

Adults and the new orthodontics - Part 4

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This is the fourth in a series of articles on “adult orthodontics” teaching a philosophy of orthodontics as presented in the book “Straight Talk about Crooked Teeth” by S. Kent Lauson, DDS, MS, Orthodontist (Figure 1). The *Nine Keys to Lower Facial Harmony* written about in the book have been found to be essential goals in achieving that coveted “Movie Star Smile” while having a positive impact on total body health.

To review, the first three articles dealt with the first four keys to lower facial harmony:

Key #1: Fully developed maxilla;

Key #2: Unobstructed nasal breathing;

Key #3: Proper forward positioning of lower jaw; and
Key #4: Healthy TMJ function.

We emphasized how the keys build upon each other and if the first keys are not addressed, then subsequent keys, many times, cannot be achieved.

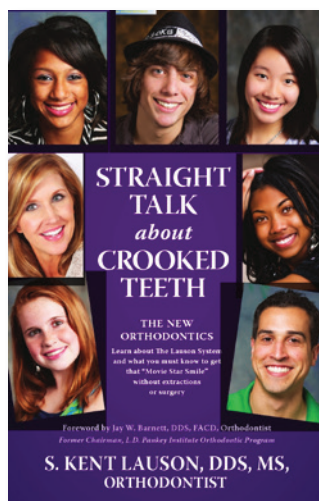


Figure 1. *Straight Talk about Crooked Teeth.*

In the last article, we wrote about the principle of the “trapping of the lower jaw” and how this can lead to TMJ Dysfunction. This trapping of the lower jaw can also lead to the serious medical condition of Obstructive Sleep Apnea (OSA). The condition of OSA, and a possible permanent solution, is the subject of this article.

So just what is sleep apnea?

Apneas (meaning, “without breath”) are the result of pauses in breathing and by definition, are when a cessation of breathing lasts for at least 10 seconds.

Although there are many variations of sleep apnea, Obstructive Sleep Apnea (OSA) is the most common type and is the result of a blockage of the airway while sleeping. Snoring results from a partial obstruction of the airway and is the body’s early warning sign for the possible development of OSA (Figure 2).

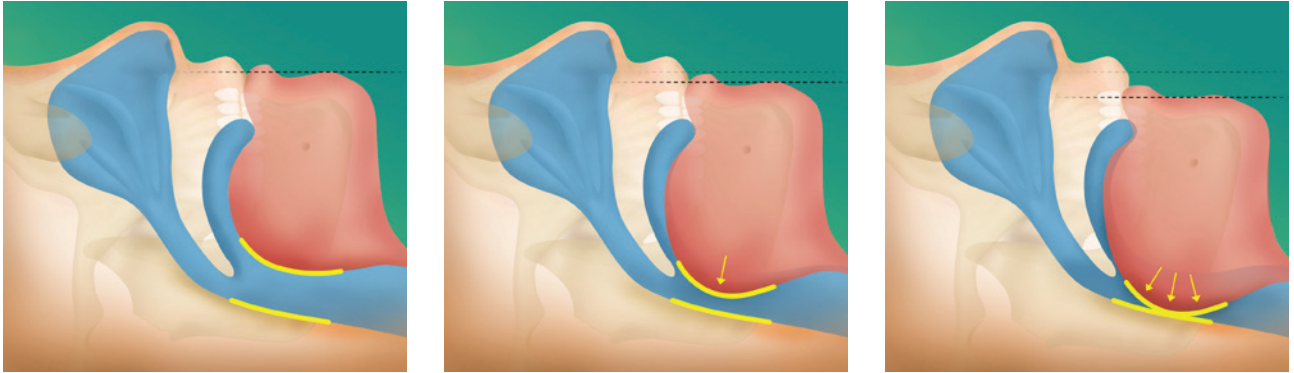


Figure 2. Illustration showing the developmental stages of OSA: Normal breathing; snoring as a symptom of a partial obstruction; and complete obstruction resulting in an apneic event (OSA).

Repeated apnea events throughout the night are classified as mild, moderate, or severe, depending on the age of the patient and the number of apnea events that occur per hour of sleep. Repeated pauses in breathing cause a reduction in blood oxygen saturation, which has many negative effects on the body.

Although OSA is typically thought of as a problem for middle-aged, overweight males, the truth is that OSA can, and does, exist in a very broad range of the population. Young and old, male and female, large and small, all have the possibility of OSA.

It is considered very serious if a child has even a small number of apnea events because of the immediate effect and the fact that the condition has grave developmental implications. Mouth breathing, behavioural and cognitive problems and hyperactivity have all been directly linked to childhood OSA.

A child with a deep overbite and a retruded, or recessed, lower jaw has a serious, developing problem that needs correction by orthodontic/orthopedic means. If the narrow upper jaw and overbite are not corrected in an ideal manner - by enlarging the constricted upper jaw and freeing up the lower jaw to come forward into the ideal position - the die is cast for OSA. The orthodontic practitioner needs to be aware of these issues and has a unique opportunity to literally change their young patients' future by treating with airway concerns in mind. Because OSA is a progressive disorder that intensifies with age, it is better to address these issues as early as possible, but be aware that treatment for this disorder can be accomplished at any age.

It has been well-established that OSA is related to serious conditions such as lowered immunity, obesity and cardiovascular stress, which can lead to strokes or heart attacks. OSA is also associated with many seemingly unrelated degenerative diseases,

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including pulmonary and systemic hypertension, diabetes and kidney disease and can rob a person an average of twelve years off his or her life. It is believed that hundreds of millions of adults suffer from OSA worldwide. Because of its widespread prevalence, it is a major global health problem.

When a person suspects OSA, a sleep physician can confirm the diagnosis with an overnight sleep study. Once confirmed, the primary recommendation for a person with OSA is to use a continuous positive air pressure (CPAP) machine, which pushes air through a person's nose, all night long, to give him or her much needed oxygen as he or she sleeps. This can work well for many, but a large percentage will become intolerant of its use and the machine then gathers dust in the

closet, reducing the person's chances for a long and healthy life. Oral appliances made by a dental sleep specialist can work well to relieve obstructive sleep apnea for many who are CPAP intolerant, but even these appliances can have their side effects causing problems with occlusion or the TMJ. A more comprehensive and permanent solution exists.

A permanent solution to OSA?

Most people with OSA have a narrow upper jaw. The nasal airway can then be compromised because the palatal bone, that is at the roof of the mouth, is the same bone that is on the floor of the nasal passageway. When the roof of the mouth is constricted, then the nasal airway is also constricted. This is the first of two chokepoints that air has to pass through to get to the lungs. Also, this narrow upper jaw typically will cause the lower jaw to be recessed by trapping it in order to allow for comfortable occlusion of the teeth. The recessed lower jaw causes the tongue to be confined and can recede more toward the back of the throat, the airway's second chokepoint, creating the likelihood of Obstructive Sleep Apnea. This classic pattern exists in almost all people with OSA.

Now for the good news! These types of structural problems can be changed. OSA does not have to be accepted as a condition a person just has to live with (or die with). The case report for this article shows how an upper jaw can be expanded and the lower jaw can be positioned more forward. As you will see, this solution is effective for children and adults alike and can significantly reduce, or even eliminate, OSA, allowing for a future life free of the dreaded CPAP machine!



Figure 3. Before orthodontic treatment.



Figure 4. Treatment post-expansion, prior to beginning Invisalign aligners.

Case Study: Bill

When Bill first came to see us, he was a 52-year-old man diagnosed with moderate to severe obstructive sleep apnea. He had been through a full sleep study and his oxygen levels during the night were recorded below 78%. This is significantly below the ideal of 92% or more. A CPAP machine was initially recommended and used, but after several weeks, Bill could not tolerate its use, so he came to us looking for an oral appliance solution. He knew that he had a serious condition that could end his life prematurely.

We began our treatment with an appliance from SomnoMed Corporation, which was chosen because of its high quality and adjustability. We did need to adjust the appliance to bring his mandible more forward after wearing it the first night as he was showing less than ideal oxygen saturation.

In our initial evaluation with Bill, we had discussed the option of a more permanent solution. This more permanent solution was an orthodontic/orthopedic treatment plan and based on his positive result with the SomnoMed appliance, he elected to move forward with that.

Our initial records show a constricted maxilla, dental crowding and right posterior crossbite (Figure 3). He had significant attrition, especially on the anterior teeth. Extensive restorations, including two molar root canals, were present. Cone beam TMJ x-rays indicated osteoarthritic changes on the condyles and airway volume was less than ideal.

Phase II of treatment

The purpose of the second phase of Bill's treatment was to expand the upper jaw and the lower dental arch. During this time, we also wanted him to continue with his SomnoMed appliance at night. Because of this, we had to activate his removable Schwarz appliances slower than normal, making this phase of treatment an eight-month process, well beyond the typical time of 4-6 months. Additionally, we had to add expansion screws to the SomnoMed appliance so that he could expand it at the same pace as the bone structure was being expanded. Figure 4 shows the expansion of the maxilla and the lower dental arch.

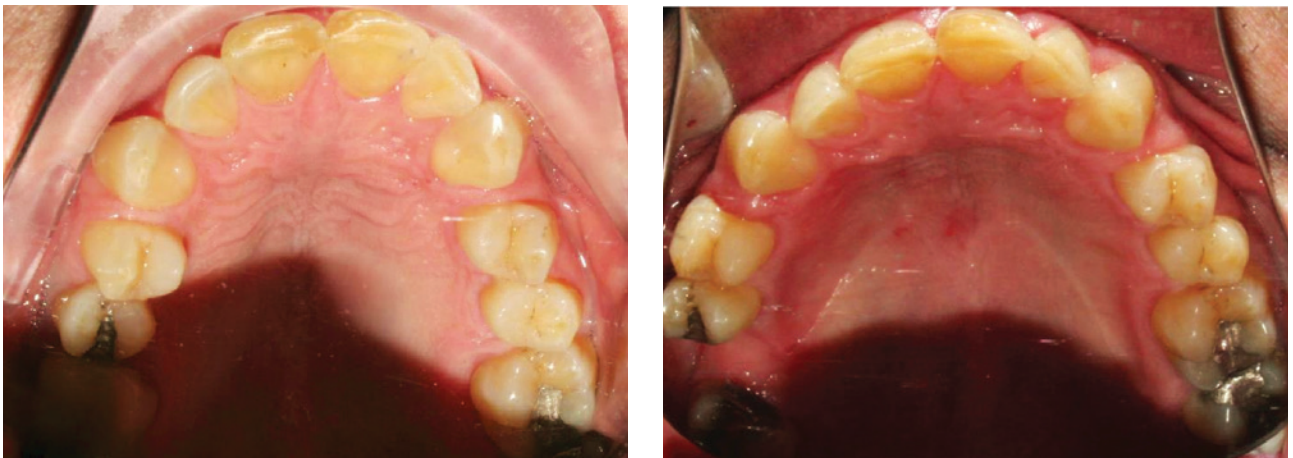


Figure 5. Before and after expansion.



Figure 6. Completed orthodontic treatment.

Phase III of treatment

The final phase of treatment was accomplished with Invisalign™ aligners. Since one of our primary objectives of treatment was to allow the mandible to close in a more forward position to increase tongue space (and eliminate the tendency for obstruction while sleeping, we elected to leave part of the space distal to the upper cuspids). This would avoid a trapping of

the mandible (over-coupling) and allow a more anterior positioning of the mandible. The Invisalign treatment was accomplished in the next 18 months for a total of 26 months of active treatment.

Figure 6 together with the x-rays taken with an i-CAT 3D cone beam imaging system showing a comparative airway analysis reveals some interesting and significant findings as follows:

1. The expanded arch forms are noted;
2. The airway posterior to the tongue is appreciably enlarged. This is what we expected and the result is significant;
3. The comparison of the two-airway volume analysis shows a 95% increase of the airway, as a result of treatment; and
4. A physician's sleep study of night-time blood oxygen levels before and after treatment revealed a considerable increase from 78% to 92%.

Final comments

I have long postulated that Obstructive Sleep Apnea can be significantly reduced or eliminated with the Functional Facial Orthopedic methods we have used for the last 28 years, as part of the Lauson System, written about in the book "Straight Talk about Crooked Teeth". We have had anecdotal evidence of these positive results for many years. However, in recent years, have we validation of the theory, with the information provided with CBCT scans, that gives proof of airway enhancements by expansion of the maxilla and repositioning of the mandible. Bill's patient testimonial follows to elucidate the case for this type of treatment:

"In 2009, I went to see my Doctor complaining of severe fatigue. After completing an overnight oximeter test (Oxygen dipped to 78%) and Sleep Study, I was diagnosed with Sleep Apnea. For treatment I was provided a CPAP machine with an additional feed in with oxygen.

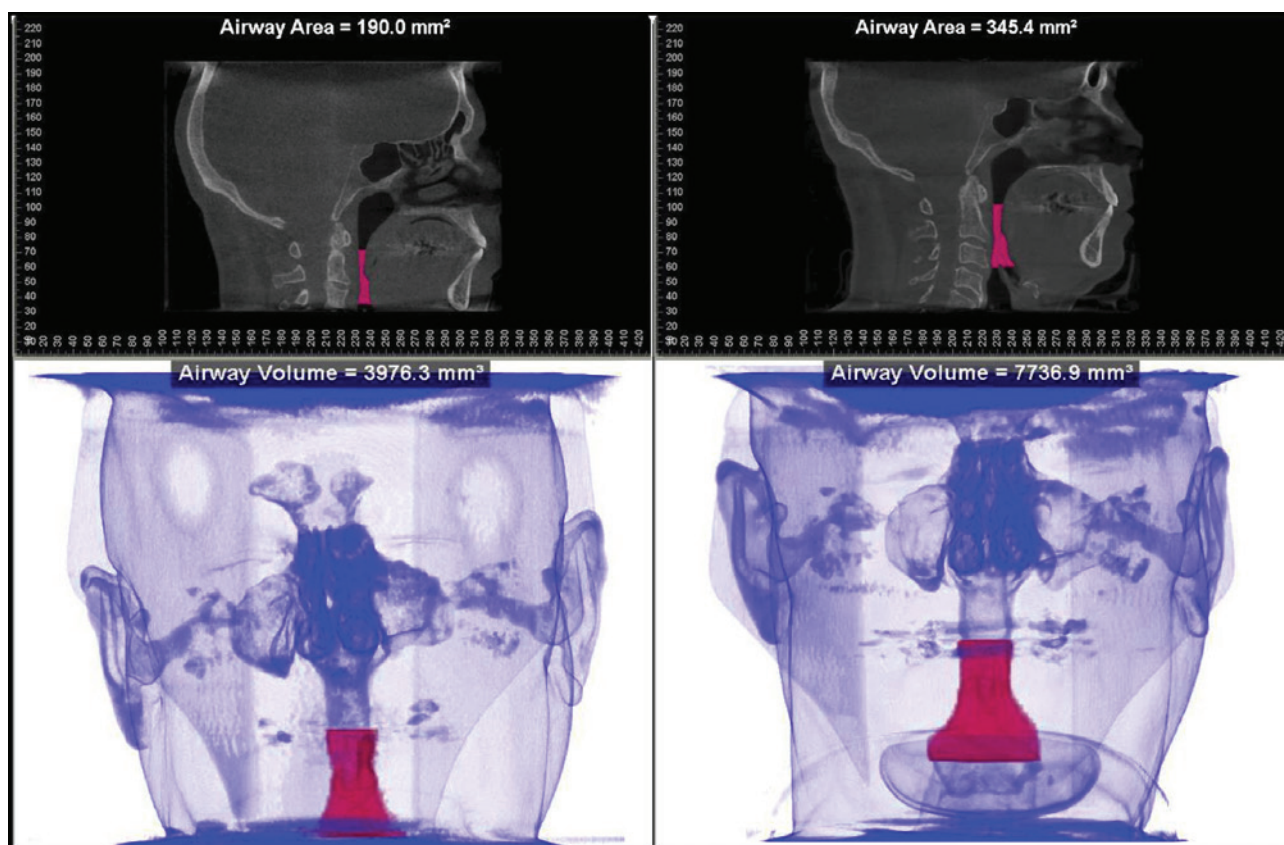


Figure 7. Volume analysis before and after treatment.

"I struggled for months trying to adapt to the CPAP. I never could sleep more than an hour before giving up and taking my mask off. My quality of life was taking a serious hit and I felt depressed. I didn't see much of a future.

"In January of 2010, I went to an Ear Nose and Throat Doctor and was told surgery was not an option and I needed to keep trying the CPAP. All hope was gone as I continued to try to adapt to the dreaded CPAP.

"I made an appointment with the orthodontist and during my initial evaluation was told the cause of my apnea was due to issues with airways and a narrow jaw. From there, I started my journey through various oral treatments, finishing up with my last Invisalign orthodontic device on May 23, 2013.

"The results are fantastic! Without wearing a CPAP, or any oral appliance, on April 29 of 2013 I conducted an Oximeter test with an Sleep Apnea clinic and my oxygen level stayed above 92% the whole night. The Sleep Apnea technician reported to me that my

apnea is under control and the dental/orthodontic treatment I have conducted is working."

This case demonstrates the efficacy of Functional Facial Orthopedics to help solve such challenging cases as OSA, as well as TMJ Dysfunction, and many other facial skeletal problems. As part

of a Straight Talk Series, these types of cases are planned for a future book about adult orthodontics.

For more information concerning the current book "Straight Talk about Crooked Teeth" please contact EODO via Brenda@eodo.com

About the authors

Dr Derek Mahony is a Sydney-based specialist orthodontist who has been actively involved in research that links constricted maxillary archforms to nasal breathing problems, adverse facial growth and systemic health problems such as nocturnal enuresis. He has presented over 400 lectures on orthodontic topics in more than 50 countries. As a practising clinician, Dr Mahony's research interests are in the aetiology of malocclusion and the guidance of facial growth. Please contact info@derekmahony.com for further information or clinical questions.

Dr Kent Lauson's distinguished career as a specialist in orthodontics, dentofacial orthopedics and temporomandibular dysfunction (TMJ) has spanned over 30 years. He graduated from the University of Iowa with his Doctorate of Dental Surgery Degree in 1971 and spent two years in the USAF Dental Corps where he studied Periodontics and was the Preventive Dentistry officer of his base. He then completed his orthodontic residency in 1975 at St. Louis University Medical Center and has been in private practice in Metro Denver ever since. During this time he helped develop the techniques for completing orthodontic treatment resulting in full beautiful smiles without the removal of any permanent teeth.