

Clinical and instrumented assessments of trunk movement and posture in spastic and dyskinetic cerebral palsy – a scoping review

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Abstract (MAX 400 WORDS):

Background

Trunk control is fundamental for enabling functional movement and supporting normal musculoskeletal development. In individuals with cerebral palsy (CP), particularly those classified at GMFCS levels IV-V, trunk control is often severely impaired, significantly impacting participation and quality of life. Despite its clinical importance, the assessment of trunk control remains underexplored, hindering accurate identification and targeted management. A wide range of tools exist, yet psychometric evidence is limited and consensus on appropriate tool selection is lacking. This study presents a scoping review on clinical and instrumented tools used for assessing trunk control in individuals with spastic and dyskinetic CP, critically evaluating existing tools and highlighting gaps in the field.

Objectives

- (I) Which clinical and instrumented assessment tools and features are used to assess trunk control in individuals with spastic and dyskinetic CP? What are the key characteristics of studies evaluating these tools, including their measurement approach, test protocol, and study sample?
- (II) Which psychometric characteristics of these tools and features have been assessed?

Methods

A systematic search was conducted across seven databases in accordance with the PRISMA-ScR guidelines. Inclusion criteria required studies to evaluate reliability, validity, or responsiveness of tools designed to assess trunk movement and posture in individuals with spastic or dyskinetic CP. Risk of bias was independently assessed using the AXIS tool.

Results

The search yielded 27,332 publications, of which 110 met the inclusion criteria. Twenty-two distinct assessment tools were identified (12 clinical and 10 instrumented). Instrumented assessment tools were more frequently evaluated (65%) than clinical tools, with 3D motion analysis being the most common. Validity was the most frequently reported psychometric property (62%), followed by reliability (30%), whereas responsiveness was not reported. Most studies focused on the spastic CP population (85%), with only four addressing dyskinetic CP. Only 28% of studies included individuals classified at GMFCS levels IV-V.

Conclusion

This review highlights critical research gaps on trunk control assessment in CP, particularly for individuals with severe motor impairment. The limited psychometric evidence, underrepresentation of high-need populations, diverse and non-inclusive test protocols, and limited coverage of trunk control facets hinder both scientific progress and clinical implementation. By mapping existing tools and critically evaluating strengths and limitations, this review offers first practical guidance for tool selection and identifies priorities for tool development. Future research should address feasibility, reliability, validity and responsiveness

of assessment tools across diverse presentations and applications, towards targeted management strategies of trunk control.

References

Van Wonterghem and Nohlin Sandsjö et al. Assessment of trunk movement and posture in spastic and dyskinetic cerebral palsy: a scoping review concerning clinical and instrumented tools and psychometric properties, *Developmental Medicine and Child Neurology* 2025 (accepted for publication 260113)