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Journal for Educators, Teachers and Trainers, Vol. 12 (1)

<https://jett.labosfor.com/>

Date of reception: 15 April 2020

Date of revision: 12 July 2020

Date of acceptance: 18 September 2020

Ivashko Natalia Vasilievna, Ryzhenko Oksana Vladimirovna (2021). Change of students' strength indicators as a result of training in the gym. *Journal for Educators, Teachers and Trainers*, Vol. 12(1). 57 – 60.

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ABSTRACT

Today, due to the ineffective physical education among university students, there is a need in the process of revising the content of PE lessons in order to adapt them to the students' needs. It is important to update interests and motives in order to replenish the theoretical competence of students about the most productive means and methods of physical education, in order to increase the effectiveness of the performed physical exercises as a way to reach qualitatively different levels of training physical qualities. The article discusses the possibilities of developing students' strength indicators as a result of training in the gym.

Keywords: gym, strength indicators

INTRODUCTION

Currently, maximum weight is included in the training system as a way to develop strength abilities. This work is done by fast and slow muscle fibers, but only fast ones can be trained. The work with the simulators is in a dynamic mode, when the muscle either relaxes or contracts, which is why the blood flow regularly flows to the working muscle fibers and flushes the metabolic products together with hydrogen ions. This hinders the development of strength. If a muscle is under dynamic load, the formation of lactic acid does not occur and the pH-level does not shift to the acidic side.

Weight puts stress on all muscle fibers. This unambiguously follows from the laws of physiology, but the growth of muscle mass and the synthesis of myofibrils will occur only with an adequate hormonal background and a sufficient concentration of creatine, which penetrates through the cell membrane to the DNA chains due to acidification of the environment. Reacting with oxygen under the condition of an excess of mitochondria, hydrogen loses free ions, turning into water. Fast myofibrils are a source of hydrogen ions, from where they are transported with the bloodstream to slow ones, where they disappear during the oxidation process. This explains why dynamic loading does not develop the strength of a slow muscle fiber.

The isotone system indicates that a static-dynamic load is given for all exercises. The system of exercises was developed by Professor V.N. Seluyanov. The trainees do exercises in a fast rhythm, with a small range of motion, without relaxing, and the range of motion of a limb or body is 10-15 degrees in 30-60 seconds. Exercise stops when a strong burning almost painful sensation occurs in the muscle. In a tense muscle, blood does not enter the capillary bed and does not feed the muscle tissue.

A hypoxic state occurs in a matter of seconds, due to which the process of glycolysis starts in the tissues under anaerobic conditions, and lactic acid appears as a decay product. Training with this type of load contributes to the hypertrophy of the SMF [3].

Throughout the whole semester, 1st and 3rd year students were involved in the experiment. During the program, 32 training sessions were planned and completed. 8 third-year students presented the control group, whose loads did not differ from the generally accepted scheme.

In the experimental group, 7 first-year students received a type of load that was different from the generally accepted one.

The training program began with a high intensity of the main exercises: during the first 3 lessons, students worked with a barbell: squatting, with a barbell on their shoulders, doing barbell bench press and deadlift, until a refusal. The number of approaches was 4-6.

The tonic training load assumed that the exercises were given in 1-3 sets, while the developmental workout was carried out with 4-9 sets. Students, performing training loads in the experimental group, were guided by certain principles. Having performed squats with a load for the developmental purpose, on other exercises the intensity decreased to 69-70%, and the number of approaches fell to 1-4. This allowed the muscle to rest actively from the main exercise, and the muscles that received the load neutralized the acidic environment. Likewise, with the change of training day, the students worked with the barbell in the bench press and deadlift. From the 4th to the 6th lesson, the student worked with a barbell, strictly following the static-dynamic regime. The intensity load was limited and did not exceed 30-40% of the maximum, the task was to perform 3-5 approaches, and the work included a time range within 30-50 seconds. On the 7-9th workout of the program, it was taken into account that the load in the main exercises would be 90-95%, but the approaches were limited to 2-3 times. Thus, the cycle included 9 trainings, and during the semester the students kept within 3 cycles.

At the beginning, (prior to the study), and then in the end, the students participated in a strength training test, while the experimental group and the control group were tested on the main exercises with weights (barbell): squatting, bench press and deadlift.

The results of the test are presented in Table 1, and the values after mathematical and statistical processing are reduced to averaged values for each group of the sample [1].

These studies allowed to monitor the development of strength endurance before the study in the control group and the experimental group. The data are summarized in Table 1.

Table 1: The results of testing the initial level of strength endurance development among students in the CG and the EG at the beginning of the research.

Tests	Push-ups (quantity)		Shot-put, m	
	CG	EG	CG	EG
X	12	13	10,1	10,3
s	0,8	0,9	0,9	0,8
m	1,5	1,6	0,3	0,2
t	0,2		0,4	
P	> 0,05		>0,05	

The data in Table 6 reflect the results of testing the development of the sample in the control group and the experimental group before research work, from which we get the following situation.

Before the study, according to the test "Push-ups (quantity)" the average value among the students of the CG was 12 times, in the EC it was 13 times. In the "Shot-put test (m)" the average value among the students from the CG was 10.1 m, in the EG it was 10.3 m.

After mathematical processing of the results when comparing the indicators of students in the control group and the experimental group at the beginning of the study, no significant difference in indicators was found. For all indicators, the differences are significant [2].

After completing the program with the recommended cycles, the sample participated in retesting, following the tasks and sequence in the control and experimental group.

According to the test data, there was collected the material that characterizes students' dynamics of developing physical strength in both groups of the sample (table 2).

Table 2: The results of testing the level of development of strength endurance among students in the CG and the EG at the end of the research

Tests	Push-ups (quantity)		Shot-put, m	
	CG	EG	CG	EG
X	13	15	10,5	10,8
s	0,7	0,9	0,9	0,9
m	0,96	1,5	0,3	0,2
t	2,1		0,21	
P	< 0,05		> 0,05	

Table 2 demonstrates the situation in terms of the development of the indicator according to the results of the study in both groups of the sample: experimental and control, from which the following can be seen.

In the final of the research project, the "Push-ups" (number / times) test showed that the average value among students from the CG was 13 times, in the EG it was 15 times. In the "shot-put (m)" test, the control group showed 10.5 m, while in the experiment group the result rose to 10.8 m. When comparing the tests at the control stage, it was determined that positive dynamics in performance took place in both groups of the sample. When comparing the test data before and after the implementation of the program, an increase was recorded that fully covered all the monitored indicators. In the middle group section, the dynamics of strength endurance developed more actively in the experimental group versus the control group. Both in the CG and in the EG there were positive changes in the indices for all tests.

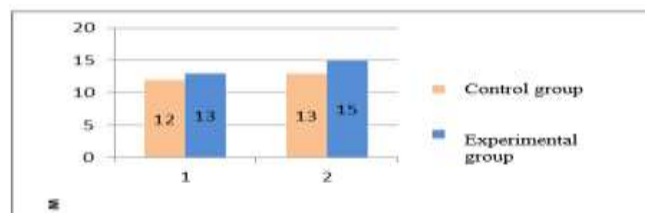


Fig.1: Results of the "Push-ups" (number / times) test at the beginning and end of the experiment

In test 1 "Push-ups" (number / times) at the beginning of the study, the average value among the students from the CG was 12 times, at the end of the study 13 times. In the EG at the beginning of the study the average value was 13 times, at the end of the study 15 times. Indicators at the end of the study in the experimental group are higher than in the control group.

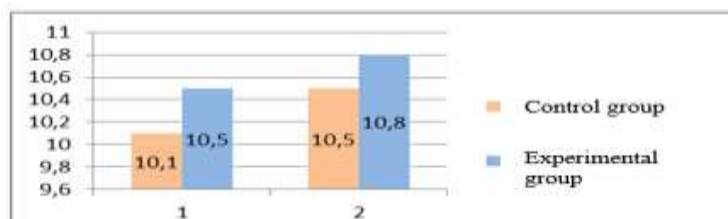


Fig.2: The results of the "shot-put, m" at the beginning and end of the study

In test 2 "Shot put, (m)" at the beginning of the study the average value among the students from the CG was 10.1 m, at the end of the study 10.5 m. In the EG at the beginning of the study the average value was 10.3 m, at the end of the study 10, 8 m. At the end of the experiment, the results are significantly higher in the EG in comparison with the CG [4]. The material collected during the experiment shows that a reliable dynamics of strength endurance indicators was recorded according to the criterion of development. The students of the experimental group demonstrated a sharp leap for the better.

Based on the results of the experiment, we collected confirmation of the hypothesis that a special program with alternating types of load and specific exercises focused on the development of strength characteristics will be successfully implemented on the basis of tactical and technical actions [5].

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