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Development of social functioning and communication in school-aged (5–9 years) children with cerebral palsy



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ABSTRACT

The aim of this study was to examine determinants of the course and level of social functioning and communication in school-aged children with cerebral palsy (CP) over a 2-year period. A clinic-based sample of 5 and 7 years old children with CP ($n = 108$; 72 males; mean age 6 y 3 mo, SD 12 mo; Gross Motor Function Classification System (GMFCS) level I–V) was followed longitudinally in three yearly assessments. Social functioning and communication were measured with the Vineland Adaptive Behavior Scales (VABS). Data were analyzed with generalized estimated equations. The results showed that social function followed a course of progressive restrictions over time in non-ambulatory children with CP aged 5–9 compared to children who could walk with or without walking aids. Overall lower levels of social functioning were found in children with GMFCS V, epilepsy, speech problems, lower intellectual capacity and older age at baseline. For communication more restrictions over time were found in children with lower intellectual capacity. Children with GMFCS V, speech problems and older age at baseline had overall greater restrictions in communication. It was concluded that motor functioning and intellectual ability can be used to identify children at risk for progressive restrictions in social functioning and communication. For children with CP and social and communicative restrictions, multidisciplinary assessment and treatment may be indicated to counteract an unfavorable development.

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1. Introduction

The International Classification of Functioning, Disability and Health (ICF; WHO, 2001) has highlighted participation, defined as involvement in life situations, as a central outcome for children with disabilities. Studies have shown that participation is associated with the development of skills and competences, social relationships, and long-term mental and physical health (Forsyth & Jarvis, 2002; Simeonsson, Carlson, Huntington, McMillen, & Brent, 2001). Social functioning and

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communication are essential aspects of participation, enabling children to realize their social, intellectual, emotional, communicative, and physical potential.

The school-age period marks a major expansion of children's social environment, from home to school and community. Consequently, the importance of social functioning and communication increases when the children grow up. A broader understanding of factors that are associated with participation, and especially with social functioning and communication, may result in more effective support for children and their parents, and will help to create treatment plans for optimizing children's participation in daily activities. Although this accounts for all children with disabilities, the focus of this paper is especially on children with cerebral palsy.

Cerebral palsy (CP) is one of the most common motor disorder in childhood, with a prevalence of two per 1000 live births (SCPE). CP is defined as "a group of permanent disorders of the development of movement and posture, causing activity limitations, which are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain". The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems (Rosenbaum et al., 2007)

Studies of children with various physical disabilities including cerebral palsy (CP) found associations between participation and disease related, personal and environmental factors, like gross motor function, manual ability, cognitive ability, communicative skills, age and gender (Bult, Verschuren, Jongmans, Lindeman, & Ketelaar, 2011). Recent studies have shown that children with more severe CP and consequently lower motor ability have greater restrictions in participation (Beckung & Hagberg, 2002; Imms, Reilly, Carlin, & Dodd, 2008; Kerr, Parkes, Stevenson, Cosgrove, & McDowell, 2008; Maher, Williams, Olds, & Lane, 2007; Michelsen et al., 2009; Morris, Kurinczuk, Fitzpatrick, & Rosenbaum, 2006; Voorman et al., 2006). Besides motor function, also learning disability (Beckung & Hagberg, 2002; Fauconnier et al., 2009) and the presence of seizures and speech problems (Fauconnier et al., 2009; Forsyth, Colver, Alvanides, Woolley, & Lowe, 2007; Hammal, Jarvis, & Colver, 2004; Imms, Reilly, Carlin, & Dodd, 2009; Law et al., 2006; Mihaylov, Jarvis, Colver, & Beresford, 2004; Morris et al., 2006), were related to participation restrictions in children with CP.

Only few studies have followed the course of social functioning and communication among school-aged children with CP. Significant increases over time in social functioning, as measured with the Pediatric Evaluation of Disability Inventory (PEDI), were found in children with CP aged 5–9 years (Smits, Ketelaar, Gorter, van Schie, & Dallmeijer, 2011). The course of social functioning was best described by a model comprising the level of manual abilities (classified by the Manual Ability Classification System (MACS)) and paternal education level.

Voorman, Dallmeijer, Van Eck, Schuengel, and Becher (2010) examined the course of social functioning in children with CP aged 9 to 16 years. Although they reported that social functioning and communication slightly increased in absolute values, the gap with the norm population widened, as measured with the Vineland Adaptive Behavior Scale (VABS) based on North-American norm data. Children in Gross Motor Function Classification System (GMFCS) level IV or V showed less advanced functioning than children in level I. Disease characteristics (GMFCS, epilepsy, speech problems), personal factors (externalizing behavior problems) and environmental factors (having no siblings, low parental level of education and high parental stress) were associated with more restrictions in social functioning and communication. Yet, it is unclear if this increase in restrictions compared to typically developing children, measured with the VABS, is already apparent in younger children with CP. Moreover, it is unknown if the same factors are associated with the course or level of social functioning and communication of younger children.

Therefore, the aim of the present longitudinal study was to examine the course and level of social functioning and communication, measured with the VABS, in children with CP aged 5–9 years, relative to normative development. In addition, we attempted to explain the variations in course, testing a similar set of disease, personal and environmental characteristics as tested in older children with CP (Voorman et al., 2010).

2. Method

2.1. Design

This study was part of *Pediatric Rehabilitation Research in the Netherlands* (PERRIN) CP 5–9, a prospective longitudinal cohort study on the course and determinants of daily functioning in children aged 5–9 years with CP. Data were collected during a baseline assessment (T_0), a follow-up assessment after one year (T_1), and a second follow-up assessment two years after study start (T_2).

2.2. Participants

Children were recruited at four rehabilitation centers and the pediatric rehabilitation departments of two university medical centers in the Netherlands between May 2006 and October 2007. All children with CP in all GMFCS levels, known in the pediatric rehabilitation centers were invited. Eligible children had a confirmed diagnosis of CP (Rosenbaum et al., 2007), diagnosed previously by a pediatric neurologist, and were aged 5 years (± 6 mo) or 7 years (± 6 mo) at study entry. Children whose parents lacked a basic knowledge of Dutch, and children diagnosed with additional diseases and disorders affecting motor functioning, other than CP, were excluded. All children received 'regular care' as provided in special schools and rehabilitation centers or private practices in the Netherlands.

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