

# Mouth Breathers

## A multi-disciplinary treatise on how to manage your mouth breathing patient

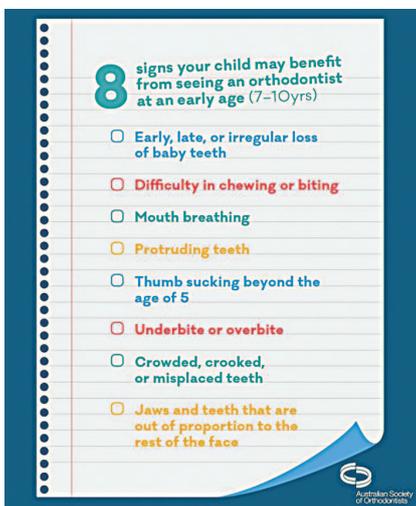
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Mouth breathing can have effects on malocclusion, facial development, overall health and even behaviour. The dentist can play a vital role in screening and even management of these effects.

### Adverse Effects of Mouth Breathing Facial Development

Trailing its U.S. counterparts in the American Association of Orthodontists (AAO) by about 20 years, our Australian Society of Orthodontists (ASO) now finally recognises the role of mouth breathing in malocclusion and craniofacial development; it now advocates early examination, and sometimes treatment, by the age of 8 [Figure 1]. However, concern about airway and Sleep Disordered Breathing (SDB) demands scrutiny much earlier, since 80% of craniofacial development is attained by the age of 5-6 years.<sup>i</sup> Rogers (2006) says that if treated late, paediatric OSA may lead to “significant morbidity...which may not be completely reversible”.<sup>ii</sup>

ENT specialists have long accepted the effects of mouth breathing on craniofacial



**Figure 1:** The ASO now recognises the role of mouth breathing in the development of malocclusion.<sup>iii</sup>



**Figure 2:** Some primates as part of Harvold's experiments lowered the mandible and protruded the tongue after their noses were blocked. This resulted in a severe open bite. [Image from Harvold EP et. Al. (1981) Primate experiments on oral respiration, American Journal of Orthodontics 79 (4)]

development, describing the phenomenon as “Adenoid Facies” or “Long-Face Syndrome”. In fact, Danish ENT, Wilhelm Meyer, first described the different facial appearances in his patients with breathing disorders as early as 1868.<sup>iv</sup>

Perhaps most telling was Harvold's landmark series of experiments on a group of unfortunate rhesus monkeys; he blocked their noses with latex plugs to induce mouth breathing, and detailed a sudden change from a horizontal to a less-attractive, vertical facial growth pattern.<sup>v</sup>

Importantly, he noted it was a change in the behaviour of the orofacial muscles, which he described as “deviant muscle recruitment”, that led to the change in facial development. [Figure 2]

### Body Posture

A number of studies published in the American Journal of Orthodontics and Dentofacial Orthopedics detail a strong relationship between mouth breathing and changes in craniocervical angulation (which basically means forward head posture).<sup>vi</sup> Gresham and Smithells assessed a group of patients with “poor neck posture” and found an increased prevalence of longer faces and Class II malocclusions, which is the typical mouth breather's craniofacial phenotype.<sup>vii</sup>

When pathology obstructs breathing,

the body will contort itself in whatever way possible to facilitate its most important reflex for survival: breathing. A case in point is this 24-year-old female with tonsillar pathology obstructing breathing [Figure 3a], that has resulted in an increase in craniocervical angulation (forward head posture) [Figure 3b].

### Behavioural Effects

Mouth breathers may often be misdiagnosed as sufferers of ADHD. The pathophysiology behind the behavioural effects of mouth breathing are detailed below by Professor of ENT, David McIntosh.

It may seem obvious once it is stated, but breathing is really important. There are two reasons we need to breathe – the first



**Figure 3a:** CBCT slice showing tonsillar hypertrophy.



**Figure 3b:** Postural effects of mouth breathing.

is to get oxygen from the air into our blood circulation, and the second is to breathe out a waste product of cell metabolism called carbon dioxide.<sup>viii</sup> If we do not get enough oxygen in, or cannot clear out the carbon dioxide, then our whole bodies will start to malfunction, and that can be fatal.

So that is the obvious. But here is an interesting fact – the way the lungs work to get oxygen in, and carbon dioxide out varies with whether we breathe through our mouth or our nose. There are a few reasons why this happens, and to avoid the boring details, I will cut to the chase – breathing through the mouth results in the blood oxygen levels dropping down.<sup>ix</sup> When this happens, the brain sends a signal to breathe more in an attempt to get more oxygen. The problem is – this does not work. This extra breathing is incorrectly called hyperventilation by non-medically trained practitioners. Hyperventilation is when you are breathing more than you have to – when you have low oxygen levels, then extra breathing is a response to that, so it is not hyperventilation.<sup>x</sup>

The amazing thing about low oxygen levels is that in children, a slight reduction on an intermittent basis for a few months is probably all it takes to start causing the brain to malfunction. We have studies in both humans and laboratory animals that show changes in the brain. The areas of the brain that seem most vulnerable are the parts that deal with

memory, emotions and behaviour. When these begin to malfunction, the child can progress to having behavioural problems, concentration problems, become quite emotional and cry at the drop of a hat, have problems with their school work, and can develop disruptive tendencies. On top of all this, they are tired from poor quality sleep caused by the low oxygen levels interrupting the brain's attempt to get into a peaceful rhythm of rest.

So why do children mouth breathe? Again, there are a range of reasons but in over 80% of cases it is due to some form of physical obstruction to the airflow. That is why seeing an ENT before any other health care professional is so important. In the case of children, seeing a paediatric ENT that manages airway problems in children may be even more appropriate, so be prepared to travel to see the right specialist for the problem. Once the ENT problems are sorted, you may also need to see other health care professionals, such as dentists, orthodontists, speech therapists, myofunctional therapists, and allergy specialists, to name the more common ones. Either way, fixing a blocked airway is so important as the research is showing that the younger mouth breathing starts, and the longer it remains, the more likely the child's brain will be affected.

### How Can Dentists Screen for Mouth Breathing and/or Sleep Disordered Breathing?

Certain signs and symptoms of mouth breathing are quite obvious, and others are less so:

- ◆ Lips apart at rest
- ◆ Thoracic breathing (heaving chest and/or shoulders)
- ◆ Venous pooling (darkened circles under eyes)
- ◆ Halitosis (due to xerostomia caused by mouth breathing)
- ◆ Plaque accumulation and/or demineralisation localised to upper anterior teeth that are exposed, due to desiccation
- ◆ Snoring
- ◆ Bruxism
- ◆ Daytime Sleepiness and/or punctuated by periods of hyperactivity
- ◆ Malocclusion
- ◆ Enlarged tonsils (specifically, the degree to which the tonsils occlude the airway)
- ◆ Adenoid Facies (Long-Face Syndrome)
- ◆ X-rays (especially CBCT can screen for airway pathology)

### How Do We Treat Our Mouth Breathing Patient?

The first step is to refer to an ENT specialist to scope the nasal and pharyngeal

airway, and treat if necessary. While there is a place for breathing exercises, many practitioners in the airway-centred orthodontics movement believe these exercises alone can cure everything from cancer to world poverty. The ENT should play quarterback from both a practical and medico-legal perspective.

After the ENT specialist treats the airway pathology, restoration of the deviant muscle behaviour and its subsequent craniofacial and postural effects is best corrected by the dentist or orthodontist.

An example is this 8-year old male patient, whose parents were seeking treatment for the flared upper incisors. The patient was diagnosed as a severe mouth breather and referred to an ENT specialist. Lack of concentration at school also led to a referral to see a paediatrician, an excerpt of whose assessment is detailed below:

#### Consultant Paediatrician Report 1 July 2015

*Problem/s:*

1. Severe language disorder
2. Likely, combined attention deficit hyperactivity disorder

*SNAP IV...suggested combined attention deficit hyperactivity disorder as well as significant classroom symptoms. The school is concerned about his ability to sit still and concentrate. He has a problem with distractibility as well as eye contact.*

*It is likely that I will be offering medication in the next visit.*

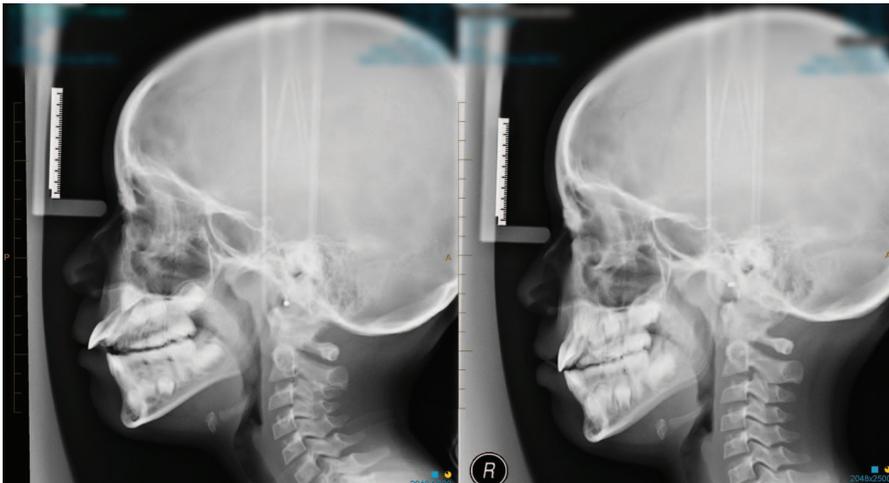
The ENT specialist prescribed a steroid nose spray to help with nasal breathing, but anticipated need for surgery in a few months. In the meantime, myofunctional orthodontic treatment began with the Myobrace® K1 and K2 appliances. The treatment helped to retrain the adverse muscular effects of the mouth breathing, thereby working to correct the malocclusion and facial growth.

The cephalograms demonstrate a reduction in overjet, however, the correction of the cervical lordosis (excessive inwards curvature of spine in the neck) is particularly striking.

Importantly, the follow-up report from the paediatrician suggests a dramatic change in behaviour too:

#### Consultant Paediatrician Report 30 September 2015

*SNAP IV suggests significant improvement of the core symptoms of hyperactivity. The family has seen an ENT surgeon who advised that adenoidectomy is not needed for the time being. He suggests the dentist's*



Before treatment (left), 6 months after treatment with the Myobrace® K1 and K2 appliances (right).

*orthodontic treatment may have helped open the upper airway.*

*I do not have enough reason to convince myself about the need of stimulant for the time being*

**What Does This All Mean?**

The inter-relationship between the dentist, ENT and paediatrician has resulted in a treatment outcome for this patient that far exceeds what these practitioners could have achieved individually.

Do you or your orthodontist do anything about mouth breathing? It's about time. ♦

**Want more information? Professor David McIntosh has written a book for parents-Snored to death. It is available online at [www.fb.me/snoredtodeath](http://www.fb.me/snoredtodeath). If you are a health professional and want to learn more at one of Professor McIntosh's courses on an introduction to ENT, simply follow him on Facebook: Dr David McIntosh.**

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