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Cardiovascular and Respiratory Effects of FES Cycling in Pediatric SCI

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Abstract

The cardiovascular and respiratory health of children with spinal cord injury (SCI) is a growing concern. Cycling with functional electrical stimulation (FES) has improved health for adults with SCI but has not been studied in children. Twenty-five subjects, ages 9.8 ± 2.4 years, with chronic SCI were randomly assigned to FES cycling, passive cycling (PC), or electrically stimulated exercise (ES). All groups exercised one hour three times per week for 6 months. Peak heart rate (HR) and peak oxygen consumption (VO2/kg) during incremental arm ergometry and fasting lipid levels were measured. Following training, peak VO2/kg increased in the FES group (17.5 ± 26.7%) but decreased in the PC (36.4 ± 46.5%) and ES (16.6 ± 60.7%) groups. Peak exercising HR decreased (FES 4.0 ± 15.1%, PC 7.6 ± 29.4%, ES 14.8 ± 25.6%) and triglyceride levels decreased (FES 23.5 ± 29.3%, PC 23.3 ± 26.1%, ES 12.9 ± 52.8%). These results indicate that all three interventions provided benefits. However, the greatest changes were seen with FES cycling, indicating that FES cycling may achieve better cardiovascular and respiratory outcomes than PC or ES in children with SCI.

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