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Title: Pattern of respiratory muscle recruitment during walking in active and less physically-active COPD patients

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Body: Aim: To investigate whether walking movement intensity is associated with the pattern of respiratory muscle recruitment in COPD. Methods: 18 patients underwent a treadmill walking test at a speed corresponding to each patient's average movement intensity of walking. This was captured by a DynaPort Minimod triaxial accelerometer during a 7-day period. Based on the median movement intensity of the whole COPD sample (1.8 m/s²) patients were evenly divided into those with a speed lower (FEV₁%pred: 45±6) or greater (FEV₁%pred: 53±5) than 1.8m/s². Compartmental chest wall volume variations, representing rib cage muscle as well as diaphragm and expiratory abdominal muscle activities, were computed by OEP. Results: Active compared to less active patients [median 2.0 (CI: 1.92-2.08 m/s²) vs 1.6 (CI: 1.52-1.65) m/s²] demonstrated greater increases in tidal volume from baseline (1.0±0.2 vs 0.6±0.1 L). This was a result of greater volume increases in the abdominal (0.44±0.08 vs 0.15±0.06 L) than the rib cage (0.55±0.13 vs 0.45±0.11) compartments. Groups differed in terms of the increase in end-expiratory abdominal volume from baseline (0.06±0.04 vs 0.19±0.04 L, p=0.045) reflecting greater expiratory abdominal muscle recruitment in physically active patients. However, no group differences were seen in end-inspiratory abdominal volume changes from baseline suggesting similar diaphragmatic muscle action. Conclusion: Patients adopting greater movement intensity exhibit more profound expiratory abdominal muscle activation that allows them to exhibit greater tidal volumes. This work was funded by Innovative Medicines Initiative Joint Undertaking (IMU-JU # 115011) and by Thorax Foundation.