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The Hand Assessment of Infants: a new tool to understand early hand function in children at high risk of unilateral cerebral palsy

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Early detection of infants with cerebral palsy (CP) or at high-risk of CP is becoming an increased focus of clinical practice. This is to ensure infants receive timely and targeted early intervention, and parents get the appropriate support.¹ By identification of infants at risk of CP in the first year of life, intervention can begin during the development of key neural networks and allow for reactive synaptic plasticity and brain structure reorganization.^{2,3} Further, early intervention aims to minimize secondary musculoskeletal complications such as muscle weakness and/or tightness, rather than waiting for an impairment to be present.³ CP is a heterogeneous condition and whilst there is a lack of high quality

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evidence to support early intervention to improve motor outcomes, there is evidence that interventions for children with unilateral CP need a different focus than those for children with bilateral CP.^{1,4}

To address the evidence gap on early intervention for children with CP, we must correctly identify children with unilateral CP at the beginning of development. The new Hand Assessment of Infants (HAI) developed by Krumlinde-Sundholm et al.⁵ is important for parents, clinicians, and researchers for several reasons. Early hand preference can be one of the first signs of unilateral CP. When it is first observed, both parents and health professionals need an assessment that can help discriminate unilateral CP from typical development, predict future function, and monitor change over time. Unlike other assessment tools of early fine motor function, the HAI considers an infant's ability to use each hand separately (i.e. left and right sides) as well as both hands together, which allows for careful evaluation of the child's overall hand skills.

There are limited assessment tools that can specifically assess change in upper limb function in children with CP during the first year of life. Evaluative tools are essential for families and therapists to objectively monitor a child's progress in response to therapy, above what would be expected with time alone. Also, researchers need these tools to evaluate the effects of current and new therapies to advance the field. The HAI has a unidimensional construct and good fit to Rasch model requirements, but further research is needed on the evaluative validity of the HAI to measure change in response to intervention in randomized controlled trials targeting hand function in infants with unilateral CP.

Motor development in the first 12 months is rapid but there is also great variability in typically developing children. Further research on the HAI is needed, including both typically developing infants and infants at high risk of CP. We need to understand how much asymmetry exists between hands in typically developing children and how early asymmetry relates to severity of motor function long term. Referencing the development of hand function to typically developing children could also

allow evaluation of hand skills in both hands, which would be beneficial for assessment of infants who have bilateral involvement. However, further studies of the HAI with this population would be required. Nonetheless, clinicians can use the HAI to detect differences between hand function in children at high risk of unilateral CP and these assessment findings can be used to guide intervention.

Implementation of the HAI into clinical practice and its further use in research studies are the next key steps. The HAI was developed by experts in the field and the results of the first studies have been validated by experienced therapists. The HAI is likely to be beneficial for clinicians (both novice and expert) working with young infants. But training on correct administration, scoring, and interpretation of the results is pivotal to ensure the HAI is used effectively in advancing the field of early intervention for infants with CP.

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