

Relationships between Gross Motor Abilities and Problematic Behaviors of Handicapped Children in Different Age Groups

MASAYUKI UESUGI^{1)*}, TOMOKO ARAKI¹⁾, SHUN FUJII¹⁾, KEISUKE ITOTANI¹⁾, YOSHITAKA OTANI¹⁾, TAKEMASA SEIICHI¹⁾

¹⁾ Kobe International University: 9-1-6 Koyouchō, Higashinada-ku, Kobe City, Hyogo 658-0032, Japan

Abstract. [Purpose] In this study, we examined problematic behaviors of independent-walking and non-independent-walking handicapped children in the infant, school child and adolescent development phases, using the Japanese version of the Aberrant Behavior Checklist (ABC-J) to determine if such behaviors relate to their gross motor abilities. [Subjects and Methods] The subjects were 86 handicapped children who were receiving physical therapy. The subjects were classified into three groups by age. Using the Gross Motor Function Classification System (GMFCS), each group was further divided into an independent-walking group and non-independent-walking group. Thirteen physical therapists and 8 occupational therapists, who were treating the subject children, rated the subjects using the ABC-J. [Results] Significant differences were observed between the independent-walking and the non-independent-walking groups in the *stereotypy* and *lethargy* scores of infants. [Conclusion] For schoolchildren and adolescents, no significant differences were observed between the independent-walking and the non-independent-walking groups in their problematic behavior scores.

Key words: Problematic behaviors, Handicapped children, Gross motor abilities

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INTRODUCTION

The incidence of mental retardation among children is high; one in 50 children is born mentally retarded in Japan¹⁾. Pediatric physical therapists often treat physically handicapped children with mental retardation²⁾. In special needs education schools, treatments for mentally retarded children account for 30.4% of physical therapists' work³⁾; therefore, they need to have a good understanding of mental retardation. Few studies, however, have addressed the problematic behaviors that are disturbance factors in physical therapy⁴⁾, and no study reported the relationships between motor abilities and problematic behaviors. Therefore, we examined the problematic behaviors of independent-walking and non-independent-walking handicapped children in the infant, school child and adolescent development phases, using the Japanese version of the Aberrant Behavior Checklist (ABC-J)⁵⁾ to determine if such behaviors relate to their gross motor abilities.

SUBJECTS AND METHODS

The subjects were 86 handicapped children (aged from

1 year 4 months to 19 years 10 months, average age: 8.5 ± 4.7 years old; 56 males and 30 females) received physical therapy at children's day service centers, pediatric hospitals or other facilities. The subjects were diagnosed as having cerebral palsy (34 subjects), mental retardation (17 subjects) and other diseases (36 subjects). The study objectives, significance, methods, and privacy protection were explained to the caregivers of the subjects in writing, and each caregiver provided her/his informed written consent. The subjects were classified into three groups by age: infants up to 6 years old, schoolchildren are from 6 years 1 month old to 12 years old, and adolescents older than 12 years old. Using the Gross Motor Function Classification System (GMFCS), each group was further divided into an independent-walking group (GMFCS Level I to III) and a non-independent-walking group (GMFCS Level IV and V). Thirteen physical therapists and 8 occupational therapists, who were treating the subject children, rated the subjects using the ABC-J.

The GMFCS is a 5 level classification system that describes the gross motor function of children and young people with cerebral palsy on the basis of their self-initiated movement with particular emphasis on sitting, walking, and wheeled mobility. The focus of the GMFCS is on determining which level best represents the child's or young person's present abilities and limitations in gross motor function. Children who have motor problems similar to those classified as Level I can generally walk without restrictions but tend to be limited in some of the more advanced motor skills. Children whose motor function has been classified as Level V are generally very limited in their ability to move

*Corresponding author. Masayuki Uesugi (E-mail: uesugi@kobe-kiu.ac.jp)

Table 1. Comparison of the independent-walking and non-independent-walking groups of three different age groups

Three groups by age	Problematic behaviors	Independent-walking	Non-independent-walking
		Median (Min–Max)	Median (Min–Max)
Infants	Stereotypy	0.0 (0.0–2.0)	1.0 (0.0–17.0)
	Lethargy	2.0 (0.0–20.0)	7.0 (0.0–33.0)
	Irritability	5.0 (0.0–27.0)	10.0 (0.0–29.0)
	Hyperactivity	7.5 (0.0–27.0)	10.0 (0.0–18.0)
	Inappropriate speech	0.0 (0.0–4.0)	0.0 (0.0–9.0)
Schoolchildren	Stereotypy	0.0 (0.0–16.0)	2.0 (0.0–15.0)
	Lethargy	5.0 (0.0–29.0)	7.5 (0.0–22.0)
	Irritability	8.0 (0.0–40.0)	5.5 (0.0–27.0)
	Hyperactivity	11.0 (0.0–40.0)	5.5 (1.0–27.0)
	Inappropriate speech	1.0 (0.0–10.0)	0.0 (0.0–4.0)
Adolescents	Stereotypy	0.0 (0.0–20.0)	1.0 (0.0–21.0)
	Lethargy	7.0 (0.0–22.0)	5.0 (0.0–24.0)
	Irritability	3.0 (0.0–32.0)	9.0 (1.0–36.0)
	Hyperactivity	10.0 (0.0–32.0)	8.0 (1.0–35.0)
	Inappropriate speech	0.0 (0.0–9.0)	1.0 (0.0–8.0)

themselves around even with the use of assistive devices⁶).

The ABC is a questionnaire developed by Aman et al. to assess problematic behaviors of mentally-handicapped persons. The ABC has been used by many studies, including studies on syndrome phenotypes and pharmacotherapy effects. Outside Japan, many studies have used the ABC^{7–12}. The ABC has 58 questionnaire items in total: 15 irritability items, 16 lethargy items, 7 stereotypy items, 16 hyperactivity items, and 4 inappropriate speech items. Medical staff, parents, caregivers, and other examiners who know the subject well assess these items using a 4-point scale: no problems (0 point), minor problems (1 point), moderate problems (2 points), and major problems (3 points). Points filled in by the examiners on the score sheets indicate the severity of the problematic behavior.

R-2.8.1 statistics software was used to conduct statistical analyses.

We used the Mann-Whitney U test to compare the ABC-J scores of the independent-walking and non-independent-walking groups. Significance was accepted for values of $U < 0.05$. The Kobe International University Ethics Committee approved this study (Approval No. G2009-004).

RESULTS

No significant differences are shown in Table 1, significant differences were observed between independent-walking and non-independent-walking groups.

DISCUSSION

The significant difference observed in the *stereotypy* score is possibly the result of the limited sensory input of non-independent-walking infants. This limitation disturbs the development of their behavioral variations, resulting in simple stereotypical behaviors. The significant difference

observed in the *lethargy* score may be due to *lethargy* often being considered a problematic behavior of infants who generally show physiological hyperkinesia. No significant difference was observed in the *hyperactivity* score, probably because some questionnaire items, asking for information such as if the subject is uncooperative, disturbs group activities and fails to respond when spoken to, could not be rated. No significant difference was observed in the *inappropriate speech* score, which was probably due to the small number of questionnaire items and many of the subjects being unable to speak. The *irritability* score showed no significant difference either. This was probably because many questionnaire items, including asking if the subject starts crying and screaming too easily, shouts inappropriately and loses his/her temper, are unaffected by motor abilities.

Regarding the relationships between motor ability levels and the rate of problematic behaviors, it has been reported that less than 5 percent of GMFCS Level I to IV patients have problematic behaviors, whereas approximately 10 percent of Level V patients have problematic behaviors¹³, indicating that the problematic behavior rate varies depending on the motor ability level. In our study, however, no significant differences were observed between the independent-walking and non-independent-walking groups, except for the above-mentioned two problematic behavior scores of infants, *lethargy* and *stereotypy*.

This study had some limitations. One limitation is that handicapped children receiving physical therapy were included in the study regardless of their disease. Another limitation is that the GMFCS, which was developed for cerebral palsy patients, was used to assess handicapped children with other diseases.

Although the ABC does not specify the age range of intended subjects, it is reported to be correlated with the Child Behavior Checklist intended for children 14 months old and over¹⁴. We thought the ABC could be used for our study;

however, Some questionnaire items, are inappropriate for infants with mental retardation. In future studies, consideration of the age of the subjects will be required. Iwasaka reported that types of problematic behaviors vary with age. For example, allotriophagy increases and dependence and hypokinesia decrease as patients age¹⁵). This study only compared problematic behaviors of the subjects depending on age and their ability to walk independently or not. Comparison of more items will be required in the future.

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