Results and Clinical Decision Making Considerations

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Purpose

- Expand upon a systematic review performed by Neto et al in 2010³
- Create guidelines for clinical decision making regarding LE orthotic intervention for children with spastic CP

Methods

- Searches carried out in 3 databases: PubMed, Embase, CINAHL
- Inclusion criteria: children with diplegic and hemiplegic spastic cerebral palsy (15 months to 18 years), LE orthotic interventions used for gait, clinical decision making, gait analysis, energy conservation
- PRISMA: 184 studies evaluated, 13 studies included

Gait Cycle

- 8 weeks of daily FES. Four hours per day, 6 days per week
- Lower limb gait mechanics
- Mean difference compared to control group
  - Hip center angle: 31.9°
  - Knee center angle: 10.4°
  - Heel normalized time in stance: 0.27
- Gastrocnemius spasticity
  - Significantly reduced post treatment and at follow-up
  - Dynamic GR & range of motion difference
  - Follow-up: 6-9°

Key Findings

- Optimal stiffness level is a balance between improving knee and ankle kinematics & enhancing push-off power and maintaining range of motion
- Orthoses can impact foot progression angle (FPA)
- FES systems demonstrated post treatment improvements in dynamic dorsi-flexion and gastrocnemius spasticity
- Significant impact on the trunk, upper extremities, or plantar pressure was not demonstrated with LE orthoses

Conclusions

- Orthotic intervention improves gait kinematics compared to barefoot or shoes only
- The best orthosis is the type optimized for the individualized impairments and needs of the patient

Clinical Relevance

- Orthoses are a widely used therapeutic intervention used to facilitate and improve the gait pattern
- Cerebral palsy presents with multifaceted symptoms rather than a set of specific impairments and the type of orthotic intervention needs to be optimized for each child’s gait limitations.

Acknowledgements / References


Figures:
- Figure 1: Representation of relevant phases of the gait cycle
- Figure 2: L to R: Posterior leafspring (PLS), Dual Carbon Fibre Spring AFO (DFSAFO), and Clampath. From Neto et al, 2010: Optimal stiffness of ankle foot orthoses for children with cerebral palsy. Dev Med Child Neurol. 6:1-10
- Figure 3: The Pediatric Walking Scale System. Images used with permission http://www.walkscale.com