Improving gait in children with spasticity using electrical stimulation

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PICO Question
Does electrical stimulation plus traditional physical therapy improve gait mechanics in children with spastic muscle tone disorders better than traditional physical therapy alone?

Introduction
• Cerebral palsy (CP) is the most common neurological disorder among the pediatric population2
• CP is a non-progressive disorder that results in spastic or non-spastic muscle tone3
• Hypertonic presentations results in gait impairments due to contractures, decreased ROM, and poor coordination3.

Typical presentation
- Wide BOS during gait
- Knee flexion and valgus
- Weak ankle dorsiflexors

Purpose of electrical stimulation
- Reduce spasticity
- Strengthen proximal and/or distal musculature
- Promote proper gait mechanics according to impairments

How it works
- Functional stimulation
- Neuromuscular stimulation
- Therapeutic stimulation
- Pre-synaptic inhibition
- Reciprocal inhibition

Muscles Stimulated
- Hip abductors
- Hip adductors
- Hamstrings
- Gastrocnemius-Soleus
- Tibialis Anterior

Conclusion
- Simultaneous and continuous ES applied to hip abductors and adductors improve gait in children with spastic diplegic cerebral palsy1
- ES controls abnormal reflexes and restores the balance between agonist/antagonist1
- Medium effect sizes, supporting the use of ES for gait impairments and activity limitation in children with CP2
- ES applied to triceps surae and tibialis anterior shows favorable results4
- TENS is a suitable management for reducing muscle spasticity in children with diplegic CP5

Limitations
- Variety of CP presentations
- Mode of ES and location
- Testing environment

References