A ROLE FOR BREATHING ASSESSMENT AND RETRAINING AS AN ADJUNCT IN ASTHMA MANAGEMENT

Asthma management – looking to the past

Breathing exercises as taught by respiratory physiotherapists were a central part of asthma strategies prior to the 1980s. With the advent of more effective asthma drugs at that time there was a trend toward pharmacologic centred management and breathing exercises went out of favour.

While the breathing exercises recommended at that time may have conferred some benefit, there was an emphasis placed on big volume breathing, which can exacerbate asthma symptoms and may explain why these exercises are no longer prescribed. 1

This report aims to re-establish a role for breathing assessment and retraining as an adjunct in the management of asthma and other respiratory disorders. The primary goal of breathing retraining in this context is to normalise each aspect of the breathing pattern (rate, rhythm, volume, mechanics and use of the nose), for all situations (awake, asleep, at rest, during eating, speech and exercise).

The specific goal of breathing retraining is to achieve physiologically normal breathing. 2

Physiologically normal breathing

There is wide variation in what is quoted today as a normal respiration rate with up to 20 breaths per minute accepted as normal. For example, one contemporary medical text gives 12 to 20 breaths per minute for the typical respiratory rate for a healthy adult at rest. 3 Another gives normal resting breathing rates between 10 and 14 breaths per minute. 4 However, the established physiological norm for adult respiration rate is 8 to 12 breaths per minute. 5

Generally accepted criteria for physiologically normal breathing at rest, when sleeping and up to moderate levels of physical exertion are:

- Rate: 8-12 breaths per minute for an adult (higher for children). 5
- Minute volume: 4-6 litres of air per minute with an average tidal volume of 500 ml.
- Mechanics: Diaphragmatic – 80 per cent of breathing effort at rest should be diaphragmatic with minimal engagement of upper chest and accessory breathing muscles.
- Rhythm: Rhythmic, smooth and regular.
- Sound: Inaudible.
- Route: Nasal for inhalation and exhalation – Air flows in through the nose, where it is warmed, filtered and humidified before being drawn into the lungs.

Sources for physiologically normal breathing. 5 6 7 8
Typical baseline breathing pattern in asthma

There is now a substantial body of evidence that dysfunctional breathing patterns including chronic hyperventilation (over-breathing) are characteristic of baseline breathing in people with asthma. Hyperventilation is a mechanism that is often overlooked in asthma. It has been suggested that hypocapnia is the rule in asthma until respiratory failure sets in. In the first trial of the Buteyko method of breathing retraining for asthma in the western world the average minute volume of participants identified with asthma was 14 litres. Hyperventilation, whether spontaneous or exercise induced, is known to cause asthma.

Hyperventilation as referred to here is a pattern of over-breathing, where the depth and rate are in excess of metabolic needs of the body at that time.

Hyperventilation as a possible mechanism for asthma

Loss of carbon dioxide through hyperventilation can trigger bronchoconstriction.

Loss of carbon dioxide through hyperventilation can trigger mast cell degranulation and histamine production.

In a study of 101 asthmatic patients during acute attacks of bronchospasm: hypoxia was observed in 91 subjects and 73 showed hypocapnia and respiratory alkalosis. Carbon dioxide retention was found in 11 patients but only at extreme degrees of obstruction.

Despite the lack of published literature, it is logical to surmise that over-breathing could potentially trigger asthma in susceptible individuals by delivery of excess allergens and germs and by dehydration of airways resulting in excess mucus production. Mouth breathing and excessive breathing volume also override normal nasal filtration and humidification of inhaled air contributing to airway trauma and possible inflammation.

A role for breathing retraining in prevention and management of asthma

There is now a significant body of published evidence showing that breathing retraining can help reduce both the symptoms of asthma and the need for both bronchodilator and inhaled corticosteroid medications.

In addition to this, research has demonstrated measurable and sustained improvements in asthma control and lung function coinciding with increased end-tidal CO₂ as measured by capnometry.

The 2016 edition of the Scottish Intercollegiate Guidelines Network (SIGN 153) in the 2016 British Guideline on the Management of Asthma states: “Behavioural programmes centred on breathing exercises and dysfunctional breathing reduction techniques (including physiotherapist-delivered breathing programmes such as the Papworth method, and the Buteyko method) can improve
asthma symptoms, quality of life and reduce bronchodilator requirement in adults with asthma, although have little effect on lung function.

These techniques involve instruction by a trained therapist in exercises to reduce respiratory rate, minute volume and to promote nasal, diaphragmatic breathing. Trials that include more than five hours of intervention appeared more likely to be effective. They can help patients’ experience of their condition and quality of life although do not affect lung function or airway inflammation. They should ideally be provided as part of integrated medical care.

Breathing exercise programmes (including physiotherapist-taught methods) can be offered to people with asthma as an adjuvant to pharmacological treatment to improve quality of life and reduce symptoms.  

In summary

Breathing retraining techniques can be applied in helping in the relief of acute asthma symptoms as well as long term management and prevention of asthma. Breathing retraining is complementary to standard medical treatment of asthma.

Call to action

That screening for mouth breathing, upper chest breathing and other signs and symptoms indicative of breathing pattern dysfunction be included as part of routine health/medical assessment in general practice.

That comprehensive breathing retraining services be made widely available in the public health sector throughout New Zealand.

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