

European Respiratory Society Annual Congress 2012

Abstract Number: 3039

Publication Number: P482

Abstract Group: 9.2. Physiotherapists

Keyword 1: Exercise **Keyword 2:** Rehabilitation **Keyword 3:** COPD - management

Title: The effects of eccentric and concentric exercise training on muscle strength in COPD: Preliminary results

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Body: Since in eccentric exercise greater force is produced at a reduced oxygen cost, this modality of exercise could be attractive for pulmonary rehabilitation of severe COPD patients. Objective: To estimate the extent to which eccentric compared to concentric exercise training produces greater increases in quadriceps force, and leads to better improvements in hamstring force, exercise capacity and physical activity. Methods: Pilot randomized clinical trial in which COPD patients were randomly assigned to either a concentric(CON) or eccentric(ECC) cycling protocol, 3 sessions/week for 10 weeks. In the CON group, target training intensity was set as 80% of peak work rate (Wmax) while in the ECC group the target intensity was set as 4-times 80% of baseline Wmax. Lung function, muscle strength(Biodex), maximal work capacity(Wmax) and physical activity(Armband) were assessed. Results: Preliminary analysis included 11 male COPD patients(69±6 years; FEV1:41±10%pred; BMI: 27±6 Kg.m⁻²). After 10 weeks of training, isometric quadriceps force was 14%(20Nm)[95%CI: 2-26%,p=0.03] and concentric hamstring force was 27%(14Nm)[95%CI:2-50%,p=0.03] higher in the ECC. A trend for greater improvements in concentric quadriceps force was observed only in the ECC group (ECC=16% of change, p=0.06 vs CON=1%,p=0.6). Both ECC and CON training yielded similar improvements in Wmax (ECC 18%,p=0.01 vs CON 16%; p=0.03). Steps/day remained unchanged (p>.05) in both groups. Conclusion: Preliminary results show a trend for greater improvements in quadriceps muscle force with ECC compared to CON training in severe COPD patients. Funding:McGill Health Centre Research Institute/pilot project and Edith Strauss.