

BUTEYKO BREATHING

"The nose is the silent warrior, the gatekeeper of our bodies, pharmacist to our minds, and weathervane to our emotions" – Dr Jayakar Nayak, nasal and sinus surgeon.

"We lose weight with oxygen, fat burns in the presence of oxygen" – James Nestor

"The key to improving body oxygenation is not taking deep breaths, in fact, you should be doing the complete opposite. Breathe light to breathe right" – Patrick McKeown, President of Buteyko Professionals International.

"If we are doing something wrong 25,000 times a day, just guess what's going to happen. It's going to wear our bodies down" - James Nestor

"When it comes to breathing, less is more" James Nestor, author of "Breathe"

"If we breathe too much, less oxygen is delivered to the cells... the mouth serves absolutely no function in terms of breathing" – Patrick McKeown

"You can improve your blood circulation by making simple changes to your breathing" – Patrick McKeown

The number of breaths per minute during normal breathing is about 10 to 12 and each breath takes in approximately 500ml of air. In modern Western society, many factors are causing us to over-breathe. When we breathe in too much or take a big breath, it doesn't actually increase the oxygen saturation in the blood, it disturbs the blood gasses. The scientists that study breathing discovered that 90% of us are breathing incorrectly and that this failure is likely contributing to many chronic diseases. How this over-breathing affects each individual depends on genetic predispositions. Not all oxygen is healthy which is why we have antioxidants, breathing too much reduces oxygen to the brain. Not all carbon dioxide is bad as normal bodily functions are very dependent on this gas, we need to have the correct balance of both.

TWO MINUTES OF OVERBREATHING CAN REDUCE OXYGEN CONTENT OF THE BRAIN BY 40%

People suffering from snoring and sleep apnoea breathe in more air than the normally accepted amounts, more like 15 to 20 breaths per minute. Left untreated, snoring (a sound created from turbulent airflow) may progress into sleep apnoea, high blood pressure or cardiovascular complaints. Apnoea means "without breath" in Greek.

This over-breathing (hyperventilation) does not add any more oxygen to the blood but causes a loss of carbon dioxide which is needed to oxygenate the blood. The heavier you breathe, the less oxygen is delivered to tissues and organs. *"A primary response to hyperventilation can reduce the oxygen available to the brain by **one half**" – Timmonds BH, Ley R. Behavioural and Psychological Approaches to Breathing Disorders*

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We are born as nose-breathers and our mouths are closed while breathing for the first 5 or 6 months of life. It seems as when we receive our first teeth, we begin to have upper respiratory infections or nasal congestion, and mouth-breathing can then often start.

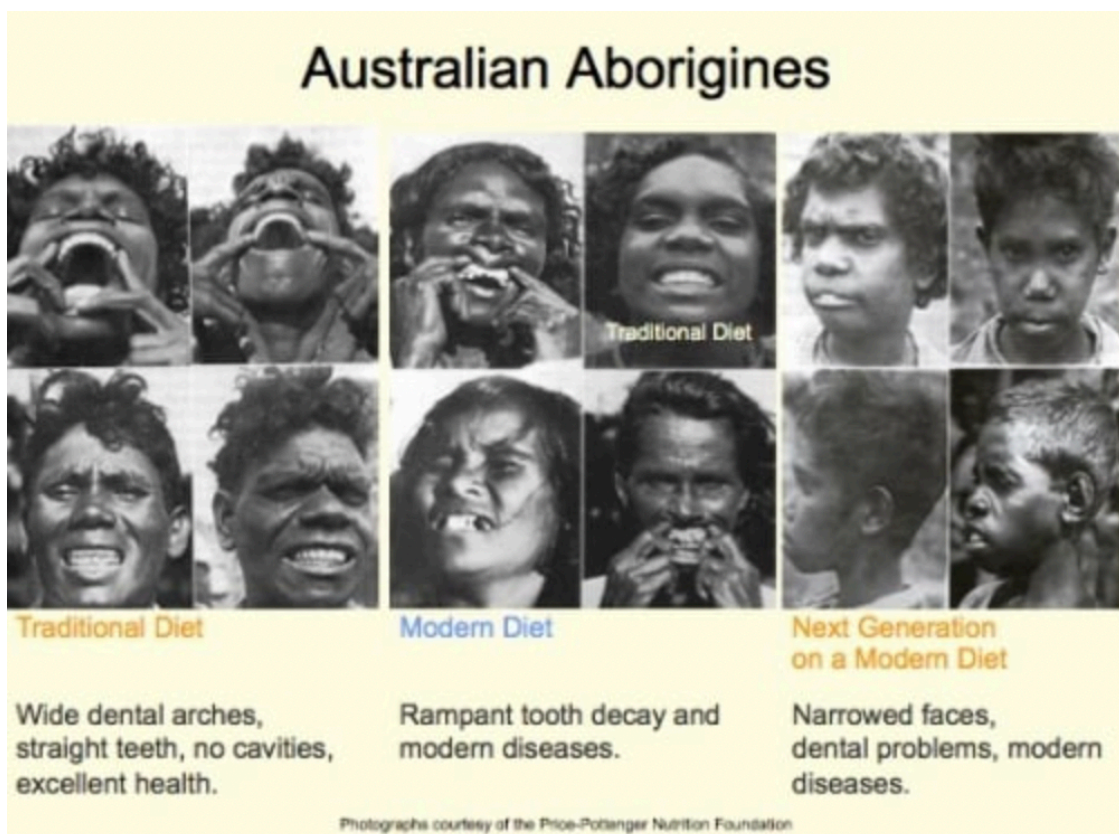
Two and a half billion years ago, there was enough waste oxygen for life on earth to begin making use of it, excrete carbon dioxide, and the start of aerobic life began. Mammals grew noses to warm and purify the air, throats to guide this air to the lungs, and networks of sacks to remove oxygen from the atmosphere and transfer it into the blood. Most animals are innate nasal breathers, it is only when an animal is sick that they usually revert to mouth breathing (except when a dog pants to cool itself). If we see an animal breathing through its mouth, it is not a good sign. Probably half of the human beings in the Western World habitually breathe through their mouths instead of through their noses. Humans have become the worst breathers in the animal kingdom. We have traded our larger brains for a smaller snout!

Just a few hundred years ago, the human face was different. The human face was forward grown, with a wide profile and large dental arches ensuring straight teeth and room for the tongue. Most importantly, there was plenty of room behind the upper jaw so that breathing could take place with ease. The modern face has changed. Dental arches can be less developed, crowding the teeth, and giving less space for the tongue. This impacts the airway.

Many believe this change in human development stems from a number of causes including the softness of the foods in the average modern diet causing underdeveloped chewing muscles and smaller dental arches. Primitive cultures were chewing on nuts, seeds, bones and raw vegetables - which was good exercise for the jaw and stimulated bone growth. Nowadays, the modern processed diet generally requires little chewing effort. Chewing assists in the development of the jaw, palate, and facial structures in children.

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The resting posture of the tongue plays a pivotal role since its effects are far more constant than atypical swallowing. Mouth breathing encourages incorrect positioning of the tongue (on the floor of the mouth), while nasal breathing naturally places the tongue in its proper resting position (on the roof of the mouth) and helps to achieve a lip seal.

The tongue can exert up to 500 grams of force making it one of the strongest muscles in the body! What does this mean for facial growth? It means that where the tip of our tongue is sitting and where that force is being placed is actually very important. The tongue position is one of the determining factors of the shape and size of the upper jaw. When you are not eating or speaking, there is an ideal spot on the roof of the mouth where the tongue should naturally rest. In cases of mouth-breathing, where a child's tongue sits low in the mouth, the lower jaw will be forced back and down, affecting the way the face grows.

Breast feeding also helps to shape the mouth. The tongue pushes the breast up to the roof of the mouth, which is how we get growth of the pallet and face. The tension that the muscle puts on the bone, activates the bone to grow. We need 3 years of breast feeding to develop the mouth and a hard diet as a toddler as the chewing helps to develop the face – Dr Dean Raio, DDS (Dentist and Breathing & Airway expert). The lower 1/3 of the face provides around 1/3 of the sensory motor input to the brain! Chewing stimulates essential neural pathways

As well as providing the body with oxygen, breathing also helps to regulate other vital bodily functions, including biochemistry, the opening and closing of blood vessels and airways, and the stress response. Poor breathing habits, or incorrect breathing, can disrupt the body's

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biochemistry and deprive the body of oxygen, causing constriction of the blood vessels and airways, and reduce oxygen delivery to the cells.

When we move our muscles, we generate carbon dioxide (CO₂), which helps to maintain body oxygenation. **Carbon dioxide is not just a waste gas, the release from haemoglobin in the red blood cells, is dependent on the presence of carbon dioxide.** Without carbon dioxide, we won't exist, it is just as important as the oxygen. Oxygen can only disassociate from haemoglobin in the red blood cells in the presence of CO₂. So a lack of carbon dioxide can put us in a state of relative hypoxia by having too little CO₂ in the blood stream. A lack of exercise results in lower production of CO₂ and a larger breathing volume. Fifty years ago, it is estimated that we performed four hours of physical exercise each day.

The regulation of breathing is determined by receptors in the brain which monitor the concentration of carbon dioxide, pH and oxygen in the blood. If we breathe too much, we remove too much carbon dioxide.

“When carbon dioxide was administered into the nose it was found to prevent the degranulation of mast cells which release histamine. When you give CO₂, the mast cells do not release histamine into the system. Histamine is implicated in causing inflammation both in rhinitis, allergic rhinitis (hay fever) and asthma” – Patrick McKeown

As our ancestors began to develop tools to more finely prepare meat, and make fire, the softer, less chewable food that we ate literally changed the structure of our skulls, to ones with more recessed chins, less expansive sinus cavities, smaller mouths and more crooked teeth. Our ancient ancestors (and animals in the wild) had perfectly straight teeth, they never needed to have braces, had overcrowding, or the need for wisdom teeth to be removed. In the last 3-400 years, because of our diet of softer food and lack of chewing, our mouths have grown so small that our teeth no longer fit, and our airways have become smaller. However, this extra energy from the more easily digested food gave us larger brains and lowered larynx with more mobile tongues and lips for speech, but this expanding brain was at the expense of the sinuses, mouths and airways.

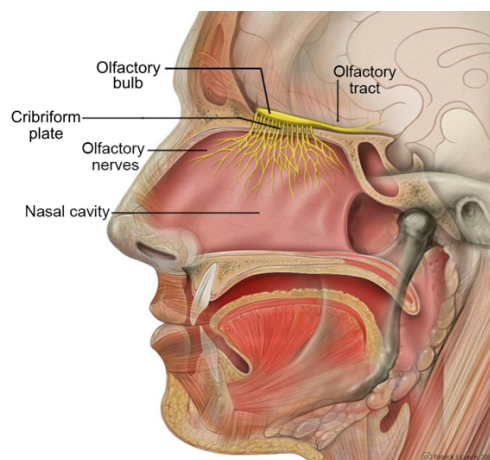
It is therefore likely that our ancient ancestors did not snore, have sleep apnoea or sinusitis. Of the 5,400 different species of mammals on the planet, humans are now the only ones to routinely have misaligned jaws, overbites, underbites = malocclusion.

The human nose performs over 30 functions in the human body - Maurice H. Cottle, MD. American Rhinologic Society, Kansas City, Missouri.

The physiological functions of the nose nasal such as warming and humidification, are vital for upper airway function. It is estimated that an adult inhales/exhales up to 10,000 liters of air daily (Kerr, 1997). As the air is treated in many ways by the structures of the nasal cavities, paranasal sinuses and the peculiarities of their lining mucosa, nasal breathing is healthy breathing.

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The nose protects the body against the air that it is taking in from the atmosphere. When the nasal cavity becomes congested, airflow decreases and bacteria flourish. These bacteria replicate and can lead to infections, colds, sinus problems, periodontal disease or cavities. When the nasal cavity becomes more blocked, we breathe with our mouths more. Nose breathing slows down the breath and makes the breathing more regular, it leads to an improved oxygen uptake in the blood. It is vital that we learn to breathe through the nose, not only because it helps to sterilise the incoming air but if we have a stuffed nose, it adversely affects sleep. The mouth lets in unfiltered air, whereas the nose filters pathogens, viruses from the air. Mouth-breathing, instead of nose breathing, physically changes the body and transforms airways in an unhelpful way. Mouth-breathers tend to be more anxious as it encourages the fight or flight response.



By Patrick J. Lynch, medical illustrator - Patrick J. Lynch, medical illustratorFile:Head_olfactory_nerve.jpg, CC BY 2.5, <https://commons.wikimedia.org/w/index.php?curid=68370471>

Inhaling air through the mouth decreases pressure, which causes the soft tissues in the back of the mouth to become loose and flex inwards, creating less overall space, and making breathing more difficult. Experiments have showed that when nose breathing is blocked, there is a downward growth pattern, a narrowing of the dental arch, more of a V shape of the roof of the mouth which can penetrate the sinuses and inhibit nasal breathing, crooked teeth, and faces that grow longer with a slacker jaw (also known as “adenoid face” – James Nestor). Mouth-breathing encourages more mouth-breathing.

Breathing in excess of metabolic requirements has a negative impact on health – *“debunk the theory of taking big breaths” – Patrick McKeown.*

Dysfunctional breathing/hyperventilation syndrome (DB/HVS) is a respiratory disorder, psychologically or physiologically based, involving breathing too deeply and/or too rapidly (hyperventilation) or erratic breathing interspersed with breath-holding or sighing.

When we over-breathe (breathing in more air than the body needs - hyperventilation), it can contribute to high blood pressure, stress, anxiety, depression, fatigue, sleep-disordered breathing (e.g., snoring and sleep apnoea), asthma, fatigue, poor concentration / attention problems, brain fog, high blood pressure, heart disease. Most people with low thyroid hormones over-breathe. The nose plays a major role in the regulation of respiration in sleep. Breathing through the mouth results in light sleep. If you are addressing sleep issues, you have to address breathing. Breathing is a fundamental aspect of sleep. Inside the carotid

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artery in the neck, there is a chemoreceptor, a chemical receptor, which reads how much oxygen is coming up. If the brain registers low oxygen, it sends feedback to the heart, which tells it to drive it up.

Symptoms of hyperventilation

Some of the symptoms of hyperventilation. Some people may have many of these, or may even have none.

Cardiovascular	Heart palpitations Missed beats Tachycardia Sharp or dull chest pain Angina Cold extremities Raynaud's Blotchy flushing of facial "blush" area Capillary vasoconstriction
Neurological	Dizziness Instability Faint feelings (but rarely fainting) Headache Parasthesiae (numbness, deadness, uselessness, heaviness, pins and needles)
Respiratory	Shortness of breath Irritable cough – dryness of the upper airways Tightness or oppression of chest Air hunger Inability to take a deep breath Excessive sighing Excessive Yawning Sniffing
Muscular	Cramps Muscle pains – neck & shoulders Lower back pain (proper diaphragmatic breathing provides stabilisation for the spine) Stiffness
Psychological	Tension Anxiety 'Unreal' feelings Phobias Panic Agoraphobia
Allergies	
Gastrointestinal tract	Difficulty in swallowing Globus (having a lump in the throat) Dry mouth and throat Acid regurgitation Heartburn Flatulence Belching Air swallowing Abdominal discomfort Bloating
General	Weakness Exhaustion Impaired concentration Impaired memory and performance Disturbed sleep, including nightmares Emotional sweating

Over-breathing can impair the functioning of the kidneys, liver, intestines and other organs and can slow the detoxification process. Mouth-breathers are sending less oxygen to their brains and also have more colds and chest infections than nasal breathers.

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Avoid sighing – one sigh every few minutes is enough to maintain chronic hyperventilation. Avoid big yawns for the same reason.

Quiet, calm, effortless and gentle breathing, with a natural pause on the exhale, is a sign of good health. Poor breathing habits create noticeable breathing, often using the mouth to take in air, breathing from the upper chest with large, obvious breaths. Despite taking in more air into the body than necessary, over-breathers often feel that they are still not getting enough air. Every animal breathes into its belly. If you are breathing through the chest (mouth-breathing) you need to take in more breaths to get less air.

“We use 50% of our breath when breathing through our chest at a rate of about 18 breaths per minute. When we breathe slowly, deeply, lightly into our bellies, we can use 85% of that air, so a 35% increase.” – James Nestor

When the body oxidises fats and carbohydrates from food, carbon dioxide (CO₂) is generated which is carried through the veins to the lungs where the excess is exhaled. The body requires a certain amount of carbon dioxide for oxygenation of the organs and muscles. Over-breathing creates vasoconstriction (narrowing of the blood vessels). Carbon dioxide also dilates the carotid artery, bringing more oxygen to the brain. However, when we over-breathe, the chemoreceptors in the brain become sensitised to carbon dioxide and exhale too much, leading to a cycle of habitual over-breathing. Mouth-breathing (hyperventilation) decreases the oxygen to the brain. Carbon dioxide is essential for a number of vital bodily functions and the prevention of various health issues. It relaxes the smooth muscle in airways, arteries and capillaries, enabling smooth breathing and healthy blood flow.

“Fire trucks at one time in the major cities in the US carried CO₂ because it was so effective for victims of stroke and heart attacks and asphyxia” – James Nestor

It takes time to change habits, which involves creating new neural pathways in the brain, which is called neuroplasticity. Typically with neuroplasticity (formation of new habits) it takes around **60-70 days to change**. Practice makes perfect. Practice = new and stronger neural pathways in the brain.

Inadequate oxygenation and retention of acid wastes in overused muscles make them painful and stiff, particularly in postural muscles where trigger points can be found.

Lack of movement in the diaphragm can cause a lack of rhythmic massage to the digestive tract and liver. Similarly, where the ribs join the spine and restriction of the joints. This could lead to numbness and tingling in hands and feet. Returning blood to the heart from the legs and lower body can be affected, leading to cold feet and legs – *Bionutri*.

As well as being central to breathing, the diaphragm plays an important role in controlling posture. During an inhalation, the diaphragm moves downward. As it descends, a positive pressure is generated in the abdomen, which contributes to posture control and stability.

The pressure acts like an inflating balloon, supporting the front of the spine and the pelvis. Conversely, good posture improves breathing. Breathing should be gentle, slow and shallow, you shouldn't be able to see someone breathing from across the room.

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Rather than focusing on breathing in more oxygen, we should be focusing on retaining the carbon dioxide in our blood, which facilitates the delivery of oxygen throughout the body. The greater the amount of air taken into the body, the less oxygen is delivered. Not all of the air that we breathe in reaches the small air sacs for gas exchange to take place from the lungs into the blood. Some of this air will remain in dead space – in the nose, throat, trachea, bronchi and bronchioles. With fast and shallow breathing, you leave a lot more air in dead space. When you reduce the respiratory rate, you do not leave so much air in dead space.

The lungs extract oxygen from the air during exhalation, in addition to inhalation! The air exhaled through the nose creates a back flow of air (and oxygen) into the lungs. Because we exhale more slowly through the nose than we do through the mouth, the lungs have more time to extract oxygen from the air we've already taken in.

For those predisposed to asthma, the loss of CO₂ caused by over-breathing contributes to constriction of the airways. By breathing calmly and quietly, healthy levels of carbon dioxide will be retained, and blood vessels and airways will remain open and clear.

For those with a structural blockage in the nose or enlarged adenoids nose breathing will be more difficult. When nasal breathing is established, a child is able to harness the benefits of nasal nitric oxide, the nose moistens, warms and filters the air so that you have a filtered and conditioned air meeting the adenoids. The adenoids are then more likely to shrink. Children with enlarged tonsils and adenoids often mouth-breathe. Clinically it is recognised that enlargement of these tissues is often associated with frequent oral breathing, instead of nasal breathing.

When the head lies on a pillow, gravity pulls the soft tissues in the throat and tongue down, closing the airway more. Airways can become conditioned to this position and snoring or sleep apnea increases as forced mouth-breathing changes the shape of the airways. Mouth-breathing causes the body to lose 40% more water, contributing to dehydration. When breathing through the nose, the pituitary gland will be more likely to release vasopressin (an antidiuretic hormone) which may therefore reduce the need to urinate at night.

The ancient Chinese, in passages from the Tao says that “the breath inhaled through the mouth is called ‘Ni Ch’i, adverse breath’ which is extremely harmful. “Be careful not to have the breath inhaled through the mouth”. They said that the nose was the “heavenly door”, and that breath must be taken from it, never do otherwise for breath would be in danger and illness would set in. The ancient Chinese philosopher Lao Tzu said “the perfect man breathes as if he does not breathe” – regular, calm, light, not from the chest, without sighs, yawns or sniffs.

In Chinese Medicine, the lungs help to free the spirit and lung issues can often be due to unexpressed grief. They say that the moment between breaths deserves special attention, because it is the moment when time stands still, when anything is possible. This is a spiritual moment that the Taoists spent much time cultivating to expand their awareness. They called it “solidifying the breath and letting it grow” and was a practise that they used to achieve longevity and greatly enhances the Wei Qi (the immune system). The lungs are about your

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future, if you open your lungs, you are opening yourself to the future. If you close off your lungs, you only have the past. Grief and sadness about the past hold you back. In Chinese 5 Elements Medicine, the emotion associated with the lungs (the Metal Element) is grief.

The Hindus considered breath and spirit to be the same thing, and the Buddhists used breathing to lengthen their lives and to reach higher planes of consciousness. The Native Americans believed that breath inhaled through the mouth sapped the body of strength, deformed the face, and caused stress and disease. Their great “secret of life” was breathing.

We have lost touch with our most basic and important biological function. To oxygenate tissues and organs, we need to breathe less, not more. The mouth doesn't serve any function at all in terms of breathing, except take the air to the lungs. It doesn't warm the air, regulate the air, it doesn't moisten the air, it doesn't harness nasal nitric oxide. The mouth is connected with the upper chest which is more likely to kick in a fight or flight response. Conversely, the nose is connected with the diaphragm. We can really influence our autonomic nervous system through the breath.

“When we breathe through the mouth, the nasal passages and throat dry out. This can lead to inflammation of the airway, which contributes to a narrowing of the airway, but also with a dry throat, when the airway closes, it takes a greater reopening pressure to re-establish breathing.” – Patrick McKeown

There are three gasses in the blood that are affected by the way we breathe: Oxygen, Carbon Dioxide, Nitric Oxide.

Oxygen:

- The primary reason that we breathe
- Necessary for aerobic respiration
- To be used in aerobic respiration it needs to be delivered to the mitochondria in the cells
- Oxygen can only be transported in the bloodstream through haemoglobin
- Haemoglobin stays almost always fully saturated with oxygen
- Does not affect the blood's pH

Carbon Dioxide (CO₂):

- Carbon Dioxide was discovered by a Christian Bohr, a Danish physiologist in 1903 and he was subsequently awarded the Nobel Prize for his work. The Bohr Effect states that as CO₂ levels in arterial blood drop the strength of the bond between oxygen and haemoglobin tightens resulting in reduced Oxygen availability to cells.
- Carbon dioxide is the main stimulus for breathing
- Maintains the normal pH of the blood
- It is the key determinant of our breathing cycle. We feel the urge to breathe in when levels of CO₂ reach our tolerance level
- A by-product of metabolism, which we get rid of through exhalations.

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- Due to the Bohr effect, it is needed for oxygen to enter the cells. Low levels of CO₂ will trap oxygen in the bloodstream. It is the catalyst for the release of oxygen from the red blood cells.
- It prevents smooth muscle from going into spasm, which is the major cause of shortness of breath experienced with asthma.

Nitric Oxide (NO):

- Nitric oxide is released in the nasal airways in humans. During inspiration through the nose this NO will follow the airstream to the lower airways and the lungs.
- It is produced primarily in the upper airway, in the paranasal sinuses, also the nasal cavity
- It can diffuse to the bronchi and lungs, where it induces vasodilatory and bronchodilatory effects (opens up the airways and blood vessels)
- Helps to reverse the build-up of plaque, helps balance cholesterol and plays a role in neural transmission (firing of neurons / brain cells), homeostasis, immune defence.
- It sterilises the inhaled air and is anti-viral.
- It acts as a neurotransmitter and signalling molecule to the immune system
- According to Dr Mark Burhenne, sinuses release a huge boost of nitric oxide, a molecule that plays an essential role in increasing circulation and delivering oxygen into cells. Immune function, weight, circulation, mood and sexual function can all be heavily influenced by the amount of nitric oxide in the body. Nasal breathing alone can boost nitric oxide **sixfold** which is one of the reasons that we can absorb around 18% more oxygen with nose breathing than by mouth-breathing.
- NO concentrations are higher at a lower air flow rate (breathing gently).
- NO plays a role in the signalling of the cardiovascular system.
- Is an aerocrine messenger, sending messages to the upper airway dilator muscles
- Foods that help in various ways of increasing nitric oxide include, beetroot, garlic, dark chocolate, leafy greens (high in nitrates), citrus fruit, pomegranate, nuts and seeds, artichoke leaf (Bionutri Aquasol tea)
- In 1992 scientists proclaimed nitric oxide as “molecule of the year”, they said it was the one molecule in the body that unites all the major disciplines of medicine.
- Nitric oxide is a key catalyst for the replication of the mitochondria which make our energy (ATP).
- The role of this gas however is still not fully understood.

Our everyday breathing habits are of greater importance than the amount of short-term air that we breathe. It is the amount of air, and the way that we breathe it in, during everyday breathing, every minute and every hour of each day that is important for health. This is opposed to the belief that it is beneficial to take ‘big’ breaths, which are often taken in loudly through the mouth, generally involving upper chest movement, that encourages over-breathing. A deep breath is often misinterpreted as a “big” breath. A “big” breath is not a deep breath. A deep breath is manifested by lateral expansion and contraction of the lower ribs.

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As you breathe in, the lower two ribs should be moving out, as you breathe out, they should move in. Nasal breathing has been estimated to improve arterial oxygen uptake by between 10-20%. So not only is there a better oxygen uptake with nose breathing, there is better oxygen delivery to the cells due to the carbon dioxide and nitric oxide.

With long term hyperventilation (mouth-breathing), breathing hard, we use up too much CO₂, and carbon dioxide in the blood is lowered, this increases blood pH. If the blood pH doesn't normalise quickly to its pH of 7.365, the kidneys step in and dump bicarbonate (HCO₃⁻) into the blood in order to bring the pH back to normal. Bicarbonate is sacrificed in order to normalise blood pH when CO₂ is low from mouth-breathing. Loss of bicarbonate reduces the body's ability to buffer any build-up of metabolic by-products such as lactic acid in muscle tissue and muscles can fatigue more readily.

Even though breathing is an involuntary activity, there are many things that can influence our breathing gradually over time: -

- **Diet** – over-eating increases breathing volume. Processed foods puts further pressure on the digestive system since these foods are generally acidic, which alters the pH of the blood. To correct this imbalance e, breathing increases in order to remove carbon dioxide to restore ph.
- **Talking** – involves large intakes of air and over-breathing e.g. people who work in retail, telesales, teachers, actors, singers, public speakers.
- **Stress** - activates the fight or flight response which increases breathing to prepare us for physical activity, but the stress that we have these days rarely demands the physical exercise such as running from a tiger to burn off the adrenaline.
- **Sedentary lifestyle.** When we move, our muscles generate carbon dioxide which helps maintain body oxygenation. A lack of exercise results in lower production of CO₂ and a larger breathing volume.
- Higher temperature / stuffy environments – modern homes and workplaces are generally well-insulated but not always well ventilated. Stuffy, central heated rooms make it difficult for the body to regulate body temperature through the skin, therefore encouraging us to revert to the primitive method of heavier breathing.
- **Big breath myth.** The widely held mistaken belief that it is beneficial to take big breaths is a major cause of over-breathing in the Western world. As mentioned above, a deep breath should not be confused with a big breath. Babies take deep breaths in a quiet and gentle way using the diaphragm. In contrast, a big breath is often loud, through the mouth with upper chest movement.
- These things cause the nose to become blocked and the blood vessels and airways to constrict, it can disrupt the sleep and result in snoring, sleep apnoea and insomnia.

When we are under stress, the first thing that changes is our breathing. Stress makes us breathe faster, more intensely, more noticeable breathing using the upper chest. However, we do have voluntary control over our breathing. Breathing through the nose and not through the mouth in a calm, relaxed, soft way is the opposite, and helps to minimise the effects of stress. Be aware of your breath throughout the whole day. Breathing should be through the nose at all times, including during exercise.

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Dysfunctional breathing includes: any disturbance to breath including hyperventilation / over-breathing (breathing in excess of metabolic requirements), unexplained breathlessness, breathing pattern disorders, irregularity of breathing.

Correct oral posture supports your spine! Have you ever considered the relationship between your teeth and bite, your jaw joints, head position, head and neck muscles, lower back, pelvis, your feet, and your general upright standing posture? Good jaw posture keeps bones and joints in correct alignment. **Good jaw posture depends on good tongue posture.**

The quickest way to alkalis the body is by breathing correctly.

Breathing Exercises (Breathing Plus)

These exercises are for clients only. I will have recommended which exercises are appropriate for you to do based on your health, breathing and age from the ones below.

While the breathing exercises below can be helpful, the most helpful breathing is our regular continuous every day breathing that is most important. The key is to breathe softly, gently and slowly through the nose. It may take a few weeks of nose breathing for the nose to become clear, so just keep working on it gently and being aware of the breath and nose breathing all through the day. It is a case of use it or lose it. Using the nose trains the tissues in the nasal cavity and throat to flex and stay open.

Slow breathing to around 6 breaths a minutes is the optimum rate for stimulating the Vagus nerve and for influencing the functioning of the autonomic nervous system.

All of the exercises below should be gentle, calm and to within your own tolerance, especially with older people or if you are unwell. You might just want to start with relaxation. If anything feels uncomfortable, stop and just return the breathing to a relaxed gentle pace. Go easy with the exercises. Find the exercise that you feel most comfortable with. The many small breaths hold, or just gently slowing the breath are often the best ones to start with.

It is very important to practice these exercises without too much effort or tension, it is the slowness and calmness of the breath as opposed to the amount of air breathed in that is important. Switch from mouth breathing to nose breathing. The more focus you can give to your breathing every day, the easier it will become over weeks, and months. The following are a few exercises to get you started but there are recommended books, CDs, Course and Live Zoom Classes at the end of the document.

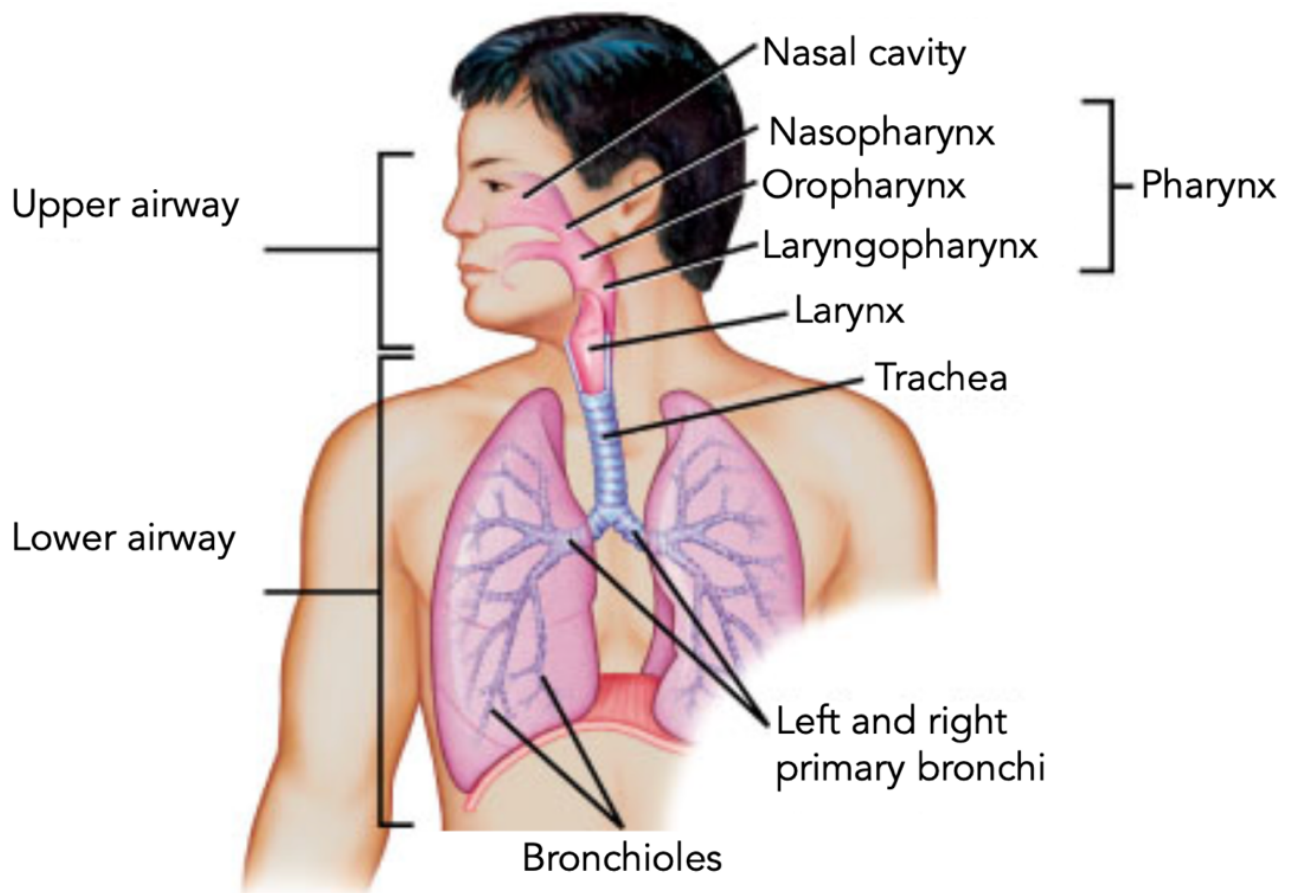
Control Pause (CP) = the length of time you can hold your breath comfortably, following an exhalation. Breathe in and out through the nose, pinch with fingers, and count the seconds. Stop at the very first distinct sign of the body needing air, do not bring will power into it to

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keep holding. The most accurate CP is taken in the morning. The greater the CP, the better you will likely feel. You will not start to clear symptoms of the nose until your control pause is at least 20 seconds – this may take a few days, weeks or even months, so keep persevering.

Note – Sleep apnoea and CP

Those with sleep apnoea, because they are holding their breath during their sleep, may actually show an unusually high control pulse due to blunted or loss of sensitivity of the chemoreceptors. However, there may be chest-breathing, fast breathing and a difference between control pulse and breathing volume.



The normal resting place for the tongue at all times should be around $\frac{3}{4}$ of the tongue placed on the roof of the mouth.

Good jaw posture depends on good tongue posture.

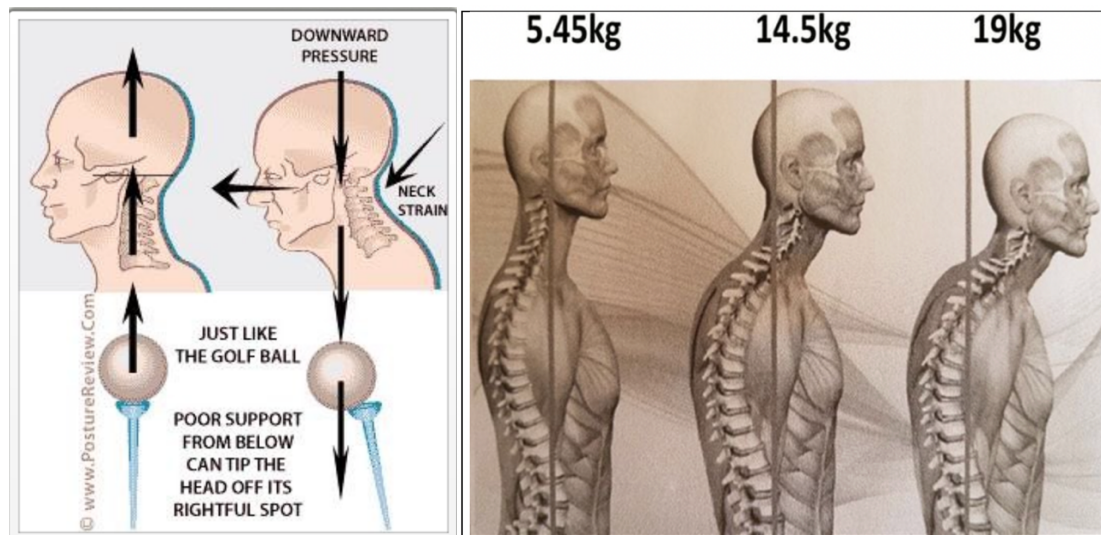
Correct oral posture supports your spine

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○ Posture

Slouching over compresses the diaphragm and moves breathing more to the upper chest which activates the sympathetic nervous system (fight or flight) increasing stress and breathing volume. Try sitting in a horse-riding position on the edge of a chair with feet tucked underneath, head pulled up and imagining the spaces between your ribs widening. Be aware of your posture at all times.

You will know that you have slowed down your breathing when you feel a tolerable air hunger. In addition, your hands may feel warmer, eyes more glassy, increased saliva in the mouth, warmer body. Many people who mouth breathe or hyperventilate have a head forward position. The diagram below shows the amount of pressure in Kg that this can put on the spine.



○ Digestion

When you correct your breathing volume, your metabolic processes improve, and your gastrointestinal tract receives more oxygen. This can reduce the need for food and helps normalise the appetite. Carbon dioxide stimulates the Vagus nerve (a parasympathetic nervous system cranial nerve that affects many areas of the body including the gastrointestinal tract (digestion), appetite control, the heart, respiration, speech, functions of the mouth. Breath has a significant effect on our mental state, just as our mental state can have a positive or negative effect on our ability to breathe well.

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○ PMS / PMT / Hormones

The second half of the menstrual cycle is called the luteal phase which lasts around 14 days and occurs after ovulation. The progesterone produced during this time serves to maintain the thickened lining of the uterus in preparation for the fertilized egg to implant itself. It also prohibits uterine muscle contractions that would cause the body to reject an egg. This phase is characterised by a gradual rise in progesterone.

When progesterone levels increase, it stimulates an increase in breathing (hyperventilation) and carbon dioxide levels can drop by 25% during this time. With this can come increased pain, fatigue, anxiety, PMS, sensitivity to carbon dioxide. As a change of breathing pattern can occur post ovulation, paying attention to breathing through the nose and doing the breathing exercise may help with these symptoms. Oestrogen and progesterone both influence minute ventilation and arterial pCO₂ levels (Slatkowska et al., 2006) and may also influence TMJ pain (temporomandibular joint). The hormonal intricacies relating to pain and the menstrual cycle are still being untangled (Sherman and LeResche, 2010), but alterations in breathing pattern during the menstrual cycle could contribute to TMJ.

EXERCISES

1. Unblock the nose
2. Reduced breathing to create air shortage
3. Walking with mouth closed
4. Walking with breath holds
5. Steps
6. Many breath holds
7. Relaxation without air shortage

Not well, older person, CP less than 10 seconds	Ex. 2, 3, 6, 7 (Six by 10 minute sessions daily)
Sleep apnoea, panic attacks, anxiety, high blood pressure	Ex. 2, 3, 6, 7 (Six by 10 minute sessions daily)
Teenagers, children	Ex. 1, 2 briefly, 3, 4, 5, 6 *Ex 5 for 12-18 times daily)
Adult in relatively good health	Ex. 1, 2, 3, 4, 5, 6, 6, (six by 10 minute sessions daily)

BUTEYKO BREATHING

EXERCISE 1

Decongest / Unblock the nose

This can work with a head cold also and also if a little fatigued and may help with constipation. This is a temporary method, but once a normal breathing volume begins to be achieved through nose-breathing practise, the nose should eventually become more and more decongested as the respiratory centre of the brain begins to reset. **I love this exercise** and it can be really helpful in temporarily clearing the airways before doing some of the exercises or when the nose is blocked.

When we pinch the nose, nitric oxide pools in the nasal cavity area and it is likely this nitric oxide helps to decongest the nose.

- Gently breathe in through the nose
- Gently breathe out through the nose
- Pinch nose with fingers to hold breath
- Hold breath for as long as possible – a strong air hunger is needed for decongestion
- Sway or nod your head as a distraction
- Release nose and continue nose breathing
- Calm breathing as soon as possible
- Wait half a minute to a minute. Repeat 6 times

If pregnant, have Type 1 diabetes, obstructive sleep apnoea, anxiety, panic attacks, epilepsy, high blood pressure or heart problems or unwell, do not hold the breath for too long, always go lightly. If you have physical obstruction issues in your nose, these exercises may not be appropriate for you. You may wish to start with the many small breath holds instead or just slow breathing and relaxation. These exercises should be done with little effort and in a relaxed state. If it becomes too hard to breathe, stop or just go within your tolerance. You may experience symptoms of detoxification when first starting with these exercises due to the improved blood flow and oxygenation of tissues and organs.

EXERCISE 2

Breathe light / Reduced Breathing Volume

- ⇒ You are not trying to deprive yourself of oxygen here
- ⇒ Instead, you are helping to normalise the breathing volume
- ⇒ **Air shortage during reduced breathing is not due to decreased oxygen, but an accumulation of carbon dioxide.**
- ⇒ Persons with asthma or panic often dislike the air shortage or air hunger
- ⇒ Relax. Sit up straight. Widen the space between ribs.
- ⇒ With mouth closed, gently breathe through the nose with a feeling of relaxation
- ⇒ This is not complicated, just subtle, just reducing the breathing to open the airways and get more oxygen into the cells
- ⇒ You may wish to use an Oximeter to monitor progress. Normal Oxygen saturation $SaO_2 = 95-100\%$

BUTEYKO BREATHING

Two options: -

- 1) Slow down the speed of the air as it enters and leaves the nostrils.
- 2) Take a shorter breath in through nose and allow a relaxed breath out

⇒ **HAND ON NAVEL EXERCISE**

- Place hands on chest and above navel and notice chest v abdominal breathing
- Follow your breath, become aware of your breathing
- Feel the air coming into your nostrils, feel the air at the back of the throat, feel your tummy move in and out. Feel the chest move up and down
- Apply gentle pressure with your hands against chest
- Create a slight resistance to your breathing
- Slow down each breath and take in less air than you would like to
- Make the in-breath smaller and shorter
- Breathe out with a relaxed exhalation. Imagine a balloon slowly deflating on its own
- Again, take a smaller or shorter breath in by placing a little pressure on your chest and tummy with your hands
- As you breathe out, bring a feeling of relaxation to the body, **allowing the air to leave the body effortlessly**
- Continue in the same way: focus on a shorter breath (active part) in and a relaxed effortless breath out (passive part).



The goal is to achieve a tolerable hunger for air. When the air hunger gets too strong, the breathing muscles will contract to cause irregular breathing. When we breathe more softly, slowly, quietly and through the nose, we should feel our body warm up and increased watery saliva in the mouth. These are the effects of the parasympathetic nervous system (rest and digest) kicking in. Breathing less is “more”.

Think of over-breathing in the same way as over-eating. To purposely reduce your breathing, you need to create a temporary feeling of air hunger by pausing on the out-breath. This will create a sensation of air hunger, *but this is not due to your body being deprived of oxygen, it is a reaction to the accumulation of carbon dioxide in the blood.* The only way that you know you are reducing your breathing is when you feel a need for air. If the air hunger becomes uncomfortable, then stop and just breathe gently and try again, just to go your own comfortable tolerance.

BUTEYKO BREATHING

EXERCISE 2 Continued

Reduced Breathing Volume

Alternative reduced breathing volume exercise

⇒ **CUPPING HANDS EXERCISE**

- Cup hands around your nose (try and have no gaps), close your mouth and breathe calmly in and out through the nose
- Focus on the amount of air you breathe as enters and leaves your nostrils. Focus on a small area just inside the nostril. Feel the air as it enters and leaves the nose.
- Concentrate on taking in less air through your nostrils. Breathe in enough air just to fill the nostrils and no more.
- Slow down the speed of the air as it leaves the nostrils
- Short breath in with a very relaxed exhalation like a balloon deflating slowly
- Continue for around 3-5 minutes. Take a rest if necessary.
- Rest for around a minute and repeat again.
- The theory is that CO₂ will pool into the hands and we breathe it into the lungs



With each version of reduced breathing volume, the objective is to slow your breathing down or take a shorter breath in to the point where you need a tolerable need for air. If the need for air is too much, or if you feel panicky or stressed, take a slightly larger breath or take a rest from the exercises for half a minute or so.

Addressing breathing should be very natural and not forced. You can only encourage breathing to slow down and reduce through mental commands, encouragement and relaxation.

How you breathe during stress is the same as a person with dysfunctional breathing; faster breathing, upper chest breathing, loud breathing, frequent sighing, mouth-breathing. Stress is the biggest factor in dysfunctional breathing patterns, but when you remove the stress, the patterns remain.

BUTEYKO BREATHING

EXERCISE 2 Continued

Reduced Breathing Volume

⇒ BLOCKING ONE NOSTRIL EXERCISE

- Block each nostril, one at a time, and determine which nostril is more blocked than the other.
- Block the free nostril so that you breathe through the more blocked one
- Just focus on the air flow as it comes in and out of the nostril, while having a feeling of relaxation or softness throughout the body
- Concentrate on slowing the speed at which the air enters the nostrils for about 3-4 minutes, with a “tolerable” feeling of a need for air (however, if uncomfortable, stop and rest).
- Be conscious of not tensing up the body while doing this

The next two exercises will quicken the process of increasing your Control Pause (CP) which I will have explained to you during our chat.

EXERCISE 3

Walking with mouth closed (no breath hold)

- Walk, but don't talk
- Walk at a pace where you can sustain nasal breathing
- If you need to open your mouth, slow down and relax
- Walk for half an hour to an hour daily – bring Buteyko into your walk
- Breathe less and more slowly than you would normally breathe

EXERCISE 4

Walking with medium to strong short breath hold

- While walking, breathe out through the nose
- Pinch nose with fingers
- Hold your breath for 10-20 paces to start with and increase to 20-80 paces
- Resume breathing through nose and continue walking for about one minute
- Repeat breath hold every minute or so for 8-10 repetitions

BUTEYKO BREATHING

EXERCISE 5 STEPS

Exercise for children, teenagers, and healthy adults

- Exhale gently through the nose
- Hold your breath by pinching your nose
- Walk as many steps as you can until you feel a strong need for air
- Try to build up a large air shortage by doing as many steps as possible – without overdoing it, it should not be stressful at all, but hold until a medium to strong need for air mobilises the diaphragm, providing it with a workout, helping to strengthen it.
- Resume breathing through the nose
- Your first breath will usually be bigger than normal but make sure you calm your breathing as soon as possible by suppressing your second and third breaths.
- You should be able to recover from “steps” within one to two breaths, if you cannot, then you have held your breath for too long.
-

EXERCISE 6 Many small breath holds

For cough, wheeze, stress, or panic. This will work more effectively if it is used in the early stages of symptoms.

If we are stressed it can be quite difficult to calm down the breath and reduce the breathing in the exercises above as the drive to breathe is too much. This exercise can be used to calm down the mind, help stop overactive thoughts and can be done at night if you can't sleep. With this exercise, we physically hold the breath. The sooner you start doing this upon symptoms arising the better.

- Relax and take a small breath in through the nose
- Small breath out through the nose
- Pinch the nose and hold the breath for 3-4 seconds and then let go
- Breathe normally for 10 seconds, bringing a feeling of relaxation to the body
- Repeat the exercise
- Keep going until symptoms cease, 10 minutes at the most. If symptoms are severe, take your asthma medication immediately, this is not a substitute for medication. If your rescue inhaler doesn't work, call the GP – Patrick McKeowan.

If the above is too difficult, have mini pauses at the end of each breath to start with instead.

Success of stopping an asthma attack: -

- ⇒ The higher your normal CP (control pulse), the easier it is to stop symptoms. Practising nose-breathing and the exercises will increase the CP.
- ⇒ The sooner you start the breath-hold exercise, the easier it is to stop the symptoms

BUTEYKO BREATHING

EXERCISE 7 Relaxation

This is simply learning to relax and calm the breathing. This is best done while listening to the Buteyko Breathing MP3 Track which you can download on your hidden client fact sheet link (link is in your original plan).

Concentrate on relaxing the head, the ears, relaxing the eyes, the nose, mouth, tongue, teeth, jaw, tongue, throat, skin, neck, shoulders, the left arm and fingers, the right arm and fingers, then the chest, the abdomen and keep going relaxing all the way down the body, even the skin, hair, tee. Focus on just relaxing and slowing the breath.

- Sit up straight.
- Imagine a piece of string gently holding you up from the top of the back of the head and the space between your lower ribs widening as you straighten the upper body.
- With your mouth closed, jaw relaxed, and while breathing gently through your nose, begin to bring a feeling of relaxation to your body. Allow your body to relax and hold your attention on each part of the body while imagining and feeling your muscles relaxing.
- Breathing should be light, quiet, effortless, soft, through the nose, diaphragmatic (from the diaphragm and not the upper chest), rhythmic, and gently paused on the exhale. Breathe should be so smooth that the fine hairs in your nostrils remain motionless.

“Generally, there are three levels of breathing. The first one is to breathe SOFTLY, so that the person standing next to you doesn’t hear you breathing. The second level is to breathe softly so that YOU don’t hear yourself breathing. The third level is to breath softly so you do not FEEL yourself breathing.” – Master Chris Pei, Beginners Guide to Qi Gong.

Summary

No.	Exercise	Instructions
1	Unblock the nose	
2	Reduced breathing to create air shortage	Hands on chest & above navel Blocking one nostril Hands cupped
3	Walking with mouth closed	
4	Walking with breath holds	Hold for 10-20 paces Hold for 20-80 paces
5	Steps	Medium to strong steps. Hold for 10 to 80 paces Very strong steps. Running with breath holding
6	Many small breath holds	
7	Relaxation without air shortage	

BUTEYKO BREATHING

Signs of mouth-breathing at night

A sign of mouth-breathing is waking up in the morning with a dry mouth or fatigue in the morning. This increases the acidification in the mouth which can lead to more dental cavities and gum disease, bad breath, inflammation of the airways. A dry mouth is a breeding ground for bacteria and plaque. Bet wetting, needing to urinate around 5-6am, asthma symptoms between 3-5am, nightmares, snoring, sleep apnoea, and waking up tired or with a blocked nose can also be signs of mouth-breathing at night. Restless sleep or signs that the bedclothes have been moved about a lot during the night. Breathing through the nose instead of the mouth can help with sleep issues and sleep quality.

Obstructive Sleep Apnoea is when the airway becomes blocked during sleep, and you stop breathing for short periods of time. However, this can even happen several times a minute through sleep, meaning that although you are asleep, you are not going fully into all of the different sleep states needed for health. Snoring can indicate there is likely some degree of sleep apnoea going on, but you do not have to snore to have sleep apnoea. The more weight a person has, the more problems they have sleeping, however you can be slim and still have sleep apnoea. Sleep apnoea can have severe health consequences such as diabetes, high blood pressure, heart disease. Some commercial transport companies even now test their drivers for sleep apnoea as those with it can fall asleep very easily. In fact, a sign of sleep apnoea is needing to take a nap in the afternoon, as well as waking up feeling fatigued, or with a dry mouth and increased anxiety. Those with a larger neck, and weak neck muscles (such as those with Ehlers Danlos Syndrome or connective tissue issues) may also be more susceptible to sleep apnoea as the soft tissue and muscles can be more flaccid. Breath training during the day can help breathing at night.

Teeth Grinding: when the tongue blocks the airway the brain realises oxygen is not coming in, and so the brain makes you do something as a survival technique. This could be moving position, so the body comes out of deeper sleep, to a lighter sleep, to be able to move. The tongue is attached to the lower jaw, therefore the brain makes you grind forward and to the side with the aim of pulling the tongue out of the throat. You are typically clenching at the same time while doing this which can be destructive to the bone, soft tissues, and teeth.

Teeth grinding may also be a sign of low magnesium, adrenal fatigue, or parasites such as oral candida which are more active at night.

BUTEYKO BREATHING

How to stop mouth-breathing at night

- First clear the nose by doing exercise number 1. If the nose is especially blocked you can use a neti pot / nasal flush kit which you can get for around £10 on Amazon (link below), which is a device that administers a saline solution through the nasal passages which can be helpful at clearing the nose and sinuses, especially when also combined with the nose unblocking exercise.
- Tape up the mouth – Patrick McKeowan recommends 3M Micropore tape using around 10-12 cm of tape (link below)
- Take off an inch, or the size of a postage stamp, dry your lips, and put across your lips. This small piece just reminds us to use the nose instead of the mouth for breathing and gives easy access during the night if you need to remove the tape quickly. During the first few nights you may find yourself taking it off yourself during your sleep, which is fine, just keep persisting.
- You might want to wear the tape around the house in the daytime for 20 mins or evening so you are already used to wearing it and realise that it not restrictive.
- If the mouth is naturally moist in the morning, there is no need to wear the tape.
- While wearing the tape, your nose will never completely block. Your nose will partially block if your CP is low. Your nose will only block completely if you switch to mouth-breathing. The nose will continue to block until CP is 20 seconds.
- The benefit of the tape is that you will have a far deeper sleep and will wake up alert in the morning
- If this is difficult to start with you can try temporarily using breathing nose strips such as “Breathe Right” strips, to make the transition easier. After a few weeks, when your breathing becomes quieter, you won’t need to wear the plastic strip as your nose will be naturally dilated and the breathing volume will have gone down.
- Alternatively, you may wish to use a nasal dilator – this is my preferred one sold by Patrick McKeown, but you can also get different ones on Amazon. <https://oxygenadvantage.com/nasal-dilator-sports/>
- Alternatively, “Myotape” (link below), is tape that fits around the mouth, but leaves a gap over the mouth may also be helpful.
- Practice nose-breathing softly for 15-20 minutes before sleep to activate the parasympathetic nervous system (rest and digest).
- Sleeping on the left side can reduce reflux / GERD.
- Sleep on the side instead of the back (this can halve the amount of sleep apnoeas)
- Stimulants such as caffeine, sugar, alcohol, processed foods, dairy and large meals especially after 8pm can all increase breathing which is not what we want for good sleep. In turn, addressing breathing may restore metabolic processes and a more appropriate appetite.
- Food intolerances such as gluten or dairy increase the heart rate and breathing and will affect the CP. Notice if any foods increase your breathing or heart rate. If in doubt, you can try the home Allergen Test (see hidden link on website, the link is in your first plan).

BUTEYKO BREATHING

Links to supplies

Neti pot / Nasal flush	https://www.amazon.co.uk/Sinus-Rinse-Packets-Thermometer-Sticker/dp/B08R9NTDHY/ref=sr_1_5?dchild=1&keywords=neti+pot&qid=1623099649&sr=8-5
3M Micropore tape	https://www.amazon.co.uk/gp/product/B004U9MLV8/ref=ppx_yo_dt_b_asin_title_o04_s00?ie=UTF8&psc=1
Breathe Right strips (different sizes available if you search)	https://www.amazon.co.uk/gp/product/B00LNC9600/ref=ppx_yo_dt_b_asin_title_o01_s00?ie=UTF8&psc=1
Myotape (children / teenage size also available)	https://www.amazon.co.uk/MYOTAPE-Improve-Quality-Breathing-Designed/dp/B08JZF6YK5/ref=sr_1_5?dchild=1&keywords=myotape&qid=1623101552&s=drugstore&sr=1-5

Buteyko Clinic International have a free Buteyko AP
<https://buteykoclinic.com/pages/free-breathing-app>

Books, Short Courses / Zoom Classes

- **Books**
- *Breathe, The New Science of a Lost Art* by James Nestor. There is also a great interview of James Nestor by Patrick McKeown about his book and well worth listening to.
<https://www.youtube.com/watch?v=wI4J2LMXcx8>
- *The Breathing Cure: Exercises to Develop New Breathing Habits for a Healthier, Happier and Longer Life* by Patrick McKeown. This is his latest book, he has also written several other books.
- **CD with book:** *Buteyko Clinic Method for chronic hyperventilation, fatigue, insomnia, snoring and sleep apnoea* by Patrick McKeown
- **Book & CD:** *Sleep with Buteyko: Stop Snoring, Sleep Apnoea and Insomnia, Suitable for Children and Adults* by Patrick McKeown (Available on Amazon)
- **Research**
A huge number of links to research on Buteyko Breathing can be found here
<https://www.myofunctionaltherapy.co.uk/copy-of-latest-research>
- **Free online course** by Patrick McKeown for children and teenagers
<https://buteykoclinic.com/buteyko-clinic-online-courses/>
- **Live Zoom Buteyko Group Classes** with Patrick McKeown
<https://buteykoclinic.com/clinic-with-patrick-mckeown/>
10% off the first session with code NOSE10
- **121 Buteyko Breathing Session with me (after First Consultation)**

BUTEYKO BREATHING

This document is for clients only. The exercises in this document are only to be used if they have been advised by me in a client plan after a consultation with me

References

1. Breathe, The New Science of a Lost Art – James Nestor
2. Butekyo Course Book - Shut Your Mouth by Patrick McKeown
3. Close Your Mouth – Patrick McKeown
4. Face Reading in Chinese Medicine – Lillian Bridges
4. The Breathing Cure - Patrick McKeown

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