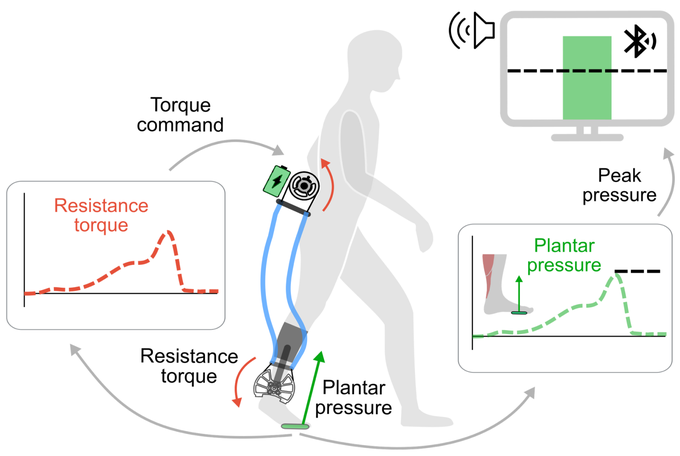
Gait Training with a Resistive Ankle Exoskeleton Improves Walking Speed and Endurance in Individuals with Cerebral Palsy

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Introduction

The objective of this study was to assess the clinical safety and efficacy of gait training with ankle exoskeleton resistance in individuals with cerebral palsy (CP).



Resistance and biofeedback to encourage plantarflexor muscle recruitment.

Methods

Design - This was an observational study designed to evaluate the effects of the gait training intervention.

Setting - The training protocol took place at the Shirley Ryan AbilityLab (Chicago, IL).

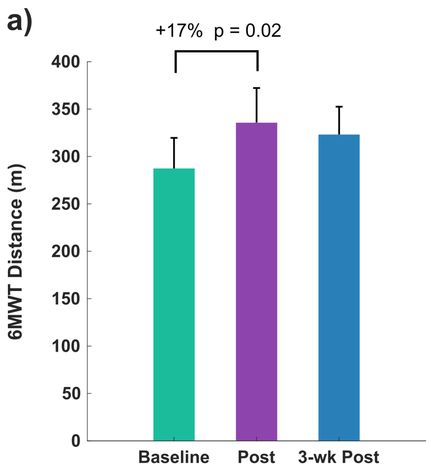
Participants - Sixteen ambulatory individuals (GMFCS levels I-III) with CP between the ages of 8 and 21 completed the study.

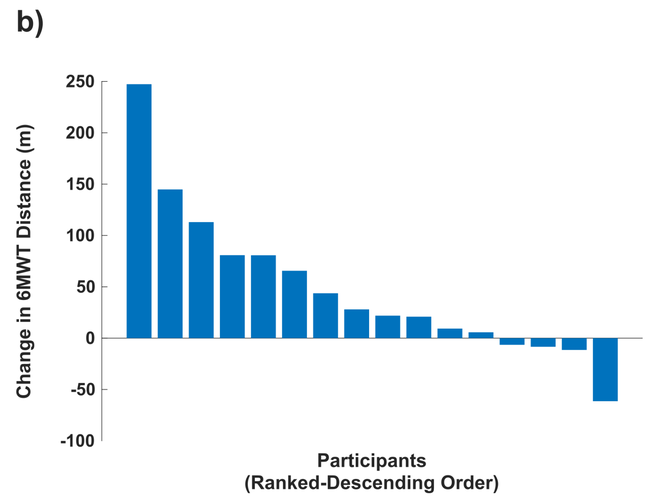
Intervention - Participants completed a pre-training assessment and then 12 sessions (roughly 3 per week for 4 weeks) of treadmill gait training with the Biomotum Spark ankle exoskeleton providing plantarflexor resistance with plantar-pressure biofeedback.

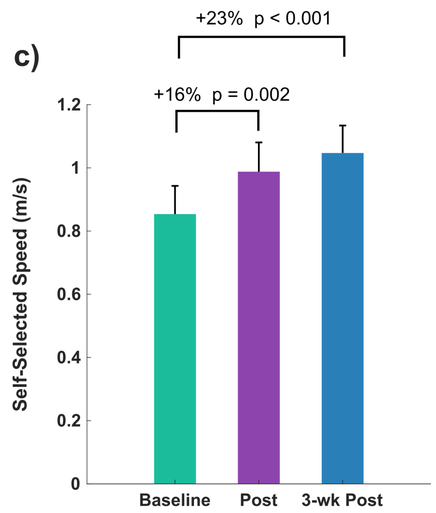
Outcomes were assessed during walking without ankle resistance before, and at follow-up visits within one week and 3 weeks after the last training session.

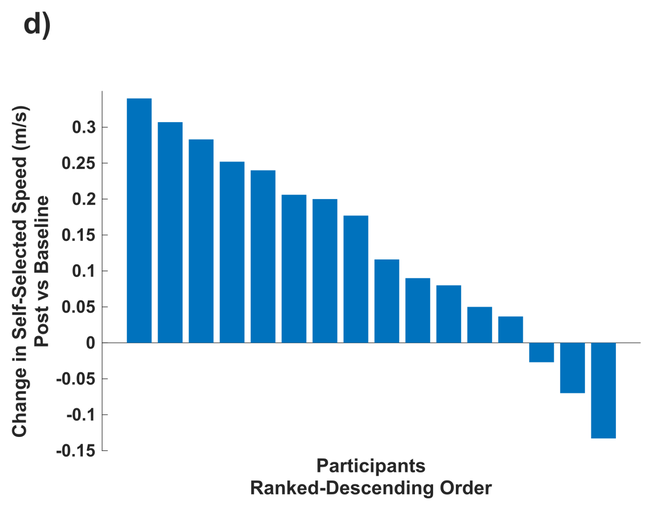


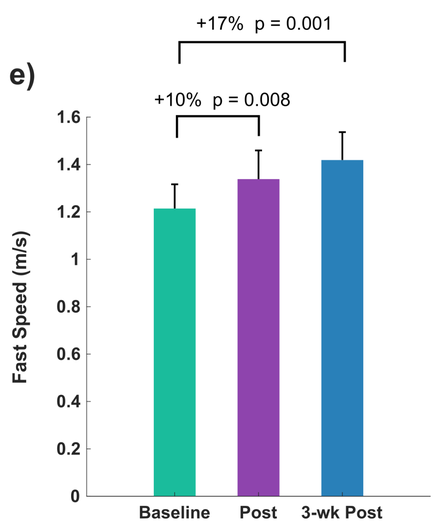
Results

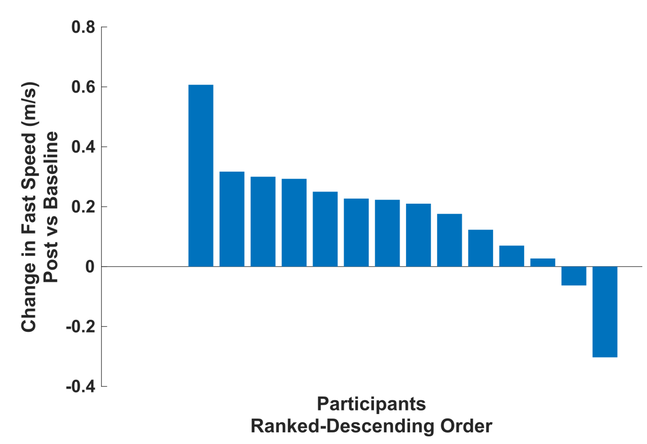












Discussion/Conclusion

- Ankle-resisted gait training had a positive effect on most mobility-related outcome measures. Walking endurance (6MWT distance) increased by 17% (p = 0.02) on the post vs baseline assessment.
- Self-selected walking speed increased by 16% (p = 0.002) and 23% (p < 0.001) on the within-1-week post and 3-week post assessments, respectively, compared to baseline.
- Fast walking speed increased by 10% (p = 0.008) and 17% (p = 0.001) on the within-1-week post and 3-week post assessments, respectively, compared to baseline.
- Month-long gait training with the Biomotum Spark ankle exoskeleton providing resistance temporarily improved walking endurance and speed greater than the MCID (on average).
- These results shed light on the clinical safety and efficacy of repeated gait training with ankle exoskeleton resistance in individuals with CP.