Resmon™ Pro

Clinical Applications for Pulmonary and Neurological Rehabilitation

Airways Clearance Assessment

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

THE CLINICAL ISSUES

PURPOSE OF RESPIRATORY PHYSIOTHERAPY:

- Reduce pulmonary resistance maintaining stable alveolar recruiting
- Improve and maintain adequate gas exchange
- Re-expand the collapsed pulmonary areas
- Improve respiratory function

- *"In spite of the widespread application of airways clearance techniques in respiratory rehabilitation, we could not identify, at this time, objective outcome measurements for these treatments."*

REFERENCE: AIPO congress (Italian Society of Pulmonology) 13 Oct 2015, Naples – Forced Oscillations and airways clearance techniques in patients with BPCO – Gigliotti et a.

- Most subjects undergoing pulmonary and neurological rehabilitation are unable to perform forced pulmonary function testing or body plethysmography, single or serial testing over time, to verify effect of rehabilitation or improvement of respiratory function.

THE BENEFITS OF PULMONARY REHABILITATION

- *"In acute state decreases recovery times."*

REFERENCE: Utilization of positive-pressure devices for breathing exercises in the hospital setting: a regional survey in Sao Paulo, Brazil. Fiore et al Respir Care 2010 Jun, 55(6) 719-724.

- *"In Chronic diseases slows the progression of the disease."*

REFERENCE: American Thoracic Society/European Respiratory Society Statement on Pulmonary Rehabilitation, Nov 2006.

FOT CLINICAL SOLUTIONS:

- *"Our results show a significant (in % of predicted value) reduction of resistance (p< 0.003) and a significant increase of reactance (p<0.002), at 5 Hz."*

NOTE: Reactance, at 5Hz, X5, is indicative and quantifies alveolar recruiting and opening of small airways, collapsed pulmonary areas.

- *"Our results show a significant relationship between the reduction of the sense of obstruction/dyspnea, reduction of resistance (p<0.0001) and increase in reactance (p<0.0001)."*
- *"FOT can underline the physiological effects of airways clearance techniques, indicating a modification at the small airways level."*

REFERENCE: AIPO congress (Italian Society of Pulmonology) 13 Oct 2015, Naples – Forced Oscillations and airways clearance techniques in patients with BPCO – Gigliotti et a.

- *"This study indicates that reactance and flow limitation improve early in the recovery phase of a COPD exacerbation in those who have flow-limited breathing, whereas resistance and spirometry do not change."*
- *"..patients with flow-limited breathing on admission (EFL index values greater than 2.8 cmH2O s L-1), improvement in EFL index values was a significant determinant of improved dyspnea during recovery in hospital."*

REFERENCE: Farah CS. et al 'Expiratory Flow Limitation Relates to Symptoms during COPD Exacerbations Requiring Hospital Admission.', Int J Chron Obstruct Pulmon Dis, 10 (2015), 939–945.

- *"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." …. "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."*

REFERENCE: ERS Lung Function Testing, 2005, Chapter 5 - Forced oscillation technique and impulse oscillometry - Goldman et al.

- *"In agreement with a study by Dellacá et al. , the reactance values decreased following bronchodilator use in the COPD patients; the reduction of Xrs was proportional to the increase in bronchial obstruction (fig. 1 e–h). Such changes occur mainly at the lower frequencies."*

REFERENCE: Gerusa Maritimo da Costa et al, 'Respiratory Impedance and Response to Salbutamol in Healthy Individuals and Patients with COPD', Respiration, 88 (2014), 101–111.

- *"As forced oscillation technique is automatic and can measure multiple breaths over long periods, it is suitable for monitoring expiratory flow limitation continuously and identifying patients breathing close to the onset of expiratory flow limitation, where intermittent sampling may be unrepresentative."*
- *"The within-breath change in reactance (D Xrs) measured by forced oscillation technique (FOT) at 5 Hz reliably detects expiratory flow limitation in chronic obstructive pulmonary disease (COPD)."*

REFERENCE: Calverley et al - Expiratory flow limitation detected by forced oscillation and negative expiratory pressure - Eur Respir J 2007; 29: 363–374.

- *"Forced oscillometry may be particularly appropriate for the objective physiological assessment of patients with an exacerbation of COPD. It is a passive manoeuvre that requires only tidal breathing, and is easily performed by breathless subjects."*
- *"Changes in Xrs,insp and Xrs,exp were easily detected during an exacerbation in subjects with COPD, were widely associated with changes in symptom and HRQOL scores and could represent useful objective measurements for documenting recovery."*

REFERENCE: MK Johnson et al 'Measurement of Physiological Recovery from Exacerbation of Chronic Obstructive Pulmonary Disease Using within-Breath Forced Oscillometry.', Thorax, 62 (2007), 299–306.

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