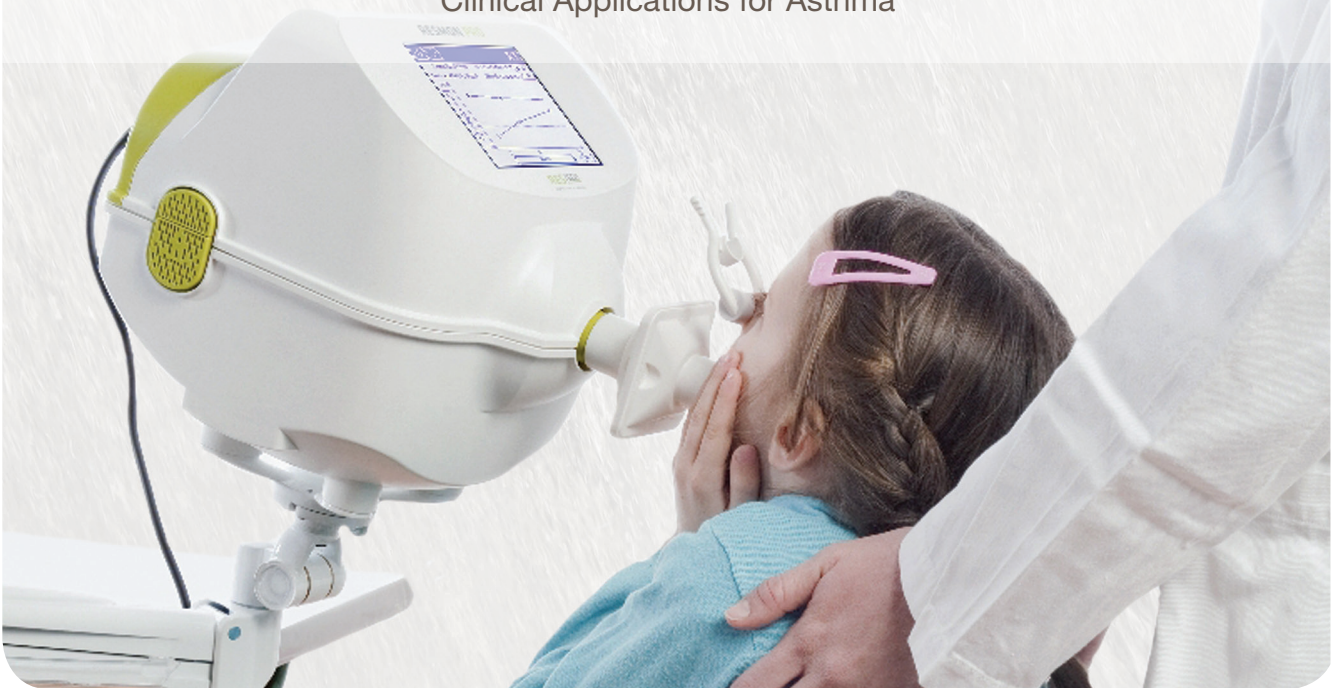




Resmon™ Pro

Clinical Applications for Asthma



THE CLINICAL APPLICATIONS OF THE UNIQUE FOT SYSTEM, RESMON PRO, FEATURING AN EXCLUSIVE “WITHIN-BREATH” FORCED OSCILLATION TECHNIQUE

THE CLINICAL ISSUES

- Pediatrics: Forced Flow Volume loops are difficult and time consuming for children to perform.
“spirometry is not an easy test to perform because the forceful expiratory and inspiratory manoeuvres require good patient co-operation. Children aged <5 years, elderly people and those with physical and cognitive limitations cannot perform spirometry easily.”

REFERENCE: Brashier et al., Measuring lung function using sound waves: role of the forced oscillation technique and impulse oscillometry system, *Breathe (Sheff)*. 2015 Mar; 11(1): 57–65.

- Pre-Post bronchodilator testing and Bronchochallenge bronchoconstrictor testing with forced flow-volume loops maneuvers and body plethysmography are very difficult to perform by most patients.
“The functional assessment of small airways is a challenging matter, given that the distal lung is relatively inaccessible for measurements. The ability of spirometry parameters to discriminate small airway obstruction is still debated.”

REFERENCE: Burgell. The role of small airways in obstructive airways disease. *Eur Respir Rev*. 2011, 20:23-33.

- DEEP INHALATION EFFECT: It has been demonstrated and referenced over the last years that the Deep Inhalation has bronchoconstrictor or bronchodilator EFFECT in COPD and Asthma patient, adults and pediatrics.
“The deep inspiration that precedes forced expiration may modify airway smooth muscle tone, and, therefore, may influence the result of the BHR test. FOT has the considerable advantage that it measures airway properties during quiet breathing.”

REFERENCE: Oostveen et al. The forced oscillation technique in clinical practice: methodology, recommendations and future developments. *Eur Respir J* 2013, 22(6), 1026–1041.

FOT CLINICAL SOLUTIONS:

- *"Forced oscillation procedures and interrupter resistance (Rint) to measure airways resistance can be applied in children as young as 3 years of age."*

REFERENCE: Burgell. The role of small airways in obstructive airways disease. Eur Respir Rev. 2011, 20:23-33.

- *"In contrast to standard PFT requiring maximal coordinated efforts, FOT requires only normal quiet breathing with the lips tightly closed to avoid airflow leak, and the wearing of a nose-clip. For this reason, children can be easily studied, often as early as 3 yrs. Similarly, elderly subjects, those with severe airflow obstruction or those with neuromuscular disease who find maximal forced respiratory efforts difficult to perform are able to breathe normally for FOT testing. Portability of commercial FOT instruments permits lung function testing at the bedside or, for occupational lung disease studies, at the place of work"*
- *".. as a matter of practical convenience, FOT is more readily utilized in the clinical pulmonary function laboratory than body plethysmography."*

REFERENCE: Goldman et al - Forced oscillation technique and impulse oscillometry - Eur Respir Mon 2005;31:72- 105.

- *"The main advantage of this simple, noninvasive and sensitive technique is that it does not require forced maneuvers, which may affect bronchial tone."*

REFERENCE: Oostveen, et al. The forced oscillation technique in clinical practice: methodology, recommendations and future developments. Eur Respir J 2003, 22(6), 1026-104.

- *"FOT assessment of response to bronchodilators was found to be in agreement with FEV1 and airway resistance by plethysmography"*

REFERENCE: Official American Thoracic Society/European Respiratory Society Statement: Pulmonary Function Testing in Preschool Children, 2007.

- *"FOT has been reported to show greater sensitivity to inhaled corticosteroid or beta-agonist inhalation than spirometry. Both inhaled corticosteroids and b-agonists improve small airways function, and FOT responses manifest prominent changes in indices of peripheral airway obstruction. In contrast, spirometric sensitivity to small airways function is less prominent. "*
- *"Such use of FOT provides a clinically valuable monitoring tool to follow therapeutic changes in small airways function over time. This use of FOT for therapeutic monitoring is not dependent on the use of FOT as an initial diagnostic evaluation."*

REFERENCE: Goldman et al - Forced oscillation technique and impulse oscillometry - Eur Respir Mon 2005;31:72- 105.

- *"During methacholine challenge testing, changes in oscillometry variables precede and are more sensitive than spirometry variables for the detection of bronchoconstriction"*

REFERENCE: Kaminsky DA . What does airway resistance tell us about lung function? Respir Care . 2012 ; 57 (1): 85 – 96.

- *"Rrs at 5 or 6 Hz was reported to differentiate healthy from asthmatic airway response to a free run challenge"*

REFERENCE: An Official American Thoracic Society/European Respiratory Society Statement: Pulmonary Function Testing in Preschool Children, 2007.

- *"On the other hand, the forced oscillation technique has been successfully used as a measure of the airway resistance heterogeneity and gas trapping, giving comparable results to the multiple breath nitrogen wash-out [17]."*

REFERENCE: Alfieri et al. Small airway dysfunction is associated to excessive bronchoconstriction in asthmatic patients Respiratory Research 2014, 15:86.

- *"The increase in reactance (Xrs5) after methacholine correlated independently with the increase in both ventilation heterogeneity in the most peripheral lung zone, represented by Sacin, and airway closure (FVC)."*

REFERENCE: Downie S et al., Effect of methacholine on peripheral lung mechanics and ventilation heterogeneity in asthma. J Appl Physiol 2013 - 114: 770-777.

- *"More recently, the within-breath analysis of Rrs and Xrs has been shown to help differentiate between asthma and COPD and also offer more useful information about the pathophysiology of asthma and COPD, which the spirometer does not."*

REFERENCE: Brashier et al., Measuring lung function using sound waves: role of the forced oscillation technique and impulse oscillometry system, Breathe March 2015.

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The Resmon Pro FOT system is not approved for clinical or diagnostic use in the U.S.A.