# THE EFFECTIVENESS OF PHYSICAL THERAPY IN CHILDREN WITH AUTISM

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**Abstract.** The main aim of the work was to evaluate the effectiveness of physical therapy conducted with autistic children from the kindergarten at Krzemienna 42B in Szczecin. The research was conducted in the first halves of 2009 and 2010. The diagnostic tool used in order to evaluate gross motor skills was psycho-educational profile – revised (PEP-R). The research group included 8 boys with medically certified autism spectrum disorder. In 2009, out of 126 tasks given, all the tested students performed 104 tasks evaluated as completed, 16 tasks evaluated as promising and 6 tasks evaluated as uncompleted. Only one boy performed all tasks properly. In 2010 the students performed 120 tasks evaluated as completed, 5 as promising and 1 as uncompleted. Four of the autistic boys performed the tasks they were given perfectly. In 2009 the biological age of most tested children was higher than the developmental age in the scope of gross motor skills. Implementing new, individual therapeutic programs based, among other things, on TEEACH tasks, helped to significantly level out the differences.

**Key words:** autism, children, gross motor skills, psycho-educational profile revised, therapy

## Introduction

In compliance with the DSM-IV classification, autistic disorders are characterized by the qualitative impairments of social interactions and communication, as well as some limited, repetitive, and stereotypical behavior, interests, and acting patterns (Pisula 2000). With autism, an often co-occurrence of intellectual disability (mental retardation) can be observed. Physical therapy of children with autism is based on the same methods and principles used with healthy children, but its course differs slightly. To reduce the intensity of autistic behaviours, sets of educational and improving programs have been introduced, all of them aiming at enhancing cognitive, psychomotor, and motor functions of an individual (Szot 2003; Valkova and Górny 2013).

Children with autism often seem to have healthy motor skills, thus problems in this sphere are frequently being ignored. The truth is, however, that their motor development can differ greatly – with normal (or even accelerated) in some children, and explicitly retarded and uneven in others (Pisula 2005).

The PEP-R profile test constitutes of a set of behaviors and skills patterns aiming to help in a proper diagnosis of a child. It delivers necessary information on the overall development of a child, and enables for the assessment of behavioral impairments in terms of interpersonal relationships. This test is predominantly designed for children aged 6 months – 7 years of age, it can be, however, quite helpful with older children – up to 12 years of age (Schopler et al. 1995). The test consists of a developmental scale divided into seven different spheres (imitation, perception, fine motor skills, gross motor skills, motor coordination, cognition, communication), as well as a behavior patterns scale divided into four spheres (contacts initiation and emotional reactions, showing interest in and playing with objects, reaction to stimuli, speech). Each of the assessment tests in the development scale can be evaluated as follows: completed, promising, and uncompleted. The completed mark is acquired by a child when "the task can be performed independently". The promising mark is acquired for those tasks "children have more or less a general idea on how to perform, however, they either cannot successfully finish the task or require repetitive assistance on how to perform the task". The task is considered uncompleted when "a child is unable to perform a single part of the task or does not even attempt on initiating the task, even though the task had been demonstrated by the researchers". Based on the information as to the tests passed, the researcher is then able to establish the real developmental age of a child in a given sphere. Similarly, based on the tasks labeled as promising, the researcher can then evaluate the developmental potential of a child (Schopler et al. 1995).

Based on the tests results, teachers-therapists prepare individually-tailored therapeutic program, ready to meet the true needs and abilities of a child. During the program implementation, specific task-oriented TEEACH exercises are being utilized.

The aim of this research study was the assessment of physical therapy effectiveness implemented in children with autism of the Preschool Education Centre at 42B Krzemienna Str. in Szczecin (Poland), and comparison of the obtained results with the results of the examinations performed prior to the introduction of the yearly individual educational programs.

## Methods

The examinations were conducted in the first halves of 2009 and 2010, and included seven boys aged 45–97 months of age. All the examined children with autism attended the Preschool Education Centre at 42B Krzemienna Str. in Szczecin (Poland), which is managed by the Szczecin Association for Autistic People (Szczecińskie Stowarzyszenie Pomocy Autystom). All the examined children had been provided with the official special needs education requirement issued by the Psychological and Pedagogical Counseling Centre, due to the visible presence of autism or some autistic characteristics. During the examinations of the children their intellectual abilities were not taken into consideration, as it is evaluated only before taking the compulsory school attendance.

In the examination, PEP-R test (composed of 18 tasks in the area of gross motor skills) was utilized, modified by the Pomeranian Educational Centre.

## Results

The detailed results of PEP-R test in terms of gross motor skills for the examined children is shown in Tables 1 and 2. In 2009, out of all the 126 tests, 103 were classified as completed (C), 17 as promising (P), and 6 as uncompleted (U). In the year 2010, out of all the 126 tests, 121 were classified as C, 4 as P, and 1 as U. It therefore shows that the amount of P marks has decreased by 13, and the number of uncompleted tests by 5 accordingly.

**Table 1.** The PEP-R test results in the gross motor skills area in the examined children with autism in 2009

| PEP task No. | Task description | Month of age – norm | Results | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | C1 45 month of age | C2 49 month of age | C3 52 month of age | C4 60 month of age | C5 68 month of age | C6 73 month of age | C7 85 month of age |
| 47 | Moving a ball | 13–16 | C | C | C | C | P | C | C |
| 48 | Pushing a ball | 13–17 | C | C | C | C | C | C | C |
| 50 | Sitting down on a chair | 14–19 | C | C | C | C | C | C | C |
| 37 | Walking independently | 14–22 | C | C | C | C | C | C | C |
| 68 | Moving an object from one hand to another | 14–22 | C | P | C | C | C | C | C |
| 60 | Drinking from a mug | 14–24 | P | C | C | C | C | C | C |
| 44 | Throwing a ball | 19–27 | C | C | C | C | C | C | C |
| 51 | Pushing a walker | 21–28 | C | C | C | C | C | C | C |
| 24 | Crossing the axis of the body | 24–28 | C | P | C | C | C | C | C |
| 38 | Clapping hands | 24–31 | C | C | C | C | C | C | C |
| 40 | Two feet jumps | 24–31 | U | P | C | C. | C | C | C |
| 72 | One hand dominance | 28–33 | C | U | C | C | C | P | C. |
| 45 | Kicking a ball | 28–35 | C | C | P | C | C | C | C |
| 39 | Standing on one leg | 29–36 | P | P | P | P | P | C | C |
| 46 | Leg dominance | 30–34 | C | U | P | C | C | C | C |
| 43 | Catching a ball | 46–51 | P | P | U | C | C | C | C |
| 64 | Ball swinging on a lace | 46–51 | P | C | U | C | C | C | C |
| 49 | Walking up the stairs | 61–65 | C | U | C | C | C | C | C |

Source: own research

In 2009, out of the total 18 tasks, 6 of them were carried out property by all the children, namely: pushing a ball, sitting on a chair, walking independently, throwing a ball, pushing a walker, clapping hands. The most difficult for the examined children was standing on one leg task (with 3 C and 5 P marks). Out of all the examined children only one performed all tasks correctly. Three of the examined boys acquired 17 C, 1 P, and 0 U results. Among the remaining examined children, the results were much more diversified, with each of them acquiring different results: 16 C – 2 P – 0 U, 13 C – 4 P – 1 U, 13 C – 3 P– 2 U, 10 C – 5 P – 3 U.

In 2010, 8 tasks were performed properly by all the children, namely: pushing a ball, sitting on a chair, walking independently, moving an object from one hand to another, drinking from a mug, pushing a walker, crossing the axis of the body, clapping hands. The most difficult for the examined children was ball swinging on a lace task (4 C, 2 P, and 1 U marks accordingly). Out of all the examined boys, four of them carried out all the tasks correctly. Two boys scored 17 C – 1 P – 0 U, and one of the boys scored 14 C – 3 P – 1 U.

In the nearest developmental sphere (that is, the tasks that were evaluated as promising) only in C1 one task was not mastered (task no 39). Three boys, however, who had their tasks passed in 2009, had the same tasks evaluated as promising in the following year (C1 – tasks no 44, 47, C3 and C6 – task no 64). Moreover, C1 noted some regression in the case of task no 64 (in 2009 – P, and in 2010 – U).

**Table 2.** The PEP-R test results in the gross motor skills area in the examined children with autism in 2010

| PEP task No. | Task description | Month of age – norm | Results | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | C1 57 month of age | C2 62 month of age | C3 63 month of age | C4 71 month of age | C5 68 month of age | C6 84 month of age | C7 97 month of age |
| 47 | Moving a ball | 13–16 | P | C | C | C | C | C | C |
| 48 | Pushing a ball | 13–17 | C | C | C | C | C | C | C |
| 50 | Sitting down on a chair | 14–19 | C | C | C | C | C | C | C |
| 37 | Walking independently | 14–22 | C | C | C | C | C | C | C |
| 68 | Moving an object from one hand to another | 14–22 | C | C | C | C | C | C | C |
| 60 | Drinking from a mug | 14–24 | C | C | C | C | C | C | C |
| 44 | Throwing a ball | 19–27 | P | C | C | C | C | C | C |
| 51 | Pushing a walker | 21–28 | C | C | C | C | C | C | C |
| 24 | Crossing the axis of the body | 24–28 | C | C | C | C | C | C | C |
| 38 | Clapping hands | 24–31 | C | C | C | C | C | C | C |
| 40 | Two feet jumps | 24–31 | C | C | C | C | C | C | C |
| 72 | One hand dominance | 28–33 | C | C | C | C | C | C | C |
| 45 | Kicking a ball | 28–35 | C | C | C | C | C | C | C |
| 39 | Standing on one leg | 29–36 | P | C | C | C | C. | C | C |
| 46 | Leg dominance | 30–34 | C | C | C | C | C | C | C |
| 43 | Catching a ball | 46–51 | C | C | C | C | C | C | C |
| 64 | Ball swinging on a lace | 46–51 | U | C | P | C | C | P | C |
| 49 | Walking up the stairs | 61–65 | C | C | C | C | C | C | C |

Source: own research

After summing up all the completed tasks and comparing the results with approximate age range for the passed tasks in the area of gross motor skills, the evaluated developmental age in the area of gross motor skills for individual children was set – Tables 3 and 4.

In 2009, one child was characterized with an equal or higher developmental age in the gross motor skills area in comparison with their biological age. In the remaining children their developmental age was lower than their biological age. In 2010, the developmental age in the gross motor skills area was equal or higher in four boys, and lower than biological age in three of the boys.

Out of seven examined children, in six of them a visible progress in motor development was seen throughout a one-year period, with C2 having the greatest observed progress. His developmental age for the gross motor skills added to 19–20 months in 2009, and was 29–30 months lower than his biological age. In the year 2010, his developmental age for the gross motor skills averaged 52–70 months and was adequate to his biological age.

**Table 3.** The differences between biological and actual developmental age in the gross motor skills area in the examined children with autism in 2009

| Child | Biol. age (month of age) | PEP-R result for gross motor skills | | | The gross motor skills developmental age (month of age) |
|---|---|---|---|---|---|
| | | C | P | U | |
| C1 | 45 | 13 | 4 | 1 | 25–27 |
| C2 | 49 | 10 | 5 | 3 | 19–20 |
| C3 | 52 | 13 | 3 | 2 | 25–27 |
| C4 | 60 | 17 | 1 | 0 | 40–51 |
| C5 | 68 | 16 | 2 | 0 | 34–39 |
| C6 | 73 | 17 | 1 | 0 | 40–51 |
| C7 | 85 | 18 | 0 | 0 | 52–70 or higher |

Source: own research

**Table 4.** The differences between biological and actual developmental age in the gross motor skills area in the examined children with autism in 2010

| Child | Biol. age (month of age) | PEP-R result for gross motor skills | | | The gross motor skills developmental age (month of age) |
|---|---|---|---|---|---|
| | | C | P | U | |
| C1 | 57 | 14 | 3 | 1 | 28–30 |
| C2 | 62 | 18 | 0 | 0 | 52–70 or higher |
| C3 | 63 | 17 | 1 | 0 | 40–51 |
| C4 | 71 | 18 | 0 | 0 | 52–70 or higher |
| C5 | 80 | 18 | 0 | 0 | 52–70 or higher |
| C6 | 84 | 17 | 1 | 0 | 40–51 |
| C7 | 97 | 18 | 0 | 0 | 52–70 or higher |

Source: own research

## Summary

The study aimed to evaluate the effectiveness of physical therapy in children with autism.

Taking into account the fact that there is a very restricted literature on the topic of physical improvement in children with autism, the possibility of results comparison with other research materials was highly limited. The results of the examination of children with autism could have been influenced by the following factors: lack of eye contact, unwillingness to cooperate, trouble with understanding the commands, difficult behavior (often involuntary), and distracting factors. Based on the examinations from the year 2009, individual therapeutic-educational programs were formulated, taking into account the needs and abilities of a child in the gross motor skills area. When introducing the programs, the main focus was given to the nearest developmental spheres. The examinations conducted in 2010 showed that the level of gross motor skills of nearly all the boys has improved. As much as four boys got all the tasks right. Improved was the number of tasks evaluated as passed (2009 – 103, 2010 – 121), as well as the tasks that all the children were capable of performing properly (2009 – 6, 2010 – 8).

## Conclusions

1. The examined children with autism can properly perform most of the tasks in the psycho-educational PEP-R profile in the area of the gross motor skills.

2. Properly conducted therapy, based on the psycho-educational PEP-R profile diagnosis and having regard to TEEACH exercises, leads to the deficits adjustment in the gross motor skills area.

3. Children with autism are often characterized by the regression in the motor skills area, which they had previously mastered.

4. Proper physical therapy allows to master the skills from the nearest developmental sphere of a child.

5. Notwithstanding the age and the therapy applied, the development of gross motor skills in children with autism goes unevenly – they are able to perform more difficult tasks (intended for older children), but at the same time are unable to carry out simple tasks (intended for younger children).

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