



The role of self-strength abilities in increasing the level of physical fitness of students of military training centers

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Abstract

Objective of the study was to identify the effectiveness of the use of training cycles in the process of physical exercises aimed at developing self-strength qualities, and to assess their impact on the level of physical fitness of students of military training centers in general.

Methods and structure of the study. To achieve this goal, a six-month pedagogical experiment was conducted on the basis of the military training center at the National Research Tomsk State University, in which 20 4th-year students (male, aged 21-22 years) took part in the training programs frame officers. The experimental and control groups of 10 people each were formed from the number of subjects. The experimental group (EG) was engaged according to the developed training plan containing cycles aimed at developing self-strength qualities. The control group (CG) underwent complex training sessions in gymnastics and athletic training, in which low-intensity exercises with own body weight and non-limiting weights were used.

Results and conclusions. On the basis of the results of the pedagogical experiment, it was proved that the construction of the educational and training process, taking into account the cyclical nature of physical activity, aimed at developing self-strength qualities, contributes to the formation of a higher level of physical fitness of students of military training centers in general.

Keywords: *self-power qualities development, students of military training centers.*

Introduction. In military-applied physical training, considerable attention has traditionally been paid to the development of strength. It is known that strength is the main physical quality that underlies other abilities, such as self-strength and speed-strength qualities, as well as strength endurance (Matveev, 1977). At the same time, the analysis of the existing instructions on the organization of physical training in the Armed Forces of the Russian Federation (Order of the Ministry of Defense of the Russian Federation No. 200 dated April 21, 2009) shows that insufficient attention is paid to the education of military personnel of self-power qualities. It is assumed that the inclusion in the training process of training cycles aimed at developing self-strength qualities will increase the level of physical fitness of students enrolled in military training programs.

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physical exercises aimed at developing self-strength qualities, and to assess their impact on the level of physical fitness of students of military training centers in general.

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Table 1. General structure of the training plan

No.	Mesocycle type	The direction of development of motor abilities	Main goals
1-2	Cumulative	Aerobic endurance and overall strength	Increase in overall physical performance
3-4		Self-power qualities	Achieving the required level of muscle strength
5	Transformative	Speed-strength qualities	Bringing to the required level of development and maintenance for a certain time
6	Implementation	Specific strength	Maximum result in control exercises

and non-limiting weights were used. The evaluation of the results of the experiment was carried out using pedagogical testing, on the basis of which the level of physical fitness of the subjects was determined: pull-ups on the crossbar and a run of 60 meters.

Results of the study and their discussion. Self-power abilities are manifested in the process of work that requires large muscle tensions, in overcoming, yielding and static modes of muscle work, in relatively slow movements with large external weights.

As the practice of physical training of officers of the personnel of military training centers shows, in the training process of military personnel, physical activity that requires the manifestation of self-strength abilities is rarely used, since to fulfill the established standards, to a greater extent, a high level of development of general and strength endurance is required.

The main reason for underestimating the importance of the development of self-power qualities in the process of physical training of military personnel is a rather narrow interpretation of this concept, which is often associated only with a low speed of performing motor actions, a short duration of physical activity and the use of external weights.

On the one hand, such an interpretation of this concept is not unfounded, since some factors can indeed negatively affect the qualities necessary for military service - for example, an increase in the physiological diameter of muscles, with a concomitant decrease in mitochondrial density, entails a decrease in local endurance.

However, on the other hand, factors that favorably affect the level of physical fitness of military personnel as a whole are not taken into account. In addition to strengthening the musculoskeletal system and increasing the functionality of the neuromuscular system, the development of self-strength qualities has a positive effect on the components of strength that are associated with other physical qualities: speed-strength, strength endurance, etc.

Based on this provision of the theory and methodology of physical culture, an experimental methodology for the physical training of cadre officers was developed, which was tested in a pedagogical experiment. Its main difference from the traditional military-applied

physical training, based on an integrated approach, is the presence of training cycles of physical activity, focused, to a greater extent, on the development of the self-strength component.

The formative experiment, aimed at evaluating the effectiveness of the developed methodology, assumed the use of a block concept of periodization of sports training (Issurin, 2010), where a significant part of the physical load was focused on the development of self-strength qualities. Table 1 shows the general structure of the training plan, a semi-annual macrocycle consisting of six mesocycles.

Consider the structure of the macrocycle, as well as the sequence and characteristics of mesocycles. According to the concept of block periodization of the training process, they can be differentiated into accumulative, transforming and implementation ones.

1. The first two mesocycles are cumulative. They are aimed at developing aerobic endurance and overall strength, which together contribute to an increase in overall physical performance. Training impacts within this period are aimed at:

- strengthening of the cardiovascular and respiratory systems through low-intensity aerobic exercise (heart rate - 120-140 bpm) with a gradual increase in the duration of the load (by 10% during one microcycle);

- anatomical adaptation of the body, due to muscle hypertrophy caused by the use of gymnastic exercises aimed at developing muscle strength, strengthening the ligamentous apparatus and tendons in order to prevent injuries and prepare for subsequent more intense loads.

2. The category of cumulative also includes the third and fourth mesocycles, which are aimed at developing self-strength qualities that ensure the achievement of the required level of muscle strength. This period is characterized by:

- consistent application in the training process of methods of non-limiting and near-limiting physical loads using athletic exercises of medium (50-80% of 1RM) and high (80-95% of 1RM) intensity, contributing to the improvement of coordination links of the central nervous and motor-muscular systems ;

- maintaining or slightly reducing the volume (no more than 20% of the previous period) of the load in aerobic


Table 2. Results of testing students of the control and experimental groups

Group	Pull-ups on the bar			60 m run		
	$x \pm m_x$	t	p	$x \pm m_x$	t	p
<i>Ascertaining experiment</i>						
EG	15,00 ± 1,01	0,62	0,54 (>0,05)	8,19 ± 0,09	0,45	0,66 (>0,05)
KG	15,90 ± 1,05			8,25 ± 0,07		
<i>Control Experiment</i>						
EG	19,80 ± 0,60	2,16	0,04 (<0,05)	7,92 ± 0,05	2,56	0,02 (<0,05)
KG	17,00 ± 1,15			8,14 ± 0,07		

exercises while maintaining their previous intensity in order to maintain the level of physical performance.

3. Within the framework of the transforming mesocycle, the basic components laid down during the previous accumulative mesocycle are modified into physical qualities that are professionally significant for military service - speed-strength and strength endurance. The main task of this period is the development of the qualities listed above, bringing them to the required level and maintaining them at this level for a certain time. This period is characterized by:

- application of methods of dynamic efforts and near-limit weights with a decrease in the total volume of load in athletic exercises;

- reduction in the volume of aerobic exercise and an increase in cyclic exercises aimed at developing anaerobic power.

4. The implementation mesocycle is aimed at achieving the maximum result in competitive, and in this case, military-applied physical training, control exercises. Its characteristic feature is the principle of directed localization of means of training influences aimed at developing target physical qualities, which consists in:

- decrease in volume and increase in intensity of all types of load;

- concentration of efforts on the development of professionally significant physical qualities that increase the efficiency of military service (speed-strength and strength endurance).

Testing of the level of physical fitness of officers of the cadre in order to assess the effectiveness of the developed methodology was carried out during the ascertaining and control stages of the study. Its implementation was carried out using control exercises taken from the Manual on Physical Training in the Armed Forces of the Russian Federation: No. 4 - "Pull-up on the crossbar" and No. 40 - "Running for 60 meters".

Table 2 presents the results of testing students from the control and experimental groups, the comparison of the indicators of which was carried out using Student's t-test for independent samples. Statistically significant differences were considered significant at $p < 0.05$.

The ascertaining experiment showed the absence of qualitative differences in the initial levels of physical fitness of the subjects of both groups. According to the results of the control experiment, after its completion, statistically significant differences were noted in the results of the tested exercises. The performance of the experimental group was higher than that of the control group. This was especially evident in the 60-meter run, which is explained by a higher level of development of strength qualities, due to the use of the block concept of periodization of sports training, which provides for the use of a higher intensity of physical activity on the muscles of the legs with near-limit and limit weights.

Thus, the results of the experiment indicate that the inclusion of physical activity in the training process for the development of self-strength qualities has a positive effect on the level of physical fitness of students undergoing military training programs. In this regard, the most effective is the use of techniques based on the concept of block periodization of physical activity, which allows you to consistently strengthen the adaptation processes to training influences that contribute to the harmonious development of the basic physical qualities of military personnel.

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