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Does manual therapy provide additional benefit to breathing retraining in the management of dysfunctional breathing? A randomised controlled trial

Mandy Jones[1], Fiona Troup[2], John Nugus[3], Michael Roughton[4], Margaret Hodson[3,5], Charlotte Rayner[6], Frances Bowen[7], Jennifer Pryor[3,5]. *[1]Health Science and Social Care, Brunel University, London, United Kingdom; [2]Physiotherapy, Physio Clinics, London, United Kingdom; [3]Respiratory Medicine, Royal Brompton and Harefield NHS Trust, London, United Kingdom; [4]Statistics, R-Squared Statistics, London, United Kingdom; [5]Respiratory Medicine, NHLI/Imperial College, London, United Kingdom; [6]Respiratory Medicine, Parkside Hospital, London, United Kingdom; [7]Respiratory Medicine, Hammersmith Hosital Imperial College Healthcare NHS Trust, London, United Kingdom*

Introduction: Dysfunctional breathing (DB) is a respiratory disorder associated with significant patient morbidity. It is characterized by unexplained breathlessnes and an abnormal breathing pattern, with combinations of erratic breathing, episodic breath holding and sighing, or hyperventilation. Treatment involves breathing retraining through respiratory physiotherapy. Recently, manual therapy has been used as a treatment component; but no evidence exists to validate its use. We sought to investigate the effects of manual therapy in addition to breathing retraining in patients with DB.
Methods: 60 subjects with primary DB were randomized into either breathing retraining (standard treatment; n=30) or breathing retraining plus manual therapy (intervention; n=30). Both groups received standardised respiratory physiotherapy: DB education; breathing retraining; home regime; audio disc. Subjects in the intervention group received additional manual therapy.
Results: No significant difference was found between groups for the primary outcome Nijmegen score or any secondary outcome measures (Table 1).
Conclusion: Breathing retraining is the primary management for patients with DB. Our results suggest the additional use of manual therapy provides no further benefit and cannot be recommended in clinical practice.

Table 1. Analysis of primary and secondary outcomes

Measurement	Treatment Effect (95% CI)	p value
Nijmegen score	2.8 (–1.1 to 6.6)	0.16
HAD Anxiety	0.6 (–0.8 to 2.0)	0.39
HAD Depression	0.3 (–0.6 to 1.2)	0.51
Breath hold	1.4 (–2.0 to 4.8)	0.41
FEV1	0.02 (–0.04 to 0.09)	0.45
FVC	0.01 (–0.09 to 0.1)	0.91

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Efficacy of airway clearance therapy with different autonomy degrees in nonCF-BE: Randomized cross-over trial

Beatriz Herrero[1,2,3], Eva Polverino[1,2,3], Dani Martí Romeu[1,2,3], Jordi Vilaró[1,2,3,4]. *[1]Respiratory Disease Department, Hospital Clínic, Barcelona, Spain; [2]IDIBAPS (Institut d'Investigacions Biomèdiques Agustí Pi Sunyer), University of Barcelona, Barcelona, Spain; [3]CIBERES, CIBER de Enfermedades Respiratorias, Mallorca, Spain; [4]Facultat de Ciències de la Salut Blanquerna, Universitat Ramon Lull, Barcelona, Spain*

Airways clearance techniques are an important part of chronic treatment of non-cystic fibrosis bronchiectasis (nonCF-BE). Notwithstanding, the literature supporting their clinical use is still poor.
Aim: To evaluate effectiveness in mucus clearance and tolerance of 3 respiratory techniques with different autonomy degrees: ELTGOL (physiotherapist-administered), Autogenic drainage (self-administered) and a temporary positive expiratory pressure device, named Uniko.
Design: Randomized crossover trial.
Population: Clinically stable adult nonCF-BE patients, sputum production $\geq$15ml/day.
Methods: Each technique is applied in 3 sessions on alternate days (1 week washout). Sputum was registered at the end session, after 1h and 24h.
Results: 7 patients were enrolled in the study (median age 69; mean FEV_1 70$\pm$16%). AD obtained the major short-time sputum production (mean values: ELTGOL 7gr; AD 15gr; Uniko 7gr). By contrast, Uniko and ELTGOL showed a higher sputum production at 24h (AD 9gr, Uniko 16gr, ELTGOL 17gr). The short-time sputum production slightly increased over time with ELTGOL (1st: 11gr; 2nd: 13gr; 3rd: 14gr), while the 24h sputum production increased with Uniko (1st: 14gr; 2nd: 17gr; 3rd: 17gr). AD was the favourite technique of 6 patients.
Conclusions: The 3 techniques were well tolerated and efficacious. AD was the most rapid in favouring expectoration. However, Uniko and ELTGOL were more effective at long-term, with an increasing trend for Uniko over time. The degree of patient' autonomy for each technique, the compliance and personal preferences should be considered to select a treatment in order to individualize and optimize the respiratory therapy in nonCF-BE patients.
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Nebulised 7% hypertonic saline improves health related quality of life in patients with non-cystic fibrosis bronchiectasis

Rachel Johnston[1], Fiona Shaw[1], Robert Wilson[2], Michael Loebinger[2], Lizzie Flude[1]. *[1]Physiotherapy, Royal Brompton and Harefield NHS Foundation Trust, London, United Kingdom; [2]Respiratory Medicine, Royal Brompton and Harefield NHS Foundation Trust, London, United Kingdom*

Introduction: Cough and sputum have a significant impact on quality of life (QoL) in non-cystic fibrosis bronchiectasis (NCFBx). Nebulised 7% hypertonic saline (HTS) has previously been shown to improve airway clearance in NCFBx, and we hypothesised that it would also improve QoL in such patients.
Method: Patients with NCFBx referred for HTS over a 4 month period at Royal Brompton Hospital were included (N=22). Patients were assessed by the Leicester cough questionnaire (LCQ) as a marker for Health Related Quality of Life (HRQol), Visual Analogue Scale for ease of clearance (VASEoC) and FEV_1 pre and post 1 month use of HTS. Results are expressed as median and interquartile range and Wilcoxon-signed Rank tests were used to assess the impact of the therapy.
Results: N=22 (Male=7), median age 64yrs (32-81), FEV_1 1.59 (0.64-3.01). There was a significant improvement in LCQ 11.0 (9.2-14.7) to 16.7 (10.7-17.7) p=0.01 and VASEoC 7 (5.5- 8) to 4.7 (3-7) p=0.002. There was no significant change in FEV_1(p=0.32). 4 patients (18%) constricted on challenge test, and were not included in analysis. No other adverse effects of the therapy were seen.
Conclusion: In addition to confirming that HTS improves airway clearance, we demonstrated for the first time that HTS also improves HRQol markers in patients with NCFBx. The minimal clinical significant difference in the LCQ is reported to be 1.3-2.7. There was therefore a statistically and clinically significant change in the total LCQ score, suggesting HRQol significantly improved with one month use of HTS. Further trials with HTS are needed to assess whether these improvements are sustained long term in such patients.

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Comparison in the efficacy of mobilization and active cycle of breathing technique in coronary artery bypass greft surgery

Hulya Arikan[1], Hatice Nur Turan[1], Betul Degirmenci[1], Sema Savci[2], Melda Saglam[1], Deniz Inal-Ince[1], Naciye Vardar-Yagli[1], Ebru Calik[1], Meral Bosnak-Guclu[3], Metin Demircin[4]. *[1]Physiotherapy and Rehabilitation, Hacettepe University, Faculty of Health Sciences, Ankara, Turkey; [2]School of Physiotherapy and Rehabilitation, Dokuz Eylul University, Izmir, Turkey; [3]Physiotherapy and Rehabilitation, Gazi University, Faculty of Health Sciences, Ankara, Turkey; [4]Cardiothoracic Surgery, Hacettepe University, Faculty of Medicine, Türkiye, Turkey*

Aim: The purpose of this study was to evaluate the efficacy of mobilization and active cycle of breathing techniques (ACBT) following coronary artery bypass graft (CABG) surgery.
Material and methods: Fifty patients (35-75 years) with CABG were included in this randomized study. Twenty-five patients (18 males, 7 females) underwent mobilization and 25 patients (21 males, 4 females) were applied ACBT combined with mobilization. Demographic variables were recorded. Patients were evaluated using pulmonary function testing, 6-minute walk test (6MWT), and respiratory muscle strength.
Results: Five days after surgery, pulmonary function variables were similarly but significantly decreased in both groups as compared to preoperative values ($p<0.05$). No significant difference was found in 6MWT distance obtained before and five days after surgery within and between the groups (15.7±29.6 vs. 6.1±59.1 m, $p>0.05$). Inspiratory and expiratory muscle strength values were statistically higher in ACBT group (-6.4±18.2 vs. -30.1±22.7 cmH2O, and -8.2±15.7 vs. -28.9±24.1 cmH2O, respectively $p<0.05$) than the mobilization group. Intensive care unit stay was significantly shorter in ACTB group than the control group (30.9±11.9 vs. 40.7±11.8 hours, $p<0.05$).
Conclusion: Functional capacity preserved after short-term ACBT or mobilization intervention after CABG surgery. Improvement in respiratory muscle strength was faster in ACBT group.

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Addition of PEEP/EPAP during nocturnal noninvasive ventilation in patients with severe restrictive disorders: Physiological effects and tolerance in a randomized pilot study

Miguel Goncalves[1], Joaquim Moreira[2], Luana Souto Barros[2], Patricia Dantas[2], João Carlos Winck[1]. *[1]Lung Function and Ventilation Unit, Pulmonology Department, Faculty of Medicine and Hospital S. João, Porto, Portugal; [2]Lung Function and Ventilation Unit, Pulmonology Department, Hospital S. João, Porto, Portugal*

Background: In patients with nocturnal hypoventilation due to Severe Restrictive Disorders (SRD), sleep events defined as obstructive or central apneas/hypopneas, can be misinterpreted and lead to suboptimal ventilatory settings.
Objectives: To analyse the physiological effects of PEEP/EPAP during sleep in patients with SRD under noninvasive mechanical ventilation (NIV).
Study design: A randomized prospective cross-over study was performed in 16 patients with a median age of 51,5 (39,7-64,7) years that included 13 neuromuscular and 3 kyphoscoliosis patients with a median FVC (% predicted) of 38,5 (26,5-50,2). In two consecutive nights, they were randomly assigned to sleep one night with a PEEP/EPAP of 0 cmH_2O and the other night with a PEEP/EPAP of 8 cmH_2O, maintaining all the other ventilation parameters. All of them performed a home complete sleep study. Subjective sleep quality, comfort and nocturnal dyspnea, respiratory events and oxygen saturation parameters were analyzed.
Results: Only one patient did not tolerate PEEP/EPAP of 8 cmH_2O and slept with a PEEP/EPAP of 6 cmH_2O.

Comparison of ventilatory parameters PEEP vs NO PEEP

Variables	PEEP	No PEEP	p value
Total AHI	3,5 (1,1–6,9)	4,2 (1,8–10)	N.S.
Median SatO2	94,3 (93–97)	95,4 (93,2–96,2)	N.S.
Time <90 SatO2	3,5 (0,5–18,6)	1,7 (0,15–11,8)	N.S.

Legend: AHI, Apnea/Hypopnea Index.

Conclusion: The application of PEEP/EPAP did not show superiority in terms of sleep parameters and symptomatic improvement. Although further research is warranted, the results of this pilot study suggest the use of NIV without the addition of PEEP/EPAP in patients with SRD.

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Influence of the interface on the use of positive expiratory pressure (PEP) device

Grégory Reychler[1], Thibault Coppens[2], Jean Roeseler[2], Pierre Delguste[1], Giuseppe Liistro[1]. *[1]Pneumology Unit, Cliniques Universitaires Saint-Luc, Brussels, Belgium; [2]Physical Medecine and Rehabilitation, Cliniques Universitaires Saint-Luc, Brussels, Belgium*

Introduction: Positive expiratory pressure (PEP) is regularly used as airway clearance technique. PEP devices provide constant back pressure to the airways during expiration. To be efficient, this pressure must be maintained up to 10 cm H_2O. Facemask and mouthpiece are used with these devices. The aim of this study was to observe the influence of the interface on generated pressure.
Material and method: Seven healthy subjects were recruited (26.7 yrs.± 6.0). They were instructed to breathe through a PEP device (PARI PEP S) according to the recommendations. Two interfaces (mouthpiece and facemask) and 4 different calibrated resistances were used in a randomized crossover design. Continuous recordings of airway pressure and airflow were performed. Sequence was composed by 5 breathes at 4 different resistances (2mm, 3mm, 4mm, 5mm). Success rate was defined as an expiratory pressure higher than 10cm H_2O.
Results: Depending on interface, significant differences (mouthpiece vs. facemask) were measured for Pe max (16.6cm H_2O±15.8 vs. 11.2cm H_2O±5.9; $p<0.001$), Pe mean (10.5cm H_2O±7.5 vs. 7.8cm H_2O±3.7; $p<0.001$), time spent with Pe>10cm H_2O (6.05s±7.75 vs. 3.88s±6.73; $p=0.006$) and inspiratory (3.65s±1.61 vs 4.32s±1.87; $p<0.001$) or expiratory (14.61s±8.76 vs 12.95s±8.22; $p=0.017$) time. Inter-subjects variability was significant for all measurements with facemask and mouthpiece. No difference in success rate (50% vs. 63%; $p=0.06$) was observed depending on interface.
Conclusion: Interface influences the expiratory pressure but the success rate is not modified.

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Comparison of two physiotherapic methods in bronchiectasis: Active cycle breathing technique (ACBT) and oscillating physiotherapy device

Hamid Reza Khoddami Vishteh, Fariba Ghorbani, Masoomeh Masoudnia, Saied Mahmoudian, Shadi Shafaghi, Katayoun Najafizadeh. *Lung Transplantation Research Center, National Research Institute of TB and Lung Disease, Masih Daneshvari Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran*

Background: Because of existence of various physiotherapeutic methods, selecting an effective and capable one is a major problem for the most of bronchiectasis patients. The aim of this study was comparison of two physiotherapeutic methods.
Materials and methods: In this cross-sectional study, 29 known bronchiectasis patients were selected. Each patient performed active cycle breathing technique (ACBT) method in one day and an oscillating physiotherapy device (RC-cornet®) method in the following day under supervision of a physiotherapist. Each physiotherapy session lasted for maximum of 30 minute and all expectorated sputum were collected for volume measurement. In addition, patients responded to 7 questions about each method satisfaction. Paired t test and McNemar test were used for comparison between two methods.
Results: The mean age of patients was 30 year and 16 (55%) were male. There were no significant differences between two methods in sputum volume (ACBT, 17.5±4 ml; RC-cornet, 18.6±4 ml, P=0.729). In addition, there were no significant differences between two methods in terms of understanding performing the method, expectorated sputum amount, time consuming, tedious, need of additional training session and overall satisfaction ($P>0.05$). However, patients believed that they can do physiotherapy with RC-cornet® method at home lonely than ACBT method (25 vs. 15, P=0.022).
Conclusion: Our findings showed that use of RC-cornet® at home is preferred by most of the patients. Since this method was more acceptable and preferable than ACBT for home usage, we highly suggest use of such convenient methods.