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Title: Effect of balance training within pulmonary rehabilitation

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Body: Patients with chronic obstructive pulmonary disease (COPD) have balance impairments however, pulmonary rehabilitation (PR) programmes lead to only minor improvements on balance in patients with COPD. Thus, there is a need to explore balance training within PR. This study aimed to determine the effects of balance training within PR among patients with COPD. A quasi-experimental design with outpatients with COPD was conducted. Participants underwent a 12-week PR programme with exercise training (3*week) and psychoeducation (1*week). Each exercise training session incorporated 5 components: warm up (10min), endurance training (20min), strength training (15min), balance training (5min) and cool down (10min). Health-related quality of life (St. George's Respiratory Questionnaire - SGRQ), quadriceps muscle strength (10 repetition maximum testing) and exercise tolerance (6-minute walk test) were assessed. Balance was determined using the Timed Up and Go (TUG) test. Sixteen outpatients participated (11 males; age 68.2±11.7; FEV1 63.3±19.0%predicted). After PR, there were significant improvements on SGRQ symptoms score (mean change (MC)=12.2 units; p=0.012; effect size (ES)=0.604), quadriceps muscle strength (MC=3.1Kg; p=0.001; ES=1.475) and exercise tolerance (MC=35.7m; p=0.001; ES=1.027). A comparison of TUG test pre- (9.3±2.5s) and post-PR (7.2±1.9s) showed significant improvements (MC=2.1±1.2s; p=0.001; ES=1.834). Before PR 8(50%) participants and after PR only 1(6.3%) had a TUG performance worse than age-matched healthy peers (p=0.004). A specific component of balance training within PR has a large effect on balance in patients with COPD. Further research is needed to determine the optimal intervention for improving balance.