



**A Comparative Pilot Study of the Efficacy of Three Portable Oxygen Concentrators during a 6-Minute Walk Test in Patients with Chronic Lung Disease**

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**Rationale:** While use of portable oxygen concentrators (POC) is likely to increase, research is limited on the ability of POCs to maintain oxygen saturation  $\geq 90\%$  during exercise<sup>1,2,3</sup>.

**Objective:** To compare the efficacy of 3 POCs, with the highest O<sub>2</sub> capacity in maintaining exertional O<sub>2</sub> saturations  $\geq 90\%$  in patients with Chronic Obstructive Pulmonary Disease (COPD) or Pulmonary Fibrosis (PF).

**Methods:** Patients who were O<sub>2</sub> dependent and within 2 years post pulmonary rehabilitation were invited to participate.

Inclusion criteria

Medically stable

R/A exertional

Desaturation  $\leq 85\%$

Exclusion criteria

Require  $>6$  L/min of oxygen

Conditions limiting walking ability

Significant cognitive or memory deficit

Six minute walk tests (6-MWTs) were administered, monitoring pulse oximetry (SpO<sub>2</sub>). A control 6-MWT was performed with the participants' current O<sub>2</sub> system and prescribed exercise flow rate. A cross over design was used. Participants randomly performed a 6-MWT with each of the 3 POCs at the max pulse dose setting and stopped if their SpO<sub>2</sub> was  $\leq 85\%$ . A self admin. questionnaire was completed after each POC walk.

Study POCs

- EverGo (Philips Respironics Inc., Murrysville, PA, USA)
- iGo (DeVilbiss Healthcare Summerset, PA, USA)
- Eclipse 3 (SeQual Eclipse 3, Caire Inc. Ball Ground, GA, USA)

No financial support was received from the manufacturers/distributors.

Statistical analysis: SPSS V-18 for Windows using a one-way ANOVA with repeated measures and the Bonferroni Post-Hoc Test.

**Results:** Ten participants (5 male, 5 female, average age 67.1  $\pm$  7.6 years old) were included (9 COPD, 1 PF). On average, the Eclipse 3 resulted in the highest SpO<sub>2</sub> at each time point and corresponded with increased total time and total distance walked. Significant differences in SpO<sub>2</sub> existed between the Eclipse 3 and all other POCs ( $p < 0.05$ ).

Measure (Mean $\pm$ SD)	Control	EverGo™	Eclipse 3™	iGo™
Pre-Exer. SpO <sub>2</sub> (%)	94.5 $\pm$ 2.3	95.0 $\pm$ 3.5	98.3 $\pm$ 2.0†	94.9 $\pm$ 3.1
End-Exer. SpO <sub>2</sub> (%)	85.4 $\pm$ 3.2	87.8 $\pm$ 4.4	92.4 $\pm$ 6.8 †	86.5 $\pm$ 4.0
Total Time (min)	4:20 $\pm$ 1:59	4:30 $\pm$ 2:22	5:06 $\pm$ 1:32	4:20 $\pm$ 2:08
Total Distance (m)	229.1 $\pm$ 121.7	225.4 $\pm$ 135.5	259.4 $\pm$ 96.3	222.3 $\pm$ 124.3
% Pred Walk <sup>4</sup>	50.6 $\pm$ 28.7	46.3 $\pm$ 34.4	58.3 $\pm$ 24.9	49.9 $\pm$ 29.0

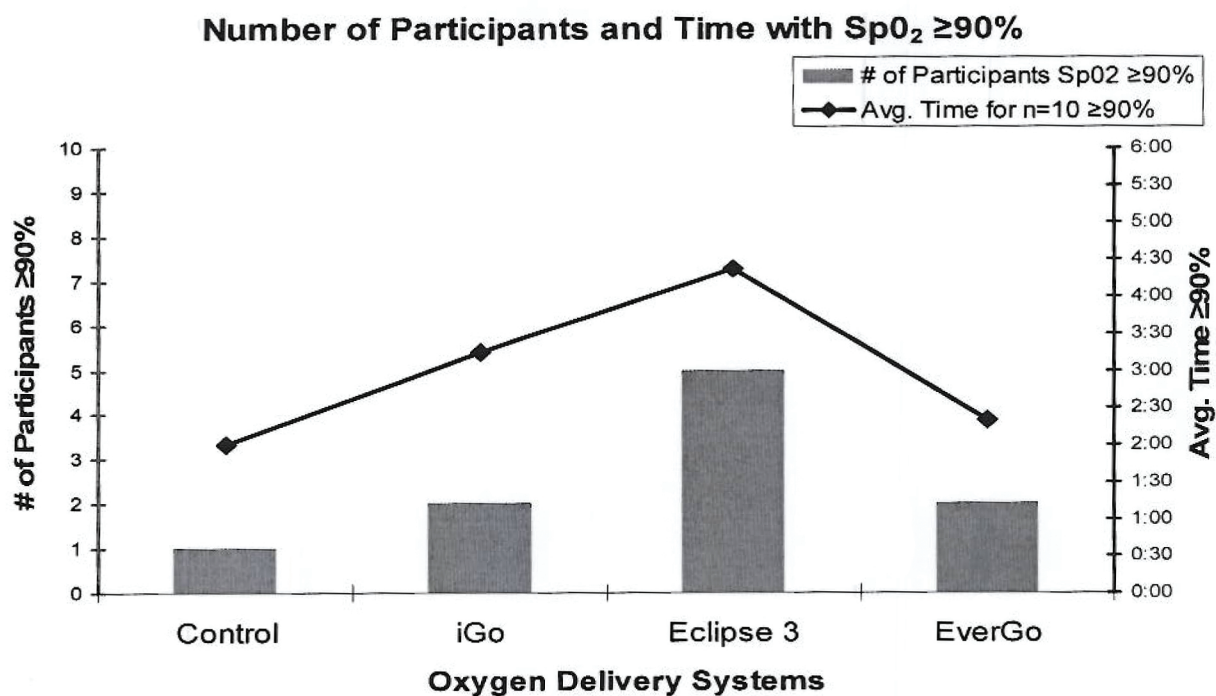


Figure 1. Participants' ability to maintain SpO<sub>2</sub> ≥90%

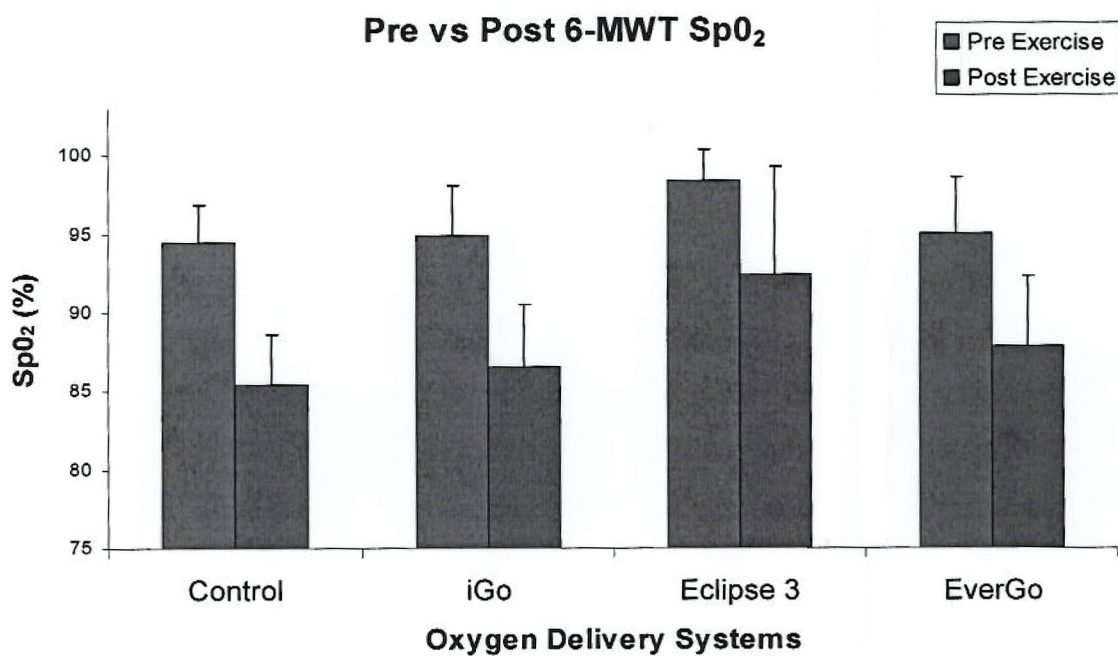


Figure 2. SpO<sub>2</sub> before and after 6-MWT



Patients preferred the Eclipse 3 when considering each POC's responsiveness to breathing during exercise. The EverGo was preferred for size and weight.

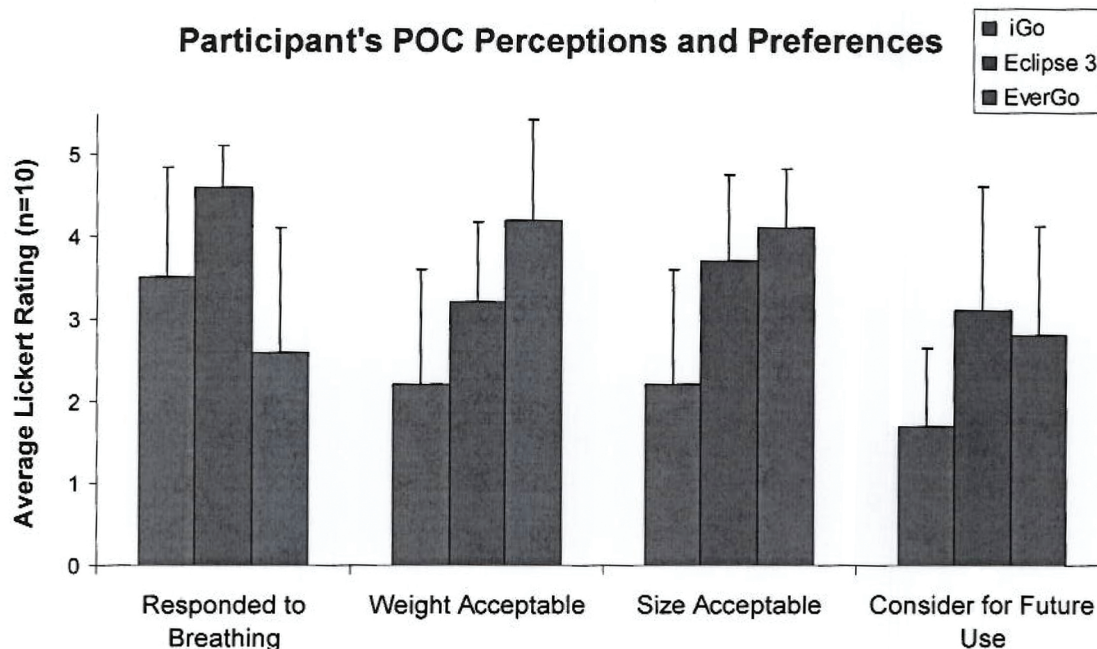


Figure 2. Questionnaire Responses

**Conclusion:** All POCs increased SpO<sub>2</sub> during exertional walk but only the Eclipse 3 resulted in mean SpO<sub>2</sub>  $\geq$  90%.

#### References

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