Improving social adaptability among students at the University of the State Fire Service of the Ministry of Emergency Situations of Russia through the use of aerobic exercises

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PhD, Associate Professor **Ye.G. Tishchenko**[1]
[1]Saint-Petersburg University of State fire service of EMERCOM of Russia

Corresponding author: murena_59@mail.ru

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Abstract

Objective of the study aims to determine the cumulative impact of a competitive team approach combined with aerobic exercise on improving the social adaptability of students with learning difficulties during physical training.

Methods and structure of the study. Two groups of cadets from the Saint Petersburg University of the Ministry of Emergency Situations of Russia participated in the study.: There were 25 people in the control group (KG) and the same number in the experimental group (EG). In the control group, physical training classes were conducted according to a standard, approved curriculum. In the experimental group, the same program was used, but using the developed methodology. A new method of aerobic exercise in EG was introduced at the end of the main part of the lesson. It consisted of alternating a three-minute run with exercises from applied gymnastics: push-ups, body lifts from a prone position, a complex strength exercise and leg lifts lying on your back. In the process of pedagogical analysis, the parameters of social adaptation, physical fitness and functional status were evaluated.

Results and conclusions. The inclusion of aerobic training using applied gymnastic elements in the program of high-speed movement and athletics classes helps to increase the range of functional capabilities of the trainees. Performing gymnastic exercises in an aerobic format has a positive effect on improving the functional state of the cardiovascular system. The introduction of aerobic training techniques into the educational process helps to develop a mechanism of social adaptation that ensures a balance of mental state in work and interaction among cadets with low academic performance.

Keywords: *adaptation period, phenomenon of social stability, correspondence competitions, aerobic training, team-competitive methodology, mental state of personality, integrated approach.*

Introduction. The study of the phenomenon of social stability has neither a sufficiently specific definition nor effective methods for its development. In all the concepts proposed by scientists, a descriptor of this phenomenon based on two positions is not visible: the presence of an influencing factor on the mental state of the individual and the ability to regulate the opposition of the exciting factor [1-4]. Based on this, ignorance of the components and structural connections leads to an ambiguous understanding and the emergence of cognitive dissonance in the study of a social phenomenon.

Social stability is understood as the ability to identify social interaction in life situations and regulate the balance of the mental state in activities and communication.

The purpose of the study is to assess the complex influence of the team-competition methodology and aerobic training on increasing the level of social stability of low-achieving cadets during physical training.

Methodology and organization of the study. Two groups of cadets of the St. Petersburg University of the State Fire Service of the Ministry of Emergency Situations of Russia were involved in the survey, the control group (CG) of 25 people, the experimental group (EG) – 25 people. In the CG, training sessions were conducted using the existing methodology, in accordance with the physical training curriculum, in

the EG – according to the existing training program, but using the proposed methodology.

The proposed methodology of aerobic training in the EG was carried out at the end of the main part of the lesson. It alternated three-minute running with exercises from applied gymnastics – flexion and extension of the arms in a prone position, raising the body from a lying position to a sitting position, a complex strength exercise, raising the legs from a supine position [10]. During the pedagogical observation, the indicators of social maturity, functional state and physical fitness were studied (Tables 1-3).

Results of the study and their discussion. No significant differences ($p < 0.05$) in the studied initial indicators were found between the groups, while in the EG the indicators of general endurance in the standards for 3 and 5 km were slightly lower. However, these differences were not significant, which allowed us to put forward the opinion about the same level of initial data (Tables 1, 2, 3).

The study revealed a positive impact of the complex methodology on the social maturity indicators. Thus, reliable changes ($p<0.05$) in the EG occurred in such indicators as communicative skills in interpersonal communication, in comradely mutual assistance, disciplined behavior, and in the indicators of purposefulness in the task at hand and self-confidence and one's abilities, reliable changes ($p<0.01$) are significantly higher.

Overcoming unfavorable factors of physical impact within cadet units, mutual understanding and mutual assistance began to manifest themselves quite stably in relationships. This shows how much the significance of generally accepted goals is reflected in their consciousness, which, in turn, contributes to strengthening comradeship and team cohesion.

In other indicators, positive dynamics were observed compared to the CG. At the same time, positive changes occurred in the functional state of cadets. Thus, reliable changes ($p<0.05$) occurred in the following parameters: frequency of cardiovascular contractions (HR) before the load, HR after the load, recovery time, step test, Stange, Genche tests, maximum oxygen consumption, in other parameters the changes that occurred did not have reliable values, but look much better, compared to the CG.

In this regard, changes occurred in the physical fitness of cadets in the standards for accelerated movement, the results in the 100 m run had a positive dynamics for improvement compared to the CG. Along with this, in the EG, a reliable improvement in the indicators in running for 1 km and 3 km was recorded. In the 5 km cross-country race, positive dynamics were also noted compared to the CG [9].

Along with this, it is necessary to note the change in the HR indicators before the load, which are considered as an increase in the level of social stability. The occurring pre-start excitement is identified with the

Table 1. Changes in social maturity indicators in educational units for the survey period (data were determined on a 9-point scale)

Name of qualities	Subdivision	Average values of indicators (score)	
		Before observation	After observation
Communicative skills in interpersonal communication	EG	3,2±0,4	4,9±0,2^{+}
	CG	3,4±0,4	3,6±0,3
Social activity	EG	3,4±0,4	3,9±0,2
	CG	3,6±0,3	3,8±0,3
Confidence in yourself and your abilities	EG	3,3±0,4	5,1±0,3^{++}
	CG	3,6±0,8	3,9±0,6
Purposefulness in the task at hand	EG	3,2±0,3	5,8±0,2^{++}
	CG	3,5±0,5	3,7±0,3
Responsibility in assignments	EG	3,1±0,4	4,8±0,3
	CG	3,2±0,3	4,4±0,2
Comradely mutual assistance	EG	3,4±0,5	4,7±0,2^{+}
	CG	3,3±0,4	3,7±0,3
Discipline of behavior	EG	3,5±0,3	4,8±0,2^{+}
	CG	3,8±0,4	4,1±0,3

Note: Significance of differences: P 0.05+; P 0.01++; P 0.001+++.

Table 2. Changes in the indicators of the functional state of the body CG and EG during the period under examination

Indicator	Subject group	Average values of indicators	
		Before observation	After observation
Heart rate before exercise (bpm)	CG	82±3,7	80±3,6
	EG	84±3,9	72±3,7+
Heart rate after exercise (bpm)	CG	112±3,7	110±3,6
	EG	114±3,9	102±3,7+
Recovery time (min)	CG	5,4±0,2	5,2±0,1
	EG	5,6±0,2	4,4±0,1+
Respiratory rate at rest (respiratory rates per minute)	CG	17,2±0,4	16,9±0,4
	EG	17,6±0,4	16,8±0,2
Step test (conventional units)	CG	75,3±0,8	82,3±0,5
	EG	76,4±0,9	88,6±0,6+
Stange's test (c)	CG	59±2,1	62±2,1
	EG	57±3,0	75±2,3+
Genchi test, (c)	CG	54±0,7	58±1,3
	EG	52±0,8	62±0,7+
VO_{2max} (ml/min/kg)	CG	53,0±0,7	62,7±0,4
	EG	52,4±0,6	72,8±0,5++

Note: significance of differences: P 0.05+; P 0.01++; P 0.001+++.

Table 3. Changes in physical fitness indicators in accelerated movement in groups during the survey period

Indicator	Subdivision	Average values	
		of indicators	After observation
5 km forced march	ЭГ	24,50±0,32	24,25±0,25
	КГ	24,45±0,32	24,35±0,32
Accelerated movement of 3 km	ЭГ	12,30±0,32	11,54±0,25+
	КГ	12,20±0,32	12,10±0,32
Accelerated movement for 1 km	ЭГ	3,56±0,24	3,32±0,22+
	КГ	3,43±0,23	3,39±0,24
100m run	ЭГ	14.5±0,O6	14.0 ±0,04
	КГ	14.4±0,06	14.2±0,06

Note: significance of differences: P 0.05+; P 0.01++; P 0.001+++.

performance of training loads and the mechanism of regulation of the mental state, provides a decrease in the HR before performing physical exercises. These data confirm the heart rate after exercise.

When after the active phase of functional performance, the mechanism of regulation of the mental state helps to bring the body to a relatively calm state. However, it should be noted that this effect in the performance of the cardiovascular system, under the influence of the mechanism of regulation of the mental state, occurs with a rational distribution of functional performance, allowing the body to cope with the assigned motor task. This statement is reflected in the step test, in the Stange and Genche tests, in the maximum oxygen consumption [8].

The changes in the functional state that occurred during the period under study show the relevance of the integrated use of correspondence competition methods with aerobic training.

Conclusions. Systematic use of aerobic training of gymnastic applied exercises in the process of classes in accelerated movement and track and field allows you to expand the scope of functional abilities of those involved. Performing gymnastic movements in an aero-

bic mode has a positive effect on increasing the level of the functional state of the cardiovascular system. The use of aerobic training methods during classes allows developing a mechanism of social stability that regulates the balance of the mental state in the activities and communication of low-achieving cadets.

The use of the step-by-step method of loading must be accompanied by measurements of blood pressure and heart rate, especially for low-achieving cadets.

To achieve a comprehensive pedagogical impact in microgroups with low-achieving students, use the work of the unit's command link. Check the indicators for accelerated movement and track and field every two weeks.

For a more accurate expert assessment of the indicators of social maturity of cadets, it is necessary to carry out joint work with the unit's command link and the teaching staff. The identified deficiencies in the behavior of cadets must be discussed in the form of pedagogical instructions.

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