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Research Paper

Correlation of Mouth Breathing Habit with Naso respiratory Obstruction: A Review

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ABSTRACT: *Mouth breathing is a well-documented detrimental habit in children that is often associated with upper airway obstruction, resulting in abnormal craniofacial growth and dental development. The purpose of this review was to explore the relationship between mouth breathing and nasal-respiratory obstruction among paediatric patients. A search of the literature was conducted electronically and via manual searches through six databases up to June 2025 for observational studies enrolling children less than 18 years of age, who exhibited mouth breathing. Thirty studies qualified for inclusion in qualitative synthesis, and 15 of these studies were eligible for inclusion in the analysis. Results indicated an association between Naso-respiratory obstruction, primarily due to adenoidal and tonsillar hypertrophy, and the establishment of mouth breathing. Persistent oral breathing, even after successful clearance of obstruction, was shown to be secondary to functional adaptation and neuromuscular change due to long-term restriction of nasal airflow. Children with mouth breathing developed a higher mandibular plane angle, narrower maxillary arch, greater overjet, and altered head position when compared with nasal breathers. In summary, the review highlights a complex interaction between structural airway obstruction, habitual breathing patterns, and craniofacial development. Effective management includes a multidisciplinary approach to treat not only anatomical causes, but also the behavioural perpetuation of mouth breathing, so that long-term dentofacial and physiological consequences can be limited.*

KEYWORDS: *Mouth breathing, Nasal obstruction, Nasorespiratory, Respiratory function, Airway obstruction, Breathing habits*

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I. INTRODUCTION

The oral cavity is essential for various physiological functions, including breathing, swallowing, suckling, chewing and speaking [1]. Functions are typically well coordinated and balanced in the oral environment [2]. When disturbances of this balance occur abnormal growth and development can ensue of the hard and soft tissue of the craniofacial complex. Although humans are obligate nasal breathers, there are various factors that can lead individuals to habitually adopt mouth breather [3]. This simple change in breathing pattern has significant and potentially deleterious effects on oral and facial development [4].

Adenoid hypertrophy is the most prevalent underlying condition causing habitual mouth breathing, but there are other anatomical variables (e.g., tonsillar enlargement, nasal septal deviation, inferior turbinate hypertrophy) that significantly impair nasal airflow and lead to mouth breathing [4]. Management of the condition is often a concerted effort by Paediatricians, General physicians, Paediatric dentists and ENT specialists.

Naso respiratory obstruction is a sensation of decreased or obstructed airflow through the nostrils and is a common symptom that can negatively affect quality of life [5]. It may interfere with essential functions such

as sleep, physical activity, and normal breathing comfort. Although not a disease in itself, Naso respiratory obstruction often arises from underlying conditions such as deviated nasal septum, hypertrophied Turbinate or nasal polyps [6]. While typically benign, it is important to investigate and exclude more serious causes, including nasal tumour [7]. This review is aimed to investigate corelation between mouth breathing and Naso-respiratory obstruction among children and its related features.

II. MATERIALS AND METHODS

2.1. Eligibility Criteria

The eligibility criteria consisted of: type of study (observational research studies) participants included (paediatric population less than 18 years with mouth breathers) and excluded participants (adult population, nasal breathers and studies in children with other deleterious oral habits); type of exposure (mouth breathing); primary outcome (class 2 according to the angles classification, anterior open bite, posterior crossbite, increased overjet, narrow palate) and secondary outcome (maxilla mandibular discrepancy ,face type) [8].

2.2. Information Sources and Search

From inception to June 5, 2025, we searched eight electronic databases for publication date, type and language, with no limitations. We manually checked the Directory of Open Access Journals, Digital Dissertations, Meta Register of Controlled Trials, WHO, PubMed, Google Scholar, and the reference sections of eligible articles and recent systematic reviews for additional relevant articles.

2.3. Study Selection

To facilitate identifying articles that may have met the inclusion criteria and move forward to the full texts, authors AT and SA reviewed the titles and abstracts of articles that were recovered from the searches. Should there be conflicts between the two reviewers, author NA would assist with discussion to resolve any conflicts [9].

2.4. Data Collection Process and Items

The data extraction procedure for the identified reports used predefined and piloted forms to collect information on: (a) study characteristics (design, clinical setting, country), (b) patient characteristics (age, gender), (c) malocclusion characteristics, (d) appliance characteristics, and (e) total number and type of extractions (if any). Data was extracted and summarized by two authors (AT, SA) and disagreements were reconciled in the aforementioned way [9].

2.5. Additional Analyses and Risk of Bias Across Studies

To strengthen the evaluation of the relationship between mouth breathing and Naso respiratory obstruction, additional subgroup and sensitivity analyses were planned. Subgroup analyses will consider: (i) age groups (preschool, school-age, adolescents) due to developmental airway differences; (ii) methods used to diagnose obstruction (endoscopy/radiography, clinical or allergy history, parent-reported symptoms); (iii) underlying causes of obstruction (adenoid/tonsillar hypertrophy, allergic rhinitis, septal/turbinate abnormalities); (iv) assessment method for mouth breathing (objective observation or validated tools versus caregiver/self-report); (v) clinical setting (ENT, dental/orthodontic, or community-based studies); and (vi) geographic and temporal factors, to capture environmental and practice-related variability. [10].

2.6. Data Synthesis

After screening 1,050 titles and abstracts and assessing 110 full texts, a total of 30 studies met the inclusion criteria for qualitative synthesis. Of these, 15 provided sufficient quantitative data to be pooled in this analysis (Figure 1). Due to heterogeneity in study designs, populations, and diagnostic criteria for both mouth breathing and Naso respiratory obstruction, data were summarised narratively. Study characteristics and outcome measures were tabulated. Where at least studies reported comparable measures (e.g. prevalence of Naso respiratory obstruction among mouth breathers or correlation coefficients between mouth breathing and obstruction severity) [4].

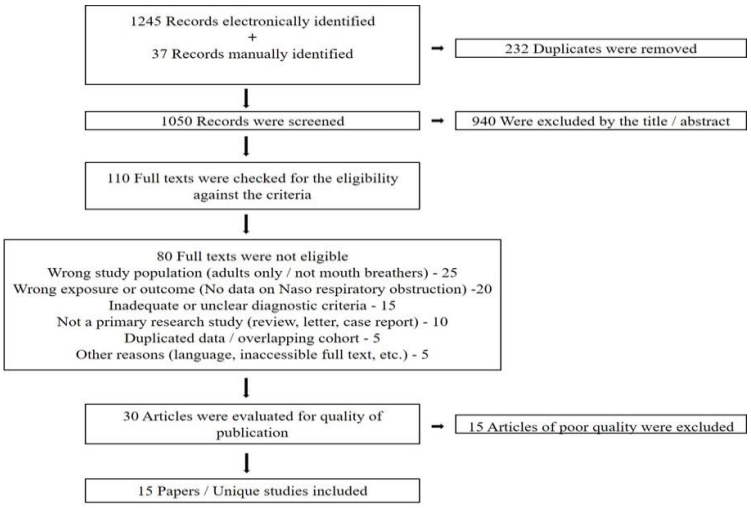

Figure 1 DATA collection and Screening

III. RESULTS AND DISSCUSION

Table 1 shows positive results of correlation of mouth breathing habit with Naso respiratory obstruction. The studies emphasize that nasal obstruction (e.g. enlarged tonsils/adenoids, other anatomical obstruction) often forces or encourages mouth breathing [11]. Enlarged adenoids and tonsils can lead to nasal obstruction, resulting in mouth breathing [12]. Craniofacial structure and adequacy of the airway were different for patients who habitually breathe through the mouth in comparison to patients who habitually breathe through the nose [13]. Nasal obstruction patients show mouth breathing habit and even after obstruction is treated by T&A improves symptoms, but does not always eliminate mouth breathing during sleep, nor fully resolve SDB (some residual AHI). This suggests that obstruction is only one part of the problem, and that habitual or structural consequences of mouth breathing ("nasal disuse") may persist even after correction of obvious obstructive causes [14]. Nasal obstruction (e.g. from tonsillar hypertrophy, adenoids, deviated septum, allergic rhinitis) is among the obstructive etiologic factors for mouth breathing [15]. It implies that in children with nasal obstruction, early assessment of breathing mode (nasal vs mouth), oral habits, and occlusion is important [16].

Mouth breathing alters muscle posture (tongue, lips, orofacial muscles), head position, and these changes, when persistent, influence the craniofacial skeleton [11]. In terms of head posture; a little, but not statistically significant difference was seen in mouth breather's vs nasal breathers [13]. Mouth breathing, often results from Naso respiratory obstruction, leads to altered facial growth patterns [17]. When comparing mouth and nasal breathers, mouth breathers showed significantly more backward and downward rotation of the mandible, overjet, steeper mandibular plane angle, greater palatal plane angle, and reduced upper and lower arch width at the canine and first molar level [18]. Mouth breathing isn't always due to nasal obstruction: a subset mouth breathes by habit even when nasal obstruction is not evident, and this subgroup may have worse sleep apnoea severity [19]. Addressing obstruction and mouth breathing may prevent or limit malocclusion [16]. The association between Naso respiratory obstruction, mouth breathing, and a "long face" (vertical facial growth) is weak [20].

Mouth breathing is a common harmful oral habit exhibited by children. Mouth breathing is often secondary to an upper airway obstruction, where air can enter either partially or completely through the oral cavity. Although nasal obstruction may be due to almost any nasal disease, the pathological hypertrophy of the adenoids is often cited as the most common etiology of mouth breathing in children [21]. The orthodontic relevance of nasal respiratory obstruction and implications for facial growth have been a topic of controversy for nearly a hundred years. Continued interest in nasal obstruction, mouth breathing, and orofacial changes is fueled by strong beliefs, poor evidence and existing uncertainty regarding cause-and-effect relationships [22]. As seen in children with nasal obstruction & mouth breathing, lowered nasal airflow is correlated with increased pulmonary arterial pressure. This suggests that chronic obstruction and mouth breathing may stress the lower respiratory / cardiovascular systems [23]. Nasal airway obstruction tends to be associated with morphological changes in the facial bones and jaws via the pathway of mouth breathing especially during growth periods [24]. The methodological factors that influence the nasal resistance measurements is crucial for accurately diagnosing Naso respiratory obstruction and its potential effects on craniofacial development [25].

Table 1 Mouth breathing and Naso respiratory obstruction

TITLE	AUTHOR	PUBLICATION	RESULT
The impact of mouth breathing on dentofacial development	Lin L	2022	Mouth breathing is one of the most common oral habits in children. It is often secondary to an obstruction in the upper airway that allows the air to enter completely or through the oral cavity. Pathological hypertrophy of the adenoids and tonsils is frequently the main underlying cause of mouth breathing in children in addition to nasal occlusion due to various forms of nasal disease.
Nasal obstruction and facial growth: the strength of the evidence for clinical assumptions	Vig KW	1998	After almost a century of contention, the orthodontic implications of Naso respiratory obstruction and its influence on facial growth are still debated. Continued interest in nasal obstruction is inspired by firmly held beliefs, scant evidence, and the ongoing doubts about cause-and-effect relationships that still exist.
Comparative Evaluation of the Relationship Between Airway Inadequacy, Head Posture and Craniofacial Morphology in Mouth Breathing and Nasal Breathing Patients	Jaiswal S	2023	There were differences in airway adequacy and craniofacial morphology between mouth-breathing and nasal-breathing patients. In head posture, there was a slight difference between mouth-breathing and nasal-breathing patients, but it was not significant.
The effect of mouth breathing versus nasal breathing on dentofacial and the craniofacial development in the orthodontic patients	Harari D	2010	When comparing nasal breathing to mouth breathing, we observed important differences in backward and downward motion of the mandible, a greater overjet, a steeper angle of the mandibular plane and palatal plane, and that the upper and lower arcs constricted at the canines and first molars in mouth breathers.
Mouth breathing, "nasal disuse"	Lee SY	2015	Nasal obstruction / obstruction treated by T&A improves symptoms, but does not always eliminate mouth breathing during sleep, nor fully resolve SDB (some

and pediatric sleep disordered breathing			residual AHI). This suggests that obstruction is only one part of the problem, and that habitual or structural consequences of mouth breathing ("nasal disuse") may persist even after correction of obvious obstructive causes
Discussion On Mouth-Breathing And Nasal Obstruction		1932	As seen in children with nasal obstruction & mouth breathing, lowered nasal airflow is correlated with increased pulmonary arterial pressure. This suggests that chronic obstruction + mouth breathing may stress the lower respiratory / cardiovascular systems.
Nasal airway obstruction and facial development	Shapiro GG	1984	Nasal airway obstruction tends to be associated with morphological changes in the facial bones and jaws via the pathway of mouth breathing — especially during growth periods.
Managing obstructive sleep apnoea in children the role of craniofacial morphology	Bozzini MF	2016	The review emphasizes that nasal obstruction (e.g. enlarged tonsils/adenoids, other anatomical obstruction) often forces or encourages mouth breathing. Mouth breathing in turn alters muscle posture (tongue, lips, orofacial muscles), head position, and these changes, when persistent, influence the craniofacial skeleton
Mouth Breathing and Its Impact on Atypical Swallowing	Alkhraisat MH and Anitua E.	2024	The review mentions that nasal obstruction (e.g. from tonsillar hypertrophy, adenoids, deviated septum, allergic rhinitis) is among the obstructive etiologic factors for mouth breathing.
Prevalence of mouth breathing with or without nasal obstruction in children with moderate to severe obstructive sleep apnea	Bokov P, Dahan J and Boujemla I	2022	Mouth breathing isn't always due to nasal obstruction: a subset mouth breathes by habit even when nasal obstruction is not evident, and this subgroup may have worse sleep apnoea severity.
Association between oral habits mouth breathing and malocclusion	Grippa udo C, Paolantonio EG and Antonini G	2016	It implies that in children with nasal obstruction, early assessment of breathing mode (nasal vs mouth), oral habits, and occlusion is important. Addressing obstruction and mouth breathing may prevent or limit malocclusion.
Opening up on airways in the purported effect of Naso respiratory obstruction on the dentofacial growth	Cheung JL and Dreyer C	2021	The association between Naso respiratory obstruction, mouth breathing, and a "long face" (vertical facial growth) is weak.

Naso respiratory characteristics and craniofacial morphology	Kluemper GT, Vig PS, Vig KW.	1995	Mouth breathing, often resulting from Naso respiratory obstruction, leads to altered facial growth patterns.
The effect of methodology on the determination of the nasal resistance	Berkinshaw ER Spalding PM, Vig PS.	1987	The methodological factors that influence nasal resistance measurements is crucial for accurately diagnosing Naso respiratory obstruction and its potential effects on craniofacial development.
Correlation between otitis media and dental malocclusion in children	Giuca M	2011	Enlarged adenoids and tonsils can lead to nasal obstruction, resulting in mouth breathing.

IV. CONCLUSION

The review emphasizes an important but complex relationship between habitual mouth breathing in children and Naso respiratory obstruction. The presence of airway obstruction often plays a precipitating role in this altered breathing pattern and is attributed to many anatomical problems, but primarily to either adenoidal or tonsillar enlargement. Oral breathing may become a habitual phenomenon that endures even after medical or surgical treatment of the airway obstruction; these habitual behaviours may be related to established behavioural patterns, structural adaptations, or neuromuscular changes that occurred in response to prolonged limitation of airflow via the nasal airway. Habitual mouth breathing during formative periods in growth and dentofacial development has potential to impact craniofacial development. The potential influences of oral breathing during sleep are more important than skeletal and dental changes impairing sleep architecture, exacerbating any residual sleep-disordered breathing, and adding an additional physiological load to the cardiovascular system, considering persistent compromised airways as a chronic state. Treatment should involve resolving the underlying cause, but also behavioural modification of the habitual oral breathing pattern, with regard to reducing the risk of malocclusion, aberrant growth patterns of the facial skeleton or impairment to systemic homeostasis.

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