



## Importance of the evaluation of the upper airways in dental practice

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**ABSTRACT:** The upper airways are part of the respiratory system. Their primary function is heating, humidifying and filtering the air. Anatomical and functional alterations in the upper airways can affect normal breathing, causing patients to mouth breathe.

Oral breathing can cause developmental craniofacial alterations, lip incompetence, small and underdeveloped nostrils, small upper lip, and oral cavity alterations like halitosis, cavities, periodontal disease and malocclusions.

A bibliographic search was made on different platforms like PUBMED, SciELO, among others, to obtain articles presenting upper airway alterations.

This bibliographic review enlists the most common upper airway alterations, to provide a guide for dentists on how to detect and refer them, and eliminate the cause of oral breathing.

**KEYWORDS:** upper airways, oral breathing, mouth breathing, nasal obstruction.

### I. INTRODUCTION

Normal breathing can be affected by anatomical and functional factors, causing the breathing process to be initiated on the mouth, instead of the nasal cavity.

Studies show that children with oral breathing are more likely to have trouble sleeping, and it is related to the presence of disorders such as Obstructive Sleep Apnea (OSA). Poor sleep quality causes fatigue during the day, irritability and even headaches. Some other studies even showed a relationship between oral respiratory disorders with a tendency of psychological disturbances, cognitive and emotional disorders. All of these symptoms can negatively affect the person's quality of life.<sup>1,2</sup>

Over the years the possible relation between upper airway morphology and craniofacial development has been studied for a correct diagnosis and orthodontic treatment,<sup>3</sup> due to their

correlation with the prevalence of certain oral conditions.

Airway morphology can cause alterations in respiratory function, resulting in facial and occlusal changes,<sup>4</sup> which can be presented in a modification of the dentoskeletal growth pattern or even focal problems like gingivitis due to oral breathing.

The aim of this study is to present different upper airway conditions that can cause oral breathing, to be able to identify them, be conscious of their treatment and the effects of these on patients, in order to raise awareness among the clinicians about the importance of their assessment in the dental practice.

### II. MATERIAL AND METHOD

A bibliographic review was made from articles taken from different sources such as: PUBMED, Science Direct, SciELO, Google Scholar and the database of the Autonomous University of Baja California; trying to obtain most of the literature no more than 5 years old. The review included articles written in Spanish and English languages. The key words were: upper airways, oral breathing, mouth breathing, nasal obstruction

### III. DEVELOPMENT

The upper airways are the part of the air-conduction system that encompasses the nasal cavity, nasopharynx, oropharynx, larynx, and the extrathoracic part of the trachea. Their structure and function directly affect the air conduction to the lower respiratory airways.<sup>3</sup>

These are of high importance, due to their participation in different systems. The particular functions of the upper airways are, heating, humidifying and filtering the air, also as an olfactory pathway, primary defense against infections, passage of the alimentary bolus and phonation.<sup>4,5</sup>



The walls of the pathways are covered with mucosal tissue; in the nose, the submucosal vascular network has a flexible tissue that is able to influence the shape and diameter of the pathway; the pharyngeal wall and its lumen are highly deformable, while the nose, larynx, and trachea are surrounded by a rigid cartilage structure.<sup>3,4</sup>

Upper airway obstructions can force patients to inhale air through the oral cavity and show common symptoms that may include congestion, nasal obstruction, rhinorrhea, snoring and sleep apnea.<sup>6,7</sup> Listed below are some of the most common upper airway conditions.

### Chronic rhinosinusitis

It is a nose and sinuses inflammatory condition, characterized by nasal obstruction, congestion and a runny nose, combined with pressure or facial pain and anosmia. Chronic rhinosinusitis is a condition with periods of remission and exacerbations, it is considered a chronic condition when it lasts more than 12 weeks.<sup>8</sup> It can develop from an acute episode of rhinosinusitis, mainly caused by bacterial infections or blockages of the sinuses drainage. Their diagnosis can be obtained by a correct anamnesis and a physical examination in which the clinician gives slight tapping to the face on the zone of the sinuses, looking for symptoms such as pain or tenderness in the area; it is also possible to be seen in X-rays and Cone Beam Computed Tomography (CBCT) as a radiopacification of the sinuses. A pharmacological treatment can be used if the cause is not obstructive, in which case surgical intervention is required. According to studies, it affects 5-15% of the general population in the United States and Europe.<sup>8,9</sup>

### Nasal polyps

Nasal polyps are a benign hyperplastic growth of the nasal mucosa.

In certain patients it can be asymptomatic, and can cause nasal problems, such as obstruction, rhinorrhea, congestion and anosmia that causes ageusia. Factors associated with nasal polyps include bacterial, fungal, viral infections, allergies and genetic predisposition. It can be confirmed by a nasal endoscopy and a CBCT scan. Topical corticosteroids can be used as pharmacological treatment, oral steroid cycles, and in other cases, surgical treatment is necessary. They are highly related to chronic rhinosinusitis.<sup>10,11</sup>

### Allergic rhinitis

It is a nasal mucosa disease, induced by inflammation resulting from exposure to allergens,

some of the most common allergens are: dust, pollen, animal dandruff, among others. Most common symptoms are rhinorrhea, nasal congestion, nose and eyes itching and sneezing; other symptoms may include palate itching, post-nasal drip, and coughing. According to its frequency it is classified as intermittent (symptoms less than 4 days a week, and no more than 4 weeks a year), and persistent (symptoms at least 4 days a week for more than 4 weeks a year). Depending on its severity, it is classified as mild (normal sleep, does not affect daily activities, no bothersome symptoms), and moderate to severe (when one or more symptoms are present: abnormal sleep, impairment of daily activities, severe symptoms). Its treatment consists of antihistamines, decongestants, nasal glucocorticoids and immunotherapy. Globally it is one of the most common conditions and it is usually a chronic condition.<sup>8</sup>

### Tonsillitis

It is a pharyngeal tonsils inflammation that can affect other areas of the throat, including the adenoids and lingual tonsils. Acute tonsillitis is an infection caused by several types of bacteria, viruses and can produce peritonsillar abscesses. Chronic tonsillitis is an infection that can cause tonsil stones.<sup>12</sup> It is characterized by recurrent infections, seven episodes in one year, five in two consecutive years, or three in three consecutive years, it can also cause nasal obstruction, accompanied by fever, halitosis and pharyngeal pain. Adenoids and palatine tonsils are often found to be enlarged (hypertrophic), erythematous and exudative; cervical nodes are often present.<sup>13</sup> Its treatment consists of antibiotics, however, a tonsillectomy is indicated in patients with chronic disease, who have Obstructive Sleep Apnea (OSA), disabling episodes, and recurrent otitis.<sup>14</sup>

Oral breathing is related to oral manifestations, such as: halitosis, chronic gingivitis, periodontitis, candidiasis, dental erosions, caries and dental malocclusions.<sup>15,16</sup>

According to McNamara, a classic example of the possible relationship between respiration and craniofacial growth are patients with "adenoid facies," described as patients with small and underdeveloped nostrils, a small upper lip, lip incompetence, prominent and proinclined upper incisors, elongated faces, deep and narrow palate, and an Angle Class II malocclusion.<sup>15</sup>

According to Chambi-Rocha, there are



reports of open bites, anterior and posterior crossbites, narrow palates, and gingival smiles resulting from oral breathing.<sup>2</sup>

The etiology of many different oral diseases such as periodontitis, caries and halitosis is dental plaque. According to Alqutami, studies suggest that the lack of a normal salivary flow surrounding the teeth and their adjacent tissues due to mouth breathing, may be the reason for the evolution of these diseases, due to the decrease of the antibacterial effects of saliva and the salivary cleansing action.<sup>17</sup>

#### IV. CONCLUSION

A timely diagnosis is one of the most important parts of a comprehensive treatment.

Oral breathing is related to different conditions that affect craniofacial development, causing dental malocclusions, and oral diseases such as periodontal and caries.

Upper airway conditions are frequent among the population, so it is essential that the dentist knows how to recognize them and refer them to the specialist for a correct treatment, since these conditions are usually related to manifestations that affect oral health, this way we promote the comprehensive health of our patients.

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