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Teaching of Swimming Technique to Children with Autism: A Pilot Study

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Abstract

The purpose of our research was to evaluate the effectiveness of using a 24-week swimming and aquatic exercise programme to a girl with autism spectrum disorders (ASD). Participant was 8 years old a girl with high- functioning autism spectrum disorder. The programme was held twice per week for 40 minutes per session. The training programme was composed swimming skills, cardio respiratory endurance, muscular endurance and, mobility skills. Swimming and aquatic exercise training programme were performed by using a constant time delay procedure (4 sec.). Findings of our study revealed that participant acquired the basic swimming skills and swimming styles of free, backstroke and breaststroke successfully through using an individualized swimming and aquatic exercise training programme.

Keywords: Autism; Swimming; Exercise

Introduction

Autism is neurobiological disorder and among the more common and serious of neurological disorders of early childhood (1). In about 70% of children with autism seen moderate or severe mental retardation. Today, the autistic patients are divided into two groups, namely High Functioning Autism (HFA), the members of which present normal or above-normal general intellectual functionality and have a IQ level higher than 70-85, and Low Function Autism (LFA), the patients of which have lower score levels than the limit number (2,3). A treatment that will completely vanish all the symptoms of autism has yet to be found. About two thirds of the autistic adults have serious lack of ability. These individuals lead completely dependent or semi-dependent lives (4). Only 1 -2 % can have an independent life whereas 5 – 10% can have a dependent life on the edge. Therefore, the aim in the treatment of the autistic individuals is to decrease destructive behavior, help acquire the language, communication skills and self- care ability, and support learning and physical development. These aims can best be attained through programs that are very well structured

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and that ascend the individual abilities to the maximum level, following a detailed evaluation that determines the strengths and personal needs of the individual (3).

Physical activity doing *regular* and adequate levels is important for children to promote fitness and health and prevent chronic conditions (5). In addition, it has positive effect for improving social development and in reducing stereotypical movements of individuals with autism spectrum disorders (ASD). Many researches report diminished motor skill level of individuals with ASD. Motor functioning is an area that has been neglected in the autistic individuals (6). It has been reported that children with autism score below average in the motor test (7). Berkeley et al. (2001) identified that 73% of the autistic children of 6- 8 years of age participated in the study were placed in the low performance category in terms of motor abilities and object control (8). In this respect, the scientific studies conducted indicated that the physical activity and training programs applied to autistic children positively contributed to the physical and cognitive development of them. Participation in the physical activity enhances the social development of the autistic individual and moderation of fixed behaviors. Scanning the literature, it is seen that Levinson and Reid (1933) indicated that training contributed to moderating fixed (stereotypic) behavior (9). In another study, in the literature research conducted by Kern et al. (1998), exercise and physical activity resulted in an increase in the rate of suitable responses given by autistic children (10). However, it was indicated in numerous studies that enabling autistic individuals to participate in the physical activities was considerably difficult (11, 12). Therefore, it may not be possible to implement standard templates in autism (13). Scholars have stressed it as a shared formal opinion that a uniform educational approach is not suitable for all autistic individuals (14). Today, various special educational techniques such as Lowaas, TEACCH (Treatment and Education of Autistic and Related Communication Handicapped Children) and PECS (Picture Exchange Communication System) are applied in the education of autistic individuals (3). Due to a wide range of individual differences, working with autistic children, individual educational planning is required in testing, physical training and sports (15).

In the scientific research studies conducted in the recent years, it has been reported aqua training and swimming training made considerable contributions to physical, intellectual and affective development of autistic individuals (16, 17, 18). In this context the purpose of our research, it was to provide descriptive information about the first year of implementation of a education and training programs that using constant time delay procedure to teach foundation

swimming skills in different styles for a girl with HFA. Additionally this research is a study aiming at creating a basis for future research.

Case

Elif is a 9 year-old female child, who was diagnosed to be a high functioning autistic at the age of 1,5 by a child psychologist, with a height of 141 cm and weighing 34 kg. Both parents are university graduates and she is the only child. The participant has a limited eye contact before training. She has a tendency to stay alone at all times. She does not respond to the call of her name. She expresses her will and needs through non-frequent mimes or getting help from her mother and going next to the object she wants. She can meet her daily self-care needs (dressing, feeding and bathroom routine) only with the instruction and physical help of her parents. Though very limited, she utters statements of only one word. Since she was 7, Elif has been regularly going to a special educational institution three times a week. Besides, she goes to a state school for the purposes of inclusive education. Nevertheless, as her mother indicated, she does not participate regularly in the inclusive education. According to her teachers, she experienced she had difficulty in fitting in the first years of her education and had learning and speaking difficulties compared to her other peers with high function autism. Her mother states that Elif had all stereotypic behaviors seen in autistic children. Before the current study, Elif did not have a regular physical activity experience. Besides, despite all the efforts made by her mother, she did not step into sea or a pool until she was 8.

Trainer

A female trainer who graduated the vocational school of physical education and sports, currently doing her PhD, having the certificates of swimming trainer and lifeguard, and who made scientific research in special education applied the pre-planned training.

Environment

So that she can have personal relationship with the trainer in the first phase of the study, except for physical activities, all the educational applications were made in a semi-olympic swimming pool of a university. Training program was implemented on days and at hours when the pool was not busy.

Data Collection and Analysis

Before and during the educational period such qualitative and quantitative data collection techniques as document investigation, observation and interview were applied. In this respect, the file including was made up of the data relating educational process, and details of the participant and her family, observational notes of the researcher and minutes of

the meetings gathered with the family and other relevant people. Data record forms depicting the personal development scales of the participant during the individualized training program were also scrutinized. Apart from these, interviews of about 1 – 2 hours made every month with the family were used as a source of information. The notes made by the trainer during sessions were recorded, and the changes took place in the training and in the child throughout the training period were closely examined. Besides, the reports sent by the psychiatrist of the child were used to follow the changes emerged in the child's abilities and performances.

Implementation

Before and during the educational period qualitative data collection techniques like document investigation, observation and interview were applied. The first phase of the study started with the child's mother's application to our institution with the desire to enable a swimming training for her kid. In the first interview with the mother, she indicated that she earlier tried the same thing in other institutions, but could not succeed in persuading the trainers because of Elif's negative stance against strangers and the pool itself. Before starting the training program, detailed information regarding the child's disease, developmental situation and personal aspects was gathered from the mother, teachers and the doctor of the child. In the light of the gathered information and literature examinations, an individualized aquatic and swimming training program was planned for Elif. An expert trainer applied the prepared program for a period of 24 months. A skill control list prepared by the trainer in accordance with her special experiences in the field and other skill checklist used in the field was used so as to be able to monitor the training process.

In the implementation of the program, "*constant time delay procedure*" was used suitable with "*TEACCH*" (Treatment and Education of Autistic and Related Communication Handicapped Children). 4 seconds were given to the participant to react. When the child reacted correctly within 4 seconds following the given instruction or shown behavior, the reaction was deemed as correct reaction and correct reactions were reinforced through verbal stimuli. When the child's reaction within 4 seconds did not match the given instruction or shown behavior, the reaction was taken as incorrect reaction. Incorrect reactions were ignored and the trainer tried the same move again. So as to adapt the participant to the training program, to have a personal relationship with her trainer and identify her developmental needs, only two hours were spent a week in the pool. The trainer, who worked with the child for a month after May, decided to increase the number of training hours from 2 to 4 in June. The underlying reasons of this was the fact that the trainer, psychiatrist and the mother

indicated that the child positively responded to the training program and that 2 ours a week could be insufficient to meet the developmental needs of the child. Apart from this change, video records of the trainer's personal swimming experiences were given to the mother so that she lets the child watch them at home. It was considered that, the actual training would be supplemented by these videos that she would watch in her own, familiar environment. The program was initially planned for a period of six months (Table 1).

Table 1. The training procedure implemented

Type of Exercise	**Duration**	**Contents**	**Objective**
1st-10th Week: Warm-up			
Walking forward and backwards Leg stretching sideways	20 min.	Walking forward and backwards on a fixed track around the pool	Warm up and Dynamism
Main training program **1. Cardio exercises (warm up and getting used to water)**			
Doing"*legkicks"* by the pool	30 sec. x 3 times	Realizing the leg movement correctly in the water and by the pool	Realizing the leg stroke correctly in the water
Doing"*run in place"* in the kids' pool		Realizing run in place without losing balance in the kids' pool	Accomplishing run in place in the kids' pool
Doing"*jumping jacks"*in the kids' pool	2 x 10 times	Realizing jumping jacks without losing balance in the kids' pool	Accomplishing jumping jacks in the kids' pool
2. Set (teaching basic techniques)			
Breath exercises in the kids' pool (water pipe)	5 x 20 times	Breath exercise in the kids' pool	Maintaining correct breath in the water
Face down leg stroke on kickboard	30 sec x 3 times	Face down leg stroke on kickboard in the pool	Accomplishing backwards leg stroke
Face up leg stroke on kickboard		Face up leg stroke on kickboard in the pool	Accomplishing leg stroke forwards
3. Set cool off			
Arm and leg stretching by the pool	5 min	Relaxing the stiffened muscles through stretching exercise	Developing intramuscular and inter-muscular coordination of leg and arm muscles
11th-24th Week Training program **1. Cardio exercises (general and special warm up)**			
Doing"*legkicks"* by the pool	30 sec. x 5 times	Realizing the leg movement correctly in the water and by the pool	Realizing the leg stroke correctly in the water
Doing"*run in place"* in the kids' pool		Realizing run in place without losing balance in the kids' pool	Accomplishing run in place in the kids' pool

continued

Table 1. (continued) The training procedure implemented

Type of Exercise	Duration	Contents	Objective
Doing*"jumping jacks"*in the kids' pool	3 x 10 times	Realizing jumping jacks without losing balance in the kids' pool	Accomplishing jumping jacks in the kids' pool
4. Set (teaching basic techniques)			
Breath exercises in the kids' pool (water pipe)	5 x 30 times	Breath exercise in the kids' pool	Maintaining correct breath in the water
Face down leg stroke on kickboard	30 sec x 15 times	Face down leg stroke on kickboard in the pool	Accomplishing backwards leg stroke
Face up leg stroke on kickboard		Face up leg stroke on kickboard in the pool	Accomplishing leg stroke forwards
Floating on the water		Exercises for floating on the water without aid	Accomplishing floating without aid
Learning arm technique of *"bye bye"* action		Application of arm technique through bye bye while string legs in the pool	Learning the arm technique for free style swimming,
5. Set cool off			
Arm and leg stretching by the pool	5 min.	Arm and leg stretching by the pool	Arm and leg stretching by the pool

At the end of the implemented training program, it was reported that considerable positive developments took place in the child, psychomotor, communication and language development being the most prominent ones. In parallel with that, after evaluating the results of development and psychiatric control and with the demand of the mother, Elif's desire and her improved swimming abilities, the program was also improved and the timing was rescheduled in the second phase. As it would be very crucial for the kid's development, the trainer suggested that the weekly training hours be doubled. At the end of August the training hours were rescheduled and increased to 8 hours a week.

Current status of the child

The study includes information about the child's swimming training within a period of 6 months. As of March 2014, the participant is 10 years old. She currently trains for 8 hours a week with her trainer. The educationalists working with the kid and the mother indicated that she reached the same levels with her peers in terms of academic, psychomotor, social and self-care skills. Besides, they stressed that Elif's communicative, speech and social skills significantly improved, and her stereotypical behaviors receded to a considerable level. Despite all these, they stated that Elif still experienced social and communicative difficulties with strangers in unfamiliar environments. According to the trainer's evaluation, the participant who did not come close to the pool at first now can successfully swim in 3

different styles (freestyle, backstroke and breast stroke) and she is physically quite active in the pool.

Result and Discussion

With the current study the influence of a swimming program and aqua training, which was used in the education of a high performing autistic child on the child's development and physical fitness level was evaluated. At the end of a training period of 24 months, it was observed that a considerable improvement was realized in the rate of suitable reactions given to clues with fixed waiting periods, as well as diminishing ritualistic behaviors in the daily life of the child. It was also seen that the participant acquired the basic swimming skills, and swam successfully in free style, backstroke and breaststroke styles as a result of the individualized swimming and physical activity program. Besides the mentioned acquisitions, it was detected that the applied program resulted in a decrease in the frequency of autism symptoms and increase in the performance in developmental areas. In literature, our findings supported by results of previous studies. In the research of Fragala-Pinkham et al., (2011), it indicated that group swimming and aquatic exercise has the potential for providing exercise in a social environment and this may have positive aspects on social development and self-esteem in addition to positive effects on health for children with ASD (19). In another research on the effectiveness of using a constant time delay procedure to teach foundational swimming skills to three children with ASD, Rogers et al., (2010), noted that the CTD procedure was effective in teaching foundational swimming skills to children (18). Moreover, in research of Konukman and Erkan (2005) reported that constant time delay is an effective way of increasing and maintaining aquatic play skills for children with ASD (20).

Accordingly, it was found in the current study that an individualized swimming and aqua training designed specifically for an autistic kid enhanced the kid's physical fitness and activity level, and therefore it positively contributed to the general health of the kid. In this respect, it is considered that this pilot application will attract the attention on the importance of physical activity and sports in the development of especially autistic children and constitute a basis for further research. Apart from these, as there are only a limited number of studies that have analyzed the applied educational programs on psychomotor development in Turkey, this study will act as a guide for specialists and families to show how to present such education.

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