

maintaining the BMI level, there was a fat free mass turnover, which may indicate a hidden muscle catabolism. Therefore, early management to prevent muscle mass loss would improve patient's daily physical activity and quality of health.

REFERENCES

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**P38 IS IT POSSIBLE TO PREDICT AMBULATORY OXYGEN (AO) REQUIREMENTS?**

<sup>1</sup>L Cornish, <sup>1</sup>F Dyer, <sup>2</sup>K Cheema, <sup>1</sup>J Bott; <sup>1</sup>Virgin Care Respiratory Care Team, Chertsey, United Kingdom; <sup>2</sup>South East Coast Quality Observatory, Horley, United Kingdom

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**Aim** To determine whether AO flow rate requirements can be predicted in patients with chronic lung diseases.

**Background** The process for AO assessment as per current UK guidance can be extremely time consuming, necessitating multiple walking tests with significant rest periods between walks. We set out to explore whether a model could accurately predict the AO flow rate required to abolish/minimise desaturation, thus simplifying the process.

**Method** Retrospective data were analysed for all patients who attended AO clinic from April 2009 to January 2013. AO needs were assessed as per current UK guidance. For those who met the criteria for AO (n = 100), resting SpO<sub>2</sub>, desaturation on the endurance shuttle walk test (ESWT) and AO flow rate required to minimise this desaturation were recorded, along with age and diagnosis.

**Results** Multiple regression analysis was undertaken to test how well the variables included in the data could predict the likely level of AO required. A range of models were constructed and tested against the actual AO flow rate that had been required. The model which accounted for the greatest proportion of the variance (r = 0.671, F = 79.40, p < 0.05) included only one variable, the level of oxygen desaturation on room air post ESWT. Adding additional variable to the model, such as age and resting SpO<sub>2</sub> did not add significantly to the predictive power of the model.

**Conclusion** Using this model, 91% of patients were predicted correctly with an error of +/- 1L of the actual flow rate. It would therefore, 9 times out of 10, give a flow rate that was either correct (+/- 1L). Use of this model will reduce the number of walking tests required when performing AO assessment, saving both time and valuable healthcare resources.

**P39 A COMPARISON OF THE REPEATABILITY AND RESPONSIVENESS OF FIELD AND LABORATORY INCREMENTAL EXERCISE TESTS BETWEEN COPD AND CHRONIC HEART FAILURE**

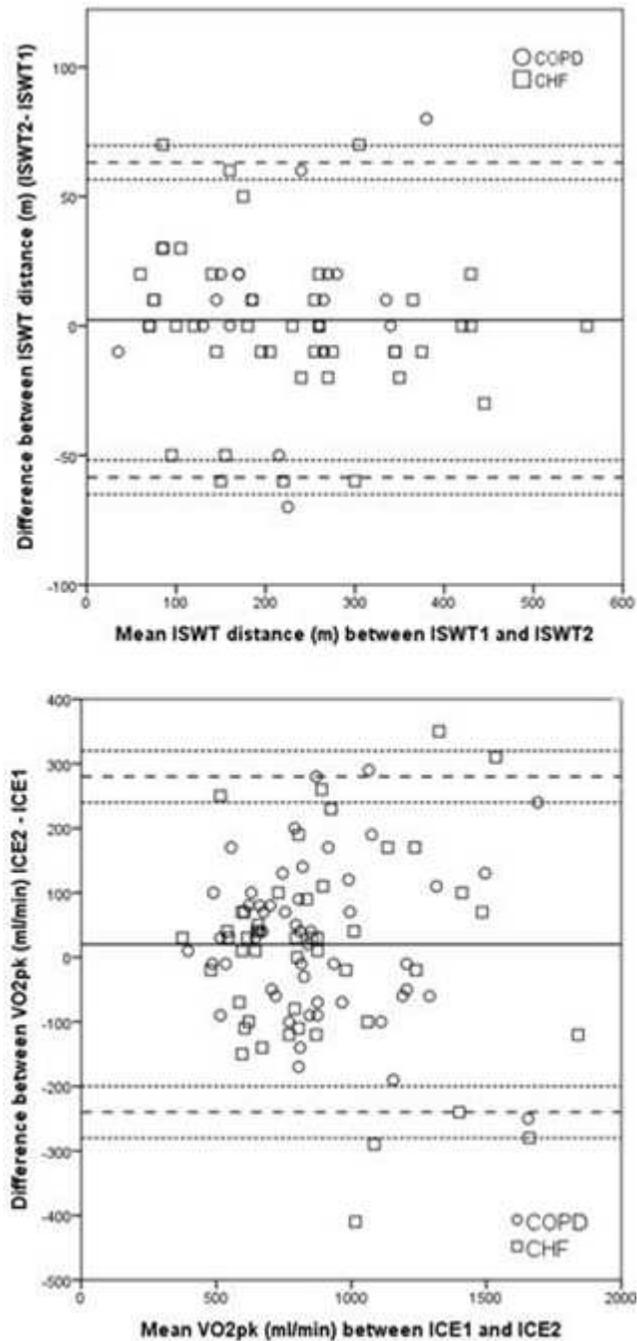
TC Harvey-Dunstan, SJ Singh, MC Steiner, MDL Morgan, RA Evans; Department of Respiratory Medicine, Glenfield Hospital, Leicester, UK

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**Aim** To describe and compare the repeatability and responsiveness of the Incremental Shuttle Walk Test (ISWT) and incremental cardiopulmonary exercise test between COPD and Chronic Heart Failure (CHF).

**Hypothesis** The null hypothesis, no difference in the measurement properties of ISWT and ICE between two chronic diseases.

**Methods** Patients with symptomatic COPD and CHF (MRC 2 or NYHA II and above, respectively) were recruited. All patients underwent seven weeks of PR (1). At baseline, participants performed a familiarisation ISWT, two ISWTs and two incremental,



**Abstract P39 Figure 1** repeatability of the ISWT distance and ICF VO<sub>2</sub>pk in COPD and CHF

symptom-limited, cardiopulmonary exercise tests on a cycle ergometer (ICE) within two weeks, on separate days. Both tests were repeated after seven weeks of PR.

**Results** 55 patients with COPD (70% male, mean [SD] age 73 [9] yr, FEV<sub>1</sub> %predicted 43 [15], FEV<sub>1</sub>/FVC 50 [9]) and 44 patients with CHF (66% male, age 71 [11] yr, LVEF 33 [10]%) were recruited.

There was a significant increase mean [SE] of 20 [4] m between the familiarisation ISWT and ISWT1 (p < 0.001). There was no difference between either, ISWT1 and ISWT2, 2 (4) m (p = 0.10), or peak oxygen uptake (VO<sub>2</sub>pk) for ICE1 and ICE2, 20 [10] ml·min<sup>-1</sup> (p = 0.16). There was no effect of disease, p = 0.11 and p = 0.47, respectively. Figure 1 shows the repeatability for the ISWT and ICE VO<sub>2</sub>pk in both conditions.

Mean [95%CI] change in ISWT after PR was 68 [50–95] m, effect size (ES) 0.58 (p < 0.001) and 62 [35–89] m, effect size

0.57 ( $p < 0.001$ ), in COPD and CHF, respectively. Mean change in  $ICE_{VO_{2pk}}$  was 28 (-14 to 69)  $ml \cdot min^{-1}$ , ES 0.09 ( $p = 0.19$ ) and 50 (-15 to 120)  $ml \cdot min^{-1}$ , ES 0.16 ( $p = 0.12$ ). There was no difference in responsiveness, between COPD and CHF, for the ISWT and  $ICE_{VO_{2pk}}$ ,  $p = 0.44$  and  $p = 0.67$ , respectively.

**Conclusions** Both the ISWT and ICE are similarly repeatable in patients with COPD and CHF. A 60 m change in ISWT distance and 260mls in  $ICE_{VO_{2pk}}$  represents, with 95% certainty, a true change within an individual.  $ICE_{VO_{2pk}}$  was similarly unresponsive to PR in both conditions.

**REFERENCES**

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**P40 SYSTEMATIC REVIEW OF THE REPEATABILITY, REPRODUCIBILITY, SENSITIVITY AND COMPARABILITY OF KEY EXERCISE CAPACITY TESTS USED IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)**

<sup>1</sup>I Fotheringham, <sup>1</sup>G Meakin, <sup>2</sup>Y Punekar, <sup>2</sup>J Riley, <sup>2</sup>S Cockle, <sup>2</sup>S Singh; <sup>1</sup>Oxford PharmaGenesis, Oxford, United Kingdom; <sup>2</sup>GlaxoSmithKline, Uxbridge, United Kingdom

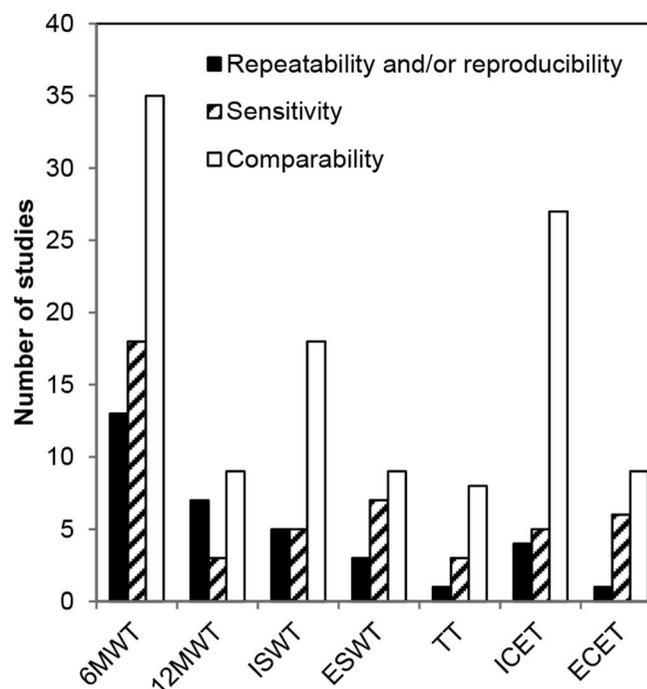
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**Introduction and Objectives** Various exercise tests are used as endpoints to evaluate the functional status of patients with COPD. While individual studies have compared different tests, a systematic assessment of this data has not been performed. We therefore aimed to review the repeatability (variation in tests performed on the same day), reproducibility (variation in tests performed on different days), sensitivity and comparability between and within exercise tests in adult patients with COPD.

**Methods** A systematic review of Embase, MEDLINE® and the Cochrane Library identified primary manuscripts in English reporting relevant data on the following exercise tests: six- and twelve-minute walk tests (6MWTs and 12MWTs), incremental and endurance shuttle walk tests (ISWTs and ESWTs), treadmill test (TT), and incremental and endurance cycle ergometer tests (ICETs and ECETs). Comparability within exercise tests was assessed by examining studies that compared different protocols of the same test type.

**Results** We identified 90 relevant studies (Figure 1). The majority of studies exploring repeatability and/or reproducibility examined the 6MWT, 12MWT and ISWT; no studies examined repeatability in treadmill and cycle tests. Only four studies reported the intra-class correlation coefficient (ICC); two examined repeatability and reproducibility of the 6MWT (ICCs = 0.94 and 0.88, respectively), and a further two reported reproducibility of the ECET and endurance TT (ICCs = 0.85 and 0.84, respectively). These data indicate good repeatability/reproducibility, but other studies contradict these findings. Prior familiarisation consistently improved repeatability and reproducibility of tests. Most relevant studies reported that exercise tests were sensitive to interventions, but the magnitude of response varied between test types and depended on the intervention and outcome assessed. Protocol variations, such as in track layout or supplemental oxygen use, affected performance in the majority of studies identified. Studies with pair-wise comparisons between walk tests, cycle tests, and walk and cycle tests reported inconsistent comparability between test types.

**Conclusion** This review found varied repeatability, reproducibility and sensitivity of exercise tests often resulting from inconsistencies in protocol administration (e.g. variations in protocols used, outcomes analysed, or protocol familiarisation). Such within- and between-test variations make comparisons difficult, even between studies ostensibly reporting the same test.



**Abstract P40 Figure 1. Breakdown of the relevant studies.** Numbers of studies that contain data examining the repeatability, reproducibility, sensitivity and comparability (within and between different tests) for the different exercise tests. As some studies fall into more than one category, the combined number of studies in this figure exceeds 90.

**P41 PULMONARY REHABILITATION (PR) ENDURANCE SHUTTLE WALK TEST DISTANCES: DIFFERENCES BETWEEN INTERSTITIAL LUNG DISEASE (ILD) AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)**

A Lewis, L Cornish, F Dyer, K Cheema, J Bott; *Virgin Care, Chertsey, Surrey, England*

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**Background** There is evidence to suggest that Pulmonary Rehabilitation (PR) is beneficial for patients with chronic lung diseases other than COPD (AAP/AACVPR guidelines 2007, ILD consultation document 2013). However, there is little evidence to suggest that PR provides exercise tolerance benefits comparable to COPD patients who participate in the same PR programmes.

**Aim** To determine whether walking distance improvements differ significantly between ILD and COPD patients following PR.

**Method** Retrospective data of PR Endurance Shuttle Walk Test distances (ESWTD) pre- to post-PR were analysed and compared between 55 Interstitial Lung Disease (ILD) and 440 COPD patients from February 2005 to December 2012. Patients participated in a PR programme run by the same clinical team. Independent sample two-tailed t-tests were performed on data for pre-PR ESWTD, post-PR ESWTD and ESWTD change.

**Results** There were no significant differences between group ESWTD prior to PR ( $t = -0.049$ ,  $p = 0.961$ ), following PR ( $t = -0.227$ ,  $p = 0.820$ ) or change in ESWTD ( $t = -0.228$ ,  $p = 0.820$ ).

**Abstract P41 Table 1.**

	No.	Mean (SD) Pre PR (m)	Mean (SD) Post PR (m)	Mean (SD) Change (m)
COPD	440	365 (339)	804 (605)	440 (530)
ILD	55	363 (309)	785 (502)	422 (443)