

## Development of intellectual abilities of school children with the help of exercise Classics

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### Abstract

**Introduction:** The problem of intellectual development of schoolchildren can be solved through exercises in physical education classes at school.

**Objective:** To determine the influence of exercise Classics on the development of intellectual abilities of schoolchildren aged 9-10 years.

**Method:** The study was conducted over a period of 9 months, in which forty 9-10 year-olds took part. Physical education classes were held twice a week, each lesson lasting for 40 minutes. The level of development of coordination abilities was assessed on the 'Shuttle run' test, and the indicators of intellectual abilities on the 'Choose unnecessary' test. The programs Bio-Stat 2009, Microsoft Excel 2016 and the student t-test were used for mathematical and statistical processing of results. There were 20 children (12 boys and 8 girls) in the Experimental group (EG) and 20 children (11 boys and 9 girls) in the Control group (CG).

**Results:** Before the beginning of the pedagogical experiment, the indicators of school children in the 2 groups were not significantly different ( $p > 0.05$ ). At the end of the study, the indicators in both groups improved. In the CG, in the 'Shuttle run' test, the indicators improved from  $10.2 \pm 0.6$  to  $9.9 \pm 0.5$  ( $p > 0.05$ ), and in the 'Choose unnecessary' test, the indicators improved by 5.1% ( $p > 0.05$ ). In EG, in the 'Shuttle run 3x10' test, the indicators improved from  $9.9 \pm 0.5$  to  $8.5 \pm 0.4$  ( $p < 0.05$ ), and in the 'Choose unnecessary' test, the indicators improved by 17.5%. These results indicate the

effectiveness of using exercise Classics in physical education lessons in working with younger school children.

**Conclusions:** If at each lesson in physical culture at school, schoolchildren perform the exercise Classics, then the indicators of not only coordination, but also intellectual abilities of children will improve. This will significantly improve the quality of standard physical education lessons at school.

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(Keywords: intellectual abilities, coordination abilities, schoolchildren, physical culture, Classics)

### Introduction

Problems of health and physical education are relevant, especially at school age<sup>1-3</sup>. Chen S, *et al*<sup>4</sup> talk about the contributing role of physical education in youth's daily physical activity and sedentary behaviour. Carpenter P, *et al*<sup>5</sup> talk about motivational climate, personal goal perspectives, and cognitive and affective responses in physical education classes. Severe diseases are becoming commoner among children, and the level of full-fledged physical development and mental mobilization of children is decreasing, especially in the primary school age. One of the solutions to this problem may be to increase their motor activity for which physical education at school takes the leading role. Thus, it is mandatory to attend a lesson in physical culture, which is the main form of classes at school. At the lesson on physical culture, schoolchildren receive comprehensive harmonic development, which strengthens health and contributes to the formation of motor skills<sup>4,6</sup>.

In Russia, there is an educational programme on physical culture for schoolchildren in grades 1-11. The programme is quite extensive and includes a large number of goals and objectives for the comprehensive harmonious development of schoolchildren in physical education classes. It reflects a set of exercises that allow you to develop all physical qualities namely strength, speed, endurance, flexibility and coordination abilities<sup>7</sup>. Of course, one programme cannot be suitable for every schoolchild. It is important to understand the effectiveness of using an individual and

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differentiated approach in working with schoolchildren<sup>8,9</sup>. In this regard, there are several opinions about replacing the programme with more modern methods<sup>10-12</sup>. However, we suggest, without violating the integrity of the programme, to only slightly supplement and improve it. This is through exercise Classics that has proven to be effective. Exercise Classics effectively develops the coordination abilities of younger schoolchildren<sup>13</sup>.

Coordination ability is the ability of a person to effectively (accurately, quickly and rationally) cope with a motor task that occurs unexpectedly. The importance of coordination abilities in everyday life, as well as in sports activities, is difficult to overestimate. A high level of such abilities allows an individual to quickly master complex technical movements and exercises<sup>14-15</sup>. It should be noted that primary school age is considered favourable for development of most physical qualities, including coordination abilities, which are the foundation for the development of other qualities<sup>16-17</sup>. In addition, research on the impact of physical exercise and motor activity on children's mental processes is of great interest<sup>18-20</sup>. The importance of physical education for the effective formation of mental abilities, as well as the influence of physical activity on schoolchildren grades, is proved. Of course, the trend is positive<sup>21,22</sup>. However, it was important for us to know how the exercise Classics affects the intellectual abilities of primary school children.

**Objectives**

To determine the influence of exercise Classics on

the development of intellectual abilities of schoolchildren aged 9-10 years.

**Method**

*Participants:* Forty children (boys and girls) aged 9-10 years took part in the pedagogical experiment. These 40 schoolchildren were healthy and had no health barriers for physical exercise. The children were selected from a total of 30 schoolchildren in each class. The principle of selection was the ability to engage in physical education and the health of the schoolchildren. During the study period, the children studied in the 3rd grade of school Number 60 in Kirov (Russia).

*Procedure:* The pedagogical experiment lasted 9 months from September to May. During the period of the pedagogical experiment, 56 training sessions on physical culture were conducted. Each session lasted 40 minutes. Lessons were held twice a week. Before the beginning of the pedagogical experiment, 2 groups were formed:

1. The Control group (CG) consisted of 20 schoolchildren (11 boys and 9 girls) from class 3A. Throughout the study, the schoolchildren were engaged in a standard physical education programme at school<sup>7</sup>.
2. The Experimental group (EG) consisted of 20 schoolchildren (12 boys and 8 girls) from class 3B. Throughout the study, the schoolchildren were engaged in a standard programme, but they additionally performed exercise Classics at each lesson. The exercise is presented in Table 1.

**Table 1: Exercise 'Classics'**

1	5	6		9	1	6		7	5	1
8	2	4		8	5	2		8	2	6
9	7	3		4	3	7		9	4	3
Square 1				Square 2				Square 3		

In the gymnasium, there are three large squares on the floor. The side of one large square is 180 cm. Within each large square there are nine small squares and the side of each small square is 60 cm. Within each small square are numbers from 1 to 9. The numbers in the squares are random.

*Task:* The schoolchild must use jumps from square to square to get from number 1 to number 2, then to number 3, and so on, to number 9. After that, he or she should jump on the same squares in reverse

order (from number 9 to number 1). You can move around the squares in any way (from one leg to the other, jump on one leg or on two). If a child makes a mistake, he returns to the previous square. During the lesson, each schoolchild must overcome three large squares. The numbers in the squares must be changed by the teacher before each lesson. You can perform the exercise in any part of the lesson.

Before and after the pedagogical experiment all schoolchildren in the two groups were assessed

with following tests:

1. Shuttle run 3x10 m (indicator of coordination abilities)<sup>23</sup>. At a distance of 10 m 2 lines are drawn. At the signal, children must run from start to finish (touch the hand line), return to the start line (touch the hand) and cross the finish line.
2. Choose unnecessary method (an indicator of intellectual abilities)<sup>24</sup>. In front of the schoolchildren are 50 drawings (10 rows of 5 drawings in each row). Out of five drawings in one row, four drawings are similar in meaning (by feature). For example, apple, orange, banana, pear, and the fifth figure differs in meaning, for example-a ball. *Task*: determine the extra drawing as quickly as possible. The exercise takes 10 seconds to complete. *Result*: the number of correctly selected drawings.

**Ethical issues:** All procedures conformed to the

ethical standards of the Helsinki Declaration of 1964 as revised in 2013. Informed written consent was obtained from all parents of participants included in the study.

**Statistical analysis:** Mathematical and statistical processing of the results were performed using Bio-Stat 2009, and the arithmetic mean was determined using Microsoft Excel 2016. The study also used the parametric student-t test criterion, The original data had a normal distribution, the result was considered significant at  $p < 0.05$ <sup>25,26</sup>.

### Results

Before the beginning of the pedagogical experiment all schoolchildren passed control standards: 'Shuttle run 3x10 m' and 'Choose unnecessary test'. At the beginning of the study, the difference in indicators in test results was not reliable. It did not matter much. After the study, the schoolchildren results changed (Table 2).

**Table 2: Indicators of coordination and intellectual abilities of children 9-10 years' old**

Test	CG				EG			
	Before	After	%	p	Before	After	%	p
Shuttle run 3x10 m (s)	10.2±0.6	9.9±0.5	2.9	>0.05	9.9±0.5	8.5±0.4	14.1	<0.05
Choose unnecessary number	7.8±0.5	7.4±0.4	5.1	>0.05	8.0±0.4	6.6±0.3	17.5	<0.05

Table 2 shows that the performance of schoolchildren in grades 3A and 3B improved in both tests. Children from CG (class 3A) were engaged in the standard programme and were able to slightly improve their performance in the 'Shuttle run 3x10 m' test from 10.2±0.6 to 9.9±0.5 ( $p > 0.05$ ). In the intellectual ability test, the indicators improved by 5.1% ( $p > 0.05$ ). The results of the CG study indicates that the standard physical education programme at school is not very effective.

In EG, in which children from grade 3B were engaged in an intervention programme, they were able to significantly improve their performance in both tests. In the 'Shuttle run 3x10 m' test, the indicators improved from 9.9±0.5 to 8.5±0.4 ( $p < 0.05$ ), and in the 'Choose unnecessary' test, the indicators improved by 17.5%. These results indicate the effectiveness of implementing exercises Classics in physical education lessons at school.

### Discussion

Physical culture plays an important role for human health. From the moment children go to school, compulsory physical education classes are introduced. Such classes are aimed at the comprehensive harmonious development of

schoolchildren and their preparation for work in life<sup>4,6</sup>.

Sets of physical exercises or individual exercises that are carried out in the physical education programme at school cover most of the movements performed in everyday life. Therefore, it would be wrong to replace the existing physical education programmes or change them to a greater extent. However, some authors suggest this approach<sup>10-12</sup>. In our opinion, the best option is only a minor addition to the generally accepted physical education programme.

The results of the study confirm the effectiveness of individual and differentiated approach in working with schoolchildren<sup>8,9,27</sup>. This approach is able to realize the hidden potential of each schoolchild. There is no doubt about the effectiveness of the exercise Classics. Research that has been done before has proven this. There is development of a sense of rhythm in children 8-9 years old with the help of exercise 'Classic's'<sup>13</sup> and some physical qualities, such as the Speed of Movement<sup>28</sup>, speed-power abilities<sup>29</sup>, and others. In the current study, it was important for us to know how the exercise Classics affects the intellectual abilities of schoolchildren. The exercise effectively fits into the physical education programme for each

lesson. Children become more active and receive individual and additional physical development at each lesson<sup>13</sup>.

At the same time, this study reveals for the first time the influence of exercises Classics on the indicators of intellectual abilities of schoolchildren. At the end of the study, they were positive. Thus, we can say that once again the effective relationship between the development of physical abilities and mental processes has been proved. Previously, this relationship was proved by some authors<sup>18-20,30,31</sup>. The importance of using the competitive methods in physical education lessons among schoolchildren should also be noted<sup>32</sup>. This study also confirmed its effectiveness. During the exercise Classics, most schoolchildren tried to complete the exercise ahead of their classmates.

### Conclusions

If at each lesson in physical culture at school, schoolchildren perform the exercise Classics, then the indicators of not only coordination, but also intellectual abilities of children will improve. This will significantly improve the quality of standard physical education lessons at school.

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