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

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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 FEV1% 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) ± 0.630L (95%CI ± 0.255) and over 3 weeks (n = 11) ± 0.560L (95%CI ± 0.326). In COPD, same day LoA (n = 26) were ± 0.582L (95%CI ± 0.169) and over 6 weeks (n = 8) ± 0.486L (95%CI ± 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 ±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
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
5.5.7 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
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.3</td>
<td>Results</td>
<td>196</td>
</tr>
<tr>
<td>7.3.1</td>
<td>Demographics</td>
<td>196</td>
</tr>
<tr>
<td>7.3.2</td>
<td>Perceived benefit from PLB</td>
<td>199</td>
</tr>
<tr>
<td>7.3.3</td>
<td>Recall of learning PLB</td>
<td>200</td>
</tr>
<tr>
<td>7.3.4</td>
<td>First reasons given for using PLB</td>
<td>201</td>
</tr>
<tr>
<td>7.3.5</td>
<td>Themes extracted from telephone interview transcripts</td>
<td>201</td>
</tr>
<tr>
<td>7.3.6</td>
<td>Focus group exploration of themes in relation to PLB use</td>
<td>202</td>
</tr>
<tr>
<td>7.3.7</td>
<td>Re-enforcement of initial PLB learning</td>
<td>203</td>
</tr>
<tr>
<td>7.3.8</td>
<td>Setting for learning PLB</td>
<td>204</td>
</tr>
<tr>
<td>7.3.9</td>
<td>PLB technique</td>
<td>205</td>
</tr>
<tr>
<td>7.3.10</td>
<td>Negative effects of PLB</td>
<td>206</td>
</tr>
<tr>
<td>7.3.11</td>
<td>PLB and short-acting bronchodilators</td>
<td>206</td>
</tr>
<tr>
<td>7.3.12</td>
<td>How PLB works</td>
<td>206</td>
</tr>
<tr>
<td>7.3.13</td>
<td>Observation of current PLB</td>
<td>207</td>
</tr>
<tr>
<td>7.4</td>
<td>Discussion</td>
<td>209</td>
</tr>
<tr>
<td>7.4.1</td>
<td>Study design</td>
<td>209</td>
</tr>
<tr>
<td>7.4.2</td>
<td>Role of the researcher</td>
<td>211</td>
</tr>
<tr>
<td>7.4.3</td>
<td>Validity and limitations</td>
<td>212</td>
</tr>
<tr>
<td>7.4.4</td>
<td>Expectations of PLB</td>
<td>214</td>
</tr>
<tr>
<td>7.4.5</td>
<td>PLB and subsequent attendance at pulmonary rehabilitation</td>
<td>214</td>
</tr>
<tr>
<td>7.4.6</td>
<td>Differences in reported experience with PLB</td>
<td>215</td>
</tr>
<tr>
<td>7.4.7</td>
<td>Variation in PLB technique</td>
<td>215</td>
</tr>
<tr>
<td>7.4.8</td>
<td>Unexpected findings</td>
<td>216</td>
</tr>
<tr>
<td>7.4.9</td>
<td>Characteristics of those reporting no benefit from PLB</td>
<td>217</td>
</tr>
<tr>
<td>7.4.10</td>
<td>Negative effects of PLB</td>
<td>217</td>
</tr>
<tr>
<td>7.4.11</td>
<td>Observations of Focus Group facilitator and scribe</td>
<td>217</td>
</tr>
<tr>
<td>7.5</td>
<td>Conclusions</td>
<td>218</td>
</tr>
<tr>
<td>8</td>
<td>Final Discussion</td>
<td>221</td>
</tr>
<tr>
<td>8.1</td>
<td>Context</td>
<td>221</td>
</tr>
<tr>
<td>8.2</td>
<td>Recently published studies</td>
<td>223</td>
</tr>
<tr>
<td>8.3</td>
<td>Impact of placebo effect</td>
<td>226</td>
</tr>
<tr>
<td>8.4</td>
<td>Findings for CRQ-SR</td>
<td>227</td>
</tr>
<tr>
<td>8.4.1</td>
<td>Dyspnoea domain</td>
<td>227</td>
</tr>
<tr>
<td>8.4.2</td>
<td>Mastery domain</td>
<td>230</td>
</tr>
<tr>
<td>8.5</td>
<td>ESWT and associated measures</td>
<td>230</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>8.6</td>
<td>Findings of qualitative study</td>
<td>231</td>
</tr>
<tr>
<td>8.7</td>
<td>Are we asking the right question?</td>
<td>232</td>
</tr>
<tr>
<td>8.8</td>
<td>Summing up</td>
<td>234</td>
</tr>
<tr>
<td>8.9</td>
<td>Conclusion</td>
<td>235</td>
</tr>
<tr>
<td>8.9.1</td>
<td>Reliability of hand-held spirometric measurement of inspiratory capacity</td>
<td>235</td>
</tr>
<tr>
<td>8.9.2</td>
<td>Requirement for two walks when conducting the ESWT</td>
<td>236</td>
</tr>
<tr>
<td>8.9.3</td>
<td>Benefit from PLB</td>
<td>236</td>
</tr>
<tr>
<td>9</td>
<td>References</td>
<td>239</td>
</tr>
<tr>
<td>10</td>
<td>Appendices</td>
<td>253</td>
</tr>
<tr>
<td>10.1</td>
<td>Appendix to chapter 2</td>
<td>253</td>
</tr>
<tr>
<td>10.2</td>
<td>Appendix to chapter 3</td>
<td>256</td>
</tr>
<tr>
<td>10.3</td>
<td>Appendix to chapter 4</td>
<td>272</td>
</tr>
<tr>
<td>10.4</td>
<td>Appendix to chapter 5</td>
<td>278</td>
</tr>
<tr>
<td>10.5</td>
<td>Appendix to chapter 6</td>
<td>304</td>
</tr>
<tr>
<td>10.6</td>
<td>Appendix to chapter 7</td>
<td>305</td>
</tr>
</tbody>
</table>