

ORTHO-TMJ-SLEEP CONNECTION HEALTH CENTERED PRACTICE

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All patients, including children and adults are looking for dentists who can help them attain good health. Napoleon Hill, a billionaire, wrote a book several years ago entitled “Think & Grow Rich”. He stated that one of the keys to becoming successful was to find out what people want and give it to them. Dentist’s who gear their practices to helping patients achieve good health will recession proof their practice.

There are three important health issues that I believe are essential that are not taught in most undergraduate programs in North America, including early orthodontic treatment, treatment of temporomandibular dysfunction and snoring and sleep apnea. In this article I would like to discuss why I believe the dental profession should become involved in treating these patients.

The majority of orthodontic practitioners do not offer early orthodontic treatment which provides an excellent opportunity for general dentists to obtain proper training in order to treat the children in their practice. There are basically two main orthodontic treatment philosophies:

1. Functional Philosophy

This involves the early treatment of malocclusions from age 5-12 using functional orthopedic appliances (removable and fixed) to help;

- a) Expand maxillary and mandibular arches
- b) Reposition the lower jaw forward in Class II skeletal malocclusions with retrognathic mandibles.
- c) Move pre maxilla forward in Class III skeletal malocclusions with mid face deficiencies.

The advantage of using functional appliances to correct the skeletal problems early is that they avoid the need to extract permanent teeth and the need for orthognathic surgery at age 17. Parents are looking for orthodontic practitioners who can treat their children early in an effort to guide their growth and avoid having to wear fixed braces and undergo orthognathic surgery at age 17. Functional appliances can usually correct the skeletal discrepancies in younger children in 7 – 9 months.

2. Retractive Philosophy

This is sometimes referred to as the “Bicuspid Extractions Philosophy”. The majority of orthodontic practitioners prefer to wait until age 12-14 to treat patients with fixed braces and utilize orthognathic surgery to correct the severe Class II and Class III skeletal discrepancies. When presented with a moderate overjet and Class II skeletal malocclusion and retrognathic mandible the treatment of choice is to extract 2 upper bicuspids and retract the upper six anterior teeth to eliminate the overjet. This has a devastating effect on the patients profile as now the patients profile is concave with an underdeveloped maxilla and mandible.

Functional clinicians routinely utilize arch development appliances when there is crowding on the upper and lower arches. These techniques have been utilized routinely in South America and

Europe for many years. Functional clinicians much prefer to develop the arches which avoids extractions of permanent teeth and helps create beautiful broad arches.

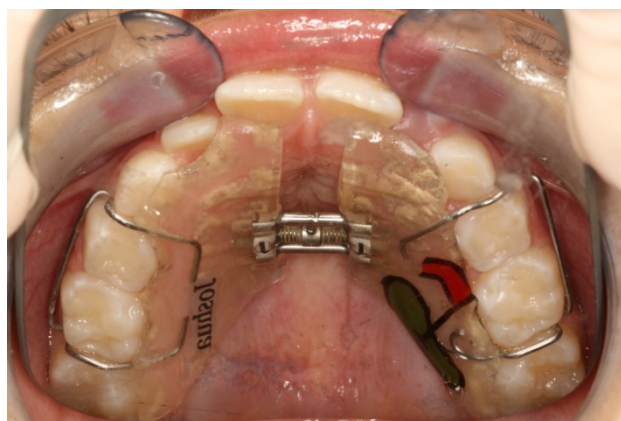
Case #1, Male Age 7 with a constricted maxillary arch. The key is that there is no room for the central and lateral incisors without extracting the primary cuspids. If the maxilla is not developed then the permanent lateral incisors most likely will erupt lingually and the cuspids possibly labially (fang-look). The use of a removable maxillary Schwarz appliance with a midline screw is a simple solution to the problem. The midline screw is turned twice weekly until it expands the upper arch 7 mm. The appliance is worn for an additional 6 months to avoid a relapse. This allows adequate space for the eruption of the 4 upper incisors which may possibly eliminate the need for future orthodontic treatment.¹ Research reveals that early orthodontic treatment reduces the time in fixed braces which certainly reduces the cost to parents. Phase I orthodontic fee is \$2,000 including records.



CONSTRICTED MAXILLARY
MALE AGE 7



MAXILLA EXPANDED
6 MONTHS



MX SCHWARZ APPLIANCE
MIDLINE EXPANSION SCREW

Case #2, female, age 16 with severely constricted maxillary and mandibular arches with a narrow smile. Upper and lower arches were expanded with a fixed Hyrax appliance for 6 months, followed by fixed orthodontic braces for 15 months. By developing the constricted arches to normal the case was completed without extractions. The end result was expanded upper and lower arches and a beautiful broad smile.



CONSTRICTED ARCHES



BROAD ARCHES



CONSTRICTED MAXILLARY ARCH



BROAD MAXILLARY ARCH



CONSTRICTED MANDIBULAR ARCH



BROAD MANDIBULAR ARCH



MAXILLARY BANDED HYRAX
MIDLINE SCREW OPEN 10 mm



NARROW SMILE



BROAD SMILE

It has been estimated that 70% of all malocclusions are Class II and the majority are Class II skeletal patients with normally positioned maxilla and retrognathic mandibles. These patients traditionally have narrow maxillary arches, moderate to large overjets and deep overbites.²

It is very common for patients, especially females over age 20 to have temporomandibular dysfunction (internal derangements within the TM joints) caused by posteriorly displaced condyles and anteriorly displaced discs as a result of the posteriorly located mandible. Condyles that are posteriorly displaced frequently result in compression of the nerves and blood vessels in the bilaminar zone distal to the condyles. There are two different treatment philosophies for the treatment of these Class II skeletal patients.

1. Functional Philosophy

The functional philosophy involves the use of functional appliances either removable or fixed to reposition the lower jaw forward. The advantage of this technique is that it can be done early when the child is actively growing and results in a dramatic and favorable improvement in the patient's profile.^{3,4,5} Many clinicians have noted that when functional appliances are utilized to develop upper arches to the normal size, and functional appliances are used to reposition the lower jaw forward there is a significant reduction in the signs and symptoms of TM dysfunction.⁶



UNDERDEVELOPED MANDIBLE
BEFORE TREATMENT



MANDIBLE ADVANCED
MARA APPLIANCE 7 MONTHS LATER



CLASS II MOLAR
OVERJET 4 MM



CLASS I MOLAR
NORMAL OVERJET



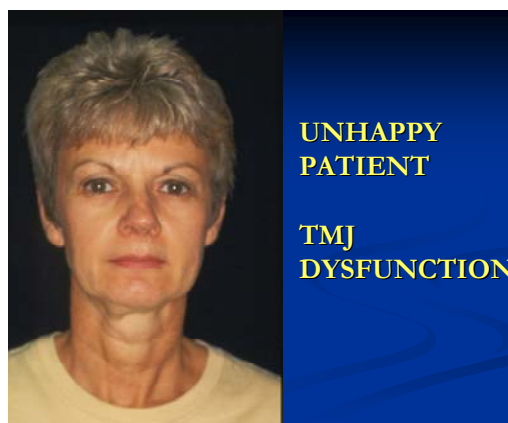
The literature is clear that if the disc can be recaptured when the functional appliance moves the mandible forward, most patients have a significant reduction in the signs and symptoms of

TM dysfunction.^{7,8} No patient wants to suffer needlessly with headaches, ringing in the ears, neck pain, dizziness, ear congestion, or tingling in the arm and hands. Our treatment objective for the Class II skeletal patients is to not only improve their facial esthetics but also to improve their TMJ and indeed overall health. Patients want straight teeth, improved profiles without having to extract permanent teeth or resorting to orthognathic surgery at age 17.⁹

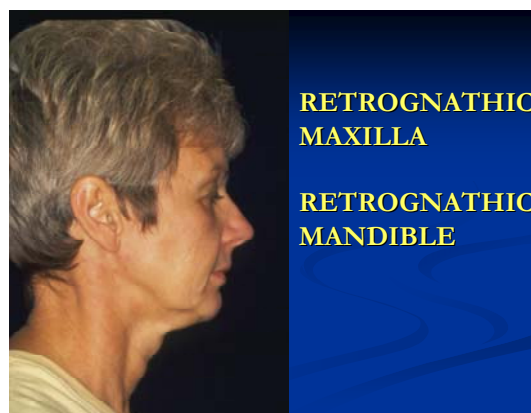
2. Retractive Philosophy

As mentioned previously, when upper bicuspid are extracted on a Class II skeletal patient with a normally positioned maxilla and a retrognathic mandible, the retraction of the upper six anteriors to eliminate the overjet sometimes prevents the mandible from coming forward to its correct position.

Clinicians must evaluate the health of the TMJ prior to choosing the treatment plan. If the patient has an internal derangement and a posteriorly displaced condyle prior to treatment, I recommend utilizing functional appliances to advance the mandible to help prevent future TMJ problems. The prevention and treatment of TM dysfunction is complex and other causes include trauma, whiplash injury, general anesthesia and the extraction of wisdom teeth.



BICUSPID EXTRACTION



MANDIBLE RETRUDED DUE TO RETRACTIVE ORTHODONTICS



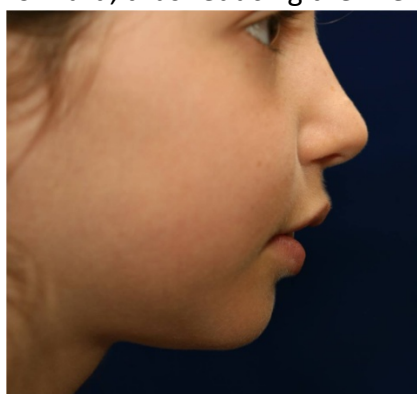
MANDIBLE RETRUDED DUE TO EXTRACTION UPPER BICUSPIDS

The treatment of choice for Class II skeletal patients with retrognathic mandibles is to advance the mandible with a functional appliance. In patients under age 11 the removable Twin Block is the appliance of choice developed by a world renowned orthodontist Dr. William Clarke from Fife, Scotland.^{10,11,12,13,14} Patients over age 11, the MARA (Mandibular Advancement Repositioning Appliance) is the functional appliance of choice developed by another famous orthodontist, Dr. James Eckhart, Manhattan Beach, California.¹⁵

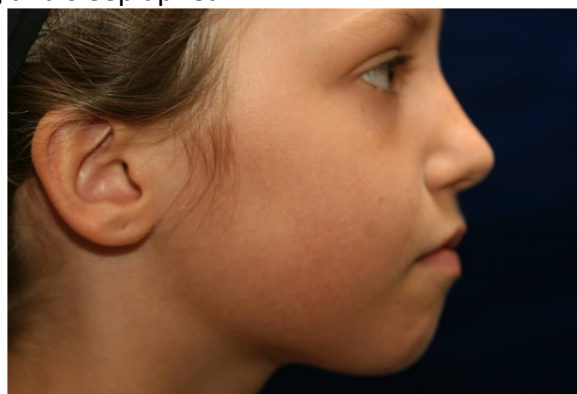
Many clinicians believe that bicuspid extractions in Class II skeletal patients with normally positioned maxillas and retrognathic mandibles can also contribute to snoring and sleep apnea. Snoring is caused by the tongue falling back and partially blocking the airway. Obstructive sleep apnea (OSA) occurs when the tongue falls back and blocks the airway for 10 seconds or more, over 35 times per night (in a 7 hour sleep cycle). Patients with underdeveloped lower jaws are extremely susceptible to OSA and snoring as the tongue is retruded when the mandible is retruded.

When orthodontic clinicians elect to extract the bicuspid and then retract the upper incisors, the mandible and tongue remain in a retruded position at the end of treatment. When patients grow older and become less active, many put on weight. In some cases, this increases the amount of fat in the neck and this further restricts the size of the pharyngeal airway which increases the incidence of OSA.¹⁶

Functional appliances (Twin Block or MARA appliances) move the mandible and tongue forward, thus reducing the likelihood of snoring and sleep apnea.^{17,18,19}



PRE-TREATMENT
RETROGNATHIC PROFILE



TWIN BLOCK 7 MONTHS
STRAIGHT PROFILE



TWIN BLOCK
2 BLOCKS INTERLOCK 70°

Sleep apnea (obstructive sleep apnea) is a serious medical condition that is becoming increasingly more prevalent in the U.S. and Canada partly due to the increase in obesity. Fifty-two percent of all adults over age 50 snore and approximately 20% have sleep apnea.

Co-Morbidity Correlations with Obstructive Sleep Apnea

- Hypertension 40 – 50%
- Coronary heart disease 34%
- Congestive heart failure 34%
- Diabetes 65%
- Erectile dysfunction 50%
- Renal disease 50%
- Fibromyalgia 80%
- Nocturnal strokes 84%

Second Hand Snoring

Years ago it was discovered that second hand smoke was extremely dangerous to the health of someone who was exposed to the smoke. Now in a study at the Mayo Clinic in 1999 they found that bed partners of snorers also have reported excessive daytime sleepiness and fatigue along with the snorer. The study showed that the bed partner of the person snoring woke up approximately 21 times per hour which resulted in loss of sleep. It is not hard to rationalize that the loss of even one hour of sleep per night could have a detrimental effect on the bed partner's health. Second hand snoring may cause partners to make poor eating decisions, cause loss of intimacy, and creates resentment, and often couples end up in separate bedrooms. The solution may be as simple as an oral appliance fabricated to move the lower jaw and tongue forward to open the airway. Oral appliances are extremely effective in the treatment of patients who snore or who have mild to moderate sleep apnea.



BICUSPID EXTRACTION
CONCAVE PROFILE
SNORING SLEEP APNEA



BICUSPID EXTRACTIONS
MAXILLA RETRACTED
TONGUE RETRUDED

Snoring Increases Risk of Cancer 5 times

At a recent meeting of the American Thorax Society in San Francisco it was stated that in evaluating 1,500 people in a sleep study over 22 years that patients with severe sleep apnea increase their risk of getting cancer by 5 times. Scientists now believe that low oxygen levels can trigger the development of cancerous tumors by promoting the growth of vessels that feed them. When you decrease the amount of oxygen in the blood of children or adults it sometimes causes serious health problems. Sleep apnea sometimes causes patients to stop breathing 30-50 times per hour for 10 seconds or more. This causes a serious decrease in oxygen in the blood. The results are high blood pressure, increased cardiovascular disorders such as heart attack, atrial fibrillation, congestive heart failure, stroke, Type 2 Diabetes, acid reflux, and even dementia and Alzheimer's disease.

ADHD (Attention Deficit Hyperactivity Disorder)

Children that are deprived of oxygen either due to a constricted maxillary arch or enlarged tonsils and adenoids often get sleep apnea. This frequently causes ADHD (Attention Deficit Hyperactivity Disorder) which studies have shown can have a significant and detrimental impact on the child's cognitive school performance and behavior. They often become aggressive and difficult to manage in school due to lack of adequate sleep at night due to constriction of their airways. To successfully treat this problem the airway constriction must be corrected. Usually this involves expansion of the maxillary arch and surgical removal of the tonsils and adenoids.

Obviously this is an extremely serious and prevalent problem in our society. The diagnosis of sleep apnea must be made following a sleep study in a hospital or private sleep clinic by a medical sleep specialist.

Three Methods to Treat Sleep Apnea

1. Oral Appliance

The oral appliance functions by keeping the lower jaw and tongue forward which opens up the airway and prevents snoring and sleep apnea. This is by far the most popular of the three treatment options. This is the treatment of choice for mild to moderate sleep apnea.^{20,21}

2. CPAP (Continuous Positive Air Pressure)

This is the favorite option for most medical doctors. The patient wears a mask over their nose or nose and mouth and air is forced up the nose using an air compressor and tube. This is the treatment of choice for severe sleep apnea patients. The literature reports that when using this CPAP device there is approximately 70% failure rate after one year. The oral appliance is the treatment of choice when patients fail with the CPAP device.^{22,23,24}

3. Surgery

Nasal surgery to correct deviated septum, remove enlarged turbinates or polyps.

Throat surgery to remove tonsils, enlarged uvula or low soft palatal tissue.

Most patients do not need surgical procedures and this is the patient's least favorite option.

Of the three ways to treat sleep apnea the oral appliance is the most popular with patients. This provides an excellent opportunity for dentists to become involved in providing oral appliances to patients who have mild or moderate sleep apnea, snore only, or who cannot tolerate the CPAP device. Most dental practices have many patients already in their practice and their bed partners will thank you for improving their health as well as their quality of sleep. The average fee for an oral appliance including records is approximately \$2,500.

Early Treatment Key To Prevent Sleep Apnea

1. Treat the children early with functional appliances.
2. Establish a normal patent airway as soon as possible by the removal of adenoids and/or tonsils.
3. Eliminate and/or control allergies which will stop mouth breathing and encourage nasal breathing.
4. Encourage orthodontic clinicians to develop arches with functional appliances instead of extracting permanent teeth.
5. Utilize functional appliances such as the Twin Block, Rick-A-Nator or MARA Appliance to reposition the lower jaw and tongue forward to open up the airway. Conversely, do not refer patients for the extraction of permanent teeth including bicuspsids.
6. Utilize functional appliances to move the lower jaw forward non-surgically in children and young adults in an effort to open up the airway. Conversely, discourage orthodontic practitioners from waiting until age 17 to surgically advance the mandible.

Most general dentists have adults who snore and have sleep apnea, and children with malocclusions that need your help. Most of us were not adequately trained in dental school to help our patients with these serious problems. I would urge you to take courses so that you can not only improve your income but also by providing a valuable health service for your patients.

In my opinion, the health centered practice of the future will provide the following services for their patients:

1. Children will be treated with a non-extraction, non-surgical philosophy, utilizing functional appliances to reposition the lower jaw and tongue forward.
2. Class II skeletal patients who are treated with functional appliances to move their lower jaw forward will be preventing the possibility of TM dysfunction and snoring and sleep apnea in the future.
3. Adults will be treated with oral appliances to help eliminate the serious risks associated with snoring and obstructive sleep apnea.

Dentists and staff who dedicate their practices to helping patients achieve healthy temporomandibular joints and eliminating snoring and sleep apnea, achieve a tremendous feeling of satisfaction. I would encourage all of you to consider expanding your practice to one that is

more health centered. The dental profession has an opportunity to significantly improve the health of our patients and we need to take our responsibility seriously.

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