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O 039 - Determining the most effective exercise for gluteal muscle activation in children with Cerebral Palsy using surface electromyography

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Introduction

Reduced lumbo-pelvic postural control is a common feature of gait in children with Cerebral Palsy (CP) leading to excessive anterior tilt and Trendelenberg patterns. These features are commonly attributed to insufficiency of the hip musculature. Exercises aimed at strengthening the the gluteus maximus and medius are frequently prescribed in children with Cerebral Palsy (1, 2). There is a lack of evidence indicating the most effective exercises in targeting gluteal muscle activation in this population.

Research Question

To determine the most effective exercise for gluteal muscle activation in children with CP to inform the design of strengthening programmes.

Methods

This was a cross-sectional study using a convenience sample of 11 children with CP. Surface electromyographic (EMG) data from the gluteus medius (GMed) and maximus (GMax) on the affected limb (hemiplegia) or more involved limb (diplegia) were recorded as participants completed 6 commonly prescribed gluteal strengthening exercises selected via focus group. Specifically we explored EMG during the clam, squat, lunge, single leg bridge, step-up and 3 point prone hip extension. EMG was assessed for peak activation, normalised to functional reference values collected during an isotonic prone hip extension and hip abduction exercise without resistance.

Results

Data from ten children with CP (5 males, 5 females; mean $\pm$ SD age, 13 $\pm$ 3 years) were included for final analysis. The single leg bridge was the most effective exercise for gluteal muscle activation, followed by the step up exercise. The differences in activation across the six exercises were found to be statistically significant using Friedman's rank test (GMax $p=0.0001$, GMed $p=0.0023$)

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