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Effect of a program adapted the "Hopscotch" on the sense of rhythm in the movements of russian children. Quasi-experimental study

Efecto de un programa adaptado de "Rayuela" sobre el sentido del ritmo en los movimientos de niños rusos. Estudio cuasi-experimental

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Abstract. Objective: To determine the effect of using a standard classics exercise on the development of indicators of sense the rhythm of movements of children 8-9 years old. Methods: Quasi-exoerimental study with intervention group (n = 52) and control group (n = 52), whose sample considered children belonging to ordinary school number 60 of the Russian Federation. The experimental group was subjected to classic exercises adapted from the game "Hopscotch", while the control group was applied the standard school physical culture program at school. The ability to feel the rhythm of the movements was assessed by the "Running in rhythm" test, while for the statistical analysis the Student's T test was applied considering p=0,05. Results: After the end of the pedagogical experiment, the indicators of children in the control group improved by 2.8% (p>0,05; d =0,3). The indicators of children in the experimental group improved by 24.7% (p<0,05; d=2,7). Such results can be explained by the effectiveness of the implementation of a set of exercises using a standard classics exercise in physical education lessons at school. Conclusion: The indicators of the sense of the rhythm of movements will significantly improve if children aged 8-9 will additionally perform a set of physical exercises on standard classics exercise during physical education lessons at school.
Keywords: Physical Education and Training; Motor Skills; Child.

Resumen. Objetivo: Determinar el efecto del uso de un ejercicio clásico estándar en el desarrollo de indicadores del sentido del ritmo de movimientos de niños de 8 a 9 años. Métodos: Estudio cuasi-exoerimental con grupo intervención (n =52) y grupo control (n=52), cuya muestra consideró a niños pertenecientes a la escuela ordinaria número 60 de la Federación Rusa. El grupo experimental fue sometido a ejercicios clásicos adaptados del juego “Rayuela”, mientras que al grupo control se le aplico el programa escolar estándar de cultura física en la escuela. La capacidad de sentir el ritmo de los movimientos fue valorada por la prueba "Correr en ritmo", mientras que para el análisis estadístico se aplicó la prueba T de Student considerando un p=0,05. Resultados: Después del final del experimento pedagógico, los indicadores de los niños del grupo control mejoraron en un 2,8% (p>0,05; d = 0,3). Los indicadores de los niños del grupo experimental mejoraron en un 24,7% (p<0,05; d = 2,7). Tales resultados pueden explicarse por la efectividad de la implementación de un conjunto de ejercicios utilizando un ejercicio clásico estándar en las lecciones de educación física en la escuela. Conclusión: Los indicadores del sentido del ritmo de los movimientos mejorarán significativamente si los niños de 8 a 9 años realizan además una serie de ejercicios físicos en el ejercicio clásico estándar durante las clases de educación física en la escuela.
Palabras clave: Educación y Entrenamiento Físico; Destreza Motora; Niño.

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Introduction

The comprehensive development of physical qualities is of great importance for a person. The wide possibility of their transfer to any motor activity allows them to be used in many spheres of human activity - in various labor processes, in various and sometimes unusual environmental conditions (De Rezende et al., 2014; De Jesus et al., 2022; Gerber et al., 2022; Salman et al., 2022). The health of the population in the country is considered as the greatest value, as a starting condition for a full-fledged activity and a happy life of people. On the basis of good health and good development of the physiological systems of the body, a high level of development of physical qualities can be achieved: strength, speed, endurance, agility, flexibility. Physical education ensures long-term preservation of a high level of physical abilities, thereby prolonging the working capacity of people (Ivashchenko, 2020; Guskov et al., 2022; Lyakh et al., 2022).

The subject of physical education in primary school is the motor system of a person with a general developmental orientation. In the process of mastering this activity, health is strengthened, physical qualities are improved, certain motor actions are mastered, thinking, creativity and independence are actively developing. The academic subject "Physical Culture" is designed to form students' stable motives and needs for careful attitude to their health and physical fitness, in the holistic development of physical and mental qualities, creative use of physical culture in the organization of a healthy lifestyle. In the process of mastering the educational material of this field, the formation of a holistic view of the unity of the biological, mental and social in a person, the laws and patterns of development and improvement of his psychophysical nature is ensured.

Despite such a great importance of physical education for a person, there are a number of problems that exist in the process of physical education at school. One of these problems is the lack or absence of gyms or other facilities for physical education lessons, since during the school year severe weather conditions in Russia do not allow you to constantly exercise outside. One of the solutions to this problem may be the development and implementation of

innovative methods and techniques in working with children in physical education classes at school. It is necessary to use such equipment or a set of exercises that would help develop physical abilities and not take up much space.

The world-famous exercise is the standard classics. Children play them not only at school, but also in courtyards. But what is the benefit of such physical exercise?. At the same time, it is important that a playful and competitive approach is used in the classroom at school, which have proven their effectiveness in working with primary school children (Kainov & Kuryerova, 2019). The sensitive period of the development of physical abilities is of crucial importance in the development of physical qualities. That is, it is necessary to purposefully develop those abilities and at the time when it is most relevant. For example, some authors suggest that a favorable period for the development of motor abilities is primary school age (Fuentes-Barría et al., 2021).

A good level of development of motor skills is the basis for other physical qualities. To date, there are quite a few motor skills, and there are various classifications. One of the most important for children aged 8-9 years is the ability to maintain balance in dynamic and static conditions (Hirschler et al., 2021; Guskov et al., 2022; Lyakh et al., 2022). For this reason, this study will determine the effect of using a standard classical exercise on the development of indicators of the sense of rhythm of movements in children aged 8-9 years.

Methods

Quasi-experimental, non-randomized study, based on the statement "Transparent reporting of evaluations with non-randomized designs" (Fuller, Pearson, Peters, & Anderson., 2012).

The population considered 118 children of between 8 and 9-years who attended the second grade in ordinary school number 60 of the Russian Federation during the period from September 1 (2020) to May 30 (2021), while the size of the sample was established with a confidence interval (CI) of 95% and a margin of error of 5% obtaining a sample size of 91 children. Therefore, considering the sample size, this study recruited 56 girls and 48 boys of between 8 and 9-years old belonging to the second grade of ordinary school number 60 of the Russian Federation, whose participation was authorized by the parent or legal guardian through an informed consent in accordance with the ethical standards established in the Declaration of Helsinki (World Medical Association 2013).

The 104 students participated in the class physical education 2 times a week for 40 minutes in each lesson, performing 72 lessons during the 9 months of the study. The students were non-randomly assigned to the control group and the experimental group, being admitted by the doctor to physical education classes at school for not presenting health contraindications.

Control Group

30 girls and 22 boys (classes 2A and 2B) were engaged in the standard school program in physical culture at school (Kainov & Kuryerova, 2019). Physical education forms a system of value orientations of a person for a healthy lifestyle, provides motivational, functional and motor readiness for it. It is carried out in accordance with general and specific laws, principles and rules of the pedagogical process. This affects the intellectual, mental, moral, volitional and other qualities of a person.

Experimental Group

26 girls and 26 boys (2B and 2G) were engaged in the same program, who performed the standard classic exercises proposed by Mendieta Toledo et al., 2019 for the game ""Hopscotch", being the cells (squares) with their respective numerical sequence elaborated by the children through of a piece of chalk. The sequence began trying not to lose balance when making the journey with the right leg, both feet being seated when the cells were together (sets 3-4, 6-7 and 9-10), where once the sequence was finished, it returned to the starting position for jumping with the left leg. For 5-6 minutes, there were 5-6 students in each drawing (no more), so that the motor load of each student was maximum (Figure 1).

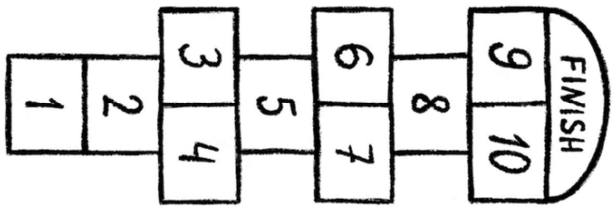

Figure 1. Standard classical exercises adapted from the game "Hopscotch"

Running in rhythm

The control standard "Running in rhythm" determined the level of development of the ability to feel the rhythm of the movements, where at a distance of 30 linear meters 15 hoops of 1 meter in diameter were placed. The execution consisted of running the distance without hitting the hoop, and the pace of the race could be maintained or changed to cover the distance as quickly as possible, the result being the number of seconds the student would spend (Kainov & Kuryerova, 2019).

Statistical analysis

All the indicators of the children who participated in the study were entered into an Excel spreadsheet, the arithmetic mean, percentage relative frequency and standard deviation were determined as measures of central tendency and dispersion. The normality of the data was determined with the Kolmogorov-Smirnov test. Finally, the Student's T test was applied and the size of the effect was determined with Cohen's "d" considering a small (0.2), moderate (0.5) and large (0.8) effect for all the analyzes an alpha level of 0.05 was considered.

Results

Prior to the study, there were no significant statistical differences between the control and experimental groups ($p>0.05$; $d = 0,4$). Table 1 shows the results of the standards at the beginning and at the end of the study.

Children from the control group who studied according to the standard program were able to improve their performance by 2.8%. Despite the positive dynamics of the results, the reliability of the results was insignificant ($p>0.05$; $d = 0,3$). In the experimental group, children's indicators improved significantly ($p<0.05$: $d = 2,7$). Children who additionally performed exercises on the Standard classical exercises during physical education lessons were able to improve their indicators by 24.7%.

Table 1.
Results of the "Running in rhythm" test at the beginning and the end of the study

Indicators	Before	After	%	p- value	Effect size
Control group (n = 52)	7.1 ± 0.3	6.9 ± 0.3	2.8	>0.05	0,3
Experimental group (n = 52)	7.3 ± 0.6	5.5 ± 0.5	24.7	<0.05	2,7

Discussion

The importance of physical culture and physical activity, especially at school age, is difficult to overestimate (Ferraz et al., 2020). Also, some authors emphasize the importance of physical culture for the development of cognitive processes in school (Kashihara et al., 2009; Mura et al., 2015; Spanaki et al., 2016). The topic of children's health and physical development is relevant and important at all times. Great importance is given to the physical activity of each child at school, this is done by physical education teachers. It is important to note that they make a great contribution to solving the general problem of obesity, sedentary lifestyle and other diseases (De Rezende et al., 2014; De Jesus et al., 2022; Gerber et al., 2022; Salman et al., 2022). Teachers in schools work according to the standard physical education program, it is quite versatile and has a lot of advantages in working with children of different ages. The program displays not only a set of exercises, but also a period in which certain physical qualities should be developed. This is a sensitive (favorable) period for the development of physical qualities. If you purposefully develop certain abilities during the sensitive period, then the increase in indicators will be higher, and if you skip this period, then it will be impossible to catch up or get the maximum result (Fuentes-Barría et al., 2021).

The results of our study in children in the control group showed that the usual physical education program is composed quite well. The children improved their performance, albeit slightly. This may indicate a favorable period of development of motor abilities at the age of 8-9 years and their natural growth during the study period. The development of coordination abilities is important for other physical qualities, since motor abilities are the foundation for the development of speed of movement, movement in space, connection of movements and much more, as well as motor abilities are material correlants of the technical training of any athlete (Hirschler et al., 2021; Guskov et al., 2022; Lyakh et al., 2022).

The results in the experimental group showed a significant improvement in motor abilities, as purposeful influence on these abilities helped to increase the final result. It took only 5-6 minutes of the total duration of the lesson.

It is also of great importance that standard classics do not require the purchase of expensive equipment, such a sign can be drawn with chalk on asphalt or with sticky tape in the gym. Children will be happy to perform physical exercise. At the same time, an individual - differentiated approach is used, that is, each child chooses for himself the speed of performing physical exercise, focusing on his condition, well-being (Ezechil, 2011; Sitovskyi et al., 2019; Arseniev et al., 2020).

Thus, the effectiveness of using the standard physical education program at school has been confirmed, a sensitive period for the development of motor abilities has been proved. For the first time, the introduction of standard classics into the pedagogical process of physical culture at school for the development of motor abilities of children aged 8-9 years has been scientifically proven. The study is promising, as it is possible to study the influence of standard classics on other motor skills and physical qualities. However, the validity of these findings should consider some factors such as the accidental sample concentrated in ordinary school number 60 of the Russian Federation. In addition to potential selection and information biases, they could have made the results predictable. This despite the fact that the sample size of the present study allows us to affirm that the findings are representative for the study population.

Conclusión

The effectiveness of the introduction of the classics of standard physical exercise in the educational process of the youngest schoolchildren was crucial for the development of a sense of rhythm in schoolchildren from 8 to 9 years of age, it being important that physical education lessons at school be interesting, emotional and developmental.

Conflict of interest

The author declares that there is no conflict of interest.

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