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**Title:** Automatic tailoring of positive end-expiratory pressure (PEEP) by forced oscillation technique (FOT) during non-invasive ventilation: Effects of posture and exertion in COPD

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**Body:** Expiratory Flow Limitation (EFL) promotes the development of intrinsic PEEP (PEEPi). EFL can be detected by FOT at 5 Hz from the difference between inspiratory and expiratory reactance ( $\Delta Xrs$ ) during quiet breathing (ERJ 2004;23:232) and CPAP (ERJ 2006;27: 983). This non-invasive measurement has been incorporated in a mechanical ventilator (Synchrony, Philips/Respironics, USA) resulting in a prototype that continuously measures  $\Delta Xrs$  and automatically adjusts PEEP to the minimum pressure able to abolish EFL (PEEPopt). The aim of this study was to measure PEEPopt in a group of COPD patients and to evaluate its alterations with changes in posture and during a six minute walking test (6MWT). Eleven COPD patients (GOLD stage 2-4, BMI  $30 \pm 10$ , FEV1%pred  $48 \pm 12$ , FEV1/FVC  $56 \pm 8$ ) were initiated to nasal BiPAP with automatic PEEP adjustment. After adaptation, ventilation was applied for 10 minutes in the seated and supine positions and during a 6MWT. Data were recorded in the last minute for each condition. At PEEP=2cmH<sub>2</sub>O, 8 patients showed EFL in the seated position, 10 in the supine and 9 in the last minute of the 6MWT. The average PEEPopt is reported in figure.

In mild to severe COPD, the development of EFL is greatly affected by posture and exertion and this results in major adjustments in the PEEP required to counteract PEEPi within the same patient.