



PHYSIOTHERAPY FOR CHILDREN WITH AUTISM AND HYPERACTIVITY

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ABSTRACT

Purpose. The purpose of the study is to develop and implement in practice a physiotherapy program and an algorithm for its application in children with autism and hyperactivity and to study the effect of its impact.

Material/Methods. The survey was conducted from May 2021 to May 2023. The treatment-research contingent includes children with autism and autism spectrum disorders from 3 to 18 years of age with motor, visual, mental and multiple disabilities who attend the Day Center for Children and Youth with Disabilities "Winnie the Pooh" in Ruse.

Results. The research results show that after the applied physiotherapy program, a significantly better effect was observed regarding motor activity, muscle tone, and psycho-emotional state compared to the baseline indicators in the studied contingent.

Conclusions. Through its specific strategies for working with children with autism, therapeutic gymnastics has a beneficial effect on increasing motor activity and further developing and strengthening motor skills.

Keywords: physiotherapy, children with autism, hyperactivity, autism spectrum disorders,

INTRODUCTION

Autism spectrum disorders, defined by mental health classifiers as Pervasive Developmental Disorders, are of wide interest to specialists because of the uniqueness and diversity of behavioral, coordination, and mental manifestations. This highlights the importance of a multidisciplinary team in therapy, including parent training. The specific clinical picture of autism is complemented by the manifestations of compensatory defence mechanisms in the process of social-emotional interaction with others. In the United States, approximately 2.2% of adults and 2.3% of 8-year-old children suffer from a neurodevelopmental disorder on the autism spectrum, characterized by deficits in social communication and the presence of restricted, repetitive behaviors or interests. [1]. There are no statistics on persons with Autism in Bulgaria. The only officially published statistics on the number of children with developmental problems in Bulgaria is from UNICEF in 2021. According to MES data for the 2019/2020 school year, there are 25,000 children with special educational needs in the education system, of which 15,000 have communication difficulties, which does not necessarily mean that they have a diagnosis of autism. On average, the percentage of adults with Autism in North America and Western Europe is about 2.2% of the population [2].

Children on the autism spectrum and those with hyperactivity often have difficulty in various aspects of daily activities. Many of them demonstrate poor motor development, coordination and balance [3]. There are also disturbances in muscle tone, dyspraxia, postural reactions and reduced strength [4]. Children with autism and attention deficit hyperactivity disorder are at risk for a variety of physical deficits, including an inactive lifestyle and obesity. Various studies have shown that children with attention deficits show greater difficulties in coordination, planning and execution of complex motor skills, as well as tasks of longer duration [5]. In addition, they demonstrate poor motor planning, problems with mobility skills and poor levels of physical fitness. There are also sleep problems. These findings also illustrate the importance of considering motor skills when examining risk factors for

problems of a different nature in children with ADHD-combined type [6]. The analyzed scientific literature shows that there are links between problems of attention and hyperactivity and problems in the coordination of movements [7] due to a malfunction of the frontal lobe and, therefore, of the executive functions [8]. Studies report that these children are at risk for a number of mental and personality disorders. This suggests that stimulating attention through movement and physical activities will lead to positive outcomes, consistent with existing evidence on how cognitive structures can be stimulated (especially attention) through the application of physical activity [8]. Observations, studies and research on functional methods for assessing muscle dysfunction in a number of nervous system diseases reveal a major problem in modern practice, namely the lack of objectivity and quantitative data for comparison in muscle strength/weakness testing [9]. Physiotherapy has the unique role of developing motor and cognitive skills and breaking stereotypes accompanying these children, fighting all their deficits. The scientific research set itself exactly this goal - to implement and apply in daily practice, both in the centers and, in parallel, in the family environment, an appropriate motor program for physical activity in children with autism and hyperactivity, which will contribute to improving their physical and psycho-emotional state and to study the effect of its impact [10 - 12].

MATERIALS AND METHODS

The purpose of the study is to develop and implement in practice a physiotherapy program and an algorithm for its application in children with autism and hyperactivity and to study the effect of its impact. For this purpose, we rely on the following points, on which we expect a positive change: tracking the psycho-emotional state during the physiotherapy sessions, observing the manifestation of positive and/or negative emotions, motivation and concentration of attention; degree of receptivity and degree of fatigue during activities; monitoring of behavioral reactions after applied physiotherapy.

The survey was conducted from May 2021 to May 2023. The treatment-research contingent covers children with autism and disorders of the autism spectrum who attend the "Winnie the Pooh" Day Center for Children and Youth with Disabilities, Ruse. The service at the center is intended for children from 3 to 18 years of age with motor, visual, mental and multiple disabilities, diagnosed with a protocol by an expert medical commission, epicrisis by a specialist doctor and their families from the Municipality of Ruse. The specified target group is among the most risky groups threatened by social exclusion in Bulgarian society. The center provides specialized support to families of children with disabilities: family counseling, weekly substitute care, the inclusion of par-

ents in parenting groups for mutual help and support, encouraging parents to join parenting networks. During the two-year practical and scientific work at the daycare center, research was carried out on 15 children with autism or autism spectrum disorders who were from a family environment. Complex physiotherapy treatment was carried out for all 15 children visiting the center. The latter was conducted daily or according to the visiting schedule. Applied physiotherapy is part of the general plan of medical, psycho-pedagogical and social rehabilitation of children. Given the nature of the study, the main criteria for recruiting participants were similar clinical manifestations of the disease, age limit, and being from a family background. According to the specified criteria, fifteen children with similar clinical manifestations of their disease were selected. The children were divided into groups A and B to monitor the effect of the complex physiotherapy treatment. The groups were formed depending on the age of the included children. Experimental group - A includes 6 children under 10 years of age (3 girls and 3 boys). All children in the mentioned group have problems with communication. Their problems can be divided into three categories. Two of the children do not speak. Another two repeat the same words over and over, like holophrases. They use their voice, but they do not use it as an object of exchange with another person. They chatter on and on, repeating the same words without addressing them to anyone, like music, an underlying noise that covers everything. Some of them avoid the voice. They use their own voice as a support to ask for something, to address the other. Rather, these children take the hand if necessary. They do not seem to hear the voice of the other speaking to them. The other two children speak in an extremely precise order, which is characteristic of them. When they speak, they verify words, control them, process them, and make them subject to repeated orders. With them, the voice serves as a support for an exchange with another person. They repeat words and sentences clearly. There is one condition for communication to be successful. The therapist's voice should be musical, rhythmic, calm, with normal decibels. They are curious about the environment that surrounds them by exploring the space around them. They take various objects (toys, picture books, etc.) in their hands. Some of the children in the group have a calm psycho-emotional state. Another part of them has moments of increased psychomotor agitation, which is expressed in stereotypical movements with the hands, a hurried gait that can turn into running and making inarticulate sounds. All children in the group are physically active, move independently, have a correct gait and posture. They have difficulty with complex motor activities.

Experimental group - B includes 9 children over 10 years of age (2 girls and 7 boys). In 6 children, recep-

tive speech is well developed, it is echoic. In 1 of them, speech is preserved, and he communicates at a normal level for his age. All children in the group interact with children and adults through the game. They have good orientation in the space of objects and people in a familiar environment. They are inquisitive and curious about the environment that surrounds them. They are observant imitate, imitate words, sentences and actions of an adult. They follow instructions from the therapist. They are imaginative and follow a logical sequence. During classes, they quickly orient themselves, as it should be done even without a verbal invitation from a therapist. Some children are calm when engaged in preferred activities, such as during meals, personal free time, or physical activities. Some of them exhibit psychomotor agitation, which is expressed by stereotypic hand movements. Factors that cause overstimulation are loud music, a directive tone, raising the voice of a child and/or an adult, a large group of children and/or adults in the room, sudden entry into personal space - taking away a favorite toy or object, excessive tension in the body, which the child cannot express. All of the group are physically active, move independently, have a correct gait and posture. Some children have difficulties with more complex motor activities. The children of experimental group A were given cardio training. The children of experimental group B were given strength training. For each group, a program of similar exercises is drawn up, tailored to the individual capabilities of each child. The data show that male patients predominate in the groups, as in experimental group A - 50% are boys, 50% girls, and in experimental group B - 78% boys, 22% girls. The average age of patients from experimental group A was 7 years, and for those from working group B, it was 15 years. The youngest patient in control group A was 5 years old, and in group B was 13 years old. The oldest patient in control group A was 10 years old and in group B, 16 years old. The predominant disease in both groups is "Generalized Developmental Disorder" (three patients from both groups). After him are respectively: "Syndrome of early childhood autism" (group A - one patient, group B - two patients), Childhood autism (group A - two patients, group B - one patient), autism (two patients from group B) and Atypical Autism (only one patient from group B).

Characteristics of research methods: Functional tests were used to assess the need for the developed complex physiotherapy program: Test of activities of daily living; Classification system for gross motor function covering the age group between 4-6 years, 6-12 years and 12-18 years The focus of the GMF falls on determining which of the levels best reflects the current abilities and limitations in the motor function group of the child; Eurofit for children (modified) - a valid and reliable as-

essment of children's physical fitness; Sensor Profile (Modified). The children in both groups were given physical therapy sessions every day or according to their visit schedule within 35 minutes for group A and 40 minutes for group B for each session. The difference in duration comes from the age difference between the two groups. Therapeutic sessions were held in the physiotherapy room individually with each child. Classes started with a good psycho-emotional state, desire for physical activities and concentration of attention. An important tool for conducting a therapy session is the therapist's body language. This includes posture, gaze and tone. The therapist's position should not be directly facing the child, but he should stand on his periphery and not be too close, which may be threatening to the child. It is important that the therapist's gaze is not directed at the child but always shifted to the side when communicating with him indicating that the therapist is calm and avoids sudden movements. The tone should be even, calm, clear and understandable. It is not desirable to speak in an imperative mood or through clenched teeth. This can lead to a negative reaction from the child. Sentences should be simple and short. In children with autism, the sensitivity threshold or hypersensitivity to certain stimuli (sound, food) often leads to stress and a panic reaction.

Physiotherapy complex - scheme for children up to 10 years old

A treadmill was used for this purpose, provided the child is in a good psycho-emotional state and motivated to train. If necessary, before starting an activity, an elastic band is placed around the waist, which serves to wrap and collect the body, which acts soothingly and stabilizes in case of a possible loss of balance. The session is within 35 minutes, which is the maximum possible duration. The time can be shortened and depends on several factors: loss of motivation and interest in the proposed activity; loss of concentration; overstimulation (intensification of stereotyped movements, manifestations of aggression and autoaggression); physical exhaustion. Indirect motor learning is used. In it, the activity is performed with minimal verbal explanation of the motor task. The skills in this indirect learning are (unconsciously) retrieved from hidden memory. The strategy that was used was "Learning through observation of movement" and "Learning through perception", in which sensory internal re-creation occurs. The therapist's focus of attention is external - attention is focused on the result of the movement. The training started with low-intensity walking (3 km per hour). Physiotherapy complex - scheme for children over 10 years of age. The training was organized as follows: Load on large muscle groups; work up to 90 seconds; rest 30 seconds. The therapy was aimed at loading large muscle groups (back, chest, legs, buttocks and abdomen) with

a loading volume of 3 series of 10-12 repetitions. Exceptions are the “rowing machine”, where the duration is 60 seconds, and punching bags, where the duration is 30 seconds. The training was carried out individually, depending on the child’s visit schedule - in the morning or in the afternoon. The session started when the child was in a good psycho-emotional state and motivated to train. The session is within 40 minutes. The time can be shortened and depends on several factors: loss of motivation and interest in the proposed activity; loss of concentration; overstimulation (intensification of stereotyped movements, manifestations of aggression and autoaggression); physical exhaustion. Indirect motor training was used. The “Trial and Error” strategy was applied. In it, learning takes place through repeated attempts by the child to complete the task, during which errors are detected and corrected. The focus of attention is external and internal. In external movement, attention is focused on the result of the movement, and in internal movement, attention is focused on the movement and the body. A constant organization of the exercises was used, in which the performance is constant and the same. In cases where the above-mentioned “maneuvers” do not help, the session is terminated, or the child is given the opportunity to choose a motor task to perform as he wishes. The child should not be insisted on or imposed control to carry out the activity we suggested. This may cause a negative reaction.

RESULTS

Comparing the results at the beginning and at the end of the research period shows a positive progression of both group A and group B in terms of the studied indicators, which is an indication of increased motor activ-

ity, increased muscle tone and increased psycho-emotional state of the studied contingent. The presented data show that the number of children who needed help at the beginning of the study was significantly reduced from 52% to 17%, and the number of children who were independent increased to 73%, compared to 28% at the beginning. The number of addicts was 20% at the beginning and 10% at the end of the study.

DISCUSSION

The data show positive changes in some of the children related to self-care activities. Positive changes are reported, despite the young age of the participants in the group and their complexity in carrying out these activities, as the percentage of dependents on help has been reduced by half. In the beginning, some children need help and support in the activities they perform with their hands. At the end of the studied period, an increase in the number of children who perform the activities independently is observed, but a greater percentage of those who need help and support is also noted, which is at the expense of those who were dependent in the initial period. A positive correlation is observed here.

CONCLUSION

After the applied physiotherapy program, a significantly better effect was observed in terms of motor activity, muscle tone and psycho-emotional state compared to the baseline indicators in the studied contingent. The research results show that these children desire to perform motor activities. Despite the available deficits related to motor planning, concentration during activities, and post-physiotherapeutic psychosomatics, they note positive results in a number of parameters.

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