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Original article

THE ROLE OF SPECIAL OLYMPICS PROGRAM ONDEVELOPING MOTOR AND SOCIAL SKILLS FOR INDIVIDUALS WITH DOWN SYNDROME

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Abstract

Aim. Motor development is considered to be an essential stage on developing independent life skills. There is a lack of intervention programs concerning getting and developing motor abilities for people with Down syndrome as well as a lack of opportunities to socially interaction in recreational and sport contexts.
The main objective of this study is to evaluate the efficiency of physical exercises interventions for individuals with Down syndrome in the area of motor abilities and social interaction.

Methods. The first part of the research was a literature review that investigated the physical exercises effects on Down syndrome individuals. In the second part of the research a physical exercise program was implemented during a period of 5 month with a frequency of 2 sessions per week, lasting one hour. The subjects of the study were 30 individuals with Down syndrome.

Results. The results reported significant improvements in motor skills: running, jumping, rolling, crawling, and handling objects. The research further concluded that no statistically or practically significant differences in motor skills could be found between female and male individuals.

Conclusions. The study concluded that individuals with Down syndrome can improve: their ability to fulfill dynamic tasks in special circumstances, the ability to control and adjust speed to fast changes of direction and have the capacity to move in special circumstance.

Keywords: Down syndrome, motor development, physical exercises, social interaction

Introduction

Motor development is considered to be an essential stage on developing independent life skills. There is a lack of intervention programs concerning getting and developing motor abilities for people with Down's syndrome as well as a lack of opportunities to socially interaction in recreational and sport contexts.

Down syndrome is a condition in which a person has an extra chromosome. Chromosomes are small "packages" of genes in the body. They determine how a baby's body forms during pregnancy and how the baby's body functions as it grows in the womb and after birth. Typically, a baby is born with 46 chromosomes. Babies with Down syndrome have an extra copy of one of these chromosomes, chromosome 21. A medical term for having an extra copy of a chromosome is 'trisomy.' Down syndrome is also referred to as Trisomy 21. This extra copy changes how the baby's body and brain develop, which can cause both mental and physical challenges for the baby.

Even though people with Down syndrome might act and look similar, each person has different abilities. People with Down syndrome usually have an IQ (a measure of intelligence) in the mildly-to-moderately low range and are slower to speak than other children. (Division of Birth Defects and Developmental Disabilities, NCBDDD, Centers for Disease Control and Prevention, 2016)

Children and adolescents with Down syndrome possess a set of health, anatomical, physiological, cognitive, and psycho-social attributes predisposing them to limitations on their physical fitness and physical activity capacities.

Apart from physical fitness, physical activity has the potential to improve health in youth with Down syndrome. Although the relationship of physical activity and health outcomes has not been directly examined in youth with Down syndrome, it is reasonable to assume that the findings in the general population of youth also apply to those with Down syndrome. Physical activity may improve the cardiovascular, metabolic, musculoskeletal, and psychosocial health profiles of all youth. (Rowland, 2007; Strong, Malina, Blimkie et al., 2005; Physical Activity Guidelines Advisory Committee, 2008)

There is a prevalence of obesity in children, adolescents, and adults with Down syndrome (Rubin, Rimmer, Chicoine, 1998; Melville, Cooper,

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McGrother, Thorp, Collacott., 2005; Prasher, 1995). Low fitness levels and obesity in individuals with Down syndrome may be related to sedentary lifestyles (Rimmer, Braddock Marks, 1995; Hoge, Dattilo 1995; Draheim, Williams, McCubbin, 2002) social and recreational opportunities (Fujiura, Fitzsimons, Marks, 1997), or low motivation to be physically active (Kosma, Cardinal, Rintala, 2002).

A study by Tsimaras and Fotiadou (2004) found that adults with Down syndrome improved their strength and balance following a 12-week training program. Rimmer et al., (2004) found significant improvements in the cardiovascular fitness and muscle strength and endurance of adults with Down syndrome who participated in a cardiovascular and strength exercise training program. Other studies also showed improvements in muscle strength following training programs for individuals with Down syndrome (Carmeli et al., 2002; Croce, Horvat, 1992). All the studies mentioned above suggest that physical activity or exercise training can increase physical fitness in individuals with Down syndrome.

Jobling, (2001) in a study described several commonalities of individuals with Down syndrome which may be viewed as barriers to participation in active leisure opportunities. The commonalities he observed included perceptions of difference, perceptions of motor skill delays, lack of practice, obesity, and inactivity. Though acknowledging these commonalities as challenges to develop opportunity rather than barriers to participation in physical activity. Jobling described two programs from Australia whereby sport and recreation opportunities were provided for children and adults with Down syndrome through community-based programs.

Published literature currently tells us more about the barriers to physical activity for children with disability than what facilitates engagement in activity (Shields et al., 2012). Shields and Barr (2011) also.

Research has also shown that a connection exists between parent support and their children's participation in physical activity (Davison, 2004; Trost et al., 2003). The physical activity levels of children's parents and siblings have a positive influence on their own participation in physical activity, just as the modelling of sedentary behaviours by parents and siblings influences a development of a sedentary lifestyle in children (Anderssen, Wold, 1992; Biddle, Goudas, 1996; Dempsey, Kimiecik, Horn, 1993). When children learn an appreciation for physical activity and when they learn how to participate in physical activities, they tend to be more physically active than their peers who are simply exposed to physical activity (Borra et al., 1995).

People with an intellectual disability are often ridiculed, misunderstood, isolated or simply ignored. With the understanding and support of Special Olympics programs they discover the skills that allow them to improve their health, and together with social interaction, develop self-confidence and bring joy to themselves, their families and their community.

Methods

The purpose of this study was to investigate the efficiency of physical exercises interventions for individuals with Down syndrome in the area of motor abilities and social interaction.

The first part of the research was a literature review that investigated the physical exercises effects on Down syndrome individuals. In the second part of the research a physical exercise program was implemented during a period of 5 month with a frequency of 2 sessions per week, lasting one hour. The subjects of the study were 29 individuals with Down syndrome from Bacău, with a range of age between 3 years old to 26 years old.

Special Olympics aims, through its programs, to contribute to the social integration, through sport, of special needs persons, and to offer them the chance to discover and develop their potential and skills through the training programs and athletic skills.

The exercise program adapted for special needs people, conducted over the course of five months is a part of the "Development of motor skills in people with Down syndrome - an essential stage toward an independent life," developed by the Special Olympics Foundation - Romania, between 2015-2016. Romania has a deficit of physical activities adapted for people with disabilities.

The motor activities program was conducted on two distinct directions, being addressed to different categories, according to the participants' age. One section of the program, called "early motor initiation," was created to increase the subjects' degree of social interaction and for them to acquire skills for an independent life through a system of unified sports training and competitions for children between 2 and 8 years old. The second section of the motor activities program was destined for individuals between 9 years old to adult age, comprising unified gymnastics training and competitions.

In order to promote the European community model and to ease the social integration of people with Down syndrome, the training sessions and the competitions were organized in the gymnasiums of the University of Bacau, while in charge of the well development of the training sessions and competitions were volunteer students from physical education and sports, physical therapy and occupational therapy, together with their

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teachers. The training sessions follow the general rules encountered also in sports clubs: the parents/caretakers take the children and adults with disabilities to the gym for the gymnastics - applicative track motor activities. Thus a social group is formed of children and adults who carry on, according to an established program, with the training sessions lead by the university teachers, together with their students. This way, the physical activities program is not just a means to develop the motor skills, producing visible effects on people with Down syndrome, but also a means that generates positive effects in developing and consolidating social relations between athletes, parents, teachers, and volunteer students.

The Special Olympics athletes have the chance to become active members of the family and community they belong to. These sports activities programs aim to give them energy, health, self-confidence and joy to live.

The novelty in this program is also the concept of Unified Gymnastics - applicative track, according to which people with or without disabilities train and compete together, for both the development of their motor skills, and the improvement of social inclusion.

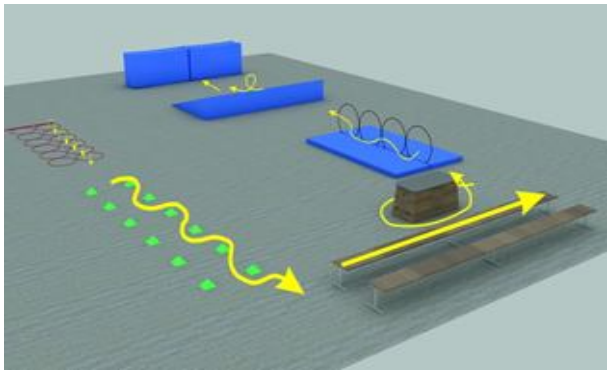

Photo no. 1 Physical activity circuit used for evaluation of the motor skill development.

Description of the circuit activity used (figure no.1): We used a circuit composed of six distinct areas that are challenging the motor capacity of the children. The starting point of the circuit was market with a white line and the finishing point was made of two high mattresses that had to be touched. The circuit starts with a set of twelve circles placed on the floor, that had to be crossed with six synchronized jumps on both legs from circle to circle, and it is followed by twelve stakes placed on two lines where the children have to run winding between them doing a slalom. The third area of the circuit consisted on two gymnastic benches were the children were required to lay on and crawl along with simultaneous or alternative traction until the end of the bench. In the fourth area we placed a gymnastic vault box, where the children was supposed to do a roundabout running to bypass that obstacle on a given route. Following the vault box we placed 4 mattresses in pair of two, with big circles placed in the middle of mattresses in a vertical position so that the children could go through the circles in a dog position, moving on their knees and forward support. The last area of the circuit was made from two incline mattresses that were put side to side to form a wide incline surface were the children had to roll on a side face down transverse with arms up. The finishing act was running from the incline surface to touch the mattresses wall.

Results

During the trainings and competitions there are several competences that have been achieved by the subjects: the ability to fulfil dynamic tasks in special circumstances, the ability to control and adjust speed to fast changes of direction, the capacity to move in special circumstances, time and space appreciation, segmental coordination, motor control and retrieval.

The results also reported significant improvements in motor skills: running, jumping, rolling, crawling, and handling objects. The research further concluded that no statistically or practically significant differences in motor skills development could be found between female and male individuals with Down syndrome.

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Table no. 1. Percentage scores for the initial and final assessments, recorded by the subjects (2-8 years old) during the early motor initiation program

	Initial positioning	Final positioning	Initial locomotion	Final locomotion	Initial object manipulation	Final object manipulation	Initial total	Final total
1	80%	100%	83%	100%	90%	100%	84%	100%
2	60%	100%	83%	95%	50%	100%	64%	98%
3	40%	100%	72%	96%	90%	100%	67%	98%
4	60%	100%	83%	95%	50%	100%	54%	98%
5	60%	100%	83%	95%	50%	100%	64%	98%
6	40%	100%	72%	96%	90%	100%	68%	98%
7	80%	100%	83%	100%	90%	100%	84%	100%
8	76%	100%	70%	100%	90%	100%	78%	100%
Ave.	**62%**	**100%**	**79%**	**97%**	**75%**	**100%**	**70%**	**99%**

As one can see (Table 1), after conducting the motor activities program adapted for 2-8-year-olds, all children recorded consistent progress in the development of the three tested motor areas. Three of the children in the program managed to record maximum scores of 100% at the final assessment of the early motor initiation program, while the other 5 children recorded total scores close to the maximum threshold (98%, 95%, 96%), which proves that all subjects involved in this program had a good progress in the development of their motor skills.

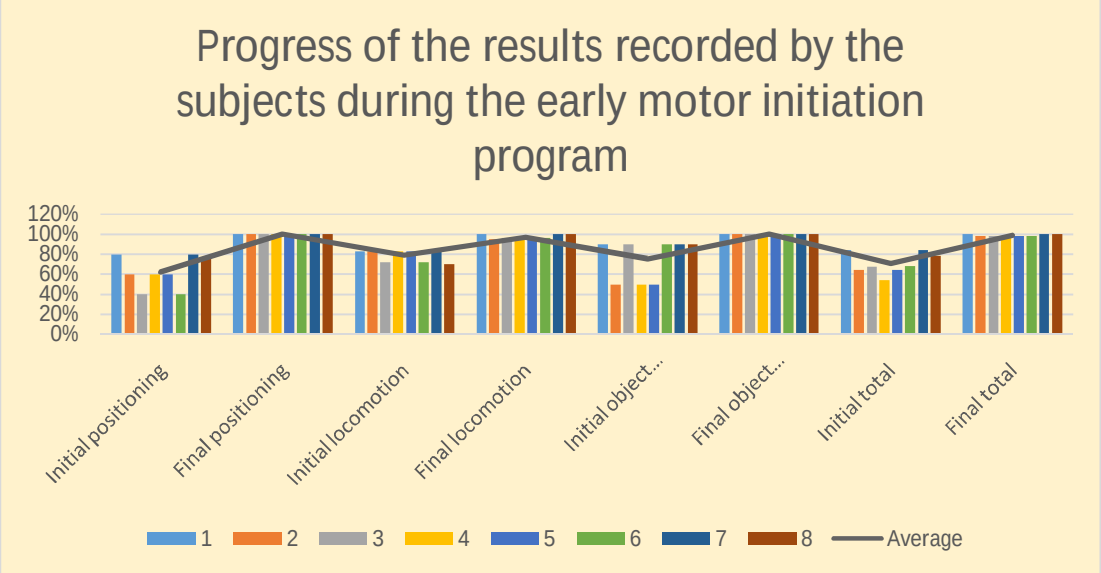

Figure 1. Progress of the results recorded by the subjects (2-8 years old) during the early motor initiation program

The lowest values were obtained from initial tests in the motor area on positioning and maintaining static equilibrium in various positions from the simple to the complex. Although all children tested had major deficient fixed position keeping and maintaining the balance after 5 months of training all children are able to obtain maximum score in the area of motor positioning and balance. (Figure no 1)

When we look at the locomotor aria which included: walking, running, jumping various forms and variations exhibited from simple to complex all children have obtained initial assessment scores between 72% and 83%, so that at the final testing all children improve their skills by obtaining locomotion scores between 95% -100%.

Motor activities on the aria of manipulation of objects showed small delays in the scores of only three up to 50% on initial assessment, five others keeping a high score in both evaluation session.

The young individuals with Down syndrome group that was involved in gymnastics unified program - practical route, evaluation of progress was done crossing the trail application and tracking the

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timing of performing the task as correctly and accurately as possible.

Route practical assessment test used was built keeping the same distances, rules and objects / materials both at initial assessment and final assessment. Applications used during training routes were created on the spot and adapted for a wide variation in motor activities.

Following the ongoing training of subjects with Down syndrome, along with volunteers and teachers, the number of sanctions for the omission, mistakenly route bypassing an element of practical dropped sharply. (No chart 3). If at the initial assessment of the young only three of them were able to execute in a perfect route, the final evaluation vast majority of subjects, specifically 12 of them managed to finish without any mistakes practical route.

To determine the effect of programs on social skills we collected data necessary to demonstrate the effect of physical activity using direct observation and interviews with parents and student volunteers.

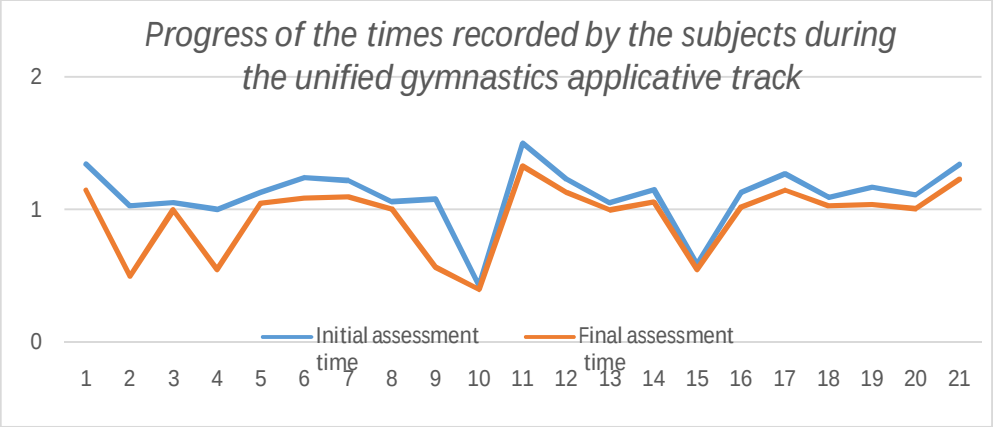

Figure 2 Progress of the times recorded by the subjects during the unified gymnastics applicative track

In the figure no 2 we can observe the evolution of the scores of all 21 participants in the unified gymnastics program. It is distinguished by far the decrease of making route times with consistent and constant participation of young people in adapted physical activity program.

To determine the influence of physical activity programs on social skills in subjects with Down syndrome we have used observation forms that have sought increased frequency of subjects initiated social behaviour. We also used semi-structured interviews with family carers and volunteers involved to highlight that these social behaviours present among subjects during training and is transferred to daily life and interactions with others with whom they come into contact.

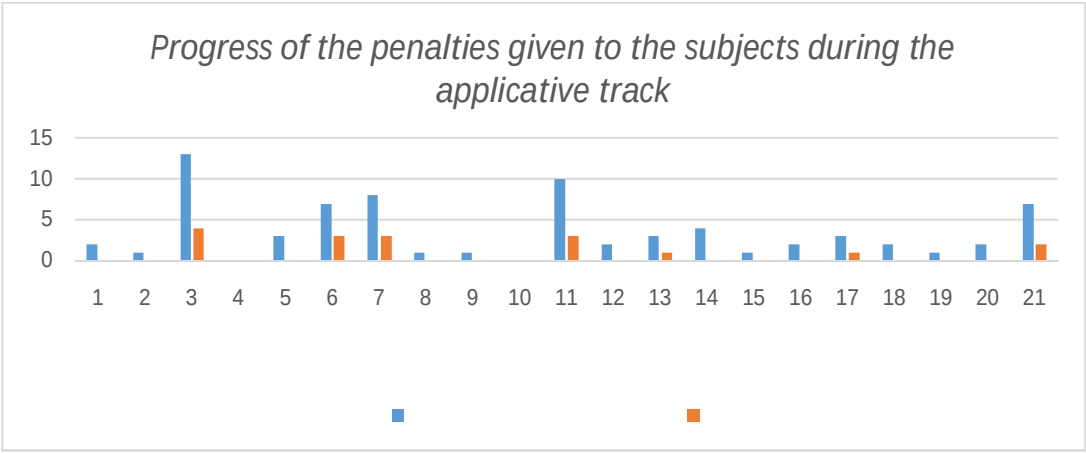

Figure 3 Progress of the penalties given to the subjects during the applicative track

Discussion

Research indicates low fitness levels in individuals with Down syndrome (Fernhall, Pitetti, Rimmer, 1996; Pitetti, Climstein, Campbell, 1992). We can also appreciate from our study that the level of fitness in individual with Down syndrome who participated at the physical exercises program exhibit is weak, but we can say that there are solution to improve their fitness level if they are involved in an structured and continuous physical activity program.

This study was designed to observe the effects of physical exercises on motor development and social interaction among the individuals with Down syndrome participating on a program run by Special Olympics Romania in collaboration with the local university. We found that when students and university coaches, individuals with Down syndrome and their families, parents or caregiversare getting implicated on a mutual physical exercises program the beneficial effects in motor development and social interaction are raising. Parent support may come in the form of positive role models, transportation, and payment of fees, providing encouragement or motivation (Prochaska, Rodgers, Sallis, 2007).

An intervention, such as this one, has a goal of increasing the overall physical activity of the participants. In the research conducted by Balic, Mateos, Blasco and Fernhall, (2002) the participants in Special Olympics and were physically active 4.9 hours per week for at least 1 year, and exhibited higher aerobic capacity, muscular strength, and power than sedentary individuals with Down syndrome.

Barriers to participation for individuals with Down syndrome in physical activities are multiple. Individuals with Down syndrome experience low fitness levels despite data-based evidence to indicate positive fitness gains from participation in physical activity and exercise because they do not participate in physical activity or exercise often enough.

Heller, Hsieh and Rimmer, (2002) found that individuals with Down syndrome experience high costs, lack of transportation, difficulty accessing equipment and fitness facilities, and difficulty finding experienced personnel to train them. Heller, Hsieh and Rimmer, (2004) reduced these barriers by providing a center-based program and found the experimental group experienced more positive attitudinal and psychosocial outcomes and fewer cognitive-emotional barriers.

In our study we tried to overcome the participation barriers by eliminating entry fees for participants, using volunteers for organizational aspects and support, offering fitness facilities easy to be accessed, and involving teachers and students from the local university, implicating parents as much as possible and adapting the physical exercise program to de necessities and the specific of the individuals with Down syndrome. A similar view about the facilitator of physical activity for individuals with Down syndrome had Shieldsand Barr (2011). In theirstudy, theyaskedparents of childrenwith Down syndrome whatthey thought enabled their children to take part inphysical activity. The four most common facilitators reported were:the positive role and influence of the family, opportunity for social interaction with peers, structured accessible programs that makeadaptations for children with Down syndrome, children who were determined to succeed, were physically skilled and encouraged by parents and coaches.

Having a social component as part of a physical activity is a particularly strong facilitator for children with disability, and in the case of children with Down syndrome is often the primary reason for participating. Formal activity programs, in particular, offer a structured opportunity for socialization, which may also facilitate a sense of belonging.

Conclusions

The study concluded that individuals with Down syndrome can improve: their ability to fulfil dynamic tasks in special circumstances, the ability to control and adjust speed to fast changes of direction and have the capacity to move in special circumstance.

There were consistent increase in terms of stability, handling objects and motor development especially in the children 2-8 years group.

The activity circuit can determine and form new competences that are necessary to adapt to a new and difficult environment, to adapt to different activities that are work oriented. On the other hand on an educational and interrelation level this programs assure in a strategic way contact lines between the community and the persons with disabilities - Down syndrome.

The results of the study revealed that there were some positive and significant increases in the amount of appropriate social behaviours expressed by the Down syndrome subjects.

We appreciate that physical activity programs tailored for people with Down syndrome that was used as individual practice, pair exercise, group activities stimulated the development of social interaction between study subjects and increased chances initiate positive social behaviours among group members.

Interviews with parents and volunteers who were present at the physical activities trainings have revealed significant behavioural changes in the subjects with Down syndrome in terms of networking with peers, decreasing conflict situations triggered both in the context of the program and in other social

environments in which they are present (school, family, neighbours).

The impact of physical activity programs adapted to the process of social inclusion of persons with Down syndrome has a positive effect on both the individual concerned and the family and community of which it is a part.

Aknowledgements

For all of our participants from my study I want to say thank you.

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