

## Efficacy of a novel method for inspiratory muscle training in woman with heart disease and weaning failure

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**Background.** Respiratory dysfunction is one of the most common causes of critical illness requiring intensive care unit (ICU) admission. Despite contribute to reducing mortality, mechanical ventilation (MV) is associated with ICU-acquired complications such as diaphragmatic dysfunction, an important indicator for failure to wean. Inspiratory muscle training (IMT) has been indicated for cardiac patients in order to restore function of the respiratory muscles. Recently, a new IMT device has been suggested in patients with COPD. However, the effectiveness of IMT as an adjunctive therapy to wean chronically ill patients from MV is still under debate. **Objective.** We aim to investigate the efficacy of an electronic tapered flow resistive loading (TFRL) in a woman with tetralogy of Fallot history during the postoperative of pulmonary valve replacement and weaning failure from mechanical ventilation. **Case Description.** An adult woman (44 years old) with congenital heart disease underwent corrective surgery and was referred for inspiratory muscle strength evaluation after repeated weaning failures. It was determined that IMT was indicated due to inspiratory muscle weakness and a rapid shallow breathing pattern. To set the load of training intensity, it was evaluated the volitional maximal inspiratory mouth pressure (P<sub>I</sub>max) with POWERbreathe Medic device. Five daily IMT sets separated by 3 to 5 minutes of rest were administered until wean, 4 x 8 repetitions. The IMT was performed with TFRL POWERbreathe® KH2. Tolerance was evaluated by vital signs and daily clinical reviews. Twenty-two sessions of IMT in total were performed. In the first access, the patient was under MV by tracheostomy, in PSV mode with P<sub>I</sub>: 8cmH<sub>2</sub>O and PEEP: 5cmH<sub>2</sub>O. On the first day approach, the P<sub>I</sub>max was -20cmH<sub>2</sub>O. The resistive load was set for 30% of P<sub>I</sub>max: 5cmH<sub>2</sub>O. Progressions of training intensity increase from 6 to 25cmH<sub>2</sub>O. Additionally, patient performed conventional physical therapy, and was disconnected from MV daily until spent a total of 10 hours per day, where she was finally extubated. Before extubation, P<sub>I</sub>max was 48cmH<sub>2</sub>O and tidal volume improved from 0,62 to 0,85. **Conclusion.** This case report describes adaptations of an IMT technique used to improve muscle performance in COPD patients. Training was well tolerated and effective as an adjunct treatment of weaning failure in an adult woman with congenital heart disease, weaning difficulty and severe respiratory muscle dysfunction. Further systematic examination will be needed to determine whether IMT with TFRL provides a significant performance or weaning benefit compared to the conventional methods.

**Descritores:** Respiratory Muscle Training; Intensive Care; Physiotherapy.