

clinical review

Sleep apnoea

A survey of breathing retraining

By Mary Birch

A Russian breathing retraining method, called the 'Buteyko Method' has been used in Australia for over 20 years. Initially this method was used mainly for asthma, and several clinical trials have demonstrated considerable benefits in preventing and reducing asthma symptoms and in reducing the need for asthma medication. Increasingly the method is also used for sleep apnoea, as the number of people diagnosed with this condition has increased due to more readily available polysomnography (sleep studies). No clinical trials of breathing retraining have been conducted for sleep apnoea.

A 20-page report published online in May 2012 incorporates a survey of Buteyko Institute practitioners' experiences in teaching breathing retraining to clients with sleep apnoea. Results suggest breathing retraining using the Buteyko Institute Method (BIM) may offer an alternative approach to current therapies such as CPAP (continuous positive airway pressure) machines or oral devices such as mandibular advancement splints, if successful clinical trials are conducted (Birch 2012). Based on the survey results, the Buteyko Institute is currently seeking sleep researchers to conduct independent clinical trials on the method in Australia and overseas.

Buteyko Institute practitioners who responded to the survey provided estimated outcomes

from their individual practices. The practitioners who provided data had collectively taught the method to over 11,000 clients with sleep apnoea. The majority of responses came from Australia, with other responses from several countries including New Zealand, Canada, the United Kingdom and the United States.

Survey results

The majority of practitioners who responded estimated following BIM breathing retraining courses:

- Over 95% of clients with sleep apnoea had improved sleep.
- Approximately 80% of clients had been able to cease use of their CPAP machine or oral appliances.
- Symptoms such as snoring, headaches, restless legs, low concentration levels and decreased energy levels also improved in the majority of clients.

Disordered breathing patterns and sleep apnoea

Author, registered nurse and breathing retraining consultant Mary Birch, conducted the survey in 2010 on behalf of the Buteyko Institute and compiled the report. The report analyses the relationship between disordered breathing patterns and sleep apnoea and suggests hyperventilation, either in chronic or intermittent form, may be a key factor in sleep apnoea aetiology and pathophysiology. Hyperventilation may be defined as:

"A pulmonary ventilation rate

that is greater than metabolically necessary for the exchange of respiratory gases. It is a result of an increased frequency of breathing, an increased tidal volume or a combination of both, and causes an excessive intake of oxygen and the blowing off of carbon dioxide." (Mosby's Medical & Nursing Dictionary 1986).

A decrease in carbon dioxide levels reduces the body's ability to release oxygen from red blood cells, due to the 'Bohr effect', which is described in standard physiology textbooks. The report suggests decreased carbon dioxide levels associated with hyperventilation may trigger apnoea (upper airway obstruction). When the upper airway is obstructed due to apnoea, carbon dioxide levels increase. Increased carbon dioxide levels lead to improved oxygenation and homeostasis when normal breathing resumes following an apnoea. Therefore, apnoea could be viewed as a response to hyperventilation, the report contends.

In addition, excessive air intake can cause collapse of the airway due to accelerated airflow or excessive negative pressure. The Venturi effect and the Bernoulli principle are two basic principles of fluid flow which are considered to play a part in airway collapse in sleep apnoea (Sankar 2011). The Bernoulli principle can be illustrated by a drinking straw. If excessive negative pressure is generated within the straw, it collapses. However, as the negative pressure decreases, the straw becomes more rigid and does not collapse.



Buteyko Institute and the Buteyko Institute Method

The Buteyko Institute of Breathing and Health (BIBH) is an Australian-based not-for-profit professional organisation founded in 1996, which regulates and represents practitioner members in Australia and overseas. The Buteyko Institute Method of breathing retraining taught by BIBH practitioners is based on the work of Russian physiologist and medical doctor, the late Professor Konstantin Pavlovich Buteyko, who started developing the method in the early 1950s.

The objective of the Buteyko Institute Method of breathing retraining is to normalise the breathing pattern in every respect. It incorporates client education and breathing retraining exercises which aim to:

- improve the breathing volume, rate and rhythm;
- improve posture and promote correct use of the diaphragm and breathing muscles; and
- restore comfortable nose-breathing.

BIM courses also incorporate lifestyle changes and provide guidelines and strategies aimed at improving sleep and eliminating symptoms. Changing breathing patterns requires time and effort on the part of the client. The breathing retraining exercises are performed regularly on a daily basis until breathing is improved, symptoms are eliminated and normal breathing patterns become automatic during the day and while sleeping.

Sleep-disordered breathing

Central sleep apnoea (CSA) and obstructive sleep apnoea (OSA) are considered to be two forms of sleep-disordered breathing (SDB). Obstructive sleep apnoea, the most common form of sleep apnoea (Baldwin and Quan 2002) is a condition characterised by repetitive episodes of complete or partial upper airway obstruction during sleep (ie. apnoea or hypopnoea), producing repetitive episodes of arousal or semi-arousal from sleep and hypoxemia (reduced oxygenation) (Quan 2009). Central sleep apnoea is characterised by the periodic occurrence of apnoea in association with loss of ventilatory motor output (Badr 2005).

Sleep apnoea is associated with numerous clinical co-morbidities such as hypertension, and vascular and cardiovascular disease (National Health and Medical Research Council 2000). It is also associated with an increase in road accidents due to daytime sleepiness. Although conditions such as obesity and anatomical changes within the upper airway have been identified as potential contributing factors for some people with sleep apnoea, the underlying aetiology and pathophysiology of sleep apnoea are unknown. Reduced upper air-

way dimensions and altered tissue mechanics are considered to play a part but do not suffice to explain the upper airway collapse which occurs during OSA, according to Gaudette and Kimoff (2010).

Conclusion

The report contends given the results of the sleep apnoea survey, the relationship between disordered breathing patterns, hyperventilation and sleep apnoea warrants further study; and the role of breathing retraining using the Buteyko Institute Method for sleep apnoea needs to be scientifically evaluated. If clinical trials are successful, this method could provide an additional approach for people who cannot tolerate CPAP or who would prefer not to use equipment or devices to alleviate their sleep apnoea.

The full report and survey results are available at: www.buteyko.info

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