



Reforming and developing socialization of children with limited abilities (mild intellectual disability)

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ABSTRACT

Objectives: The article contains the results of the study of the impact of additional physical education and sports activities on the correction of psycho-physiological disorders, physical qualities of children with intellectual disability. The objectives of the study were the following: 1) to analyze the indicators of the physiological qualities of schoolchildren aged 7–11 with mild intellectual disability; 2) to design a program of additional physical education and sports activities for students of a special (remedial) school of the VIII type on the basis of the study results; 3) to try out the developed program for students of a special (remedial) school of the VIII type.

Materials: The longitudinal study (2015-2019) served as the method. The systematic pedagogical monitoring of the state and dynamics of the physiological states of students achieved by them in the course of a school year. The results obtained in the study, processed according to the mathematical method of descriptive statistics and checked with Student's t-test, the analysis of variance with Fisher's criterion (F-criterion).

Results: In our study, we obtained results that show that the improvement of the motor function in children of primary school age is closely related to the level of morpho-functional maturation of the body and external stimulation with physical exercises. The skillful application of specially selected and dosed physical exercises during the enhanced natural morpho-functional development of the body of children contributes to the improvement of the relevant processes, a significant improvement in the functional capabilities of all body systems.

Conclusions: The designed program for students of the special (remedial) school of the VIII type confirmed its effectiveness during the testing. The physiological development program was built on game techniques taking account of the developmental characteristics of children with a mild degree of intellectual disability and positive results were obtained that prove the following: if the physical education program is aimed at developing qualities that correspond to the enhanced natural morpho-functional development of the body of children, it stimulates the accelerated development of the motor function, increasing the adaptive capacity of the child's body. Additional physical education and sports activities with children who have intellectual disability should be systematic, continuous and they should be organized in such a way that learning the material in the educational and training process could take place in view of the individual state and the sensitive period of development of motor skills.

Keywords: psycho-physiological features of children with limited abilities, socialization, adaptation, adaptive and sports activities

INTRODUCTION

In the contemporary system of special education, adaptive physical culture (APC) serves as an integral part of the correctional and developmental process. The use of diverse means and forms of APC as an innovation in the educational field, directed towards "the maximum possible development of resilience in people who have stable deviations in health status", is actively expanding (1-3).

A variety of motor skills and abilities gained by students in the process of physical training classes at school is directed to increasing their general physical fitness. The main indicators of the general physical fitness of schoolchildren were, are and will be achievements in the basic movements. They focus on the ability to control their body, the ability to perform movement economically, quickly, accurately. These movements reveal the level of development of physical qualities: speed, agility, strength, etc. Quality implies such a property that is reflected in the ability to perform not one

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narrow task, but a more or less wide range of tasks united by a psychophysical community. It is quite natural, the pedagogical process of physical education is not limited to a narrow set of exercises, "applied in living conditions".

Among the children with developmental impairments, the most numerous category is represented by children with mental retardation. The movements of mentally retarded people are marked by awkwardness, poor coordination, excessive slowness, or, conversely, impulsivity. This serves as one of the reasons that impede the acquisition of simple, vital skills and self-care skills. In addition to the disorder of complex motor movements, the degree of manifestation of which depends on the site of the brain lesion, children with intellectual disability manifest various degrees of impaired pre-motor zones, the intellect level, the degree of motor capacity limitations, etc. Underdevelopment of motor skills is manifested in the form of insufficiency of precise and subtle movements, especially small, and slow development of the motor stereotype.

Researchers who were engaged in studying the development of physical qualities in schoolchildren with intellectual disability (4-8), point out to a low level of their development in this category of children compared to school students of mass schools. However, a significant variation of the signs characterizing the development of physical qualities is observed in children with mental retardation, compared to their healthy peers. This is due to the preservation of motor skills in some children with mild intellectual disability. V. N. Weisman (1997) explains this paradoxical motor phenomenon on the basis of the levels of the motion construction theory, developed by N.A. Bernstein (1990), according to which a motor act is a complex, multi-level construct, guided by the leading level (semantic structure) and a number of background levels (technical components of movements) (9, 10). Owing to this theory, it becomes clear why children with more profound forms of intellectual disability are more disturbed in complex motor acts that require reflection and verbal mediation. In school years, the impaired motor skills of intellectually impaired children are significantly smoothed under the influence of correctional and educational work, which is systematically carried out at all classes and during extracurricular time (11-13).

The most important result of psychological and pedagogical control is the assessment of student performance, which determines conformity of their level of preparedness with the requirements of a particular pedagogical system and the entire educational system (14-16). The need to assess academic performance in the process of pedagogical physical education of students with intellectual impairments is not in doubt, however, there are no normative guidelines for assessing the level of educational achievements of students in the subject "Physical Education". The syllabus of 2003 (Bgazhnokova 1998) defines the basic requirements for students' knowledge and skills, that is, contains technical and knowledge components on the subject "Physical Culture", and also recommended that control standards be adopted twice a year, but not specified, which control standards should be relied upon (17).

All the aforesaid enables us to speak about the importance of the problem of correcting the development of physical qualities in school students with intellectual impairment through the means of physical education. This also points to the necessity of searching for new approaches to manage disorders in the development of physical qualities in children with mild intellectual disability. It also requires the need to search for effective programs on physical education at special reforming institutions.

METHODOLOGICAL FRAMEWORK AND METHODS

The purpose of the study was to determine the effect of additional physical education and sport activities on the treatment of disorders, physical qualities of schoolchildren with intellectual ability.

Objectives of the study:

- to analyze the indicators of physical qualities in 7–11-year-old schoolchildren with mild intellectual disability;
- to design, on the basis of indicators of physical qualities, a program of additional physical education and sport activities for students of a special (remedial) school of the VIII type;
- to determine the effectiveness of the developed program for students of a special (remedial) school of the VIII type.

The study was conducted in a special (remedial) school of the VIII type from 2015 to 2019 academic year. Children with intellectual disabilities are taught in special (remedial) general education schools of the eighth type. In these educational institutions, the goal of educational activity is as follows: to teach children to read, count, and write and be independent in social and living conditions. In schools of the eighth type, there are carpentry, metalworking, sewing, or bookbinding workshops, where students in the school get a profession that allows them to earn a living. The path to higher education is closed for them; after finishing school, they receive only a certificate that they have listened to a ten-year course.

To date, 50 schoolchildren have been surveyed with a general diagnosis of "mild intellectual disability - F-70" engaged in physical education in the main group and using the specially designed program "Psycho-physiological development through adaptive sport" in the sport game club. Groups were formed in different classes. Classes A, B, C were engaged in the club from the 2nd year of schooling, class K - from the 3rd year of schooling.

The method of research was systematic pedagogical monitoring of the state and dynamics of the physiological states of students, achieved by them during the school year. In the process of pedagogical monitoring, physical qualities were studied according to the following tests: "Forward leaning while sitting" - flexibility; "Standing long jump" - the strength of the muscles of the lower extremities; "Shuttle run 3 x 10 m" - speed endurance and agility; "30 m sprint" - the speed of movement.

The results obtained in the study, processed with the help of the mathematical method of descriptive statistics and checked with Student's t-test, the analysis of variance in Fisher's criterion (F-criterion).

RESULTS AND DISCUSSION

Based on the data obtained in the study, we have designed a program of additional physical education and sport activities "Badminton", which is intended for 5 years of training sessions for students of a remedial school of the VIII type. The availability of the "Badminton" program is determined by the degree of difficulty for schoolchildren with intellectual disabilities to perform the standard tests of physical fitness. In connection with this, the physical culture and sports program for the high performance type "Badminton" was designed using a large number of special techniques, which enable one to master the normative part of the program, taking account of the severity of the disease and the capabilities of the child. Special game techniques were developed in the form of a set of exercises using badminton elements, outdoor games aimed at mastering special technical skills and developing physical qualities.

After testing the program in extracurricular sports activities 3 times a week for 40 minutes, the effectiveness of the APC program and the influence on the development of physical qualities were evaluated.

The test "forward leaning while sitting" is a test of flexibility to measure the active flexibility of the spine and hip joints. As the body develops, flexibility changes unevenly. Thus, the mobility of the spinal column during extension significantly increases in schoolchildren from 7 to 12 years of age. However, in our study, we obtained the following results: at the age of 7, schoolchildren of a remedial school have a very low result in the "flexibility" indicator. When comparing the variance of test scores in this test in groups at the age of 7 with the standards among schoolchildren of public schools, we obtained the F-test value for the significance level $p = 0.05$ of significant differences between the groups, thus proving that schoolchildren with mild intellectual disability are far from reaching the norm in the development of this quality.

Over time, the results of this test show that flexibility is formed slowly and with significant specific features. Mean values do not have significant differences throughout the entire study in the whole body according to the paired Student's t-test of dependent indicators and the F-criterion. However, the indicators of physical quality "flexibility" in the studied groups after 2-3 years of training in the sports club have changed in a positive direction by 47% by the age of 10 (see **Fig. 1**). In the literature data of schoolchildren participating in a study conducted in Naberezhnye Chelny (18), the development of the quality not only slowed down, but also worsened from 3.1 ± 0.46 to 1 ± 0.39 cm (see **Fig. 1**, results – Secondary schools N 68 and 69).

We consider that a phase reflex of stretching is manifested in children with intellectual disability. It is believed that intellectual disability is a disorder of the organization of human behavior due to structural changes. The specifically human organization of motor experience associated with the supralimbic brain, which is typical for individuals with mild intellectual disability suffers from it especially. Lesions of the motor structures of the brain are often manifested in the form of spasticity, i.e. in a significant increase in the phase reflex of stretching. Thus, the test for flexibility is a sensitive and reliable test for children with mild intellectual disability, which can be both an indicator of the effectiveness of remedial work and an assessment of the progression or arrest of the disease.

The "standing long jump" test is used to determine and measure the dynamic strength of the muscles of the lower limbs. This is a highly coordinated task that requires the concentration of attention from a person who performs it and the coordination of the work of the legs, arms, and trunk. The highest annual increase in results in standing long jumps among girls is observed from 9 to 10 years of age, in boys it continues up to 14-15 years of age.

People with intellectual disability often lag behind in physical development from the age norm and often, even in the absence of obvious intrauterine conditioned dysplasticity, are characterized by a disproportion in the structure of the trunk and limbs, leading to delayed or underdeveloped qualities responsible for coordinating the work of the legs, arms and body. The results obtained by us confirm the literature data. In the "standing long jump" test, children with mild

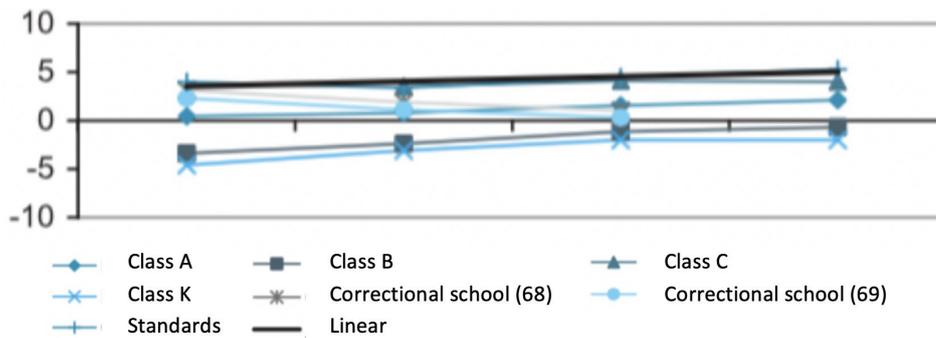


Figure 1: The test "forward leaning while sitting"

intellectual disability show a result below the average of the physical fitness standards of schoolchildren, and over time by the age of 10–11, the rate has worsened in some cases. Schoolchildren with mild intellectual disability up to the age of 11 have specific features in the technique of doing the exercise, as in children with normal development, but at pre-school age.

Comparing the variances of test scores according to the F-criterion in the "standing long jump" test in groups of 7 year olds with the standards, we obtained data that schoolchildren with mild intellectual ability significantly lag behind in the development of this quality. However, in some cases the development of physical quality varies (F-criterion) - $t_{emp} 2.06 < t_{crit} 2.5$ (class A); $t_{emp} 2.2 < t_{crit} 2.51$ (class K), and these data indicate that schoolchildren with mild intellectual disability in the development of this quality may have normal values as a paradoxical motor phenomenon according to V.N. Weisman (9).

By the age of 10–11, after mastering the 3-year sport program, focusing on jumping exercises that are used in team sports, we achieved positive results in the "Standing Long Jump" test in classes A, B, C in 95% cases ($p < 0.05$) according to the paired Student's t-test of dependent indicators. According to the values of the F-criterion, three classes in the degree of homogeneity of this indicator are similar to the standards.

The 30 m sprint test is a test to determine the speed of movement. The psychomotor underdevelopment in children with intellectual disability is manifested primarily in the delay and slowing down of the development of locomotor functions, in unproductiveness and insufficient expediency of successive movements, in motor restlessness and fussiness. Increased excitability and motor disinhibition make it possible in simple motor acts, like sprinting, to show results above standard, which can be considered as a very well developed physical quality. Comparing the variances of test scores in the "30 m sprint" test in groups of 7-year-olds with the standards, we determined that the speed of movement in the studied groups is more developed than that of schoolchildren in public schools.

The dynamics of intellectual disability is determined with the processes of compensation that are developing in the CNS and the evolution of age maturation. In general, the dynamics of intellectual disability can be defined as "non-progressive" (according to P. B. Gannushkin, 1998) or "evolutionary" (according to G.E. Sukhareva, 1965) (19, 20). Positive evolutionary dynamics in intellectual disability may be associated primarily with the natural growth and development of the organism, causing an increase in its adaptive capabilities. Our data shows that by 10–11 years of age, when the brain reaches the physiological development of an adult, the results approach the normal values in the tests for the speed of movement – the "30 m sprint test". It is quite natural that such an improvement is limited by the profound character of mental underdevelopment and the greater the delay in development the less pronounced this improvement is: favorable dynamics is possible with intellectual disability of mild and moderate forms, when the reforming impact is created in view of specific features of children. The obtained results showed that the training of motor quality, taking account of specific features of children during the training cycle, can significantly ($p < 0.05–0.001$) improve its values. In classes A and B, significant changes in the speed of movement were obtained in 95–99% ($p < 0.05–0.001$) in the whole general body of dependent indicators on the paired Student's t-test.

Thus, the results obtained in our study show that the indicator of the rate of movement improves most intensively in younger schoolchildren with intellectual disability, which indirectly indicates a sensitive period for the development of this quality. Training the speed of movements in children of primary school age should be carried out with identical means, provided that adequate periods of work and relaxation are adhered to (21–23).

Both in the literature, and in our case, the following fact is confirmed that speed is a quality which is better subject to improving. That is why the Special Olympics program (international sports program to help people with intellectual

disability) focuses on cyclical sports, simple running exercises such as smooth running, walking for short distances, attracting even people with profound intellectual disability to exercise (programs of dynamic activity of Special Olympic Games). Good results in the correction and development of this quality are achieved both in the process of training and in game activities, as in our case.

The test "Shuttle run 30 * 10 m" is used to assess speed endurance and agility associated with a change in direction of movement and alternation of acceleration and deceleration. "Shuttle run 3 * 10 m" in its content is not enough, but it can serve as a criterion for the development of agility. It is believed that the results in this test almost mirror the results in short-distance running, which in the system of comprehensive assessment of physical fitness of schoolchildren is an indicator of the development of speed. However, for children with intellectual disability, this exercise is a coordination and a complex motor task, which makes it possible to assess speed endurance and agility (24-26).

In our study, we obtained the results that show that both flexor muscles and extensor muscles develop with certain features and differ from the norm in connection with the developmental pathology in schoolchildren with intellectual disability. The results come closer to the norm only by 10 years of age, when the indicators of the functional maturity of the neuromuscular apparatus — excitability and lability — approximate the level of adults. The size of chronaxia of individual muscle groups in children aged 10 may even be less than in adults; at the age of 7 to 12, the rate of movements also increases rapidly. Exercises with a change of direction, mobile games gave positive shifts in the test "Shuttle run 3 * 10 m": over time the indicator comes to normal values as early as 9 years of age, and by 10–11 years of age it grows, coinciding with the natural morpho-functional development of the body children, and contributes to the improvement of relevant processes. The obtained indexes of the mean values did not differ significantly, however, when comparing the variance of test score points in this test, differences were found in the degree of homogeneity of the physical quality indicators - speed endurance. The value of the F-criterion in classes A and B is better and much better ($t_{emp} 6.1 > t_{crit} 3.22$ class A); $t 10.2 > t 2.51$, class B). And in the classes of $t_{emp crit}$ K and C, this quality is at the level of $p = 0.05$ and coincides with the norm.

CONCLUSION AND RECOMMENDATIONS

The improvement of the motor function in children of primary school age is in close connection with the level of morpho-functional maturation of the body and external stimulation with physical exercises. The skillful use of specially selected and dosed physical exercises during the enhanced natural morpho-functional development of the body of children contributes to the improvement of the relevant processes, a significant improvement in the functional capabilities of all body systems.

In our study, the program of physical development was built on game techniques taking account of the developmental characteristics of children with mild mental retardation and positive results were obtained that prove the following: if the program of physical training is aimed at developing qualities that correspond to the enhanced natural morpho-functional development of the body of children, it stimulates accelerated development of the motor function, increasing the adaptive capacity of the child's body. This fact especially applies to children with a slight degree of intellectual disability. Additional physical training and sports activities in different types of sport with children who have mental retardation should be systematic, continuous and they should be organized in such a way that mastery of the material in the educational and training process takes account of the individual state and the sensitive period of development of motor skills. When designing additional physical education and sport syllabuses, as well as school curricula in physical culture, both achievements and the maintenance of an optimal level of health should be taken into account. For children with mild intellectual disability it is very important to take into account the rate of growth and development of the organism, especially the age-related maturation of organs and systems, in view of specific features of the disease. For systematic observation (pedagogical observation and monitoring) of the state and dynamics of indicators of school students' motor preparedness during the school year, it is important to use special scientifically based tests that most objectively reflect the degree of development of students with mild intellectual disability: tests for flexibility, speed, speed endurance and agility.

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