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LITERATURE, PUBLICATIONS SUMMARY

June 2020



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PUBLICATIONS, PRESENTATIONS, POSTERS, BIBLIOGRAPHY

FOR RESMON PRO FULL
and DIARY

Annika W. M. Goorsenberg, Julia N. S.D' Hooghe Annelies M. Slats, Joost G. van den Aardweg, Jouke T. Annema and Peter I. Bonta

RESISTANCE OF THE RESPIRATORY SYSTEM MEASURED WITH FORCED OSCILLATION TECHNIQUE (FOT) CORRELATES WITH BRONCHIAL THERMOPLASTY RESPONSE

Respiratory Research (2020) 21:52 <https://doi.org/10.1186/s12931-020-1313-6>

Samriti Gupta & Sushil K. Kabra

INDIGENOUS REGRESSION EQUATIONS FOR FORCED OSCILLATION TECHNIQUE– A MUCH NEEDED AFFAIR

Indian Journal of Pediatrics, 2020 - <https://doi.org/10.1007/s12098-020-03194-2>

Sajal De, Nalok Banerjee, Gagan Deep Singh Kushwah, Dharmendra Dharwey

REGRESSION EQUATIONS OF RESPIRATORY IMPEDANCE OF INDIAN ADULTS MEASURED BY FORCED OSCILLATION TECHNIQUE

Lung India – 2020, Vol 37, Issue 1, Page 30-36

Liwia Starczewska-Dymek, Andrzej Bozek, and M. Mielnik

THE SENSITIVITY AND SPECIFICITY OF THE FORCED OSCILLATION TECHNIQUE IN THE DIAGNOSIS OF BRONCHOCONSTRICTION IN CHILDREN

Journal of Asthma 2019 - <https://doi.org/10.1080/02770903.2019.1702054>

Ilaria Milesi, Roberto Porta, Luca Barbano, Simona Cacciatorea, Michele Vitacca ,Raffaele L. Dellacà,

AUTOMATIC TAILORING OF THE LOWEST PEEP TO ABOLISH TIDAL EXPIRATORY FLOW LIMITATION IN SEATED AND SUPINE COPD PATIENTS

Respiratory Medicine 2019 - 155 (2019) 13–18

Sajal De, Nalok Banerjee & R. R. Tiwari

REGRESSION EQUATIONS OF RESPIRATORY IMPEDANCE MEASURED BY FORCED OSCILLATION TECHNIQUE FOR INDIAN CHILDREN

Indian Journal of Pediatrics, 2019 - <https://doi.org/10.1007/s12098-019-03116-x>

BTS congress 2019

PIGEON FANCIERS WITH NORMAL SPIROMETRY AND NO KNOWN ILD, DISPLAY FORCED OSCILLOMETRY FINDINGS SUGGESTIVE OF SUB-CLINICAL INTERSTITIAL LUNG DISEASE

M Spears, W Henderson, S Dickson, E Johnson, SJ Bourk- e, B Goptu, R Allen, LV Wain, C McSharry

Thorax, Volume 74, Issue Suppl 2 - <http://dx.doi.org/10.1136/thorax-2019-BTSabstracts2019.89>

Sajal De

LONG-TERM AMBIENT AIR POLLUTION EXPOSURE AND RESPIRATORY IMPEDANCE IN CHILDREN: A CROSS-SECTIONAL STUDY

Respiratory Medicine 2019 – Published October 01, 2019 DOI: <https://doi.org/10.1016/j.rmed.2019.09.015>

Ronald J. Dandurand, Jean-Pierre Lavoie, Larry C. Lands, Zoltán Hantos and the Oscillometry Harmonisation Study Group

COMPARISON OF OSCILLOMETRY DEVICES USING ACTIVE MECHANICAL TEST LOADS

ERJ Open Research 2019 5: 00160-2019; DOI: 10.1183/23120541.00160-2019

ERS 2019 Thematic Poster Presentation (4810) : **ASSOCIATION BETWEEN LONGITUDINAL CHANGES IN RESPIRATORY SYMPTOMS AND LUNG MECHANICS IN COPD**

E Zannin, P Walker, P Pompilio, P Calverley, R Dellacà

European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (701) : **THE ROLE OF R5-19 IN ASSESSING PERIPHERAL AIRWAY OBSTRUCTION**

R Ong-Salvador, E Dijkers, R Van Steenwijk

European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (4863) : **ASSESSMENT OF EXPIRATORY VS INSPIRATORY RESISTANCE AND REACTANCE USING FOT AS A MEASURE OF AIR TRAPPING**

A Nasr, L Jarenbäck, L Bjermer, E Tufvesson

European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (4863) : **TEMPORAL VARIABILITY OF FORCED OSCILLOMETRY FROM HOME TELEMONITORING AND RELATIONSHIP WITH PATIENT-CENTRED OUTCOMES AND AECOPD**

S Zimmermann, J Huvanandana, C Nguyen, A Gobbi, C Farah, M Peters, R Dellaca, G King, C Thamrin

European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (4517) : **FOT AND IOS IOS DEPICT LONGER DURATION OF DISEASE IN CHILDREN WITH SICKLE CELL DISEASE (SCD) WHILE N2MBW PROVIDES NEW INSIGHT ON RESPIRATORY PATTERN**

F Lucca, M Piazza, L Tenero, E Bonetti, S Cesaro, G Piacentini
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (2666) : **CHARACTERIZATION OF ASYMPTOMATIC SUBJECTS WITH EXERCISE-INDUCED BRONCHOCONSTRICTION (EIB)**

H Johansson, K Alving, M Emtner, C Janson, L Nordang, P Pio Pompilio, A Malinovski
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (223) : **SHORT TERM INTRA-INDIVIDUAL VARIABILITY OF RESPIRATORY RESISTANCE MEASURED BY FORCED OSCILLATION TECHNIQUE IN HEALTHY ADULTS AND ADULTS WITH OBSTRUCTIVE AIRWAY DISEASES**

S De, N Banerjee, G D S Kushwah, D Dharwey
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (3880) : **FORCED OSCILLATION TECHNIQUE MEASURING PERIPHERAL AIRWAY INVOLVEMENT DURING MANNITOL CHALLENGE**

A Nasr, K Romberg, U Nihlen, L Karlsson, E Tufvesson, L Bjermer, L Jarenbäck
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (4063) : **FORCED OSCILLATION TECHNIQUE (FOT) IN THE EVALUATION OF COPD PATIENTS ENROLLED IN PULMONARY REHABILITATION (PR)**

I Romagnoli, B Lanini, E Chellini, C Mannini, B Binazzi, E Vulpio, F Gandi, F Gigliotti
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

ERS 2019 Thematic Poster Presentation (4946) : **NEURAL RESPIRATORY DRIVE AND AIRWAY RESISTANCE IN OBSTRUCTIVE SLEEP APNOEA**

E I Schwarz, B He, M Al-Sherif, M Kohler, J Steier
European Respiratory congress 2019, Madrid, 28 Sept – 2 Oct 2019

Emanuela Zannin, Biswajit Chakrabarti, Leonardo Govoni, Pasquale P. Pompilio, Robert Romano, Peter M.A. Calverley and Raffaele L. Dellaca'

DETECTION OF EXPIRATORY FLOW LIMITATION BY FORCED OSCILLATIONS DURING NON-INVASIVE VENTILATION

AJRCCM Articles in Press. Published on 26-June-2019 as 10.1164/rccm.201903-0570LE

EAACI 2019 and ALLERGY 2019 : Poster presentation and Letter to the editor :

FORCED OSCILLATION TECHNIQUE AS USEFUL METHOD TO MONITOR THE EFFICACY OF MEPOLIZUMAB IN TREATING SEVERE EOSINOPHILIC ASTHMA

Tontini C., Marchionni A., Gobbi A., Gallifuoco M., Lucchetti B., Garritani M. S., Bilò M. B., Antonicelli L.

EAACI (European Academy of Allergy and Clinical Immunology), Lisbon, Portugal 1-5 June 2019 and <https://doi.org/10.1111/all.13938> and published in ALLERGY June 2019

<https://doi.org/10.1111/all.13938>

Liwia Starczewska Dymek, Andrzej Bozek, and Tomasz Dymek

APPLICATION OF THE FORCED OSCILLATION TECHNIQUE IN DIAGNOSING AND MONITORING OF BRONCHIAL ASTHMA IN PRESCHOOL CHILDREN

Adv. Resp. Med 2019; 87: 25-35

Sabine C. Zimmermann, Katrina O. Tonga and Cindy Thamrin

DISMANTLING AIRWAY DISEASE WITH THE USE OF NEW PULMONARY FUNCTION INDICES

Eur Respir Rev 2019; 28: 180122

Alessandro Gobbi, Carlo Gulotta, Béla Suki, Enrico Mellano, Riccardo Pellegrino, Vito Brusasco, Raffaele L. Dellacà

MONITORING OF RESPIRATORY RESISTANCE IN THE DIAGNOSIS OF MILD-INTERMITTENT ASTHMA

Clin Exp Allergy. 2019;00:1–3. <https://doi.org/10.1111/cea.13376>

Chris Campbell (Senior Editor, Respiratory Therapy)

SYMPOSIUM EXAMINES OF NON INVASIVE SCREENING OF EXPIRATORY FLOW LIMITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASES

Summary review of the supplement on : " European Respiratory & Pulmonary Diseases SUPPLEMENT, 5 Sept 2018 by Peter Calverley and Raffaele Dellaca
Respiratory Therapy, Vol 14, N.1 – Winter 2019

SIMRI 2018 (Italian society of pediatric respiratory medicine), : Poster and Oral Presentation –
FORCED OSCILLATION TECHNIQUE (FOT) TO EVALUATE EXERCISE INDUCED ASTHMA IN CHILDREN

Marta Florile, Michele Piazza, Laura Tenero, Marco Zaffanello, and Giorgio Piacentini
SIMRI 2018 – 27-29 September 2018, Pisa, Italy

Chris Campbell (Senior Editor, Respiratory Therapy)

THE BENEFITS OF FORCED OSCILLATION TECHNIQUE (FOT) AS A TOOL FOR ASTHMA DIAGNOSIS

Summary review of the publication : “ C. Heijkenskjöld Rentzhog, C. Janson, L. Berglund, M. P. Borres, L. Nordvall, K. Alving and A. Malinoschi

OVERALL AND PERIPHERAL LUNG FUNCTION ASSESSMENT BY SPIROMETRY AND FORCED OSCILLATION TECHNIQUE IN RELATION TO ASTHMA DIAGNOSIS AND CONTROL - Clin Exp

Allergy. 2017;47:1546–1554

Respiratory Therapy, Vol 13, N.4 – Fall 2018

Peter Calverley and Raffaele Dellaca

NON INVASIVE SCREENING OF EXPIRATORY FLOW LIMITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASES

ERCA-JIVD 3rd Joint International Meeting, Lyon, France, March 2018

European Respiratory & Pulmonary Diseases SUPPLEMENT, publication date : 5 Sept 2018

ERS 2018 Thematic Poster Presentation (1015) : **PILOT DATA OF THE SHORT-TERM EFFECTS OF E-CIGARETTE VAPING ON LUNG FUNCTION**

J Stockley, E Sapey, S Gompertz, R Edgar, B Cooper

European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Poster Discussion (1669) : **COMPARISON BETWEEN IMPULSE OSCILLOMETRY AND RESMON PRO AND THE USE OF INSPIRATORY PARAMETERS**

L Jarenbäck, L Bjermer, E Tufvesson

European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Thematic Poster Presentation (2718) : **COMPARISON OF BRONCHODILATOR RESPONSIVENESS BETWEEN FORCED OSCILLATION TECHNIQUE AND SPIROMETRY**

E Lauhkonen, S Sivagnanasithiyar, G Kaltsakas, R Iles

European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Thematic Poster Presentation (2210) : **INFLUENCE OF AN ULTRAENDURANCE EVENT ON LUNG HEALTH**

C Wheatley, G Stewart, C Fermoyle, B Ziegler, B Johnson
European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Thematic Poster Presentation (4169) : **LONGITUDINAL ASSESSMENT OF LUNG FUNCTION IN PATIENTS WITH PECTUS EXCAVATUM (PE)**

D Trachsel, E Zannin, R Dellacà, F M Haecker, T De Trey
European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Thematic Poster Presentation (4300) : **THE EFFECT OF BRONCHIAL THERMOPLASTY ON LUNG FUNCTION IN SEVERE ASTHMA PATIENTS**

A W Goorsenberg, J N D'Hooghe, A M Slats, J G Van Den Aardweg, J T Annema, P I Bonta
European Respiratory congress 2018, Paris, 15-19 Sept 2018

ERS 2018 Thematic Poster Presentation (4711) : **CHANGE OF LUNG FUNCTION IN SEVERE EOSINOPHILIC ASTHMA UNDERGOING TREATMENT WITH ANTI-INTERLEUKIN-5 MONOCLONAL ANTIBODY**

L Antonicelli, A Gobbi, M B Bilò, M S Garritani, M F Brianzoni, R Dellacà
European Respiratory congress 2018, Paris, 15-19 Sept 2018

Paul P. Walker, Pasquale P. Pompilio, Paolo Zanaboni, Trine S Bergmo, Kaiu Prikk, Andrei Malinovsky, Josep M. Montserrat, Jo Middlemass, Silvana Šonc, Giulia Munaro,, Dorjan Marušič, Ruth Sepper, Roberto Rosso, A. Niroshan Siriwardena, Christer Janson, Ramon Farre', PhD, Peter M.A. Calverley and Raffaele L. Dellaca.

TELEMONITORING IN COPD: THE CHROMED STUDY, A RANDOMIZED CLINICAL TRIAL

* : Chromed is a clinical research study performed with the home measuring version "Diary" of the Resmon Pro

Am J Respir Crit Care Med 2018 – Vol 198, N.5, 620-628

Claudia Calogero, Grazia Fenu, Enrico Lombardi

MEASURING AIRWAYS OBSTRUCTION IN SEVERE ASTHMA IN CHILDREN

Frontieres in pediatrics, June 2018, vol 6, article 189

Liwia Starczewska Dymek, Andrzej Bozek, and Marek Jakalski

THE USEFULNESS OF THE FORCED OSCILLATION TECHNIQUE IN THE DIAGNOSIS OF BRONCHIAL ASTHMA IN CHILDREN

Canadian Respiratory Journal - [https:// www.hindawi.com/journals/crj/aip/7519592](https://www.hindawi.com/journals/crj/aip/7519592), June 26, 2018

Elliot Wallaert, Thierry Perez, Anne Prevotat, Gregory Reychler, Benoit Wallaert*, Olivier Le Rouzic
THE IMMEDIATE EFFECTS OF A SINGLE AUTOGENIC DRAINAGE SESSION ON VENTILATORY MECHANICS IN ADULT SUBJECTS WITH CYSTIC FIBROSIS

PLOS ONE - <https://doi.org/10.1371/journal.pone.0195154> March 29, 2018

ATS 2018 Poster Presentation: **FLUCTUATION OF CLINICAL AND MOLECULAR MARKERS IN HEALTHY AND ASTHMATIC SUBJECTS CHALLENGED WITH RHINOVIRUS**

A. Sinha, X.U. Binbin, E. D. Eckert, U. Frey, R. Chaleckis, C. Wheelock, R. Lutter, P. J. Sterk
American Thoracic Society congress, San Diego, CA, 19-23 May 2018

ARTP 2018 Oral Presentation : **THE SHORT-TERM EFFECTS OF E-CIGARETTE VAPING ON LUNG FUNCTION**

James.A. Stockley

ARTP – Association for Respiratory Technology and Physiologists, Brighton, UK, 25-26 Jan 2018

ARTP 2018 Poster Presentation: **THE FORCED OSCILLOMETRY TECHNIQUE IS NOT A USEFUL MARKER OF EARLY DISEASE IN ALPHA-1 ANTITRYPSIN DEFICIENCY**

J. A. Stockley, B.G. Cooper, R.A. Stockley, E. Sapey

ARTP – Association for Respiratory Technology and Physiologists, Brighton, UK, 25-26 Jan 2018

Or Kalchiem-Dekela, Stella E. Hinesa,

FORTY YEARS OF REFERENCE VALUES FOR RESPIRATORY SYSTEM IMPEDANCE IN ADULTS: 1977–2017

Respiratory Medicine 136 (2018) 37–47

Roberto “Roby” Perissin

REVIEW : CLINICAL AND TECHNICAL ADVANCES TO THE FORCED OSCILLATORY TECHNIQUE - A LONG ESTABLISHED TECHNIQUE WITH A NEW, NOVEL APPROACH.

Respiratory Therapy, Vol 13, N. 2, Spring 2018 – 28-30

Nicole Beydon, Claire Goaguen, Pascale Jacquemart, Valerie Le Bail, Helene Morsy, Isabelle Schmit, Francoise Vallee

COMPARAISON DE LA RÉSISTANCE RESPIRATOIRE DE L'ENFANT MESURÉE PAR LES TECHNIQUES DE L'INTERRUPTION ET DES OSCILLATION (COMPARISON OF RESPIRATORY RESISTANCE IN INFANTS MEASURED BY INTERRUPTION AND OSCILLATIONS)

CFP2A 2017 (Société Pédiatrique de Pneumologie et d'Allergologie Française), Paris 16-18 Nov 2017

Bernt Boegvald Aarli, Peter MACalverley, Robert LJensen, Raffaele Dellacà, Tomas MLEagan, Per SBakke, Jon AHardie
THE ASSOCIATION OF TIDAL EFL WITH EXERCISE PERFORMANCE, EXACERBATIONS, AND DEATH IN COPD
International Journal of COPD 2017:12 2179–2188

Bernt Boegvald Aarli, Peter MACalverley, Robert LJensen, Raffaele Dellacà, Tomas MLEagan, Per SBakke, Jon AHardie
THE ASSOCIATION OF TIDAL EFL WITH EXERCISE PERFORMANCE, EXACERBATIONS, AND DEATH IN COPD
International Journal of COPD 2017:12 2179–2188

C. Heijkenskjöld Rentzhog, C. Janson, L. Berglund, M. P. Borres, L. Nordvall, K. Alving and A. Malinoschi
OVERALL AND PERIPHERAL LUNG FUNCTION ASSESSMENT BY SPIROMETRY AND FORCED OSCILLATION TECHNIQUE IN RELATION TO ASTHMA DIAGNOSIS AND CONTROL
Clin Exp Allergy. 2017;47:1546–1554

Gobbi, A., Dellacà, R. L., King, G., & Thamrin, C.
TOWARD PREDICTING INDIVIDUAL RISK IN ASTHMA USING DAILY HOME MONITORING OF RESISTANCE
American journal of respiratory and critical care medicine, 195(2), 265-267.

ERS 2017 Poster Presentation: **IMPACT OF ENVIRONMENTAL EXPOSURE ON RESPIRATORY TRACT ON SCHOOL CHILDREN**
S. Levra, V. Bellisario, R. Tassinari, L. Maugeri, A. Gobbi, M. Bugiani, P. Piccioni, C. Gulotta, R. Bono
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Poster Presentation: **CHANGES IN FORCED OSCILLATION MECHANICS AND SYMPTOMS PRIOR TO COPD EXACERBATIONS DURING HOME TELEMONITORING**
Sabine C. Zimmermann, Chinh D. Nguyen, Alessandro Gobbi, Joanna C. Watts, Claude S. Farah, Raffaele L. Dellacà, Matthew J. Peters, Gregory G. King, Cindy Thamrin
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Oral Presentation: **COMPARISON BETWEEN WITHIN-TEST AND TRIPPLICATE RECORDINGS OF IMPEDANCE BY FORCED OSCILLATION, TECHNIQUE (FOT)**
Alessandro Gobbi, Claudia Calogero, Pasquale Pompilio, Grazia Fenu, Raffaele Dellacà, Enrico Lombardi
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Oral Presentation: **EFFECT OF DIFFERENT MASK DESIGN FOR MEASURING RESPIRATORY INPUT IMPEDANCE IN PRE-SCHOOL CHILDREN BY FORCED OSCILLATION TECHNIQUE (FOT)**

P. Pompilio, D. Caroline, A. Gobbi, R. Perissin, R. Dellacà, T. Carvelli
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Poster Presentation: **FEASIBILITY OF MEASURING LUNG FUNCTION WITH THE FORCED OSCILLATION TECHNIQUE IN AN EPIDEMIOLOGICAL STUDY.**

S Levra, P Piccioni, M Bugiani, S Pizzimenti, C Gulotta
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Poster Presentation: **FLUCTUATION DYNAMICS OF CLINICAL MARKERS IN ASTHMATIC AND HEALTHY SUBJECTS CHALLENGED WITH RHINOVIRUS**

A Sinha, X Binbin, V Leoni, E Delgado Eckert, U Frey, R Lutter, P J. Sterk
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Oral Presentation: **FORCED OSCILLATION TECHNIQUE: AN ALTERNATIVE OUTCOME MEASURE FOR METHACHOLINE PROVOCATION TEST**

R O Salvador¹, E Dijkers¹, P Sterk², R van Steenwijk²
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Poster Presentation: **FORCED OSCILLATION TECHNIQUE (FOT) VS SPIROMETRY FOR ASSESSING THE IMPACT OF ENVIRONMENTAL EXPOSURE IN CHILDREN.**

L Maugeri¹, S Levra¹, E Mellano¹, D Dassetto¹, P Piccioni², M Bugiani², R Dellacà³, C Gulotta¹
European Respiratory congress 2017, Milan, 9-13 Sept 2017

ERS 2017 Poster Presentation: **OSCILLOMETRY REFERENCE VALUES IN PRESCHOOL CHILDREN**

E. Lombardi, M. Bacciarini, G. Giannini, C. Calogero, A. Gobbi, R. Dellacà
European Respiratory congress 2017, Milan, 9-13 Sept 2017

Sabine C. Zimmermann, Joanna C. Watts, Amy Bertolin, Kanika Jetmalani, Gregory G. King, Cindy Thamrin (2017). **DISCREPANCY BETWEEN IN VIVO AND IN VITRO COMPARISONS OF FORCED OSCILLATION DEVICES.**

J Clin Monit Comput DOI 10.1007/s10877-017-0050-y.

ATS 2017 Poster Presentation: **Fluctuation Dynamics of Clinical Markers in Asthmatic and Healthy Subjects Challenged with Rhinovirus**

A Sinha, X Binbin, V Leoni, E Delgado Eckert, U Frey, R Lutter, P J. Sterk
American Thoracic Society congress, Washington, DC, 21-24 May 2017

Eleni Skylogianni , Konstantinos Douros, Michael B. Anthracopoulos, Sotirios Fouzas
THE FORCED OSCILLATION TECHNIQUE IN PAEDIATRIC CLINICAL PRACTICE
Paediatric Respiratory Reviews Volume 18, March 2016, Pages 46-51

ERS 2016 Poster Presentation: **FORCED OSCILLATION TECHNIQUE CAN HIGHLIGHT THE EFFECT OF AIRWAYS CLEARANCE IN COPD**

Isabella Romagnoli, E.M Romano, B. Lanini, B. Binazzi, E. Vulpio, A. Lazzeri, C. Castellani, F. Gigliotti
European Respiratory congress 2016, London 3-7 Sept 2016

ERS 2016 Poster Presentation: **CONTRIBUTION OF RESPIRATORY RESISTANCE VARIABILITY MEASURED BY FORCED OSCILLATORY TECHNIQUE (FOT) TO ASSESS THE LIKELIHOOD OF ASTHMA DIAGNOSIS**

L. Maugeri, A. Gobbi, E. Mellano, M. Guglielmo, S. Pizzimenti, G. Rolla, R. Dellaca'. C. Gulotta
European Respiratory congress 2016, London 3-7 Sept 2016

ERS 2016 Oral Presentation: **RANDOMIZED CONTROLLED TRIAL OF TELEMONITORING WITH ADDITION OF DAILY FORCED OSCILLATORY TECHNIQUE IN OLDER PEOPLE WITH COPD AND CO-MORBIDITY (THE CHROMED* STUDY)** * : Chromed is a clinical research study performed with the home measuring version "Diary" of the Resmon Pro

P. Pompilio, P. Zanaboni, T. Bergo, T Grzetic Romcevic, V. Isetta, C. Janson, A. Malinoschi, D. Marusic, J. Middlemass, J. Monserrat, G. Munaro, K. Prikk, R. Sepper, N. Siriwardena, P. Calverley, R. Dellaca', R. Rosso, PP. Walker
European Respiratory congress 2016, London 3-7 Sept 2016

ERS 2016 Poster Presentation: **DAY-TO-DAY VARIABILITY OF INSPIRATORY RESISTANCE : A SENSITIVE AND SPECIFIC MARKER OF ASTHMA**

A. Gobbi, C. Gulotta, B. Suki, E. Mellano, M. Vitacca, F. Colombo, R. Pellegrino, V. Brusasco, R. Dellaca'.
European Respiratory congress 2016, London 3-7 Sep 2016

ERS 2016 Poster Presentation: **EFFECTS OF POSTURE AND SLEEP IN RESPIRATORY MECHANICS DETECTED BY FORCED OSCILLATORY TECHNIQUE (FOT)**

E. Gatti, L. Maugeri, E. Mellano, R. Dellaca'. C. Gulotta
European Respiratory congress 2016, London 3-7 Sept 2016

ERS 2016 Poster Presentation: **SBW AND FOT IN HEALTHY AND ASTHMATICS PRE AND POST BRONCHIAL CHALLENGE**

C. Veneroni, A. Malinovski, A. Van Muylem, R. Dellaca', A. Michils

European Respiratory congress 2016, London 3-7 Sept 2016

ATS 2016 Poster Presentation: **INSPIRATORY AND EXPIRATORY IMPEDANCE REFERENCE VALUES IN**

6-11 YEAR OLD ITALIAN CHILDREN

Enrico Lombardi, Giulia Abbati, Giulia Biadene, Raffaele L. Dellaca, Alessandro Gobbi, Grazia Fenu, Claudia Calogero. Am J Respir Crit Care Med 193;2016:A4504

ATS 2016 Poster Presentation: **NO EFFECT OF THE MEASUREMENT DURATION ON THE WITHIN-SESSION RE-PEATABILITY OF RESPIRATORY IMPEDANCE IN ADULTS**

Ellie Oostveen, Karla Leemans, Wilfried De Backer, Kevin De Soomer. Am J Respir Crit Care Med 193;2016:A6355

ATS 2016 Poster Presentation: **SUCCESSFULLY MANAGING A POTENTIALLY NEAR FATAL ASTHMA BY HOME MONITORING - A CASE REPORT**

Laura Maugeri, Alessandro Gobbi, Enrico Mellano, Emiliano Gatti, Raffaele L. Dellaca, Carlo Gulotta. Am J Respir Crit Care Med 193;2016:A3593

ATS 2016 Oral Presentation: **BREATH-TO-BREATH AND DAY-TO-DAY VARIABILITY OF RESPIRATORY IMPEDANCE IN ASTHMA PATIENTS**

Chinh D. Nguyen, Alessandro Gobbi, Raffaele L. Dellaca, Gregory G. King, Cindy Thamrin
Am J Respir Crit Care Med 193;2016:A4592

ATS 2016 Poster Presentation: **EXPIRATORY FLOW LIMITATION IS RELATED TO SYMPTOMS AND PREDICTS OUTCOMES OF PULMONARY REHABILITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

Sabine C. Zimmermann, Louise Ganderton, Aimee Fraser, Luke Scott, Amy Bertolin, Joanna Watts, Andrew Chan, Cindy Thamrin, Gregory G. King.
Am J Respir Crit Care Med 193;2016:A6353

EPOC 205 15 Symposium COPD – Barcelona 7-8 April 2016: **THE FORCED OSCILLATIONS TECHNIQUE (FOT): IS IT AS USEFUL AS SIMPLE TO PERFORM?** Oral session, 20 min.

Felip Burgos

ERS 2016 Poster Presentation: **CHANGES IN INSPIRATORY RESISTANCE AFTER EXERCISE CHALLENGE RELATE TO SUBCLINICAL AIRWAYS INFLAMMATION IN ADOLESCENTS WITHOUT FEV1-FALL**

Henrik Johansson, Pasquale Pompilio, Margareta Emtner, Raffaele Dellaca, Andrei Malinovsky

ERS 2016 Poster Presentation: **IDENTIFICATION OF LUNG MECHANICAL PROPERTIES IN PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (AECOPD) OR ACUTE HEART FAILURE (AHF) THROUGH FORCED OSCILLATION TECHNIQUE (FOT): PRELIMINARY RESULTS**

AC Repposi, Fabiano DiMarco, Emanuela Rancati, Mirta Cavallini, Fulvia Ribolla, Sara Job, Stefano Centanni

ERS 2016 Poster Presentation: **LUNG FUNCTION ASSESSED BY HOME FORCED OSCILLATION AND SELF REPORTED SYMPTOMS DURING COPD EXACERBATIONS**

Pasquale Pio Pompilio, Roberta Macis, Valentina Isetta, Giulia Munaro, Paul Walker, Angelo Paolo Castellani, Mireia Dalmase, Jo Middlemass, A. Niroshan Siriwardena, Paolo Zanaboni, Ruth Sepper, Kaiu Prikk, Andrei Malinoschi, Christer Janson, Dorjan Marušič, Tatjana Dolgan, Raffaele L. Dellaca', Peter M.A. Calverley,

Roberto Rosso, G. Barisione, A. Bacigalupo, C. Brusasco, C. Scanarotti, S. Penco, A. M. Bassi, T. Lamparelli, A. Garlaschi, R. Pellegrino, V. Brusasco (2014)

MECHANISMS FOR REDUCED PULMONARY DIFFUSING CAPACITY IN HAEMATOPOIETIC STEM-CELL TRANSPLANTATION RECIPIENTS.

Respiratory Physiology & Neurobiology 2014 194, 54–61

Bernt B. Aarli, Peter M.A. Calverley, Robert L. Jensen, Tomas M.L. Eagan, Per S. Bakke and Jon A. Hardie

VARIABILITY OF WITHIN-BREATH REACTANCE IN COPD PATIENTS AND ITS ASSOCIATION WITH DYSPNOEA

Eur Respir J 2015; 45: 625–634

AIPO Congress 2015 - Poster Presentation: **FORCED OSCILLATIONS AND AIRWAYS CLEARANCE TECHNIQUES IN PATIENTS WITH COPD.**

Isabella Romagnoli, Elisabetta Maria Romano, Barbara Lanini, Barbara Binazzi, Emanuele Vulpio, Alessio Lazzeri, Carla Castellani, Francesco Gigliotti

AIPO Congress 2015 - Presentation: **IL VERO OBIETTIVO: LA PERIFERIA DEL POLMONE (THE REAL OBJECTIVE : THE LUNG PERIPHERY)** (in Italian)

Carlo Gulotta

BTS Conference 2014 Oral Presentation: **DIFFERENCES IN FORCED OSCILLATION TECHNIQUE BETWEEN HEALTHY INDIVIDUALS, OBSTRUCTIVE SLEEP APNOEA AND OBESITY HYPOVENTILATION SYNDROME.** S. Mandal , A. Vaughan-France , E. Suh, T. Dhir, P. Pompilio, R. Dellaca, N. Hart

ATS 2014 Poster Presentation: **DETECTION OF EXPIRATORY FLOW LIMITATION IN OBESSE PATIENTS WITH CHRONIC RESPIRATORY FAILURE.**

Pompilio, P., Suh, E. S., Dellaca, R., Hart, N., & Mandal, S. American Journal of Respiratory and Critical Care Medicine, Vol. 189, Meeting Abstracts, 2014 EFFECTS OF OBESITY ON LUNG FUNCTION, 2014, pp. A3514

ATS 2014 Poster Presentation: **ABOLITION OF EXPIRATORY FLOW LIMITATION IN SEVERE CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) USING AUTO-TITRATING CONTINUOUS POSITIVE AIRWAY PRESSURE BASED ON THE MEASUREMENT OF WITHIN-BREATH AIRWAY REACTANCE DETERMINED BY THE FORCED OSCILLATION TECHNIQUE.**

Suh, E.S., Pompilio, P., Mandal, S., Hill, P., Romano, R., Dellaca, R., Hart, N. American Journal of Respiratory and Critical Care Medicine, Vol. 189, Meeting Abstracts, 2014, NOVEL AND TRADITIONAL LUNG FUNCTION ASSESSMENT. May 1, 2014, A3555-A3555

ATS 2014 Poster Presentation: **CLINICAL TRIALS FOR ELDERLY PATIENTS WITH MULTIPLE DISEASES (CHROMED): A PILOT STUDY.** * : Chromed is a clinical research study performed

with the home measuring version "Diary" of the Resmon Pro

Pasquale Pompilio, Valentina Isetta, Andrei Malinovschi, Jo Middlemass, Giulia Munaro, Mireia Dalmases, Christer Janson, Aloysius Niroshan Siriwardena, Roberta Macis, Paolo Zanaboni, Peter M Calverley, Raffaele Dellaca, Roberto Rosso- on behalf of CHROMED consortium
Eur Respir J 2014; 44: Suppl. 58, P971.

ATS 2014 Poster Presentation: **INSPIRATORY AND EXPIRATORY AIRWAYS RESISTANCE IN RELATION TO EXERCISE-INDUCED BRONCHOCONSTRICTION (EIB) AND AIRWAYS INFLAMMATION.**

Johansson H, Pompilio PP, Emtner M, Dellacà RL, Malinovschi A.
Eur Respir J 2014; 44: Suppl. 58, P3967.

ATS 2014 Poster Discussion: **DETECTION OF FLOW LIMITATION IN COPD PATIENTS USING TWO DIFFERENT FORCED OSCILLATION DEVICES.**

K. De Soomer, A. M. Vints, R. Heyndrickx, L. Claus, W. De Backer, E. Oostveen.
Eur Respir J 2014; 44

ATS 2014 Poster Discussion: **INSTRUMENT VARIABILITY IN THE MEASUREMENT OF RESPIRATORY RESISTANCE.**

E. Oostveen, K. De Soomer, J. A. Otte, A. M. Vints, W. De Backer.
Eur Respir J 2014; 44(58), P1823.

ATS 2014 Poster Presentation: **DAY-BY-DAY VARIABILITY OF INSPIRATORY RESISTANCE: A NOVEL TEST FOR THE DIAGNOSIS OF ASTHMA.**

Gobbi A, Gulotta C, Mellano E, Suki B, Dellacà R.
Eur Respir J 2014; 44: Suppl. 58, P2809.

COPD 9th Conference 2014 Poster Presentation: **ACCEPTABILITY OF A NOVEL TELEMONITORING SYSTEM FOR ELDERLY PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND COMORBIDITIES: THE CHROMED CLINICAL TRIAL, PRELIMINARY RESULTS.**

* : Chromed is a clinical research study performed with the home measuring version "Diary" of the Resmon Pro

Pasquale Pompilio, Valentina Isetta, Andrei Malinovschi, Jo Middlemass, Giulia Munaro, Mireia Dalmases, Christer Janson, Aloysius Niroshan Siriwardena, Roberta Macis, Paolo Zanaboni, Peter M Calverley, Raffaele Dellaca, Roberto Rosso- on behalf of CHROMED consortium .

National SAPC Congress 2014: **CLINICAL TRIALS FOR ELDERLY PATIENTS WITH MULTIPLE DISEASES (CHROMED) PILOT STUDY.** * : Chromed is a clinical research study performed with the home measuring version "Diary" of the Resmon Pro

Pasquale Pompilio, Valentina Isetta, Andrei Malinovschi, Jo Middlemass, Giulia Munaro, Mireia Dal

mases, Christer Janson, Aloysius Niroshan Siriwardena, Roberta Macis, Paolo Zanaboni, Peter M Calverley, Raffaele Dellaca, Roberto Rosso- on behalf of CHROMED consortium

SIMG Congress 2014: **SCREENING DI PATOLOGIE OSTRUTTIVE RESPIRATORIE PRESSO GLI STUDI DI MEDICINA GENERALE: IL POSSIBILE RUOLO DELLA TECNICA DELLE OSCILLAZIONI FORZATE (FOT)./ SCREENING OF OBSTRUCTIVE RESPIRATORY DISEASES IN GENERAL PRACTITIONERS OFFICES: POSSIBLE ROLE OF FORCED OSCILLATION TECHNIQUE (FOT).**

Calzolari M., Nardi R., Colombo F., Marelli M, Pompilio P, Macis R. , Gobbi A , Dellacà R.L. Antonelli, A., Crimi, E., Gobbi, A., Torchio, R., Gulotta, C., Scano, G., ... Pellegrino, R. (2013). Mechanical correlates of dyspnea in bronchial asthma. Physiological Reports 1–11.

ERS 2013, Poster Presentation: **FORCED OSCILLATION TECHNIQUE (FOT) IN RELATION TO EXERCISE-INDUCED DYSPNEA WITHOUT FEV1-FALL – RESULTS FROM ANDAS-STUDY.**

H. Johansson, P. P. Pompilio, K. Norlander, R. Dellacà, A. Malinovski
ERJ, September 2013, 42(57), P4701

ERS 2013, Poster Discussion: **THE USE OF FORCED OSCILLATION TECHNIQUE (FOT) TO ASSESS SMALL AIRWAYS DYSFUNCTION.**

Andrei Malinovski, Chiara Veneroni, Alain Van Muylem, Alain Michils, Raffaele L. Dellacà
2013 European Respiratory Journal 2013;42: Suppl 57,P4696.

Claudio Tantucci (2013) **EXPIRATORY FLOW DEFINITION, MECHANISMS, METHODS AND SIGNIFICANCE.**

Pulmonary Medicine, Vol.2013, Article ID 749860, 6 pages.

G. Barisione, P. P. Pompilio, A. Bacigalupo, C. Brusasco, A. Cioè, R. L. Dellacà, T. Lamparelli, A. Garlaschi, R. Pellegrino, V. Brusasco (2012). **AIRWAY DISTENSIBILITY WITH LUNG INFLATION AFTER ALLOGENEIC HAEMATOPOIETIC STEM-CELL TRANSPLANTATION.**

Respiratory Physiology & Neurobiology, 184(1), 80–85

C. Gulotta, M.D., B. Suki Ph.D., V. Brusasco M.D., R. Pellegrino M.D., A. Gobbi Ph.D., A. Pedotti Ph.D., and R. L. Dellacà Ph.D.(2012) **MONITORING THE TEMPORAL CHANGES OF RESPIRATORY RESISTANCE: A NOVEL TEST FOR THE MANAGEMENT OF ASTHMA.**

American Journal of Respiratory and Critical Care Medicine, Vol. 185, No. 12, pp. 1330-1331.

N. Koulouris, G. Kaltsakas, A. Palamidis, S.A. Gennimata.(2012) **METHODS FOR ASSESSING EXPIRATORY FLOW LIMITATION DURING TIDAL BREATHING IN COPD PATIENTS.**

Pulmonary Medicine, Vol. 2012, Article ID 234145, 8 pages.

R. Pellegrino, A. Antonelli, M. Mondino (2010).

BRONCHODILATOR TESTING: AN ENDLESS STORY.

The European Respiratory Journal, 35, 952–954.

R. L. Dellacà, A. Gobbi, M. Pastena, A. Pedotti and B. Celli (2010). **HOME MONITORING OF WITHIN-BREATH RESPIRATORY MECHANICS BY A SIMPLE AND AUTOMATIC FORCED OSCILLATION TECHNIQUE DEVICE.**

Physiological Measurements 31 (2010) N11– N24.

Dellacà, R. L., Pompilio, P. P., Walker, P. P., Duffy, N., Pedotti, a, & Calverley, P. M. a. (2009). **EFFECT OF BRONCHODILATION ON EXPIRATORY FLOW LIMITATION AND RESTING LUNG MECHANICS IN COPD.**
The European Respiratory Journal, 33(6), 1329–37.

R. Torchio, A. Gobbi, C. Gulotta, R. Dellacà, M. Tinivella, R. E. Hyatt, V. Brusasco, and R. Pellegrino (2009) **MECHANICAL EFFECTS OF OBESITY ON AIRWAY RESPONSIVENESS IN OTHERWISE HEALTHY HUMANS.**
Journal of Applied Physiology 107, 408-416.

Farre, R., & Navajas, D. (2004). **ASSESSMENT OF EXPIRATORY FLOW LIMITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A NEW APPROACH.**
European Respiratory Journal, 23(2), 187–188.

Dellacà, R. L., Duffy, N., Pompilio, P. P., Aliverti, a, Koulouris, N. G., Pedotti, a, & Calverley, P. M. a. (2007). **EXPIRATORY FLOW LIMITATION DETECTED BY FORCED OSCILLATION AND NEGATIVE EXPIRATORY PRESSURE.**
The European Respiratory Journal, 29(2),363–74.

R.L. Dellacà, P. Santus, A. Aliverti, N. Stevenson, S. Centanni, P.T. Macklem, A. Pedotti, P.M.A. Calverley (2004). **DETECTION OF EXPIRATORY FLOW LIMITATION IN COPD USING THE FORCED OSCILLATION TECHNIQUE.**
European Respiratory Journal, 24(2), 332–333.

Farre, R., & Navajas, D. (2004). **ASSESSMENT OF EXPIRATORY FLOW LIMITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A NEW APPROACH.**
European Respiratory Journal, 23(2), 187–188.

REFERENCE EQUATIONS USED IN THE RESMON PRO FULL:

NEW in version 6.1.2 :

PRE-SCHOOL and 2-13 years of age : Claudia Calogero, MD, Shannon J. Simpson, PhD, Enrico Lombardi, MD, Niccolò Parri, MD, Barbara Cuomo, MD, Massimo Palumbo, MD, Maurizio de Martino, MD, Claire Shackleton, BSc (Hons), Maureen Verheggen, MMedSc, Tania Gavidia, MIH, Peter J. Franklin, PhD, Merci M.H. Kusel, MBBS, PhD, Judy Park, MBIostat, Peter D. Sly, DSc, and Graham L Hall, PhD

Respiratory Impedance and Bronchodilator Responsiveness in Healthy Children Aged 2–13 Years. *Pediatric Pulmonology* 48:707–715(2013)

And, option :

PRE-SCHOOL(2-7 years of age) : Calogero, C., Parri, N., Baccini, a, Cuomo, B., Palumbo, M., Novembre, E., ... Lombardi, E. (2010).

Respiratory impedance and bronchodilator response in healthy Italian preschool children. *Pediatric Pulmonology*, 45(11), 1086–94.

7-17 YEARS OLD: Ducharme, F. M., Davis, G. M., & Ducharme, G. R. (1998). **Pediatric reference values for respiratory resistance measured by forced oscillation.** *Chest*, 113(5), 1322–8.

ADULTS: Oostveen, E., Boda, K., van der Grinten, C. P. M., James, A. L., Young, S., Nieland, H., & Hantos, Z. (2013). **Respiratory impedance in healthy subjects: baseline values and bronchodilator response.** *The European Respiratory Journal : Official Journal of the European Society for Clinical Respiratory Physiology*

FOT CONCEPTS, GUIDELINES AND SUGGESTED READING

ADULTS:

Oostveen, E., MacLeod, D., Lorino, H., Farre, R., Hantos, Z., Desager, K., & Marchal, F. (2003). **The forced oscillation technique in clinical practice: methodology, recommendations and future developments.** *European Respiratory Journal*, 22(6), 1026–1041.

“As a tool for the investigation of respiratory mechanics in clinical practice, the forced oscillation technique (FOT) is well supported theoretically.”

“The most attractive feature of FOT is that the forced oscillations are superimposed on the normal breathing, avoiding the need for any special breathing manoeuvre or any noticeable interference with respiration.”

“WESSELING and WOUTERS [61] found abnormal Zrs data in 70% of the subjects with chronic bronchitis in the

presence of normal spirometry.”

“FOT has proven to be at least as sensitive as spirometry to detect impairment of lung function due to exposure to cigarette smoke or occupational hazards. The sensitivity to detect mild airway disease and the minimal requirements for subjects cooperation make FOT a very suitable lung function test for epidemiological and field studies.”

“A significant correlation between the changes in Rrs and FEV1 following bronchoconstriction has been reported by several investigators. “

“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. This may be the reason why FOT has proved more sensitive than FEV1 to detect changes in BHR in asthmatics after corticosteroid treatment [101].”

“There is evidence that FOT and plethysmography provide comparable information on bronchial sensitivity and responsiveness and may be superior to spirometry”

Navajas, D., & Farré, R. (2001). **Forced oscillation technique: from theory to clinical applications**, *Monaldi Archives for Chest Disease = Archivio Monaldi per Le Malattie Del Torace / Fondazione Clinica Del Lavoro, IRCCS [and] Istituto Di Clinica Tisiologica E Malattie Apparato Respiratorio, Università Di Napoli, Secondo Ateneo*, 56(6), 555–62. 555–562.

“It has been suggested that FOT is adequate for assessing the increase in airway obstruction induced by bronchial challenge... Similarly, FOT has been used to assess the decrease in airway resistance induced by bronchodilation agents... Another interesting feature of FOT is that its time resolution allows the easy measurement of the dose-response effect”

“According to the currently available data, FOT has a sensitivity and specificity similar to that of conventional spirometric indices [65, 69].”

“In recent years, FOT has been employed to assess upper airway obstruction in patients with the sleep apnea/hypopnea syndrome (SAHS).”“The technique has enough time resolution to track the obstructive events undergone by the upper airway during the different phases of the breathing cycles.”

Bates, J. H. T., Irvin, C. G., Farré, R., & Hantos, Z. (2011). **Oscillation mechanics of the respiratory system**. *Comprehensive Physiology*, 1(3), 1233–72.

“The reproducibility of Zrs in healthy humans is similar to that observed in other parameters of respiratory mechanics such as those provided by body plethysmography or the flow interrupter technique;”

“The FOT has been shown to reveal differences in baseline lung mechanics in patient both with asthma and COPD who had abnormal spirometry (52). Also, the frequency dependence of Rrs has been shown to change in patients with asthma or other obstructive diseases (37, 52, 112, 192, 212), likely due to the presence of ventilation inhomogeneities (37, 212). Furthermore, patients with different types of obstructive lung disease (emphysema, chronic bronchitis and asthma) have been reported to show different patterns of abnormality by the FOT with similar abnormalities in spirometry (282).”

“The FOT has also been shown to provide indices related to the severity of asthma (50), and can be used to detect central airway obstruction due to either tracheal stenosis or vocal cord dysfunction (137), which can be

confused with asthma.”

“Several recent studies have used the FOT to follow the temporal variations in lung function associated with asthma (72, 110, 233). Indeed, home monitoring via the FOT may become an important means of following asthmatic patients in the future (66).”

“Another characteristic feature of COPD is that Zrs is often very different between inspiration and expiration in contrast to the situation in normal subjects (65). In particular, the magnitude of Zrs is abnormally elevated in expiration due to the presence of expiratory flow limitation (68), which prevents the FOT from being able to probe the lung beyond the choke point where flow limitation occurs. Accordingly, bronchodilation produces a particularly marked reduction in the magnitude of Xrs when flow limitation is relieved (67).”

“The FOT has been used in patients with sarcoidosis, providing parameters that correlate significantly with those of spirometry. In particular, the magnitude of Zrs at 4Hz appears to be clinically useful in this disease (78).”

“Routinely measured lung volumes (total lung capacity and vital capacity) have been shown to correlate well with average Xrs and with the slopes of Xrs and Rrs versus frequency in patients that have ILDs but no sign of airway obstruction (281).”

FOT has been applied in occupational respiratory diseases such as silicosis in which the pattern of Rrs is similar to that seen in COPD; Rrs is elevated and has an increased negative dependence on frequency (59).

“The FOT can also be useful in assessing possible side effects of therapies in nonpulmonary diseases, such as the treatment of spinal cord injury with neostigmine and glycopyrrolate which have been implicated in increased airway secretions and bronchospasm (235).”

“Recent preliminary data suggest that the FOT could be useful for assessing the evolution of respiratory function soon after lung transplantation when spirometry is not feasible (119).”

“In a study of patients with extra-thoracic upper airway obstruction, mostly due to carcinoma, Rrs and Xrs were correlated with airway resistance measured by body plethysmography. Moreover, Rrs tended to be higher in patients with upper airway obstruction compared to patients with COPD (284).”

Tracheal stenosis is another extrapulmonary disease where the FOT has been employed to characterize respiratory resistance, and a strong correlation between indices derived from Rrs and the diameter of tracheostenosis has been reported (137). Patients with tracheal stenosis also tend to have a marked flow dependence of Rrs measured by FOT which has been found to be correlated with conventional upper airway obstruction indices derived from spirometry (288).”

PEDIATRICS

Beydon, N., Davis, S. D., Lombardi, E., Allen, J. L., Arets, H. G. M., Aurora, P., ... Wilson, N. M. (2007). An official American Thoracic Society/European Respiratory Society statement: pulmonary function testing in preschool children. American Journal of Respiratory and Critical Care Medicine, 175(12), 1304–45

“Lack of cooperation and noninvasiveness are key features of the FOT, which is therefore increasingly used in young children.”

“The feasibility of the FOT in the acutely ill, untrained preschool children measured in the emergency room ranged from 20% in 3 years old to more than 80% in 5 years old. In laboratory or field settings, higher values of 80 to 100% have been obtained in healthy preschool children or stable preschool patients.”

“The single frequency sinusoid has optimal signal-to-noise ratio; allows the descriptions of Zrs variations with time, within- and between-breath and in relation to flow and volume; “

“FOT assessment of response to bronchodilator was found to be in agreement with FEV1 and airway resistance with plethysmography”

“The FOT was probably one of the first techniques applied to preschool children to estimate the airway response to metacholine and histamine. ... In wheezy preschool children, changes in FOT paralleled those observed with plethysmography, interrupter resistance, or spirometry.

Frey, U. (2005). **Forced oscillation technique in infants and young children.** Paediatric Respiratory Reviews, 6(4), 246–54.

“In stable ASTHMA, higher respiratory resistance at various frequencies were found in the mid range in comparison with healthy subjects. These changes in Rrs were consistent with decreased FEV1 values in asthmatic group”

“Reversible airway obstruction and bronchial hyperresponsiveness (BHR) are significant components contributing to the diagnosis of bronchial asthma in infants and young children. Changes in mid-frequency Zin were related to changes in FEV1 or clinical signs after a challenge with bronchodilators. Similarly, BHR showed changes from baseline comparable or better than other lung function tests. The increased Rrs was accompanied by a decrease in Xrs in most studies after challenge.”

“One study assessed the feasibility of FOT in the emergency department in the untrained child with respiratory distress.

.... These success rates were higher than those for spirometry”

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