0,20
	15	0,24	–0,33	–0,11	–0,07	–0,02	–0,20	–0,11	0,04	–0,13	–0,01	–0,34	0,05
	16	–0,22	**0,45**	0,03	–0,31	–0,11	0,01	0,28	–0,03	0,16	–0,04	**0,40**	–0,12
	17	–0,25	**0,52**	0,04	–0,25	–0,06	0,11	0,29	–0,03	0,20	–0,02	**0,46**	–0,14
	18	0,26	–0,26	–0,07	0,03	–0,21	–0,11	–0,20	0,03	–0,23	0,06	–0,29	–0,03
	19	**0,40**	–0,20	–0,11	–0,02	**–0,37**	–0,24	–0,25	–0,10	–0,29	–0,02	–0,22	–0,10
	20	0,07	0,06	0,09	–0,02	–0,13	0,03	–0,04	–0,06	0,23	–0,06	**0,49**	–0,14
	21	0,30	–0,34	–0,21	0,15	–0,11	–0,21	**–0,44**	–0,01	–0,21	0,00	–0,25	0,22
	22	0,31	**–0,36**	–0,12	0,14	–0,09	–0,19	–0,31	–0,02	–0,11	–0,07	–0,22	0,20
	23	0,20	–0,18	–0,22	0,08	–0,04	–0,14	–0,30	0,04	–0,24	–0,04	–0,33	0,30
Strength Endurance	24	–0,20	–0,12	0,14	–0,04	0,17	0,24	0,06	–0,02	0,07	0,06	–0,27	–0,27
	25	0,08	**–0,38**	–0,17	0,04	–0,10	–0,03	–0,29	–0,06	–0,20	–0,13	**–0,40**	–0,13
	26	0,10	**–0,43**	0,11	0,30	0,27	0,33	–0,17	0,24	0,02	0,29	**–0,40**	0,17
	27	–0,06	–0,11	0,04	–0,01	0,09	**0,39**	–0,04	–0,18	–0,04	0,01	–0,36	–0,11
	28	–0,01	–0,17	–0,04	–0,01	0,03	0,33	–0,15	–0,26	–0,03	–0,04	–0,26	–0,01
	29	–0,11	–0,11	0,23	0,00	0,12	0,04	0,05	–0,08	0,04	0,12	–0,06	–0,36
Coordination	30	–0,26	0,18	0,02	–0,26	0,14	–0,07	0,23	–0,13	–0,16	–0,16	0,02	–0,13
	31	–0,32	0,25	0,08	–0,27	0,08	0,02	0,26	–0,18	0,00	–0,10	0,22	–0,23
	32	–0,30	0,18	0,15	–0,09	0,19	0,01	**0,37**	0,03	–0,08	0,00	0,04	0,05
General and special endurance	33	0,05	0,07	–0,31	–0,11	–0,17	–0,27	–0,13	0,03	–0,23	–0,17	0,16	**0,42**
	34	0,18	0,13	–0,25	–0,06	–0,21	–0,20	–0,08	0,05	–0,19	–0,08	–0,02	**0,38**
	35	0,02	0,19	–0,08	–0,01	–0,12	–0,14	–0,05	0,05	0,02	0,07	0,01	0,09
	36	–0,10	0,31	–0,01	–0,07	–0,06	–0,02	0,09	0,02	–0,01	0,14	–0,15	0,06
	37	–0,16	0,32	–0,08	–0,12	–0,03	–0,08	0,18	0,12	–0,11	0,11	–0,30	0,14
	38	–0,10	0,30	–0,06	–0,08	–0,06	–0,08	0,10	0,07	–0,05	0,11	–0,18	0,11

Remark. 1–12 psychophysiological indicators: *1 – simple motor skills (number of clicks per 10 s), 2 – resistance to knock-down factors (%), 3 – simple visual-motor reaction (ms), 4 – simple auditory motor reaction (ms); 5 – selection reaction from static objects (ms), 6 – reaction to a moving object (ms), 7 – reaction discrimination (ms), 8 – selection response from dynamic objects (ms); 9 – Assessment of the sense of tempo (80 beats min^{-1}) (ms), 10 – evaluation of line accuracy reproduction (mm), 11 – playback speed of the preset line (mm s^{-1}), 12 – assessment of the perception of the change in the size of the object (s).* ***13–38 indicators of physical readiness****: 13 – running on 30 m (s), 14 – leap in height (cm) (Abalakov's method) (cm), 15 – leap in length (cm), 16 – throwing jerks 10 times (s), 17 – throws roll 10 times (s), 18 – throw the ball (3 kg) back with both hands (cm), 19 – throw a printed ball (3 kg) forward from behind the head (cm), 20 – climbing a rope without the feet (s), 21 – pulling on the crossbar for 20 seconds (number of times), 22 – push-ups for 20 s (number of times), 23 – flexion of the trunk lying on the back for 20 s (number of times); 24 – lifting the legs on the gymnastic wall (number of times), 25 – squatting with a partner of equal weight (number of times), 26 – pulling on the crossbar (number of times), 27 – push-ups number of times), 28 – flexion-extension of hands in the rest on the uneven bars (number of times), 29 – partner's uplift of the trunk from behind (number of times); 30 – running on the "bridge stand" (5 – to the left, 5 – to the right) (s), 31 – 10 somersaults forward (s), 32 – turnovers on the "bridge stand" 15 times (s); 33 – running on 800 m (s), 34 – running 2x800 m (1 min rest) (s); 35 – 1 series of 15 back arch throw (s), 36 – 2 series of 15 back arch throw (s), 37 – 3 series of 15 back arch throw (s), 38 – sum of three series of back arch throw (s).*

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The reliability of the presented results correspond to authors

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