

# Impact of positive airway pressure in post-exercise recovery from dyspnea in COPD patients.

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## Introduction

Dyspnea is the most common symptom limiting the ability of COPD patients to perform activities of daily living. Although there has been research involving the benefit of providing Non Invasive Ventilation (NIV) during exercise, there is little research specifically looking at shortening dyspnea recovery times post exercise only. We evaluated the effect of positive airway pressure (PAP) administered via a NIV device as an adjunct to shortening the duration of dyspnea post-exercise. In this study we compared the recovery times of 10 clinically stable COPD patients using Bilevel pressure support and sham therapies following an exercise test protocol.

## Methods

- 10 clinically stable COPD patients with an FEV1 < 55% were evaluated across 2 sites; 9 subjects completed the study.
- After providing informed consent, patients were asked to come for 2 visits, during which they performed physiological and exercise testing
- Visit 1:** Spirometry, a 6MWT, and a baseline treadmill test were done. For the treadmill test, Borg dyspnea ratings were measured before the start of the exercise (Baseline), after each minute of exercise, and then after every 30 seconds during seated recovery. Patients were asked to initially walk at a comfortable speed; the incline was subsequently increased by either 1% (Baseline 6MWD < 250m) or 2% (Baseline 6MWD >250m) each minute until they reached a Borg score of 7. All patients were given inhaled bronchodilator medication 15 minutes prior to starting the treadmill tests.
- Visit 2:** Patients performed 3 identical treadmill tests (based on treadmill performance on Visit 1) but were provided three different recovery methods immediately following termination of exercise.

- For the 3 treadmill tests patients received one of the interventions in a random order
  - Baseline – No Intervention
  - Sham – Vitalograph Inhaler - HFA placebo aerosol
  - PAP therapy– with 10cm H2O delta using a Respironics prototype
- Recovery time to baseline Borg, Heart Rate, Respiratory Rate, and SpO2 were measured.

## Results

Figure 1: Average recovery times per intervention

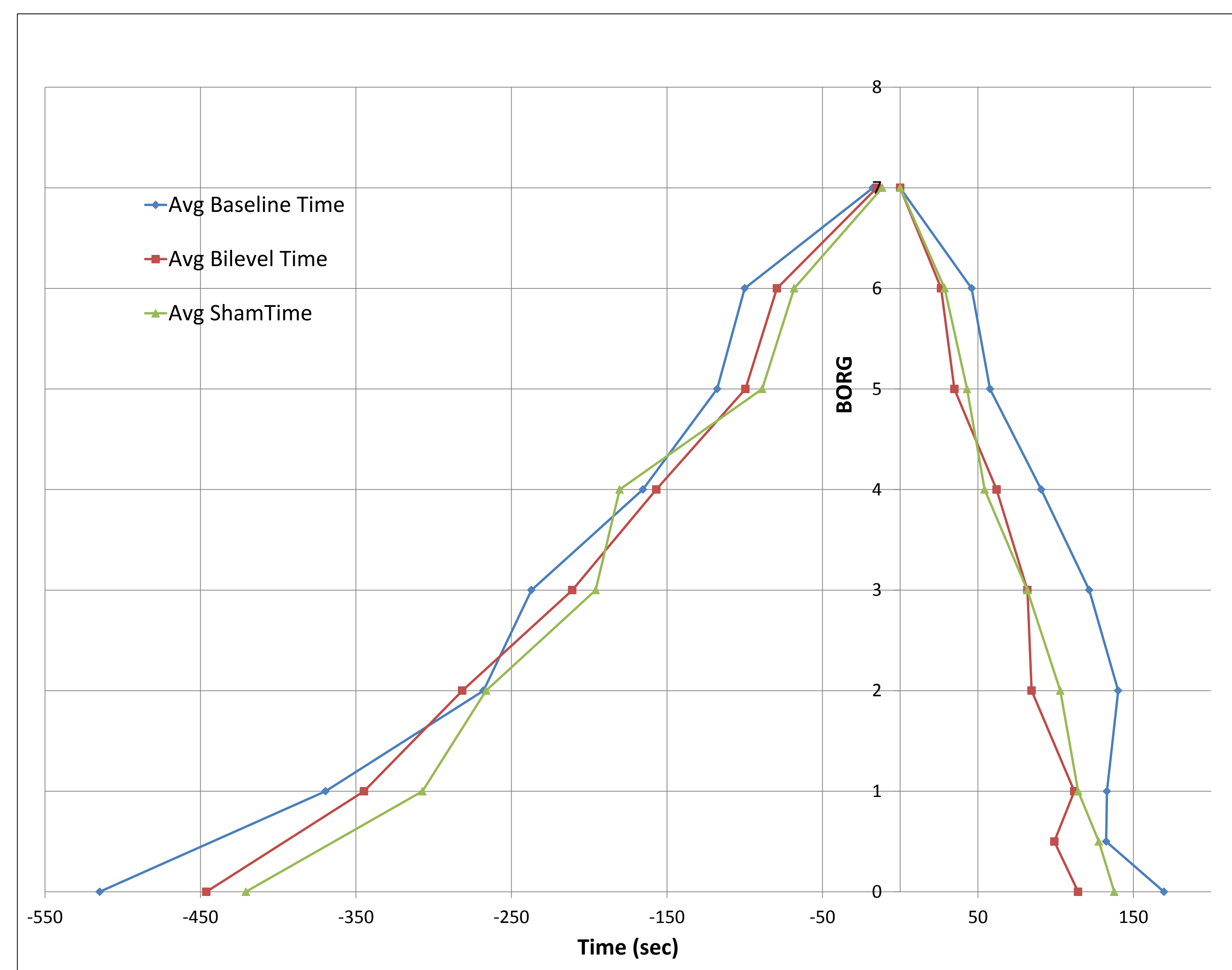


Table 1: % improvement in Average Therapy Recovery Time Vs Baseline – Across All subjects and Responders

	Baseline Time (sec)	Bilevel Time (sec)	Sham Time(sec)
(9 / 9) - Avg Time	176.67	113.11	131
Avg % Improvement		35.97	25.85
p. c/w Baseline		0.08	0.16
(7 / 9) - Avg Time	191	94.71	130.14
Avg % Improvement		50.41	31.86
p. c/w Baseline		0.02	0.14

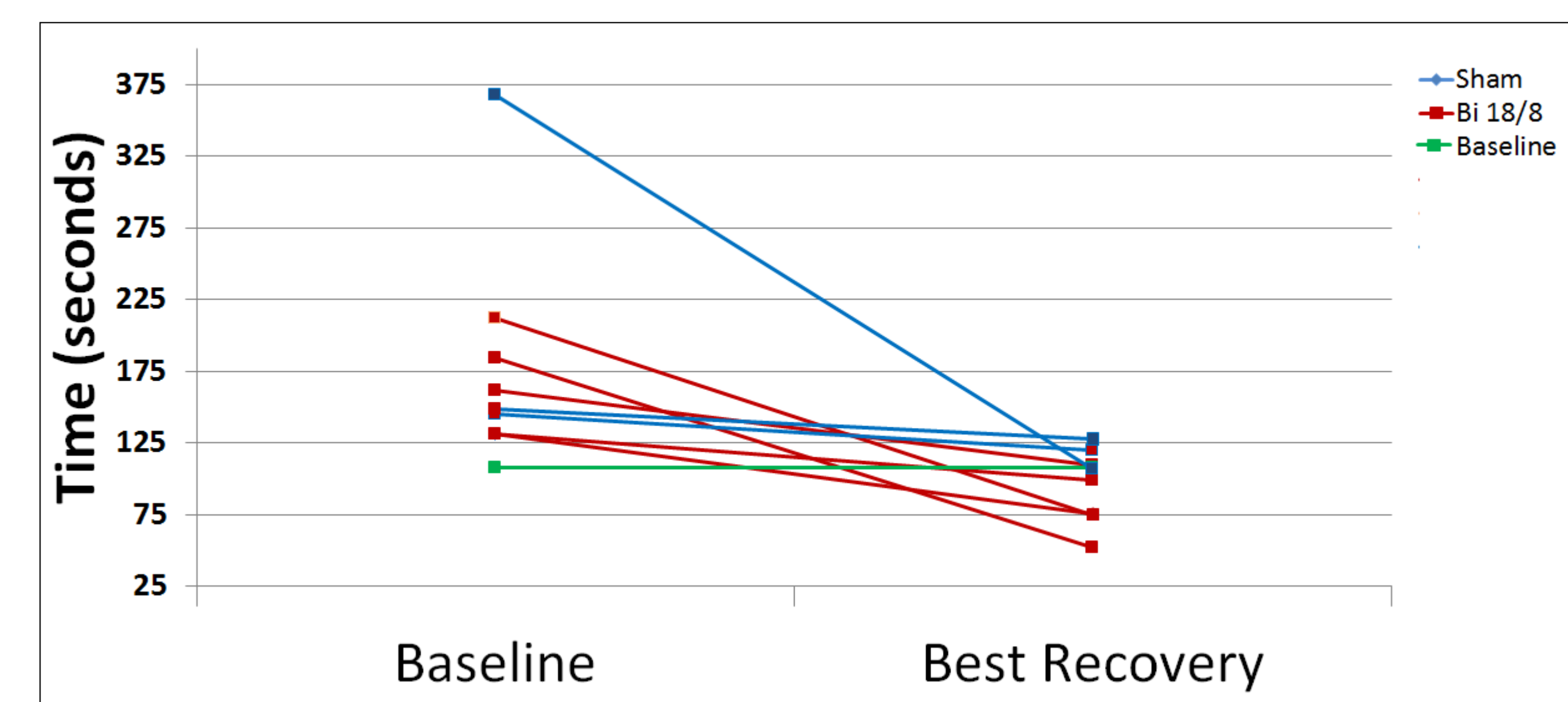


Figure 2: Baseline versus Best Recovery

- Dyspnea recovery time post-exercise was shorter with the PAP therapy compared to the sham treatment.
- In most subjects, PAP therapy showed the fastest recovery times with an average improvement in recovery time of 36% as compared to baseline, while the sham therapy showed an average improvement in recovery time of 25% as compared to baseline.
- Amongst the responders to therapy (7/9 – 78%), PAP therapy showed the fastest recovery times with an average improvement in recovery time of 50% as compared to baseline, while the sham therapy showed an average improvement in recovery time of 32% as compared to baseline.
- Since the recovery using the sham device was also shorter than baseline, it could indicate a psychological impact or a training phenomenon.

## Conclusions

- These preliminary findings suggest that PAP therapy in the post-exercise period results in a shorter time for dyspnea recovery to baseline. This may allow for more participation in higher-order activities of daily living.
- Research with a larger number of patients is warranted to understand the impact of possible placebo effect and training phenomenon in this population.

## References

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