



## FES CYCLING AND CEREBRAL PALSY FACT SHEET

### WHAT IS FES CYCLING?

Functional Electrical Stimulation (FES) Cycling is a therapeutic exercise where small electrical pulses are applied to peripheral nerves through adhesive electrodes in order to produce strong muscle contractions in weakened or paralyzed muscles. These muscle contractions are then utilized to facilitate cycling exercise with a motor, providing assistance and/or resistance to pedaling.

### HOW CAN FES CYCLING HELP ME?

Below are some summaries of studies from the four decades' worth of clinical research on lower extremity FES Cycling in individuals with cerebral palsy- highlighting the potential benefits.

Published	Article Topic/Summary	What does this mean?
2011 <sup>1</sup>	Case study: FES Cycling in adult with spastic diplegic CP	<ul style="list-style-type: none"> <li>• <b>Muscle strength improved</b> by 22.2% in the quads, 18.5% in the hamstrings</li> <li>• Improved Timed Up and Go Test- a test which measures <b>leg function, mobility, and fall risk</b></li> </ul>

Published	Article Topic/Summary	What does this mean?
2012 <sup>2</sup>	FES Cycling in adolescents with spastic CP	<ul style="list-style-type: none"> <li>• FES cycling was well tolerated</li> <li>• Participants demonstrated <b>improved cycling cadence, power output, heart rate, and decreased variability in cycling performance</b> compared to cycling without FES</li> </ul>
2020 <sup>3</sup>	Randomized controlled trial: FES cycling combined with goal-directed training and adapted cycling	<ul style="list-style-type: none"> <li>• FES group found to have <b>improved gross motor function, goal performance/ satisfaction, and peak cycling resistance</b></li> <li>• Follow up study (published in 2022) found the improvements above baseline were <b>maintained at 16 weeks</b> in gross motor function</li> </ul>

2021 <sup>4</sup>	Aerobic responses to FES-assisted and volitional cycling in children with CP	<ul style="list-style-type: none"> <li>• FES group demonstrated <b>significant increase in cycling cadence</b> compared controls</li> <li>• FES assistance helped retain higher gains in cadence during training, even after training ended</li> <li>• Higher cadence→ improved muscle coordination and timing</li> <li>• FES assistance may lead to <b>improved functional movement patterns</b> and pedaling efficiency</li> </ul>
2023 <sup>5</sup>	Randomized controlled trial: effects of FES cycling on gait in diplegic cerebral palsy	<ul style="list-style-type: none"> <li>• FES group showed <b>increased muscle strength, gross motor function and energy expenditure</b> after training and follow up compared to controls</li> <li>• Reduced pelvic tilt while walking in FES group</li> </ul>

## REFERENCES:

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