

# Relationships between problematic behaviors and motor abilities of children with cerebral palsy

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**Abstract.** [Purpose] This study aimed to examine whether motor abilities of children with cerebral palsy are related to their problematic behaviors. [Subjects] The subjects were children with mental retardation who were undergoing physical therapy. [Methods] Twenty-one examiners, 13 physical therapists, and 8 occupational therapists treated and examined the subjects by using the Japanese version of the Aberrant Behavior Checklist. The Japanese version of the Aberrant Behavior Checklist scores were compared between the Gross Motor Function Classification System I to III (12 subjects) and Gross Motor Function Classification System IV and V groups (17 subjects). [Results] Lethargy and stereotypy scores significantly differed between the groups, proving that patients with Gross Motor Function Classification System levels IV and V have more severe problematic behaviors. [Conclusion] In this study, only five types of problematic behaviors, namely irritability, lethargy, stereotypy, hyperactivity, and inappropriate speech, were examined. Despite this limitation, the study clarifies that problematic behaviors of children with cerebral palsy, except lethargy and stereotypy, have little relationship with their motor abilities.

**Key words:** Cerebral palsy, Motor abilities, Problematic behaviors

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## INTRODUCTION

Physically handicapped children who require physical therapy often also have mental retardation (MR). For children with cerebral palsy (CP) with different Gross Motor Function Classification System (GMFCS) levels, the prevalence of severe MR was reported as follows: level I (capable of going up and down stairs), 32% to 42%; level II (capable of walking), 18% to 30%; level III (capable of walking with assistive mobility devices), 8% to 12%; level IV (capable of using electric-powered wheelchairs), 9% to 15%; and level V (have limited self-mobility even with electric-powered wheelchairs), 13% to 16%. Children with CP are known to have higher risks of behavioral and psychological problems than healthy children. These issues, however, await further studies<sup>1</sup>. Many children with CP are reportedly impatient, tire easily, and show symptoms of attention-deficit hyperactivity disorder with poor short-term memory<sup>2</sup>.

In this study, children with CP were divided into two groups, namely the GMFCS I to III group and the GMFCS IV and V group, in order to examine whether their motor abilities and problematic behaviors differ, using the Japanese version of the Aberrant Behavior Checklist (ABC-J).

## SUBJECTS AND METHODS

The subjects were 29 children with MR and CP who were undergoing physical therapy in hospitals and other facilities for children with handicaps. Twenty-one examiners, 13 physical therapists, and 8 occupational therapists treated and examined the subjects by using the ABC-J. For each ABC-J score, the GMFCS I to III and GMFCS IV and V groups were compared. The subjects' written consent was obtained after their parents explained the study to them. The Kobe International University Ethics Committee approved this study (approval No. G2009-004).

Aman and Singh developed the ABC in the 1980s in a facility for patients with MR in New Zealand. They were studying antipsychotic therapy for behavioral problems. The ABC has been translated into over 20 languages, including Chinese, French, and German<sup>3</sup>. Although many studies use the ABC outside Japan<sup>4-10</sup>, only a few studies have used the ABC in Japan<sup>11-15</sup>.

For each ABC questionnaire item, medical staff, parents, caretakers, and other examiners who knew the subjects well assessed them on a 4-point scale, where 0 indicates no problem; 1, a slight problem; 2, a moderate problem; and 3, a major problem. The examiner can assess problematic behaviors of the subjects by recording these scores on a score sheet. The questionnaire includes 15 items on irritability, 16 on lethargy, 7 on stereotypy, 16 on hyperactivity, and 4 on inappropriate speech.

The GMFCS was used to classify the gross motor abilities of the patients with CP. The patients' motor abilities were divided into five levels, where level I indicated the mildest

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disabilities and the patient could go up and down stairs, and level V indicated the most severe disabilities and the patient could not even maintain good posture in a wheelchair.

Statistical analyses were conducted by using the IBM SPSS ver. 20.0 software. The Mann-Whitney U test was used to compare the ABC-J scores between the two groups.

## RESULTS

The average scores of the GMFCS I to III and GMFCS IV and V groups were respectively as follows: for irritability, 5.50 and 11.82; for lethargy, 3.33 and 8.47; for stereotypy, 0.92 and 3.29; for hyperactivity, 5.33 and 8.29; and for inappropriate speech, 1.42 and 1.76. Significant differences were observed in the lethargy ( $p = 0.034$ ) and stereotypy scores ( $p = 0.033$ ), proving that patients with GMFCS levels IV and V have more severe problematic behaviors.

## DISCUSSION

Paralysis of one side of the body due to CP tends to cause problematic behaviors such as aggressiveness, irritability, and hyperactivity<sup>16, 17</sup>. The percentage of children with CP with dependence, resistive movement, hyperactivity, and other problematic behaviors is reportedly approximately five times higher than that of healthy children<sup>18</sup>. Parkas et al. reported that 25% of parents of 8- to 12 year-old children with CP assess their children as having problematic behaviors<sup>19</sup>. Carlsson et al. reported that 18% of children with CP are on the borderline in terms of problematic behavior<sup>20</sup>.

In this study, only five types of problematic behaviors, namely irritability, lethargy, stereotypy, hyperactivity, and inappropriate speech, were examined. Despite this limitation, the study clarifies that the problematic behaviors of children with CP, except lethargy and stereotypy, have little relationship with their motor abilities. Irritability and inappropriate speech were thought to be unaffected by motor abilities because these can be expressed non-physically. Contrary to our expectations, hyperactivity was also unaffected by motor abilities. This was probably because the questionnaire items for hyperactivity included “deliberately ignores directions”, “does not pay attention when he/she is talked to”, “easily gets distracted”, and other such items that have little relevance to motor abilities.

The present study examined a limited number of subjects, only 29 patients with CP. More subjects need to be examined in the future. CP has various types, including the spastic, dyskinetic, and ataxic types. Patients' symptoms vary significantly depending on the type of their CP. Patients should be examined by dividing them into groups according to CP

type. Although many studies have been conducted on CP, only few studies address the problematic behaviors of patients with CP. This study, which addressed physical therapy for children, has significance.

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