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Original article

CHALLENGING AUTISM WITH PHYSICAL THERAPY

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Abstract

Autism spectrum disorder (ASD) is characterized by impairment in social communication deficits and the presence of restricted and repetitive behaviors, interests, or activities. In Romania the prevalence of ASD is on a high rate, around 1/68 children is affected by ASD. This study employed an intervention involving motor skills training, whole body exercise, sensory stimulation activities and games to improve manual motor skills in a group of 22 children (age between 6-11).Thischildrens with ASD were engaged in this intervention for 50 minutes, twice per week for 4 months . Bruininks-Oseretski Batery (2005) was used to measure running speed and agility, balance, bilateral coordination, strength, response speed, visual motor control, upper limb speed and dexterity. The results indicating improvement in motor skills were evident but participants had difficulties to reach a high score in tasks like running speed and agility and response speed.Despite this, many findings of practical significance emerge from this study, which demonstrate a viable model for implementation of similar programs with multiple participants.We also used Sensory Profile questionnaire to evaluate children's sensory processing patterns at home, school, and in the community.

Given the importance of motor skills for independence, safety and quality of life, more research on activities that promote the development of this skills in children with ASD is necessary for a complete rehabilitation.

Understanding how to facilitate motor skills and sensory processing development in these individuals will assist them in becoming more active in the community and more independent around their homes.

Keywords:Autism, motor skills, sensory processing.

Introduction

. A growing body of evidence from research on autism spectrum disorder (ASD), confirms a substantial sensory motor component in ASD. Yet, policy and practice lag behind in recognizing the potential contributions of physical therapists in research, practice and education related to ASD. As the incidence rate of autism spectrum disorder increases, so does the interest in the health and wellness of these individuals. Children with autism spectrum disorder are at higher risk of inactivity than their peers with and without disabilities (Rimmer & Rownald, 2008), risk of obesity is as much as 40% greater in children with ASD (Curtin, Jojic and Bandini, 2014).

ASD is characterized by deficits in social communication and restricted or repetitive behaviors, interests, or activity, making participation in physical activities challenging (Pan, Frey, 2006). Children with ASD also have unique sensory processing patterns that affect participation in everyday life activities (Ismael, Mische Lawson, Cox, 2015). Researchers have found relationship between sensory processing patterns and play and recreation choices for toddlers, children and teen affected by autism The literature suggests that children's participation increases when their unique sensory processing patterns are supported within activities (Dunn, Cox, Foster, Mische-Lawson, Tanquary2012). A large percentage of autistic children struggle with sensory processing challenges. It could show up as an aversion to touch or clothing, an unwillingness to eat food s with certain textures, or an inability to cope with noisy environments. These sensory sensitivities can cause a lot of stress to both the child and the family, and fuel fears about the child's ability to attend school, make friends, or eat enough nutrients to be healthy.

In a motivating and harmoniously positive environment, the meeting between children with autism and movement is beneficial, compensatory and curative (Geambasu, 2015).

Physical therapy practitioners promote participation in meaningful activities, including leisure by matching individual strengths to activities and by modifying and adapting activities to match personal factors (Pizzi, Vroman, 2013). Participation in healthy, meaningful leisure

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activities can increase quality of life, physical wellness, mood and well-being (Penedo, Dahn, 2005). Moreover, participation in healthy, physically active leisure activities can increase health and decrease the risk of obesity (Dugan, 2008). For children with ASD, finding meaningful physical activities may not only decrease risk of obesity and related condition but also provide a sense of meaning and purpose (King, Law, Hanna, King, Hurley, Rosenbaum, Petrenchik, 2006).The therapeutic approach of the child with autism includes 3 plans: the social interaction plan, the self image and the physical condition plan (Geambasu, 2015).

Method

This study employed an intervention involving motor skills training, whole body exercise, sensory stimulation activities and games to improve manual motor skills in a group of 22 children (age between 6-11).Thischildrens with ASD were engaged in this intervention for 50 minutes, twice per week for 4 months. Participants were not excluded based on race/ethnicity or gender.All childrensenvolved in study are from Bucharest, Romania they are from Special School for Deaf no. 1. The study started with first evaluation in september2018.

Prior to the experiment, participants were introduced to the task through both verbal description and practice at the highest level of coherence. We applied different exercises and tasks designed to evaluate the movement of the lower and upper limbs, reaction time , goal directed walking , the awareness of the body , fine motor skills and others. The final evaluation took place on january2019.

Bruininks-Oseretski Batery was used to measure running speed and agility, balance, bilateral coordination, strength, response speed, visual motor control, upper limb speed and dexterity. We will present the results of the subtest fine motor skills.

We also measured the number of stepsper day using Fitbit Zip Wireless Activity Tracker.

Findings

BRUININSK-OSERETSKI TEST- FINE MOTOR SKILLS SUBTEST

UPPER LIMB COORDINATION

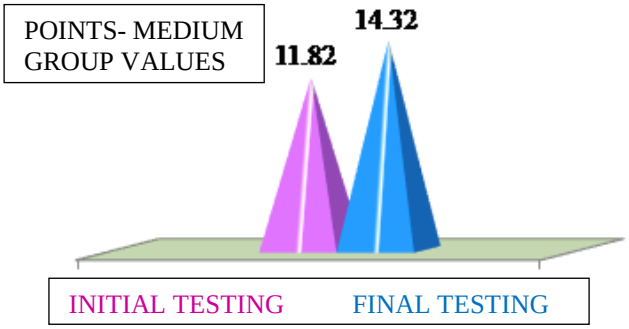
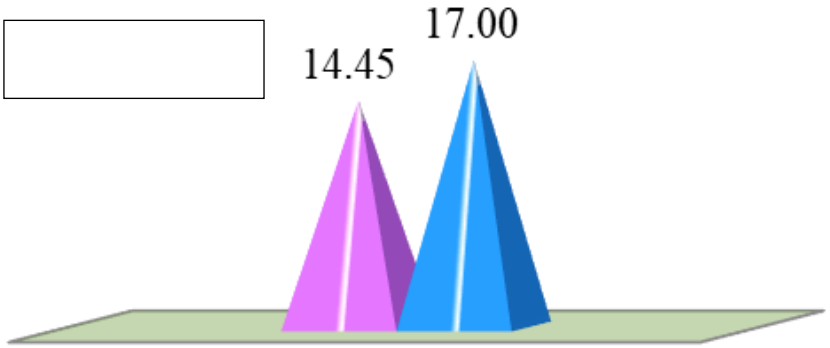
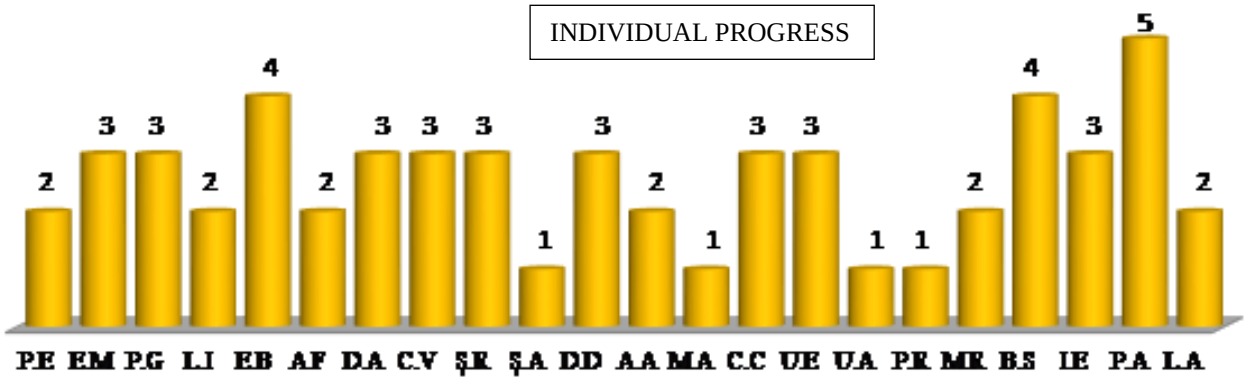


Figure 1. Upper limb coordination – grup values - a) initial testing b) final testing

VISUAL MOTOR CONTROL





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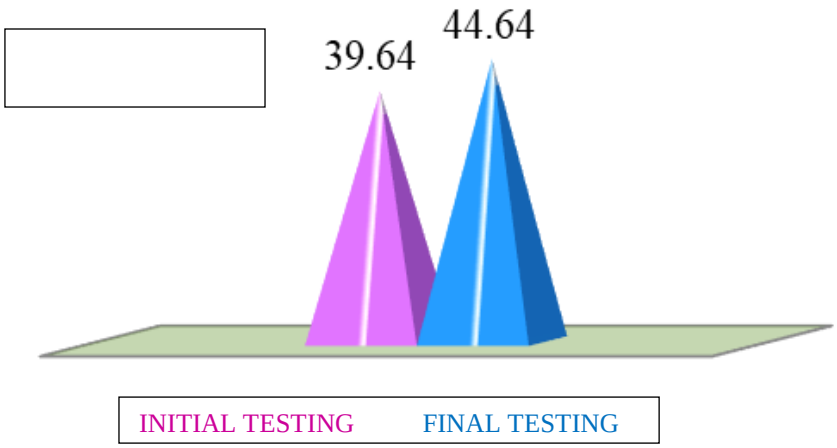
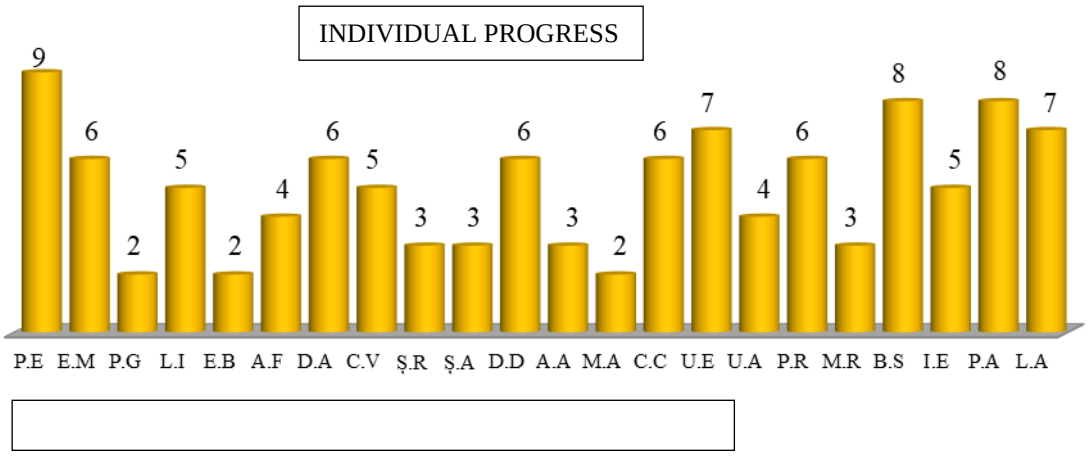
UPPER LIMB SPEED AND DEXTERITY





RESPONSE SPEED

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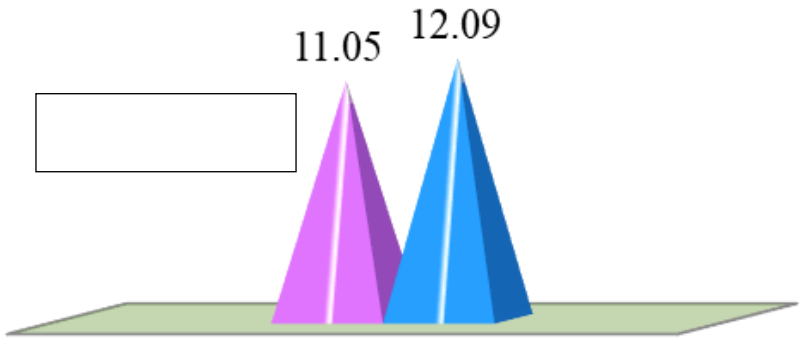
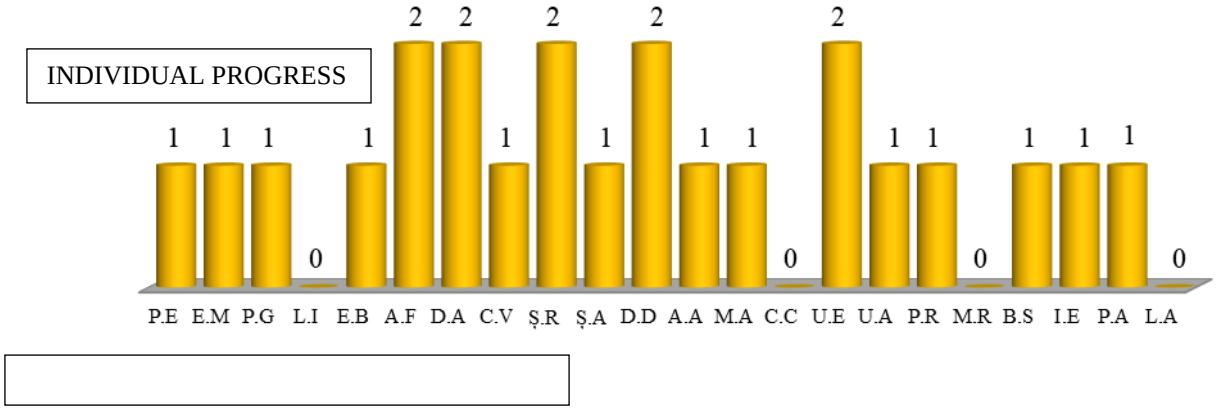
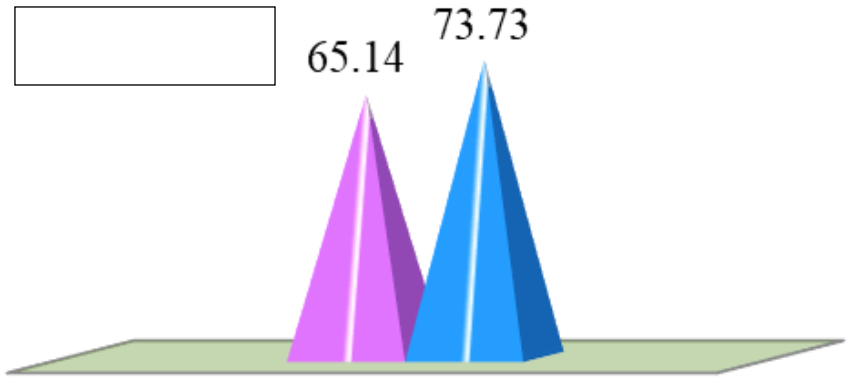




FINE MOTOR SKILLS SUBTEST TOTAL



NUMBER OF STEPS PER DAY USING FITBIT ZIP WIRELESS ACTIVITY TRACKER

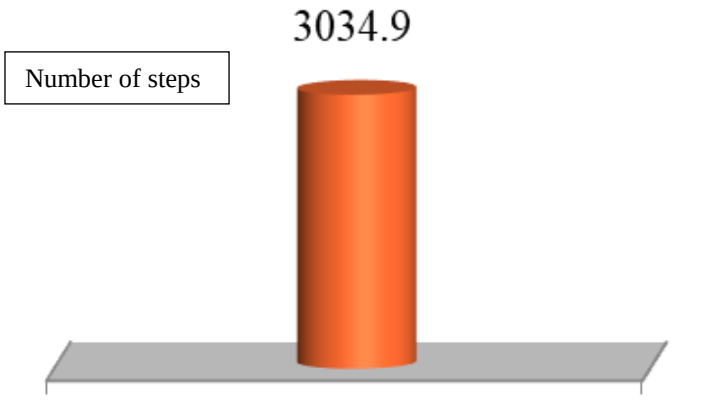


Figure 11. Number of steps performed daily –group average

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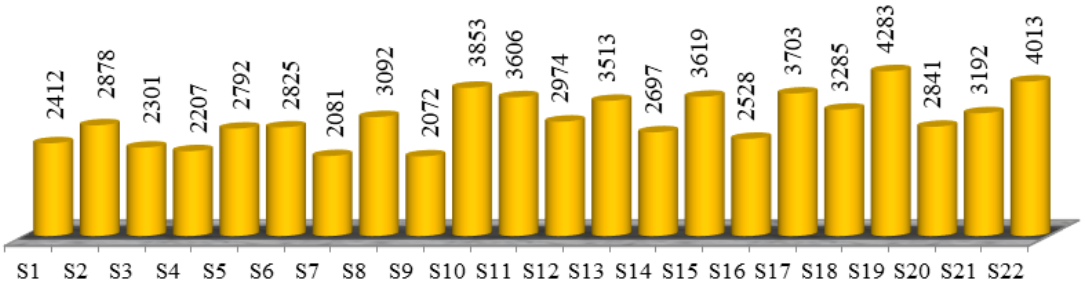

Results

A total of 22 participants with ASD (*n* = 18 males and *n* = 4 females) between the ages of 6 and 11 years (mean = 8.5 years) were included in this study. The purpose of this study was to examine whether participation in a 4 months intervention involving motor skills training would improve running speed and agility, balance, bilateral coordination, strength, response speed, visual motor control, upper limb speed and dexterity. We will present the results of the subtest fine motor skills according to Bruininks-Oseretski Batery. The results indicated that as a group, the participants had the best improvement results for subtest fine motor skills where they improve with 8.59 points. Upper limb speed and dexterity subtest shown an improvement of 5 points. For the subtest upper limb coordinationthe groupobtained an improvement of 2.5 points. For visual motor controlsubtest the results indicated an improvement of 2.55 points/ group. The lowest rate of progress were enrolled for the subtest response speed where the group improve only with 1.04 points. This findings, although discrepant, is encouraging given the potentially to individuals affected by ASD to gain autonomy and improve the quality of life.

It is important to note that the practical implication of this study as it relates to physical education. Therefore, we encourage parents, teachers and other specialists involved in rehabilitation to include students with ASD in physical fitness and physical activity assessments and provide them with individualized information about associated behaviours that can impact their health into adulthood.

Conclusions

Data analyses were performed using Excel program and graphics generated by SPSS V23 (Statistical Package for Social Sciences). We measure the parameters from initial and final evaluation for fine motor skills subtests :bilateral coordination, response speed, visual motor control, upper limb speed and dexterity.

We can formulate the following conclusions:

►We notice a significant improvement in the coordination of upper limbs at the end of the training period. Individual progress can be seen in figure no. 2, the differences taking between 1 and 6.
►According to the average number of points obtained at the end of the training period, the visual control has a significant improvement . Figure no. 4 shows individual progress where differences vary between 1 and 5 points. ►The mean score obtained in final testing shows a statistically significant improvement for upper limb speed and dexterity. The individual progress is graphically illustrated in figure no. 6 where scoring differences vary between 2 and 9 points.
► At the end of the training period, a statistically significant mean score was obtained, indicating a qualitative score for response speed compared to the initial test. The individual progress is shown in the graph in figure no. 8. Differences vary between 0 and 2 points, 4 of the subjects have not progressed at the end of the training period. ►The increase in the mean score in the final test shows a statistically significant improvement of the overall fine motor skills subtests as compared to the initial testing. Individual progress can be seen in the graph in figure no. 10 where the differences range between 4 and 14 points.
► The average number of steps / day of subjects is equal to 3034.9. The recorded values vary between 2072 and 4283, resulting in an amplitude of 2211 steps. The number of steps taken by each subject is relatively homogeneously dispersed around the average. In the graph in figure no. 11 shows the average number of steps at the group level and in the figure no. 12 average number of steps per day per subject.

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