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The effect of individualized exercise training applied to autistic individuals on motor skills development

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Abstract

The purpose of this research is to examine the effect of motorized development of individualized exercise training that is regularly applied to autistic individuals. The study included 10 boys with an average age of 11.7 (±1,9) who were educated at the Agir Vivre L'autisme school in Paris and 18 boys and 2 women with an average age of 13 (±2,9) who were educated at the Izmit Autism Sports Club Association in Kocaeli. It covers a total of 30 children. The practice lasted eight weeks, five days a week and two hours a day. Wilcoxon test, which is a nonparametric test, was applied to the obtained data after descriptive statistical procedures (mean, standard deviation) in the SPSS 21.0 package program. The meaning level was taken as 0.01. A statistically significant difference was found between the pretest-posttest results of all the parameters of the study group ($p < 0.01$). As a result of this research, it can be stated that the physical activity program which is applied regularly, systematically and correctly to the children with autism makes an important contribution to the development of the children's motor skills.

Keywords: Autism, physical activity, motor development

INTRODUCTION

Autism spectrum disorder (ASD): It is a neurological disorder that can cause problems related to thinking, emotion, language and communication with other people (American Psychiatry Association, 2014; Darica et al., 2005, Lovaas, 2005). ASD effects and severity of symptoms are different for each person. It causes negativities for children's both intelligence and motor development levels (Korkmaz, 2017; Tufan, 2006; Wing, 2010).

ASD is seen in every 59 children (59/1) according to research made by "Diseases Control and Prevention Center" on 2018, April. These numbers were stated as 68/1 in 2016, 88/1 in 2012, 110/1 in 2010 and 125/1 in 2008 (www.autismspeaks.org). ASD's etiology hasn't been known clearly yet. It has been thought that genes of a children or environmental factors are effective (Benson, 2016).

Diversifying therapies help nerve cells in brain to develop and physical activity helps blood vessels in brain to develop (Baniel, 2015). Physical activity programs for children make positive contribution on behavior problems, environment perception capacity, becoming independent depending on mobility, developing self-confidence with feeling to succeed and social sharing (Alp and Camliyer, 2016; Yanardag, 2007).

As physical activity programs, which are assumed as the basis for being healthy, are important for us, it is required to have same idea for autistic individuals. They can have an inactive life due to disadvantages of their life. Obesity and emaciation are in secondary hazards group due to appetizing features of

medicines taken and their fondness to junk food. Life of children who are psychologically affected by this will be anxious and harder.

Motor skill progresses to more complicated skills more than things children do in natural environment (Guler, 2017). Children don't want to maintain actions they are not successful at (Pelligrino, 2009). Insufficiency of basic motor skills of children studying at school and pre-school leads to a problem of special motion development at adolescence and adulthood stages. Low performance at basic motor skills is an important factor affecting participating in physical activity and social activities negatively in both childhood and adulthood stages (Hands et al., 2009). Childhood is assumed as the most important period in motor learning. Children learn fast with games in this period. They automatically develop new skills by combining what they see with their imagination in fields they are talented. Developmental stages in individuals with ASD may not always proceed with natural methods. All children have different features. This situation makes us think that it is more advantageous to lecture with individual education systems (Yanardag and Yilmaz, 2017).

Most of the children with ASD have motor development retardation to fulfill their life skills. Fine motor skills and gross motor skills are weak and have difficulties to coordinate parts of body (Torres and Whyatt, 2018). Therefore, they have difficulty to fulfill daily life skills in order to have quality life. It is helpful to do lower motor skill exercises in order to put on and to take off their clothes, to button up their clothes, to zip up, to sit down and get up at toilet, to walk, to open the door, to climb up stairs, to make up their beds, use of fork and spoon and do such activities better.

The aim of this research is to examine the effect of individualized exercise training regularly applied to autistic individuals on motor development**.**

METHOD

Research Group

Research covers 30 children including 10 boys with autism diagnosis with 11,7 (±1,9) age average studying at Agir Vivre L'autisme in Paris and 18 boys and 2 girls with autism diagnosis with 13 (±2,9) age average studying at Izmit Autism Sports Club Association in Kocaeli.

Measurement Instrument

Materials and centers used in research: in France, Paris, Agir Vivre L'autisme's gymnasium room; Voil balance branded treadmill, gymnastic mat, 20 wilson trainer ball, Wilson tennis ball bucket (500x500), selex branded training bar and perforated funnel, selex junior branded balance board were used. Cosfer CSF1753 2,5 Hp motorized massage treadmill, gymnastic mat, 20 wilson trainer ball, Wilson tennis ball bucket (500x500), selex branded training bar, perforated funnel and balance board were used in Izmit Autism Sports Facility in Turkey, Kocaeli.

Method

Applications lasted for eight weeks in total including five days in a week and two hours in a day. Studies proceeded in parallel in both countries. Studies were applied one-to-one. Before starting to make research, 01/02/2018 dated and 2017/383 numbered ethics committee approval were received from Kocaeli University Noninvasive Clinical Researches Ethics Committee.

Development of motor skill capacities including balancing actions (flamingo balance), actions (horizontal jump, treadmill, plank, sit-up, and vertical jump) and manipulative actions (ball catching-

throwing) was considered important in research. Studies were designed by the help of special education specialists. Applied behavior analysis and modelling were used in educational methods. Movement forms were applied with individualized education programs chosen in accordance with autistic individuals' development levels and supported with educational games.

Data Analysis

Non-parametrical test; Wilcoxon test was applied after definitive statistical transactions (average, standard deviation) in SPSS 21.0 packaged software to obtained data. Semantic level was assumed as 0.01.

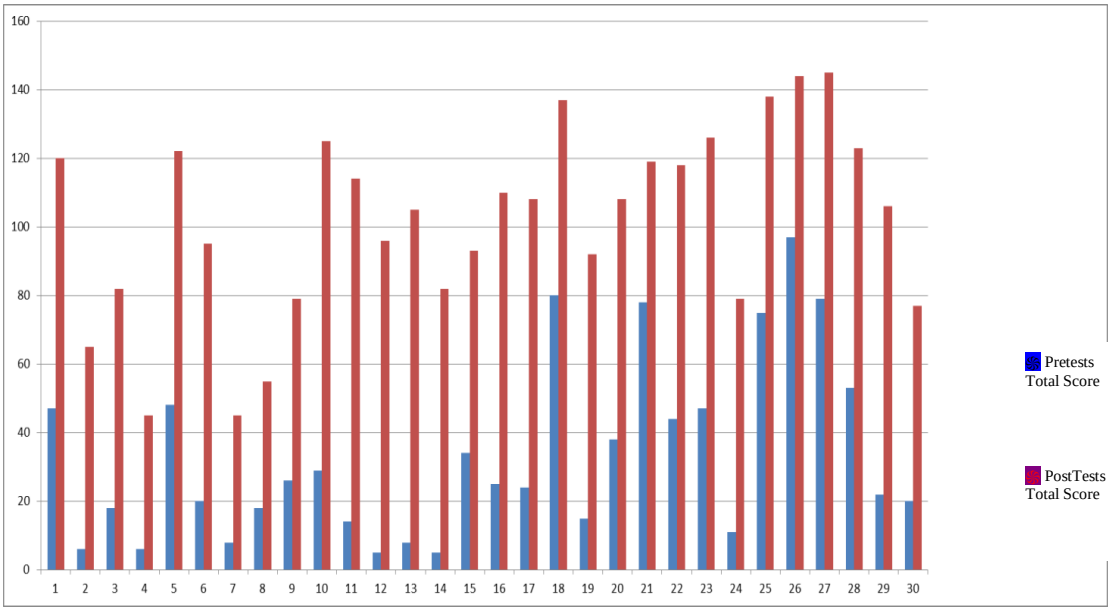
RESULTS

Table.1 Wilcoxon Test Results of Parameters Applied to Individuals with ASD

Parameters	**Pretest Mean ± SS**	**Posttest Mean ± SS**	**Z**	**p**
Flamingo balance test left	6,27 ± 6,0	16,60 ± 4,9	4,707	,000*
5cm horizontal jump	2 ± 0,83	2,93 ± 0,25	4,053	,000*
5cm vertical jump	1,83 ± 0,83	2,90 ± 0,40	4,137	,000*
Tennis ball catching right	1,00 ± 0,00	3,00 ± 0,59	5,215	,000*
Tennis ball catching left	1,10 ± 0,30	2,83 ± 0,59	5,058	,000*
Tennis ball throwing right	1,83 ± 1,34	3,00 ± 0,0	4,742	,000*
Tennis ball throwing left	1,57 ± 1,13	3,00 ± 0,0	4,915	,000*
Plank / sn	3,50 ± 5,04	20,23 ± 10,99	4,546	,000*
Sit up / number	4,13 ± 6,54	16,57 ± 10,96	4,710	,000*
Treadmill test	4,70 ± 3,81	9,83 ± 0,91	4,117	,000*

*(p<0.01)

A statistically significant different was found considering pretest posttest results at all parameters as you can see in Table 1 (p<0.01).



Graphic .1 Difference between total pretest and posttest scores of participants

Total points of tests applied to thirty students with ASD included in research are shown in Graphic 1. There is no child with ASD who does not make progress according to this graphic. There are 3 children showing progress difference under 50% considering general average. It is seen that children with less score made more progress. No significant difference is noticed when observing development of children in Turkey and France.

DISCUSSION and CONCLUSION

Statistically significant difference was found between pretest and posttest in study made in order to examine effect of regular physical activity made for individuals with ASD ($p<0.01$). Regular, systematic working program applied and planned in accordance with children's developmental features, knowledge, skill levels by setting solid goals may be the reason. Furthermore, making effort to keep attraction levels of children high by doing motor development activities in application program accompanying with frequent repetitions and games may be the another reason.

We didn't observe differences related to motor features of children in research we made in two countries and with different children. It was observed that speed of learning daily activities of children increases in parallel with development of their motor skills as a result of researches made in both countries. Besides their duration of tolerance increased and less behavioral problem was encountered.

Determined that children involved in exercise program are better than ones who don't do exercise in terms of social communication, anger management and being adapted to differences in environment in study they conducted with instructors working with five-six years old individuals with ASD (Karakas et al., 2016). Observed that physical capacity of children in experimental group develops and their behavioral problem reduces in 1-weeks study they made with children with ASD by dividing them into control and experimental groups (Alp and Camliyer, 2016). Emphasized the importance of sports in life quality of children by attracting attention to similar features of physical activities and thinks that sports activities develop social interaction, strengthen self-esteem and are entertaining. Furthermore he thinks that it creates countless opportunities for learning (Massion, 2006).

It is required to consider challenges related to bringing sports to autistic individuals. As educations are individual and special, costs are increasing. It is stated that people to work in this field have to have knowledge concerning many disciplines and apply multi-disciplinary education or therapy system and it is hard to educate personnel with these qualifications (Loann and Melanie, 2017). It is thought that sportive activities with the participation of families organized in a right way may make positive contribution to psychological state of the children. In that point, more than 90 % psychological disorders were determined in article examined psychological disorders accompanying with autism (Mukaddes and Tanidir, 2015). They think that when these psychological disorders are treated, then life quality of person and ones taking care of him/her will increase. We observed that children in our study were reacting (to shout, to cry, to react, to throw materials) when they first started sports exercises, but they came mentally ready to lessons with a smile as long as they succeed. Some students had positive changes in food habits.

Determined that regular physical activity program increases physical capacity, also reduces behavioral problems and develops social adaption in research they made with 40 children with ASD in 5-8 age range (Keskin et al., 2017).

Determined that psychomotor features of both groups develop but there is no significant difference between groups when they divide working group into two parts as pool group and land group and apply exercise program in research with universe group including 8 people (Yanardag et al., 2009).

They examined 55 studies in physical activity content analysis applied for people with mental disabilities. They concluded that physical activity capacity of children with mental disabilities doing regular physical exercises develop in all studies (Yilmaz et al., 2015).

Stated that motor development disorders are common especially in autistic individuals, that we can obtain concrete data in terms of early diagnosis and treatment when correct motor test measurements are developed and their speech disorders and social adaptation problems may be reduced with these data. We observed those universe groups that we can qualify as mobile are more talented at sports in our study (Rujuta et al., 2018).

We think that there is not sufficient study in literature concerning this field of study. However, to attract attention to two facts especially emphasized in both our studies and studies in literature: fact that behavioral problems making life difficult reduce and that positive developments in social interaction exist as a result of physical activity programs made for children with ASD.

As a consequence, it is possible to say that physical activity program applied regularly, systematically and correctly to autistic children make an important contribution to motor development of children.

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