

ACPWH CONFERENCE 2008

Dysfunctional breathing for women's health physiotherapists

L. Stonehewer

Physiotherapy Department, Birmingham Heartlands Hospital, Birmingham, UK

Abstract

Hyperventilation is a debilitating condition that affects up to 10% of the population and has a wide range of symptoms. Dysfunctional breathing can have many different causes, including: respiratory conditions such as bronchiectasis, asthma or chronic obstructive pulmonary disease; neurological conditions such as multiple sclerosis, muscular dystrophy or stroke; musculoskeletal conditions such as kyphoscoliosis; psychological disorders such as anxiety or stress; and pregnancy since hyperventilation is seen more frequently in women. Women's health physiotherapists have a unique and important role to play in the prevention of dysfunctional breathing.

Keywords: dysfunctional breathing, hyperventilation, women's health physiotherapy.

Hyperventilation is a debilitating condition that affects up to 10% of the population and has a wide range of symptoms. It is not a new condition, being first recognized in soldiers during the American Civil War. Hyperventilation is more common in women than men during times of peace, but this bias changes during wars. The condition has been given many names over the years, from Da Costa's syndrome or soldier's heart to hyperventilation or dysfunctional breathing. This variation in names has not always helped to clearly define the disease and the symptoms associated with it.

The definition of dysfunction is 'impairment or abnormality of the functioning of an organ' (Robinson & Davidson 1996), and therefore, dysfunctional breathing is an abnormal pattern of breathing. Hyperventilation is breathing in excess of the body's metabolic demands.

So what is normal breathing? It should be quiet, rhythmical and via the nose. During inspiration, the diaphragm should be responsible for 80% of the activity, but expiration should be passive. The rate of breathing should be between 10 and 15 breaths per minute, with a tidal volume of 400–500 mL per breath. This gives a

minute volume of 5–6 L, which is the amount of air that passes in and out of the lungs per minute at rest, and is the measure that is of most importance.

Dysfunctional breathing can be any variation from the above; it is extremely common and, in many cases, totally symptom-free. The condition can have many different causes, including: respiratory conditions such as bronchiectasis, asthma or chronic obstructive pulmonary disease; neurological conditions such as multiple sclerosis, muscular dystrophy or stroke; musculoskeletal conditions such as kyphoscoliosis; psychological disorders such as anxiety or stress; and pregnancy.

A change in breathing pattern is a normal reaction to physical and emotional stress or strain, and only becomes abnormal when it causes symptoms, which can be either acute or chronic. Acute symptoms such as fainting are easily recognized, but chronic symptoms can be insidious and hard to detect.

The symptoms of chronic hyperventilation can be attributed to hypocarbia. The body releases too much carbon dioxide by over-breathing, leading to a respiratory alkalosis and raised pH. This hypocarbia then has an effect on many of bodily functions, including: increased nerve cell activity, which causes tingling sensations and can also lead to jumpy, twitchy

Correspondence: Louisa Stonehewer, Senior Physiotherapist, Physiotherapy Department, Birmingham Heartlands Hospital, Bordesley Green East, Birmingham B9 5SS, UK (e-mail: louisa.stonehewer@heartofengland.nhs.uk).

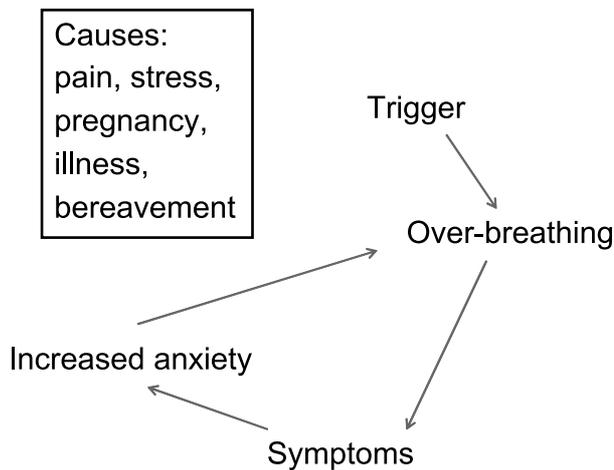


Figure 1. The vicious cycle of chronic hyperventilation.

muscles; sympathetic nervous system stimulation, leading to increased release of adrenalin; lactic acid production (to balance the lowered pH), causing or leading to cramps and fatigue; and constriction of the smooth muscle in both the lung, leading to bronchoconstriction, which manifests as a tight chest, and the bowel, which can manifest as irritable bowel symptoms. The uptake of oxygen into the blood is also affected, which causes symptoms of feeling ‘detached from reality’ and ‘foggy-headed’.

The physical symptoms of chronic hyperventilation are diverse and can manifest in many ways. The most common are: (1) breathlessness, which is varied, undue, and often described as ‘air hunger’ or an inability to take a satisfying breath; (2) cough, which is dry and irritable; (3) fatigue, which can lead to poor sleep and lack of concentration; (4) musculoskeletally related aches and pains, and sometimes weakness; (5) neurologically related pins and needles, and dizziness; (6) gastrointestinally related bloatedness; and (7) cardiac chest pains.

Unfortunately, a vicious cycle develops where unexplained and unpleasant symptoms lead to many expensive and unnecessary investigations, which usually come back negative, causing more uncertainty, which results in more stress and over-breathing (Fig. 1).

Assessment of hyperventilation is done subjectively and objectively. Subjectively, the patient will usually have a complex past medical history and describe feelings of tiredness, and undue breathlessness or asthma-type symptoms that are often unresponsive to inhaled treatment. Of the few validated objective measures available, the Nijmegen Questionnaire (van Doorn *et al.* 1982; HENHST 2008) is quick and simple to use,

and therefore, is perhaps the most frequently employed assessment. Signs to be aware of in the clinical setting are rapid speech patterns, frequent sighing, yawning, coughing or giggling (all ways of reducing CO₂), noisy breathing, an inability to relax, with poor posture and hunched shoulders. Treatment consists of education about the causes and effects of hyperventilation, including the fight-or-flight response, breathing retraining and relaxation, management of any underlying conditions (e.g. pain or chronic illness), and general advice on a healthy, well-balanced life-style.

Women’s health physiotherapists have a unique and important role to play in the prevention of dysfunctional breathing. Pregnancy does many things to the body, including changing the shape of the diaphragm and, during labour, altering its function. Postnatally, women are routinely instructed in how to assist the recovery of the pelvic floor and transverse abdominal muscles, but perhaps not the diaphragm. If the diaphragm is ignored at this stage, it may become a ‘fixer’ from which all the other core stabilizers will pull from, rather than having an active part in core stability. While attempting to ‘feel the tummy moving’ during breathing exercises, it is very common for people to take in a big breath, rather than a small but deeper breath. This increases their minute volume and may lower their CO₂ levels in the long term, possibly causing chronic hyperventilation syndrome.

Ensuring that a patient can use her diaphragm before teaching the routine postnatal exercises will help. The common commands seem to be ‘pull up from the pelvis and then make sure you are breathing into your tummy’. Changing this command to ‘make sure you are breathing into your tummy and then pull up’ might make all the difference, since the patient may then be more aware that she is unable to feel the ‘normal’ breath and must work on this first before trying to flatten her stomach enough to get into her still-too-tight jeans. Any constriction around the abdomen, such as jeans or ‘tummy-flattering pants’, can, of course, make diaphragmatic breathing even harder!

Other postpartum influences, such as bigger breasts, carrying a fragile baby, pushing a pram, and lifting car seats in and out of a vehicle are all going to influence posture and breathing. Psychological and hormonal changes leading to ‘baby blues’ or postnatal depression can all contribute to ongoing breathing problems that may not manifest themselves for many years.

One of the effects of adrenalin is to stimulate the bladder, which may lead to frequency of micturition, and therefore, improving breathing patterns may help, by raising the CO₂ levels and, thus, reducing the stimulation of the sympathetic nervous system. A raised CO₂ level will also reduce smooth muscle constriction in the bowel, thereby easing constipation.

Further advice, including a list of physiotherapists who treat hyperventilation and dysfunctional breathing (PH 2008), can be obtained from the Physiotherapy for Hyperventilation website (www.physiohypervent.org).

References

Heart of England NHS Trust (HENHST) (2008) *Nijmegen Questionnaire*. [WWW document.] URL http://www.heartofengland.nhs.uk/upload/HoE/chestclinic/Nijmegen_Questionnaire.pdf

Physiotherapy for Hyperventilation (PH) (2008) *Physiotherapy Directory*. [WWW document.] URL <http://www.physiohypervent.org/contacts.html>

Robinson M. & Davidson G. W. (eds) (1996) *Chambers 21st Century Dictionary*. Chambers Harrap, Edinburgh.

Van Doorn P., Folgering H. & Colla P. (1982) Control of the end-tidal PCO₂ in the hyperventilation syndrome: effects of biofeedback and breathing instructions compared. *Bulletin Européen de Physiopathologie Respiratoire* **18** (6), 829–836.

Louisa Stonehewer is a senior physiotherapist at the Heart of England National Health Service Foundation Trust, Birmingham, UK. She has been involved in the management of people with chronic breathlessness for nearly 20 years.