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The Effects of Mouth Breathing on Maxillofacial Development and Oral Health

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ABSTRACT: Mouth breathing is a parafunctional habit where air is partially or completely inhaled through the mouth. Prolonged mouth breathing in children can lead to physical and cognitive developmental deficiencies, speech disorders, atypical swallowing, maxillofacial developmental impairment, skeletal malocclusions, and oral health problems. Early diagnosis of etiological factors and multidisciplinary treatment approaches are crucial in individuals exhibiting mouth breathing. This review aims to highlight the relationships between mouth breathing, maxillofacial development, and oral health, and to report on treatment approaches.

KEYWORDS: Mouth breathing, maxillofacial development, oral health.

INTRODUCTION

Respiration, in its simplest definition, is the process of taking in oxygen from the outside, delivering it to the organs in the body, and then expelling it as carbon dioxide. The exchange of oxygen and carbon dioxide keeps the blood pH constantly stable. The organ chain consisting of the nose, mouth, pharynx, larynx, trachea, bronchi, and lungs is responsible for the proper functioning of this system. Under normal physiological conditions, respiration occurs through the nose, and nasal breathing is the first physiological function that develops at birth [1]. If there is a condition obstructing or blocking the airway in the nasal cavity or nasopharynx, normal nasal breathing is abandoned, and mouth breathing occurs. In this case, the oral cavity becomes the primary pathway for respiratory airflow [2]. Mouth breathing is a pathological condition that can be chronic or seasonal, and its etiology is multifactorial [3].

Mouth breathing has been classified as follows:

1. Obstructive: This type of mouth breathing is seen in individuals with increased resistance in the nasal airway or obstructed normal airflow. These are ectomorphic individuals with long, narrow faces and nasopharyngeal passages.
2. Habitual: This type of mouth breathing is seen in individuals who breathe through their mouths due to persistent habits despite the removal of obstruction.
3. Anatomical: This type of mouth breathing occurs when the short upper lip prevents the lip from closing effortlessly. There are two types:

a. Total blockage: The nasal passages are completely blocked.

b. Partial blockage [4].

The causes of mouth breathing include nasal polyps, nasal septum deviation, nasal concha hypertrophy, chronic rhinitis, sinusitis, adenoid and tonsil hypertrophy, allergies, and climatic conditions [5]. In addition, it has been stated that mouth breathing can occur solely due to habit [6].

According to Moss's functional matrix theory, nasal breathing ensures the correct and harmonious development of dentofacial and maxillofacial features [7]. When nasal breathing is abandoned and mouth breathing is adopted due to various reasons, this development is affected. It causes significant pathologies, especially in children during the active development period. Mouth breathing manifests itself in surrounding tissues as increased facial height, thin and short upper lip, thick and sagging lower lip, and a deep palate dome. It is stated that when mouth breathing continues for a long time in children during the active growth period, the typical facial appearance called adenoid face develops. The tongue and mandible are positioned lower due to mouth breathing, causing a decrease in orofacial muscle tone to compensate for the increased facial height [8]. In addition, oral findings such as chronic gingivitis, periodontitis, dry mouth, bad breath, increased risk of caries, candida infections, and dental erosion are observed [9].

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Many studies have been conducted on the prevalence of mouth breathing in societies. In studies conducted according to ethnic origin and different age groups, this rate varies between 11% and 60% [10]. When we examine the etiology, the factors causing mouth breathing can be listed as follows: 1. Anatomical factors;

• Nasal Septum Deviation: This is the curvature of the nasal septum to the right or left. It is a fairly common cause that narrows the nasal cavity.

• Nasal Polyp: The mucosa covering the paranasal sinuses that open into the nasal cavity (such as the maxillary sinus, ethmoidal sinus) swells like a balloon due to edema and protrudes into the sinus cavity. Nasal polyps formed in this way narrow the nasal cavity and make nasal breathing difficult.

• Nasal Concha Hypertrophy: Frequent inflammations, dust entering with the air, or other substances can cause hypertrophy of the mucosa covering the nasal concha, narrowing the nasal cavity.

• Pharyngic Tonsil Hypertrophy (Adenoid Vegetation): The Waldeyer lymphatic ring in the throat cavity; The pharyngeal tonsil consists of the tonsil pharyngica, located at the top and back of the pharynx (in the nasopharynx); the tonsil palatina, located on the right and left sides in the middle part of the pharynx (in the mesopharynx or oropharynx); and the tonsil lingualis, located at the bottom, at the base of the tongue. Hypertrophy of the uppermost tonsil pharyngica is also called adenoid vegetation and makes nasal breathing difficult. 2. Environmental factors

3. Weather conditions

4. Sleeping position

5. Artificial feeding and non-nutritive sucking habits [11].

Chewing motion can continue without interruption during nasal breathing. However, when nasal breathing turns into true mouth breathing, the lips, tongue, and mandible must change position to provide an airway in the mouth [12]. Therefore, mouth breathing hinders chewing motion and reduces the duration and degree of vertical occlusal force on the posterior teeth. Reduced vertical occlusal force can be an environmental factor inducing vertical malocclusions by extruding posterior teeth [13].

Head posture is the result of a complex and delicate balance between muscles in the cervicomandibularcranial system designed to protect the pharyngeal airway [14]. Obstruction or narrowing of the pharyngeal air space leads to forward head posture to improve airflow to the lower respiratory tract. Adaptations may occur in the scalene, sternocleidomastoid, and superior trapezius muscles to accommodate this altered head position [15, 16]. Therefore, forward head posture is often associated with mouth breathing and is described as an adaptation to expand and facilitate airflow within the oropharynx [17].

Children who breathe through their mouths are frequently reported to have chronic gingivitis, periodontitis, candida infection, dental erosion, and tooth decay. They have difficulty breathing and also have poor chewing efficiency due to prolonged chewing time. Because of their low chewing efficiency, they often prefer soft and non-nutritious foods, which increases the incidence of malocclusion and tooth decay [9].

Bad breath is a common occurrence in a large segment of the population, and it is frequently observed in children who breathe through their mouths. This is due to the dryness of the mouth caused by keeping the mouth open overnight [18]. Saliva is an important material for controlling oral microflora due to its mechanical washing and antimicrobial properties. Decreased saliva production leads to changes in the microflora [19, 20]. The first place where dryness in the tissues resulting from mouth breathing is observed is the tongue. In the altered microflora, microorganism products accumulate on the dorsum of the tongue, leading to putrefaction and forming a dry layer on the tongue. People who breathe through their mouths complain of a bad taste in their mouths in the mornings. The dry layer formed on the tongue is the cause of this complaint [21, 22].

Individuals who breathe through their mouths have a higher risk of tooth decay. White caries is the most common type of caries in those who breathe through their mouths. Mouth breathing causes dry mouth, meaning less saliva than normal. The decrease in the cleansing effect of saliva and the lack of saliva in the teeth due to the open positioning of the lips increases the rate of caries [23].

CONCLUSION

In conclusion, mouth breathing can cause significant changes in the morphology of the face, nose, lips, and jaw, and is therefore considered an important factor in the occurrence of diseases related to the nose and throat. It is also predicted in this study that it can affect the general condition of children, their sleep patterns, chewing and eating habits, and social life. Early diagnosis of mouth breathing will eliminate the health and social life problems that the child may experience in the future

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