

Airway Focused Orthodontics

Early orthodontic treatment for children

BY DR. BROCK RONDEAU

It has been estimated that about 70% of children under age 12 have a malocclusion.¹ The term “orthodontics” refers to the straightening of teeth. The term “orthopedics” means treating the structural or skeletal problem, mainly in the mixed dentition, while the child is actively growing. The treatment of these children with orthopedic problems uses functional appliances, fixed or removable, in the mixed dentition. Research indicates that malocclusions worsen over time, so why not treat children as early as possible to avoid more costly and lengthy treatment later?² When this treatment philosophy is explained to the patients’ caregivers, a large percentage readily agree to the treatment.

The advantage of treating early is that it avoids the extraction of permanent teeth and orthognathic surgery. Parents seek out general

dentists who advocate early treatment to prevent the extraction of permanent teeth. Children with crooked teeth, underdeveloped lower jaws, protruding upper teeth, narrow arches and narrow smiles are extremely self-conscious. When the problems are solved, their self-image improves, and they become more positive, which helps determine a better future for them.

Properly sized maxillary arch

One of the most important keys to total health is a patent airway. To achieve a patent airway, the first consideration is establishing a properly sized maxillary arch. A constricted maxillary arch also causes malocclusions, including crooked teeth. The constricted maxillary arch has been cited in the literature as one of the main contributors to skeletal Class

II malocclusions with a retrognathic mandible. This malocclusion can also cause TM dysfunction, snoring and sleep apnea.^{3,4}

To help diagnose a constricted V-shaped arch, place a cotton roll between the two upper permanent molars on the lingual side. Normal measurement in permanent dentition is 37–39 mm. The width of the cotton roll is 37 mm.

Fig. 1: Standard cotton roll, 37 mm.



Fig. 2: Cotton roll between first molars.



Male, age 8

- Mouth breather
- Constricted upper arch
- No room for upper incisors

Treatment plan:

- Upper removable expansion appliance
- Schwarz appliance
- Six months of treatment
- Adequate space for upper incisors
- Open the nasal airway
- Convert from a mouth breather to a nasal breather

Fig. 3 : Narrow arch. No room for laterals.



Fig. 4 : Constricted upper arch. Mouth breather.



Fig. 5 : Upper expansion appliance.



Fig. 6 : Expanded arch. Open nasal airway.



Fig. 7: Constricted upper arch. No room for laterals.



Fig. 8: Arch expanded.



Fig. 9: Narrow upper arch.



Fig. 10: Expanded arch. Broad smile.



symptoms of ADHD include increased behavioral problems, decreased academic performance and decreased growth hormones, which have a negative effect on the child's growth and development. Also, the child has trouble sleeping due to the tongue being retruded and obstructing the pharyngeal airway. This increases the incidence of enuresis (bed-wetting).⁶ These are all serious problems for children when they are in the mixed dentition stage.

When the lower arch is too narrow, it does not allow enough room for the tongue. Frequently, with a narrow lower arch, the tongue has scalloping (a 70% chance of snoring and life-threatening sleep apnea).⁷ Patients with severe sleep apnea can have serious health problems, including high blood pressure, heart attacks, strokes, Type 2 diabetes, kidney problems, fivefold increase in the risk of cancer, dementia and Alzheimer's.^{8,9,10,11}

Fig. 11: Constricted arch. Tongue blocks airway.



Fig. 12: Expanded arch,, open airway.



Properly sized mandibular arch

A narrow lower arch forces the tongue to assume a backward position in the mouth, increasing the incidence of snoring and obstructive sleep apnea. There is a direct correlation between obstructive sleep apnea and attention deficit hyperactivity disorder (ADHD).⁵ This is a very serious problem for children. The signs and

Fig. 13: Lower Schwarz.



Fig. 14: Lower expansion appliance.



When the tongue lacks adequate space on the upper and lower arches, this can also have a negative effect on the child's speech.

Fig. 15: Lower bicuspid extractions. Tongue retruded closes airway.



A two-phase treatment

General dentists must learn to treat children in the mixed dentition stage by expanding the upper and lower arches to prevent snoring, ADHD and obstructive sleep apnea in the future. The solution is the use of upper and lower fixed or removable expansion appliances. Treatment time is only four to six months, and this can result in significant improvement in the child's overall health.

The treatment of choice for children in the mixed dentition stage is a two-phase treatment.

- **Phase 1: Mixed dentition (orthopedic phase).** The first priority is to evaluate the airway. Constricted airways can be caused by enlarged tonsils or adenoids, nasal obstruction due to a deviated septum or allergies. These children must be referred to an ENT specialist for resolution of the airway constriction. Skeletal problems, such as constricted upper or lower arches, must be treated with fixed or removable arch expansion appliances. Anterior or posterior crossbites should be corrected as early as possible. Oral habits—such as anterior tongue thrusts, thumb-sucking or mouth breathing—need to be addressed as early as possible. It is extremely important to treat Class II skeletal problems with a normally positioned maxilla and a retrognathic mandible to prevent TM dysfunction, snoring and sleep apnea in the future. Functional appliances used in the mixed dentition stage almost always prevent the extraction of permanent teeth and the need for orthognathic surgery.
- **Phase 2: Permanent dentition (orthodontic phase).** Dental problems, such as crooked teeth or spaces, are corrected with the straight wire appliance (braces) in the permanent dentition. Extraction of permanent bicuspid is more common if functional appliances are not used.

Functional appliances utilized in the mixed dentition

Functional jaw repositioning appliances, such as the Twin Block appliance, significantly improve the profile of patients and correct the overjet

by advancing the mandible without the need to extract permanent teeth. This treatment plan almost always prevents the extraction of permanent teeth and the need for orthognathic surgery at age 17.

Functional jaw repositioning appliances create outstanding profiles

Fig. 16: Twin Block.



Fig. 17: Seven months.



Fig. 18: Before: Retrognathic profile.



Fig. 19: After: Straight profile.



Fig. 20: Before: Twin Block appliance.



Fig. 21: After: Twin Block appliance.



Throughout the years, the orthodontic profession has been divided into two groups regarding the philosophy of treatment.

1. **Retractive philosophy.** The treatment is mainly done in the permanent dentition with the use of fixed braces. It is referred to as the retractive technique because the upper first bicuspid are

frequently extracted to correct the overjet. The upper six anterior teeth are then retracted to correct the overjet. This negatively affects the patient's profile, causing a retraction of the upper lip, which makes the nose appear longer. The extraction of the upper bicuspid also results in a constriction of the maxillary arch which negatively affects nasal breathing, speech and the width of the smile.

2. Functional philosophy. The functional philosophy involves treating patients mainly in the mixed dentition stage using fixed or removable functional appliances. Younger patients with abnormal habits—such as thumb-sucking or tongue thrusting, airway problems, evidenced by snoring, sleep apnea or mouth breathing—must be treated immediately. Patients who present with skeletal problems, such as constricted maxillary, mandibular arches or a retrognathic mandible, must also be treated early. When functional jaw orthopedic appliances are used in the mixed dentition to solve orthopedic problems—transverse, sagittal or vertical—most orthodontic cases can be completed without extractions or surgery. When 80% of the malocclusion is corrected in the mixed dentition, this can significantly reduce the time the patient has to wear fixed braces.

Many malocclusions are Class II skeletal, with a normally positioned maxilla and a retrognathic or under-developed mandible. Two prominent orthodontic clinicians and researchers, Dr. James McNamara and the late Dr. Robert Moyer, made the startling

revelation that 80% of Class II malocclusion involve retrognathic mandibles.^{12,13} Most functional clinicians believe that fewer than 5% of the Caucasian maxillas are truly prognathic. If the maxilla is in the normal position, considering these facts, how can orthodontic clinicians continue to apply retractive mechanics to the upper arch following the extraction of upper bicuspid?

Male, age 8

- Diagnosis:
- Constricted upper arch
- Intermolar width of 27 mm
- No room for central and lateral incisors
- Severe bruxism habit

Treatment plan:

- Expand the maxillary arch
- Removable expansion appliance
- Eliminate the need to extract permanent teeth
- Open the nasal airway
- Prevent bruxism
- Braces, one month

Fig. 22: Constricted maxillary arch.



Fig. 23: Severe bruxism.



Fig. 24: No room for lateral incisors.



Fig. 25: Schwarz expanded maxilla.



Fig. 26: No room for lateral incisors.



Fig. 27: Room for lateral incisors.



Fig. 28: Braces front teeth only, four months.



Fig. 29: Constricted arch, age 8.



Fig. 30: Broad arch, age 12.



Fig. 31: Crooked teeth, age 8.



Fig. 32: Straight teeth, age 12.



Linder-Aronson also confirmed what other orthodontic researchers, such as Dr. Edward Angle and Dr. Donald Woodside, stated earlier: One of the main causes of the Class II skeletal malocclusion (normal maxilla, retrognathic mandible) is airway obstruction (enlarged tonsils, adenoids, nasal obstruction, etc.).¹⁴

If the literature has an abundance of articles proving that airway obstruction can not only negatively impact the health of younger patients but also cause most malocclusions, you might wonder why this subject is virtually ignored in most dental and graduate orthodontic programs. If you want to help children grow properly, avoid serious health problems as previously

outlined and prevent malocclusions, it is imperative that general dentists become more knowledgeable in this area. The literature confirms that Class II skeletal malocclusion originates from airway constriction. This causes the maxillary arch to constrict, forcing the mandible into a more posterior position in the mouth to achieve a proper occlusion. As a result, Class II skeletal malocclusion presents with a normally positioned maxilla with a retrognathic mandible.

When you understand the etiology of the Class II skeletal malocclusion, it seems reasonable to reverse the entire procedure, eliminating the need for extractions of permanent bicuspid teeth. It is completely illogical to try and correct the Class II skeletal problem by extracting teeth from a properly positioned maxilla and retracting them backward. This creates a retrognathic mandible and leaves the mandible in an undesirable position. The ideal treatment of would be to diagnose and treat the airway constriction. Refer the patient to an ENT specialist to address the enlarged tonsils and adenoids or treat the deviated septum. Treat allergies by first eliminating dairy products. If airway constriction caused the maxilla to constrict, expand the maxilla to normal width to allow the mandible to move forward into its proper position and achieve normal occlusion with the maxillary arch. Then use a functional jaw repositioning appliance to move the lower jaw forward to its correct position. As mentioned previously, this significantly improves the patient's profile and, in many cases, prevents future TM dysfunction, snoring and sleep apnea.

One simple diagnostic tool that general dentists can use with their Class II patients is as follows:

1. The patient usually presents with an overjet. Ask the patient to occlude in centric occlusion. Observe the normally positioned maxilla and posteriorly positioned mandible. The profile clearly shows a retrognathic, underdeveloped mandible.
2. Ask the patient to move the mandible forward to an end-to-end occlusion. Observe the patient's profile. If there is a significant improvement in the profile, I recommend treating this patient with a functional mandibular repositioning appliance. In my opinion, it is absolutely incorrect to extract upper bicuspid teeth in this scenario. Do not refer this patient to an orthodontic practitioner for upper bicuspid extractions.

Fig. 33: Mandible back.



Fig. 34: Mandible forward.



Case study: Female, age 8

- Severe headaches
- Overjet of 6 mm
- Normal maxilla
- Retrognathic profile
- Class II skeletal
- Retrognathic mandible

Fig. 35: Alyssa, Age eight. Headaches.



Fig. 36: Retrognathic profile.



Fig. 37: Overjet of 6 mm.



Fig. 38: Twin Block. Move mandible forward.



Fig. 39: Overjet of 6 mm.



Fig. 40: Overjet 1 mm. Seven months. Twin Block.



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Treatment plan:

Phase 1

- Mixed dentition
- Twin Block
- Move mandible forward
- Seven months

Phase 2

- Permanent dentition
- Fixed braces
- 12 months

Fig. 41: Retrognathic profile.



Fig. 42: Straight profile.



Fig. 43: Headaches.



Fig. 44: Happy patient. No headaches.



Fig. 45: Before Twin Block appliance.



Fig. 46: After Twin Block appliance.



Fig. 47: Before underdeveloped lower jaw.



Fig. 48: After. Straight profile.



In the case below, the extraction of four bicuspids resulted in an unattractive profile. The extraction also caused constriction of the upper and lower arches. I highly recommend that you do not refer patients with constricted arches and dental crowding to an orthodontic clinician who does not understand that extracting bicuspid teeth in Class II skeletal cases with a retrognathic mandible and a properly positioned maxilla can be detrimental to the health of many patients.

The extraction of four bicuspids resulted in an unattractive facial profile. The extraction caused a constriction of the upper and lower arches. The constricted lower arch caused the tongue to go back and obstruct the patient's airway at night. This caused the patient to snore and have severe sleep apnea.

"Study concludes that with the closing extraction spaces, the maxilla and the mandible retruded, causing a retrognathic mandibular position and consequent constriction of the oropharyngeal airway"¹⁵

"Our children with permanent teeth missing due to congenital agenesis or permanent teeth extraction had a smaller oral cavity, known to predispose to the collapse of the upper airway during sleep."¹⁶

"2022 systematic review of research on the airway and extractions. Concludes that premolar extraction/retraction can cause the narrowing of the pharyngeal airway, a change in the tongue position, and the reduction of oral cavity space, and hence is a risk for sleep apnea."¹⁷

"We recommend that optimizing the airway for every patient and never doing any treatment (such

as retraction) which will diminish the airway, even minutely, needs to become the standard of care in airway centric dentistry."¹⁸

This also caused severe bruxism at night as the patient attempted to open his airway. Early treatment with functional appliances to expand the upper and lower arches and avoid the extraction of four bicuspids could have significantly improved the long-term health of this patient.

As mentioned previously, the extraction of bicuspids in this situation can increase the risk of TM dysfunction, snoring and, sometimes, life-threatening sleep apnea. Our patients deserve much better treatment.

One of the main causes of TM dysfunction is a retrognathic mandible, large overjet and deep overbite. When

the mandible is retrognathic, CBCT X-rays of the temporomandibular joint clearly demonstrate that the condyles are posteriorly displaced when the patients bites in centric occlusion. This causes impingement on the nerves and blood vessels distal to the condyle, which is one of the main contributing factors of TM dysfunction.

The unpleasant symptoms of TM dysfunction include headaches, ear aches, dizziness, fainting, shoulder and back problems, and ringing in the ears. TM dysfunction can be present in children and adults when the mandible is retrognathic. It is most common in females over age 20.

Dr. Clifton Simmons has written several articles about using anterior repositioning splints to move the lower jaw forward and eliminate the painful symptoms of TM dysfunction.

Fig. 49: Bicuspid extraction closes airway.



Fig. 50: Severe bruxism.



Fig. 51: Bicuspid extraction closes airway. Retracts anteriors.



Fig. 52: Tongue goes back obstructs airway. Snoring. Sleep apnea.



To prevent TM dysfunction in children and adults, the treatment of choice would be to use jaw repositioning appliances, such as the Twin Block appliance, to move the lower jaw forward and correct the large overjet and deep overbite.¹⁹

Is failure to treat children early supervised neglect?

I strongly believe that our educational system has failed to provide graduating general dentists with adequate training in either orthodontics or orthopedics. When I travel around North America teaching, I am told by general dentists in my courses that some of the orthodontists in their area chose not to treat children in the mixed dentition but prefer to treat in the permanent dentition. Several dentists have informed me that the reason they wanted to incorporate early ortho treatment for children in their practice is that orthodontists in their area preferred to delay treatment.

I believe it is time for all general dentists to take this functional philosophy more seriously. What I particularly like about my practice is that, with attention to the importance of a patent airway and early interceptive orthodontics, I am involved in a health-oriented dental practice. Some general dentists have told me that one reason they wanted to learn about orthodontics and orthopedics is that they live in a rural area where there is no orthodontist. I recommend to my course participants that they learn how to make the correct diagnosis for each case. Just treat the simple cases and refer the complex cases to orthodontic specialists. This is the formula for most medical and

dental practices. General dentists and medical doctors treat the simple cases and refer the complex cases to medical or dental specialists. An interesting question is: Why is orthodontics not taught in most dental schools in North America? What if the other specialties—endodontics, periodontics, prosthodontics, restorative dentistry—had decided to take a similar position regarding the training dentists acquire in dental school?

The result, I would submit, is that we could be categorized as hygienists, not dentists. In South America and some European countries, general dentists are taught to treat children in the mixed dentition and then refer them to orthodontists for fixed braces. Since 70% of children under age 12 have a malocclusion, how can dental schools fail to add early orthodontic treatment for children to the curriculum? Unfortunately, we all know the answer. When the malocclusion worsens over time as the child grows older, how can orthodontic clinicians choose not to treat children early? Perhaps this should be called “supervised neglect.”

In this article, I have tried to show what outstanding facial and dental changes are possible when utilizing functional appliances in general practice. With proper training, general dentists can learn to use these appliances effectively to help their younger patients. Most general dentists have numerous children with simple malocclusions that can easily be corrected with the appropriate functional appliances. The average fee charged for six to nine months of treatment using the functional appliances as shown is approximately \$2,500, plus the cost of

records. The estimated cost for records is \$500. General dentists do not have to do any external marketing since the patients are already within their practice.

I recommend that dentists considering orthodontics start by treating simple cases in mixed dentition with functional appliances. If your practice starts just two appliances per week for 50 weeks, this will total approximately 100 patients with a gross income of more than \$250,000 from simple cases alone. If you want to increase your income as well as your personal satisfaction with your practice, I urge you to consider adding orthodontics and functional appliances to your general practice.

Since mothers make 90% of the health care decisions, we must gear our practices to making them happy. In my experience over the last 45 years, mothers want early treatment for their children because it ensures that most can be treated without extracting permanent teeth. I believe the time has come for all general dentists to get adequate training so they can start treating the children in their practice the same way they would want their own children treated. **DT**

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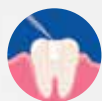
Dr. Brock Rondeau, IBO, DABCP, DACSDD, DABCDMS is one of North America's most sought-after speakers, lecturing more than 50 days per year for 35 years. He is the past president and master senior certified instructor for the International Association for Orthodontics. More than 25,000 dentists have attended his courses and study clubs in the United States, Canada, China, Australia, England, Poland, and Turkey.

He had an extremely busy practice, limited to treating patients with orthodontic, orthopedic, TMD, snoring, and sleep apnea problems. He has published more than 30 articles in orthodontic and dental journals and has produced internet courses in orthodontics, TMD, and snoring and sleep apnea. His textbook, *Early Orthodontic Treatment for Children*, is now available.

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