

# A plea for developmental motor screening in Canadian infants

Susan R Harris PhD PT FCAHS

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Motor delays during infancy may be the first observable sign of a specific neurodevelopmental disability or of more global developmental delays. The earlier such disorders are identified, the sooner these infants can be referred for early intervention services. Although developmental motor screening is strongly recommended in other Western countries, Canada has yet to provide a developmental surveillance and screening program. Ideally, screening for motor disabilities should occur as part of the 12-month well-baby visit. In advance of that visit, parents can be provided with a parent-screening questionnaire that they can complete and bring with them to their 12-month office visit. Interpretation of the parent-completed questionnaire takes only 2 min to 3 min of the health care professional's time and, based on the results, can either reassure parents that their infant is developing typically, or lead to a referral for standardized motor screening or assessment by a paediatric physical or occupational therapist.

**Key Words:** *Autism; Cerebral palsy; Developmental motor delay; Infant developmental screening*

In 2011, the Canadian Paediatric Society's (CPS) *Early Years Task Force* published a position statement recommending an enhanced well-baby visit to include developmental screening at 18 months of age for all Canadian infants (1). The purpose of the present article is to make a case for earlier screening and surveillance in Canada, with a focus on developmental motor screening.

Delayed motor milestones in infancy may be the first indicator of a specific neuromotor disorder (eg, cerebral palsy [CP]) or an early warning sign of a pervasive developmental disorder such as autism (2). The earlier such disorders are identified, the sooner the infant can be referred for early intervention services. In 2013, the Neuromotor Expert Screening Panel of the American Academy of Pediatrics published a clinical report outlining an algorithm for surveillance and screening young children for motor delays, and emphasizing the importance of a 'timely diagnosis' in minimizing family stress (3). This clinical report recommended developmental surveillance of age-appropriate motor skills at all well-child visits, and developmental screening at nine, 18 and 30 months using standardized tests (3).

Unfortunately, the CPS has offered no comparable recommendations for specific identification of motor delays, nor have they stressed the importance of conducting screening before 18 months of age (1). Recent research from Denmark has shown that the median age for diagnosis of CP in their national registry data was 11.1 months, with 51% of infants diagnosed before one year of age (4). These findings are comparable with those from the Montreal Children's Hospital (Montreal, Quebec), where 58% of infants were referred to a neurologist for an initial diagnosis of CP before one year of age (5). Because more than one-half of infants with CP can be diagnosed before one year of age, waiting until 18 months for an enhanced well-baby visit, as suggested by the *Early Years Task Force* (1), would

## Plaidoyer pour le dépistage du développement moteur des nourrissons canadiens

Les retards de développement des nourrissons peuvent constituer le premier signe observable de déficience neurodéveloppementale spécifique ou plus globale. Plus ce type de trouble est dépisté rapidement, plus ces nourrissons pourront être orientés rapidement vers des services d'intervention précoces. Même si le dépistage des troubles de développement moteur est fortement recommandé dans d'autres pays occidentaux, le Canada n'a pas encore prévu de programme de surveillance et de dépistage des troubles de développement. Dans l'idéal, le dépistage des déficiences motrices devrait faire partie du bilan de santé à 12 mois. Avant ce bilan, les parents peuvent recevoir un questionnaire de dépistage qu'ils peuvent remplir et apporter avec eux au rendez-vous en cabinet à 12 mois. Le professionnel de la santé ne doit consacrer que deux à trois minutes de son temps à l'interprétation du questionnaire rempli par les parents et, d'après les résultats, il peut soit rassurer les parents en leur disant que leur nourrisson se développe normalement, soit les orienter vers un dépistage ou une évaluation standardisé du développement effectué par un pédiatre ou un ergothérapeute spécialisé en pédiatrie.

mean that one-half of the infants eventually diagnosed with CP would miss six months of critical early intervention time. Given that early intervention has been shown to enhance motor outcomes of infants with CP and those at high risk for the disorder (6,7), it would appear more prudent to propose an enhanced well-baby visit that includes developmental screening somewhere between nine and 12 months of age.

Furthermore, a recent retrospective study from Iran (2), based on parent reports of ages at early motor milestone attainment for their children with autism (n=124), reported that these children had significant delays in attaining independent sitting, standing without support and walking compared with normative standards, leading the study authors to recommend that "signs like delays in motor development should be treated as warning signs for disorders such as autism".

In my own clinical experience as a developmental physiotherapist, a community paediatrician referred a six-month-old, full-term, low-risk infant for delays in attaining motor milestones (ie, not yet rolling over). When that baby was assessed using the Bayley Scales of Infant Development (BSID), a comprehensive standardized assessment, he was found not only to have significant motor delays (>2 SD below the mean) but also significant cognitive delays, thus underscoring the statement that motor delays "may be the first or most obvious sign of a global developmental disorder" (3).

Ideally, the primary health care provider (paediatrician, family physician or community nurse practitioner) should ask the parent(s) to complete a screening tool before their nine- to 12-month well-child visit, as was suggested by the *Early Years Task Force* position statement for their recommended 18-month visit (3). Two parent-screening tools that have strong predictive accuracy and are easy to administer (8) are the Ages & Stages Questionnaire (ASQ) (9)

Department of Physical Therapy, Faculty of Medicine, University of British Columbia, Vancouver, British Columbia

Correspondence: Dr Susan R Harris, Department of Physical Therapy, Faculty of Medicine, University of British Columbia,

212 – 2177 Wesbrook Mall, Vancouver, British Columbia V6T 1Z3. Telephone 604-264-0249, e-mail susan.harris@ubc.ca

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and the Parents' Evaluation of Developmental Status (PEDS) (10). Each takes 5 min to 15 min for parents to complete and 2 min to 3 min for professionals to score. Both have gross motor and fine motor sections, making them appropriate as the initial screening instrument for developmental motor delays.

For infants who exhibit motor delays on either the ASQ or PEDS, the primary health care provider could then refer them to a community-based, paediatric physiotherapist or occupational therapist for a specific developmental motor screening test. Fortunately, there are two developmental motor screening tests that were standardized in Canada, both with strong reliability and reasonable predictive accuracy.

The Alberta Infant Motor Scale (AIMS) was normed on a randomly selected, population-based sample of 2202 Albertan infants, covers an age range from birth to 18 months, and can be administered and scored in 20 min to 30 min (11). The Harris Infant Neuromotor Test (HINT) includes normative data for 412 infants from five Canadian provinces, spans an age range of 2.5 to 12.5 months, and can be administered and scored in  $\leq 30$  min (12). In a head-to-head comparison of the two tests with a sample of 144 low- and high-risk infants assessed at 4.5 to 6 months, the predictive validity of the HINT to the gross motor scale of the third edition of Bayley Scales (BSID-III) at three years of age was slightly greater than for the AIMS (13). Based on reassessment on the HINT and the AIMS at 10 to 12.5 months of age, predictive correlations to the BSID-III gross motor scale were identical and, not surprisingly, much stronger than for the earlier assessments. With regard to predictive accuracy of the two tests for significant motor delay ( $< 2$  SD from the mean) at 2 years of age on the BSID-II, sensitivity and specificity were reasonably comparable: sensitivity for both tests was 100% and specificity ranged from 84.5% to 97.9%. The authors cautioned, however, that the low prevalence rate of severe motor delay at 2 years of age on the BSID-II (1.4/100) resulted in unanticipated high rates of sensitivity and specificity (13).

Nonetheless, the strong and significant predictive correlations of both tests when administered at 10 to 12.5 months to three years of age, BSID-III gross motor outcomes add support to the suggestion that providing an enhanced well-baby visit during the last quarter of the first year of life would be preferable to waiting until 18 months.

The HINT has the added advantage of having a five-item questionnaire on parent/caregiver concerns about their infant. Strong concurrent accuracy has been shown between the degree of parental concern on this questionnaire with scores on the BSID (14) and HINT total scores from the portions of the test administered by a paediatric professional (15). As Dr Robert Haslam, a senior Canadian child neurologist, commented in 'a Letter to my younger colleagues' in the *Journal*: "Never underestimate the concerns of a parent" (16).

In their commentary on improving the odds for effective developmental surveillance, Rourke and Leduc (17) encouraged the CPS "to develop recommendations for developmental surveillance and screening and, in particular, when to apply a specific developmental screening tool to health maintenance visits". Because one of the CPS-recommended well-baby visits is at 12 months, this would appear to be a more optimal time point than the 18-month visit to include enhanced developmental screening with the goal of identifying early cases of CP, autism or global developmental delay and, consequently, being able to provide an additional six months of early intervention. By sending the ASQ, PEDS or HINT parent questionnaire to parents to complete in advance of the 12-month visit, this step would require only an extra 2 min to 3 min on the part of the

primary health care provider to interpret the questionnaire results, thus minimizing physicians' concerns that an 'enhanced visit' may require too much additional time on their part (1).

For infants with suspected motor delays based on the parent questionnaire results, referral to a developmental physiotherapist or occupational therapist for further assessment on the AIMS, HINT or BSID would be the next appropriate step (along with concurrent medical investigations of the underlying etiology of the delays), followed by referral to an early intervention program if the additional test results confirm the parent screening concerns. Fortunately, many Canadian provinces have excellent infant development programs that provide family focused early intervention services.

As Rourke and Leduc (17) concluded in their 2012 commentary on developmental surveillance: "This is an opportune time for the CPS to... develop recommendations for developmental screening and surveillance". It is this author's hope that developmental motor screening and surveillance will be embedded within those recommendations, and that screening and surveillance will be initiated during the important first year of the infant's life.

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