

COMPARATIVE STUDY OF STRENGTH DEVELOPMENT IN MIDDLE SCHOOL GIRLS

Ciubotaru Mihai¹

Grosu Bogdan-Marius²

¹“Iorgu Vârnav Liteanu” Technological High School,
mihaiCiubotaru11@yahoo.com

²“Ștefan cel Mare University”, Suceava, grosu.bogdan@usm.ro

Key words: motor quality, strength, girls, middle school.

Summary

Physical education, along with the other fundamental motor activities in the field, is an integral part of the measures regarding harmonious physical development and maintaining an optimal state of health. The specialized literature, from the last period, is rich in studies, articles and works that analyze the content and way of organizing physical education and sports activities. It requires the finding of new methods and means by which to act in practice and the continuous improvement of the existing ones, of the so-called classic, traditional ones based on the new objectives facing this educational object. The importance of motor skills also emerges from the fact that an appreciable number of practitioners and theoreticians of the field argue that the whole set of motor actions and especially their execution method depend to a large extent on the level of development of these skills. This research aims to carry out a theoretical and practical study on the possibilities of developing the forms of force manifestation.

Introduction

In a contemporary life, man demands a good physical development with a perfect balance and a combination of intellectual activity with movement, elements that lead to the maintenance of health. Starting from the old Latin saying "mens sana in corpore sano", the modern man is concerned about his health, the need to exercise, practicing physical exercises in order to train and develop the motor qualities indispensable to life.

Physical exercises practiced in an organized setting under the command of a teacher lead to the harmonious development of students, each according to their age.

The teaching of physical education and sports at the secondary school level depends very much on the professionalism shown by the teaching staff in the classes held in the primary cycle. During that period, the student accumulates basic information and skills, making it very easy for him to move to another level. The quality and efficiency of acquiring information, basic motor skills and skills specific to sports games in the primary cycle comes as a complement to the secondary cycle. For this reason, the physical education teacher who teaches at the secondary school must ascertain the level of knowledge, the level of learning of basic and specific motor skills and the stage of harmonious development of the students in the previous cycle, in order to develop a didactic teaching strategy .

In my personal opinion, I must mention the fact that the field of physical education is in continuous development and is improving day by day thanks to teachers eager to discover new knowledge by applying experiments to classes that reveal progress or regression results.

In order to have good results in the proposed activities, there must be a harmony between physical condition, basic and specific physical capacities. Correctly performed physical exercises develop the basic motor qualities (speed, skill, flexibility, resistance, strength) that are indispensable to our lives and very important in order to practice a performance sport [16]. For a higher quality of the didactic approach, we must take into account the sports base, the materials available, both for activities carried out outdoors and for those carried out indoors, either in the gym or in the classroom.

As several authors say [1,2,3,7,11], motor qualities are characteristics of the human body that ensure the performance of movement actions in daily life or in physical education lessons with the help of speed, skill, mobility, resistance indices and force. Most authors [13,15] divide motor qualities into:

- basic motor qualities: speed, skill, mobility, resistance, strength;
- motor qualities specific to certain sports branches or tests.

Each motor quality has specific particularities but also interdependence between them: speed - rapidity, skill/mobility - complexity, precision, strength - load, resistance - duration.

Most of the researchers in the field [9,10,15] who approach the development of the strength motor quality mention the fact that it represents the ability of the human body to overcome an external or internal force with the help of muscle contraction. According to Rohozneanu D. M. [14] motor capacity will develop following the design and implementation of instructional strategies with effects on game performance.

Practicing sports games leads to increasing the quality of life, reducing the frequency of diseases and promoting a correct and healthy lifestyle[4,5]. Likewise, physical exercise practiced since childhood contributes to the harmonious development of the human body, qualities and motor skills[6,8].

The physiological peculiarities of this age designate this period as one of the most favorable stages for the development of motor skills. Speed (moving speed) and skill remain in the foreground, which can be developed without special restrictions, but the distances traveled at maximum speed are less than in adults. Also during this period it is recommended to develop motor quality and resistance, because VO₂ max can be improved before adulthood. From the point of view of motor quality, the emphasis will be placed on: general muscular development, explosive strength training and endurance strength training are initiated[12].

Research methodology and organization

A number of 27 girls from the 5th grade, from the "Iorgu Vârnav Liteanu" Technological High School, Liteni city, Suceava County, 15 students were part of the experimental group and 12 of the control group were involved in the research. Two tests were administered during the 2022-2023 school year, the initial test in September 2022 and the final test in June 2023.

The following were used as research methods: the bibliographic study method - the study of specialized literature, the pedagogical observation - the observation of the students' behavior within the research, the pedagogical experiment method (the test method) - the objective was to ascertain and highlight the evolution of the previously established groups of students, from a motor point of view and the

statistical-mathematical method – the presentation of data after collection and measurement through tables and graphs.

Results and their interpretation

Taking into account the fact that the students of the 5th grade undergo changes in the school program, the transition from the primary cycle to the secondary school cycle, the much more loaded curriculum, we must take these aspects into account in carrying out this research. Initial testing is a benchmark for the level of preparation and development of 5th grade girls.

So, we used 6 tests specific to the quality of motor strength, as follows: the muscles of the upper limbs - push-ups (no.), pull-ups on the gym bench (no.), the muscles of the abdomen and back - lifting the trunk from lying on the back 30", raising the trunk from lying on the face 30" and the muscles of the lower limbs – long jump from the seat (cm), jump over the gymnastic bench 30".

The results obtained are centralized, analyzed and represented graphically for interpretation.

Table 1. Results obtained at the initial and final tests, 5th grade, experiment class

Name	Pushups (nr.)		Pull-ups on the gym bench (nr.)		Lifting tr. from supine position 30"		Lifting tr. facial lying down 30"		Standing long jump (cm)		Jump over the gym bench. 30"	
	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F
A.B	3	6	2	4	15	23	16	20	13	145	5	14
A.D	2	5	2	5	16	20	15	20	13	146	7	14
B.G	4	7	3	6	16	21	17	24	13	148	9	16
D.D	3	8	3	5	14	23	15	21	13	147	7	17
D.F.	2	6	2	5	16	22	14	20	12	142	6	15

D.R.	2	5	1	3	15	20	15	20	13	149	8	14
D.U.	1	4	1	4	14	19	14	21	13	146	9	15
E.R.	5	8	4	7	17	23	15	23	13	147	7	14
F.T.	2	4	2	3	14	21	14	22	13	149	8	16
G.T.	3	5	2	4	13	19	14	21	13	146	7	16
L.B.	3	6	3	5	14	21	15	22	13	145	6	13
L.F.	4	6	2	4	15	22	14	21	13	148	7	15
P.G.	2	4	1	4	13	18	14	23	13	149	7	16
R.E.	2	5	2	5	14	21	15	22	13	149	8	15
R.S.	3	7	2	6	17	22	16	23	13	147	6	14
X	2,7	5,7	2,1	4,6	14,	14,	21,	13	146,	7,1	14,	
S	3	3	3	7	87	21	87	53	4	87	3	93
+/-S	1,0	1,3	0,8	1,1	1,3	1,5	0,9	1,3	3,1	1,1	1,1	
Cv	3	3	3	1	0	6	2	0	6	1,96	3	0
%	37,	23,	39,	23,	8,7	7,4	6,1	6,0	2,3	15,	7,3	
	79	28	08	84	6	2	6	5	6	1,33	78	6
	0,2	0,3	0,2	0,2	0,3	0,4	0,2	0,3	0,8	0,2	0,2	
	7	4	2	9	4	0	4	4	2	0,51	9	8

Analyzing the results obtained in the push-up motor test, the girls from the experimental class, at the initial testing, achieve a result equal to 2.73 repetitions, and the control class 2.67 repetitions. In the final test, the experimental class achieves a performance equal to 5.73 repetitions compared to 4.33 repetitions obtained by the control class.

In the pull-ups on the gymnastic bench, in the initial testing, the experimental class achieves 2.13 repetitions and 2.25 repetitions of the control class. According to the data collected at the final test, the experimental class achieves an average equal to 4.67 repetitions, 0.67 more than the control class with 4 repetitions (Figure 1.).

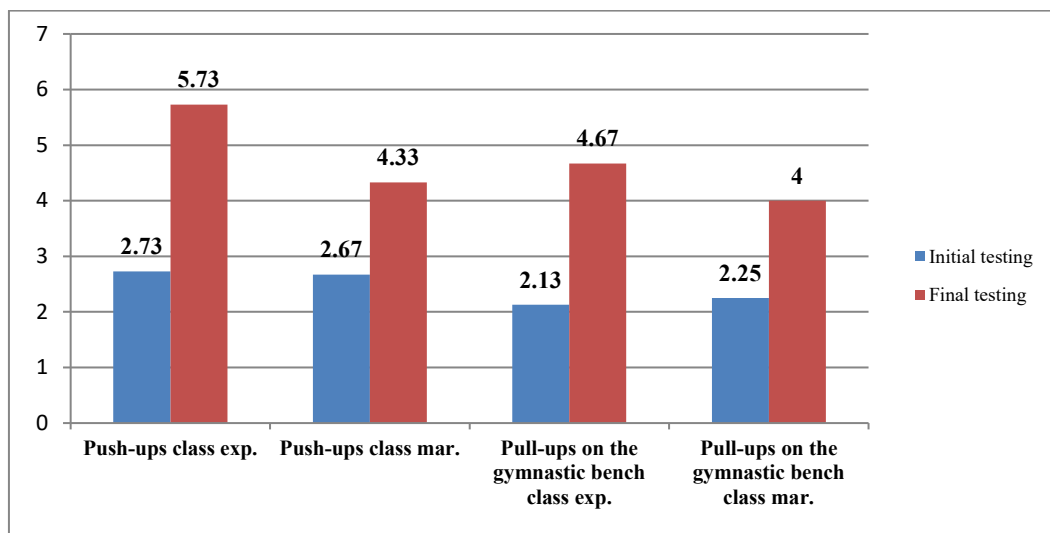


Fig. 1. Comparative analysis of the results obtained for the samples intended for the muscles of the upper limbs

From the results of the initial test, when lifting the trunk from supine for 30", it can be seen that the experimental group achieves 14.87 and the control class 14.92 repetitions. At the final test, the experimental class ticks an average of 21 repetitions, while the control class 17.33 (Figure 2.).

Comparing the data recorded by the experimental class with the control class, in the motor test of lifting the trunk from lying face down 30", it can be said that at the initial test there are no differences between the two groups, while at the final test the experimental class outperforms the control class with a difference of 4.53 repetitions.

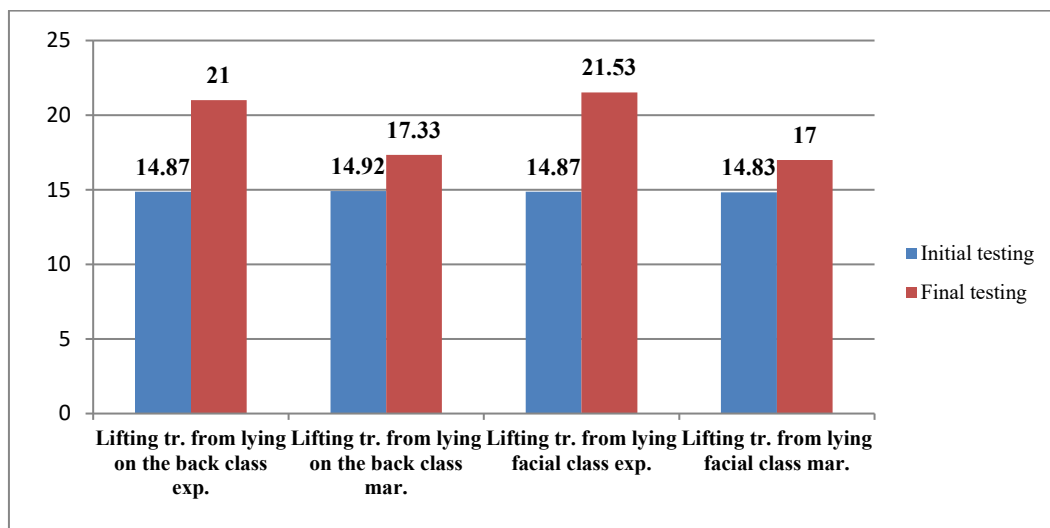


Fig. 2. Comparative analysis of the results obtained for the samples intended for the abdominal and back muscles

The girls from the experimental class, in the standing long jump, achieve an average equal to 134cm at the initial check and 146.87cm at the final test, 12.87cm more. In the control class, at the initial test the girls get 133.25cm and at the final test 141.25cm, 8cm more. Comparing the two groups, we can see a more pronounced increase of 4.87 cm, in the experimental class.

Analyzing the last sample supported in the research, at the initial test, when jumping over the gymnastic bench, the girls from the experimental class achieve 7.13 repetitions and 17.93 at the final test, and the control class obtains 7.17 and 13.33 repetitions at the initial testing, respectively the final testing (Figure 3.).

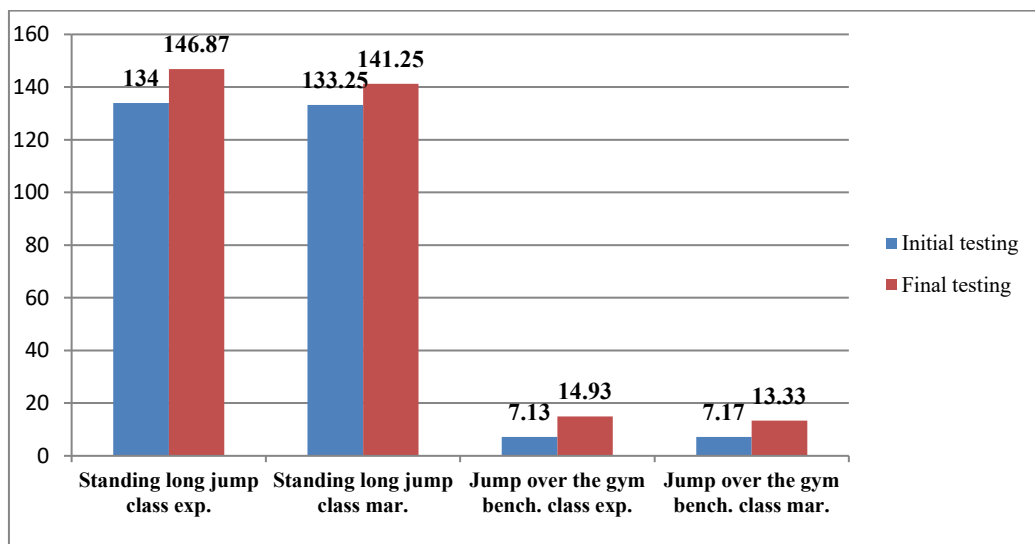


Fig. 3. Comparative analysis of the results obtained for the samples intended for the muscles of the lower limbs

According to the centralized and interpreted results (Tables 1. and 2), from the research if we apply the National Evaluation System in physical education and sports, in the initial test, in push-ups, the girls in both classes get a grade 6, while in the final test the experiment class achieves grade 9 and the control class grade 7. In pull-ups on the gymnastic bench, starting from grade 6 in both classes, the experiment class obtains grade 9, and the control class grade 8.

Checking, according to the scoring and performance verification system in Romania, the lifting of the trunk from lying on the back for 30" in the motor test, we arrive at the final test where the experiment class gets a grade of 10, and the control class gets a grade of 7. The same performance is also achieved when lifting the trunk from lying down facial for 30" where the girls from the experiment class got a grade 10 and the control class got a grade 7.

Also discussing the last two samples, in the initial testing we have a grade of 6 in both groups. At the final testing in the experiment class we get a 10 for both tests intended for the muscles of the lower limbs, while in the control class we get a 7 for the standing long jump and an 8 for jumping over the gymnastic bench.

**Table 2. Results obtained at the initial and final tests, 5th grade,
 witness class**

Name	Pushups (nr.)		Pull-ups on the gym bench (nr.)		Lifting tr. from supine position 30"		Lifting tr. facial lying down 30"		Standing long jump (cm)		Jump over the gym bench. 30"	
	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F	T ^I	T ^F
A.F.	3	4	2	3	15	18	16	18	130	142	5	12
A.L.	2	4	2	5	16	18	15	17	132	141	7	14
C.G.	3	4	3	4	16	19	17	20	135	143	9	15
D.E.	3	5	3	5	14	17	15	17	138	144	7	13
D.F.	2	4	2	4	16	18	14	16	129	139	6	12
D.R.	2	4	1	3	15	16	15	17	137	141	8	14
E.R.	1	3	1	4	14	17	14	16	135	145	9	15
E.N.	4	6	4	4	17	20	15	18	131	139	7	14
F.T.	2	4	2	3	14	17	14	17	133	142	8	14
H.T.	3	5	2	4	13	15	14	16	137	141	7	13
L.B.	3	5	3	5	14	17	15	15	132	140	6	12
V.F.	4	4	2	4	15	16	14	17	130	138	7	12
X	2,6 7	4,3 3	2,2 5	4	14, 92	17, 33	14, 83	17	133, 25	141, 25	7,1 7	13, 33
S	0,2 6	0,2 2	0,2 5	0,2 1	0,3 4	0,4 0	0,2 7	0,3 7	0,89	0,61	0,3 4	0,3 3
+/-S	0,8 9	0,7 8	0,8 7	0,7 4	1,1 6	1,3 7	0,9 4	1,2 8	3,08	2,09	1,1 9	1,1 5
Cv %	33, 29	17, 97	38, 49	18, 46	7,8 1	7,9 1	6,3 2	7,5 2	2,31	1,48	16, 65	8,6 6

Conclusions

Analyzing the performances obtained by the girls from the 5th grade who participated in the experiment, it can be seen that in the initial tests between the two classes involved in the research, there were no significant differences, having close or even equal values. At the final test, better results can be observed in the experimental class, thus confirming the fact that the means proposed and applied in the class for the development of motor quality were effective.

From the research carried out, it is evident that the means used in physical education and sports lessons in the experimental class brought a positive contribution in terms of the development of motor skills, and the poor results from the control class indicate the lack of effective exercises applied in within the hours.

Bibliography

- [1]BOCA, A.-G. (2021) *Teoria educației fizice și sportului*. Editura Universității Ștefan cel Mare, Suceava, p. 5-81. ISBN 978-973-666-663-6;
- [2]DUMITRU M. (2011). *Educația fizică componentă a curriculum-ului național (teorie și metodică)*. Editura Ovidius University Press, Constanța. p. 72-73. ISBN 978-973-614-643-5.
- [3]GHERVAN, P. (2014). *Teoria educației fizice și sportului*. Editura Univesității "Ștefan cel Mare", Suceava. p. 30-36. ISBN 987-973-666-429-8.
- [4]GROSU, B.-M. (2014) *Fotbal – fundamente științifice*, Editura Universității Ștefan cel Mare, Suceava, p. 5-7. ISBN 978-973-666-414-4;
- [5]GROSU, B.-M. (2019) *Fotbal – fundamente științifice*, ediția a II-a revizuită, Editura Universității Ștefan cel Mare, Suceava, p. 5-6. ISBN 978-973-666-567-7;
- [6]GROSU, B.-M. (2023) *Abordarea fotbalului juvenile din perspective psihomotricității*. Editura Ovidius University Press, Constanța, p. 26-32 ISBN 978-606-060-078-7;
- [7]HANȚIU, I. (2013). *Teoria și metodică educației fizice și sportului - (note de curs)*. Editura Universității din Oradea, Oradea, p. 58-64, p. 71-74.
- [8]LEUCIUC, F.-V. (2020) *Metode și tehnici de tonifiere musculară*. Editura Universității Ștefan cel Mare, Suceava, p. 6-11. ISBN 978-973-666-639-1;
- [9]LEUCIUC, F.-V. (2019) *Culturism*. Editura Universității "Ștefan cel Mare", Suceava. p. 26-50. ISBN 978-973-666-588-2.
- [10]LEUCIUC, F.-V.(2010) *Musculație*. Editura Universității "Ștefan cel Mare", Suceava. p. 15-17. ISBN 978-973-666-329-1.
- [11]LUPU, E. (2006). *Metodica predării Educației Fizice și Sportului*. Editura Institutul European, Iași, p. 39-43. ISBN 973-611-436-8, 978-973-611-436-6.

- [12]NICULESCU M., MATEESCU A., CREȚU M., TRĂILĂ H.(2007) *Bazele științifice applicative ale pregătirii musculare*. Editura Universitaria, Craiova. p. 165-173. ISBN 973-742-393-3.
- [13]POGOLȘA, L., CRUDU, V.- coordonatori. (2017) *Cadrul de referință al Curriculumului Național*. Editura Lyceum, Chișinău, p.17-18. ISBN 978-9975-3157-7-7.
- [14]ROHOZNEANU, D.-M. (2016) *Strategii privind optimizarea capacității de forță la handbaliștii juniori*. Editura Didactică și pedagogică,. București p. 13
- [15]ȘERBĂNOIU, S., TUDOR, V. (2013) *Teoria și metodică educației fizice și sportului*. Curs universitar. București. p. 74.
- [16]TRIBOI, V. (2009) *Teoria și metodică antrenamentului sportiv*. Editura Valinex, Chișinău. 369 p. ISBN 9789975681162