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**DEVELOPMENT OF METHODS AIMED AT STUDENTS’  
STRENGTH AND SPEED PERFORMANCE IMPROVEMENT**

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*Abstract*

The all-Russian physical culture and sports complex “Ready for Labor and Defense” is a project aimed at preserving traditions related to nation’s health. The scientifically grounded normative base of new GTO complex had determined trends in the activity of physical education teachers, needs to introduce new raining methods for young people to meet GTO complex standards. Viewing main parameters of physical development and motor fitness, modern students lag behind their peers of the 1980’s and 1990’s. The lowest performance is demonstrated by students when fulfilling strength and speed tests. One of the reasons for such low performance is self-training decline. The article presents methodological developments for students aged 18 to 24 corresponding to the VI stage of GTO complex. These methods are aimed at improving the performance during tests, i.e. two legs standing long jump for young men and women, modified pull-up for young men, falling leaf (number of times per 1 minute) for young women. The article offers several types of classes and sets of exercises, as well as guidance for self-training of students. Experimental data showing the improvement of performance within specified types of practical tests for both young men and women are presented. The article shows positive dynamics in fulfilling the standards of GTO complex with the account of gold, silver and bronze medals in strength and speed performance tests. Efficiency of presented methods aimed at improvement of physical fitness of students has been confirmed by the results of the study.

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**Keywords:** University students, physical fitness, norms of GTO complex, teaching methods..



## 1. Introduction

The complex “Ready for Labor and Defense” was created in 1930s and had lost its social functions during the crisis of 1990s. It was revived in 2014 and since then it has been preserving the national Russian traditions related to the health of our nation. “This project will ensure innovative development of physical culture and sports industry, will allow to concentrate the state efforts on solving issues of patriotic education of youth, as well as maintain healthy lifestyle and disseminate best practices ensuring an ongoing physical education of population” (Mironova, Dementiev, Grigoriev & Pristav, 2016, p. 100). The All-Russia Physical Culture and Sports Complex (GTO) as a basic mechanism for capitalizing human resources and saving human potential provides for the fulfillment of state standards for different age groups of the population of Russia. The scientifically grounded normative base of new GTO complex had determined the trends in the activity of physical education teachers, the need to introduce training methods of children and young people to meet GTO complex standards (Spirin, 2015), as well as the focus on increasing the interest and awareness of the importance of physical exercises to achieve high performance results (Pashin & Vasilyeva, 2016).

## 2. Problem Statement

The complex of GTO sets new tasks for university teachers of physical education. To comply with the standards of new complex, a high level of student physical training is required. However, specialists in the field of physical education note that in recent years the level of health and physical fitness of schoolchildren and university students has significantly decreased (Bogdanov, Vasyutina & Shelkova, 2016, Simonova & Dmitrieva, 2016). In their article Lysova & Nechushkin (2012) they indicate a lag in the main parameters of physical development and motor fitness of modern students in comparison with their peers of 1980’s and 1990’s. The lowest performance is demonstrated by students when fulfilling strength and speed tests. (Lysova & Nechushkin, 2012, Starkova, 2016).

According to Tsutsaeva & Vyalkina (2016) one of the reasons for such low performance is self-training decline, which creates a problem in students’ readiness within GTO complex.

All this forms the basis for pedagogical teams of higher education to develop methods for increasing physical readiness of students to meet the requirements of GTO.

In order to prepare young people to meeting standards of GTO complex, physical education specialists offer various organizational and methodological approaches to improving their physical fitness (Vitko & Kondrakov, 2016; Proskuryakova, 2016; Stolyar, Vitko, Pikhaev, & Kondrakova, 2016; Shchegolev, Lipovka & Korshunov, 2016, Rayzikh & Petrov, 2017).

## 3. Research Questions

The study of the level of physical fitness at North-Eastern Federal University against five-point scale showed that most students meet the proposed standards; however, the level of compliance with the standards can be described as an average one (55%). Young women are more likely to see a decrease in the “average” score to 2 and 1 points rather than an increase to 4 and 5 points. A small number of students have “lower than average” score (among young men); however, a number of students with 4 and 5 points

is significantly higher compared to young women (Prokopenko & Polkova, 2017, Research results and their discussion, para. 5).

During the long-term observations over the results of individual physical qualities it has been stated that the performance of young men and women in standing long jump has degraded. The same was observed among young men in pull-ups.

Physical activity studies conducted at North-Eastern Federal University showed that most of the students are currently “not aware of the importance of physical activity in their spare time and, at the same time, its impact on health and well-being in general. Only having regular trainings, during both academic and free time, it is possible to maintain a high level of physical fitness and get ready for meeting standards of GTO (Prokopenko, 2016).

This state of affairs determined the purpose of further studies.

#### **4. Purpose of the Study**

The purpose of this study is aimed at development and reasoning of the effectiveness of methods for increasing the strength and speed performance among university students to meet standards of new GTO complex.

#### **5. Research Methods**

40 full-time students of the first and the second year of North-Eastern Federal University took part in the pedagogical experiment (February - May, 2017). Out of this number 19 students were young men and 21 students were young women, corresponding to the VI stage of GTO complex (from 18 to 24 years old). They have gone through a series of tests in the beginning and in the end of the experiment. Young men and women were tested with the standing long jump to assess their speed-strength preparedness. Young men were tested with the pull-ups and women were tested with the sit-ups (chins per min.) to assess their strength preparedness. This strength test for young women was taken due to the fact that it is used in higher education standards without reference to time.

Both schedule and sets of exercises were developed for the time period of one semester for 12 weeks (Table 1).

The sets of exercises were included into physical education classes: 2 times a week. Moreover, students had to attend individual trainings (in sports facilities or at home): 1-3 times a week. To correctly fulfill the exercises, a technique was introduced to students. Besides, possible mistakes and methodological instructions were given to students.

Guidelines aimed at fulfilling exercise sets.

Long jumps should be performed 5 times a week followed by a warm-up activity: running, running in place, rope jumping for 3-5 minutes. A rest between sets when rising on toes and jumping on toes should take 20 to 30 seconds. A rest should vary from 1 to 2 minutes when performing jumps with the change of legs and rabbit jumps. A rest between exercises should comprise 2 to 3 min. The number of standing long jumps for young women can be reduced by 10%. Circuit exercises are appreciated.

Pull-ups should be fulfilled 3 times a week. A rest between sets is 3 to 4 min. In case the level of student preparedness is low, the exercise is carried out with the help of a partner.

A set of exercises when training the abdominal muscles for young women is performed 3 to 4 times a week with mandatory performance at the maximum rate at the end of each week. A rest between sets is 2 to 3 min. One can alternate exercises during vertical pull-ups and pull-ups with turns to the right and to the left. At the end of the exercises it is necessary to sit-up (hyperextension) - at least 20 repetitions in 2 sets.

To track personal goals and results, each student was given a self-study outline and state requirements for the implementation of the GTO standards, VI stage with the account of gold, silver, bronze medals.

**Table 01.** Outline of classes and sets of training exercises meeting GTO standards

Training exercises	Weeks					
	1-2	3-4	5-6	7-8	9-10	11-12
Standing long jump, number × sets						
1. Rising on toes on the right and left leg with the elevation of at least 10 cm	12x2	14x2	16x2	18x2	20x2	22x2
2. Jumping on toes as quickly as possible, 1-3 cm, without touching the support	10x2	12x2	14x2	16x2	18x2	20x2
3. Scissors jump, pushing away from the bench with the support leg	8x2	10x2	12x2	14x2	16x2	18x2
4. Squat jump, straightening with the arms up, back to crouch position	10x2	12x2	14x2	16x2	18x2	20x2
Total:	80*	96	112	128	144	160
Pull-ups for young men, number						
Set 1	6	8	9	10	11	12
Set 2	5	6	7	8	9	10
Set 3	4	4	5	6	7	7
Set 4	3	3	4	4	5	5
Set 5	3	3	3	4	4	4
Total:	21	24	28	32	36	38
Falling leaf with legs fixed and hands behind the head for young women, number × set						
1. Vertical pull-up	15x2	18x2	21x2	24x2	26x2	28x2
2. Vertical pull-up with left and right turns	16x2	18x2	20x2	22x2	24x2	26x2
3. Vertical pull-up within a time period of 30 seconds (at the end of a week)	+	+				
4. Vertical pull-up within a time period of 45 seconds (at the end of a week)			+	+		
5. Vertical pull-up within a time period of 60 seconds (at the end of a week)					+	+
Total:	62	72	82	92	100	108

80\* – number of exercises during one workout should be indicated.

## 6. Findings

Dynamics of physical fitness of young men and young women as a result of experiment is presented in Table 2.

The average performance of standing long jumps has increased from 211.31 cm to 216.78 cm among men (an increase of 2.58%); the average performance of pull-ups has risen from 7 times to 8.47 times (an improvement of 21%) The average performance of standing long jumps has increased from 154 cm to 162 cm among women (an increase of 5.19%); the average performance of falling leaf exercise in 1 minute has risen from 38.66 times to 43.71 times (an improvement of 13.06%).

Thus, all students have improved their performance, which resulted in their compliance with the standards of GTO complex (Table 3).

**Table 02.** Dynamics of strength and speed-strength indicators of students as a result of experiment

Type of test	M±m		Difference	
	before	after	in units	in %
Young men (n=19)				
Standing long jump, double take-off (cm)	211.31±4.04	216.78±4.17	5.47	2,58
Pull-ups (number)	7.0±0.93	8.47±0.74	1.47	21
Young women (n=21)				
Standing long jump, double take-off (cm)	154.0±3.92	162.0±4.33	8.0	5.19
Falling leaf (number per 1 min)	38.66±1.96	43.71±2.01	5.05	13.06

**Table 03.** Meeting GTO standards as a result of experiment (number of people)

Type of test	Bronze		Silver		Gold		Failed		Succeeded	
	before	after	before	after	before	after	before	after	before	after
Young men										
Standing long jump	4	4	2	2	2	4	11	9	8	10
Pull-ups	1	3	2	6	2	2	14	8	5	11
Young women										
Standing long jump	4	4	-	2	2	2	15	13	6	8
Falling leaf	2	3	6	4	6	12	7	2	14	19

Basing on the results of experiment the number of students meeting GTO standards has increased. It should also be mentioned that the quality of students' performance was improved: bronze to silver and silver to gold.

## 7. Conclusion

The conducted pedagogical experiment showed an improvement in the performance of the declared types of practical tests for both young men and young women. Positive dynamics in fulfilling the norms of GTO complex concerning strength and speed-strength tests by students was revealed. It has been experimentally confirmed that the developed methods for increasing the strength and speed-strength preparedness of students, as well as additional physical training are effective measures for preparing and

implementing the standards of GTO complex. These developments will increase the methodological support of educational and extra-curricular forms of physical education and sports at the university.

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