

THE INFLUENCE OF EARLY INTERVENTION MOVEMENT PROGRAMS ON MOTOR SKILLS DEVELOPMENT IN PRESCHOOLERS WITH AUTISM SPECTRUM DISORDER (CASE STUDIES)

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Submitted in June, 2009

OBJECTIVE: The purpose of the present study was to assess the motor skills performance of preschoolers with autism spectrum disorder after eight weeks of physical activity intervention.

METHODS: Participants included 5 children, 4 male and 1 female, from 62 to 81 months old, who were attending the identical special kindergarten. Both the quantitative and qualitative aspects of the children's performance were examined. With regards to the quantitative examination, participants were measured using the Movement Assessment Battery for Children (Henderson & Sugden, 1992). Qualitative results were obtained through personal observation. Each motor skills intervention program continued for eight weeks, and children were tested in both pre and post intervention phases.

RESULTS: Over the course of the intervention, four of the participants improved their motor skills, while one did not.

CONCLUSIONS: This study concluded that even preschool children with autism can improve their motor and social skills if they are involved in a physical activity at least twice a week. The physical activity program could improve their motor and social skills which could help them in their future development.

Keywords: Intellectual disability, motor development, autism spectrum disorder, Movement Assessment Battery for Children (M-ABC), early intervention.

INTRODUCTION

Children with Autism Spectrum Disorder (ASD) may be at risk for being physically inactive because characteristics of the disability interfere with successful participation in traditional forms of physical activity (Fox & Riddoch, 2000).

Children with ASD demonstrate:

- restricted, repetitive, and stereotyped patterns of behavior, interests, and activities;
- qualitative impairments in social interaction;
- qualitative impairments in communication (American Psychiatric Association, 2000).

These impairments may interfere with a variety of physical activity opportunities, such as riding a bike to school without supervision, playing tag with peers during recess, etc.

The health benefits of participating in adequate amounts of physical activity and the fact that health behaviors are established during childhood are well documented. It is recommended that children engage in more than 60 minutes and up to several hours of moderate to vigorous physical activity per day, 10 to 15 minutes or more in duration (Corbin & Pangrazi, 1999),

but it is unclear whether children with ASD are meeting these guidelines.

Since impairments associated with the disability may place individuals with ASD at risk for inactivity, addressing positive physical activity habits early in life could contribute to regular participation in physical activity, which leads to the enjoyment of health benefits and contributes to maximal community participation as an adult.

Taking into consideration the importance of motor skills, as well as the problems that a delay in their development can result in, the necessity for early intervention has been clearly demonstrated (Samouilidou & Válková, 2006). This is also supported by a large number of studies (Casto & White, 1984; Cowden, Sayers, & Torrey, 1998; Guralinick, 1991; Odom, 1988; Orr, 1990; Sayers, Cowden, Newton, Warren, & Eason, 1996; Stedman, 1988; White & Casto, 1985).

This study is focused mainly on the ability of children with autism spectrum disorders to participate in physical activity intervention, the probable results of measurement, the validity of the test battery and changes that will occur over the course of the intervention.

AIM

To identify the level of motor skills improvement which has occurred in children with Autism Spectrum Disorder after eight weeks of intervention in which was used some of the games from the book *Purposeful play* by McCall and Craft (2004).

METHODS

Participants

Preschoolers were recruited based upon the following criteria: a) diagnosis, b) age, and c) medication. Participants included 5 children, 4 males and 1 female. Diagnoses of Autism Spectrum Disorder were recognized in all cases. The age range was from 62 to 81 months old. The children in this study are from a special public kindergarten, founded in 1991, and located in a middle sized city in the Czech Republic. This kindergarten is a facility for children with special education needs, developmental disorders and developmental delay. The staff there has very good attitudes towards "challenged children" and is specially trained for early intervention. Children with autistic behavior, intellectual disability, communication and social disorders, aged from 6 months to 7 years of age are served there (Samouilidou & Válková, 2007).

Instrument of assessment

The instrument used for the assessment of the motor skills of the children was the Movement Assessment Battery for Children (M-ABC) (Henderson & Sugden, 1992). The selection of the M-ABC was determined using the available characteristics in order to measure partial as well as total motor disability in the motor skills of children from 4 years up to 12 years in different sets. The results can serve in future motor interventions. The M-ABC is a valid and reliable motor test and very important in identifying children with motor impairment, evaluating motor development, and assessing the efficacy of intervention (Henderson & Sugden, 1992). The Harcourt-Assessment Company has granted permission to use their internationally applied test in the Czech Republic for clinical and research purposes.

This M-ABC is developed especially to evaluate mild to moderate motor impairment. The test has a checklist (used for screening children) and a performance test. According to the authors, the test is not time consuming and children are likely to participate in the test. To assess one child with this test it takes from about 20 to 40 min. Standardized guidelines and instructions included in the accompanying manual are followed while administering this test. This ensures that the test is used in a standard way throughout the assessment and that the scores obtained can be reliably compared to those norms obtained by Henderson and Sugden when the

battery was created in 1992. Though based on United Kingdom (UK) norms, this battery has been validated for use in many European and Asian countries. As is the nature of any motor assessment, the aim is to replicate the full ability of the child in the assessment context. Due to this, it is important to try and maintain as natural an environment as possible in order for the child to perform. This is very much the case with the M-ABC. The assessment tasks are play like in nature and should lead to full cooperation from the child.

Each task on the M-ABC is scored in either total seconds taken to complete the task, e.g. threading beads, or counting the number of successful attempts out of total trial numbers, e.g. rolling a ball into a goal area. The M-ABC is organized into three domains or performance areas, covering manual dexterity (3 items), ball skills (2 items), static balance (1 item) and dynamic balance (2 items). (Compare appendix.) A special feature of the M-ABC test is the organization into four different age bands for age groups between 4 and 12 years. Children can score between 0 and 5 on each item, so that the total score will range from 0 to 40, with increased impairment associated with higher scores. The Total Impairment Score (T.I.S.) is the sum of all the scaled scores and this is then expressed as a percentile of the norm. For example, T.I.S. of 13+ would indicate that the child lies in the 5th percentile, and is therefore has a very impaired score. For the purpose of this study, the performance test was used. This allows for both quantitative analysis as well as the entering of comments on observations gathered and identified in this study as qualitative data. This manual M-ABC is not still translated into the Czech language, so it was used in the English language. Commands and communication with children were applied in Czech.

Ethical proof

The kindergarten atmosphere is typical, with warm relations between staff and parents. Staff and parents are open to new information as well as to accepting progressive approaches. The staff informed parents briefly about the measurements and the purpose and content thereof. Authors participated in a short meeting with parents. Parents signed the consent letter and asked to receive results and explanations.

Intervention

Preschool children with Autism Spectrum Disorder were involved in physical activities, twice per week, with each exercise lecture lasting for 60 minutes. The intervention program was carried out over a period of eight weeks, which meant 18 exercise lectures in total. The physical activities for this intervention were used from the book *Purposeful play* by McCall and Craft (2004), in which they introduce Early childhood movement activities on a budget, adapted for Autistic children. One hour (60 minutes) is recommended if the attractive emo-

tional content of the children games is to be respected. Besides these games, we were using different physical fitness exercises that we could adapt for Autistic preschool children. The program, as well as the assessment, were provided by the authors with kindergarten staff support.

RESULTS

In this chapter quantitative and qualitative results are presented. We will focus mainly on the quantitative results, pre and post intervention, including the Total Impairment Score (T.I.S), and the scores in the three Subtests of MABC: Manual Dexterity (MD); Ball Skills (BS); Static & Dynamic Balance (SDB). The score is recorded in points. The qualitative results include personal observations during the intervention related to the guidelines for the M-ABC test.

Participant one: P. S.

Male, 75 months old on the day of the first assessment (77 months old after intervention). His diagnosis was recognized as Asperger syndrome. He was enrolled in the kindergarten at the age of 45 months and accepted in a case study when he had already been involved in the kindergarten for 30 months. The predominant characteristics of this child are confusion, being easily distracted and not being able to concentrate during the activity. Another of his characteristics is day dreaming.

Quantitative results:

P. S. obtained a total impairment score of 27 before the intervention, which placed him below the 1st percentile for his age and, after the intervention, he had a score of 13.5, which placed him in the 5th percentile for his age. In the subtests:

- In Manual Dexterity, he scored 12 before the intervention and 7.5 after the intervention. In posting coins and at the bicycle trial, he scored better after the intervention, but in threading beads there were no differences before and after the intervention.
- In Ball Skills, he scored 5 before the intervention and 0 after the intervention. In catching a bean bag and rolling a ball into the goal he scored better after the intervention, i.e. he was without any impairment in ball skills after the intervention.
- In Static and Dynamic Balance, he scored 10 before the intervention and 6 after the intervention. In one leg balance and walking heels raised, he scored better after the intervention, and in jump over a cord he was successful both before and after the intervention.

Qualitative results:

In general, P. S. showed happiness and signs of joy during the whole time of the intervention. At the begin-

ning, he did not show much interest in physical activities, but he participated. After a few classes he became interested, and showed joy and happiness during the classes. Each activity was interesting for him and he did everything relatively successfully. In particular, he enjoyed the running. It was even possible to see a smile on his face. Exercising with a ball was also interesting for him. He did well on both of the tests, both before and after the intervention and he acted interested.

P. S. participated in 10 out of 16 classes of physical activities, which means he received 62.5% of the intervention.

Participant two: B. L.

Male, 68 months old on the day of the first assessment (70 months old after the intervention). His diagnosis was defined as childhood autism and intellectual disability, behavior impairment and a specific developmental delay of speech and language. He was enrolled in kindergarten when he was 50 months old and accepted in a case study when he had already had 18 months of involvement in the kindergarten. The predominant characteristics of this child were impulsiveness, impatience, disorganization, being easily distracted, confusion and loss of concentration arising during the activity.

Quantitative results:

B. L. obtained a total impairment score before the intervention of 35, which placed him below the 1st percentile for his age and, after the intervention, of 24, which placed him again below the 1st percentile for his age. In the subtests:

- In Manual Dexterity, he scored 12 before the intervention and 9 after the intervention. In posting coins, he scored better after the intervention. In threading beads, he scored worse after the intervention. In bicycle trial there were no differences in his performance before and after intervention.
- In Ball Skills, he scored 8 before the intervention and 0 after the intervention. In catching a bean bag and rolling a ball into the goal, he scored better after the intervention, i.e. he was without impairment in ball skills after the intervention.
- In Static and Dynamic Balance, he scored 15 before the intervention and 15 after the intervention. In the events called one leg balance, walking heels raised and jump over a cord, there were no differences in his performance before and after the intervention, i.e. there was a maximum impairment score.

Qualitative results:

Although the assessment of B. L. showed improvements in his motor skills, he didn't seemed to be interested in almost any activities during class. He needed assistance to perform any activity, mainly because he wasn't able to understand what he needed to do. He did

not concentrate and many times during the class or during the testing he was just looking around. He seemed hyperactive, was making unnecessary movements and was also speaking quietly without any specific meaning. For the last three weeks of the intervention he did show interest in some activities: running, stretching and in all activities with the ball, but he couldn't keep his attention on one activity for very long. In the last few classes, he was running around and smiling without anybody asking him to do that. During the testing procedure, he only showed interest in performing the tasks of posting coins and threading beads, in both of which he was successful. In all other tests though, he didn't show any interest.

B. L. participated in 15 out of the 16 classes of physical activities, which means he received 95.75% of the intervention program.

Participant three: M. A.

Male, 69 months old on the day of the first assessment (71 months old after intervention). His diagnosis was defined as childhood autism. He was enrolled in the kindergarten when he was 63 months old and accepted in a case study when he had 6 months of involvement in the kindergarten. The predominant characteristics of this child were impulsiveness, hyperactivity and being easily distracted.

Quantitative results:

M. A. obtained a total impairment score before the intervention of 20 which placed him in the 4th percentile for his age and, after the intervention, his score was 16.5, which placed him in the 6th percentile for his age. In the subtests:

- In Manual Dexterity, he scored 10 before the intervention and 12.5 after the intervention. In posting coins and threading beads, he scored worst after the intervention. At the bicycle trial, he scored better after the intervention.
- In Ball Skills, he scored 3 before the intervention and 0 after the intervention. In catching a bean bag, he scored better after the intervention and in rolling a ball into the goal, there was no impairment, neither before nor after the intervention.
- In Static and Dynamic Balance, he scored 7 before the intervention and 4 after the intervention. In the tasks of one leg balance and walking heels raised, he scored better after intervention, and in jump over a cord he was successful both before and after intervention.

Qualitative results:

At the beginning of the intervention, he didn't show any interest in physical activities, but this didn't last long. After a few classes he was so happy and active in all activities that it didn't matter if it was running,

jumping or just some static game. He was successful in all games, especially in jumping, which was one of his favorite activities, but, during the testing procedures, he wasn't able to concentrate, nor to exhibit eye contact. After promising him some candy for after the testing, he was motivated to finish the tests without a lot of assistance.

M. A. participated in 14 out of 16 classes of physical activities, which means he received 87.5% of the intervention.

Participant four: O. K.

Male, 64 months old on the day of the first assessment (64 months old after the intervention). His diagnosis was defined as childhood autism and intellectual disability. He was enrolled in the kindergarten when he was 58 months old and accepted in the case study when he had had 6 months of involvement in the kindergarten. The predominant characteristics of this child were passive behavior, disorganization, confusion, and support and help being essential in his education program.

Quantitative results:

O. K. obtained a total impairment score before the intervention of 39, which placed him below the 1st percentile for his age and, after the intervention, he had a score of 35, which placed him again below the 1st percentile for his age. In the subtests:

- Of Manual Dexterity, he scored 15 before the intervention and 15 after the intervention. There were no differences observed between before and after the intervention.
- In Ball Skills, he scored 9 before the intervention and 5 after the intervention. In catching a bean bag and rolling a ball into the goal, he scored better after the intervention.
- In Static and Dynamic Balance, he scored 15 before the intervention and 15 after the intervention. No differences were observed between before and after intervention.

Qualitative results:

O. K. was the only child in the group who couldn't do almost any activities. He was motivated and he concentrated, but he has a high impairment of motor skills and only moderate intellectual disability. This means that he needed more time to learn how to perform some of the activities. In the last few weeks of intervention, he finally learned to run without assistance and he liked to run. He used ball skills in that he managed to push the ball, which was impossible at the beginning of the intervention. In testing procedures, he performed well considering his abilities.

O. K. participated in 11 out of 16 classes of physical activities, which means he received 68.75% of the intervention.

Participant five: T. K.

Female, 81 months old on the day of the first assessment (83 months old after intervention). Her diagnosis was defined as childhood autism. She was enrolled in the kindergarten when she was 51 months old and accepted in a case study when she had already had 30 months of involvement in the kindergarten. The predominant characteristic of this child were passive behavior and speech problems. She does not respond independently unless motivated or prompted.

Quantitative results:

T. K. obtained a total impairment score before the intervention of 14, which placed her below the 5th percentile for her age, and, after intervention, of 16, which placed her in the 2nd percentile for her age. In the subtests:

- In Manual Dexterity, she scored 9 before the intervention and 7 after the intervention. In posting coins, she scored better after the intervention, but in threading beads and the bicycle trial there were no differences between before and after the intervention.
- In Ball Skills, she scored 5 before the intervention and 6 after the intervention. In catching a bean bag, she scored the same before and after the intervention and in rolling a ball into the goal, she scored worse after the intervention.
- In Static and Dynamic Balance, she scored 0 before the intervention and 3 after the intervention. In both one leg balance and jump over a cord, no differences were observed, she was successful both before and after the intervention. In walking heels raised she scored worse after the intervention.

Qualitative results:

T. K. was able to concentrate and was interested from the beginning in all activities during the class: running, ball games, balloons, jumping, and, at the end, the match game. She was able to perform all activities without any problems. She presented joyous behavior during every class. At the beginning she had some difficulties when doing the match game. It was a little bit hard for her to recognize some of the objects on the paper, but after a few classes she managed to do it. During the testing procedure she showed signs of joy and happiness.

T. K. participated in 6 out of 16 classes of physical activities, which means that she received only 37.5% of the intervention.

DISCUSSION

The main purpose of this research was to measure the extent of impairments before and after eight weeks of physical activity intervention in fine and gross motor

skills concerning preschool children with autism spectrum disorder. All children with ASD had movement impairment according to the M-ABC. For the purpose of this study it is more meaningful to discuss each case separately with global remarks.

Participant one: P. S. had a total impairment score before intervention of 27, which indicates a poor level of motor performance. But, after intervention, scored 13.5, which means he is on the borderline (Henderson & Sugden, 1992). His test performance was the best among all the participants after the intervention.

He improved his manual dexterity, probably because of the match game, and decreased his impairment by 30%. Physical activity intervention was developed according to the children's abilities and interests. Since the children enjoy ball games the most (and P. S. was not an exception in that area), physical activity classes were mainly focused on ball games. For that reason, P. S. scored 5 on the test of ball skills before the intervention and 0 after the intervention, which means that P. S. is without impairment in ball skills after the intervention. He also improved his static and dynamic balance. His static balance impairment decreased by 20% after intervention. His total impairment score decreased by 50% due to the physical activity intervention. If he hadn't missed six physical activity classes, he would have improved his motor skills even more. No resistance was noted during the intervention nor during the testing. A possible explanation of this is that the presence of the children's teacher in every class made him feel comfortable.

Participant two: B. L. had a very low level of motor performance. His total impairment score was 35 before the intervention. After the intervention his total impairment score was 24. The reason might be that he was present at 15 out of the 18 classes, which means he received 95% of the intervention. He also is the only child in the group who has a participation score of over 90%. He improved his manual dexterity by 20% and his ball skills score went from 9 to 0. This means that he is without any impairment in ball skills after the intervention. He demonstrated his joy during all the ball games. His dynamic and static balance didn't change after the intervention. We can speculate that this is because the intervention didn't have any balance games. His total impairment score decreased by 27.5% due to the physical activity intervention. Generally, B. L. had only limited interaction with his environment and demonstrated even more limited expressiveness during the whole intervention and testing procedure. From this perspective, the inquiry has demonstrated that social-skill deficits as well as different kinds of behavioral problems seem to cooccur with attention, motor, and language problems (Szatman, Offord, & Boyle, 1989; Moffitt, 1990; Frick, Kamphaus, Lahey, & Loeber, 1991; Kavale & Forness, 1996).

Participant three: M. A. had a total impairment score of 19, which indicates a serious developmental delay. But, after the intervention, he had a score of 16.5.

He didn't improve his manual dexterity and his impairment score is higher now than before the intervention in this subtest. A possible explanation might be his lack of concentration and eye contact during the testing procedure. His ball skills improved from 9 to 0, which indicate that he is without any impairment in ball skills after the intervention. He expressed joy during all the ball games. His dynamic and static balance improved from 7 to 4.

His total impairment score decreased by 8.75%. This finding is not excellent considering that he received 87.5% of the intervention. It could be a lack of motivation in the testing procedures that are the cause of the small size of this increase. Regarding the qualitative aspects of his performance, M. A. seemed to have a problem with comprehending the instructions. This problem, which is probably one of the main reasons that resulted in the child's low performance, could be due to an attention deficit, which is a common characteristic of autistic individuals (Frith & Hermelin, 1969; Fulkerson & Freeman, 1980; Varni, Loovas, Koegel, & Everett 1979; Wing, 1976).

Participant four: O. K. had a very low motor performance level with a total impairment score of 39 before intervention and 35 after intervention. He improved only his ball skills from 9 to 5. His manual dexterity and static and dynamic balance were without improvement. His interaction with the environment and even more limited expressiveness during the whole intervention procedure were generally very good.

His total impairment score decreased to 10%. Since he received the diagnoses of autism and mental retardation, his improvement of motor skills by 10% can be considered to be his great success. Auxter, Pyfer and Huettig (2005) stated that motor delays are very common among persons who are severely mentally retarded. Generally, the greater the intellectual disability is, the greater the lag in attaining major developmental milestones (Winnick, 2005).

Participant five: T. K. had a total impairment score of 14 before the intervention and 16 afterwards. This indicates that she had a motor delay, but after eight weeks she has even a more serious developmental delay. This means that there were no improvements in her motor skills. The reason for this is that she was only present at 6 physical activity classes out of 16, which means that she received only 37.5% of the intervention. But why is her impairment higher now than before eight weeks at the beginning of the intervention? The reason could be the fact that she didn't go to kindergarten for the last four weeks. On the day of the assessment before the intervention, she was in the kindergarten almost

every day, but at home she didn't have any activities. As a consequence of her inactivity, her motor skills impairment increased.

Global remarks

Despite the great impairment in motor development of autistic children tested in this study, they have the right to participate and succeed in motoric programs, but they need the help, guidance and support of physical educators who are really willing to help these children to improve their motor development. In fact stimulation and early intervention oriented to mobility improvement is considered to be a basic approach for the future of these children's development (Kavale & Forness, 1996; Orr, 1998; Stedman, 1988; Winnick, 2005). This is the most important finding of the study.

In general, children with autism face difficulties in certain domains of motor development. The observed characteristics described in the presented case studies are common in children with autism. This is a problem with both gross and fine motor skills; repetitive and unusual movements of the body and perceptual deficits that affect psychomotor performance in specific fine manual motor skills. Winnick (2005) and others (Casto & White, 1984; Fox & Riddoch, 2000; Odom, 1988; Stedman, 1998; Varni et al., 1979) indicate that the reason for this impairment in children's motor development can be coded as a biochemical error or a disturbance in the central nervous system. But nothing has been proven yet and new studies have to be conducted in order to distinguish what really affects and causes the deterioration of this impairment. There are also studies indicating that children with autism have problems with motor imitation, so they cannot imitate a movement in order to learn it after a period of time (Auxter et al., 2005; Casto & White, 1984; Corbin & Pangrazzi, 1999; Varni et al., 1979; White & Casto, 1985), but there are studies as well that indicate improvements in motor imitation skills in children with autism related to appropriate intervention. The benefits of early intervention, such as the mean of the improvement of the motor and social skills of children with a disability have been presented (Samouilidou & Válková, 2006). This is also supported by a large number of studies (Casto & White, 1984; Cowden, Sayers, & Torrey, 1998; Guralinick, 1991; Odom, 1988; Orr, 1990; Sayers, Cowden, Newton, Warren, & Eason, 1996). The presented research results can be classified as early kindergarten educational intervention, which seems to be considered to be background information. Even findings in the presented studies were not successful in all cases in movement and behaviour improvement, which was documented as related to the applicable diagnoses, the length of inclusion in special care and the length of the intervention program.

Moreover, such children have problems with social interaction, which means that they cannot learn some basic motor skills, as social interaction is required for this acquisition. For instance, for the acquisition of ball skills, children typically require partners to practice with, which automatically implies social interaction.

Undoubtedly, we really have to distinguish among these and plan individualized exercise motor programs as children have differing levels of impairment. They require their special needs to be met in a different manner, and they have specific motor delays that cannot be mixed together. So, motor programs can only be successful if they are adapted to the needs of particular children, contributing as a result to their mental, social and motoric condition and a healthy way of life.

CONCLUSION

Children with autism possess communication and social skill abilities that may enable them to be included with their peers in educational and recreational settings. If children with autism have the chance to be a part of early intervention programs, then it will be important for them to possess or acquire motor skills that will allow them to remain involved.

Most importantly, the differences in motor skills levels occur over time in our sample of preschoolers with Autism Spectrum Disorder involved in intervention programs. The positive development of participants is presented related to the differences between pre and post periods of the eight weeks of the intervention program. The improvement was visible in both a quantifiable and qualitative way. All five children showed their enjoyment of participating in physical activity and four out of five made very good progress in motor skills.

A minimum of eight weeks of inclusion in an intervention program (a longer period of time would be better) can improve these children's motor abilities and skills. Even the small improvement presented was a great opportunity for parents to watch their autistic children participating equally in physical activities typical for early childhood. Any intervention program has to respect the special content needed for an individual as well as individual educators' approaches, relevant to the communication needs of preschool children with autism in order to support a learning environment that gives children the opportunity to master their motor skills.

Limitations of the study are:

- participation of only five children,
- no control group,
- time limitations for the intervention,
- space limitations for the intervention,

- the translation of the ABC-M battery for preschool autistic children into the Czech language.

Regarding future research, the same intervention should be done in a bigger group of participants and with a control group, so that a generalization of the results would be acceptable and meaningful. In addition, intervention should last one year, so that the final result would show the influence of early intervention in the area of physical activity in preschool children with autism spectrum disorder.

For further research we would also recommend the testing of the validity and reliability of the ABC-M battery for preschool children with autism.

The intervention program improved the movement skills of preschoolers with autism and they, as we have already said, displayed enjoyment of the activities and interest in participating in the intervention tasks. Preschool children with autism need regular physical activity. This might help them to increase their future participation in physical activity or sport.

The impact of the presented study should be useful in the domain of adapted physical education for children with autism spectrum disorder and contribute in some way to support the improvement of motor development in such participants.

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APPENDIX

Description of age band one

Movement Assessment Battery for Children the M-ABC is a clinical assessment used to determine the extent of impairment in fine and gross motor skills. It includes eight items divided into three subtests; manual dexterity, ball skills, and static and dynamic balance; the tests are also divided into four age bands, with children undertaking different activities depending on their age. The battery has been purposely designed to identify deviant or impaired performance and will not provide information on the overall motor abilities of the child, if the skills are advanced for their age. Authors of this test have stated the purposes of its use as identification and screening, intervention planning, program evaluation and as a research tool. Although M-ABC was validated on children without disabilities, it can also be used with children with disabilities who have the ability to acquire normal motor patterns, such as children with mental retardation, autism, visual impairments, and hearing impairments. The performance test can be administered to children from the age of four up to the age of 12. In all, there are 32 items in the battery – subdivided into four age categories. These age categories are called “age bands” and are distributed as follows. Age band one (4–6 years), age band two (7–8 years), age band three (9–10 years) and age band four (11+ years). For the purpose of this study, age band one was used. With 8 tasks in each age band, these are again divided into three areas, each associated with a different area of motor development. All three areas are identical throughout the battery in order to allow for continuation from one age band to the next and to allow for the monitoring of progression as the child grows older. The three areas are manual dexterity (MD), ball skills (BS) and static and dynamic balance (SDB) and the 8 tasks within the first two age bands are highlighted below.

Manual dexterity (MD): PC – posting coins

TB – threading beads

BT – bicycle trail

Ball skills (BS): CBB – catching a bean bag

RBG – rolling a ball into a goal

Static and dynamic balance (SDB):

OLB – one leg balance

JOC – jumping over a cord

WHR – walking with heels raised

**VLIV RANÝCH INTERVENČNÍCH POHYBOVÝCH
PROGRAMŮ NA ROZVOJ MOTORICKÝCH
DOVEDNOSTÍ U DĚTÍ PŘEDŠKOLNÍHO VĚKU
S PORUCHOU AUTISTICKÉHO SPEKTRA
(PŘÍPADOVÁ STUDIE)
(Souhrn anglického textu)**

CÍLE: Účelem předložené studie bylo zhodnotit motorické dovednosti předškolních dětí s poruchami v autistickém spektru po osmitýdenním intervenčním programu.

METODIKA: Experimentu se zúčastnilo 5 dětí, 4 chlapci a 1 dívka ve věku od 62 do 81 měsíců. Všichni navštěvovali stejnou speciální mateřskou školu. Šetření zahrnovalo jak kvantitativní, tak kvalitativní aspekty. Kvantitativní data účastníků byla měřena testem M-ABC (Baterie motorického vyšetření dětí) podle Henderson a Sugden (1992), zatímco kvalitativní data byla získána pozorováním. Intervenční pohybový program trval osm týdnů a děti byly měřeny před a po intervenci.

VÝSLEDKY: Čtyři děti po programu vykazovaly zlepšení dovedností, jedno dítě nikoliv.

ZÁVĚRY: Studie uzavírá, že i děti s poruchou v autistickém spektru mohou dosáhnout zlepšení v motorických i sociálních dovednostech, pokud jsou zařazeny do intervenčního pohybového programu minimálně dvakrát týdně, což může napomoci jejich dalšímu rozvoji.

Klíčová slova: mentální postižení, motorický rozvoj, porucha v autistickém spektru, M-ABC (Baterie motorického vyšetření dětí), raná intervence.

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