



## FIMS Position Statement

### Ventilatory muscle training in patients with chronic obstructive pulmonary disease (COPD)

Respiratory reserve does not affect the ability of healthy individuals to exercise unless there are loads of very high intensity. (1,2) However, respiratory reserve does become a factor that limits physical activity if there is a deterioration in lung function with age or disease.(3) In patients with COPD, decreased pulmonary function and respiratory reserve lead to a sedentary lifestyle, inactivity and eventual deconditioning of the musculoskeletal and cardiovascular systems.(2,4)

Dyspnea experienced by almost all patients with COPD, is the main cause of inactivity. Pulmonary function is impeded by increased respiratory load,(5,6) ineffective ventilatory muscle function,(5,6,7,8) geometrical changes in the lungs associated with hyperinflation and incomplete emptying with each respiratory cycle, and increased in pressure to overcome intrinsic positive pressure and expiratory pressure.(6) The prolonged use of corticosteroids in COPD patients induces a catabolic process and an eventual deterioration in ventilatory muscle function, strength and endurance.(9,17,18)

Respiratory muscle training improves respiratory muscle strength and endurance in healthy individuals(10) and ventilatory capacity in quadriplegic

patients,(11) those with neuromuscular disease(12) , and in cardiac patients treated prophylactically prior to open heart surgery.(13)

Decreased respiratory reserve in patients with COPD places them at a high risk for serious complications, frequent exacerbations of lung disease that may be compounded by bacterial or viral infections or inflammation,(14) allergic reactions,(15) excessive secretions,(14) cor pulmonale(14) and surgery and/or trauma.(16)

The benefits of respiratory muscle training are well documented. Belman and Mittman(19) were the first to demonstrate that ventilatory muscle training enhances ventilatory muscle strength, endurance and exercise capacity in patients with COPD.

Their observations were subsequently confirmed by many other investigators.(19, 20) Goldstein et al.(21) and Reis et al(22) clearly demonstrated a reduction in symptoms of dyspnea and fatigue after a respiratory exercise program. Other studies have demonstrated that respiratory muscle training is a successful adjunct to protocols used to wean patients from mechanical ventilation.(23,24, 25)



The various ventilatory training methods have been used:

1. resistive breathing training.(11)
2. isocapneic hyperventilation.(10, 20)
3. threshold pressure training.(27)

In addition to preventing exacerbations in patients with COPD, ventilatory muscle training has been show to be advantageous as prophylactic pre-operative treatment (13). There have been good results shown with respiratory rehabilitation programs of mild to moderate intensity.(26)

Based on this information it is recommended that:

1. ventilatory muscle training be routinely incorporated into respiratory rehabilitation programs.
2. ventilatory muscle training be a primary component in the management of all stages of COPD.