
BENEFITS OF RMT IN PARKINSON'S DISEASE



Patients with a neuromuscular disease such as Parkinson's disease (PD) are at increased risk of aspiration pneumonia, malnutrition and reduced quality of life. The underlying reason for these risks is respiratory muscle weakness, which can negatively impact three different but connected, physiological processes:

- Speech
- Swallow
- Cough

Respiratory muscle training (RMT) successfully improves respiratory muscle weakness, alleviating associated symptoms by treating the underlying cause [1].

SPEECH

More than 90% of PD patients have hypokinetic dysarthria, which may also be one of the first visible symptoms at disease onset. It manifests with problems in articulation, phonation, speech rhythm and fluency, as well as speech associated facial expressions. As these symptoms are typically not associated with dopamine deficits, medication such as dopaminergic replacement therapy does not improve them [2].

Speech production relies on muscle activation that greatly overlaps with that of breathing, including diaphragm and chest wall, to coordinate the larynx, glottis and vocal folds with the upper and lower airway systems. Activation of both inspiratory and expiratory muscles together provide the best control of chest wall function and optimal speech support.

Evidence: A preliminary study showed that RMT improves respiratory muscle strength and lung volume initiation during speech in PD patients, thereby improving speech breathing and intensity [3].

SWALLOW

Swallow impairments are common in PD patients and greatly contribute to malnutrition, reduced QOL, social isolation, and aspiration pneumonia, the leading cause of death in PD. More than 80% of PD patients develop dysphagia during the course of their disease. Some forms of dysphagia can be partially treated by pharmacological interventions; mainstay therapy however is swallowing treatment by SLTs, including respiratory muscle training [4]. Coordination between breathing and swallowing needs to be highly coordinated to prevent aspiration. The preserved pattern of swallowing at the right lung volume to prevent aspiration is often disturbed in PD patients, and swallowing may occur during inhalation rather than exhalation.

Strengthening the respiratory system supports swallow function by improving laryngeal function to ensure airway protection, prevent aspiration, and reduce pneumonia risk; by increasing ribcage flexibility to improve lung volume and ease of inhalation before swallow; and by improving cough function to strengthen the cough reflex for good pulmonary hygiene, airway clearance and to prevent aspiration. In addition, respiratory muscle training can lay the foundation for conscious re-training of a correct breathe-swallow pattern.

Evidence: RMT improves swallow safety by decreasing compression phase duration and increasing hyolaryngeal movement, thereby lowering the risk of aspiration [5,6].

COUGH

Voluntary cough is an important airway protection mechanism to prevent aspiration pneumonia and is often impaired in PD patients. Clearance of small airways to prevent aspiration during swallowing is based on sequential voluntary cough. Initiation and pattern of sequential voluntary cough are often impaired in PD patients, especially in the presence of dysphagia, suggesting a neuroanatomical link between the two disorders [7,8].

Evidence: RMT improves cough effectiveness by increasing volume acceleration in PD patients [5]. Improved cough function due to RMT has also been observed in other patient populations, such as following a stroke, and during healthy aging [9,10].

RMT is an effective and safe method to improve speech, swallow and cough impairments in persons with PD, reducing the risk of aspiration pneumonia [5].

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