

The effect of expiratory muscle strength training on oxidative stress and functional exercise capacity in patients with obstructive sleep apnea syndrome

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Introduction: Obstructive sleep apnea syndrome (OSAS) is a respiratory sleep disorder with a risk of cardiovascular disease (CVD). Repeated episodes of hypoxemia and reoxygenation throughout the night lead to oxidative stress in OSAS. Expiratory muscle strength training (EMST) is a new effective intervention increasingly used in the rehabilitation of OSAS. In the literature, there is limited evidence about the effects of EMST in patients with OSAS.

Objective: We aimed to investigate the effect of EMST on CVD risk, oxidative stress and functional exercise capacity in patients with moderate OSAS who were refused or ineligible for other treatments.

Methods: Sixteen male patients (mean age: 44.12±6.13 years, mean BMI: 30.08±4.43 kg/m²) with moderate OSAS were included. CVD risk ratio calculated with SCORE2. The patients underwent a 12-week EMST program (60% of their maximal expiratory pressures, MEP) using a threshold loading device for 25 breaths per day, seven days per week. Respiratory muscle strength (inspiratory muscle strength-MIP and MEP) was measured. Total antioxidant level (TAS) and total oxidant level (TOS) were determined from serum blood samples. Oxidative stress index (OSI) was calculated. Functional exercise capacity was determined with a 6-minute walk test (6MWT).

Results: At baseline the patients SCORE 2 were min 1%-max 13%. After the 12-week EMST program, there was no significant difference in TAS values (p=0.205), while a significant decrease was observed in TOS (p<0.001) and OSI (p<0.001). MIP (p>0.001), MEP (p<0.001), 6MWT distance (p=0.001) significantly increased after training. No significant difference was observed in SCORE 2 ratios before and after treatment (p>0.05). There was a positive correlation between the ΔOSI and Δ6MWT distance values (r=0.603, p=0.013).

Conclusion: EMST decreases oxidative stress levels and increases respiratory muscle strength and functional exercise capacity in moderate OSAS patients. The rate of reduction in oxidative stress was associated with an increase in exercise capacity. EMST training is a promising treatment modality for OSAS.