

# Physiotherapy Briefings for Physicians

A Research Summary from the  
Canadian Physiotherapy Association

February 2010

## Developmental Coordination Disorder

This issue focuses on research into physiotherapy intervention for children with developmental coordination disorder (DCD), a delay in the development of motor skills that affects from 5-6% of children in the typical population to 30-50% in children less than 1250 gm birth weight.

### Physiotherapists play a key role in early identification, assessment and treatment of children with DCD

Children with DCD have difficulty coordinating movement, resulting in an inability to perform common everyday tasks. With DCD, there are no underlying medical or neurological conditions that account for the children's motor difficulties; they may be of normal or above average intellectual abilities. However, their motor difficulties may influence their social, academic and emotional development through loss of self-esteem. DCD is also often associated with other developmental disorders such as ADHD, speech-language delays and learning impairment [1].

#### Physiotherapists assess motor delay and impact of the delay

Physiotherapists are key members of the interdisciplinary team assessing children at risk for DCD, skilled at administering standardized developmental tests as well as identifying specific areas of deficit in the pediatric population.

The diagnostic criteria for DCD [5] are:

- A. Performance in daily activities that require motor coordination is substantially below that expected, given the person's chronological age and measured intelligence. This may be manifested by marked delays in achieving motor milestones (e.g., walking, crawling, sitting); dropping things; clumsiness; poor performance in sports; poor handwriting.
- B. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living.
- C. The disturbance is not due to a general medical condition (e.g., cerebral palsy, hemiplegia, or muscular dystrophy) and does not meet criteria for a pervasive developmental disorder.
- D. If mental retardation is present, the motor difficulties are in excess of those usually associated with it.

Authors of a recent study [6] focussed on refining the description of children diagnosed with DCD noted that evaluation of each criterion is within the scope of practice of different health professionals. Children with DCD should be assessed carefully by physiotherapists and occupational therapists to determine the particular areas of difficulty for that child as there may be both gross and /or fine motor issues that significantly impact function.

One of the most common assessment tools used in DCD studies is the Movement Assessment Battery for Children (M-ABC) [7]. This tool, validated for children between the ages of 4 and 12 years, evaluates three task areas: manual dexterity, ball skills, and static and dynamic balance.

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#### DCD Facts [1]

- DCD is more prevalent in boys, with the ratio of boys to girls varying from 2:1 to 5:1.
- Children born preterm are at greater risk of developing motor, cognitive and behavioural impairments than infants born at term.
- A growing body of evidence suggests that up to 50% of children with attention deficit/hyperactivity disorder may also have DCD.



Early prediction and identification of DCD allow for early intervention, before motor problems are compounded by secondary loss of self-esteem.

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*Physiotherapy Briefings for Physicians* is an initiative of the Physiotherapy Association of British Columbia. This topic was developed in consultation with the Canadian Physiotherapy Association.

- A recent study [3] investigated the incidence of DCD in eight-year-olds who were born extremely preterm (<29 weeks) to determine whether assessments done at an earlier age can accurately predict DCD. In the test group (n = 50), 42% were diagnosed as having DCD using the M-ABC, as compared with 8% in the control group. On retrospective review of these subjects' previous motor assessments, the researchers found that motor assessment using the Peabody Fine Motor Scales at 3 years of age is highly predictive of DCD at school age. The authors suggested that early prediction and identification of DCD would allow for early intervention, before motor problems are compounded by secondary loss of self-esteem.
- A controlled trial [4] describes a study to test a therapy developed in the Netherlands specifically for children with DCD: neuromotor task training (NTT). NTT is a task-oriented approach that incorporates elements from the cognitive neuroscience approach. The treatment group (n = 26) received nine 30-minute NTT sessions over approximately three months, administered by paediatric physiotherapists. The control group (n = 13) received no interventions. Children were assessed before and after the trial period using the M-ABC and the Test of Gross Motor Development (TGMD-2). After the treatment interval, the test group's M-ABC score had improved significantly (pretest: mean 17.7, SD 5.5; posttest: mean 11.8, SD 7.4; p = 0.003). The control group showed no change (pretest: mean 16.7, SD 5.4; posttest: mean 17.0, SD 7.5). On the TGMD-2, the quality of the test group's motor patterns had improved (pretest: mean 75.8, SD 12.0; posttest: mean 83.2, SD 11.2; p < 0.001), whereas that of the control group had deteriorated (pretest: mean 90.0, SD 15.3; posttest: mean 79.3, SD 17.7; p < 0.001).

## Physiotherapists play a key role in early identification, assessment and treatment of children with DCD...continued from front page

For younger children, the Peabody Developmental Motor Scales (PDMS-2) [8] is commonly used for fine and gross motor skills. This tool consists of six subtests: reflexes, stationary, locomotion, object manipulation, grasping, and visual-motor integration.

## Physiotherapy: an effective intervention for children with combined ADHD and DCD

A recent study [2] examined the prevalence of DCD among a cohort of patients with ADHD, characterized the motor impairment, identified additional co-morbidities, and determined the role of physiotherapy intervention for these patients. Physical therapy sessions were performed twice weekly for one hour each, in groups of four or five patients. Patients were also instructed in daily, 30-minute home sessions including muscle strengthening, stretching and balance exercises. The intervention program:

- Included a cognitive, task-specific approach.
- Stressed attention to performance of skills and self-control in the ability to perform activities.
- Integrated knowledge of motor learning and motor control into the treatment protocol.
- Required that patients keep a diary of an individualized, home-based program.

A key finding was that intensive physiotherapy intervention significantly improved motor performance, as assessed by the Movement Assessment Battery for Children (M-ABC) (test group n = 14, control group n = 14; p = 0.001).

The study authors reported also that:

- Of 96 consecutive children with ADHD, 55.2% were also diagnosed with DCD.
- DCD was most often detected among patients with inattentive type ADHD (64.3%) compared with 11% among hyperactive/impulsive type patients.
- Patients with ADHD and DCD more often had specific learning disabilities than patients with ADHD alone (p = 0.05).
- Patients with ADHD and DCD more often had expressive language deficits than patients with ADHD alone (p = 0.03).

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