CAHIERS MAGELLANES-NS
Volume 06 Issue 2
2024

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

EFFECT OF SWIMMING TRAINING ON THE PHYSICAL CAPABILITIES OF UNIVERSITY STUDENTS

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Abstract:
Muscular regular activity can provide strengthening of the organism, especially in adolescence. It seems important to clarify the impact of physical activity in the aquatic environment on the organism of students. The aim of the study: to determine the dynamics of physical fitness of university students of youth age in the conditions of swimming lessons. During the whole study on the bachelor's degree of humanitarian directions of training 32 male students were observed. From them we collected a group of swimmers (17 people), which in addition to physical education classes experienced loads during swimming lessons three times a week. The second sample - the control group (15 young men) led a physically inactive lifestyle during the entire observation. Standard functional tests were used as research methods. Both groups were monitored for 4 years - during the whole undergraduate education. The results in the conducted work were processed using correlation analysis and Stjudent(t) criterion. Systematic training of students in the swimming pool led to positive dynamics of their body stability and improved coordination. Swimming classes provided young male students with an increase in endurance with the growth of his strength and speed capabilities. Systematic training in the swimming pool contributes to the improvement of physical development indicators in adolescent students.
Keywords: students, adolescence, physical activity, swimming, aquatic environment, physical ability.

Introduction

Building up the level of regular muscle activity is in all cases able to develop the biological features of the human body, reducing the risk of pathology (Makhov & Medvedev, 2020; Medvedev, 2021a) and, if present, weakening its manifestations (Glamazdin *et al*., 2022; Tkacheva *et al*., 2023). Regular physical activity stimulates the development of major muscle groups and enhances the expression of vital signs in all parts of the body (Medvedev, I.N. (2021b; Makhov & Medvedev, 2021).

The increasing prevalence of poor physical activity among the majority of the population (Medvedev *et al*., 2021a), especially young people (Mikhaylova *et al*., 2021a), is recognized as a negative aspect of modern times. The state of health of full-time university students (Tkacheva & Medvedev, 2022), who are soon to start active labor activity (Kartashev *et al*., 2023), is very important for the development of society. At the same time, nowadays more and more modern students have poor physical preparation and low physical capabilities due to their involvement in the learning process (Makhov, A.S., & Medvedev, I.N. (2020; Mikhaylova *et al*., 2021b). Only by overcoming this situation can it be realistic to optimize the main functional characteristics of internal organs (Medvedev *et al*., 2021b) and strengthen the whole body (Glamazdin *et al*., 2023; Makurina *et al*., 2023). It is clear that an increase in the volume of motor activities of a young person can be effective in increasing the productivity of mastering the educational program (Mikhaylova *et al*., 2021c; Medvedev *et al*., 2021c). The need for regular physical activity has been emphasized by many researchers based on the results of observations of different categories of observers (Karpov *et al*., 2020; Medvedev *et al*., 2022a). In addition, the need to improve the methods of physical activation of young people before the beginning of their working life (Mal *et al*., 2020) against the background of somatic health promotion (Karpov *et*

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

al., 2021; Medvedev *et al*., 2023) is recognized.

The need to continue such research is related to obtaining information required to continue increasing the productivity of sports activities of university students (Sapunova *et al*., 2023), as well as to increase the intensity of their brain and vital organs, which is extremely important for their overall health and improving the mastery of their future profession (Karpov *et al*., 2023; Glamazdin *et al*., 2024). One of the options for increasing the physical activity of students can be considered in students to regularly visit the swimming pool not to the detriment of academic classes on the schedule of the university.

Purpose of the work: to determine the dynamics of physical fitness of university students of adolescent age in the conditions of swimming lessons.

Materials and Methods

To perform this study, the authors collected 32 clinically healthy male students aged 17-18 years who were enrolled in the first year of university in the humanities. They were followed for 4 years, throughout their undergraduate studies. All observed young men were divided into two comparable groups. One group was named the swimmer group (17 young men). All of these students, after enrolling at the university, began regular swimming lessons at the university swimming pool while making sure to attend physical education classes on the academic schedule. The pool sessions were held three times a week and lasted 40-60 minutes. The second group was called the control group (15 young men). It was formed by students who lead a non-sports lifestyle, regularly attending classes devoted to physical education twice a week according to the university schedule. In all cases, at baseline and at the end of their undergraduate studies, the results of a number of standardized functional tests were evaluated to assess the state of their physical fitness.

Mathematical processing of the numerical data obtained during the study was carried out using the methods of variation statistics by computer, using the program “StatSoft, Inc.” USA. The Student's criterion (t) was calculated.

The results of the study and their discussion

At the beginning of the observation all students had low physical abilities. At the same time, the initial results of the performed testing had no differences between the groups, showing a low degree of physical fitness of students (Table). Initially, they had low speed and strength parameters. This was evidenced by the data of their performance of tests: running thirty meters in 6.4±0.49 s, running sixty meters in 11.4±0.62s, the ability to make a horizontal jump of 1.41±0.22 m. At the beginning of the first year, students could run a distance of 924.6±32.45m in a time of 6 minutes, which proved their low endurance. The small number of pull-ups they were capable of (3.2±0.61 repetitions) spoke about their initially undeveloped strength properties. At the same time, at the beginning of the observation, the students were noted to have poor coordination abilities. This was indicated by the results of their participation in shuttle run (12.3±0.47 s) and jumping rope (25.8±1.75 repetitions).

Before the beginning of swimming lessons in the group of swimmers, the performance of pull-ups on the crossbar, getting the body out of the supine position and participation in shuttle run turned out to be difficult for the observed. An extremely difficult outcome was the error-free performance of the necessary sports movements without shortness of breath. At the same time, young swimmers initially indicated an early development of subjective fatigue with an increase in the number of errors in the performance of swimming movements and inhibition of their reaction.

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ISSN:1624-1940
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Table. Physical abilities of the observed

Indicators of physical abilities of the observed	Initial assessment data, M±m, n=32	Final assessment data, M±m	
		group of swimmers, n=17	control group, n=15
Long jump distance, m	1.41±0.22	2.23±0.26 p<0.01	1.52±0.19
Distance run in 6 minutes, m	924.6±32.45	1286.7±44.28 p<0.05	948.4±51.75
Number of pull-ups performed on the bar, times	3.2±0.61	8.2±0.45 p<0.01	4.0±0.29
Lifting the body from a lying position during a minute, times	21.6±1.24	35.9±1.38 p<0.01	23.2±1.57
Duration of shuttle run 4x9, s	12.3±0.47	8.9±0.52 p<0.01	11.9±0.58
Jumping rope for 25 s, repetitions	25.8±1.75	42.0±1.86 p<0.01	26.2±1.61
Thirty-meter run, s	6.4±0.49	4.8±0.31 p<0.01	6.3±0.29
Running sixty meters, s	11.4±0.62	8.2±0.47 p<0.01	11.1±0.53

Note: p - statistical significance of changes in test parameters during the performed observation.

At the final examination of the persons training in the pool, who were included in the control group, no reliable changes in the results of the tests were found. At the end of the fourth year of training in student swimmers there was an elimination of signs of fatigue from training. This could be judged by their subjective sensations and by the reduction of pulse rate at the end of training (their pulse rate at this time was lower than the initial one by 26.7%, not exceeding the level of 105 beats per minute in swimming conditions).

At the end of undergraduate studies, students who regularly practiced swimming showed a pronounced improvement in test results (table). They found an increase in speed and strength parameters: there was an acceleration of running test distances (by 33.3% and by 39.0%, while the jump lengthened by 62.4%).In those who visited the swimming pool on a regular basis, an increase in strength parameters was found (they increased by 56.2% the number of pull-ups performed, increased by 66.2% the number of lifting the body to the vertical position per minute). Also the swimmers achieved an improvement in coordination. This was manifested in them by the end of the observation by a 38.7% reduction in their shuttle run time and a 62.7% increase in their ability to jump rope. In addition, the swimmers experienced an increase in their endurance level, as judged by a 39.2% increase in the distance they were able to run for 6 minutes measured on a stopwatch.

Powerful stimulation of the organism in the group of swimmers occurred due to the strong load accompanying swimming as a result of immersion in water and the need to perform rational movements. Under these conditions comes the development of muscular, respiratory and cardiovascular systems. Their development is based on the intensification of the main biochemical intracellular processes in all cells of the body. In addition, the achieved result should be associated with activation of transcription,

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

translation, glycolysis, glyconeogenesis and Krebs cycle. Under these conditions, the most important achieved result can be considered an increase in the volume of synthesized protein and the amount of generated energy in mitochondria of transverse striated muscle cells, cardiomyocytes and lung cells.

As a result of all these changes in the group of swimmers by the end of their undergraduate studies, the speed and accuracy of movements increased, which was noted in the running test, in the jump test and in the pull-up test. Thus, in the case of regular swimming lessons, the time required to run short distances of 30 and 60 meters decreased in young men. First of all, it should be associated with the increase in their degree of muscle development, with a high degree of mastery of sports movements and with the increase in the physical reserves of their body (Stradze *et al*., 2023). A very important result of their training should be considered the achievement of optimization of locomotor characteristics in young swimmers, leading to greater body stability. This should be associated primarily with the development of trunk and limb muscles in the course of swimming training with the improvement of vestibular mechanisms (Medvedev *et al*., 2022b). Another biologically very valuable achievement of young swimmers is the increase in their endurance level, which was made possible by the increase in their various physical capabilities.

Conclusion

Various aspects of the effects of swimming on humans continue to be actively studied by modern researchers. In the study conducted, it was found out that swimming lessons throughout undergraduate studies increased the physical capabilities of young males. This was associated with an increase in their movement clarity, strength performance and speed parameters. As a consequence of regular exercise, the male undergraduates had significant improvements in their coordination and increased their endurance. Continuing to lead a non-sporting lifestyle maintained the initial low level of physical abilities in undergraduate students without dynamics. In this regard, it is clear that regular swimming lessons significantly increase physical abilities and improve locomotor parameters of young male students.

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