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Mouth breathing: A review

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Abstract

Introduction: Mouth breathing is a habit that occurs in most children and can cause changes in craniofacial and occlusal development.

Objective: To analyze the aetiology of mouth breathing, the effects it has on dental occlusion and craniofacial development, as well as its treatment.

Methodology: An extensive literature search was carried out in the PubMed, SCOPUS and Google Scholar databases, analyzing the keywords: mouth breathing, craniofacial development, occlusal development, aetiology and treatment.

Results: The aetiology of mouth breathing is attributed to inflammatory, anatomical and obstructive factors, the latter being the main cause of mouth breathing. Its main effects on occlusion are an increased facial height and overjet together with an inclined occlusal plane. Alterations of mouth breathing in craniofacial development are abnormal transverse and vertical growth and backward and downward rotation of the maxilla and mandible. Treatment can be by rapid expansion, myofunctional therapy, surgically and by pharmacological treatment.

Conclusion: Mouth breathing is an anomaly that can be caused by an obstruction of the upper airway, and can cause occlusal problems and a deviation of craniofacial development, so it is important to correct it early and in a timely manner.

Keywords: Mouth breathing, craniofacial development, occlusal development, aetiology and treatment

1. Introduction

The quality of life in children with mouth breathing (MB) is significantly diminished [1].

MB is one of the most harmful habits in the pediatric population, commonly resulting from upper airway obstruction which causes air to enter mostly through the mouth [2]. Oral breathing can worsen upper airway collapse making treatments to correct it more complex [3].

Infants become affected in the functions of the stomatognathic system, their academic development, social and even nocturnal cycle, in most cases MB is accompanied by obstructive apnea where it complicates the child's condition [3-5]. Patients with this condition may also present with postural abnormalities of the spine and head [6].

This type of breathing has been shown to influence patient health because it alters the oral microbiota and salivary proteins, it is common to observe halitosis in these patients [7-8]. MB can also bring repercussions in craniofacial development and dental occlusion [9].

Among the treatments that can be performed to eliminate or reduce MB are myofunctional therapy, maxillary expansion, surgical treatments such as frenuloplasty and pharmacological treatments with intranasal steroids [10-12]. Knowing that MB is a problem that affects a large part of the child population and that has repercussions on the patient's oral and general health, as well as on their academic and social performance, as dentists we should be trained to be able to diagnose and treat, avoiding the affectation in the development and growth of the child patient. The objective of this work is to analyze the literature on relevant aspects of MB, particularly its aetiology, the effects it has on dental occlusion and craniofacial development, as well as its treatment.

2. Materials and Methods

Information from articles published in PubMed, SCOPUS and Google Scholar was analyzed with emphasis on the last 5 years. The quality of the articles was evaluated based on the standard guidelines, i.e., identification, review, choice, and inclusion. The quality of the review was assessed using the measurement instrument for evaluating systemic reviews. The search was performed using Boolean logical operators and, or and not. It was realized with the words “mouth breathing”, along with the following terms: craniofacial development, occlusal development, aetiology and treatment, also in conjunction with logical Boolean operators or, and.

3. Results and Discussion

3.1 Etiology

3.1.1 Obstructive factors

The aetiology is often attributed to upper airway obstruction, which causes air to enter completely or partially through the oral cavity^[2]. Likewise, nasal obstruction can be caused by hypertrophy of the adenoids and/or tonsils which cause alteration in the pressure exerted by the tongue contributing to MB, the latter being the main cause^[13-15].

3.1.2 Inflammatory factors.

Allergic rhinitis is a chronic inflammatory disease, where the oral mucosa is affected due to allergen inhalation, this condition is associated with oral breathing, along with myofunctional and orofacial disorders^[16-18].

3.1.2 Anatomical factors.

It is important to evaluate anatomical structures in order to detect abnormalities that may affect breathing such as a low frenulum insertion or a deep palate^[19]. Ankyloglossia is a condition that has been attributed to MB^[20].

Analyzing the selected literature, it is established that the aetiology of MB is attributed to inflammatory, anatomical and obstructive factors, the latter being the main cause.

3.2 Effects of mouth breathing on occlusion

MB during infancy can affect dental occlusion causing malocclusions and thus impacting the functions of the stomatognathic system^[9],^[21-22].

Oral breathers present with increased facial height and horizontal overbite, an inclined occlusal plane and lip eversion of the anterosuperior teeth^[23-24]. These patients present with Class II malocclusion, which can be dental and/or skeletal, which can alter the temporomandibular joint^[25-27].

The effects on occlusion cause facial and/or aesthetic discrepancy, and dental and labial inclination, leading to the development of temporomandibular disorder.

3.3 Effects of MB on craniofacial development

MB can affect the craniofacial development pattern of growing children^[28-30]. Transverse and vertical growth may be affected in these patients^[31]. It is common to observe a dolichofacial pattern as a result of MB^[32]. They exhibit retrognathism in the maxilla and mandible, as well as backward and downward rotation^[33-35].

The most prominent effects of MB on craniofacial development are abnormal transverse and vertical growth and backward and downward rotation of the maxilla and mandible.

3.4 Treatment

3.4.1 Rapid expansion

Rapid expansion corrects the transverse deficiency of the maxilla, and promotes increased nasal dimensions, which in the short term helps improve breathing^[10],^[36]. Although rapid expansion increases the volume of the upper airway, it can change the anatomy of the soft tissues of the nose that influence aesthetics and functionality, the nasopharyngeal volume and the oropharyngeal volume do not show significant changes, so other treatments are needed^[37-38].

3.4.2 Myofunctional therapy

Myofunctional and Behavioural therapies can help to decrease MB, sometimes they are limited by a short lingual and/or labial frenulum which interferes with mobility, overbite and reduced maxillary arch width can be observed after treatment^[11],^[24]. In myofunctional therapy, oropharyngeal exercises, isotonic and isometric movements are performed to help the oral muscles, pharynx and upper airway which in turn improves the functions of speech, breathing, blowing, chewing and swallowing^[39]. Myofunctional treatment along with orthopaedics during mixed distinction can help correct or improve breathing^[40].

3.4.3 Surgical treatment

Surgery as a treatment is used as an adjunct to myofunctional therapies, when there is anatomical airway obstruction, frenuloplasty with myofunctional therapy helps to improve outcomes when there is a short lingual and/or labial frenulum^[11],^[20]. When the patient presents with larger than normal adenoids the treatment may be an adenoidectomy^[41].

3.4.4 Pharmacological treatment

When adenoid hypertrophy is present the use of intranasal steroids can be an alternative for adenoidectomy^[41-42]. Azelastine-fluticasone spray has been used to reduce adenoid hypertrophy^[12].

Treatment of MB can be performed by rapid expansion, myofunctional therapy, surgically and by pharmacological treatment.

4. Conclusions

Mouth breathing is an anomaly that can be caused by an obstruction of the upper airway, and can cause occlusal problems and a deviation of craniofacial development, so it is important to correct it in an early and timely manner. There are different treatment options depending on the need and the case of each patient, which are rapid expansion of the maxilla, myofunctional therapy, pharmacological treatment and surgical treatment.

5. Conflict of Interest

Not available

6. Financial Support

Not available

7. References

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