



Major deleterious oral habits: a brief systematic review

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Abstract

Introduction: The deleterious habits in children, in the deciduous dentition phase, seem to be present in more than half of the child population, reaching rates greater than 90%, depending on the population studied, and dentofacial alterations may already be present in half of these individuals. Early identification is essential so that malocclusions, which are more difficult to treat, do not set in. **Objective:** It was to carry out a brief systematic review to highlight deleterious oral habits, as well as to point out their main predictors and treatments. **Methods:** The systematic review rules of the PRISMA Platform were followed. The research was carried out from April to June 2023 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** A total of 87 articles were found. A total of 32 articles were evaluated in full and 16 were included and developed in this systematic review study. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 6 studies with a high risk of bias and 43 studies that did not meet GRADE. Since pediatric follow-up is more frequent than consultations with the pediatric dentist, the early identification of deleterious habits by physicians is of fundamental importance in referring these patients to dental treatment that diagnoses and removes these habits, before difficult-to-resolve malocclusions get settled. Preventive measures should also be taken, guiding parents so that deleterious oral habits do not take hold, such as a minimum period of

six months of breastfeeding, finger sucking should be replaced by an orthodontic pacifier, the bottle should have an orthodontic spout, removing the habit of pacifier and bottle until the age of three. There is an association between deleterious habits and different types of malocclusions in different planes of space, with atypical swallowing being a habit that must be diagnosed early.

Keywords: Oral habits. Deleterious oral habits. Dentofacial changes. Children. Malocclusions.

Introduction

The deleterious habits in children, in the deciduous dentition phase, seem to be present in more than half of the child population, reaching rates greater than 90%, depending on the population studied, and dentofacial alterations may already be present in half of these individuals [1]. Finger sucking, prolonged use of a bottle or pacifier, britches, and onychophagia are the most frequently found habits and may have different results, due to individual predisposition, age, and duration of the habit. Early identification is essential so that malocclusions, which are more difficult to treat, do not set in [1,2].

In this sense, mouth breathing is one of the most common deleterious oral habits in children. In addition to nasal obstruction caused by various types of nasal diseases, pathological hypertrophy of adenoids and/or tonsils is usually the main etiological factor for mouth breathing in children [3,4]. Uncorrected mouth breathing can result in abnormal dental and

maxillofacial development and affect the health of the dentofacial system. Mouth breathers can exhibit various types of growth patterns and malocclusions, depending on the exact etiology of mouth breathing. Furthermore, breathing through the oral cavity can negatively affect oral health, increasing the risk of caries and periodontal disease [5].

In this scenario, dental malocclusion can be defined as the abnormal positioning of the teeth in the maxilla and/or mandible, which results in a disharmonious aesthetic and functional relationship between the dental arches, as well as between the dental elements and the craniofacial skeletal framework. This type of pathological alteration is one of the most frequent facial deformities in the population and may be of primary origin, when the cause is hereditary or congenital, or of secondary origin, in which physical factors interfere with the development of the jaws and teeth eruption [6,7].

Also, malocclusions of primary origin are due to human evolution, especially changes in eating habits. Teeth are considered a closed system, that is, their size and shape are genetically predetermined, while the bone that holds them is considered an open system since it is influenced by external stimuli to develop [8]. What is observed in the history of modern man is a progressive reduction in the size of the jaws, mainly due to the consumption of industrialized foods, of soft consistency, which do not offer adequate functional stimulation. As tooth morphology is still similar to prehistoric times, this means little space in the jaws and, therefore, poor tooth positioning [4].

The secondary origin of malocclusions encompasses deleterious oral habits, and physical and long-lasting etiological factors, which can lead to deviations in normal growth and lead to more severe dental-skeletal deformities. Habits can be considered as acquired reflexes or stimuli that bring pleasure and/or satisfaction, performed repeatedly, with anomalous and quite complex muscle contraction patterns, giving rise to dental-skeletal deformities [2,4,6].

Therefore, the present study aimed to carry out a brief systematic review to highlight deleterious oral habits, as well as to point out their main predictors and treatments.

Methods

Study Design

The systematic review rules of the PRISMA Platform were followed. Available at: www.prisma-statement.org/. Accessed on: 06/20/2023.

Data Sources and Research Strategy

The search strategies for this systematic review were based on the keywords (MeSH Terms): "*Oral habits. Deleterious oral habits. Dentofacial changes. Children. Malocclusions*". The research was carried out from April to June 2023 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. In addition, a combination of keywords with the Booleans "OR", "AND" and the operator "NOT" were used to target scientific articles of interest.

Quality of Studies, Eligibility of Articles, and Risk of Bias

Studies were chosen that rigorously presented the results of the search process that presented scientific quality according to the GRADE classification, and that did not present a risk of significant bias, that is, that could compromise the safety of the results. According to GRADE recommendations, the quality of scientific evidence in the studies addressed was classified as high, moderate, low, or very low, according to the risk of evidence bias, sample size, clarity of comparisons, precision, and consistency in the effects of analyses. High-quality evidence was assigned using four criteria: 1) Randomized or prospective controlled clinical trials; 2) Retrospective clinical trials or case series; 3) Sample size greater than 15 participants; 4) Studies with statistically well-prepared results; 5) Studies published in indexed journals with a significant impact factor; 6) descriptive, interpretive, theoretical (credibility of methods) and pragmatic validity.

The Cochrane Instrument was adopted to assess the risk of bias in the selected studies using the Cohen Test to calculate the effect size - the magnitude of the difference in the results between the studies addressed in this study (Effect Size) versus the Inverse of the Standard Error (precision or sample size) to determine the Risk of Bias of the studies using the Funnel Plot chart.

Results and Discussion

Summary of Findings

A total of 87 articles were found. Initially, duplication of articles was excluded. After this process, the abstracts were evaluated and a new exclusion was performed, removing the articles that did not include the theme of this article, resulting in 44 articles. A total of 32 articles were evaluated in full and 16 were included and developed in this systematic review study (Figure 1). Considering the Cochrane tool for risk of bias, the overall assessment resulted in 6 studies with a high risk of bias and 43 studies that did not meet GRADE.

Figure 1. Flowchart showing the article selection process.

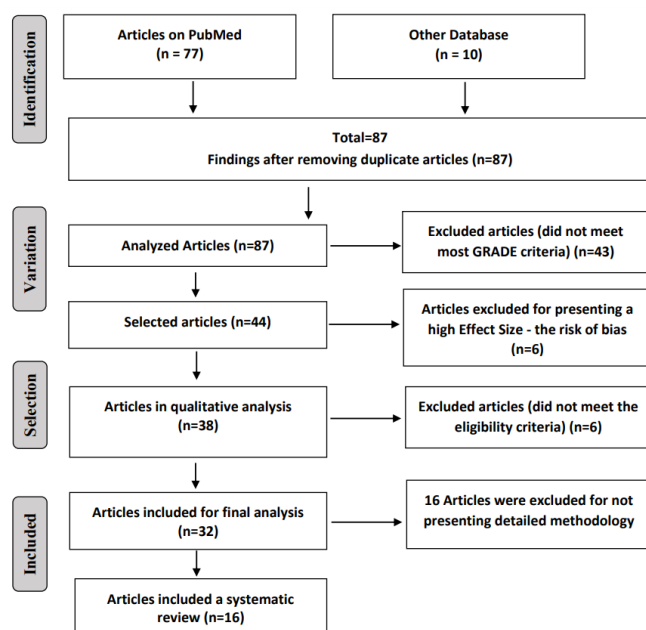
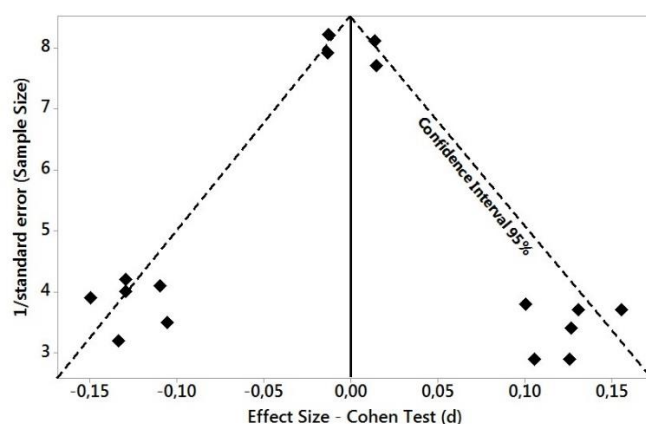


Figure 2 presents the results of the risk of bias of the studies through the Funnel Plot, showing the calculation of the Effect Size (Magnitude of the difference) using the Cohen Test (d). The sample size was indirectly determined by the inverse of the standard error (1/Standard Error). This graph showed symmetrical behavior, not suggesting a significant risk of bias, both between studies with small sample sizes (lower precision) that are shown at the bottom of the graph and in studies with large sample sizes that are displayed in the upper region.

Figure 2. The symmetrical funnel plot does not suggest a risk of bias among the small sample size studies that are shown at the bottom of the plot. High confidence and high recommendation studies are shown above the graph (NTotal = 16 clinical studies evaluated in full in the systematic review).



Source: Own authorship.

Major Findings - Main Deleterious Oral Habits Feeding bottle

The use of a bottle, unlike breastfeeding, which requires the efforts of sucking and expressing the milk, does not exercise the baby's oral muscles adequately. Breastfeeding, in addition to offering protection against infections, favors the development of the muscle tone necessary for the use of the first set of teeth and promotes the growth of the jaws [1,2].

Substituting a bottle, to the detriment of breastfeeding, is closely related to an increased rate of sucking habits, and prolonged use of a bottle is present in half of the children who have harmful habits. Other aggravating factors, related to the use of a bottle, can be cited: the habit of parents adding sugar or, even, giving the bottle immediately before the child goes to sleep, without doing oral hygiene afterward, causes another very serious problem, called bottle caries. Dental destruction modifies the anatomy of the deciduous teeth, sometimes leading to the loss of some of these elements, later causing the bad positioning of the permanent teeth and, therefore, malocclusion [3,4].

Pacifier and Digital Suction

Sucking is an instinctive attitude of mammals, initiated in intrauterine life. The act of sucking is fully developed when the child is born, being vital for nutrition and as a means of communication with the external environment. Digital sucking and pacifier use are considered psychomotor reinforcements, which tend to disappear with age, usually by the third year of life. Its persistence beyond four years of age can cause alterations in facial growth and development and even malocclusions in the primary dentition itself [4]. Dentofacial changes caused by prolonged use of pacifiers and digital sucking are similar and invariably result in anterior open bite.

This malocclusion is characterized by a buccal inclination of the upper incisors, a lingual inclination of the lower incisors, and palate atresia, preventing complete closure of the lips when at rest. The absence of labial sealing results in a projection of the tongue between the incisors - technically called lingual interposition - during swallowing, which accentuates the inclination of the teeth, and alters breathing, which can become predominantly buccal and, consequently, modify pressures between the nasal floor and the oral cavity, thus affecting the growth of the palate [9,10].

Also, this lingual thrust not only occurs during swallowing, but can also occur during speech, or even at rest. In all cases, negative pressure is created inside the oral cavity, which increases palatal atresia and

results in posterior crossbite. The prolonged use of a pacifier, as well as a bottle, is prevalent in more than half of the patients who have deleterious habits and, when this habit is abandoned before the age of five, the malocclusions that exist in the primary dentition are naturally corrected [10-12].

The habit of finger sucking, although less frequent, causes more significant dental problems than the pacifier, as it can persist in permanent dentition, increasing the predisposition to ear infections, and sleep disorders, and negative impact on the emotional development of children. The habit of sucking lips and cheeks or biting objects can be considered an extension of the habit of finger sucking, with the same mechanisms that result in the aforementioned malocclusions [12].

Bruxism

Bruxism is a parafunctional activity, characterized by the habit of grinding or clenching the teeth, occurring more frequently at night, especially in very anxious children, and is usually identified by parents due to the intensity of the noise. Some factors predispose to this habit: local (premature contact between teeth, occlusal interference); systemic (asthma or rhinitis, central nervous system disorders); psychological (stress, anxiety); occupational (playing competitive sports); and hereditary. Bruxism can also be associated with sleep disorders, in different degrees of excitement (nocturnal enuresis, sleep talking, restless sleep) [4,13].

In children, most of the wear produced is minimal, and, therefore, dental treatment is not indicated, only psychological follow-up is recommended. However, when the frequency, intensity, and duration of the habit exceed a tolerable limit, dental intervention is necessary [14].

Onychophagy

Onychophagia or the habit of biting nails is a more common compulsion in children over four years of age, present in approximately 16% of those who have deleterious habits. It is a manifestation resulting from tensions and frustrations determined by social and family rules, which can be replaced by the habit of biting the lips and chewing gum. Onychophagia may be associated with anxiety or stress reflexes, with a higher prevalence in puberty [1,4].

This habit can cause dental fractures, gingival inflammation, root resorption, and craniomandibular dysfunction, in addition to infections due to the ingestion of bacteria present under the nail. Onychophagia has no cure, as it is not a disease but a

reflection of the person's emotional state, disappearing as tension decreases and maturity increases [2,4].

Lingual interposition

As mentioned, the interposition of the tongue between the dental arches during speech, swallowing, or resting can be a consequence of anterior open bite and proclination of the incisors. On the other hand, interposition can also be the cause of malocclusions, when it occurs during the resting position: it is considered a low-intensity force, but in the long term it also causes open bite. Tongue thrusting during swallowing is a less harmful condition because, despite the force being of high intensity, it is of short duration [15].

Postural Habits

During sleep or recreational activities, the child may present inappropriate postures, such as placing the hand or arm under the face, which may result in a narrowing of the upper dental arch and posterior crossbite. Postural changes would also influence the intermaxillary positioning and lingual posture, as well as the arrangement of the airways [1,4,6,15].

A cross-sectional observational clinical study determined the relationship of dental malocclusions in the vertical, transverse, and sagittal planes with deleterious habits in pediatric patients. A total of 155 children from 6 to 12 years old. Of the 155 patients evaluated, 45.3% had vertical malocclusion, 52.0% sagittal malocclusion, and 13.6% transverse malocclusion. The most frequent type of malocclusion in the vertical plane was the anterior deep bite (22.2%), in the transverse plane, the edge-to-edge bite (7.1%) and the anterior crossbite (6.5%) were less frequent. Finally, in the sagittal plane, Class II Div 1 (20%) and Class III (20.7%) were the most frequent. Among the most common deleterious habits, anterior position (58.7%) and mixed breathing (51.0%) were observed, in contrast to the habit of retroposition, lip-sucking, and mouth breathing, which were the least frequent. Considering age and sex, children with atypical swallowing habits are more likely to have malocclusion in the three spatial planes. Therefore, there is an association between deleterious habits and different types of malocclusions in different planes of space, with atypical swallowing being a habit that must be diagnosed early and treated interdisciplinary [16].

Conclusion

Since pediatric follow-up is more frequent than consultations with the pediatric dentist, the early identification of deleterious habits by physicians is of

fundamental importance in referring these patients to dental treatment that diagnoses and removes these habits, before difficult-to-resolve malocclusions get settled. Preventive measures should also be taken, guiding parents so that deleterious oral habits do not take hold, such as a minimum period of six months of breastfeeding, finger sucking should be replaced by an orthodontic pacifier, the bottle should have an orthodontic spout, removing the habit of pacifier and bottle until the age of three. There is an association between deleterious habits and different types of malocclusions in different planes of space, with atypical swallowing being a habit that must be diagnosed early.

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Ethical Approval

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Informed consent

Not applicable.

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Data sharing statement

No additional data are available.

Conflict of interest

The authors declare no conflict of interest.

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