ACP® Outcomes Accelerated

Cerebral Palsy

Functional Electrical Stimulation

Evidence supporting the efficacy of functional electrical stimulation (FES) to improve gait for children with cerebral palsy (CP) is growing steadily. The results of studies using FES to activate the dorsiflexors during gait are increasingly demonstrating improvements in gait quality, such as gait kinematics and gait symmetry, muscle strength and motor control. Utilizing FES during swing directly impacts the efficacy of gait.[14] Use of peroneal nerve FES to initiate dorsiflexion at terminal stance must be balanced with the child's ability to push off.[15] Studies have contributed results to the evidence demonstrating that push-off is preserved with FES.[7,15] Based on the outcomes shown in a growing number of studies, peronal nerve FES may be a valuable treatment option for children with CP.

Benefits of FES found in the published research for children with CP include:

Gait Quality, Speed and Symmetry

- Increased mean dorsiflexion[13,15]
- Significantly increased peak dorsiflexion[3-6,9,13,15,16]
- Increased ankle dorsiflexion at initial contact with the use of FES [4,13]
- Improved heel position at initial contact in some subjects both with and without FES[5]
- Improved ankle and foot posture during stance; more symmetrical heel to toe pattern[7,11]
- Increased symmetry of step length[1]
- Trends toward increased gait velocity and cadence[1,3,10, 19]
- Decreased overall gait deviations compared to normative values for children with CP[10]

Patient Preference and Quality of Life

- Children tolerate and/or comply with wearing FES[11,12,14,15]
- Decreased toe-drag and falls[14,17]

Strength, Motor Control and Neuroplasticity

- Improved muscle strength and control[2,9]
- Increased cross sectional area and muscle mass[2,9]
- Increased voluntary strength[8,14]
- Improved selective motor control [14]
- Decreased spasticity and improved control of the motor patterns used in gait[8,14]
- Improved Gross Motor Functional Measure scores[1]

Energy Cost

- Decreased total work imposed on the ankle in terminal stance[4, 13]
- Decreased energy expenditure[19]
- Improved endurance[18]

Current evidence for the use of peroneal nerve FES for the treatment of drop foot with children who have CP is very promising in terms of tolerability, kinematic improvements and muscle plasticity. The use of FES with a pediatric population is increasingly becoming a viable and effective standard of care. Technologies like the WalkAide and the Pace XL are at the forefront of this paradigm shift and promise to be an exciting part of future therapeutic interventions.

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