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## The effect of relative age effect on physical characteristics and fundamental movement skills in intellectual disabled boys

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### Abstract

The aim of this study was to investigate whether physical characteristics and fundamental movement skills were differentiated by relative age effect. Material and Methods: Data were collected from the 60 Intellectual Disabled boys with a mean age of  $6,94 \pm 0,58$  years at Mersin City Center Izem Rehabilitation Center in February, March and April 2018. The age of the participants was calculated in months and divided into three groups as 71-76 months, 77-84 months and 85-93 months. Basic movement skill levels have been determined by the Test of Gross Motor Development (TGMD). Kruskal Wallis test was used to test differences among groups because data did not show normal distribution. Statistical significance was accepted as  $P < 0.05$ .

Results: The findings of this study showed that there was no significant difference between the three groups in terms of mean body height, body weight and body mass index in the Intellectual Disabled boys who do not participate in physical and sportive activity program. In addition, there is no significant difference between the three groups in both locomotor and object control skills. Participants received low scores in the skills of gallop, two hand strike, catching and kicking while the three groups in the sprint, hop, leap and throw had zero points. All three groups demonstrated only positive performance in kicking. Conclusion: Fundamental movement skills are not differentiated in boys with intellectual disabled due to the relative age effect. It seems that they had only the ability to demonstrate the skill of kicking the ball with the foot.

**Keywords:** relative age effect, physical characteristics, fundamental movement skills, intellectual disability

### Introduction

Starting with the development in the womb, the human attaches to life. With childbirth, every child needs regular physical activity for normal development. Regular physical and sporting activities play an important role in improving obesity and low physical fitness of children with intellectual disabilities. Children's physical activity levels are a means of improving their physical and mental health. All the skills required for lifelong physical activity or sport performance are based on basic movement skills (Balyi, 2001; Demirci & Toptaş Demirci, 2016) [1, 6]. Age differences among children born in the same calendar year may adversely affect the effectiveness of basic movement education at an early age.

It has been shown in the literature that relative age- related physical and movement skills differ in healthy children born at different months of the same year (Dutil, Tremblay, Longmuir, Barnes, Belanger & Chaput, 2018) [9]. In this respect, it is important to consider the relative age effect in the selection of talented athletes when performing performance evaluation in sporting events.

It is important that talented individuals be selected, monitored and pioneered to advance to the next level. Although motor capacity, psychological capacity and biometric-anthropometric properties required for yield apply to all sports, whichever is more dominant may be different for each sport (Bompa, 2011) [4].

In the first four months of the same year, the groups formed according to the ones born in the other months of the year are used as a general strategy in the planning of the teaching environment in the provision of sports and movement education. In order to keep the effects of developmental differences under control in school and sports activities, children are divided into age categories (Toptaş Demirci & Demirci, 2018) [7]. These categories are kept in an age (year) range due to large differences in mental, physical and psychological aspects. Nevertheless, the fact that the earliest children in the same year can be almost one year older than the most recent ones continues this problem. Even if born in the same year, the

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importance and effect of which month was born revealed the concept of Relative Age Effect. The advantage of premature birth in the same year is called "Relative Age Effect" (Ersanlı, 2005) [10]. Those born in the first months of the year have developmental advantages over those born late. These differences, known as the relative age effect (Bell & Daniels, 1990) [2] and having lower grades during education (Bisanz, Morrison & Dunn, 1995) [3], exhibits the ability to cope with lower challenges exhibiting lower self- efficacy levels, Increased risk of need for special educational support (Dhuey & Lipscomb, 2010) [8], risk of movement and sport education withdrawal (Crane & Temple, 2015) [5] is higher risk of attention deficit and hyperactivity disorder diagnosis. In this context, this study aims to investigate whether physical characteristics and fundamental movement skills were differentiated by relative age effect which shows developmental differences between those born at different periods of the same year.

## Materials and Methods

### Participants

Data were collected from mentally handicapped boys with a mean age of  $6.94 \pm 0.58$  years at the İzem Rehabilitation Center in Mersin Province in February, March and April

2018 with a consent form. The ages of the participants were calculated in months and divided into three groups as 71-76 months, 77-84 months and 85-93 months.

### Data collection tools

Ulrich in the evaluation of basic movement skills (2000), developed by the Test of Gross Motor Development-Second Edition (TGMD-2) test adapted to Turkish Language by Tepeli (2007) was used. With this test, locomotor skills including sprint, hop, jump, side-gallop and object control skills including ball two hand strike, catching, kick and throw were determined.

### Statistical analysis

All statistical analyzes were performed with SPSS version 20.0. P value of less than 0.05 was considered significant. Kruskal Wallis test was used in comparison between the 3 groups because the data did not show normal distribution.

### Results

The aim of this study was to investigate whether physical characteristics and fundamental movement skills were differentiated by relative age effect.

**Table 1:** Comparison of physical characteristics of Intellectual disabled children among relative age Groups.

Variables	Median (25–75 percentil)			X <sup>2</sup>	sd	Asymp. Sig.
	71-76 Month (n=21)	77-84 Month (n=11)	85-93 Month (n= (35))			
Body Height (cm)	115,75 (123-131,5)	123,00 (129-137,00)	120,00 (130,00-135,00)	3,495	2	,174
Body weight (kg)	18,75 (22,5-31,5)	22,00 (27-34,00)	22,00 (29,00-34,00)	2,018	2	,365
Body Mass Index (kg/m <sup>2</sup> )	13,94 (15,65-18,66)	14,36 (15,98-17,60)	14,83 (17,16-19,22)	1,156	2	,561

**Table 2:** Comparison of locomotor and object control skills among relative age groups in intellectual disability children.

Variables	Median (25–75 percentil)			X <sup>2</sup>	sd	Asymp. Sig.
	71-76 Month (n=21)	77-84 Month (n=11)	85-93 Month (n= (35))			
Sprint	0,00 (1,00-2,0)	0,00 (1,00-2,00)	0,00 (1,00-1,00)	3,389	2	,184
Hop	0,00 (,00-1,25)	0,00 (,00-4,00)	0,00 (,00-3,00)	,776	2	,678
Leap	,00 (,00-0,00)	,00 (,00-0,00)	,00 (,00-0,00)	1,440	2	,487
Side gallop	1,00 (3,0-4,00)	1,00 (3,00-4,00)	0,00 (1,00-4,00)	1,453	2	,484
Two hand strike	0,00 (1,0-1,25)	0,00 (2,00-3,00)	0,50 (1,00-2,00)	2,916	2	,233
Catch	0,00 (1,0-2,0)	0,00 (2,00-3,00)	1,00 (2,00-3,00)	2,923	2	,232
Kick	2,00 (3,00-3,00)	2,00 (2,0-3,00)	1,00 (2,00-3,00)	3,717	2	,156
Throw	,00 (,50-1,00)	,00 (1,00-1,00)	0,00 (,00-1,00)	,994	2	,608

### Discussion and Conclusion

Early onset of movement education in children is critical to achieving the biological potential of children. Because delays in starting this training are not fully compensated in later developmental periods (Balyi, 2001) [1]. In our study, it was observed that physical characteristics and basic mobility skills did not differ in the mentally handicapped boys due to the relative age variable. The findings of this study show that there is no significant difference between the three groups in terms of average height, body weight and body mass index in the mentally handicapped boys who do not participate in the physical and sport activities program. Again, there was no significant difference between the three groups in both locomotor and object control skills. Three groups received zero points in sprint, leap, jump and throw skills, while the participants scored low in side-gallop, two hand strike, catching and kick the ball by foot skills. Most notably, all three groups scored positively in kicking.

Reported that there is limited age effect on the effectiveness of basic mobility training in healthy primary school age children with a mean age of 6-7 years between 68-89 months. In healthy boys, height and hopping skills change relative to age. Similar to this study, it was observed that 6-8 male intellectual disability children in our study did not get points in sprint, hop, leap and throw skills, and scored very low in side gallop, two-handed batting (strike) and catching skills. In mentally handicapped boys, the ability to kick the ball with foot was found to be low values close to the values of healthy children ranging from low to moderate.

Physical fitness levels and long reaction times of mentally disabled people have important problems preventing their independence in daily living activities. It has not correct to link low levels of physical fitness of mentally retarded children to the fact that only cognitive abilities have limited. Compared to other skills of the mentally disabled, where development is not observed, kicking skills can be observed, and markedly low-level development may result from the observation and imitation of many soccer-related examples in social settings, education and television. While it seems appropriate to educate healthy children with one or two age differences in the same group, this range is enlarged to increase to 3 years or more in the mentally disabled.

As a result; in healthy children, those born in the same year are classified as a same group or those born in different periods of the same year are grouped according to the periods in which they were born. It was concluded that children born in different periods of the same year should not be grouped according to their chronological age. Instead of this, 3-year grouping considering body height and body weight values would be appropriate in the provision of movement education and training to mentally disabled children.

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