IMPROVING THE EFFORT CAPACITY OF PRESCHOOLERS

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Abstract

Background. It is assumed that the insertion of the physical education elements (movement exercises, movement games, relay race, dance steps) in all types of activities carried out in kindergarten determines the increase of effort capacity (evaluated by the Ruffier test) and there is the possibility of contributing greatly to form as a child, a being who lives in harmony with his colleagues, to behave correctly and civilized.
Objectives. Monitorizing the effort capacity during the development of activities that contain physical education elements. Comparative analysis of the effort capacity between the two monitorized groups.
Methods. Pedagogical observation method. In particular, we aimed to adapt the child's body to the effort by recording the physiological indicators and determining the effort capacity of the cardio vascular apparatus.
The method of graphical representation. The graphical representation method was used for a more complete interpretation of the results obtained in the tests by highlighting the differences between the performances obtained by the subjects at different moments of the research.
Results. In both groups the final results are better than the initial ones recorded at the beginning of the experiment, but in the experimental group there is a significant increase between the final and the initial testing compared to the controlled group where the growth is much smaller.
Conclusion. Proceeding to the insertion of the elements of physical education in all the activities carried out in the kindergartens and not only to the intended activity, it will be realized the presentation of the contents and of the other fields in an attractive, flexible, mobilizing form, which leads the interest of the children for investigation, documentation, research and practical application.

Keywords: *improved, pre-school, effort capability*

Introduction

Knowledge and development of functional parameters has always been a concern of specialists in the field of physical education, because this approach is the basis for the development of various intervention strategies specific to each educational cycle.

The capacity for physical effort is represented by the possibilities of the active muscular system to release the energy necessary to produce a mechanical thing as high as possible and to maintain it for as long as possible.

The muscular system can release energy by anaerobic glycolysis or by oxidative phosphorylation. Depending on the needs and possibilities of oxygen supply, physical effort becomes predominantly aerobic or anaerobic. (Dragan, I, 2002)

The vast majority of specialists believe that exercise capacity can be improved by doing 3-5 workouts per week. They also believe that improving aerobic training is achieved if the duration of the effort is between 30-60 minutes.

For aerobic physical activity to produce metabolic changes, the effort must exceed a minimum threshold, called the aerobic threshold, which depends on the level of fitness of the subject.

Any activity that increases your heart rate for a longer period of time will ultimately lead to improved exercise capacity.

Cooper (1982) considers that the most popular aerobic exercises are: walking, jogging, swimming, dancing and aerobic gymnastics.

The research context

The aim of this research is represented by the optimization of the strategies for developing the effort capacity of preschoolers, by identifying the most efficient aerobic means.

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The aim of the research was also to increase the efficiency of the educational act at the level of preschool education by carrying out different elements of physical education within each type of activities included in the kindergarten program.

One of the basic factors for performing many of the motor actions is the ability of physical effort, which generally means the body's ability to perform a mechanical work as high as possible and maintain it for as long as possible.

Research objectives

a) Studying the way in which the issue is approached in the literature.

b) Application to the experimental group, of the methodical procedures and of the expected content for the improvement of the effort capacity

c) Establishment, battery of measurements and samples through the prism of which the efficiency of the research is appreciated.

d) Carrying out the initial and final measurements and tests on the research sample.

e) Adaptation and application to the experimental group of the intervention plan, in addition to the classical means respecting at the same time the study program.

Experimental research hypothesis

In order to carry out the research, we issued the following hypothesis:

The application of a regular program of sports activities, of aerobic type, of 30 minutes, 3 times a week, will determine positive effects at functional level and will improve the effort capacity of the subjects engaged in research.

It is assumed that the insertion of the elements of physical education in all types of activities carried out in kindergarten determines the increase of the effort capacity, evaluated by the Ruffier test.

It is believed that through the judicious application of the elements of physical education in preschool education there is the possibility to contribute greatly to the formation of a child from a being who lives in harmony with his colleagues, who behaves correctly and civilized.

The Research methods

For the elaboration of the research and especially for the verification of the established working hypotheses we used the following research methods:

Pedagogical documentation, a method that gave me the opportunity to study the literature on the issue of the paper.

Registration method. Subjects recorded heart rate values at different times during the independent program.

Test method. The tests used were directly related to the objectives

For the evaluation of the functional parameters, of the effort capacity, the Ruffier Test was used).

Statistical-mathematical method. The data obtained by tests and measurements were analyzed and interpreted using the statistical-mathematical method;

Graphical representation method: This allowed me to express the processed data and the resulting findings. (Tudor V. 2008)

Conducting research

The study took place during an entire school year. The testing of effort capacity and the development of the educational programs were realized according to the schedule below:

- The first stage – observance – took place in September 2015 and it tested the initial effort capacity for both groups (experimental and control)

- The second stage – the fundamental one – took place between November and May and concerned the training programs for the experimental group. The focus was on applying the intervention program that was done differently. In the same time, the effort capacity was monitored to emphasize progress and improve the intervention plan.

- The third stage – final control stage – took place in June and included the final testing, analysis and interpretation of the Ruffier test results and the checking of the initial hypotheses. Ruffier Test was used to evaluate the effort capacity (physical condition).

Functional capacity testing was done through an effort capacity exploration test.

A non-specific test is used to assess exercise capacity: estimating aerobic power (maximum VO2) by the indirect method, using the Ruffier test.

The Ruffier test uses the formula:

$$\frac{P_1+P_2+P_3-200}{10}$$

P_1 is the pulse in the sitting position at rest for 15 seconds, which then multiplies by 4;

P_2 is the pulse for 15 seconds, while sitting, but after performing 30 genoflexions in 45 seconds, multiplied by 4 (ie 0-12 seconds of the first minute of effort);

P_3 represents the pulse per 15 seconds multiplied by 4, sitting in the 45-60 seconds of the post-effort minute.

The result obtained is interpreted as follows:

- the value below 0 means a very good effort capacity;
- the value between 0-5 means a good effort capacity;
- the value between 5-10 means an average effort capacity;
- the value between 10-15 means a satisfactory effort capacity;
- a value higher than 15 shows that the test is unsatisfactory and further investigations are required.

One of the main factors in the accomplishment of many of the motor actions is the physical effort ability, meaning the capacity of the organism to perform an increased mechanical act and to maintain it as long as possible. The physical capacity is improved following the systematic practicing of the favorable physical exercises, especially the development of the motor skills – strength, speed, resistance and the consequence of this improvement is the increase of the endurance degree of the organs and organism systems to superior stress. The quantity and quality of the effort made during the development process of the motor skills are very important.

The interdisciplinary activities contribute to the application of the unitary approach, that of the integration of the content of more disciplines into a globalized, holistic enterprise, in which the boundaries between the categories and types of activities fade away and are brought together in a unitary scenario in which the theme is investigated by the means of different sciences.

There is an important difference in the effort capacity of children in the experimental group and the one of the children in the control group.

Besides the quantitative data, there is a significant improvement in the qualitative aspects of the effort skills for the children in the experimental group. They have more development autonomy, self-control and planning skills. There are improvements in the other experimental domains, such as a better attention control, better knowledge desire and an improved behavior.

Research results

Table 1. *The average value of the Ruffier index*

Month	September	November	January	March	May	June
Experimental group	22,8	19,14	18,26	14,12	12,61	9,8
Control group	22,7	21,6	19,87	18,11	16,62	15,89

Note: *The table contains the values of the average Ruffier index during the experiment, recorded every two months, in the experiment group and in the control group.*

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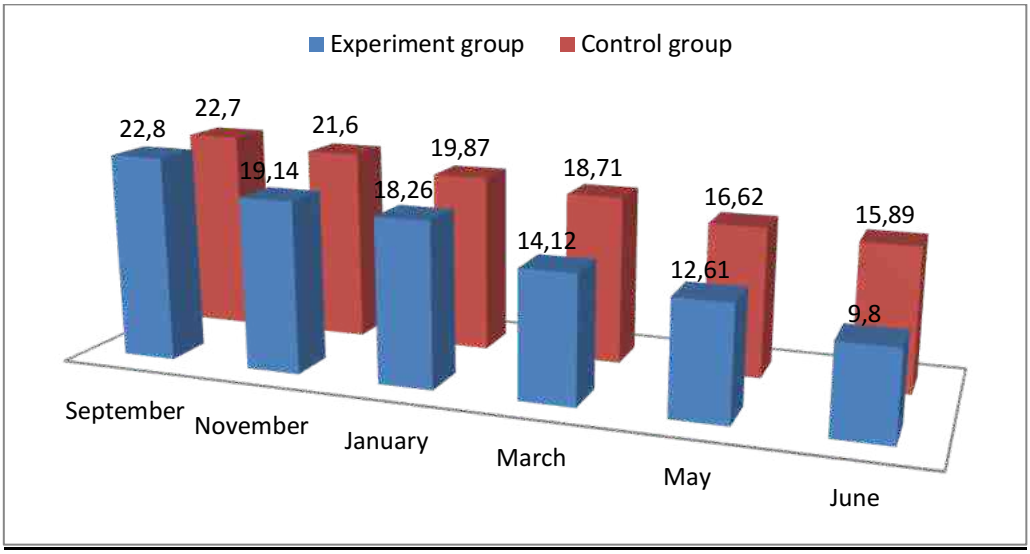

Figure 1. The average of the Ruffier index

In both the experiment group and the control group, there was a decrease in the Ruffier index, which means that the children's effort capacity increased. In the experiment group, however, the capacity for effort is significantly increased, as a result of the intervention plan that included elements of physical education inserted in various contexts.

Both groups (experimental and control) have registered a decrease of the *Ruffier* index, meaning that the effort ability of the children has increased. However, in the case of the children in the experimental group, the effort capacity is significantly increased following the intervention plan that included physical exercises elements inserted in different contexts.

Before the experiment, both groups (experimental and control) had more or less the same medium values (22.7 and 88.8). Later on, the experimental group improves the effort capacity by 57%, while the control group improves it by 30%.

The experimental group has a clear improvement of the effort capacity, changing the score from "insufficient" to "medium" – increasing thus three levels of *Ruffier* index; the control group improves its effort capacity, but it still is in the initial limits of the "insufficient" score.

This is due to the intervention plan applied, respectively to the gymnastics programs, dance, movement games, application routes / routes, relays carried out in the other activities than those of physical education.

The experiment used was of the ameliorating type, according to the hypothesis issued and highlighted the differences of progress of the experiment group compared to the control group, through the different application of the training programs.

The identification of the most efficient operational structures for improving the capacity of effort and motivating the development of physical education elements in various contexts during as many activities as possible correlates with the significant qualitative and quantitative leap registered by the subjects from the experimental group, which verifies the research hypotheses.

In fact, the Ruffier test provides objective indicators for assessing cardiovascular and respiratory function. The fact that the cardiovascular system - highly sensitive and relatively easy to measure - plays important roles in physical exertion, has a high functional lability and reacts quickly even to small demands, recommends it as a tool in researching cardiovascular and respiratory regulation processes.

The applied intervention program produced substantially greater effects on effort capacity.

The study shows that both groups improve their initial value of the parameters, as a result of the training process. However, the magnitude of the improvements is larger in the experiment group than in the control group.

This finding leads us to the same conclusion, namely that interdisciplinary training with the application of elements of physical education is superior to traditional training.

We consider that the programs developed and subjected to experimentation, through specific exercises aimed at improving the capacity of effort, were effective and favor the increase of motivation for practicing sports activities both in general and for their practice as an independent activity.

The results obtained (both of the average values by groups and of the individual values) with the help of the Ruffier appreciation scale are particularly significant for the research hypothesis.

From the interpretation and comparison of the data obtained in the study, the following can be deduced: the proposed programs represent a good means of improving the cardiovascular adaptation to effort; thus in the experimental group there is a significant increase between the final and the initial test in the Ruffier Test compared to the control group where the increase between the initial and the final test is insignificant.

The fact that almost 90% of the subjects in the experiment group went from "unsatisfactory" (on initial testing) to "satisfactory" and "average" after applying programs to improve exercise capacity, supports the idea that elements of physical education throughout the program with preschoolers in kindergarten.

The results of the study show that both groups improve their initial parameters value, following the training program. However, the improvement in the case of the experimental group is higher than for the control group. This leads us to the same conclusion, that the interdisciplinary training with elements of physical exercises is superior to the traditional education process.

We consider that the training programs we have developed and tested, through the specific exercises that were focused on improving the effort abilities were efficient and favorable for the improvement of children's motivation to practice sport activities in general, and to practicing them as an independent activity.

Conclusions

At preschool age, the child feels the need to move, being attracted to dynamic activities rather than static ones. It would be a mistake to stop the desire of free movement activities that the child shows because he could get hurt or he/she is not paying attention.

One can use the games and motor exercises, the fun text and lyrics games, sports activities, thematic dances, popular dances to improve children's moral and will skills, perseverance, competitiveness, creativity, imagination, thinking, judgement, quick decisions making, collaboration, team spirt skills, by paying attention to age particularities and the hygiene-sanitary norms. Introducing physical exercises elements in the activities children perform at kindergarten, their effort capacity, tenacity, distributive attention, anticipation capacity, the integration in the individual and collective activities are increased and preschool children are forced to have a good and sociable behavior.

There was a real progress in what concerns the physical development of the children in the experimental group that benefited from physical education elements during their activities throughout the day spent at kindergarten. Though the main reasons for this increase are usually considered to be the internal factors, the anatomic-physiological conditions specific to the age, by completing them with the physical exercise, the children are healthier and have a correct and harmonious body development and illness resistance. The activities are better performed and in a much better mood when they include elements of physical exercises.

Physical capacity improves as a result of the systematic practice of physical exercises that promote, in particular, the development of motor skills - strength, speed, endurance and consequently increases the degree of adaptation of organs and systems of the body to higher demands. The quantity and quality of the effort made in the process of developing motor qualities have a very important role.

Interdisciplinary activities contribute to the application of a unitary approach, that of integrating the contents of several disciplines in a globalized, holistic approach, in which the boundaries between categories and types of activities disappear, melt into a unitary scenario in which the theme is left investigated with the means of various sciences.

There is a considerable separation of the effort capacity of the children from the experiment group compared to the effort capacity of the children from the control group.

Beyond the quantitative records, there is a significant improvement in the children in the experiment group of the qualitative aspects. They have a capacity for autonomy, self-control, more developed. And in the other experiential fields there is a greater power of directing attention, of determination to know, a behavioral improvement.

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