

COMMENTARY

Moving forward: The importance of tailored orthotic management in children with cerebral palsy

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Ankle-foot orthoses (AFOs) are considered the primary management technique to support standing and ambulation in children with cerebral palsy (CP). However, doubts have emerged regarding the effectiveness of rigid traditional AFOs in everyday activities. The prevailing practice of enforcing every ankle into a strict 90-degree alignment without any user-centered customization is controversial, and depending on the specific case, can sometimes have detrimental effects for the user in terms of muscle development, walking energy cost, balance, and discomfort.^{1,2}

A primary problem for the orthotic management customization in children with CP is that current clinical standards for prescribing the *ideal* AFO are limited to lab-based outcomes. Thus, not considering the specific needs of an individual patient and with unclear assessments of the effects of AFOs' design features on patient outcomes within a real-life context.³ This lack of rigorous evidence about the effects of AFOs in uncontrolled environments, together with the deficit of research into experiences of families and final users, limit the AFOs prescription, monitoring, and follow-up care of these patients.

Bjornson et al.⁴ highlighted some of these issues in their article and demonstrated that individualized AFOs alignments for foot and shank, together with shoe modifications are features that, if tailored, can have a great positive influence on pediatric gait. Although with a relatively small sample size, the randomized trial performed in 19 children with CP provided promising results, showing that a tailored alignment for a rigid AFOs had significant benefits on clinical balance assessment and parent-report of functional mobility than a non-tailored approach. These new insights can be useful for personalization and design of future AFOs, but most importantly, to inform clinical decision-making.

Although a considerable step, individualization of orthotic alignment and footwear still might not be enough to reach the ideal user-centered goals in daily life. Patients and families report that rigid traditional AFOs for CP benefit mobility, but they are also uncomfortable solutions with poor adaptability to changes on speed or walking terrains.¹ Limiting these adaptations not only diminishes the adoption and versatility of the device, but also hampers the child's progression and development.

New solutions should evolve from rigid designs towards assistive configurations that enhance the residual capabilities of the user.² Thus, allowing the achievement of lasting improvements and long-term effects for children with CP. Nevertheless, this process entails big challenges that must be carefully addressed: the provision of the necessary, cooperative, and timely assistance while preventing undesired motion and ensuring joint stability. All this must be accomplished using a lightweight and robust solution that accounts for both balance and locomotion supports.

As evidenced by Bjornson et al.⁴ and others,¹⁻³ understanding the qualitative end-users' perspectives and goals (e.g. by reports or questionnaires) is crucial to improve the design of new AFOs solutions. Additionally, retrieving more quantitative information about patients' walking performance in daily life (e.g. by employing sensors on the AFOs) is key and might have implications for the clinical-decision-making and the outcomes of rehabilitation.

Ultimately, new designs for AFOs should focus on meeting healthcare professionals' priorities and end-users' expectations. To do that, it is essential that the features of AFOs are individually tailored for the specific user's needs, striking a balance between enhancing functional abilities, promoting greater autonomy, and ensuring social acceptance when using the device.

This commentary is on the original article by Bjornson et al. To view this paper visit <https://doi.org/10.1111/dmcn.15675>

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Not required.

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