

## STRENGTH DEVELOPMENT WITHIN PHYSICAL EDUCATION AND SPORT CLASS IN GYMNASIUM

*Trofin Maria Mădălina*

*Leuciuc Florin Valentin<sup>1</sup>*

<sup>1</sup>*University Stefan cel Mare of Suceava, Romania*

### **Keywords: strength, Gymnasium, optimization**

**Abstract:** This research was fulfilled in order to determine strength development of schoolchildren belonging to secondary school. To achieve this optimization there were chosen two grades, respectively the 6<sup>th</sup> grade A class and the 6<sup>th</sup> grade D class of the 9<sup>th</sup> Elementary School *Ion Creanga* of Suceava. We started from the following hypothesis: if we use specific methods and tools used for strength development, closely related to the particularities of each age group, we get the desired result, namely the development of the motric skill – *strength* – and the fulfillment of the goals of Physical Education and Sports subject. Following the used methods and means, there was recorded a progress in final testing.

### **Introduction**

Strength concept is often treated in specialized writings. Most authors dealing with matters related to sport training, among other things, treat the notion of strength.

The definition of strength concept, to which different authors refer, evolves in three main directions: Definitions referring to the ability of muscles to develop a certain level of tension; Definitions highlighting the physiological and physical sides; Definitions related to the movements of each individual (Leuciuc F.V., 2010, p. 15).

Within school classes, strength is related to the motric skill – endurance in the sixth link. Strength and endurance are motric skills which can be easily improvable and systematically taught from the age of 9-10 years, characterized by an upward trend and a maximum opportunity for improvement.

Skills that force the body in terms of speed are placed before those that force the body in terms of strength and endurance (I.A. Bratu, 1985, p. 65).

By the age of 11 – 12 years, muscle strength follows a parallel development for both sexes. This explains the fact that at this age girls sometimes are physically more developed than boys in terms of strength. After this period, strength development for boys is more pronounced, ending at 18-20 years, 2-3 years later than girls (Leuciuc F.V., 2010, p. 78).

From the age of 10-15 years, we can count on achieving higher results in strength development with the specific means and methods of this motric skill.

For children, strength development is not indicated earlier, due to multiple causes, among which the most important are the differences between the growth rhythms of skeletal and muscle systems (C. Florescu, V. Dumitrescu, A. Predescu, 1969, p 167).

During childhood, strength should be developed in terms of speed, using by excellence natural exercises such as: pushups, squats, jumping on one leg and both legs, jumped step, skipped step (Leuciuc F.V., 2010, p. 79).

### **Materials and methods**

To achieve any scientific research paper, in any field, certain research methods are required. The theoretic subject named Research Methodology provides the means to research and teach us which they are and how these methods of scientific investigation should be used.

This ongoing research aims at determining the development level of the motric quality – *strength* for students of the 6<sup>th</sup> grade A class and for students of the 6<sup>th</sup> grade D class studying at the 9<sup>th</sup> Elementary School *Ion Creanga* of Suceava.

To achieve the objectives of this research we used the following methods: studying biographical writings, teacher observation, experimental method, statistical-mathematical method and graphical method.

In this research we applied the following control samples:

- Abdominal strength test;
- Standing long jump;
- Vertical jump test (Jump Sargeant).

Samples were held in the gym of the school, and the materials used were as follows: 10 gym mats, wooden cubes, a whistle, a stopwatch and a meter to measure. The research took place at the 9<sup>th</sup> Elementary School *Ion Creangă* of Suceava.

The subjects formed two groups of students: the control group represented by the 6<sup>th</sup> grade A class and the experimental group represented by the 6<sup>th</sup> grade D class. Students showed responsiveness and interest in the activity. The research lasted from the 28<sup>th</sup> November 2013 until the 14<sup>th</sup> May 2014.

### Results

The control group (the 6<sup>th</sup> grade A class) counted 29 students – 21 girls and 8 boys, and the experimental group (the 6<sup>th</sup> grade D class) 27 students-16 girls and 11 boys. I mention that all students were able to perform physical exercises without medical excuse. Following the sustained samples there was obtained the results shown in Tables 1 and 2.

	Abdominal strength test (no. of repetitions)		Standing long jump (cm)		Vertical jump test (Jump Sargeant) (cm)	
	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.
Boys						
X	19.5	25.85	231.87	233.85	60.12	61.71
S	4.44	4.56	19.17	17.69	9.53	10.3
C.V.	22.77	17.64	8.26	17.56	15.86	17.7
Girls						
X	17.57	21.19	193.28	195.04	44	45.09
S	2.89	4.14	14.4	14.11	6.75	6.69
C.V.	16.55	19.54	7.45	7.23	15.34	14.84

Table no 1. The 6<sup>th</sup> grade A class: control group

	Abdominal strength tes (no. of repetitions)		Standing long jump (cm)		Vertical jump test (Jump Sargeant) (cm)	
	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.
Boys						
X	28	31.45	246.09	249.9	64.09	67.18
S	5.62	5.53	7.86	8.09	6.94	7.05
C.V.	20.07	1.76	3.19	3.23	10.84	10.5
Girls						
X	23	25.12	206.25	208.06	51.18	53.25

S	6.07	6.66	26.73	26.51	11.58	11.53
C.V.	26.42	26.51	12.96	12.74	22.63	21.65

Table no 2. The 6<sup>th</sup> grade D class: experimental group

### Discussions

Improvements were noted for both groups after final testing.

Thus, for the abdominal strength test:

- boys of the control group progressed by 32.6%, while those of the experimental group by 12.32% (Figure 1);
- girls of the control group progressed by 20.6%, while those of the experimental group by 9.21% (Figure 2);
- following the results of this sample, we see that both boys and girls of the control group progressed more than those of the experimental group: boys by 20.28% and girls by 17.5%.

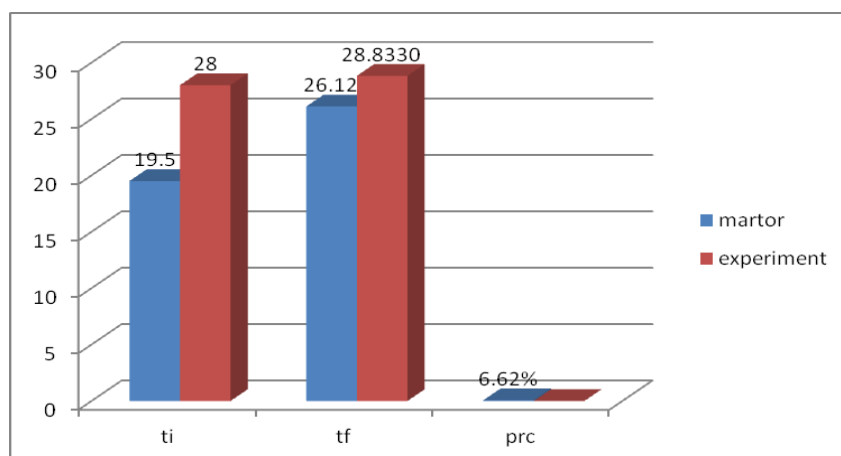


Figure 1: Average values obtained by the male subjects in the abdominal strength test

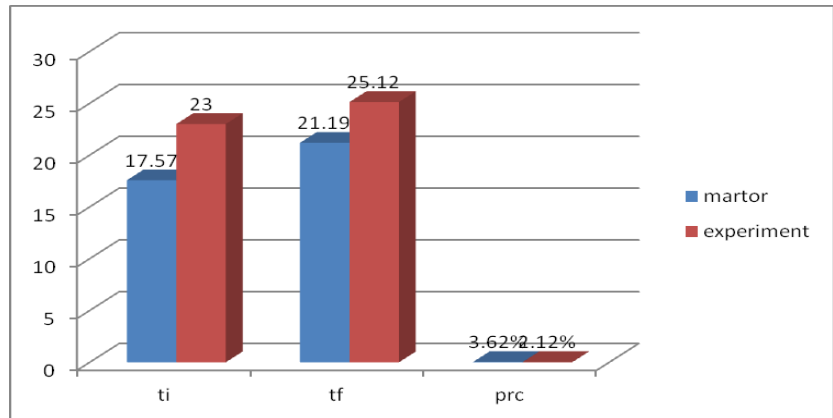


Figure 2: Average values obtained by the female subjects in the abdominal strength test

Regarding the test of standing long jump: boys of the control group progressed by 1%, while those of the experimental group by 1.6% (Figure 3); girls of the control group progressed by 1%, while those of the experimental group by 1% (Figure 4); following the results of this sample, we see that both boys and girls of the control group progressed by 0.4%, while the girls recorded the same progress of 1%.

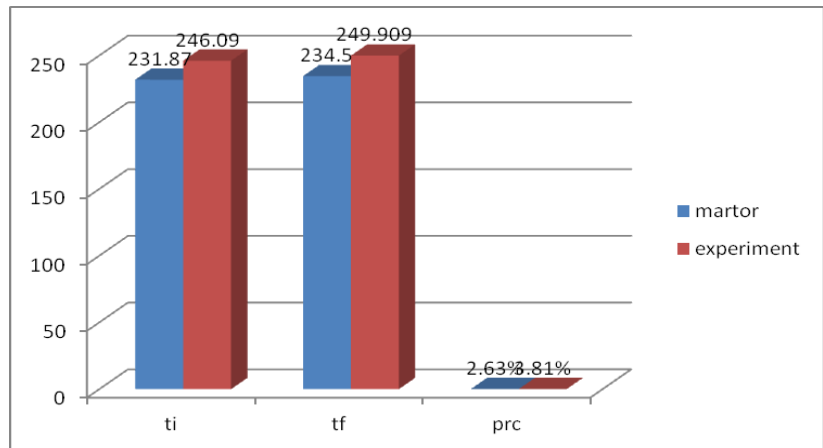


Figure 3: Average values obtained by the male subjects for the test of standing long jump

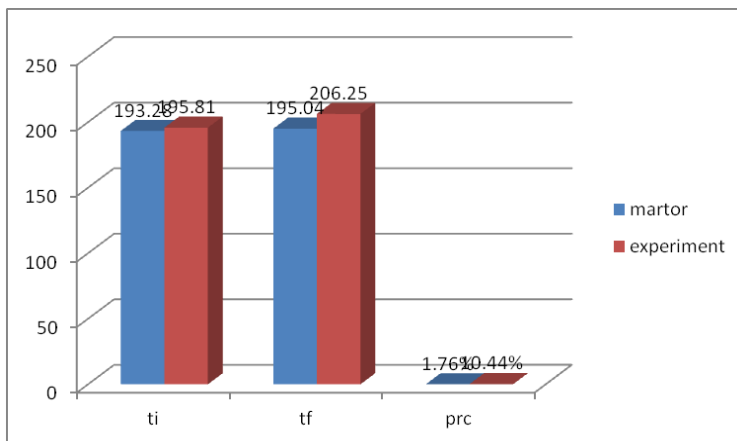


Figure 4: Average values obtained by the female subjects for the test of standing long jump

Vertical jump test (Jump Sargeant): boys of the control group progressed by 2.7%, while those of the experimental group by 4.9% (Figure 5); girls of the control group progressed by 2.47%, while those of the experimental group by 4.04% (Figure 6); following the results of this sample, we see that both boys and girls of the experimental group recorded a higher progress than those of the control group: boys by 2.2%, while girls by 1.6%.

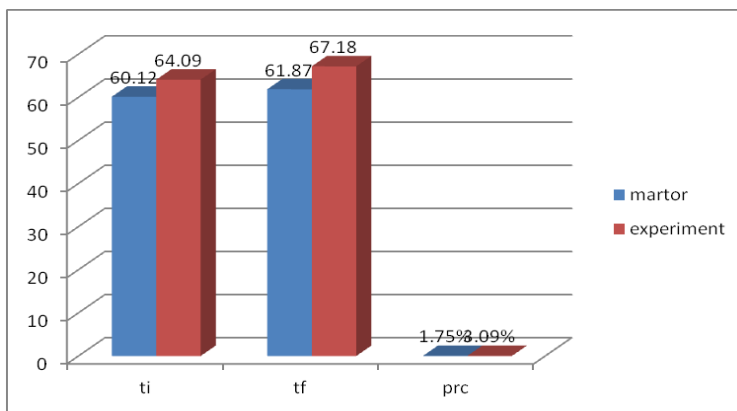


Figure 5: Average values obtained by the male subjects for the vertical jump test (Jump Sargeant)

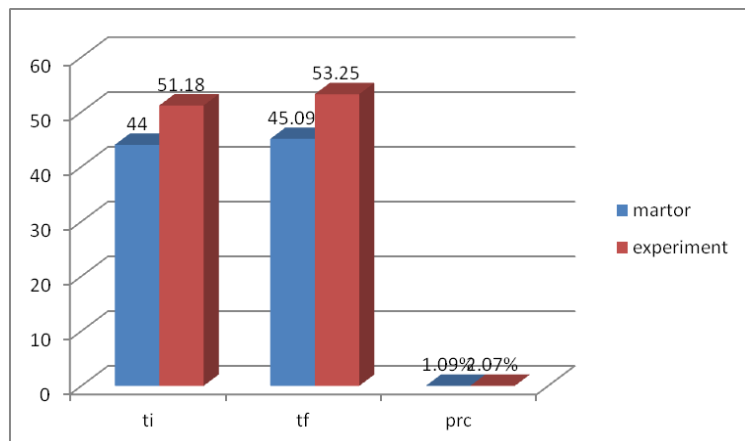


Figure 6: Average values obtained by the female subjects for the vertical jump test (Jump Sargeant)

In the first two samples girls were better than boys recording a visible progress, while in the last sample boys recorded better results.

Abdominal strength test is a test that develops both abdominal muscles and students' ability to perform physical exercises having as counterweight one's own body.

The test of standing long jump is effective because it develops mainly lower limb muscles, but also the upper limb muscles. Also the test creates a better orientation in space and time and also determines the ability to correctly estimate lengths.

Vertical jump test involves all muscles of the body.

The results and the statistical – mathematical indices presented in tabular form show the usefulness of the control samples that were applied.

### Conclusions

The research found a real success, so we came to the following conclusions:

1. After applying the set of tests, the experimental group recorded a progress compared to the control group. Arguments that come to support this assertion are the results of the statistical-mathematical indices and graphic representations of the average values of the two groups in all three samples.

2. The means and methods used are appropriate, thus the research objective namely the optimization of the motric skill – *strength*, was accomplished – optimization is effective.

3. The research hypothesis was achieved, obtaining the desired result, namely the development of motric skill – *strength*.

#### References

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**Titlul:** Dezvoltarea forței în cadrul lecției de educație fizică și sport în învățământul gimnazial

**Cuvinte cheie:** forță, ciclul gimnazial, optimizare

**Rezumat:** Această cercetare a fost făcută cu scopul de a determina gradul de dezvoltare a calității motrice forța în ciclul gimnazial. Pentru a realiza această optimizare s-au ales două clase de la nivelul ciclului gimnazial, respectiv clasa a VI-a A și clasa a VI-a D de la Școala Generală numărul 9, Ion Creangă, din Suceava. Datorită mijloacelor și metodelor adecvate ce s-au folosit, optimizarea a fost eficientă. S-a plecat de la ipoteza: dacă vom folosi metode și mijloace specific utilizate pentru dezvoltarea forței, acestea fiind în concordanță cu particularitățile de vârstă, vom obține rezultatul dorit și anume dezvoltarea calității motrice forța și îndeplinirea obiectivelor educației fizice și sportului. În urma metodelor și mijloacelor folosite s-a constatat un progres la testarea finală.