

Dyspnea and its treatment with positive airway pressure during simulated activities of daily living in COPD Patients.

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Introduction

Activities of Daily Living (ADL) may be limited by exertional dyspnea in patients with advanced COPD. To obtain relief from episodes of dyspnea accompanying these ADL, patients may use bronchodilators or adjuncts such as pursed lip breathing. When symptoms are severe, the ADL may be abandoned altogether. In our study, we evaluated dyspnea and its treatment with Positive Airway Pressure (PAP) given by noninvasive ventilation in seventeen subjects during the Glittre ADL-test, a field test consisting of standardized ADL-like activities.

Methods

- 17 clinically stable COPD patients with an FEV1 < 55% provided consent and were evaluated across 3 sites.
- During the Glittre ADL-test [1], Subjects were instructed to stand up from a chair, walk 5 m, ascend and descend a 2-step rise, then walk another 5 m to a shelf. The shelves were positioned at shoulder and waist height. The participant moved 3 bottles of water (22 Once Bottles), each weighing 1 kg, from the upper to the lower shelf and then to the floor;

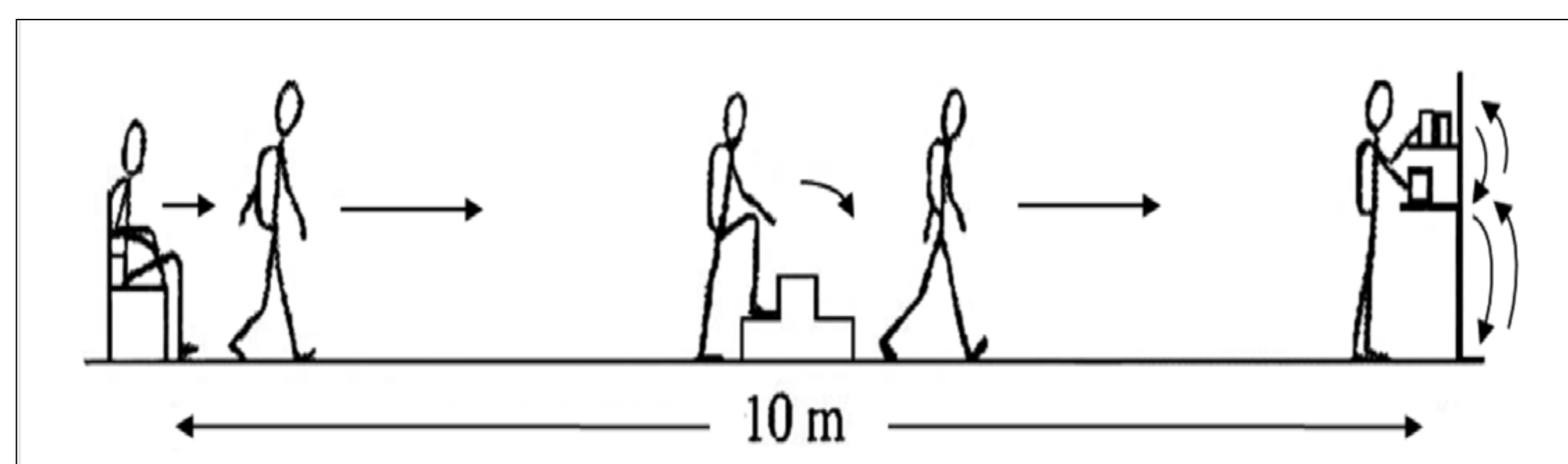


Figure 1: Glittre Test-ADL

- The sequence is then reversed such that each bottle is returned to the middle and top shelf. The subjects then proceeded back up and down the stairs to the starting position. This task cycle constituted one lap;
- At that time the participant sat down and then immediately stood up to begin the next lap. The test ended when the participant completed 5 laps. Participants were told to perform the test as quickly as possible. Rests were allowed but participants were told to resume activity as soon as possible.

- During the test, participants were asked to wear a backpack filled with a 2.5 kg (women) or 5 kg (men) weight. The 2.5 kg weight simulates the weight of a supplemental oxygen unit, which can be exchanged for the weight when appropriate. This allows for the addition of oxygen for some patients without affecting the integrity of the test.
- Each patient underwent 3 iterations of the Glittre ADL-test in a random order.
 - Baseline – No Intervention
 - Intervention 1 – PAP therapy after completion of Glittre ADL- test.
 - Intervention 2 – PAP therapy available as needed during the Glittre ADL-test and required during recovery.
- Borg scores were assessed before, during and after each Glittre ADL-test: prior to start, every lap during the test and every 30 seconds during the recovery phase [2, 4].
- Subjects' SpO2 and Heart rate were monitored at all time. All subjects were given Bronchodilator 15 minutes prior to starting the test.
- Analysis of the total time needed to complete the Glittre ADL-test and the time to recovery back to their baseline Borg after the test was conducted using paired t-tests.

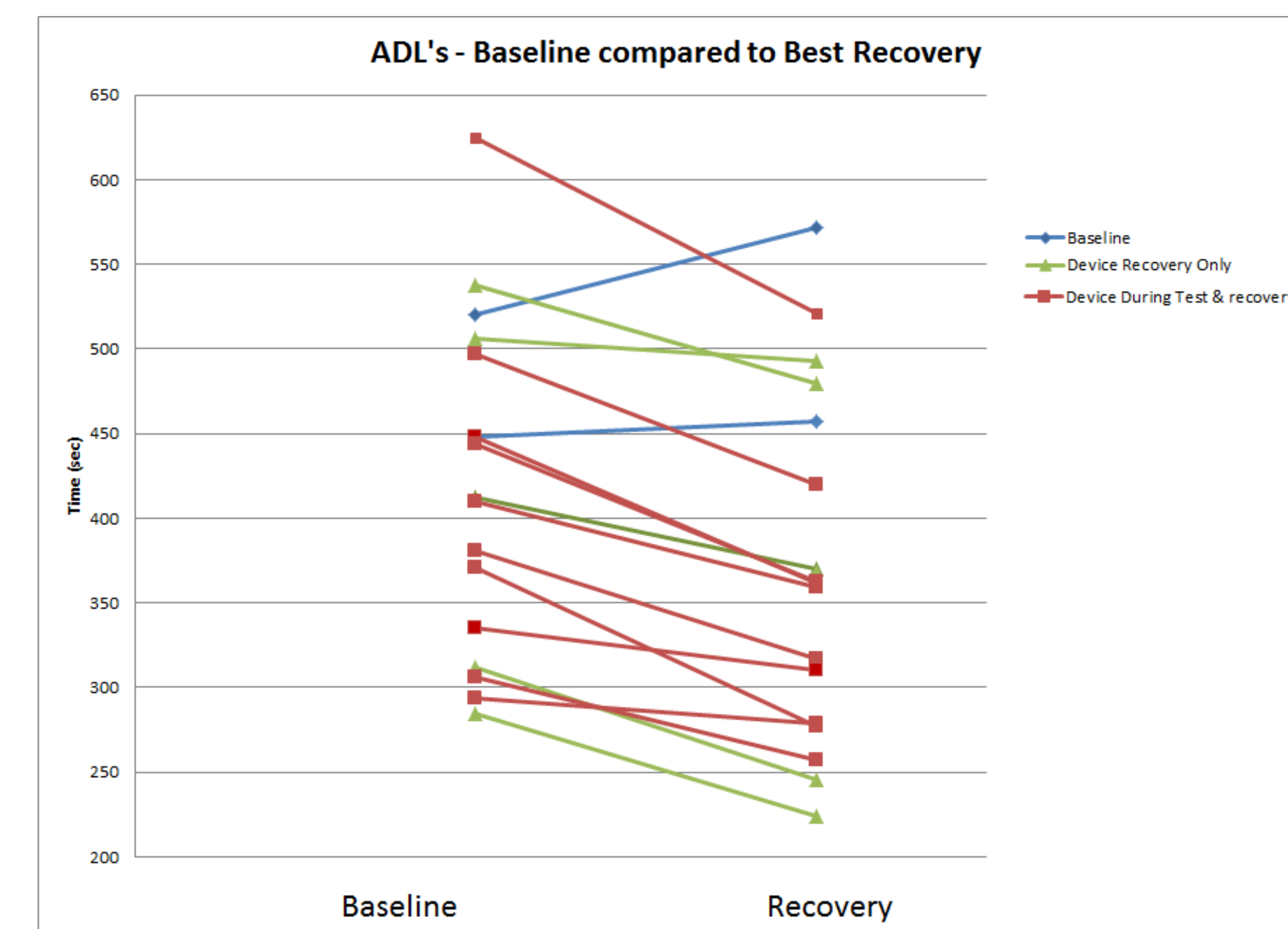


Figure 2: Baseline Vs Best Recovery Time

- Compared with baseline dyspnea recovery time, 15 of the 17 (88%) patients using PAP during recovery had a faster dyspnea recovery time; the mean reduction was 8%. (Figure 2).
- 10 of the 17 subjects (59%) elected to use intermittent PAP during the ADL test (Table 2). Compared with baseline, these patients had a 16% shorter time in completing the Glittre ADL-test test and reached an overall lower BORG after the ADL test.

Results

(17/17)	Baseline Time (sec)	Device-Recovery Only Time (sec)	Device- During test and Recovery Time (sec)
Avg time	420	387	375
% faster		8%	11%
p. c/w Baseline		0.001	0.0006
Avg Borg (Max)	6	5	5
p. c/w Baseline		0.65	0.43
(10/17)	Baseline	Device recovery	Device during test and recovery
Avg time	443	399	377
% faster		10%	15%
p. c/w Baseline		0.00012	0.00004
Avg Borg (Max)	6	6	5
p. c/w Baseline		0.78	0.04

* 10 (of 17) patients elected to use PAP during ADL exercise

Table 1: Patients using PAP during exercise and Recovery

Conclusion

- Our results from this small sample of COPD patients suggest that PAP during and/or after performing ADL-like activities decreases the maximal level of dyspnea experienced during ADL, may reduce the time it takes to perform a standardized set of ADL, and shortens the dyspnea-recovery time following ADL.
- Further studies with larger numbers of subjects are warranted.

References

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