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**Title:** Tidal breathing flow-volume curves with impedance pneumography during expiratory loading

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**Body:** Introduction: Diagnosis of asthma in the preschool children is difficult due to the lack of objective lung function tests suitable for this age group. Impedance pneumography (IP) is a mode of measurement that could enable ambulatory 24h recording of tidal flow indices. IP can provide accurate flow signal in freely breathing subjects (Seppä et al. Eur Respir J. 2011;38(55 Suppl):219s), but tidal breathing flow-volume curves (TBFVC) or difficult respiratory conditions have not been demonstrated. Objectives: To induce changes in breathing control and mechanics and study the ability of IP to reproduce the TBFVC and track its changes under difficult conditions. Methods: TBFVCs were obtained from 17 lung-healthy subjects simultaneously with a direct mouth pneumotachograph (PNT) and IP during free breathing and expiratory loading (15 cmH<sub>2</sub>O.l/s). The TBFVC were normalized in flow and volume and the largest distance between the PNT and IP curves was found for each subject as  $d_{max}$ . Results: The agreement of PNT and IP normalized TBFVCs was found excellent having  $d_{max}$  of 7.2 %±3.1 % and 7.3%±4.2 % during free and loaded breathing, respectively. Intense expiratory loading did not degrade the agreement.

**Conclusion:** We conclude that by using correct electrode placement and proper cardiac filtering, IP was able to accurately reproduce and track changes in normalized TBFVCs under free and loaded respiration in healthy subjects.