

de Bruin

DENTAL CENTER

GENERAL AND COSMETIC DENTISTRY

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The way we breathe directs how our bodies function to thrive or survive. Our airways dictate how we grow and behave, so if our airways are compromised, oxygen becomes limited for cell growth and it will adversely affect some part of our body. The way we look and feel depends on this. I believe it is my obligation, as a dentist, to recognize and treat the problems associated with restricted airways so we can live, look and feel better. In the following you will learn how all of us at de Bruin Dental Center use an airway-centered approach to give our patients beautiful faces and beautiful smiles. In order to provide this physiologic aspect of dentistry, we must look beyond just the teeth.

-Tom de Bruin, DDS

WHAT LIES BENEATH:

The obvious conditions are just the *tip of the iceberg*. According to Functional Dentistry, below the surface are long term problems linked to a long list of serious health issues. Let us know if you or a loved one suffer from any of the following.



Why should dentistry focus on airway disorders?

Treating airway disorders is important because it is our primary physiologic function, we can't go without air for very long! It takes about 3 minutes or so without air to start a cascade of events brought on by our automatic/autonomic nervous system to keep us alive. It's the sympathetic response commonly known as the "fight or flight response" that kicks in to keep us alive. These responses include an increase in heart rate to get oxygen in the blood to all the organs in the body. The most important organ, being the brain, aka the command center, which will continue to keep us alive. **Opening and keeping our airway open is on the forefront of every one of our Comprehensive Exams.**

When the airway is obstructed, we resort to mouth breathing.

A compromised airway leads to compensations in posture, which most commonly occurs when we change from nasal breathing to mouth breathing. Nasal breathing has many physiologic benefits including filtering, warming and moistening of the air which prepares it for the lungs. Unfortunately, when we stop nasal breathing, it is usually due to congestion brought on by some sort of allergic reaction (i.e. dairy, pets or seasonal allergies).



This in turn impacts our posture and diaphragm.

When we go into mouth breathing mode, we usually go into **a forward head posture** with the mouth open and the tongue in the floor of the mouth. This also changes the full-body posture, leading to a hunched over position, chest constriction and the lack of diaphragmatic breathing. The lack of diaphragm involvement can lead to a stagnation of the visceral organs, which can lead to many problems of the digestive system from constipation to IBS type symptoms.

How does this impact dentistry?

The list of potential problems goes on and on from disruption of sleep, increased anxiety, weight gain, and more. However, what our focus should primarily be on, is what this has to do with dentistry? Our teeth wind up in their position or alignment, as a result of what we call 'the neutral zone'. There is a balance between the force of the tongue on the inside and the force of the lips, and cheeks on the outside. Stated simply the tongue is our palatal expander and the lips and cheeks are our braces. The expansion of the palate leads to the growth of the mid-face in a forward, outward and downward direction and this leads to the growth of the airway which is behind the mid face.

Underdeveloped mid face leads to TMD (temporo-mandibular disorder).



The opposite happens when the tongue cannot live in the roof of the mouth. The result is the mid face is underdeveloped and the airway is underdeveloped directly connected to the compromises in breathing. The culprit in the underdeveloped mid face is the underdeveloped maxilla which traps the mandible in the retruded position. There is a strong correlation between a retruded mandible and TMD symptoms, as well as crowding of the teeth.



We then start to see bruxism.

What we are realizing is that crowded teeth are a symptom of a compromised airway. This crowding or misalignment of the teeth causes teeth to collide during function which we commonly know as bruxism. This has been shown to be related to the body's attempt to open the airway by bringing the lower jaw forward. This has been demonstrated during sleep studies with video as well as EMG leads to the muscles of mastication/chewing.

The muscles we use to chew contract in response to oxygen desaturation and the lower jaw moves all around trying to open the airway. With the teeth being in the way of opening the airway, bruxism occurs and over time teeth will wear down, chip, fracture or even break.

HOW WE BREATHE

Nasal breathing vs. mouth breathing

- The nasal passages are our first line of defense against illness as they prepare inhaled air for the lungs
- Nitric Oxide (produced in the paranasal sinuses) keeps the sinuses sterile, kills invaders in inhaled air, as well as improves oxygen utilization and exchange in the lungs
- Nasal breathing removes dust, mildew, mold, animal dander, smoke, and so on from inhaled air via cilia containing a layer of mucous which traps debris and pathogens
- Children who mouth breath bypass this system which often results in enlarged tonsils, snoring, fatigue, and illness
- Nose breathing leads air to the bottom of the lungs where oxygen is absorbed into the bloodstream
- Mouth breathing leads to more shallow breathing near the top of the lungs
- Blood vessels can detect less oxygen in the lungs leading to vasoconstriction which raises blood pressure making the heart work harder
- Therefore, mouth breathing leads to low oxygen levels which are not good for the body or the brain

Apneic kids cannot wait 8 years or more to breathe properly. Early orthodontics addresses breathing, swallowing and posture problems as well as making more beautiful faces and smiles. Kids are happier, smarter and better behaved when they sleep well. Early orthodontics takes advantage of growth to make the job easier and reaps the physiological and psychological gains at as early an age as possible.

Facilitation of a patent nasal airway by adeno-tonsillectomy does not erase the old dysfunctional reflex patterns of swallowing and breathing. Expanding the dental arches to achieve the ideal functional climate for breathing, swallowing and sleep is the clinical goal. Expansion of the palate creates more space in the mouth for the tongue and facilitates positioning of the tongue anteriorly and laterally in the roof of the mouth. Orthodontic expansion of the maxilla facilitates nasal breathing because the roof of the mouth is also the floor of the nose. ***Three-dimensional palatal expansion widens the nasal passage and decreases resistance to oral-nasal airflow.*** Reducing nasal resistance reduces turbulence of airflow and decreases collapsibility of the flexible oropharynx. Kids whose airways no longer collapse at night also enjoy improved breathing during the day.

There is virtually universal agreement that the teeth and alveoli lie in a position of balance between the cheeks, lips, and tongue. Harvold has shown that interventions that disrupt the ideal situation of nasal breathing, lips sealed, tongue in the roof of the mouth, head balanced on the spinal column cause malocclusions as well as adaptive functional and structural changes.

The science of ***physiological orthodontics*** is about understanding ideal physiological function and its attendant structure, ***analyzing the dysfunction that caused the malocclusion and addressing treatment at correcting both structure and function as close to ideal as possible.*** Early orthodontics is about doing it sooner rather than later to improve the quality of life and hopefully prevent neurobehavioral and learning disorders.

CONSEQUENCES OF KID'S APNEA

In children some of the morbid consequences associated with sleep disordered breathing are:

- Increased incidence of upper respiratory infections
- Neurobehavioral problems
- Failure to thrive
- Underdevelopment of the face and jaws
- Cardiovascular problems

The consequences of sleep disordered breathing - snoring and sleep apnea in children are not the same as in adults.

- Children usually do not display sleepiness. They act out their tiredness with inappropriate emotional behavior.
- Kids' attention spans are extremely short
- Kids' school performance falls off
- Cognitive development is slow
- Motor development skills are delayed

Consequences however are different than causes

- Successful treatment is addressed at both causes and consequences
- Treatment directed at causes involves effective prevention and correction of abnormal posture and functions of the mouth, tongue and face, and their relationships with breathing, the dentition, speech and feeding

BAD LIP POSTURE

Note how the lower jaw is retruded behind the upper teeth and lip. Lower jaw retrusion reduces space for the tongue and forces it to intrude into the oral airway. There are therapists for re-educating the lip posture and swallow and orthodontic devices to stimulate mandibular growth.



FACIAL ABNORMALITIES

Two distinct varieties of facial form have been identified that occur with high prevalence in young children having obstructive sleep apnea (OSA): long face and short face.

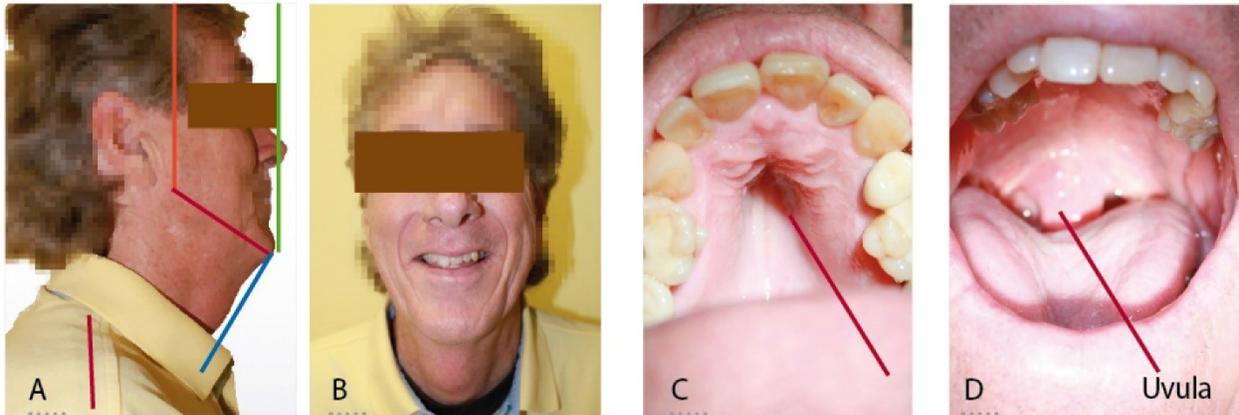
The short face phenotype is characterized by retrognathia, deep overbite, and frequently large overjet. Characteristic of the adult short face is a mandibular step plane of occlusion. The anterior six teeth are at a higher plane than the posterior eight. During a swallow the teeth are kept from touching in occlusion by the sides of the tongue. The lateral border of the tongue has a scalloped border indicative of dysphagia (lateral tongue thrust). In swallowing the lateral borders of the tongue extrude over the lower posterior teeth and against the lingual-incisal edges of the maxillary posterior teeth. This lateral resting posture of the tongue between the posterior teeth prevents the mandibular posteriors from erupting to their full potential. Centric occlusion is an adaptive retrognathic position. These patients generally have excessively large freeway spaces from rest position to centric occlusion. In centric occlusion however, there is reduced vertical dimension, lingually tipped posterior teeth, and reduced space for the tongue, which consequently encroaches downward and posteriorly, narrowing the oropharynx.

The long face is characterized by an open mouth resting posture, narrow maxilla, high palatal vault, anterior open bite, usually a unilateral or bilateral crossbite and an anterior tongue thrust dysphagia. These children are predominantly oral breathers and have some form of nasal obstruction to inhibit or prevent nasal breathing. A significant number of these patients are prognathic. The swallow is dysfunctional in that the tongue initially protrudes forward during deglutition to create the necessary seal to initiate propulsion of the bolus. In the resting posture the mouth is open, and the tongue is in the floor of the mouth to facilitate a patent oral airway.

In mastication the long face child is only capable of occlusion on posterior teeth. Typically, the first and/or second molars are the only teeth that touch in mastication. The anterior open bite causes noticeable muscular strain for these children to seal the lips. The open mouth resting posture and the narrow maxilla result in a narrow nose. This is readily noticeable in the frontal section view of panoramic radiographs.



The effect of open mouth posture and downward growth on a growing child



THESE KIDS ARE ALL MOUTH BREATHING BECAUSE SOME PART OF THEIR AIRWAY IS OBSTRUCTED

- Apnea is cessation of breathing during sleep
- Snoring is frequently associated with sleep apnea
- 90% or more of all apnea patients snore
- Apnea and snoring are collectively referred to as Sleep Disordered Breathing
- *Failure to treat sleep disordered breathing in children puts them at risk for very serious health problems*
- The gold standard for diagnosis of sleep disordered breathing is a polysomnographic study. It is performed at a sleep laboratory.



PARENTS, THIS IS ONE THING TO LOOK FOR. The child above is sleeping with her mouth open. Note the already protruding upper anterior teeth and the chapped lips. She is mouth breathing. The inspired air is not being properly warmed, humidified and filtered. She is developing an open bite, improper anterior tongue thrust swallow, and a narrow upper arch. She may or may not have obstructive sleep apnea, but this is not a healthy pattern. Talk to your dentist.



Nasal Breathing

Breathing is the transport of gases to and from the lungs and tissues. Breathing gets oxygen (O₂) to the cells of the body, removes excess carbon dioxide (CO₂) and regulates the chemical balance in the body between O₂ and CO₂. CO₂ is the major chemical factor regulating ventilation. It is produced in the body by cell metabolism, exercise and digestion. CO₂ can be stored in the blood, is a necessary factor to maintain pH by its buffering action as bicarbonate or carbonic acid. It can facilitate release of oxygen from hemoglobin, prevents smooth muscle from going into spasm and triggers breathing. As CO₂ builds up in the body it changes the pH of the blood, which in turn triggers the brain at the medullary center to take a breath. A pattern of breathing develops that maintains the appropriate blood O₂ and CO₂ levels with the minimum expenditure of energy. Breathing is carried on automatically. The exception is when we do not wish to use the breathing apparatus for some specific task such as trumpet playing, swallowing, vomiting or singing. Only then is breathing under conscious control.

The respiratory central pathway maintains the patent airway and dominates reflex control of the oral and pharyngeal region. It supersedes all other reflexes.

Human beings are obligate nasal breathers. The mouth is merely a back-up breathing organ. The nose is the ideal organ for warming, filtration and humidification of inhaled air. Breathing is a primal function necessary for survival. It is a reflex function that predominates over all regulatory activity of the brain. Evolutionary design of humans is based on facilitation of nasal breathing. Adaptation of humans to an erect posture requires the back and neck to balance the head in the upright posture. Ideal posture requires a balance of structure and function.

Enlarged tonsils



What Can You Do?

- LOOK, LISTEN AND READ
- Find doctors with whom you can comfortably discuss your questions and issues.

The take home message - Kids' apnea is a complex problem involving:

- Nasal airway that works
- Oral airway free of obstructions
- Proper position and function of tongue and lips
- Timely growth and facial development
- Coordination of breathing, swallowing, lip function, tongue function, and posture

Appropriate care involves prevention as well as treatment of symptoms, consequences and causes.

Successful treatment usually requires active parental involvement in a multidisciplinary approach.

The proper protocol should focus on craniofacial development, the treatment of jaw joint, breathing and enhancing the body's ability to reduce stresses and tensions, "allosatic load" for improved overall health. This knowledge is totally unique in dentistry with the ability to diagnose and successfully improve the quality of life for kids and adults.

Additional aspects to recognize:

The 3-gas system; O₂, the importance of NO and CO₂ and activating the stem cells in your patients and improving the autonomic system function to improve their lives. I humbly believe that we are rewriting the medical books. Our combined knowledge has taken us to a new frontier in understanding how to treat the diseases of the 21st century, with 21st century knowledge. Our industry is recognizing our role in treating sleep and breathing disorders and temporomandibular dysfunction, we now recognize that all these problems stem from a lack of proper craniofacial development and breathing.

Now there are treatments available (non-surgically and without the use of a CPAP) to dramatically correct the way we breathe, fix facial deficiencies/deformities and improve our overall health.

Treatment:

The science of ***physiological orthodontics*** is about understanding ideal physiological function and its attendant structure, analyzing the dysfunction that caused the malocclusion and addressing treatment at correcting both structure and function as close to ideal as possible. ***Early orthodontics is about doing it sooner rather than later to improve the quality of life and hopefully prevent neurobehavioral and learning disorders.***

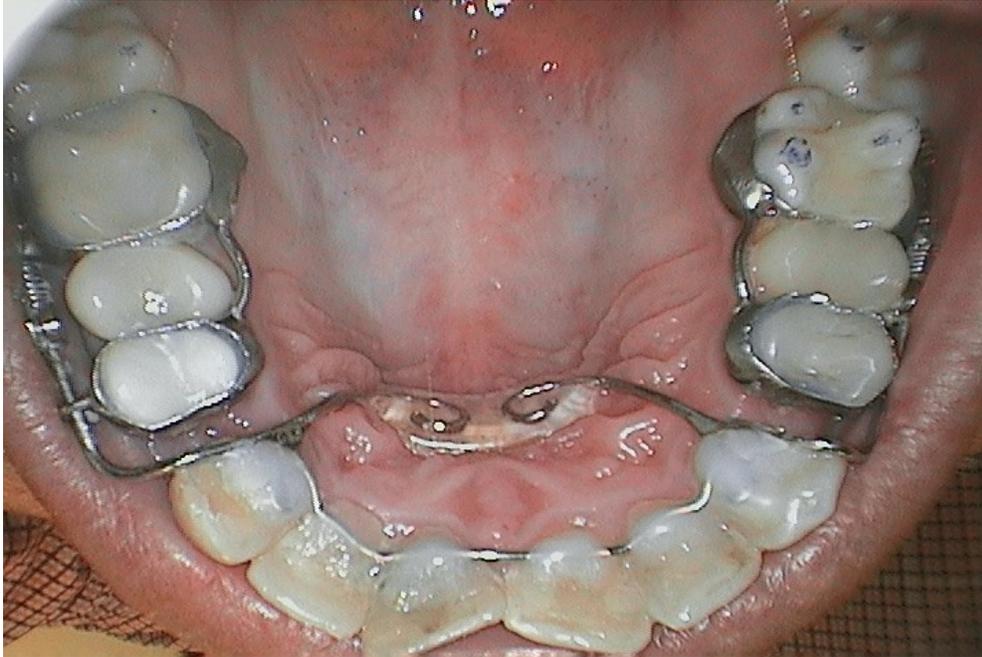
TRADITIONAL orthodontics may only address limited tooth and smile esthetics. Some may wait until growth is complete or nearly complete to initiate treatment. In contrast, ***early orthodontics*** utilizes growth in its favor. By age four 60% of facial growth is done. By age six 80% of facial growth is complete. By age 11 or when the second molars have erupted, 90% of facial growth is completed. Orthodontic treatment between the ages of 6 and 11 often results in a catch-up of growth to normal by the age of 12. Treatment over the age of 12 virtually assures that there will be relapse.

Physiologic Orthodontic Treatment:

Treatments for kids with airway problems will vary depending on the age of the child. First, a proper diagnosis of the cause of the compromised airway is imperative. A diagnosis could be any series of complications that include enlarged tonsils and adenoids, allergies, poor tongue posture, tongue ties just to name a few. If the airway is not open, the child is doomed for improper growth, poor facial development, health complications and sleep-disordered breathing. An airway centered dentist or ENT doctor are two professionals that can help with the diagnosis.

If the child is younger than six years old, proper tongue posture and nasal breathing with the lips sealed is what will help the child grow and develop properly. If these things are in place, the airway will be open, and the child will breathe normal and healthy.

If the child is six years or older, a growth guidance appliance followed by protraction orthodontics (braces that bring teeth forward) is indicated to correct the improper facial and jaw development from a compromised airway. The child must have the "six-year molars" erupted so the appliance can be attached to adult/permanent teeth for anchorage. This appliance will remodel the jaw bones with the sinuses and turbinates to bring the facial features forward and help open the airway. This type of orthodontic (and orthotropic) treatment will help develop beautiful, healthy faces.



Growth Guidance Appliance showing orthopedic development of the upper jaw bringing the teeth forward and creating space behind the canines to make room for the tongue, open the airway and esthetically develop the facial features.

FAGGA (Fixed Anterior Growth Guidance Appliance) is designed to non-surgically develop the maxilla (upper jaw) to help with proper bone growth, improved airway and proper tongue posture in addition to aligning the muscles and joints of the jaw.

Maxillary Fixed Anterior Growth Guidance Appliance

Description:

The MX Fixed Anterior Growth Guidance Appliance, Facial Version or MX Fixed Osseo-Restoration™ Appliance, Facial Version is a fixed appliance used mostly on non-compliant patients during stage 3-4 growth or patients over age 9 through adulthood to develop the Naso-Maxillary Complex and upright the MN ramus through remodeling. This appliance takes advantage of the remodeling occurring in the facial region by influencing residual growth sites. Its design is based on the concepts found in the removable MX sagittal appliance which has served orthodontic practitioners for decades. The current modifications include:

1. A fixed design using orthodontic bands on the MX 1st bicuspids and the MX 1st molars.
2. The anchorage is achieved with a lingual connecting wire welded between the bicuspid and molar bands on each side.
3. A bilateral welded hook facially placed on the bicuspid bands which holds the active pressure wire attached to an acrylic pad.
4. Proprietary activation springs with a screw retained lock mechanism
5. The proprietary force delivered to the acrylic component by the screw retained lock mechanism
6. The anterior palatal acrylic is specifically sized and placed to initiate a 3D remodeling response to the Naso-Maxillary Complex.
7. The anterior lingual stabilization and retention wire rests on the cingulums of the four incisors and the cuspid rests touch the distal-lingual of the cuspids.
8. The transpalatal seating wire

Made of stainless-steel orthodontic wire, orthodontic bands, and a specialized acrylic pad, the appliance fits comfortably in the roof of the mouth while allowing the tongue adequate space to comfortably rest. To activate the appliance, the screw retained lock mechanism is loosened and the springs are compressed bilaterally.

It is important to note here, that when the MX Fixed Anterior Growth Guidance Appliance, Facial Version or MX Fixed Osseo-Restoration™ Appliance, Facial Version treatment has begun, the following factors contribute greatly to the successful outcome for each patient. Based on the current understanding of Craniofacial Biology, it is imperative that clinical treatment should progress in the direction of:

- Normal facial balance
 - Nasomaxillary complex
 - Mandibular position
 - Symmetry
- Stable Class I cuspid occlusion
- Stable Temporomandibular Joints

and that the following be ideally achieved:

- Lip Seal (Competent lips and strong orbicularis oris)
- Nasal Breathing (Healthy airway)
- Absence of Tongue Habits

These three attributes shall be referred to as the “BIG 3”. It should be noted that the “BIG 3” represent more than just the three points indicated above. When achieving the “BIG 3” each patient is equalizing the complex forces of Craniofacial Biology including such factors as harmonious balance of extrinsic soft tissue influence, balanced growth, congruent function, and biological stability.



Advantages:

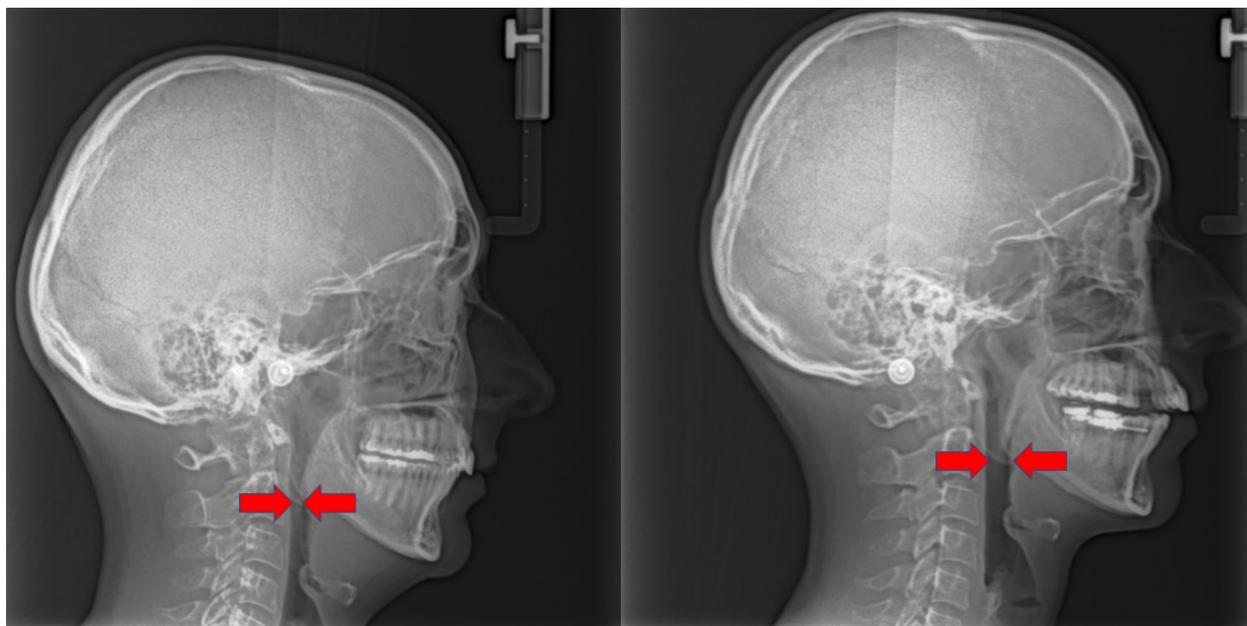
There are several important Dentofacial Orthopedic advantages in the use of the special MX Fixed Anterior Growth Guidance Appliance, Facial Version or MX Fixed Osseo-Restoration™ Appliance, Facial Version:

1. This is an excellent appliance to develop the Naso-Maxillary Complex. This appliance takes advantage of the remodeling occurring in the facial region by influencing residual growth sites.
2. This appliance develops the MX three dimensionally through remodeling
3. This appliance in association with the “BIG 3” eliminates cants, excessive gingival show, and remodels the Naso-Maxillary Complex to a more functional configuration.
4. This appliance creates a positive effect on the nasopharyngeal airway
5. It is composed of heavy-duty materials, yet is comfortable for the patient to wear, and easy for the parent to see.
6. Activating the appliance is easy for the doctor
7. Construction is quite straightforward, and chairside adjustments are easy, requiring only a few moments of the dentist’s time.
8. Patient and parent acceptance are excellent.

Before and after treatment of the Growth Guidance Appliance. The next step is Functional Orthodontics to close spaces by bringing the teeth forward and maintaining the open airway.



X-ray showing the airway opened after Growth Guidance Appliance therapy.



TMD (temporomandibular disorder)

In many cases of malocclusions and poor airways comes TMD. They almost go hand in hand. Crooked teeth, narrow jaws and retruded faces can bring on many symptoms of pain. TMD is a “blanket” term that relates to symptoms in or around the jaw joints, head, neck and face. There are many symptoms that are associated with TMD. The most common symptoms are the following (but can include many more):



Musculoskeletal/Occlusal Signs Form

Name: _____ Age: _____ Date: _____

Symptoms

- Headaches
- TMJ Pain
- TMJ Noise
- Limited Opening
- Ear Congestion
- Vertigo (Dizziness)
- Tinnitus (Ringing in the Ears)
- Dysphasia (Difficulty Swallowing)
- Loose Teeth
- Clenching/Bruxing
- Facial Pain (Non Specific)
- Tender, Sensitive Teeth (Percussion)
- Difficulty Chewing
- Cervical Pain
- Postural Problems
- Paresthesia of Fingertips (Tingling)
- Thermal Sensitivity (Hot and Cold)
- Trigeminal Neuralgia
- Bell's Palsy
- Nervousness/Insomnia

Signs (Extra-Oral)

- Facial Asymmetry Bilaterally
- Short Lower Third of the Face
- Chelitis
- Abnormal Lip Posture
- Deep Mentalis Crease
- Dished-Out or Flat Labial Profile
- Facial Edema
- Mandibular Torticollis
- Cervical Torticollis
- Forward Head Posture (Lordosis)
- Elongated Lower Face (Steep Mandibular Angle)
- Speech Abnormalities

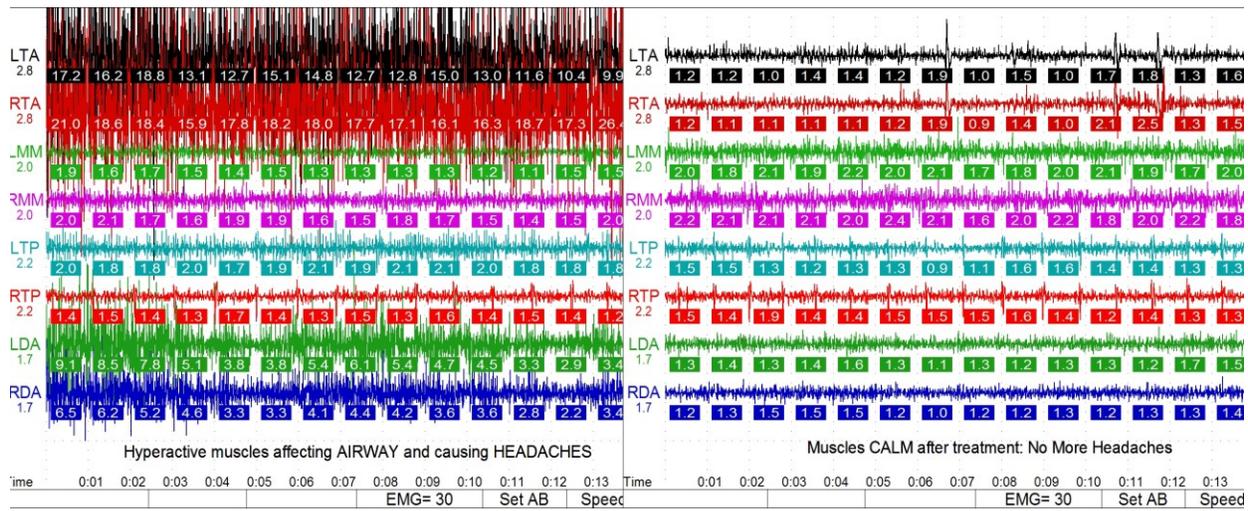
Signs (Intra-Oral)

- Crowded Lower Anteriors
- Wear of Lower Anterior Teeth
- Lingual Inclination of Upper Anteriors
- Lingual Inclination of Lower Anteriors (Div. II Occlusion)
- Bicuspid Drop Off
- Depressed Curve of Spee
- Lingually Tipped Lower Posteriors
- Narrow Maxillary Arch (High Palatal Vault)
- Narrow Mandibular Arch
- Midline Discrepancy
- Malrelated Dental Arches
- Tooth Mobility
- Flared Upper Anterior Teeth
- Facets
- Cervical Erosion (Abfractions)
- Locked Upper Buccal Cusps
- Fractured Cusps (Particularly Cl. I & II Non-functional Cusps)
- Chipped Anterior Teeth
- Loss of Molars
- Open Interproximal Contacts
- Unexplained Gingival Inflammation and Hypertrophy
- Crossbite
- Anterior Open Bite
- Anterior Tongue Thrust
- Lateral Tongue Thrust
- Scalloping of the Lateral Border of the Tongue

Temporal headaches, neck pain or stiffness and clicking or popping joints are the most common symptoms of TMD. These symptoms can be subjective and differ from person to person. A great tool to be able to evaluate these symptoms is the K7 system. Surface EMG scans and jaw trajectory scans are recorded to evaluate the activity of muscle groups that impact the way our jaws posture and function.

When the muscles are hyperactive and must work hard just to get the teeth to come together, the muscles become overactive and fatigue quickly. These hyperactive muscles can't rest and recover so they get sore and painful and turn into TMD symptoms like headaches, neck soreness and jaw pain. This type of TMD scenario can be very consistent with retruded jaws, crowded teeth and bad bites because the jaws want to come forward but are held back by the teeth and how we bite. Correcting jaw relationships and how we bite can treat TMD symptoms.

This is an example of a patient that had many TMD symptoms including headaches with a compromised airway and retruded jaws. The scan on the left shows the patient lightly bringing the teeth together in the habitual or normal bite. Note the hyperactive muscle activity and how hard these muscles are working just to get the teeth to lightly come together. The scan on the right shows very calm muscles after the jaw relationship was corrected to decompress the jaw joints and let the muscles relax in a new comfortable bite. The TMD symptoms all went away and patient reported no more joint noise and pain and no more headaches and neck pain.



This becomes a very valuable tool to be able to objectively measure where the bite should be in a healthy physiologic position. When I treat a patient with TMD, I will use this system to get them out of pain before we move on to any definitive treatment because we need to know where the ideal comfortable jaw position should be *before* treatment and not guessing where it may be *after* treatment.

Sleep-Disordered Breathing:

Gasping for breath is only one of the adult symptoms of sleep-disordered breathing. If you find yourself clenching or grinding your teeth, your spouse pokes you at night to get you to turn over and stop snoring, your head is constantly thrust forward in front of your shoulders, or your tongue has scalloped edges, then you most likely have airway-centered disorder.

The brain's primary goal is ensuring survival, so breathing well is a top priority and if that is not happening our brains direct our bodies to go into a fight or flight response. The vicious cycle during sleep occurs.

Breathing becomes compromised -> fight/flight/freeze response -> Adrenaline and cortisol spikes throughout the body -> Blood glucose drops due to immediate need for energy -> Heart rate and blood pressure increases -> Brain and body wakes up -> Sleep disturbed(Sleep-Disordered Breathing) -> Hypoxia (lack of oxygen in the entire body) -> Systemic Conditions/Inflammatory changes with endocrine and metabolic interactions -> Chronic fatigue, Stress/Anxiety, Crave sugary foods/Weight gain/Obesity, High blood pressure, Cardiovascular disease, Poor brain activity and development (Dementia) and several other systemic diseases

Sleep Appliances:

There are different ways to treat sleep-disordered breathing and sleep apnea. First and foremost, it is important to:

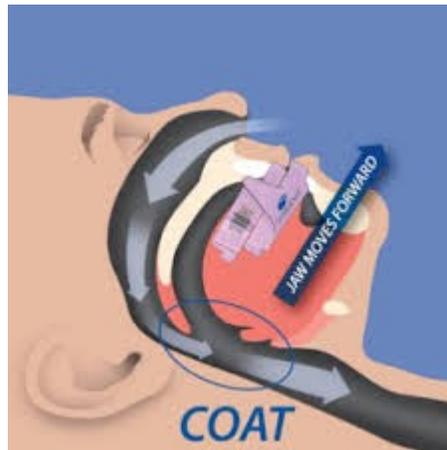
- *Recognize the symptoms
- *Evaluate a detailed health history of systemic problems
- *Identify facial hard and soft tissue deficiencies

The next course of action is to have your airway checked by your dentist. If there is a problem with the airway, get a sleep study that can be done at home or at a Sleep Center to diagnose sleep apnea. If the diagnosis comes back with any form of sleep apnea, the indicated treatment options would be the following:

1. CPAP machine (continuous positive airway pressure)
2. Orthodontics to expand the jaws and bring the teeth and bone forward to open the airway, correct facial hard and soft tissue deficiencies, correct tongue posture problems and straighten and align the teeth and smile. (Face forward orthodontics!)
3. Custom fitted Sleep Appliance that will move and maintain the lower jaw in a forward position and keeps the tongue aligned to open the airway during sleep.

There are many different sleep appliances on the market and it is important to have one designed to protect the TMJ, allow for good, comfortable jaw and facial muscle position as well as opening the airway.

Sleep Appliance: *Somnodent*



The following is from *Somnomed.com*:

Effective: 91% of patients reported improvement in sleep quality with SomnoDent¹

Highest Quality: FDA 510K cleared, Class II Medical Devices, and manufactured at an ISO 13485 certified facility. Customized using the highest quality acrylic which does not discolor or attract odors.

Custom-fit: SomnoDent sleep apnea oral appliances are manufactured using dental impressions of your teeth, ensuring an effortless, custom-fit unique to your mouth

Non-Restrictive in Movement: While wearing a SomnoDent, you will be able to fully open and close your mouth, yawn, drink, take oral medication and even speak clearly, making it ideal for the patient who may be claustrophobic.

Easily Adjustable: SomnoDent is unlimited in protrusive advancement, meaning that you can advance your lower jaw as forward as possible when wearing the device.

Highly Adaptable: If you have missing teeth, crowns, bridge work or wear a full upper denture, a SomnoDent can be adapted to fit your mouth structure.

Patient Compliance: 88% of patients reported regular use of their SomnoDent device¹

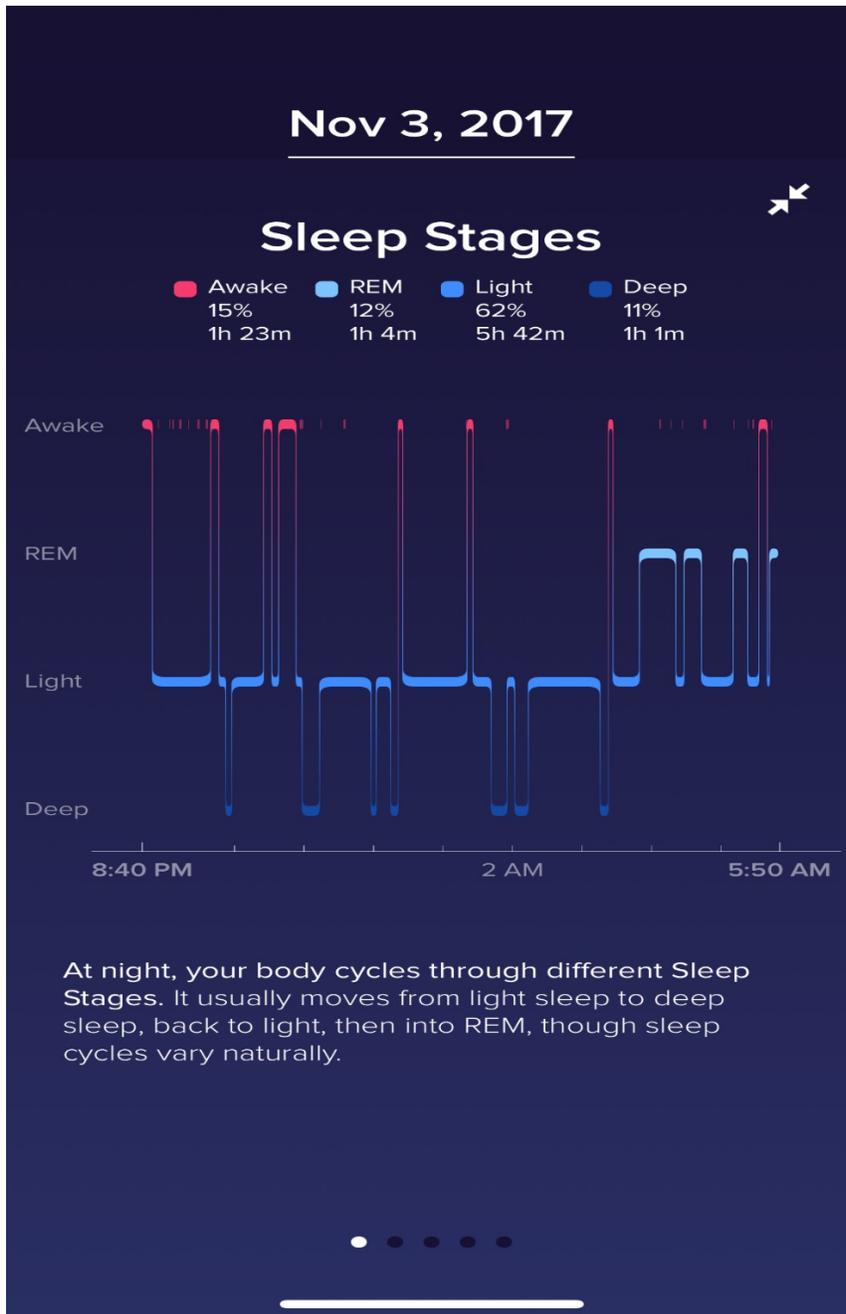
Enduring Durability: A combination of premium materials and, for some models, inner cast framework, ensures that the SomnoDent oral device is one of the strongest appliances currently available, making it an ideal treatment option for all patients, especially teeth grinders (bruxers). 1 to 3-year warranty against manufacturing defects.

Clinically Proven: 15+ independent studies demonstrate the device's significant clinical benefits

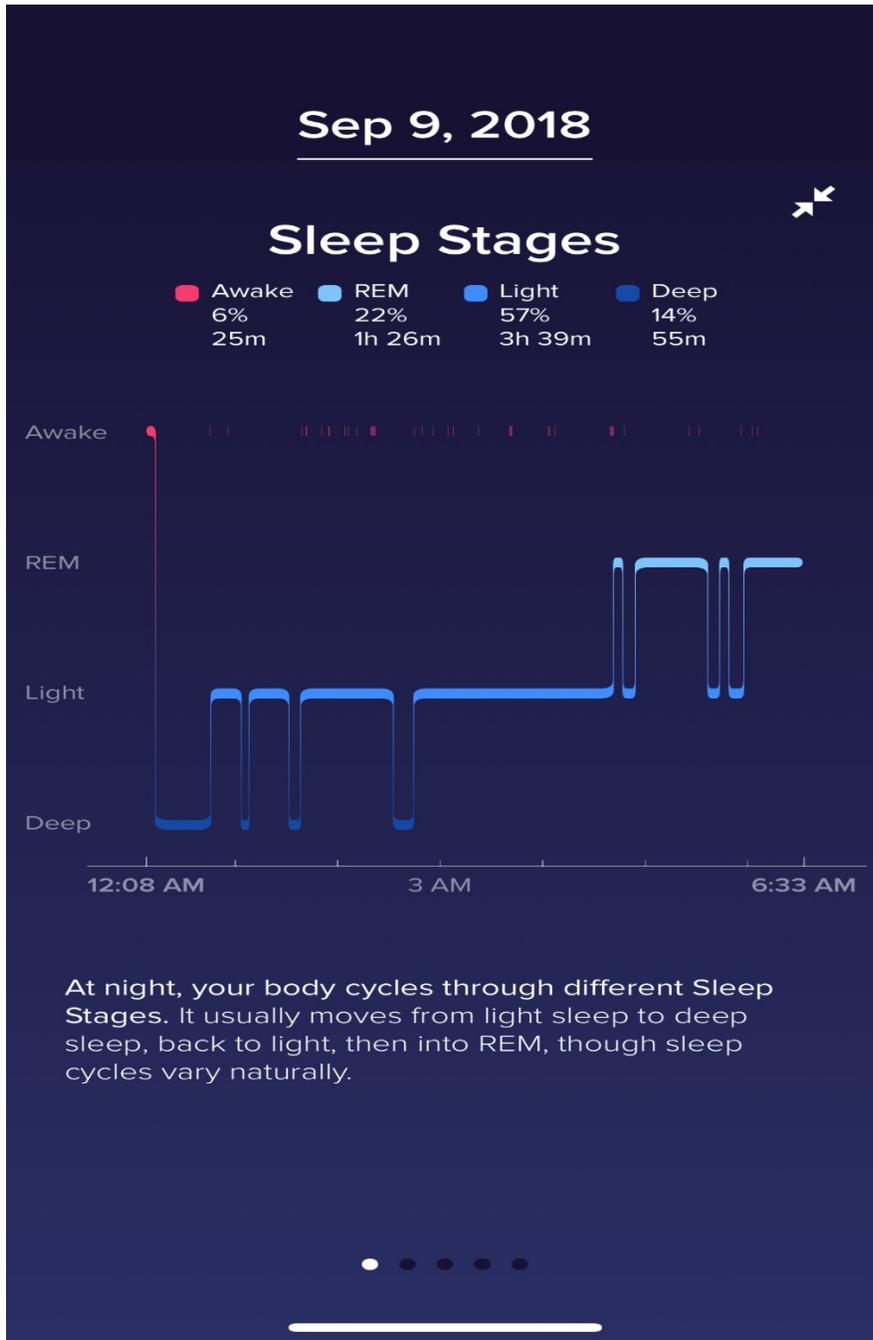
Combination Use: SomnoDent can conveniently be used as a companion to your CPAP for combination therapy, allowing simpler mask fitting, reduced CPAP pressure and a compact alternative for travelling.

The following shows two basic recordings of sleep stages on a patient presenting with moderate to severe sleep apnea. She complained of insomnia, always being tired and feeling lethargic throughout the day. The first recording (Nov. 2017) is without a sleep appliance and the second recording (Sept. 2018) is while wearing a sleep appliance. The second recording shows significantly less awake/apneic episodes and greatly improved sleep. She also stated how much better she feels throughout the day with more energy and no more fatigue.

Without sleep appliance:



With sleep appliance:



Research Articles:

Airway and Cancer:

<https://well.blogs.nytimes.com/2012/05/20/sleep-apnea-tied-to-increased-cancer-risk/>

<https://sleepfoundation.org/sleep-news/sleep-apnea-associated-higher-mortality-cancer>

<https://www.soundsleephealth.com/blog/cancer-sleep-apnea-the-blood-oxygen-compromise>

<https://aasm.org/study-links-severe-sleep-apnea-to-increased-risk-of-stroke-cancer-and-death/>

Airway and Brain Function:

<http://newsroom.ucla.edu/releases/sleep-apnea-takes-a-toll-on-brain-function>

<https://www.sleepdr.com/the-sleep-blog/how-does-sleep-apnea-impact-the-brain/>

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