

**Computer Aided Lung Sound Analysis before and after airway clearance interventions - Is there potential to develop a good outcome measure?**

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This research is about developing a new outcome measure for respiratory physiotherapy because the current ones all have weaknesses that affect their usefulness.

Respiratory physiotherapists lack adequate measures to assess the effectiveness of treatment. The number ( $N$ ), frequency ( $f$ ) and timing ( $T$ ) of added lung sounds are used to assess patients but the objectivity of standard auscultation has been questioned. In this research, Computer Aided Lung Sound Analysis (CALSA) was used to assess if the  $N$ ,  $f$  and  $T$  of crackles per breathing cycle (BC) could be quantified in clinical settings and be used as an objective, non-invasive, bedside clinical outcome measure. Two experimental studies were conducted incorporating both 'before-and-after' and 'repeated measures' components. Twenty-four patients in the first study and thirty patients in the second study, with productive lung disorders were recruited from out-patient clinics. Demographic and anthropometric, lung function, oxygen saturation, breathlessness and lung sound data were collected, before and after a single intervention (self-intervention in the first study and intervention applied by a physiotherapist (PT) in the second study). Repeated lung sound recordings were taken at seven anatomical sites with a digital stethoscope, and in the second study the PT used standard auscultation. PT findings were noted on a chart. Recorded crackles' parameters were analysed with CALSA for  $N$ ,  $T$  and  $f$ . The intra-subject reliability of lung sounds, in both studies, was found to be good to excellent, estimated by the Analysis of Variance, Intraclass Correlation Coefficient, Smallest Real Difference and Bland and Altman 95% limits of agreement. The significant analysis of variance from the Inter-subject reliability analysis confirmed the expected between subject variability. The  $f$  of crackles increased in the majority of patients after the interventions but the  $N$  and  $T$  showed no consistent changes. Agreement between CALSA and the PT's findings was also explored. Agreement was poor in anterior chest sites, but higher in posterior sites. We conclude that 1) CALSA is a reliable measure; 2) crackles' frequency might be a more sensitive parameter than the number or timing of crackles per BC to assess an intervention's effects and 3) that physiotherapists appear to have more difficulties assessing crackles in anterior than in posterior sites. In future, CALSA may provide an objective and responsive tool for assessing and monitoring respiratory interventions in clinical settings.



- 11:45 COPD exacerbation: resolution of symptoms after starting antibiotic treatment was unaltered by the timing of therapy but was dependent on baseline gas transfer  
K. Vijayasaratha, R. Stockley (Birmingham, United Kingdom) 1767
- 12:00 Acute exacerbations of COPD: are at-risk patients identified early and managed appropriately?  
S. Fong, W. Ahmed, S. Saha, C. Brook, T. Fernandez, P. Raines, A. Choudhury (London, Romford, United Kingdom) 1768
- 12:15 A comparison of the management of COPD exacerbations in six European hospitals: demographics and baseline data  
K. Armitage, M. Woodhead, M. Pappalettera, L. Sieske, S. Vila, F. Blasi, S. Ewig, G. Huchon, T. Schaberg, A. Torres, The European COPD Exacerbation Study Group (Manchester, United Kingdom; Rotenburg, Herne, Bochum, Germany; Milan, Italy; Barcelona, Spain; Paris, France) 1769
- 12:30 Long-term treatment with clarithromycin of stage II COPD patients with frequent exacerbations  
K. Zykov, A. Rvatcheva, A. Pustovalov, A. Averyanov (Moscow, Russian Federation) 1770

## Room New York 2

## Session 212

10:45-12:45

**E-Communication Session: Mucociliary clearance, novel techniques and assessments, in adult, paediatric and mechanically ventilated patients**

**Chairs: E. Main (London, United Kingdom), R. Gosselink (Leuven, Belgium)**

- E1771 Prone or supine: which is the most beneficial position for thoracoabdominal motion of preterm newborn recovering from RDS?  
T. Oliveira, R. Britto, D. Franca, N. Pereira, L. Vaz, V. Parreira (Belo Horizonte, Brazil)
- E1772 Effects of a new chest physiotherapy protocol in infant RSV bronchiolitis. A RCT  
G. Postiaux, J. Louis, J. Gerroldt, A. C. Kotik, A. Lemuhot, C. Patte (Charleroi, Belgium)
- E1773 Glossopharyngeal breathing in children with spinal muscular atrophy type II  
A. Markstrom, M. Nygren-Bonnier, P. Lindholm, E. Mattson, B. Klefbeck (Stockholm, Sweden)
- E1774 Evaluation of peripheral muscle strength and resistance in asthmatic female children  
F. V. A. Barros, C. M. Jacob, J. Maria Santarem Sobrinho, A. C. Melo, M. Arruda Martins, R. Paula Vieira, C. Ricardo Fernandes de Carvalho (Sao Paulo, Brazil)
- E1775 Demonstrate effects of RP on respiratory function using advanced functional imaging  
W. Vos, K. Ides, J. De Backer, E. Boelen, D. Vissers, S. Truijen, W. De Backer (Antwerp, Belgium)
- E1776 Computer aided lung sound analysis before and after physiotherapy for mucociliary clearance  
A. Marques, A. Bruton, A. Barney, P. White (Southampton, United Kingdom)
- E1777 Reliability of computer aided lung sound analysis detecting crackles in bronchiectasis patients – a potential outcome measure for respiratory physiotherapy  
A. Marques, A. Bruton, A. Barney, P. White (Southampton, United Kingdom)
- E1778 The impact of physiotherapy interventions on gastroesophageal function in bronchiectasis and COPD  
A. Lee, L. Denehy, S. Roberts, R. Stirling, J. Wilson, B. Button (Melbourne, Australia)
- E1779 Positive expiratory pressure and lung function in cystic fibrosis patients  
V. Parreira, S. Pires, N. Sulmonett, P. Camargos, J. Haddad, R. Britto (Belo Horizonte, Brazil)
- E1780 Bone mineral density, body composition, peripheral muscle endurance, and quality of life in cystic fibrosis  
M. Bosnak-Guclu, S. Savci, D. Inal-Ince, H. Arikian, M. Saglam, Z. Ozaydin, D. Dogru (Ankara, Turkey)
- E1781 Are chest wall vibrations in ventilated patients more effective with ventilator or manual hyperinflation?  
R. Stiger, H. Shannon, E. Main (London, Staffordshire, United Kingdom)
- E1782 Impact of mechanical ventilation (MV) on the mucociliary system in rabbits  
V. Piccin, C. Calciolari, K. Yoshizake, S. Gomes, C. Albertini-Yagi, M. Dolhnikoff, M. Macchione, E. G. Calдини, E. M. Negri (Sao Paulo, Brazil)
- E1783 Determination of the best threshold to initiate inspiratory muscle training in mechanically ventilated patients  
F. Guimaraes, S. Constantino, A. C. Pezzino, M. Coelho, R. Silva, S. Menezes, C. Dias (Rio de Janeiro, Brazil)
- E1784 Respiratory effects of three different physiotherapeutic techniques after cardiac surgery  
C. Dias, R. Vieira, C. Peixoto, P. Backer, S. Menezes, F. Guimarães (Rio de Janeiro, Brazil)
- E1785 Assessment of activity of daily living, quality of life and alexitymia in patient with preoperative coronary artery graft bypass surgery  
Z. Gultekin, N. Duruturk, P. Taskin, E. Gurer, B. Oksar, A. Akgun, S. Ozcobanoglu (Ankara, Turkey)
- E1786 The role of physiotherapist in the multidisciplinary team in emergency situation in the Clinical Hospital – Faculty of Medicine, University of Sao Paulo  
C. Stipanich, L. Cunha, S. Aguera, A. Rodrigues, C. Tanaka, J. Torquato, J. Lucato (Sao Paulo, Brazil)
- E1787 Effects of sodium chloride high concentrated solution inhalations in patients with chronic non-allergic obstructive bronchopulmonary diseases  
V. Kobylansky, E. Gamal, T. Petrova, I. Litvinenko, G. Babadzhanova, M. Burmistrova (Moscow, St Petersburg, Russian Federation)