

If the title of this article stirs your curiosity, hopefully by the end all should be clear, and you will understand just how increased levels of pain, soft-shelled eggs and how you breathe - are all linked.

With implications ranging from increased fascial and muscular tone, to colonic spasms, menstrual distress, pseudo-angina attacks, epileptic seizures, profound fatigue, muscle cramps, brain-fog, lowered pain thresholds, sympathetic arousal, increased sensitivity to light and sound, and feelings of extreme anxiety - I hope you will see that I am not exaggerating when I say this is a topic worth understanding! This is a subject that is likely to be particularly relevant to anyone who works with vulnerable, chronically painful and fatigued individuals - or who is someone who fits that description.

Why Me?

Before making these connections, though, I need to offer a brief summary of a personal health episode. I have shared this information with various audiences before when attempting to highlight just how powerful and immediate the effects of respiratory alkalosis can be.

Back in 1998, I had flown from London to Edinburgh to make a video for my publishers to accompany my book on Muscle Energy Techniques. It was a long day in a hot studio, accompanied by time pressures relating to the need to complete the shoot on time, and I had a plane to catch. I had skipped breakfast, consumed more coffee than usual, and had forgotten to drink enough water.

These details are all relevant to what followed, as will become clear. Around mid-afternoon, I felt a strange sensation in my left leg. A mild tingle was passing down toward the foot, before fading away. This repeated itself a number of times over a period of an hour or so, but I paid little attention and focused on the details of the video shoot.

The next day, safely back in London, the same mild symptom became more insistent

and frequent, and then started to affect my left arm as well. Within an hour or so, it was accompanied by a strong spasm of the left leg and arm muscles, and finally of the whole left side of my body, including my face. This experience convinced me I was having a stroke, and so I headed rapidly to the emergency room of my local hospital (St. Mary's, Paddington, London).

To cut a long story short, I was admitted to a neurological ward, spent a week being prodded, poked, observed and investigated - including a battery of neurological tests, cardiac investigations, blood tests and MRI scans. Nothing was found to be abnormal (not bad for a 60-year-old!). Finally, an enlightened neurologist had me wired up to an ECG machine, and asked me to breathe rapidly for two minutes. Within 30 seconds, all of my symptoms came back, with a severe contracture affecting my left side from face to foot.

"Ah" said this gifted consultant: *"Your problem is hyperventilation. Go away and learn how to breathe."*

I did.

This life-changing experience turned out to be a turning point in my life and career focus. As a moderately successful osteopath and naturopath, I had long been aware of the importance of balanced breathing and had written about it in relation to stress management. But now, following this episode (which has never recurred), the topic became a virtual obsession.

Now, when I feel I need to study a subject deeply, I write a book about it – so the end result of this experience was a text co-authored with physical therapist Dina Bradley and psychologist Chris Gilbert. (Chaitow et al 2002)

I have spent the past ten years with breathing pattern disorders as a top priority (for myself and my patients), and have studied as many aspects of breathing dysfunction and rehabilitation as I could. I am convinced this should be among the most important aspects of the work of all those engaged in health care, particularly manual therapists.

Alkalosis

So, what actually happens when we overbreathe? I will try to summarize a

complicated sequence:

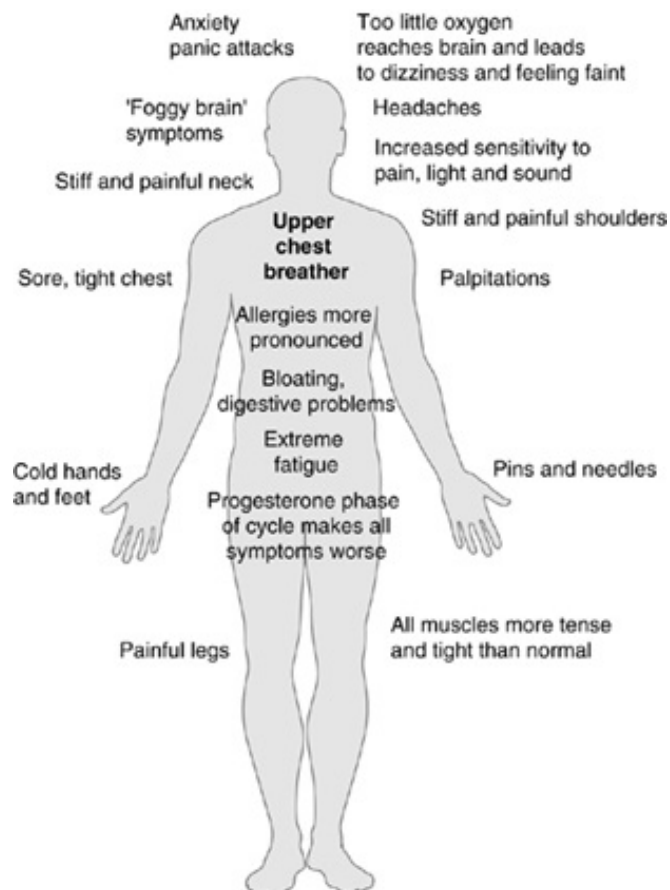
- As we exhale, we eliminate carbon-dioxide (CO₂). This is recruited from carbonic acid that circulates in the blood.
- If breathing is more rapid than is ideal for the current needs of the body, we lose too much CO₂ (and therefore carbonic acid), and the blood becomes more alkaline than normal. (Lum 1994)
- This creates a state of *respiratory alkalosis*: the blood's pH moves from a normal of around 7.4 to perhaps as much as. Not much change, you might say, but what a difference it makes, and the effects are dramatic.
- Anxiety appears (and therefore, so does even faster breathing) - aggravating the feelings of anxiety or even panic. (Macefield & Burke 1991, Han et al 1996)
- Smooth muscles constrict - and since these surround all of the "tubes" of the body, this creates a narrowing of blood vessels and interferes with normal digestion and bladder function. (Ford et al 1995)
- A process known as the Bohr effect starts, causing the red blood cells to bind more tightly to the oxygen molecules they carry.
- This means not only less blood gets to the brain and muscles, but also less oxygen is released by the blood that does get through, creating profound fatigue and a lack of mental clarity or "brain-fog." (Timmons & Ley 1994)
- Sympathetic arousal occurs, creating altered neural function - more rapid reflex functions, lowered pain threshold, and sensitivity to all stimuli (Winters & Crago 2000)
- Balance is disturbed. (Aust & Fischer 1997)
- The kidneys try to rebalance the increased alkalinity by excreting bicarbonates, and a generalized imbalance occurs in the calcium and magnesium levels in the body, causing even more neurological mayhem, with cramps and spasms becoming more likely, accompanied by numbness, pins and needles and possibly pain. (Macefield & Burke 1991)
- These changes provide a superb environment for the evolution of myofascial trigger points, as these are known to evolve in ischemic tissues where oxygen

levels are low. (Perri & Halford 2004)

- All these changes are more prevalent in women, and are more severe in the post-ovulation phase of the menstrual cycle. (Damas-Mora 1982)

All these changes are anxiety provoking, which does little to calm the breathing rate! Chronic fatigue and chronic pain problems (such as fibromyalgia) are characterized by just such breathing patterns, as are a host of other health problems, most of which can at the very least be improved by better breathing, while many can be completely eliminated. (Sachse 1995, Brucini et al 1982)

All of these symptoms are more likely in deconditioned individuals (i.e. people not undertaking aerobic activity), because of the way their cells produce ATP (energy) in an anaerobic environment, creating acid wastes that then further stimulate the breathing rate.(Nixon & Andrews 1996)



The symptoms deriving from upper-chest, rapid breathing patterns may be caused, or may be exacerbated by the physiological effects of these patterns, that result in respiratory alkalosis and all that follows.

How Widespread Are BPDs?

Breathing pattern disorders or BPDs (about which the notes above offer a description) are up to seven times more common in women and are more likely during the post-ovulation/premenstrual period because of increased progesterone levels.(Damas-Mora 1982)

And they are much more likely to manifest when blood sugar levels are low.

Remember my lack of breakfast, my coffee intake and dehydration? (Brostoff 1992)

It has been estimated that the symptoms of at least 10 percent of all people seeking medical advice in the U.S. are the result of a BPD.(Lum 1984, Lum 1994, Nixon & Andrews 1996)

Habit

Why do so many people breathe in an upper-chest, rapid pattern? There are many reasons for feeling anxious and stressed, or holding an "image" posture with a protruding chest and flat stomach, or of having mild asthmatic tendencies. But according to experts who have spent their professional lives studying breathing pattern disorders in general and hyperventilation in particular, whatever the background or original trigger, the main cause is pure habit. (Lum 1994)

As a person becomes habituated to shallow breathing, the body learns to tolerate very low levels of CO₂ in the blood and this becomes the "normal" for that person. In order to maintain this low CO₂ level, rapid upper chest breathing is necessary.

Relearning to tolerate higher levels of CO₂ is a useful part of breathing retraining, achieved by focus on a slow exhalation and sometimes by specialized breath holding exercises based on the Russian Buteyko system. (Buteyko 1990, Faling 1995)

It's useful when thinking about the "habit" of upper chest breathing to think of another common habit: poor posture. The slouched, round-shouldered, chin-poked, belly-sagging posture of so many people is something of which practitioners are all

too aware.(Timmons & Ley 1994)

How do you change poor posture into better posture?

By retraining (such as the Alexander technique), combined with appropriate therapeutic interventions to stretch tight muscles and tone weakened ones, often aided by home-work such as Pilates-type exercises. Slowly, over a period of months, it often is possible to turn poor posture into better, or even good, posture.

Exactly the same applies to breathing pattern disorders.

Manual therapy/massage methods are helpful in preparing the structures for better breathing and the person needs to do homework to reestablish a better pattern.

This has, in many studies often involved severely anxious hyperventilators or people with severe balance disorders, taken up to six months to normalize, with some people improving within a few weeks. (Han et al 1996, Pryor & Prasad 2002)

Asthma

Mild forms of asthma and hyperventilation are almost identical, and the diagnosis given depends on the particular training of the doctor making the call. This can be pretty important because mild hyperventilation is curable, while a diagnosis of asthma often is a sentence to a lifetime of medication. (Lum 1996)

The Fascial Connection

As mentioned earlier, contractile smooth muscle cells have been found to be present in enormous numbers in most connective tissue. Their main function appears to be that, following injury, proliferation occurs allowing them to act as architectural supports to the damaged tissue as it heals. (Kinner & Spector 2002)

The cells in connective tissue, like other contractile smooth muscle cells, are affected by changes in pH (as in respiratory alkalosis), suggesting that a generalized increase in fascial tone occurs as pH rises, making all muscles feel more tense and impacting directly on musculoskeletal integrity.

Just how much effect pH changes have on these cells remains a matter of ongoing research. (Yahia et al 1993, Hastreite et al 2001, Ahluwalia 2001)

A Fowl Story

During the 1980s, a commercial egg farmer noticed his hens were laying soft-shelled eggs. The birds were being housed in very crowded and hot conditions, and the option of making them free range or installing air-conditioning was not economically possible. Veterinary experts decided that, as the birds were obviously hyperventilating, their calcium metabolism was disturbed, leading to the egg problem. They provided the hens with carbonated water (CO₂ dissolved in water), and shortly after that, the egg quality returned to normal. (Odom et al. 1985)

What we can learn from this is that the symptoms of hyperventilation (calcium disturbance in this instance) can be modified by biochemical interventions. The farmer's problem was solved, but the stress of the chickens was untouched.

Other choices might have been tried - for example calming music, soothing aromas, massage, cranio-sacral therapy or even reflexology - any or all of which might well have had a calming effect, resulting in slower breathing. But what would have really helped the chickens was unavailable (free range life, air conditioning, etc).

Now consider the stressed, highly pressured patients, with multiple minor symptoms who consult complementary manual therapists.

Through massage and/or reflexology and/or aromatherapy these complex, highly Stressed, individuals can probably be offered safe, symptomatic relief and moments of calm, helping them cope with their own version of the hell the chickens were enduring.

But what would help them most would probably be a cash infusion, a new job, a new hip, possibly a new relationship/spouse - or some other life-changing event that cannot be provided.

However such individuals can be taught to respond to the stress/pain/fatigue differently - perhaps through methods such as cognitive behavioral therapy or counseling, and of course - fundamentally - they can learn how to breathe differently.

Further Reading: Chaitow L Bradley D Gilbert C 2002. *Multidisciplinary Approaches to Breathing Pattern Disorders*. Churchill Livingstone, Edinburgh.

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