

P N M E D I C A L

# SUBSTANTIATED EFFECTS RESPIRATORY MUSCLE THERAPY HAS ON DYSPNEA, COPD, CHF, DYSPHAGIA, ASTHMA AND SPINAL CORD INJURY



Active contraction of the respiratory muscles provides the energy required for ventilation of the lungs during breathing. Quiet breathing is maintained by the diaphragm and external intercostal muscles during inspiration, while expiration is a passive process. During vigorous breathing or in respiratory disease, additional muscles are activated, and expiration becomes muscle mediated [\(1\)](#). Respiratory muscle weakness, defined as insufficient respiratory muscle strength to overcome increased respiratory load, is prevalent in respiratory and neuromuscular diseases, but also in a wide range of other disorders, such as spinal cord injury [\(2\)](#), congestive heart failure [\(3\)](#), and low back pain [\(4\)](#). It is also impaired in dysfunctions of the vocal cords,

dysphonia and dysphagia [\(5\)](#). Respiratory muscle strength, endurance, fatigue and dyspnea or breathlessness interrelate and contribute towards exercise tolerance, which is often greatly reduced in diseases affecting muscle strength [\(1\)](#).

Evidence has shown that RMT increases inspiratory and expiratory mouth pressure, as well as ventilatory capacity, proving its efficacy to increase strength and improve endurance, respectively [\(6\)](#). Associated and additional benefits include reduction of dyspnea, increased exercise tolerance and performance, health-related quality of life, depression and anxiety, which were observed in a range of different patient groups and associated diseases [\(3\),\(4\),\(7\)](#). Recent evidence with strong clinical implications has shown that RMT optimizes use of and efficacy of dry powder inhalers in COPD patients, and reduces hyperinflation, a strong prognostic marker for COPD progression and mortality [\(12\),\(13\)](#).

## **RECENT FINDINGS EXPAND INDICATIONS FOR USE**

Recently, the proven efficacy of RMT has been extended to highly prevalent health problems including low back pain and hypertension, underlining its importance for a growing user group [\(4\),\(8\)](#). In addition, the impact of RMT on exercise performance and voice quality leads to significant improvements in healthy individuals and athletes [\(9\),\(10\)](#).

The currently dominant method of RMT in the literature is inspiratory muscle training, with a training duration of at least 5 to 6 weeks with daily frequency. While this increases inspiratory muscle strength, functionality of expiratory muscles might remain unchanged. This could affect pulmonary function and peak cough flow, which is often impaired in individuals suffering from respiratory and neuromuscular diseases. Indeed, studies including training of expiratory muscles report improved swallowing and cough function and vocal volume in addition to other RMT mediated benefits [\(9\),\(11\)](#).

## **THE BREATHER**

The Breather RMT device combines inspiratory and expiratory muscle training, with demonstrated efficacy in improving speech and swallowing in patients with neuromuscular disease such as Parkinson's (16). Furthermore, RMT in athletes and healthy individuals using the Breather led to improved respiratory functions, heart rate, peripheral muscle strength and exercise performance (14).

The Breather applies the method of resistive RMT, in contrast to the second widely used threshold method. Comparative evidence has reported similar overall efficacy of the two methods, with higher quality of life scores achieved by resistive RMT [\(15\)](#).

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