



Effects of Water Immersion on Respiratory Muscle Strength in Children With Duchenne Muscular Dystrophy: A Pilot Study

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Background and Aim. Duchenne muscular dystrophy (DMD) is characterised by progressive muscle weakness, including the respiratory muscles, leading to significant pulmonary complications. Patients with DMD develop restrictive respiratory syndrome, resulting in a progressive decline in pulmonary function. Vital capacity (VC) decreases over time, with significant impairment typically observed by age 21. Aquatic therapy has been shown to provide physiological benefits in patients with DMD, particularly by enhancing motor function and promoting balanced muscle activation. However, the specific pulmonary responses to water immersion in this population remain largely unexplored. This pilot study aims to investigate changes in inspiratory and expiratory muscle strength in individuals with DMD during water immersion.

Methods. A cross-sectional study was conducted with four patients diagnosed with DMD (mean age: 11.5 years). Respiratory muscle strength, including maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP), was measured in an upright and stable position in two conditions: on dry land and during water immersion at clavicle level by using a non-invasive mouth pressure device (*RP Check, MD Diagnostics Ltd., Maidstone, UK*) in accordance with standard guidelines. Each measurement was repeated at least three times, and the highest value was recorded for analysis.

Results. Due to the limited sample size, statistical analyses were not performed. However, measurements indicated a decrease in MIP during water immersion (–15%, –17%, –7%, –30%), while MEP showed an increase (13%, 14%, 20%, 32%).

Conclusions. Clavicle-level water immersion might alter respiratory muscle strength in patients with DMD, leading to a reduction in inspiratory muscle pressure and an increase in expiratory muscle pressure compared to dry-land values. Further studies with larger sample sizes are needed to confirm these findings and explore their clinical implications.

Keywords: Immersion; Pulmonary Function Test; respiratory muscle; Duchenne Muscular Dystrophy

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