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Title: Effect of positive expiratory pressure on sternocleidomastoid and parasternal muscles in patients with COPD: A randomized clinical trial

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Body: Introduction: Chronic obstructive pulmonary disease (COPD) leads to chronic airway obstruction and air trapping, affecting diaphragmatic action and placing it at a mechanical disadvantage, requiring the recruitment of accessory muscles. Objective: To investigate the effect of 10 and 15 cmH_2O EPAP on the activity of sternocleidomastoid (SCM) and parasternal muscles in patients with stable COPD. Methods: A randomized clinical trial with twenty-one COPD patients. Subjects were randomly allocated to two groups: 10 cmH_2O Group (n=10) and a 15 cmH_2O Group (n=11). We evaluated the electromyographic (EMG) activity of SCM and parasternal muscles in spontaneous breathing (Pre-EPAP), during application of EPAP by face mask for 20 minutes, and for 10 minutes after mask removal (Post-EPAP). Results: The application of 10 cmH_2O EPAP promoted reduction EMG activity in the SCM muscle ($p<0.0001$) and increased parasternal muscle activity ($p<0.0001$). The group submitted to 15 cmH_2O EPAP showed a tendency towards greater EMG activity in the SCM muscle and a significant decrease in activity of the parasternal muscle ($p= 0.005$). Conclusions: In patients with stable COPD, 10 cmH_2O EPAP induced a significant decreased in activity of the inspiratory accessory muscle and increased parasternal muscle activity after the application. This may be of practical benefit to reverse the extensive use of the chest wall muscles and reduce their mechanical disadvantage in patients with COPD.