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**Title:** Short-term effects of physiotherapy on ventilation inhomogeneity in cystic fibrosis patients with moderate to severe lung disease

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**Body:** Background: Cystic fibrosis (CF) lung disease is characterised by progressive peripheral airway dysfunction. The lung clearance index (LCI) as a measure of ventilation inhomogeneity determined during multiple breath washout (MBW) was shown to be more sensitive in detecting lung disease than conventional lung function tests. A recent study reported no consistent short-term effect of physiotherapy (PT) on lung function in paediatric patients, neither for LCI nor FEV1 (Fuchs SI et al. *Pediatr Pulmonol* 2010;45:301-306). Aims: To investigate the impact of PT in adolescents and adults with CF and moderate to severe lung disease on MBW and conventional lung function parameters. Methods: Ventilation inhomogeneity was assessed with a validated open-circuit N2-MBW system (Exhalyzer D and Spiroware 3.1, Eco Medics AG). Two to three successful tests followed by spirometry were done before and 30 minutes after standardised PEP mask PT. Results: In this ongoing study so far 19 patients (10f), mean age 24 years (range 13.3-43.4), were measured. For the group, LCI (mean; range) before (15.7; 7.4-19.5) and after PT (15.7; 7.1-20.5) was not different, but 6/19 patients showed a difference of more than 3 LCI units (increase in 3/19: 3.1, 3.4, 5.6; decrease in 3/19: -3.69, -4.8, -4.84). LCI-CV before and after PT was 3.7% and 3.3%. FEV1 (mean; range) before (67%; 34-89) and after PT (69%; 38-89) differed significantly (p=0.016). Conclusion: In CF patients with moderate to severe lung disease the short-term effect of PT may be variable. By opening up previously poorly ventilated lung regions, PT may either increase or decrease ventilation heterogeneity.