

European Respiratory Society Annual Congress 2013

Abstract Number: 4216

Publication Number: P2217

Abstract Group: 1.2. Rehabilitation and Chronic Care

Keyword 1: Skeletal muscle **Keyword 2:** Exercise **Keyword 3:** COPD - management

Title: Effect of Taichi and treadmill exercise on quadriceps strength in patients with COPD

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Body: Background: Traditionally exercise at 60% of maximum load has been considered necessary for effective rehabilitation. It has recently been reported that patients who develop quadriceps contractile fatigue during exercise training show greater training benefits than those who do not (Burtin ERJ 2012;40:338). It is unknown whether Tai Chi is more likely to produce quadriceps fatigue than conventional exercise. Therefore the purpose of the study was to seek the presence of quadriceps fatigue after Tai Chi exercise as compared to constant rate treadmill exercise at 60% of maximal load. Methods: Tai Chi exercise and constant treadmill exercise at 60% of maximal load were performed in random order in 11 patients with COPD, mean age 62 years, mean BMI 24.4 kg/m² and mean FEV₁ 61 % predicted. Both protocols lasted for 60 minutes. Unpotentiated quadriceps twitch tension (TwQ) elicited by magnetic stimulation of the femoral nerve was measured before and 20 and 60 minutes after each task. Results, TwQ significantly decreased after Tai Chi exercise and were 8.7±1.8 Kg, 7.6±2.0 Kg and 7.8±2.9 Kg, before, 20minutes and 60 minutes after excise respectively (p<0.05), whereas quadriceps strengths were similar before, 20 and 60 minutes after treadmill exercise (8.1±1.8 Kg, 8.5±2.1 Kg and 8.2±2.0 Kg, respectively, p>0.05). Minute ventilation was not different between the 2 tasks (peak 38.2±9.1 l/min and 41.7±15.5 l/min respectively) Conclusion: Despite similar exertion, Tai Chi exercise but not treadmill exercise was associated with quadriceps fatigue and so could be an alternative method for pulmonary rehabilitation in patients with COPD.