

## **DEVELOPMENT OF STRENGTH MOTOR QUALITY IN 15-16 YEAR OLD STUDENTS USING CALISTHENICS EXERCISES**

*Benedek Florian*

University “Ștefan cel Mare” of Suceava  
florian.benedek@usm.ro

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### **Abstract**

Even today, many schools and high schools in our country do not have an appropriate material base. Taking into account this aspect in this study we tried to focus on certain means that can be put into practice in any school or high school. In addition to the material aspect, given the fact that at the age of 10th grade students the main concern is the physical aspect, I considered the fact that the development of strength motor skills quality through calisthenics exercises is a current theme and worth developing.

From our point of view, exercises that use your own body weight are the best choice regardless of the situation. We assume that by using them in a scientific way we achieve efficiency regardless of the available space, without the need for materials and installations. The risk of injury is low and the motor density is increased.

In conclusion, we can say that we managed to show how effective is the application of calisthenics exercises for the development of muscle strength.

### **Introduction**

Any movement performed by people, whether in sports activities, in their free time or at work, involves the mobilization of motor qualities, which have a different weight from one action to another. At the same time, it should be mentioned that all motor qualities are closely related to motor skills and abilities. [1,3,5]

The development of all motor skills is dependent on certain factors. The main factor to be taken into account when considering the development of motor skills is the age of the individuals. [2,9,10] The appropriate age differs from one motor quality to another. When children are small, all motor skills are taught, but especially speed and skill, and starting from the age of 14-15, more emphasis is placed on the development of strength and speed. [6]

Among all the methods for strength development, in this study we chose to use mainly the circuit method. I considered it to be the most accessible to be used in school, in physical education lessons. [4]

The main advantage of using this method in physical education lessons is that you can work with all the students at the same time.

The types of exercises we chose to apply in the experiment are calisthenics. [7,10] The main reason for this choice is the fact that no special equipment, devices or materials are needed.

Calisthenic exercises involve movements performed with your own body weight. In this case gravity taking the place of weights. They are the ideal method of replacing weights as well as going to the gym.

The great advantage of this method is that the proposed exercises can be performed anywhere and anytime because no special equipment is required. It should also be mentioned that, unlike exercises performed with weights, calisthenics exercises do not cause any damage to the body. Extra weights can cause serious damage to the joints and muscles.

In this study we started from the following hypothesis:

We assume that by using calisthenics exercises in physical education lessons and integrating them into a didactic strategy adapted to the individual characteristics of the students, an efficient and rapid development of strength motor quality can be achieved.

The purpose of the paper is to present a way by which any physical education teacher can quickly and efficiently develop the motor quality of force even when the material conditions are precarious and the students present different particularities.

Calisthenic exercises are always the best choice when it comes to physical education because they are easy to apply regardless of the material base available, the dosage can be adapted and adjusted according to needs, they determine an increased motor density of the lesson and also, they can be picked up and practiced by students in their free time as they present a low risk of injury. [8,10]

The objectives of the study are:

1. Development of strength motor quality using exclusively calisthenics exercises.

2. Development of the body's morpho-functional indices.

3. Improving general physical condition.

The tests applied in the study are:

Test I – SQUATS for 30 seconds.

Test II – TRUNK EXTENSIONS for 30 seconds

Test III – CRUNCHES for 30 seconds

Test IV – PUSH-UPS the maximum number of push-ups possible

Subjects involved in research

Both the subjects in the experiment group and those in the control group are students in the 10th grade from the same high school.

Place, time and ambient conditions

The place where the experiment was carried out was the Suceava Food Industry Technical College.

## Results and discussion

In this study, we performed initial and final tests with the two groups (the experimental group and the control group), and for each applied test, based on the results obtained, we calculated the arithmetic mean, the standard deviation and the coefficient of variability.

We mention the fact that for the experimental group we used calisthenics exercises in the physical education class, and for the control group the exercises provided in the school curriculum.

We first centralized the results obtained by the experiment group, and then we also centralized the results obtained by the students from the control group.

Table 1 – The results of the experimental group

Parameters statistically	Crunches 30''		Extensions 30''		Squats 30''		Pushups Max. No.	
	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.
X	22.33	27.4	22.53	28.33	21.93	27.8	11.2	16.4
S	2.63	3.37	2.44	3.08	2.37	3.48	4.93	5.76
CV	11.77	12.29	10.83	10.87	10.80	12.51	44.01	35.12

Table 2 – The results of the control group

Parameters statistically	Crunches 30''		Extensions 30''		Squats 30''		Pushups Max. No.	
	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.
X	20.86	21.8	21.86	22.86	21.66	22.53	11.2	11.93
S	2.32	2.36	2.66	2.66	2.19	2.26	5.08	4.97
CV	11.12	10.82	12.16	11.63	10.11	10.03	45.35	41.65

**The difference in progress between the experimental group and the control group:**

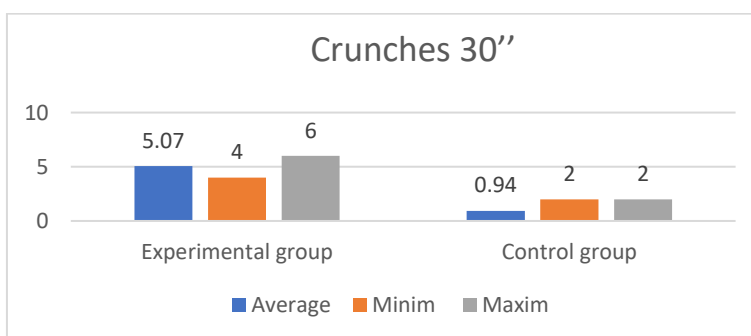


Chart 1 – The difference in progress between the two groups in the Crunches 30" test

On the first trial, the experimental group achieved an average progress of 5.07 repetitions, while the control group achieved an average progress of only 0.94 repetitions.

The average progress made by the experimental group was 4.13 repetitions higher compared to the average progress made by the control group.

In terms of progress in the lowest number of repetitions achieved by one of the students, the experimental group achieved a progress of 4 repetitions, while the control group achieved a progress of 2 repetitions, the difference in progress between the two groups being 2 repetitions.

The highest number of repetitions achieved by one of the students in the experimental group recorded a progress of 6 repetitions, while the control group recorded a progress of 2 repetitions, the difference in progress being in this case 4 additional repetitions in favor of the experimental group.

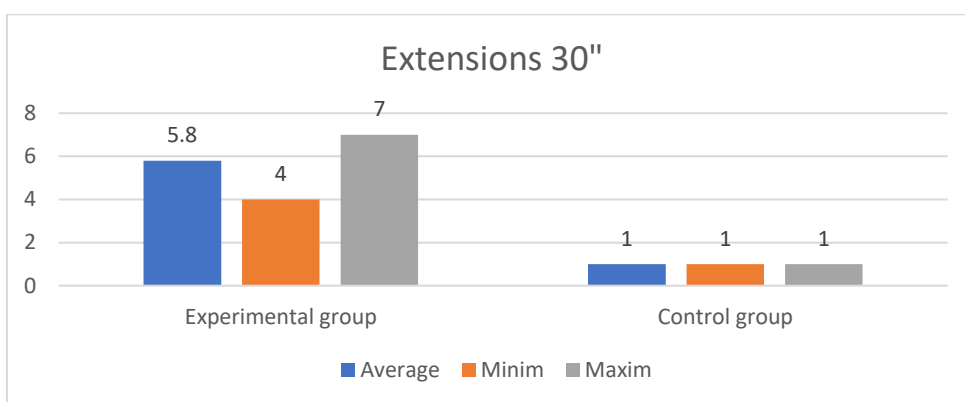
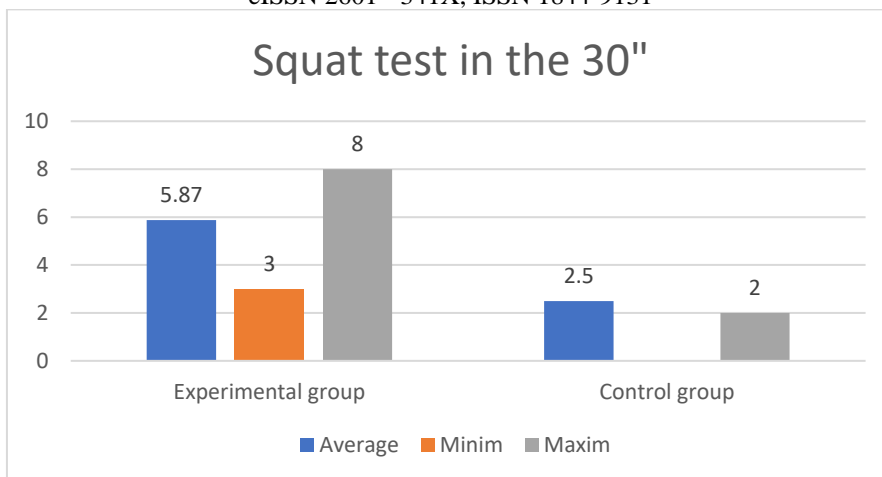


Chart 2 – The difference in progress between the two groups in the Extensions 30" test

In the second test, the average progress of the experimental group was 5.8 repetitions, while the average progress of the control group was one repetition, the difference in progress between the two groups being 4.8 repetitions.

The minimum number of successes of the experimental group recorded a progress of 4 repetitions, while the control group achieved a progress of one repetition, the difference being 3 repetitions in favor of the experimental group.

The maximum number of successes of the experimental group progressed by 7 repetitions, while the control group progressed by only one repetition, the difference in progress between the two groups being 6 additional repetitions in favor of the experimental group.

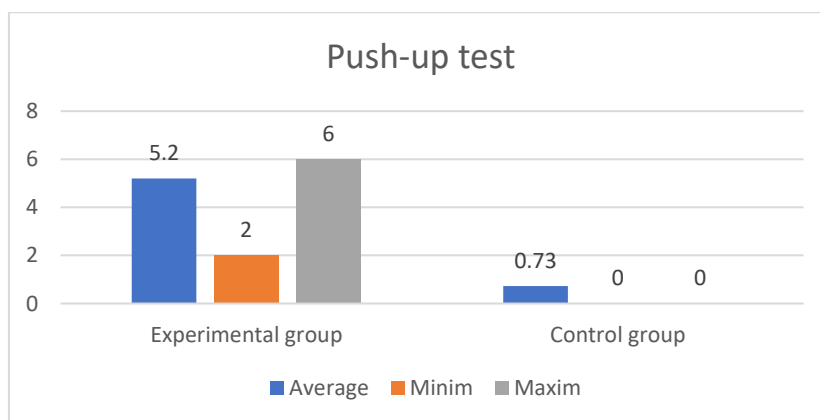


Graph 3 – The difference in progress between the two groups in the 30" Squat test

The average progress of the experimental group in the third test taken by the students was 5.87 repetitions, and the average progress of the control group was 0.87 repetitions, the difference in progress between the two groups being 5 repetitions.

The progress recorded in terms of the minimum number of repetitions in the experimental group was 3 repetitions, and in the control group no progress was recorded.

The progress recorded in terms of the maximum number of successful repetitions was in the experimental group 8 repetitions, and in the control group 2 repetitions, the difference being 6 additional repetitions in favor of the experimental group.



Graph 4 – The difference in progress between the two groups in the push-up test

At the last test, the average progress achieved by the experimental group was 5.2 repetitions, and the average failure achieved by the control group was 0.73

repetitions, the difference in progress between the two groups being 4.47 repetitions in favor of the experimental group.

The progress made in terms of the minimum number of successful repetitions by the students in the experimental group was 2 repetitions, while the control group did not make any progress.

The progress recorded in terms of the maximum number of successful repetitions by the students in the experimental group was 6 additional repetitions, while the control group did not manage to achieve a noticeable progress this time either, the difference being clearly superior in favor of the experimental group.

### **Conclusions**

Taking into account the results we obtained from the experiment, we consider the fact that the hypothesis from which we started has been demonstrated, and calisthenics exercises have shown their effectiveness when used in a proper way.

The differences in progress between the students in the experimental group and the students in the control group were visible in all four tests that we applied in the work. In each individual test, the experimental group achieved a progress of 4-5 more repetitions than the control group, and this aspect is easy to see if we follow the interpretation of the results in the form of graphs.

It should be mentioned, besides the statistical results we obtained, that the students in the experimental group had other major changes during the experiment. They didn't just build strength, they also made progress in body posture, physical appearance, self-confidence, endurance, and many other improvements.

As a final conclusion, we declare ourselves satisfied with the activity achieved and I am sure that the students we worked with will continue to use calisthenics exercises both in physical education classes and as a means of spending useful free time.

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