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DYSPNEA AND THE EFFECT OF RMT

Respiratory diseases are serious issues that significantly impact their patients as well as their caregivers. It is extremely important that these issues be stopped or slowed as much as possible. One of the ways that this can be done is by the addition of muscle training to rehabilitation for patients with respiratory diseases. In this blog post, we're going to review the effect of RMT on dyspnea in patients suffering from respiratory illnesses like COPD and asthma. Let's get started below

Key Findings

- Dyspnea is perceived when the respiratory effort to meet the respiratory demand is inappropriately high.
- Dyspnea is the underlying cause for exercise limitation, reduced quality of life and disease
- progression in respiratory muscle disorders.
- In people with COPD, hyperinflation and insufficient inspiratory capacity lead to the perception of dyspnea.
- In people with asthma, airway narrowing and inspiratory muscle stress lead to short attacks of severe dyspnea.
- Non-pharmacological interventions for dyspnea include rehabilitation and respiratory muscle training (RMT).

Patient Impact

RMT effectively reduces dyspnea in people with respiratory disorders.

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Dyspnea

With dyspnea at its core, exercise limitation and reduced quality of life contribute to a progressive downward spiral in people with COPD. The physiology of dyspnea is best explained by an inappropriateness of the outgoing motor command and the respiratory effort (length-tension-inappropriateness or LTI, of the inspiratory muscle, where length and tension correspond to muscle volume and pressure, respectively), or when the requirement for respiratory work becomes excessive. The effort of breathing becomes more difficult for patients as time increases, in other words, and can begin to affect the way they live their lives. The sensation of dyspnea is dependent on inspiratory muscle strength and demand for inspiratory muscle work.

COPD

Expiratory flow limitation in COPD patients leads to dynamic hyperinflation, which can be described as 'air trapping' in the lungs during exercise, leading to insufficient inspiration and the sensation of dyspnea. Adaptation of respiratory muscles in COPD patients lead to inefficient breathing patterns with low flow rates at rest, but an inability for exercise induced hyperinflation, in much the same way that marathon runners can not match the pace of sprinters. Thus, the diaphragm of stable COPD patients is predominantly composed of high endurance, low power muscle fibres, which leave patients with little capacity for high power breathing required during exercise.

Asthma

People with asthma have similar pulmonary abnormalities, but show less static lung recoil pressure and more airway narrowing. In addition, inspiratory muscle stress is short lived in these patients, causing periodic attacks, in contrast to constant difficulties in COPD patients. Both patient groups have low aerobic fitness.
Rehabilitation and IMT

Therapeutic interventions affect either lung emptying by using bronchodilators, or by reducing the ventilatory demand, which is achieved by rehabilitation.
Pulmonary rehabilitation is effective, but only 1.7% of COPD patients who could benefit from it have access to it. Comorbidities such as walking disabilities might not allow rehabilitation. Inspiratory muscle training (IMT) either alone or in addition to rehabilitation has been shown to effectively reduce dyspnea, due to strengthening of inspiratory muscles. In patients with asthma, change in inspiratory muscle strength was associated with a change in dyspnea intensity, and reduction in ß2-agonist production by up to 78%.

Conclusion

IMT can be viewed as a relatively accessible, evidence-based component of rehabilitation programs, that reduces dyspnoea, improves exercise tolerance and enhances quality of life in patients with COPD. IMT is also suitable for treating asthma patients with high perceptions of dyspnoea and high consumption of medication.

References

Alison K. McConnell.The role of inspiratory muscle function and training in the genesis of dyspnoea in asthma and COPD. – Primary Care Respiratory Journal (2005) 14, 186-194.