

Comparison of motor and process skills among children with different developmental disabilities

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Abstract. [Purpose] The purpose of the present study was to compare the motor and process skills of children with different developmental disabilities. [Subjects] Thirty-nine children with developmental disabilities participated in this study which was conducted at N hospital in South Korea. [Methods] The motor and process skills of the participants were compared among three different disabilities: pervasive developmental disorder, cerebral palsy, and intellectual disorder. The data were analyzed using descriptive statistics and one-way ANOVA. [Results] Significant differences in motor skills were found among the diagnoses. The cerebral palsy group showed poorer motor skills than the pervasive developmental disability and intellectual disability groups. [Conclusion] The findings have clinical implications for strategies of rehabilitation for children with developmental disabilities.

Key words: Developmental disability, Motor skill, Process skill

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INTRODUCTION

According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorder-V, developmental disabilities include intellectual disability, learning disability, motor dysfunction, communication disorders, pervasive developmental disorders, and attention deficit and hyperactivity disorder¹⁾. In general, children with developmental disabilities present various problems, such as gross and fine motor, somatosensory, cognition, language, and behavioral disorders^{2, 3)}. Children with developmental disabilities have difficulty performing functional activities due to these problems⁴⁾. According to Occupational Therapy Practice Framework-III, in order to perform purposeful activities in daily life, we need motor, process, and social-interaction skills. Motor skills are goal-directed actions that a person enacts when interacting with and moving task objects and themselves around task environments⁵⁾. Process skills are related to the goal-directed actions that a person enacts when selecting, interacting with, and using task tools and materials, carrying out individual task actions and steps, and modifying task performance when problems are encountered⁶⁾. Children with developmental disabilities have motor and process skill deficits because they have difficulty with physical, mental, and intellectual functions⁷⁾. These problems are expected to present diverse patterns of motor and

process skills across diagnose, and these are important issues for rehabilitation intervention. Therefore, the purpose of this study was to compare differences in motor and process skills across the diagnoses of developmental disabilities.

SUBJECTS AND METHODS

The design was a cross-sectional study comparing motor and process skills measured by the Assessment of Motor and Process Skills, AMPS. The participants were 39 children with developmental disabilities attending N hospital in Seoul, 25 males (64.1%) and 14 females (35.9%) with a mean age of 7.5 years (SD=2.6). All participants received an explanation about the purpose and methods of the study in accordance with the ethical principles of the Declaration of Helsinki prior to their participation, and this study was approved by the institutional review board of Korea University (KU-IRB-11-09-P-1). The inclusion criteria were children who were between three and twelve years old who were receiving a developmental disability diagnosis who had a possible assessment of motor and process skills. AMPS was used to measure motor and process skills while performing daily living activities. AMPS was developed by Fisher to measure occupational performance in daily life. AMPS consists of two evaluation areas: motor skills and process skills. Motor skills are related to physical interactions between tasks and the environment when an individual performs activities, and are composed of various sub-items, such as body alignment, stabilization, and manipulation⁸⁾. Process skills have relevance to using, interacting with, and choosing tools for tasks and correction when a person identifies problems in performing tasks, and process skills have various sub-items, including attention skills, and heeds⁹⁾. All participants were assessed by an occupational therapist who

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Table 1. Motor and process skills with significant differences among the diagnose (logit)

Diagnosis	N	Motor skill*		Process skill	
		Mean (SD)	F (df)	Mean (SD)	F (df)
PDD	13	1.46 (0.80)		0.13 (0.66)	
CP	12	0.15 (0.69)	7.88 (2, 36)	-0.13 (1.09)	0.32 (2, 36)
ID	14	1.34 (1.13)		0.02 (0.73)	

*p<0.05

PDD: pervasive developmental disorder; CP: cerebral palsy; ID: intellectual disability

had previously been trained in the administration and scoring of AMPS. Descriptive statistics were used for demographic characteristics, and one-way ANOVA was used to analyze the data and groups of diagnosis. SPSS software (ver. 20.0. Chicago, USA) was used to perform statistical analysis, and the statistical significance level was chosen as 0.05.

RESULTS

The area of motor skills showed significant differences with diagnosis; however, the difference in process skills were not significant (Table 1). The results of the Bonferroni post-hoc test indicate that the cerebral palsy group had a lower mean motor skills' score than the pervasive developmental disability and intellectual disability groups. The mean difference in motor skills between the pervasive developmental disability and intellectual disability groups was not significant (Table 2).

DISCUSSION

According to the results of this study, the area of motor skills showed significant differences among the pervasive developmental disability, cerebral palsy, and intellectual disability groups. Additionally, the results of the post-hoc test indicate the cerebral palsy group had lower motor skills than in the pervasive developmental disability and intellectual disability groups. Similarly, Kottorp et al. reported motor skills showed significant differences among children with cerebral palsy, intellectual disabilities, and autism⁵). This is because motor skills are related to gross and fine motor functions, including postural control, muscle tone, body alignment, and movement coordination. Moreover, children with cerebral palsy have specific characteristics related to motor functions, such as abnormal postural tone and movement patterns due to damage in the cerebral cortex, compared to other groups. However, children with cerebral palsy, pervasive developmental disorders, and intellectual disabilities showed similar process skills. As with all studies, the present study had limitations. The number of children was small, and further studies should recruit greater numbers of participants. Nevertheless, the result of this study have clinical implications for rehabilitation intervention, because this study found differences in motor and process skills among children with different developmental disabilities when they performed daily living activities.

Table 2. Result of the Bonferroni post-hoc test for motor skill (logit)

Diagnosis (I)	Diagnosis (J)	Mean difference (I-J)	Standard error
PDD	CP	1.31*	0.36
	ID	0.12	0.35
CP	PDD	-1.31*	0.36
	ID	-1.19*	0.35
ID	PDD	-0.12	0.35
	CP	1.19*	0.35

*p<0.05

PDD: pervasive developmental disorder; CP: cerebral palsy; ID: intellectual disability

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