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**Title:** Acute effects of incremental maximal exercise on balance in patients with COPD

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**Body:** Background: Chronic obstructive pulmonary disease (COPD) leads to impaired exercise capacity. Recent data suggests that patients with COPD may also present an impaired balance. However, the acute effects of incremental maximal exercise on balance in patients with COPD remain unknown. Aim: to verify the acute effects of maximum intensity incremental effort on balance in patients with COPD. Methods: In a cross sectional study, 27 patients with COPD (15 men; 67±8 years; forced expiratory value in the first second 41±15 % predicted) were included. Before and after performing an Incremental Shuttle Walking Test (ISWT), all patients had their static balance assessed by a force platform in four different conditions (standing with feet hip-width apart and eyes opened [SFHEO]; standing with feet hip-width apart and eyes closed [SFHEC]; standing in short base [SSB]; and one-legged stance test [OLST]). The main parameters for stabilographic analysis used were 95% confidence ellipse area of center of pressure (COP area in cm<sup>2</sup>) and mean velocity sway of COP (MVel in cm/s) for antero-posterior (A/P) and medial-lateral (M/L) direction of movement. Results: The mean walked distance during the ISWT was 436±138 m, corresponding to 68±19 % predicted. Balance was significantly impaired after the ISWT for the SFHEO condition (COP area before ISWT: 2.94 [1.53-5.29] cm<sup>2</sup> versus after: 3.35 [1.85-5.36] cm<sup>2</sup>; p=0.03) and MVel A/P (before ISWT: 0.91 [0.74-1.25] cm/s versus after: 1.04[0.81-1.27] cm/s; p=0.04). No differences were observed for the other conditions. Conclusion: Static balance seems to be negatively and acutely affected by a maximal exercise in patients with COPD.