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2. Improving the training of athletes of different qualification.
3. Biomedical Aspects of Physical Education and Sports.
4. Human health, physical rehabilitation and physical recreation.
5. Biomechanical and informational tools and technologies in physical education and sport.
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CONTENT

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FEATURES OF EMPATHY OF STUDENTS OF PEDAGOGICAL SPECIALTIES

Abstract. ***Purpose:*** *to define levels of empathy at students.* ***Material and methods:*** *levels of the manifestation of empathy are studied at students of faculty of the primary education of full-time education and correspondence course (120 persons). The technique of the definition of empathy of I. M. Yusupov was used.* ***Results:*** *the reliable decrease is revealed in the level of empathy to children from the II to the IV course of the full-time education. On the correspondence course the level of empathy to children remains stable on the II and IV courses.* ***Conclusions:*** *this technique of the definition of level of empathy allows to judge the professional suitability of those who chooses a pedagogical profession, and helps to define, what profession shouldn't be chosen by graduates of schools because of the incompatibility with the object of the future professional activity.*

Keywords*:* *students, pedagogical specialties, empathy, communicative abilities.*

Introduction. One of the most important tasks of national education is preparation of highly qualified pedagogical personnel. A teacher carries out an important social function – executes spiritual, intellectual, physical development and education of a personality. His work is directed not only on the organization of educational and informative process, but also on the organization of out-of-class improving the activity of pupils, the systematic solution of problems of the formation of an active citizen. Therefore the main directions of the development of a modern higher school demand the search of effective ways of the implementation of professional and applied physical training of future teachers which tasks are not only the mastering of fundamental knowledge, but also the perception of a cult of health, education physically, mentally and spiritually healthy citizen [4; 5].

According to opinion of scientists [1; 3], professional and applied competences of a future teacher have to provide the mastering of practical skills providing the preservation and strengthening of own health and health of school students, self-determination in physical culture, general and professional and applied physical preparedness, a certain psychophysical preparedness of a graduate of pedagogical higher education institution for a profession of a teacher, acquisition of experience of the creative use of sports and sports activity for the achievement of vital purposes.

Educational activity of a teacher is various components on the functional character, demanding manifestations of certain professional abilities: informative, constructive, predictive, organizing, communicative, analytical [3].

In a profession of a teacher the communicative component is basic because pedagogical activity is communicative materially. The main task of a teacher is providing positions of a pupil as an active subject of own activity. Communicative abilities of a teacher also help in it first of all which are shown in ability to interest, cause an emotional response, to provide a contact, to support him, to warn the conflict, to sort out the relations, to carry out educational influence, etc.

The productivity of the manifestation of communicative abilities depends on some negative factors which psychologists call "internal obstacles" (V. V. Stolin), "psychological barriers" (B. D. Parilin), " repulsive forces " (V. Levi). The empathy is one of such psychological qualities.

The empathy is considered as the realization of empathy to the current emotional state of other person. The developed ability to empathy is a professional quality for teachers, whose activity is directly connected with children. The empathy is necessary for the increase of efficiency of the activity, for the development of ability of communicativeness. The empathy also can be understood as emotional responsiveness of a person on experiences of other person. Besides the emotional empathy, the esthetic empathy is allocated – an infusion in the artistic image causing the esthetic reaction [7].

The connection of the work with scientific programs, plans, subjects. The research is executed according to a subject 3.1. The consolidating plan of the research work in physical culture and sport sphere for 2011-2015 of the Ministry of Ukraine for family, youth and sports "The improvement of program and standard bases of physical education in educational institutions" (number of the state registration is 0111U001735).

The aim of the research: to define empathy levels at students of the faculty of primary education of full-time education and correspondence course.

The material and the research methods. The research was conducted with students of the II and IV courses of full-time education and correspondence course (120 persons). The technique of definition of empathy of I.M. Yusupov was used [2; 6].

Results of the research and their discussion. The technique of I. M. Yusupov allows to define the level of polycommunicative empathy to parents, animals, elderly people, children, heroes of works of art, acquaintances and strangers. In a questionnaire of 36 statements, on each of which the examinee has to estimate, in what measure he agrees or disagrees with it, using 6 versions of answers which are estimated in points from 0 to 5 [2; 6].

The conducted researches with students of the faculty of the elementary education (tab. 1) testify that the greatest empathy is shown to parents. On the II course the empathy point to parents is equal 10,5±0,41, on the IV course of full-time education the highest is 11,2±0,44, this point is already slightly lower at students of the II course of correspondence course – 10,4±0,42, and on the IV course decreases authentically ($p < 0,05$) to 8,2±0,52 points.

The empathy to animals is the highest at students of the II course of full-time education – 8,2±0,35, and it is reliable above, than on other courses (6,1–6,5.

p<0,05). The attitude towards elderly people makes 7,6-7,8 points at full-time education, at the correspondence course – 6,9–6,0. On the IV course the lowest point is (6,0±0,69) that is reliable below, than on of full-time education (p <0,05). Least of all students show their empathy to heroes of works of art, thus, that reading of fiction occupies from them one of the priority occupations in free time. The empathy point makes 6,3±0,42 to heroes of works of art on the II course and 6,9±0,50 on the IV course at students of stationary form of education. They put reading fiction on the 2–3 places in free time. Students of a correspondence department move reading fiction on the 5th place that probably influences their attitude towards heroes of books. They find less time for reading fiction and think of destinies and characters of heroes of works that defines the lowest point of empathy of all scales – 5,8–5,9.

Table 1

Express-diagnostics of empathy (points)

Scale of empathy	Form of education							
	Full-time education				Correspondence course			
	II course		IV course		II course		IV course	
	$\bar{X}$	m	$\bar{X}$	m	$\bar{X}$	m	$\bar{X}$	m
To parents	10,5	0,41	11,2	0,44	10,4	0,42	8,2	0,52
To animals	8,2	0,35	6,5	0,39	6,5	0,58	6,1	0,49
To elderly people	7,6	0,41	7,8	0,43	6,9	0,42	6,0	0,69
To children	8,8	0,37	7,7	0,41	8,2	0,52	8,1	0,56
To heroes of works of art	6,3	0,42	6,9	0,50	5,8	0,40	5,9	0,6
To strangers and unfamiliar people	7,7	0,42	8,0	0,45	7,7	0,50	6,7	0,47
The total points	49,1	1,6	48,3	1,7	45,7	1,70	40,6	1,82

The empathy point testifies to rather high sociability of students to strangers and unfamiliar people. It is in limits of 7,7-8,0 points at students of full-time education. It makes 7,7±0,5 points at students of correspondence course on the II course, and on the IV course decreases to 6,7±0,47 points.

For the professional activity of a teacher at younger school the main importance is related to children. The analysis of average grades of empathy with children testifies that they would be in limits of 7,7–8,8 points. The highest point at students of the II course of full-time education is 8,8±0,37, the lowest is 7,7±0,41 at the IV course of full-time education, the decrease is reliable at the level p<0,05. At students of the IV course the empathy to children is lower, than to parents, elderly people and even to unfamiliar (8,0±0,45) people. Students of correspondence course (8,2 and 8,1) have lightly higher empathy points to children.

We analyzed levels of empathy of students to children. It is necessary to tell that the author of a technique gives a very wide interval for the definition of the average level of empathy from 5 to 13 points, on the high level leaving only one gradation – 14 points. In this regard the main percent of answers drops out on the average level (tab. 2) within 83–86% that testifies to weak sensitivity of system of an assessment. According to this system only 4 persons (13,4%), on the IV course – 1

person, and on a correspondence department on 2 persons treat a high and a very high level of empathy on the II a course of full-time education.

Table 2

Levels of empathy to children

Levels of empathy	Form of education							
	Full-time education				Correspondence course			
	II course (n=30)		IV course (n=30)		II course (n=30)		IV course (n=30)	
	n	%	n	%	n	%	n	%
very high	1	3,3	1	3,3	0	0	0	0
high	3	10	0	0	2	6,7	2	6,7
middle	25	83,4	25	83,4	26	86,7	25	83,4
low	1	3,3	3	10	1	3,3	3	10
very low	0	0	1	3,3	1	3,3	0	0

On the II course of full-time education only 1 student has a low level of empathy to children, on the IV course – 4 persons (13,4%) from whom 1 – has a very low level. On a correspondence course 2 students of the II course have a low and a very low level of empathy, and on the IV – 3 persons treat a low level.

The assessment of the general level of polycommunicative empathy (tab. 1) testifies to the decrease in average grades (45,7–40,6) at students of correspondence course in comparison with full-time education (49,1–48,3) at $p<0,05$. The distribution on levels of empathy of individual indicators of students is presented in tab. 1. According to an assessment on full-time education there are 13,3% (II course) and 6,7% – (IV course) persons with a high level of empathy, and on correspondence course – 6,7% on the II course and 3,3% on the IV course. A person possessing a high level of empathy, is characterized by psychologists [6;7] by the sensitivity to needs and problems of people around, the generosity, the tendency to forgive a lot of things. He likes "to read" their faces and "to look" in their future, he is emotionally sympathetic, sociable, quickly comes into contacts and finds a common language (possibly, it is mutual, and children reach for him, people around appreciate his warm-heartedness). He tries not to allow conflicts and to find compromise solutions. He transfers criticism to his address well. In an assessment of events he trusts feelings and intuition more, than analytical conclusions. He prefers to work with people, than alone. He constantly needs social approval of his actions. At all listed qualities he is not always accurate in exact and laborious work. It will be easy to bowl him down.

Most of students (tab. 3) belong to the average or normal level of empathy. According to psychologists [6], a normal level of empathy is inherent in the vast majority of people. People around can't call him "thick-skinned", but at the same time he isn't among especially sensitive persons. In the interpersonal relations is more inclined to judge about others on their acts, than to trust the personal impressions. Emotional manifestations aren't alien, but they are in the majority under self-checking. In communication he is attentive, tries to understand more, than it is told by words, but at excessive outpouring of feelings of the interlocutor he loses patience.

He prefers delicately not to state his point of view, without having been sure that it will be received. When reading works of art and viewing movies he watches more action, than experiences of heroes. He finds it difficult to predict the development of human relations therefore it happens that their acts are unexpected for him.

The low level of empathy is noted at 15 people, from them 24 students on the II course of correspondence course and the most large number on the IV course of correspondence course are trained on the II course of full-time education. Such people feel difficulties in the establishment of contacts with other people, they feel uncomfortably in a noisy company. Emotional manifestations in acts of people around sometimes seem to them unclear and deprived of sense. They give preference to lonely classes, specific people, instead of work with people, are supporters of accurate information and rational decisions. Possibly, they haven't enough friends, and those who are, appreciate more business qualities and a precise mind, than keenness and responsiveness. People pay to such person the same. It happens when he feels his estrangement, people around pay attention not too favor him [6; 7].

Table 3

The general level of polycommunicative empathy of students

Levels of empathy	Form of education							
	Full-time education				Correspondence course			
	II course (n=30)		IV course (n=30)		II course (n=30)		IV course (n=30)	
	n	%	n	%	n	%	n	%
very high	0	0	0	0	0	0	0	0
high	4	13,3	2	6,7	2	6,7	1	3,3
middle	24	80	28	93,3	24	80	20	66,7
low	2	6,7	0	0	4	20	9	30
very low	0	0	0	0	0	0	0	0

Conclusions. Thus, this technique of the definition of the level of empathy allows to speak about the professional suitability of those who chooses a pedagogical profession, and helps to define, what profession shouldn't be chosen to graduates of schools because of incompatibility with object of the future professional activity.

The reliable decrease is noted in the level of empathy with children from 8,8 points on the II course to 7,7 points on the IV course at students of full-time education in our researches that is probably connected with passing of student teaching at elementary school, direct inclusion in practical activities of communication with children and insufficient professional orientation of students. On correspondence course the empathy level with children, though isn't really high, it remains stable on the II and the IV courses. During the study in pedagogical HEI it is necessary to reveal empathy to children of students whenever possible to correct their attitude towards pupils in the course of professional and applied physical preparation for the development of communicative abilities.

Studying of valuable orientations of students of different forms of education in the sphere of physical culture will be **the prospect of the subsequent researches.**

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THE STATUS OF PHYSICAL TRAINING JUDOISTS OF 14–16 YEARS OLD ON INDICATORS COORDINATING ABILITIES

Abstract. ***Purpose:*** *to determine the impact of special physical training aimed at developing coordination skills.* ***Material and Methods:*** *in 57 explored participated judo 14-16 years old male, who trained at the stage of the specially-basic training. Methods: Analysis of scientific and technical literature, testing physical properties, methods of mathematical statistics.* ***Results:*** *actual problems of physical training judo. the level of physical fitness for the performance of coordination abilities. Analyzed the typical training program for judo and determined its effectiveness.* ***Conclusions:*** *found that physical training judo 14–16 years on indicators of quality of coordination within the average. Therefore, to achieve good results in the need to improve the modern sport judo training program. Formed guidelines for building a training process designed to develop coordination skills.*

Keywords: *physical training, coordination qualities of 57 judoists 14–16 years old.*

Introduction. Analyzing educational literature, single combats textbooks for coaches, it should be noted about the insufficiency of modern researches of coordination abilities, as a question of coordination training and control of coordination abilities stated in them in line with general provisions of diagnostics and training of general and special agility, created in the 70th years [2; 4]. The deficiency of scientifically methodical textbooks in a branch of a modern technique of training and agility diagnostics in different types of sports, and in particular in single combats, is one of the reasons why a question of coordinate- motive improvement is paid not enough attention in practice of sports training [3; 5].

In practice of the highest sports skill a problem of the improvement of coordination abilities try to resolve on the basis of general recommendations of training of agility now it is called coordination abilities [14].

Many experts consider that coordination training has to enter the "technical training" section. Other experts consider that its place isn't defined exactly in a training system of a sportsman.

Some scientists who deal with problems of sports motility and sports training, and also coaches try to put forward own theories concerning the function of coordination training as a part of technical training; others are sure in the need of definition of its independent role [14].

Specialists in research of a problem of motive coordination unanimously

consider that coordination training is one of the most important and integral parts of complex training process, but at the same time it remains still one of the least developed sections of sports preparation [5; 7].

A new conceptual approach concerning a problem of coordination preparation in sports develops for the last 20 years in the sphere of the theory of physical education and sports which considers coordination and coordination abilities from positions of the complex characteristic of opportunities available for a person to optimize activity parameters in connection with the solution of difficult tasks of study to actions [6].

At present the lack of special methodical and educational literature is reflected in difficulties of planning of coordination training of sportsmen in training process. Therefore the majority of coaches don't plan coordination preparation or carry out it at the empirical level.

Therefore, coordination abilities (agility) is an ability to seize difficult motive actions, quickly to study and improve sports movements, it is rational to apply skills in a situation which changes constantly. Agility is cultivated by studying of new physical exercises and performance by seized motive actions in training or competitive conditions.

Factors which define differences in coordination abilities, represent training experience, qualification and age of sportsmen. At the same time the problem of training of specific coordination abilities is tried to be resolved on the basis of general provisions of the development of coordination abilities in practice of the highest sports skill.

Exercises are applied to the development of agility of judoists mainly at the first stages of long-term training and in the preparatory period. In the subsequent agility is supported and improved together with growth of skill of judoists.

Considering that isn't enough special means of improvement of coordination abilities, introduction of a factor of variety when performing unusual actions to provide the growing requirements to coordination of movements becomes the main line of a technique of their improvement in process of deepening of sports specialization.

It can be reached by introduction of unusual initial provisions; variety of dynamic, temporary and spatial characteristics of movements; creation of unexpected situations due to the change of a place of classes and conditions of their carrying out; use of different training devices and special equipment for expansion of a range of variability of movement skills (L. P. Matveyev, 1977). The matter is that at improvement of this quality of learned by heart movements practically cease to provide the training action and allow to keep coordination abilities at the reached level in the best time.

It is known that for high-class sportsmen characteristic high variety of dynamic, spatial and temporary characteristics in the course of overcoming of a distance of competition, ability to a choice of optimum option of motive actions depending on a situation which developed in competitions, and functional condition of a sportsman. It is natural that ability of a sportsman to an effective variation is

considerably caused by the main characteristics of movements both level of perfection of coordination abilities, and ability to show them in the conditions of progressing tiredness, from what judoists should face during collision. It defines one of the essential requirements to a technique: to plan the work directed on the improvement of coordination abilities, a trace not only in the conditions of a resistant state, but also in a condition of hidden and obvious tiredness.

The development of ability to mastering movements is the important characteristic of a motility of a person. The detailed analysis of references in the sphere of physical education and sports concerning coordination and coordination abilities in sports, and in particular in single combats, shows that throughout a long time the development of coordination abilities is a subject of special attention of specialists of different research centers, schools of sciences and fields of knowledge. It is caused by that is a lot of both native, and foreign, authors are seen by solutions of problems which collected, and work in the direction of the development of a concept of the development of coordination abilities [5; 6].

There are different results from the research of this question. So, I. K. Bachmann considers that a degree of ability to study in muscular efforts doesn't depend on age, sex at persons from 6 to 26 years old. But the author emphasizes that different types of movements, for example, study differently at the teenage age. For one of this period is favorable, for others – on the contrary. F. M. Henry and G. A. Nelson didn't find a considerable difference between boys of 10 and 15 years old in ability to study by three kinds of movements by hands. But they point to the tendency to decrease in such ability with the age.

V. I. Lyakh and E. Sadovskiy, analyzing the existing concepts of coordination preparation in sports, and in particular in judo, note that views of authors of definition of a place and functions of coordination training in a training system of the sportsman are rather various [5]. One of them sees the development of agility in common during technical training [8]. Others, for example, Matveyev, consider that education of coordination isn't reduced to one of the preparation parties (technical, physical etc.), and makes as though one of leading bases of all its contents [9; 10].

On the basis of the analysis of literature it is possible to claim that available concepts of coordination improvement in sports, in effect, suitable for training of sportsmen with a low level of skill. At the same time, in practice of the highest sports skill a problem of training of coordination abilities try to head on the basis of general provisions (recommendations) of the development of coordination abilities.

Communication of work with scientific programs, plans, subjects. The researches were conducted according to the Built plan of the research work in physical culture and sport sphere for 2011-2015, behind a subject 2.9 "Individualization of training process of skilled wrestlers".

The aim of the research: the definition of influence of means of special physical preparation aimed at the development of coordination qualities.

Tasks:

1. To define the level of preparedness of coordination abilities of judoists of 14-16 years old.

2. To analyze and define the efficiency of the typical program of training of judoists at a precompetitive stage.

3. To systematize and generalize scientific information concerning opportunities of improvement of physical preparation and to create methodical recommendations for construction of educational and training process.

The material and the research methods. Male sportsmen who train at a stage of specially basic preparation took part in the research. In total 57 judoists of 14-16 years old took part. The research was conducted on the basis of Kirovograd sports school "Nika" during September, 2013.

The research methods:

– the analysis of scientifically methodical literature was carried out for studying of condition of a question concerning the development of the complex technique aimed at the development of coordination qualities of judoists. 17 references were used which shine different views on coordination opportunities from the point of view of physiology, pedagogics and different positions, rather physical preparation in judo fight.

– testing of physical qualities. In the course of training of judoists much attention is paid to physical preparation.

Therefore for the determination of efficiency of the training program we held testing which will help to establish this fact.

– methods of mathematical statistics. For the purpose of the determination of static reliability of viability and the difference between signs which are compared, and options of indicators, and also for the processing of the data obtained during pilot studies by an assessment of the reliability of quantitative characteristics of the experimental material and the shifts of results of testing received during pedagogical experiment, methods of mathematical statistics, widespread in pedagogical researches were used.

Results of the research and their discussion. Muscular and motive feelings have specific character in each type of physical exercises. It depends on a peculiar coordination of movements and used devices. Specialized perceptions in sports activity in a different way are called feelings (feeling of a carpet).

It is known that abilities to a reconstruction, differentiation, measurements and estimates of spatial and hour parameters of movements and actions or the activity, as a whole based on accuracy and a subtlety of specialized feeling, rather various, have specific character and develop depending on features of the corresponding sport.

At the same time these abilities are isolated meet rather seldom. Besides they are in the corresponding sheaves with other special specific coordination abilities, and also with physical and mental abilities.

These sheaves are caused by that in motive activity coordination of movements acts as the whole psychomotor process in which in combination and close interlacing its different components are presented: intellectual, touch sensory sensomotor and motor.

Abilities to reproduce, measure and differentiate parameters of movements precisely first of all develop at systematic use of specially preparatory exercises,

methods and methodical methods of the development of special, quickly functional qualities.

During the performance of exercises on coordination qualities a coach has to increase loading from training to training. The increase of level of intensity during the performance of exercises means:

– the increase in coordination complexity of tasks by the increase in number of variability of exercises;

– the increase of requirements to accuracy, speed, profitability and stability of the performance of techniques, at the same time;

– the performance of difficult coordination exercises in the conditions of deficiency of time;

– the reduction of pauses between exercises and series of exercises;

– the performance of coordination exercises after physical activities.

For the improvement of called abilities it is rational to use a methodical approach which cornerstone is increased requirements to other analyzers, and such exercises where control is exercised mainly by means of muscular feeling. Examples of such tasks are the exception or complication of visual control.

The systematic use of special exercises aimed at the development of coordination abilities is the important theoretic-methodical provision of coordination training. There are about it researches are directed on the detection of significant coordination qualities, testify to need of continuation of the experimental development of methods of diagnostics and control, the development of coordination abilities, for different types of sport. It is necessary in order to coaches as show results of questioning and supervision over highly qualified specialists of branch of single combats, differently imagine the importance of these or those coordination abilities which define sports results and level of technical and tactical achievements.

One of the main methodical problems of coordination training is an optimum combination of coordination exercises aimed at the development of coordination abilities to exercises which influence complex qualities (speed, force, endurance, flexibility). Thus, scientists and coaches are faced by a problem of the development of these exercises.

The principle of the creation of comprehensive programs of physical actions is based on the increase of requirements to different levels of coordination abilities. Complex coordination abilities are estimated on time of the performance of difficult coordination actions. Such complexes are effective for an assessment of the basic level of coordination abilities as a result of the general preparatory work.

At an integrated assessment of specific coordination abilities the realization of this principle provides the development of the program of specific physical actions of the increased coordination weight. Concerning to an assessment of coordination abilities of sportsmen who specialize in different types of sport, similar programs can be made on the basis of the sets of exercises used for coordination of the development. In their basis the heaviest exercises in the coordination relation have to be set which apply in the course of training of sportsmen.

The development of coordination abilities demands a severe observance of the principle of systematic character. It is impossible to allow big breaks between classes as everything conducts to loss of muscular feelings and thin differentiation at efforts and to their relaxation.

The planning of classes for coordination abilities has to be based taking into account the following provisions:

1. It is necessary to be engaged in good psychoemotional condition.
2. Loadings shouldn't cause considerable tiredness because against background of tiredness the clearness of muscular feelings decreases.
3. In structure of separate classes of exercise it is necessary to plan for the development of coordination abilities at the beginning of training.
4. Intervals between repetitions of separate exercises have to be sufficient for renewal of working capacity.

Physical preparedness of the investigated was estimated on indicators of coordination abilities. In tab. 1 the presented results of the research of coordination abilities of judoists of 14-16 years old. Behind the results of testing of coordination qualities indicators make "shuttle run of 4x9 m" 10,34±0,05 s and reach a point "good". Behind results of testing "turns around to the milestone for 20 s" it is established that indicators reach a point "good", both to the right, and to the left sides.

Behind the results of testing of coordination qualities of judoists on the system of kata (tab. 2) it became clear that only 5,26% of sportsmen, carrying out trick O-soto-guruma, received an assessment "excellent", 24,56% received "good", 43,87% – are "right", 26,31% – "almost right", "unsatisfactory" – 0%.

Carrying out trick Ure-nage, 3,5% of athletes received an assessment "excellent ", 33,33% received "good", 45,63% – "right", and 17,54% – " almost right", "unsatisfactory" – 0%.

Behind the results of the research it is certain that indicators of coordination qualities of judoists have generally average values of variability that points to a quite good level of the development of this quality. But in modern sports, with such indicators it isn't possible to reach good results therefore it is expedient to reconsider a training system of judoists of this age.

Table 1

Physical preparedness of judoists of 14-16 years old behind results of indicators of coordination abilities

Quantity of the investigated	Sex	Shuttle run 4x9 m, M±m (s)	Turns around to the milestone in 20 seconds	
			To the right, M±m (times)	To the left, M±m (times)
57	m	10,34±0,05	28,50±0,23	28,70±0,17

Table 2

Assessment of Coordination Abilities on KATA system

Exercise	Almost right (3–4 points), quantity of persons	Right (5–6 points), quantity of persons	Good (7–8 points), quantity of persons	Excellent (9–10 points), quantity of persons
O-soto-guruma	15	25	14	3
Ure-nage	10	26	19	2

Conclusions:

1. On the basis of the carried-out analysis of scientific and scientifically methodical literature it was defined that to coordination abilities is paid not enough attention. This ability is developed in parallel with technical training.

2. When carrying out testing it was established that physical preparedness of judoists of 14-16 years old on indicators of coordination qualities is in limits of average values. Therefore for the achievement of good results in modern sports it is necessary to improve the program of preparation of judoists.

Prospects of the subsequent researches. The subsequent researches will be directed on research of other physical qualities that further will allow to define the general level of physical preparedness and to make the complex analysis of physical training of judoists of 14-16 years old at a stage of special- basic preparation.

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THE ANALYSIS OF PSYCHOPHYSIOLOGICAL CONDITION OF STUDENTS WITH THE VARIOUS LEVEL OF MOTION ACTIVITY

Abstract. ***Purpose*****:** *to reveal distinctions in some psychophysiological characteristics of students with various level of motion activity.* ***Materials and methods:*** *the research was conducted on the basis of Kharkov national medical university. 312 students are surveyed. Methods were used: questioning and pedagogical supervision.* ***Results:*** *the reliable distinctions are observed in the speed of processing of visual information at proof test at young men, and also in the subjective estimation by students of their health, activity and general self-appraisal in the analysis of psychophysiological indicators at students with the various level of motion activity.* ***Conclusions:*** *the reliable connection of the level of motion activity with a self-appraisal by students of their functional state is established.*

Keywords: *students, motive activity, proof test, speed of processing, functional state, health.*

Introduction. By nature of the manifestation of psychophysical qualities of students it is possible to carry to representatives of professions, whose work causes a constant intellectual tension and demands a long attention. They have one of the longest working days – 8–9 hours that makes 50-60 hours [1] in a week. The compelled restriction of physical activity at cerebration reduces a stream of impulses from muscles to motive centers of a cerebral cortex. It reduces the excitability of nervous centers, and, therefore, and the intellectual working capacity. During the long work in sitting position the static stress of muscles of a neck, a humeral belt, a back are observed. Lack of dynamic muscular tension, and also mechanical squeezing of blood vessels of a back surface of hips in sitting position reduces the intensity of blood circulation, worsens brain blood supply, complicates its work [3; 5]. A. O. Navakatikyan, 1987 [7]; M Berezina, 2000 [2]; I. N. Shuvalova, 2004 [10], etc. were engaged in questions of individual and typological properties of higher nervous activity, personal characteristics and parameters of a vegetative homeostasis of students with various extent of adaptation to the educational activity. However the problem of the optimization of ratios between a level of physical activity and a psychophysiological condition of students on which the working capacity depends, has no unambiguous decision yet [4; 9].

The aim of the research: to reveal distinctions in some psychophysiological characteristics of students with the various level of the motive activity.

The tasks of the research:

1. To divide students into groups with the low and high level of the motive

activity by means of questioning and pedagogical supervision.

2. To define a functional condition of the central nervous system (CNS) of students with the various level of physical activity by the test of simple visual and motor reaction.

3. To compare such characteristics of the function of attention as a speed of processing of information, an accuracy of the performance of work at students to the various level of motive activity by means of a technique "proof test".

4. To carry out a self-assessment of a functional condition of students with the various level of physical activity by means of the questionnaire "HAM".

The material and the methods of the research. 312 students (162 boys and 150 girls) of Kharkov national medical university are surveyed. The average age of examinees is 18,3±0,1 years old. All students study on the 1-2 courses, they are carried on a state of health to the 1st and 2nd medical groups and had no sharp and chronic diseases at the time of inspection.

By means of questioning and pedagogical supervision students were divided into two groups. The group with low motive activity (1 group) was made by students who went in for physical culture 1 or 2 times a week with lasting classes less than 3 hours per week only within the obligatory program of HEI. The group with high motive activity (the 2nd group) was made by students who went in for physical culture as within the obligatory program of HEI, and is independent or in sports sections 3 and more times once a week with lasting classes 3 hours and more in a week. Thus, 4 groups were created: boys and girls with low motive activity (78 and 107 persons respectively); boys and girls with high motive activity (84 and 43 persons respectively). The calculation of average values of the level of motive activity in a week in these groups showed boys and girls with low motive activity have an identical indicator, equal 2,3±0,2 hours per week. At girls and boys with high motive activity average value made respectively 4,4±0,5 and 5,8±0,3 hours per week.

The test of simple visual and motor reaction is used for an assessment of psychophysiological characteristics of students, realized in the hardware-software complex «ValeoTest» with calculation of such indicators of a functional condition of CNS as the functional level of system (FLS), the stability of reaction (SR) and the level of functionality (LF). The functional condition of CNS as specialized governing body considerably defines the nature of course of sensor, motive, vegetative and behavioral reactions [6]. FLS characterizes the most probable level of functioning of nervous system, its tone which is bigger, than the time of reaction is shorter. SR is considered as an indicator of the stability of a condition of CNS, indirectly it characterizes the stability of such psychological parameter as attention. LF allows to judge about the ability of the studied person to form the functional system is adequate to a task and to hold it rather long.

The technique of the proof test with Anfimov's table estimates such characteristics of function of attention as a speed of processing of visual information (Vproc.inf.) equal to the relation of total of the seen letters by time of the implementation of the test; the work performance accuracy – the accuracy coefficient calculated on a formula CA=m/n×100 %, where CA – a coefficient of accuracy, n – a

quantity of letters which are needed to be deleted, m – a quantity of the letters [8] which are correctly deleted for operating time.

The questionnaire "HAM" was applied to a self-assessment of a functional state. The characteristics parrying force, health, exhaustion belong to the category "health". Characteristics of the movement, mobility, speed and pace of course of functions and processes belong to the category "activity". Characteristics of an emotional state belong to the category "mood" [8].

The results of the research and their discussion. A number of researchers work of students on weight refers to the 1st category – easy, and on intensity to the 4th – very intense work [7]. In the analysis of psychophysiological indicators at students with the various level of motive activity the reliable distinctions were observed in the speed of processing of visual information at proof test at boys, and also in value judgment by students of the health, activity and the general self-assessment (tab. 1).

At boys of the 1st group the latent time of reaction for an irritant is on the average 28 ms less, than at girls of the 1st group; at boys of the 2nd group – is 24 ms less, than at girls of the 2nd group.

Table 1

Psychophysiological indicators of students with the various level of motive activity (M±m)

Indicator	Boys		Girls	
	Low motive activity	High motive activity	Low motive activity	High motive activity
T reaction, ms	280,12±4,4	282,84±3,5	308,13±4,3	306,64±11
FL_CNS, point	4,14±0,1	4,12±0,04	3,91±0,1	3,83±0,1
SR_CNS, point	1,99±0,2	1,65±0,1	1,30±0,1	1,10±0,1
LF_CNS, point	3,30±0,3	2,92±0,1	2,50±0,1	2,31±0,2
Quantity of mistakes, %	3,36±0,4	4,74±0,8	9,31±2,7	4,67±1
V proc.inf., kn/s	3,32±0,1	3,05±0,1 *	3,59±0,1	3,59±0,1
Accuracy coefficient, %	97,43±0,3	97,03±0,2	97,19±0,4	97,29±0,4
Health, point	49,15±1,5	53,11±1,4	48,56±1,2	54,35±1,6 *
Activity, point	43,20±1,7	45,42±1,6	43,31±1,5	49,19±2,5 *
Mood, point	51,15±1,7	54,23±1,6	52,36±1,0	56,19±2,3
General self-assessment, point	47,48 ± 1,4	50,84 ± 1,3	47,79 ± 1,1	52,95±1,8 *

Note. *T reaction – time of simple visual and motor reaction, FL_CNS – functional level of the central nervous system, SR_CNS – stability of reaction of the central nervous system, LF_CNS – level of functionality of the central nervous system, information V proc.inf. – speed of processing of information; * – p <0,05.*

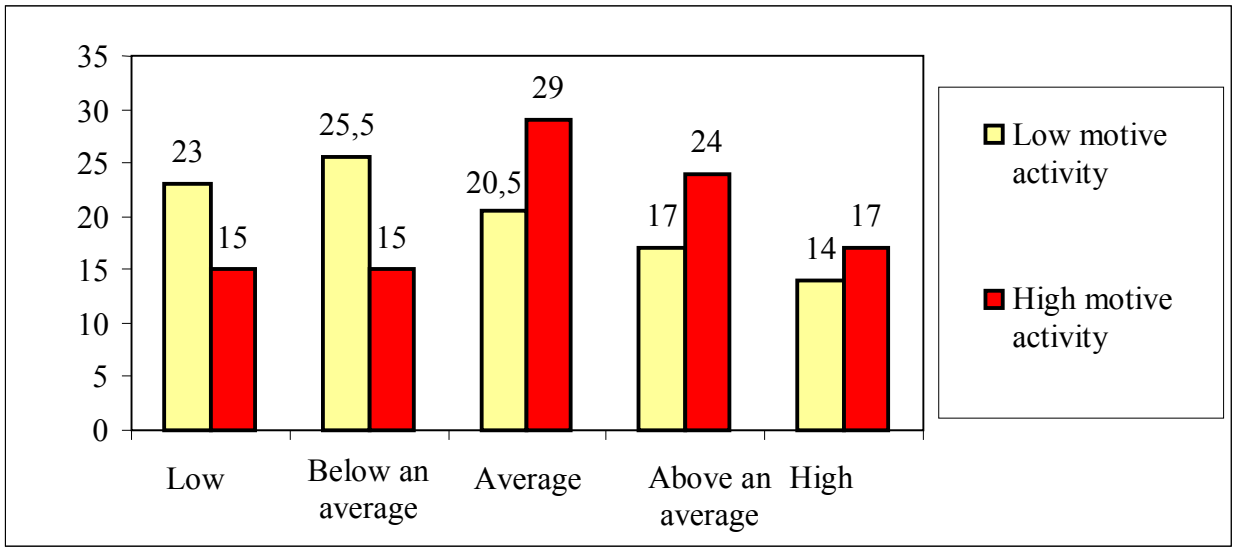
The greatest percent of mistakes, i.e. pressing the button before the emergence of a signal, observed at girls of the 1st group – 9,31%, the smallest – at boys of the 1st group is 3,36%. There was an interesting fact of authentically lower speed of processing of information (for 8,1%) at boys with high motor activity in comparison with boys with low motive activity. Such tendency wasn't observed at girls (p <0,05).

Average values of points of health, activity, mood and the general self-assessment at boys and girls of the 2nd group are higher, than at students of the 1st group. Using Student's criterion, it was defined that health of boys of the 2nd group is reliable above, than the 1st ($p<0,05$). The difference in health, activity, mood and the general self-assessment of students with the various level of motive activity becomes even more evident if to divide them on levels: low, below an average, average, above an average, high. High rates of health are characteristic for 28% of boys of the 2nd group and 12% of boys of the 1st group while low indicators of health observed at 20% of boys of the 2nd group and 35% of boys of the 1st group. Girls of the 1st group had high rates of mood –10%, and girls of the 2nd group had 24%. Low indicators of health observed at 33% and 13% of girls of the 1st and 2nd groups respectively. By the criterion of Student a reliable difference of indicators of health, activity and the general self-assessment ($p<0,05$) in groups with low and high motive activity are observed at girls. With the increase of the level of motive activity the health, and also activity and the general self-assessment of girls authentically increased. In pic.1 the distribution of an indicator of the general self-assessment of students with low and high motive activity on levels is shown: low, below an average, average, above an average, high.

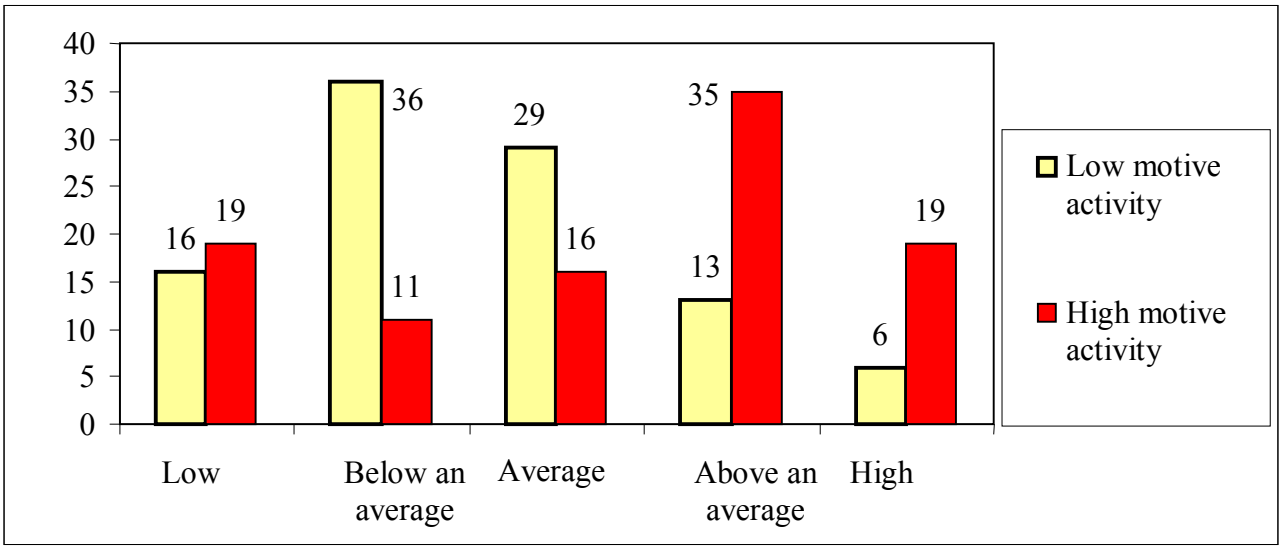
The indicator of the level of the general self-assessment has the reliable positive dependence on the level of motive activity (criterion of d Somer: $r=0,3$, $p<0,05$).

The analysis of the questionnaire "HAM" showed that the average value of general self-assessment at boys with low and high level of motive activity respectively made 47,48±1,4 and 50,8±1,3 points ($p> 0,05$) at the maximum value of 70 points. The average value of general self-assessment of girls with low and high level of motive activity respectively made 47,8±1,1 and 53,0±1,8 points ($p<0,05$).

a)



b)



Pic. 1. Distribution of boys (a) and girls (b) on the level of general self-assessment depending on the level of motive activity (in %)

Conclusions:

1. In the analysis of results of the test of simple visual and motor reaction, the reliable changes of any indicator weren't observed.

2. In our work the reliable influence of motive activity of students on the level of general self-assessment is revealed as the indicator of the level of general self-assessment has the reliable positive dependence on the level of motive activity.

3. Authentically the best results in an assessment of health, activity and general self-assessment were observed at a self-assessment of the functional state by means of the questionnaire "HAM" at girls with high motive activity. The similar tendency was observed at boys with high level of motive activity.

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DETERMINATION OF OPTIMUM MODEL OF TACTICAL PREPARATION FOR TRAINING PROCESS CONTROL IN RUGBY LEAGUE

Abstract. ***Purpose:*** *determination of the optimal model of tactical training for management training process in rugby league.* ***Material and research methods:*** *34 sportsmen of cities of Simferopol and Sevastopol, participant of championship of Ukraine, took part in research, from rugby league among grown man commands.* ***Results:*** *presented the optimum model of tactical preparation for control training process in rugby league. Conclusions: first optimum tactical model descriptions, developed on the basis of deep analysis of appearances of the best commands of the world, Superligi of England, are examined in Ukraine, NRL of Australia, which allow deeper to give a glance on preparation of command which does possible to apply these base charts in all periods of preparation of command on the whole, taking into account the necessary level of development of physical qualities and technical preparedness of rugby-players. It allows it is more optimum to manage an training process in preparation, both in junior commands and in the commands of masters.*

Keywords: *rugby league, training process, innovative approach, controlling, tactical preparedness, contention activity.*

Introduction. A variety of athletic techniques, tactics and a physical preparation demands a selection of rational efficient techniques and methods of preparation from the specialists. The problem of a preparation of highly qualified specialists and their competitive and training activity control is one of the most important ones in modern sports [1; 5–7; 9].

A rugby league is one of the sports, which is actively developing in Ukraine. A rugby league is a kind of sporting games, representing a bright sporting performance, and having more than century-old history of development [4; 11]. The specificity of the sports is its speed-power orientation, which demands a high concentration of efforts for a long time. At the present stage of development, a rugby league demands innovative approaches to a methodology of training the rugby players [2; 8; 10; 3]. The development of optimal tactical model characteristics for controlling a training process of the rugby players is an actual problem in a direction of improving a quality of learning and training process [3].

In our country, the one of the most important tasks in rugby leagues

development was a problem of determining the model characteristics of the sportsmen, taking into account their age and qualification. The models usage is a base foundation for increasing a level of physical and technical fitness of the rugby players [3] that makes it possible to construct tactical schemes of a location of defensive and attacking players on their own half and on a half of the opponents' playing ground (differ radically from other kinds of rugby). This is going to allow quite objective and well-timed controlling the learning and training process and increasing a level of sports mastery in rugby league [3].

Almost all the trainers of rugby leagues teams have a background experience in a rugby union. For more qualitative adaptation of such trainers, it is necessary to take into account the differences between a rugby league and a rugby union. In a tactics of a rugby union, «a flight of thought» (a creative approach) predominates, and in a rugby union – «a quick-thinking». When comparing a game and tactics of rugby league and rugby union games, it is possible to determine their difference in comparative characteristics, where insignificant similarity is present.

In a rugby union, the interaction of players, their tactical team location in defense and attack is carried out proceeding from the moments of playing-in a ball, in standard positions in particular (ruck, maul), where keeping a ball by attacking players and further development of attack by defending or attacking line takes place. During playing-in an out and an encounter, a scrimmage is happening. Provided that reliable communications between the players are established in a rugby union, it is easier to defend, than attack. The goal of a defense is a neutralization of a player, which handle the ball, and a prevention of playing actions of an opponent team in order to occupy its playing ground. There are three defending lines both in a defense, and in attack.

The key difference: in accordance with laws of rugby union, a captured player gets rid of a ball, for which the teams are challenge in tactical combinations (ruck, maul, etc.).

In a rugby league, a game tactics is built from a defense, a game is more rapid and dynamic, without any encounters and playing-in a ball. A captured player keeps a ball, he is set free from the capture and a following attack is begun by a team, which handles a ball. After using six attacks in a row, in order to gather points, a team passes a ball to an opponent, in case of ineffective termination of the given set. The dynamics of rugby leagues involves a lesser number of game pauses that is connected with quick playing-in and factual absence of a scrimmage during playing-in a ball in standard game positions that makes a rugby league even more spectacular. As a result, duration of a pure hour of the game in rugby league is equal to 60 minutes, and in rugby, as a comparison, – 15-30 minutes. As for a tactics, the games differ greatly in a defense, an attack, and consist of different combinations. The development of tactical defending and attacking models will allow quite objective and well-timed controlling learning and training process and increasing a level of sports mastery in rugby league.

The connection of the research with scientific programs, plans and subjects. The research is carried out in accordance with a research plan of Ministry of Education and Science, Youth and Sports for 2011-2015 on the subject 1.1. «The scientific and methodological basis of information technologies usage during a preparation of the specialists in the field of physical culture and sports», a state registration number is 0111U003130.

The goal of the research: to determine an optimal model of tactical preparation for controlling learning and training process in rugby league [3].

In accordance with the goal of the research, the following tasks were solved:

- to identify a detailed model of tactical actions in a competitive activity of a team during a defense on its half of the playing ground and on the opponents' one;
- to identify a detailed model of tactical actions in a competitive activity of a team during an attack on its half of the playing ground and on the opponents' one.

The material and methods of the research. The following research methods were used in the given work: the theoretical analysis and generalization of literary sources, pedagogical tests, and the pedagogical observation of physical fitness level of rugby sportsmen. The participants of the research were 34 sportsmen of Simferopol and Sevastopol, the participators of Ukrainian Rugby league Championship among adult teams.

The research results and their discussion. Based upon a conducted system analysis of foreign and native literature and observation of competitive activity of rugby league players, and also for objectification of information, received during the observation, the discussions and the exchange of ideas of leading players and trainers were carried out. The results of the research impacted tactical models, which received approval in the teams of Simferopol and Sevastopol, and are also used during a preparation for competitive activity of these teams. It was found out that tactical schemes of the course of events differ radically according to a location of the teams on a playing ground, both in a defense and an attack, both on their half of playing ground and opponents' one (Fig. 1-4).

On Fig. 1, a model of a team location during a defense on its half of a playing ground is depicted. In scheme, the defending players are divided conventionally: linearly across the width of a playing ground, in depth, into the first and the second defense line. Across the width of a playing ground the players are located in accordance with a scheme: a left wing – 4 players, midfield – 4 players, a right wing – 4 players. In depth, the second line consists of one player (a fullback defender)

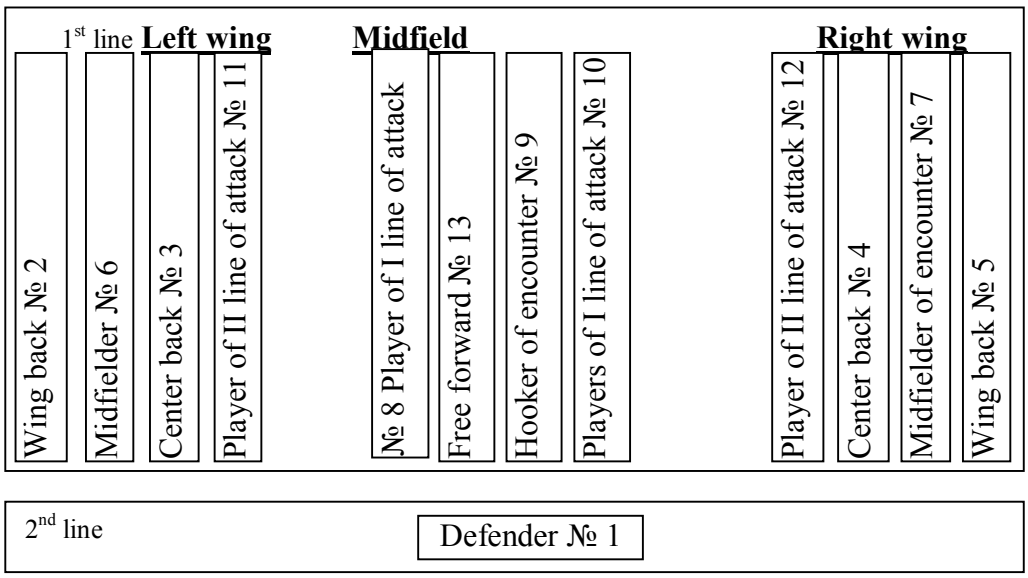

Fig. 1. Tactical model of competitive activity of a team on a defense on its half of a playing ground.

On Fig.2, a model of competitive activity of a team on a defense on an opponent's half of a playing ground is depicted. In contrast to a defense on its half, wing backs № 2 and № 5 move into the second defending line, and, in the center, a player № 1 (a fullback) stays, which catches a ball from a long-range shot by an opponent's leg with further rapid development of counter-attack and a usage of optimal variants of attack combinations.

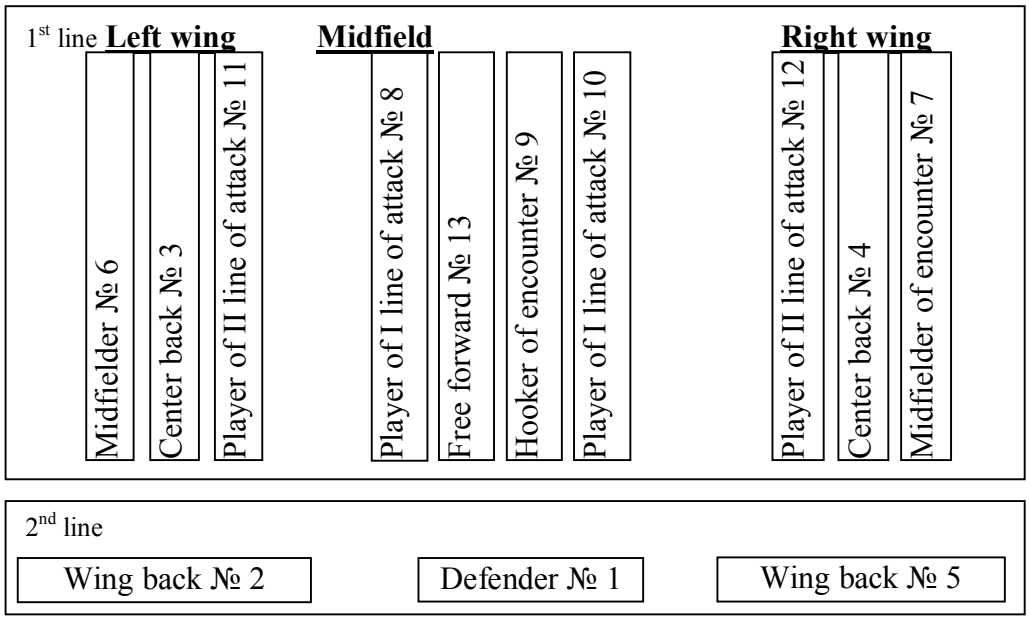

Fig. 2. A model of competitive activity of a team on a defense on an opponent's part of a playing ground.

An attack begins straight after handling a ball. Starting with an initial shot, the first two or three attacks are performed by heavy forwards (№ 8, 10, 11, 12), starting with a shot after the 5th tackle – the players of a back line (№ 1, 2, 5). Their task is to win back a territory as quick as possible, and not to allow an opponent to remove to defending line-ups, trying to provide an advantage on the areas of a playing ground, planned beforehand. Thereafter, the midfielders lead out remaining players into free space, creating a quantitative superiority with a further attack realization at the expense of a combinative game. Further, a result depends on a mastery of the players (their physical and technical qualities).

A rugby union is a game of positional attacks. Here the rearrangements take place after a pause or a stoppage in a game (ruck, maul, corridor and encounter). In a rugby league the attacks begin mainly with its half of a field, and after several rapid attacks a further formation of positional attack takes place. During a positional attack, the creative abilities of rugby players show up to the fullest extent, and a location of the players on a playing ground depends on a situation of a location of the opponent's defenders. The major moments of positional attack are the following ones:

- outplaying of the opponent;
- creating a quantitative superiority;
- changing an attack direction.

A positional attack is a complex and difficult of accomplishment one, and, besides, it demands rational ratio of players and collective actions. The players under

№ 1, 2, 3, 4, 5 make tries due to individual qualities (feints, accelerations, etc.) in a final stage of attack. A creative ability of players during making and realizing specific decisions is of great importance.

During moving from a defense to an attack, the direction of an attack in many ways depends on proper allocation and presence of physical capabilities of the players and an opponent team, which allows to attack effectively in case of an existence of weak spots in the given situation.

The team actions in attack during moving from a defense to an attack from its half of a playing ground are depicted on Fig. 3. According to a model of competitive activity, the teams in attack on their half of a playing ground:

1) the first attacking line: a midfield consisted of post players № 8 and № 10, attacking marker-hooker № 9 and the players of the 2nd line of attack № 11 and № 12;

2) the second line: a left wing consists of 2 players – midfielder № 6 and center back № 3.

Correspondingly, a right wing consists of 2 players: a midfielder of encounter № 7 and free forward № 13.

3) the third line: a left wing – a defender № 1 and wing back № 2.

A center back № 4 and wing back № 5 represent a right wing of attack.

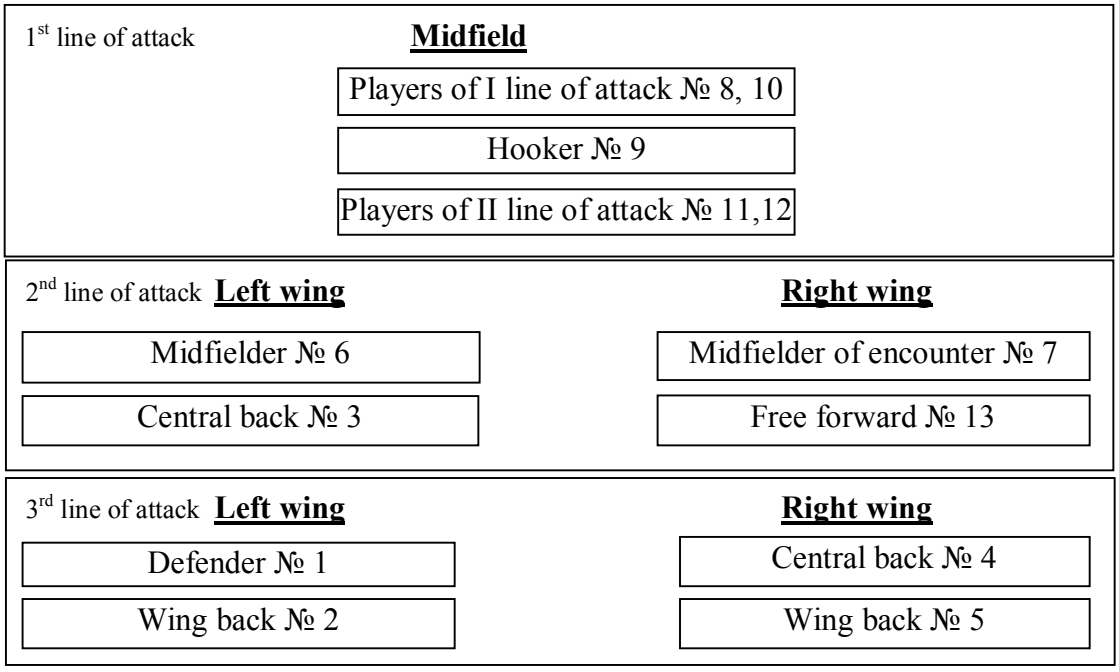

Fig. 3. A model of competitive activity of a team in attack on its half of a playing ground.

A model of team allocation on an opponent's half of a playing ground differs from a scheme of attack on its half (Fig. 4).

1) the first attacking line: a midfield consisted of post players № 8 and № 10, and a hooker № 9;

2) the third line: a left wing consists of a midfielder № 6, a player of the 2nd line of attack № 11 and a defender № 1.

A right wing also consists of 3 players – a midfielder of encounter № 7, a player of the 2nd line of attack № 12 and free forward № 13.

3) the third line: a left wing – a center back № 3 and wing back № 2.

A central back № 4 and wing back № 5 represent a right wing of attack.

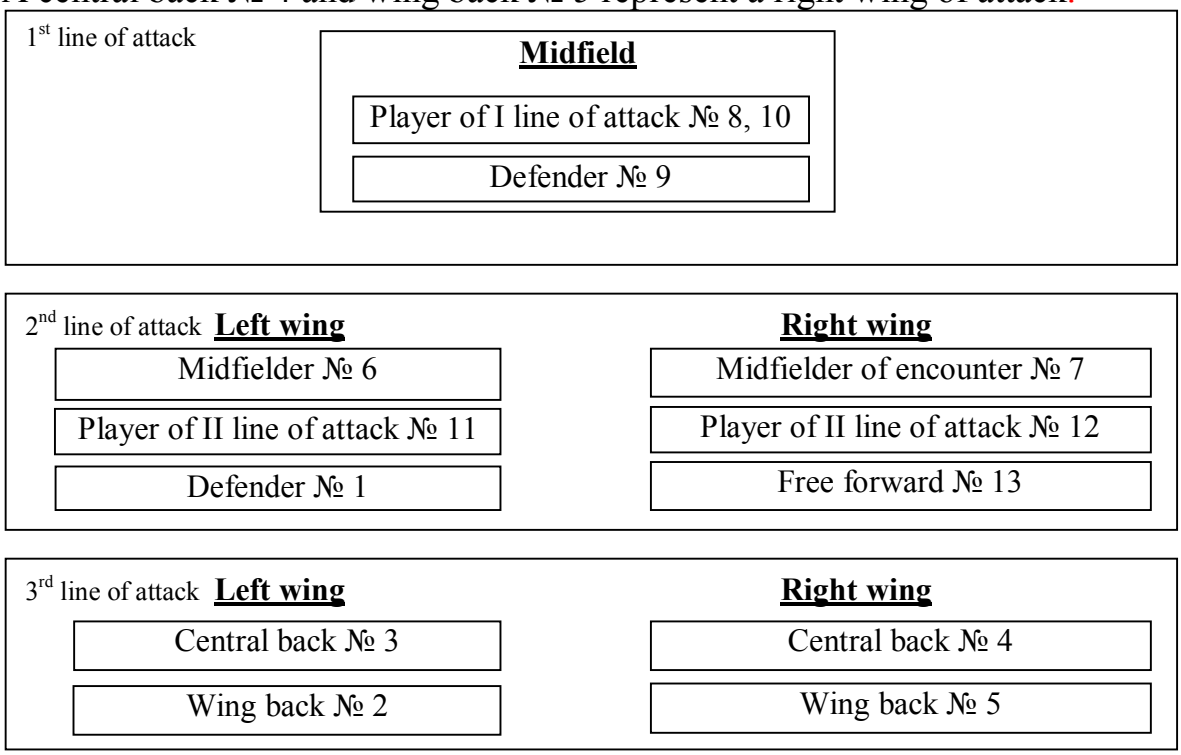

Fig. 4. A model of competitive activity of a team in attack on an opponent's part of a playing ground.

Conclusions. The deep analysis of competitive activity of rugby leagues teams was conducted for the first time in Ukraine, and allocation of teams was carried out over the lines and sides, both in an attack and a defense. The analytical tactical models of a preparation of the teams in rugby league were developed. Based on foundations and analysis of model characteristics of rugby players, indicated in the article [3], which are formed according to the indicators of general physical, special and technical preparation models, it is possible to use them effectively in the developed tactical attacking and defensive models that allows rational usage of the players with attack directions changes, and is an efficient orient point for enhancing a quality of rugby league game.

The perspectives for further researches. Along with increasing a skill and physical fitness level of rugby players, further changes of rules towards staginess and reducing pauses during a game, the alterations of tactical models both for teams' preparation and their competitive activity are possible that can lead to essential transformational changes, which are on a planning stage of the research.

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THE CHARACTERISTICS OF THE VISUAL RESPONSE IN ARCHERY DIFFERENT QUALIFICATIONS 14–16 YEARS

Abstract. ***Purpose:*** *levels of simple visually motor reaction at archers of various qualification are defined.* ***Materials and methods****: 15 shooters took part in research from onions of various qualification. Used the software Complex-reaction for definition of visual reaction* ***Results:*** *average values in groups on simple visually motor reaction to neurodynamic functions at athletes of a different floor who specialize in difficult and coordination types sports are defined.* ***Conclusions:*** *during experiment the group of candidates for the master of sports showed stabler result, the group of 1 categories showed the best result in reaction speed, but results significantly differ. The group of 2 categories showed average results in the test that testifies to insignificant level of preparation.*

Keywords: *archery, simple visually motor reaction, average time of reaction.*

Introduction. It is common knowledge that nowadays, with a tempo of modern living, visual system undergoes extremely intensive loads. The development of modern technologies, all-round computerization is leading to the changes in a work of upper part of visual analyzer.

At the same time, sporting activity in archery demands high tension not only on the part of locomotive and vegetative system, but also on controlling and governing neuronal mechanisms.

The achievement of high results in sporting activity depends largely not only on physical, but also on psychophysiological state of the sportsmen [8].

A modern archery is represented by a great number of directions of sporting activity of the sportsmen, which use various kinds of both fire and missile weapon [5].

When it comes to archery, a performance success during the competitions depends on complicated and subtle coordination of movements in the aiming period, during which an archer aims at a target, stabilizes body position, holding a bow, and fires a shot [7].

A problem of increasing functional capabilities of visual analyzer in sporting and professional activity is rather actual one. This is, first of all, due to the fact that demands for a precision of motor actions execution, taking place mostly under the conditions of time shortage on the background of heightening neuroemotional and physical tension, are rising in sports [2].

The efficiency of many physical exercises performance depends on visual sensor system capabilities. The performance of sports movements is constantly

regulated with a help of feedbacks, which regularly come from proprioceptors and are corrected by nervous system and visual information. For instance, a shot precision in basketball depends on kinesthetic sensor system sensitivity, which is improving during multiple repeats, and also on the ability of distance determining, flight path of a ball with a help of visual sensor system [1].

A visual perception is fundamentally important, because it is a visual analyzer that allows a sportsman to put appropriately all physical and sports potentials into practice [6; 9].

The research connection with scientific programs, plans and subjects. The research is carried out in accordance with a research plan in the field of physical culture and sports for 2011-2015. The scientific subject code 2.8. is «The improvement of sportsmen preparation in separate sports groups» (0111U003125).

The goal of the research: to identify a level of visual-motor reaction of the archers of different qualification.

The tasks of the research:

1. To define a role of visual-motor reaction in sporting activity of the archers.
2. To determine a time of simple visual-motor reaction of the archers.
3. To compare an obtained data by groups.

Material and methods of the research. Fifteen archers of different sports qualification, aged from 14 to 16, took part in the experiment (CMS, I, II). The researchers were conducted at the premises of Youth Sports School of Olympic Archery Reserve «Kommunar» of Kharkov.

The following research methods were used in a course of the work: the analysis of literary sources, the pedagogical analysis, and the methods of mathematical statistics.

As a part of the research, we has tested 15 archers of different qualification in order to determine a time of simple visual-motor reaction with a help of Complex-reaction software. Besides, we were determining a latent period of simple visual-motor reaction.

The research results and their discussion. In a course of the experiment, the archers were divided into three groups, each of which included five sportsmen. The first group included the sportsmen, having a category «Candidates Masters of Sports», the second one – the sportsmen of the first categories, and the third one – the sportsmen of the second categories. The results of the research are represented in Table 1-3.

Table 1

The results of measuring a time of simple visual-motor reaction of the archers, candidates masters of sports (n=5)

№	A sportsman (CMS)	Year of birth	Average time, msec	Mean-squared deviation, msec	Variation coefficient, %
			$\bar{X}$	σ	V
1	№ 1	1999	276	76	27
2	№ 2	1998	247	56	23
3	№ 3	1998	238	29	12
4	№ 4	1998	209	86	41
5	№ 5	1999	198	31	16
Average value			234	56	24

Having analyzed an obtained data from Table 1, we received a possibility to determine the average result of CMS group; it was equal to 234 msec. The best result belongs to a sportsman under № 5 – 198 msec, and the worst one – to a sportsman under № 1 and is equal to 276 msec.

Table 2

The results of measuring a time of simple visual-motor reaction of the archers, I category (n=5)

№	A sportsman (I category)	Year of birth	Average time, msec	Mean-squared deviation, msec	Variation coefficient, %
			$\bar{X}$	σ	V
1	№ 1	1999	222	61	27
2	№ 2	1999	244	140	57
3	№ 3	1999	213	39	18
4	№ 4	2000	235	76	32
5	№ 5	1999	212	42	20
Average value			225	72	31

According to a data from Table 2, a group of the sportsmen of the first categories showed the average value, which is equal to 225 msec.

The best time reaction result belongs to a sportsman under № 5 – 212 msec, and a sportsman under № 2 showed the worst result, which is equal to 244 msec.

Table 3

The results of measuring a time of simple visual-motor reaction of the archers, II category (n=5)

№	A sportsman (II category	Year of birth	Average time, mc	Mean-squared deviation, msec	Variation coefficient, %
			$\bar{X}$	σ	V
1	№ 1	2000	262	45	17
2	№ 2	2000	229	49	21
3	№ 3	2000	232	61	26
4	№ 4	1998	351	137	39
5	№ 5	1999	289	81	21
Average value			273	75	25

Having carried out the analysis of the results, represented in Table 3, we determined the average value of a group of the sportsman of the second categories; it was equal to 273 msec. The best sportsman was the one under № 3 – 232 msec, and the worst one – under № 4, whose result was equal to 351 msec.

The comparative analysis of the results, obtained by groups (Fig. 1), showed that the best result belongs to a group of the sportsmen of the first category, a bit lower one – to CMS group, and a group of the sportsmen of the second category showed the low level result.

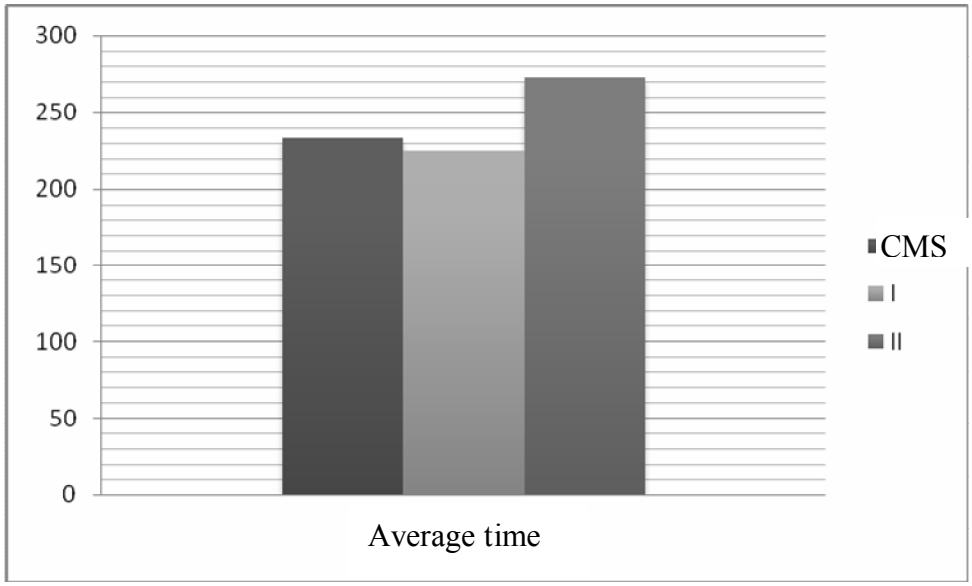

Fig. 1. Average time of reaction

In Fig. 2, a ratio of the indicators of mean-squared deviation by groups is depicted.

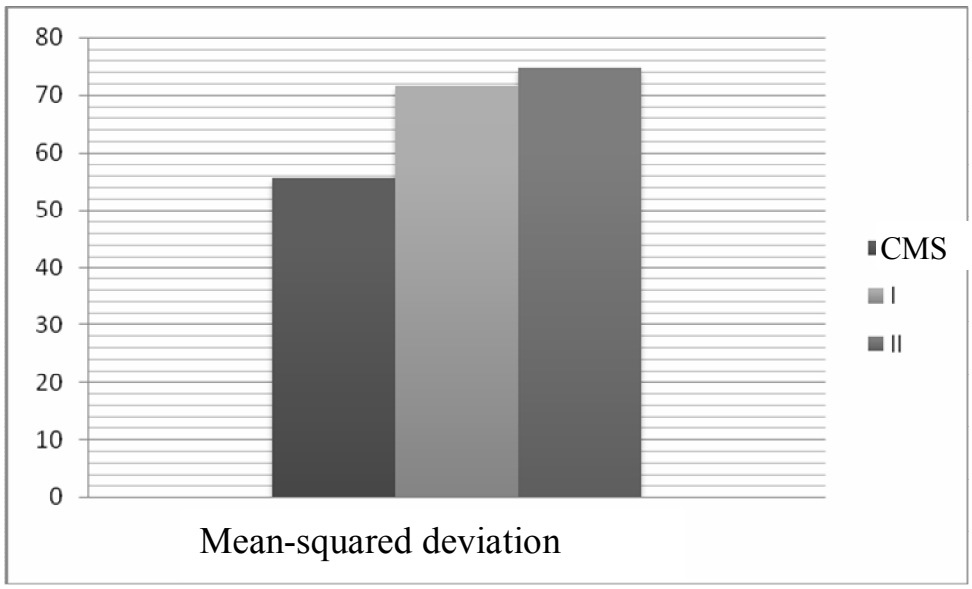

Fig. 2. Mean-squared deviation

Proceeding from the indicators of mean-squared deviation, the CMS group has a lesser data spread, the sportsmen of a group of the first and the second categories showed a larger data spread. This may suggests a presence of instability of the results in these groups.

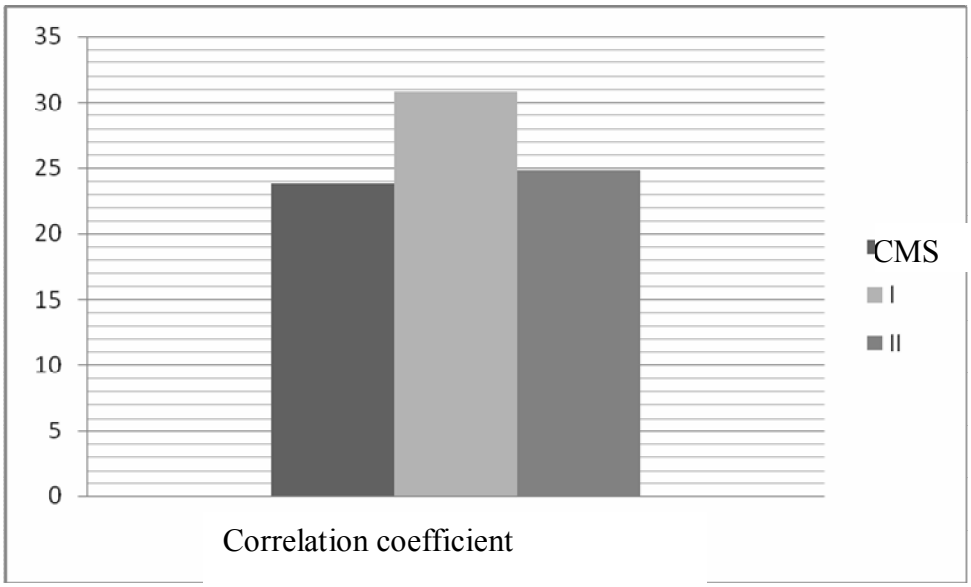

Fig. 3. Variation coefficient

After analyzing a variation coefficient among all the three groups (Fig. 3), it is possible to conclude that a CMS group and a group of the second categories showed the most homogeneous data. In a group of the first categories, a variation coefficient is worse, marginally acceptable.

Conclusions:

1. With a help of visual organs, a sportsman perceives environment, the actions of his contestant and partners, analyzes his attitude to environmental conditions, can orient in spatio and realizes current and final control of the results of his actions. Due to visual response, the opportunities for a perception of colors, sizes, distance and motion speed of objects are created. This suggests the fact that, in sporting activity, vision contributes mostly to solving tactical questions.

2. In a course of researching simple visual-motor reaction of the archers, the following results were obtained: in CMS group, the average time is equal to 234 msec, in a group of the sportsmen of the first category – 225 msec, and in a group of the sportsmen of the second category – 273 msec.

3. On the basis of the obtained results, it can be stated that a group of the sportsmen of the first category showed the best result as for time reaction, if comparing with other groups, but, at the same time, spread and homogeneity of results are below than in CMS group. The CMS group came short of time reaction speed, but the represented results of mean-squared deviation and variation coefficient were more stable. A group of the sportsmen of the second categories showed average results in a test, that suggests the insufficient level of training.

The perspectives for further research. The indication of a level of complex visual-motor reaction and a conduction of comparative study of simple and complex visual-motor reaction are in the planning stage in future.

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THE DYNAMICS OF THE HIGH-SPEED ABILITIES OF YOUNG PLAYERS 12, 13, 14 YEARS OLD

Abstract. ***Purpose:*** *to determine the dynamics of the high-speed abilities of young players.* ***Materials and Methods:*** *the change in performance of speed players at women's 30 meters run, using both specific and non-specific methods. In the training process of players 12–14 years to use specific tools, as well as holding athletic activities for the development of speed. The literature analyzed for the development of young players quickness, educational testing, methods of mathematical statistics.* ***Results:*** *the dynamics of development of physical skill of speed for young players using specific and non-specific methods.* ***Conclusions:*** *the use of the training process in microcycle preparatory period of athletics orientation training gives a positive result in the development of the physical speed quality.*

Keywords: *speed, football, physical skill, specific and non-specific methods.*

Introduction. The tendency of the development of modern football is the performance by football players in a game increasingly of technical-tactical and motive actions with a ball and without a ball with manifestation of maximum speed. Besides, the ability to own a ball is required from players at a high speed with movements and to carry out repeatedly "explosive" actions on a course of a game. It is difficult to count on a game in a cool team without possessing speed.

Speed at football players is shown in speed of reaction and in performance of movements [1] in the course of a game.

The generally generalizing term "speed" was used for the characteristic of physical skills of sportsmen who are directly defining their high-speed abilities. Speed is a complex of morphofunctional properties of a person who is directly defining high-speed characteristics of movements, and also time of motive reaction [7].

The most intensive development of speed at children from 10 to 11 years old [8]. According to G. V. Monakov, the speed gain makes from 10 to 14 years old 17–20%, and after 15 years old – 8%.

Speed is an ability of a person to carry out movements with the maximum frequency (speed) in minimum short time without the occurrence of exhaustion. Speed as motive ability represents a set of rather independent components:

1) hidden (latent) period of simple motive reaction;
2) speed of single movement;
3) frequency (pace) of movements [11].

To avoid the premature stabilization of the reached level of the development of speed, it is necessary, to use high-speed and power and actually power exercises [4] widely, along with repeated run at the maximum speed.

Special attention is paid to the development of speed during the period from 6 to 13 years old, and to the development of speed of actions – from 8 to 14 years old. Exercises on speed are recommended to be carried out after vigorous warm-up at the beginning of the main part, mainly before the performance of statistical efforts and before the exercises aimed at the development of endurance. During the performance of these exercises a player has to be concentrated and put his maximum efforts [10].

At the age of 12–14 years old it is recommended [5] to develop high-speed and power qualities and speed effectively, and also the general level of functionality. This age is characterized by unevenness of physical preparedness and a problem of this stage – the creation of prerequisites for the future improvement of all qualities defining sports result [5].

The level of the development of high-speed abilities is one of the most important indicators of special physical preparedness of football players (L. M. Maksimkov, 1988; D. Dinkov, 1995; S.Yu. Tyulenkov, 1999, 2003).

The formation of high-speed qualities promotes faster performance of various technical and tactical actions that provides overtime for the efficiency of the solution of important motive tasks in football.

In football where intensity and dynamics of movements constantly change, requirements to speed and to high-speed qualities of a player are especially high. First of all it concerns the ability to make decisions in the field quickly, to carry out simple and difficult motive activity, to find partners [2].

The whole process of preparation of a football reserve is recommended to consider in 4 stages, to the corresponding age features of young football players:

I stage (8–10 years old) of preliminary preparation [3];

II stage (11–12 years old) of initial specialization [4];

III stage (13–15 years old) of profound specialization [5];

IV stage (16–17 years old) of sports improvement [6].

At all stages control tests are provided that allows to estimate in dynamics the efficiency of training process and prospects of each football player [4].

The various running exercises during 5–10s are most often used for the change of frequency of movements in sports practice.

Run on 30 m straight off is the easiest and reliable way of the determination of high-speed abilities at persons of any age and preparedness. The test is repeated twice with an interval of 3–5 min. The best result is taken into consideration [11].

The aim of the research: studying of features of the development of physical quality of speed in football players of 12-14 years old.

Tasks:

1. To study the age features of the development of physical quality of speed at young football players of 12-14 years old on the basis of the analysis and synthesis of data of scientific and methodical literature.

2. To reveal dynamics of the development of physical quality of speed at young football players of 12-14 years old by the results of testing.

The material and the research methods. These observations were made with a football team of academy “Metallist” for three years.

In training process the coaches used one class of a track and field athletics orientation in a microcycle of the preparatory period that positively affected the improvement of results of the development of physical quality of speed.

The researches were conducted for 2011-2013 on the basis of football academy "Metallist" with football players of 12, 13, 14 years old. Young football players of 1998 of one group in number of 20 people took part in the experiment.

For the definition of the development of physical quality of speed the test "run on 30 meters" was used. The tests were carried out in standard identical conditions, the time of a run of a 30-meter piece were fixed by means of a mile electro stop-watch. Young football players carried out two attempts, the best result was entered in the protocol.

Such methods of the research were used: theoretical analysis of references, pedagogical testing, methods of mathematical processing of the received results.

Results of the research and their discussion. In tab. 1 the indicators are given in run on 30 m of football players of 12, 13, 14 years old, and also standard requirements for these ages. The standard result for young football players of 12 years old makes 5,10 s in compliance of the training program Children's and Youth Sports School of Olympic Reserve, schools of the highest sports skill [9]. The average value in run on 30 m of group of 12 years old football players made 5,35±0,06s.

The standard requirements in run on 30 meters for 13 years old football players makes 4,80 s, the average value is equal 4,77±0,05s on group.

Analyzing the received results of testing of 12-year-old football players, it is possible to draw a conclusion that the group didn't fulfill standard requirements on the average. It was connected with that there were no purposeful classes in speed development. At the same time the use of special classes and means at 13-year-old football players yielded positive result – the group was enclosed in standard requirements of dough of 30 meters on the average.

Analyzing the results in run on 30 m at 14-year-old football players, it should be noted that the group is also put in standard requirements. The average result is equal 4,30±0,05 s, standard requirements for this age group are made by 4,40 s.

Analyzing the indicators of 13-year-old football players, it should be noted that the results improved ($p < 0,001$) authentically in run on 30 meters in comparison with football players of 12 years old.

Table 1

The results of run on 30 meters of young football players for 3 years, s

№	Name, surname	12 years old	13 years old	14 years old
1.	Malinovskiy Nazar	5,02	4,40	4,07
2.	Gudz Stanislav	5,27	4,40	4,04
3.	Ignatenko Vladislav	4,94	4,58	4,06
4.	Mazun Mihail	4,79	4,53	4,12
5.	Skarunskiy Dmitriy	5,52	4,92	4,13
6.	Kalodyazhnyi Yaroslav	5,25	4,87	4,17
7.	Kalyuzhnyi Ivan	5,15	4,63	4,19
8.	Yesyp Maksim	5,83	4,80	4,14

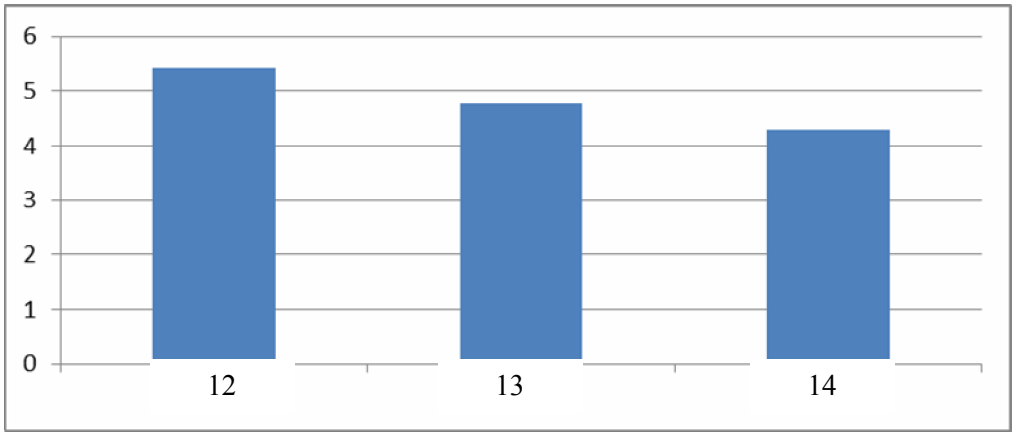
№	Name, surname	12 years old	13 years old	14 years old
9.	Chekis Maksim	5,63	5,09	4,26
10.	Piskun Danil	5,37	4,76	4,24
11.	Zinovyev Vadim	5,10	4,67	4,30
12.	Suhanskiy Igor	5,38	4,91	4,30
13.	Fesik Vladislav	5,52	4,85	4,31
14.	Surovykin Bogdan	5,65	5,02	4,51
15.	Mekeladze Aleksandr	5,49	4,83	4,48
16.	Lutsenko Yaroslav	5,40	4,75	4,48
17.	Shevchenko Aleksandr	5,37	4,72	4,44
18.	Sergienko Vitaliy	5,03	4,64	4,46
19.	Beytlink Dmitriy	5,52	4,92	4,37
20.	Trifanov Artyom	5,70	5,13	4,92
	The standard requirements	**5,10**	**4,80**	**4,40**
	In group on the average, $\bar{X}$±m	**5,35±0,06**	**4,77±0,05**	**4,30±0,05**

Table 2

Matrix of reliability of distinctions of indicators of speed of football players of 12-14 years old

Age	12–13 years old		13–14 years old		14–15 years old	
	t	p	t	p	t	p
12–13 years old	*		7,43	<0,001	13,44	<0,001
13–14 years old	–	–	*		6,65	<0,001

However the most significant improvement of results of speed is observed at 14-years age old in comparison with the 12th and 13th football players (p <0,001).



Pic. 1. Dynamics of the development of physical quality of speed of football players of 12-14 years old

Conclusions:

1. Analyzing the results of young football players in run on 30 meters, it is possible to draw a conclusion that only group of 12-years-old football players aren't put in standard requirements. At the same time the groups of 13-year-old and 14-year-old football players are put in standard requirements and dynamics of the results in run on 30 meters in comparison with the 12-years-old improved authentically.

2. The use in educational and training process, in a microcycle of the preparatory period of class of a track and field athletics orientation speed yields positive result in the development of physical quality.

Prospects of the subsequent researches. In future the researches with this group will be continued, connected with the development of physical qualities and competitive activity.

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THE INFLUENCE OF HYPOXIC TRAINING ON PREPAREDNESS OF SPORTSMEN WHO ARE SPECIALIZED IN TYPES OF ENDURANCE

Abstract. ***Purpose***: *to study the problem of the influence of training in conditions of midlands and highlands on a functional state and preparedness of sportsmen who are specialized in types of endurance on the basis of the analysis of references.* ***Materials and methods****: analysis and synthesis of references.* ***Results:*** *the processing of information allowed to define the extent of the influence of training in mountain conditions and in the conditions of an artificial hypoxia on a functional state and sports result of the highly skilled sportsmen who are specialized in types of endurance.* ***Conclusions****: it is defined that the correct organization of the training process in midlands and highlands allows not only to expand the functionality of organism of runners, but also to improve the technique of run.*

Keywords: *midlands, highlands, hypoxia, training, functional state.*

Introduction. The continuous increase in volume and intensity of training load, promoting the increase of the level of functioning of the main systems of an organism and, as a result, the reduction of terms of restoration after a hard physical activity, is one of the problems of modern track and field athletics. At the same time the realization of a new functional level of activity of systems is often at a loss that separate links of the musculoskeletal device fail, which are incapable to cope with the overloads caused by the raising volume and the intensity of training loads [8].

Researches of the influence of a hypoxia as one of factors of a successful preparation for competitions and an effective remedy of the mobilization of functional reserves of an organism and its transfer to a new higher level of adaptation for the participation in competitions in the conditions of the plain are carried out since holding the XIX Olympic Games in Mexico.

Experts noticed that the development of higher speeds is possible at movement in run, by bicycle, by car, on skates in the conditions of the rarefied atmosphere. These supervisions were confirmed by V. N. Tutevich's works, D. B. Dill, L. G. C. E. Pugh in the field of aerodynamics and physiology [8].

One of the first research works on a problem of use of trainings in midlands for training of runners on average distances was led by the German scientist H. Mellerowicz (1970) who established their positive influence on maximum oxygen consumption (MOC) and sports result.

Scientific researches on training of runners on average distances in midlands in

1982-1984 were conducted by L. Pohlitz [12]. The participants of the experiment took prizes in the European championship 1982, the World Cup 1983 and the Olympic Games 1984.

Such well-known runners on average distances, as L. Bragina, N. Sabaite, T. Kazankina, N. Olizarenko, T. Providokhina, O. Minyeyeva, T. Samolenko, etc. used a training systematically in the conditions of midlands. It should be noted that during this period the Soviet runners on average distances dominated on the international scene.

Trainings in midlands were obligatory for runners on average distances of GDR that allowed to bring up the whole group of outstanding sportsmen – Yu. Haze, H. Kyuntse, Z. Vodars, K. Vakhtel, U. Bruns, H. Ulrich, R. Vaygel, etc.

The progress of the whole group of the Chinese runners among which are the world record-holders Wang Junxia and Chu Yung Xia, are also connected with systematic (3–4 times) departures in midlands during various periods of a year cycle of preparation [11].

The analysis of sports results of runners on 800 and 1500 m of the African countries showed that representatives of Kenya, Ethiopia, Morocco, Algeria, etc. achieved the greatest progress. According to R. Kuks-Kok, it was promoted by certain genetic prerequisites to the economic adaptation of tissues of an organism to the lowered content of oxygen in the internal environment, i.e. the resistance to a hypoxia [11].

In recent years in special literature much attention is paid to such kit of hypoxic preparation at which sportsmen are in conditions of an artificial hypoxia a considerable part of days, to the corresponding height of 2000-3000 m, and train in usual conditions. A. A. Grushin, D. V. Kostina, V. S. Martynov [2], F. A. Rodriguez, M. J. Truijens, N. E. Townsend [13] believe that the inhabitation in rooms with the partial pressure of oxygen, to the corresponding conditions of midlands and highlands which is followed by training on the plain provides the effective sports improvement and stimulates the hematopoietic functions and the increase of opportunities of aerobic system in general at the expense of a hypoxic factor.

The analysis of special literature showed that the use of a training in mountain conditions in the XX century found the broad application in a training system of sportsmen in sports with primary manifestation of endurance. At the same time, it should be noted that practically all researches were conducted with the participation of highly skilled sportsmen.

The aim of the research: on the basis of the analysis of references to study a problem of influence of training in the conditions of midlands and highlands on a functional state and preparedness of sportsmen which are specialized in types of endurance.

The material and the research methods: the analysis and the synthesis of references on a research subject.

Results of the research and their discussion. In modern science the extensive actual material are saved up which is mainly connected with the use of midlands in training of sportsmen [9].

Training in mountain conditions promotes the development of a complex of the adaptive reactions providing the growth of special preparedness and creating conditions for the successful performance at competitions in the conditions of the plain.

According to J. Kolba [3], training in mountain conditions promotes the increase of the profitability of a work that is expressed in the increase in oxygen capacity of blood and diffusion of oxygen in muscular tissue.

In mountain conditions the works of J. Vigil [14], F. P. Suslov, E. B. Gippenreyter [8], T. V. Samolenko [7], V. N. Platonov [5], etc. are devoted to the creation of training process. The approximate models of mesocycles of training of highly skilled athletes are given in them in midlands and highlands by the preparation for the main competitions of a year.

To the influence of the hypoxia caused by the decrease in partial pressure of oxygen in inhaled air, and the hypoxia created by the performance of loading of the increased intensity, on the preparedness of sportsmen the works of A. Z. Kolchinskaya [4], V. N. Platonov, M. M. Bulatova [6], etc. are devoted.

The works of the Chinese experts in the field of physical culture and sport are devoted to reactions of an organism of sportsmen to conditions of midlands and highlands, and also the intensity of their individual adaptive reactions. So, Tkhen E, Ghon Dzhova and others studied hypoxemic reactions and changes of hemogram at highly skilled runners on average distances in the conditions of highlands and midlands. The results of the researches indicate the positive changes of results in run, however influence the indicators of hemogram and the maximum consumption of oxygen slightly.

V. N. Platonov [5] specifies that training in midlands and highlands, along with the improvement of opportunities of various links of system of power supply, can render a negative effect on the most important components of technical and tactical skill, and also a number of important components of physical and mental preparedness.

At the same time A. Yakimov [11], referring to the picked team coach of China which has prepared the world record-holders in stayer run, speaks about the expansion of functionality of an organism of runners and the formation of economic style of run.

A. V. Timushkin [9] offered various options of the organization of a motive mode of sportsmen at the heights from 1600 to 3200 m above the sea level. In his opinion, the greatest positive shifts during the training at the average heights are caused by a "rigid" motive mode, and at the heights of 2300-3000 m – to "percussion".

Scientists of sports scientific center of researches in Shandong studied changes of parameters of erythropoietin, erythrocytes and reticulocyte at runners on average distances at application of various techniques of training – HiHiLo and LoHi. The essence of techniques: at HiHiLo technique sportsmen lived in conditions of an artificial hypoxia, training with a low intensity carried out in the conditions of a hypoxia, and training with a high intensity – in the conditions of the plain; at LoHi

technique – trainings were alternately carried out in flat conditions and in the conditions of a hypoxia, accommodation in flat conditions. The results of the research revealed the increase of studied parameters in both groups, however at sportsmen who were carrying out trainings by a technique of HiHiLo, they were more significant.

Hou Yan, studying the influence of training of HiHiLo on aerobic abilities of the qualified runners on average distances, he established the substantial increase of indicators of hemoglobin, the maximum consumption of oxygen and a threshold of an anaerobic exchange.

A. V. Timushkin [9] considers a hypoxemic training in the conditions of the plain, as the addition to the main training program which is an effective remedy of the increase of physical and functional abilities of an organism of sportsmen.

Investigating the terms of coasting for the participation in competitions on the plain of highly skilled fast walkers who were born and live in highlands, Bay Syuy Yuy [1] established that for the sportsmen participating in walking on 20 km they fluctuate within 3–5 days, for the sportsmen acting at a distance of 50 km – 5–8 days.

Tsyuy Chengan and Fen Pu [10] investigated the structure of muscles of the athletes specializing in the types of endurance living in various mountain regions of China. The results of the research allowed to note that the efficiency of athletes is in direct dependence on "coefficient of muscles" which the greatest values are recorded at the athletes living in Tibet and Gansu.

Thus, the analysis of references showed that the researches of the last years connected with the use of midlands and highlands in the course of training of athletes are generally devoted to their influence on a functional condition of an organism of athletes and consider questions of the creation of training process in small degree. Besides, the researches were generally conducted on highly skilled athletes.

In our opinion, there aren't enough researches in the literature available to us, devoted to the influence of conditions of midlands and highlands on the competitive activity of qualified runners on average distances. There are also no data on the influence of loadings of various orientation practically which are carried out in the conditions of midlands and highlands, on the competitive result of the athletes who are constantly living in conditions of the plain and the mountain district.

Conclusions:

1. The results of the research testify that, according to the authors, a training in mountain conditions has the most expressed impact on the cardiovascular system, the device of hematosis, external breath and gas exchange of sportsmen.

2. The experts in the field of physical training and sports pay much attention to the creation of training in mountain conditions of highly skilled athletes, leaving a training of the qualified athletes outside a circle of interests, making a reserve of a picked team of the country.

3. The correct organization of the training process in midlands and highlands allows not only to expand the functionality of an organism of runners, but also to improve a technique of run.

The prospects of the subsequent researches: studying of the influence of trainings of various orientation in the conditions of midlands and highlands on the competitive activity of the qualified runners on the average distances.

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PROSPECTS SPORT SYSTEM OF PHYSICAL EDUCATION STUDENTS

Abstract. ***Purpose:*** *To assess the status and prospects of development of sports-oriented direction in the system of physical education students.* ***Material and Methods:*** *The analysis of literature, which developed the theoretical and practical aspects of the development of physical education students.* ***Results:*** *it is determined that the system of physical education students in groups of physical and sports education is the most common sports-oriented form of organization studies. It is noted that the traditional system of physical education is not effective enough to improve the physical health of students.* ***Conclusions:*** *The solution to the problem to ensure the necessary level of physical health of students lies in the formation of their personality a certain level of physical culture.*

Keywords: *physical education, sports system, physical health, student study groups.*

The statement of a problem and analysis of the last researches and publications. In recent years in Ukraine the considerable attention is given to the development of national system of physical education of students that is displayed in Laws of Ukraine "About education", "About higher education", "About physical culture and sport" and in the Concept of national education of student's youth. The noted documents define a strategy of the development of system of physical education of student's youth which realization has to provide the formation at youth of world outlooks and valuable orientations, bring up the responsible relation to own health at them, to a healthy lifestyle, create conditions for their full physical and spiritual development [3]. Despite of considerable attention from the state to a system of physical education of student's youth, the last remains still ineffective [1; 4; 9]. Till this time there is still unresolved existing contradiction between the public need for the healthy physically prepared student's youth and impossibility to satisfy this requirement with traditional means of physical education which are used at higher school [7].

Nowadays the problem of preservation and promotion of health of student's youth gained special relevance. It is connected with that for this time about 90% of students have serious deviations in a state of health, 50% from them are on the dispensary account, and every fifth student is carried to preparatory or special medical group, or exempted on a state of health from physical activities [2].

According to T. Yu. Krutsevich [5] more than 70% of students have low and

below an average levels of somatic health. The given statistics testifies to the need of impartial analysis of the most widespread kit of the organization of classes on physical education of student's youth.

The aim of the article. On the basis of the analysis of special literature to estimate a state and prospects of the development of sports focused direction in system of physical education of student's youth.

The connection of the work with scientific programs, plans, subjects. The research is conducted within the implementation of the complex scientific project for 2013-2014. "Theoretico-methodological principles of the formation of personal physical culture at children and youth as bases of their health" (the number of the state registration is 0113U001205).

Methods of the research are based on the analysis of special literature in which theoretical and practical aspects of the reorganization of system of physical education of students are developed.

The statement of the main material. The practical organization of physical education of student's youth is regulated by the Provision on the organization of physical education and mass sport in higher educational institutions [8]. According to this situation a teaching and educational process of physical education and mass sport in the sphere of higher education are based on such basic principles of:

– the priority of the educational orientation of process of physical education and a functional factor in estimation of physical development of students;

– the multiplicity which provides the creation in higher educational institutions of classes for a wide choice by students of means of physical education for study and participation in sporting events which would be equitable to their inquiries, interests, a state of health, physical and technical fitness, sports qualification;

– the individualization and differentiation of educational process of physical education;

– the combination of public administration and student's self-government. This situation gives to higher educational institutions wide opportunities concerning kits of the organization of physical education of student's youth. According to them students are distributed in educational groups, for the organization of a practical training – physical education, sports education and physical rehabilitation. However, practice shows that sports focused kit of the organization of classes on physical education is the most widespread for students of educational groups of physical and sports training. Results of a number of scientific researches testify to it. So, it is drawn a conclusion in the dissertation research of L. M. Baribina (2013) that the organizations of occupations on physical education of student's youth on the basis of an independent choice to students of sports specialization is the most progressive kit. According to the scientist exactly such approach stimulates the interest of students in a concrete sport and the interest in the development of the physical abilities. There is a speech in the article of B. A. Akishin (2008) about an optimum of sports focused approach to the organization of classes in physical culture at students of higher educational institutions (HEI). Such assessment of a sports system of physical education of student's youth among scientists didn't get an unambiguous support. So,

for example, it is noted in the dissertation research of P. M. Oksemi (2008) that the efficiency of classes on physical education of students is caused by their sports orientation. At the same time the author notes that in modern science and practice the active search of ways of the improvement of physical education in HEI is conducted. In the dissertation research of D. I. Tsis (2013) proves the situation that introduction to teaching and educational process of classes of a sports orientation promotes the improvement of general physical preparedness of students. Thus, he also notes that technique of the organization and carrying out classes on physical education in HEI needs the subsequent improvement. V. S. Gumenniy (2004) notes that classes on physical education are given in the section system (track and field athletics, swimming, football, volleyball, basketball, boxing, table tennis, athletic gymnastics, sports aerobics, township sport) in Kremenchug state polytechnic university. However the scientist comes to a conclusion that organization and technique of physical education of students demands the improvement, after all the traditional system of physical education, is insufficiently effective. I. E. Kramida (2011) draws a conclusion that classes on specializations are more effective in respect of preservation of health of students. At the same time the scientist notes that a tendency to the decrease in efficiency of classes in the typical program in physical culture in respect of preservation and improvement of health in 2007-2010 in comparison with 2001-2004 is observed at Siberian state aerospace university (Krasnoyarsk).

There are a lot of publications in scientifically methodical literature in which also a sharper assessment of the process of sports system of physical education of students becomes. So, S. P. Drachuk (2006), R. Petrin (2013) and T. B. Seroreza and V. M. Mirshavki (2013) in their researches note that classes in the existing "Basic training program for higher educational institutions of Ukraine on physical education" are inefficient concerning the increase of the level of physical health of students. L. P. Pilipey (2012, 2013) pays attention of experts to an inefficiency of the existing system of physical education and sport in higher education institutions which is constructed on standardly team approaches and not connected with the identity of a student. V. O. Gruzhevsky (2014) also notes the imperfection of a modern technique of physical education of students, connecting it with the prevalence of standard approach. The attention in the dissertation research of M. O. Nosko is focused (2003) on the need of the development and scientific justification of new ways of the improvement of quality of process of physical education of student's youth. The researches which are conducted by G.P.Griban (2014) showed that most of students, since 1990 and till 2013, in this or that measure are unsatisfied with the high school system of physical education, by methods and kits of carrying out studies. The author notes that the improvement of system of physical education of student's youth has to happen in the direction of the development of scientifically methodical, normative-legal support, the developments of society given of educational standards to new requirements.

The assessments are noted above of the existing system of physical education of student's youth demand the profound studying of different parties of its functioning. So, N. N. Zavydivska (2014) notes in her research that the current

training program in discipline "Physical education" has conceptual, advisory nature and provides, near a practical training, assimilation by students theoretical and methodical-practical sections. The author pays attention to the need of definition of a quantitative ratio between fundamental knowledge and sports system process of physical education. O. Kosheleva (2012) also considers a necessary search of ways of the improvement of theoretical training of students in physical education, thus she notes on the need to consider interests of students and to pay attention to questions which take an interest in youth first of all. G. A. Kirko (2011) and A. A. Pomazan (2011), noting the need of classes not less as four hours for a week during the entire period of study in higher education institution, draw a conclusion about the need of the improvement of quality of the organization and carrying out studies of discipline "Physical education" due to inclusion of modern improving systems, realizing thus an individual approach to a student. One of such approaches connected with an individualization of the process of physical education of student's youth it is offered by L. M. Barybina (2012). It has two directions: distribution of students on sports specializations according to their specific features and an individualization of educational process on physical education in each section. Zh. L. Kozina (2012) recommends to consider their functional readiness, psychophysiological opportunities and a level of the development of physical qualities at an individualization of the process of distribution of students on sports sections and at creation of educational process on physical education. The results which concern the organization of physical education of students of M. S. Zhukovsky National aerospace university "HAI" are given in the dissertation research of O. F. Bakanova (2013). The author established transition conditions from the organization of classes in physical education which are based on the preparation for delivery of standard requirements, for the organization of classes which are based on the accounting of specific features of physical development and are directed on preservation of health and formation of a healthy way of life. The attention in the dissertation research of O. E. Kolomiytseva is paid to need of expansion of the directions of professionally applied physical education of students (2006). The taken-up questions by the author concerning factors which accompany educational activity of students, developed the system of professionally applied physical preparation for students of average humanitarian educational institutions and is noted that for this time it is necessary to expand a range of the search of more optimum ways of the increase of system effectiveness of physical education of student's youth. A little later O. E. Kolomiytseva (2014) pays attention to the reasons which reduce the system effectiveness of physical education of students, namely – the incompleteness of scientific justification of a special orientation of applied physical education of students and an insufficient number of hours which are taken away on planned classes in physical preparation. L. P. Pilipey (2012) also notes on lack of system approach to professionally applied physical education of students. He focuses attention to that the effective system of professionally applied training of students according to specialty and positive career expectation are the new kit of formation of motivation for attraction of student's youth to classes in physical culture and sport.

The analysis is carried out above testifies to the need of the improvement of existing system of physical education of students. The reasons which cause such necessity, are formulated accent in publications of a number of leading experts. So, generalizing factors which T. Krutsevich and O. Pidlisny influence the process of physical education of students [6] draw a conclusion that conditions of the organization and methods teaching and educational to process include a reproductive method of study, conservatism of the contents of programs of classes on physical education, an authoritative and formal way of communication of teachers with students, lack of self-checking of the physical state from students. Such conclusion is confirmed also by the researches of L. P. Pilipey [9] which, stating that the existing system of physical education of students doesn't meet modern requirements, pays attention to the absence of systemically organized theoretical knowledge, methodological, logical, practical-methodical, design and methodical postulates which provide the creation of physical education in higher educational institutions. V. L. Volkov [1] is noting that educational and training class in physical education of students is one of the most expedient kits of improvement of the personality, notes that for this time of the researches which are conducted in this sphere have no only methodology, and the developed methodical recommendations have one-sided character and are guided by a concrete type of physical activity of students.

Conclusions. The carried-out analysis of special scientifically methodical literature in which cover problems of the development of system of physical education of student's youth, allows to draw the following conclusions.

1. The sports focused kit of the organization of classes is the most widespread in the system of physical education of student's youth in groups of physical and sports education.

2. The traditional system of physical education of student's youth is insufficiently effective concerning of providing an optimum level of their physical health, and techniques of the organization and carrying out classes in physical education in HEI are needed the subsequent improvement.

3. The solution of the problem of providing the necessary level of physical health of student's youth lies in the education plane at them a personal responsibility for a condition of the health, to formation at them the positive relation to classes for physical exercises and to maintaining a healthy, physically active, way of life, that is to the formation at them the appropriate level of personal physical culture.

Prospects of the subsequent researches. It is planned to investigate features of the formation of personal physical culture of students of higher educational institutions of a different profile in the subsequent investigations.

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PHYSICAL DEVELOPMENT, FUNCTIONAL AND ADAPTATION CAPABILITIES OF THE WORKERS OF INTERNAL AFFAIRS AGENCIES OF UKRAINE AT THE STAGE OF PROFESSIONAL BECOMING

Abstract. ***Purpose:*** *to find out the influence of employments by the experimental program on the level of physical development, functional state and adaptation capabilities of the workers.* ***Material:*** *the study involved 54 workers of the first categories and first age groups, which were included in experimental (n=28) and control (n=26) groups. The indices of growth, body mass, vital capacity, dinamometry, gemodinamics, adaptation potential were analyzed.* ***Results*****:** *it is set, that employments after the experimental program influence more expressed growth of indexes of physical state of servicemen, on comparison with the operating program of physical training.* ***Conclusions:*** *at the end of experiment the servicemen of experimental group had better indexes than the servicemen of control group of Quetelet index – on 17,62 g/cm^{-1}, vital capacity index – on 5,58 ml/kg^{-1}, strength index – on 6,22%, Robinson's index – on 2,97 c.u., adaptation potential – on 0,08 c.u.*

Keywords: *physical development, functional state, adaptation potential, the stage of the professional becoming, the workers of internal affairs agencies.*

Introduction. A professional preparation of the workers of internal affairs agencies (IAA) is a determining factor of a quality of law enforcement activity, providing legality and crime prevention [9]. A physical preparation as an integral part of a professional preparation contributes to efficient tasks performance, ensuring of personal security of police workers and their surrounding [1; 2; 5; 8]. The future IAA workers are provided with the basics of a professional preparation during the student years in the course of their study at Ministry of Internal Affairs (MIA) Institutions of Higher Learning (IHL). However, the analysis of the workers' personal files showed that about 40% of law enforcement officers, which had not studied at IHL of MIA of Ukraine, served in IAA. For professional becoming of such workers, the initial preparation courses are organized, during which a formation of special knowledge, skills and abilities, necessary for official duties performance, takes place [4; 6; 10].

The workers, which has not studied at IHL of MIA of Ukraine, has certain difficulties with new conditions of learning and official activity in IAA, because the yesterday's civilians find themselves in new conditions of learning and official activity, new real-life situations, which are accompanied by significant change of mental and physical states. It has an adverse effect on the indicators of their physical development, functional state and health.

In the works of many scientists [1; 3; 7; 8], it is stated that physical

preparation, as one of the main subjects of initial preparation, has considerable possibilities in enhancing a process of adaptation to new conditions of official and professional activity, health improvement, increasing functional reserves of the workers' organism. However, the analysis of normative documents concerning the questions of physical preparation organization [4;9;10] made it possible to find out a range of reasons, which reduce its efficiency: a low physical fitness and health level of the candidates for service; inadequate consideration of basal value of a physical state, service and official categories and a specificity of future official activity of law enforcement officers; a significant amount of special physical preparation classes.

The analysis of scientific works [2; 5; 8] allowed to come to a conclusion that the direction of solving the indicated problem is the improvement of current program of physical preparation of the workers at initial training courses by means of implementing a new planning procedure and physical preparation organization depending on official categories and taking into account the workers' physical state.

The research connection with scientific programs, subjects and plans. The research is carried out in accordance with a research plan in the field of physical culture and sports for 2011-1015 of the Ministry of Ukraine for family, youth and sports within the context of the subject 3.8 «The theoretical and methodological basics of constructing a system of mass control and an assessment of the development and physical fitness level of different population groups» (a state registration number is 0111U000192).

The goal of the research: to research an influence of the author's methodology classes on a physical development, functional state and adaptive capabilities of the workers of the Ministry of Internal Affairs of Ukraine at the stage of professional becoming.

The material and methods of the research: the analysis of literary sources, the pedagogical observation, the pedagogical experiment, the methods of mathematical statistics.

The research was conducted at the premises of the National academy of Internal Affairs in 2013-2014. The participants of the research were the workers of the 1st service and official category of the first age group (n=54). The experimental (EG, n=28) and control (CG, n=26) groups were formed. In order to determine an influence of the author's methodology classes on a physical development, functional capabilities of the workers we carried out the analysis of the growth, body mass, VC, carpal dynamometry, HR, arterial tension indicators and made the calculations of corresponding indices (Quetelet, vital capacity, strength, Robinson's ones). For assessing the adaptive capabilities, the methodology of determining the adaptation potential (AP), proposed by R.M. Bayevskiy (1979), is used. The research was carried out according to the results of the monitoring of the workers: during entering the initial training courses (the 1st stage), during their termination (the 2nd stage) and in one year of service after a termination of the courses (the 3rd stage).

The research results and their discussion. In normative documents [9; 10], it is stated that, in order to provide an efficient coursing of professional becoming stage for law enforcement officers, which had not studied at IHL of MIA of Ukraine, the

initial training courses were organized.

Depending on the character and specifics of service career, all the constant military personnel of collective forces (CF) is divided into three service and official categories [8; 9]: the 1st one – command staff of the MIA office of Ukraine, a military personnel of research establishments, institutions of learning of MIA of Ukraine; the 2nd one – junior enlisted personnel and command staff of local, regional, transit bodies, State Automobile Inspectorate, police of guard and patrol duty; the 3rd one – junior enlisted personnel and command staff of quick-reaction and unconventional units and special forces.

The system of physical preparation of CF workers at the stage of professional becoming includes general (GPP) and special physical preparation (SPP) [1, 8, 9]. The scientists [2; 5; 7] confirm that a high GPP level allows developing major physical qualities, improving functional capabilities of the organism, strengthening health, increasing performance capability and forming a basis for the development of special qualities of the workers. On account of the lack of a sufficient level of GPP, it is not possible to develop special physical qualities and improve the professional activity efficiency.

In the works [3; 4; 6; 10], it is pointed out that physical preparation of the workers on the stage of professional becoming should be organized in accordance with service and official categories. Nevertheless, the analysis of the curriculums of initial preparation courses showed that, practically at all the courses, most of the time, which is provided for physical preparation classes, is devoted to special physical preparation. Thus, for example, at the courses of initial preparation of the workers, appointed to the position of investigation officers (the 2nd category), 92 % of overall time is allowed for special physical preparation classes, at the courses of the workers, employed into subdivisions («Titan», «Gryphon» (the 3rd category)), – 95 %; at initial training courses of the National Academy of Internal Affairs (the 1st category) – 70 %.

The conducted researches indicate that a content of the classes with the workers of various service and official categories should differ in volume of general and special physical preparation. Thus, for the workers of the 1st category, the future activity of which is connected with high intellectual, neuropsychic loads in case of inadequate physical loads and low physical activity, a ratio of GPP and SPP volumes in per cent should be equal to 70/30; for the 2nd category – 50/50, for collective forces workers of the 3rd category, in official activity of which the significant physical and mental loads are constantly present –30/70. However, if at initial preparation courses for the workers of the 3rd category a ratio of GPP and SPP means is reasonably sufficient, then for the workers of the 1st category a system of physical preparation organization and carrying out at initial preparation courses requires further development.

That is why, relying on the works of the scientists and taking into a consideration the results of investigative studies, we proposed a program of improving physical preparation of the workers of MIA of Ukraine at the stage of professional becoming, the essence of which consists in accelerating adaptation to

official activity conditions, strengthening health, improving physical state of the workers by using physical preparation means depending on service and official categories and physical state level of law enforcement officers.

The experimental program was implemented to physical preparation system of initial training courses of the National Academy of Internal Affairs. The efficiency of the program was assessed according to the indicators of physical development, functional state and adaptation capabilities of law enforcement officers of experimental and control groups.

The analysis of Quetelet index showed that initial data of the workers of EG and CG was not differ significantly against each other (P>0,05) (Table 1). After the 2nd stage of the research, the indicators of Quetelet index of the worker of EG are 12, 78 g/cm^{-1} better (P<0,05), if comparing with CG, and after the 3rd one – 17,62 g/cm^{-1} better (P<0,001).

The dynamics of Quetelet index has a following character: a significant improvement of the indicators in the course of the whole period of the experiment in EG and deterioration in CG, which lacks statistical significance. A difference between initial and final values of Quetelet index in EG is equal to 17,22 g/cm^{-1} (P<0,05) that highlights the author's methodology classes effect. According to the table of indices ranging, a value of body mass Quetelet index of the workers of both groups at the beginning of the experiment is assessed as «overweight». In EG, after a termination of initial training courses, and also during the first year of service, a value of Quetelet index corresponds to «normal weight». As for CG, the changes were not observed.

Table 1

The level and dynamics of Quetelet index of the workers of EG and CG in the course of a pedagogical experiment (g/cm^{-1})

Stages of the research, levels of probability	EG (n=28)			CG (n=26)			The probability of a difference between CG and EG the indicators	
	X	σ	±m	X	σ	±m	t	P
1st	429,09	33,52	6,33	426,76	19,42	3,81	0,31	>0,05
2nd	413,24	21,62	4,09	426,02	19,89	3,90	2,26	<0,05
3rd	411,87	17,99	3,40	429,49	16,01	3,44	3,81	<0,001
P1-P2	t=2,10; P<0,05			t=0,14; P>0,05				
P2-P3	t=0,26; P>0,05			t=0,67; P>0,05				
P1-P3	t=2,40; P<0,05			t=0,55; P>0,05				

The research of the level and dynamics of vital capacity ratio showed that at the beginning of the experiment the values of EG and CG were statistically equal (P>0,05) and answer «below the average» level. After the second stage, in EG a significant 5,66 ml/kg^{-1} increase (P<0,01) of the indicator of vital capacity index is observed, and in CG – 0,57 ml/kg^{-1} increase (P>0,05), at the same time a difference between the indicators of EG and CG is equal to 4,75 ml/kg^{-1} (P<0,01) at the given stage (Table 2). At the end of a pedagogical experiment, the indicators of vital capacity index in EG are 5,58 ml/kg^{-1} (P<0,001) significantly higher, than in CG.

The analysis of vital capacity index dynamics showed that, in the course of the research, the indicators of the workers of EG significantly increased by 6,39 ml/kg^{-1} (P<0,001), and in CG – improved with a lack of significance by 0,47 ml/kg^{-1} (P>0,05) that is the evidence of more positive influence of author's methodology classes on improving respiratory system activity of the workers of EG at the stage of professional becoming in comparison with current physical preparation program. At the end of the experiment, the index value in EG corresponds to «above the average» level, and in CG – to «below the average» one.

Table 2

The level and dynamics of vital capacity indicators of the workers of EG and CG in the course of a pedagogical experiment (ml/kg)

Stages of the research, levels of probability	EG (n=28)			CG (n=26)			The probability of a difference between CG and EG the indicators	
	X	σ	±m	X	σ	±m	t	P
1st	54,72	6,70	1,27	55,06	4,71	0,92	0,22	>0,05
2nd	60,38	5,61	1,06	55,63	4,62	0,91	3,40	<0,01
3rd	61,11	5,00	0,94	55,53	3,19	0,63	4,93	<0,001
P1-P2	t=3,42; P<0,01			t=0,44; P>0,05				
P2-P3	t=0,52; P>0,05			t=0,09; P>0,05				
P1-P3	t=4,05; P<0,001			t=0,42; P>0,05				

The analysis of strength index showed that, after the 2nd stage of the research, the average value of EG index was 5,09% (P<0,001) significantly higher, than in CG (Table 3). At the end of a pedagogical experiment, the difference between the indicators of strength index in EG and CG was equal to 6,22% in favor of EG (P<0,001). In the course of the whole research period, a strength index of the workers of EG was significantly increasing: by 5,81% after the 2nd stage and by 6,63% after the 3rd stage of the experiment (P<0,001). In CG, after the 2nd stage, a strength index improved with a lack of significance by 0,3% (P>0,05), and after the 3rd – reduced to the initial level (Table 3).

Table 3

The level and dynamics of strength index indicators of the workers of EG and CG in the course of a pedagogical experiment (%)

Stages of the research, levels of probability	EG (n=28)			CG (n=26)			The probability of a difference between CG and EG the indicators	
	X	σ	±m	X	σ	±m	t	P
1st	61,81	6,48	1,23	62,23	3,89	0,76	0,29	>0,05
2nd	67,62	5,35	1,01	62,53	3,76	0,74	4,07	<0,001
3rd	68,44	5,09	0,96	62,22	3,90	0,77	5,06	<0,001
P1-P2	t=3,65; P<0,01			t=0,28; P>0,05				
P2-P3	t=0,59; P>0,05			t=0,29; P>0,05				
P1-P3	t=4,26; P<0,001			t=0,01; P>0,05				

The research of Robinson's index showed that, at the beginning of the experiment, its values in EG and CG were equal (P>0,05) and corresponded to the average level. After the 2nd stage, Robinson's index improved significantly by 3,11 c.u, than in CG, and after the 3rd one – by 297 c.u. (P<0,05) (Table 4).

The analysis of Robinson's index dynamics showed that in EG its value significantly improved by 3,98 c.u. during the experiment (P<0,05), and in CG – by 0,38 c.u. (P>0,05). At the same time, the average index value of the workers of EG after the termination of initial training courses and after one year of a service is assessed as «above the average», and, as for law enforcement officers, – as «average» one.

Table 4

The level and dynamics of Robinson's index of the workers of EG and CG in the course of a pedagogical experiment (c. u.)

Stages of the research, levels of probability	EG (n=28)			CG (n=26)			The probability of a difference between CG and EG the indicators	
	X	σ	±m	X	σ	±m	t	P
1st	88,56	6,72	1,27	88,23	7,28	1,43	0,17	>0,05
2nd	84,74	5,57	1,05	87,85	5,61	1,10	2,04	<0,05
3rd	84,58	4,33	0,82	87,55	5,52	1,08	2,19	<0,05
P1-P2	t=2,32; P<0,05			t=0,21; P>0,05				
P2-P3	t=0,12; P>0,05			t=0,19; P>0,05				
P1-P3	t=2,64; P<0,05			t=0,38; P>0,05				

The analysis of physical development and functional state indicators of the workers showed that author's methodology classes have more efficient influence on enhancing the major systems of law enforcement officers' organism, than current physical preparation system. Thus, in the course of studying at initial training courses, a body mass of the workers of EG reduced, strength indicators increased, the activity of cardiovascular and respiratory systems improved that contributed to enhancing the adaptation of the workers to new learning conditions and increasing their service activity efficiency.

The adaptation capabilities of law enforcement officers were determined with a help of adaptation potential of cardiovascular system. The lower a value of AP, the higher the adaptation capabilities of vascular supply system of the workers.

At the beginning of the experiment, AP of the workers of both groups was significantly equal (P>0,05) and characterized by «adaptation mechanisms tension». After the second and the third stages, AP value in EG was 0,08 c.u. (P<0,05–0,01) significantly better, than in CG (Table 5). The AP dynamics analysis showed that its value improved by 0,10 c.u. in EG after the termination of initial training courses (P<0,01), and in CG – only by 0,01 c.u. (P>0,05).

The analysis of a ratio of the workers number, which had different adaptation capabilities levels at the beginning of the research and after the termination of initial

training courses, showed that, in EG, at the beginning of the experiment, 71,4% of law enforcement officers were characterized by adaptation mechanisms tension, 28,6% – by satisfactory adaptation. After the termination of initial training courses, a ratio of the levels in EG changed: 50% of the workers had satisfactory adaptation, 50% – adaptation mechanisms tension. As for CG, a ratio remained unchanged: 73,1% of law enforcement officers, which are characterized by adaptation mechanisms tension, and 26,9% – by satisfactory adaptation.

Table 5

The level and dynamics of adaptation potential of the workers of EG and CG in the course of a pedagogical experiment (c. u.)

Stages of the research, levels of probability	EG (n=28)			CG (n=26)			The probability of a difference between CG and EG the indicators	
	X	σ	±m	X	σ	±m	t	P
1st	2,21	0,14	0,03	2,20	0,12	0,02	0,21	>0,05
2nd	2,11	0,12	0,02	2,19	0,10	0,02	2,48	<0,05
3rd	2,12	0,10	0,02	2,20	0,10	0,02	2,91	<0,01
P1-P2	t=2,77; P<0,01			t=0,35; P>0,05				
P2-P3	t=0,35; P>0,05			t=0,35; P>0,05				
P1-P3	t=2,46; P<0,05			t=0,24; P>0,05				

Conclusions. It is determined that, at the end of the experiment, the following physical development indicators of the workers of EG are better in comparison with the indicators of law enforcement officers of CG: Quetelet index – 17,62 g/cm^{-1} better (P<0,001), vital capacity index – 5,58 ml/kg^{-1} better (P<0,001), strength index – 6,22% better (P<0,001). The positive influence of author's methodology classes on functional capabilities of cardiovascular system and respiratory system of the workers is proved: the indicators of Robinson's index of law enforcement officers of EG are 2,97 c.u. significantly better (P<0,05), than the ones of CG, and the indicators of adaptation potential are also 0,08 c.u. better (P<0,01).

The perspectives for further researches. The research of an influence of author's methodology classes on a state of health of the workers of MIA of Ukraine forms a basis for future researches.

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STATUS ANAEROBIC ENERGY SPRINTERS QUALIFIED FOR THE EFFECTS OF A MEANS OF REHABILITATION

Abstract. ***Purpose:*** *we determined the effect of the complex on the functional recovery of the state and dynamics of special physical qualities sprinters.* ***Material and methods:*** *the study involved 15 trained sprinters. Power anaerobic muscular activity was assessed using the battery of tests known. We have determined the ability of muscles, which reflects the potential for the rapid mobilization of productive resources systems sprinters.* ***Results:*** *dynamics of the special physical readiness test for the autumn-winter preparation period was positive and was at a high level, which was the key to improving athletic performance in a group of runners, sprinters, which was tested.* ***Conclusions:*** *revealed that the proposed complex of recovery has led to the growth rates of the special physical preparedness and capacity anaerobic power.*

Keywords: *anaerobic power, recovery, speed-power training, sprinters.*

Introduction. In a sprint race, the work is provided due to phosphocreatine and glycolytic processes in the runners' organism. The anaerobic working capacity of a sprinter is a result of alactic and lactic capabilities of working muscles, and is a factor, which determines productivity in sprint. In the process of anaerobic power assessment, any corresponding regulations for qualified sprinters were not found. That is why, the analysis of anaerobic working capacity of sprinters and a possibility of their well-timed correction with a help of recovery means are actual.

The anaerobic alactic power is a work scope, which is performed in one unit of time and connected with such maximal velocity, which is enough for a person to produce and use ATP-CP system under the conditions of high intensity, of very short endurance – from 4 to 5 seconds [5; 7; 8].

The running field tests, which determine a level of anaerobic productivity, are performed within the range from 1 to 10 seconds and are based mainly on ATP-CP system [8]. A test should be actual and specific for muscles and training activity regimes that are customary used by sprinters. Thus, Margaria-Kalamen's test, on condition of its termination with maximal efforts, can be treated as a measure of anaerobic alactic productivity [7]. A capability of performing a maximal vertical jump, according to many coaches' opinion, can be an important skill in sprint [4]. Therefore, a vertical jump height is an objective functional measurement, which is used for assessing anaerobic power and capacity [10]. At the same time, anything is notified about a possibility of urgent correction of anaerobic energy-supply with a help of recovery means for the purpose of enhancing a working capacity. It is evidently possible on condition of using the techniques of influence both on working

muscles state, and on psychophysiological state of qualified sprinters.

The connection of the research with scientific programs, plans and subjects. The research was conducted in accordance with a research plan in the field of physical culture and sports for 2011-2015 2.13. «The modeling of technical and tactical actions of qualified sprinters in swimming and speed-power kinds of track and field athletics», a state registration number is 011U000191.

The goal of the research: to find out a dynamics of anaerobic energy-supply state of qualified sprinters in a preparatory period with account of an influence of a complex of working capacity recovery techniques.

The tasks of the research:

1. To study the interrelation of special physical working capacity with anaerobic power of the runners-sprinters.
2. To assess an influence of a complex of working capacity techniques on anaerobic energy-supply of qualified sprinters.

The material and methods of the research. The sprinters, which had a qualification from the second category to CMS (n=15), were the participants of the research.

The methods of the research: a testing, a statistical data analysis. A special physical fitness of the runners-sprinters, namely a level of speed-power qualities, was tested. The determination of anaerobic productivity with a help of sprinting upstairs test of Margaria-Kalamen took place [8]. The informative value of the given test is assessed ambiguously: from high to low correlation with the results in sprint exercises [9]. The indicators of muscle work power were calculated according to following formulas:

W (power) = a body mass (kg) x distance of sprinting upstairs (m) / time (s)

W_{real} (relative power) ($Wxkg^{-1}$) = (a body mass (kg)) × distance of sprinting upstairs (m) / time (s) / a body mass (kg) [7]

The maximal power dimension, which a person is able to manifest in a single motor action, received quite extensive use [2; 3]. For this purpose, a dimension of vertical jump power, so called «vertical jump according to V.M. Abalakov» [1] is used. It was calculated:

W (power) = 60,7 x a jump height (cm) + 45,3 x a body mass (kg) – 2055.

W_{real} (relative power) ($Wxkg^{-1}$) = a power (W) / a body mass (kg) [5; 7].

The organization of the research. The complex of techniques consisted of vibro training device exercises after the first and the second trainings. Some variability in the usage of vibromassage was saved, in cases of choosing the additional positions on a vibro-trainer. It depended on a state of muscles, which received more load during a training process. The exposition on a training device – 5 minutes for each position. Besides, the usage of rather small concentrations of negative aerphones with 20 minutes duration, and listening to compact disk «Relaxation» with the same duration was included to a content of a complex. A sportsman took up a comfortable position or performed the exercises on a vibro training device at a rest room. A total time of a procedure was from 15 to 20 minutes.

The statistical analysis. A hypothesis of normality of results distribution according to Kolmogorov-Smirnov's test was checked, the changes reliability according to t-test was identified, and the interrelation of the researched indicators according to Pearson correlation was calculated.

The research results and their discussion. The following indicators (Table 1) characterized an anaerobic energy supply state, as a prerequisite of performing an increasing scope of specific training work of a sprinter. A power and relative work power in a test «a vertical standing jump» and according to Margaria-Kalamen's test increased reliably in the first part of a preparatory period. In the second part of autumn-winter preparatory period, the power and relative work power indicators in a test «a vertical standing jump» relatively stabilized. The growth of these indicators according to Margaria-Kalamen's test was observed. A height of vertical standing jump was higher than an average standard indicator [6]. The results of Margaria-Kalamen's test in a researched group of sportsmen were in a mean range of a norm [5].

An obtained data suggests a gradual enhancement of anaerobic working capacity in a researched group of sprinters. At the same time, a location of the measured indicators within the limits of an average norm is the evidence of a considerable level of affinity of sprinters' organism reaction to training loads, which were used. It may evidence in a favor of a complex of recovery techniques, the usage of which provided a well-timed correction of sprinters' working muscles state and their psychological state.

The effectiveness of the tests, which characterize a level of speed-power reactions and power qualities, reliably improved during a preparatory period, which was considered. At the same time, the results of standing triple jump increased reliably only till a middle of a preparatory period, and a vertical jump reduced essentially in a middle of a preparatory period and had a tendency for a growth in a further mesocycle. Thus, in the background of gradual growth of a level of speed-power reactions and power qualities, a retardation of appearance of speed-power preparation results is observed. It can be both a consequence of a considerable load volume of a power character, and a significant volume of jumping exercises, that led to a temporary reduce of a level of speed-power qualities. Therefore, it is required to consider such a dynamics of a special physical fitness to be the one, which characterizes a useful course of adaptive change in the sportsmen's organism.

At the end of a preparatory period, in the moment of the highest fixed level of physical working capacity of runners-sprinters, which participated in the research, the interrelation of a capability of performing a distant long standing jump and maximal anaerobic power according to Margaria-Kalamen's test (R=88).

Table 1

The dynamics of the indicators of anaerobic providing of training activity of sprinters during autumn-winter preparatory period (n=15)

Functional indicator	Mesocycle			t/W I-II*	p I-II	t/W II-III	p II-III
	All-preparatory period	Basic	Special-preparatory				
	$\bar{X}$±m						
W **(according to vertical jump), W**	4626±19	4984±19	4996±20	8,04	<0,05	0,67	>0,05
W_{real} **(according to vertical jump), W/kg**	59±0,20	63±0,19	63±0,18	10,07	<0,05	0,45	>0,05
W_{real} **(according to Margaria's test), W**	1478±18	1518±25	1553±25	3,55	<0,05	10,57	<0,05
W_{real} **(according to Margaria's test), W**	19±0,22	19±0,27	20±0,31	2,28	<0,05	3,62	<0,05

Note: *1 – all-preparatory mesocycle; 2 – basic mesocycle; 3 – special-preparatory mesocycle*

With other testing indicators, including a sporting result in 60 m run, a correlation is limited to low coefficients, but is a reliable one. It can be a confirmation of the fact that reducing of the results of speed-power preparation tests takes place in the background of maximal anaerobic power growth and, therefore, is a positive phenomenon. A pick power according to vertical standing jump has a reliable, but weak correlation, only with the results of jumping tests. At the same time, a connection between the indicators of both tests, oriented to anaerobic power assessment, is not found. Such correlation interrelations are understandable, taking into consideration different specifics of the tests, which were used for an assessment of anaerobic working capacity of sprinters. However, the interrelation of vertical standing jump with other parameters, which were used, suggests its prognostic value for speed qualities of the tested runners, and sporting result.

Conclusions:

1. The correlation analysis of anaerobic power indicators according to Margaria-Kalamen's test provide evidence of more considerable amount of connections with pedagogical tests indicators and sporting result in winter competitions, than vertical standing jump, and has the highest level of a predictive value as for speed-power qualities, which were tested.

2. The dynamics of the test indicators of special physical preparation during autumn-winter period was positive and, besides, it was on a quite high level that became a guarantee of sporting result improvement in a group of runners-sprinters, which was tested.

3. The usage of a proposed complex of working capacity recovery techniques was a basis, which has led to providing a progressive growth of special physical preparation with efficiency increase and a power of anaerobic energy-supply systems.

The perspectives for further researches. The assessment of an influence of a developed methodology of working capacity recovery on the indicators of psychophysiological state of runners-sprinters is in the planning stage in future.

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