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Effects of downhill walking in pulmonary rehabilitation for patients with COPD: a randomised controlled trial

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Downhill walking is a feasible, acceptable and safe training modality that increases the likelihood of achieving clinically important gains in functional exercise tolerance in patients with COPD
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ABSTRACT The development of contractile muscle fatigue (CMF) affects training responses in patients with chronic obstructive pulmonary disease (COPD). Downhill walking induces CMF with lower dyspnoea and fatigue than level walking. This study compared the effect of pulmonary rehabilitation (PR) comprising downhill walking training (DT) to PR comprising level walking (conventional training (CT)) in patients with COPD.

In this randomised controlled trial, 35 patients (62±8 years; forced expiratory volume in 1 s (FEV_1) 50±17% predicted) were randomised to DT or CT. Exercise tolerance (6-minute walk test distance (6MWD); primary outcome), muscle function, symptoms, quality-of-life and physical activity levels were assessed before and after PR. Absolute training changes and the proportion of patients exceeding the 30 m 6MWD minimally important difference (MID) were compared between groups. Quadriceps muscle biopsies were collected after PR in a subset of patients to examine physiological responses to long-term eccentric training.

No between-group differences were observed in absolute 6MWD improvement (mean 6MWD change 77±46 m DT *versus* 56±47 m CT; p=0.45), however 94% of patients in DT exceeded the 6MWD MID compared to 65% in CT (p=0.03). Patients in DT tended to have larger improvements than CT in other outcomes. Muscle biopsy analyses did not differ between groups.

PR incorporating downhill walking confers similar magnitudes of effects to PR with conventional walking across clinical outcomes in patients with COPD, however, offers a more reliable stimulus to maximise the achievement of clinically relevant gains in functional exercise tolerance in people with COPD.