Developing resistance through dynamic games, for the 2-nd grade schoolchildren

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Abstract

The aim of the research was to develop a methodology for the development of resistance motric quality, using dynamic games, these means of education being specific to the children enrolled at primary school level in the 2nd class.

In this work we intended to emphasize that if we will conduct, for 10 weeks, one weekly physical education and sports lesson with pupils aged between 8 and 10, a lesson in addition to the two activities provided in the curriculum, in which to use dynamic games that aim at increasing the effort capacity, we will achieve an improvement in motor capacity, with emphasis on motor strength.

The research was carried out in several stages: a first stage in which the bibliographic study of the specialized literature was carried out, a stage in which the initial evaluation was carried out, a stage of application of the stimulus program with specific means, a final evaluation stage of the subjects and a stage of processing the collected data and formulating the conclusions. The sample of the survey was made up of 30 pupils at the level of primary education in the 2nd grade, aged between 8 and 10 years. The 30 pupils were divided into two distinct groups in terms of gender, consisting of 15 boys and 15 girls. In the research were used four resistance evaluating tests.

The stimulus program consisted of a weekly physical education lesson for 10 weeks, lessons in which pupils played 20 games. Comparing the values recorded by the pupils in the initial assessment with the values recorded in the final assessment, it was concluded that all pupils had better values in the tests that concerned the motor quality of the resistance.

Keywords: resistance, dynamic games, 2nd grade

Rezumat

Scopul cercetării a fost acela de a elabora o metodologie de dezvoltare a calităţii motrice rezistenţa, utilizând jocuri dinamice, aceste mijloace de învăţmânt fiind mijloace specifice copiilor şcolarizaţi la nivelul ciclului primar, în clasa a II-a.

În cadrul lucrării ne-am propus să evidenţiem faptul că dacă vom desfăşura săptămânal timp de 10 săptămâni o lecţie de educaţie fizică şi sport cu elevii cu vârsta cuprinsă între 8 şi 10 ani, lecţie suplimentară celor două activităţi prevăzute în planul de învăţmânt, în care să utilizăm jocuri dinamice care să vizeze creşterea capacităţii de efort, vom obţine o âmbunătăţire a capacităţii motrice, cu accent pe calitatea motrică rezistenţa.

Cercetarea s-a desfăşurat în mai multe etape: o primă etapă în care a fost realizat studiul bibliografic al literaturii de specialitate, o etapă în care a fost realizată evaluarea iniţială, o etapă de aplicare a programului de stimulare cu mijloace specifice, o etapă de evaluare finală a subiecţilor şi o etapă de prelucrare a datelor colectate şi formulare a concluziilor. Eşantionul cercetării a fost format din 30 de elevi şcolarizaţi la nivelul învăţământului primar în clasa a 2-a, cu vârste cuprinse între 8 şi 10 ani. Cei 30 de elevi au fost împărţiţi în doua grupuri distincte din punct de vedere al genului, formate din 15 băieţi şi 15 fete. Au fost folosite în cadrul cercetăriipatru teste de evaluare a rezistenţei.

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Programul de stimulare a constat în realizarea săptămânal a unei lecţii de educaţie fizică timp de 10 săptămâni, lecţii în cadrul cărora elevii au derulat un număr de 20 de jocuri.

În urma comparării valorilor înregistrate de elevi la evaluarea iniţială cu valorile înregistrate la evaluarea finală a rezultat că toţi elevii au înregistrat valori îmbunătăţite la testele ce au vizat calitatea motrică rezistenţa.

Cuvinte cheie: rezistenţa, jocuri dinamice, clasa a 2-a

Introduction

The desire to get a better acquaintance with the characteristics of the children from a motricity point of view during the primary cycle and the evolution of motor skills (one of the main areas of physical education content) for children aged between 8 and 10 years, determined the choice of research theme.

It is also known that, at primary level, one of the objectives of increasing the motric capacity of children concerns the education of resistance [1]. Even in the case of children practising sports, the initial objectives within the training program aim at improving the effort capacity, only after this period technical and tactical objectives can be formulated.

From a biological point of view, it is presented in the literature that the development of children of low school age is unevenly realized, indicating faster development periods and slower development periods. It is also known that the game is a form of activity with serious psychological and pedagogical implications, which contributes to the information and formation of the child. The didactic game gives a higher return then other ways of working in learning, especially for small school children. because it is part of the children's favorite daily preoccupations.

Starting from the two premises, the propose of the paper is to develop a working methodology to educate the "resistance" through motion games. Another purpose of the incentive program applied to students enrolled in the second grade will lead to one of the objectives of the Physical Education and Sports discipline, which aims at forming the habit of independent practice of physical exercises and increasing the interest in practicing dedicated sports.

Aim of the research

The aim of the research is to develop a methodology for the development of the motor quality-resistance through the dynamic games specific to the children enrolled in the primary cycle, in order to improve the educational educational process in the discipline of Physical Education and Sports - 2nd grade.

Objectives of the research

The objectives of the research were as follows:

1. Establishing the level of knowledge by synthesizing general information about the motricity of the 8-10 year old child enrolled in the second grade.
2. Collecting objective data, before applying the stimulus program, to outline the biomotoric profile of subjects aged 8 to 10 years from the level of resistance development point of view.
3. Elaboration of a motivational stimulation program, scientifically based and adapted to the biomotric potential of the pupils enrolled in the second grade.
4. Applying the stimulus program to a weekly activity with students, additional to the two lessons provided in the curriculum.
5. The collection of objective data, following the application of the motor stimulation program, in order to outline the biomotric profile of subjects aged between 8 and 10 years, in terms of the level of resistance development.
6. Highlighting the statistical significant differences between the values initially recorded in resistance tests and the values recorded by the same students after application of the stimulation program.

Premises of the research

It is presented in the literature that the development of the level of motor skills is based on a good effort. Also, the beginning of sports activity in each sport starts with training that aims to develop the capacity of effort and implies the development of the motric quality-resistance.

On the other hand, dynamic play corresponds to the highest degree of psychic particularities of preschoolers and young school pupils, and it must have an increased share in the content of physical education.

As the current education plan only provides two weekly physical education lessons, and current student generations have a low level of development of all motric qualities, we consider that introducing an additional weekly lesson of physical education and sports can help improve the level of finess in general and resistance in particular.

Last but not least, the level of resistance development needs to be checked at certain time intervals, taking into account the phenomenon of ascendancy registered among younger generations.

According to this tendency, it has been scientifically demonstrated that current generations have a larger size and a reduced biomotric potential in terms of resistance values, compared to 10 years ago generations.

Hypothesis of the research
Running weekly, for 10 weeks, of a physical education and sports lesson with pupils aged between 8 and 10, a lesson in addition to the two activities in the curriculum in which to use dynamic games aimed at increasing the effort, will lead to better values for resistance.

Materials and methods
Science research tasks
The tasks outlined in the research were as follows:
1. Examining the literature and detachment of motoric characteristics of pupils at the primary level.
2. Establishing motric tests and evaluation tests to diagnose the level of resistance development for pupils aged between 8 and 10 years.
3. Evaluation in terms of the level of resistance development for 30 pupils aged between 8 and 10 years, enrolled at the "Pia Bratianu" Secondary School.
4. Setting up a database with information on the resistance values of pupils in the second grade, aged between 8 and 10 years.
5. Elaboration of Dynamic Game Based Stimulation programs, selecting methods, means, and processes appropriate for the education of resistance.
6. The application of motric stimulation programs, each of the 30 pupils benefiting weekly from a physical education activity, in addition to the two lessons foreseen in the curriculum for this category of subjects.
7. The final evaluation in terms of the level of resistance development of the 30 pupils who participated in the incentive program, enrolled at the "Pia Bratianu" Secondary School.
8. Completion of the database with the information obtained at the initial and final tests on the level of development of the 8 to 10 year old pupil resistance.
9. Establish statistical and mathematical tests that will outline all the significant differences for the

pupils following the application of the stimulus program.
10. Analysis, processing and interpretation of data.
11. Formulate the final conclusions from the comparisons between the initial values and the final values, respecting the gender criterion.
12. Implementation of the research project.

Research sample. Experimental groups
The group of 30 pupils were enrolled in the "Pia Bratianu" Gymnasium School. All 30 students are enrolled in the 2nd grade and are aged between 8 and 10 years old.
The group of 30 pupils at primary level was composed of two distinct gender groups: 15 male subjects and 15 female subjects. We mention that the statistical computation for demonstrating the hypothesis was done for each of the individual groups, because between the two genders there are differences in the evolution and the development of the mottic quality-resistance.
The stimulus program was to achieve a physical education lessons per week, which involved performing an activity lasting 50 minutes, additional activity to the two lessons provided in the curriculum.

Assessment methods
Individual evaluation sheets were structured on two content domains: general data relating to the pupil and tests / test scores related to motric strength - resistance.
Both the initial evaluation and the final evaluation were carried out through four evaluation tests of muscle resistance.
1. The running test between two lines at 16 m at the required rate assesses the aerobic capacity. The test consists in scrolling as many shots between two lines traced to the ground at a distance of 16 meters, at a rhythm set by sound signals, rising about 0.5 seconds per minute. Participants must run on a flat surface to the other line before hearing the sound signal. At the sound, they will come back and run back to the opposite line drawn on the ground. If the participants arrive at the line before hearing the sound, they must wait for the next sound to start the other line. Subjects will continue to run until they can no longer cross the line before they hear the beep. Those who do not cross the line before

hearing the sound signal have the opportunity to re-enter in the next two laps. If they do not, the subjects are stopped and record the number of laps they run at the rhythm of the beeps.

Testing is done only once, and the result consists in the number of laps performed at the rate required by the audio signals [2].

2. The Holding Position Test, with 180º flexion arms in scapular humeral joints, forearms extended 180º on arms , palms in pronation, is a test that measures strength in the upper limbs and shoulders. Subjects must remain in the hanged position at the chin ups bar as long as possible. Subjects can climb the trellis so they can adopt the position they need to maintain. The legs must not touch the ground, and the legs should be in the extension on the thighs. Participants can be supported so they do not swing. Only one test per subject is allowed and the result recorded is the time in seconds that has passed since the position is accepted until the hand of the participant releases the bar.

3. The "rolling rug" test is a test that measures the strength of upper and lower limb muscles. The subjects adopt the prone posture with anterior support on the palms, the forearms extended on the 180º on arms, the upper limbs on 90º in the scapulohumeral joints. From this initial position, the pupils performs alternating knees moves to the chest. Pupils run as many repetitions as they can.

Only one test per subject is allowed and the result recorded is the number of repetitions of the exercise that the subject can execute without stopping.

4. The "jump" test is a test that measures the strength of the muscles of the lower limbs. The subjects perform as many jumps as possible from the orthostatic position, without stopping. Only one test per subject is allowed and the result recorded is the number of jumps bending the knees that the subject can execute without stopping.

Statistical methods

In the present study, the statistical test was selected from the non-parametric tests for two pair samples, by checking that there were statistically significant differences between the initial assessment and the final evaluation [3]. The Wilcoxon Statistical Test compares two pair distributions by comparing two test-retest or pairwise variables [4].

Another argument for choosing the Wilcoxon test is the low volume of the samples, consisting of 15 subjects. We considered it appropriate to produce two samples, respecting the gender criterion, girls and boys having a different biometric potential.

For the statistical processing of the data, the mathematical statistical program S.P.S.S. 20 for Windows was used.

Intervention program

From the point of view of the stimulus program, the children performed a weekly physical education lesson between 11 January 2016 and 25 March 2016, which was added to the two physical education and sports lessons scheduled in the weekly schedule of these subjects [5]. We mention that the stimulus program consisted of 10 activities, the duration of each lesson being 50 minutes.

The stimulus program consisted of 20 dynamic games selected from the literature and made two in each of the 10 additional activities performed with pupils enrolled in the second grade.

In Table 1 we present the chart of activities carried out during the 10 weeks of application of the incentive program.

Table 1. The chart of activities carried out under the stimulus program

Nr. Crt.	Name of the game	Number of activity
1.	Help your colleagues!	Activity 1
2.	Leave the ball!	Activity 1
3.	The forms	Activity 2
4.	The second one runs	Activity 2
5.	The third one runs	Activity 3
6.	Run for the handkerchief	Activity 3
7.	The flying feather	Activity 4
8.	Come with me, run away from me!	Activity 4
9.	Flying Feather (Variant)	Activity 5
10	Lucky, lucky!	Activity 5
11.	Rabbit without a bunk!	Activity 6
12.	Rabbit and turtle	Activity 6
13.	The Circle	Activity 7
14.	The human chain	Activity 7
15.	Fighting on horseback	Activity 8
16.	The Wolf and the sheep	Activity 8
17.	The ball in the basket	Activity 9

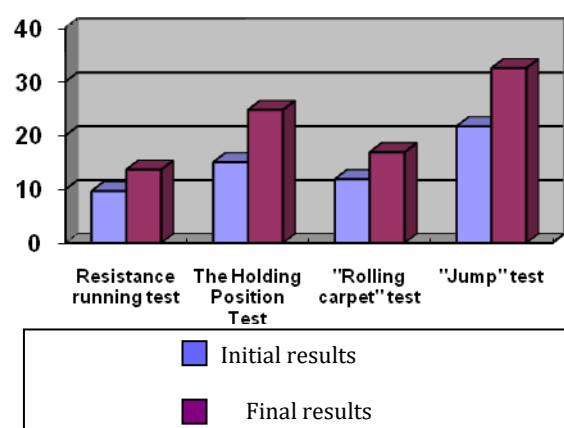| 18.	Aiming with the circle	Activity 9
19.	The penguins	Activity 10
20.	Get your friend out of the circle	Activity 10

Results

A. Following the analysis and comparison of the data obtained in the initial and final assessment tests at the group of 15 boys using the nonparametric test for two Wilcoxon pair samples, the following results were obtained:

1. The resistance on running on the required tempo: the average of the values obtained at the required tempo at the initial evaluation was 9,64 laps, and the average of the values obtained in the final test was 13,64 laps; 15 of the subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the values obtained in the final test following the application of the stimulation program is statistically significant (Z = -3,413; p = 0,001)

2. The Holding Position Test, with 180º flexion arms in scapular humeral joints, forearms extended 180º on arms , palms in pronation: the average of the values obtained at the initial evaluation was 15 s and the mean of the values obtained in the test final was 24.73 seconds; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the values obtained in the final testing following the application of the stimulation program is statistically significant (Z = -3,415; p = 0,001);

3. "Rolling rug" test: The average of the values obtained at the initial evaluation was 11.87 repetitions, and the average of the values obtained in the final test was 16.87 repetitions; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the final test results obtained following the application of the stimulation program is statistically significant (Z = -3,417; p = 0,001);

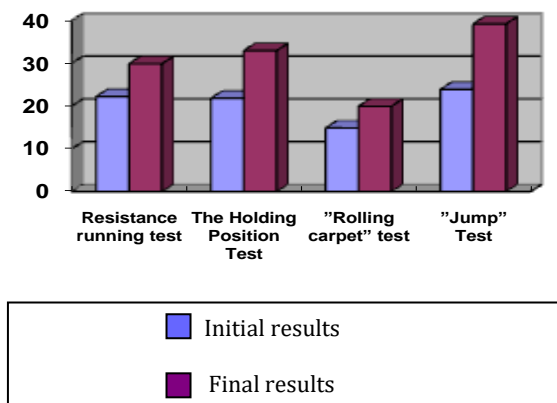**Graphic 1**. Comparison of values average results boys tests

4. "jump" test: the average of the values obtained in the initial evaluation was 21.67 repetitions, and the average of the values obtained in the final test was 32.47 repetitions; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the values obtained in the final testing, following the application of the stimulation program, is statistically significant (Z = -3,413; p = 0,001).

B. Following the analysis and comparison of the data obtained in the initial and final assessment at the group of 15 girls, using the nonparametric test for two Wilcoxon pair samples, the following results were obtained:

1. The resistance on running on the required tempo: The average of the values obtained at the required tempo at the initial assessment was 22.20 laps, and the average of the values obtained in the final test was 29.87 laps; 15 of the subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the final test results obtained from the application of the stimulation program is statistically significant (Z = -3,412; p = 0,001);

2. The Holding Position Test, with 180º flexion arms in scapular humeral joints, forearms extended 180º on arms , palms in pronation: the average of the values obtained at the initial evaluation was 21.80 s and the average of the values obtained at final testing was 32.93 s; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial

test values and the final test results obtained from the application of the stimulation program is statistically significant (Z = -3,411; p = 0,001);

Graphic 2. Comparison of values averae resusts girls tests that focused on the development of resistance

3. "Rolling rug" test: the mean value obtained in the initial assessment was 14.87 repetitions, and the mean values obtained in the final test were 19.93 repetitions; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the final test results obtained following the application of the stimulation program is statistically significant (Z = -3,419; p = 0,001);

4. "Jump" test: the average of the values obtained in the initial assessment was 23.87 repetitions, and the average of the values obtained in the final test was 39.20 repetitions; 15 subjects received positive values, no negative values, and no subjects recorded constant values; the difference between the initial test values and the values obtained in the final testing following the application of the stimulation program is statistically significant (Z = -3,410; p = 0,001).

Discussions and conclusions

The analysis and interpretation of the data obtained by comparing the values registered by the pupils enrolled in the second grade to the initial testing and the values recorded by the same students in the final testing and the centralization of the partial conclusions lead to the following general conclusions:

Following the application of the intervention program, statistically significant differences were recorded between the values obtained at the initial evaluation and the final assessment at the level of the four resistance tests, both at the group of female femme subjects and at the level of the group consisting of male subjects. In conclusion, at the end of the stimulation program, all pupils scored positive values in the tests that concerned the motric quality of resistance;

We conclude by asserting that the hypothesis formulated in this research is confirmed, and null hypotheses are rejected. Therefore, weekly training for 10 weeks of an additional physical education and sports lesson that aims at educating the motric force will lead to its improvement, and ultimately to the goal of increasing the overall effort capacity.

It has also been demonstrated that the correct selection and application of specific means in physical education and sport, through dynamic games within a weekly supplementary physical education lesson led to statistically significant increase in conditional motric quality -resistance values, for the second grade schoolchildren.

We propose the elaboration of the annual plan for the design of the educational instructive process and incentive programs in the physical education and sports lessons taking into account the level of development of the motric quality- resistance in the initial evaluation. Also, the units of learning related to the motric quality-resistance are indicated to be given 8-10 lessons in the planning and design process.

Another proposal aims at introducing at least three physical and sports education lessons into the curriculum for students enrolled in the second grade and the development of realistic school curricula, in line with the biomotric potential of this category of subjects.

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