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INFLUENCE OF HIPPO THERAPY TRAINING ON THE DEVELOPMENT OF COORDINATION ABILITIES IN PRIMARY SCHOOL CHILDREN WITH AUTISM

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Key words: hippotherapy, primary school children, autism, coordination abilities, program, pedagogical conditions.

Annotation: The article examines the influence of hippotherapy classes on the development of coordination abilities in primary schoolchildren with autism. The experimental hippotherapy program included six modules of classes: "Acquaintance – Meeting", "Horseman", "Walk", "Joyful Rider", "Smart Horse", "Visit the Horse". The program was implemented in compliance with the developed pedagogical conditions. The implementation of the experimental program has shown its positive effect on the development of coordination abilities in children with autism in all five indicators. Most of them have medium and high levels.

Introduction. Currently autism spectrum disorders are the subject of close attention of many scientists. Relevance of this issue is explained by the noticeable increase in number of children with mental development disorders in whole, including autism spectrum disorders (ASD).

Research of the children autism phenomenon started with works of Leo Kanner, who gave a perfect description of clinical criteria. In our country, the study of this issue started from 1947 by Samuel Mnukhin [9].

The term “autism” derives from the Latin word autos (“by yourself”) and it means isolation from the world, separation from reality. Currently we are aware of two main types of autism – Kanner autism (classic autism) and types of autism, including autistic state of various genesis [2, 8].

Autistic disorders are several groups of disorders described in the DSM-IV-TR under the heading “Pervasive developmental disorder”, which, as it is known, are characterized by severe and large-scale difficulties in several developmental areas simultaneously: these are skills of social interaction, communication skills, stereotyped behavior, interests and activities.

Respectively, the degree of disorders happens to be different in each individual, who was diagnosed with “autistic disorders”.

There are several types of autism: childhood autism (autistic disorder, infantile autism, infantile psychosis, Kanner syndrome); atypical autism (atypical childhood psychosis, moderate intellectual disability with autistic features); Rett syndrome (genetic disease diagnosed in girls); childhood disintegrative disorder (disintegrative psychosis, Heller syndrome, childhood dementia, symbiotic psychosis); hyperkinetic disorder with intellectual disability; Asperger syndrome (autistic psychopathy, schizoid childhood disorder).

The priority task of modern medicine, correctional pedagogy, special psychology and adaptive physical culture is solving tasks of the prevention, abilitation and rehabilitation of children with autism spectrum disorders.

As it is known, the first place by frequency of occurrence in children is taken by the “early childhood autism” (ECA) among autism spectrum disorders, which affects the communicative, cognitive and speech spheres.

Nervous system disorder in autistic children leads to the deficit in social interactions, communication, the presence of a large number of repetitive actions (stereotypies) [4, 7, 10]. In motor development of children with ASD such features as awkwardness of voluntary movements, problems in development of visual-motor coordination, difficulties in overcoming obstacles, space orienting is impaired. According to our observation, during physical culture classes, children with ASD often cannot do turns without the help of another person, their movements do not have smoothness and tempo, balance is disturbed. Autistic children cannot jump, stand on one leg, push off with their feet and land softly after jumps. They have difficulties of voluntary motor imitation – hypotonia or hypertonia, often they walk on their toes, their running is monotonous.

It is also important to note that pathological processes in the nervous system are changing functions of the vestibular analyzer, which is reflected in low indicators of the manifestation of coordination abilities.

Therefore, there is need to use different means of adaptive-motor rehabilitation for autistic children, hippotherapy in particular, for correction and prevention of psychophysical features of children of this nosological group.

“Hippotherapy” came to Russia in 1991 in the form of two main terms: hippotherapy and therapeutic riding. In hippotherapy, the passive riding (in which the equestrian does not control the horse) is applied, in therapeutic riding the active form of riding (in which the equestrian controls the horse) is applied [9, 11].

Hippotherapy is a unique mean of adaptive-motor rehabilitation, where the key moment is an interaction of a child with the horse. These odd-toed mammals are considered as the most noble and smart animals. Contact of an autistic child with the

horse would help them to find the relationship with the outside world. During classes, children with ASD have to keep track on balance, coordination and synchronization of their movements, include all muscles of their body in the action [5, 6, 8].

Hippotherapy has a comprehensive effect on a child. In particular, it contributes to strengthening of the musculoskeletal system, develops tactile, visual and olfactory sensations, has a positive effect on the vestibular system [3, 6, 11].

Thus, the use of hippotherapy to develop coordination abilities as an important condition of life support of autistic children is relevant.

We defined the contradiction between the need to increase the level of coordination abilities of children with ASD and insufficient development of pedagogical conditions of using hippotherapy, contributing to the correction of motor disorders in such category of children.

The purpose of this study is to examine the effect of hippotherapy on the development of coordination abilities of primary school children with autism.

Hypothesis of the study: it is suggested that the process of development of coordination abilities in primary school children with ASD would be more effective if such pedagogical conditions were created:

- taking into account individual special features and motor impairments of schoolchildren with ASD when performing exercises with the horse and on the horse;

- forming the class's stereotype, use of visual timetable;

- initiation (not imposing) of tactile contact during exercises with the horse and on the horse;

- use of adapting exercises for the development of coordination abilities (space orienting, balance, overcoming obstacles) and strengthening of manual dexterity of hands (performing exercises without and with objects on the horse and etc.);

- creating an emotionally comfort atmosphere and situations of success while interacting with the horse.

One of the tasks of our work is to study the impact of systematic classes of the experimental program aimed at the development of coordination abilities of primary school children with autism.

New data, which expand and deepen views on the possibility of learning coordination abilities by using hippotherapy among children diagnosed with atypical autism.

Theoretical and practical significance of our work consists in the development of pedagogical conditions and programs aimed at the development of coordination abilities using hippotherapy.

Selected, justified and modified diagnostic tests and the suggested hippotherapy program could be useful for teachers working with primary school children with autism.

Results obtained in the study could be used in educational establishments and rehabilitation centers working with disabled children. They also could be included in the program content of the “Adaptation physical culture” subject and courses of professional development of adaptive physical culture.

Theoretical and methodological foundation of our study are:

- modern views on motor function of a person as a complicated hierarchic and self-developing function (I.M. Sechenov, M.O. Gurevich, N.I. Ozeretskij, N.A. Bernstein, P.K. Anokhin, E.P. Il'in, B.B. Kosov et al.);

- combinations of thesis about the development of psychomotor abilities of a human and their structure (S.L. Rubenstein, E.P. Il'in, V.P. Ozyorov, B.B. Kosov, I.M. Turevskij et al.);

- works on using hippotherapy as the mean of rehabilitation (Yu.A. Slepchenko, I. Straus, V.I. Rodionova, M.M. Maksimova et al.).

Methods and organization. The study was carried out since August 2020 to March 2021 on the base of the equestrian club located in Shchyokino. 5 primary school children 9 years old diagnosed with atypical autism participated in the study. The experimental program serves as one of the moments, which allow children with ASD using hippotherapy classes forming coordination abilities.

The purpose of this program is forming an adequate motor basis in primary school children with autism during hippotherapy classes.

Program tasks are:

1. Development of motor (coordination) abilities by interaction with the horse (on the horse);

2. Teaching to solve tasks according to the sample and verbal instructions.

3. Formation of abilities of interaction with the horse and the instructor.

4. Correction of emotional and volitional sphere.

For our experimental program, a calm gray horse of an average height of 150-160 cm at the withers with a good step frequency.

In our program exercises aimed at the establishing tactile and social contact with the horse, exercises on the horse, which are learning how to mount the horse, holding on the saddle when the horse is moving, exercises on the horse with objects, games aimed at social interaction were used. Structure of the hippotherapy class is presented on the table 1.

Table 1

Structure of the hippotherapy class

Part of the class	Content	Exercises
Preparatory	Warm-up	Calisthenics with images (lumberjack, clocks etc.)
	Meeting with the horse	Greeting, petting
Main	Exercises on the horse	Different types of positions on the horse
		Arms and legs movements on the horse
	Exercises on the moving horse	Step, trot, turns, stops (with the instructor)
	Exercises on the horse with and without objects aimed at developing coordination	Exercises with reflex balls, fitballs, speech and movement exercises
Final	Expressing gratitude to the horse	Feeding, petting and praising
	Games aimed at social interaction	Bringing water in a cup (giving water to the horse), moving carrots and apples (feeding the horse), hay

Contents of the experimental program “World of animals” are presented on the table 2. Hippotherapy classes were held 3 times a week 45 minutes long with the guidance of the coordinator in adaptive physical culture.

The experimental program included sig modules of classes: "Acquaintance – Meeting", "Horseman", "Walk", "Joyful Rider", "Smart Horse", "Visit the Horse" (Table 2).

Table 2

Contents of the “World of animals” experimental program

Module	Exercises	Number of hours
Adapted calisthenics set	Calisthenics with images (lumberjack, clocks etc.)	6
Acquaintance – Meeting	Greeting, petting, talking, gestures	4
Horseman	Various types of positions on the horse: sitting on the horse; sitting sideways; lying on the stomach with the head to the withers; lying on the stomach crosswise; lying on the stomach with the head to the tail; lying on the back with the head to the horse's tail (“rocking on the waves”).	20
Walk	Movements: stops, steps, trot,, turns, riding to the left (to the right), making stops (with the instructor)	20
Joyful Rider	Torso turning (reach the tail), hand movements to the sides (bird), hands up (“reach to the sun”), exercises with balls (hanging ball etc.)	16
Smart Horse	Expressing gratitude to the horse by feeding it, petting and praising	10
Games – “Visit the Horse”	Bucket (carrying water with a cup from one bucket to another – let’s give water to the horse), moving carrots and apples (feeding the horse), horse-litter (moving hay).	10

Results and discussion. In order to identify the effectiveness of classes, the testing was carried out to identify the initial and final level of the development of coordination abilities of primary school children with autism. The evaluation of the development of coordination was carried out on the basis of the evaluation of performance of motor tests presented on the table 3. Results were evaluated in points.

Table 3

Characteristics of tests included in the study program

Test name	Performance description	Evaluation criteria
Standing up without using arms	Evaluation of general coordination. The child must stand up from the initial position of lying on the back without using arms.	3 points (high level) – performs it correctly, without mistakes, without using arms; 2 points (average level) – stands up with an arm as a support; 1 point (low level) – performs the test with multiple hand touches.
Test on the identification of switching movements of fingers “Fist – border – palm” (Luriya A.R.)	The child is asked to repeat a series of 9 movements, which consists of a thrice-repeated series of "fist – border – palm" movements, according to the sample given by the testers. The number of errors was evaluated.	3 points (high level) – clear performance, without mistakes; 2 points (average level) – made 2 mistakes; 1 point (low level) – made 3 and more mistakes.
Holding balance on the moving horse	Position of sitting on the horse, hands to the sides. The instructor controls the horse. Torso, arms and legs’ position was evaluated.	3 points (high level) – sits independently, holds their torso well, legs are pinned to the horse, heels are pointing down; 2 points (average level) – the torso is leaning forward, arms are not held on the same line; 1 point (low level) – the position is not steady, arms are not being held to the sides, the instructor’s help is needed
Holding balance while lying on the horse	The initial position is lying on the stomach on the horse, facing the withers, hands up, legs bent and heels together. The correct performance was evaluated.	3 points (high level) – position on the horse is taken correctly, balance is being held; 2 points (average level) – arms are not fully straightened, mistakes in the position of the legs; 1 point (low level) – position is made with serious mistakes.
Touching balls sitting on the horse	This test is performed in the position of sitting on the horse with the instructor’s help. Riding and reaching hanging balls.	3 points (high level) – clear task performance; 2 points (average level) – task is made with 1-2 mistakes; 1 point (low level) – task is made with 3 or more mistakes.

At the beginning of the study, low indicators in all examined tests were registered, which is related to the fact that the children have only started attending hippotherapy (Table 3). As a result of systematic classes according to our program for children with autism, positive dynamics were noted.

Maximum improvements were registered in the “Holding balance while lying on the horse” – 5 children (100%), and in the test of standing up from up from the initial position of lying on the back without using arms – 3 children (60%), which, in our opinion, is associated with strengthening the muscles of the torso while horse riding.

Average level was registered in the “Fist – border – palm” test – 3 children (60%) and in the “Holding balance while sitting on the horse” – 4 children (80%). Insignificant improvement was registered in the “Touching balls sitting on the horse” test, which is related to difficulties of the tasks and the need to train them for a longer period, and also to the primary defect. In whole, positive dynamics were registered, which indicates the effectiveness of the experimental program.

Table 4

Results of development levels during the study

№	Control measurement	Stages	Low level	Average level	High level
1.	Standing up from the initial position of lying on the back without using arms	before	5 (100%)	-	-
		after	-	2 (40%)	3 (60%)
2.	Test on the identification of switching movements of fingers “Fist – border – palm” (Luriya A.R.)	before	5 (100%)	-	-
		after	1 (20%)	3 (60%)	1 (20%)
3.	Holding balance on the moving horse	before	5 (100%)	-	-
		after	-	4 (80%)	1 (20%)
4.	Holding balance while lying on the horse	before	5 (100%)	-	-
		after	-	-	5 (100%)
5	Touching balls sitting on the horse	before	5 (100%)	-	-
		after	2 (40%)	2 (40%)	1 (20%)

Conclusion.

1. During the study, the program of the development of coordination abilities in primary school children, who were diagnosed with atypical autism, was developed and experimentally justified.

2. The experimental program included 6 modules of classes: "Acquaintance – Meeting", "Horseman", "Walk", "Joyful Rider", "Smart Horse", "Visit the Horse". The program was implemented in compliance with pedagogical conditions:

- compensation of primary and secondary disorders during classes, and also individual special features of schoolchildren with ASD during exercises with the horse and on the horse;

- formation of the class's stereotype, implementation of the visual timetable;
- initiation (not imposing) of tactile contact during exercises with the horse and on the horse;

- use of adapting exercises for the development of coordination abilities (space orienting, balance, overcoming obstacles) and strengthening of manual dexterity of hands (performing exercises without and with objects on the horse and etc.);

- creating an emotionally comfort atmosphere and situations of success while interacting with the horse.

4. Results of the study would allow suggesting the number of practical guidelines for specialists in adaptive physical culture, working with children with ASD:

- establishing emotional contact for the child to see that they are understood;
- constructing and following the classes' plan using the visual timetable (a board with pockets, where cards showing the sequence of exercises in this lesson are inserted). If the child understands the sequence of exercises, their anxiety reduces.

- development of communication skills, which is needed for further interaction;

- watching the child, taking their interests into account;

- do not insist on completing tasks (short-term performance of tasks). If children worked out for several minutes, it is important to praise them and move on to the next task;

- there is a need to pay attention to desires and mood of children;

- it is important to not try and change the behavior of children;

- it is also important to keep calm, be patient and talk to children without raising your voice;

- use alternative ways of communication (pictures, symbols, cards with images emotions on them);

- setting interaction boundaries (avoiding the word "no", "do not", instead use the word "stop", "let's stop");

- do not impose tactile contact, but initiate it (if the child is having difficulties while holding balance on the horse, they should give their hand themselves);

- give a positive assessment of the child's actions, giving praise with explanation of what the child has done (Well done, you have reached the tail!);

- gradually implement new exercises (giving time to process information, do not hurry the child and supporting the initiative);

- show the exercise, standing by the child's site (which could reduce anxiety);

- showing a motor stereotypy of arm movements by moving the child's arms (if the tactile contact is established);

- there is also a need to diversify the child's sensations: visual (by using balls, ribbons), hearing (by using bells, rattles), tactile (by touching, petting), moving and olfactory sensations;

- it is important to increase children's confidence in their efforts, to focus your attention to the child's personality, using the individual approach;

- use various exercises while riding on the horse (arm movements up, to the sides, exercises with a ball (moving, holding, touching a hanging ball), exercises aimed at holding balance, orienting in space and in their own body during classes.

Thus, the point of the need to use hippotherapy for children with autism is that the horse acts as a kind of guide between the child and the instructor, which allows establishing reliable contact, establish communication possibilities, develop social skills, and also contributes to the formation of coordination abilities as an important condition for a full-quality life of the child in the future.

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