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## STRENGTH DEVELOPMENT THROUGH MEANS SPECIFIC TO THE SOCCER GAME IN 7<sup>TH</sup> GRADE STUDENTS

NĂCUȚĂ DIANA<sup>1</sup>, GIDU DIANA VICTORIA<sup>2</sup>, CAZAN FLORIN<sup>2</sup>, VOINEA FLORIN<sup>2</sup>, PARASCHIV CIPRIAN<sup>3</sup>, MUȘAT GEORGE COSMIN<sup>2</sup>, PETRESCU ANDREI MĂDĂLIN<sup>2</sup>, GEORGESCU ADRIAN DORIN<sup>2</sup>

### Abstract

*Aim.* The aim was to demonstrate that the use of specific methods and means of the soccer game will lead to increase of the strength, in 7th grade students

*Methods.* The experiment involved 28 schoolchildren (experimental group N =14 and control group N=14) aged between 12 and 14 years old. The tests used to highlight the development of strength in the students were: push-ups, sit-ups and the long jump test. The experimental group performed a training program with exercises specific to the soccer game, for 15 minutes, twice a week, for 3 months.

*Results.* The statistical analysis demonstrates that, in all applied tests, the experimental group scored significantly better results at the final test than the control group (push-ups -  $t = 2.395$ ,  $p < 0.05$ ; sit-ups -  $t = 2.432$ ,  $p < 0.05$ , long jump -  $t = 2.432$ ,  $p < 0.05$ ).

*Conclusions.* The working hypothesis was confirmed - the use of methods and means specific to the soccer game, in the physical education lesson, increased strength among 7th graders.

*Keywords:* strength, schoolchildren, soccer game.

### Introduction

More and more often we encounter soccer at school level. It represents an important means of Physical Education being present in all educational cycles and contributes to the education of students, along with other sports disciplines.

The acquisition of the basic technical and tactical procedures, has in mind the following aspects in the conception of the authors A. Dragnea (2006); D. Colibaba-Evuleț, I. Bota (1998): - the possibility of using them as exercises to achieve other objectives of school physical education; - the possibility of full practice of the respective sports games, according to the provisions of the regulation, within lessons, excursions, camps, etc.; - the possibility to observe and select students who show special qualities and interest for the respective sports game (Gidu, D.V., 2017, Gidu DV et al, 2021).

The efficiency of the use of games in physical education lesson is given by a series of aspects: sports games represent the most attractive global activity for children, through which they can act on a background of motoric and mental demand in order to fulfill the instructive - educational objectives of physical education lessons.

Soccer is one of the few sports, which has become not only a social phenomenon, but also a real industry. It is a game with very simple rules that can be quickly assimilated by participants and easily understood by spectators. The presence of this game in the school can only have beneficial effects on students, educating discipline, punctuality, respect for the teacher, referees, colleagues and opponents. It also develops team spirit, courage, physical dedication, perseverance, physical and especially mental resistance. Being practiced at the level of all forms of education, football produces certain instructive-educational values, with beneficial results on the plans: mental, somatic, functional, etc. (Păun D., 2012).

Soccer involves several physical movements, from running and sprinting to jumping and dribbling. These diverse exercises contribute to the following:

- Building endurance: Soccer requires good cardiovascular endurance, and constant playing on the field helps children improve their ability to stay active for a longer period of time.
- Increase strength and agility: Sprints, dribbling and quick changes of direction help children develop their muscles and improve their agility and coordination.
- Improve coordination: Ball control, passing and kicking the ball are just some of the activities that help children develop their fine motor skills and hand-eye coordination.

The motor quality of force represents "the ability of the human body to make efforts to overcome, maintain or yield in relation to an external or internal resistance, through the contraction of one or more muscle groups" (A., Dragnea, A., Bota, 1999).

<sup>1</sup> National Pedagogical College "Vaile Lupu", Iași, Aleea Mihail Sadoveanu 46, Romania;

<sup>2</sup> Faculty of Physical Education and Sport, "Ovidius" University from Constanta, Bd Mamaia no 124, Romania; Corresponding author: [campiap@yahoo.com](mailto:campiap@yahoo.com);

<sup>3</sup> Grigore T. Popa University of Medicine and Pharmacy, Iași, Str.Universității nr.16, Romania.

Strength is conditioned by several factors that can be grouped into the following categories: central factors, peripheral factors, psychological factors, methodical factors and environmental factors (Dragnea et al., 2006; Mocanu, G., 2015; Tudor, V., Crisan, D.I., 2008, Constantinescu O.V., 2024).

As far as the effort is concerned, due to the increase in hormone secretion at the age of 13-14 years, the children's body has real availability to bear this type of request, without negative consequences on their health.

Within the age range between 11 and 15 years, strength shows a typical evolution: until 11-12 years, it follows a parallel development in both sexes, which may explain the fact that sometimes girls surpass boys in terms of the strength I can develop; while, after 12 years, the increase in strength is much more pronounced in boys (A. Demeter, 1981; C. Bota, 2000).

The intensity of the effort must be followed with great rigor during preadolescence. At 11-13 years old, the load with which you work must not exceed 30% of your body weight. For 13-14-year-old children, the intensity can increase up to 75% of the body weight, and the load can exceed the body weight only after 14 years. At the beginning of this age period, intense muscle tension is still not indicated, because the muscles, tendons and ligaments are not sufficiently strengthened. Instead, working with a partner, with dumbbells, performed gradually and exercises separated by long breaks can be used without the risk of unwanted effects on the health of preadolescents (A. Demeter, 1981; I. Drăgan, A. Demeter, 1990 , Olar, VM, Melenco, I., 2024).

### Methods

The experiment took place between September 2023 and March 2024, during approximately 6 months (excluding school holidays) at Gâstești Secondary School, Iași. Physical education classes were held in the morning, between 9:00 and 10:00, twice a week, on Tuesdays and Thursdays. 28 students between the ages of 12 and 14 participated in the experiment. The identification data of the subjects are presented in table no. 1.

Table no. 1. The identification data of the subjects

Subjects	Age (years)	Height (cm)	Weight (kg)
Experimental group (N = 14)	12.64 ± 0.49	164.79 ± 8.37	63.07 ± 11.95
Control group (N = 14)	13.17 ± 0.39	160.94 ± 10.38	65.17 ± 9.72

The students were informed about the experiment and all their guardians agreed to the children's voluntary participation and signed an agreement in this sense.

On a somatic level, the following milestones were recorded:

- body height (waist - cm) measured using a tallimeter;
- body weight (kg) - was measured using a classic medical scale.

The physical parameters recorded were:

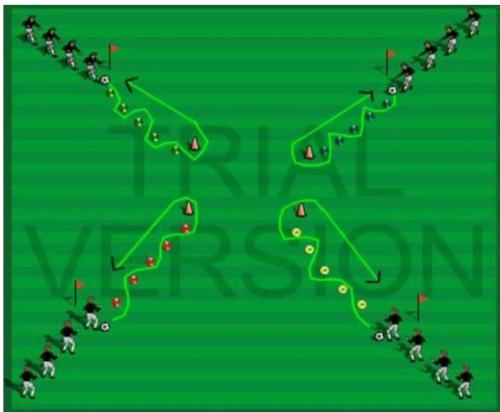

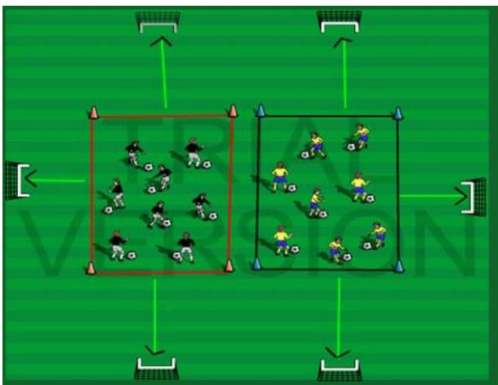
- strength of the upper limbs - push-ups (number of push-ups in 60 seconds)
- abdominal strength - sit-ups (number of sit-ups in 60 seconds)
- lower limb strength - standing long jump (cm)

In the statistical analysis of the data, the minimum threshold of significance was set at  $p = 0.05$ .

We used the following exercises assigned to the 5th link of the lesson, with specific themes from the football game, followed by workshops for the development of motor qualities, strength, which were transposed into circuits, as follows:

Table no.2. Specific exercises from the football game for the preparation of the experiment group

Description	Representation and duration	Methodical indications
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<p>1. The students are arranged in 4 columns, in the corners of the field. All children have a ball at their feet. At the teacher's signal, the first 4 children (1 from each column) will drive the ball simultaneously between the cones placed on the ground, go around the cone and return to the tail of their row. They will drive the ball first with both feet, then with just the right foot, and finally with the non-handy foot.</p>	<p>5 minutes</p> 	<p>The ball is driven carefully, and the ball is as close to the foot as possible. The exercise will be performed from easy running to allow each child to reach the objective of the lesson. The retreat at the tail of the string is performed on the edge.</p>
<p>2. The students are arranged in 4 columns, in the corners of the field. All children have a ball at their feet. At the teacher's signal, the first 4 children (1 from each column) will drive the ball simultaneously between the balls placed on the ground, go around the cone and return to the tail of the row on the right. They will drive the ball first with both feet, then with just the right foot, and finally with the non-handy foot.</p>	<p>5 minutes</p> 	
<p>3. There are 8 students in two squares. At the teacher's signal, the students will drive the ball inside the box they are in. At the signal of 2 consecutive whistles, they will have to exchange squares with each other. At the signal of 3 consecutive whistles, the students will have to score a goal in one of the 3 gates intended for each box. The ball must be passed into the goals inside the box.</p>	<p>5 minutes</p> 	<p>The ball must be driven by students with both feet. The ball must be kept as close to the foot as possible. Hitting the ball, in order to score a goal, must be as accurate as possible. When changing squares, students must not bump into each other. If they touch, they will perform 3 squats each.</p>

**Results**

The tested motor parameters are presented in table no. 3

Table no. 3. Somatic parameters of the tested students (N = 28)

Subjects	Parameters	
	Heigh (cm)	Weight (kg)
Experimental group (N = 14)	157.92 ± 6.28	50.92 ± 5.89
Control group (N = 14)	158.46 ± 5.59	50.78 ± 5.83
t	0.238	0.065

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p p > 0.05 p > 0.05

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The motor parameters tested are presented in table no. 4

Table no.4. The motor parameters of the tested students (N = 28)

Subjects	Parameters					
	Push-ups (nr. rep./ 1')		Sit-ups (nr. rep./ 1')		Standing long jump (cm)	
	Ti	Tf	Ti	Tf	Ti	Tf
Experimental group (N = 14)	8.50 ± 2.82	11.71 ± 3.89	19.42 ± 1.78	20.85 ± 1.79	142.50 ± 8.49	149.64 ± 8.42
Control group (N = 14)	8.64 ± 2.40	9.07 ± 2.67	19.21 ± 1.67	19.50 ± 1.74	142.85 ± 8.19	143.78 ± 8.18
t	0.144	2.395	0.329	2.432	0.113	2.866
p	p > 0.05	p < 0.05	p > 0.05	p < 0.05	p > 0.05	p < 0.05

### Discussions

Strength of the upper limbs - push-ups For the parameter "strength of the upper limbs - push-ups", in the final testing, the experimental group obtained an average of  $11.71 \pm 3.89$  push-ups, and the control group  $9.07 \pm 2.67$  push-ups. For this parameter, the statistical analysis of the data from the final test demonstrated that the experimental group obtained significantly better results than the control group ( $t = 2.395, p < 0.05$ ).

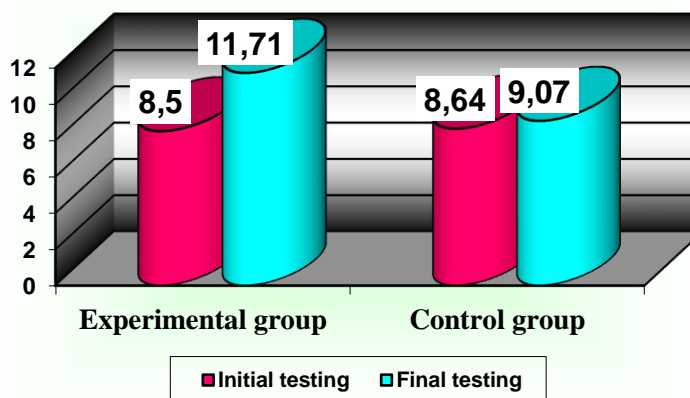


Figure 1. The values recorded in the upper limb force parameter – push-ups.

The experimental group registered significant values for this parameter at the final test compared to the initial one, where the average from the initial test was  $8,502 \pm 2.82$  push-ups, while the control group does not register a significant increase. We believe that this fact is due to the specific training program, with exercises and means from the soccer games, used during the experiment.

At this parameter, the statistical analysis of the data from the final testing demonstrates that the experimental group obtained significantly better results than the control group ( $t = 2.432, p < 0.05$ ).

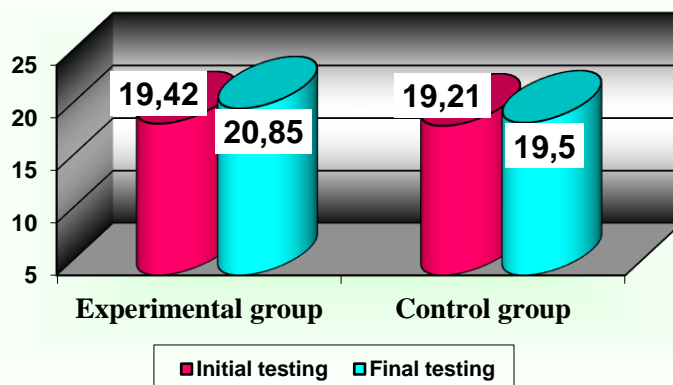


Figure 2. Recorded values of the abdominal muscle force parameter.

In the experimental group, in which we applied the specific training program, with means specific to the football game, we noticed that there are significant differences between the initial and final testing ( $t = 4.907, p < 0.05$ ).

The experimental group registered significant values for this parameter at the final test compared to the initial one, where the average from the initial test was  $19.42 \pm 1.78$  abs, while the control group does not register a significant increase. We believe that this fact is due to the specific training program, which exercises and means from the soccer games, used during the experiment.

*Lower limb strength – standing long jump*

In the "standing long jump" parameter, in the final testing, the experimental group obtained an average of  $149.50 \pm 8.42$  cm, and the control group  $143.78 \pm 8.18$  cm. At this parameter, the statistical analysis of the data from the final testing demonstrates that the experimental group obtained significantly better results than the control group ( $t = 2.432, p < 0.05$ ).

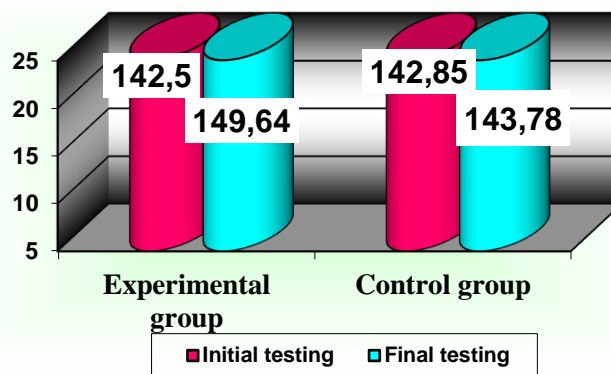


Figure 3. Recorded values for the lower limb strength parameter – standing long jump

In the experimental group, in which we applied the specific training program, with means specific to the football game, we noticed that there are significant differences between the initial and final testing ( $t = 3.982, p < 0.05$ ). The experimental group registered significant values for this parameter at the final test compared to the initial one, where the average from the initial test was  $142.50 \pm 8.49$  cm, while the control group does not register a significant increase. We believe that this fact is due to the specific training program, which included exercises and means from the soccer games, used during the experiment.

**Conclusions**

After analyzing the obtained results, the following conclusions can be drawn:

For the parameter "Strength of the upper limbs" - push-ups, the experimental group recorded significant values at the final test compared with the initial one ( $t = 7.398, p < 0.05$ ).



For the "abdominal muscle strength" parameter - sit-ups, the experimental group recorded significant values at the final test compared with the initial one ( $t = 4.907$ ,  $p < 0.05$ ).

For the parameter "Strength of the lower limbs" - standing long jump, the experimental group recorded significant values for this parameter at the final test compared with the initial value ( $t = 3.982$ ,  $p < 0.05$ ).

In the control group, there were no significant differences between the final test compared to the initial one, in any of the tested parameters ( $p > 0.05$ ).

So, the hypothesis of the research was confirmed, the use of the methods and means of work specific to the game of football, in the physical education lesson, led to the development of the quality of motor strength, in 7th grade students.

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