

## Study of physical preparedness of students of Ukrainian state university of railway transport

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### Abstract

Determining the level of physical fitness of students of the Ukrainian State University of Railway Transport. The study involved 76 students who belong to the main medical group due to their health condition. The following methods were used in the study: theoretical analysis and generalization of literature sources, pedagogical experiment, testing, method's of mathematical processing of results. The analysis of indicators of the level of physical fitness of first-year students showed that it mainly corresponds to "3" and "2" points, for second-year students – "3" and "4". The worst in first and second year students are endurance. Based on the results of our pedagogical research, we can draw the following conclusions: 1. Timely diagnosis of the level of physical fitness of students at the beginning of university (first year) allows you to identify existing gaps in their physical fitness. 2. Timely diagnosis and control of physical condition in higher education allow to make appropriate adjustments to the program of physical education in order to improve and further develop the basic physical qualities of students. The results of the pedagogical experiment indicate that, at the time of testing, a higher level of physical fitness have young men of the second year. It should be noted that second-year students regularly attended physical education classes and followed a certain program to improve general physical fitness, which had a positive impact on the level of development of their physical qualities and physical fitness in general. Planning, implementation and management of the educational process in higher education institutions of Ukraine can be successful only with the receipt of objective data on the physical fitness of students. Analysis and generalization of literature sources showed insufficient study of the initial level of physical fitness of students.

**Keywords:** physical training, students, young men, physical culture

### Introduction

The main task of Ukrainian universities is to prepare a perfect, well-prepared personality (Grinko V, Kudelko V, Hlotov Y. 2018) [4, 7]. One of the means of comprehensive development of personality, the formation of the foundations of a healthy lifestyle, increased physical activity and physical fitness is physical culture (Grinko V., Kudelko V., Yefremova A., Klokova S., 2020). Today, the issues of improving the physical fitness of young people, as well as improving health in higher education are among the most important and relevant. Research shows that almost the entire period of study at the university has a negative impact on the lives of students. The researchers note that students have a significant decrease in motor and physical activity, high levels of psycho-emotional and mental stress, impaired work and rest, nutrition and sleep (Grinko V., Kudelko V., Hlotov Y. 2017) [3]. In addition, according to many authors, students have a significant decrease in interest in regular physical education and sports (Grinko V.; Kudelko V.; Yefremova A.; Klokova S. 2020). All this leads to the deterioration of the health of modern youth, increased morbidity, hypodynamics, obesity, decreased physical fitness and efficiency. Scientific data show that an important factor that ensures the potential of a person is his health, which is characterized by the optimal level of physical fitness and efficiency. Therefore, in order to improve the organization of training sessions on physical education in

the universities of Ukraine, the issues of timely diagnosis and control of the level of physical fitness of student youth are increasingly raised (World Health Organization, 2010) [9]. Timely diagnosis makes it possible in the future to take measures of pedagogical influence in order to correct, improve and control both the physical fitness of students and their health in general (LO Deminskaya, 2010) [17]. Many specialists paid attention to the need to diagnose and control the indicators of physical fitness of students of higher education institutions (Kuprienko ML, Krivets IG, 2014). However, despite numerous studies in this area, the problem of timely diagnosis of physical fitness of students in higher education is still relevant. The obtained data will enable university teachers not only to control, analyze and monitor the dynamics of physical fitness of student youth, but also to make adjustments to the process of physical education in order to improve it (Grinko V., Yefremova; Kudelko V.; 2020).

### Purpose, tasks, materials and methods.

*Purpose.* The purpose of the study is to determine and analyze the initial level of physical fitness of first and second year students of the Technical University of Ukraine. *Methods.* Research methods: theoretical analysis and generalization of literature sources, pedagogical experiment, testing, methods of mathematical processing of results. Assessment of the level of physical fitness of the subjects was checked using control

standards for physical education. The obtained research results were subjected to mathematical processing using standard software packages for statistical data processing of research: Microsoft Excel 2000. *Object.* The pedagogical experiment was attended by 76 young men aged 17-19 (students of I-II courses of the Ukrainian State University of Railway Transport). Of these, 37 are first-year students and 39 are second-year students. All subjects in terms of health belong to the main medical group. The study was conducted at the sports base of the Ukrainian State University of Railway Transport in Kharkiv (Ukraine). The essence of the study was to determine the level of physical fitness of Ukrainian first and second year students during their studies at the university.

### Research results and their discussion.

In accordance with the purpose of the experiment, a study was conducted in which 76 students participated, in particular, their initial level of physical fitness was studied. The optimal level of physical fitness of a person is one of the main characteristics of his health, which is characterized by the degree of readiness of a person to perform physical activities of various kinds for a specific period of time. This readiness depends on the level of development of physical qualities of the person, features of his physical development and functional possibilities of an organism. However, every year there is a progressive decline in the level of physical fitness, as well as the deterioration of the health of the Ukrainian population, especially for student youth. Therefore, the

problem of improving the level of physical fitness of modern students is one of the important tasks facing the system of higher education, in particular, the departments of physical education and sports. In connection with the above, it is important to identify the initial indicators of the level of physical fitness of student youth in the first months of their studies at the university after graduation. This enables teachers, with the help of adequately selected tools and methods of physical education, to influence the improvement and maintenance of a high level of physical condition of students.

To determine the initial level of physical fitness of students of I - II courses of the university used control standards for physical education. The level of physical fitness was determined using indicators of endurance, speed and strength, flexibility and coordination. The rating scale was a 15-point rating system used at the Department of Physical Education and Sports at the Ukrainian State University of Railway Transport. The task of passing the control standards for the assessment of physical fitness is mandatory for students of Ukrainian universities.

With the help of control tests the level of physical fitness of first and second year students of the Ukrainian State University of Railway Transport was determined (Dubnytsky V. Yu., 2011; Lykov IA, 2013; GP Bystray, LA Korshunov, I.A. Lykov, NL Nikulina, SA Okhotnikov, 2010) [12, 14] (Table 1).

**Table 1:** Indicators of the level of physical fitness of young men of I - II courses (n = 76)

Testing	Group I course (n=37)		Group II course (n=39)		t	p
	Result $\bar{X} \pm m$	Mark	Result $\bar{x} \pm m$	Mark		
3000 m (s) running	970,14±19,94	1	931,72±20,08	1	1,36	>0,05
Pull-ups on the crossbar	9,92±0,39	2	12,21±0,39	3	4,15	>0,05
Tilt the torso forward from a sitting position, (cm)	9,46±0,41	2	10,56±0,47	2	1,76	>0,05
100 m (s) running	14,55±0,23	2	14,34±0,18	3	0,73	>0,05
Shuttle running 4 × 9 m (s)	9,65±0,11	3	9,23±0,06	4	3,45	<0,05
Long jump from a place (cm)	227,68±2,01	3	235,51±2,38	3	2,52	>0,05
Lifting the torso to the side in 1 minute	41,55±1,23	3	45,10±1,09	3	2,17	>0,05
Flexion and extension of the arms in the supine position	31,08±1,06	2	38,64±0,57	4	6,28	>0,05
Hanging on bent arms (s)	36,19±2,11	3	35,51±1,97	3	0,23	>0,05

Analysis of the indicators of the level of physical fitness, given in table 1, shows that the significance of differences in boys of I and II courses was recorded between indicators of strength, coordination, abdominal muscle strength and explosive force ( $p < 0,05 - 0,001$ ).

When comparing the obtained indicators of testing of first-year students with control standards, it was found that they mainly correspond to the marks "3" and "2" points. It should be noted that the worst first-year students have developed endurance, which corresponded to a score of "1". A similar comparison of second-year students' test scores shows that the level of coordination and strength corresponds to "3" and "4" points, and in tests for speed, explosive power and abdominal muscle strength – "3" points. However, endurance and flexibility indicators corresponded to scores of "1" and "2" points, respectively. For a more detailed analysis, we conducted an individual analysis of physical fitness of first- and second-year students. The strength of the muscles of the

students' arms was assessed using tests: flexion and extension of the arms in the supine position (number of times); pull-ups on the crossbar (number of times); hung on bent arms (seconds). Individual analysis of test results showed that in the test of flexion and extension of the arms in the focus lying only 2.7% of first-year boys showed an "excellent" level of strength development, 16.2% - "good", 48.7% - "average", 29.7% - "low" and 2.7% - "very low". The following results were observed in second-year boys: 10.2% had an "excellent" level of arm muscle development, 51.3% - "good" and 38.5% - "average". The dynamic strength of the arm muscles was determined by the results of pull-ups on the crossbar. The following data were obtained in this test: 18.9% of first-year students showed an "average" level of development of dynamic arm strength, 37.9% - "low" and 43.2% - "very low". The second-year students found that 10.3% have an "excellent" level of development of strength qualities, 12.8% - "good", 30.8% - "medium" and 46.1% - "low".

The results of the torso lift test in 1 minute showed that 5.4% of first-year boys have an “excellent” level, 29.7% - “good”, 40.6 - “medium”, 18.9% - “low” and 5.4% - “very low”. Individual analysis of the results of second-year boys showed that 12.8% of subjects showed an ‘excellent” level of abdominal muscle strength, 28.2% - “good”, 56.4% - “average” and 2.6% - “low”. The explosive force was determined by the results of a long jump from a place. Individual analysis in this test showed that 2.7% of first-year students showed an “excellent” result, 5.4% - “good”, 48.7% - “medium” and 43.2% - “low”. The second-year students found that 7.7% showed in this test an “excellent” level of explosive force development, 20.5% - “good”, and 66.7% and 5.1% - “medium” and “low”, respectively.

Individual analysis of indicators of the level of development of coordination abilities (shuttle running 4 × 9 m) of first-year boys revealed that 8.1% have an “excellent” level of coordination development, 29.7% - “good”, 32.4% - “average”, 27.1 - “low” and 2.7% - “very low”. In the second-year boys, according to the results of individual analysis, it was recorded that 20.5% of the subjects showed an “excellent” level, 56.4% - “good” and 23.1% - “average”. On the positive side, no second-year student showed a low and very low level of coordination.

Comparison of the results of the 100 m run between first and second year students showed that 19.0% of subjects have an “excellent” level of development of speed qualities, 24.3% have “good” and “low”, and 16.2% - “medium” and “very low”. In second-year students, the results of individual analysis showed the following: 12.8% of young people have an “excellent” level of development of speed qualities, 30.8% - “good” and “low” and 25.6% - “medium”.

Flexibility indicators were determined using the test of tilting the torso forward from a sitting position. Individual analysis in this test showed that 10.8% of first-year students have an “average” level of flexibility, 35.1% - “low” and 54.1% - “very low”. The second-year students recorded that 25.6% showed a “medium” level, 38.5% - “low” and 35.9% - “very low”. It should be noted that in this test, no young man I and II years could not show a “good” and “excellent” level of flexibility.

It was experimentally determined that the subjects of the first and second courses developed the worst endurance, which corresponds to “1” point. Thus, an individual analysis of the 3000 m run found that only 5.4% of first-year boys have a “good” level of endurance development, 16.2% - “medium”, 46.0% - “low” and 32.4% - “very low”. In the second-year boys, individual analysis revealed the following: 15.4% of subjects showed a “good” result, 17.9% - “medium”, 51.3% - “low” and 15.4 - “very low”. None of the first and second year subjects was able to show an “excellent” result.

Thus, the results of the pedagogical experiment indicate that, at the time of testing, a higher level of physical fitness have young men of the second year. It should be noted that second-year students regularly attended physical education classes and followed a certain program to improve general physical fitness, which had a positive impact on the level of development of their physical qualities and physical fitness in general. Planning, implementation and management of the educational process in higher education institutions of Ukraine

can be successful only with the acquisition of objective data on the physical fitness of students (Grinko V., Kudelko V., 2019) [6]. Therefore, before starting the implementation of training sessions on physical education, it is necessary to determine the initial level of physical fitness of students. Therefore, the issues of timely comprehensive diagnosis and, in the future, control of the level of physical fitness of university students are relevant.

Thus, to further improve the physical fitness of students, as well as the implementation of its further control, the stage of preliminary study of the level of initial physical fitness of students should be considered as an important component of the pedagogical process. It should also be noted that diagnosis and control can successfully help in the work of university teachers, coaches of sports sections of universities, and medical staff who monitor the health of students (Grinko V., 2015) [10].

The analysis of literature sources shows that the problem of timely comprehensive diagnosis of the level of development of physical qualities of students in the first years of study requires more detailed and in-depth study (Grinko V., Kudelko V., 2020) [8, 5]. In this aspect it is necessary to consider that in the given age period the young organism of young men is still in a stage of formation and development (Novikova N., 2011) [16]. Therefore, for optimal planning of the educational and training process in physical education it is necessary to take into account the age characteristics of the formation of the body of students. An important role in the planning and implementation of comprehensive physical training of university students is played by physical education. Our research is a continuation of scientific work devoted to the study of identifying the level of physical fitness of students in higher education. The data obtained in our study confirm the results of other scientists, who found that the level of development of physical qualities and physical fitness of most students are quite low.

## Conclusions

In accordance with the purpose of the pedagogical experiment, we conducted a study of the level of physical fitness of first and second year students of the Ukrainian State University of Railway Transport of Ukraine. Analysis and generalization of literature sources indicate a lack of information regarding the initial level of physical fitness of first and second year students in higher education.

The obtained data of the pedagogical experiment indicate that in the first-year boys the indicators of dynamic strength of arm muscles, speed and flexibility correspond to the score “2” points, indicators of static strength of arm muscles, abdominal muscles, coordination and explosive force. – “3” points. In the second-year boys, the indicators of explosive force, speed, arm muscle strength and abdominal muscle strength corresponded to the score “3” points, and the indicators of coordination and dynamic strength of the arm muscles – “4” points and only flexibility indicators corresponded to the score “2” points. It was found that the worst in young men, both I and II courses developed endurance, which corresponds to a score of “1” point. The results of the pedagogical experiment make it possible to recommend the inclusion in the program of physical education for first-year boys more physical exercises

aimed at increasing and developing endurance, strength and speed. For second-year students, the physical education program should include an emphasis on endurance and flexibility. Thus, based on the results of our pedagogical research, we can draw the following conclusions: 1. Timely diagnosis of the level of physical fitness of students at the beginning of university studies (first year) allows you to identify existing gaps in their physical fitness.

2. Timely diagnosis and control of physical condition in higher education allow to make appropriate adjustments to the program of physical education in order to improve and further develop the basic physical qualities of students.

### Further research of the problem

The research can be continued in the direction of determining the dynamics of the level of physical fitness of first and second year students, which take place during the school year.

### Conflict of interest

The authors state that there is no conflict of interest.

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