ria A and B are inclusive criteria, with the former referring to motor performance significantly below that expected given the person's age and intelligence (Criterion A); the latter that this impairment interferes with activities of daily living or academic performance (Criterion B). Criteria C and D are those excluding other conditions such as medical, e.g. cerebral palsy (Criterion C), and are over what one would expect if mental retardation* is present (Criterion D). Criterion A is assessed almost exclusively by an individually administered normative referenced test and the Movement Assessment Battery Test for Children (MABC) has been a widely used instrument for this purpose. The majority of papers have reported use of the original MABC,[2] and with the advent of MABC-2 in 2007,[3] it is timely that its statistical and clinical attributes were put to the test.

The paper by Wuang et al.[4] has a number of strong points. First, there are a good number of children diagnosed with developmental coordination disorder across a 6-year age range with approximately 20 in each age group. Secondly, the selection process is rigorous with DSM-IV criteria being adhered to, using both inclusion and exclusion criteria. In addition, the more rigorous 5% cut-off for Criterion A is used, which is in line with the recent more conservative prevalence figures.[5] Thirdly, different measures are used to establish reliability and responsiveness of the MABC-2. Reliability is a familiar concept but responsiveness, defined as the detection of small but important changes in motor performance over time, has not been as widely examined. Responsiveness aids in the interpretation of score changes after treatment and selection of appropriate outcome measures. In this study the measures taken involved internal consistency (Cronbach's alpha coefficient), test–retest reliability, intraclass correlation coefficient (ICC), and responsiveness using both internal and external measures.

The results of the first two measures, Cronbach's alpha and intraclass correlation coefficients, are encouraging with the former providing a figure of 0.9 overall and the latter being 0.97. Within each of these figures the lowest figure was still above 0.8 indicating some confidence in the reliability measured. The responsiveness measures are more complex with the twin concepts of minimal detectable change (internal measure) and minimal important differences (external measure), combining to reflect real change during a period of treatment and the degree to which any change in measurement corresponds to a score which clinicians would perceive as important. Again, the results are encouraging with all subscales, except balance, being able to differentiate between groups of children whose motor performance had improved or stayed the same. The reason why balance did not do this is that the children with developmental coordination disorder performed well on 'balance 1' of the balance section with 58% of them scoring between the mean and one standard deviation above at baseline. As the authors note, this leaves very little room for improvement and something that users of the MABC should be aware of.

Rigorous studies bring us a step closer to more accurate diagnosis of the condition and to measuring any improvement following intervention. The standard of research papers in the field of developmental coordination disorder has improved rapidly during the last decade and much of this has been due to consistency in the way the children are diagnosed. Continuing to fine-tune the instruments used in the diagnosis process makes the role of the clinician easier with more reliable and valid data from which they can make their professional decisions. This paper is hopefully the start of others that will examine the assessment instruments in detail to aid in this process.

REFERENCES

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th edn. Washington, DC: American Psychiatric Association, 1994.
2. Henderson SE, Sugden DA. Movement Assessment Battery for Children Manual. Sidcup: Psychological Corporation, 1992: 240.
3. Henderson SE, Sugden DA, Barnett A. Movement Assessment Battery for Children 2. Kit and Manual. London: Harcourt Assessment/Pearson, 2007.
4. Wuang Y-P, Su J-H, Su C-W. Reliability and resposiveness of the Movement Assessment Battery for Children-Second Edition in children with developmental coordination disorder. *Dev Med Child Neurol* 2012; **54:** 160–65. DOI 10.1111/j.1469-8749.2011.04177.x.
5. Lingam R, Hunt L, Golding J, Jongmans M, Emond A. Prevalence of developmental coordination disorder using the DSM-IV at 7 years of age: a population-based study. *Pediatrics* 2009; **123:** e693–700.

Hand function in children with an upper brachial plexus birth injury

VIRGINIA SIMSON NELSON

Department of Physical Medicine and Rehabilitation, C.S. Mott Children's Hospital, University of Michigan Medical School, Ann Arbor, MI, USA.

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This commentary is based on the original article by Immerman et al. on pages 166–169 of this issue.

The incidence of neonatal brachial plexus palsy (NBPP) in the United States is 1.5 per 1000 live births,[1] about half the incidence of cerebral palsy in industrialized countries. Looking at these figures, it would seem that the number of research arti-

*UK usage: learning disability.

cles on the two topics would be about the same ratio. But the number of research publications in areas related to NBPP is far behind those related to cerebral palsy. Many articles about NBPP discuss clinicians' own experience, surgical techniques, or outcomes such as range of motion or strength. While these are important topics, the more important question is 'What is the functional outcome of children with NBPP and how can that outcome be improved?'

The article by Immerman et al.[2] presents evaluation of a group of 25 children with NBPP using the nine-hole peg test (9-HPT) at a mean age of 9 years. The aim of this study was 'to evaluate hand function in children with upper brachial plexus palsy'. The children had been diagnosed at birth as having an upper trunk lesion, however, no details of the diagnostic workup were provided. Twenty-two of the children had neurosurgical treatment with six having concomitant shoulder reconstruction and 10 patients having later reconstructive procedures. Assessment of the children at 9 years included evaluation of shoulder function using the Gilbert and the Miami shoulder classifications, and shoulder range of motion, as well as the 9-HPT for both hands. Results on the 9-HPT were compared with normative values matched for sex, age, and hand dominance. Shoulder function was rated as 'good' or 'excellent' in 24 out of 25 children. 9-HPT results showed that 20 children took longer to complete the task with the involved hand compared with the uninvolved hand. This time difference was on average 18% longer, compared with the expected difference of 7%. These results were used to show detectable hand function deficits in the majority of the patients tested.

This study provides important early work looking at hand function in children with NBPP who have been considered to have upper trunk lesions. However, there is no information to support that these children had only upper trunk lesions. Additional information provided by the authors in the discussion states that only one of 35 patients who underwent electrodiagnostic studies between 4 and 11 months of age had abnormal findings limited to the C5/C6 muscles. These studies included needle examination of the first dorsal interosseous muscle. While electrodiagnostic studies are not a measure of function, they may serve as a proxy in very young infants in whom there are no good measures of function other than 'expert opinion.'

The importance of this article is that it provides a study of function in children with NBPP and stresses the importance of looking at the function of the entire arm, even when the child clinically appears to have only an upper trunk lesion. Initial electrodiagnostic studies of these children should include needle examination of muscles representative of all nerve roots and trunks of the brachial plexus. Further studies should look at the role of strength and sensation in the functioning of the entire arm in children with NBPP. This study could also be expanded to include a population of children with NBPP who did not have surgery.

REFERENCES

1. Foad SL, Mehlman CT, Ying J. The epidemiology of neonatal brachial plexus palsy in the United States. *J Bone Joint Surg Am* 2000; **90:** 1258–64.
2. Immerman I, Alfonso DT, Ramos LE, et al. Hand function in children with an upper brachial plexus birth injury: results of the nine-hole peg test. *Dev Med Child Neurol* 2012; **54:** 166–69. DOI: 10.1111/j.1469-8749.2011.04120.

Speaking to like-minded individuals

LISA SAMSON-FANG

Department of Pediatrics, University of Utah, Salt Lake City, Utah, USA.

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This commentary is on the original article by Arrowsmith et al. on pages 170–175 of this issue.

Arrowsmith et al.[1] describe the resting energy expenditure (REE) and evaluate the validity of a food intake record in a cohort of children with cerebral palsy. Their study provides critical information for clinicians and also underscores how unique nutritional management issues are in children with cerebral palsy.

When I entered developmental pediatrics fellowship, I thought I would come to understand how to manage nutritional issues in this population. I had found them perplexing as a primary care clinician. Serendipitously, I trained at the University of Virginia where the North American Growth in Cerebral Palsy Project (NAGCePP) emerged under the leadership of Dr. Richard Stevenson. NAGCePP was a multicenter research collaboration focused on nutritional issues in children with cerebral palsy and it has played a central role in moving this research agenda forward. I learned that knowledge in this area was limited; the best way to manage these issues was not known but researchers, like those in the NAGCePP, shared my interest in better understanding them.

Fast forward 20 years. Researchers have demonstrated that using malnutrition to maintain small stature in children with severe cerebral palsy has negative health consequences.[2] We have learned that many nutritional assessment tools (measuring height, weight for height, body mass index, serum albumin, skin-fold measures) are unreliable or invalid in this population.[3] Data has shown that some children and their families benefit from tube feeding but families need more sup-