Effect of Ankle-Foot Orthoses on Walking Efficiency and Gait in Children with Cerebral Palsy

Reference:

Scientific Literature Review

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Podiatric Relevance:
Cerebral palsy (CP) is known to have devastating effects on biomechanics and gait. Although ankle foot orthoses (AFO) are often prescribed by podiatric physicians, limited studies have specifically evaluated the effects of AFO on the pattern and efficiency of gait.

Methods:
This retrospective study analyzed a group of 172 children (21 hemiplegics, 97 diplegics, and 54 quadriplegics). With a ten minute rest between sessions, a barefoot (BF) and AFO session were evaluated with regard to speed, energy cost, and speed-matched energy cost. 80 patients underwent additional 3D gait analysis. Further subgroups were created for the type of AFO and specific involvement of cerebral palsy: hemiplegia, diplegia, or quadriplegia.

Results:
Significant differences were found between BF and AFO groups. The AFO group had a 9% faster speed, 6% lower energy cost and 9% lower speed-matched energy cost compared to the BF walking group. Gait analysis as defined by the Gillette Gait Index was unchanged between groups. By subgroup, energy cost and speed-matched energy cost were significantly improved only in the quadriplegia group. Results also showed a relationship between the speed-matched energy cost and the change in knee flexion angle in both the stance phase of walking and the terminal swing phase.

Conclusion:
The most significant finding of this study was that the use of an AFO decreases the energy cost of walking in quadriplegic children with CP compared with BF gait. This same energy cost was found to be unchanged in hemiplegic and diplegic children with CP. In addition, this improvement in energy cost was shown to be associated with more efficient walking. These findings support the recommendation and prescription of AFO by the podiatric physician for patients with CP.