European Respiratory Society
Annual Congress 2012

Title: Upper limb strength and lung function as determinants of upper limb work capacity in COPD

Dr. Jennifer 7300 Alison jennifer.alison@sydney.edu.au [1,2], Prof. Peter 7301 Bye peterb@mail.med.usyd.edu.au MD [3] and Dr. Zoe 8707 McKeough zoe.mckeough@sydney.edu.au [1]. [1] Discipline of Physiotherapy, The University of Sydney, NSW, Australia ; [2] Department of Physiotherapy, Royal Prince Alfred Hospital, Sydney, NSW, Australia and [3] Department of Respiratory Medicine, Royal Prince Alfred Hospital, Sydney, Australia .

Body: Aim: To determine the relationship between upper limb strength, lung function and upper limb exercise capacity in people with chronic obstructive pulmonary disease (COPD). Methods: Repeated measures design. Participants were included if they had a diagnosis of COPD, FEV_1/FVC ratio < 0.7. Exclusion criteria were an acute infection in the prior month, or neurological, musculoskeletal or cardiovascular conditions that limited upper limb exercise. Participants completed the following assessments: spirometry, incremental supported arm exercise (SAE) to peak work capacity on an arm ergometer, incremental unsupported arm exercise (UAE) to peak capacity using an unsupported arm test (Takahashi, T. et al. JCRP 2003;23:24-30), isometric upper limb strength measurements using a hand held dynamometer. Dominant arm strength was calculated by the mean of the following strength measurements: shoulder flexion & extension, horizontal abduction & adduction, internal & external rotation and elbow flexion. SAE and UAE were performed in random order based on concealed allocation sequence. Results: 68 participants completed the study, mean (SD) age 65(8) yrs, FEV_1 %pred 50 (17)%, FVC %pred 77 (17)%, FEV_1/FVC 0.48 (0.1). Peak oxygen consumption (VO_{2peak}) for SAE and UAE was 0.80 (0.28) L/min and 0.71 (0.31) L/min respectively. Dominant arm strength was 103 (29) Newtons. Multiple regression on VO_2SAE and VO_2UAE using combined dominant arm strength and FEV_1%pred as predictors, accounted for 66% (p< .001) and 55% (p<.001) of the variance, respectively. Conclusion: Upper limb strength combined with FEV_1%predicted are significant predictors of both supported and unsupported upper limb exercise capacity in COPD.