

Buteyko: A useful tool in the management of asthma?

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Medical management of asthma focuses on drugs which, although effective, are costly and produce side-effects. Recent evidence suggests a role for breathing interventions that reduce total ventilation, such as the Buteyko method, which has strong similarities to techniques already used by therapists to manage hyperventilation. Both approaches should be made readily available to patients with asthma. Asthma nurses and therapists should consider these techniques to enable patients to 'step down' drug treatments in accordance with medical guidelines. This may involve a re-thinking of their role, from one where the main emphasis is on supporting the established medical model towards one that also offers a non-pharmacological alternative.

This article explains the aims of Buteyko and discusses the increasing evidence base for methods that reduce ventilation and may benefit many patients with asthma, not just those with established chronic hyperventilation.

Key words: Buteyko, asthma, non-pharmacological, hyperventilation, diaphragmatic breathing

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Therapists and nurses have historically played a role in the management of asthma symptoms through methods such as breathing control (formerly diaphragmatic breathing), exercise programmes and sputum clearance techniques. However, their current role within the NHS is mainly one of supporting medical management through advice and education.

Breathing modifications have also been taught to people with asthma by complementary therapists using yoga, the Alexander technique and the Buteyko breathing technique (BBT). The medical approach has been based almost entirely on pharmacological methods since the introduction of inhaled bronchodilators and steroids, and complementary therapies are not considered to have sufficient evidence to warrant their recommendation by the medical profession (Scottish Intercollegiate Guidelines Network and British Thoracic Society, 2003).

Drug therapy, however, does have its problems. Estimated costs of asthma management are £850 million a year, with prescription charges being particularly costly (National Asthma Campaign, 2001). There is some evidence that the overuse of asthma medications such as bronchodilators can be counterproductive and may contribute to increased death rates (Abramson et al, 2001). Inhaled steroids are associated with a number of side-effects including dysphonia, oral thrush and possible detrimental effects on bone density with long-term use (Scottish Intercollegiate

Guidelines Network and British Thoracic Society, 2003). Adherence to inhaled steroid prescriptions is a significant problem as highlighted by Gruffydd-Jones et al (2000), who found only 34% of patients surveyed used a regular preventer as advised by their medical practitioners.

A survey by Ernst (2000) found one third of asthma respondents reported using breathing exercises to relieve their symptoms, suggesting that non-pharmacological alternatives remain attractive to patients. Holloway and Ram (2002) highlighted this increased demand for non-pharmacological approaches and recommended the need for more research into these techniques. Now may be the time for those working with patients with asthma to reconsider their role as providers of these alternatives in addition to supporting the established medical model.

BUTEYKO

The BBT was developed in Russia by Dr Buteyko during the 1940's and offers patients a strategy to reduce their asthma symptoms by teaching them to 'breathe less'. The main aims are to reduce total ventilation (minute volume) during practice sessions, reset the respiratory control centre and control the 'drive to breathe' in the longer term. Another important aim is to encourage nose breathing rather than mouth breathing and techniques to clear the nose are taught to facilitate this (Motin, 1999)

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This approach acknowledges that breathing patterns are well-entrenched habits that need perseverance, practice and repetition to bring about meaningful change. A clear, detailed and well-structured programme is provided, which includes measurable goals, encouraging motivation through feedback. The current programme advocated by the Buteyko Breathing Association recommends a minimum of 5 hours contact time for individual supervised teaching, supplemented by at least 1 hour of independent practice a day (Brindley and Oliver, 2002).

A reduction in ventilation is achieved either by reducing the tidal volume and adding pauses at the end of expiration (reduced breathing) and/or by reducing the respiratory rate through slow, timed breathing using the same tidal volume (Brindley, 2002). Periods of breath holding (control pauses and extended pauses) enable patients to tolerate increasing periods of air hunger, which reduces their drive to breathe and gives them a target which can be progressively increased over time. It is possible that the respiratory centre learns to accept a reduced minute volume, allowing patients to control the tendency for hyperventilation during an asthma attack, thus preventing the attack from developing.

BREATHING TECHNIQUES THAT REDUCE VENTILATION

There is increasing evidence that techniques that reduce total ventilation are of benefit in helping to control the symptoms of asthma. Although early studies on the effectiveness of BBT and pranayama yoga were inconclusive, a number have shown potential benefits that warrant further research (Ernst, 2000; Holloway and Ram, 2002).

Bowler et al (1998) found that patients with asthma were able to reduce their bronchodilator medication and improve quality of life scores with BBT as compared with a control group that received relaxation and abdominal breathing from a physiotherapist. They suggest that hypoventilation was a key element in achieving these effects as the BBT group achieved a significant reduction in minute volume compared to the controls. Problems with initial patient selection and lack of adequate control may have affected the validity of this research. However, the findings were supported by Opat et al (2000), who also found a significant improvement in quality of life and a significant reduction in the use of inhaled bronchodilators with BBT (via a video) compared with a placebo video.

McHugh et al (2003) studied 38 patients and found a large, clinically significant reduction in

inhaled bronchodilator and inhaled steroid use in the BBT group compared to a control group that received a standard asthma education programme. Cooper et al (2003) also found a reduction in bronchodilator use and asthma symptoms in BBT patients compared with those trained with the Pink City Lung Exerciser (Pulmotech, Jaiper) and a placebo control group. However, no reduction was seen in asthma exacerbations or airway hyperresponsiveness and the authors conclude that BBT may help patients adapt to asthma and feel more in control of their symptoms, rather than altering the underlying disease process. Although it was difficult to blind patients and researchers effectively, this was a well controlled study with 69 patients studied over a 6-month period.

Reduction in bronchodilator use has been challenged as an appropriate outcome measure for BBT, since BBT actively encourages this, resulting in an inequality between the BBT and the control group (Thomas et al, 2003). Buteyko practitioners advise using bronchodilators only when necessary (i.e. when asthma symptoms are present and not subsiding) and it could be argued that this advice should be given to patients anyway, in accordance with current guidelines (Scottish Intercollegiate Guidelines Networks and British Thoracic Society, 2003). The protocol used by McHugh et al (2003) ensured that advice regarding medication use was closely matched between the BBT group and the control group and their results were very similar to those of Bowler et al (1998) and Cooper et al (2003), adding strength to the evidence for the technique.

Other studies have also found benefits in methods such as yoga and physiotherapy breathing retraining aimed at reducing ventilation. Nagarathna and Nagendra (1985) found improvements in the number of attacks from asthma, scores for drug treatments and peak flow rate with yoga exercises, including pranayama breath slowing techniques. Manocha et al (2002) found improvements in airway hyperresponsiveness and some aspects of quality of life in a yoga-trained group where participants were taught a form of meditation that the authors claim can lead to a reduction in tidal volume and respiratory rate. This randomized controlled trial was affected by fairly high drop-out rates in the yoga group, which may have affected the outcomes.

Thomas et al (2003) also found a significant improvement in quality of life in asthma patients with symptoms of disordered breathing (chronic hyperventilation) following physiotherapy intervention aimed at reducing ventilation. This was a single practice study with one physiotherapist providing the treatment, so the findings may not be

transferable to other settings. However, when considered in context with the other positive findings, the overall evidence in favour of techniques that reduce ventilation is difficult to ignore.

CHRONIC HYPERVENTILATION AND ASTHMA

The above evidence strongly suggests that techniques aimed at reducing ventilation in patients with asthma may be of benefit, although the theory underpinning this approach remains controversial. The initial theory put forward by Dr Buteyko (Kazarinov, 1990) claimed that the effects of BBT resulted from increases in carbon dioxide levels as a result of hypoventilation, although this explanation has not been supported by research.

Al-Delaimy et al (2001) found no improvements in exercise-induced asthma with patients breathing higher levels of carbon dioxide and claimed that rises in carbon dioxide were an unlikely explanation for the effects of BBT. However, their protocol resulted in an increase in minute volume in the intervention group, which does not occur with BBT and may have countered any beneficial effects from the carbon dioxide itself.

The lack of an acceptable theory may be one reason why the medical profession have not pursued approaches that encourage hypoventilation. Current medical opinion regards such techniques as only appropriate for asthmatics identified as dysfunctional breathers, also known as chronic hyperventilators (Keeley and Osman, 2001; Thomas et al, 2001; Morgan, 2002).

Dysfunctional breathing is becoming a recognizable syndrome and treatment aims to reduce minute volumes and reset the drive to breathe, thereby reducing sensitivity to carbon dioxide (Bradley, 2002). Hough (2001) highlights the overlap between hyperventilation and asthma and suggests that therapists use the Nijmegen questionnaire to identify those patients who are chronic hyperventilators – the implication being that these are the patients likely to benefit from an approach like BBT.

Innocenti (2002) acknowledges that the treatment of hyperventilation may be used for patients with asthma but states that the relationship between hyperventilation and asthma is ambiguous, and this approach may not be appropriate for all. One study by Thomas et al (2001) found a prevalence of around one third of women and one fifth of men with asthma with scores indicative of dysfunctional breathing. However, Keeley and Osman (2001) argue that the actual prevalence is less than this.

Medical research has focused on methods for identifying those with chronic dysfunctional

breathing (such as the Nijmegen questionnaire) and doctors are unlikely to refer asthmatics for hyperventilation management unless they have this evidence. Unfortunately, since the clinical tests used to diagnose dysfunctional breathing have not been widely accepted and the syndrome itself remains controversial (Keeley and Osman, 2001; Morgan, 2002), it is difficult to verify the actual prevalence. This remains a significant stumbling block to any move away from reliance on pharmacology alone (Morgan, 2002).

Is it appropriate to only consider those with dysfunctional breathing as suitable candidates for this approach, however? It is accepted that patients usually hyperventilate acutely initially during an asthma attack (Morgan, 2002) and Hurwitz et al (1995) demonstrated that acute voluntary hyperventilation causes bronchoconstriction in people with asthma. Teaching patients to reduce their minute volume and their drive to breathe may enable them to control hyperventilation and maintain nose breathing even when challenged by an asthma trigger. This might reduce the extent of subsequent airway obstruction through simple physical effects.

Moloney et al (2002) found dehydration of the expired air of asthmatics admitted to the emergency department during an acute attack and suggest that rehydration be considered as a potential adjunct to treatment. Slow controlled nose breathing is less likely to allow cold, dry, dirty air to enter the lower respiratory tract. Even in the absence of chronic hyperventilation, such techniques could prove beneficial to any patient with asthma and there is now evidence to support further work and investment in this area.

DIAPHRAGMATIC BREATHING: WHAT IS THE RELATIONSHIP WITH BBT?

Breathing control is a method traditionally taught by physiotherapists to help control asthma symptoms (Innocenti, 1974; Hough, 2001). It is aimed at relaxation and gentle abdominal breathing and increases the contribution of the diaphragm to inspiration, while reducing the relative contribution of the upper chest and accessory muscles. It has not been determined whether this also reduces the minute volume as with BBT, or whether it actually increases it.

A leading BBT practitioner advises asthmatics not to use physiotherapy as he claims 'physiotherapy involves teaching you to breathe more deeply' (Stalmatski, 1997). He further argues that 'breathing from the diaphragm is not going to make you healthier unless you are advised to breathe less, not more'. Further investigation into the effects of

breathing control on minute volume is necessary in order to respond to this challenge.

CONCLUSION

There is evidence to support strategies aimed at reducing total ventilation and this should be considered an important aim of treatment in long-term asthma management. Strategies for managing hyperventilation could be promoted for the benefit of all patients with asthma, not just those who have demonstrable disordered breathing (chronic hyperventilation). BBT can provide additional skills to enhance the effectiveness of this approach.

A change in emphasis towards teaching long-term preventative techniques rather than simply supporting the current use of medication could have implications for the role of the asthma nurse and/or the deployment of increasing numbers of therapists into primary care. Kellet and Mullan (2002) have highlighted the advantages in taking an approach that encourages self-management and reduces the cost of medication. Respiratory nurses and therapists could play an important role in promoting empowerment for patients with asthma, but this will depend on where they believe their future professional priorities lie. **IJTR**

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KEY POINTS

- Many people with asthma are looking for non-pharmacological alternatives to manage their symptoms.
- The Buteyko breathing techniques teach patients how to reduce their total ventilation and 'breathe less'.
- Buteyko breathing techniques help patients to reduce their bronchodilator medication and improve their quality of life.
- Reducing total ventilation may help patients control asthma symptoms, even if they do not have the signs and symptoms of chronic hyperventilation.
- Traditional breathing techniques such as diaphragmatic breathing need to be investigated for their effects on total ventilation.
- Asthma nurses and respiratory therapists should consider their role in promoting non-pharmacological approaches to asthma.

Clinical

COMMENTARIES

Non-pharmacological means of managing asthma deserve further attention. The fact that they have received little consideration to date is in no small part due to reluctance of the medical profession to expand their conceptual framework from the limiting biomedical model to a systems-based approach within the fuller biopsychosocial model (Engel, 1977).

With Buteyko breathing technique (BBT) intervention taking place within a classroom setting, it is essentially a psychosocial intervention and does not fit into the biomedical framework, where the working assumption is one of inflammation in the airways *causing* asthma. Under a biopsychosocial construct, inflammation of the airways is *associated* with asthma in a feedback loop, as may also be the case for other factors.

Factors associated with inflammation of the airways are still worthy of

consideration, but not to the exclusion of other variables that may also influence clinical outcomes. As commented on in this article, hypoventilation exercises, nose breathing, hydration, meditation and diaphragmatic breathing may be such factors in play with asthma and possibly BBT.

In a recent meta-analysis, Salpeter et al (2004) found that regular use of β_2 -agonists produced tolerance to their bronchodilatory effect within 1 week. The meta-analysis of 22 trials concluded that regular use of β_2 -agonists leads to increased airway inflammation and worsening of asthma control.

Given the pro-inflammatory potential of β_2 -agonists and in light of the fact that all published randomized controlled trials of BBT (Bowler et al, 1998; Cooper et al, 2003; McHugh et al, 2003) have revealed impressive (85–100%)

reductions in the use of such medication, the likelihood that BBT can lead to long-term reduction in β_2 -agonist use clearly merits further investigation.

BBT has been criticized for not producing improvements in objective outcome measures of lung function. It is noteworthy that barely a handful of studies have shown improved lung function in asthma when inhaled corticosteroids are used early in the diagnosis of asthma and there is no concurrent or previous use of β_2 -agonists (Haahtela et al, 1994).

Any improvement or preservation in lung function appears to be lost with the introduction of regular β_2 -agonist therapy. A trial where BBT is used early in the diagnosis of asthma and before introduction of β_2 -agonist therapy may be necessary to observe improvements in lung function to appease the 'diehard biomedicalists'.

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Complementary medicine has attracted considerable media attention over recent years, but its importance in disease management remains controversial.

Many patients are keen to minimize their use of medication and understandably express interest after seeing claims about the great benefits of some complementary therapies. Medical professionals are often sceptical and require 'proof' that may sometimes be unrealistic or incompatible with the way the complementary technique is practiced.

Complementary therapists may not understand the traditional research process or perceive that the medical profession does not view them sympathetically. Budget holders will be interested in the cost implications of any treatment. Research funding is difficult to obtain and studies challenging to design.

In this article, the author looks at the evidence from seven studies of breathing techniques including Buteyko, yoga and physiotherapy

breathing retraining in patients with asthma. She concludes that we should promote such breathing techniques designed to reduce ventilation and make them available to all patients with asthma.

Are these conclusions valid? There are still few randomized trials and these vary in design and in the methods of breathing retraining, with some studies having a small number of participants: attempts to deal with the perennial problems for complementary medicine of how to provide effective blinding and the choice of a control group has had varying success.

Several outcome measures are often assessed, increasing the chances of 'false positive' results. Finally, some results are inconsistent between studies, making it difficult to assess the effectiveness or to judge if one method is more beneficial than another.

Overall, however, there do appear to be some favourable trends across the studies, particularly with reduced symptoms and use of reliever medication – both

important endpoints. There is, however, little evidence to suggest that the techniques alter the underlying disease process. The physiological basis has received little research and we do not actually know if reduced ventilation is achieved as only one study has measured this.

Breathing exercises are not an easy option. They will not suit everyone, requiring dedication both to learning the technique and the subsequent practice. It is questionable whether someone who is not compliant with use of regular prophylactic medication would be so with a demanding breathing exercise regimen.

Patients may benefit from the techniques while taking part in a study but may not continue with them after it is completed, and so longer-term observational studies are required on the cost effectiveness and safety.

We also need studies to determine whether some types of patients are more likely to benefit and respiratory therapists and

nurses could certainly get involved in this area.

It may be possible to develop effective, simplified versions of the techniques. For example, many breathing therapies advocate breathing through the nose rather than the mouth, and there are good reasons to think this could have beneficial effects.

In conclusion, until more is known, we need to keep an open mind – but breathing techniques such as Buteyko may help patients feel more in control of their asthma with a resulting reduction in symptoms and use of reliever medication. Therefore, they may be worth trying if patients are well informed, sympathetic to the ethos behind the technique and are willing and able to spend time learning and practising it.

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