

The effectiveness of pursed lips breathing in the  
management of breathlessness in stable chronic  
obstructive pulmonary disease

Suzanne Emily Roberts

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## Abstract

**Introduction:** This dissertation aims to explore, in a clinical setting, the effectiveness of pursed lips breathing (PLB), in the management of dyspnoea in stable COPD.

**Methodology:** A mixed methodology that comprised a randomised controlled trial (RCT), a predominantly qualitative follow-up (FU) study and two measurement studies was used. The RCT intervention group was taught PLB at home over 8 weeks. Primary outcome measures were the Self Report Chronic Respiratory Disease Questionnaire (CRQ-SR) dyspnoea and mastery domains and Endurance Shuttle Walk Test (ESWT). The FU study investigated the long-term experience of PLB in a subset of RCT participants through telephone interview, focus group and observation of PLB technique at home visit. Prior to the RCT a study using limits of agreement (LoA) methodology was conducted to investigate reliability of hand-held spirometric measurement of inspiratory capacity (IC) with a view to using it as an outcome measure. Following the RCT a retrospective analysis of data collected from the ESWT was performed comparing a 1-walk protocol with the published 2-walk protocol.

**Results:** Forty-one patients with COPD were recruited to the RCT (PLB  $n = 22$ , control  $n = 19$ ); mean age 68 years (SD 11), mean FEV<sub>1</sub>% predicted 47% (SD 15.80) and 13 were approached to participate in the FU; 11 of 13 agreed to telephone interview, 5 to attend the focus group and 6 to home visit. The median time since learning PLB was 17 months (6 - 23). The **RCT** found no statistically significant difference between groups in the primary outcome measures and in retrospect was insufficiently powered. *Post hoc* analysis found effect sizes for primary outcome measures were: CRQ-SR dyspnoea 0.05, CRQ-SR mastery 0.48 and ESWT 0.44. For secondary outcome measures the PLB group showed a significant ( $p = 0.02$ ) improvement in oxygen saturation on ESWT. **Long-term follow-up** found 9 of 11 still used PLB, 8 reported definite benefit. Those using PLB used it for breathlessness with four themes identified: use of PLB with physical activity (8/11), to increase confidence and reduce panic (4/11), as an exercise (3/11), at night (3/11). Discontinuation of PLB (2/11) was due to no benefit. **Hand-held spirometric measurement of IC** found LoA for same-day IC measurement in healthy volunteers ( $n = 20$ )  $\pm 0.630L$  (95%CI  $\pm 0.255$ ) and over 3 weeks ( $n = 11$ )  $\pm 0.560L$  (95%CI  $\pm 0.326$ ). In COPD, same day LoA ( $n = 26$ ) were  $\pm 0.582L$  (95%CI  $\pm 0.169$ ) and over 6 weeks ( $n = 8$ )  $\pm 0.486L$  (95%CI  $\pm 0.302$ ). **Retrospective analysis of ESWT data** identified that completion rates improved by 17% for the 1-walk protocol but that the ceiling-effect was 12.2% compared to 7.3% for the 2-walk protocol. LoA between protocols when measuring change over time ( $n = 31$ ) was  $\pm 80\%$  (95%CI 25.56); less than the difference described as “somewhat better” (113%) following pulmonary rehabilitation (PR) but greater than the m.c.i.d. of 68%.

**Conclusions:** LoA for IC exceeded the clinically significant reported 0.3L; the protocol tested here was not sufficiently reliable for use as an outcome measure. Analysis of ESWT data showed the 1-walk protocol was adequate for identify change in clinical practice but, for research purposes the 2-walk protocol should be retained. From the RCT learning PLB resulted in reduced physiological stress with respect to oxygen desaturation when performing ESWT compared to the control group. Long-term follow-up showed that, in severe COPD perceived benefits persisted in 62% of patients.

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## Table of contents

Abstract	ii
Acknowledgments.....	iii
Table of contents.....	iv
Table of Figures.....	xi
Table of Tables.....	xiv
List of Appendices.....	xvii
List of abbreviations.....	xx
1 Introduction.....	2
1.1 Overview.....	2
1.2 Publications arising from the work presented in this dissertation.....	3
1.3 Context.....	4
1.3.1 COPD: incidence and burden.....	4
1.4 Pathophysiology of breathlessness.....	6
1.4.1 Definitions.....	6
1.4.2 Neuro-regulatory factors.....	7
1.4.3 Mechanical factors.....	7
1.5 Psychological factors.....	10
1.5.1 Summary.....	10
1.6 Overview of the management of breathlessness in COPD.....	10
1.6.1 Smoking cessation.....	11
1.6.2 Bronchodilator Therapy.....	11
1.6.3 Inhaled glucocorticosteroids.....	13
1.6.4 Reduction in exacerbation frequency.....	13
1.6.5 Pulmonary Rehabilitation.....	14
1.6.6 Oxygen supplementation and Non-Invasive Ventilation.....	14
1.6.7 Treatment of cor pulmonale.....	15
1.6.8 Opiates.....	15
1.6.9 Surgical interventions.....	16
1.7 Overview of physiotherapy management of breathlessness in COPD.....	17
2 Pursed lips breathing: Literature review.....	20
2.1 Introduction.....	20
2.2 Literature review methodologies.....	21
2.3 Results.....	22

2.3.1	2005 literature search findings.....	23
2.3.2	2008 Literature search findings .....	37
2.3.3	Discussion: 2008 literature search .....	48
2.3.4	Conclusion and implications for research.....	53
3	Outcome measures.....	56
3.1	Introduction.....	56
3.1.1	Use of literature searches and ICF to inform choice of outcome measures to investigate use of PLB in COPD.....	57
3.2	Methodology: measuring intervention in long-term conditions and outcome measurement in COPD .....	60
3.3	Results: measuring intervention in long-term conditions .....	61
3.3.1	Models for measuring outcome in long-term conditions management.....	61
3.3.2	Defining quality of life (QoL).....	62
3.3.3	The important domains of quality of life .....	62
3.3.4	Issues with quality of life measurement.....	63
3.4	Discussion: measuring intervention in long-term conditions .....	64
3.5	Conclusion: measuring interventions in long-term conditions .....	65
3.6	Results: measuring intervention in COPD .....	66
3.6.1	Factors effecting health related quality of life in COPD .....	66
3.6.2	Measuring health related quality of life in COPD .....	69
3.6.3	Characteristics of outcome measures.....	71
3.7	Discussion: measuring intervention in COPD .....	73
3.8	Conclusion: measuring intervention in COPD.....	74
3.9	Methodology: identifying specific outcome measures for PLB study.....	75
3.10	Results: identifying specific outcome measures for PLB study .....	76
3.10.1	Generic versus specific measures of health related quality of life.....	76
3.10.2	Disease specific measures of health related quality of life .....	76
3.10.3	Dyspnoea measures.....	77
3.10.4	Dynamic Hyperinflation .....	78
3.10.5	Exercise capacity .....	79
3.10.6	Anxiety and Depression.....	80
3.11	Description of outcome measures chosen for PLB study .....	80
3.11.1	Chronic Respiratory Disease Questionnaire (CRQ) .....	80
3.11.2	Endurance Shuttle Walk Test (ESWT) .....	82
3.11.3	Modified Borg scale of perceived breathlessness .....	84

3.11.4	Inspiratory capacity (IC) .....	85
3.11.5	Medical Research Council (MRC) dyspnoea scale.....	86
3.11.6	Hospital Anxiety and Depression Scale (HADS) .....	87
3.12	Discussion .....	88
3.13	Conclusion .....	88
4	Measurement of inspiratory capacity.....	94
4.1	Introduction: Dynamic Hyperinflation and Inspiratory Capacity .....	94
4.2	Methodology: Healthy volunteer study.....	95
4.2.1	Predicted inspiratory capacity .....	96
4.2.2	Statistical method.....	96
4.3	Results: Healthy volunteer study .....	97
4.3.1	Demographics .....	97
4.3.2	IC measurement .....	98
4.3.3	Limits of agreement between two operators measuring IC on the same subject on the same day .....	99
4.3.4	Limits of agreement for the same operator, 3 weeks apart .....	100
4.3.5	Summary of results .....	103
4.4	Introduction to Stable COPD study .....	104
4.5	Methodology: COPD study.....	104
4.5.1	Inclusion criteria: .....	105
4.5.2	Exclusion criteria: .....	105
4.5.3	Statistical Method: .....	105
4.6	Results: COPD study .....	106
4.6.1	Demographics .....	106
4.6.2	IC measurement .....	106
4.6.3	Same day limits of agreement.....	109
4.6.4	Limits of agreement over time .....	110
4.6.5	Summary of results .....	111
4.7	Summary of key results from both studies.....	111
4.8	Discussion of results from both studies .....	111
4.9	Conclusions.....	113
5	An investigation into the effects of PLB in stable COPD .....	115
5.1	Introduction.....	115
5.2	Summary of main study protocol.....	115
5.2.1	Population, study duration and description of intervention .....	115

5.2.2	Research questions and outcome measures .....	116
5.2.3	Summary of protocol .....	117
5.2.4	Inclusion criteria .....	117
5.2.5	Exclusion criteria .....	118
5.2.6	Permitted medication .....	119
5.2.7	Proscribed medications/therapies.....	120
5.2.8	Criteria for Discontinuation of Study Intervention .....	120
5.2.9	Substantial amendments.....	121
5.2.10	Statistical Considerations .....	122
5.2.11	Randomisation .....	123
5.2.12	Ethical approval .....	123
5.3	Methodology .....	124
5.3.1	Recruitment.....	124
5.3.2	Baseline assessment .....	125
5.3.3	Home Visit 1 (HV1).....	126
5.3.4	Intervention .....	127
5.3.5	Home Visit 2 (HV2).....	128
5.3.6	Discharge assessment.....	128
5.3.7	Statistical analysis .....	129
5.4	Results.....	130
5.4.1	Demographics .....	130
5.4.2	Exacerbations, deviations from protocol and adverse reactions .....	131
5.4.3	CRQ-SR analysis .....	134
5.4.4	Performance of ESWT .....	142
5.4.5	ESWT and associated secondary outcome measures analysis .....	142
5.4.6	Results of HADS score measurements .....	157
5.4.7	Results of MRC dyspnoea scale scores.....	159
5.4.8	Observed and subjective response to PLB at HV1 and HV2.....	159
5.5	Discussion .....	160
5.5.1	Study design.....	160
5.5.2	Study population .....	161
5.5.3	Study methodology .....	163
5.5.4	Study power .....	166
5.5.5	Effects of PLB used at rest.....	168
5.5.6	Changes in primary outcome measures .....	168

5.5.7	Predictors of benefit.....	171
5.6	Conclusion .....	171
6	Comparison of two ESWT protocols.....	173
6.1	Introduction.....	173
6.2	Methodology .....	174
6.2.1	Participants.....	174
6.2.2	ESWT protocols.....	174
6.2.3	Statistical analysis .....	175
6.3	Results.....	176
6.3.1	Demographics .....	176
6.3.2	ESWT completion rates .....	176
6.3.3	Ceiling effect for standard and 1-walk ESWT protocol .....	177
6.3.4	Floor effect for standard and 1-walk ESWT protocol.....	178
6.3.5	ESWT limits of agreement for same-day performance of standard protocol and 1-walk protocol .....	178
6.3.6	ESWT limits of agreement for percentage change measured by standard protocol and 1-walk protocol over 6 – 8 weeks.....	181
6.3.7	ESWT limits of agreement for percentage change measured by standard protocol and 1-walk protocol over 6 – 8 weeks, excluding outlier .....	183
6.4	Discussion .....	184
6.4.1	Limits of agreement when comparing change .....	185
6.4.2	Ceiling and floor rates.....	185
6.4.3	Implications of selection of second or longest ESWT as the test result .....	186
6.5	Conclusions.....	187
7	The long-term experience of COPD patients taught PLB .....	190
7.1	Introduction.....	190
7.2	Methodology .....	192
7.2.1	Study design.....	192
7.2.2	Ethical approval .....	193
7.2.3	Recruitment process.....	193
7.2.4	Telephone interview.....	194
7.2.5	Focus group.....	194
7.2.6	Analysis of interview and focus group .....	195
7.2.7	Home visit.....	195
7.2.8	Analysis of PLB observation .....	196



7.3	Results.....	196
7.3.1	Demographics .....	196
7.3.2	Perceived benefit from PLB.....	199
7.3.3	Recall of learning PLB.....	200
7.3.4	First reasons given for using PLB.....	201
7.3.5	Themes extracted from telephone interview transcripts .....	201
7.3.6	Focus group exploration of themes in relation to PLB use.....	202
7.3.7	Re-enforcement of initial PLB learning.....	203
7.3.8	Setting for learning PLB .....	204
7.3.9	PLB technique.....	205
7.3.10	Negative effects of PLB.....	206
7.3.11	PLB and short-acting bronchodilators .....	206
7.3.12	How PLB works.....	206
7.3.13	Observation of current PLB .....	207
7.4	Discussion .....	209
7.4.1	Study design.....	209
7.4.2	Role of the researcher .....	211
7.4.3	Validity and limitations.....	212
7.4.4	Expectations of PLB .....	214
7.4.5	PLB and subsequent attendance at pulmonary rehabilitation .....	214
7.4.6	Differences in reported experience with PLB .....	215
7.4.7	Variation in PLB technique .....	215
7.4.8	Unexpected findings .....	216
7.4.9	Characteristics of those reporting no benefit from PLB .....	217
7.4.10	Negative effects of PLB.....	217
7.4.11	Observations of Focus Group facilitator and scribe.....	217
7.5	Conclusions.....	218
8	Final Discussion .....	221
8.1	Context.....	221
8.2	Recently published studies.....	223
8.3	Impact of placebo effect.....	226
8.4	Findings for CRQ-SR .....	227
8.4.1	Dyspnoea domain.....	227
8.4.2	Mastery domain .....	230
8.5	ESWT and associated measures.....	230

8.6	Findings of qualitative study.....	231
8.7	Are we asking the right question?.....	232
8.8	Summing up.....	234
8.9	Conclusion .....	235
8.9.1	Reliability of hand-held spirometric measurement of inspiratory capacity .....	235
8.9.2	Requirement for two walks when conducting the ESWT.....	236
8.9.3	Benefit from PLB.....	236
9	References .....	239
10	Appendices .....	253
10.1	Appendix to chapter 2.....	253
10.2	Appendix to chapter 3.....	256
10.3	Appendix to chapter 4.....	272
10.4	Appendix to chapter 5.....	278
10.5	Appendix to chapter 6.....	304
10.6	Appendix to chapter 7.....	305