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**Title:** Malnutrition is associated to poor exercise capacity irrespective of dynamic hyperinflation in COPD patients

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**Body:** In patients with COPD, we investigated the effect of the fat-free mass (FFM) on maximal exercise capacity and the relationship with changes in operational lung volumes during exercise. In a cross-sectional study fifty-seven patients (16 females; age  $65 \pm 8$  yrs) were consecutively assessed by resting lung function, symptom-limited cardiopulmonary exercise test, and body composition by means of bioelectrical impedance analysis to measure the FFM index (FFMI, kg/m<sup>2</sup>). Patients were categorized as depleted (n = 14) or non depleted (n = 43) according to FFMI. No significant difference in gender, age and in resting lung function was found between depleted and non depleted patients. When compared with non depleted, the depleted COPD patients had a significantly lower O<sub>2</sub> uptake at peak of exercise and at anaerobic threshold as well as peak O<sub>2</sub>Pulse, O<sub>2</sub> uptake efficiency slope (OUES) and heart rate recovery (HRR) (p < 0.05 for all comparisons), but similar inspiratory capacity/total lung capacity ratio at peak of exercise. Moreover, they also reported significantly higher leg fatigue (p < 0.05), but not dyspnea on exertion. In all patients, significant correlations (p < 0.01) were found between FFMI and peak O<sub>2</sub>Pulse, OUES, HRR and leg fatigue. This study shows that malnutrition per se plays a part in the reduction of exercise capacity of COPD patients. FFM depletion was strictly associated to poor cardiovascular response to exercise and to leg fatigue but not to dyspnoea.