

INTRODUCTION

- Arterial oxygen desaturation is frequent in patients with idiopathic pulmonary fibrosis (IPF), contributes to exercise capacity limitation and is associated with poor survival.
- The effect of ambulatory oxygen on exercise capacity in patients with IPF has been poorly investigated
- ➔ We evaluated an automatic titration device (FreeO2[®], OxyNov), a closed loop system that continuously adjusts oxygen flow rate to a predefined targeted SpO₂, in patients with IPF during a 6-minute walk test (6MWT).

AUTOMATIC OXYGEN TITRATION DEVICE

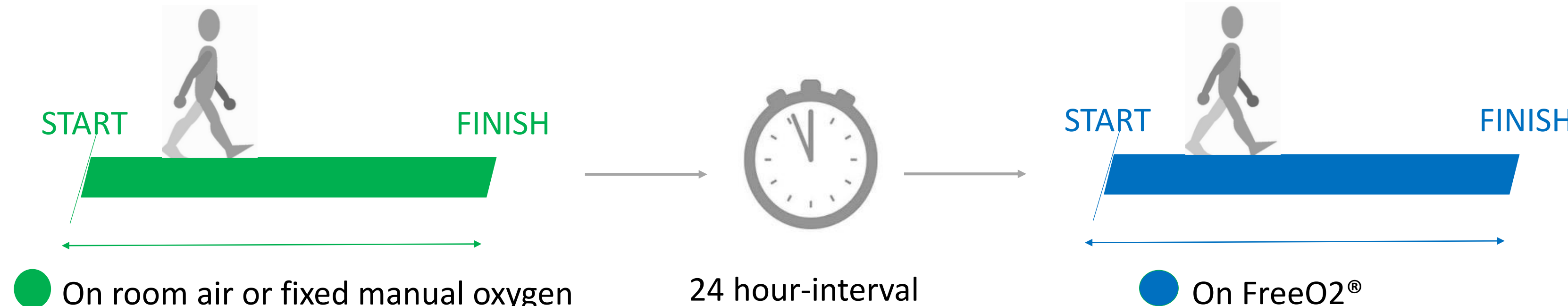


Fig. 1: FreeO2[®], an automatic oxygen titration device that adjusts oxygen flow rate to a predefined targeted SpO₂

METHODS

Prospective monocentric open-label study

- Consecutive stable IPF patients with oxygen desaturation at exercise (SpO₂ fall of more than 4%)
- Patients were divided in two groups whether or not they previously required ambulation oxygen supply.



- Each patient performed **two 6MWT under the following conditions** with a 24 hour-interval:
 1. room air (RA), or on a fixed oxygen (FO) flow depending on each patient's predefined oxygen need (same flow than used at home)
 2. FreeO2[®] with a 92% targeted SpO₂ (± 2 %).
- A physical therapist recorded settings from baseline to termination exercise time:
 - SpO₂
 - Borg dyspnea index (BDI)
 - pulse rate
 - maximal oxygen uptake
 - walking distance
 - walking distance when FreeO2 was on.

RESULTS

Table 1: Patients characteristics

Patients characteristics	
Number of patients included	16
Patients using ambulation oxygen supply	
- Number	9
- Flow rate (L/min)	2 to 7
Age (years)	69 +/- 11
Sex ratio (F/M)	8/8
Mean Forced Vital Capacity (%)	63+/-5
Mean D _L CO (%)	34+/-11
Mean room air PaO ₂ (mmHg)	67+/-16

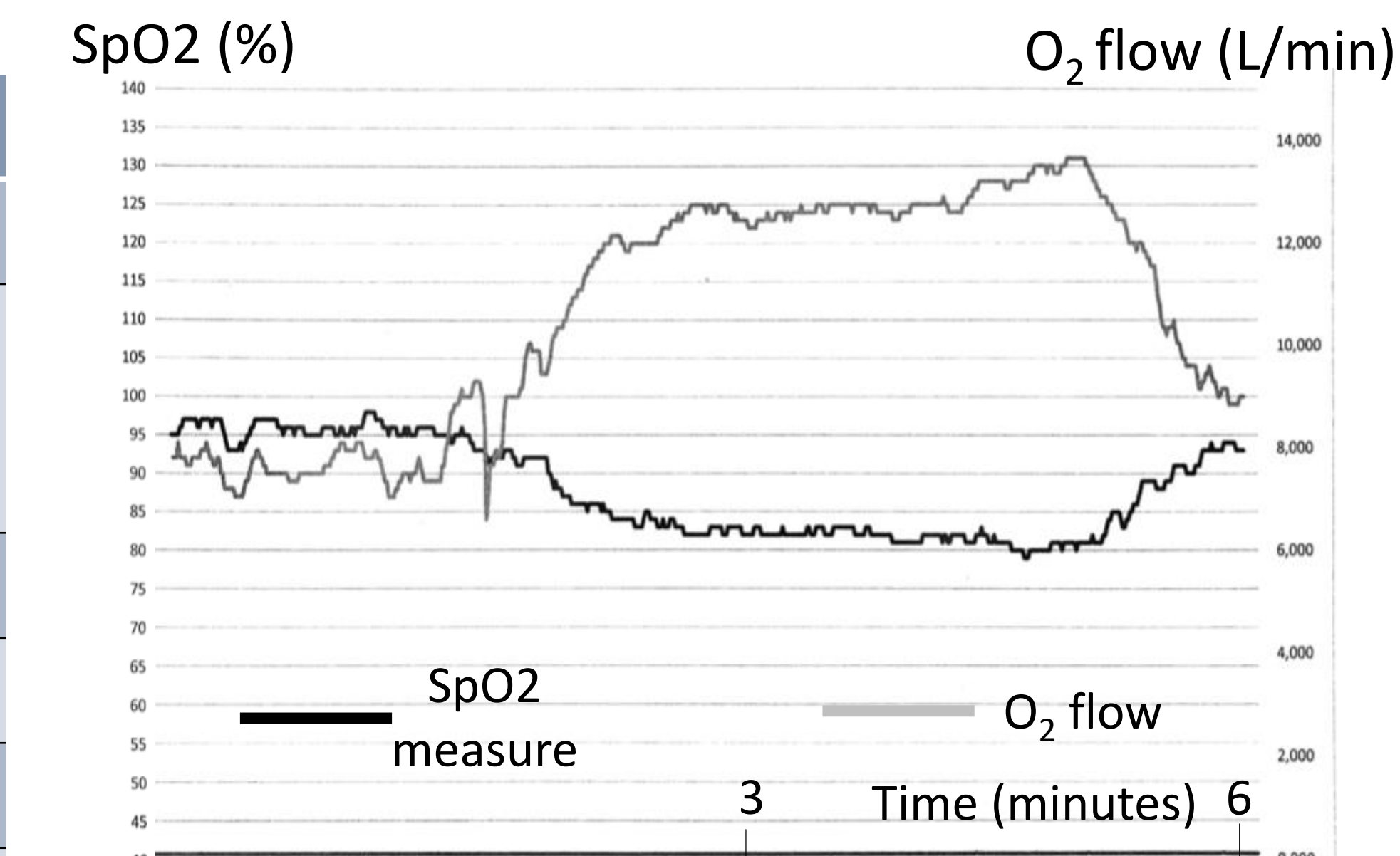
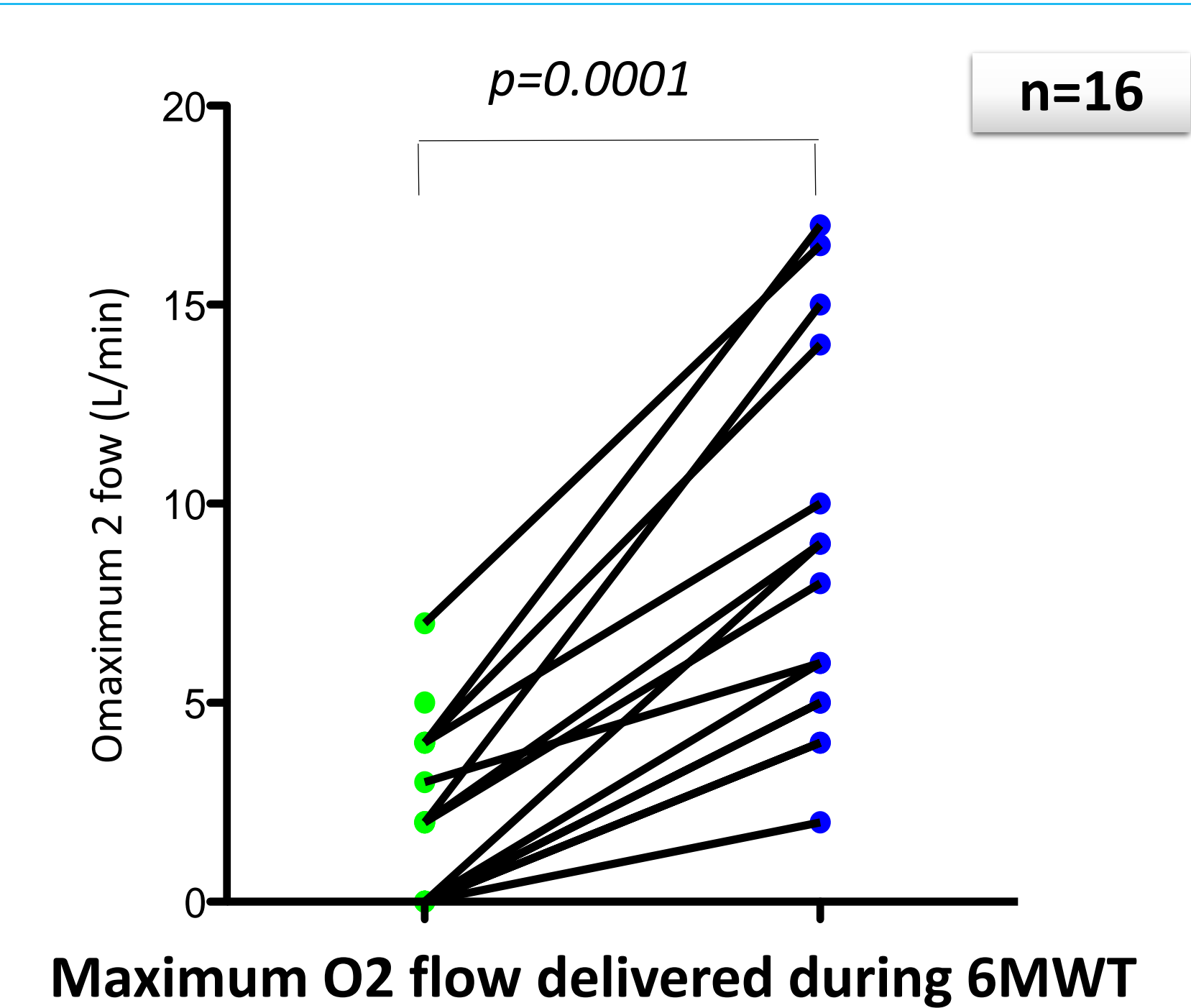
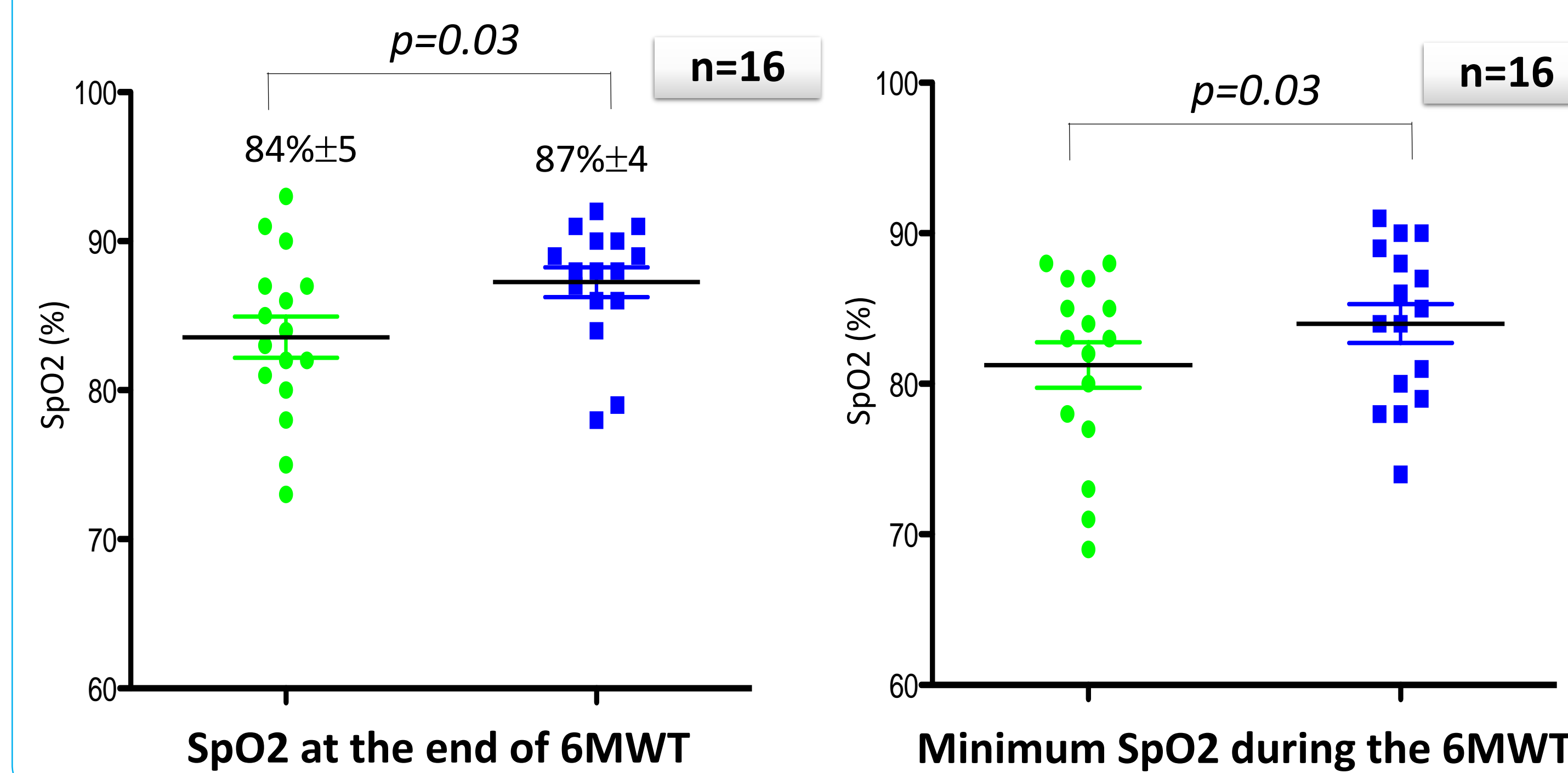


Fig. 2: Evolution of SpO₂ level and O₂ flow during a 6MWT performed with the FreeO2[®] device. Exemple about 1 patient

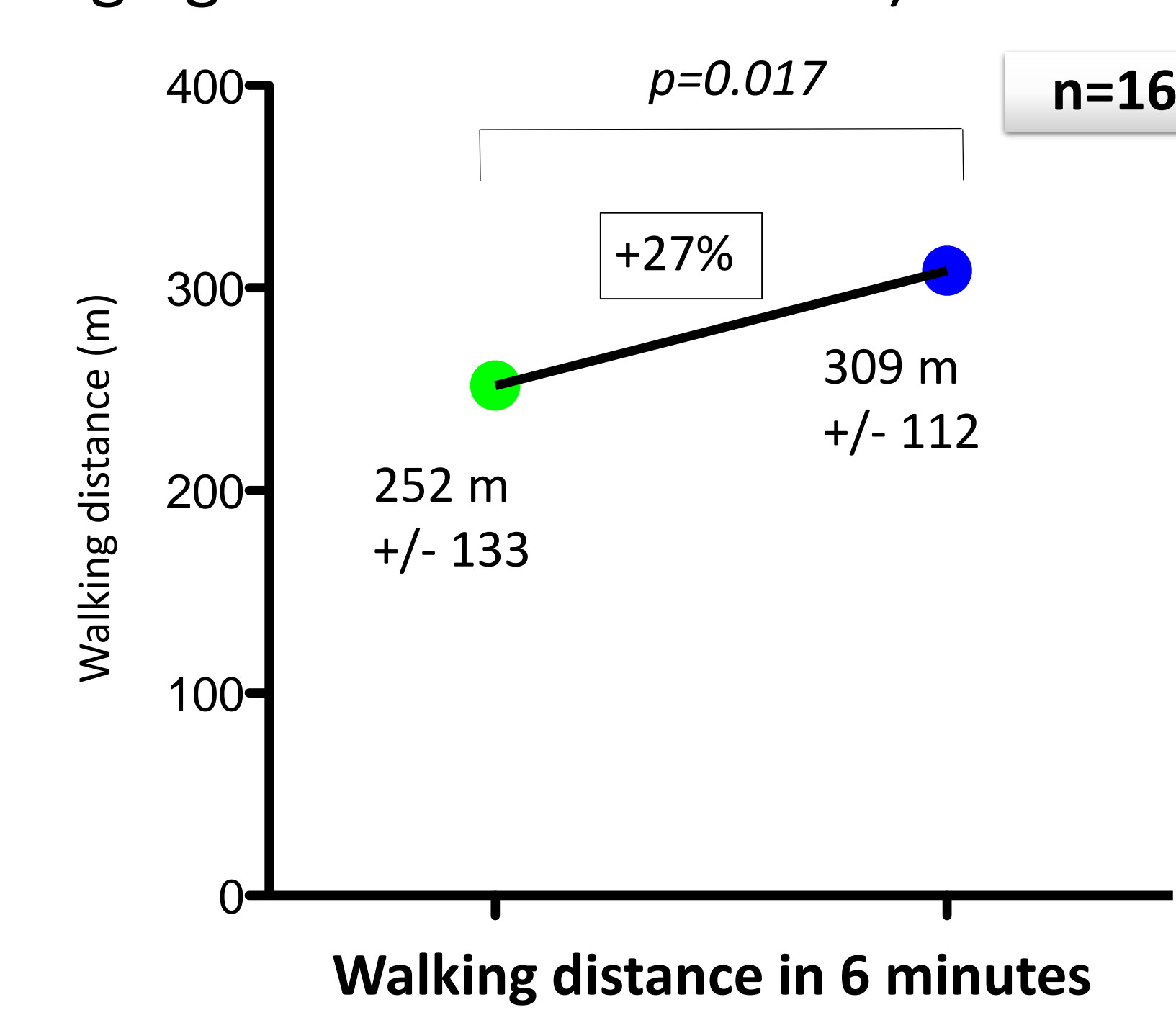
Mean oxygen flow measured during the test performed with FreeO2[®] was 8.7±4.8 l/min, with a maximal flow of 17 l/min.



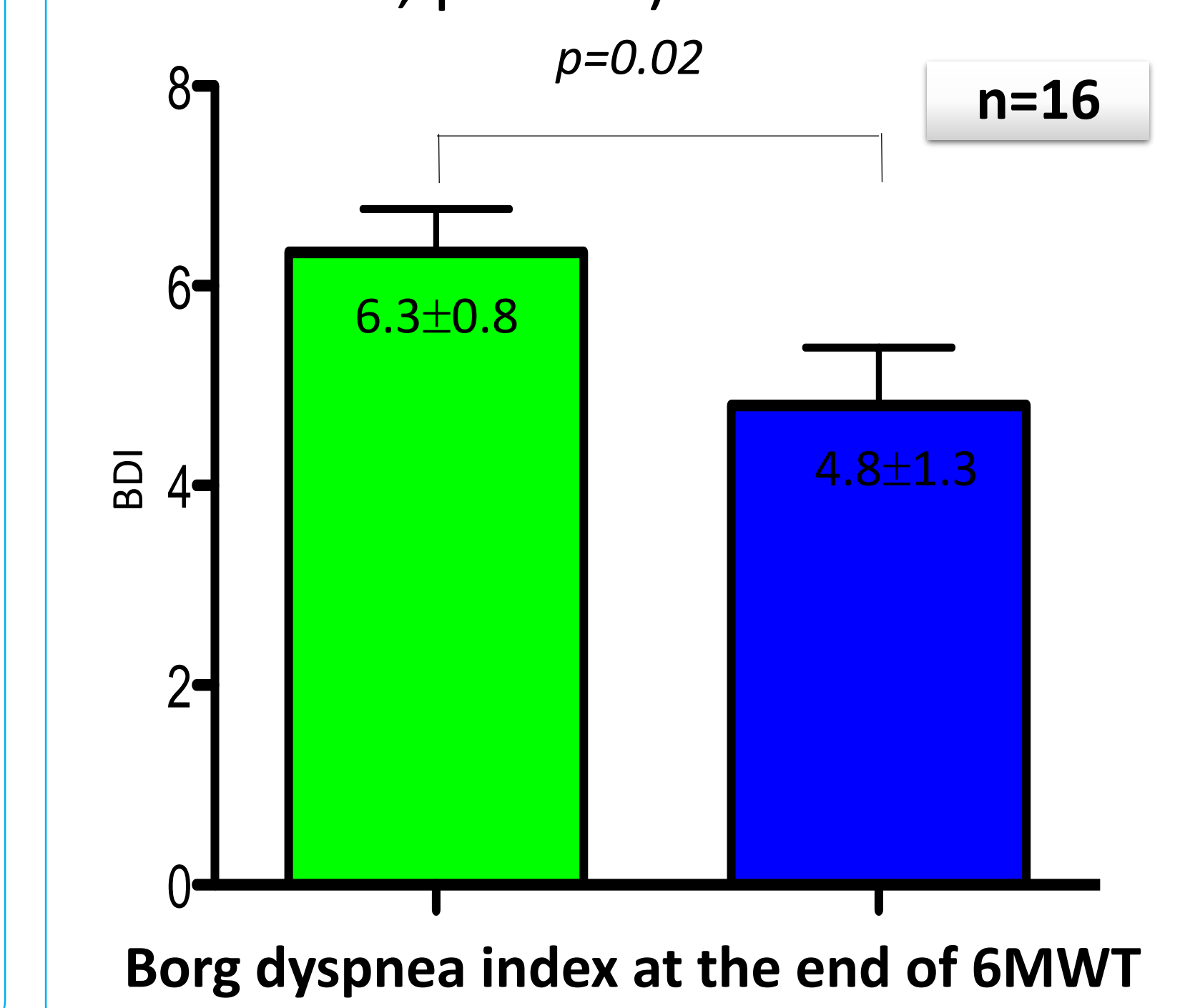
All patients presented **oxygen desaturation** during the test, but SpO₂ at end of 6MWT (87.4±4% vs 83.5±5%, p=0.039) and minimal SpO₂ (84±5% vs 81.2±6%, p=0.034) were higher with FreeO2[®].



A significant increase in **walking distance** was observed with FreeO2[®] (309±112 vs 252±133 m, p=0.13). Mean change in walking distance was 56 m (ranging from -60m to +240m).

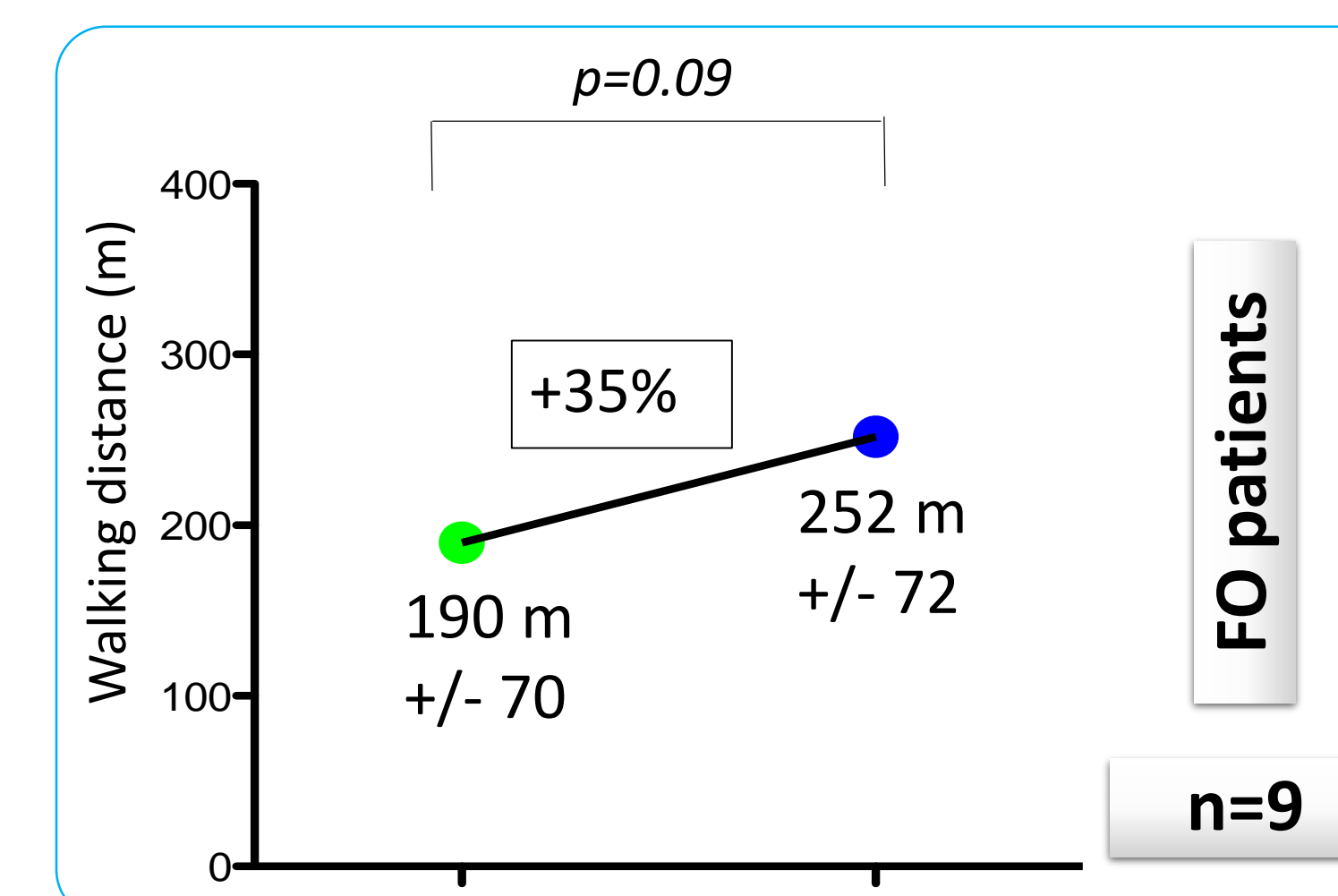


BDI was lower when the 6MWT was performed with FreeO2[®] than with fixed oxygen or on room air (6.3±0.8 vs 4.8±1.3, p=0.02).

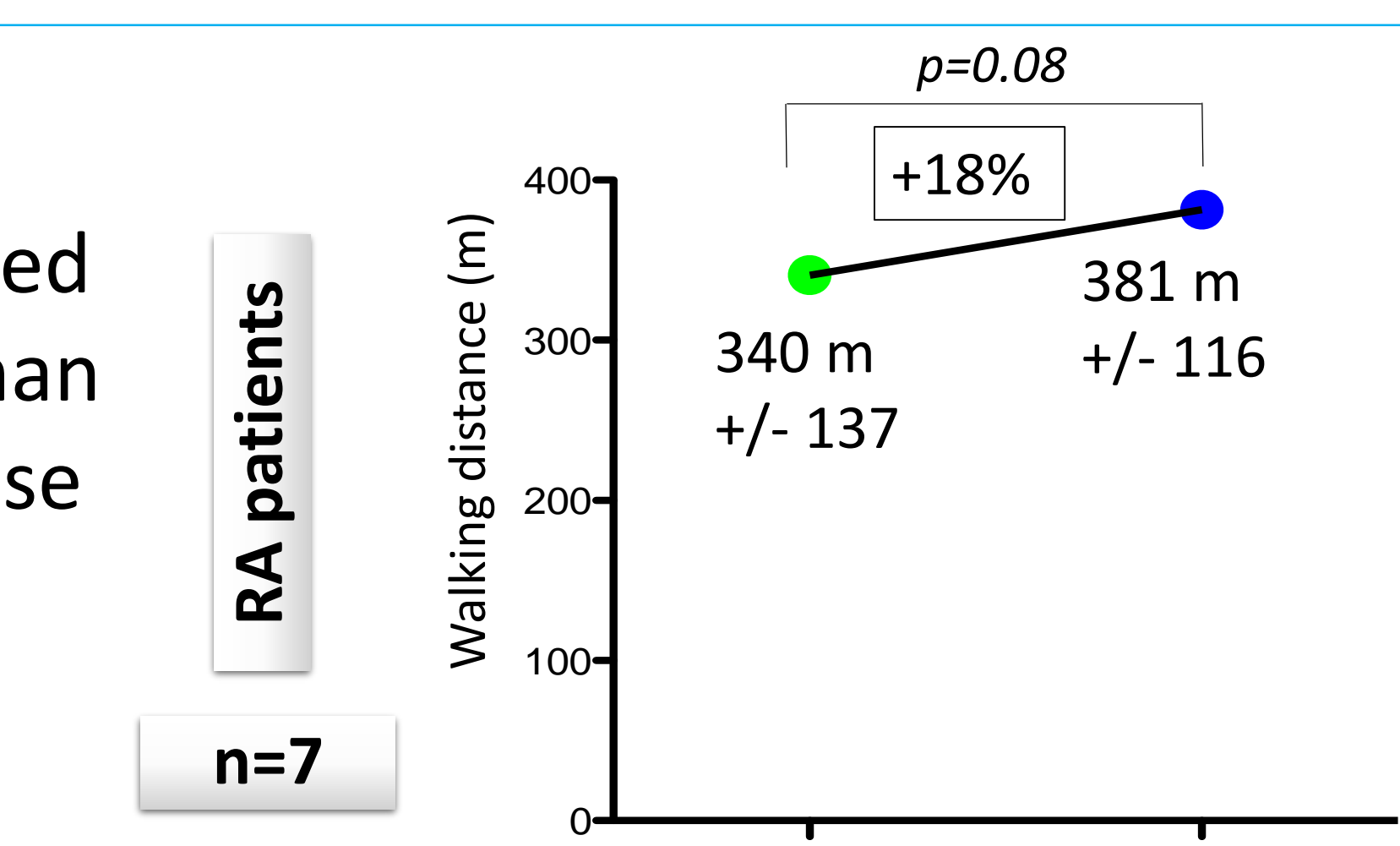


Conditions applied to the 6-minute walk test:

- On room air or fixed oxygen flow
- On FreeO2[®]



Walking distance tended to improve more for fixed oxygen flow (FO) patients (35% [(-5)-(+200%)]) than room air (RA) patients (18% [(-1)-(+79%)]) but these data did not reach statistical significance.



CONCLUSION

IPF patients often need high oxygen flows during exercise. Automatic titration of oxygen flow maintains higher SpO₂ levels during exercise in hospitalized IPF patients. Automatic titration of oxygen flow improves exercise tolerance and increases walking distance. These results should be taken into account to prescribe adequate ambulation oxygen supply devices and need to be confirmed on a larger scale.

REFERENCES

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3. Ryerson C. et al. "High Oxygen Delivery to Preserve Exercise Capacity in Patients with Idiopathic Pulmonary Fibrosis Treated with Nintedanib. Methodology of the HOPE-IPF Study." *Annals of the American Thoracic Society* 13, no. 9 (September 2016): 1640–47.
4. Vainshelboim B. et al. "Physical Activity and Exertional Desaturation Are Associated with Mortality in Idiopathic Pulmonary Fibrosis." *Journal of Clinical Medicine* 5, no. 8 (August 18, 2016).