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Original article

INFLUENCE OF CROSSFIT ON DYNAMICS INDICATORS OF PHYSICAL FITNESS OF YOUNG PEOPLE

SERHII ROMANCHUK[1], ARTUR ODEROV[1], KLYMOVYCH VOLODYMYR[1], OREST LESKO[1], IRYNA TYCHYNA[2], YAROSLAV PANKEVYCH[1], CHERNOZUB ANDRII[3] , IVAN PYLYPCHAK[1]

Abstract

Aim. Institutions of higher education in Ukraine should transform the quantitative indicators of educational services into quality, which involves reviewing the content of higher education and filling it with modern material, the introduction of new learning technologies. The preparation of young people for professional activities is carried out within the educational system. The strategy of the current higher education should form a specialist who is able not only to realize the accumulated potential of knowledge, skills and abilities, but also to go beyond the regulated activities (Klymovych, Olkhovyi, Romanchuk, 2016). The defined strategy characterizes the tendency to increase the role of the "human factor" in all spheres of activity, including in the military direction. Distinctive features of youth education in higher education institutions are the ever-increasing amount of educational information with limited training time; intense nervous and emotional load; overload of the intellectual sphere; reduction of motor activity. One of the leading places in the education system is physical education. This is the only academic discipline that accompanies the student (cadet) throughout the period of study. The level of physical fitness is determined during the selection of an entrant to study in an educational institution, in each semester of study, during inspections and unannounced inspections, as well as during the state certification for graduation.

Methods. To determine the impact of crossfit on the development of basic physical qualities, we conducted a comparative analysis of the level and dynamics of physical fitness of young people who were in the learning process (I-IV semesters) regularly engaged in crossfit section (this group was marked № 1 (n =24)) and students, who were engaged in the existing program of physical education in higher education institutions (№ 2 (n = 23)).

Results. The level of physical fitness was determined in accordance with the results of exams and tests in physical education. No significant difference was found during the first three semesters ($p>0.05$). In the fourth semester, a significant difference was found ($t =4.44$; $p <0.001$), that the impact of crossfit was more pronounced in the fourth semester, and the use of crossfit led to higher results of basic physical qualities.

Conclusions. Comparing the results of indicators of basic physical quality of students who were systematically engaged in crossfit in the primary education process and students who studied under the existing program of physical education in higher education, we can conclude that the use of crossfit leads to higher results of basic physical qualities.

Keywords*:* crossfit, student, physical fitness, sports, physical qualities.

Introduction

Ensuring a high level of professional training is always the focus of many scientists identified in the field (Bazilevich N., Tonkonog O. (2016)). However, today in the physical training of students (cadets) a critical situation that contradicts the level of social demands on the psychophysiological state of future professionals and the effectiveness of physical training of students, which provides graduates with the ability to effectively solve training problems (Kostiv S., Oderov A., Klymovych V. (2021); Oderov A., et al., (2020)).

Several researches of domestic scientists show that today scientific researches on maintenance of effective preparation in a higher educational institution, directed on research of ways of increase of physical training of students proceed. In particular, the issues of methods and forms of teaching with the use of different sports are considered (Gaponenko G., Romanyuk O., Kovalchuk O. (2018)), software and normative support of training, technologies of preparation, control, methodical and given maintenance, research of their efficiency, the scientific and theoretical basis is discussed, profile schemes of separate specialties are developed. An important feature of the research of some authors in a certain direction is the attempt to closely link the process of training physical and mental professionals (Romanchuk S., Oderov A., et al., 2017).

[1] Department of physical education, special physical training and sport, National Army Academy named after Hetman Petro Sahaidachnyi , Lviv, Ukraine
[2]Military Institute of Taras Shevchenko National University of Kyiv, Kyiv, Ukraine
[3]Petro Mohyla Black Sea National University, Mykolaiv, Ukraine
stroyova@ukr.net

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Improving the physical fitness of students, especially in conditions of insufficient levels of development of physical qualities in young people entering educational institutions, requires the search for new technologies in the organization of physical training. Rapidly developing sports are effective in the urgent improvement of general physical qualities, are popular among various segments of the population in the world, scientists consider crossfit (Klymovych V., Oderov A., et al., 2019). The basic methodological principles of this sport were borrowed from one of the common areas of fitness, which was founded in 2000 by the US Armed Forces. Crossfit uses multi-joint, energy-intensive movements, which are combined into a continuous set of exercises involving your own weight, special devices, tools and cyclic exercises. (Oderov A., Klymovych V., Korchagin M., et al., 2019).

Material & methods

To determine the impact of crossfit on the development of basic physical qualities, we conducted a comparative analysis of the level and dynamics of physical fitness of students who were in the process of primary education (I-IV semesters) systematically engaged in crossfit section (this group was marked № 1 (n=24)) and students who were engaged in the existing program of physical education in higher education (№ 2 (n=23)).

Methods of mathematical statistics were used, which helped to solve the problems of our study. Methods of mathematical statistics were used to prove the patterns identified in the study. One-dimensional and two-dimensional statistical analyzes were used. Mathematical and statistical calculations were performed using computer programs, including "Excel", "SPSS", "STATISTICA 7" in the operating system "Windows Vista".

The application of the above methods allowed us to organize research and verify the indicators of the formed groups, to prove the effectiveness of the program of physical training of students of higher education institutions at the stage of primary education with using crossfit.

Results

The development of speed qualities of the respondents of groups № 1 occurred during all four semesters: in the II and III semesters no significant difference was found t = 0.38; p>0.05, t = 1.91; p>0.05, and in the IV semester a significant difference was found t = 3.55; p <0.001. In group № 2 during the initial training positive changes occurred only in the second semester, in other semesters the result did not improve, but was at the same level, no significant difference was found t = 0.18; p>0.05.

During the first three semesters of study, no significant difference between groups № 1 and № 2 was found p>0.05. In the fourth semester, a significant difference between groups № 1 and № 2 was found: t = 3.34; p<0.01, which indicates the impact of crossfit classes on the development of speed qualities of students.

A comparative analysis of the results of pull-ups on the crossbar in group № 1 shows that the improvement of the result occurred during all semesters of study. In the period from I to III semesters the result improved, but no significant difference was found (p>0.05), only in the IV semester had a significant difference ~~was~~ found (t = 6.74; p<0.001) (*table 1*). Analyzing the results of group № 2, we can say that the results improved over three semesters, and in the fourth semester it decreased compared to the third semester, which indicates ineffective training methods used in the current curriculum.

Table 1. **Indicators of physical fitness of cadets involved crossfit with those who play other sports**

Semesters	Group № 1 (n = 24)			Group № 2 (n = 23)			Significance of the difference	
	$\bar{x}_1$	σ_1	$\pm m_1$	$\bar{x}_2$	σ_2	$\pm m_2$	T	P
Speed qualities (running on 100 m, s)								
I	14.62	0.55	0.11	14.71	0.66	0.14	0.55	p>0.05
II	14.55	0.58	0.12	14.68	0.70	0.15	0.66	p>0.05
III	14.30	0.58	0.12	14.68	0.70	0.15	1.98	p>0.05
IV	14.10	0.46	0.09	14.68	0.70	0.15	3.34	p<0.01
I-II	t=0.38; p>0.05			t=0.18; p>0.05				
I-III	t=1.91; p>0.05			t=0.18; p>0.05				
I-IV	t=3.55; p<0.001			t=0.18; p>0.05				
Strength qualities (pull-ups on a crossbeam, in times)								
I	12.08	1.53	0.31	11.91	1.38	0.29	0.40	p>0.05
II	12.88	1.65	0.34	12.17	1.67	0.35	1.45	p>0.05
III	12.58	1.86	0.38	13.09	1.35	0.28	1.07	p>0.05
IV	14.92	1.38	0.28	13.00	1.57	0.33	4.44	p<0.001
I-II	t=1.72; p> 0.05			t=0.58; p>0.05				
I-III	t=1.02; p> 0.05			t=2.98; p<0.01				
I-IV	t=6.74; p<0.001			t=2.50; p<0.01				
Endurance (running 3 km, s)								
I	778.00	16.66	3.40	792.48	46.97	9.79	1.40	p>0.05

II	762.17	19.68	4.02	754.74	6.80	1.42	1.74	p>0,05
III	745.50	25.94	5.29	742.87	64.04	13.35	0.18	p>0.05
IV	734.75	28.41	5.80	748.57	11.70	2.44	2.20	p<0.05
I-II	t=3.01; p<0.01				t=3.81; p<0.001			
I-III	t=5.16; p<0.001				t=2.99; p<0.01			
I-IV	t=6.43; p<0.001				t=4.35; p<0.001			

Comparing the results of groups № 1 and № 2, we can say that during the first three semesters no significant difference was found (p>0.05). In the fourth semester, a significant difference was found (t= 4.44; p<0.001), and the impact of crossfit training was more pronounced in the fourth semester (*table 1*).

Thus, the use of crossfit means has led to the development of strength qualities of cadets of group № 1 during the entire period of primary education in the school.

Studies of the results of the 3000-meter run of students in group № 1 showed a continuous steady increase in the results of endurance exercise during all four semesters on the arithmetic mean (p<0.001). Analyzing the results of students in group № 2, we can say that the results improved over four semesters. In the period from 1 to 2 semesters the result improved, a significant difference was found (t = 3.81; p<0.001), in the 3rd semester a significant difference was found t= 2.99; p<0.01, and in the fourth semester there was a significant difference t= 4.35; p<0.001, which indicates an unstable increase in the result.

In the I-III semesters, the indicators for running 3 km of students in groups № 1 and № 2 are significantly the same (p>0.05). In the IV semester of the study the results of group № 1 are significantly better than in students of group № 2, the difference between the results of groups in the IV semester is 13.82s; t=2.20; (p<0.01). The established results indicate a more effective method of training using crossfit than the methods used in the current curriculum.

Discussion

The practical significance of the results of the study is to develop a program of physical training for students of higher education at the stage of primary education with the use of crossfit, development of complexes of crossfit exercises lasting 20–25 minutes for physical education classes. The results of scientific research were used during the organization of training sessions on the subject "Physical Education and Special Physical Training", with students of I-II courses in higher education (Oderov A., Kuznetsov M., Romanchuk S., et al., 2022; Oderov A., Korchagin M. & Romanchuk S., 2020).

Conclusions

Comparing the results of indicators of basic physical quality of students who were systematically engaged in crossfit in the primary education process and students who studied under the existing program of physical education in higher education, we can conclude that the use of crossfit leads to higher results of basic physical qualities.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the research, authorship, and/or publication of the article *Influence of crossfit on dynamics indicators of physical fitness of young people*

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