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Analysis of the results of the introduction of the experimental methodology for the integrated development of motor qualities and the assimilation of elements of the technique of young weightlifters 10–12 years

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Purpose: *revealing the influence of the experimental technique on the development of motor qualities and the assimilation of elements of the technique of young weightlifters 10–12 years.*

Material & Methods: *in this study young men of 10–12 years engaged in weight lifting sections in the Youth Sports School of KhTP, as well as in the sports school No. 2 of Kharkov took part. The subjects were divided into two groups, control and experimental, for 24 athletes 10–12 years in each. At the time of the experiment, there was no significant difference between the groups in the tests that were used to determine the level of physical and technical preparedness.*

Results: *experimental technique of complex development of impellent qualities and mastering of elements of technics of weightlifting of young sportsmen is presented. The combination of the assimilation of elements of technics and physical exercises is more effective the accentuated decision of each of the elements.*

Conclusions: *it was found that the combination of training in weightlifting techniques with the development of motor skills in the experimental group made it possible to more effectively solve both problems – the assimilation of the element of technics and the development of motor qualities.*

Keywords: *preparation of weightlifters, motor qualities, elements of technics, sports results.*

Introduction

Weightlifting is an Olympic and popular sport among modern youth [1; 3; 8; 18; 19]. This circumstance attracts specialists' attention to the development and scientific and methodological substantiation of the theory and methods of training athletes of different ages and qualifications.

Increasing the requirements for performing skills has forced many specialists to pay special attention to the qualitative basic and specialized training of athletes in weightlifting. Its goal is to technically perfect mastery of various elements, connections and combinations.

Various studies conducted in various complex coordination sports, devoted to the following issues: the development of a general concept of long-term training of athletes, model characteristics of the sport, management issues, the study of biomechanical fundamentals of exercise techniques, the development of didactic provisions reflecting the most important for the practice of sports patterns in training complex motor actions, methods of teaching exercises [3], theory and methodology of selection and prediction [20; 21], education of physical qualities [22; 23].

According to the research, the initial training stage is especially important, as during this period there is a rapid development of power abilities, the development of sports skills, the intensive course of adaptation processes to the specific conditions of weightlifting. The problem of training young athletes at the stage of initial training in weightlifting is given some attention, there is a constant improvement of the methods of training young athletes. In particular, scientific research devoted to various aspects of this problem has been carried out in recent years [2; 3; 18–19], two methodological aids have been issued (L. S. Dvorkin, 2005; V. G. Oleshko, 2011). A large number of scientific articles have been published, programs for the Youth Sports School are being issued. All this testifies to the relevance of the research direction.

Analyzing the available scientific and methodical literature devoted to the training of athletes in weightlifting, it should be noted that many issues are presented quite widely.

In particular, different views on the age at which weight lifting begins (L. S. Dvorkin, 2005; V. G. Oleshko, 2011), the scope and content of the training work (Yu. V. Verkhoshanskii 2013; Bl Sheiko, 2008), the use of various training aids (L. S. Dvorkin, 2005, N. A. Laputin, 1973, Yu. K. Gaverdovskii, 2007; A. V. Chernyak, 1970; V. Yu. Dzhym 2013).

Relationship of research with scientific programs, plans, themes. Scientific research was carried out on the theme of the Consolidated Plan for Research in the Field of Physical Culture and Sports for 2011–2015. 3.7 "Methodological and organizational-methodical bases for determining the individual norm of the physical state of a person" (state registration number 0111U000192.

Purpose of the study: to reveal the influence of the experimental method on the development of motor qualities and the assimilation of the elements of the technique of young weightlifters 10–12 years old.

Material and Methods of the research

In this study, young men of 10–12 years old, engaged in weight lifting sections in the Youth Sports School of KhTP, as well as in the sports school No. 2 of Kharkov took part. The subjects were divided into two groups, control and experimental, with 24 athletes in each. At the time of the experiment, there was no significant difference between the groups in the tests that were used to determine the level of physical and technical preparedness.

Research methods: theoretical method and generalizations of literature, pedagogical observation, pedagogical experiment, method of mathematical statistics.

Results of the research and their discussion

In the training process, which lasted for 2 years, the experimental group developed the methodology of the complex development of physical qualities and the assimilation of elements of technology, which positively influenced their performance.

So, within two years, the results of testing physical qualities improved, and their increase in most indicators was observed immediately after the first year of training (Table 1)

The results in the 30 m run for the first year of training improved by 0,6 s (t=2,65; p<0,05), for the second one by 0,5 s (t=2,14; p<0,05).

Speed agility is also a credible change. The time to overcome the distance in the shuttle race 3x10 m decreased after a year of training by 0,7 s (t=2,14, p<0,05), after the second – by 0,6 s (t=2,12; p<0,05), which in general for two years was 1,3 s (t=4,72; p<0,001).

The testing of speed-strength qualities with the use of jumping exercises also revealed uniform changes between the indicators of the first and second years of training (Table 1).

Standing high jump, this is a difficult exercise for technical characteristics, after the first year of training it improved by 4,7 cm (t=2,21; p<0,05), at the end of the study the average figure increased by 4,5 cm (t=2,18; p<0,05).

Easier in technical performance, standing long jump for the first year improved by 15,5 cm (t=2,55; p<0,05), after the second year of training the result was 189,8 cm (t=2,64; p<0,05).

At the same time, tests on the use of force-oriented exercises have a slightly different orientation. The results of push-ups, significantly improved in the first and second year of training (t=2,36; 2,09; p<0,05).

Indicators of the strength of the hands in the pull-up exercise on the crossbar have a significant improvement only during the period of the experiment (t=2,24; p<0,05), while for each year there were no significant changes (p>0,05).

Specific motor exercises, which are used in training weightlifters and used during training of young weightlifters of the experimental group, have a positive dynamics (Table 1).

The number of sit-ups for 30 s for the first year increased by 2 times (t=2,33, p<0,05), and 2 times in the future (t=2,17;

Table 1

Dynamics of changes in the indicators of the general physical preparedness of weightlifters 10–12 years of the experimental group

Indicators	Group			Estimating the statistical difference	
	10 years, n=24	11 years, n=24	12 years, n=24		
		$\bar{X}$±m		t	p
Running on 30 m, s	6,2±0,15	5,6±0,17	5,1±0,16	$t_{1,2}$=2,65 $t_{1,3}$=5,02 $t_{2,3}$=2,14	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Shuttle run 3x10 m, s	8,6±0,20	7,9±0,21	7,3±0,19	$t_{1,2}$=2,14 $t_{1,3}$=4,72 $t_{2,3}$=2,12	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Standing high jump, cm	35,4±1,4	40,1±1,6	44,6±1,3	$t_{1,2}$=2,21 $t_{1,3}$=4,82 $t_{2,3}$=2,18	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Standing long jump, cm	157,9±4,3	173,4±4,3	189,8±4,5	$t_{1,2}$=2,55 $t_{1,3}$=5,13 $t_{2,3}$=2,64	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Push-ups, number of time	32,5±1,9	39,0±2,0	44,5±1,7	$t_{1,2}$=2,36 $t_{1,3}$=4,71 $t_{2,3}$=2,09	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Pull-up, number of time	8,6±1,2	10,6±0,9	12,1±1,0	$t_{1,2}$=1,33 $t_{1,3}$=2,24 $t_{2,3}$=1,12	$p_{1,2}$>0,05 $p_{1,3}$<0,05 $p_{2,3}$>0,05
Sit-ups number of time for 30 s	22,2±0,5	24,2±0,7	26,2±2,3	$t_{1,2}$=2,33 $t_{1,3}$=5,12 $t_{2,3}$=2,17	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05

p<0,05).

The results of testing the motor qualities of young weightlifters of 10–12 years of the control group also have a positive dynamics, but significant changes occurred only at the end of the experiment (p<0,05), while after the first and second years of training they were not significant (p>0,05).

Conducted training process in the experimental group also positively influenced the formation of elements of the technique of weightlifting (Table 2).

The performance of the competitive snatch classic exercise improved over two years. For the first year the result increased by 9,5 kg (t=2,35, p<0,05), for the second year the result improved by 9,2 kg (t=2,24; p<0,05).

In the second competitive exercise – snatch classic, the gain for the first year of training was 9,5 kg (t=2,28; p<0,05), for the second year of training was 8,5 kg (t=2,11; p<0,05).

In the sum of the double-event in accordance with the snatch and jerk, the classical improvement was significant (p<0,05) from year to year.

When performing squats with a barbell on the shoulders of young weightlifters 10–12 years, the average result at the beginning of the study was 43,6±3,0 kg, and in the second year (11 years) it increased to 52,6±2,6 kg, and for the third year of the study (12 years) reached 61,1±2,8 kg. The difference in results in the period from 10 to 11 years was 9,0 kg (t=2,27; p<0,05), in the following year from 11 to 12 years – 8,5 kg (t=2,22; p<0,05), for the entire study period the result increased by 17,5 kg (t=4,26; p<0,001).

The output of the barbell upright rowing for young weightlifters was 31,9±3,3 kg. After the first year of training (at 11 years), the results increased and averaged 42,5±3,1 kg, after the third year (12 years) the average group results reached 51,6±2,9 kg.

Probability of the difference in results was from 10 to 11 years – t=2,34; p<0,05, the next year (from 11 to 12 years) received less significant changes – t=2,14; p<0,05.

In the study barbell bent over rowing parameters in young weightlifters, the average group result was 44,4±3,2 kg at the beginning of the study, in the second year (11 years) the index was 54,5±2,8 kg, in the third year of the study (12 years) – 64,0±3,0 kg. The difference in results from 10 to 11 years was 10,1 kg (t=2,37; p<0,05), in the following year from 11 to 12 years – 9,5 kg (t=2,14, p<0,05), and in two years the increase in the result was 19,6 kg (t=4,48; p<0,001).

Conclusions

1. The training process, which used the technique of complex development of motor qualities and the assimilation of elements of the technique of weightlifting in the experimental group allowed to increase the test results. This may indicate that the messages of assimilation of elements of engineering and physical exercises that ensure their implementation, effective.

2. The combination of training in the elements of weightlifting techniques with the development of motor qualities in the experimental group made it possible to effectively solve both problems – the assimilation of the element of technology and the development of motor qualities.

Further research: based on the comparison of the results of the experimental group with similar results of the control group, to prove that the developed method is more effective than the traditional training program.

Table 2

Dynamics of changes in the indices of special physical training and elements of the technique of weightlifters 10–12 years of the experimental group

Indicators	Group			Estimating the statistical difference	
	10 years, n=24	11 years, n=24	12 years, n=24		
		$\bar{X}$±m		t	p
Snatch classic, kg	19,2±2,7	28,7±3,0	37,9±2,8	$t_{1,2}$=2,35 $t_{1,3}$=4,81 $t_{2,3}$=2,24	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Clean and jerk classic, kg	27,7±2,9	37,2±3,0	45,7±2,7	$t_{1,2}$=2,28 $t_{1,3}$=4,54 $t_{2,3}$=2,11	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Snatch, clean, and jerk combination, kg	46,9±5,6	65,9±6,0	83,6±5,5	$t_{1,2}$=2,31 $t_{1,3}$=4,68 $t_{2,3}$=2,17	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Front squat, kg	43,6±3,0	52,6±2,6	61,1±2,8	$t_{1,2}$=2,27 $t_{1,3}$=4,26 $t_{2,3}$=2,22	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Barbell upright rowing, kg	31,9±3,3	42,5±3,1	51,6±2,9	$t_{1,2}$=2,34 $t_{1,3}$=4,48 $t_{2,3}$=2,14	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05
Barbell bentover rowing, kg	44,4 ±3,2	54,5±2,8	64,0±3,0	$t_{1,2}$=2,37 $t_{1,3}$=4,47 $t_{2,3}$=2,31	$p_{1,2}$<0,05 $p_{1,3}$<0,001 $p_{2,3}$<0,05

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References

1. Verkhoshanskiy, Yu.V. (2013), *Osnovy spetsialnoy silovoy podgotovki v sporte* [Fundamentals of Special Strength Training in Sports], Sovetskiy sport, Moscow. (in Russ.)
2. Gaverdovskiy, Yu.K. (2007), *Obuchenie sportivnym uprazhneniyam. Biomekhanika. Metodologiya. Didaktika* [Training of sports exercises. Biomechanics. Methodology. Didactics], Fizkultura i Sport, Moscow. (in Russ.)
3. Dvorkin, L.S. (2005), *Tyazhelaya atletika* [Weightlifting], Sovetskiy sport, Moscow. (in Russ.)
4. Dzhim, V.Yu. (2013), "Comparative analysis of the technique of jerky exercises in weightlifting and kettlebell lifting", *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu*, No. 11, pp. 10-16. (in Russ.)
5. Doronin, A.M. (1992), *Skorostno-silovaya podgotovka sportsmenov s ispolzovaniem mashiny upravlyayushchego vozdeystviya: avtoref. diss. na soiskanie uchenoy stepeni kand. ped. nauk* [Speed-strength training of athletes using a control machine: PhD thesis abstract], GTsOLIFK, Moscow, 28 p. (in Russ.)
6. Yevdokimov, B.S. (1971), "Assessment of the level of special training for the physical fitness of a weightlifter", *Tyazhelaya atletika*, Fizkultura i sport, Moscow, pp. 118-123. (in Russ.)
7. Ippolitov, N.S. (1975), *Issledovanie prognosticheskoy znachimosti skorostno-silovykh kachestv u podrostkov pri otbore dlya zanyatiy tyazheloy atletikoy: avtoref. diss. na soiskanie uch. stepeni kand. ped. nauk* [Investigation of the prognostic significance of speed-strength qualities in adolescents in selection for weightlifting: PhD thesis abstract], Leningrad, 24 p. (in Russ.)
8. Korobkov, A.V. (1964), *Issledovanie vzaimosvyazi razvitiya fizicheskikh kachestv i obucheniya tekhnike tyazheloatleticheskikh uprazhneniy: avtoreferat. dis. kand. ped. nauk* [Investigation of the interrelation between the development of physical qualities and training in the technique of weightlifting exercises: PhD thesis abstract], Moscow, 25 p. (in Russ.)
9. Laputin, N.A. (2004), *Spetsialnye uprazhneniya tyazheloatleta* [Special weightlifter exercises], Fizkultura i sport, Moscow. (in Russ.)
10. Medvedev, A.S., Frolov, A.I. & Furaev, A.N. (1980), "High-speed strength qualities of weightlifters of high qualification and their relationship with technical skill", *Tyazhelaya atletika*, FiS, Moscow, pp. 33-34. (in Russ.)
11. Mikhaylyuk, M.P. (1977), "Speed-power training of qualified weightlifters", *Tyazhelaya atletika*, Fizkultura i sport, Moscow, pp. 46-48. (in Russ.)
12. Oleshko, V.H. (2011), *Pidhotovka sportsmeniv u sylovykh vydakh sportu* [Training of athletes in power sports], DIA, Kyiv. (in Ukr.)
13. Platonov, V.N. (2015a), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i ee prakticheskie prilozheniya. V 2 kn.* [The system of training athletes in the Olympic sport. General theory and its practical applications. In 2 books], Book 1, Olimp. lit, Kiev. (in Russ.)
14. Platonov, V.N. (2015b), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i ee prakticheskie prilozheniya. V 2 kn.* [The system of training athletes in the Olympic sport. General theory and its practical applications. In 2 books], Book 2, Olimp. lit, Kiev. (in Russ.)
15. Piven, O.B. & Jim, V.Yu. (2014), "Improvement of the training process of athletes of power sports on the basis of their biorhythms", *Slobozans`kij naukovo-sportivnij visnik*, No. 5 (43), pp. 65-69. (in Ukr.)
16. Piven, O.B. & Dorofeev, T.I. (2017), "Dependence of sports result from data of physical development, morphofunctional and special force readiness of weightlifters at the stage of preliminary basic training", *Slobozans`kij naukovo-sportivnij visnik*, No. 4 (60), pp. 75-85. (in Ukr.)
17. Farfel, B.C. (1963), "Moving qualities of weightlifters", *Tribuna masterov tyazheloy atletiki*, Fizkultura i sport, Moscow. (in Russ.)
18. Filin, V.P. (1970), *Problema sovershenstvovaniya dvigatelnykh (fizicheskikh) kachestv detey shkolnogo vozrasta v protsesse sportivnoy trenirovki: avtoref. diss. na soiskanie uch. stepeni d-ra. ped. nauk* [The problem of improving the motor (physical) qualities of school-age children in the process of sports training: Doctor of Science thesis abstract], Moscow, 55 p. (in Russ.)
19. Chernyak, A.V. (1970), "Speed-strength training of sportsmen-dischargers", *Tyazheloatlet: sbornik statey v pomoshch treneru*, FiS, Moscow, pp. 28-36. (in Russ.)
20. Cornelius, A.E., Brewer, B.W. & Van Raalte, J.L. (2007), "Applications of multilevel modeling in sport injury rehabilitation research", *International Journal of Sport and Exercise Psychology*, Vol. 5(4), pp. 387-405, doi: 10.1080/1612197X.2007.9671843.
21. Visek, A.J., Watson, J.C., Hurst, J.R., Maxwell, J.P. & Harris, B.S. (2010), "Athletic identity and aggressiveness: A cross-cultural analysis of the athletic identity maintenance model", *International Journal of Sport and Exercise Psychology*, Vol. 8(2), pp. 99-116, doi: 10.1080/1612197X.2010.9671936.
22. Huijing, P.A. (1992), "Elastic Potential of Muscle", *Strength and Power in Sport*, Blackwell Scientific Publications, pp. 151-168.
23. Komi, P.V. (1992), "Stretch-Shortening Cycle", *Strength and Power in Sport*, Blackwell Scientific Publications, pp. 169-179

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Influence of neurodynamic properties on the choice of coping strategies in qualified athletes

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Purpose: *evaluation of the influence of neurodynamic properties on the formation of coping strategies with stress in qualified athletes.*

Material & Methods: *study involved 43 high-class athletes (MS, MSIG, HMS) at the age of 14–29 years (kind of sport – kayaking and canoeing). To determine the neurodynamic properties of athletes, the Diagnostic Complex "Diagnostic-1" was used to determine the strategies of stress-overcoming behavior-the "Questionnaire of Ways of Coping Questionnaire" by R. Lazarus and S. Folkman. The study used the final score of the test of competitive personal anxiety.*

Results: *surveyed athletes identified the prevalence of such coping strategies as "Self-control", "Seeking social support", "Taking responsibility", "Problem solving planning" and "Positive revaluation". The interrelationships of coping strategies with indices of neurodynamic properties-the strength and dynamism of nervous processes, the rate of complex selection reaction.*

Conclusions: *specific psychophysiological markers of such coping strategies as "Search for social support", "Taking responsibility" and "Escape-avoidance", one can consider indicators of the strength and dynamics of nervous processes, the speed of a complex selection reaction. The preference for non-constructive coping strategies for athletes was associated with an increase in the run-up time (the time for reaching the minimum exposure of the signals in the feedback mode).*

Keywords: *neurodynamic properties, coping strategies, qualified athletes, kayaking and canoeing.*

Introduction

A special place in the formation of reliability and effectiveness in sports belongs to resistance to stress, the nonspecific reaction of the organism to various stress factors, the impact of which causes not only a corresponding protective reaction of the organism, but also a universal process – an adaptation syndrome, that is, the mobilization of the organism's capabilities [4; 19; 23]. The authors assume that it is the athletes with a high level of existing stress that can constitute a risk group for the development of occupational stress and mental burnout [1; 3; 16].

The issues of ensuring the optimal mental state of athletes in order to increase the effectiveness of training and competitive activities are devoted to a number of studies [2; 3; 4; 18]. As methods of optimizing the mental state, most authors consider mastering certain anti-stress technologies, as well as developing self-diagnosis and behavioral management skills in stressful situations, coping strategies (coping strategies) [6; 14; 15; 21]. A large number of works are devoted to overcoming (coping) the state or feelings of anxiety among athletes [2; 24].

There are three main types of coping strategies: 1) strategies for cognitive adaptation, 2) strategies for behavioral adaptation, and 3) emotionally-oriented strategies [2; 14]. In general, the adaptability of coping strategies is associated with a number of positive results, including a subjective assessment of their health, social support, psychosocial adaptation [27]. The use of constructive strategies to overcome stress determines the ability of an athlete to maintain the necessary performance for a long period of time with high efficiency, which helps achieve high results in sports [1; 2; 23]. Coping strategies play an important role in the processes of self-regulation, diagnosed by methods of game bio management [2; 9].

The most productive strategies to overcome difficulties include proactive coping (preparation for a possible stressful situation), strategies for actively overcoming problems, planning activities, seeking social support and a strategy of humor. To ineffective in the long term include the strategy of avoidance, avoiding problems [1; 14]. It should be noted that the effectiveness of coping strategies is not a stable characteristic, but depends on a number of factors. Thus, focusing on the problem may be a less effective strategy to overcome stress than avoiding, if accompanied by an emotional interpretation of a stressful situation [26]. In general, stress tolerance, tolerant attitude towards stress, is one of the main criteria of physical and mental health [6; 13; 15].

Thus, the problem of overcoming stressful situations, difficulties in training and competitive activities, interpersonal communication of athletes depending on their individual characteristics (personal, neurodynamic) remains one of the topical problems of the theory and methodology of sports training, psychology and psychophysiology of sports.

Relationship of research with scientific programs, plans, themes. In carrying out complex biological research with the participation of athletes in accordance with the principles of bioethics, the theory and methodology of athletic training and reserve capabilities of athletes of the Scientific Research Institute of NUPES "Programs of complex biological research of the features of athletes' functional capabilities", as well as the legislation of Ukraine on health protection and the Helsinki Declaration of 2000, the directive of the European

Society 86/609 on the participation of people in biomedical research [22].

The work was carried out in accordance with the state budget research theme "Technology prediction of economic development in the instants of the forced disinfection" (State Registration No. 0117U002385) of the Ministry of Education and Science of Ukraine.

Purpose of the study: assessment of the influence of neurodynamic properties on the formation of coping strategies with stress in qualified athletes who specialize in rowing and canoeing.

Material and Methods of the research

The study involved 43 high-class athletes (MS, MSIG, HMS) at the age of 14–29 years (sport –rowing and canoeing), among them 27 men and 16 women. Diagnostic complex "Diagnost-1" was used to determine the neurodynamic properties of athletes [11]. Strength and functional mobility of nervous processes, efficiency of sensorimotor activity, dynamics of nervous processes, speed of complex sensorimotor reaction of two signals from three, indicators of sensorimotor asymmetry and asymmetry of dynamic muscular endurance of the right and left hand (teping test), and others were analyzed in this study.

To study the strategies of stress-overcoming behavior (coping strategies) and determine the preferred style of coping with a stressful situation or problems, the athletes used the "Question Ways of Coping Questionnaire" R. Lazarus and S. Folkman (adapted T. L. Kryukova, and others) [5; 25]. The test contains 50 statements that are combined into 8 scales: confrontational copying (CC), distancing (D), self-control (C), seeking social support (SSS), taking responsibility (TR), escape-avoidance (E), problem solving planning (PSP) and a positive reassessment (PR). The study used the final indicator of the competitive personal anxiety test (adapted by Yu. L. Khanin) [12; 20].

Statistical processing of data was carried out using nonparametric statistics. The results were processed by statistical analysis using STATISTICA 6.0.

Results of the research and their discussion

Based on the results of previous studies, it was found that the effectiveness of mental self-regulation and adaptability in the surveyed athletes (complex co-ordination sports, jumping into water) was associated with the strength and functional mobility of nervous processes, the accuracy of reaction to a moving object and the ratio of lead/lag reactions. The intensity of the existing stress was associated with the indices of the strength of the nervous processes, the efficiency of the sensorimotor activity and the accuracy of the reaction to the moving object [17]. In addition, the higher psychophysiological status of athletes corresponded to a lower level of personal anxiety. A decrease in the level of situational anxiety was noted with an increase in the sensorimotor endurance of athletes [24]. Representatives of cyclic sports (cycling) as psychophysiological markers of mental self-regulation and adaptability have defined indicators of functional mobility of nervous processes in the feedback mode, and stress resistance – an indicator of the dynamics of nervous processes [18].
In this study, an attempt was made to identify the criteria for assessing the stress-resistance and stress-vulnerability of high-class athletes by analyzing the relationship between coping strategies and psychophysiological characteristics and the level of competitive personal anxiety. The surveyed athletes identified the prevalence of such coping strategies as "Self-control", "Seeking social support", "Taking responsibility", "Problem solving planning" and "Positive revaluation". The voltage level on these scales exceeded 50% (Table 1).

Table 1
Types of coping strategies of athletes (n=43), Me [25%, 75%]

Coping strategies	Number of points	Level of stress, %
"Confrontational copying"	9 [8; 12]	50,0 [44,4; 66,7]
"Distancing"	9 [7; 10]	50,0 [38,9; 55,6]
"Self-control"	13 [12; 16]	61,9 [57,1; 76,2]
"Seeking social support"	12 [9; 15]	66,7 [50,0; 83,3]
"Taking responsibility"	8 [6; 9]	66,7 [50,0; 75,0]
"Escape-avoidance"	11 [9; 12]	45,8 [37,5; 50,0]
"Problem solving planning"	15 [12; 16]	83,3 [66,7; 88,9]
"Positive reassessment"	14 [12: 16]	66,7 [57,1: 76,2]

Table 2
Correlation relations of the indicator of competitive personal anxiety with the types of coping strategies of athletes (n=43), r_s

Indicators	Correlation relations, r_s
The indicator of competitive personal anxiety is the indicator "Confrontational coping"	0,34*
The indicator of competitive personal anxiety is the indicator "Search for social support"	0,37*
The indicator of competitive personal anxiety is the indicator "Escape-Avoidance"	0,43**

Remark. ** – p<0,05; ** – p<0,01.*

The correlation analysis of the obtained data showed that none of the indicators of coping strategies in the surveyed athletes was associated with age and sports experience. The final index of competitive personal anxiety (Table 2) reliably correlated according to the Spearman criterion with the indicators "Confrontational coping", "Search for social support" and the "Escape-avoidance" strategy (espectively: r_s=0,34, p<0,05; r_s=0,37, p<0,05 and r_s=0,43, p<0,01), which can indirectly testify to the influence of preferred coping strategies on the success of competitive activities of athletes.

Correlation analysis revealed the presence of Spearman correlation between the indicator on the "Search for social support" scale and the brain performance indicator for long sensorimotor loads, the strength of the nerve processes (r_s=0,34, p<0,05). The indicator of the dynamics of the nervous processes (the time of reaching the minimum exposure of the signals in the feedback mode, the test of 5 minutes) and the rate of the complex selection reaction by the same criterion correlated with the indicator on the scale "Search for social support" (respectively: r_s=0,38, p<0,05 и r_s=0,35, p<0,05). The score on the "Taking responsibility" scale was associated with the speed of the sensorimotor response when two signals were selected from three (r_s=0,37, p<0,05). In addition, a direct correlation was established between the indicator on the flight-avoidance scale and the indicator of the dynamics of nervous processes in the feedback mode, a test of 5 minutes (r_s=0,40, p<0,01) (Table 3). A higher level of stress on the

scale "Search for social support" was associated with a lower strength of the nervous processes and less dynamism of the nervous processes (feedback speed), large latent periods of a complex selection reaction (the choice of two signals out of three). Higher values of the indicator "Acceptance of responsibility" corresponded to large latent periods of a complex selection reaction (i.e., less speed of a complex selection reaction). A higher level of voltage on the scale "Flight-avoidance" was associated with a less dynamic nerve processes.

Table 3

Correlation relations of the indices of neurodynamic properties (in feedback and imposed rhythm regimes) with the psychological characteristics of athletes (n=43), r_s

Indicators	Correlation relations, r_s
Latent period of a complex choice reaction, ms - indicator "Search for social support"	0,35*
Latent period of a complex selection reaction, ms - indicator "Taking responsibility"	0,37*
The indicator of the strength of the nervous processes (in the regime of the imposed rhythm),% of the errors - the indicator "Search for social support"	0,34*
The indicator of the dynamics of nervous processes (in the feedback mode, the test of 5 minutes), sec - indicator "Search for social support"	0,38*
The index of the dynamics of nervous processes (in the feedback mode, the test of 5 minutes), sec - the indicator "Escape-Avoidance"	0,40**

Remark. ** – p<0,05; ** – p<0,01.*

Thus, the strategies "Taking responsibility" and "Searching for social support" turned out to be associated with genetically conditioned basic properties of the nervous system that develop and improve both in ontogeny and in the process of sporting activity [8; 10]. It should be noted that the latent periods of a complex selection reaction are considered as additional indicators of strength and functional mobility of nervous processes [11]. At the same time, the strategy "Escape-avoidance" was associated precisely with the psycho-physiological characteristics that do not depend on the length of the sports training and the age of the athletes. Almost all the studied properties of the psychophysiological functions of the examined athletes were associated with age and sports experience, except for the dynamics of the nervous processes, which was determined by the time of reaching the minimum exposure of signals (run-in time) in feedback mode (test 5 minutes). The slower the athletes reached their highest result in the feedback mode, the greater the probability of preferring a flight strategy, on the one hand. On the other hand, the preference for non-constructive strategies to overcome difficulties by athletes contributed to a decrease in motivation during testing, which led to a "worsening" of psychophysiological indicators, in this case, to an increase in the feedback time in feedback mode.

It should be noted that it is the strategy of "Escape-avoidance" refers to the non-constructive coping strategies that promote mental burnout in elite sport [1]. Athletes prefer to choose defection strategy at high rates of mental burning out – figure "Impairment of achievements" and the integral index of mental burnout. Acceptance of responsibility, planning, problem solving and social support are constructive strategies to cope with stress in athletes. The higher the emotional intelligence (self-motivation, control their emotions), the lower the likelihood of athletes escape strategy [1].

Indicators of sensorimotor asymmetry and asymmetry dynamic muscular endurance of the right and left hand (tapping test) were not associated with test performance Copping strategies that in some way is not consistent with the published data on the adaptation of communication in the sphere of sports with the type of functional brain asymmetry [7]. Promising in this direction seems to conduct comprehensive studies of different types of sensory-motor and motor asymmetries in athletes, representatives of sports with different orientation of the training process, due to their level of stress, with the efficiency and adaptability of psychic self-regulation.

Thus, the specific psycho-physiological markers of certain coping strategies in the examined athletes (namely – the strategy of "Search of social support", "Taking responsibility" and "Escape-avoidance") can be regarded as indicators of the strength and dynamism of nervous processes, the speed of a complex choice reaction.

Conclusions

1. At the surveyed athletes revealed the prevalence of such coping strategies as "Self-control", "Search for social support", "acceptance of responsibility", "Planning solution to the problem" and "positive reappraisal".

2. The interrelationships between coping strategies and indices of the neurodynamic properties of rowers have been revealed. Specific psycho-physiological markers of the strategies "Searching social support", "Taking responsibility" and "Escape-avoidance" can be considered indicators of strength and dynamism of the nervous processes, the speed of the complex reaction of choice.

3. A higher level of stress on the scale "Search for social support" was associated with a lower strength of the nervous processes and less dynamism of the nervous processes, greater latent periods of the complex reaction of choice. The higher values of the indicator "Taking responsibility" corresponded to the lower speed of a complex selection reaction. A higher level of voltage on the scale "Escape-avoidance " was associated with a less dynamic nerve processes.

4. Preference for non-constructive coping strategies for athletes was associated with an increase in the run-up time (the time for reaching the minimum exposure of the signals in the feedback mode).

5. Identified relationships of coping strategies with neurodynamic properties of athletes can have predictive value and be used to optimize sports development in this sport.

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References

1. Berilova, E.I. (2015), "Emotional intelligence and coping-strategies as regulators of burnout in the elite sport", *Integrativnyy podkhod k psikhologii cheloveka i sotsial'nomu vzaimodeystviyu: sbornik nauchnykh trudov, Adygeyskiy gosudarstvennyy universitet*, No. 4, pp. 98-103. (in Russ.)
2. Bochaver, K.A. & Dovzhik, L.M. (2016), "Coping Behavior in Professional Sport: Phenomenology and Diagnostics", *Elektronnyy resurs, Klinicheskaya i spetsial'naya psikhologiya [Clinical Psychology and Special Education]*, Vol. 5, No. 1, pp. 1-18. (in Russ.)
3. Veynberh, R.S. & Hould, D. (2014), *Sports Psychology*, Olimp. l-ra, Kyiv. (in Ukr.)
4. Voronova, V.I. (2007), *Sport Psychology*, Olimp. l-ra, Kyiv. (in Ukr.)
5. Kryukova, T.L., Kuftyak, Ye.V. & Zamyshlyayeva M.S. (2005), "Adaptatsiya metodik, izucheniye sovladayushchego povedeniya Ways of Coping Questionnaire (Oprosnik sposobov sovladaniya R. Lazarusa i S. Folkmana)", *Psikhologiya i praktika. Sbornik nauchnykh trudov*, Vol. 4, RTSOI «EKSPERT-YEGE», Kostroma, pp. 171-190. (in Russ.)
6. Kundiyev, Yu.I., Kal'nish, V.V. & Nagornaya, A.M. (2002), "The role of stress in the formation of public health: a structural analysis", *Zhurnal AMN Ukrainy*, No. 2, T. 8, pp. 335-345. (in Russ.)
7. Leutin, V.P., Nikolayeva, Ye.I. & Fomina, Ye.V. (2007), "Asymmetry of the brain and human adaptation", *Asimmetriya,* No. 1, Vol. 1, pp. 71-73. (in Russ.)
8. Lysenko, E.N., & Shynkaruk, O.A. (2015), "Influence on the manifestation of neurodynamic properties of athletes of sexual dimorphism and strenuous physical work", *Nauka i sport: sovremennyye tendentsii*, Vol. 6, No. 1, pp. 11-18. (in Russ.)
9. Mazhirina, K.G. & Dzhafarova, O.A. (2011), *Diagnostika strategiy samoregulyatsii i stressoustoychivosti metodami igrovogo bioupravleniya: Metodicheskoye rukovodstvo* [Diagnostics of strategies of self-regulation and stress resistance by methods of game bio management: Methodical guidance], Novosibirsk. (in Russ.)
10. Makarenko, M.V. & Lyzohub, V.S. (2011), *Ontohenez psykhofiziolohichnykh funktsiy lyudyny* [Ontogenesis of psychophysiological functions of a person], Cherkasy. (in Ukr.)
11. Makarenko, M.V., Lizohub, V.S. & Bezkopyl'nyi, O.P. (2014), *Metodichni vkazivki do praktikumu z diferentsial'noi psikhofiziologii ta fiziologii vishchoi nervovoi diyal'nosti liudyny* [Methodical instructions to the practical workshop on differential psychophysiology and physiology of higher human nervous activity], Kyiv-Cherkasy. (in Ukr.)
12. Petrovskaya, T. (2014), "Emotional intelligence and competitive anxiety of athletes", *Nauka v olimpiyskom sporte*, No. 4, pp. 60-63. (in Russ.)
13. Platonov, V.N. (2015), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i yeye prakticheskiye prilozheniya* [System of training athletes in the Olympic sport. General theory and its practical applications], in 2 books, Book 1, Olimp. lit, Kiev. (in Russ.)
14. Rasskazova, Ye.I., Gordeyeva, T.O. & Osin, Ye.N. (2013), "Coping strategies in the structure of activity and self-regulation: psychometric characteristics and possibilities of application of the COPE methodology", *Psikhologiya. Zhurnal Vysshey shkoly ekonomiki*, No. 1, pp. 82-118. (in Russ.)
15. Romanyuk, V.L. & Pylypaka, Yu.I. (2016), "Reactivity and Mental Health of Personality", *Psykholohiya: real'nist' i perspektyvy: Zbirnyk naukovykh prats' Rivnens'koho derzhavnoho humanitarnoho universytetu*, No. 7, pp. 182-188. (in Ukr.)
16. Tukaiev, S.V., Vasheka, T.V. & Zyma, I.G. (2013), *Psychological and neurophysiological aspects of the emotional burnout development*, Volkoff, V.P. (eds.), *Aktualnye aspekty vnutrenney meditsiny: kollektivnaya nauchnaya monografiya* [Actual aspects of internal medicine], Publishing House «SibAK», Novosibirsk, pp. 86-107. (in Russ.).
17. Fedorchuk, S., Lysenko, O., Kolosova, O., Khalyavka, T. & Romaniuk, V. (2017), "Influence of psychoemotional stress on the functional state of the neuromuscular system and the efficiency of sensorimotor activity of highly skilled athletes", *Slobozhans'kij naukovo-sportivnij visnik*, No. 4(60), pp. 109-116. (in Russ.)
18. Fedorchuk, S.V., Lysenko, E.N. & Tukayev, S.V. (2017), "Efficiency of mental self-regulation and adaptability relative to neurodynamic features of cyclists", *Sportivna meditsina i fizichna reabilitatsiya*, No. 2, pp. 62-68. (in Russ.)
19. Filippov, M. & Il'in, V. (2014), "Modern aspects of the psychophysiological understanding of the athlete's reliability", *Nauka v olimpiyskom sporte*, No. 4, pp. 29-35. (in Russ.)
20. Khanin, Yu.L. (1982), "Adaptation of the scale of competitive personal anxiety", *Voprosy psikhologii*, No. 3, pp. 136-141. (in Russ.)
21. Chikina, L.V., Fedorchuk, S.V., Trushyna, V.A., Yanchuk, P.I. & Makarchuk, M.Yu. (2012), "Influence of mental rotation of objects on the state of psychophysiological functions of women", *Fiziolohichnyy zhurnal*, Vol. 58, No. 5, pp. 36-43. (in Ukr.)
22. Shynkaruk, O.A., Lysenko, O.M., Hunina, L.M., and others (2009), *Medyko-biolohichne zabezpechennya pidhotovky sportsmeniv zbirnykh komand Ukrayiny z olimpiys'kykh vydiv sportu* [Medico-biological support of the training of athletes of national teams of Ukraine from Olympic sports], Olimp. l-ra, Kyiv. (in Ukr.)
23. Shynkaruk, O., Lysenko, E. & Fedorchuk, S. (2017), "Stress and its impact on the competitive and training activity athletes", *Fizychna kul'tura, sport ta zdorov'ya natsiyi: zbirnyk naukovykh prats'*, No. 3(22), TOV "Planer", Vinnytsia, pp. 469-476. (in Ukr.)
24. Fedorchuk, S., Tukaiev, S., Lysenko, O. & Shynkaruk, O. (2018), «The psychophysiological state of highly qualified athletes performing in diving with different levels of anxiety», *European Psychiatry, Elsevier*, Vol. 48, pp. 681.
25. Lazarus, R.S. & Folkman, S. (1984), *Stress, appraisal, and coping*, NY: Springer publishing company.
26. Suls, J. & Fletcher, B. (1985), «The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis», *Health Psychology*, Vol. 4, No. 3, pp. 249-288.
27. Vaillant, G.E. (2000), «Adaptive mental mechanisms. Their role in a positive psychology», *American Psychologist*, Vol. 55, No. 1, pp. 89-98.

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Features of the improved methodology of pedagogical control of physical preparedness of athletes in aesthetic gymnastics

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Purpose: *determine the most effective method of pedagogical control of physical prepareness of athletes 12–14 years old, engaged in aesthetic gymnastics.*

Material & Methods: *in the experiment involved twenty athletes 12–14 years old, engaged in aesthetic gymnastics. Theoretical analysis and generalization of scientific and methodical literature was carried out, pedagogical methods of research, medical and biological methods of research, methods of mathematical statistics.*

Results: *the complex of exercises of pedagogical control of physical prepareness of gymnasts at the stage of basic specialized training in aesthetic gymnastics is developed, theoretically and experimentally proved.*

Conclusions: *advanced complex is a rational systematization of the means of pedagogical control in aesthetic gymnastics, which will allow gymnasts to progress and have high results in the sport of higher achievements.*

Keywords: *pedagogical control, physical readiness, aesthetic gymnastics, physical qualities, female athletes.*

Introduction

The basis for the management of the training process is pedagogical control. With its help, they receive information about the training of athletes, the correctness or mistakenness of pedagogical reception, which ultimately enhances the quality of the training work [1; 7; 8].

Pedagogical control is carried out by the method of control tests with the help of special exercises or tests. The main criteria for assessing the level of development of physical fitness athletes in aesthetic gymnastics are:

– simplicity and accessibility of control exercises for all those involved;

– testing should be conducted under the same conditions for all gymnasts;

– it is necessary to adhere to a certain order of carrying out of control tests, such as exercises on flexibility, an estimation of speed-strength qualities, coordination, function of balance and vestibular stability, force, endurance [5].

Aesthetic gymnastics is a relatively new and very entertaining sport, based on stylized, natural movements of the whole body. This sport is little studied [9].

For successful development and quality performance of exercises it is necessary to develop and improve physical qualities [2]. In the aesthetic gymnastics the following physical qualities are distinguished: coordination, flexibility, strength, speed, jumping, balance, endurance. This is described in detail in the international rules for aesthetic gymnastics. The disadvantage of at least one of the above physical qualities is punished by the judging panel [9]. Control over the development of physical qualities will improve the level of sports training for gymnasts, apply more advanced training systems and, as a result, improve athletic performance. The relevance of the chosen topic is determined by the requirements of the practice of sports associated with improving the effectiveness of the training process in aesthetic gymnastics [2–4].

Purpose of the study: to determine the most effective method of teaching pedagogical control of physical preparedness athletes 12–14 years engaged in aesthetic gymnastics.

Material and Methods of the research

The following research methods were used in writing the work and carrying out the research: theoretical analysis and generalization of scientific and methodological literature, pedagogical methods of research (pedagogical observation, special pedagogical testing, pedagogical experiment), medical and biological research methods (morphological parameters: body length, mass body, chest circumference, respiratory system parameters: VC, cardiovascular parameters: heart rate, blood pressure), mathematical methods statistics.

Studies were conducted during the 2016–2018 academic year in Kharkov. The main experiment was attended by 20 female athletes of 12–14 years of age who are engaged in groups of specialized basic training in children's sports gymnastics. As a result of the preliminary testing, the gymnasts were divided into two groups of 10 people: control and experimental.

At the initial stage of the studies, it was necessary to carry out a comparative analysis of the morphological parameters (body length, body weight, chest circumference) of the gymnasts, as well as functional indices (VC, HR, SBP, DBP) for the selected age category. Given the difference between some gymnasts in two years (12 and 14 years), this stage was mandatory to determine the feasibility of further research. Student's t-test was used for this analysis. The data obtained by the gymnasts

aged 12–14 years did not exceed the maximum value of the t-test index – 2,04 (according to S. V. Nachinsky) [6], that is, their morphological indices have no significant differences. This proves the possibility of using the same pedagogical control tools for gymnasts of this age group.

Next, a traditional set of control standards was chosen to determine the physical preparedness of gymnasts – 14 test exercises, which are conducted on one training day and are aimed at determining the level of physical preparedness. The selected tests are held annually in the Youth College of Rhythmic Gymnastics and generally accepted. When testing the group, a statistical analysis of the test results was carried out, which showed a high level of variability. This fact is explained by the congenital data of the gymnasts and indicates the need to take into account the individuality factor of athletes and apply individual approaches to physical activity planning and when setting technical elements. Thus, a correlation analysis was carried out to determine the level of interconnection of elements performed by gymnasts, which allowed for more detailed statistical information on the physical fitness of gymnasiums. The range of values of the correlation relationships between the indicators of motor qualities and capabilities is as follows: [0,60; 0,97]. This analysis showed that all exercises should be included in the gymnasts physical training program at the stage of specialized basic training, since the correlation matrix has a close, positive and direct proportional relationship, that is, they are directly related to each other [2].

Results of the research and their discussion

For the main study, it was decided to divide a group of gymnasts into two equal groups of 10 girls each. For the reliability of the further experiment, a comparative analysis of the primary indices of physical preparedness of the gymnasts of the control and experimental groups was carried out according to the Fisher criterion. Figure 1 shows the distribution curves of the results of the primary study to the gymnasts of the control and experimental groups.

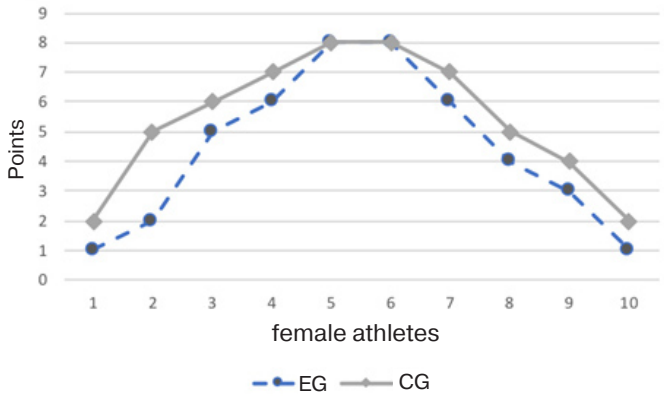

Fig. 1. Distribution of the results of primary studies of the observational experiment of gymnasts CG (n=10) and EG (n=10)

This analysis showed that the control and experimental groups are homogeneous. After previous studies gymnasts continued to train in their usual mode.

At the end of the initial stages of the research, it was decided to finalize and improve the traditional complex of control exercises, taking into account the received indices of the previous testing of gymnasts and taking into account the specificity of aesthetic group gymnastics.

During the experiment, the volume of loads in the control and experimental groups was the same, but the physical training program in the EG was experimental.

The next pedagogical control of physical preparedness of gymnasts was held after 6 months. The control group of gymnasts, as in the previous testing, performed 14 test standards. The experimental group performed an advanced set of exercises, in which 18 control standards were proposed, divided into 9 exercises a day. That is, the gymnasts of this group surrendered the specifications for two days.

A set of tools for pedagogical control of physical fitness of gymnasts, based on a combination of exercises aimed at determining the level of development of physical qualities.

The complex offered 18 control exercises, which are performed by gymnasts for two days.

On the first day athletes perform 9 test tasks aimed at revealing the level of development of flexibility and strength:

1. Bridge stand. P.P. – stand, legs apart, hands up. Run cities with the maximum deflection. Measure the distance from the heels to the end of the third finger, cm.

2. "Tilt forward, standing on the bench." P.P. – the main counter on the gym bench. Tilt down, trying to reach the floor with your hands. Measure the distance from the plane of the bench to the end of the third finger, cm.

3. "Twine from a support". Run the twine on the right (left) leg and the transverse twine from the support. Measure the distance from the groin area to the floor, cm.

4. "Translation of the stick". P.P. – Stand the legs apart, gymnastic stick down. Translation gymnastic stick with centimeter markings from front to back and back. Measure the distance between the hands by twisting the stick with straight hands, cm

5. "Angle in the ordinary hang". P.P. – on the Swedish wall. Angle content. It is counted as the content in seconds before the point of lowering the legs below the right angle, s.

6. "Lifting the trunk back". P.P. – lying on the stomach, legs are fixed on the width of the shoulders, hands behind the head. Raising the trunk to the vertical. The number of correctly executed in 20 s, counts is counted, number of times.

7. "Pistols". P.P. – standing right (left) sideways to the Swedish wall, grip at the level of the belt, left (right) hand to the side.

1–2. Squat on the right (left), left (right) forward.
3–4. Climbing jump up.
5–8. Same.

Counts the number of jumps by 10 cm and return to full sitting, number of times.

8. "Push-ups". P.P. – Lying on the knees. Bending and bending of the hands. The number of correctly executed movements, number of times is taken into account.

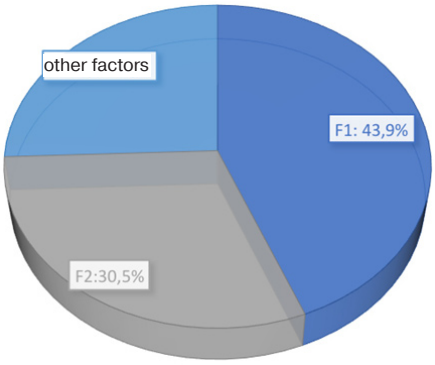

Fig. 2. Factor structure of traditional control exercises to determine the physical preparedness of the gymnasts of the control group

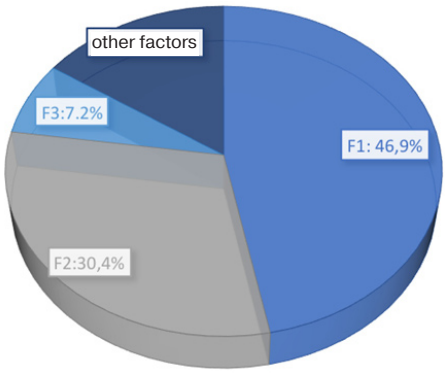

Fig. 3. Factor structure of the proposed complex of control exercises, aimed at determining the level of physical preparedness s of gymnasts

On the second day, gymnasts also perform 9 test assignments that provide information on the level of development of speed, speed-strength abilities, coordination abilities, balance and endurance functions:

1. "Running 30 m". Running from a high start to 30 m (acceleration), s.

2. "Leap in length". Leap from the place with a push of two feet. Measures the distance from the socks in the starting position to the heels after landing, cm.

3. "Leap in height". Leap in height (Abalakova) – the gymnast wears a belt with a centimeter tape, which, going down, passes through a bracket attached to the floor. By extracting a centimeter tape in the jump by a jerk of two with a semicircle, the height of the jump is determined, cm.

4. "Slopes". P.P. – handstand up. 10 bends forward until the fingers touch the floor. The execution time is fixed, s.

5. "The emphasis is squatting – emphasis is lying". P.P. – The main rack. The emphasis is on sitting down, the rest resting, the emphasis is sitting down, P.P. Counts the number of repetitions in 20 seconds, the number of times.

6. "Roll Back". P.P. – main rack. 5 somersaults forward, 5 jumps without leaving the place. The quality of leaflets, jumps, and scores is assessed.

7. "Extraction back". P.P. – Stand on the right (left) leg. Left (right) straight leg from behind grab with hands. The time is fixed, without going off and changing the posture, s.

8. Passet. P.P. – Stand on the right (left) leg. Left (right) bend forward, pressing the foot to the knee joint of the supporting leg, arms up, eyes closed. Measures the time content without going off and changing the posture, s.

9. "Double". Jumping rope with a double turn on two legs with straight legs in the air. The number of times without regard to time, the number of times.

To prove the effectiveness of the pedagogical control tools used and the degree of informativeness of both the traditional complex and the complex proposed by us, factor analysis was carried out. According to the results of factor analysis, the traditional set of exercises was 74,4% (Figure 2).

The complex developed by us is informative and effective at 84,5%. The results of the factor analysis of the developed complex of control exercises are shown in Figure 3.

Thus, we can conclude that the developed set of exercises is 10,1% more informative than the traditional approach of pedagogical control of the physical preparedness of athletes, is used in the Youth Artistic Gymnastics.

Conclusions

Assessment of the level of development of physical preparedness of athletes is important for determining the effectiveness of the training process, objectively demonstrates the indicators of physical development, and also provides an opportunity to adjust training programs in a timely manner.

A set of pedagogical control tools has been developed that includes both traditional physical exercises and exercises proposed for the first time.

The difference between the two complexes is the rational systematization of the means of pedagogical control. On the first day, the gymnasts do strength exercises after the exercises for flexibility, is rational in terms of physical fitness. On the second day gymnasts consistently perform exercises that allow to determine the level of development of speed, speed-strength abilities, coordination abilities, equilibrium functions and endurance.

Control of physical readiness at the stage of specialized basic training is the main component of the training process, which will allow gymnasts to progress successfully and have high results in the sport of higher achievements.

To date, a set of exercises has been successfully introduced into the system of training gymnasts of the Youth College of Rhythmic Gymnastics and is actively used in practice.

Prospects for further research. In further studies, it is planned to experimentally investigate the effectiveness of the program, according to which the experimental group was preparing for tests of an improved method of pedagogical control of physical readiness.

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References

1. Barchuk, I.S. & Panichiv, I.C. (2003), *Phizychna kultura* [Physical culture], UNITI, Moscow. (in Ukr.)
2. Wiener-Usmanova, I.A. (2013), *Integral'naya podgotovka v khudozhestvennoy gimnastike: avtoref. dis. dok. ped. nauk* [Integral training in rhythmic gymnastics: Doct. of Sci. thesis abstract], St. Petersburg, 32 p. (in Russ.)
3. Govorova, M.A. & Pleshkan, A.V. (2001), *Spetsial'naya fizicheskaya podgotovka yunykh sportsmenok vysokoy kvalifikatsii v khudozhestvennoy gimnastike* [Special physical training of young athletes of high qualification in rhythmic gymnastics], Moscow. (in Russ.)
4. Karpenko, L.A. (2003), *Khudozhestvennaya gimnastika* [Rhythmic Gymnastics], SPGAFK. P.F. Lesgafta, St. Petersburg. (in Russ.)
5. Matveev, L.P. (2004), *Teoriya i metodyka fizychnoyi kul'tury. Vvedennya v predmet* [Theory and methods of physical culture. Introduction to the subject], St. Petersburg. (in Russ.)
6. Nachinskaya, S.V. (2012), *Sportivnaya metrologiya: ucheb. posobiye dlya stud. vyssh. ucheb. zavedeniy* [Sports Metrology: textbook allowance for stud. supreme. training. institutions], Akademiya, Moscow. (in Russ.)
7. Platonov, V.N. (2015), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i yeye prakticheskiye prilozheniya: ucheb-nik v 2 kn.* [The system of training athletes in the Olympic sport. General theory and its practical applications: training-nik in 2 books, Book 1, Olimp. lit., Kyiv. (in Russ.)
8. Platonov, V.N. (2017), Dvigatel'nyye kachestva i fizicheskaya podgotovka sportsmenov [Motor qualities and physical training of athletes], Kyiv. (in Russ.)
9. IFAGG (2018), Competition rules of the Aesthetic Group Gymnastics, available at : http://www.gymnasticsontario.ca/wp-content/uploads/2018/02/IFAGG-competition-rules-2017.pdf

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Study of the adaptive capabilities of the functional state of the basketball players' organism to physical loads during the microcycle of the preparatory training period

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Purpose: *to determine the adaptive capabilities of the functional state of the organism of young basketball players to physical loads during the training microcycle of the preparatory period.*

Material & Methods: *in the study involved 10 basketball players of 14–15 years of training and training group of children's and youth sports school in Kharkov. The survey was conducted during the microcycle of the preparatory period and 12 months later in the preparatory period at the stage of special training. To assess the adaptive capabilities of the functional state of basketball players, a cyto-biophysical method for determining the bioelectrical properties of the nuclei of buccal epithelial cells.*

Results: *the research of the functional state of the basketball players organism on the index of electronegativity (EN%) of the buccal epithelial cell nuclei after exposure to physical loads of various directions showed that the proposed physical loads during the training process proved to be quite effective for the development of athletes preparedness, as evidenced by the improvement in the adaptive capabilities of the basketball players' organism during the considered period of sports training.*

Conclusions: *electronegativity index (EN%) of the buccal epithelial cell nuclei in basketball players after the action of physical loads at the end of the microcycle does not change reliably, but has only a tendency to decrease, which indicates a favorable course of the athlete's organism adaptation processes to physical loads and the rational construction of the microcycle training program.*

Keywords: *functional state of the basketball players' organism, the bioelectrical properties of the nuclei of buccal epithelium cells, the index of electronegativity.*

Introduction

Development of modern basketball is characterized by a significant increase in the volume and intensity of training loads.

Training of high-qualified basketball players is becoming more and more intensive year by year, and growing training and competitive loads impose high demands on their bodies [3; 8].

The existing situation significantly increases the requirements for objective management of the training process, the quality of training sessions, and, especially, the effectiveness of their impact on the basketball players' body [9; 10]. At the same time, the medical-biological assessment of the effect of physical exertion on the athletes' organism acquires a special urgency, it provides information for the optimal dosage of loads, control over the course of recovery processes and forecasting of sports results [4; 5; 7; 8].

To control the training process, it is necessary to evaluate changes in the functional condition of athletes - those that are the result of a long period of training, and those that develop under the influence of loads of individual exercises, exercises, microcycles. This allows you to plan more fully the training process, based on the correspondence between the real adaptive resources and the capabilities of the athlete at the moment and in the prospective perspective [1; 3; 4; 6; 8].

Purpose of the study: to determine the adaptive capabilities of the functional state of the organism of young basketball players to physical loads during the training microcycle of the preparatory period for bioelectric properties of nuclei of buccal epithelium cells.

Material and Methods of the research

In the study, 10 basketball players of 14–15 years of the training and training group of the children's and youth sports school took part. Kharkov. The survey was conducted during the microcycle of the preparatory period and 12 months in the preparatory period at the stage of special training.

The study used the following research methods:

– theoretical analysis and generalization of scientific and methodological literature;

– generalization and analysis of sports training: conversations and analysis of training plans;

– biomedical research methods;

– methods of mathematical statistics.

To assess the adaptive capabilities of the functional state of

basketball players, a cyto-biophysical method for determining the bioelectrical properties of the nuclei of buccal epithelial cells.

Assessment of the functional state of the organism of young basketball players with the cyto-biophysical method (V. G. Shakhbazov) on the bioelectrical (electrokinetic) properties of the nuclei of buccal epithelium cells reflects the degree of adaptation of the human body to physical stresses [2].

The method does not require expensive equipment, it is relatively simple and affordable. uration of the analysis of one sample is 5–10 minutes. Therefore, it can be attributed to express methods. The advantages of the method should also include full painlessness and non-traumatism for the examinee. The study is based on an analysis of 100 cells. The bioelectrical properties of the nuclei of buccal epithelial cells were estimated from the index of electronegativity (EN %).

To determine the effect of physical loads during the training microcycle on the functional state of the basketball players' organism, a study was also made of the relationship between the bioelectric properties of the nuclei of buccal epithelial cells of the examined basketball players and the cardiovascular system, in particular, the heart rate It is known that the heart rate is quite informative in assessing the general state of human health [2].

Indicators of electronegativity of the cell nuclei and heart rate were measured before and after exercise at the end of the training session.

Results of the research and their discussion

At the first stage of the study, the influence of physical loads on the functional state of the basketball players' organism at the beginning of the microcycle was studied in a training session of a developing character that took place after a day of rest. The exercises included physical workout exercises, which were aimed at the development of speed-strength qualities. For this purpose, various accelerations, relay races, exercises with stuffed balls were used. The main part of the training session was devoted to technical training. In the final part, we used relaxation exercises.

Results of this series of studies, which are presented in the table, show that the initial indicator of electronegativity of the buccal epithelial cell nuclei of the examined basketball players was within the norm and corresponded to 67.2%, which indicates the restoration of the functional state of the athletes organism after a rest day [2]. The heart rate indicators also corresponded to the norm – 73,6 beats min^{-1}

After a low intensity training load, the indicator fell by 20,2%, which may indicate insufficient adaptation of the athletes to the training load after the rest period and low fatigue [2]. HR values were consistent 116 beats min^{-1}.

Next series of studies was conducted on the second day of the microcycle in a training session aimed at developing general physical training (Table).

Results of the study indicate that the initial index of electronegativity of the buccal epithelial cell nuclei was higher than in the previous series of studies, but remained within the norm and amounted to 71,3%, which is 4.1% higher than the previous one, which is explained by sufficient body recovery. HR values were consistent 82,9 beats min^{-1}.

After physical loads of high intensity and volume, the index of electronegativity of the buccal epithelial cell nucleus decreased by 14,4%. Thus, this training led to less pronounced changes in the electronegativity index of the buccal epithelial cell nuclei, which indicates a less significant following physical stress on the body of basketball players and more pronounced fitness for them. Heart rate indicators for basketball players after physical exertions of the second day of the microcycle –124 beats min^{-1}.

The next series of studies was conducted with the same training and training group of basketball players in 12 months, in the preparatory period, at the stage of special training.

The samples of buccal epithelial cells from basketball players were taken on the third day of the microcycle. The output index of electronegativity (EN, %) of the buccal epithelial cell nuclei (the results are presented in the table) was within the norm – 69,1%. After the load, the electronegativity index of the buccal epithelial cell nuclei was 60%, that is, the EN after the training load decreased by 9,1%, which indicates an increase in the adaptability to physical activity in athletes.

The heart rate for basketball players on the third day of the microcycle was: to the load – 82,1 beats min^{-1}, after the load –

Influence of physical loads of training exercises on the functional state of the basketball players' organism during microcycles of the preparatory period in terms of electronegativity (EN, %) of buccal epithelial cell nuclei

Days of microcycles	Indicators of electronegativity of properties cell nuclei of buccal epithelium (EN, %)		
	before training	after training	difference
1st day of a microcycle, after a day of rest	67,2	47,0	20,2
	p<0,05		
2nd day of a microcycle	71,3	56,9	14,4
	p<0,05		
	after 12 months of training		
3rd day of a microcycle	69,1	60,0	9,1
	p<0,05		
4th day of the microcycle	61,6	57,3	4,3
	p>0,05		
5th day of the microcycle	60,3	57,9	2,4
	p>0,05		

157 beats min^{-1}.

The results of the studies obtained on the 4th day of the microcycle during the game training showed that the initial index of electronegativity of the buccal epithelial cell nuclei was 61,6%. After training, which was accompanied by an increased emotional state of basketball players, the electronegativity index of the buccal epithelial cell nucleus was 57,3%, that is, the decrease in the electronegativity index of the buccal epithelial cell nucleus was only 4,3%, which indicates a significant increase in athletes' fitness, increase their adaptability to Physical exercise with sufficient recovery after training the previous day of the microcycle. This is indicated by the heart rate, which amounted to the load 76 beats min^{-1}, after the load – 128 beats min^{-1}.

The next series of studies was conducted in a training session on general and special physical training (the results are presented in the table). Classes were conducted at the end of a weekly microcycle, the output indicator of electronegativity of the buccal epithelial cell nuclei was 60,3%. After training, the electronegativity index of the buccal epithelial cell nuclei decreased in all athletes by an average of 2,4% and amounted to 57,9%.

The HR indicators after performing the exercises during this training session were – 125 beats min^{-1}, and before doing the exercises – 74 beats min^{-1}.

Thus, the results of studies of the functional state of the organism of basketball players on the indicator of electronegativity of the buccal epithelial cell nucleus after exposure to physical loads of different directions indicate that the proposed physical loads during the training process of this group of surveyed basketball players proved to be quite effective for the development of athletes' preparedness, as evidenced by the improvement of adaptive capabilities basketball players in the course of the considered period of sports training.

Obtained results allowed us to conclude that the physical loads that are used in the microcycle in the studied period of the training process were adequate to the functional capabilities of the basketball players' organism, and by the end of the microcycle the athletes were already sufficiently adapted to them.

Conclusions

1. Results of the studies made it possible to reveal that at the initial stage of the microcycle training loads led to a significant decrease in the electronegativity index of the buccal epithelial cell nuclei in basketball players, which indicates that their organism is insufficiently adapted to these loads.

2. According to the results of the research it is established that the bioelectric properties of the nuclei of buccal epithelium cells in basketball players vary under the influence of one training session and depend on the functional status of the athletes.

3. Using the estimation of the electronegativity index of the buccal epithelial cell nuclei and the heart rate, it was found that the degree of decrease of these parameters is directly related to the volume and intensity of the loads.

4. The indicator of electronegativity of the buccal epithelial cell nuclei in basketball players after the action of physical loads at the end of the microcycle does not change reliably, but has only a tendency to decrease, which indicates a favorable course of adaptation processes of the athletes organism to physical loads and rational construction of the microcycle training program.

Prospects for further research are related to studies of the effect of physical exertion on the functional state of the basketball players' organism in the conditions of competitions.

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References

1. Bykova, Ye.A. (2012), "Using the methods of swimming to enhance the functionality of handballers in the preparatory period of the annual cycle", *Problemy i perspektivy razvitiya sportivnykh igr i edinoborstv v vysshikh uchebnykh zavedeniyakh : sbornik statey VIII mezhdunarodnoy nauchnoy konferentsii* [Problems and prospects for the development of sports games and martial arts in higher education: a collection of articles of the VIII International Scientific Conference], Kharkov, No. 2, Tom 3, pp. 17-20. (in Russ.)
2. Honcharenko, M.S. (red.) (2012), *Valeolohichnyi instrumentarii aparatno-prohramnoi diahnostyky y monitorynhu zdorovia: metodychnyi posibnyk* [Valeleological instrumentation of hardware and software diagnostics and monitoring of health: a methodical manual], KhNU imeni V. N. Karazina, Kharkiv. (in Ukr.)
3. Koval, M.V. & Chucha, N.I. (2016), "Riven spetsialnoi pratsezdatnosti basketbolistiv studentskoi komandy", *Sportyvnye igry*, No. 1, pp. 21-24. (in Ukr.)
4. Korsun, S.M., Shaposhnikova, I.I. & Suvorova, Ya.V. (2014), "Peculiarities of the influence of training loads of various orientations on the functional state of the organism of young gymnasts", *Aktualni problemy medyko-biolohichnoho zabezpechennia fizychnoi kultury, sportu ta fizychnoi reabilitatsii : materialy I nauk.-prak. internet-konf.* [Actual problems of medical and biological support of physical culture, sports and physical rehabilitation: materials and sciences. internet conf.], KhSAPC, Kharkiv, pp. 49-52. (in Russ.)
5. Korsun, S.M., Shaposhnikova, I.I., Suvorova, Ya.V. & Mamon, R.I. (2016), "Assessment of the functional state of the organism of students under the influence of physical loads on the bioelectric properties of the cell nuclei", *Aktualni problemy medyko-biolohichnoho zabezpechennia fizychnoi kultury, sportu ta fizychnoi reabilitatsii: zb. statei II mizhn. nauk.-prak. internet-konf.* [Actual problems of medico-biological isolation of physical culture, sports and phizic reabulitis: zb. articles II міжн. scientific-prak. Internet-conf.], KhSAPC, Kharkiv, pp. 170-175. (in Russ.)
6. Korsun, S.M., Kovalova, S.V., Shaposhnikova, I.I. & Suvorova, Ya.V. (2017), "Peculiarities of application of methods of therapeutic physical culture in the rehabilitation of persons with amputation defects of the upper extremities", *Dosiahnennia i perspektyvy reabilitatsii, pidvyshchennia funktsionalnykh mozhlyvostei i yakosti zhyttia osib z urazhenniamy oporno-rukhovoi systemy : zb. nauk. pr. nauk.-prakt. konf.* [Achievements and perspectives of rehabilitation, increase of functional abilities and quality of life of persons with lesions of the musculoskeletal system: sciences pr. sci.-practice conf.], Kharkiv, pp. 119-122. (in Ukr.)
7. Korsun, S.M., Shaposhnikova, I.I., Perevoznyk, V.I. (2018), "Assessment of the level of speed abilities and functional state of the body of

young football players", *Aktualni problemy medyko-biolohichnoho zabezpechennia fizychnoi kultury, sportu ta fizychnoi reabilitatsii: zb. statei IV mizhn. nauk.-prak. internet-konf.* [Actual problems of medical and biological support of physical culture, sports and physical rehabilitation: Sb. Articles IV International sciences. internet conf.], KhSAPC, Kharkiv, pp. 24-31. (in Ukr.)
8. Pomeshchykova, Y.P. & Sapsai, S. (2016), "The effect of the method of combined exercises on the indicators of high-endurance of basketball players 15–16 years old", *Zb. nauk. pr. Kharkivskoi derzhavnoi akademii fizychnoi kultury*, No. 3, pp. 111-113. (in Ukr.)
9. Pomeshchikova, I.P., Ruban, L. & Naumenko, L. (2015), "Functional state of the cardiovascular system at female basketball players of a team of the first league in the course of carrying out medical and pedagogical observation", *Slobozhanskyi Herald of Science and Sport*, No. 1(45), pp. 102-107.
10. Pomeshchikova, I.P., Zhang Xing Yu & Koval, Maryna (2016), "Level of coordination abilities and physical working capacity of grade 8 female students suzhou wuzhong yingchuu middle school", *Education and space (Soul Suzhou China)*, No. 3, pp. 83-86.

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Assessment of the level of terminological competence of physical education teachers as the basis of professional activity

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Conditions of modern interpretation of the learning process require an increasing role of the teacher and a lesson in physical culture. The normative requirements for the teacher already form a new approach to the teaching of physical culture, where the culture of communication and the level of cultural and professional competence of the teacher of physical culture occupy an important place, which, of course, is impossible without the knowledge and skillful use of gymnastic terminology.

Purpose: *identification of the level of terminological competence of teachers of physical culture, peculiarities of using terms, reasons that prevent teachers from effectively using gymnastic terminology during their professional activities.*

Material & Methods: *in the study participated teachers of physical culture (n=87).*

Results: *certain features of the use of gymnastic terminology by teachers of physical culture are examined. They found they lacked a level of terminological competence during their professional activities when using physical exercises. The reasons not allowing teachers of physical training to effectively use gymnastic terminology are revealed.*

Conclusions: *level of terminological competence of each specialist is individual and very often requires its increase. It is established that despite the important role of using gymnastic terminology, its component in the lesson of physical culture decreases every year. A number of reasons have been identified that affect the level of terminological competence of teachers and are reflected in the quality of professional activity in general.*

Keywords: *gymnastic terminology, teacher, physical culture, terminological competence, professional activity.*

Introduction

Physical culture has absorbed the centuries-old experience of preparing a person for life, where the determining and guiding role is assigned to the teacher, trainer. Their professionalism largely determines the quality of professional activities, which in turn requires a high level of knowledge and effective practical use of acquired skills [2; 15; 20]. An important and integral component of the educational process in the conduct of sports activities is the use of gymnastic terminology. Specificity of terminology is that it briefly, accurately and affordably defines an unlimited number of physical exercises, the vast majority of which is of an abstract and artificial nature [1; 22]. Therefore, it is very difficult to explain them. To help come the notation - terms that make it possible to define exercises in one or more words [16; 23]. Knowledge and use of terms facilitates communication between teachers and students during classes, helps to simplify the description of exercises, shortens the time for explaining program material, increases interest in studies, carries a learning and developing function, and, therefore, activates and improves the learning process itself [16; 22]. But the observations of recent years have revealed a tendency to reduce the importance of gymnastic terminology when conducting physical education lessons at school [14]. Also, the analysis of the latest research and publications revealed the existing problems associated with the inadequacy of the use of terminology and the low level of possession by teachers of physical culture [9–11]. So, N. M. Kovalchuk and V. I. Sanyuka note that school teachers do not use gymnastic terminology at lessons and do not require it from pupils. Specialists emphasize that often teachers use absolutely ungermatic, or incorrect terms [12], which leads to a lack of knowledge of the gymnastic terminology of students [10]. The authors emphasize that the quality teaching of physical culture is an important task of state significance, the implementation of which depends to a large extent on the level of professional competence of teachers and requires each specialist not only to teach program material, but also to profound knowledge and skillful use of gymnastic terminology, as the share of the educational process and a weighty component of the professional readiness of the teacher of physical education [9–11].

Nadezhda Kovalchuk and Tetyana Gnitetsky in their writings repeatedly draw attention to the mistakes of teachers that occur in the published plan-outline of the lesson and suggest ways to eliminate the shortcomings [13]. Also, the authors point to an insufficient level of knowledge among future teachers studying in universities and note that an important direction of solving this problem is the professional and competent use of gymnastic terminology by teachers in the process of professional training of future teachers of physical culture [24; 27]. L. P. Sushchenko and G. V. Olifer assert that the level of professional training of future teachers of physical culture depends on pedagogically correct communication [20; 24]. The authors note that the main factor that does not allow future teachers to effectively use gymnastic terminology is inad-

equate teaching at the place of study, ineffective control of knowledge, calls for the creation of modern perfect teaching and methodological works on the issues of gymnastic terminology [20; 24; 27].

Actual aspects of professional training of future specialists in their publications have been studied by various authors:

– possibility of professional communication in the preparation of athletes with the study of terminology in classes in the Ukrainian language (in the professional field) [25];

– efficiency of teaching vocational vocabulary in sports schools [26];

– need to create conditions for rethinking the approaches to vocational training and improving the professional activity of teachers through the modernization of the educational and pedagogical process, changing the structure of its organization in accordance with modern requirements [3, 21; 24].

– ways of formation of professional skills of teachers of physical culture [28].

Thus, the analysis of the literature made it possible to assert that the problem of the teacher's professional training is considered quite widely, but the question of professional and terminological competence of the teacher of physical culture was not yet the subject of a comprehensive scientific study, and was only partially considered in some aspects. And the authors do not touch at all the reasons that led to the existing position of terminological competence of teachers directly at the time of work in the school, to a considerable extent multiplies the relevance and social significance of our research.

Purpose of the research: identification of the level of terminological competence of teachers of physical culture, peculiarities of using terms, reasons that prevent teachers from effectively using gymnastic terminology during professional activities.

Relationship of research with scientific programs, plans, themes. Research was carried out in accordance with the thematic plan of the research work of the Kharkiv State Academy of Physical Culture for 2016–2018, the Initiative Scientific Theme of the Department of Dance Sports, Fitness and Gymnastics: "Theoretical and Methodological Basis for the Development of System-Forming Components of Physical Culture (Sports, Physical Recreation , fitness)" (2017–2020).

Material and Methods of the research

87 teachers of physical culture (49 women and 38 men), teachers of schools of the city of Kharkiv took part in the study. Of them, teachers of the highest category – 21; the first category – 24; the second category – 28; specialists (without a category) – 14. All participants have a higher special education. The age of respondents is from 22 to 67 years. Work experience – from 1,5 to 43 years. By sport specialization – representatives of sports games, martial arts, boxing, tourism, cycling, swimming, track and field athletics, sports and rhythmic gymnastics, acrobatics, etc. The consent for participation in the study was filled by the teachers of the questionnaire.

In the 2016–2017 school year, pedagogical observations, interviews, interviews and questionnaires of physical education teachers were conducted during the course of pedagogical practice by KSAPC students in Kharkiv general education schools, open lessons, thematic seminars, refresher courses and other events in relation to the significance and characteristics their use of gymnastic terminology in the course of their professional activities. The questionnaire included obtaining information through written responses to 9 standardized questions. The questionnaire was anonymous and consisted of direct questions for obtaining direct information from the respondent (Table). For each question, there were 2–5 answers. Questionnaire No. 5, 6, 9 had several options for answers, and also allowed teachers to express an individual opinion (Table).

The questionnaire consisted of three parts: introductory, main and demographic. The introductory part of the questionnaire indicated: the scientific institution where the study is being conducted; purpose and objectives of the study; the role of each respondent in solving the tasks; rules for completing the form, guarantee of confidentiality. The main part consisted of questions, the answers to which the research tasks should solve. The demographic part of the questionnaire consisted of questions that determined the characteristics of the respondent: gender, age, sport, sports qualification, place of study, work experience in school, category. These data were needed for a better analysis of the collected material. To establish contact with the respondent, this part was posted at the beginning of the questionnaire. At the end of the questionnaire, the respondent was thanked for the cooperation.

Pedagogical observations were conducted directly during the lessons of physical culture and were aimed at identifying the quality and special features of using gymnastic terminology. The purpose of the interview and the talk of determining the reasons that do not allow teachers to effectively use gymnastic terminology during their professional activities. The interview allowed getting information through oral answers of respondents to a question about the topic under study. The conversation, thanks to bilateral discussions, helped to obtain more detailed answers to questions about the reasons that prevent teachers from using gymnastics vocabulary effectively.

In the group non-simultaneous survey, 87 teachers took part. The total number of responses of the entire group of respondents to each question of the questionnaire was considered which allowed finding the percentage and using the analysis of quantitative data to identify trends in the questions studied and make their characteristics.

Results of the research and their discussion

Results of determining the specifics of using gymnastic terminology by teachers and assessing their level of terminological competence are presented in the table.

According to the results of the questionnaire it was revealed that 98,2% of teachers (85 respondents) have a common opinion that the knowledge of gymnastic terminology is necessary in their professional activities. But, in practice, it is used by 87,4% of teachers (76 respondents). At the same time, 93,1% of teachers say that this makes it possible to strengthen the quality of the teaching process of any modules, namely, it contributes to better memorization of exercises, more effec-

Determination of the level of terminological competence of teachers of comprehensive schools in Kharkiv (based on the results of the survey), n=87

No. i/o	Questions of the questionnaire	Results	
		m	%
1	**Do you think that the knowledge of gymnastic terminology is necessary in the professional work of the teacher?**		
a	Yes	85	98,2
b	No	2	1,8
2	**When conducting physical education lessons, do you apply gymnastics vocabulary?**		
a	Yes	76	87,4
b	No	0	0
c	Partially	11	12,6
3	**Do you think that the use of gymnastic terminology contributes to the quality of physical education lessons?**		
a	Yes	81	93,1
b	No	6	6,9
4	**How do you assess your level of gymnastic terminology?**		
a	High	7	8,1
b	Sufficient	50	57,4
c	Low	21	24,2
d	I can not answer	9	10,3
5	**In your opinion, the use of gymnastic terminology affects** (*several answers were noted*):		
a	Quality of training (mastering the technique of performing exercises, implementing the tasks of the lesson or training, etc.)	80	92,0
b	Facilitating communication between the trainer, teacher and student	19	21,8
c	Facilitating the explanation of exercises	77	88,5
d	Increase of motivation for studies	30	34,5
e	Your option	6	6,9
6	**What difficulties do you have when using gymnastic terminology when conducting physical education lessons** *(several answers were noted)*?		
a	I can not clearly and briefly explain the motor task (I use verbosity)	31	35,6
b	I do not know the terminological names of the exercises, the starting points	9	10,3
c	I'm confused in the teams	7	8,4
d	I can not compile and write a summary of the physical culture lesson	35	40,2
e	Your option	5	5,7
7	**Do you think that you need to improve your level of terminology competence?**		
a	Yes	78	89,7
b	No	4	4,6
c	I do not know	5	5,7
8	**Do you think that students need to know the basics of gymnastic terminology and this is an important factor in the conduct of the educational process?**		
a	Yes	71	81,6
b	No	8	9,2
c	I do not know	8	9,2
9	**If you think that you need to improve your level of terminology competence, then at the expense of** (*several answers were noted*):		
a	study of special methodical literature	67	77,0
b	holding special methodical sessions, seminars, round tables, conferences, debates	45	51,7
c	Your option	13	15,0

Remark. *n – total number of teachers; m - number of answers to the questions of the questionnaire by teachers.*

tive instruction in the technique of their implementation, discipline in class. It is alarming that 9,2% of teachers believe that the knowledge of gymnastic terminology is not necessarily in their professional work, and 12,6% of teachers use gymnastic terminology in part in the teaching process. It is interesting that there is a dissenting opinion among 13 teachers (15%) of 87 respondents who believe that the use of gymnastic terminology in conducting physical education lessons is not necessary and a sufficiently experienced teacher can qualitatively conduct professional activities practically without the use of terms, with the exception of several commands and titles exercises or elements by sport. The study found that 6,9% of teachers believe that the use of gymnastic terminology does not contribute to the quality of physical education lessons. Teachers argue that instead of terminological commands and necessary explanations they use a whistle, makes it easier to conduct a lesson, promotes discipline and minimizes the use of gymnastic terminology. Teachers note that they most often use the whistle when conducting lessons, when two classes are engaged simultaneously in the hall and it is very difficult to give commands in this situation in this situation. Over time, the constant use of the whistle becomes a habit, and the significance of terminology decreases.

The analysis of the questionnaire revealed that 50 teachers (57,4%) state that the level of terminological competence in them is sufficient for the qualitative conduct of physical education lessons. But observations in physical education lessons did not confirm this: the actual level is much lower. The study showed that only 8,1% of teachers consider their level of mastery of gymnastic terminology high; 24,2% define their level as low; 10,3% of teachers could not determine their level. But all the respondents acknowledged the need to improve it by conducting special methodological sessions, seminars, round tables, conferences, debates, studying scientific and methodological literature. In the opinion of only 13 teachers out of 87 respondents, in order to effectively improve their level of terminological competence, it is necessary to regularly monitor the knowledge of terminology after carrying out the above-mentioned activities.

All respondents note that it is very difficult to master gymnastic terminology perfectly. Analysis of the survey and the results of the table shows that most problems arise when explaining the starting positions; not all teachers correctly submit commands; admit mistakes in explaining gymnastic combinations; do not always know how to disassemble and correctly communicate to the students program exercises in sports; make a lot of mistakes in the notes of lessons when writing general development and program exercises used in training modules. In this case, the main mistakes in terminology are most often noted such as verbosity and inaccuracies in explanation, distortion and confusion of terms, negatively affects the quality of the lesson [14].

On the question of the questionnaire about the possession of pupils in gymnastic terminology, 71 teachers (81,6%) answered that the students need to know the basics of gymnastic terminology and this is an important factor in the conduct of the educational process. Survey of teachers and observation of physical culture lessons revealed a positive trend in the practice of involving students in self-assembly and conducting complexes of general developmental exercises for evaluation precisely using gymnastic terminology, involving students in competitions for the best conduct of various complexes of GDE (with or without objects for the development of physical qualities and others) [4; 5]. The majority of the teachers surveyed noted that independent gymnastic exercises contribute to increasing students' self-esteem, improves their motivation for physical education lessons, introduces the element of competition, develops teamwork skills and is a means of encouraging children to learn physical culture. It is interesting to note that attendance of such lessons, where students can independently carry out exercises and encouraged for this good grades, significantly increased [5; 6; 14].

But, despite the important role of using terminology in the lessons of physical culture, its component in the lesson decreases every year. This, in the first place, is due to the fact that less and less in the schools of the city of Kharkov in the lessons of physical culture applies the module of gymnastics. Namely, he traditionally forced teachers to use more gymnastic terminology in the classroom. This trend spread with the introduction in 2009 of a modular system that enabled the teacher to plan modules for the school year independently [14; 17; 19], and in connection with the complexity and trauma of this module, teachers are not interested in including it in the plans for classes. This led to the fact that at present in many schools in the city of Kharkov the gymnastics module is not planned at all, and as a result, the quality of using gymnastic terminology in physical education classes has received less attention and its educational and methodological has significantly decreased. The survey of teachers revealed a number of other reasons that affect the level and quality of using gymnastic terminology in physical education classes. Most teachers note that an important reason is that during the training in sporting terminology, little attention is paid to the sports terminology, and further, when the young specialist starts to work in the specialty, there is not always a competent employee who can correctly correct mistakes and professionally help him in improving terminological literacy. Also among the reasons for the teacher called family circumstances, a long break, which prevents them from working on their specialization immediately after graduation. Also, a significant reason for the teacher is the lack of control over the quality of terminology use during the educational process: on the one hand, from the school administration, and on the other, the pupils do not require the terminological competence and the quality of its use from the teacher. A significant number of teachers emphasize that in their school the administration refers to physical culture lessons as a not very important activity, and the professional level of physical education lessons is not controlled. At the same time, the most attention is paid to the design of various documents, it takes a lot of time and does not allow you to prepare at a sufficient level for the lesson.

Teachers also note that it is very difficult to study gymnastic terminology, emphasize the complexity and large amount of material, and if there is a break in the practice of its use, the terminology is forgotten and knowledge can be restored only provided that practical training and use of educational materials on this topic. Most teachers note that the level of possession of gymnastic terminology is influenced by the basic knowledge that they received while still in physical education classes, especially in junior and high school. If the teacher in the classroom professionally used gymnastic terminology and required his knowledge from the students, then during the years of studying at school she was very memorable, and in the further professional activity acquired the important value and significantly contributed to the improvement of the level of personal professional competence. Also a significant reason for neglect of gymnastic terminology teachers is low wages. Also, the analysis of the survey showed that the level of possession of gymnastic terminology is influenced by sports specialization of the teacher. It was found that representatives of such sports as martial arts, boxing, sports games, tourism assess their level of possession of gymnastic terminology as medium and low. Representatives of gymnastic sports traditionally rate their level as average and high. Pedagogical observations confirmed that teachers who have a specialization related to gymnastic sports really have sufficient knowledge of terminology and effectively apply it in physical education classes, and teachers - representatives of «non-hymen» sports own it at a much lower level.

An important reason for the lack of knowledge of sports (in particular, gymnastic) terminology, most teachers (58 of 87) call the fact that the actual curriculum for physical education, namely, state requirements for the level of general education of students does not provide for their knowledge of the terms, in particular, gymnastic exercises, which in turn gives the teacher the opportunity not to pay attention to terminology in general, despite the fact that they all recognize the need for its application.

Despite the fact that the program is constantly updated, it is supplemented by a large number of modern requirements,

tasks and recommendations, and new modules are constantly added to it, the level of physical education lessons is getting worse every year. The practical material of the program has not been revised for a very long time and at present a lot of exercises and tests do not correspond to the level of preparedness and health indicators of students. About the questions of terminology in the program does not even go. Unfortunately, in it the terminological errors occur.

Careful analysis of the updated curriculum on physical culture for general education schools (for grades 5–9) [17] found that it included new, unconventional and unusual for schoolchildren and teachers training modules such as «corfball», «cheerleading», «Military sports games» and others. Even in them, in the chapter «theoretical information» we are not talking about the terminology of the sport. In the explanatory note of the updated program, the specified contribution of the subject «physical culture» to the formation of key competencies of students. One of them is «communication between the state (and native in case of difference) languages», which is a component of the formation of students' ability to «correctly use the terminological apparatus, communicate in various situations during physical education and sports, communicate through conflicts, culture and sport by language means. At the same time, the training resources recommended by the updated program include the study of Ukrainian sports terminology [17]. But the analysis of the program material in the training modules has revealed that there is practically no terminology in them, and it is practically impossible to form the necessary competence, since the content of the educational material of all modules does not provide for the study of terms, in particular, Gorodki, Fencing and Sport orienteering, where in the known component it is offered to know the basics of the terminology of these sports. The module «Gymnastics», applied in the main school, is called up, where the theoretical information was included in the section «The content of the educational material» without questions from the gymnastic terminology. In practical material, which includes special physical training, exercises on gymnastics instruments, acrobatics exercises and others, the gymnastic terminology of the language also does not go, although it is impossible to carry out these exercises effectively without knowledge of special terms. At the same time, the section «Expected results of educational and cognitive activity of students» is focused on qualitative assimilation of knowledge, skills and skills of the presented material [17]. Therefore, without the revision of the school curriculum on physical culture, the main document that is always used by both an experienced and a novice teacher, it is impossible to change the existing situation.

Conclusions

Based on our research, it was established that knowledge and skilful use of terms testifies to the level of terminological competence of the teacher of physical culture. Despite the important role of the use of terminology in physical education lessons, its component in the lesson decreases every year, which is why the elimination of the gymnastics module largely contributes to it. The level of possession of gymnastic terminology for each specialist is individual and very often requires an increase. Observing the terminological competence of teachers in physical education classes revealed some significant terminological mistakes in the presentation of the training material. There was revealed a positive trend in the practice of attracting students to self-assembly and conducting complexes of general development exercises using gymnastic terminology. A number of reasons were identified that, in our opinion, significantly affect the level of terminological competence of teachers and are reflected in the quality of professional activities in general. The results of pedagogical observations revealed that teachers, representatives of sports and rhythmic gymnastics, acrobatics better know gymnastic terminology and apply it professionally enough in physical education classes than teachers specializing in single combats, boxing and sports games.

Thus, the results of the whole complex of studies carried out confirm the conclusions of many specialists that, despite the rather long time of application of gymnastic terminology in physical education, the quality of its use is not improving today, but, on the contrary, it is deteriorating noticeably [9–11; 14]. The conclusions of I. B. Grinchenko [3], E. S. Vilchkovsky [2], S. A. Mekhonoshin [18], M. M. Zheleznyi and V. V. Chernyakova [27], V. I. Malets [16], N. M. Kovalchuk and V. I. Sanyuk [9] and other scientists on the existence of problems related to the level of readiness of physical education teachers for the implementation of professional activities. The results of our research supplement the data of scientific works of N. M. Kovalchuk and V. I. Sanyuk concerning the insufficient level of terminological competence in teachers of physical culture and confirm the conclusions of these specialists about the necessity of knowledge of gymnastic terminology not only by teachers but also by pupils as part of professional readiness teachers of physical education [9–11; 13]. Confirmed data A. Kh. Deineko on increasing the motivation of students to physical education lessons, provided they are involved in self-assembly and conducting complexes of general development exercises for evaluation and competitions for the best complex [4; 6; 7]. But quantitative data on the specifics of teachers' use of gymnastic terminology in the lessons of physical culture and the level of possession of it in the work of specialists are not presented. Also, for the first time, the reasons that led to the current decline in the role of gymnastic terminology in physical education lessons are considered; identified factors are essential, necessary for lighting and require their elimination.

Prospects for further research. In subsequent studies it is planned to find out the level of knowledge of sports terminology by coaches in various sports.

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References

1. Borovska, O.V. (2003), *Korotkyi tlumachnyi slovnyk terminolohii haluzi fizychnoi kultury ta sportu* [Short Interpretative Dictionary of Terminology of the Field of Physical Culture and Sports], Lviv. (in Ukr.)

2. Vilchkovskyi, E.S. (2002), "Professional orientation of training of specialists in physical education", *Rozvytok pedahohichnoi i psykholohichnoi nauk v Ukraini 1992-2002: zb. nauk. prats do 10-richchia APN Ukrainy, Ch. 2* [Development of pedagogical and psychological sciences in Ukraine 1992-2002: Sb. sciences Works for the 10th anniversary of the Academy of Pedagogical Sciences of Ukraine, Part 2], Academy of Pedagogical Sciences of Ukraine, OVS, Kharkiv, pp. 301-309. (in Ukr.)
3. Hrynchenko, I.B. (2011), "Professional training of future teachers of physical culture in new conditions", *Vyshcha osvita Ukrainy u konteksti intehratsii do yevropeiskoho osvitnoho prostoru*, Dod. 3, T 7, Hnozys, Kyiv, pp. 84-93. (in Ukr.)
4. Deineko, A.Kh. (2015), "Basic gymnastics as the basic component of the invariant component of the school curriculum on the subject Physical Culture", *Slobozans`kij naukovo-sportivnij visnik*, No. 47(3), pp. 30-34. (in Ukr.)
5. Deyneko, A.Kh. & Krasova, I.V. (2015), *Kompleksy obshcherazvivayushchikh uprazhneniy v sisteme fizicheskogo vospitaniya* [Complexes of General Developing Exercises in the Physical Education System], KhGAFK Kharkov. (in Russ.)
6. Deineko, A.Kh. (2016), *Formuvannia kultury rukhovoi diialnosti v uchniv p'iatykh ta shostykh klasiv zasobamy osnovnoi himnastyky: avtoref. dys. kand. ped. nauk* [Formation of a culture of motor activity in pupils of the fifth and sixth forms by means of basic gymnastics: PhD thesis abstract], Lvivskyi nats. Universytet, Lviv, 20 p. (in Ukr.)
7. Deineko, A.Kh. (2014), "Increasing the motivation for physical education classes for 5-6 grade students", *Slobozans`kij naukovo-sportivnij visnik*, No. 4(42), pp. 26-30. (in Ukr.)
8. Zaitseva, V.M. (2004), *Suchasna sportyvna terminolohiia: navch. posib.* [Modern Sports Terminology], Kyiv. (in Ukr.)
9. Kovalchuk, N.M. & Saniuk, V.I. (2006), "Modern problems of using terminology of general development exercises in school", *Fizychne vykhovannia u shkoli*, No. 2, pp. 35-43. (in Ukr.)
10. Kovalchuk, N.M. & Saniuk, V.I. (2007), *Zahalnorozvyvalni vpravy ta yikh konstruiuvannia* [General development exercises and their design], Volyn. NU them Lesia Ukrainka, Lutsk. (in Ukr.)
11. Kovalchuk, N.M. & Saniuk, V.I. (2013), "Use of general-development exercises at school", *Fizychne vykhovannia u suchasnii shkoli*, No. 1, pp. 21-23. (in Ukr.)
12. Kolomoiets, H.A. (2012), "Teacher-practitioner, innovator-professional", *Fizychne vykhovannia v suchasnii shkoli,* No. 2, pp. 29-33. (in Ukr.)
13. Kovalchuk, N.M. & Hnitetska, T. (2014), "On the issue of drawing up the plan, the abstract of the lesson: to help the teacher", *Fizychne vykhovannia v ridnii shkoli*, No. 1 (89), pp. 21-24. (in Ukr.)
14. Krasova, I.V. & Deineko, A.Kh. (2017), "Possibility of qualitative teaching of physical culture without terminological competence", *Molodyi vchenyi: intehratsiini pytannia suchasnykh tekhnolohii, spriamovanykh na zdorov'ia liudyny. Materialy I mizhnar. molodizh. nauk-prakt. konf., 2017 berez. 17–18*, Kharkiv, KhSAPC, Kharkiv, pp. 248-251. (in Ukr.)
15. Kurtova, H.Yu. (2011), "Analysis of the modern system of professional training of teachers of physical culture", *Visnyk Chernihivskoho natsionalnoho pedahohichnoho universytetu imeni T. H. Shevchenka, Seriia: Pedahohichni nauky*, No. 83, pp. 123-127. (in Ukr.)
16. Malets, V.I., Zheliznyi, T.I., Kharchenko, M.M. & Cherniakov, V.V. (2006), *Himnastychna terminolohiia: navch. Posibnyk* [Gymnastics Terminology: Teaching. manual], ChSPU, Chernihiv. (in Ukr.)
17. Ministry of Education and Science of Ukraine (2017), Methodical recommendations for the teaching of physical culture in the 2017/2018 academic year. Normative legal support of physical culture. Annex to the letter of the Ministry of Education and Science of Ukraine dated 09.08.2017 № 1 / 9-436, available at: http://mon.gov.ua/activity/education/zagalna-serednya/navchalni-programi-5-9-klas-2017.html. (in Ukr.)
18. Mekhonoshyn, S.O. (2011), «Technological modeling of exercises for exercises in gymnastics classes», *Suchasni problemy fizychnoho vykhovannia i sportu shkoliariv i studentiv Ukrainy: materialy KhI Vseukrainskoi naukovo-praktychnoi konferentsii molodykh uchenykh z mizhnarodnoiu uchastiu, 2011 kvit. 28-29; Sumy, Sum. DPU im. A. S. Makarenka*, Sumy, T. 1, pp. 107-113. (in Ukr.)
19. Mullagildina, A.Ya., Krasova, I.V. & Marchenkov, M.K. (2015), "Motivation of pupils of 7-8th forms to gymnastics", *Slobozans`kij naukovo-sportivnij visnik*, No 6(50), pp. 5-7. (in Russ.)
20. Olefir, H.V. (2011), "The problem with the problems of the vocational training of the Maybutn teachers of the phisic culture", *Naukovyi visnyk Donbasu*, available at: http://nbuv.gov.ua/UJRN/nvd (accessed by 17.10.2017). (in Ukr.)
21. Osadchy, V.V. (2009), "Modern Requirements for the Training of Future Teachers", available at: http://vuzlib.com/content/view/354/84/ (accessed by 24.10 2017). (in Ukr.)
22. Saliamin, Yu.M., Tereshchenko, I.A., Prokopiuk, S.P. & Levchuk, T.M. (2010), *Himnastychna terminolohiia* [Gymnastics Terminology], Olimp. l-ra, Kyiv. (in Ukr.)
23. Serhiienko, L.P. (2011), *Terminy i poniattia u fizychnii kulturi* [Terms and Concepts in Physical Culture], Navchalna knyha – Bohdan, Ternopil. (in Ukr.)
24. Sushchenko, L.P. (2003), *Teoretyko-metodolohichni zasady profesiinoi pidhotovky maibutnikh fakhivtsiv fizychnoho vykhovannia ta sportu u vyshchykh navchalnykh zakladakh: avtoref. dys. d-ra ped. nauk* [Theoretical and methodological principles of training of future specialists of physical education and sport in higher educational institutions: Doct. of Sci. thesis abstract], Kyiv, 46 p. (in Ukr.)
25. Trehubova, H. (2004), "Culture of Professional Speech", *Osvita, tekhnikumy, koledzhi*, No. 4, pp. 72-76. (in Ukr.)
26. Khomenko, I.M. & Hlazyrin, I.D. (2008), "Sports terminology - the basis of professional broadcasting of a specialist in physical culture", *Pedahohika, psykholohiia ta medyko-biolohichni problemy fizychnoho vykhovannia i sportu*, No. 7, pp. 143-146. (in Ukr.)
27. Cherniakov, V.V. & Zheliznyi, M.M. (2015), "On the issue of terminological competence of the teacher of the faculty of physical education", *Visnyk Chernihivskoho natsionalnoho pedahohichnoho universytetu*, No. 117, pp. 163-164. (in Ukr.)
28. Cherpak, Yu.V. (2012), "Methodical Preparedness of a Teacher to a Lesson of Physical Culture: Actual Issues, Reference, Advice", *Fizychne vykhovannia u suchasnii shkoli*, No. 6, pp. 18-21. (in Ukr.)

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Effect of ergotherapy on the level of self-care of children with cerebral palsy

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Purpose: *form a block of ergotherapy for children with cerebral palsy, supplement it with a program of physical rehabilitation and determine its utility in increasing the level of self-service.*

Material & Methods: *analysis and generalization of foreign and domestic special scientific and methodological literature; pediatric assessment of activity limitations (PEDI). The contingent of subjects – 106 children 4–6 years old, 54 of them with spastic hemiplegia and 52 with spastic diplegia. Methods of physical therapy were included in the exercises with control groups. The main groups received a part of the modified standard procedures, and the key difference was the use in the main groups of ergotherapy, namely targeted therapy.*

Results: *purpose of ergotherapeutic interventions was to achieve the maximum possible activity of the child. Purposeful therapy required a priority analysis of the task, the environment of performance and the capabilities of the child. Procedures for targeted therapy were built from occupations that included a specific task algorithm. According to the final results, the main groups had significantly better results in a number of items in the self-service section of PEDI.*

Conclusions: *use of targeted therapy in conjunction with physical therapy has advantages in improving self-service level, compared with the standard protocol of physical therapy.*

Keywords: *ergotherapy, recovery, functioning, activity, participation, physical activity, exercise.*

Introduction

Physical rehabilitation of the children's contingent is an important social problem [1; 2]. One aspect of rehabilitation in pediatrics is infantile cerebral palsy (cerebral palsy). Rehabilitation approaches among children with cerebral palsy are complex and comprehensive. Rehabilitation programs are complemented by medical and surgical procedures, physical therapy, ergotherapy, language therapy, recreational activities, school adaptation and training, psychosocial support, the use of orthoses and other adaptive equipment [9; 10].

In modern conditions, the process of formation of executive skills and physical therapy and ergotherapy in children with infantile cerebral palsy requires the mastery of foreign experience [7], the creation of new guidelines for social rehabilitation and the application of an interdisciplinary approach [7; 5, 12; 11], taking into account the polymorphism of clinical manifestations and the complexity of the pathogenesis of cerebral palsy [9; 13; 3], as well as the availability of creative approach from specialists [5].

Relationship of research with scientific programs, plans, themes. The work was carried out in accordance with the "Summary plan of research in the field of physical culture and sports for 2011–2015". On topic 4.4 "Improving the organizational and methodological foundations of programming the process of physical rehabilitation for dysfunctional disorders in different systems of the human body" (state registration number 0111U001737) and the NUPCS research plan for 2016–2020 on the topic: 4.2. "Organizational and theoretical and methodological basis for physical rehabilitation of persons of different nosological, professional and age groups", number of state registration 0116U001609 for the period 01.16.2017 – 30.12.2017.

Purpose of the study was to form a block of ergotherapy for children with hemiplegic and diplegic forms of cerebral palsy, to supplement the program of physical rehabilitation and to determine its utility in increasing the level of self-service.

Material and Methods of the research

The materials were obtained during the research on the basis of the Kyiv city center for the rehabilitation of children with disabilities (main groups) and the Special Educational and Educational Complex "Dream" (Kyiv) (control groups). The contingent of subjects – 106 children 4–6 years old, 54 of them with spastic hemiplegia (HP) and 52 with spastic diplegia (DP). The main groups that were involved in the developed program included 28 children with DP (MG1) and 27 with HP (OG2). Differences between the main and control groups at the beginning of the course of therapy were not revealed. In order to assess the significance of the difference, in the presence of a normal distribution of the results of the studies, the Student's t-test (for independent or for dependent groups) was used, and for the indicators, the distribution was different from the normal one, using the Mann-Whitney U test (for independent groups) and the Wilson test (for dependent groups).

Children underwent a course of restorative treatment. The following procedures and techniques were included in the exercises with the control groups: bimanual training, unimunal training, therapeutic gymnastics, massage, games. The main groups received a part of the modified standard procedures: constraint-induced movement therapy (CIMT), bimanual training (bimanual intensive training), complex therapeutic gymnastics. The key difference was the use of ergotherapy in the main groups, namely goal-directed training (GDT), which required the transfer of mastered movements in the practice of daily life (Activities of Daily Living) and the instrumental ac-

tivity of everyday life (Instrumental Activities of Daily Living).

The duration of the course was 30 days, 22 of which were filled with Ergotherapy and physical therapy. The duration of therapy per day was the same in groups and was 6 hours.

Research methods: analysis of scientific literature, synthesis and generalization; Pediatric Evaluation of Disability Inventory (PEDI).

The main hypothesis: the use of targeted and modified therapy in accordance with modern provisions of techniques from the standard protocol can better improve the self-care of children with cerebral palsy.

Results of the research and their discussion

Aim of the ergotherapeutic measures was to achieve the maximum level of employment and independence in the occupations of its spheres. The program is constructed taking into account the analysis of published sources [4–6; 13]. The terms used in the work were translated and put into circulation by A. A. Mangushev.

Targeted therapy (or targeted functional therapy, targeted activity-based therapy), conducted with children, required priority analysis, task analysis, fulfillment and activity demands and child's opportunities. On the possibility of modification, then adapt the environment and adjust the structure of the task easier than the features and abilities of the child. Adaptation of the environment and tasks contributes to improving the efficiency of implementation and, in general, the rehabilitation process.

Classes of purposeful functional therapy were built on certain activities (activities), including a certain algorithm of tasks is a sequence of actions. This approach made it possible to form an effective program of the movement for the task, which, along with the quality requirements, determined the final result of the purposeful activity. Thus, a certain occupation must be productive, and the child must see the results of his work in a particular object, product, or job. Executive knowledge and skills training activity formed due to the formation of a good idea of the tasks, actions and their significance, working in a passive-active form (with the participation of the ergotherapist and later the parents) with a gradual transition to the active.

There was a demand that the child should gradually reach the certain ergotherapist and solve problems independently by performing an algorithm of actions. So, the role of the ergotherapist passed to the control of the process of performing operations and only then the result.

It was taken into consideration that variants of the ability to use the brush in a more preferable, rational manner are possible, and the brush function itself can undergo slight changes.

At the beginning of the course, skills were more easily formed, and later complicated ones: in particular, use a spoon and later with a fork; it is more difficult to wash than wash your hands; to undress easier than to dress. Moderate growth of requirements contributed to the formation of self-reliance and sustained interest.

During the training, attention was paid to: the child's attitude to action, the presence of interest; teach little by little; learning from the last elements – movement is performed with the help, and the last element itself; combination of game with discipline; variable of specialists to prevent attachment to certain circumstances or people.

On the peculiarities of purposeful training (GDT), it can be noted that they are similar in some characteristics to the methodology of SMART goals. The main characteristics of GDT: activity is associated with goals (the goals of children / families are realistic and possible), factors that limit (on the part of the child, the environment, the goal itself), attention to the characteristics of the result and the reasons for making appropriate corrections in the task or the environment.

That is, the child's desire to learn a particular activity or improve it was at the heart of the formation of the goal.

The purpose-oriented therapy program focuses on: 1-activity of daily life (self-care and personal hygiene) 2 instrumental activity of daily life (household help / work).

Since it was desirable that the training activity take place on the basis of actual necessity, the organization of the classes was planned taking into account the combination of all directions. For example, using the bath before and after eating, dressing up contaminated when eating or drawing clothes.

To create these aspects of the activity, special equipment and premises (or zones) were used: furniture, utensils and household implements; specially equipped rooms (kitchen, bathroom, toilet room, locker room) a corner of wildlife; comfortable workplaces, work samples, children's sets of materials and tools for creativity, natural material.

The assimilated movements during the physical therapy sessions were transferred to the practice of daily life activity and the instrumental activity of everyday life. For example, the capture of objects with the entire palm of your hand when working with a brush, glasses, comb, sometimes with spoons; contrasting the thumb to the rest when working with some types of faucets in the bathroom, clothespins, keys, tassels; messages of the ability to capture and turn the brush when opening the doors.

The task of ergotherapy in the activity of everyday life:

– to promote the formation of the skill of independent food intake with the aspect of using cutlery and table etiquette;

– to promote the formation of personal hygiene skills;

– contribute to the formation of dressing and undressing skills (mittens, skirt, trousers, tights, hat, shoes);

– to promote the formation of skills to use the toilet;

– to promote the formation of skills in using light switches, door locks and latches, and a telephone.

In the teaching of eating habits, spoons with special shapes and pens were used; tables and chairs of the appropriate size; stand for feet support elastic tubes, a cup with two handles, an ordinary cup for gradual increase in complexity. Thus, ways of capturing and holding containers, drinking from them were

formed. In addition, a connection was formed between eating and washing hands before and after, using a handkerchief.

For example, increasing the independence in eating can be due to the fact that the ergotherapist will no longer hold the child's brush with a spoon, but will hold his hand. To the child with cerebral palsy, the spoon rose always in front and was located along the midline of the body, and by no means from the side. After the entire trajectory with the spoon was performed several times with the ergotherapist, the following movements were performed without holding the child's hand at the end of the movement (the spoon almost at the lips). Thus, the child is easier to learn to complete the action.

On the features of improving self-intake of food in children with diplegic form, attention was paid to the position and balance of sitting. And in children with a hemiplegic form for the presence of activity and focus on one hand, caused an incorrect position and associative movements. If necessary, held by the shoulders, pressing the chest (to stimulate the correct position of the head). The help in overcoming the asymmetric character of the movements passed as the positioning of the free hand: put on the table or under it, across the stomach, the brush is rotated outwards.

The main thing in the training was the division of classes into small steps that were not higher than the child's ability and with which it was much easier to cope on their own. That is, the analysis of the task (taskan alysis). For example, the formation of the skill of individual hygiene began with the lightest elements – roll up (pidtyanuty) sleeves, moisten your hands, rub your hands. Subsequently, the opening and closing of the cranes, the use of soap and towels, washing, using the comb.

In order to better form the skills of using the toilet, the room was equipped with special handles that were attached to the side wall and helped to move to a sitting and standing position, a stable footrest and various removable toilet seats. It is important that the child can get toilet paper on his own, and the handle or the water wash button was adapted to the child's capabilities.

The skills of independent stripping were formed initially with clothes without buttons, lightnings and other fasteners (hat, t-shirt, sweater, gloves). Like other activities, dressing and undressing are complex, even one of the most difficult for children with cerebral palsy, because they require a balance, good visual-motor coordination, the ability to reach the object, brothers and release, fix the position of the hands, good fine motor skills.

In addition, in the process of forming skills to put on and take off clothes, if necessary, the child's concept of the sides and parts of clothing (front or back, top or bottom.

General rules for teaching a child the skills to dress and take off his clothes: selecting the optimal position to reduce spasticity and uncontrolled movements; try to maintain the symmetry of the position of the child at the beginning and in the process; the position of the child should be convenient for the specialist (height, slope of the surface) and safe for the child; maximum participation of the child in accessible movements.

To provide the correct position to the hands and the body in general when the sitting position is flexed (in the shoulder joints, the internal rotation, hands are pressed to the trunk, the legs are not bent sufficiently, the back is round), the following procedure was performed: take the child by the arms from the outside of the elbows and above them; raise and return the arms outward with one careful movement, pulling the child (towards the child) towards him - for straightening the back, raising the head, better bending of the legs and a more functional position of the hands. This allowed properly putting on the sleeve and forming the right skill.

If the child is unable to keep the balance sitting (on the floor or chair) and simultaneously perform manipulations with his hands while dressing / undressing, techniques were used to provide better stability in the form of supporting points of the hip joints, hips, knees or feet.

We used a way of self-maintaining balance when dressing / undressing with a chair. So, the child sat face to back with his feet lowered under the backrest on the pedestal (stand), and her hands alternately maintained a balance when training skills with clothes for the upper body.

With poor ability to maintain balance in the sitting position, there was also an option of dressing / undressing while lying down, sitting against a wall or in a corner. In particular, the lying on the side and the bridge for dressing the pants were used. The position sitting against the wall or in the corner was used when dressing socks, trousers, and shoes.

Manipulations with buttons, zippers, means of fixation shoes were trained on clothes of special dolls or ergotherapist, stands with buttons and fasteners. Initially, large buttons and other fasteners were used. It was mastered the use of comfortable in height hangers, cabinets. Improvement in the ability to plan the algorithm of actions in this activity occurred with the use of games.

The ergotherapist provides a sufficient level of explanations about the importance of self-service skills, ergonomic methods of problem solving, forms a presentation by own example (demonstration) and joint execution, creates situations of neatness formation, emotional-aesthetic sensitivity, and criteria for evaluating the result. That corresponds to the stages of development of everyday skills in such children: the formation of motivation (interest, needs, responsibilities) and value attitude to skills of self-service and self-realization; creation of a system of knowledge and ideas; transfer of theoretical knowledge to use in practice.

In general, as in solving problems of self-service, and other directions of ergotherapy, the ergotherapist had elements (show, push to action with his help, cheer, wait, praise for diligence), periodically repeated.

If the child has a desire to do everything himself by virtue of his abilities, the ergotherapist provided only the necessary assistance, and never performed the movements that had already been mastered instead of the child. Rehabilitants showed what exactly he should do, and if necessary help through the movements of his hands and body.

The task of ergotherapy on the instrumental activity of everyday life was aimed at mastering the skills and abilities that were necessary for the opportunity:

– participation in the maintained cleanliness of the classrooms;

– participation in the maintenance of order in toys, the arrangement of furniture (in particular, toy), the cleanliness of dishes;

– participation in the organization of planned activities and activities in accordance with the schedule (preparation of equipment and materials for classes, food intake, decomposition, washing plates, etc.);

– participation in the care of plants (watering, changing the location, transplanting) and animals (feeding, monitoring environmental conditions) in the nook of wildlife;

– participation in cooking, decomposition and washing products.

The program developed had a number of advantages in influencing the self-care of children in PEDI (Table). Thus, the children of the main groups were statistically different from the control groups by a large number of items, which was not noted at the first examination.

In particular, under the item "Consistency of food consumed", all four groups had significant positive changes ($p<0,01$). However, there were no statistical differences between MG1 and CG1, MG2 and CG2 ($p>0,05$), which indicates the same effectiveness of the programs that were used. Thus, the average value in MG1 increased by 0,46 to 2,6±0,62 points, in CG1 – by 0,58 to 2,9±0,69 points, in MG2 – by 0,41 to 3,1±0,75 points, in CG2 – by 0,28 to 3,2±0,72 points.

Analysis of the results of the item "Use of dishes for eating" noted the presence of significant changes in all groups ($p<0,01$). In addition, statistically significant differences were found between MG1 and CG1 ($p<0,05$), MG2 and CG2 ($p<0,01$). The dynamics of mean values among children with hemiplegia was as follows: in the MG1 group, the increase was 1,29 points, and the rate of 2,9±0,94 points in the group CG1 was 0,58 points and the index was 2,3±0,78 points. In the groups of children with diplegia, the mean values were as follows: MG2 3,3±0,67 points, CG2 2,7±0,69 points, and the increment was respectively 1,22 points and 0,56 points. Such dynamics showed a more positive effect of the developed program among children of the main groups on the ability to use a spoon, fork and knife.

The analysis of the changes based on the results of the item "Use of Drinking Capacities" noted the presence of significant changes among groups of children with both hemiplegia and diphtheria: MG1 ($p<0,01$), CG1 ($p <0.01$), MG2 ($p<0,01$), CG2 ($p<0,05$). The dynamics of mean values among children with hemiplegia was as follows: in the MG1 group, the increase was 0,93 points, and the score 3,5±0,92 in the group CG1 was 0,46 points and the index was 2,5±0,94 points. In the groups of children with diplegia, the mean values were as follows: MG2 – 3,7±0,86 points, CG2 – 3,0±0,82 points, and the increment, respectively, was 0,67 points and 0,32 points. Also statistically significant differences were found between MG1 and CG1 ($p<0,01$), MG2 and CG2 ($p<0,01$), which confirmed the statistically more positive effect of the developed program in the main groups of children on the ability to hold, raise a bottle or drink, pour liquid into a cup or glass.

At repeated estimation the received parameters for performance of a point of "cleaning of a teeth" has been established at a level 3,1±0,86 points among children of group MG1 and 2,4±0,86 points among children of group CG1. In the groups of children with diplegia, mean values were established and at the levels of 3,3±1,00 points and 2,7±0,79 points in MG2 and CG2, respectively. The increase in the indices of the mean values was: MG1 – 1,0 CG2 – 0,46 points; MG2 – 1,15 points; CG 2 – 0,52 points. Thus, the analysis of the dynamics of the results of the point "tooth cleaning" noted the presence of reliable changes in all groups ($p<0,01$), that testifies to the positive impact of both intervention programs on the features of forming skills to open the mouth for cleaning teeth, hold the toothbrush and prepare it, brush your teeth. However, at the time of reassessment, significant differences were found between MG1 and CG1 ($p<0,01$), MG2 and CG2 ($p<0,05$), which confirmed a statistically more positive effect of the developed program in the main groups of children compared to control.

Analysis of the results of the item "Hand hygiene" stated the presence of significant changes in all groups of children ($p<0,01$). In addition, statistically significant differences were found between MG1 and CG1 ($p<0,05$), MG2 and CG2 ($p<0,05$). The dynamics of mean values among children with hemiplegia was as follows: in the group MG1, the increase was 1,43 points, and the index 3,4±1,06 points in the group CG1, the increase was 0,69 points, and the index was 2,81±0,84 points. In the groups of children with diplegia, the mean values were as follows: MG2 – 3,6±0,74 points, CG2 – 3,1±0,78 points, and the gain in the groups was 1,11 points and 0,68 points, respectively. Such dynamics showed a more positive effect of the developed program among children of the main groups on the ability to hold hands, rubbing hands together, turning water on and off, using soap, washing thoroughly and wiping hands.

The carried out analysis of changes based on the results of the paragraph "Body and face washing" noted the presence of significant changes among groups of children with both hemiplegia and diplegia ($p<0,01$). The dynamics of mean values among children with hemiplegia was as follows: in the MG1 group, the increase was 1,46 points, and the score 2,4±1,16 points in the CG1 group was 0,65 points, and the index was 1,7±0,94 points. In the groups of children with diplegia, the mean values were as follows: MG2 – 2,4±1,12 points, CG2 – 1,7±1,10 points, and the increment was respectively 1,33 points and 0,60 points. Also statistically significant differences were found between MG1 and CG1 ($p<0,05$), MG2 and CG2 ($p<0,05$), which confirmed a statistically more positive effect of the developed program in the main groups of children on the ability to wash body parts, soap, sponge, wipe.

When reassessing, the results obtained for performing the item "Clothes that are worn over the head / fastened in front" were set at 2,9±1,04 points among the children of the MG1 group and 2,3±0,84 points among the children of the CG1 group. In groups of children with diplegia, mean values were established at 3,2±0,72 points and 2,7±0,74 points in MG2 and CG2, respectively. The increase in the indicators of average values was: MG1 – 1,18 points; CG1 – 0,54 points; MG2 – 1,15 points; CG2 – 0,64 points. Thus, the analysis of the dynamics of the results (Table) of this paragraph noted the presence of significant changes in all groups ($p<0,01$), which is indicated by the positive impact of both intervention programs on the formation characteristics, for example, the skills

of removing / putting on a shirt or sweater without fasteners / which is fastened in front. In addition, at the time of reassessment, significant differences were found between MG1 and CG1 (p<0,05), MG2 and CG2 (p<0,05), which confirmed a statistically more positive effect of the developed program in the main groups of children compared with control.

An analysis of the results of the "Fastener" clause revealed the presence of significant changes among groups of children with both hemiplegia and diphtheria (p<0,01). In addition, statistically significant differences were found between MG1 and CG1 (p<0,05), MG2 and CG2 (p<0,05). The dynamics of mean values among children with hemiplegia was as follows: in the MG1 group, the increase was 1,21 points, and the index itself was 2,8±1,04 points in the CG1 group, the increase was 0,58 points, and the index itself was 2,1±1,11 points. In the groups of children with diplegia, the mean values were as follows: MG2 – 3,6±1,12 points, CG2 – 3,06±0.89 points, and the gain in the groups was 1,89 points and 1,20 points, respectively. Such dynamics showed a more positive effect of the developed program among children of the main groups.

The analysis of changes based on the results of the item "Pants" found the presence of significant changes among the groups of children with both hemiplegia and diplegia: MG1 (p<0,01), CG1 (p<0,01), MG2 (p<0,01), CG2 (p<0,05). Among the children with hemiplegia, the dynamics of the mean values was as follows: in the MG1 group, the increase was 0,93 points, and the index 2,5±0,92 points in the CG1 group increased by 0,38 points and the index itself was 2,0±0,77 points. In the groups of children with diplegia, the mean values were as follows: MG2 – 2,5±1,19 points, CG2 – 1,8±93 points, and the increment was 1,15 points and 0,32 points, respectively. Also statistically significant differences were found between MG1 and CG1 (p<0,05), MG2 and CG2 (p<0,05), which confirmed a statistically more positive effect of the developed program in the main groups of children on the possibility of dressing/lifting, fastening/unfastening trousers.

Under the item "Footwear/Socks", all four groups had significant positive changes (p<0,01) in self-service options when removing/dressing socks and shoes, using velcro fasteners and laces. However, no statistical differences between MG1 and CG1, MG2 and CG2 were observed (p>0,05), which indicates equal effectiveness of the programs that were used. Thus, the mean value in MG1 increased by 1,07 to 2,1±0,92 points, in CG1 – by 0,65 to 1,9±0,71 points, in MG2 – by 0,70 to 1,9±0,85 points, in CG2 – by 0,56 to 1,7±0,98 points.

According to the item "Problems related to the toilet", all four groups of children had significant positive changes: MG1 (p<0,01), CG1 (p<0,05), MG2 (p<0,01), CG2 (p<0,05), which reflected an improvement in the autonomy and peculiarities of using the toilet. Note that there were no statistical differences between OG1 and CG1 for this item (p> 0,05), and differences were established between MG2 and CG2 (p<0,05). This indicates a similar effectiveness of programs among children with hemiplegia and better effectiveness of the developed program in children with diphtheria. Thus, the mean in MG1 increased by 0,57 points to 2,5±1,04 points, in CG1 – by 0,19 points to 2,3±0,96 points, in MG2 – by 0,70 to 2,9±1,13 points, in CG2 – by 0,16 to 2,2±0,76 points.

The analysis of the results of the total score for the self-service section noted the presence of all groups of children of significant positive changes for the course (p<0,01). Thus, both the standard and the developed program were generally effective in the self-service section. However, statistically significant differences were established between MG1 and CG1 (p<0,05), MG2 and CG2 (p<0,01). Such dynamics showed a more positive effect of the developed program. We note that the dynamics of the mean values among children with hemiplegia was as follows: in the MG1 group, the increase was 13,89 points, and the indicator 43,4±10.21 points in the CG1 group increased by 7,62 points, and the indicator itself was 37,6±9,23 points. In the groups of children with diplegia, the mean values were as follows: MGG2 46,7±9,32 points, CG2 40,7±7,42 points, and the gain in the groups was 13,26 points and 7,16 points, respectively.

Average indicators of the self-care section of PEDI children with hemiplegia and diplegia after a course of rehabilitation

Self-service section indicators	Me (25%; 75%) MG1 (n=28)	CG1 (n=26)	p	Me (25%; 75%) MG2 (n=27)	CG2 (n=25)	p
Consistency of food consumed	3 (2; 3)**	3 (2; 3)**	>0,05	3 (3; 4)**	3 (3; 4)**	>0,05
Use of dishes for food	3 (2; 4)**	2 (2; 3)**	<0,05	3 (3; 4)**	3 (2; 3)**	<0,01
Use of pots for drinking	3 (3; 4)**	3 (2; 3)**	<0,01	4 (3; 4)**	3 (2; 4)*	<0,01
Teeth cleaning	3 (2,25; 3,75)**	2 (2; 3)**	<0,01	3 (3; 4)**	3 (2,5; 3)**	<0,05
Hair combing	3 (2; 3)**	3 (2; 3)**	>0,05	3 (2; 3)**	3 (2; 3)**	>0,05
Care of the nose	3 (3; 4)**	3 (3; 4)**	>0,05	3 (3; 4)**	3 (3; 4)**	>0,05
Hand hygiene	4 (2; 4)**	3 (2; 3)**	<0,05	4 (3; 4)**	3 (2,5; 4)**	<0,05
Body and face washing	2 (1; 3)**	2 (1; 2)**	<0,05	2 (1; 3)**	1 (1; 2,5)**	<0,05
Clothes, dressed over the head/fastens front	3 (2; 4)**	2 (2; 3)**	<0,05	3 (3; 4)**	3 (2; 3)**	<0,05
Fasteners	3 (2; 3)**	2 (1; 3)**	<0,05	4 (3; 4)**	3 (2,5; 4)**	<0,05
Pants	2 (2; 3)**	2 (1; 3)**	<0,05	2 (2; 3)**	2 (1; 2,5)*	<0,05
Shoes / Socks	2 (1; 3)**	2 (1; 2)**	>0,05	2 (1; 3)**	2 (1; 3)**	>0,05
Tasks associated with the toilet	2,5 (2; 3)**	2 (1; 3) *	>0,05	3 (2; 3)**	2 (2; 3)*	<0,05
Control of bladder function	3 (3; 3,75)**	3 (3; 3)	>0,05	3 (3; 4)	3 (3; 3,5)	>0,05
Awareness of defecation	3,5 (3; 4)	4 (3; 4)	>0,05	4 (3; 4)	4 (3; 4)	>0,05
Total amount of the section	46 (35; 49)**	40 (27,8; 43,3) **	<0,05	46 (42; 53)**	39 (37; 49)**	<0,01

Remark. ** – difference between the indicator is statistically significant in comparison with the indicator at the admission level p<0,05; ** – p<0,01.*

Conclusions

One of the socially significant problems of physical rehabilitation in pediatrics is infantile cerebral palsy. The complex approach of rehabilitation measures is provided by a combination of physical therapy, speech therapy, adaptive learning, social support, the use of orthoses and surgical procedures, if necessary. Accordance with international practice ergotherapy helps to achieve the maximum level of functionality and independence in all aspects of life by people with disabilities through a set of activities and active rehabilitation technologies.

The ergotherapeutic interventions that were included in the rehabilitation program included targeted therapy. Classes of purposeful functional therapy were based on certain types of training activities, which were represented by a certain sequence of movements for the formation of an effective program of purposeful movement. Targeted therapy focuses on the formation of executive knowledge and skills in the activity of everyday life and the instrumental activity of everyday life. Given the wide variety of skills that are required in training activities, the rehabilitation program focused not only on the child's ability to manipulate objects, but also on the target tasks that a person performs daily.

Statistical analysis revealed that the use of targeted therapy, as a method of ergotherapy, combined with physical therapy, has advantages in improving the level of self-service of the Pediatric Evaluation of Disability Inventory in comparison with the standard protocol of physical therapy.

Prospects for further research in this area are the study of long-term results.

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References

1. Vitomskiy, V. (2015), «Assessing the impact of technology of the physical rehabilitation on functionality of the respiratory system of the children with functional single ventricle», *Slobozans`kij naukovo-sportivnij visnik*, No. 6(50), pp. 44-47. (in Ukr.)
2. Vitomskyi, V. (2015), "Physical rehabilitation of children with congenital heart disease: a review of foreign experience and achievements", *Theory and Methods of Physical Education and Sports*, No. 3. pp. 48-54. (in Ukr.)
3. Kuschenko, O., Vitomsky, V., Lazareva, O. & Vitomska, M. (2017), "Means of ergotherapy in increasing the level of functioning and independence of children with cerebral palsy", *Molodizh. nauk. visn. Skhidnoievrop. natsion. un-tu imeni Lesi Ukrainky*, Vol. 26, pp. 94-102. (in Ukr.)
4. Martinyuka, V.Y. (ed.) (2016), *Osnovi social'noï pediatriï. Navchal'no metodichnij posibnik* [Fundamentals of social pediatrics. Teaching methodological manual], Vol. 1, Kiev. (in Ukr.)
5. Romenska, T.G. (2016), "The peculiarities of social and living skills formation of preschoolers with typical development and children's cerebral palsy", *Naukovi zapysky Ternopilskoho natsionalnoho pedahohichnoho universytetu imeni Volodymyra Hnatiuka. Ser. Pedahohika*, No. 3, pp. 175-182. (in Ukr.)
6. Finni, N.R. (2005), *Pebenok s cerebral'nym paralichom. Pomoshch', uhod, razvitie* [Baby with cerebral palsy. Assistance, care, development], Moscow. (in Russ.)
7. Shevtsov, A.G. (2007), "Occupational therapy as an interdisciplinary sphere of rehabilitation activity", *Naukovyi chasopys NPU imeni M.P.Drahomanova. Seriia № 19. Korektsiina pedahohika ta psykholohiia*, No. 8, pp. 81-88. (in Ukr.)
8. Choi, B.C. & Pak, A.W. (2006), "Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. definitions, objectives, and evidence of effectiveness", *Clin Invest Med.*, Vol. 29, Iss. 6, pp. 351-364.
9. Gunel, K.M. (2009), "Rehabilitation of children with cerebral palsy from a physiotherapist's perspective", *Acta Orthop Traumatol Turc.*, Vol. 43. Iss. 2, pp. 173-180, doi:10.3944/AOTT.2009.173.
10. Helders, P.J., Engelbert, R.H., Custers, J.W., Gorter, J.W., Takken, T. & Van der Net, J. (2003), "Creating and being created: the changing panorama of paediatric rehabilitation", *Pediatr Rehabil.*, Vol. 6, pp. 5-12.
11. Imas, Y. & Lazarieva, O. (2017), "Pre-conditions and modern development of specialities in physical therapy and ergo-therapy in Ukraine", *Фізичне виховання, спорт і культура здоров'я у сучасному суспільстві*, No.2 (38), pp. 10-15.
12. Trabacca, A., Vespino, T., Di Liddo, A. & Russo L. (2016), "Multidisciplinary rehabilitation for patients with cerebral palsy: improving long-term care", *Journal of Multidisciplinary Healthcare*, Vol. 9, pp. 455-462.
13. Vitomskiy. V.V., Lazarieva, O.B., Imas, E.V., Zhovnir, V.A. & Emets, I.N. (2017), "Dynamic of bio-geometric profile indicators of children's with functionally one ventricle posture at stage of physical rehabilitation", *Pedagogics, psychology, medical-biological problems of physical training and sports*, No. 7; 21(3), pp. 146-151, doi:10.15561/18189172.2017.0308.

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Influence of modern choreography means on the level of technical preparedness of athletes from acrobatic rock'n'roll at the stage of preliminary basic training

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Purpose: *to study the influence of modern choreography on the level of technical preparedness of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.*

Material & Methods: *theoretical analysis and generalization of data of special scientific and methodological literature, pedagogical observation, pedagogical testing, pedagogical experiment, method of expert evaluations, methods of mathematical statistics. The study involved 40 athletes (20 sports pairs of the Juvenile category).*

Results: *the level of technical mastery of the performance of the competitive program is determined before and after the pedagogical experiment. Dynamics of indicators of the level of technical preparedness of young athletes from acrobatic rock'n'roll.*

Conclusions: *study testifies to the positive influence of the means of modern choreography on the level of technical preparedness of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.*

Keywords: *technical preparedness athletes, acrobatic rock'n'roll, modern choreography.*

Introduction

The rapid growth of achievements in world sports constantly requires a relentless search for new, increasingly effective means, methods and organizational forms of training young athletes [3; 4; 9]. The current stage of development of acrobatic rock'n'roll is characterized by a high level of performing skills. As in any complex co-ordinated sport, acrobatic rock'n'roll should have a harmony between complexity, composition, performance [2; 6; 10; 12]. The growing competition in acrobatic rock'n'roll competitions on the international stage provides that the championship should be kept for those sports couples who will be able to combine the difference in complexity in unordinary motor connections with virtuosic performance and expressiveness, emotionality, and artistry. Therefore, today requires a more qualitative approach to the technical preparedness of young athletes, based on the principles of individualization and advancing development in an ever-changing environment in which acrobatic rock'n'roll [1; 5; 11].

The growth of the world popularity of acrobatic rock'n'roll as a spectacular dance sport determines the urgent need to search for new forms and means of choreographic training for athletes who would be allowed to be included in competitive programs adapted to the "rock and roll" style of performing elements of modern dance disciplines, in turn, will improve the technical preparedness of the Juvenile category in acrobatic rock'n'roll [1; 8; 11; 14].

The analysis of the scientific and methodical literature showed the lack of consideration of the issue in this direction and highlighted the problems of the technical preparedness of the Juvenile category in acrobatic rock'n'roll, which was the subject of our study.

Relationship of research with scientific programs, plans, themes. The work is carried out in accordance with the Consolidated Plan of research work in the field of physical culture and sports for 2016–2020. On the topic: "Psycho-sensory regulation of the motor activity of athletes of situational sports" (No. 0116U008943).

Purpose of the study: was to study the influence of the means of modern choreography on the level of technical preparedness of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.

Objectives of the study:

1. To study the special scientific and methodical literature on the research problem.
2. To determine the content of the technical training of the Juvenile category athletes in acrobatic rock'n'roll l in the training process.
3. Analyze the dynamics of the technical readiness indicators of the Juvenile category in acrobatic rock'n'roll after the pedagogical experiment.

Material and Methods of the research

Research methods: theoretical analysis and generalization of data of special scientific and methodological literature, pedagogical observation, pedagogical testing, pedagogical experiment, method of expert evaluations, methods of mathematical statistics. The study involved 40 athletes (20 sports pairs of the Juvenile category).

Results of the research and their discussion

The first stage of our study was the study of the level of tech-

nical skill of young athletes engaged in acrobatic rock'n'roll at the stage of preliminary basic training. The level of technical skill of the "juvenile" category in acrobatic rock'n'roll was estimated in points for the performance of the criteria of competitive programs: the main course (male partner+female partner) of dance figures; composition.

Results of the study of the level of technical skill of athletes engaged in acrobatic rock'n'roll at the stage of preliminary basic training, after the primary control tests (performance of competitive programs) is presented in Table 1, 2.

Shown in Table 1 judges scores are averages of six partial criterion evaluations: "A" – main move (male partner+female partner), scores (0-20) "B" – dance figures, points (0-25) "C" – composition, points (0-20).

We also used penalties for technical errors in view of the scale of reductions in accordance with the Regulations of the World Confederation of Rock and Roll.

Analysis of the assessment of the level of technical skill of athletes in the performance of the competitive program by a sports couple at the initial stage of the experiment in the experimental group (EG) showed that the partner and partner of the sports pair No. 7, the "Basic" criterion, received the highest average score of 8.7 points and 8.5 points course ". The total score of the sports couples number 7 is 17.2. The best results of this criterion were shown by the partner and partner of sports pairs No. 4 and No. 5 (the number of points of average scores from 8,5 to 8,4). Sports couples received a total score:16,9; 16,8. The average results of this criterion were shown by the male partner and female partner of sports pairs No. 1, No. 3, No. 6, No. 8, No. 9 and No. 10 (the score of average scores from 8,4 to 8,2). Sports couples No. 1 and No. 9 received a total score of 16,7; couples No. 6 and No. 10 received a total score of 16,6; sports pair No. 3 and No. 8 received a total score of 16,5. The worst results of this criterion are the partner and partner of sports pair number 2 (the number of points of average scores from 8,2 to 8,1). The total score of the sports pair No. 2 – 16,3.

Highest average score in the "Dance Figures" criterion of the competition programs was given by the partner and partner of the sports couples No. 7 – by 8,95 points. The total sum of the points of the sports couples No. 7 – 17,9. The best results of this criterion were shown by male partner and female partner of sports couples number 3 and number 4 (the number of points average grades of 8.9). The total amount of points – 17,8 each sporting couples. The average results of this criterion were shown by male partner and female partner of sports couples No. 5, No. 6, No. 9, No. 10 and No. 8 (the number of points of average grades from 8,8 to 8,6). Sports couples received a total of points: 17,6; 17,4; 17,3; 17,2. The worst results of this criterion are the male partner and female partner of sports couples number 1 and number 2 (the number of points of average grades is 8,5). The total sum of points was 17,0 each sporting couples.

The highest average score in the criterion "Composition" of competitive programs was given to a male partner and female partner of sports couples No. 6 (the number of points of average ratings at 8,7). The total score of the sports couples number 6 is 17,4. The best results of this criterion were shown by the male partner and female partner of sports pairs No. 10, No. 9 and No. 8 (the number of scores of average scores from 8,65 to 8,5). Sports couples received a total score of 17,3; 17,1; 17,0. The average results of this criterion were shown by the male partner and female partner of sports couples No. 7, No. 1, No. 4 (number of scores of average scores from 8,2 to 8,1). Sports couples received a total score of 16,4; 16,2; 16,2. The worst results of this criterion are the male partner and female partner of sports pairs No. 2, No. 3, No. 5 (number of points of average ratings is 8,0). The total score of 16,0 was awarded to each sports couples.

Coefficient of variation (V, %) showed that the group is homogeneous.

Analysis of the assessment of the level of technical skill of athletes in the performance of the competitive program by a sports couple at the initial stage of the experiment in the control group (CG) showed that the highest average score of 9,1 points and 9,0 points was obtained by the male partner and female partner of sports pair No. 2 – "main move". The total score of the sports pair number 2 is 18,1. The best results of this criterion were shown by the male partner and female partner of sports pairs No. 1 and No. 3 (the number of points of the average ratings is from 9,0 to 8,8). Sports couples received a total score of 17,9 and 17,7. The average results of this criterion were shown by the male partner and female partner of sports couples No. 4, No. 5, No. 6, No. 7, No. 9 and

Table 1

Results of the performance of the competitive program by a sports couple (male partner, female partner) from acrobatic rock'n'roll before pedagogical research (EG, n=20)

Criteria for evaluating the competitive program, scores		Sports couple									
		1	2	3	4	5	6	7	8	9	10
A	Main move (male partner)	8,3	8,1	8,3	8,4	8,4	8,3	8,5	8,3	8,3	8,3
	Main move (female partner)	8,4	8,2	8,2	8,5	8,4	8,3	8,7	8,2	8,4	8,3
B	Dance figures (male partner)	8,5	8,5	8,9	8,9	8,8	8,7	8,95	8,6	8,65	8,65
	Dance figures (female partner)	8,5	8,5	8,9	8,9	8,8	8,7	8,95	8,6	8,65	8,65
C	Composition (male partner)	8,1	8,0	8,0	8,1	8,0	8,7	8,2	8,5	8,55	8,65
	Composition (female partner)	8,1	8,0	8,0	8,1	8,0	8,7	8,2	8,5	8,55	8,65
Overall rating ("A" + "B" + "C")		49,9	49,3	50,3	50,9	50,4	51,4	51,5	50,7	51,1	51,2
Ранг		9	10	8	5	7	2	1	6	4	3
Average arithmetic, $\bar{X}$		8,32	8,22	8,38	8,48	8,38	8,57	8,57	8,45	8,52	8,53
Mean square deviation, σ		0,18	0,23	0,42	0,36	0,36	0,21	0,34	0,16	0,14	0,18
Coefficient of variation, %		2,2	2,8	5,0	4,2	4,3	2,4	3,9	1,9	1,6	2,1

Table 2

Results of the performance of the competitive program by a sports couple (male partner, female partner) from acrobatic rock'n'roll before pedagogical research (CG, n=*20*)

Criteria for evaluating the competitive program, scores		Sports couple									
		1	2	3	4	5	6	7	8	9	10
A	Main move (male partner)	8,9	9,0	8,8	8,7	8,6	8,7	8,5	8,4	8,5	8,6
	Main move (female partner)	9,0	9,1	8,9	8,6	8,5	8,6	8,6	8,3	8,4	8,3
B	Dance figures (male partner)	8,6	8,6	8,9	8,7	8,7	8,9	8,95	8,7	8,7	8,7
	Dance figures (female partner)	8,6	8,6	8,9	8,7	8,7	8,9	8,95	8,7	8,7	8,7
C	Composition (male partner)	8,9	8,7	8,8	8,9	8,7	8,6	8,4	8,3	8,6	8,7
	Composition (female partner)	8,9	8,7	8,8	8,9	8,7	8,6	8,4	8,3	8,6	8,7
Overall rating ("A" + "B" + "C")			52,9	52,7	53,1	52,5	51,9	52,3	51,8	50,7	51,5
Ранг			3	4	2	5	7	6	8	10	9
Average arithmetic, $\bar{X}$			8,78	8,85	8,75	8,65	8,72	8,63	8,45	8,58	8,62
Mean square deviation, σ			0,21	0,05	0,12	0,08	0,15	0,26	0,20	0,12	0,16
Coefficient of variation, %			2,4	0,6	1,4	0,9	1,7	3,0	2,9	1,4	1,8

No. 10 (the number of scores of average ratings from 8,7 to 8,3). Sports couples No. 4 and No. 6 received a total score of 17,3; sports couples No. 5 and No 7 received a total score of 17,1; sports couples No. 9 and No. 10 received a total score of 16,9 points. Worst results of this criterion are the partner and partner of the sports pair No. 8 (the number of points of the average ratings is 8,4 and 8,3). Total score of the sports couples No. 8 – 16,7.

Highest average rating in the criterion "Dance figures" of competitive programs was given to a male partner and female partner of the sports pair No. 7 – 8,95 points. The total score of the sports couples number 7 is 17,9. The best results of this criterion were shown by male partner and female partner of sports couples No. 3 and, No. 6 (the number of points of the average ratings by 8,9). Sports couples No. 3 and No. 6 received a total of 17,8 points. The average results of this criterion were shown by the male partner and female partner of sports couples No. 4, No. 5, No. 8, No. 9 and No. 10 (the score of the average ratings is 8,7). Sports couples No. 4, No. 5, No. 8, No. 9 and No. 10 received a total score of 17,4. Worst results of this criterion are the partner and partner of sports couples No. 1 and No. 2 (the number of points of the average ratings is 8,6). Sports couples No. 1 and No. 2 received a total score of 17,2.

The highest average score in the criterion "Composition" of the competitive programs was given to the male partner and female partner of sports pairs No. 1 and No. 4 (the number of points of the average ratings at 8,9). The total score of sports pairs No. 1 and No. 4 is 17,9. The best results of this criterion were shown by the male partner and female partner of sports couples No. 3, No. 2 No. 5 and No. 10 (the number of points of average ratings from 8,8 to 8,7). Sports couple No. 3 received a total of 17,6 points. Sports couples No. 2, No. 5 and No. 10 received a total score of 17,4. Average results of this criterion were shown by the male partner and female partner of sports pairs No. 6, No. 7 and No. 9 (the score of average scores is from 8,6 to 8,4). Sports couples No. 6 and No. 9 received a total of 17,2 points. Sports pair number 7 received a total score of 16,8. The worst results of this criterion are the partner and partner of the sports pair No. 8 (the number of points of the average ratings is 8,3). The total score of the sports pair number 8 is 16,6.

Coefficient of variation (V%) showed that the group is homogeneous.

During the pedagogical research in the experimental group, the means of choreography were used in the training process in the form of performing modern dance movements (modern jazz, hip-hop, disco). The control group took part in pedagogical research on the traditional method of the training process of a sports couple with acrobatic rock'n'roll.

The results of the performance indicators of the components of the competitive program of a sports couple from acrobatic rock'n'roll after pedagogical research are presented in Table 3 and 4.

Analysis of the assessment of the level of technical skill of athletes in the performance of a competitive program by a sports couple after a pedagogical experiment in an experimental group (EG) showed that the highest average score of 9,7 points and 9,8 points was obtained by the male partner and female partner of sports pair No. 4 – criterion "Main move". The total score of the sports couples number 4 is 19,5. Best results of this criterion were shown by the partner and partner of sports pair No. 5 (number of points of average ratings from 9,6 and 9,7). The total score of sports couples No. 5 is 19,3. Average results of this criterion were shown by the male partner and female partner of sports pairs No. 1, No. 2, No. 3, No. 6 (the number of points in the average ratings is from 9,6 to 9,4). Total score of the sports couples number 6 is 19,2; sports couples No. 1 and No. 3 received a total score of 19,1; Total score of the sports pair number 2 is 18,9. The worst results of this criterion are the partner and partner of sports couples No. 7, No. 8, No. 9 and No. 10 (the number of points of average scores from 8,9 to 8,5). Sports couples received a total score: 17,7; 17,1; 17,3; 17,2.

Highest average score in the criterion "Dance figures" of competitive programs was given to a male partner and female partner of sports couples No. 5 and No. 6 – by 10,15 points. Sports couples No. 5 and No. 6 received a total score of 20,3 points. The best results of this criterion were shown by the male partner and female partner of sports pairs No. 1, No. 2, No. 3 and No. 4 (number of points of average ratings is from 10,1 to 10,05). Sports couple No. 3 received a total of 20,2 points; sports couples No. 1, No. 2 and No. 4 received a total score of 20,1. Average result of this criterion was shown by the male partner and female partner of sports pair No. 7 – 9,95 points. Total score of the sports couples number 7 is 19,9. The worst results of this criterion are the partner and

Table 3

Results of the performance of the competitive program by a sports couple (male partner, female partner) from acrobatic rock'n'roll after pedagogical research (EG, n=20)

Criteria for evaluating the competitive program, scores		Sports couple									
		1	2	3	4	5	6	7	8	9	10
A	Main move (male partner)	9,5	9,4	9,6	9,7	9,6	9,6	8,8	8,6	8,6	8,6
	Main move (female partner)	9,6	9,5	9,5	9,8	9,7	9,6	8,9	8,5	8,7	8,6
B	Dance figures (male partner)	10,05	10,05	10,1	10,05	10,15	10,15	9,95	9,6	9,65	9,65
	Dance figures (female partner)	10,05	10,05	10,1	10,05	10,15	10,15	9,95	9,6	9,65	9,65
C	Composition (male partner)	9,7	9,55	9,6	9,7	9,55	9,3	9,05	9,1	9,05	9,15
	Composition (female partner)	9,7	9,55	9,6	9,7	9,55	9,3	9,05	9,1	9,05	9,15
Overall rating ("A" + "B" + "C")		58,6	58,1	58,5	59,0	58,7	58,8	55,7	54,5	54,7	54,8
Ранг		4	6	5	1	3	2	7	10	9	8
Average arithmetic, $\bar{X}$		9,77	9,68	9,75	9,83	9,78	9,63	9,28	9,08	9,12	9,13
Mean square deviation, σ		0,23	0,29	0,27	0,17	0,29	0,45	0,53	0,47	0,45	0,47
Coefficient of variation, %		2,4	2,9	2,8	1,7	2,9	4,7	5,7	5,2	4,9	5,1

partner of sports couples No. 8, No. 9 and No. 10 (the number of points of average ratings from 9,65 to 9,6). Sports couples No. 9 and No. 10 received a total score of 19,3; sports pair number 8 received a total score 19,2.

Highest average score in the criterion "Composition" of competitive programs was given to the male partner and female partner of sports pairs No. 1 and No. 4 (the number of points of average ratings is 9,7). Sports couples No. 1 and No. 4 received a total score of 19,4. The best results of this criterion were shown by the male partner and female partner of sports couples No. 2 No. 3 and No. 5 (the number of points of average ratings from 9,6 to 9,55). Sports pair No. 3 received a total of 19,2 points; sports couples No. 2 and No. 5 received a total score of 19,1. The average result of this criterion was shown by the male partner and female partner of sports pair No. 6 (the number of points of average ratings is 9,3). The total score of the sports couples number 6 is 18,6. The worst results of this criterion are the male partner and female partner of sports couples No. 7, No. 8, No. 9 and No. 10 (the number of points of average ratings from 9,15 to 9,05). Sports pair number 10 received a total score of 18,3; sports pair number 8 received a total score of 18,2; sports couples No. 7 and No. 9 received a total of 18,1 points.

Coefficient of variation (V%) showed that the group is homogeneous.

Analysis of the assessment of the level of technical skill of athletes in the performance of a competitive program by a sports couple after a pedagogical experiment in a control group (CG) showed that the highest average score of 9,2 points and 9,3 points was obtained by the male partner and female partner of the sports pair No. 1 – criterion "Main move". Sports pair No. 1 received a total of 18.5 points. The best results of this criterion were shown by the male partner and female partner of sports pairs Nos. 2 and 3 (the number of scores of average scores from 9.2 to 9.1). Sports couples No. 2 and No. 3 received a total score of 18,3. Average results of this criterion were shown by the male partner and female partner of sports pairs No. 4, No. 5, No. 6, No. 7, No. 9 and No. 10 (score of average scores is from 8.9 to 8.5). Sports couples received a total sum of points: No. 4 – 17,7; No. 5 – 17,5; No. 6 – 17,8; No. 7 – 17,6; No. 9 – 17,3 and No. 10 – 17,2. The worst results of this criterion are the male partner and female partner of the sports pair number 8 (number of points of the average ratings is 8,6 and 8,5). Sports pair number 8 received a total score17,1.

The highest average score in the criterion "Dance figures" of competitive programs was given to a male partner and female partner of sports pair No. 7 – 9,2 points. Sports pair number 7 received a total score of 18,4. The best results of this criterion were shown by the partner and partner of sports pairs No. 3, No. 6 and No. 10 (the number of points of average ratings from 9,1 to 9,0). The total score of 18.2 was given to sports couples No. 3 and No. 6; sports pair No. 10 received a total score 18,0. Average results of this criterion were shown by the partner and partner of sports pairs No. 1, No. 4, No. 5, No. 8, No. 9 (score of average scores is from 8,8 to 8,9). Sports couples No. 4, No. 8, No. 9 received the total amount of balances 17,8: sports couples No. 1, No. 5 received a total score of 17,6. Worst results of this criterion are the male partner and female partner of sports pair number 2 (number of points of average ratings is 8,7). Total score of 17,4 was given to the sports pairNo. 2.

The highest average score in the criterion "Composition" of the competitive programs was given to the male partner and female partner of sports pairs No. 1 and No. 4 (the number of points of average ratings is 9,1). The total score of 18,2 was given to sports couples No. 1 and No. 4.

The best results of this criterion were shown by the partner and partner of sports pairs No. 3, No. 2 No. 5 and No. 10 (number of points of average ratings from 9,0 to 8,9). Sports pair No. 3 received a total score of 18,0: sports couples No. 2, No. 5 and No. 10 received the total score 17,8. The average results of this criterion were shown by the male partner and female partner of sports couples No. 6, No. 7, No. 9 (the number of points of average ratings from 8,8 to 8,6). The total score of 17.6 was awarded to sports couples No. 6 and No. 9; sports pair No. 7 received a total score of 17,2.

Table 4

Results of the performance of the competitive program by a sports couple (male partner, female partner) from acrobatic rock'n'roll after pedagogical research (CG, n=20)

Criteria for evaluating the competitive program, scores		Sports couple									
		1	2	3	4	5	6	7	8	9	10
A	Main move (male partner)	9,2	9,1	9,2	8,9	8,8	8,9	8,8	8,6	8,7	8,8
	Main move (female partner)	9,3	9,2	9,1	8,8	8,7	8,9	8,8	8,5	8,6	8,5
B	Dance figures (male partner)	8,8	8,7	9,1	8,9	8,8	9,1	9,2	8,9	8,9	9
	Dance figures (female partner)	8,8	8,7	9,1	8,9	8,8	9,1	9,2	8,9	8,9	9
C	Composition (male partner)	9,1	8,9	9	9,1	8,9	8,8	8,6	8,5	8,8	8,9
	Composition (female partner)	9,1	8,9	9	9,1	8,9	8,8	8,6	8,5	8,8	8,9
Overall rating ("A" + "B" + "C")			53,5	54,5	53,7	52,9	53,6	53,2	51,9	52,7	53,1
Ранг			5	1	3	8	4	6	10	9	7
Average arithmetic, $\bar{X}$			8,92	9,08	8,95	8,82	8,92	8,85	8,65	8,78	8,85
Mean square deviation, σ			0,20	0,08	0,12	0,08	0,15	0,28	0,20	0,12	0,19
Coefficient of variation, %			2,2	0,9	1,3	0,9	1,6	3,2	2,3	1,3	2,1

The worst results of this criterion are male partner and female partner of sports pair number 8 (the number of points of average ratings is 8,5). Sports pair number 8 received a total of 17,0 points.

The coefficient of variation (V%) showed that the group is homogeneous.

Absolute ratings and their ranking places provide an important material for the analysis of the prospects for further training of sports couples with acrobatic rock'n'roll.

The dynamics of changes in indicators of the criteria for evaluating the performance of a competitive sports pair program from acrobatic rock'n'roll before and after the pedagogical experiment in the experimental group showed the result for each criterion (Table 5).

The criteria for assessing the performance of the competitive program before and after the pedagogical experiment in the experimental group showed the following changes: the criterion "A" (Main move (male partner+female partner)) in the group increased by 10,5% in percentage terms; criterion "B" (Dance figures) in the group in percentage terms increased by 14,1%; criterion "C" (Composition) in the group in percentage terms increased by13,2%.

All indicators of the criteria for evaluating the performance of the competition program before and after the pedagogical experiment in the experimental group have the reliability of the differences in the results ($p<0,05$)

The dynamics of changes in the criteria for evaluating the performance of a competitive sports program from an acrobatic rock'n'roll before and after the pedagogical experiment in the control group showed the following results for each criterion (Table 6).

Parameters of the criteria for assessing the performance of the competition program before and after the pedagogical experiment in the control group showed the following changes: the criterion "A" (Main move (male partner+female partner)) in the group increased by 2,4% in percentage terms; criterion "B" (Dance figures) in the group in percentage terms increased by 2,2%; criterion "C" (Composition) in the group in percentage terms increased by 2,4%.

Indicators of the "B" criterion for evaluating the performance of the competitive program before and after the pedagogical experiment in the control group have the reliability of the differences in the results ($p<0,05$). Indicators of the criteria "A" and "C" have unreliable differences in the results ($p>0,05$).

Using the methods of mathematical statistics, we observe a tendency for the performance of the competitive program of a sports couple (male partner, female partner) to change from acrobatic rock'n'roll before and after the pedagogical experiment (Tables 7 and 8).

Based on the statistical indicators of the performance of the competition program during the pedagogical experiment, both the reliability of differences in the results ($p<0,05$) and the unreliability of the differences in the results ($p>0,05$) are shown in the experimental and control groups.

Table 5

Dynamics of changes in indicators of the criteria for evaluating the performance of a competitive sports couple program (male partner, female partner) from acrobatic rock'n'roll after a pedagogical experiment (EG, n=20) (p<0,05)

Criteria for evaluating the competitive program, scores		$\bar{X}$		σ		*m*		$t_{p.}$	$t_{rp.}$	p
		before	after	before	after	before	after			
A	Main move (male partner+female partner)	16,68	18,44	0,25	0,98	0,08	0,31	5,50	2,71	<0,05
B	Dance figures (male partner+female partner)	17,43	19,88	0,33	0,44	0,01	0,13	18,79	2,71	<0,05
C	Composition (male partner+female partner)	16,56	18,75	0,57	0,54	0,18	0,17	8,85	2,71	<0,05

Table 6

Dynamics of changes in indicators of the criteria for evaluating the performance of a competitive sports couple program (male partner, female partner) from acrobatic rock'n'roll after a pedagogical experiment (CG, n=20) (p<0,05)

Criteria for evaluating the competitive program, scores		$\bar{X}$		σ		*m*		$t_{p.}$	$t_{rp.}$	p
		before	after	before	after	before	after			
A	Main move (male partner+female partner)	17,3	17,72	0,46	0,51	0,14	0,16	1,97	2,71	>0,05
B	Dance figures (male partner+female partner)	17,49	17,88	0,25	0,32	0,08	0,1	3,04	2,71	<0,05

Table 7

Statistical indicators of the performance of the competitive program of a sports couple (male partner, female partner) from acrobatic rock'n'roll before pedagogical experiment (p<0,05)

Sport couple number	Experimental group (n=20) $\bar{X}$±m	Control group (n=20)	t	t_{gr}	p
1	9,32±0,06	8,82±0,05	6,40	2,71	<0,05
2	9,22±0,08	8,78±0,07	4,14	2,71	<0,05
3	9,05±0,05	8,85±0,01	3,92	2,71	<0,05
4	9,48±0,12	8,75±0,04	5,77	2,71	<0,05
5	9,38±0,12	8,65±0,02	6,00	2,71	<0,05
6	9,23±0,15	8,72±0,05	3,23	2,71	<0,05
7	8,57±0,11	8,63±0,08	0,44	2,71	>0,05
8	8,45±0,05	8,45±0,07	0,00	2,71	>0,05
9	8,52±0,04	8,58±0,04	1,06	2,71	>0,05
10	8,53±0,06	8,62±0,05	1,15	2,71	>0,05

Remark. *Criteria for evaluating the performance of the competition program "A" + "B" + "C", where A – Main move; B – Dance figures; C – Composition.*

The use of modern choreography tools in the experimental group gave an improvement in the average percentages by 12,8% of the deviation from the initial level of technical preparedness of athletes in the performance of competitive programs.

In the control group, a significantly worse result (2,3%) is shown, which confirms the effectiveness of modern choreography in the training process of sports pairs of the Juvenile category in the experimental group during the pedagogical experiment.

The difference in the mean values of the experimental and control groups of the pedagogical experiment is 10,5%.

During the pedagogical experiment, we discovered the original movements of modern choreography that were applied in the training process of the experimental group and their positive impact on the criteria for evaluating the competitive program "Main move", "Dance figures", "Composition".

The defining factors of the positive impact on the criterion "Main move" is the use of the disk style of the performance of the grand batman (which is identical in structure and dynamics to the basic movements of the acrobatic rock'n'roll) and the execution of the conditional passй with the maximum amplitude (raising the hip to the highest possible level).

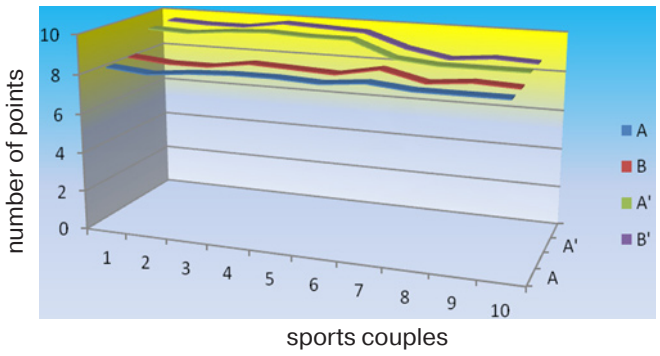


Fig. 1. Indicators for assessing the fulfillment of the criterion of the competitive program "Main move" in EG:

A – indicators of evaluation of partners' fulfillment of the criterion of the competitive program "Main move" at the beginning of the pedagogical experiment; B – indicators of the evaluation of the partners' performance of the criterion of the competitive program "Main move " at the beginning of the pedagogical experiment; A' – indicators of the partners' performance evaluation of the criterion of the competitive program "Basic Course" after the pedagogical experiment; B' – indicators of the evaluation of the partners' performance of the criterion of the competitive program"Main move"after the pedagogical experiment.

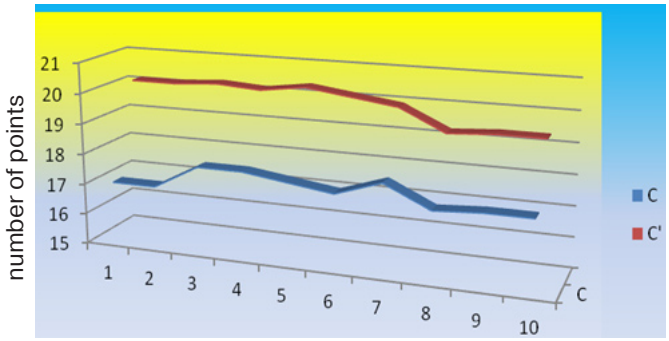
Table 8

Statistical indicators of the performance of the competitive program of a sports couple (male partner, female partner) from acrobatic rock'n'roll after pedagogical experiment (p<0,05)

Sport couple number	Experimental group (n=20)	Control group (n=20)	t	t_{gr}	p
	$\bar{X}$±m				
1	9,77±0,07	9,05±0,07	7,27	2,71	<0,05
2	9,68±0,09	8,92±0,06	7,03	2,71	<0,05
3	9,75±0,09	9,08±0,03	7,06	2,71	<0,05
4	9,83±0,06	8,95±0,04	12,20	2,71	<0,05
5	9,78±0,09	8,82±0,03	10,12	2,71	<0,05
6	9,63±0,15	8,92±0,05	4,62	2,71	<0,05
7	9,28±0,17	8,85±0,09	2,24	2,71	>0,05
8	9,08±0,16	8,65±0,07	2,52	2,71	>0,05
9	9,12±0,15	8,78±0,04	2,19	2,71	>0,05
10	9,13±0,16	8,85±0,06	1,64	2,71	>0,05

Remark. *Criteria for evaluating the performance of the competition program "A" + "B" + "C", where A – Main move; B – Dance figures; C – Composition.*

The determining factors of the positive influence on the criterion "Dance figures" is the use of the variations in the levels of the positions of the athletes from the acrobatic rock'n'roll during the competitive program (parterre positions, variations in the entrance to the stalls, rides, jumping original movements).



sports couples

Fig. 2. Indicators for assessing the fulfillment of the criterion of the competitive program "Dance figures" in EG:

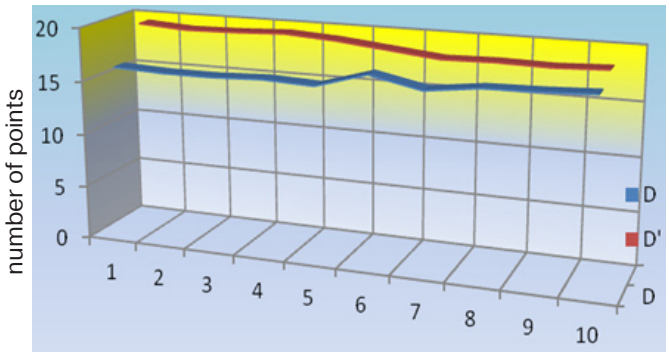
C – *indicators for assessing the performance by sports couples of the criterion of the competitive program "Dance figures" before the beginning of the pedagogical experiment;*
C' – indicators of the performance of sports pairs by the criterion of the competitive program "Dance figures" after the pedagogical experiment.

Determinants of the positive influence on the "Composition" criterion are a variety of disc-type shots (run-kick, double kick, etc.), Use of the movements of modern dance discipline "hip-hop" (a variety of springboard jumps – Bounce species).

Conclusions

1. Analysis of the special scientific and methodological literature testifies to the insufficient level of research of the technical preparedness of the Juvenile category in acrobatic rock'n'roll at the stage of preliminary basic training.

2. Content of the training and training process aimed at improving the technical preparedness of the Juvenile category athletes in acrobatic rock'n'roll at the stage of preliminary basic training is developed.



sports couples

Fig. 3. Indicators for assessing the fulfillment of the criterion of the competitive program "Composition" in EG:

D *– indicators for evaluating the performance by sports couples of the criterion of the competitive program "Composition" at the beginning of pedagogical research; D' – indicators of the performance of sports pairs by the criterion of the competitive program "Composition" after pedagogical research.*

3. Statistical indicators of the increase in the level of technical preparedness of the Juvenile category athletes in acrobatic rock'n'roll at the stage of preliminary basic training.

Improved in the experimental group, the average values of the percentage by 12,8% deviation from the initial level of technical training of athletes in the category "Juvenile" acrobatic rock'n'roll in the performance of competitive programs.

In the control group, a significantly worse result (2,3%) is shown, which confirms the effectiveness of modern choreography in the training process of sports pairs of the Juvenile category in the experimental group during the pedagogical experiment.

Prospects for further research will be aimed at determining the significance and the role of technical training for junior category athletes in acrobatic rock'n'roll.

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References

1. Bateeva, N.P., Kyzim, P.M., Pluzhnykov, A.V. & Firsova, Yu.Yu. (2011), "Using Dance Directions in Acrobatic Rock & Roll", *Slobozans`kij naukovo-sportivnij visnik*, No. 3, pp. 74-77. (in Ukr.)
2. Bateeva, N.P. (2013), *Udoskonalennia spetsialnoi fizychnoi ta tekhnichnoi pidhotovky kvalifikovanykh sportsmeniv z akrobatychnoho rok-n-rolu v richnomu makrotsykli: avtoref. dys. kand. nauk fiz. vykhovannia i sportu* [Improvement of the special physical and technical training of qualified athletes from acrobatic rock'n'roll in the annual macro cycles: author's abstract. dis Cand. Sciences of Phys. education and sports: PhD thesis abstract], KhSAPC, Kharkiv, 22 p. (in Ukr.)
3. Bateeva, N.P. & Kyzim, P.N. (2017), *Sovershenstvovanie fizicheskoy i tekhnicheskoy podgotovki kvalifitsirovannykh sportsmenov v akrobaticheskom rok-n-rolle v godichnom makrotsikle* [Improving the physical and technical training of skilled athletes in acrobatic rock and roll in a one-year macro cycl], Kharkov. (in Russ.)
4. Kyzim, P.N., Alabin, V.H., Makurin, Yu.K. & Mullahildina, A.Ya. (1999), *Akrobatychnyi rok-n-rol* [Acrobatic rock'n'roll], Osnova, Kharkiv. (in Ukr.)
5. Kyzim, P.N. (1997), *Programma izucheniya (prepodavaniya) osnovnykh dvizheniy akrobaticheskogo rok-n-rolla v 1–4 klassakh obshcheobrazovatelnykh shkol* [Program for studying (teaching) the main movements of acrobatic rock and roll in the 1-4 grades of comprehensive schools], Osnova, Kharkov. (in Russ.)
6. Platonov, V.N. (2004), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i ee prakticheskie prilozheniya* [System of training athletes in the Olympic sport. General theory and its practical applications], Olimpiyskaya literatura, Kiev. (in Russ.)
7. Serhiienko, L.P. (2010), *Sportyvna metrolohiia: teoriia i praktychni aspekty* [Sport Metrology: Theory and Practical Aspects], Olimpiiska literatura, Kyiv. (in Ukr.)
8. Andersen, N. (1990), *International aerobics center seminar "Sweat systems"*. Minneapolis.
9. Dragnea, C.A. & Teodorescn, S.M. (2002), *Teoria Sportului*, Bucuresti, Fest.
10. Naglak, Z. (1991), *Metodyka trenowania sportowca*, AWF, Wroclaw.
11. Schnabel, G. (1994), "Prinzipien des sportlichen", *Trainingswissenschaft*, Sport Verbag, Berlin, pp. 282-294.
12. Shepard, R.I. & Astrand, P.O. (Eds) (1992), *Endurance in Sports*, ISBN: 978-0-632-05348-3.
13. Thomas, J.R. & Nelson, J.K. (2001), *Research Methods in Physical Activity*, Human Kinetics.
14. Ulatowski, T. (1992), *Teoria sportu*, Tom II, UKFiT, Warszawa.

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Level of involvement of children and adolescents in various forms of motor activity in Ukraine and member countries Active Healthy Kids Global Alliance

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Purpose: *compare the estimates of individual indicators of motor activity in Ukraine and other countries according to the standards of the Active Healthy Kids Global Alliance (AHKGA).*

Material & Methods: *analysis and generalization of scientific literature; methods of the theoretical level of research (analysis and synthesis), a sociological survey, evaluation of data using the Active Healthy Kids Global Alliance methodology. The study was conducted in groups of students aged 12–14 (n=1893, of whom 899 were men and 994 girls) and 15–17 years (n=925, of them 449 men and 476 girls). The assessments of the indicators of the motor activity of children of different ages, presented in the AHKGA database and special reports from different countries.*

Results: *results of a survey of pupils of secondary schools in Ukraine, the analysis of reports on the motor activity of children in the AHKG member countries made it possible to compare the estimates of such indicators of locomotor activity as organized sport and physical activity, unorganized active play, and active transportation.*

Conclusions: *according to AHKGA standards, organized sports activities and motor activity of Ukrainian children are rated for "D", unorganized gaming activity – for "C" and active movement – for "B".*

Keywords: *children, pupils, motor activity, AHKGA, active movement, sports, gaming activities.*

Introduction

Positive effect of motor activity on the state of human health is a universally recognized fact. Insufficient level of motor activity can cause the development of a number of diseases and adversely affect the overall functional state of the body [16].

Importance of motor activity in the formation of a healthy nation is also fixed in nationwide official documents. In particular, in the National strategy for improving motor activity in Ukraine until 2025, "Motor activity – a healthy lifestyle – a healthy nation" states that the motor activity should be introduced for the primary prevention of chronic non-infectious diseases and physical rehabilitation [6].

To date, the motor activity of children of different ages is considered as a set of organized and unorganized forms, carried out during the day [8; 10]. Special concern for specialists is caused by the volume of motor activity of children and teenagers in their spare time. Reduction in the volume of motor activity is often due to the fact that children of different ages choose inactive ways of spending free time [9]. This phenomenon contributes to the overall economic development and welfare of citizens of different countries [16].

The influence of motor activity on the formation of the organism of children of different ages in our time is an object of study of many scientific studies around the world [11; 12].

Among the Ukrainian scientists, the problem of the motor activity of children of different ages is also a popular subject of research. The scientific works of this subject cover the age periods, beginning with preschool age. In this context, we recall the research of N. Moskalenko "Modeling the rational motor conditions of children 3–4 years in pre-school institutions of various types" (2016) [4].

Group of authors, A. Kindzer, I. Bodnar and N. Sorokolit found that only 25,5% of schoolchildren actively spend their leisure time, after school attend sports sections or dance clubs [2]. The connection of physical activity and mental performance of students in the main school was studied by G. Danilenko [1]. Motivation for the motor activity of primary schoolchildren – A. I. Ostapenko and I. V. Kosaty [5]. Features of the motor activity of junior schoolchildren in the course of the school day were also studied by V. A. Sutula, A. Kh. Daineko, and A. V. Vishnya. The authors, in particular, found that the educational material for fifth-ninth-grade students is not actually accompanied by a meaningful continuation of the formation of a culture of motor activity among schoolchildren [7].

Studying various aspects of motor activity, the authors quite often study the specificity of its influence on the systems of the organism of people of different age groups. In particular, T. Yu. Krutsevich and N. E. Pangelova in the study "Rational motor activity as a factor in increasing the mental capacity for work of schoolchildren" found that different regimes of physical activity in the physical training class allow to influence the effectiveness of mental activity of schoolchildren during the school day [3].

In 2004, in Kenya, the Republic of South Africa, Kenya and the state of Louisiana (USA), data were summarized on the studies of the involvement of children and young people in various forms of motor activity. These data formed the basis of the corresponding reports called the "Report Cards on Physical Activity". Such reports contained information on a complete assessment of the current state of motor activity among children and youth in a given country [13]. "Map of the motor activity report" interpreted the relevant scientific conclusions for

practical application in the state policy to increase the level of systematic involvement of children and youth in various forms of motor activity [15].

In 2014, the Active Healthy Kids Global Alliance (AHKGA, Global Alliance for Active, Healthy Children) was created. The organization brought together academics, health professionals and all those interested in working together to develop physical activity among children and young people around the world. The number of countries that are joining the corresponding cooperation is increasing annually. To date, scientists from 38 countries from all over the world have presented their reports to the Alliance. All reports are based on standardized schemes that provide estimates of certain indicators of motor activity [14].

To date, most studies of the motor activity of people of different ages, carried out by Ukrainian scientists, do not have unified algorithms. This concerns both approaches to determining the volume of motor activity, and the forms and types of motor activity themselves, which are the object of scientific research. This makes it difficult to carry out a comparative analysis with similar data that are presented by international organizations or scientists from other countries.

Relationship of research with scientific programs, plans, themes. The research was carried out in accordance with the research topic of the Department of Theory and Methods of Physical Culture of Lviv State University of Physical Culture for 2017–2020. "Theoretical and methodical aspects of the optimization of the motor activity of various population groups" (minutes No. 4 of 17.11.2016).

Purpose of the study was to compare the assessments of individual indicators of motor activity in Ukraine and the countries members of the Active Healthy Kids Global Alliance.

Objectives of the study:

1. Using the methodology of AHKGA, to determine the indicators of such indicators of general educational motor activity of children in Ukraine, such as: organized sport and physical activity, active play and active transportation.

2. To determine the impact of the indicators of the countries' economic development on the selected indicators of motor activity and make a comparative analysis of these indicators.

Material and Methods of the research

To solve the set tasks, a sociological poll was conducted among pupils of general education schools in Ukraine. In the sociological survey, two groups of students took part. The first group was students aged 12–14 years, the second – students aged 15–17 years. The research was carried out on the basis of general educational institutions Lviv, Ternopil, Ivano-Frankivsk and Khmelnitskyi.

The total number of interviewed students aged 12–14 years was 1,893 people, which is 4% of the total population. Nnumber of interviewed children was 899 people, the number of girls interviewed – 994 people. The accuracy of the study was ±3%.

The total number of interviewed students aged 15–17 was 925 people, which is 6% of the total population. Number of interviewed children was 449 people, the number of girls interviewed – 476 people. The error in the study was ±3%.

Research methods: analysis and generalization of scientific literature; methods of the theoretical level of research (analysis and synthesis), a sociological survey.

Results of the research and their discussion

This study compares our own empirical data with similar data from other countries. It should be noted that most of the reports on the motor activity of children and young people in different countries are presented in the form of relevant scientific publications, and are systematized on a special electronic resource The global matrix 2.0 on physical activity for children and youth [14].

The data presented in the motor activity reports are evaluated according to a standard scale, which is common for all AHKGA member countries. The scale provides for equal ratings from "A" (high level) to "F" (lowest level). In some cases, the relevant indicators may be undefined, then in the report they are indicated by the abbreviation "INC" (there is no data on this indicator) [14]. Evaluation criteria are presented in Table 1.

Table 1

Criteria for assessing the state of motor activity in children and youth

Assessment	Landmark
A	81–100%
B	61–80%
C	41–60%
D	21–40%
F	0–20%
INC	no data on this indicator

When comparing data from different countries in our study, we took into account information on gross domestic product (GDP) per capita [17], as well as life expectancy in different countries, presented in the report of the World Health Organization (WHO) [18].

Level of attraction to unorganized gaming (active play). Because of the lack of a unified algorithm for collecting information, and also because of the complexity of the correct interpretation of the data, reports from 21 out of 38 countries sent to the AHKGA did not contain information on the unorganized gaming activities of children [14].

In the overall rating of AHKGA, two African countries received high ratings of the "unorganized gambling" segment – Ghana and Kenya [14].

Among pupils of secondary schools of Ukraine at the age of 12–14 years, 51,1% are attracted to various sports games in their spare time. At the same time, the rates between young men and women differed by 5%, amounting to 53,8% and 48,7%, respectively. In the age group 15–17 years, the rate of student involvement in gaming activities in their spare time was 50,1%. Among the pupils of the senior school age, the gender characteristics were much more expressive. If among girls this indicator was 37,8%, then among the young men it was 63% (Figure 1).

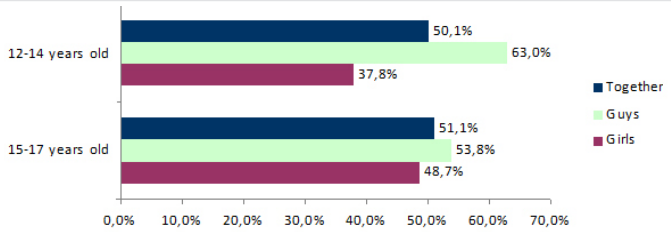

Fig. 1. Level of involvement in the unorganized gaming activity of pupils of general education schools in Ukraine (n=1893, n=925)

Such indicators allowed to evaluate the indicator "active play" in Ukraine on "C". In the list of countries in which "unorganized gambling activities" according to AHKGA standards are also rated at "C", there are a total of six countries. In these countries, the level of involvement of children in this segment of motor activity is in the range of 41–60% (Table 2).

Table 2

Countries in which the level of involvement of children and youth in unorganized gaming activities in accordance with the standards of AHKGA is rated at "C"

Countries	Estimation	Level of attraction	GDP per capita ($)	Life Expectancy
Belgium	C+	–	40 456	81,1
Spain	C+	–	26 327	82,8
Finland	C	52%	42 159	81,1
Ukraine	C	50,1–51,1%	2 109	71,3
Nigeria	C		2 758	61,8
Wales	C		–	–

Organized sport and physical activity. According to the scale of assessment proposed by AHKGA, in Ukraine, the level of involvement of children aged 12–17 in organized sports activities in their free time is rated at "D". The corresponding figures in the age groups 12–14 years and 15–17 years are 33% and 32,3%. At the same time, the rate of children in both age groups was significantly higher than that of girls (Figure 2).

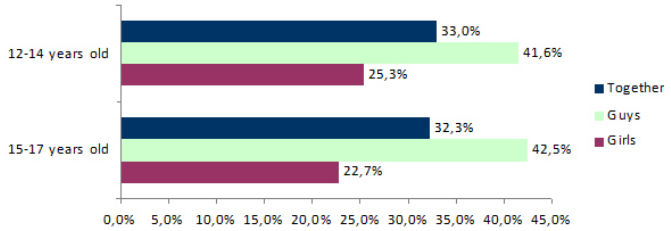

Fig. 2. Level of attracting students of general education schools in Ukraine to organized sports and motor activity (n=1893, n=925)

Analysis of additional indicators, such as GDP per capita, showed that the overall high assessment of involvement in organized sports and motor activity is not related to the economic development indicators, because in the list of countries in which the level of this indicator is rated at "D" as a country with a low level of GDP per capita, and in relation to rich countries (Table 3).

Table 3

Countries in which the level of involvement of children and young people in organized sport activities during off-school hours by AHKGA standards is rated at "D"

Countries	Estimation	Level of attraction	GDP per capita ($)	Life Expectancy
Mexico	D	40%	9 592	76,7
England	D	34%	44 118	81,2
Ukraine	D	32–33%	2 109	71,3
Poland	D	30,6%	12 662	77,5
Qatar	D	25–30%	78 829	78,2
Chile	D	25%	13 331	80,5

In the group of countries in which the index of attracting children and young people to organized sports activities during extra-curricular time is the highest, the main place is occupied by Denmark (Table 4).

Table 4

Countries with the highest rates of involvement of children and youth in organized sports activities during extra-curricular time

Countries	Estimation	Level of attraction	GDP per capita ($)	Life Expectancy
Denmark	A	83%	51 424	80,6
Sweden	B+	75%	48 966	82,4
Netherlands	B	71%	44 333	81,9
Spain	B	61–78%	26 327	82,8
Canada	B	76%	43 935	82,2
Zimbabwe	B	67%	1 037	60,7
Portugal	B	–	18 984	81,1
Australia	B	64%	51 642	82,8
Slovenia	B–	47–60%	20 712	80,8
New Zealand	C+	56%	36 963	81,6

Level of attraction to active transportation (active transportation). An analysis of this indicator of motor activity showed that the level of involvement of Ukrainian children in active forms of displacement when crossing the distance from home to school and back according to AHKGA standards corresponds to the "B" rating. Note that in active forms of movement (or transportation) is understood mainly walking and cycling. This includes also running, riding on rollers, skate, scooter and the like. Most Ukrainian schoolchildren get to school by foot. Among students aged 12–14 years, this figure is 73,6%. Another 3,6% of students of this age use a bicycle. A generalized indicator for children of this age group is 77,2%.

Among students aged 15–17 years old, walking through the distance from home to school uses 75,9% of children, the bicycle – 4,1%. The generalized indicator is 80%. Significant differences on the basis of gender were not revealed (Table 5).

As can be seen from the table, in general 74,6% of students aged 12–17 years reach the educational institution on foot, another 3.8% do it with a bicycle. A generalized indicator of

Table 5

Level of involvement of pupils of Ukrainian general education schools in active forms of displacement when overcoming the distance from home to an educational institution

Type of motor activity	12–14 years old (n=1893,%)		15–17 years old (n=925,%)		12–17 years old (n=2818, %)		Together (n=2818, %)
	Guys	Girls	Guys	Girls	Guys	Girls	
Walking	73,9	73,6	73,7	77,9	73,8	75,3	74,6
Bicycle riding	3,4	3,9	4,2	4	3,7	3,9	3,8
Together	77,3	77,5	77,9	81,9	77,5	79,2	78,4

children, using active forms of displacement when overcoming the distance from home to school is 78,4%, which is a relatively high indicator compared with similar data from other countries.

There were no significant differences with regard to the age characteristics of the students. The corresponding indicators remain practically unchanged both in the middle and in the senior school age.

There have also been no significant changes in the indicators, taking into account the gender specificity of the students. Note that only among girls aged 15–17 there is an increase in the rate of those who go to school on foot. This indicator increased by 4,3% compared to the age group of 12–14 years.

Among the European countries that reported on the motor activity of children and youth to the AHKGA, the "active movement" segment was rated "B" also in Denmark and Finland [14]. Statistical data for all countries with the same rating are presented in Table 6.
According to the AHKGA, the best indicators of attracting children of different ages to the "active movement" segment are recorded in the Netherlands and Zimbabwe [11].

In a group of countries where this segment of motor activity according to AHKGA standards received low ratings, 11 countries entered. It is interesting that most of these countries are economically developed and have high GDP per capita values (Table 7).

Table 6

Countries in which the level of involvement of children and young people in active forms of displacement according to AHKGA standards is rated at "B"

Countries	Estimation	Level of attraction	GDP per capita ($)	Life Expectancy
Ukraine	B	78,4%	2 109	71,3
Finland	B	70%	42 159	81,1
Denmark	B	68,5%	51 424	80,6
Hong Kong	B	–	42 097	–
Japan	B	68-93%	32 481	83,7
Kenya	B	60–76%	1 432	63,4
Nigeria	B	61–80%	2 758	61,8
Thailand	B–	51,2%	5 426	74,9

Table 7

Countries with low levels of involvement of children and young people in active forms of displacement according to AHKGA standards

Countries	Estimation	Level of attraction	GDP per capita ($)	Life Expectancy
Australia	C–	43–53%	51 642	82,8
Chile	C–	48,6%	13 331	80,5
England	C–	47%	44 118	81,2
China	C–	41,1%	8 280	76,1
Belgium	C–	40%	40 456	81,1
Canada	D	25%	43 935	82,2
Colombia	D	–	5 687	74,8
Ireland	D	23%	48 940	81,4
Malaysia	D	22,2%	10 073	75
SAR	D–/F–	20%	35 392	77,1
USA	F	11–15%	55 904	79,3

Conclusions

According to the AHKGA methodology, the indicators of the motor activity of children in Ukraine were selected for the study and received the following assessments: "active play" – "C" (50,1–51,1% of children aged 12–17); "Organized sport and physical activity" – "D" (32–33% of children 12–17 years old); "Active transportation" – "B" (78.4% of children 12–17 years old).

The highest scores for the indicator "unorganized gaming" were received in Ghana and Kenya ("B" score). The highest rates of involvement of children in organized sports and motor activity are recorded in Denmark and Sweden. The corresponding assessments of this indicator in the countries mentioned are "A" and "B+". The highest rates of involvement of children in active displacement are recorded in the Netherlands and Zimbabwe. "Active displacement" in these countries is rated at "A".

Childcare after hours depends on how to do it. Only in the case of "active movement" is the lowest estimates recorded mainly in economically developed countries.

Prospects for further research are the determination of other indicators of the motor activity of children of different ages in Ukraine, which will in the future form a visible report on the motor activity of children and youth in Ukraine and submit it to the AHKGA.

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References

1. Danylenko, H.M. & Nesterenko, V.H (2016), "Influence of physical activity on the level of mental performance of pupils studying under different programs", *Sovremennaia pedyatryia*, No. 8, pp. 55-58. (in Ukr.)
2. Kindzera, A.B., Bodnar, I.R. & Sorokolit, N.S. (2017), "Characteristics of the level of daily motor activity of schoolchildren of grades 5-9", *Fizychna kultura, sport ta zdorov'ia natsii*, No. 4, pp. 176-180. (in Ukr.)
3. Krutsevych, T. & Panhelova, N. (2014), "Rational motor activity as a factor for improving the mental working capacity of schoolchildren", *Sportyvnyi visnyk Prydniprovia*, No. 2, pp. 73-76. (in Ukr.)
4. Moskalenko, N., Poliakova, A. & Reshetylova, V. (2016), "Modeling of rational motor regime for children 3-4 years old in preschool institutions of different type", *Sportyvnyi visnyk Prydniprovia*, No. 3, pp. 151-157. (in Ukr.)
5. Ostapenko, O.I. & Kosata, I.V. (2016), "Modern technologies of forming habit of motor activity of junior pupils in the process of physical education", *Naukovyi chasopys [Natsionalnoho pedahohichnoho universytetu imeni M.P. Drahomanova]. Seriia 15: Naukovo-pedahohichni problemy fizychnoi kultury (fizychna kultura i sport)*, No. 10, pp. 76-79. (in Ukr.)
6. President of Ukraine (2016), "On the National Strategy for the Improvement of Motor Activity in Ukraine for the period up to 2025" "Motor Activity – a Healthy Lifestyle – A Healthy Nation", *Uriadovyi kur'ier*, No. 38, pp. 8-9. (in Ukr.)
7. Sutula, V.O., Deineko, A. Kh. & Vishnia, O.V. (2015), "Formation of the culture of motor activity in students of general educational institutions", *Slobozans`kij naukovo-sportivnij visnik*, No. 6, pp. 170-173. (in Ukr.)
8. Asfour Lila, et al. (2015), «The association of organized and unorganized physical activity and sedentary behavior with internalizing and externalizing symptoms in Hispanic adolescents», *Child and adolescent mental health*, No. 21.2, pp. 109-114.
9. Hills, Andrew P., Dengel, Donald R. & Lubans, David (2015), «Supporting public health priorities: recommendations for physical education and physical activity promotion in schools», *Progress in cardiovascular diseases*, No. 57.4, pp. 368-374.
10. Marques, Adilson, Ekelund, Ulf & Sardinha, Luнs B. (2016). «Associations between organized sports participation and objectively measured physical activity, sedentary time and weight status in youth», *Journal of Science and Medicine in Sport*, No. 19.2, pp. 154-157.
11. Neufer, P. Darrell, et al (2015), "Understanding the cellular and molecular mechanisms of physical activity-induced health benefits", *Cell metabolism*, No. 22.1, pp. 4-11.
12. Poitras, Veronica Joan, et al (2016), "Systematic review of the relationships between objectively measured physical activity and health indicators in school-aged children and youth. Applied Physiology", *Nutrition, and Metabolism*, No. 41.6, pp. 197-239.
13. Harrington, Deirdre, Belton, Sarahjane, Murphy, Marie et al (2016), *The 2016 Ireland North and South Report Card on Physical Activity for Children and Youth*, University of Leicester, University of Ulster.
14. Active healthy kids (2016), The global matrix 2.0 on physical activity for children and youth, Released on November 16th, 2016 at the International Congress on Physical Activity and Public Health in Bangkok, Thailand, available at: https://www.activehealthykids.org/the-global-matrix-2-0-on-physical-activity-for-children-and-youth/ (accessed 26 February 2018).
15. Tremblay, Mark S. et al (2014), "Physical Activity of Children: A Global Matrix of Grades Comparing 15 Countries", *Journal of Physical Activity and Health*, No. 11(Supp 1), pp. 113-S125.
16. Warburton, D.E. & Bredin, S.S. (2016), "Reflections on physical activity and health: what should we recommend?", *Canadian Journal of Cardiology*, No. 32.4, pp. 495-504.
17. World Economic Outlook Database (2016), International monetary fund, April 2016, available at: http://www.imf.org/external/ns/cs.aspx?id=28 (accessed 28 February 2018).
18. World Health Organization (2016), World health statistics 2016: monitoring health for the SDGs, sustainable development goals, available at: http://www.who.int/gho/publications/world_health_statistics/2016/en/ (accessed 28 February 2018).

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Legal Regime of sports volunteering

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Purpose: *to investigate the legal regime regarding sports volunteering in Ukraine.*

Material & Methods: *disclosed the concept of "legal regime", "sports law". Regulatory and legislative documents on volunteer activity of various countries of the world and Ukraine are considered.*

Results: *the current state of the regulatory and legal support for sports volunteerism in Ukraine is analyzed.*

Conclusions: *analysis of normative and legal documents on volunteer activity has shown that for today there is no legislatively fixed term "sports volunteering" and the main provisions for increasing the social significance of sports volunteering, removing obstacles to the use of volunteer assistance in organizing and conducting mass sports and health events and sports competitions of the state values. It is not determined who can be the founder of sports volunteer organizations, what is the procedure for registering these organizations and the principles for exercising state control over their activities.*

Keywords: *sports volunteering, legal regime, sports legislation, regulatory support.*

Introduction

In the modern world, the volunteer movement, being an element of social responsibility and the highest manifestation of a developed civil society, is gaining increasing importance. In Ukraine, volunteer activities are carried out in many areas, one of which is sports volunteering. A sports volunteer is a person who has received special training and carries out sports volunteer activities by providing assistance in organizing and conducting competitions [11]. The unselfish help of voluntary assistants is an effective way to solve the main issues of successful competition, in turn contributes to the creation of a positive image of Ukraine in the world [10].

Analysis of scientific literature indicates that the problem of sports volunteering as a kind of volunteer activity was engaged by such scientists as E. V. Goncharenko (2010), I. A. Kogut (2010), K. I. Levkov (2013), C. F. Matveev (2013), A. S. Bondar (2015, 2016), V. V. Prikhodko (2017), I. V. Petrenko (2016, 2017); H. Morgan (2013), K. Hallman (2015).

Today, volunteer activity at the state level is regulated by the laws of Ukraine "On Social Work with Children and Youth" (2001), "On Social Services" (2003), "On Volunteering" (2015). The current state of the legal and regulatory framework for sports volunteerism in Ukraine indicates that there is no legislatively fixed term "sports volunteering" and basic provisions for its development at the state level, although sports volunteerism is an active component of building a civil society and therefore, state support for it is important values.

Purpose of the study: to analyze the legal regime of sports volunteering in Ukraine.

Material and Methods of the research

Analysis of regulatory and legislative documents on volunteer activities of various countries of the world and Ukraine. The current state of the regulatory and legal support for sports volunteerism in Ukraine is considered.

Results of the research and their discussion

The state administration of the sphere of physical culture and sports in Ukraine is still in the stage of improvement. Reforming this direction requires solving a set of organizational, economic and legal issues, taking into account the experience of European countries. This is very important for the development of a healthy and socially active nation, after all, a characteristic feature of the sphere is that it is connected not only with material values, but also in many respects with the spiritual and physical needs of citizens [3].

The legal regime is a special order of legal regulation expressed in a certain combination of legal means and creating the desired social position and a specific degree of favorability or unfavorability for the satisfaction of the interests of subjects of law. In other words, the legal regime presupposes a certain order of legal regulation, which is provided through a special combination of methods, methods and types of legal regulation involved for its implementation [1].

Important is the definition of the concept of sports legislation, clarify the role of the rule of law in the regulation of social relations in the field of physical culture and sports. The sports legislation of Ukraine is a system of interacting normative legal acts and other sources adopted by the competent bodies of the state and bodies of self-regulation of sports organizations in order to regulate the legal bases for the development of mass and professional sports, physical education in general, regulating social relations in the field of physical culture and sports [2].

Sport legislation of Ukraine, being an external form of legal regulation of sports relations, is characterized by normative acts of different legal force, content and form. Sources of sports legislation are a multi-level hierarchical system, which is based on the Constitution of Ukraine and can be represented as follows:

– laws adopted by the supreme representative body of state power have the highest legal force and fix a high level of regu-

latory regulation in the field of physical culture and sports (for example, the Law of Ukraine of 17.11.2009 "On Physical Culture and Sport") [5];

– decrees of the President of Ukraine, which are the official source of legal information, have important normative powers to regulate this social activity;

– place belongs to the normative acts of local self-government bodies and local state administrations that relate to the sphere of physical culture and sport, as well as departmental regulations, statutes, regulations of national sports federations, public organizations of physical culture and sports, which are characterized by departmental and territorial limitations and locality of action;

– international agreements and charters of international sports organizations [8].

This legal framework establishes a system of conceptual ideas and views on the role, organizational structure and tasks of volunteerism in the field of physical culture and sports in Ukraine.

The analysis of the current legislation in the field of physical culture and sports shows that it has two main functions – regulatory and protective. The regulating function fixes the optimal organizational system of bodies and sports organizations in the field of physical culture and sports, their powers, and creates favorable legal conditions for the activities of sports organizations and athletes. The protective function is aimed at the protection of special relations in the field of sports, provides protection of athletes, coaches and other sports professionals from negative impact, implies the observance of social and legal guarantees of their activities.

The UN General Assembly, taking into account the recommendations of the Economic and Social Council, submitted in resolution 1997/44 of July 22, 1997, at the 52nd session, adopted the following decisions on the distribution of the volunteer movement:

– call upon governments of states, as well as volunteer organizations, public, governmental and non-governmental organizations to cooperate;
– outline ways to improve work, cooperation and popularization of activities;
– a joint organization of volunteers to develop a program of work [9]

For volunteering to be legally recognized in the "Message of the European Commission to the Council of Europe" (1998), it was stressed that it is necessary to establish a legal framework for the functioning of various volunteer organizations and to draw a clear boundary between voluntary and labor relations, national legislation should first define and provide it proper regulation [1].

The study of normative and legal acts on volunteer activity in various countries of the world has shown that there is no similar for all regulation of volunteer activity, mainly because of the diversity of volunteer initiatives, but also because different countries, adopting their own laws, pursue different goals [8].

In the Czech Republic, for example, the Law on Voluntary Activities (2002) defines only certain forms of volunteer and stipulates the specific conditions under which the Czech state supports them.In Hungary, the Law on Community Service Volunteering (2005) also has a relatively narrow regulatory In Italy, the Law on a Common Policies for Voluntary Activities (1991) establishes the principles and criteria governing relations between government agencies and volunteer organizations. The Law on Associations and Foundations (2003), in Luxembourg, the Law on Youth Volunteer Service (1999). In Poland, the Law on Public Benefit and Voluntary Activities (2003) regulates the volunteer activities of non-profit and non-governmental organizations, associations, local governments, state administration and other legal entities subject to this law. In Portugal, the Volunteer Act 71/1998 (1998) regulates the voluntary activities of projects and programs designed to assist individuals, families and communities. In Romania, the Law on Voluntary Activities (2001, Amendments 2002) encourages the voluntary activities of Romanian and foreign citizens united in public and private registered non-profit organizations. The Spanish "Voluntary Work Law" (1996) provides that volunteer work must be carried out within the framework of a specific project or program [9].

In Ukraine, as in many countries around the world, a legal mechanism has been developed to regulate the activities of volunteers in accordance with the needs and characteristics of the state. Since independence, the state has issued a number of regulatory and legislative documents on the support and development of the volunteer movement. In particular: the Law of Ukraine "On Social Work with Families, Children and Youth" (dated June 21, 2001, No. 2558-III); Ordinance of the President of Ukraine "On the organization of the International Year of Volunteers in Ukraine in 2001" (from 22.03.2001, No. 67/2001). The Law of Ukraine "On Social Services" (from 19.06.2003, No. 966-IV); Resolution of the Cabinet of Ministers of Ukraine "On approval of the Regulation on Voluntary Activities in the Sphere of Providing Social Services" (dated 10.12.2003, No. 1895); The decree of the Cabinet of Ministers of Ukraine "On the formation of the Coordination Council for the development and support of the volunteer movement" (from 23.04.2003, No. 225-r); The Law of Ukraine "On Voluntary Activities" (dated April 19, 2011, No. 3236-VI) [4–7]. This testifies to the recognition by society of the importance of volunteerism.

Thus, the Law of Ukraine "On Social Work with Families, Children and Young People" stipulates that the volunteer movement is a voluntary, charitable, unprofitable and motivated activity that has a socially useful character [6]. It is declared that support and assistance to its development is one of the main directions of the state policy in the sphere of social work with children and youth.

The Law of Ukraine "On Voluntary Activities" defines the features of the legal status of a volunteer and a volunteer organization, their rights and responsibilities; principles and directions of volunteer activity; implementation of state policy in the field of volunteerism; sources of financing [4]. Volunteer activities are listed, which are divided into two groups. The first group includes directions of social orientation, and to the second group – other types of activity, among which the directions on which it is possible to carry out volunteer activity in the sports and sports branch are organized: the organization of mass sports and cultural events of national and international importance; the education of young students and

the creation of conditions for its creative, intellectual, spiritual and physical development; carrying out of organizational-mass actions in the established order during after-school and extra-curricular time. The implementation of these areas can not be successful without involving sports volunteers, whose training should be carried out in accordance with scientifically based algorithms of vocational training in the sports and sports industry.

The law also deals with ensuring the effective regulation of legal relations arising in the process of producing volunteer activities in Ukraine, promoting the development of volunteerism in Ukraine, improving the quality of volunteer assistance. In particular, the Law specifies the terms "volunteer activity", "volunteer", removes restrictions for the implementation of volunteer activities by organizations and institutions that clarifies the rights and duties of volunteers and organizations and institutions that attract volunteers to their activities, explains the specifics of reimbursement of costs associated with provision of volunteer assistance. The law also changes the voluntary life and health insurance of volunteers for the period of volunteer assistance provided by organizations and institutions that attract volunteers to their work. It is noted that there are a number of advantages in volunteer activity, which, in our opinion, should attract students to such activities, including:

– obligatory volunteer insurance for the period of work;

– reimbursement of expenses related to volunteer work;

– for students, volunteer work will be counted as a production practice, provided that the work corresponds to the profile of education in institutions of higher education.

In order to find out the level of public awareness of the legal support for sports volunteer activity, we conducted a survey among respondents on the Internet using the website (www.survio.com/en/), which was attended by 100 citizens, the average age of the respondents was 31,5 years.

The results of the survey indicate that the majority of respondents who answered the questions of the questionnaire, namely 75,0%, are related to the sports volunteer movement.

63.0% of the respondents who are related to the sports volunteer movement consider the existing regulatory framework insufficient for the successful functioning of sports volunteer activity, namely: 43,0% of respondents expressed the opinion that the existing legal documents do not cover all areas of sports volunteer activity, 11,0% said that the existing legal acts can not be regarded as a regulatory and legal support for activities, since there are no legislative acts which clearly define the status of athlete's volunteering.

Most respondents believe that the existing regulations: do not cover all areas of sports volunteers – 43,0%, do not reflect the specifics and multifunctionality of the activity of the sports volunteer system – 9,0% and do not regulate sports volunteer activity – 11,0%. At the same time, 37,0% of respondents believe the contrary, that there are enough legal documents regulating the activity of sports volunteers.

Conclusions

Analysis of regulatory documents on volunteer activity showed that today there is no legislatively fixed term "sports volunteerism" and the main provisions for increasing the social significance of sports volunteering, removing obstacles to the use of volunteer assistance in organizing and conducting mass sports and sports events of national importance. It is not determined who can be the founder of sports volunteer organizations, what is the procedure for registering these volunteer organizations and the principles for exercising state control over their activities, etc.

Prospects for further research are to further disclose the activities of sports volunteers in the organization and conduct of physical fitness and sports events and sports competitions.

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References

1. Vavreniuk, S.A. (2014), "Theoretical and legal foundations of state management of physical culture and sports in Ukraine", *Teoriia ta praktyka derzhavnoho upravlinnia*, No. 3(46), pp. 60-63. (in Ukr.)
2. Horbunova-Ruban, S.A., Kulynych, O.V., Kokhanyi, T.A. & Parshchyk, A.V (2004), *Volonterskoe dvyzhenye v Kharkove* [Volunteer Movement in Kharkiv], Kharkiv. (in Ukr.)
3. Цвік, М.В., Ткаченко, В.Д., Петришина, О.В. (2002), *Загальна теорія держави та права*, Харків. (in Ukr.)
4. The Verkhovna Rada of Ukraine (2011), the Law of Ukraine "On Volunteer Activity" No. 3236-VI of April 19, 2011, available at: http://zakon.rada.gov.ua/laws/show/3236-17/ed20120324 (accessed by 23.11.2015). (in Ukr.)
5. The Verkhovna Rada of Ukraine (2017), the Law of Ukraine "On Physical Culture and Sports" of 14.09.2017 № 3808-12, available at: https://zakon.help/law/3808-XII/edition14.09.2017/page3 (accessed by 12.11.2015). (in Ukr.)
6. The Verkhovna Rada of Ukraine (2001), the Law of Ukraine "On Social Work with Families, Children and Youth", dated 21.06.2001 No. 2558-III, available at: http://zakon2.rada.gov.ua/ laws/show/2558-14 (accessed by 15.11.2015). (in Ukr.)
7. The Verkhovna Rada of Ukraine (2003), the Law of Ukraine "On Social Services" dated June 19, 2003 No. 966-IV, available at: http://zakon2.rada.gov.ua/laws/show/966-15 (accessed by 19.10.2015). (in Ukr.)
8. Krechko, V.K. (2011), "Peculiarities of normative and legal support for volunteer activity", *Materialy I Vseukrainskoi studentskoi naukovoi konferentsii (v ramkakh KhI Mizhnarodnoi naukovo-praktychnoi konferentsii «Fizychna kultura, sport ta zdorov'ia»), KhSAPC, Kharkiv*, pp. 23-25. (in Russ.)
9. Liubarska, O.M. (2012), *Osnovy sotsializatsii osobystosti* [Fundamentals of Socialization of the Personality], Kyiv. (in Ukr.)
10. Petrenko, I.V. (2017), "Organizational Aspects of the Training of Sport Volunteers", *Naukovyi chasopys Nats. ped. un-t im. M.P. Dragomanova*, No. 1(82)17, pp. 52-55. (in Ukr.)
11. Petrenko, I.V. & Bondar, A.S. (2018), "The Role and Importance of Sports Volunteering in the Modern Olympic Movement", *Molod ta olimpiiskyi rukh: zb. tez dopovidei XI Mizhn. konf.*, Kyiv, pp. 36-38. (in Ukr.)

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Age dynamics of the level of development of static equilibrium in middle-class students with visual impairments

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Purpose: *to study the age-related dynamics of indicators of the ability to maintain static equilibrium in middle-class students with visual impairments.*

Material & Methods: *static equilibrium indices were determined by the method of E. Ya. Bondarevsky. The study was attended by middle school students with impaired view of the communal institution "Kharkiv Special Boarding School I–III Steps 12" Kharkiv Regional Council.*

Results: *peculiarities of the dynamics of static equilibrium in children of secondary school age with visual impairment, depending on age and sex.*

Conclusions: *it was revealed that the indices of static equilibrium on one leg, both with the eyes open and with the eyes closed, vary with age in different directions with age. The girls observed mostly the best indicators of static balance with their eyes open, the boys – with closed.*

Keywords: *lack of vision, age dynamics, static equilibrium, content of a sustainable situation, middle-class pupils.*

Introduction

The nature of human motor activity is largely determined by the ability to maintain and maintain equilibrium. This ensures the normal functioning of all physiological systems of the body, the optimal amplitude of movements, the rational distribution of muscular effort, which leads to energy efficiency and increased efficiency of motor actions.

Static equilibrium manifests itself with prolonged preservation of certain postures by a person [1; 10]. The basis of spatial orientation and maintaining the equilibrium is static sensitivity [4].

Static sensations reflect the position of the body in space. When you change the posture in the receptors located in the vestibular apparatus of the inner ear, muscles, joints, tendons, skin of the feet, and eyes, there is an excitation – nerve impulses that flow along the leading nerve fibers into the brain, where they cause a sense of static. Static sensations contribute to balancing the position of the body in space, taking a pose when performing work operations with auditory and visual spatial differences. Static sensation is individual, gives in to training and changes with age. The development of visual and auditory sensitivity contributes to its formation [4].

Coordination of the vertical position of the body, provided by the ability to maintain equilibrium, is an indicator of a person's functional state, his health [25].

The ability to maintain static equilibrium is provided by the joint functioning of the motor, auditory, visual, vestibular and tactile analyzers [1; 5; 11; 18; 21].

Visual impairment leads to a decrease in a person's ability to maintain a balance [1; 11; 18], which negatively affects its vital activity, since the performance of even relatively simple movements requires a sufficiently high level of development of the equilibrium organs [9].

The static sensation in persons with visual impairments is corrected by the participation of auditory and proprioceptive analyzers, muscular sensitivity of the hands, feet and the reception of the feet [4].

The problems of studying the age dynamics of the indices of the ability to maintain static equilibrium in different contingents were handled by L. E. Shesterova [22], T. Bala [2], I. A. Kuzmenko [6–8].

B. V. Sermeev [16], L. V. Kharchenko [20], I. Yu. Gorskaya [3], L.O. Ryadova [12–15] and others studied the problem of developing coordination abilities in children of secondary school age with visual impairments. However, the age-specific features of the development of the ability to maintain static equilibrium in middle-class students have not been the subject of a special study, which requires further scientific research.

Relationship of research with scientific programs, plans, themes. The study was carried out in accordance with the thematic plan of the research work of the Kharkiv State Academy of Physical Culture for 2013–2015. On the topic "Theoretical and Applied Basis for Building Monitoring of Physical Development, Physical Preparedness and Physical Condition of Different Populations" and for 2016–2020. On the topic "Improving the process of physical education in educational institutions of various profiles" (State Registration No. 0115U006754).

Purpose of the study: was to investigate the age features of the development of the ability to maintain static equilibrium in middle-class students with visual impairments.

Material and Methods of the research

The study was conducted on the basis of the communal institution "Kharkiv Special Boarding School No. 12" Kharkov Regional Council for children with visual impairments. 117 middle-class students took part in it.

To achieve the research goal, the following methods were used: theoretical analysis and generalization of scientific and methodological literature, testing of the ability to maintain static equilibrium.

Results of the research and their discussion

Considering the indicators of the ability to holding n static equilibrium among students of middle classes with visual impairments, which were evaluated according to the results of the content of a stable position on one leg with open and closed eyes, it was found that they are the best of the 9th grade girls and 8 classes of both exercises.

We note that the results of the content of a stable position with closed eyes among schoolchildren of the 7th and 10th grades were almost the same level.

Analysis of the ability to maintain static balance with open eyes in children in the age aspect indicates that with age, they vary in different directions. The most significant improvement in the results is the holding of a stable position on one leg in students from the 7th to the 9th grade, and their significant deterioration from the 9th to the 10th grade (Figure 1). Differences in indicators statistically significant ($p<0,05$).

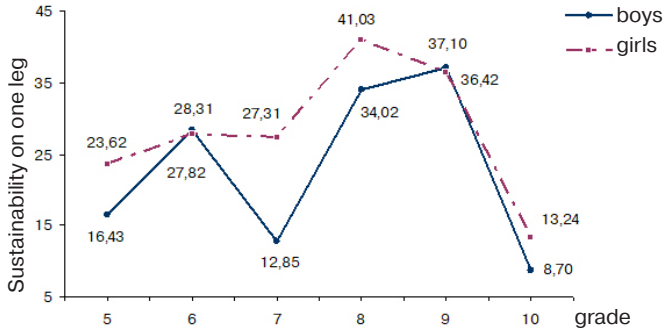

Fig. 1. Age dynamics of indicators of development of the ability to maintain static balance with open eyes in children of secondary school age with visual impairments

Comparing the results of holding a stable position on one leg with the eyes open in girls in the age aspect, we conclude that with age, they change wavy. The lowest indices of the ability to maintain static equilibrium are fixed in the pupils of the 10th grade. Differences in the results, in general, are significant ($p<0,05$). The exception is the indicators of schoolgirls of the 6th and 7th grades, where the authenticity of the differences is not observed ($p>0,05$).

The study of the indices of the ability to maintain static balance with closed eyes in children, depending on the age, showed a multidirectional change in them. The best results of the maintenance of a stable position on one leg were recorded in students of the 9th grade (Figure 2). Differences in indicators are mainly reliable ($p<0,05$), except for the results of pupils of the 5th and 6th, 7th grades, 6th and 7th grades, 8th and 9th grades, where the authenticity of the differences is absent ($p>0,05$).

Age dynamics of the results of the content of the situation stand on one leg with closed eyes in girls has a wavy character: from the 6th to the 8th grade there is an increase in the indices of the ability to maintain static equilibrium, and from the 8th to the 10th grade – their decrease Figure 2). The differences in the results are, in the main, reliable ($p<0,05$), with the exception of those of the 8th and 9th grade pupils, where the authenticity of differences is not observed ($p>0,05$).

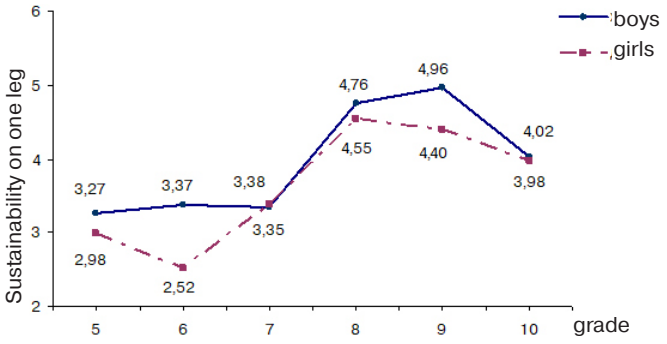

Fig. 2. Age dynamics of the indices of development of the ability to maintain static balance with closed eyes in children of secondary school age with visual impairments

In our opinion, a significant and sharp decrease in their level can be explained, on the one hand, by violations of the functions of the vestibular analyzer, which negatively affects the motor skills of children with visual impairment; with another – secondary deviations, such as a violation of posture in the frontal and sagittal planes.

A significant increase in the indices of the ability to maintain static equilibrium in schoolchildren of the 8th class can be associated with the preservation of a stable position due to the reflex muscle tension of synergists and adequate relaxation of the muscles of the antagonists, which contributes to a rapid reflex movement towards a stable support area.

Comparison of the indicators of the ability to maintain static equilibrium in the sexual aspect allowed to say that with the eyes open, they are mostly reliably ($p<0,05$) higher in girls, except for the results of schoolchildren of the 6th and 9th grade, where the authenticity there are no differences ($p>0,05$).

Analyzing the results of the content of a stable position on one leg with closed eyes in children of secondary school age with visual impairments on the basis of gender, it should be noted that in children they are basically better than girls, except for the indicators of 7th grade pupils. Differences are significant ($p<0,05$) in the results of schoolchildren of grades 5, 6, 9.

Figures 1 and 2 show that the indicators of the ability to maintain static balance in both children and girls with visual problems are more pronounced when performing an exercise with open eyes. This confirms the thoughts of VP Ermakov, A. A. Yakunin [4]; I. B. Soldatova, V. G. Gofman [17], T. Yu. Krutsevich [18], who believe that a person is able to maintain a more stable position with open eyes than with closed ones.

We believe that the differences in the indicators of the abil-

ity to maintain static equilibrium in schoolchildren are due to the fact that the reflexive inclusion of adaptive mechanisms, in particular, the vestibular analyzer, with the content of a stable position with the eyes open, comes faster in girls, with closed ones in children.

Conclusions

1. A sensitive period of development of the ability to maintain static equilibrium with both open and closed eyes in children of secondary school age with visual impairment is the age of 14–15 years for men and 13–14 years for girls. It should be noted that in healthy children the most favorable period of development of coordination abilities, in particular, the ability that was investigated, M. A. Fomin, Yu. N. Vavilov [19] consider the age of 7–10 years. So, in children with visual impairment, the sensitive period of development of static equilibrium comes later than those who see well.

2. Indicators of the ability to maintain static equilibrium with open and closed eyes, both in children and in girls of secondary school age with visual impairments, change with age, wavy.

3. In the course of the study it was revealed that the results of the maintenance of a stable position with the eyes open are mostly the best for girls, with closed ones for children.

Prospects for further research in this area are the study of the age-related dynamics of indicators of development of other types of coordination abilities among middle-school students with visual impairments.

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References

1. Aloshyna, A., Bychuk, I. & Haiduk, O. (2013), ″Formation of the coordination abilities of the junior pupils in the process of the physical education″, *Molodizhnyi naukovyi visnyk Skhidnoievropeiskoho natsionalnoho universytetu imeni Lesi Ukrainky*: Zhurnal, No. 11, pp. 42-48. (in Ukr.)
2. Bala, T. (2011), ″The influence of the cheerleading exercises on the level of the development of the coordination abilities of the schoolchildren of the 5th-6th grades″, *Slobozans`kij naukovo-sportivnij visnik*, No. 4(27), pp. 14-19. (in Russ.)
3. Chavychanov, A.A. (1997), ″Change in the motor function with vestibular loads″, *Fiziologicheskie osnovy upravleniya dvizheniyami,* Moscov, pp. 43-53. (in Russ.)
4. Fomin, N.A. & Vavilov, Yu.I. (1991), *Fiziologicheskie osnovy dvigatelnoy aktivnosti* [Physiological basis of the motor activity], Fizkultura i sport, Moscov. (in Russ.)
5. Gorskaya, I.Yu. (2001), *Teoreticheskie i metodologicheskie osnovy sovershenstvovaniya bazovykh koordinatsionnykh sposobnostey shkolnikov s razlichnym sostoyaniem zdorovya: avtoref. diss. na soiskanie uchenoy stepeni d-ra ped. nauk* [Theoretical and methodological basis for improving the basic coordination abilities of the schoolchildren with the different health conditions: PhD thesis abstract], Omsk. (in Russ.)
6. Karpeev, A.G. & Avtamonov, V.A. (2013), *Metodologicheskie aspekty izucheniya koordinatsionnykh sposobnostey* [Methodological aspects of the study of the coordination abilities], Akademiya, Moskov. (in Russ.)
7. Kharchenko, L.V. (1999), *Sovershenstvovanie bazovykh koordinatsionnykh sposobnostey shkolnikov 8–12 let s narusheniem zreniya: avtoref. dis. na soiskanie uchenoy stepeni kand. ped. nauk* [Improvement of the basic coordination abilities of the schoolchildren 8–12 years old with the visual impairment: PhD thesis abstract, Omsk. (in Russ.)
8. Kuzmenko, I.A. (2012), ″Age features of the development of the coordination abilities of the secondary school pupils″, *Fizicheskaya kultura, sport i turizm. Integratsionnye protsessy nauki i praktiki*: *materialy V mezhdunarodnoy nauchno-prakticheskoy konferentsii* [Materials of the V International Scientific and Practical Conference], 19–23 aprelya 2012 g. Orel, Gosuniversitet-UNPK, Orel, pp. 25-30. (in Russ.)
9. Kuzmenko, I.O. (2013), *Rozvytok koordynatsiinykh zdibnostei shkoliariv serednikh klasiv z urakhuvanniam funktsionalnoho stanu sensornykh funktsii: avtoref. dys. na zdobuttia naukovoho stupenia kand. nauk z fiz. vykh. ta sportu* [Development of the coordination abilities of the schoolchildren of the middle classes taking into account the functional state of the sensory functions: PhD thesis abstract, KhDAFK, Kharkiv. (in Ukr.)
10. Kuzmenko, I.O. (2015), ″Level of the development of the static and the dynamic equilibrium of the schoolchildren of the grades 5–9″, *Moloda sportyvna nauka Ukrainy*: *Zb. nauk. prats z haluzi fizychnoi kultury, sportu i zdorov'ia liudyny*, No. 19: u 4-kh t., LDUFK, L, T. 2, pp. 137-140. (in Ukr.)
11. Lyakh, V.I. (2006), *Koordinatsionnye sposobnosti: diagnostika i razvitie* [Coordination abilities: diagnostics and development], TVT Divizion, Moscov. (in Russ.)
12. Matveev, L.P. (1991), *Teoriya i metodika fizicheskoy kultury (obshchie osnovy teorii i metodiki fizicheskogo vospitaniya; teoretiko-metodicheskie aspekty sporta i professionalno-prikladnykh form fizicheskoy kultury)* [Theory and methodology of the physical culture (general principles of the theory and the methods of the physical education, the theoretical and the methodical aspects of the sports and the professionally applied forms of the physical culture)], Fizkultura i sport, Moscov. (in Russ.)
13. Riadova, L. & Shesterova, L. (2014), ″Study of the level of the development of the coordination abilities of the children of the middle school age with the visual impairment″, *Moloda sportyvna nauka Ukrainy*: *Zb. nauk. prats z haluzi fizychnoho vykhovannia, sportu i zdorov'ia liudyny*, No. 18: u 4-kh t., LDUFK, T. 3, pp. 177-181. (in Ukr.)
14. Riadova, L.O. (2014), ″Features of the level of the development of the coordination abilities of the children 11–15 year with the visual impairment″, *Visnyk Chernihivskoho natsionalnoho pedahohichnoho universytetu imeni T. H. Shevchenka,* Chernihiv, No. 118, T. III, pp. 246-250. (in Ukr.)
15. Riadova, L. (2015), ″Dynamics of the development of the coordination abilities of the children of the middle school age with the visual impairments under the influence of the specially directed exercises and mobile games″, *Fizychne vykhovannia, sport i kultura zdorov'ia u suchasnomu suspilstvi*: *Zb. nauk. pr. Skhidnoievrop. nats. un-tu im. Lesi Ukrainky*, Skhidnoievrop. nats. un-t im. Lesi Ukrainky, Lutsk, No. 3(31), pp. 168-173. (in Ukr.)
16. Riadova, L.O. & Shesterova, L.Ye. (2018), ″Age changes in the indicators of the development of the ability to maintain dynamic balance in the pupils of the middle classes with the visual impairment″, *Aktualni problemy fizychnoho vykhovannia riznykh verstv naselennia*: *zbirnyk naukovykh prats*, KhDAFK, Kharkiv, pp. 214-219, available at: http://hdafk.kharkov.ua/ua/naukova-robota/naukovo-teoretichni-vidannya/aktualni-problemi-fizichnogo-vikhovannya-riznikh-verstv-naselennya (in Ukr.)
17. Veretelnykova, Yu.A. (2016), Rukhova *aktyvnist i zdorov'ia riznykh verstv naselennia* [Motor activity and health of the different sections of the population], Uporiadnyk, KhNMU, Kharkiv. (in Ukr.)
18. Sermeev, B.V. (1987), *Fizicheskoe vospitanie detey s narusheniem zreniya* [Physical education of the children with the visual impairment],

Zdorov'ya, Kyiv. (in Russ.)
19. Shesterova, L.Ye. (2004), *Vplyv rivnia aktyvnosti sensornykh funktsii na udoskonalennia rukhovykh zdibnostei shkoliariv serednikh klasiv*: *avtoref. dys. na zdobuttia nauk. stupenia kand. nauk z fiz. vykh. ta sportu* [Influence of the level of the activity of the sensory functions on improvement of the motor abilities of the high school students: PhD thesis abstract], KhDAFK, Kharkiv. (in Ukr.)
20. Soldatov, I.B. & Gofman, V.R. (2000), *Otorinolaringologiya* [Otorhinolaryngology], ELBI, Sankt-Peterburg. (in Russ.)
21. Krutsevych, T.Yu. (2012), *Teoriia i metodyka fizychnoho vykhovannia: zahalni osnovy teorii i metodyky fizychnoho vykhovannia* [Theory and methods of the physical education: general principles of the theory and methods of physical education], NUFVSU «Olimpiiska literatura», Kyiv. (in Ukr.)
22. Yermakov, V.P. & Yakunin, G.A. (2000), *Osnovy tiflopedagogiki: razvitie, obuchenie i vospitanie detey s narusheniyami zreniya* [Fundamentals of the teaflopedagogics: development, education and parenting of the children with the visual impairment, Tumanit, izd. tsentr VLADOS, Moscov. (in Russ.)

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Peculiarities of sensory motion reactions by students of KSAPC

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Purpose: *to establish the features of the manifestation of sensorimotor reactions by students of various specializations of KSAPC.*

Material & Methods: *analysis of scientific and methodological information, generalization of best practical experience, psychophysiological methods of research, methods of mathematical statistics. 72 first-year students of the KSAPC, engaged in various sports, aged from 17 to 19, took part in the research. Participants were divided into 4 groups of 18 people: 1 – cyclical sports (track and field, cycling, tourism); 2 – complex coordination sports (sports and artistic gymnastics, acrobatics, sports dances); 3 – sports games (football, basketball, volleyball, handball); 4 – martial artists (freestyle and Greco-Roman wrestling, judo, boxing). Athletes were qualified from the 2nd category to the candidate for master of sports.*

Results: *in the course of the study it was determined that the best indicators of sensorimotor reactions were observed among students of martial artists, and then - in representatives of sports games, complex coordination and cyclic sports. The greatest differences from the results of the assessment of the level of sensorimotor reactions of martial artists were marked with cyclical sports (from 6% to 12%), followed by complex coordination sports (from 3% to 6%) and sports games (from 1% to 5%).*

Conclusions: *conducted research confirmed the importance of psychophysiological characteristics of athletes of various sports as success factors.*

Keywords: *students, sports, sensorimotor indicators, comparative analysis.*

Introduction

Diagnosis of the functional conditions of the athlete's body is one of the topical areas of modern sports science. High sports achievements are closely connected with the psychophysiological functions of a person. It is known that the total dedication in training activity and the competitive results achieved by the athlete are largely due to the level of development of psychosensory abilities [6; 13; 14; 17].

Since the psychophysiological functions of man represent the biological foundation of the individual-typological features of the higher nervous system, they characterize the process of formation and improvement of special motor skills in conditions of training and competitive activity. The functional state of psychophysiological functions can be an indicator of both the level of preparedness of an athlete, and the development of his processes of fatigue and overstrain [1; 2; 5; 20].

Objective criteria for the current functional state of the central nervous system are indicators of sensorimotor reactions of varying degrees of complexity [8; 10; 18].

The parameters of sensorimotor reactions are one of the most accessible and at the same time sufficiently accurate neurophysiological indicators reflecting the dynamics of the speed of nervous processes and their switching, motor coordination, overall performance and activity of the central nervous system in various fields of activity, including mental performance of students [12; 15; 16; 19]. This makes it possible to obtain information to recommend to students the most suitable type of physical activity for them and to predict success in the chosen sport.

Relationship of research with scientific programs, plans, themes. The research was carried out in accordance with the theme of the research work of the Kharkov State Academy of Physical Culture "Psycho-sensory regulation of the motor activity of athletes of situational sports" (state registration number 0116U008943).

Purpose of the study: to establish the features of the manifestation of sensorimotor reactions by students of various specializations of KSAPC.

Objectives of srudy:

– to determine the parameters of sensorimotor reactions in KSAPC students;

– to carry out a comparative analysis of the parameters of sensorimotor reactions in students of various sports of KSAPC.

Material and Methods of the research

To solve the research problems, the following methods were used: analysis of scientific and methodological information, generalization of best practical experience, psychophysiological methods of research, methods of mathematical statistics.

72 first-year students of the Kharkov State Academy of Physical Culture (KSAPC), engaged in various sports, aged from 17 to 19, took part in the research. Participants were divided into 4 groups of 18 people: 1 – cyclical sports (track and field, cycling, tourism); 2 – complex co-ordination sports (sports and artistic gymnastics, acrobatics, sports dances); 3 – sports games (football, basketball, volleyball, handball); 4 – single combat (freestyle and Greco-Roman wrestling, judo, boxing). Athletes were qualified from the 2nd category to the candidate for master of sports.

Results of the research and their discussion

Based on the analysis of scientific and methodological information and generalization of best practical experience, it was established that the specifics of competitive activity of an athlete leaves its imprint on the level of development of leading sensorimotor reactions that ensure high sports achievements [3; 4; 9].

Evaluation of sensorimotor reactions was performed using tests developed for tablet PCs [2; 11]: visual motor reaction (simple reaction); reaction to a moving object (complex reaction); reaction of choice (complex reaction).

Table 1 presents the results of testing the sensorimotor responses of students of KSAPC.

The coefficient of variation was used to determine the homogeneity of the sample observations. The obtained data testify to the homogeneity of the parameters of a simple visual-motor reaction and the selection reaction of the examined athletes, since the coefficient of variation lies in the range from 6,2% to 14,9%. The reaction rates for a moving object have a high coefficient of variation in all groups (from 29,0% to 36,0%), which is explained by the low qualification of athletes who individually have a prediction of the situation (anticipation) (Table 2).

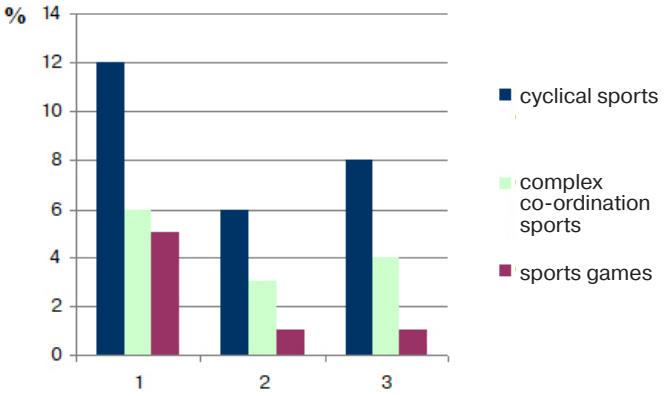

Fig. 1. Differences in the results of assessing the level of sensorimotor responses from those of athletes *(1 – reaction to a moving object; 2 – selection reaction; 3 – simple visual-motor reaction).*

Analysis of Tables 3, 4, 5, 6 allows us to speak of both the similarity of the functional state of the participants in the study ($p>0,05$) and the differences between the groups of students, the reliability of the differences are observed between martial artists and athletes of complex co-ordinating sports in testing simple visual- motor reaction ($t=2,16$; $p<0,05$).

Comparing the parameters of the sensorimotor reactions of the subjects, it was established that in all tests, the figures of the combatants are higher than those of other groups. The greatest differences from the results of the assessment of the level of sensorimotor reactions of martial artists were noted with cyclic sports (response to a moving object by more than

Table 1

Indicators of sensorimotor reactions of students KSAPC (n=72), $\bar{X}\pm m$

No.	Indicators of sensorimotor reactions	1 group	2 group	3 group	4 group
1.	A simple visual-motor reaction (ms)	237,25±8,60	225,87±3,88	219,81±3,86	217,40±3,27
2.	Selection reaction (ms)	688,27±18,34	665,59±15,41	650,80±12,81	647,81±18,95
3.	Reaction to a moving object (ms)	25,72±2,24	24,10±1,71	23,86±1,73	22,74±1,82

Remark. *1 group – cyclical sports (track and field, cycling, tourism); 2 group – complex co-ordination sports (sports and artistic gymnastics, acrobatics, sports dances); 3 group – sports games (football, basketball, volleyball, handball); 4 group – single combats (freestyle and Greco-Roman wrestling, judo, boxing).*

Table 2

Coefficient of variation in the parameters of the sensorimotor responses of students of KSAPC (n=72), %

No.	Indicators of sensorimotor reactions	1 group	2 group	3 group	4 group
1.	A simple visual-motor reaction (ms)	14,9	7,1	7,3	6,2
2.	Selection reaction (ms)	11,0	9,6	8,1	12,1
3.	Reaction to a moving object (ms)	36,0	29,0	30,0	33,1

Remark. *1 group – cyclical; 2 group – complex co-ordination sports; 3 group – sports games; 4 group – single combats.*

Table 3

Reliability of differences in the parameters of sensorimotor reactions of students of cyclic sports with other groups

No.	Indicators of sensorimotor reactions	Groups		
		1 and 2	1 and 3	1 and 4
1.	A simple visual-motor reaction (ms)	t=-1,21; p>0,05	t=1,11; p>0,05	t=1,67; p>0,05
2.	Selection reaction (ms)	t=-0,95; p>0,05	t=0,74; p>0,05	t=0,73; p>0,05
3.	Reaction to a moving object (ms)	t=-0,57; p>0,05	t=0,10; p>0,05	t=0,54; p>0,05

Remark. *1 group – cyclical; 2 group – complex co-ordination sports; 3 group – sports games; 4 group – single combats.*

Table 4

Reliability of differences in the parameters of sensorimotor reactions of students of complex coordination sports with other groups

No.	Indicators of sensorimotor reactions	Groups		
		2 and 3	2 and 4	2 and 1
1.	A simple visual-motor reaction (ms)	t=1,85; p>0,05	**t=2,16; p<0,05**	t=–1,21; p>0,05
2.	Selection reaction (ms)	t=1,67; p>0,05	t=1,53; p>0,05	t=–0,95; p>0,05
3.	Reaction to a moving object (ms)	t=0,66; p>0,05	t=1,03; p>0,05	t=–0,57; p>0,05

Remark. *1 group – cyclical; 2 group – complex co-ordination sports; 3 group – sports games; 4 group – single combats.*

Table 5

Reliability of differences in the parameters of sensorimotor reactions of students of game sports with other groups

No.	Indicators of sensorimotor reactions	Groups		
		3 and 4	3 and 1	3 and 2
1.	A simple visual-motor reaction (ms)	t=0,48; p>0,05	t=1,11; p>0,05	t=1,85; p>0,05
2.	Selection reaction (ms)	t=0,13; p>0,05	t=0,74; p>0,05	t=1,67; p>0,05
3.	Reaction to a moving object (ms)	t=0,45; p>0,05	t=0,10; p>0,05	t=0,66; p>0,05

Remark. *1 group – cyclical; 2 group – complex co-ordination sports; 3 group – sports games; 4 group – single combats.*

Table 6

Reliability of the differences in the parameters of the sensorimotor reactions of students of martial artists with other groups

No.	Indicators of sensorimotor reactions	Groups		
		4 and 1	4 and 2	4 and 3
1.	A simple visual-motor reaction (ms)	t=1,67; p>0,05	**t=2,16; p<0,05**	t=0,48; p>0,05
2.	Selection reaction (ms)	t=0,73; p>0,05	t=1,53; p>0,05	t=0,13; p>0,05
3.	Reaction to a moving object (ms)	t=0,54; p>0,05	t=1,03; p>0,05	t=0,45; p>0,05

Remark. *1 group – cyclical; 2 group – complex co-ordination sports; 3 group – sports games; 4 group – single combats.*

12%, response to a choice of 6%, a simple visual-motor reaction by 8%), then – with complex-coordinated sports (reaction to moving object by 6%, response of choice by 3%, simple visual-motor reaction by 4%) and sports games (response to a moving object is better by 5%, response of choice by 1%, simple visual-motor reaction by 1%) (Figure 1).

The higher parameters of the sensomotor reactions of martial artists are explained by the specifics of the competitive and training activity, which forms the skills to quickly analyze, evaluate and predict the situation and make timely decisions during the fight.

The received data testify to the importance of the psychophysiological state of athletes as a factor determining success in various sports.

This analysis revealed that in the planning of the training process is necessary to develop a set of special exercises aimed at the development of sensorimotor reactions specific to the sport. This is also confirmed by the results of research presented in scientific works (V. A. Taimazov, Ya. V. Golub, 2004; I. S. Belenko, 2009; Podrigalo, V. and et. al., 2017).

Data on psychophysiological features in various sports are supplemented. So, I. S. Belenko (2009) studied the psychophysiological features of representatives of sports games; N. O. Martusevich, E. A. Kondratenkova (2015) studied the psychophysiological state of sportsmen of game and cyclic sports; A. N. Veraksa, S. V. Leonov, A. E. Gorova (2011) conducted psychological testing in rhythmic gymnastics; S. Iermakov and et. al. (2016) studied the psychophysiological characteristics of athletes in martial arts.

Conclusions

On the basis of the analysis of scientific and methodological information and generalization of best practical experience it was established that the specifics of the competitive activity of athletes in various sports leaves their imprint on the level of development of the leading sensorimotor reactions.

In the course of the study, it was determined that the best indicators of sensorimotor reactions were observed in students of martial artists, followed by representatives of sports games, complex coordination and cyclic sports. The greatest differences from the results of the assessment of the level of sensorimotor reactions of martial artists are marked with cyclic sports (reaction to a moving object is higher by 12%, the response of choice is 6%, a simple visual-motor reaction by 8%), then – with hardcore sports (reaction to moving object by 6%, response of choice by 3%, simple visual-motor reaction by 4%) and sports games (response to a moving object by more than 5%, response by 1%, simple visual-motor reaction by 1%).

The level of preparedness of the participants in the study determines their optimal functional state of the neuromuscular system, emphasizes the formation of the necessary skills and skills. This is evidenced by the absence of significant differences in the results of most of the indicators used.

The conducted research confirmed the importance of psychophysiological features of sportsmen of various sports as success factors.

The application of psychophysiological methods is a promising way of predicting the success of athletes.

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

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References

1. Alekseev, A.V. (2007), *Preodoley sebya. Psikhicheskaya podgotovka sportsmenov k sorevnovaniyam* [Overcome yourself. Psychic preparation of athletes for competitions], Sovetskiy sport, Moscow. (in Russ.)
2. Ashanin, V.S. & Romanenko, V.V. (2015), "The use of computer technology to assess sensorimotor reactions in martial arts", *Slobozans`kij naukovo-sportivnij visnik*, No. 4, pp. 15-18. (in Russ.)
3. Belenko, I.S. (2009), "Psychophysiological features of young sportsmen of game kinds of sports of different age period of development and training", *Vestnik TGPU*, No. 3 (81), pp. 54-58. (in Russ.)
4. Boychenko, N.V., Aleksenko, Ya.V. & Alekseeva, I.A. (2015), "Innovative technologies in the system of preparation of martial arts", *Yedinoborstva*, No. 1, pp. 25-27. (in Ukr.)
5. Boychenko, N.V., Alekseeva, I.A. & Aleksenko, Ya.V. (2013), "Application of information technologies in sports and martial arts", *Yedinoborstva*, No. 1, pp. 56-60. (in Russ.)
6. Veraksa, A.N., Leonov, S.V. & Gorovaya, A.Ye. (2011), "Psychological features of artistic gymnasts", *Vestnik Moskovskogo universiteta, Seriya 14: Psikhologiya*, No. 4, pp. 134-147. (in Russ.)
7. Ilin, Ye.P. (2006), *Psikhomotornaya organizatsiya cheloveka* [Psychomotor organization of man], Piter, SPb. (in Russ.)
8. Martusevich, N.O. & Kondratenkova, Ye.A. (2015), *Diagnostika psikhofiziologicheskogo sostoyaniya sportsmenov razlichnykh spetsializatsiy* [Diagnosis of the psychophysiological state of athletes of various specializations], MGU imeni A. A. Kuleshova, Moscow. (in Russ.)
9. Pervachuk, R.V., Tropin, Yu.N., Romanenko, V.V. & Chuev, A.Yu. (2017), "Modeling characteristics of sensorimotor reactions and specific perceptions of skilled wrestlers", *Slobozans`kij naukovo-sportivnij visnik*, No. 5, pp. 84-88. (in Russ.)
10. Rovnyy, A.S. & Romanenko, V.V. (2016), "Modeling characteristics of sensorimotor reactions and specific perceptions of martial artists of high qualification", *Yedinoborstva*, No. 12, pp. 54-57. (in Russ.)
11. Taymazov, V.A. & Golub, Ya.V. (2004), *Psikhofiziologicheskoe sostoyanie sportsmena. Metody otsenki i korrektsii* [Psychophysiological state of the athlete. Methods of assessment and correction], Olimp SPb., SPb. (in Russ.)
12. Tropin, Yu.N. & Boychenko, N.V. (2018), "Interrelation of psychophysiological indicators and physical readiness in wrestlers", *Slobozans`kij naukovo-sportivnij visnik*, No. 2, pp. 82-87. (in Russ.)
13. Iermakov, S., Podrigalo, L., Romanenko, V., Tropin, Y., Boychenko, N. & Kamaev, O. (2016), «Psycho-physiological features of sportsmen in impact and throwing martial arts», *Journal of Physical Education and Sport*, Vol. 16(2), pp. 433-441.
14. Korobeynikov, G., Korobeinikova, L. & Shatskih, V. (2013), «Age, psycho-emotional states and stress resistance in elite wrestlers», *International Journal of Wrestling Science*, Vol. 3, No. 1, pp. 58-69.
15. Korobeynikov, G., Korobeinikova, L., Mytskan, B., Chernozub, A., & Cynarski, W.J. (2017), «Information processing and emotional response in elite athletes», *Journal of Martial Arts Anthropology*, No. 17(2), pp. 41-50.
16. Podrigalo, L., Iermakov, S., Potop, V., Romanenko, V., Boychenko, N., Rovnaya, O. & Tropin, Y. (2017), «Special aspects of psycho-physiological reactions of different skillfulness athletes, practicing martial arts», *Journal of Physical Education and Sport*, Vol. 17, Iss. 2, pp. 519-526.
17. Romanenko, V., Podrigalo, L., Iermakov, S., Rovnaya, O., Tolstoplet, E., Tropin, Y., & Goloha, V. (2018), «Functional state of martial arts athletes during implementation process of controlled activity–comparative analysis», *Physical Activity Review*, No. 6, pp. 87-93.
18. Tropin, Y., Romanenko, V. & Ponomaryov, V. (2016), «Model characteristics of sensory-motor reactions and perceptions of specific wrestlers of different styles of confrontation», *Slobozhanskyi Herald of Science and Sport*, No. 3, pp. 99-103.
19. Tropin, Y. & Shatskikh, V. (2017), «Model features of sensorimotor reactions and specific perception in wrestling», *International scientific and professional conference on wrestling «Applicable Research in Wrestling» Novi Sad*, Serbia, 5th-7th May, Novi Sad, pp. 241.
20. Zhumakulov, Z.P. (2017), «Education Technology of Primary Training Sport Wrestling», *Eastern European Scientific Journal*, No. 5, pp. 29-35.

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The reliability of the presented results correspond to authors

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