The Importance of Correct Breathing for Raising Healthy Good Looking Children

Dr. Rosalba Courtney N.D., D.O., PhD

The state of a child’s airways and their breathing habits should be a fundamental consideration if we wish to optimize their health, facial attractiveness, postural and skeletal development, cognitive function and development. The modern epidemics of chronic non-communicable illnesses, such as asthma, allergy, sleep apnea, ADHD, depression, anxiety, postural dysfunction, crooked teeth and orthodontic problems, plaguing children in western and industrialized countries continue to increase.1 These diseases appear to be linked and clinicians report that a child with one of these conditions tends to have several of the other.2 Epidemiological studies suggest that this has to with environmental rather than genetic factors.3 Changes in diet, social changes, reduced activity levels, reduced exposure to the complex microbial “old friends” with which we and our immune systems co-evolved and exposure to increasing levels of environmental toxins have all been shown to play a part in the rise of chronic childhood illnesses.4-6 Improved diet, better gut health, reduced exposure to environmental toxins and other stressors are essential to improving the health of today’s children. However, to best help children with these conditions we also need to do what we can to ensure that their airways are not obstructed and that they have good breathing.

Children with the chronic health problems and changing facial structure of modern society mentioned above very often also suffer from poor respiratory health and poor breathing habits.7-10 Children with allergies and poor immune health frequently have obstructed airways due to enlarged adenoids and tonsils, blocked and runny noses, asthma, croup and frequent upper respiratory tract infections. As a result of or in conjunction with this, children develop functional breathing disorders such as mouth breathing, breathing pattern disorders, sleep-disordered breathing, sleep apnoea, hyperventilation and hypoventilation. These disorders of breathing can then contribute to structural changes and vicious cycles of dysfunction that have repercussions for children’s health and the attractiveness of their appearance.

MOUTH BREATHING IN CHILDREN

Many children in western society habitually breathe through their mouths rather than through their noses. This not only changes the structure of their faces to make them more narrow and disproportionate but also has many adverse health consequences.10 According to several observers of adults and children in traditional pre-industrial societies, mouth breathing is rare and facial structure is almost universally characterised by a broad palate, straight teeth and a complete absence of the dental crowding and malocclusion so commonly seen in today’s children. The 18th century ethnographer George Catlin studied over 150 native American Indian tribes, comprising two million people. Catlin is famous for his 500 portraits of men, women and children and colourful journals describing all aspects of native American life. He also became known as a passionate advocate for the importance of nasal breathing. His book, The Breath of Life or Malrespiration and its Effects upon the Enjoyment of Life of Man, expounds on this topic and describes the diligence with which Native American mothers ensured their children’s mouths were closed, attributing their superb health and “total absence of malformation of their beautiful sets of teeth, scrupulously kept together by the lower jaws” to this behaviour.11 Dr. Weston Price, a dentist from Cleveland, Ohio, made similar observations after travelling the world in the 1930’s and 1940’s examining the diet, habits, health, teeth and facial structure of over 12 different cultural groups both hunter-gatherer and agricultural who lived pre-industrial lifestyles.12 Fossil records suggest that the change in human facial structure towards a narrower and less functional shape began with the dawn of agriculture and increased after the industrial revolution but that the most radical
changes have been since the 19th century. In modern western society mouth breathing is most prevalent in children under the age of 13. After this age it sometimes improves because of growth patterns in the face which widen the airway. However it is important to improve breathing habits and optimise the function of the airway as early as possible in young children because many of the detrimental changes brought about by disordered breathing on structure, health and cognitive function by disordered breathing can have lasting consequences.

EFFECTS OF MOUTH BREATHING ON STRUCTURAL DEVELOPMENT: THE FACE, TEETH AND JAWS
The changes in facial structure occurring in modern humans have a lot to do with the extent to which they breathed through their mouths as children. A child who has a blocked nose or who has a perceived or real difficulty getting enough air will either become obliged to breathe through their mouth rather than through their nose or choose the oral route because it is more comfortable or has become habitual. Tongue position and swallowing patterns change as a result of this and the forces that normally shape facial and dental development become aberrant.

The tongue of a mouth breathing child sits low in their mouth and the normal pressures needed to develop the width of the upper palate are reduced or abnormal. If tongue position is incorrect, swallowing pattern tends to become abnormal. Normally every time we swallow, (1-2 times per minute) the tongue pushes upwards into the palate and then backwards to complete the normal swallow. When a predominately mouth breathing child swallows the tongue tends to thrust forward instead of upwards and the lower jaw tends to moves backwards instead of staying still. This creates forces that distort the position of the teeth and work against normal facial growth.

POSTURAL EFFECTS
Posture, especially of the head and neck, is also very much influenced by a child’s breathing. It has long been recognized that blocked or obstructed airways at the nose or throat will make a person tilt their head back to increase the size of the airway and ease breathing. If this head-tilting response becomes habitual the person develops the fixed postural abnormality called forward head posture. This head posture is associated with changes in the whole spine and upper shoulder girdle and results in back pain, headaches and temporal-mandibular joint disorder (TMJD).

Breathing patterns in a child with airway obstruction tend to be upper thoracic dominant and inefficient due to poor co-ordination between the diaphragm and abdominals and overuse of accessory muscles of breathing. In the long term this can have adverse affects on the motor control mechanisms needed to ensure spinal stability and prevent back pain.

EFFECTS OF MOUTH BREATHING ON ORAL HEALTH, INFECTION AND AIRWAY FUNCTION
The nose normally acts as a filter and participates in the immune response against viruses, bacteria and fungi. Chemical substances produced in the nose, such as nitric oxide and lysozyme, break down pathogens such as bacteria, viruses and fungi in the nasal and oral mucosa. Mouth breathing reduces the availability of these substances, thus compromising the child’s immune defence system. A major disadvantage of mouth breathing is that the air passes into the lungs and upper airway without undergoing the purification, humidification and warming that normally occurs when it passes through the nasal route. The result of this is oral dysbiosis, increased dental caries and gum disease and increased upper respiratory infection.

Oral dysbiosis or growth of abnormal bacteria in the mouth and throat is a well-known cause of increased tooth decay and gum disease and probably also contributes to ongoing enlargement of adenoids and tonsils and to ear infections. It may also contribute to abnormal gut flora. Many parents report that when their child stops mouth breathing not only do they have fewer colds and upper respiratory tract infections but also their enlarged lymph glands become smaller. Parents also report that their children have fewer ear infections, and this is supported by research showing that otitis media is aggravated by habitual mouth breathing and associated habits such as atypical swallowing patterns and chronic sniffing.

Mouth breathing has also been shown to aggravate airway related conditions such as asthma and sleep
apnoea. Oral breathing causes a decrease in lung function in mild asthmatic subjects at rest and during exercise and is thought to play a role in the pathogenesis of acute asthma exacerbations. Some research has shown that improving nasal breathing can reduce the severity of asthma.

Nasal breathing plays a major role in the regulation of respiration in sleep. The effect of mouth breathing on the patency of the pharyngeal airway is a major contributing factor to sleep apnoea. Some researchers stress that collapse of the pharyngeal airway triggered by the switch to oral breathing is the key step in onset of sleep-disordered breathing.

MOUTH BREATHING AND NITRIC OXIDE

The nose is one of the main places in the body that nitric oxide is made. The paranasal sinuses produce 60% of the body’s nitric oxide. This particular substance is involved in over 2000 reactions in the body. Decreased levels of nitric oxide in the nose and systemically have wide ranging consequences on functions such as oxygen transport, nerve conduction, immunity, function of the bronchi and blood vessels, and even memory and learning.

Unless a child is very much obstructed, breathing through their mouth can result in lower levels of oxygen than nasal breathing even though nasal breathing results in the intake of a lower volume of air. Research has shown that nasal breathing can provide up to 10% more oxygen than mouth breathing and this phenomenon has been shown to be due to the effects of nitric oxide produced in the paranasal sinuses. In my clinic I generally measure oxygen levels in mouth breathing children to see what closing their mouth and breathing through their nose does to their O2 saturation. I’ve found that in a small number of children whose airways are very obstructed nasal breathing does cause a drop in oxygen. In these cases removal of enlarged tonsils and adenoids is a pre-requisite to establishing nasal breathing. However, in most other cases nasal breathing has beneficial effects on O2; otherwise, the levels stay stable even when the child initially feels discomfort and says that they feel like they are experiencing a shortage of air.

DYSFUNCTIONAL BREATHING IN CHILDREN

Mouth breathing tends to co-exist with other types of dysfunctional breathing such as breathing pattern disorders, sleep-disordered breathing, hyperventilation and hypventilation. Children may also begin to use a “sniffing pattern” of breathing where the nostrils narrow during inhalation rather than widen and the head is slightly retracted and tipped back during the in-breath cycle. Studies undertaken by paediatricians and osteopaths working with the Russian Academy of Osteopathic Medicine in St. Petersburg indicated that according to their measures of around two thousand children around 80% had at least one of the following types of dysfunctional breathing: mouth breathing, habitual upper thoracic/vertical pattern of breathing and/or sniffing breathing pattern.

In adults as well as children dysfunctional breathing has been shown to have several components in addition to poor breathing habits such as mouth breathing: a biochemical component which appears as either hyperventilation or hypoventilation, a biomechanical component which appears as a breathing pattern dysfunction, and a psychophysiological component.

BREATHING PATTERN DISORDERS IN CHILDREN

Breathing pattern disorders are common in all children with the common chronic illnesses of modern times. They include thoracic breathing, excess sighing, irregular breathing, hyperinflation and speech/breathing disorders. In most cases of breathing pattern disorders the diaphragm does not function efficiently, breathing rate is increased and rhythms of breathing can be excessively irregular, with disproportion between inhalation and exhalation.

Breathing rates and rhythms and the oscillations they produce in pressure, blood flow and autonomic nervous system function are important influences on the body’s ability to maintain homeostasis. These oscillations are key determinants of the ability of various body systems to communicate with each other and to co-ordinate their responses to internal and external environmental changes. Chaotic breathing rhythms, habitually rapid breathing and chronic thoracic breathing tend to maintain imbalances in the autonomic nervous system and compromise the body’s ability to maintain homeostasis.
Regulation of breathing rate and rhythm through regular practice of breathing exercises has been shown to improve a large number of disease states including anxiety, depression, asthma, irritable bowel disease and hypertension. Children can be taught to alter breathing patterns with child-focused techniques, and they show health improvements and improved psychological resilience from doing so.

Children with asthma who develop dysfunctional upper thoracic breathing patterns can end up with poorly controlled asthma and medication overuse. Abnormal breathing patterns such as hyperventilation, mouth breathing and upper chest breathing can worsen asthma symptoms. They make a child more likely to experience disproportionate breathlessness and anxiety about their symptoms, and to lose control of breathing in ways that affect asthma control and increase medication use.

Research has shown that breathing pattern is a significant influence on the extent of breathlessness and that improved breathing patterns result in a dramatic decrease in extent of breathlessness. This is an important consideration if we wish to avoid overmedicating a child with asthma. In many cases teaching a child to correct bad breathing habits and to control their breathing can be the first step in helping them manage and control their asthma symptoms.

HYPERVENTILATION AND HYPOVENTILATION IN CHILDREN

Breathing affects the body’s ability to take up oxygen and regulate carbon dioxide levels. It also affects the body’s acidity and alkalinity. Levels of O2 and CO2 and pH affect a child’s respiratory and immune health, their behavior and the development and the function of their brain and nervous system.

Children with obstructed airways and breathing dysfunction can either overbreath (which is called hyperventilation) to compensate for the obstruction or underbreath and have insufficient oxygen and too much CO2 (called hypoventilation). Sometimes they cycle between these two states, particularly at night if they have sleep apnoea or sleep-disordered breathing.

A child who is hyperventilating does not necessarily have higher levels of oxygen. If fact it is well known that low carbon dioxide levels can actually impair O2 delivery to the brain and other organs. Chronically low levels of CO2 also affect the body’s ability to balance pH and in the long term children can end up with low bicarbonate levels and some degree of acidosis. Normalising excessive hyperventilation tendencies can make the airways less reactive and prone to spasm. This is an important consideration in children with asthma because some studies have shown lower levels of carbon dioxide in adults (children have not been studied) with asthma and allergy.

Hyperventilation affects many systems of the body, particularly the brain and nervous system. It can aggravate anxiety states and is an important contributor to panic disorder. Hyperventilation results in lower oxygen supply to the brain, and this is an important consideration for learning and cognitive development in children. One study found that hyperventilation alters responsiveness to auditory cues and verbal recall even in healthy children. Higher CO2 can be protective of the brain particularly under conditions of hypoxia (low oxygen) because it helps to maintain cerebral perfusion and improves cerebral glucose utilisation and oxidative metabolism.

Children with certain types of neurological diseases, including children with autism, have been found to be more likely to hyperventilate.

SLEEP-DISORDERED BREATHING IN CHILDREN

Many research studies over the last decade have shown that children (and babies) with sleep-disordered breathing, i.e. who mouth breathe during sleep, snore, or have sleep apnoea, have an increased incidence of learning and behavioural difficulties and show signs of delayed intellectual development, poor impulse control, hyperactivity and altered neural processing. One of the most recent studies followed 11,000 British children for six years, starting when they were six months old. The children whose sleep was affected by breathing problems like snoring, mouth breathing or apnoea were 40% to 100% more likely than normal breathers to develop ADHD. Children with the most severe and most persistent sleep-disordered breathing had the worst behavior and cognitive function. This research like other research before it was also able to...
show that cognitive and attention-directed tasks and behavioral issues greatly improved when the airway size was improved by removal of adenoids and tonsils. In many cases children diagnosed with ADHD before the surgery no longer fit the criteria after it.

Why is this? This is thought to be due to the fact that disturbed sleep patterns and lack of oxygen prevent the brain developing as it should. Also research shows that frequent arousals at night eventually lead to imbalances in the autonomic nervous system so that the fight/flight or aroused state of the sympathetic nervous system persists in the day.46

Normal restorative sleep has many stages. In the deeper levels of sleep the muscles to the airway lose their normal tone. If the child’s airway is already compromised because of postural and structural abnormalities, enlarged adenoids or tonsils or a chronically blocked nose their airway can become obstructed and instead of staying in the deep sleep that children’s brains need for rest and proper development their nervous system becomes aroused. This can happen repeatedly and frequently at night. In severe cases this is called sleep apnoea and it affects about 3% of children. However many more children snore and have some degree of what is known as upper airways resistance syndrome.47

Sleep-disordered breathing also results in lowered levels of growth hormone. This affects the growth of skeletal bone, including facial bones, and affects muscles, fat and insulin levels.

BREATHING EMOTIONS AND STRESS

Many parents have reported that when a child’s breathing improves or after adenoids or tonsils are removed they seem like a different child, calmer, less irritable and happier. This can be because they are getting a better oxygen supply or their carbon dioxide and pH levels have improved. It may also be partly due to direct neurological and psychophysiological effects of breathing. Recent research using brain scans shows that breathing sensations are processed in parts of the brain that also process emotions. Conditions such as anxiety, depression and panic disorder are as much as four times higher in people with asthma.48 It is believed that asthma and other conditions that affect airflow influence the function of the limbic system and adjacent parts of the brain involved in emotional processing, and that breathing disturbance contributes to anxiety by activating the brain’s fear network.49

Breathing is a major influence on mind-body interaction. It has long been known that attention to breathing can train mental focus, calm stress and promote positive emotional states. Focused attention on the breath is the foundation of most meditation, mindfulness and relaxation techniques and is a means for getting in touch with our deeper selves.

Children can also be trained to use breathing modulation for emotional self-regulation. Children with health and behaviour problems can have poor perception of body sensations. Learning to feel and modify breathing can be one of the most effective ways to help children become grounded and connected to their bodies in general. Increased sensitivity to their felt senses can help them to recognize and therefore regulate emotions.

SIGNS AND SYMPTOMS OF BREATHING DYSFUNCTION - THE OBVIOUS AND NOT SO OBVIOUS

Some signs that a child has airway obstruction and poor breathing are obvious when we are aware of what to look for. However these signs are often overlooked by parents and health practitioners, perhaps because their importance is not sufficiently appreciated. One of the most important signs that a child has obstructed airways or breathing dysfunction is mouth breathing. The more severe the obstruction the more likely we are to see classic signs such as facial pallor, dark circles under the child’s eyes, constant sniffing and hypo-nasal speech tones. The presence of breathing pattern disorders such as exaggerated upper chest breathing, frequent sighing, unexplained breathlessness and speech/breathing disorders are sometimes also fairly easy to spot.50

Parents should be alerted that there may be a sleep breathing disorder if a child breathes noisily at night, snores, sleeps with their mouth open (particularly with the head thrown back), has restless sleep, wakes frequently at night, wets the bed, grinds their teeth at night, has difficulty going to sleep, night terrors or bad dreams.51 There are now a number of centers that are equipped to perform polysomnography for children. These are recommended to confirm the severity of sleep-disordered breathing in children so parents
can make the correct decision regarding the extent and urgency of treatment.

Oxygen and carbon dioxide levels can be abnormal in children with breathing dysfunction.

WHAT CAN BE DONE TO IMPROVE A CHILD’S BREATHING

The solution to a child’s breathing problems often needs to be multi-layered, combining diet, breathing exercises, dental work and sometimes medication and removal of adenoids and tonsils. Correcting gut and immune function through increasing probiotic and lactofermented foods, reducing processed foods and providing good quality nutrient-dense food diet is fundamental. As the function of the immune system improves the lymphoid tissue in the upper airways can reduce in size and breathing can subsequently also improve.

Children can be taught breathing exercises to improve their breathing. Breathing heals in many ways and working with a practitioner who understands breathing therapy can be very helpful. One technique that has become well known, particularly for teaching children to stop mouth breathing, is the Buteyko method. This method can be helpful for both asthma and mouth breathing. Buteyko practitioners sometime make the assumption that all mouth breathing or asthmatic children are hyperventilating and this is not always the case. It’s best to work with a Buteyko practitioner or other breathing therapy specialist who assesses a child’s breathing and treats the child according to their individual needs, and preferably takes a holistic approach, referring to other health professionals when necessary.

Some children with very large adenoids and tonsils cannot stop mouth breathing unless these are removed. While natural non-surgical means are always preferable some children with severe obstruction of their airways do need to have their adenoids and tonsils removed to make enough space for breathing. If the jaw is narrow a dentist or orthodontist can be consulted regarding widening the palate or increasing the height of the back teeth to make more room for breathing.

Breathing dysfunction leads to musculo-skeletal changes that reinforce abnormal breathing patterns and effect posture and movement patterns. Children holding tension patterns and restrictions of movement associated with breathing pattern abnormalities often respond well to manual therapy such as massage, physiotherapy and chiropractic or osteopathic treatment, particularly if breathing training is also undertaken.

Stress and emotional suffering are powerful influences on breathing and in some children these need to be addressed as part of treating the contributing factors to breathing dysfunction.

CONCLUSION

How a child breathes is a reflection of their health and the myriad factors that influence it. By observing how a child breathes we can glean important information about their current state of health and we can also make predictions about their future health and facial development. When we improve a child’s breathing dysfunctions, by working directly with breathing or by addressing its causes, we remove an important obstacle to health and to the development of their facial attractiveness as teenagers and adults.

Children with a history of asthma, croup, frequent upper respiratory tract, ear infections and ADHD should have their breathing habits and their airways evaluated and corrected when possible. In cases where breathing dysfunction exists establishing proper airway function and improving breathing habits can lead to improvements in children’s health, mood, attention and behaviour. Many people also are unaware that taking steps to improve a child’s breathing can improve their sleep, eliminate bedwetting, decrease their need for asthma medication and reduce the incidence of colds and ear infections.

Good health is associated with a wide face, broad palate with plenty of room for all the teeth, facial symmetry and good posture. This type of face is also attractive. To help our children develop this attractive face we need to take care that their breathing habits are good and that their airways are adequate.

CASE STUDY

Many cases like Josh’s exist. Josh was an irritable baby who did not sleep well. As he grew older he suffered from many colds, ear infections and croup. By the age of five Josh was diagnosed with asthma. He was a frequent mouth breather who snored at night and often
wet the bed. At school the teacher said that he was a delightful child in many ways but always fidgeting and fooling around, unable to settle down to do his work and disruptive to the rest of the class. At the age of eight Josh was still wetting the bed most nights, needing asthma medication daily and had been prescribed Ritalin for ADD. In her search for natural approaches to improve his health his mother had taken steps to mostly eliminate dairy, sugar, processed food and wheat from his diet. These had improved Josh’s health but he still breathed through his mouth, wheezed if he did not take his asthma medication daily, was easily upset, distractible and frequently tired.

Josh’s dentist recommended he learn to stop mouth breathing to help his facial development and because it might also help his asthma. He was referred for breathing therapy and after doing his breathing exercises daily for two weeks he was sleeping much better at night, and had gone five nights straight without wetting the bed. His need for asthma medication had reduced and his mother reported that he was much calmer and seemed happier in himself. Josh still found it hard to breathe through his nose all the time and because his tonsils were still very large he was referred to an ear, nose and throat specialist who recommended that his tonsils be removed. A year later Josh was a different child and the majority of his health problems were resolved.

BIOGRAPHY
Dr. Rosalba Courtney N.D., D.O., PhD practises in Sydney as an Osteopath, Naturopath and Breathing Therapist. She has studied a wide range of breathing therapies including the Buteyko method and these have been a large part of her practice since 1991. Her PhD was on the topic of “Dysfunctional Breathing: its parameters, measurement and clinical significance”. Rosalba runs workshops for practitioners and patients. For further information see www.breatheandbody.com.au or email breatheandbody@optusnet.com.au

REFERENCES


