



Developing Pediatric Pulmonology Infection Control Guidelines: A Quality Improvement Project

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Developmental coordination disorder (DCD) is a hidden, subtle, misdiagnosed, and misunderstood disability [1-3]. Previous terminology included 'minimal cerebral palsy,' 'dyspraxia,' 'minimal brain dysfunction,' and 'clumsy child syndrome' [4]. In 1994, the International Consensus Meeting on Children and Clumsiness' was held in London, Canada where the term 'developmental coordination disorder' as used by the American Psychiatric Association, was accepted [5]. DCD is a neurodevelopmental motor disorder which affects five to six percent of children [4]. There are four diagnostic criteria:

- Coordination skill acquisition and execution, is substantially below what would be expected for a child of that chronological age.
- The motor skills deficits considerably interfere with activities of daily living and impacts on academic productivity, leisure, and play.
- The above-mentioned symptoms have developed during the early developmental period.
- The symptoms are not due to intellectual impairment, visual impairment or a neurological condition impacting on movement ability [4].

DCD is characterised by clumsy, slow, or inaccurate motor skills which results in difficulty in conceptualising, planning and executing movements [27]. Challenges in learning and automatizing gross and fine motor activities occur [6,7]. Although children with DCD experience difficulties with motor skills and coordination, they can learn motor skills, given the necessary time and practice [8,9].

Gross motor symptoms include an awkward gait and poor posture [10,11]. The child is accident prone and has limited sporting ability [12]. Fine motor difficulties result in challenges with dressing, using zippers and buttons, tying shoelaces, and doing buckles [1,6]. The child's handwriting is illegible, colouring in pictures is untidy [26], and they have difficulty using a scissor for cutting paper [13]. There may be difficulties with eye tracking while reading and clumsy page turning [14,15]. The child will exhibit difficulty

opening and closing containers, building with blocks and construction toys [12]. There may be poor speech articulation [1,6].

Although DCD is classified as a motor disorder, its impact extends beyond the physical domain and results in challenges in performing academic or vocational tasks [4]. Along with the motor coordination difficulties, academic challenges may be present [16]. Social difficulties may arise because of decreased participation in leisure and play activities [12]. Children with DCD are at greater risk of emotional and behavioural challenges when compared to their typically developing peers, as DCD impacts on all domains of functioning [2,12]. Each day is full of frustrations and disappointments, which may lead to aggression, angry and tearful outbursts [17]. The siblings and families also experience higher levels of emotional stress, as they continually assist the child with daily living tasks [18].

The child's gender may play a role in the emotional challenges of the child. For boys, the challenges around participating in sporting and physical activities may result in a negative self-concept and reduced social engagement [18,19]. Girls may have challenges with lowered self-perception as a result of difficulties in self-care skills, such as applying makeup and wearing clothes with complex fasteners [20]. Children may be teased and bullied and may become socially isolated [21] and have higher levels of anxiety [22]. They have feelings of inadequacy, reduced self-efficacy, lowered self-esteem, and self-image [23]. They may have difficulties with self-expression and feel uncomfortable in their own bodies [22].

The disorder's negative impact on academic productivity results from the motor skills deficit and not an intellectual disability [4]. Despite normal intelligence, a child experiences difficulty in successfully carrying out academic tasks in the classroom due to poor motor skills and deficits in planning, sequencing and organising thoughts [17]. Poor spelling and difficulties with the communication of ideas on paper is seen. The quality of the written work may not be a true indication of the learner's cognitive ability, yet this

is often the medium through which judgements of cognition are made in schools [13,23]. They struggle to keep up with the class pace, work much slower and have poor time management [1].

These children have great difficulty with attention on learning tasks, as they expend much of their energy on managing their bodies [25]. Due to poor spatial perception they need to consciously think through many of the activities their classmates automatically perform. They have difficulty concentrating and focusing on scholastic tasks and thus memory skills may be impaired [1,24]. Manipulating concrete materials is difficult which may impair maths skills such as geometry [16].

In conclusion, paediatricians should take care with the diagnosis, as DCD is often inaccurately labelled as having an intellectual delay, attention deficit disorder, or being on the autistic spectrum.

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