The feasibility of using functional electrical stimulation assisted cycling in children with cerebral palsy

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Abstract

Cerebral palsy (CP) is a non-progressive disorder of the brain that results in decreased strength, abnormal muscle tone and difficulty with gradation of movement in the affected muscle groups. These impairments result in decreased independence with functional mobility and decreased physical activity. Stationary cycling has been proposed as an effective exercise intervention in this population as it does not require standing balance. However, many children with CP lack the coordination and muscle strength to cycle at threshold target levels to improve cardiovascular function.1,2  Functional Electrical Stimulation (FES) assisted cycling is proposed as a method of supplementing the individual’s volitional effort and improving the coordination of the task. The purpose of this investigation was to assess the feasibility of applying FES to children with CP, as these children have intact sensation in their lower extremities. Two subjects participated in this demonstration and results showed that FES applied to the quadriceps can result in increased average cycling cadence and torque and increased average and peak power. FES also decreased the variance in cycling performance. Further investigation is necessary to determine the optimal stimulation settings and intervention frequency and to investigate the strength, motor control and functional effects of FES assisted cycling intervention.

References


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