

**ESTIMATION OF THE EFFICIENCY OF USING THE ELEMENTS
OF THE BOCCE GAME IN THE ADAPTIVE PHYSICAL EDUCATION
OF 9–11-YEAR-OLD CHILDREN WITH MILD MENTAL RETARDATION**

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Abstract. The article presents the results of the study of physical development and the methodology for correcting postural disorders of 9–11-year-old schoolchildren with a diagnosis of mild mental retardation. The data are presented that assess the functional state of the musculoskeletal system and the coordination abilities of children of this category before the start of the pedagogical experiment and after using the developed methodology for correcting the existing disorders of physical development. The technique of therapeutic gymnastics with the use of elements of the bocce game is proposed.

Key words: mental retardation, physical development, posture disorder, remedial gymnastics, bocce, adaptive school.

Аннотация. В статье представлены результаты исследования физического развития и методика коррекции нарушений осанки школьников в возрасте 9–11 лет с диагнозом умственная отсталость легкой степени. Приведены данные, оценивающие функциональное состояние опорно-двигательного аппарата и координационных способностей детей означенной категории до начала проведения педагогического эксперимента и после применения разработанной методики коррекции имеющихся нарушений физического развития. Предложена методика лечебной гимнастики с применением элементов игры бочче.
Ключевые слова: умственная отсталость, физическое развитие, нарушение осанки, лечебная гимнастика, бочче, адаптивная школа.

Mental retardation is a condition in developmental deviation that leads to the disability. Nowadays in Russia, there are currently more than 21 thousand children under the age of 18, who are for the first time recognized as disabled in the category of mental disorders and behavioral disorders [4]. Mental retardation occurs in the case of emerging morphofunctional changes in the brain and other human tissues, mainly in the early stages of ontogenesis or postnatal development [1]. The reasons for the changes are various factors that have a negative impact on the development of the fetus [5]. Children with mental retardation, have various disorders of physical development, including impaired posture and coordination abilities. The special educational needs of children with intellectual disabilities imply the development of adapted methods for correcting various disorders of physical development, which could be introduced into the process of adaptive physical education.

Purpose of the study is to evaluate the effectiveness of the developed and applied methodology for the therapeutic gymnastics with the inclusion of elements of the bocce game for the correction of posture disorders in 9-11-year-old children with a mild mental retardation.

Due to the fact that outdoor games are the most suitable form for overcoming and compensating the developmental defects of children with intellectual disabilities, specialists offer a variety of techniques with the inclusion. However, the analysis of scientific and methodological literature revealed insufficient coverage of the issue of using the bocce game in the process of adaptive physical education, as well as the use of this game in physical therapy

lessons. At the same time, exercises in throwing a small ball, which are used during this game, develop the muscles of the shoulder girdle, develop their coordination abilities [2].

Schoolchildren with mental retardation are noted to have a failure of voluntary attention, which negatively affects their involvement in the educational process. The use of game tasks and outdoor games will help eliminate the negative impact of this factor and improve the process of adaptive physical education [3].

Materials and methods. The study was conducted in "Adaptive School No. 18" in Omsk during the academic year from September 2020 to April 2021. The experimental group included 16 schoolchildren aged 9-11 years with a diagnosis of mild mental retardation.

Before the start of the experimental stage, preliminary testing was carried out, which included measuring the shoulder index (according to O.A. Aksenova), somatoscopy, measuring the strength endurance of the back muscles, measuring the strength endurance of the abdominal muscles, measuring the indicators of dynamic coordination (squats, t, sec), measurement of indicators of static coordination (Romberg posture), measurement of indicators of flexibility of the spinal column (forward bend).

The experimental part consisted in conducting physical therapy lessons aimed at correcting posture disorders. Classes were held 2 times a week for 12 weeks. At the III stage of the study (February-April 2021), repeated testing, analysis and interpretation of the data of the pedagogical experiment, statistical processing of the results, assessment of the effectiveness of the proposed method of correcting posture disorders in 9-11-year-old children with mild mental retardation were carried out.

Results and its discussion. According to a preliminary study, most of the subjects had a stooped posture: in 88% of children, the shoulder index was less than 89.9%, in 12% of the subjects, the shoulder index ranged from 92% to 94%.

Somatoscopy data: in children with a low Aksenova index, the rib cage, the head, neck and shoulders are inclined forward, the abdomen is stuck out, the shoulder blades are symmetrical, the lower angles protrude from behind, clearly exude above the skin, the pelvic incidence is reduced. When determining the strength endurance of the trunk muscles, low indicators of test performance were revealed in most of the subjects.

The assessment "low indicator" *when performing a test to determine the strength endurance of the muscles of the back corresponds to 75%* of children, 25% of the subjects had a result corresponding to the normal indicator of the test. A low rate of performance of the test for determining the strength endurance of the abdominal muscles was recorded in 81% of the subjects, 19% of the subjects completed the test task within the normal range.

Assessment of the state of dynamic coordination (squatting for 10 seconds) in the majority of the subjects (94%) revealed a high level of this type of coordination ability, in 6% of the subjects the indicators correspond to the norm. *Indicators of the level of the flexibility of the spinal column: 62 – low level, 19 – low and medium level.* When determining the level of static coordination using the Romberg posture, 25% of the subjects showed a low level of test performance, 19% - a level below the average, 37% - an average level, and in 19% of children the level of static coordination was above average.

The obtained results indicate the incidence of disorders in the physical development of 9-11-year-old children with mental retardation (impaired posture, weakened back and abdomen muscles).

The proposed method of posture correction included a course of remedial physical exercises, which consisted of three parts. Tasks of the preparatory part of the course were to create visual perception of a correct posture, to increase the level of general physical preparedness

The objectives of the main part of the course were correction of posture disorders - special exercises in protective preparatory position (P.p.) - lying on the back, stomach, knee-wrist;

exercises to strengthen the shoulder girdle; special exercises were exercises using elements of the bocce game, exercises from P.p. standing at the gym wall-bars, exercises with a medicine ball (throwing up and catching the ball in the P.p. while standing, sitting, etc.), exercises in the grip of a small ball holding it on an outstretched arm in various positions - arm to the side, arm up, swing with a straight arm with the ball, etc.

The objectives of the final part of the course were aimed at a gradual decrease in the load and included the previously studied combined developing exercises, breathing exercises, relaxation exercises, elements of the bocce game.

The tasks in correcting a stooped posture were to reduce the thoracic spinal curvature, to put the scapula in the correct position.

The means that were used to correct the stooped posture were posture control exercises, options for working with a small ball; instead of the usual small ball, bocce balls were used. The bocce ball is larger and heavier, that creates additional weight when performing corrective exercises for stretching the chest muscles and strengthening the muscles of the shoulder girdle, as well as contributes to the development of fine motor skills and coordination. The gradual mastery of the action with the bocce ball creates opportunities for more successful learning.

As they mastered performing actions with bocce balls, the game situations were gradually complicated. Taking into account the peculiarities of the physical, mental, emotional development of a child with mental retardation, in order to achieve a positive result during the lesson, it is necessary to use such methods as the sequential mastering parts of the exercise; creation of facilitated conditions for the exercise; the use of lead-up and simulation exercises, demonstration of physical exercises and simultaneous verbal explanation.

After the implementation of the developed methodology, repeated testing was carried out. To assess the significance of differences before and after the study, the nonparametric Wilcoxon test was used. The following results were obtained:

Table 1. – Indicators of test results in 9–11-year-old children of with mental retardation before and after the end of the pedagogical experiment, Me [microdistrict], $p < 0.05$

№	Test unit	Before experiment Me [md]	After experiment Me [md]	P
1	Shoulder index due to Aksenova, %	87 [84;88]	89,5 [87;90,5]	0,003
2	Strength endurance of the back muscles, t (s)	10,5 [7;60]	16 [11;65]	0,001
3	Strength endurance of the abdominal muscles, t (s)	15 [4;48]	17,5 [10;53]	0,001
4.	Dynamic coordination, squats times / s	7[6;9]	8[6,5;9,5]	0,038
5.	Static coordination - Romberg pose (Stork), t (s)	3[2;5]	4[2;6,5]	0,011
6.	Spine mobility, forward bend, cm	-5,5 [-10;3,5]	-3,5 [-8;5]	0,002

Conclusion. On the basis of the data obtained, it can be concluded that the application of the developed methodology made it possible to obtain a statistically significant improvement in the indicators of the physical development of the subjects. The inclusion in the lesson of special exercises for stretching the muscles of the chest, strengthening the muscles of the shoulder girdle (including using balls for playing bocce), as well as exercises for controlling posture, which include the player's standing in the bocce, were a prerequisite for a statistically significant improvement in the shoulder indicator. index.

Due to the inclusion of special exercises in the main part of the exercise therapy lesson, the indicators of strength endurance of the muscles of the back and abdomen improved. The use of the player's stand in bocce, control of the posture during the throw allowed to statistically significantly improve the results of the abilities for dynamic and static coordination.

Indicators of static balance in the Romberg position improved, as well as indicators of dynamic coordination. There is a statistically significant improvement in the results of testing the flexibility of the spinal column. The greatest increase in indicators was revealed when analyzing the strength abilities of the muscles of the back (18%) and abdomen (21.5%).

The insignificance of changes in the shoulder index may be associated with a relatively short period of corrective work, the complexity of the correction of this defect, the peculiarities of the mental and cognitive spheres of people with intellectual disabilities. At the same time, the obtained data are statistically reliable and testify to the effectiveness of the applied technique.

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ОЦЕНКА ФУНКЦИИ РАВНОВЕСИЯ КВАЛИФИЦИРОВАННЫХ ПРЫГУНОВ В ВОДУ

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Аннотация. В статье раскрыты стабилметрические параметры функции равновесия квалифицированных прыгунов в воду, согласно полученным показателям пробы «Допусковый контроль». Выявлены высокие характеристики функции равновесия квалифицированных прыгунов в воду. Значения коэффициента Ромберга свидетельствовало о значительном воздействии зрительного анализатора на удержание равновесия. Выявленное смещение центра давления вперед при удержании европейской стойки с открытыми глазами указывало на сформированный навык смещения центра давления вперед при выполнении стойки перед прыжком. Динамика выявленных показателей указывает на необходимость обучения прыгунов в воду выполнять их тренировочно-соревновательную деятельность только с открытыми глазами.

Ключевые слова: квалифицированные прыгуны в воду, функция равновесия, стабилметрические параметры.