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# ASPECTS REGARDING THE DEVELOPMENT OF THE STRENGTH OF THE LOWER LIMBS THROUGH SPECIFIC MEANS OF THE SOCCER GAME IN 16-YEAR-OLD STUDENTS

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**Abstract** The main goal we want to highlight in this study is the fact that I want to know in detail the issue of muscle strength development at this age. For the realization of this work, I started from the hypothesis that strength is a motor quality, which can be improved considerably from the first lessons, if the one who leads the instructional process knows the methodology related to the means used to develop this quality. This paper tries to demonstrate that by applying a series of means specific to the football game, we will succeed in developing the explosive force of the lower limbs, in a group of 10th grade students.

In conclusion, we can say that we managed to show how effective is the application of the means specific to the football game for the development of the muscles of the lower limbs.

**Introduction** The motor quality, strength, is a quality that is necessary for man in everyday life, regardless of whether he is a child, adult, teenager, athlete or just a human being. The fact that we move involves the use of the muscles of the lower limbs, if we climb some stairs as well, if we lift a bag or a chair we need the strength of the upper limbs.[1,3,9,11]

The great specialists of physical education considered that strength represents "the most frequently requested quality in motor activity." From these statements we can draw the conclusion that strength is the quality that must be given great importance during the child's development, starting from the age of the young schoolboy and continuing with the pubertal and adolescent periods, the period in which the methodology for the development of this quality does not present any of restrictions in developing any form of manifestation of force. [4,7,8]

My research paper wants to focus on the issue of lower limb strength. The development of this quality by means specific to the game of football represents an attractive topic for physical education teachers, for football coaches and especially for sports trainers. The means used for this goal are very numerous, but also attractive for students, the game of football being one of the most attractive and practiced sports in our country, but also in the world.

For the development of strength regardless of where this is desired, in the sports training lesson, but especially in the physical education lesson where we are directly interested, certain requirements must be met in the methodology of strength development in students and high school students.

The motor quality of strength is provided in the school curriculum for the 10th grade. In the school curriculum, it is recommended to develop explosive strength, which represents the ability to develop a maximum force in the shortest possible time.[

**Material and method**

Strength is a motor quality, which can be improved considerably from the first lessons, if the person leading the instructional process knows the methodology related to the means used to develop this quality.

In this paper, we started from the hypothesis that: using a series of means specific to the football game, we will succeed in developing the explosive force of the lower limbs, in a group of 10th grade students.

The purpose and tasks of the research:

The goal pursued by me in the paper is to make the instructional process more efficient for 10th grade students, by approaching a set of means from the football game, which will lead to an increase in the indices of explosive force. Considering the importance of the factors that compete for the development of the explosive force indices, I propose in my work to make a theoretical and also a methodical contribution regarding the acceleration of the force development process in the football game.[5,6]

The tasks of my work: In order to establish the veracity of the hypothesis, I proposed the creation of a training model that would lead to the achievement of the purpose of the work:

- documentation regarding the content of football game preparation, but also the theory and methodology of physical education, especially issues related to motor skills;
- analysis of the school curriculum, but also of the planning documents for 10th grade students;
- determination of the training level of each student;
- choosing a set of means in accordance with the specific age, but also the level of training of the students;
- the analysis, but also the interpretation of the data collected following the research carried out.

Objectives of the study:

In order to successfully carry out the desired experiment, I have established a series of objectives, which, if fulfilled, will surely lead to the achievement of the

tasks and purpose of my work. These objectives have the role of making my work easier and guiding my work:

- taking measurements of the student's waist and mass in order to establish the level of somatic development and the body mass index;
- the organization of initial tests and final tests, which lead to the establishment of final conclusions, but also the establishment of the level of training of the students who will start the experiment;
- the organization of the experiment groups with the help of a school game made by the students of the 4 classes of the $10^{th}$ grade in the high school where the experiment was carried out;
- increasing the indices of the explosive force of the students participating in the experiment, as well as increasing the range of motor skills they benefit from.

Description of the tests applied in the research:

The tests applied in my research have the role of establishing the level of explosive strength of the students both at the initial and final testing. All three tests that I have chosen are part of the tests proposed by the national evaluation system and the Romanian Football Federation for the evaluation of the explosive force of the lower limbs. These 3 events, "standing long jump, standing triple jump and vertical jump"[2,10]

After choosing the theme, the formulation of the working hypothesis and the purpose and tasks of the work are stages that compete for the optimal realization of the research.

The choice of the groups that will participate in the experiment is also an important stage, the level of training of the students, as well as their availability to participate in the experiment to be carried out is an important factor in the success of the research.

Another stage is the collection of data, following the application of the tests, followed by the analysis and interpretation of the obtained data. The formulation of conclusions and their verification is the stage in which we can establish the veracity of the working hypothesis, a very important stage, in which we deduce the qualitative level of the methods and means used in our research.

Subjects subject to research:

In order to carry out my experiment, I asked for the consent of the management of the Suceava High School with Sports Program, in order to carry out a football game with 10th grade students of high school, students who willingly participated in the action undertaken by me. Following the game played on the high school's synthetic field. In the experiment, we selected 16 students, 8 students were part of the experimental group, and 8 of the control group. The selection of the experiment group was made by me and the teacher of the physical education

students. Each student's participation also took place with the consent of a doctor, who gave his consent that the students were fit for the effort.

Place, time and ambient conditions in which the research was carried out:

The experiment I carried out was on the LPS sports field, a field with a synthetic grass surface, which is in very good condition. The period in which the experiment took place was between 10.01.2022-04.04.2022, a period of 3 months, in which the students of the experimental group carried out the weekly program proposed by me, and those of the control group, the weekly program they had the coordinating professor.

Systematization and description of the means used:

We have made a series of exercises from the game of football, which, when used, can lead to the development of explosive strength, a quality that footballers need a lot in the game of football, winning aerial duels being directly influenced by it. The exercises I chose were some integrated ones, exercises in which I used duels with opponents, complex exercises that demanded the students from a physical point of view. In each practice I used a series of 3-4 exercises, at the end of each practice the 4 vs 4 game was used.

**Results and discussion**:

After taking the tests by the 16 students of the two groups, we collected the following data to be analyzed and interpreted as follows:

Table 1 Results obtained by the students of the Experiment Group at the initial and final testing

| Name | Testul 1 Standing long jump | | Testul 2 Vertical jump | | Testul 3 Triple jump from the spot | |
|---|---|---|---|---|---|---|
| | T.i | T.f | T.i | T.f | T.i | T.f |
| A.L. | 192 cm | 199 cm | 38 cm | 44 cm | 518cm | 528cm |
| A.S. | 189 cm | 197 cm | 37cm | 39 cm | 523cm | 538cm |
| F.C | 197 cm | 209 cm | 39 cm | 42 cm | 529 cm | 537 cm |
| G.R. | 209 cm | 219 cm | 42cm | 47cm | 534 cm | 539 cm |
| M.M. | 201 cm | 221 cm | 41 cm | 45 cm | 538cm | 568cm |
| N.A. | 199 cm | 210 cm | 36 cm | 39 cm | 532cm | 553cm |
| T.C. | 201 cm | 211cm | 40 cm | 42 cm | 524 cm | 551 cm |
| T.F | 186 cm | 196 cm | 31 cm | 38 cm | 516 cm | 536 cm |

Table 2 Statistical indicators of the Experiment Group at initial and final testing

| Statistical indicators | Test no.1 cm | | Test no.2 cm | | Test no.3 cm | |
|---|---|---|---|---|---|---|
| | Initial testing | Final testing | Initial testing | Final testing | Initial testing | Final testing |
| Average (X) | 196.75 | 207.75 | 38 | 42 | 526.75 | 543.75 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Standard deviation | 7.459 | 9.632 | 3.464 | 3.207 | 7.796 | 12.736 |
| C.V.(%) | 3.79% | 4.63% | 9.11% | 7.63% | 7.79% | 2.34% |

Table 3 Results obtained by students of the Control Group at the initial and final testing

| Name | Testul 1 Standing long jump | | Testul 2 Vertical jump | | Testul 3 Triple jump from the spot | |
|---|---|---|---|---|---|---|
| | T.i | T.f | T.i | T.f | T.i | T.f |
| B.A. | 182 cm | 186 cm | 32 cm | 36 cm | 511cm | 519cm |
| C.B. | 177 cm | 179cm | 33cm | 37cm | 514cm | 518cm |
| I.C. | 187 cm | 188 cm | 35 cm | 39 cm | 519 cm | 522 cm |
| S.I. | 201 cm | 211 cm | 40cm | 42cm | 522 cm | 526 cm |
| S.T. | 195 cm | 198 cm | 33 cm | 38 cm | 521cm | 528cm |
| U.R. | 190 cm | 197 cm | 37 cm | 40 cm | 522cm | 527cm |
| V.D. | 180cm | 187cm | 38 cm | 39 cm | 519 cm | 529 cm |
| V.F. | 181 cm | 189 cm | 30 cm | 33 cm | 512 cm | 519 cm |

Table 4 Statistical indicator values of the Control Group initial and final testing

| Statistical indicators | Test no.1 cm | | Test no.2 cm | | Test no.3 cm | |
|---|---|---|---|---|---|---|
| | Initial testing | Final testing | Initial testing | Final testing | Initial testing | Final testing |
| Average (X) | 186.625 | 191.87 | 34.75 | 38 | 517.5 | 523.5 |
| Standard deviation | 8.262 | 9.833 | 3.370 | 2.725 | 4.503 | 4.503 |
| C.V.(%) | 4.42% | 5.12% | 9.69% | 7.17% | 0.87% | 0.86% |

Test 1: In the initial test, the long jump test, the students of the experimental group and those of the control group achieved average jumps equivalent to grades 7 and 5 respectively, this shows us that the level of explosive strength of the experimental group students is better than that of the control group on average, but both groups have modest results. The causes can be both the lack of specific training and the lack of a technique related to the jump, which shortens the jump by good centimeters.

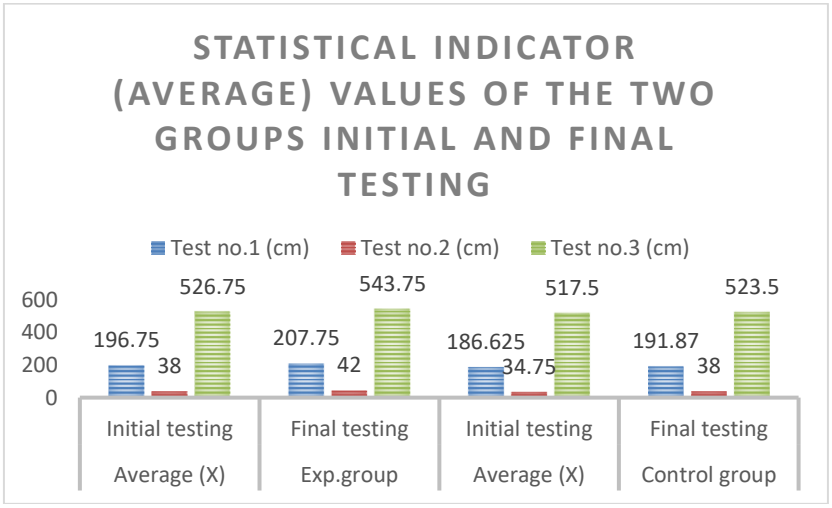
Test 2: In the second initial test, the one in which the students jumped vertically, they obtained an average score of 8 and 7 respectively. The students of the experimental group, maintaining their explosive force indices higher than the students of the control group, by about 4 cm on average, which is equivalent to 1 point in the scoring system.

Test 3: In the third test, the average of the students of the experimental group was grade 8, and of the students of the control group was grade 7, this also

shows the superiority of the explosive strength indices of the students of the experimental group.

Table 5 Statistical indicator (average) values of the two groups initial and final testing:

| Statistical indicators | | Test no.1 (cm) | Test no.2 (cm) | Test no.3 (cm) |
|---|---|---|---|---|
| Average (X) Exp.group | Initial testing | 196.75 | 38 | 526.75 |
| | Final testing | 207.75 | 42 | 543.75 |
| Average (X) Control group | Initial testing | 186.625 | 34.75 | 517.5 |
| | Final testing | 191.87 | 38 | 523.5 |



Graphic 1 Statistical indicator (average) values of the two groups initial and final testing

The final testing of the two groups highlights the following aspects:

Test 1: The experimental group has an average jump of 207.75 cm, compared to the 191.87 cm average of the control group, in the first test. This unequivocally demonstrates the superiority of the students of the experimental group. They achieved 15.88 cm better evolutions than the students of the control group, which leads us to think that the indices of the explosive force values of the students of the experimental group are clearly higher.

Test 2: In the vertical jump test, the superiority of the experimental group over the control group is also maintained. The students in the first group managed to jump an average of 42 cm compared to 38 cm, which converted into grades represents a grade of 9 and 8 respectively, both groups managing to progress from the initial testing.

Test 3: In the triple jump test, the students of the experimental group made the greatest progress, a jump of 2 points, but those of the control group, with a progress of about 6 cm, failed to move to a higher grade, although their evolution was in progress.

Analysis of the experiment group mean graph:

Test 1: The averages of the first test, that of the long jump, show us that the experimental group made a progress of 11 cm, which makes us conclude that the means chosen to carry out the experiment were optimal.

Test 2: In the vertical jump test we also see a 4 cm improvement, the relaxation indices increasing from the initial to the final testing.

Test 3: The triple jump test also shows increased values from the initial to the final test, values on average by 17 cm, translated into grades a progress from grade 8 to grade 10, this progress being the highest achieved by students at the 3 samples.

**Conclusions**

After analyzing the results obtained by the students in the three tests, we can draw the following conclusions:

● The students of both groups achieved progressive results in all three tests, in terms of centimeters jumped, from the initial to the final testing, which proves to us that the exercises chosen for the experiment were good.

● The students of the experimental group succeeded on the progress line, the student G.R. achieving very good evolutions in the first test, from 209 cm jump at the initial testing to 219 cm at the final testing, these results prove that this student has superior indices and superior qualities in terms of explosive strength.

● In the second test, that of detente, also the student G.R. managed in the initial test the best jump of 42 cm, but also in the final test of 47 cm, but the greatest progress was made by the student T.F., a progress of 7 cm from 31 to 38 cm.

● On the third sample of the initial testing, the student M.M. achieved an evolution of 538 cm, and in the final 568 cm, evolution with the most significant progress, progress of 30 cm.

● Although the period of the experiment was one of about 3 months, a short one, the progress values obtained by the students are significantly higher, the hypothesis that strength indices can develop very quickly, even from the first trainings being done. This should encourage students to train this form of manifestation, for further growth of evolutions.

● The working hypothesis from which we started was certainly validated, its veracity being ensured by the quality of the results from the final testing.

● I recommend the student G.R. to try practicing some athletics events, especially those related to jumping, his qualities being obvious for these events.

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