

# Dynamics of students' physical fitness during sectional crossfit and football sessions

Valeriy Hrygoriev

Kherson State University, Kherson, Ukraine

**Purpose:** to assess the influence of crossfit and football in the sectional work on physical education on the dynamics of physical fitness of students.

**Material & Methods:** studies of the level of physical preparedness of students were carried out with the help of two tests before and after the introduction of experimental techniques in the survey groups. Two experimental (18 girls, 16 boys) and two control groups (22 girls and boys) from the 2nd year students of the Kherson State University.

**Results:** the analysis of the physical readiness of the students of the University was carried out under the influence of the classes of crossfit and football in the framework of the sectional work on physical education on the dynamics of the indicators of the development of high-speed, strength and speed-strength qualities, the development of agility and flexibility.

**Conclusion:** use of developed methodological approaches to the application of sectional forms of physical education contributed to significant changes in the indicators of physical preparedness.

**Keywords:** students, physical education, crossfit, football, physical readiness, sectional work.

## Introduction

The process of physical education of student youth plays an important role in the formation of a harmoniously developed and competitive personality. As you know, increasing the level of health and the development of the necessary physical qualities are directly related to the motor activity of students, which, unfortunately, decreases both during school hours and during the studies at the university.

In the scientific literature (P. N. Oksyom, A. V. Shumakov, 2007, M. A. Nosko, A. A. Danilov, V. M. Maslov, 2011, A. A. Bili-chenko, 2014), it is suggested that one of the most promising areas for optimizing the physical condition of students is the inclusion in the program of higher educational institutions for physical education section work from the most popular among modern youth physical education, in particular, various types of fitness, crossfit or football [2; 7; 8].

Common methods of physical training in many students are not encouraging, because they require a long and routine work. That's why you should pay attention to the means of section work, not only available, but also popular among young people, for example, pilates, cheerleading, football and fitness. One such means is a relatively new type of fitness that has evolved into a separate sport – crossfit, and is popular among young people [8; 9].

It has been experimentally proved (D. V. Bondarev, 2009, S. S. Galyuza, 2013) that the use of football facilities in physical education of students of a technical college with load parameters, taking into account the level of preparedness of students, contributed to a significantly more pronounced growth of physical and functional readiness than engage in the current program of "physical education". Also, under the influence of physical education with the use of football funds, there are changes in the structure of physical fitness of students, but, unfortunately, as an effective means of increasing physical fitness, health and constant interest in physical edu-

cation, has not found its use in programs for physical education of university students [3; 4; 6].

According to N. A. Bazilevich, A. S. Tonkonog, 2016; A. S. Zinaturova, I. I. Panova, 2014, it is the crossover, as a new sport, that can become such a powerful stimulus to regular physical education and sports activities for student youth [1; 5]. He is able to improve the functional condition and physical fitness of youth and ultimately to strengthen health. It can be used as one of the methods of development of human power abilities [7].

However, there is still very little scientific research in this direction, and therefore this formulation of the problem necessitates a more detailed study and experimental verification of the influence of crossfit classes on optimizing the physical condition of university students [7]. Therefore, research on crossfit or football facilities and effective means of using them in the framework of the sectional work on physical education for the purposeful improvement of the physical fitness of students is an urgent task, the solution of which will contribute to enhancing student mobility and strengthening their health.

**Relationship of research with scientific programs, plans, themes.** The research was carried out in accordance with the plan of the scientific and complex theme of the Department of Theory and Methods of Physical Education of the Kherson State University "Theoretical and methodological foundations of physical culture and health work with various population groups" by the state registration number 0115U004401.

**The purpose of the research:** to assess the influence of crossfit and football in the sectional work on physical education on the dynamics of physical fitness of students.

## Material and Methods of the research

The study of the level of physical readiness (PR) of students

was conducted on the basis of KSU in the period from September 2015 to June 2016. In this study, II year students attended traditional forms of physical education (CG<sub>1</sub> – girls, CG<sub>2</sub> – boys, 22 people each) and students attending the section on female crossfit over (EG<sub>1</sub> – girls, 18 people) and the section with football (EG<sub>2</sub> – boys, 22 people) in the framework of physical education in high school. The level of PR was determined by methodological approaches L. P. Sergienko [10].

## Results of the research and their discussion

Main objective was to preserve the author's procedures and improving health, improving the physical condition of the students based on the use of means of female crossfit for girls and football facilities for boys.

Process of practical implementation of means of female crossfit in the group of girls and football means in the group of boys in the framework of the sectional work on physical education (PE) provides for unity of educational, health and educational tasks and observance of such obscuredactic principles as the principle of consciousness and activity, visibility, accessibility, individuality, systematic, gradual, the implementation of which contributes to the effectiveness of the PE process.

In our opinion, the use of experimental techniques in groups of girls and boys should positively influence the dynamics of their level of PR. For example, training women's crossfit to positively influence the development of power, speed and strength and endurance, and playing soccer with children will contribute to the development of stamina, speed and agility. Confirm or refute this hypothesis will allow the obtained results of the study of students' PR at the end of the experiment.

The average rates and growth rates of PR in student groups are presented in tables 1, 2.

A comparative analysis of the results shows that the EG girls for the period of the main experiment improved their index of running at 50 m from 8,39±0,06 s at the beginning to 8,21±0,06 s at the end (t=2,14, p≤0,05). The average index of running at 100 m in them at the beginning of the experiment was 17,06±0,07 s, while at the end – 16,91±0,08 s (t=1,48, p≥0,05). The girls of CG at the beginning of the main experiment ran at a speed of 8,46±0,06 s, while at the end of the experiment this indicator averaged 8,49±0,07 s (t=0,32, p≥0,05). Concerning the results of running on 100 m, on the contrary, there is even a slight improvement in the indices of girls CG with 16,98±0,07 s to 16,92±0,09 s (t=0,55, p≥0,05).

Comparative analysis of the results showed that over the period of the experiment, the run-off index by 50 m was improved in the children of the EG (t=3,36, p≤0,05) and CG, but the changes were not significant (t=0,40 at p≥0,05). The EG guys overcame the distance in 100 m by 3,53% faster (t=4,64, p≤0,001), the CG guys – 0,41% slower than at the beginning of the experiment (t=0,46 at p≥0,05) (Table 2).

From the data in Tables 1 and 2, it can be seen that the increase in the average running index per 1000 m (overall endurance) in the EG girls was 7,31% of the values of 5,43.2±0,08 min·s<sup>-1</sup> to 5,18.1±0,09 min·s<sup>-1</sup> (t=2,09, p≤0,05). The girls of the CG had some changes in this indicator in the direction of worsening of the results: at the beginning of the experiment, the run-on index for 1000 m averaged 5,42.2±0,08 min·s<sup>-1</sup>,

and at the end – 5,44.2±0,09 min·s<sup>-1</sup>. In the groups of children we also observe relatively better indicators of the final data, but the children of EG have significant differences, while the children of CG do not have any significant differences. Thus, the average running index of 1000 m in male EG was 3,31.4±0,09 min·s<sup>-1</sup>, 11,79% better than at the beginning of the experiment – 3,59.2 min·s<sup>-1</sup> (t=2,32, p≤0,05). The children of the CG had a running index of 1000 m improved by 1,69%: the output was on an average 3,58.0±0,11 min·s<sup>-1</sup>, final data – 3,54.2±0,10 min·s<sup>-1</sup> (t=0,27, at p≥0,05) (Table 2).

In terms of dexterity development, EG students improved their results. Thus, the result of the shuttle run of 4x9 m at the beginning of the experiment in the girls of the EG was on the average 11,13±0,10 s, whereas at the end of the experiment this indicator was lower (i.e., the best performance of this test was observed) and amounted to – 10,84±0,11 s. Girls of this group overcame the test at 0,29 with faster. The boys of EG had output data at the level of 9,43±0,12 s, and the final data improved and amounted to an average 8,92±0,13 s (t=2,89, p≤0,05). Girls CG performed the test after the main experiment somewhat better, but the improvement in the result was only 0,36% than at the beginning of the experiment. The average parameters of the shuttle run of 4x9 m in the girls of this group were 11,18±0,09 s at the beginning of the experiment and 11,14±0,10 s at the end, but they did not differ reliably (t=0,31, p≥0,05) (Table 1). On the contrary, the boys of CG, at the end of the experiment, coped worse with the performance of this test. So, their output data were 9,51±0,12 s, and the final ones were 0,42% worse and averaged 9,55±0,14 s.

Both the EG and the CG students improved the result of the "zigzag run" test during the experiment: the girl EG – by 0,32 s (t=1,30, at p≥0,05), the guys EG – by 0,72 from; girls CG – 0,04 s, boys CG – 0,06 s, but the differences were not reliable, the level of development remained constant. In the children of EG, the zigzag run parameters at the end of the experiment were significantly different from the initial (t=2,54, p≤0,05) (Table 1, 2).

The data presented in Tables 1 and 2 show that in the development of strength endurance, which we studied after performing the tests "push-ups" in the group of girls, "pull-ups" in the group of young men and "lifting the trunk into the sad position 30 s" positive changes occurred in girls and boys EG, while in the representatives of CG, improvement in performance was observed only after the performance of the test "pull-ups" in a group of girls. Girls of EG performed the test "push-ups" by 4,84 times better (t=3,69, with p≤0,01). According to the intergroup evaluation tables, after the introduction of the methodology, the level of development of this quality in girls of the EG increased from below the average to the average and above the average. In female CG, changes that occurred over a given period of time were insignificant (t=0,17, at p≥0,05). At children EG the results of display of strength endurance that was diagnosed on pulling-ups have improved, but not on authentic differences (t=0,51–0,81, at p≥0,05).

The use of author's techniques with students positively contributed to the effectiveness of development of strength endurance muscles of the trunk. At the end of the experiment, the indices were in girls EG 24,82±0,28 times, which is 11,90% more than in the beginning – 22,18±0,42 times (t=5,28, p≤0,001). In the children of the EG, the mean value at the end of the experiment increased by a significant value

Table 1

Dynamics of indicators of physical readiness of girls during the period of the basic pedagogical experiment

Indicators	Experimental group				Control group			
	ID	KD	Reliability		ID	KD	Reliability	
	Mx±Smx		t	p	Mx±Smx		t	p
Running on 50 m (s)	8,39±0,06	8,21±0,06	2,14	≤0,05	8,46±0,06	8,49±0,07	0,32	≥0,05
Running on 100 m (with)	17,06±0,07	16,91±0,08	1,48	≥0,05	16,98±0,07	16,92±0,09	0,55	≥0,05
Running on 1000 m (min s <sup>-1</sup> )	5,43.2±0,08	5,18.1±0,09	2,09	≤0,05	5,42.2±0,08	5,44.2±0,09	0,17	≥0,05
Shuttle Run 4x9 m (s)	11,13±0,10	10,84±0,11	1,36	≥0,05	11,18±0,09	11,14±0,10	0,31	≥0,05
Running in a zigzag (s)	22,34±0,18	22,02±0,17	1,30	≥0,05	22,42±0,18	22,38±0,18	0,24	≥0,05
Push-ups / pull-ups, count	14,40±1,01	19,24±0,84	3,69	≤0,01	14,64±0,92	14,84±0,80	0,17	≥0,05
Raising the trunk from the sad position (times)	22,18±0,42	24,82±0,28	5,28	≤0,001	22,86 ±0,50	22,34±0,46	0,78	≥0,05
Standing long jump (cm)	175,3±1,7	182,6±1,5	2,28	≤0,05	178,2±1,8	180,0±1,6	0,52	≥0,05
Jump up from the place (cm)	39,12±1,36	41,34±1,25	1,21	≥0,05	39,24±1,50	39,86 ±1,39	0,30	≥0,05
Torso tilt forward (cm)	13,53±0,68	14,17±0,49	0,77	≥0,05	13,62±0,72	13,54±0,55	0,09	≥0,05

Remark. ID – initial data, FD – final data.

Table 2

Dynamics of indicators of physical readiness of boys during the period of the basic pedagogical experiment

Indicators	Experimental group				Control groupm			
	ID	KD	Reliability		ID	KD	Reliability	
	Mx±Smx		t	p	Mx±Smx		t	p
Running on 50 m (s)	7,34±0,06	7,03±0,07	3,36	≤0,01	7,42±0,08	7,38±0,07	0,40	≥0,05
Running on 100 m (with)	14,46±0,07	13,95±0,09	4,64	≤0,001	14,47±0,10	14,53±0,09	0,46	≥0,05
Running on 1000 m (min s <sup>-1</sup> )	3,59.2±0,08	3,31.4±0,09	2,32	≤0,05	3,58.0±0,11	3,54.2±0,1	0,27	≥0,05
Shuttle Run 4x9 m (s)	9,43±0,12	8,92±0,13	2,89	≤0,05	9,51±0,12	9,55±0,14	0,22	≥0,05
Running in a zigzag (s)	20,02±0,18	19,30±0,22	2,54	≤0,05	19,94±0,19	19,88±0,23	0,20	≥0,05
Push-ups / pull-ups, count	12,54±0,50	12,90±0,42	0,81	≥0,05	11,94±0,48	11,48±0,52	0,51	≥0,05
Raising the trunk from the sad position (times)	27,34±0,58	29,67±0,42	3,28	≤0,01	28,17±0,52	27,46±0,45	1,51	≥0,05
Standing long jump (cm)	232,1±2,4	239,3±2,2	2,16	≤0,05	229,3±2,5	230,3±2,6	0,29	≥0,05
Jump up from the place (cm)	49,20±1,69	53,85±1,56	2,07	≤0,05	48,65±1,49	49,39±1,58	0,34	≥0,05
Torso tilt forward (cm)	12,28±0,79	12,93±0,59	0,66	≥0,05	12,85±0,85	12,90±0,64	0,05	≥0,05

(t=3,28, p≤0,01) to 29,67±0,42 times. It should be noted that the students of the CG, both girls and boys, at the end of the experiment did not comply with this standard. Thus, in the girls of CG the indicator at the end of the experiment decreased to 22,34±0,46 times, while for men the CG decreased to 27,46±0,45 times (t=0,78–1,51) (Table 1, 2).

Based on the materials of the study, it was established that the introduction of experimental methods positively influenced the manifestation of the speed-strength qualities of the EG students and in most cases there were reliable differences between the output and final data. Thus, the average indicators in standing long jump in the girls was 175,36±1,76 cm at the beginning of the experiment, and at the end it was 4,16% better and made up 182,65±1,52 cm (t=2,28, at p≤0,05) (Table 1). We also observe significant differences between the indices at the beginning and at the end of the experiment when performing the standing long jump test and in the children of the EG: the indicator on average improved by a significant value (t=2,16 at p≤0,05). At CG students, we also observe an improvement in the length of the jump standing long jump during the experiment, but the differences turned out to be unreliable (t=0,29–0,52) (Table 2).

A comparative analysis of the results of the jump up showed that all students, both girls and boys, the final indices increased, but in the case of EG students this increase was

more significant (t=0,30, at p≥0,05). The mean indices at the end of the experiment in the children of the EG differed significantly from the indices at the beginning of the experiment (t=2,07, with p≤0,05), whereas in the men of the CG the differences were unreliable (t=0,34, at p≥0,05).

When analyzing the results of the development of flexibility under the influence of experimental methods, there was some improvement in the indices of the CG students, but the growth proved to be unreliable (t=0,66–0,77, with p≥0,05). A slight decrease in the mean group index of the body torsion forward by 0,59 cm was observed in the CG girls, while in the case of boys in CG, the increase was 0,39%, but the differences were unreliable (t=0,05–0,09 at p≥0,05).

### Conclusions

The use of the developed methodical approaches to the use of female crossfit over resources in the group of girls and football means in the group of boys contributed to significant changes in the indicators of physical readiness, which indicates an increase in the effectiveness of the process of physical education of student youth.

Prospects for further research in this area are to study the effect of sectional physical education classes on optimizing the physical condition of students.

**Conflict of interests.** The author declares that no conflict of interest.  
**Financing sources.** This article didn't get the financial support from the state, public or commercial organization

## References

1. Bazylevych, N.O. & Tonkonoh, O.S. (2017), "Influence of the use of crossfire on the formation of students' motivation for regular physical education and sports", *Molody vcheny*, No. 2 (42), pp. 113-117, available at: <http://molodyvcheny.in.ua/files/journal/2017/2/27.pdf> (in Ukr.)
2. Bilichenko, O.O. (2014), *Henderni osoblyvosti formuvannia motyvatsii do zaniat fizychnym vykhovanniam u studentiv: avtoref. dys. na zdobuttia nauk. stupenia kand. nauk fiz. vykh. i sportu* [Gender peculiarities of the formation of motivation for physical education at students: PhD thesis abstract], Dnipro, 21 p. (in Ukr.)
3. Bondarev, D.V. (2008), "Assessment of the intensity of specific football exercises in the performance of their students", *Fizychnye vykhovannia, sport i kultura zdorov'ia u suchasnomu suspilstvi: zb. nauk. prats Volyn. nats. un-tu im. Lesi Ukrainky*, Lutsk, T. 2, C. 20-23. (in Russ.)
4. Haliuza, S.S. (2013), *Rozvytok fizychnykh zdibnostei studentok universytetiv v protsesi zaniat futbolom: avtoref. dys. kand. ped. nauk* [Development of physical abilities of university students in the course of football: PhD thesis abstract], Luhansk, 20 p. (in Ukr.)
5. Zinnaturov, A.Z. & Panov, I.I. (2014), "Crossfit as a direction to improve the process of physical education in high school", *Izvestiya Tul. gos. un-ta: Fizicheskaya kultura. Sport*, No. 1, pp. 14-19. (in Russ.)
6. Kokorev, D.A., Vyprikov, D.V. & Vezenitsin, O.V. (2016), "Technique of the use of functional all-round events (crossfit) in the process of physical education of students", *Teoriya i praktika fiz. kultury*, 2016, No. 9, pp. 16-18. (in Russ.)
7. Maljar, E.I. (2007), "The Impact of Football Facility on the Level of Functional Readiness of Students-Taxpayers", *Pedahohika, psykhohihiia ta med.-biol. probl. fiz. vykh. i sportu*, No. 7, pp. 101-104. (in Ukr.)
8. Nosko, M.O., Danilov, O.O. & Maslov, V.M. (2011), *Fizychnye vykhovannia i sport u vyshchyykh navchalnykh zakladakh pry orhanizatsii kredytno-modulnoi tekhnolohii* [Physical education and sport in higher educational institutions in the organization of credit-modular technology], Vydavnychi Dim "Slovo", Kyiv. (in Ukr.)
9. Oksom, P.M. & Shumakov, O.V. (2007), "Mini-football – an effective means of physical education of students of higher pedagogical educational institution", *Problemy ta perspektyvy rozvytku ihrovykh vydiv sportu: zb. nauk. pr. V vseukr. nauk.-prakt. konf.*, Lviv, pp. 54-58. (in Ukr.)
10. Serhienko, L.P. (2007), *Testuvannia rukhovykh zdibnostei shkolariv* [Testing of pupils' motor abilities], Olimpiiska literatura, Kyiv. (in Ukr.)

Received: 27.10.2017.

Published: 30.12.2017.

## Information about the Authors

**Valeriy Hrygoriev:** Assistant Professor of the Department of Medical and Biological Foundations of Physical Education; *Kherson State University, st. Universitetska, 27, Kherson, 73000, Ukraine.*

**ORCID.ORG/0000-0002-1137-2112**

**E-mail: grigorev161@ukr.net**