

# Association between motor and mental functioning in toddlers with cerebral palsy

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## Background

Although motor impairments are the central concept in the definition of Cerebral Palsy (CP)<sup>1</sup>, participation of these children can be influenced by other accompanying impairments. For instance, Beckung and Hagberg<sup>2</sup> found that motor functioning and learning disability were important predictors for participation restrictions in children with CP<sup>2</sup>. However, little is known about the association between the motor and mental functioning in children with CP.

## Purpose

The purpose of this study was to examine the association between motor functioning and mental functioning in toddlers with CP.

## Methods

Seventy-eight children with CP, 2.5 years of age, participated in this cross-sectional study. To measure mental and motor functioning, the Bayley Scales of Infant Development-Second Edition (BSID-II) Mental and Motor scales were used<sup>3</sup>.

Table 1 Characteristics of the children

Characteristic	N	Mean (SD)
<b>Gender</b>		
Male	43	
Female	35	
<b>Age (in months)</b>		31 (1)
<b>Typology</b>		
Dyskinetic	3	
Ataxia	0	
Spastic	75	
<b>Distribution</b>		
Unilateral	34	
Bilateral	41	
<b>GMFCS</b>		
I	24	
II	9	
III	20	
IV	17	
V	8	
<b>Total</b>	<b>78</b>	

## Results

The characteristics of the 78 children are presented in Table 1. Spearman correlation between Mental Development Index (MDI) scores and Psychomotor Development Index scores was 0.67 ( $p < 0.01$ ). Table 2 illustrates the association between mental and motor functioning categories of the children. In total 65 % ( $n = 51$ ) performed on the same level in mental and motor functioning. Twenty-seven children (35%) were more delayed in motor functioning compared to mental functioning. Of these 27 children, 15 performed within normal limits in mental functioning and significantly delayed in motor functioning. No children performed better on the motor than on the mental functioning.

Table 2 Crosstabulation of classification by MDI and PDI

		Classification Psychomotor Development Index (PDI)				Total
		Significantly Delayed Performance	Mildly Delayed Performance	Within Normal Limits	accelerated performance	
Classification Mental Development Index (MDI)	Significantly Delayed Performance	36	0	0	0	36
	Mildly Delayed Performance	7	0	0	0	7
	Within Normal Limits	15	5	15	0	35
	Accelerated performance	0	0	0	0	0
Total		58	5	15	0	78

## Conclusions

An association was found between mental and motor functioning. Almost two third of the toddlers performed on the same level for motor and mental functioning. In those cases in which motor and mental functioning did not develop in the same way, it was always in favour of mental functioning. So when a child is significantly delayed in motor functioning, it does not automatically mean that it is also delayed in mental functioning. Professionals always need to take this into consideration.

## Literature

- Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M. The Definition and Classification of Cerebral Palsy. *Dev Med Child Neurol* 2007; 49(s109):1-44.
- Beckung E, Hagberg G. Neuroimpairments, activity limitations, and participation restrictions in children with cerebral palsy. *Dev Med Child Neurol* 2002; 44(5):309-316.
- Bayley N. *Bayley Scales of Infant Development Second Edition Manual*. San Antonio: The Psychological Corporation; 1993.