ORTHODONTIC ALTERATIONS ASSOCIATED WITH MOUTH BREATHING HABIT

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ABSTRACT

Objective of the study was to investigate the relation between mouth breathing habit as an etiological factor causing orthodontic alterations in a sample of growing children.

A total of 67 children (24 females, 43 males) with a mean age of 9.3 years were referred from Ear, Nose and Throat clinic, who had mouth breathing habit of more than 6 months, and were 8-11 years and upon arrival to Orthodontic clinic. Comprehensive orthodontic assessment with extra and intraoral examinations were carried out.

This study showed the significant connection between mouth breathing habit and various orthodontic malocclusion traits. Upon patient extra-oral profile examination, a class II skeletal relation presented in 78% of patients, showing maxillary protrusion and/or mandibular retrognathia with more than 4mm profile convexity. Intra-orally, an increased overjet of 4mm or more was found to exist in 89.4% of this mouth breathing respiratory pattern sample. Open bite or reduced overbite of less than 1mm appeared to occur in 68%. Unilateral or bilateral posterior cross bites co-existed with class II molar angle relation in 65.7% of the mouth breathing habit sample. Finally, moderate to severe maxillary crowding was detected in 64.6% of the sample.

There was a great correlation between nasopharyngeal airway obstruction causing mouth breathing habit and the development of various skeletal and dental abnormalities, eventually leading to higher demand and need for orthodontic care.

Key Words: Breathing pattern, mouth breathing, skeletal and dental alterations, orthodontic malocclusion.

INTRODUCTION

Etiology of malocclusion in a contemporary perceptive is an interaction between an individual's genetic background, and the environmentally influenced function.¹ Oral function includes articulation, chewing and swallowing. Nasal breathing is the norm in order to attain correct growth and development of the craniofacial complex.² Malocclusion can result from abnormal habits such as mouth breathing³, to what extent does nasal resistance or mouth breathing influence the dentoskeletal complex has been under focus by many researchers over decades. 4,5,6

One of the most common causes of mouth breathing in children is hypertrophied adenoids and/or tonsils, other reasons to cause this nasal obstruction or resistance conditioning mouth breathing is chronic and allergic rhinitis, nasal traumas, congenital nasal deformities, foreign bodies, polyps, and tumors.⁷ Linder-Aronson presented a hypothesis, stating that enlarged adenoids aggravate nasal breathing, this respiration pattern disrupts those muscle forces exerted by tongue, cheeks and lips upon the maxillary arch, these alternations in normal oral function can lead to anomalies usually affecting the maxillary and mandibular arches, and consequently lead to dental and orthodontic irregularities.⁸ Early investigators showed a skeletal problem of Angle's class II division I malocclusion, while others indicated that children with mouth breathing often develop V-shape maxillary arch.⁹ This supports the

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suggestion that nasal resistance or mouth breathing pattern is a risk factor for development of malocclusion.

On the other hand, a few have disagreed that mouth-breathing can affect the form of the jaw or create a malocclusion.^{10,11} Warren et al stressed that an individual's breathing pattern results from environmental and genetic causes.¹² With regard to nasal resistance other authors have stated that the adenoids have no direct cause-and-effect relationship with creation of malocclusion or mouth-breathing habit.¹³⁻¹⁴

Hence, the etiologic role of breathing pattern causing facial and dental alterations is as yet controversial, and most studies in that outlook are usually cross-sectional, with only few reports assessing mouth breathing as a long term habit in children at late mixed dentition stage. While, in orthodontic practice patients aged between 12-17 years are provided orthodontic treatment¹⁵, which upon clinical examination mouth breathing or poor lip seal is often present, but it is usually hard to investigate the extent of mouth breathing etiology causing such facial and dental alterations. The purpose of this study was to investigate the association between mouth breathing habit and presence of malocclusion in a sample of non-orthodontic Jordanian children aged 8-11 referred from ear nose and throat clinic showing more than 6 months mouth breathing pattern.

METHODOLOGY

A total number of 67 patients (24 females, 43 males) mean age 9.3 years were followed from March 2010 to March 2011 at Prince Rashed Military Hospital for mouth breathing habit at ear nose and throat outpatient clinic and referred to orthodontic clinic provided they had the following inclusion criteria:

- 1. Patient age between 8-11 years of age.
- 2. No current or previous orthodontic treatment.
- 3. Patient medical history showing at least 6 months of mouth breathing pattern.
- 4. Patient consent to be referred for orthodontic examination.

Upon arrival to orthodontic clinic, first author performed a full orthodontic assessment following American Board of Orthodontics (ABO) clinical diagnostic examination sheet, this form was completed at orthodontic clinic along with brief parent's interview. Statistical analysis was done for those examined orthodontic traits.

RESULTS

This study showed the significant connection between mouth breathing habit and various orthodontic malocclusion traits. Upon patient extra-oral profile



Fig 1: Extra-oral photos of an 11 years old male patient with mouth breathing habit and class II profile convexity above norm. Note: Mentalis muscle strain to close his mouth.







Fig 2: Intra-oral photos of an 11 years old female patient with mouth breathing habit presenting dental alteration of 6mm overjet and maxillary dental crowding, along with reduced overbite.

TABLE 1: DISTRIBUTION OF SUBJECTS BY AGE AND GENDER

	8	9	10	11	Total
	years	years	years	years	
Male	11	3	19	10	43
Female	8	4	5	7	24
Total	19	7	24	17	67

TABLE 2: DISTRIBUTION OF THOSE SIGNIFICANT ORTHODONTIC ALTERATIONS

Orthodontic variable	Within norm	alteration
Profile convexity	n=15	n=52 with >4mm
Overjet	n=7	n-60 with >4 mm
Overbite	n=21	n=46 with $<1mm$
Post. Cross-bite	n=23	n=44
Dental crowding	n=24	n=43 >mild

n represent the number of patients

examination, a class II skeletal relation presented in 78% of patients, showing maxillary protrusion and/or mandibular retrognatia with more than 4mm profile convexity.

Intra-orally, an increased overjet of 4mm or more was found to exist in 89.4% of this mouth breathing respiratory pattern. Open bite or reduced overbite of less than 1mm appeared to occur in 68% of this study sample. Unilateral or bilateral Posterior cross bites co-existed with class II molar angle relation in 65.7% of the mouth breathing habit sample. Finally, moderate to severe maxillary crowding was detected in 64.6% of the sample.

DISCUSSION

Respiratory pattern and its influence on the development of Dentofacial structures has been a subject of investigation for many researchers over decades. Whether an individual is a nasal or mouth breather, various studies have discussed the possible influences of these respiratory patterns on the functional, neuromuscular, skeletal and dental functions.^{16,17,18}

Mouth breathing usually develops as a consequence of nasal resistance, whether patient had surgical intervention or not, this habit may become apparent at late mixed dentition stage at 8-11 years of age, this study investigated various orthodontic traits to exist at this age by cooperation and referral from ear nose and throat clinic. Previous researchers as Ricketts differentiate the main characteristics of the respiration obstruction syndrome which are presence of hypertrophied tonsils or adenoids, oral breathing, open-bite tendency, cross-bite, other features include excessive anterior face height, incompetent lips, and V-shaped maxillary arch.¹⁹ Harvold et al. experimentally induced nasal obstruction in animals, which resulted in mouth breathing and caused maxillary narrowing, increased lower facial height, and consequently malocclusion and dental anomalies.²⁰

Other recent Japanese researchers went even further claiming that lip seal may have an effect on occlusal traits such overbite, overjet and even disrupts oral muscle forces²¹ some claim that abnormal head posture could be due to abnormal functions such mouth breathing, tongue thrusting, and this can lead to the development of malocclusion and alters head posture.^{22,23}

While other studies refused the association of mouth breathing habit and the etiology of mouth breathing, as Klein found there is no conclusive evidence that obstruction of nasal respiration alters facial growth and patient development.¹⁶ other authors disagreed that facial morphology and the respiratory mode are intimately related.^{17,18}

In this descriptive study anteroposterior relations as class II malocclusion and overjet along with maxillary crowding were positively correlated with mouth breathing habit.

Vertically, Anterior open bite or reduced overbite was found to exist higher than normal population. Further, transversely depicted in posterior crossbite and narrow deep maxillary arch was also present positively in mouth breather, all this correlates with Ricketts and Harvold keystone studies in this field as referred above.

In the present study, no investigation of the exact cause of an individual nasal resistance was carried out; neither the severity of nasal resistance was assessed, as we believe that neither the severity of adenoids obstructive size or cause of obstruction is a risk factor in development of class II malocclusion, presence of anterior open bite and or posterior cross bite occurrence.²⁴

CONCLUSION

There was a great correlation between nasopharyngeal airway obstruction (mouth breathing habit) which cause changes in muscular function, and dental orthodontic anomalies. Patients/parents should be made aware about the importance of healthy respiratory pattern in growing children to attain normal dentoskeletal growth pattern.

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