

Analiza porównawcza postępowania fizjoterapeutycznego u dzieci ze zdiagnozowanym autyzmem atypowym

Comparative analysis physiotherapy in children with atypical autism

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Streszczenie

Wstęp. Autyzm jest całościowym zaburzeniem rozwoju mającym wpływ na wszystkie obszary funkcjonowania dziecka. Powoduje zaburzenia w nawiązywaniu komunikacji interpersonalnych. Prowadzi do występowania trudności w podporządkowywaniu się regułom społecznym wynikającym z braku ich zrozumienia.

Materiał i metodyka. W pracy został opisany przypadek dwójki dzieci Zuzanny i Aleksandra, którzy uczęszczali na zajęcia fizjoterapeutyczne do placówki Krajowego Towarzystwa Autyzmu w Kielcach raz w tygodniu po 1 godzinie zajęć z fizjoterapeutą. Badania odbywały się od listopada 2015 r. do marca 2016r. Dzieci były w wieku 4 lat. Ocenie poddano model PEP dzieci w skali 0-5.

Wyniki. U dzieci z autyzmem atypowym zaburzona jest percepcja, komunikacja i mowa. Najmniejszą trudność sprawiają wykonywanie zadań z zakresu motoryki dużej i koordynacji. Badany chłopiec wykazywał lepsze rokowanie w porównaniu z dziewczynką.

Wnioski. Dzieci z rozpoznaniem autyzmem atypowym różnią się ze względu na płeć w zakresie rozwoju psychofizycznego. Fizjoterapia wpływa na zmniejszenie zaburzeń ze spektrum autyzmu zdiagnozowanego według profilu psychoedukacyjnego PEP. Płeć ma znaczący wpływ na stopień rozwoju motoryki dużej i małej u dzieci z ASD.

Słowa kluczowe:

autyzm, ASD, fizjoterapia, profil psychoedukacyjny

Abstract

Introduction. The autism is an all-embracing development disorder that affects all areas of the child functioning. It causes disturbances in the interpersonal communication. It leads to difficulties in submission to social rules due to the lack of their understanding.

Material and Methods. In this research the case of two children has been described, Zazanna and Aleksander, who took part in the physiotherapeutic sessions with the physiotherapist at the National Autistic Society in Kielce, once a week for 1 hour. The research was held in the period from November 2015 to March 2016. The children were 4 years old. The PEP model with a scale 0-5 was used to evaluate the children.

Results. The children with atypical autism have disturbances in perception, communication and speech. The least difficult are for them tasks related with gross motor and visual-motor coordination. The examined boy was more promising comparing to the girl.

Conclusions. The children with diagnosed atypical autism differ in terms of psychophysical development depending on their gender. According to the psychoeducational profile PEP, the physiotherapy reduces disorders resulting from the diagnosed autism spectrum. The gender has significant influence on the fine and gross motor development in children with ASD.

Key words:

autism, ASD, physiotherapy, psychoeducational profile

Introduction

Autism is a disorder with unknown aetiology, it is often difficult to diagnose. In case of autism some characteristic symptoms may appear, i.e.: fear, disturbances in sight, hearing and kinesthetic perception, and troubles in communication. However, in each person the above symptoms may have different forms and individual way of behaviour [1, 2]. Autism was described by Leo Kanner in 1943. It means closing in one's own world and weakening of logical thinking. In the Polish literature the most common terms are: autism and infantile autism. They are in accordance with the classification systems DSM-IV and ICD-10 [3, 4]. Atypical autism symptoms appear late, i.e. after the age of three years. It happens that atypical autism remains non-diagnosed for whole life. Autistic disorders may be accompanied by other disease entities, like atypical childhood psychosis or mental impairment. Atypical autism requires a precise differential diagnosis, so that is not confounded with other diseases from the autism spectrum, e.g. with Asperger syndrome [5, 6]. Atypical autistic disorders may demonstrate in a various way, i.e. speech disturbances, problems with initiating conversation, troubles in relations with other children, problems with communication, avoiding eye contact, aggression, self-aggression, isolation, stereotypical behaviours and easy mechanical remembering. One child with the autism may not speak and hits the wall with his or her head, while the other may in turn have also problems with talking, but would seek a contact with people. Accurate diagnosing if this is a childhood autism, or an atypical autism, may be only made by an experienced child psychiatrist [7].

The autism spectrum is a disorder that remains for lifetime. The symptoms are not steady and they change in the course of the patient's development. First symptoms appear in children up to 3 years old. Frequency of ASD (Autism Spectrum Disorder) occurrences is estimated for 60-70 cases per 10 000 persons. Autism occurs 4 times more often in boys than in girls. However, in girls it is characterized by a hard course [8].

Autism is an all-embracing development disorder that affects all areas of the child functioning. It causes troubles with social relations, difficulties in submission to social rules due to the lack of their understanding. Most autistic children is non-speaking, do not communicate using gestures, have difficulties with indicating, copying, obeying instructions. If the children speaks, it is often only echolalia. They are not able to create longer complex statements, it is difficult for them to initiate and maintain any dialogs. They have not at all or limited understanding of abstract concepts. Even well functioning autistic persons have some problems with the linguistic pragmatics. In addition, some behavioural disturbances are observed in them - numerous stereotypies and rituals, focusing on non-functional properties of objects. In some of them also appear aggressive and self-aggressive behaviours [9]. Physiotherapeutic procedure for an autistic child applies to four areas, i.e.: general health, self-reliance and upbringing, communication and social relations and gaining school skills [10]. For correct planning of the physiotherapeutic procedure it is required to perform accurate diagnosis, including: determination of co-existing medical

problems. assessment of problems related with reception and integration of sensory stimuli, evaluation of the child's contact with the environment and his or her social development and self-reliance. The child's emotional development and mental condition as well as a current stage of his or her identity advancement are also taken into account. Such performed diagnosis would allow proper planning of the therapy and ensures that no skills important for the child's further functioning are omitted [11].

Material and methods

The subject of this research was an analysis of physiotherapeutic procedure in children with diagnosed atypical autism before the therapy was started and after 6 months of its continuance. In this research the case of two children has been described, Zazanna and Aleksander, who took part in the physiotherapeutic sessions with the physiotherapist at the National Autism Society in Kielce, once a week for 1 hour. The research was held in the period from November 2015 to March 2016. The examined children were four years old. Before deciding on the exact therapy the children were subject to diagnosis according to the Psychoeducational Profile. PEP is a test based on the developmental concept of evaluation that is used to determine characteristic, individualized methods of teaching and therapy for children with comprehensive disturbances of development. PEP is a tool that allows to create a developmental profile which reflects strong and weak sides of the examined person. The PEP model was created to evaluate children with a minimal linguistic potential. It uses gradable system of the skill assessment that facilitates preparation of the Individual Development Plans based on the skill profile [3].

Research results

The children were carefully observed during the research. Description of Zuzia's observances performed during the physiotherapeutic sessions is presented below. Zuzia was born in time by Cesarean section, the cytomegaloviral disease appeared during the pregnancy. Zuzia's physical development was correct, while her mental development was retarded. First sitting trials were around 9th month, standing around 18th, walking in 19th month of her life. Zuzia had no contact with related persons. The girl had no serious somatic diseases in the period nor she had any injuries. Her mother was worried about her lack of communicativeness and emotional disturbances, so she decided to come to the clinic.

Motor activity: the child is hyperactive, sometimes looks like stiffened, walks correctly. Efficiently passes set obstructions, avoiding them. Quickly moves from place to place, often walks aimlessly.

Manual activity: holds a crayon, draws line for colouring, outlines her fingers with the other hand, interlaces a ribbon between fingers. No stereotype motor actions.

Self-service and socialization: washes her hands with assistance, she uses a spoon unaided and rather sufficiently. She deals well with dressing and undressing. She performs physiological functions independently. She does not seek any contacts with other children or adults.

Knowledge and skills: she knows where individual toys are located, correctly reads, correctly arranges animal figures in a puzzle. She correctly identifies body schema.

Verbal and non-verbal communication: retarded speech, doesn't keep and avoids any eye contact. Reacts to speech, ignores calling her by name. When she feels that the speech is pressing, she reacts with grinding her teeth. She shows great interest in the surroundings. Often initiates new motor activities herself during the sessions (see Table 1).

Table 1. Structure that presents Zuzia's PEP model

Copying	She is able to take actions previously showed by the physiotherapist
Perception	Proprioception and vestibular system is normal
Fine motor	Impaired precise actions
Gross motor	Problem with spatial imagination and planning of motion, walking correct
Visual-motor coordination	Impaired
Cognitive performance	Disorders of attention and concentration
Communication, active speech	Understands instructions, retarded speech. Minimal eye contact

In case of Aleksander, his delivery proceeded without any major complications. The boy's first sitting trials were around 8th month, standing around 14th, walking in 16th month. Aleksander showed impaired contact with his surroundings. The boy had retarded speech with the elements of direct echolalia, so his parents took him to the clinic.

Motor activity: correct walking functions, he passes round set obstructions without the therapist's assistance.

Manual activity: correctly holds a crayon, impaired muscular tension within upper limbs grip function areas.

Self-service and socialization: washes his hands without assistance, he uses a spoon unaided and rather sufficiently. He can manage undressing and dressing, but this activities take him long time. He performs physiological functions independently, seeks some contacts with other children or adults.

Knowledge and skills: he knows where individual items are located, speech with numerous direct echolalia, correctly arranges animal figures in a puzzle, correctly identifies body schema.

Verbal and non-verbal communication: retarded speech, understands uttered to him instructions and is able to perform them. Reacts to speech, does not ignore calling him by name. No hearing oversensitivity, when provoked he reacts with his sight, hand, and sometimes audible signals. He like listening to soft music, e.g. a cassette with record (see Table 2).

Table 2. Structure that presents Aleksander's PEP model

Copying	He is able to take actions previously showed by the physiotherapist
Perception	Impaired functions of proprioceptive and vestibular system
Fine motor	Impaired precise actions
Gross motor	Impaired spatial imagination and planning of motion
Visual-motor coordination	Impaired
Cognitive performance	Retarded
Communication, active speech	Understands instructions, retarded speech function. Impaired eye contact

Below you will find a detailed summary of results obtained from examinations.

The performed examinations indicate that the physiotherapeutic sessions increase copying of the therapist's actions. According to the statistical analysis $\chi^2 = 0.08; df = 1; r_c = 0.2$ which means a tendency to differentiation of the copying degree in the examined children (see Table 3).

Table 3. The structure that presents copying of the physiotherapist by the examined

Gender	kopiowanie / copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	2	4	4
Boy	1	3	3
Total	3	7	7

The research demonstrated that after 6 months the perceptive disorder intensity decreased. According to the analysis $\chi^2 = 0.08; df = 1; r_c = 0.2$ which determines direct correlation between the gender and the perception degree (see Table 4).

Table 4. The structure that presents perception degree amongst the examined

Perception	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	3	4	7
Boy	1	2	3
Total	4	6	10

The research indicates that after 6-month therapy the fine motor improved entirely. According to the analysis $\chi^2=0.06$; $d_f=1$; $r_c=0.55$ which determines a tendency to correlation between the gender and the fine motor development. The results are presented in Table 5.

Table 5. The structure that presents fine motor development level in the examined

Fine motor	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	3	5	8
Boy	2	3	5
Total	5	8	13

The research indicates that physiotherapeutic sessions significantly improve the gross motor in the examined. The statistical analysis proves that $\chi^2=0.079$; $d_f=1$; $r_c=0.2$ which indicates tendency to correlation between the gender and the gross motor development (see Table 6).

Table 6. The structure that presents gross motor development level in the examined

Gross motor	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	3	4	7
Boy	1	2	3
Total	4	6	10

The above research demonstrated that the therapy had significant effect on the decrease of visual-motor coordination in the children. According to the statistical analysis $\chi^2=0.050$; $d_f=1$; $r_c=0.17$ there is a tendency to correlation between the visual-motor development level and the gender in the investigated group. The results are presented in Table 7.

Table 7. The structure that presents visual coordination development level in the examined

Visual-motor coordination	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	2	4	6
Boy	2	3	5
Total	4	7	11

The research demonstrated that $\chi^2 = 0.09$; $d_f = 1$; $r_p = 0.2$, which means appearance of a tendency to correlation between the visual-motor development level and the gender in the investigated group (see Table 8).

Tabela 8. Struktura przedstawiająca rozwój czynności poznawczych wśród badanych

Table 8. The structure that presents cognitive performance development amongst the examined

Cognitive performance	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	3	4	7
Boy	2	3	5
Total	5	7	12

The research demonstrated that the physiotherapy sessions improved active speech and communication in the examined. According to the analysis $\chi^2 = 0.06$; $d_f = 1$; $r_p = 0.18$ which determines direct correlation between the gender and the communication and active speech development. The results are presented in Table 9.

Table 9. The structure that presents communication and active speech development level amongst the examined

Gross motor	copying		Total
	At initiation of therapy	After 6 months of therapy	
Girl	2	5	7
Boy	1	2	3
Total	3	7	10

Comments to testing results and discussion

The knowledge development and more and more new researches determine the need to seek optimal educational and therapeutic solutions that would allow to improve functioning of the child with ASD. Among all forms of rehabilitation the leading role belongs to physiotherapy. It allows diagnosing disorders that prevent the child from correct functioning in his or her environment. The physiotherapeutic sessions give the child possibility to realize disorders from the range of "sensory selectiveness", where the child is sensory stimulated accordingly to existing impairments. According to Jean Ayres everyone can correctly function at the moment when all senses are integrated in the 4-channel way. That is why, the physiotherapy is mainly directed to correct processing of stimuli in order to reach integration that leads to self-control, sense of security, educational skills, as well as curiosity to explore nearer and farther surroundings [12, 13].

According to Doman Delocato stereotypies relating to the body or objects are expressions of the drift to self-healing, to norm the perceptive channels with an impaired function. Secondary effect of such behaviours is narrowing of social interactions. Stereotype forms of behaviour reduce fear connected with inability to attribute a state of mind to other persons. Therefore, the

physiotherapist's role consists in adequate stimulation of the sensory channels to improve, in result of the therapy, the child's functioning in the society [14].

Hanna Jaklewicz, when testing the group of autistic children, using Gunzberg's questionnaire PAC and PAC-1, demonstrated that the investigated group was characterized by the prevalence of skills in self-service, motor and manual efficiency, over the skills in communicating or behaviour control [15]. This also confirms the results obtained by authors.

Stereotype movement disorders as well as rigidly restricted interests may reduce motor activity in the children with diagnosed ASD. Motor disorders may appear as an incorrect lateralization, incorrect feeling of body schema, reduced muscular tonus. The difficulties may also occur as an impaired coordination or balance. The motor problems resulting from the gross and fine motor may be often encountered. Usually, all the above dysfunctions are caused by disorders resulting from incorrect sensory integration of stimuli. To prevent negative consequences that may appear as a faulty posture or motor retardation, it is required to use the whole series of physiotherapeutic activities. However, the interaction during the motor therapy must not be limited only to stiffly predetermined exercises. This should also include the elements of psychotherapy. It is important that during the sessions, the physiotherapist teaches the child how to acquire social relations that would facilitate his or her functioning in the environment [16].

Many parents or physiotherapists are discouraged to work with the child with ASD due to any failures or the child's negative attitude. But, it may often result from incomprehension of the message that we direct to the patient. It is very important to address it very clearly in order to formulate what we want to communicate in such way that due to our intention we would receive a reply, creating the same some relation. It is sometimes difficult to understand some motives that prevent the child from an action, but it also happens very often that what seemed to be a milestone, finally appears as a very simple act to overcome the resistance. Among children with ASD we may observe bursts of anger, self-aggression, that is often misunderstood by neurotypical persons, but after deeper analysis it may come out that it is a way that the child uses to communicate, informing about his or her desires, anxieties, fear, etc. However, on the other hand self-aggression or aggression may be an effect of excessive stimuli coming from outside and difficulties with integrating and understanding of these sensory impacts [17].

The results of the research described in this article are also confirmed by M. Karga, according to her long-term and accurate physiotherapy improves psychomotor functions in patients with ASD. Her researches indicate that correctly planned therapeutic program supports improvement of the patient's relations with the environment and positive autoperception [18]. The children with diagnosed autism have negative attitude toward the external world. Their mind fails to "filter" information coming in the form of e.g. acrid smells, irritating noises, glaring colours, etc., so they retract from daily life or behave oddly. According to L. Sochock diversified therapeutic sessions and differentiated methods of the work with a child: music therapy, dog therapy, physical exercises, behavioural method, positively affect the child's condition. The same they increase the patient's chance

for independent and efficient functioning. Common conclusion from this work and Sochock's article is assertion that in the process of the child's rehabilitation, some interrelation is needed between the therapist, family, society and the patient alone [19]. Frequent problem in the work with ASD child is fear and impaired sense of security that prevents the child from entering into social relations. So, it is very important to create best working conditions through correctly formulated verbal announcements, procedures of actions, structured activities, work with timer, etc. It is essential that the therapy is individually tailored to the child, as there is no one "golden mean". Correctly formulated short and long-term goals of the therapy will allow to reach success [8]. The child with autism spectrum should be treated as a health one, having all rights pertaining to his or her age. Establishing emotional bond with a child consists mainly in winning his or her confidence, and only at this stage you may build a particular rehabilitation plan [1]. It is needed to have strong self-determination and patience to gain relation with the child during sessions. It often happens that much simpler is to initiate contact for a stranger than for the parents, who may be treated indifferently. The child sometimes does not want to work at home, while during the therapeutic sessions he or she demonstrate very strong will to participate. It is usually due to other type of motivation, surroundings and many other aspects. Thus, it is very important that the physiotherapist works not only with a child, but also with his or her parents, instructing them for work at home [11].

The children with autism spectrum often show features that relate to rigid adherence to usual habits and stereotypies. Such rigidity may also apply to their attention, and especially to its indivisibility. That is why, it is essential to take into account, when formulating the therapy, also the aspects of motivation, analysis of difficult behaviours, in order to minimize them in the manner and allows to keep sense of security in the child. The physiotherapy sessions must be so arranged that they rise the child's interest, developing his or her abilities to explore the environment. Used therapeutic methods should be pleasant and attractive to the child, and they must allow him or her to integrate stimuli [3].

Another very important element of the physiotherapy is to develop in the child the ability to concentrate attention. It is very difficult to reach this feature and requires long-time therapy. Correct cognitive functions, remembering, stimuli differentiating, depend in a great extent on the correct use of attention that is a base of learning process [7].

The ASD children show high attention unsteadiness that depends on their mood, recent events and stimuli, coming from outside. Therefore, during the therapy it is required to focus on the disorder diagnosis from the sensory point of view, and then on its correct stimulation which depends on the child's oversensitivity or undersensitivity [6,8]. During the therapy it is also needed to observe the patient's special likings, to be able this way to get to the child's "world". Such knowledge about the child's interests will allow to select adequate positive boosts that in a large extent would facilitate work, and the same contribute to initiating the therapist-child interrelations. Early intervention gives the child a chance for better functioning in his or her future life. It will allow to avoid problems secondary to autistic disorders, which result from the lack of correct approach to the child. Suitable physiotherapy will permit to eliminate or mini-

mize basic autistic impairments. It will also equalize shortages caused by obstructed contacts. Each case is different, but there are many premises that may be generalized and used in the ASD child therapy [12].

Conclusions

The children with diagnosed atypical autism are different in psychophysical development depending on their gender. Physiotherapy reduces disorders resulting from the diagnosed autism spectrum according to the psychoeducational profile PEP. The gender has significant influence on fine and gross motor development in the children with ASD. Impairments of cognitive functions and visual-motor coordination bode better in a boy than in a girl. The research indicated that for the children with ASD the biggest problems included copying therapist's actions, perception activities, or communication and active speech. The least difficult are tasks related with gross motor and visual-motor coordination.

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