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Review Article

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Mouth breathing habit: a review

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ABSTRACT

Human beings are considered to be nose breathers but various reasons can force them to adapt by breathing through their mouth instead of nose, and this can have extensive consequences. Breathing through both nose and mouth provide lungs with oxygen but with extremely dissimilar effects on the body and with different levels of oxygen supply. Mouth breathing as a habitual respiration through the mouth instead of the nose. Mouth breathing results in a wide spectrum of consequences. These consequences involve different areas of the body which include mouth, craniofacial development, upper and lower airway. Mouth breathing can be considered as the most obvious manifestation of a syndromic pattern. Mouth breathing habit generally have severe effects on the growth of the facial skeleton and also on the occlusion of teeth on account of the displacement of normal lateral, buccal and lingual muscular forces. The pathogenesis of mouth breathing habit is complex and multifactorial. Mouth breathing is best managed by using a multidisciplinary approach where the specialists include pediatrician, physicians, pediatric dentists and ear-nose-throat (ENT) specialists. Since there is a close correlation between oral breathing and dentofacial in harmonies, the pediatrician and pediatric dentist should work together after an early identification of an oral breathing in a child. This review article aims to survey the scientific literature in regarding prevalence, etiology, consequences and treatments for mouth breathing in order to update the healthcare professionals regarding the recognition of this syndrome and sensitize them looking for an early and comprehensive intervention.

Keywords: Mouth breathing, Nose breathing, Oral habits

INTRODUCTION

There are various physiological functions of the oral cavity which include respiration, swallowing, suckling, mastication and speech. All these functions are balanced in oral cavity. Any disturbance among any of these physiologic functions results to an abnormal growth and development of bony and soft tissue structures of the craniofacial complex. Human beings are considered to be nose breathers but various reasons can force them to adapt by breathing through their mouth instead of nose, and this can have extensive consequences. Breathing through both nose and mouth provide lungs with oxygen

but with extremely dissimilar effects on the body and with different levels of oxygen supply.²

Mouth breathing refers to the state of inhaling and exhaling through the mouth instead of nose. Mouth breathing is a very common problem. The literature describes the prevalence of mouth breathing as ranging from 5 to 75% of children. The mouth does not usually contribute in respiration. Increased struggle to the flow of air through the nasal passage may be considered to be the significant reason of mouth breathing.³ The reduced nasal respiratory function causes altered tongue posture. This ultimately results in inferior positioning of mandible

which thereby inducing changes in neck and facial muscular activity leading to development of dental and facial characteristics.⁴ Mouth breathing results in a wide spectrum of consequences. These consequences involve different areas of the body which include mouth, craniofacial development, upper and lower airway.⁵ Mouth breathing can be considered as the most obvious manifestation of a syndromic pattern.^{6,7} It has been stated the Mouth breathing habit have serious effects on the growth of the facial skeleton and occlusion of teeth on account of the displacement of normal lateral, buccal and lingual muscular forces.⁸ The pathogenesis is complex and multifactorial. The causes of mouth breathing habit can be both local and systemic, related to malformations, bad habits, airway disease, etc.^{9,10}

The most common etiology associated with mouth breathing habit is adenoid hypertrophy, with tonsils hypertrophy, nasal septum deviation and inferior turbinate hypertrophy can also cause a significant obstruction and promote the habit of breathing through the mouth. 11-13 Mouth breathing is best managed by using a multidisciplinary approach where the specialist that has a key role is the paediatrician, physicians, pediatric dentists, and ear-nose-throat (ENT) specialists. Since there is a close correlation between oral breathing and dento-facial inharmonies, the pediatrician should involve the pediatric dentist after an early identification of an oral breathing in a child. 14

This review article aims to survey the scientific literature in regarding prevalence, etiology, consequences and treatments for mouth breathing in order to update healthcare professionals involved in the recognition of this syndrome and sensitize them looking for an early and comprehensive intervention.

DEFINITION

According to Chacker's, Nasal breathing difficulties are defined as a long or prolonged exposition of the frontal facial tissues to the drying up effect of the inhaled air. 15-17

According to Sassouni, Mouth breathing as a habitual respiration through the mouth instead of the nose. 15-17

A little later, Merle offered the term Oronasal breathing instead of Oral or Mouth breathing as he considers this term is more correct and exact. 15-17

CLASSIFICATION

Sim and Finn (1987) classified mouth breathers into the following three categories according to the etiology as:¹⁸⁻²⁰

Obstructive: Children who have an increased resistance to or a complete obstruction of the normal flow of air through the nasal passages. The child is forced by sheer necessity to breathe through the mouth.

Habitual: Habitual mouth breather is a child who continually breathes through his mouth by force of habit, although the abnormal obstruction has been removed.

Anatomical: The anatomic mouth breather is the one whose short upper lip does not permit closure without undue effort. A) Total blockage: nasal passages are completely blocked. B) Partial blockage (Figure 1).

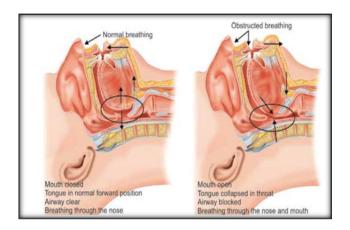


Figure 1: Difference between normal and obstructed breathing.

ETIOLOGY²¹

The etiology of mouth breathing is multifactorial. The most common is due to nasal obstruction. Nasal obstruction can result from either congenital or postnatal causes and may amplify resistance to air-flow and impair sucking-swallowing responses, with increased risks of aspiration or of more severe and threatening respiratory distress conditions. In addition, nasal obstruction alters the "trophic" flow of sensory information towards the olfactory brain.

Enlarged turbinate

This may be due to allergies, chronic infections of mucous membrane, atrophic rhinitis, hot and dry climatic conditions, polluted air.

Intranasal defects

Deviated nasal septum, subluxation of septum, thickness of septum, bony spurs and nasal polyps.

Allergic rhinitis

Continuous infections and toxins of the bacteria may sensitize the tissue to develop allergic reactions.

Hypertrophy of pharyngeal lymphoid tissue (adenoids)

Repeated infection results in the over growth of lymphoid masses blocks the posterior nares, rendering mouth breathing necessary.

CLINICAL FEATURES

Mouth breathing patients have characteristic intraoral and extraoral symptoms. In the period between 1970 and 1980, Aronson reported the connection between mouth breathing and craniofacial appearance including long face, anterior open bite, overjet, posterior crossbite.

Effect on face18

Incompetant lips; short upper lip; everted lower lip; proclination and spacing between teeth; tongue is suspended between upper and lower arches resulting in constriction of buccal segment; increased mandibular plane angle; retrognathic maxilla and mandible (Figure 2).



Figure 2: Adenoid faces.

Effect on occlusion of teeth¹⁸

Proclination of anteriors justified by interposition of the hypertonic lower lip between maxillary and mandibular incisors provoking labioversion of the maxillary incisors; posterior crossbite; anterior open bite; distal relation of mandible to maxilla (Figure 3).



Figure 3: Effects of mouth breathing on teeth.

Effect on lip19

Lip apart posture (Figure 3); gummy smile; short thick incompetent upper lip; voluminous curled over lower lip (Figure 4).

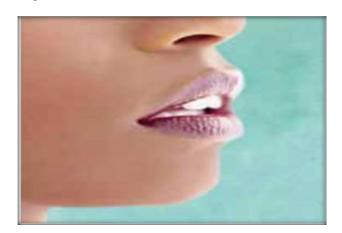


Figure 4: Lip apart Swallow.

Effect on gingiva

Constant drying of the gingiva occurs which causes irritation. There is accumulation of debris resulting in an increase in bacterial population.¹⁸

Effect on speech

Abnormalities of the oral and nasal structures can extremely compromise speech performances. There is Nasal tone in voice. ¹⁹

DIAGNOSIS

An early diagnosis is very essential for the correction of mouth breathing and also to avoid any associated conditions. The most important step in diagnosis of mouth breathing is proper record of detailed case history. A detailed case history concerning about the development of the habit, frequency, duration and associated symptoms must be recorded.²² During recording case history patient should be enquired about nasal stiffness, nasal discharge, sore throat and any repeated attacks of cold.²³ Other than case history proper clinical examination should be done along with various and diagnostic tests. Proper clinical examination should include evaluating all intraoral and extraoral features.

The following diagnostic tests are performed to confirm the diagnosis of mouth breathing:²⁴

Mirror test: The mirror test is also called the fog test. A double sided mirror is held between the nose and the mouth. Fogging on the nasal side of the mirror indicates nasal breathing while fogging on the oral side-mouth breathing.

Massler's water holding test

Patient is asked to hold the mouth full of water. Mouth breathers cannot retain the water for a long time. 18

Massler and Zwemer butterfly test/cotton test

Butterfly shaped cotton strands are placed over the upper lip below nostrils. On exhalation if the fibres flutter downwards, the patient is a nasal breather and if the fibres flutter upwards, the patient is a mouth breather. 18

Inductive plethysmography (rhinometry)

The total airflow through the nose and mouth can be quantified using inductive plethysmography, the only reliable way. This allows the percentage of nasal and oral respiration to be calculated. A minority of the long face children had less than 40% nasal breathing. Nasal air flow characteristics are studied by using devices consisting of flow meters and pressure gauges. 18

Cephalometrics

Can be used to calculate amount of nasopharyngeal space, size of adenoids and to know he skeletal patterns of the patient by taking various cephalometric angles.^{8,25}

TREATMENT OF MOUTH BREATHING

Treatment consideration²²

There are various factors which should be considered during treatment of Mouth breathing habit. They are as follows:

Age of child: Most of the time mouth breathing habit is self-correcting after puberty. This can be accredited to the increase in nasal passages. As the child grows the nasal passage increase in size which relieves the obstruction caused due to enlarged adenoids.

ENT examination: An otorhinolaryngologist examination may be advised to determine whether conditions which require treatment are present in the tonsils, nasal septum or adenoids. If the mouth breathing habit continues even after the removal of cause then it is habitual.

Prevention and interception: Mouth breathing can be intercepted by use of an oral screen. ¹⁸⁻¹⁹

Treatment according to symptoms

There are various symptoms associated with mouth breathing habit. The treatment of mouth breathing habit according to symptoms may be divided into following factors. Remove the cause: Etiological agents for mouth breathing habit should be treated first. If any nasal or pharyngeal obstruction is present then removal of obstruction by surgery or local medication should be pursued. If a respiratory allergy is present, it should be brought under control.

Intercept the habit: Interception of habit is very important. Even after the removal of the obstruction if the habit continues then it should be corrected.

METHODS OF CORRECTION

Exercises

Various exercises are recommended for correction of mouth breathing habit. It includes: a) Hold a sheet of paper between the lips. b) Patients with short hypotonic upper lip should Stretch the upper lip to maintain lip seal or stretch in downward direction toward the chin. c) Button pull exercise: A button of 11/2" diameter is taken and a thread is passed through the button hold. The patient is asked to place the button behind the lip and pull the thread, while restricting it from being pulled out by using lip pressure. d) Tug of war exercise: This involves two buttons, with one placed behind the lips while the other button is held by another person to pull the thread. Blow under the upper lip and hold under tension to a slow count of 4 repeat 25 times a day. Draw upper lip over the upper incisors and hold under tension for a count of 10.

Maxillothorax myotherapy

This therapy was advocated by Macaray 1960. These expanding exercises are used in conjunction with the Macaray activator. Macaray constructed an activator out of aluminium with which development of the dental arches and dental base relationship could be corrected at the same time as encouraging mouth breathing. The mouth breather holds the activator in the mouth and at the same time with the left and right arms alternately carries out 10 exercises 3 times a day. 18,19

Oral screen

It was First introduced by Newell in 1912. It is a myofunctional appliance that is easy to fabricate and easy to wear. It works on the principle of both force application and force elimination. Principle of oral screen: It is a functional appliance which produces its effects by redirecting the pressures of the muscular and soft-tissue curtain of the cheeks and lips. It works on the principle of both force application and force elimination. For example, anterior teeth proclination can be corrected utilizing the principle of force application. The screen comes in contact with the proclined teeth so that the forces from the lips are transmitted directly to the proclined teeth through the screen. Posterior cross bite can be corrected utilizing the principle of force

elimination by providing a spacer between the teeth and the screen.²⁶

Rapid maxillary expansion (RME)

Patients with narrow, constricted maxillary arches benefit from RME procedures aimed at widening of the arch. It increases nasal air flow and decrease nasal air resistance. Increase in intranasal space occurs due to outer walls of nasal cavity moving apart.¹⁸

DISCUSSION

The most potential etiological factor for the alterations of the occlusion and normal facial growth is mouth breathing habit. The harm to the stomatognathic system is even greater when the mouth breathing habit is assosciated with other parafunctional habits. Cattoni et al stated that children with this habit exhibit pathologic adaptations regarding postural and morphological characteristics of the stomatognathic system.²⁷ Thus, the early diagnosis of mouth breathing and proper intervention is suggested in order to avoid the emergence of future orofacial abnormalities.

According to Fujimoto et al mouth breathing is a consequence of some form of obstruction to breathing through the nose. This obstruction may be due various reason such as any anatomical predisposition or some problem acquired throughout development such as allergic problems, adenoid hypertrophy, turbinate hypertrophy, tonsils hypertrophy, nasal polyposis, tumours nasal cavity and rhinopharynx, nasal trauma, deleterious buccal habits, generalized muscular hypotonicity and others. Among the various obstacles which are present to a proper nasal breathing, the main cause is allergic rhinitis that generates a sensation of discomfort and difficulty in nasal breathing, subsequently leading to breathing by the oral route. Page 19 of 19

In the study conducted by Bhayya et al mouth breathing habit was found to be the second most prevalent habit with the incidence rate of 17%.³⁰ This incidence was higher when compared to the findings of the previous studies. Guaba et al and Kharbanda et al studied about prevalence of malocclusion ond oral habits in North India region and reported that tongue thrusting and mouth breathing as the most prevalent habits.^{31,32} Abou- EI-Ezz et al did their study on prevalence of mouth breathing habit and its probability as etiological factor of malocclusion.³³ They have concluded that malocclusion is highly associated with mouth breathing habits existence.

Bresolin et al studied about the facial characteristics of children who breathe through the mouth and found that these children had longer faces with a narrower maxilla and retrognathic jaws.³⁴ Conti et al observed that postural problems were significantly more common among children in the group with mouth breathing syndrome, highlighting the need for early interdisciplinary treatment

of this syndrome.35 According to Abreu et al mouth breathing habit delivers the individual with a series of postural alterations in order to facilitate the passage of air through the mouth.³⁶ These alterations include anteriorization of the neck and nape, shoulders inclined forward and tilt of the head forward. BluStone stated that the allergen evaluation test is important examination test that needs to be performed, inorder to be rule out any allergenic possibility.³⁷ Jefferson reports that the first and most effective way to prevent mouth breathing is to encourage breastfeeding during the first months of life so that act of breastfeeding provides the necessary stimuli to the perfect development of the craniofacial complex.³⁸ During breastfeeding it is almost impossible for the baby to breathe through the mouth, which makes it stronger the thesis that breastfeeding is essential for a correct development of physiological functions and for a better quality of life. 39,40

CONCLUSION

There are various habits which may be considered normal to a certain stage of the child's development. Parents should be aware of normal habit and they must be able to differentiate between normal and abnormal for that particular age group, so that the adverse complications can be dealt in a better way. A multidisciplinary team should work to give early diagnosis and appropriate treatment plan, preventing the consequent disorders of chronic mouth breathing. If there is upper airway obstruction it may cause an obstacle to normal dentofacial development, so mouth breathing children deserve prompt attention before growth has proceeded irreversibly. The early recognition of such facial patterns may be utilized to identify those breathing compromised individuals who are likely to develop such types of malocclusions. Thus the multidisciplinary team including ENT specialist pedodontist, orthodontist, paediatrician should work collectively for proper treatment of mouth breathing habit and ultimately reducing continuing detrimental effects of breathing impairments on facial characteristics.

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