Relaxation therapies for asthma: a systematic review

A Huntley, A R White, E Ernst

Background: Emotional stress can either precipitate or exacerbate both acute and chronic asthma. There is a large body of literature available on the use of relaxation techniques for the treatment of asthma symptoms. The aim of this systematic review was to determine if there is any evidence for or against the clinical efficacy of such interventions.

Methods: Four independent literature searches were performed on Medline, Cochrane Library, CISCOM, and Embase. Only randomised clinical trials (RCTs) were included. There were no restrictions on the language of publication. The data from trials that statistically compared the treatment group with that of the control were extracted in a standardised predefined manner and assessed critically by two independent reviewers.

Results: Fifteen trials were identified, of which nine compared the treatment group with the control group appropriately. Five RCTs tested progressive muscle relaxation or mental and muscular relaxation, two of which showed significant effects of therapy. One RCT investigating hypnotherapy, one of autogenic training, and two of biofeedback techniques revealed no therapeutic effects. Overall, the methodological quality of the studies was poor.

Conclusions: There is a lack of evidence for the efficacy of relaxation therapies in the management of asthma. This deficiency is due to the poor methodological quality of the studies as well as the inherent problems of conducting such trials. There is some evidence that muscle relaxation improves lung function of patients with asthma but no evidence for any other relaxation technique.

Table 1  Relaxation therapies included in this systematic review

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacobsonian progressive relaxation</td>
<td>A routine of tensing, relaxing and attending the sensation of each of the 15 muscle groups</td>
</tr>
<tr>
<td>Hypnotherapy</td>
<td>Induction of a trance-like state of heightened suggestibility or compliance. The client passively receives ideas or instructions from the hypnotist similar to self-hypnosis involving a series of visual and sensory exercises; used to gain deep relaxation</td>
</tr>
<tr>
<td>Autogenic training</td>
<td>A technique learnt to monitor and gain control over automatic, reflex regulated body functions using information obtained from monitoring apparatus</td>
</tr>
<tr>
<td>Biofeedback training</td>
<td>Mental repetition of a mantra provided by the instructor to induce deep relaxation</td>
</tr>
</tbody>
</table>

Bronchial asthma is a multifactorial disease in which environmental, infectious, allergic, and psychological elements all play a part. There is evidence that emotional stress can either precipitate or exacerbate both acute and chronic asthma. Whatever precipitates an asthmatic attack, anxiety is likely to accompany it.

Mathe and Knappe found that psychological stress is associated with a decrease in airway resistance in non-asthmatic subjects but with an increase in those with asthma. Similarly, several investigators have shown that exercise leads to bronchodilation in non-asthmatic subjects but to bronchoconstriction in asthmatics. Thus, the physiological response of the asthmatic lung differs from that of the non-asthmatic lung. The hypothesis behind the studies described in this review is that relaxation therapies help patients with asthma to deal with their symptoms associated with anxiety and stress.

Using criteria generally applied to evaluation of asthma medication, it has been commented that, overall, the effects of relaxation therapy on asthma have not been of clinically significant magnitude.5 6 When used in conjunction with medication and as a component of a self-management programme, relaxation therapy has nevertheless been accepted as useful in the treatment of asthma.

The acknowledgement of the role of anxiety in asthma onset and exacerbation, and the fact that there is a large body of literature available on the use of relaxation techniques for the treatment of asthma symptoms, demand that this subject should be examined systematically. This systematic review therefore seeks to examine all randomised clinical trials (RCTs) of relaxation therapies to determine their effectiveness in the treatment of asthma.
suggestion or repetition of phrases aimed at a specific effect on asthma. Only RCTs (parallel or crossover designs) were included. There were no restrictions regarding publication language. Studies were included if they defined asthmatic subjects by American Thoracic Society (ATS) criteria or specified reversible airway constriction. Any studies involving experimentally induced asthma or patients suffering from other medical conditions in addition to their asthma were excluded, as were purely immunological studies.

Studies were included by agreement between the first two authors. All studies that met the criteria were read in full and data were extracted using purpose designed data forms, independently by the first two authors, any discrepancies being resolved by discussion. Their methodological quality was assessed according to the method of Jadad et al. The Jadad score is a method of quantifying the likelihood of bias in clinical trials which awards points for correct randomisation (2), blinding (2), and description of withdrawals and dropouts (1). The maximum score is 5, minimum 0.

The outcome measures extracted were lung function parameters, symptom diaries, medication usage, and asthma events (unscheduled visits to doctors, prescriptions of antibiotics or prednisolone, or days missed from school/work). The lung function tests extracted were, initially, as a “gold standard” for comparing the treatment group statistically with the control group and thus are included in tables 2, 3, and 4.

### RESULTS

Fifteen RCTs concerning relaxation therapies for treatment of asthma symptoms were identified. Five described progressive muscle relaxation, one described mental and muscular relaxation, three investigated the role of hypnotherapy and self-hypnosis, three involved autogenic training, two described biofeedback techniques, and one investigated transcendental meditation (TM). The overall quality of these studies was poor with only one study scoring 3 points on the Jadad score, eight scoring 2 points, five scoring 1 point, and one scoring zero points. Of these 15 studies, nine fulfilled our criteria for comparing the treatment group statistically with the control group and thus are included in tables 2, 3, and 4.

### Muscular/mental relaxation (table 2)

Alexander and coworkers investigated the short term effects of Jacobsonian relaxation or sitting quietly in 44 children with moderate/severe asthma in a home for chronic asthma sufferers. Mean PEFR was significantly increased in the treatment group compared with the control group (p<0.01), but the increase was not of clinical relevance (11%). In addition, a “relaxation thermometer” used to rate subjects’ feelings of relaxation after treatment showed a greater sense of relaxation in both groups with no significant difference between them.

In a study by Erskine and Schonell 12 adults with chronic asthma were allocated to either muscular and mental relaxation sessions followed by relaxation tapes for home use or to muscular relaxation without home practice. No significant changes in lung function or self-reports were seen in either group.

In a study by Hock et al 20 asthmatic boys attending a clinic received either Jacobson’s relaxation or assertive training. There were no significant differences between the groups at weeks 4 and 8. However, FEV1 values in the relaxation group improved by 17.7% by the end of training and were superior to the assertive training group (p<0.01) at 1 month follow up. The detail given in reporting these results was limited.
Relaxation therapies for asthma

Table 3

RCTs of hypnosis/self-hypnosis or autogenic training for asthma symptoms

<table>
<thead>
<tr>
<th>Study</th>
<th>Source</th>
<th>Sample size</th>
<th>Age range</th>
<th>Treatment</th>
<th>Control</th>
<th>Design</th>
<th>Primary measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anon</td>
<td></td>
<td>18 252</td>
<td>[10–60 years]</td>
<td>Multicentre two parallel groups</td>
<td>Hypnosis and self-hypnosis</td>
<td>a) no b) yes c) no d) yes e) 1 year f) no</td>
<td>FEV₁, Daily wheeze and medication diary</td>
<td>i) NSD ii) NSD iii) NSD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 i) FEV₁ Dropouts (DO)/withdrawals (WD) Jadad score</td>
<td>ii) NSD</td>
<td>i) NSD ii) NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deter and Allert</td>
<td>31 [16–60 years]</td>
<td>Three parallel groups</td>
<td>Waiting list control group</td>
<td>a) no b) yes c) no</td>
<td>info, discussion and systematic relaxation</td>
<td>i) NSD ii) NSD iii) NSD</td>
</tr>
</tbody>
</table>

Biofeedback training was used in a similar way by Coen et al. They investigated the long term effect of biofeedback induced facial relaxation on asthma symptoms in 33 children attending a clinic. They were allocated to either biofeedback for facial relaxation or control biofeedback for maintaining face tension at a stable level. It is unclear whether biofeedback was practised daily. Despite extensive analysis of lung function measurements, scoring for symptom severity, medication use and frequency of attack, no meaningful conclusions can be drawn from the data.

Biofeedback training was used in a similar way by Coen et al. Twenty subjects from a paediatric clinic with non-steroid dependent reactive airway disease were randomised to either biofeedback assisted facial muscle tension or the control group (telephone contact). Results showed decreased asthma severity (p<0.027) in the experimental group compared with baseline but not in the control group. No effect on pulmonary function was seen.

Studies with inadequate analysis

The following RCTs were located by our search but did not compare the outcomes in different groups statistically.

One hundred and six adults were involved in a three armed RCT by Lehrer et al in which progressive muscle relaxation, listening to relaxing music, and no treatment were assessed for their effect on asthma symptoms. There were no clinically relevant changes in any of the parameters measured in any group.

In a study by Loew and coworkers functional relaxation was investigated in a three armed crossover study compared with a placebo relaxation method and salbutamol. Eighteen children and adolescents attending a clinic with acute bronchial asthma undertook all three treatments at random. Both functional relaxation (14%) and salbutamol (32%) significantly improved Raw from baseline values (p<0.05 and p<0.01, respectively). The placebo relaxation method had no effect. However, functional relaxation was not significantly different from placebo treatment.

Hypnosis and autogenic training (table 3)

In a multicentre trial coordinated by Maher-Loughnan, the effect of hypnosis on asthma symptoms was examined over the period of 1 year in 252 children and adults with moderate, persistent, or severe asthma. Participants were randomised either to monthly hypnosis sessions and daily autohypnosis or to daily relaxation and breathing exercises (control group). Hypnosis significantly increased FEV₁ compared with baseline (p<0.05) but only by 4.3%. No significant change in FEV₁ occurred in the control group. The results from the daily wheeze and medication diaries for both groups showed an improvement but overall this was not significant.

Deter and Allert performed a three armed trial in which 31 adults with mild, medium, or severe asthma recruited from a clinic were allocated to either discussion and autogenic training, discussion and systematic relaxation, or to a waiting list control group. The study period was 1 year with a 1 year follow up. The only significant change following autogenic training and relaxation was the decreased use of sympathomimetics compared with baseline (p<0.05). There were no significant differences between the treatment and control groups for either lung function or use of sympathomimetics.

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Table 4. RCTs of biofeedback for asthma symptoms

<table>
<thead>
<tr>
<th>Source</th>
<th>Study design</th>
<th>Study group</th>
<th>Intervention</th>
<th>Main outcome measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kovacs et al.</td>
<td>Two parallel groups</td>
<td></td>
<td>Biofeedback for reducing dose of medication</td>
<td>Lung function tests, PEFR</td>
<td>No significant difference (NSD)</td>
</tr>
<tr>
<td>Coen et al.</td>
<td>Two parallel groups</td>
<td></td>
<td>Biofeedback for maintaining face tension at a stable level</td>
<td>Lung function tests, PEFR</td>
<td>No significant difference (NSD)</td>
</tr>
<tr>
<td>Ewer et al.</td>
<td>One group intervention</td>
<td></td>
<td>Biofeedback training for 15 min twice daily</td>
<td>Lung function tests, Medication</td>
<td>No significant difference (NSD)</td>
</tr>
</tbody>
</table>

DISCUSSION

Fifteen RCTs that investigated the effect of relaxation therapies on asthma symptoms were found in the literature. Nine of these compared the outcomes of treatment and control groups statistically. Data from some studies suggest that muscular relaxation may provide some improvement in lung function but that there was no evidence that hypnosis, autogenic training, or biofeedback are effective for asthma symptoms. The main limitation in the evidence overall is the poor quality of the trials. Only one of the 15 studies scored 3 points on
the Jadad scale. Other methodological weaknesses included small sample size, short study duration, inappropriate outcome measures, and incorrect statistical analysis. Many of the studies were short, five trials lasting 2 months or less. Sample size calculation was only reported in two of the 15 trials, and blinding of assessors, though highly desirable to reduce bias, was only described in three trials. In addition, the therapy may not have been applied optimally. It is important that the intervention is practised frequently, which only occurred definitely in nine of the trials. A particular difficulty with trials of relaxation techniques is finding an appropriate control intervention that is indistinguishable from the genuine intervention but inactive. Certainly the characteristics of an inactive control should take into account repeated daily practice as well as the same amount of time and therapist’s attention as the relaxation method under examination. It is possible that a truly inactive (placebo) control for relaxation is not achievable. This may partially account for the fact that, in the trials where the control intervention was possibly active—for example, massage, a new bronchodilator, or supportive psychotherapy—authors only reported improvements from baseline and not comparisons with control groups. Even if the control is only partially effective, large sample sizes will be required if the therapy is to be accurately assessed. Direct comparison with standard pharmaceutical asthma care is likely to be fruitless since the effectiveness of relaxation therapies is unlikely to be of the same order. However, relaxation therapies with even small effect sizes, if demonstrated reliably, might be cost effective as an adjunct to conventional pharmaceutical intervention.

There have been several other reviews on relaxation, psychoeducational, and behavioural therapies for the treatment of asthma symptoms. Most are non-systematic and the only previous systematic review included non-randomised trials. They all point out, as does this review, the methodological weakness of the majority of studies, in particular the fact that many do not distinguish between adults and children and between clinical conclusions and statistically significant data. However, they also concluded that psychological relaxation therapies have potential in asthma self-management and that these therapies warrant future research.

In conclusion, there is a lack of good quality evidence on which to assess the efficacy of relaxation therapies in the management of asthma. The existing evidence is seriously limited by poor quality. There is some evidence to suggest that muscular relaxation may warrant further investigation for the improvement of lung function in asthma patients, but the evidence for hypnotherapy, autogenic training, biofeedback, and transcendental meditation is less promising.

References

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Thorax 2002 57: 127-131
doi: 10.1136/thorax.57.2.127

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