# Inspiratory muscle training in children and adolescents with neuromuscular disorders: a cross-over randomized controlled trial

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## Abstract

Progressive respiratory muscle weakness and ineffective cough contributes to morbidity and mortality in children with neuromuscular disorders (NMD). Inspiratory muscle training (IMT) aims to preserve or improve respiratory muscle strength and reduce respiratory morbidity. This study intended to determine the safety and efficacy of IMT in children with NMD. A randomized cross-over study compared three-month intervention (IMT) with control periods (no IMT). Children diagnosed with NMD (5-18 years) performed 30 breaths (at 30% of inspiratory muscle strength (Pimax)) with an electronic threshold device, twice daily. During the control period participants did not perform any IMT. Twenty-three children (median (IQR) age of 12.33 (10.03-14.17) years), mostly male (n=20) and non-ambulant (n=14) participated. No adverse events related to IMT were reported. No difference in median patient hospitalization and respiratory tract infection rates between control and intervention periods (p=0.60; p=0.21) was found. During IMT, Pimax and peak cough flow improved with a mean (SD) of 14.57 ( $\pm$ 15.67) cmH <sub>2</sub>O and 32.27 ( $\pm$ 36.60) L/min, compared to 3.04( $\pm$ 11.93)cmH <sub>2</sub>O (p=0.01) and -16.59 ( $\pm$ 48.29) L/min (p = 0.0005) during the control period. Spirometry, functional ability and total health-related quality of life scores following intervention did not show a significant change. Patient satisfaction with IMT was high (median 8/10 (IQR 5-10)) and adherence was good. A three-month IMT programme in children with NMD appears safe and well-tolerated, with significant improvement in respiratory muscle strength and cough efficacy. The use of IMT could be considered as an adjunct to respiratory management in children with NMD.

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