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Objective control skills among students with intellectual disability at special school in Korea

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The purpose of this study was to examine the level of objective control skill and performance criteria of students with intellectual disability at special school. Three hundred thirty one students with intellectual disability were participated this study (M: 230, F: 101). Their aged was from 10-18 aged old. We had the test the objective control skill by video, objective control skill consisted of overhand throwing, catching, kicking, hitting, dribbling. Data were analyzed using liner regression and calculated mean, standard error, standard deviation and 95% confidence interval. Total objective control skill mastery was 47%, and hitting skill score was the highest than another subtest, the lowest performance skill was overhand throwing. There were showed that not significant difference object control skill in according to gender. Also not effect object control skill and subtest in according to age except dribbling. It was showed that significant effect objective control skill in according to disability level.

Keywords: Intellectual disability, Object control, skill, Special school

INTRODUCTION

Object control motor skills are a sub-factor for assessing fundamental movement skill (FMS). Children who acquire object control skills display them through active participation and coordination in various sports activities or skilled physical activities in the future. Therefore, it is important to assess the level of object control motor skill acquisition and performance in childhood (Hardy et al, 2010).

Object control skill development begins in infancy with reaching towards and grabbing objects, showing gradual qualitative changes from unskilled to skilled performance of throwing, kicking, hitting, catching, and dribbling actions.

In general, object control skills become mature around school age, and children are known to show varying levels of acquisition depending on gender, age, level of physical activity participation, and level of fitness (Hardy et al., 2010; Park, 2008; Staples et al., 2010). Children with intellectual disability often show delayed physical and motor development compared with children without intellectual disability due to disadvantages in perceptual motor skills and cognitive disorders (Faison-Hodge and Porceetta, 2004; Hong, 1996). In addition, it is assumed that, as in children without intellectual disability, those with intellectual disability would show differences in object control motor skill development according to increasing age, gender, or level of intellectual disability. However, while a recent relevant study by Lee (2012) in middle school students with intellectual disability suggested that gender and age affect FMSs, studies examining object control skill performance level in children with intellectual disability are almost non-existent. Most studies are related to basic motor skills, cognitive development, coordination relationships, and the effects of various sports (Choi and Roh, 2011; Kang and Kim, 2009; Kim, 2005; Kim et al., 2004; Rintala and Loovis, 2013). Therefore, basic data study assessing object control motor skills in children with intellectual disability is necessary to establish a plan for physical activities that facilitate the development of the ability to participate in various sports and physical activities. Object control skills show a big difference in physical coordination skills with increas-

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ing age and according to practice experience. They can be regarded as an important motor skill assessment that becomes the foundation for high-level sport skill performance. Therefore, the purpose of this study is to provide the foundational data to establish a physical activity plan by identifying the performance criteria according to each category of object-control motor skills as well as the object-control motor skill levels of the students with intellectual disability who are currently attending a specialized school.

MATERIALS AND METHODS

Participants

We sent a document with an explanation of our study, and showed interest four special schools in the Seoul metropolitan area. Three hundred and sixty-one students with intellectual disabilities between the ages of 10-18 years participated. All of the participants lived in the Seoul metropolitan area, and their parents were Korean. With parent or guardian consent, we received basic information such as gender, birth date, physical activity participation, disability classification. The demographic characteristics of the participants are shown in Table 1.

Testing procedure and method

The testing instrument was used object control skill among to TGMD-2. This instrument was first developed by Ulrich and reconstructed by Park et al. (2009). The object control skill consists of an overhand throwing (10 points), catching (6 points), kicking (8 points), striking (8 points), and dribbling (6 points), for a total of 38 points. The content validity and reliability of this FMS assessment, with a high alignment of assessments at 85%, has been previously demonstrated (Park 2008).

The study participants performed 5 movements of the object control skill 2-3 times. The participants were recorded by a video camera placed 6-7 meters away. Three specialists in special physical education within our doctoral program scored each object control skill and the average score was calculated. Statistical analysis was performed with SPSS for Windows. Descriptive statistics, including proportions and the mean based on the raw score, were used to describe the mastery of object control skill and linear regression was used as a post-hoc test. The level of statistical significance was set at $P < 0.05$.

Table 1. Demographic characteristics (n = 331)

Characters			
Height		155.99 ± 14.0 (cm)	
Weight		52.66 ± 17.83 (kg)	
Gender		n	%
	Male	230	69.5
	Female	101	30.5
Age	10-12	81	24.5
	13-15	104	31.4
	16-18	146	44.1
Disability level	1	186	56.2
	2	103	31.1
	3	42	12.7

RESULTS

Object control skill of students with intellectual disability

The results for the object control motor skills of the 331 students with intellectual disability aged 10-19 who participated in this study are shown in Table 1. The mean value of mastery of object control motor skill performance of students with intellectual disability was 47%. Upon examining the performance for each subtest of object control motor skills, the performance for hitting was found to be higher than that for other subtest; throwing showed the lowest performance.

Object control skill according to age, gender, disability level

After analyzing whether age, degree of intellectual disability, gender, height, and weight affect object control motor skills, it was found that, while age affected dribbling, gender, height, and weight did not have any effect on object control motor skills. The degree of intellectual disability was found to affect object control motor skills (Tables 2-5).

DISCUSSION

This study examined the object control skill and performance level in each subtest of students with intellectual disability. Hitting showed the highest performance among object control motor skill subtest, and throwing showed the lowest performance. Hardy et al. (2010) analyzed object control motor skill levels in Aus-

Table 2. Mastery of object control skill

	M ± SE	SD	Mastery (%)
Object control skill	17.86 ± 0.54	9.28	47
Throwing	3.21 ± 0.15	2.7	32.1
Catching	3.59 ± 0.122	2.1	35
Kicking	3.76 ± 0.14	2.6	47
Hitting	4.33 ± 0.12	2.2	54.1
Dribbling	2.82 ± 0.13	2.4	47

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Table 3. Object control skill according to gender

	Gender				
	b	β	t	*P*	R^2
Object control skill	-1.55	-0.075	-1.31	0.190	0.002
Throwing	-0.213	-0.035	-0.626	0.532	-0.002
Catching	-0.442	-0.093	-1.066	0.096	0.006
Kicking	0.089	0.015	0.273	0.785	-0.003
Hitting	-0.482	-0.097	-1.73	0.084	0.006
Dribbling	-0.391	-0.074	-1.30	0.192	0.002

Table 4. Object control skill according to age

	Age				
	b	β	t	*P*	R^2
Object control skill	-0.004	-0.075	-1.313	0.190	0.002
Throwing	0.094	0.097	1.70	0.088	0.006
Catching	-0.442	-0.093	-1.66	0.096	0.006
Kicking	0.089	0.015	0.273	0.785	-0.003
Hitting	-0.482	-0.097	-1.732	0.084	0.006
Dribbling	0.270	0.249	4.47	0.000***	0.059

***$P<0.001$.

tralian kindergarten students and found that the performance for kicking was the highest followed by throwing, catching, and hitting, results that differ from those of the current study. The study by Lee (2012) also showed the highest performance for kicking, replicating the results of the study.

In addition, after analyzing whether the performance for object control motor skills and subtest were affected by age, gender, and degree of intellectual disability, it was found that gender had no effect, and age did not affect any subtest except for dribbling. However, the degree of intellectual disability had an effect on object control motor skills and subtest. These results did not replicate the results of the study by Lee (2012), as no difference was found with increasing age in object control motor skills or in any other categories excluding kicking. Lee (2012) and Kim (2005) showed results that differed from those of this study by suggesting that gender did not affect control motor skills while, in this study, gender difference was found in subtest such as throwing and catching with no gender differences for hitting, kicking, and dribbling (Lee, 2012). Consistent with the results of this study, Westendorp et al. (2011) found a difference in object control motor skills and subtest depending on the degree of intellectual disability. As the degree of intellectual disability affects the object control motor skills in students with intellectual disability, it would be necessary to develop a motor program for improving object-control motor skills or a personalized motor program that takes into account the degree of intellectual disability during physical activity classes.

Table 5. Object control skill according to disability of level

	Disability of level				
	b	β	t	*P*	R^2
Object control skill	5.144	0.392	7.131	0.000***	0.151
Throwing	0.088	0.336	6.10	0.000***	0.110
Catching	0.076	0.231	4.07	0.000***	0.050
Kicking	0.098	0.360	6.64	0.000***	0.127
Hitting	0.069	0.217	3.78	0.000***	0.044
Dribbling	1.173	0.344	6.253	0.000***	0.115

***$P<0.001$.

This study was conducted in order to identify the level of object control motor skills and the performance in each category of students with intellectual disability who are currently attending a specialized school. For this, five subtest of object control motor skills (overhand throwing, catching, kicking, hitting, and dribbling) were measured and analyzed in students with intellectual disability between the ages of 10 and 18 who were attending a specialized school. The following results were obtained: first, students with intellectual disability show less than 50% mastery performance of object control motor skills with hitting showing the highest performance. Second, object control motor skills were affected by the degree of intellectual disability but not by age or gender. Therefore, when developing a motor program for object control motor skill improvement, the degree of intellectual disability must be taken into consideration.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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