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A randomised crossover trial investigating the effect of a portable positive pressure ventilation device on exercise tolerance in patients with COPD

Background: Dyspnoea is a common symptom in COPD and can lead to progressive decline in exercise capacity. Non-Invasive Ventilation has been shown to improve symptoms and exercise capacity but is clinically impractical due to logistical constraints. A portable ventilation device (Vitabreath) may overcome these barriers and be a useful adjunct therapy.

Aim: To investigate the effect of Vitabreath on exercise capacity in patients with COPD.

Methods: Randomised crossover design; 12 participants with COPD ($FEV_1\%$ 45 ± 15) performed 3 Six-Minute Walk Tests using i) Vitabreath, ii) Threshold Positive Expiratory Pressure (PEP), or iii) no device. Primary outcome: six-minute walk distance (6MWD). Secondary outcomes: changes in heart rate, oxygen saturations (SpO_2), dyspnoea, and lower limb (LL) fatigue, and recovery time of each variable.

Results: Mean 6MWD was less using Vitabreath compared to no device ($p=0.01$). Use of Vitabreath resulted in a smaller change in dyspnoea ($p=0.008$) and LL fatigue scores ($p=0.02$), and a faster LL recovery time ($p=0.01$) compared to Threshold PEP. SpO_2 recovery time was faster using Vitabreath compared to both Threshold PEP ($p=0.008$) and no device ($p=0.03$). Parametric data presented as mean \pm SD, Non-parametric data presented as median (IQR).

Conclusion: The data suggest no benefit in using the Vitabreath in improving exercise capacity.

	Vitabreath	Threshold PEP	No device	ANOVA p=
6MWD (m)	417 \pm 50	430 \pm 67	465 \pm 71	0.01
Change in Variable				
Dyspnoea (Borg)	2 (1)	3 (1)	3 (2)	0.03
LL fatigue (Borg)	0 (2)	2 (1)	1 (1)	0.03
Recovery time (seconds)				
LL fatigue	0 (120)	120 (180)	120 (180)	0.014
SpO_2	28 (62)	68 (113)	83 (83)	0.003

