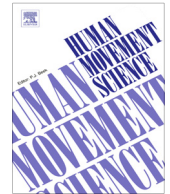




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Identifying play characteristics of pre-school children with developmental coordination disorder via parental questionnaires

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ABSTRACT

Motor coordination deficits that characterize children with Developmental Coordination Disorder (DCD) affect their quality of participation. The aim of the current study was to identify play characteristics of young children with DCD, compared to those of children with typical development in three dimensions: activity and participation, environmental factors and children's impairments.

Method: Sixty-four children, aged four to six years, participated. Thirty were diagnosed as having DCD; the remaining 34 children were age, gender and socioeconomic level matched controls with typical development. The children were evaluated by the M-ABC. In addition, their parents completed a demographic questionnaire, the Children's Activity Scale for Parents (CHAS-P), the Children's Leisure Assessment Scale for preschoolers (CLASS-Pre), and My Child's Play Questionnaire (MCP).

Results: Children with DCD performed significantly poorer in each of the four play activity and participation domains: variety, frequency, sociability, and preference (CLASS-Pre). Furthermore, their environmental characteristics were significantly different (MCP). They displayed significantly inferior performance (impairments) in interpersonal interaction and executive functioning during play, in comparison to controls (MCP). Moreover, the children's motor and executive control as reflected in their daily function as well as their activities of daily living (ADL) performance level, contributed to the prediction of their global play participation.

Discussion: The results indicate that the use of both the CLASS-Pre and the MCP questionnaires enables the identification of unique play characteristics of pre-school children with DCD via parents' reports. A better insight into these characteristics may contribute to theoretical knowledge and clinical practice to improve the children's daily participation.

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1. Introduction

Developmental coordination disorder (DCD) or 'clumsiness' is one of the most common neuro-developmental disorders. DCD occurs among 5–6% of schoolchildren, aged five to eleven years (American Psychiatric Association, 2013). However, despite its high incidence, knowledge about the features of actual daily performance such as play, among young children with DCD is scarce. Such knowledge is particularly essential since identification of deficient abilities in actual performance, as reflected in activities of daily living (ADL) and play in relation to motor skill deficits is required in order to diagnose DCD (Criteria A and B in *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM–5; American Psychiatric Association, 2013).

DCD is under-recognized and under-diagnosed, due to a lack of awareness on the part of physicians and therapists concerning its manifestation, as well as a lack of standardized assessment tools (Blank, Smits-Engelsman, Polatajko, & Wilson, 2012). DCD represents a significant risk factor in the long-term development of children and adolescents and influences their activity performance abilities and self-perception. Therefore, a better understanding of the early manifestations of DCD is critical (Piek, Baynam, & Barrett, 2006; Venetsanou et al., 2011).

Play is one of the most significant activities that affects children's cognitive, physical, emotional, and social development and is a central aspect of health and well-being (Lifter, Foster-Sanda, Arzamarski, Briesch, & McClure, 2011; Rigby & Rodger, 2006). Play provides opportunities to explore the environment and to develop and practice a range of skills such as thinking, planning, and problem-solving (Henry, 2008).

The most intensive, versatile, and significant period of play occurs during the preschool ages of three to six years, referred to as the "age of play," according to Erikson's (1939) psychosocial developmental phases.

Most of the literature about the play characteristics of children with DCD describes those of school-aged children reporting less involvement and lower levels of enjoyment in free play at school, physical education classes and organized sports, compared to their peers (Cairney, Hay, Faught, Mandigo, & Flouris, 2005; Cairney, Hay, Veldhuizen, Missiuna, & Faught, 2010).

Such limitations in play participation may lead to secondary emotional, behavioral, and social problems. Indeed, feelings such as unhappiness, frustration, anger, low self-confidence, self-perception, social rejection, isolation and loneliness have been reported among school-aged children with DCD (Chen, Tseng, Hu, & Cermak, 2009; Mandich, Polatajko, & Rodger, 2003; Missiuna, Moll, King, King, & Law, 2007; Piek & Dyck, 2004; Poulsen, Ziviani, Johnson, & Cuskelly, 2008; Stephenson & Chesson, 2008). Many of them also experienced a chronic sense of failure related to play and physical activities and tended to report lower generalized self-efficacy (Cairney, Hay, Faught, Mandigo et al., 2005; Cairney, Hay, Faught, Wade et al., 2005; Cairney et al., 2010; Jarus, Lourie-Gelberg, Engel-Yeger, & Bart 2011; Mandich et al., 2003; Poulsen, Ziviani, & Cuskelly, 2008).

The possibility of children as young as three and four years old developing internalizing behaviors is a major concern (Sugden, Kirby, & Dunford, 2008). Therefore, there is a need to identify these children's play characteristics as early as possible, in order to avoid secondary socio-emotional deficits (Mandich et al., 2003; Skinner & Piek, 2001).

To date, most studies that focused on pre-school children with DCD aged four to six years largely described children's overall daily performance without a specific focus on play (Bart, Jarus, Erez, & Rosenberg, 2011). Others have included populations with developmental delays, but not specifically DCD (Case-Smith & Kuhaneck, 2008; Hestenes & Carroll, 2000). Kennedy-Baehr and her colleagues provided valuable information about the play characteristics of preschool children aged four to six years with probable DCD (pDCD) (Kennedy-Behr, Rodger, & Mickan, 2011, 2013a, 2013b, 2015). The researchers analyzed videotapes of free play observations using standardized tools, such as the Revised Knox Preschool Play Scale (Knox, 2008) and the Play Observation Scale (POS) (Rubin, 2001) within a preschool setting and compared their coding results to those of children with typical development (TD) (Kennedy-Behr et al., 2011, 2013a, 2013b, 2015).

The results showed significant differences in the gross and fine motor play skills and overall play age of children with pDCD in comparison to children with TD. In addition, children with pDCD were less involved in active play and displayed a higher probability of struggling with peer interaction while playing outdoors, compared to children without pDCD (Kennedy-Behr et al., 2011, 2013a, 2013b, 2015). Furthermore, children with pDCD were involved in aggressive incidents more often during free-play than their peers (Kennedy-Behr et al., 2013b).

In light of the existing literature, play characteristics of preschool children with DCD were evaluated in the current study by parental report. Three dimensions of play were simultaneously evaluated based on the terminology offered by the World Health Organization (International Classification of Functioning Disability and Health (ICF, World Health Organisation, 2001).

The first dimension, activities and participation, was defined in light of previous findings that described these children to be less involved, less sociable and to have a lower enjoyment level (e. g., Cairney, Hay, Faught, Mandigo et al., 2005; Cairney et al., 2010; Jarus et al., 2011; Kennedy-Behr et al., 2011, 2013a, 2013b, 2015; Poulsen, Ziviani et al., 2008). Both play and ADL are part of Criteria B of the DCD diagnostic criteria (American Psychiatric Association, 2013).

Studies about ADL performance among children with DCD are scarce (Van der Linde et al., 2015). Yet, relationships between ADL performance and play participation characteristics have been reported among young children with DCD (Bart et al., 2011). Thus, background information about their ADL performance was also gathered in the current study.

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