

Physical workability of students in the conditions of the mixed format of education in the discipline "physical culture and sport"

UDC 796:378.14



Dr. Hab., Professor **Zh.B. Safonova**¹
PhD, Associate Professor **T.V. Koltoshova**¹
PhD, Associate Professor **I.N. Sheveleva**¹
PhD, Associate Professor **O.A. Melnikova**¹
¹Omsk State Technical University, Omsk

Corresponding author: koltoshova@rambler.ru

Abstract

Objective of the study was to identify the possibility of self-improvement of the physical performance of students during the period of the mixed format of mastering the discipline "Physical culture and sport".

Methods and structure of the study. 120 students (90 boys and 30 girls) of the 1st and 2nd courses took part in the experiment. The assessment of physical performance was carried out according to the step-test method modified by V.L. Karpman (1981), which makes it possible to use it in the "field" conditions.

During the period of the mixed mode of training (2020-2021), in order to increase physical performance during independent physical education, the maximum test was used, which includes eight physical exercises that ensure their consistent impact on all muscle groups.

Results and conclusions. The results of the experimental study made it possible to conclude that the maximum test, which includes eight physical exercises, provides a consistent effect on all muscle groups and allows you to optimize the load, according to the individual condition of the student.

During the period of the mixed format of mastering the discipline "Physical culture and sport" students at the university must include the most effective and accessible methods and means to improve physical performance.

Keywords: *students, physical performance, optimal load, self-study.*

Introduction. The study and evaluation of the physical performance of students are necessary, first of all, from the standpoint of a socio-hygienic approach based on medical and statistical indicators, pedagogical observations of philosophical and sociological understanding. The first is an assessment of physical condition; the second is an assessment of one's well-being, the desire to learn and be ready for work and the formation of healthy needs in life activity.

The issue proposed for discussion is not new, but this does not reduce its relevance, since, according to A.G. Shchedrina (2003), despite the positive social transformations, the problem of "health care, mass physical culture, and the health of the country's population is far from being resolved" [5].

The physical state is characterized by the degree of readiness of a person to perform muscular and labor

loads of a different nature in a given specific period of time, depending on the level of physical qualities and functional capabilities of individual body systems [3].

However, if we turn to the definition of the physical condition of a person, given by T.V. Khutiev et al. (1991), then its mandatory component, in addition to anthropometric indicators, are physiological parameters, including physical performance and exercise tolerance [4].

The definition of physical performance provides information about the "tolerant pulse", that is, the maximum heart rate allowed in the lesson. Without taking into account these fundamental provisions, motor activity is ineffective.

The transition to active individual design of physical activity, which increases the aerobic abilities of the individual, should be carried out through the optimi-

zation of students' motor activity with an emphasis on physical exercises of various directions in accordance with the functional capabilities of the individual.

Objective of the study was to identify the possibility of self-improvement of the physical performance of students during the period of the mixed format of mastering the discipline "Physical culture and sport".

Methods and structure of the study. 120 students (90 boys and 30 girls) of the 1st and 2nd courses took part in the experiment. The assessment of physical performance was carried out according to the

step-test method in the modification of Karpman V.L. (1981), which allows using it in "field" conditions [1].

During the period of the mixed mode of training (2020-2021), in order to increase physical performance during independent physical education, the maximum test was used, which includes eight physical exercises that ensure their consistent impact on all muscle groups [2].

The first exercise is for the shoulder girdle (jerk movements of the arms: 1 time bent at the elbows, 2 straight lines, counted at a time); the second - flexion-

Table 1. Indicators of the maximum test among students

Indicators	Youths (n-90) Girls (n-30)	The main medical group		
		I survey	II survey	p=0 (significance of differences)
Jerking hands	Y,	21±0,1	24±0,2	-
	G	18±0,8	21±1,1	< 0,05
Flexion and extension of the arms in the lying position	Y	18±0,8	21±0,6	< 0,05
	G	5±0,9	5±0,9	without change
Squats	Y	18±0,7	20±0,2	< 0,05
	G	16±0,6	17±0,6	without change
Bends back while sitting on a bench	Y	9±0,5	10±0,3	< 0,05
	G	9±0,5	9±0,4	without change
Raising straight legs in the starting position lying on your back	Y	12±0,9	14±0,7	< 0,05
	G	10±0,9	11±0,7	< 0,05
Step test (climbing the bench)	Y	17±0,6	21±1,2	< 0,05
	G	14±1,1	17±0,003	< 0,05
Raising the legs in the starting position lying on the stomach	Y	14±1,3	18±1,1	< 0,01
	G	15±1,1	17±0,03	< 0,05
Running in place heart rate difference	Y	48±0,5	48±0,7	without change
	G	42±0,5	46±0,7	> 0,05

Table 2. Indicators of physical performance of students

Indicators	1 2	Main group	
		Youths (n-90)	Girls (n-30)
Heart rate at rest, bpm	1	80±0,2	89±0,6
	2	78±0,4	80±0,4
	Po	<0,005	<0,005
Heart rate maximum, bpm	1	164±0,1	155±0,3
	2	148±0,3	140±0,6
	Po	<0,001	<0,005
PWC ₁₅₀ , kgm/min	1	780±30	608±24
	2	969±24	720±15
	Po	<0,05	<0,05
VO ₂ max absolute, l/min	1	3,4±0,2	2,8±0,1
	2	4±0,1	3,2±0,3
	Po	<0,005	<0,005
VO ₂ max relative, ml/min/kg	1	41±8,2	40±14
	2	46±2,3	44±13
	Po	<0,05	<0,05
Heart rate at the 5th minute of recovery	1	102±0,4	110±0,4
	2	96±0,3	90±0,6
	Po	<0,001	<0,05

Note: 1 - before, 2 - after the experiment.



extension of the arms, in an emphasis lying down; the third - squats on the whole foot, arms forward; fourth - bending back, sitting on a bench, hands behind the head; fifth - raising the legs to a right angle from the ip. lying on your back; sixth - climbing on a bench 30 cm high; seventh - lifting straight legs from a prone position; eighth - running in place with a high hip lift. These are technically simple movements that do not require special training. Each exercise is performed the maximum number of times within 20 seconds with intervals between exercises of 30 seconds. The reaction to running is determined by the pulse before and after the load. The maximum number of exercises performed is divided by four and this determines the optimal number of repetitions individually for each student.

Results of the study and their discussion. Repeating this test after two weeks of regular classes will show their performance dynamics among students. In table. Figure 1 shows the results of the maximum test conducted by students after two weeks of its regular performance.

According to the WHO recommendations, physical culture and health-improving classes are held at the level of 70-85% of the maximum heart rate, which makes it possible to judge adaptation to the work performed (load) and the level of the functional state of the cardiovascular system.

Evidence of an increase in the functional capabilities of the cardiovascular system of students (boys and girls) who study independently according to the maximum test was a favorable and reliable ($p < 0.05 - 0.001$) dynamics of physical performance indicators (Table 2). with a standard load (step test) indicates a reserve of the cardiorespiratory system, and hence the possibility of further increasing the number of repetitions of each of the eight exercises of the maximum test. adaptation of students to gradually increasing loads. At the same time, an increase in aerobic capacity should be noted, based on a significant ($p < 0.05$) increase in the relative Maximum oxygen consumption ($VO_2 \text{ max}$), which exceeded that before the start of classes.

Conclusions. The results of the experimental study made it possible to conclude that the maximum test, which includes eight physical exercises, provides a consistent effect on all muscle groups and allows you to optimize the load, according to the individual condition of the student.

During the period of the mixed format of mastering the discipline "Physical culture and sport" of students at the university, it is necessary to include the most effective and affordable methods and means to increase physical performance.

References

1. Karpman V.L., Belotserkovsky Z.B. Testirovanie v sportivnoj medicine [Testing in sports medicine]. Moscow: Fizkultura i sport publ., 1988. 208 p.
2. Perepelov A.N., Safonov Zh.B. Optimizaciya uchebnogo processa po fizicheskomu vospitaniyu v tekhnicheskikh vuzah [Optimization of the educational process in physical education in technical universities]. Study guide. Omsk: OmPI publ., 1986. 63 p.
3. Sautkin M.F. Diagnostika i povyshenie fizicheskikh vozmozhnostej rastushchego organizma [Diagnosis and increase in the physical capabilities of a growing organism]. Ryazan: RIO RyazGMU publ., 2015. 100 p.
4. Khutiev T.V., Antamonov Yu.G., Kotkova A.B. et al. Upravlenie fizicheskim sostoyaniem organizma – treniruyushchaya terapiya [Managing the physical state of the body - training therapy]. Moscow: Medicina publ., 1991. 213 p.
5. Shchedrin A.G. Zdorovyj obraz zhizni: metodologicheskie, socialnye, biologicheskie, medicinskie, psihologicheskie, pedagogicheskie, ekologicheskie aspekty [Healthy lifestyle: methodological, social, biological, medical, psychological, pedagogical, environmental aspects]. Novosibirsk: Alfa Vista publ., 2007. 144p.