Influence of adaptive physical education on motor possibilities, behavior and quality of life of children with autism

Musiienko O. V., Chopyk R.V., Kizlo N.B.

Ivan Franko Drohobych state pedagogical university

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Abstract
The aim of the work is to establish the impact of adaptive physical education classes according to our proposed method on the motor abilities and behavior of children with autism spectrum disorders and on the quality of life of their families.


Results. It has been established that children with autism have significant impairments of motor activity and psychophysical condition, which significantly affects the quality of life of children and their families. There is a very low level of development of motor skills. Parents of children in the experimental group noted that from now on their children began to have fewer problems with movement, their movements became more coordinated and it became easier to move. In terms of self-care and self-care, the difficulties became less significant (average level), the usual daily activities also became easier, the phenomena of discomfort and anxiety decreased.

Conclusions. Children with autism have significant deviations in motor development, arbitrariness of movements, understanding of expediency of movements, general motility of the body. Classes in adaptive physical education according to our proposed method allowed children with autism to overcome most motor disorders, which was a prerequisite for improving higher nervous activity and behavior. Significant improvement of psychophysical condition of children as a result of employment, and also growth of quality of life is established.

Key words: autism, general motor skills, behavior, quality of life, adaptive physical education

Annotaciю
Мусієнко О. В., Чопик Р. В., Кізло Н. Б. Вплив занять адаптивним фізичним вихованням на рухові можливості, поведінку та якість життя дітей з аутизмом

Мета роботи – встановити вплив занять адаптивним фізичним вихованням за запропонованою нами методикою на рухові можливості та особливості поведінки дітей з аутизмом.

Матеріал та методи. Аналіз та узагальнення даних літератури щодо особливостей психо-моторного розвитку дітей з аутизмом, їхньої поведінки. Розробка методики адаптивного фізичного виховання дітей з аутизмом, яке містить вправи на розвиток загальної та дрібної моторики, імітації, координації рухів і розвиток фізичних якостей, таких як сила, спритність, гнучкість. Експертна оцінка виконання тестових вправ. Анкетування батьків з приводу психофізичного стану їхніх дітей та якості життя сімей, які виховують дитину з аутизмом.

Результати. Встановлено, що діти з аутизмом мають значні порушення рухової діяльності та психофізичного стану, що значно впливає на якість життя самих дітей і їхніх сімей. На базі примітивної рівень розвитку рухових вмінь. Батьки дітей експериментальної групи відмітили, що відтепер їхні діти стали мати менше проблем з пересуванням, їхні рухи стали координаційнішими і рухалися стабільніше. В плані догляду за собою і самобідруванням труднощі стали не настільки значними (середній рівень), зміна скоординованої діяльності також полегшилася, зменшилися явища дискомфорту та тривоги.

Висновки. Діти з аутизмом мають значні відхилення у моторному розвитку, довільній рухові структури рухів, загальній моторність тіла. Заняття адаптивним фізичним вихованням за запропонованою нами методикою дозволило дітям з аутизмом подолати більшість порушень у моторній сфері, що склало передумови для поліпшення вищої нервової діяльності та поведінки. Встановлено значне поліпшення психофізичного стану дітей в результаті занять, а також зростання якості життя.

Ключові слова: аутизм, загальна моторика, поведінка, якість життя, адаптивне фізичне виховання

Анотація
Мусієнко О. В., Чопик Р. В., Кізло Н. Б. Вплив занять адаптивним фізичним вихованням на двигунільні можливості, поведінку та якість життя дітей з аутизмом

Ціль роботи – установити вплив занять адаптивним фізичним вихованням на двигунільні можливості та поведінку дітей з аутизмом.

Матеріал та методи. Аналіз і обґрунчоці дані літератури на основі особливостей психо-моторного розвитку дітей з аутизмом, їх поведінки. Розробка методики адаптивного фізичного виховання дітей з аутизмом, яка складається з розробки та виконання вправ, які здійснюють розвиток загальної та дрібної моторики, координації рухів та розвиток фізичних якостей, таких як сила, спритність, гнучкість.

Результати. Встановлено, що діти з аутизмом мають значні порушення рухової діяльності та психофізичного стану, що значно впливає на якість життя самих дітей і їхніх сімей. На базі примітивної рівень розвитку рухових вмінь. Батьки дітей експериментальної групи відмітили, що відтепер їхні діти стали мати менше проблем з пересуванням, їхні рухи стали координаційнішими і рухалися стабільніше. В плані догляду за собою і самобідруванням труднощі стали не настільки значними (середній рівень), зміна скоординованої діяльності також полегшилася, зменшилися явища дискомфорту та тривоги.

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Ключові слова: аутизм, загальна моторика, поведінка, якість життя, адаптивне фізичне виховання

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Introduction

Many children with autism have disorders of regulation of muscular activity, as a result of which control over motor acts is not formed in time, there are difficulties in the formation of arbitrary movements, in the formation of their purposefulness and coordination, spatial orientation suffers [1-7]. Many children develop concomitant movements (synkinesis), as well as difficulties in visual-motor coordination [8–10]. Disorders of the motor sphere are deepened by the characteristic behavioral features of autistic children with a lack of social interaction, mutual communication, underdevelopment of imagination [9-11].

A wide range of disorders occurs even against the background of shallow intellectual functions. Thus, a child who suffers from autism and has a high tested intelligence, may have severe impairment of motivation [1; 4; 5; 8]. Children with autism spectrum disorders need specially organized classes aimed at the correction and development of the motor sphere [12; 13] or at least the inclusion of episodes of such classes in the game [14]. The difficulties of an autistic child and the problems of his learning are largely due to the deficit or incorrect distribution of psychophysical tone [15-19].

The motor development of a child with autism is not so much the development of motor skills of adaptation to the world around, as the accumulation of stereotypical means of obtaining pleasant vestibular, proprioceptive, tactile sensations. Deep delay in the development of household skills, awkwardness in performing any actions with objects are combined with exceptional dexterity in the stereotype of self-stimulation [14; 19].

Children with autism spectrum, as a rule, have difficulty with imitation, with imitation of movements. Not only in children but also in adults with autism there is a violation of the ability to reproduce movements according to the pattern [1; 5; 8; 9]. The main features inherent in the motor sphere of children with autism, complicate the development of their motor skills, increase with age and increase depending on the severity of autism, namely:

- deceleration (inhibition), chaotic movements;
- various motor stereotypes;
- delay in the development of imitation;
- delay in the development of movements necessary for mastering self-care skills (independent eating, dressing, toilet, washing);
- delay in the development of movements necessary for the game.

Children with severe autism spectrum disorders have access to complex small motor actions, especially when they are in their area of interest. At the same time, other children with autism spectrum disorders generally try to avoid actions that require fine motor skills; attempts to ask them to draw, sculpt, cut with scissors cause negativity and problematic behavior. The reason for this attitude of the child to this activity - difficulties and unpleasant sensations not only because of motor, but also because of sensory disorders (the child does not like to pick up a pencil and scissors, touch plasticine), difficulty concentrating [8; 9].

In matters of motor development of the child's autism spectrum, the problem of uneven development is important - the inconsistency of the motor sphere to the chronological and mental age [10-12].

Thus, the specific signs of autism:

- significant opportunities in the motor sphere (uncharacteristic of "normal" mental retardation), including - in fine motor skills, when performing specific actions related to the special interests and passions of the child;
- stereotypes and self-stimulation in the motor area;
- lack of innate ability to imitate, to imitate movements;
- significant lag of the motor sphere from intellectual and language development (observed in adolescents with Asperger's syndrome).

Effective approaches to the correction of the motor sphere are based on the theory of levels of construction of movements by NA Bernstein. Such correction can take place both in special classes (kinesitherapy) and during the whole correctional and pedagogical process, and most importantly - in everyday life. To do this, the family must understand the logic and the need for harmonious development of the child and (with the support of experts) to create the conditions for this [7].

The motor sphere of children with autism is characterized by the presence of stereotyped movements, difficulties in the formation of objective actions and household skills, disorders of fine and gross motor skills. Children are characterized, in particular, disorders in basic movements: heavy, jerky gait, impulsive running with a distorted rhythm, excessive hand movements or meaninglessly spread arms that do not participate in the process of motor activity, one-push repulsion when jumping with two legs, stereotyped movements. Children's movements can be sluggish or, conversely, tightly constrained and mechanistic, with a lack of plasticity. Exercises and actions with the ball are difficult for children, which is associated with impaired sensorimotor
coordination and fine motor skills of the hands [4; 6; 11; 12].

Physical culture, adapted to the characteristics of children with autism, is not only a necessary means of correcting motor disorders, stimulating physical and motor development, but also a powerful "agent of socialization" of the individual. The conscious nature of motor learning is important for the development of the motor sphere of autistic children. It is difficult for an autistic child to regulate arbitrary motor reactions according to language instructions. She cannot control the movement according to the instructions of another person and is not able to completely subordinate the movement to her own language commands. Therefore, the main goals of teaching autistic children in adaptive physical education classes are:

- development of imitation abilities (ability to imitate);
- incentives to follow instructions;
- formation of skills of arbitrary organization of movements (in the space of one's own body and in external space);
- education of communication functions and the ability to interact in a team.

To teach children with autism movements and in order to correct their existing disorders of the motor sphere, we created a method based on the laws of formation of levels of construction of movements [7], the method of teaching movements to preschool children SV Malanov [8] and methods motor correction of developmental disorders EV Maksimova [7].

The aim of the work is to establish the impact of adaptive physical education classes according to our proposed method on the motor abilities and behavior of children with autism spectrum disorders and on the quality of life of their families.

Material and methods

Participants

Control (3 boys) and experimental (3 boys) groups of children with a confirmed diagnosis of childhood autism (so-called "low-functioning autism", disability of subgroup A) were created to conduct research. All children were somatically healthy at the age of 5-7 years. The children were invited to the control group from the Lviv educational and rehabilitation center "Dzerelo", to the experimental group - from the Drohobych Voluntary Society for the Protection of Disabled Children "Nadiya". Children from the control group in October 2019 and March 2020 underwent an expert evaluation of the test exercises, with which we determined the functioning of their motor area. Children from the experimental group were engaged in individually adaptive physical education according to our proposed method 2 times a week for 45 minutes. and also passed an expert assessment of the implementation of test exercises in October 2019 and June 2020. The study was conducted from October 2019 to March 2020.

Procedure

Each session of adaptive physical education contained exercises for the development of general and fine motor skills, imitation, coordination of movements and the development of physical qualities such as strength, agility, flexibility. Most of the exercises in the main part of the lesson were difficult to perform to give the child the opportunity to capture proprioceptive sensations, focus on the purpose of their movements, the process of performing the exercise and the correctness of movements.

Before the experiment, during classes with children and after the final stage of the experiment, pedagogical observations were conducted to determine the degree of motor skills of children with autism, their problem behavior, self-aggression, stereotyped movements so that during individual classes could be more effective work with them and teach them the necessary skills.

The pedagogical experiment consisted in studying and comparing the motor skills of children with autism who were engaged in adaptive physical education and children who were not engaged, and obtaining information about the effectiveness of our proposed methods of adaptive physical education.

The control group consisted of children from LNRC "Source": A. (7 years), L. (6 years), O. (5 years). The experimental group was formed from the children of DDTZDI "Nadiya": V. (7 years old), N. (6 years old), M. (5 years old). Both groups of children are equal in age and gender.

Classes on adaptive physical education, we conducted in DDTZDI "Hope" individually with each child for 45 minutes. 2 times a week.

The quality of children's motor skills was assessed by three experts with higher education in the field of physical education and sports by performing test exercises in points.

The following exercises were evaluated:

- 1 exercise - overcoming a number of 5 obstacles of different heights, widths and depths (gymnastic bench, tunnel, cylinders with a diameter...
of 20, 40, 55 cm). The child had to step over the bench and the cylinders without holding hands.

Exercise 2 - exercises on the Swedish wall (climbing and successive crossing of links).
Exercise 3 - walking on your hands in a supine position, feet in the hands of the teacher.
Exercise 4 - receiving and passing the ball in pairs.
Exercise 5 - moving up on an inclined (angle 30º) gymnastic bench lying on your stomach, intercepting with your hands.

Each expert evaluated the performance of the exercise on a five-point scale:
- 0 points - the child does not perform the exercise;
- 1 point - the child performs the exercise with significant help, physical and verbal prompting, problem behavior;
- 2 points - the child performs the exercise with physical and verbal prompting and assistance, but with minor changes in behavior;
- 3 points - the child performs the exercise correctly, but with a lot of tips, not very agile, mostly calm.
- 4 points - the child performs the exercise only with a verbal hint, correctly, calmly, quite deftly.
- 5 points - the child performs the exercise independently, correctly, calmly, deftly.

The scores given by the experts for the exercises were processed mathematically to determine the arithmetic mean of the number of points for each exercise performed by the child.

Pedagogical observations during classes were conducted constantly, recording the behavior of children (desirable and undesirable), determining their capabilities and available tasks. Before the beginning of classes (September 2019) and at the end of the experiment (March 2020), a survey of parents regarding the psychophysical condition of their children was conducted.

Table 1

Psychophysical condition of children with autism
(Questionnaire for parents)

Dear parents, evaluate, please, the psychophysical condition of your child and describe it.

Baby’s name
The age of the child

| The presence of stereotypical movements (describe) | Spinning on the spot or grabbing rotating objects |
| Protest behavior regarding changes in lifestyle or environment (describe) | The presence of aggression |
| Presence of autoaggression (beating yourself, biting, etc.) | Specific use of objects (toys) or excessive interest in their parts (describe) |
| Excessive fascination with some action, subject (describe) | Plays not with toys, but with unusual things (describe) |
| It is difficult to stop, to distract from monotonous, repetitive actions. | |
| • Problem behavior (mark or cite something else): | |
| • deceleration | |
| • tantrums | |
| • cry | |
| • excessive passivity | |
| • oppositional behavior | |
| • self-stimulation | |
| Emotions prevail (positive, negative) | |

Additionally, we used the EQ-5D-5L questionnaire [20–23] to assess the quality of life of children with autism, and the answers were given by parents at the beginning and end of the experiment. The questionnaire allowed to assess the ability of children with ASD to move, self-care (self-care), normal daily activities, the presence of pain / discomfort, anxiety / depression.
To establish the reliability of the data obtained in the work used methods of mathematical statistics, which were used to evaluate the results of research.

The conducted pedagogical experiment allowed us to receive the following data on an individual estimation of performance of test exercises by each of the inspected boys.

**Results**

According to our data, there is a very low level of skills of children in both groups to perform test exercises at the beginning of the pedagogical experiment in October 2019.

Below are diagrams with data of children of the control group (Fig. 1 a-c) and experimental groups (Fig. 1 d-e).

![Diagram of the results of test exercises](image)

**Fig. 1.** Diagram of the results of test exercises:

1st - 5th - exercise numbers (from the 1st to the 5th).

- before the start of the experiment (October 2019);
- at the end of the experiment (March 2020)

From fig. 1a shows that the boy A. (7 years old) at the beginning of the measurements received low scores of expert evaluation for the performance of test exercises: overcoming obstacles (1 exercise) - 1.33 points; exercises on the Swedish wall (2 exercises) - 1,667 points; walking on the hands lying down, legs in the hands of the teacher (3 exercises) - 0 points; reception and transfer of the ball in pairs (4 exercises) - 1 point; movement lying on the abdomen on an inclined (angle 30°) bench, intercepting with his hands (5 exercises) - 0.33 points.

At the end of the pedagogical experiment, the performance of A.'s exercises was almost unchanged: for the performance of 1 exercise, 1,667 points; 2 exercises - 1,667 points; 3 exercises - 0 points; 4 exercises - 0.667 points; 5 exercises - 0.333 points.
Thus, the performance of 2, 3 and 5 exercises did not change. The boy A. could not perform the exercise of walking on his hands at all, he performed the exercise of moving on the bench very problematically and performed the exercises on the Swedish wall with considerable difficulty. We recorded slightly better results for 1 exercise (overcoming obstacles), namely an increase of 0.33 points. Instead, for performing Exercise 4, A. received 0.33 points less at the end of the experiment than at the beginning. It can be argued that no significant significant changes in the reactions, behavior or skills of the boy during the experiment did not occur (p > 0.9).

In fig. 1b shows diagrams of the results of test exercises performed by a child L. (6 years old).

The chart shows that the expert scores for all five exercises do not exceed 1 point. Thus, during the experiment there were no changes in the scores for 1 and 3 exercises, the score for 5 exercises increased slightly - by 0.33 points; the score for performing 4 exercises increased by the same amount; the score for performing 2 exercises increased by 0.667 points. As can be seen from the results, all changes in estimates are insignificant and unreliable (p > 0.9). There were no significant changes in the boy's skills during the experiment.

In fig. 1c shows a diagram of the results of test exercises by a boy O. (5 years old). The boy O. showed slightly better initial (October 2019) results than A. and L. After performing 1 and 5 exercises, the results of expert evaluations approached 2 points. Experts estimated the performance of 2 and 4 exercises at 0.333 points, the performance of 3 exercises - at 0.667 points. But at the end of the experiment in March 2020, the results of 1 and 5 exercises decreased by 0.33 points, the results of 3 and 4 exercises did not change, and the result of 2 exercises increased slightly, but did not reach 1 point. That is, it can be argued that a slightly higher level of O.'s skills tends to decrease at the beginning of the experiment than that of A. and L., that is, the boy may gradually lose his existing skills.

Evaluating the performance of exercises by children of the experimental group, we obtained results that differed significantly at the end of the experiment from the results of the control group (Fig. 1d-e).

At the beginning of the experiment, there was no difference in the assessments of experts performing test exercises by children of both study groups. All children before the experiment had scores for exercises not exceeding 1 point. However, at the end of the experiment in March 2020, we found that the children in the experimental group had significant success in performing the exercises.

In fig. 1d shows a diagram of the results of test exercises by a boy V. (7 years old).

According to expert estimates, the initial level of 1 exercise corresponded to 1 point. At the end of the experiment, the boy V. overcame obstacles to score 4.667 points, ie he performed exercise №1 independently correctly, quite deftly and without demonstrating problematic behavior. For 2 exercises (exercises on the Swedish wall) the score increased from 1 point at the beginning of the experiment to 3.333 at the end, which indicates significant progress in the exercise: he performed the exercise not very deftly, with a lot of verbal clues, but without physical assistance. For the performance of 3 test exercises (walking on the hands lying down, legs in the hands of the teacher) at the beginning of the experiment the boy received only 0.667 points, which means that one of the three experts believed that the boy did not perform the exercise, and two still evaluated its performance in 1 point (performance not to the end with considerable help, a physical hint, problem behavior). At the end of the experiment, experts rated her performance at 3 points, ie the boy showed significant progress in motility and understanding of the exercise. The fourth exercise (receiving and passing the ball in pairs) at the beginning of the experiment, the boy could not do at all, constantly avoiding the joint work and help from the teacher. And at the end of the experiment, all the experts rated her performance at 3 points, ie the boy could throw the ball in pairs not very confidently and deftly, with tips, but did not refuse to perform the exercise and showed positive emotions.

The boy improved the performance of exercise №5 (movement lying on a bench) by 2 points from 0.667 in October 2019 to 2.667 in March 2020, ie he needed help and tips, but also diligently performed the exercise without problematic behavior. All changes in the results of expert assessments of test exercises performed by the boy V. were significant (p <0.99).

In fig. 1d presents the results of expert evaluations of the child's exercise N. (6 years). The chart shows that the boy could not perform Exercises 2 and 4 at the beginning of the study, but instead demonstrated good performance in March 2020: exercises on the Swedish wall - 4 points, receiving and passing the ball - 2.667 points.

Exercise 1 (overcoming obstacles) was performed by the boy N. with considerable difficulties and problematic behavior at the beginning of the study, and at the end of the experiment he performed it with 5 points. Exercises 3 and 5 were evaluated by experts with less than one point, while at the end of the experiment the boy performed them with 4 and 5 points, respectively.
The probability of growth was significant \( P > 0.99 \). The child has achieved significant success in psychomotor activities during the experiment, learning to perform at a good level almost all the exercises, except for receiving and passing the ball.

The third boy who was examined during the pedagogical experiment was M. (5 years old). He showed a significant increase in the indicators of expert evaluations of test exercises (\( p < 0.99 \)) (Fig. 1e).

At the beginning of the pedagogical experiment for performing exercises 2, 3 and 5 experts gave a score of 1 point, for performing exercises 4 - 0 points, exercises 1 - 0.333 points. At the end of the experiment there was a significant (\( p <0.99 \)) increase in the quality of all exercises: exercises 2, 3 - 3.33 points, exercises 1 and 5 - 4.33, exercise 4 - 2 points. That is, if at the beginning of the experiment the boy had significant difficulties in performing all the exercises: problematic behavior, needed physical and verbal help, did everything very slowly. At the end of the experiment, the boy M. performed most of the test exercises on his own, quite deftly and quickly, almost without prompting. Some difficulties arose only with exercise 4 (receiving and passing the ball in pairs): in the beginning the child could not do it at all, and in the end he did it with help, physical and verbal help, but without showing problematic behavior.

In addition to the pedagogical experiment, we conducted pedagogical observations and questionnaires of the parents of the boys involved in the survey.

According to our observations, it was found that the behavior of children in the control group did not change. In March 2020, as in October 2019, they showed significant difficulties in understanding the position of body parts and their actions in space, had problematic behavior (screaming, crying, self-aggression), stereotyped movements. Neither teachers nor their parents noticed any changes according to the results of the survey.

The boys from the experimental group, who were engaged in adaptive physical education according to our proposed method, showed significant improvements in general and fine motor skills, they significantly reduced the manifestations of autoaggression, stereotyped movements. Children have learned to focus on the task and realize the purpose of their movements, to maintain work concentration for the required period of time, to form the ability to constructively overcome difficulties and to model circumstances that contribute to understanding the value of achieving the goal. The boys learned to adapt to failure and error, while maintaining attention to the task.

In addition to our questionnaire on the psychophysical condition of children, we used the questionnaire EQ-5D-5L to assess the quality of life of children with ASD, the answers were given by parents at the beginning of the experiment and at the end. The EQ-5D-5L questionnaire is designed to provide answers to patients themselves. As children with ASD could not answer the questions on their own, their parents did it for them. In September 2019, before the experiment, all parents pointed to minor difficulties with movement, significant difficulties with self-care and washing, moderate difficulties with normal daily activities, sometimes pain, almost constant discomfort in the body, anxiety or sometimes depression. On the scale of quality of life of their children, they scored 40 ± 8 points out of 100 possible, which indicates a rather low quality of life of their children as patients (people with special needs).

At the end of the experiment (March 2020), the parents of the children in the control group did not notice significant changes in the quality of life of their children, ie all three parents rated the quality of life of children at 40 ± 7 points out of 100. Fewer problems with movement, their movements became more coordinated and it became easier to move. In terms of self-care and self-care, the difficulties became less significant (average level), the usual daily activities also became easier, the phenomena of discomfort and anxiety decreased.

On the scale of quality of life of their children, they scored 65 ± 6 points out of 100, which indicates a significant (\( P > 0.99 \)) increase in the quality of life of their children as patients (people with special needs). Children with ASD have not ceased to be disabled, but their quality of life has increased significantly, which has added positive emotions to the difficult lives of these children and their parents.

**Discussion**

Our results of expert assessment of motor abilities of children with autism indicate significant success of children in the experimental group in mastering exercise, understanding the movements of their bodies [1-3]. In addition, we observe (according to a survey of parents) improving the behavior of children in the experimental group, reducing aggression and self-aggression, stereotyped movements, improving coordination, reducing their clumsiness and, consequently, improving the quality of life of children and families, who educate them. In our opinion, such significant changes are due to improved functioning of the proprioceptive analyzer in children. Because negativism and problematic
behavior of children with autism are often caused by unpleasant (including painful) feelings from their own body: “tingling in the body”, abdominal pain for no objective reason, muscle and joint pain without pathological changes in them, hair pain, etc., exercise is a powerful stimulator of correction of all sensory systems, including proprioceptors [5, 9, 12]. In addition, children from the experimental group began to learn to notice and determine the movement of their own body and its parts, understand the actions they are able to perform with a particular movement, and then learn the next complex movements based on already learned.

Significant improvement in the quality of life of children in the experimental group and their parents, in our opinion, due to the normalization of children's well-being, disappearance or significant reduction of unpleasant (painful) sensations from their own body, as a result, reduced stereotypes, reduction of unpleasant (painful) sensations from children's well-being, parents, in our opinion, due to the normalization of children's sensory systems, including proprioceptors [5, 9, 12].

Conclusions

1. Children with autism have significant deviations in motor development, arbitrariness of movements, understanding of expediency of movements, general motility of the body. One of the main methods of helping children with autism to establish psychomotor function is adaptive physical education.

2. Children with autism, who engaged in adaptive physical education, showed significant improvements in general and fine motor skills, learned to focus on the task and realize the purpose of their movements, maintain concentration for the required period of time, develop the ability to constructively overcome difficulties and model circumstances that contribute to knowledge of the value of achieving the goal; they significantly reduced the manifestations of autoaggression, stereotyped movements. The boys learned to adapt to failure and error, while maintaining attention to the task.

3. Classes in adaptive physical education according to our proposed method allowed children with autism to overcome most motor disorders, which was a prerequisite for improving higher nervous activity and behavior, as well as improving the quality of life of children and their parents.

Conflict of interest

Authors state that there is no conflict of interest.

References


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**Information about the authors**

**Musiyenko O.V.**

http://orcid.org/0000-0002-0153-8262

musiyenko1976@gmail.com

Drohobych Ivan Franko State Pedagogical University

Theatralna str., 2 Drohobych, L’viv Reg., 82100 Ukraine

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**Chopyk R.V.**

http://orcid.org/0000-0003-2707-8185

Drohobych Ivan Franko State Pedagogical University

Theatralna str., 2 Drohobych, L’viv Reg., 82100 Ukraine

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**Kizlo N.B.**

http://orcid.org/0000-0003-3301-7311

Drohobych Ivan Franko State Pedagogical University

Theatralna str., 2 Drohobych, L’viv Reg., 82100 Ukraine

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**Мусієнко О.В.**

кандидат біологічних наук, доцент

http://orcid.org/0000-0002-0153-8262

musiyenko1976@gmail.com

Дрогобицький державний педагогічний університет імені Івана Франка

вул. Театральна, 2, Дрогобич, Львівська обл., 82100 Україна

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**Чопик Р.В.**

кандидат педагогічних наук, доцент

http://orcid.org/0000-0003-2707-8185

Дрогобицький державний педагогічний університет імені Івана Франка

вул. Театральна, 2, Дрогобич, Львівська обл., 82100 Україна

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**Кізло Н.Б.**

http://orcid.org/0000-0003-3301-7311

Дрогобицький державний педагогічний університет імені Івана Франка

вул. Театральна, 2, Дрогобич, Львівська обл., 82100 Україна

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