MOUTH BREATHING CAUSES MALOCCUSIONS, TMD, SLEEP DISORDERS

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Dr. Rondeau has been treating children's orthodontic orthopedic problems for over 35 years and has taught over 24,000 dentists worldwide. He recommends early orthodontic treatment for children utilizing a functional philosophy which is a non-extraction, non-surgical approach. By developing the arches with functional appliances he avoids the extraction of permanent teeth. He utilizes functional appliances to reposition the lower jaw forward which prevents orthognathic surgery and future TMJ and snoring and sleep apnea problems.



Treatment must be implemented to prevent children from mouthbreathing which causes malocclusions and many health problems such as ADHD, aggressive behaviour, poor marks in school, bedwetting, bruxism, snoring and sleep apnea.

Since 75% of children and adults have a malocclusion general dentists need to take courses in order to treat them. Parents are looking for general dentists to help not only improve the appearance of their children but also increase their overall health by creating beautiful, broad smiles, patent airways and healthy TM joints.

hen I started practicing orthodontics 35 years ago I quickly came to the conclusion that I wanted to treat my patients with a functional philosophy rather than the retractive philosophy. My objective with both children and teenagers was to give everyone a proper size maxillary and mandibular arches. Since the vast majority of patients have narrow underdeveloped arches, the first phase of treatment is to develop the upper and lower arches to normal using fixed or removable expansion appliances. Mothers usually prefer the fixed appliances where patient cooperation is guaranteed. Mouth breathing is one of the most damaging conditions that adversely affects your overall health. When you expand the upper arch you open the airway horizontally with the expansion screw and vertically when the palate drops. If you do not correct this problem of constricted upper arch at an early age the vault of the palate rises with the mouth breathing habit which causes a deviated septum. This further restricts the ability for the patient to

breathe through the nose. The child ends up with one bad nostril and one worse nostril. This can even result in snoring for the child or as an adult. The Functional Philosophy (Airway Orthodontics) teaches us to develop the upper arch to normal width. V-shaped maxillas are an indication that the patient has a narrow underdeveloped arch.

The objective is to convert the V-shaped arch into a broad rounded arch. One of the criteria that I rely on with children is that "is there enough room for the upper and lower central and lateral incisors without extracting the primary canines?" If there is not enough room I expand (develop) the arches until there is room for all 4 incisors. The other key for me is the distance between the upper first molars on the lingual should be 37 mm in permanent dentition. Place a cotton roll which is 37 mm between the molars to check the width of the upper arch.

Females will stop growing at approximately age 14-15. Males will stop growing approximately age 17-18. With normal swallowing and nasal breathing the arches are expanded approximately 1/2 mm per month. With a normal swallow the tongue goes on the roof of the mouth and expands the maxilla. The problem is that most narrow V-shaped underdeveloped arches are mouth breathers. These patients do not expand at 1/2 mm per month and therefore need a fixed or removable expansion appliance to achieve the desired shape for the upper arch. The objective in Airway Orthodontics is to open the nasal airway with expansion appliances and clinically we would like to convert mouth breathers to nasal breathers. Ideally it is important to make room for all the permanent teeth and to create a beautiful broad smile. The functional philosophy (airway favorable) starts with early orthodontic treatment for children.

The retractive technique (airway unfavorable) waits until all the permanent teeth erupt and then, since there is crowding due to the narrow arches decides to make room by extracting permanent teeth, usually the first bicuspids. This causes a construction of the upper and lower arches and creates an unfavorable and narrow smile at the end. Approximately 50 percent of my practice is the treatment of TM Dysfunction (TMD). I have observed a higher incidence of TMD in patients who had skeletal Class II malocclusions, normal maxilla, retrognathic mandible, large overjet who had extractions of the upper first bicuspids followed by retraction of the six upper anterior teeth. Extractions negatively affect the airway as the upper arch is constricted 16 mm due to the loss of tooth structure. This also causes the tongue to retrude to the back of the throat which negatively affects the airway and can contribute to snoring and life-threatening sleep apnea. Patients with untreated severe sleep apnea live approximately 10 years less than a patient with no sleep apnea.







Transforce Transverse







Straight Teeth 10 Months Fixed Expander 6 Months Fixed Braces 4 Months



No Room Laterals



Straight Teeth Broad Arch 10 Months



Constricted Mx Arch Intermolar Width 30 Mm No Room Laterals

Crooked Front Teeth





Expanded Arch Intermolar Width 37 Mm 10 Months Lingual Bonded Retainer



Happy Patient Straight Teeth

Functional Philosophy

Use functional appliances in the mixed dentition:

Expansion appliances to expand upper and lower arches a)

Twin Block Appliance









- b) Mandibular advancement appliances to reposition the lower jaw forward in Class II skeletal cases with underdeveloped mandibles
- Advance pre maxilla in Class III malocclusions with mid-C) face deficiencies.

Underdeveloped Lower Jaw



Twin Block





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Introduction by: Dr. Neal C. Murphy Professor of Orthodontics

The advantage of using functional appliances early to correct the functional or skeletal problems is that this avoids the need to extract permanent teeth.

If the mandible is moved forward:

- a) Expansion of the maxilla unlocks the trapped mandible and it comes forward naturally (most common in Class II, Div 2 cases and if the patient has TM dysfunction)
- b) The early correction of the Class II skeletal case with the retrognathic mandible prevents the need to have orthognathic surgery at age 17 or the removal of the upper bicuspids to retract the upper anterior teeth and restrict the airway.



When the arches are expanded to accommodate all the permanent teeth the patient has a much broader smile than the narrow smiles as a result of the extraction of permanent teeth. As mentioned earlier, I see fewer children and adults with TMD when treated with the functional philosophy.



Retractive Technique

This is sometimes referred to as "Bicuspid Extraction Philosophy". The treatment is delayed until the permanent dentition, age 12-14 and the patients are treated with fixed braces and extraction of permanent teeth.

In a Class II skeletal case with a normal maxilla and retrognathic mandible the extraction of the upper bicuspids and the retraction of the 6 anterior teeth has a devastating effect on the patients profile. The maxilla is retracted back to join the retrognathic mandible. This results in a concave, very unattractive appearance and an extremely thin upper lip. The results of the constricted maxilla leaves a narrow smile and dark unattractive buccal corridors.



I believe that general dentists and orthodontists that offer orthodontic treatment must evaluate children at an early age to recognize mouth breathing and try to convert them to nasal breathing as early as possible. This always involves the expansion and development of the arches and sometimes the referral to an ENT specialist for removal of the adenoids and tonsils which are obstructing the airway. General dentists have a clear choice either take courses on Early Orthodontic Treatment for Children or refer your younger patients to an orthodontist that has an airway focused or functional philosophy. The long term health of the children in your practice requires that the mouth breathing must be treated as soon as possible to avoid long term health problems.



This is a photo of a lower lingual arch following the extraction of the lower primary canines by an orthodontic practitioner who called this Phase One Treatment. This restricts the normal growth of the mandible and guarantees that there will be no room for all the permanent teeth which means extraction of lower bicuspid teeth at a later date.

The airway focused or functional approach would have been to leave in the primary cuspids and to develop the lower arch to normal to allow room for the permanent central and lateral incisors to erupt into the proper position. Clinicians must accept the fact that crowded teeth are the results of a constricted dental arch. The solution must be to develop the arch to normal rather than put in an appliance that restricts the growth of the mandible and exposes the patient to extraction of permanent teeth. The serious problem affecting the long term health of the patient is that failure to develop the lower arch or the extraction of permanent teeth in the lower arch causes the tongue to fall back and block the pharyngeal airway. This can cause snoring and life-threatening sleep apnea later on in life.¹



Children and adults can have TMD due to deep overbites. Children can brux at night and flatten the cusps of the primary molars and increase the deep overbite. The treatment of choice is to do composite buildups on the lower first and secondary molars to open the bite in the posterior. In order to stabilize the TMJ and to prevent the mandible from going distally when you increase the vertical with the composite buildups it is necessary to fabricate a Rick-A-Nator. The upper appliance is attached to the first molars, has mesial rests on the upper first primary molars reinforced with flowable composite for retention. The Rick-A-Nator also has an incisal ramp that is approximately 2-3 mm long which holds the mandible forward. It causes the condyles to move down and forward away from the nerves located distal to the condyles. The ramp is fabricated at 1 mm overbite and 1 mm overjet. The Rick-A-Nator holds the mandible forward which opens the airway. Composite buildups open the vertical dimension which creates more room for the tongue which helps open the airway. Send the appropriate bite registration to the orthodontic lab to fabricate the Rick-A-Nator. I can highly recommend Orthodent Lab, Bill Van Evans, master technician to make your appliance.

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BROCK RONDEAU

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Course Objectives

LEVEL I – The purpose of this comprehensive program is to teach general and pediatric dentists how to diagnose and treat simple orthodontic cases. Emphasis will be placed on thorough records and diagnosis. Treatment will involve using a combination of functional appliances, mainly in mixed dentition and fixed orthodontic braces (straight wire technique) in permanent dentition. Dr. Rondeau's systematic approach, organization and marketing tips make incorporating orthodontics into the general practice relatively easy.

LEVEL II – This 2 session, 4 day orthodontic course has been created for those who have attended Dr. Rondeau's Level I Introduction to Orthodontics or are currently practicing orthodontics and want to take their practice to the next level with greater case diagnosis and finishing skills. Learn a system for treating patients that involves stabilizing the temporomandibular joint prior to any orthodontic treatment, and bring these important skills to your practice where you can ensure a beautiful smile, straight teeth and healthy jaw joints (TMJ).

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Session 2	November 18 & 19, 2022
Session 3	January 20 & 21, 2023
Session 4	March 3 & 4, 2023

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featuring 6 interceptive ortho cases

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Session 2	January	20	&	21,	2023

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TMD Case Presenation

Female, age 8 presents with 6 mm deep overbite, Class I malocclusion and TM dysfunction including severe headaches.



Rick-A-Nator Upper Molars Cemented



Posteriorly Displaced Condyle Anterior Displaced Disc Centric Class I Molar

Composite buildups lower first and second primary molars.

Treatment Plan

Rick-A-Nator fixed upper appliance

Incisal ramp to keep lower jaw forward

Composite Buildups Lower Primary Molars



Condyle Downward Forward After Rick-A-Nator and Composite Buildups



Deep Overbite Headaches



Composite Buildups 5 mm Space Between Molars



It is extremely important to check the frenum on the lower to see if the patient is tongue tied. Abnormal shortening of the lingual frenum restricts the normal movement of the tongue. When the patient swallows, the tongue is supposed to go to the roof of the mouth and help expand the maxillary arch. If the patient is tongue tied then this will cause a constriction of

Slight Overbite No Headaches

Rick-A-Nator First Molar Erupted



the upper arch which causes mouth breathing and a deviated septum as well as several malocclusions including posterior crossbites, Class II skeletal problems. The constricted maxillary arch and chronic mouth breathing can also cause many adverse health problems for the patient as mentioned earlier.



Treatment Plan

- 1. Expand the upper and lower arches to make room for the tongue
- 2. Surgically release the lingual frenum
- 3. Myofunctional therapy to retrain the tongue

It is vitally important that we diagnose and treat mouth breathing and airway problems in children which will ensure a healthier child as they grow older. Your total body health depends on you being able to breathe through your nose. Any airway obstruction of the mouth, jaw, nasal passages, tongue, or throat can lead to mouth breathing, snoring, sleep apnea, upper airway resistance syndrome. Research into airway obstruction in children reports an increased incidence of behavioural problems and learning difficulties.² Many clinicians believe that airway obstruction which causes sleep disorders also causes ADHD (Attention Deficit Hyperactivity Disorder). Symptoms of ADHD include hyperactivity, aggressive behaviour, lack of focus, anxiety, lack of social skills, bed wetting, depression and brain damage.^{3,4,5,6} Mouth breathing also effects the emotional and psychological health of the child as well as increased rate of obesity, diabetes, and cardiovascular disease.^{7,8,9} Due to all the adverse affects of

airway obstruction in children it is imperative that general dentists learn to diagnose and treat children so they can have a normal life.

Another extremely important reason to solve the airway obstruction in children early is because if the child does not get to stage 3 sleep there are no growth hormones secreted. No growth hormones means the child will not achieve their proper height or weight.¹⁰ When the patient is a mouth breather this causes a constriction of the maxilla. This is often the cause of the Class II skeletal malocclusion with normally positioned maxilla and a retrognathic mandible. The mandible goes back so the teeth of the lower arch can interdigitate with the teeth on the constricted upper arch.

When the mandible retrudes, the tongue also retrudes and further obstructs the airway. This can often lead to sleep disorders such as snoring, upper airway resistance syndrome, and obstructive sleep apnea, all of which impacts the child's sleep negatively.¹¹

The other serious problem when the mandible retrudes, this frequently causes the condyles to be posteriorly displaced which can cause temporomandibular dysfunction. The most common painful symptoms include headaches, earaches, dizziness, ear congestion and ringing in the ears, back and neck pain. Mouth breathing is a serious problem as it can cause sleep disorders as well as temporomandibular joint problems.

These two cephalometric films clearly demonstrate how the airway is increased with either a functional repositioning orthopedic appliance such as a Twin Block, Carriere Class II Motion Appliance or MARA Appliance. The airway will also increase with an oral appliance to prevent snoring and sleep apnea when the mandible is advanced.^{12.13,14,15}

Oral Appliance Moved Mandible Forward Increased Size of Airway



One of the common problems regarding airway obstruction in children is enlarged tonsils and adenoids.

After

CAUSES OF AIRWAY OBSTRUCTION

- 1. Narrow V-Shaped arches
- 2. Enlarged tonsils and adenoids

Before

- 3. Tongue ties
- 4. Bicuspid extraction
- 5. Deep overbites
- 6. Receding lower jaw
- 7. Mandibular tori

Enlarged Tonsils Grade 4





Tonsils are graded according to how much of the tonsil is obstructing the airway.

Grade 1	Obstructs 25% of the airway
Grade 2	Obstructs 50% of the airway
Grade 3	Obstructs 75% of the airway
Grade 4	Obstructs 100% of the airway

Grade 3 and Grade 4 enlarged tonsils should be referred to an ENT specialist for evaluation and possible removal.

The adenoids are best diagnosed by a dentist by measuring the size of the upper airway on a cephalometric x-ray. Normal

size 6-10 mm. Enlarged adenoids, 2 mm upper airway. Enlarged adenoids should be referred to an ENT specialist that will confirm the problem and possible removal.

I believe the time has come for general dentists to get educated in order to provide early orthodontic treatment for the children in their practice. Due to the presence of dental corporations and the influx of many dentists, general dentists need to look for other services they can offer in their practice. Since 70% of

children have a malocclusion there is certainly an opportunity to take some courses to help the children become healthier and better looking by keeping all their permanent teeth.

In dental school, many of us were not taught to treat children in the mixed dentition. We were encouraged by our instructors to refer patients at age 12 to an orthodontist when all the permanent teeth erupt and completely ignoring the malocclusion. I do not know of any other medical or dental problems that occur in children that are delayed until age 12-14 when all the permanent teeth erupt. It is completely illogical not to intervene at an early age when the research shows that left untreated malocclusions do not get better but rather worsen over time. This could also be called "Supervised Neglect". Is this really the standard of care to watch the malocclusion get worse from age 6 to age 14 before you refer for treatment? I hardly think so. The problem lies initially with the orthodontic instructors failing to provide us with the proper education so that we could treat the children in our practice. Thankfully the other instructors in dental schools did want us to learn endodontics, periodontics, prosthodontics, restorative and oral surgery so we could be competent to treat our patients.

Orthodontics means the straightening of the teeth. Orthopedics means correcting the skeletal (bone) problem. Ideally I want to treat the skeletal problems in the early orthodontic treatment Phase I in the mixed dentition before the eruption of the permanent teeth while the children are actively growing. To accomplish this we use functional orthopedic appliances that while correcting the constricted arches, deficient mandibles and maxillas also have a significant improvement in the patients airway.

It has been estimated that 70% of children under age 12 have a malocclusion. The malocclusion of crooked teeth is caused initially by mouth breathing which causes a constriction of the maxilla which causes crowding in a Class I malocclusion. The constricted maxilla also causes the Class II skeletal malocclusion because the mandible assumes a more posterior position so it can interdigitate with the teeth of the maxilla. The profile is retrognathic due to the normal maxilla and retrognathic mandible and large overjet. Therefore, if mouth breathing is the primary cause of the Class I and Class II malocclusion, when is the best time to treat the airway problem? I am a strong advocate of early treatment for children. Since 90% of the face is developed by age 12 it is imperative that we must treat children early if we want to guide and positively modify the growth of the children in our practice. The key to correcting the mouth breathing problem is to expand or develop the upper and lower arches with fixed or removable functional appliances to make room for all the permanent teeth. This eliminates the crowding in the mixed dentition and significantly reduces the time the patient will have to spend later in fixed braces or clear aligners. Phase One arch development is extremely important and parents look for dentists who can provide this essential service for their children. Many parents had extractions when they were teenagers and want non-extraction, non-surgical treatment for their children.

Phase I: Early Treatment, Mixed Dentition (Orthopedic Phase)

Eliminate mouth breathing by expanding the upper and lower arches and removal of any obstructions to the airway by referring the patient to an ENT specialist for possible removal of the tonsils and adenoids. Problems would include thumb sucking, tongue thrusting, anterior crossbites, posterior crossbites, open bites, deep overbites. Class II skeletal malocclusions should be treated in mixed dentition with fixed or removable functional appliance to reposition the lower jaw forward to its correct position. Ideally then when all the permanent teeth erupt the patient has a Class I malocclusion and can have Phase 2 treatment with fixed braces or clear aligners. In the case of Class III malocclusions use fixed or removable functional appliances to move the pre-maxilla forward to help correct the malocclusion to Class I in permanent dentition.

Phase II: Permanent Dentition (Orthodontic Phase)

Fixed braces or clear aligners to mainly straighten the teeth. All skeletal problems corrected earlier with functional appliances.

You should be offering orthopedic and orthodontic treatment for the children in your practice for the following reasons:

- 1. There are a large number of children in your practice that need treatment.
- 2. Most dental schools and orthodontic graduate programs in North America do not teach techniques to treat children in the deciduous and mixed dentition.
- 3. When functional, skeletal, and dental problems are treated in the deciduous and mixed dentition, this can usually prevent the extraction of permanent teeth and orthognathic surgery in the permanent dentition.
- 4. Mothers are looking for dentists who can treat their children's malocclusions at an early age. They do not want to wait until the malocclusion gets worse and the cost for orthodontic treatment increases.
- 5. Early orthodontic treatment for children will help increase your personal satisfaction in your practice when you start to see the positive influence you have on the children's personality and self-esteem.
- 6. Why would you refer out 50 orthodontic cases per year at \$6,500 per case when you can retain the \$325,000 in your bank account every year?
- 7. Functional problems such as airway constriction due to enlarged tonsils or adenoids, which cause anterior open bites due to tongue thrusts, must be dealt with early in the mixed dentition. Its' much easier to motivate a younger child to wear functional appliances with tongue cribs or a myofunctional

appliance than to wait and try to treat teenagers with the same problem.

- 8. Some young children with deep overbites and retrognathic mandibles with large overjets can have TMJ (temporomandibular joint disorders). These children can have headaches, ear problems, dizziness, ringing in the ears, vertigo, neck and back problems, and numerous other unpleasant symptoms. If we do not solve the problem in children these problems can worsen in adulthood. These can easily be solved with appropriate treatment with functional appliances.
- 9. Other malocclusions that should be treated are unilateral and bilateral posterior crossbites, anterior crossbites, thumb sucking, deep overbites.
- 10. Skeletal problems that must be addressed early in the mixed dentition include:
 - a) Class I skeletal constricted maxillary and mandibular arches that are the cause of the dental crowding and impacted teeth. Solutions would be to expand the upper and lower arches to make room for all the permanent teeth that will be erupting in the future.
 - b) Class II skeletal - The vast majority of the Class II skeletal patients have a normally positioned maxilla and an underdeveloped mandible (retrognathic). The use of functional appliances such as the removable Twin Block (under age 12) or the new Carriere Class II Motion Appliance or the fixed MARA (Mandibular Anterior Repositioning Appliance) will advance the deficient mandible in the mixed dentition. Failure to treat early could result in the patient at age 17 having to undergo orthognathic surgery to surgically advance the mandible. The Class II correction with the functional appliances as listed previously will correct the malocclusion in 7-9 months. Obviously, mothers and children prefer this type of treatment that is prevalent in other countries, including Europe and South America.
 - c) Class III skeletal The majority of Class III skeletal patients in the mixed dentition have a midface deficiency and a prognathic profile. The maxilla is deficient. Early orthodontic treatment using fixed or removable functional appliances such as the Anterior Sagittal, new fixed Carriere Class III Motion Appliance or the fixed Tandem Appliance, can successfully move the maxilla and pre-maxilla forward to create a normal maxilla and correct the Class III skeletal problem in the mixed dentition while the child is actively growing.

- 11. It is a fact that a patient must have a patent airway in order to have the correct amount of oxygen in the blood to achieve optimum health.
- 12. Early orthodontic treatment can have long-term health benefits for our younger patients. If you want to move your practice in the direction of improving the health of your younger patients then I would urge you to take courses to gain the knowledge to be able to help improve the long-term health of these patients. Many dentists who have taken my orthodontic courses over the years have thanked me because they were able to improve the health and malocclusions of their own children.

It is rather unfortunate that the orthodontic departments in most dental schools in North America do not teach general dentists how to utilize functional appliances in the mixed dentition.

Therefore, general dentists must take orthodontic courses after graduation in order to provide these essential health services for their patients.

CONCLUSION

If 70% of the children have a malocclusion that can be treated as early as age 5 or 6 why aren't the dental schools teaching us to help these patients. This is extremely critical when you see what future health problems can be caused by persistent mouth breathing throughout life.

Before we start treating the teeth and gums, should we not correct the health damaging mouth breathing? Should we not fix the foundation, the correct size for the upper and lower arches first before we worry about the teeth? Should we not treat in the mixed dentition to solve the Class II and Class III skeletal malocclusions?

If you want to take your practice to the next level and enjoy more personal satisfaction, I highly recommend you take an Early Orthodontic Treatment for Children course and get involved in improving the overall health of the patient and not just the teeth. So

References available upon request