"HEALTHY BREATHING"

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OPTIMISE YOUR BREATHING AND GAIN CONTROL OF YOUR HEALTH USING

THE BUTEYKO BREATHING METHOD.

'GOOD BREATHING, LIKE GOOD NUTRITION ' is breathing that meets the body's needs and provides optimal conditions for health. It doesn't mean that the more you breathe the better off you are, any more than the key to good nutrition is not eating more. In fact, one of the most potent healing tools is the restricted diet or fasting. It may be that you need to breathe less, but that the breathing should be of a better quality and more appropriate to your body's energy expenditure.
This article is based on the discoveries and clinical observations of Russian physician Dr Konstantin Pavlovich Buteyko about the use of breathing as a tool for overcoming the symptoms of disease and for enhancing health.

The common perception is that the more we breathe, the better we live. Over fifty years ago, Dr Buteyko observed, after many years of research, that the sicker people became, the larger volume of air they needed to breathe and that bringing the volume of their breathing back to normal led to elimination of their symptoms and control of their disease process. He then developed the following concept: the more you breathe, the closer you are to death, while the less you breathe, the longer you will live.

To many people, this statement appears at first to be absurd and to go against basic intuitive knowledge. However, Dr Buteyko developed a method of breathing based on training people to use a lesser volume of air effectively which is one of the most potent means of correcting body physiology and eliminating disease that I have come across. In a short period of time, it dramatically affects the health of people with asthma, allergies, cardiovascular disease, high blood pressure, immune problems, sleep apnoea, chronic fatigue syndrome and stress aggravated conditions.

Research conducted in Brisbane in 1995 showed that asthmatics using this form of breathing were able to reduce their use of bronchodilator medication by 90 per cent and of steroid drugs by 49 per cent compared to asthmatics that were taught normal physiotherapy breathing exercises. Doctors working with this breathing method in Russia demonstrated that blood pressure levels consistently drop to normal if blood pressure is too high. Russian research also showed that the breathing normalises the immune system of people who suffer from respiratory and allergic diseases and of people whose immune systems have been damaged by radiation. Different forms of breathing therapy have existed across many cultures and many ages. In China, breathing is a major part of the self development and healing art of Qi Gong. In India, Pranayama forms a major part of the practice of yoga. Qi Gong and Pranayama use conscious focus on and control of the breath to heal disease, access the life force, elevate the spirit and calm the mind. It is interesting that practitioners of these arts have claimed success in helping sufferers with the same types of disease processes as those seen to be helped by the Buteyko method of breathing.

It seems from research into these different types of breathing that the physiological changes that ultimately occur are similar, despite the fact that Qi Gong and yoga breathing are associated with deep, slow breathing while Buteyko breathing uses breath holding and the controlled reduction of ventilation. Proponents of the Buteyko method would say that this method is quicker and more direct because of the role of carbon dioxide in body physiology, and that it is therefore more effective in achieving the aim of optimising breathing and body physiology.

The functions of breathing

The functions of breathing or respiration are:

1. To provide oxygen for the production of energy in the aerobic pathways of the cell's mitochondria (which are responsible for respiration and energy production).
2. To help keep the correct pH levels in the body.
3. To maintain enough carbon dioxide for bodily functions.

Most people, including many trained health professionals, think that the purpose of breathing is to get enough oxygen or as much oxygen as possible. They are not aware of the need to maintain the correct balance between oxygen and carbon dioxide (and probably between oxygen and the body's own protective anti-oxidant systems). If our bodies are depleted of carbon dioxide because of overbreathing, we are unable to use oxygen properly.

Overbreathing therefore leaves us depleted of oxygen in the tissues. People who overbreathe feel breathless and are unable to take a deep breath.

One of the fundamental qualities of our physical being is our ability to maintain a steady state despite all the changes that go on within and around us. This ability is called homeostasis. Our temperature, acidity and alkalinity, resting heart rate, weight, balance of hormones and blood sugar tend always to stay very close to an established normal range. The reason that life is so good at maintaining homeostasis is that if we step outside fairly narrow parameters of normality, we become ill or die. One of the most important of these parameters is our pH or state of acid/alkaline balance, which controls most of the chemical reactions in our body.

Our bodies will maintain normal pH through retaining adequate levels of that much maligned, but highly essential, gas produced by the body's energy metabolism, carbon dioxide (C02).

A number of the chemical reactions in our body which sustain the processes of life are dependent on there being adequate levels of C02. If an imbalance occurs between the levels of oxygen and carbon dioxide, all the functions of breathing become disturbed.

What is bad/good breathing?

Most people whose body, mind or spirit is out of balance will hyperventilate or overbreathe with lots of short chest breaths that leave them depleted of CO2 and therefore not utilising oxygen properly. Good breathing, according to the standards of medical texts and the World Health Organisation is about four to six litres of air per minute.

Between attacks, people who regularly suffer from asthma breathe about fifteen litres per minute. During attacks, they go up to twenty seven litres per minute. Reducing the ventilation levels of asthmatics to nine litres per minute reduces their need for medication by 90 per cent.

The better your breathing, the less breaths per minute you need to take. Twelve breaths per minute would be about the upper limit of what you should be breathing. Less than that is better. When doing focused, relaxed breathing, you should be able to reduce your breaths per minute to four.

Bad breathing tends to be localised in the upper chest and rapid chest breathing is the hallmark of classic hyperventilation or overbreathing.

People who overbreathe usually say that they can't take a full or satisfying breath and run out of breath easily. They feel they need to breathe more but, if they try, can't sustain it or find that it makes them feel worse.

Exercise or exertion in people who overbreathe can lead to anxiety palpitations, chest tightness or a whole range of other symptoms associated with overbreathing. Medical texts sometimes refer to the inability to exercise in these people as effort syndrome. Effort syndrome and hyperventilation are associated with excess production of lactic acid and excess loss of CO2.

Good breathing uses the diaphragm rather that the chest. The effects of this are to allow slower, fuller breaths. Hyperventilation is much less likely to occur in people who use the diaphragm to breathe. The movement of the diaphragm massages the abdominal organs and by equalising the pressure difference between the thoracic and abdominal cavities, prevents the upward movement of organs such as the stomach and gall bladder, helping to correct acid reflux and gall bladder problems.

Good breathing keeps the level of carbon dioxide in your lungs at about 5.5 to 6.5 per cent. Healthy, strong people breathe less at rest and during sleep but they can breathe deeply and get as much air as they need to if they exert themselves or just want to take a deep breath. People with good breathing always breathe through their nose. Mouth breathing tends to make you overbreathe: the body responds by restricting breathing even more. It does this by making more mucous and creating swelling in the nasal passages and spasm in the muscles of the bronchi.

People with good breathing do not get breathless when they need to hold their breath or run. Also stress does not destabilise their breathing or their nervous system because good breathing increases their resistance to stress.

People who breathe badly tend to be oversensitive to CO2 as a trigger to breathe. This is known as high ventilation response to C02. People with incorrect breathing and hyperventilation are very quick to respond to any increase in levels of CO2 with increased respiration, thereby overbreathing and depleting CO2 levels. People with good breathing tend to be normal responders to C02. People with exceptional endurance and stamina probably have a low ventilation response to C02. They do not hyperventilate under stress or when physically exerting themselves and their ability to release oxygen from the red blood cells to the tissues is enhanced.

Symptoms of disease as defence mechanisms against hyperventilation and loss of C02

One of the most common manifestations of bad breathing is the presence of what Dr Buteyko calls defensive reactions against the loss of C02. These are reactions that the body creates to limit the loss of C02 and appear as symptoms of disease. He lists quite a number of these but the most obvious are conditions where we see an increased level of mucous, spasm and swelling in the airways such as sinusitis, nasal polyps asthma and chronic bronchitis. According to Dr Buteyko the restrictions created in the nose and airways are created in response to the body's need.

Asthmatics and people with other nasal and respiratory disorders can learn to quickly open their airways just by reducing their breathing or by holding their breath in order to raise CO2 levels.

Great physicians of the past like Hippocrates and Paracelsus said that we must understand and follow the will of nature and not attempt to control it. If it is the will of nature to reduce the loss of CO2 by constricting the airways and correction of the CO2 levels leads to an

elimination of symptoms, we are doing one of the most effective things in natural healing - eliminating the cause of a condition. Anyone with experience in natural healing will tell you that causes of disease are often many and this case is no exception. However, normalising breathing helps us to break many of the vicious cycles that perpetuate disease processes in the body.

The validity of Dr Buteyko's observations and theories on the presence of defensive reactions against the loss of CO2 is supported by the rapid relief of symptoms seen when we breathe in such a way that CO2 levels increase. Learning to control symptoms with breathing is always best done with an experienced Buteyko practitioner.

Testing your breathing and levels of C02

Research done by Dr Buteyko in the 1960s showed that the levels of CO2 could be tested very accurately and easily by measuring the length of time that subjects could hold their breath without forcing or straining after a relaxed or normal expiration. He found that if C02 levels were normal, the person could hold their breath for forty seconds. He considered optimal levels of C02 to be 6.5 per cent of alveolar air and this correlated to a breath-holding period after expiration of sixty seconds. Many asthmatics cannot hold their breath for longer than ten seconds and even people without overt respiratory disease may only be able to hold it for ten seconds before gasping for air. Training ventilation response to CO2 with breathing exercises will increase the time that the breath can be held.

How and why does breathing become abnormal?

Most of us are totally unaware of breathing. That is as it should be, considering what an effort it would be to have to re- member to breathe 70,000 times per day. We breathe the way we breathe because of unconscious mechanisms.

Stress, anxiety and emotions all stimulate our breathing rate and heart rate. The strongest immediate stimulus to our breathing comes through stress from our sympathetic nervous system, our fight or flight response. Our nervous system gears us up to flee or fight by increasing our heart rate and our breathing. However, we mostly sit and endure whatever our stressor is behaving in the socially appropriate way rather than as our animal natures dictate. Our physiology therefore begins to adapt to this state of abnormal arousal which is not discharged by physical activity. If our breathing stays in this increased state our body maintains the physiological effects of the stress response long after the stressful event has passed. A number of psychological and personal growth therapies use breathing to affect the psyche. The reason for this is that breathing effects emotion as much as emotion affects breathing. Our anxiety makes us breathe more rapidly and our rapid breathing keeps us in a state of metabolic imbalance where CO2 levels are too low and oxygen utilisation is poor. Low levels of carbon dioxide make our nervous system more excitable. Our brain wave patterns change reflecting low levels of oxygen uptake due to low levels of CO2. Depression has been shown to be associated with low brain oxygen and subsequent brain wave changes.

Exercise, or lack of it, can affect our breathing. If we don't exercise or exercise too strenuously, particularly while mouth breathing, we worsen the effects of stress on our bodies and begin to make what should be a passing state of sympathetic nervous system dominance into a prolonged and persistent situation. Aerobic exercise training is helpful because it increases our tolerance to CO2. However, exercise that is too strenuous for our level of fitness will make us hyperventilate. It is my belief that incorrect breathing is one of the major factors in over-training syndrome, with loss of CO2 being one of the major factors in loss of glutamine, thereby effecting the immune and energy systems. Healthy people make 93 per cent of their energy aerobically and the rest anaerobically. Bad breathing can decrease the amount of energy we make aerobically to 84 per cent. It is the aerobic pathways that make CO2 and use oxygen. Anaerobic energy metabolism is much more inefficient and much more destabilising to homeostasis than aerobic metabolism.

When we make energy anaerobically we use no oxygen and make lactic acid as a by-

product. Lactic acid is known to stimulate breathing, contributing to hyperventilation. This leads to a situation where bad breathing itself causes the production of a substance that leads to more bad breathing.

One of the primary factors affecting breathing is what happens in the cell, how well oxygen is used to make energy. When cellular metabolism is inefficient because of toxic overload, disease or deficiency of vitamins, minerals and possible essential fatty acids, our aerobic cellular metabolism becomes impaired.

The modern Western diet of processed food contributes to bad breathing. Dr Weston Price, in his book Nutrition and Physical Degeneration, showed that when people used to a traditional unprocessed diet ate processed foods such as white flour and sugar, their children showed the classic signs of mouth breathing such as a long narrow face and narrowed upper jaw. They began to develop what we would call orthodontic problems with crowding and crossing of the teeth, protruding or under- developed lower jaws. Previous to this, all the people in the fourteen different cultures that he studied had shown perfect facial structures, with broad faces that allowed plenty of room for nasal breathing and showed no sign of dental malformation. Medical authorities all over the Western world are aware that the rate of asthma is doubling every ten years, as is its severity. People in more primitive societies show very low levels of asthma. A study done on the differences in asthma incidence between East and West Germany showed that there was a four times greater incidence of asthma in the more affluent West Germany. My feeling is that the high level of calories from fat and sugar with relatively low micro-nutrient levels leads to an inefficiency of the cellular respiration mechanism and contributes to overbreathing. The processed diet of the world's affluent countries provides the conditions that lead to metabolic inefficiency and subsequent breathing problems. Depleted levels of carbon dioxide lead to further cellular metabolism inefficiency.

Carbon dioxide is one of the most powerful regulators of the aerobic energy pathway in the cell. Liver cells in a medium containing CO2 show a sevenfold increase in metabolic activity in the aerobic pathways compared to cells in a medium which has the same pH but uses phosphate buffers. The fact that carbon dioxide is used in reversible chemical reactions in the aerobic energy pathways is not mentioned in many biochemistry text books but it is written about and discussed extensively by Dr Buteyko. He describes in detail how C02 takes part in the regulation of numerous key points of metabolism and respective physiological functions of the organism. Low levels of C02 may lead to an inefficiency of cellular respiration that perpetuates bad breathing, creating the need in the body for defensive mechanisms to retain CO2.

A raised level of acidity will have the effect of increasing breathing and aggravating hyperventilation. Acidity happens because of disease, mineral deficiency excess protein and grain in the diet and as part of the allergic response. Factors which lead to acidity will tend to create overbreathing. Metabolic acidosis develops as a long term adaptation to the respiratory alkalosis caused by hyperventilation, creating yet another vicious cycle where bad breathing leads to more bad breathing.

One thing to keep in mind is that the way we breathe was inherited in part from our parents. It takes a number of generations for the breathing to really become disturbed. The increased incidence we are seeing of asthma today is one result of diet and lifestyle changes over the last two centuries.

How do you change how you breathe?

To bring your CO2 levels back to normal, you have to train the unconscious mechanisms in your nervous system that create the ventilation response to C02. You can do this by focusing your attention on the breath/ meditation, by physical exercise and also through specific Buteyko breathing exercises. Measures that improve your general metabolic efficiency will also help to normalise your breathing.

Focusing your attention on the breath/meditation

Unless we are severely low in oxygen, what normally drives our urge to breathe is carbon dioxide. As the levels build up in our bodies we feel the desire to breathe. People who overbreathe have higher levels of response to C02 and tend to increase their breathing before the levels of C02 are at their optimal levels.

You can train this response to C02 through breathing exercises. Many meditation techniques and mild Buteyko training use focused relaxed attention on the breath as a way of calming the nervous system and normalising the breathing. In this state your breathing will begin to slow naturally. Research has shown that CO2 levels will begin to increase despite the fact that the breathing may become deeper. After a period of time of unforced observation of your breathing, you may become so still that your breathing is almost suspended. In this state your breathing centre and your nervous system are trained to accept more normal breathing and higher levels of C02.

Deep, slow breathing

My observation is that many people who have tried to do deep breathing exercises and found them difficult and uncomfortable are already overbreathing and are too low in C02. Their bodies use restricted breathing in an attempt to regain their necessary balance of C02. As a result the chest is often tight and the diaphragm not functioning as it should. If you change the focus of your breathing exercises to raising CO2 levels your breathing very soon becomes freer and full chest expansion and diaphragm movement become possible.

Deep, slow breathing is the type of breathing traditionally used to treat hyperventilation. It can be very useful if the breathing is slowed sufficiently to actually raise C02 and if it can induce a sense of relaxation. A very anxious and depressed person often feels tension in the pit of their stomach. Breathing with stronger diaphragmatic movement such as one does in a deep slow breath for three or four breaths can break the cycle and allow you to move onto focused attention or meditation breathing.

Physical exercise

Training the body to accept a change in the ventilation threshold of C02 is also possible through physical exercise, if most of that exercise is undertaken while maintaining nasal breathing. The level of exertion must be built up very slowly so as to discourage hyperventilation. Excessive exercise and training are major causes of disturbed breathing and disturbed metabolism.

Swimming is one exercise that is known for its ability to raise levels of C02. The reason for this is that when we are swimming we are restricted from taking in as much air as we would with the same amount of exertion on dry land. The ability of your body to build up CO2 is enhanced by training your breath-holding ability. In swimming this is done by increasing the number of strokes between breaths. By swimming slowly at first and then, after a warm up period, building up the strokes from three to five, then over time to seven strokes between breaths, you can improve your tolerance for CO2.

Other forms of exercise such as walking and running can also be used to build up CO2 tolerance. This is done by utilising a long warm up period of 10-20 minutes. In the warm up you should do slow controlled breathing, ideally with a gap at the end of the in breath and also at the end of the out breath. More intense exercise can be done after the warm up period but should be kept within your ability to maintain nasal breathing. At first, maintaining nasal breathing during exercise will limit your performance, but over time your normal exertion will be possible with the added benefit of increased endurance and lowered pulse rate. Dr John Douillard, who has trained many elite athletes to high levels of performance utilising nasal breathing, says that the drop in performance experienced lasts from three to ten weeks.

The Buteyko method of breathing

The Buteyko method of breathing teaches people to utilise posture, focused attention on the breath and controlled breath-holding to raise the levels of C02. It is also probably one of the only forms of breathing retraining that teaches people to reduce the volume of air while maintaining a relaxed diaphragm. Dr Buteyko developed a system for normalising the parameters of breathing that enabled some people to overcome chronic diseases that they had had for years in a number of weeks. Changing unconscious breathing patterns takes discipline, perseverance and persistence. In many cases it requires the help of a trained Buteyko practitioner. Most Buteyko practitioners teach the principles of the breathing over a four to five day period in a workshop setting. This is the length of time they find it takes to make some of the initial shifts in physiology that allow participants to continue on their own. A video teaching the method has also recently become available.

Improving metabolism

A number of medical authors have observed that there are some people whose hyperventilation stops when they are given supplementary magnesium. This is not surprising considering the fact that it is partly the loss of cellular magnesium by hyperventilation that creates the acidity that perpetuates hyperventilation. The B vitamins and magnesium are part of the co-enzyme used in the aerobic metabolism pathways.

Both magnesium and B vitamins have been used in medical studies to improve asthma. Studies done with vitamin B6 show that this vitamin is very low in its active form in the blood of asthmatics and that supplementing it with vitamin B6 has led to improvement in asthma. Magnesium intake in the diet also correlates to lower levels of asthma severity and frequency. Other nutrients probably play an important role as well.

Dr Joanna Budwig talks about the importance of ultra-unsaturated fats like alpha-linolenic acid in breathing. These fatty acids contain free electrons that have a great affinity for oxygen. As aerobic metabolism only happens inside the cell (while anaerobic occurs outside the cells and the cell membrane is made of fat and protein. it could be that the affinity of these fats for oxygen helps in the transport of oxygen into the cell.

Metabolic toxicity can result in a situation where the enzyme systems of the mitochondria are poisoned. Inefficient cellular respiration can result, affecting our breathing. In this case, the way to improve our breathing may involve a detoxification program like controlled fasting or bowel cleansing. Substances like co-enzyme Q10, which improves mitochondrial activity, may also help cellular respiration and breathing.

The effects of breathing on your health

If your breathing is incorrect, your health suffers. The effects of incorrect breathing are felt by a whole range of systems - immune, circulatory, endocrine and nervous - as well as by your energy production. By working with your breathing you can improve a whole range of symptoms and conditions.

The heart and circulation

When we hyperventilate and lose an excess of C02, one of the most immediate effects is on the circulation. Blood vessels constrict leading to increased blood pressure. Normalising breathing has a very rapid effect on lowering blood pressure in most cases. Raising CO2 through regulating breathing makes you feel warm as your blood flow increases.

People with Raynauds syndrome and migraine can learn to control symptoms that come from the constriction of blood vessels in the head or in the hands and feet by raising their CO2 levels.

The movement of the relaxed diaphragm in a person with good breathing also has a

mechanical effect, increasing the venous return to the heart muscle. People who overbreathe or hyperventilate decrease the amount of oxygen taken up by the heart muscle and increase resistance in coronary blood flow.

One of the classic signs of heart disease is breathlessness, which can increase any underlying hyperventilation. Some cardiologists believe that hyperventilation not only produces symptoms that mimic heart disease but may trigger a heart attack in some situations.

The nervous and muscular Systems

The nervous system responds to a drop in CO2 by becoming more excitable.

Smooth and skeletal muscle becomes more prone to spasm and constriction. Hyper-ventilation seems to make the sympathetic nervous system become dominant. The effect of this on stress related disorders like certain types of digestive disorders and headaches becomes very clear when you see how these symptoms can be controlled with breathing Brain wave patterns will change in response to low levels of carbon dioxide, showing certain types of abnormalities associated with less efficient functioning.

Epilepsy-like brain wave patterns are produced by hyperventilation: in the past, people were made to hyperventilate to see if they had epilepsy. The onset of epileptic attacks is associated with the drop in brain oxygen that is associated with lowered levels of CO2.

Psychologists have known for a long time that people with panic disorder hyperventilate and that this hyperventilation is the cause of many, if not all, of the symptoms they experience. The pounding heart, breathlessness, tingling and numbness in hands, feet and face, dizziness and feeling of unreality can all be reproduced by getting susceptible individuals to breathe as quickly and as deeply as they can for a few minutes.

Most people, when stressed, are told to take a big deep breath and relax. To someone who is hyperventilating and already taking in too much air, this advice may not really help.

People who are prone to anxiety and panic attacks need to change their ventilation response to CO2 over time so that, when the initiating situation comes about, they already have developed a new unconscious breathing pattern that has given them a reserve of C02. Most people with breathing disorders or anxiety disorders are too near the threshold of CO2 and any small stimulus to breathing will leave them in a destabilised state. Getting back to normal in this state is like trying to crawl up a cliff once you have already fallen off. People need daily breathing training to prevent the onset of panic, anxiety and stress and then need to quickly recognise the early signs of low CO2 to help then keep away from the edge of the cliff. Once it is trained, breathing can be used more effectively during a stressful situation.

Effects on immunity

Breathing can affect the immune system. Tests on immunity showed that, after three days of training to breathe with the Buteyko method, subjects' levels of autohemolysin plaque forming cells (associated with autoimmunity) decreased. Skin microflora levels, which are elevated when immunity is low, decreased. At the All Union Scientific Centre of Radiation Medicine in Russia, this method was used with fifty victims of the Chernobyl nuclear accident. Eighty three per cent of the patients showed an improvement in their symptoms and in the objective measurements of their immune system functions in blood tests. Dr Otto Warburg, who inspired and was quoted by the famous alternative cancer specialist Dr Max Gerson, felt that the problem with cancer patients was that cancer cells used anaerobic metabolism (non- oxygen utilising) in preference to normal aerobic (oxygen utilising) metabolism. In this case, improving the efficiency of aerobic energy pathways would be of great assistance. The presence of CO2 can increase the efficiency of the metabolic

reactions of CO2 seven fold.

The effects of breathing on arthritis are also of interest as 25 per cent of people with rheumatoid arthritis suffer from asthma.

Infection and allergy both lead to hyperventilation. In the short term, overbreathing leads to what is known as respiratory alkalosis: because of the subsequent loss of minerals and bicarbonate stores (which are made primarily from C02), the body becomes more acid. This acidity seems to increase both hyperventilation and allergic symptoms. People become less allergic if they can successfully change their breathing patterns. It is known that low CO2 increases the release of histamine from mast cells.

The Buteyko method has become known for its ability to help sufferers of emphysema, chronic bronchitis, asthma and sinus problems. People who have inflammation, infection or restriction of the airways are the ones most likely to develop breathing disorders. It is also most likely that bad breathing has been one of the major factors in the development of their breathing related disease. People who have lung diseases all develop symptoms of breathlessness and often a sense of fear, anxiety or even panic about being able to get enough breath. This breathlessness tends to make them overbreathe and consequently lose an excess of CO2. This loss of CO2 from the alveoli of the lungs contributes to bronchospasm and decreased uptake of oxygen into the tissues. This makes the feeling of breathlessness worse and subsequently induces the person to hyperventilate even more. One of the keys points of Dr Buteyko's hypothesis is that bronchospasm and increased mucus is part of the body's defence mechanism against loss of C02. He teaches that asthma is not a disease and is only a defence mechanism against bad breathing and loss of C02.

Sleep apnoea

People with this condition stop breathing during the night, sometimes every few minutes. This results in a low level of blood oxygen and an increase in carbon dioxide.

They wake in the morning feeling as if they have not slept. Hyperventilation and resulting low levels of carbon dioxide can be major contributing factors to sleep apnoea. A number of research studies have been done where administration of C02 has led to normalisation of blood oxygen and a reduction or cessation in sleep apnoea episodes. Researchers at Toronto Hospital showed that, in patients with heart disease, the chief determinant of disturbed breathing and sleep apnoea was hyperventilation and low CO2 (hypocapnia). Raising the levels of CO2 above the threshold for apnoea abolished the sleep apnoea. The experiences of people working with the Buteyko breathing is that similar effects can be achieved with breathing alone in some cases.

Fatigue

Fatigue always accompanies bad breathing. This is because of the effects of both oxygen and carbon dioxide on energy metabolism and the calming effects of breathing on the nervous system. A nervous system that is dominated by sympathetic activity or the 'flight or fight' response wastes a lot of energy. Sympathetic nervous system dominance leads to an aggravation of breathing problems, with hyperventilation becoming fixed and established in the person's homeostatic mechanisms. Breathing can be used as a tool for restoring rest, relaxation and energy. Many people with chronic fatigue syndrome (CFS) have greatly aided their recoveries using the principles of normalising breathing. CFS is often accompanied by feelings of breathlessness and sufferers have been shown to suffer from frequent episodes of sleep apnoea.

CFS is frequently accompanied by insomnia and by a type of restless fatigue where sleep and rest are not restorative. Aerobic energy production in the person with chronic fatigue is defective. Normalising oxygen and carbon dioxide levels seems to increase the effectiveness of aerobic energy pathways in people who have metabolic blocks in these pathways. Magnesium levels are always very low inside the cells of people with CFS and

raising levels of intracellular magnesium is one of the keys to improving their energy. Correcting cellular pH through maintaining normal CO2 is one way to stop the draining of magnesium from the cell.

Many people who correct their breathing find that they lose a large amount of excess weight. This is because fat is only burned in the aerobic metabolic pathways. As these are switched on, people who were previously unable to lose fat find that it often goes without reducing their food intake.

Hormones

One of Dr Butevko's ideas is that overbreathing leads to depletion of the body's steroid production. This includes adrenal steroids as well as testosterone, the oestrogens and progesterone. Shock and stress are common causes of premature menopause. One function of breathing could be to take the stress out of the nervous system, allowing the endocrine system to normalise itself. Observation of the effects of correcting breathing on hormone levels has led to its use in the treatment of numerous types of hormonal problems in Dr Buteyko's clinic in Russia.

Insulin sensitivity and production are both increased by normalising breathing. Diabetics must be very careful when working with breathing due to the fact that blood sugar levels will often drop very quickly as CO2 levels increase. Interestingly, in the case of hypoglycaemia, blood sugar levels seem to become more stable when breathing is normalised, decreasing the need for frequent meals and snacks. If breathing affects so many processes in the human body, how can we ignore it as a tool for healing? Correcting breathing involves some discipline as you must practice it every day. Symptoms such as breathlessness, angina, headaches or fatigue remind us that our breathing is out of balance. Part of the teaching of the Buteyko method is that it is important to use breathing at these times to prevent disturbances in our homeostasis that may lead to further disease in the form of other defence mechanisms.

We should also become aware of what our breathing does at times of stress, anxiety and depression and use breathing to modify our emotional responses. Finally, we should avoid or correct those factors that lead to a disturbance of breathing like incorrect diet, lack of or too much exercise, nutritional deficiency, toxicity and infection.

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