

Relationship between Oral Habits and Malocclusion among 10 - 12 Years Old School Children in Zawia, Libya

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Abstract

It is still debated whether bad habits and mouth breathing have a role in the etiopathogenesis of malocclusions. Beyond this debate, it is important to note that anytime these issues are connected to malocclusion, they have a significant impact on prognosis and must be

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resolved to provide a functional environment conducive to physiological growth.

Objective: *The purpose of this study was to evaluate the prevalence of deleterious oral habits and their association with malocclusion in school-going children from 10 to 12 years old in Zawia city of Libya. It was an attempt to determine the most common oral habits among children and the effect of these habits on the permanent dentition.*

Materials and methods: *The samples for this study consisted of 281 cases (115 males and 166 females). The study's target population consisted of schoolchildren attending the 10 and 12 years of primary school in state-funded schools in Zawia city (West Libya). Study subjects were selected by systematic random sampling. The scheduled activities for recording the data were started after signing informed consent from parents. The data was recorded by an anamnestic questionnaire and clinical examination. Three examiners, following WHO guidelines, carried it out.*

Results: *The study found that mouth breathing was the most prevalent oral habit about 21.0% (n = 59) and tongue thrust was found to be the least prevalent adverse oral habit about 3.9% (n = 11).*

Keywords: *deleterious oral habits, Mouth Breathing/Diagnosis*

Introduction:

Oral habits are highly complicated, acquired patterns of muscular contraction. They are associated with sleep, hunger, anger, tooth eruption, and fear. Some children even demonstrate oral habits as a way to decompress. These habits might be non-nutritive sucking (thumb, finger,

pacifier, and/or tongue), lip biting, and bruxism events. Additionally, these practices may harm the dentoalveolar structure. According to Finn, S. B. (1998), there are two primary categories of oral habits:

(1) Acquired oral habits: These are behaviors that a child develops over time that can be easily reversed and replaced with new ones when the child reaches adulthood.

(2) Compulsive oral habits: Compulsive oral habits are established actions in children that provide protection when emotional stresses become intolerable for the child. Discontinuing these practices causes the child to become apprehensive and worried.

Al-Atabi. H. Sin (2014) showed that a habit is an activity or state that has become automatic as a result of repetition. We should highlight the nervous behaviors, which include picking at one's fingers and nose, twisting one's hair, scratching one's eyes or ears, and pulling on one's hair, before mentioning the general category known as "oral habits" to put things in appropriate perspective. Oral habits are defined as the stereotypical, repetitive, and frequently subconscious functions of the masticatory system that deviate from its physiological function in both quality and quantity. Abnormal oral habits operate so subtly and unconsciously that even the patient is frequently unaware of their presence. At first, all of these easy routines require a conscious effort to follow.

It is still being debated whether bad habits and mouth breathing contribute to the etiopathogenesis of malocclusions. In addition to the controversy surrounding this topic, Thomaz EB et al. (2013) found that each of these harmful oral habits has a unique effect on the prevalence of malocclusion. For instance, pacifier sucking, and different weaning methods such as baby bottle sucking accompanied with a severe oral

habit such as finger sucking, most often cause conditions such as premaxilla, the protrusion of the upper incisors, anterior open bite and posterior cross bite, atypical swallowing, among many others. With all these conditions being common characteristics of malocclusion, several researchers point out a relationship between bad oral habits and the prevalence of malocclusion.

Lagana et al. (2013) investigated the prevalence of oral habits, malocclusions, and the need for orthodontic treatment in a sample of 7 to 15-year-old Albanese schoolchildren and stated that oral habits were present in 80.6% of their subjects. Additionally, Cavalcanti et al. (2008) confirmed that there was a positive association between deleterious oral habits and malocclusion. However, Luzzi et al. (2011) found that no statistically significant associations could be detected between non-nutritive sucking habits and malocclusion.

Objective:-

To evaluate the prevalence of deleterious oral habits and their association with malocclusion in school-going children from 10 to 12 years old, in the Az-Zawia region of Libya, this study is an attempt to determine the most common oral habits among children and the effect of these habits on the permanent dentition.

Materials and Methods:

The samples for this study consisted of 281 cases (115 males and 166 females). The study's target population consisted of schoolchildren attending the 10 and 12 years of primary school at state-funded schools in Zawia city (West Libya).

Systematic random sampling was used to choose study participants. After parents signed an informed permission form, the

planned activities for collecting the data were initiated. An amnestic questionnaire and a clinical examination were used to collect the data. Three examiners conducted it under the direction of the WHO. All examiners participated in a course on "Functional Analysis" techniques for breathing, nasal obstruction, sucking habits, and biting habits before beginning any clinical examinations.

The detection of the presence and the type of parafunctional oral habit was done in two stages: questionnaire and clinical examination. The questionnaire included, personal data, and the presence or absence of oral habits including tongue thrust, mouth breathing, bin biting, lip sucking, nail-biting, and thumb sucking. Personal data and information about orthodontic treatment were obtained directly from the students. The children were observed when completely relaxed. Each assessment was repeated two or three times until the two examiners reached an agreement. Before the oral habit examinations, the parents answered a questionnaire The English questionnaire was translated to Arabic and again retranslated back to English by a bilingual translator. The comparison was made between the original and the retranslated English questionnaire for adjustments of words and phrasing of questions.

Clinical examinations were conducted in a classroom setting with natural daylight as the source of illumination. This ensured a uniform understanding of clinical methods and the application of diagnostic criteria. Using latex gloves, dental mouth mirrors, and millimeter rulers, the dental occlusion was evaluated. No radiographs, study casts, or previously written records were used. A survey was completed by the parents/guardians about the child's condition related to the manifestations of these habits. A single study subject was interviewed and examined for 3 to 4 minutes.

The orthodontic variables and oral habits evaluated were as follows:

Orthodontic Variables:

Molar relationship: Angle's classifications were used to assess the relationship between the upper and lower first permanent molars. Patients with subdivision malocclusions were included in the Class II or Class III groups according to the influential occlusal characteristic or based on the relationship between the canines.

Overjet and Overbite: Values between 0 and 4 mm were examined normally.

Mouth breathing was diagnosed by observing lip incompetence at rest, the tension in the oral muscles when the lips are closed, and dilated nostrils when requested to breathe through the nose. Each swallowing evaluation was carried out three times, with the consensus opinion being adopted after examination of the fingers, lips, and nails for any indications of persistent sucking or biting that could lead to the diagnosis of thumb and lip sucking as well as nail biting.

The data were gathered using the following inclusion criteria: *

- 1-Age group of 10-12 years.
- 2-Children have a normal occlusion
- 3-Children have class I.
- 4-Children have class II, Div 1, Div
- 5-Children have class III.
- 6-Children have dental caries except for the first molar.
- 7-Children have oral habits such as (Thump-sucking, sucking lips, nail-biting, biting the pen, tongue-sucking, and mouth breathing).

***The exclusion criteria:**

- 1-Children less than 10 and more than 12.
- 2-Children have caries in the upper first molar.
- 3-Children have orthodontics.
- 4-Children have missed the first molar.
- 5-Children have stress.

Statistical Analysis:

Data were statistically analyzed by using IBM Statistical Package for Social Science (SPSS), Version 21.0 (SPSS, Chicago, IL, USA). Relationships between malocclusion and oral Habits were calculated by the Pearson chi-square test and the one-way – ANOVA test was used for multiple comparisons between the groups. A p-value of <0.05 was considered statistically significant.

Result:

The study included 281 cases, of which 40.93% (n=115) were males and 59.07% (n=166) were females. 21% (n=59) indicated that mouth breathing was the most prevalent oral habit, and 3.9% (n=11) indicated that tongue thrust was the least prevalent adverse oral habit, while 15.7% (n=44) of the cases had a pen bite, 13.9% (n=39) had nail-biting, 12.5% (n=35) had lip sucking, and 5.7% (n=16) have had Thumb sucking. Whereas, 27.4% (n= 77) showed that there were non-sighs as shown in Table 1.

Table 1-Prevalence and distribution of oral habits

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tongue Thrust	11	3.9	3.9	3.9
	Mouth breathing	59	21.0	21.0	24.9
	Thumb sucking	16	5.7	5.7	30.6
	Pen bite	44	15.7	15.7	46.3
	Lip sucking	35	12.5	12.5	58.7
	Nail biting	39	13.9	13.9	72.6
	Non-sigh	77	27.4	27.4	100.0
	Total	281	100.0	100.0	

In addition, the results of the study showed that 0.4% (n=1) of tongue thrust cases, 2.5% (n=7) of mouth breathing cases, 0.7% (n=2) of thumb sucking cases, and 2.1% (n=6) of pen bite cases, 2.5% (n=7) of lip sucking cases, 3.9% (n=11) of Nail-biting cases had had normal occlusion. In comparison, 9.6% (n=27) of cases showed no normal Occlusion. Whereas, 2.5% (n=7) of tongue thrust cases, 11% (n=31) of mouth breathing cases, 3.2% (n=9) of thumb sucking cases, 8.9% (n=25) of pen bite cases, 5.7% (n=16) of lip sucking cases, and 7.5% (n=21) of nail-biting cases have had Class 1 Malocclusion, while 7.8% (n=22) of cases showed no Class 1 Malocclusion. Additionally, 3.6% (n=10) of Mouth breathing cases, 1.5% (n=4) of Thumb sucking cases, 3.6% (n=10) of Pen bite cases, 2.1% (n=6) of Lip sucking cases, 0.7% (n=2) of Nail-biting cases have had Class 2 division 1 and division 2 Malocclusion, while 5.3% (n=15) of cases showed no Class 2 division 1 and division 2 Malocclusion. Otherwise, the study found that Class 3 Malocclusion occurred in 1.1% (n = 3) of tongue thrust cases, 3.9% (n = 11) of mouth

breathing cases, 0.4% (n = 1) of thumb sucking cases, 1.1% (n = 3) of pen bite cases, 2.1% (n = 6) of lip sucking cases, and 0.7% (n = 2) of nail-biting cases. In comparison, 4.6% (n=13) of cases showed no Class 3 Malocclusion as shown in table 2 and Figure 1.

Table 2- oral habits, malocclusion classification Cross tabulation

oral habits		Malocclusion classes					Total
		Normal Occlusion	Class 1	Class2 Div1	Class2 Div2	Class 3	
Tongue Thrust	Count	1	7	0	0	3	11
	% of Total	0.4%	2.5%	0.0%	0.0%	1.1%	3.9%
Mouth breathing	Count	7	31	7	3	11	59
	% of Total	2.5%	11.0%	2.5%	1.1%	3.9%	21.0%
Thumb sucking	Count	2	9	3	1	1	16
	% of Total	0.7%	3.2%	1.1%	0.4%	0.4%	5.7%
Pen bite	Count	6	25	9	1	3	44
	% of Total	2.1%	8.9%	3.2%	0.4%	1.1%	15.7%
Lip sucking	Count	7	16	4	2	6	35
	% of Total	2.5%	5.7%	1.4%	0.7%	2.1%	12.5%
Nail biting	Count	11	21	5	0	2	39
	% of Total	3.9%	7.5%	1.8%	0.0%	0.7%	13.9%
Non sigh	Count	27	22	4	11	13	77
	% of Total	9.6%	7.8%	1.4%	3.9%	4.6%	27.4%
Total	Count	61	131	32	18	39	281
	% of Total	21.7%	46.6%	11.4%	6.4%	13.9%	100.0%

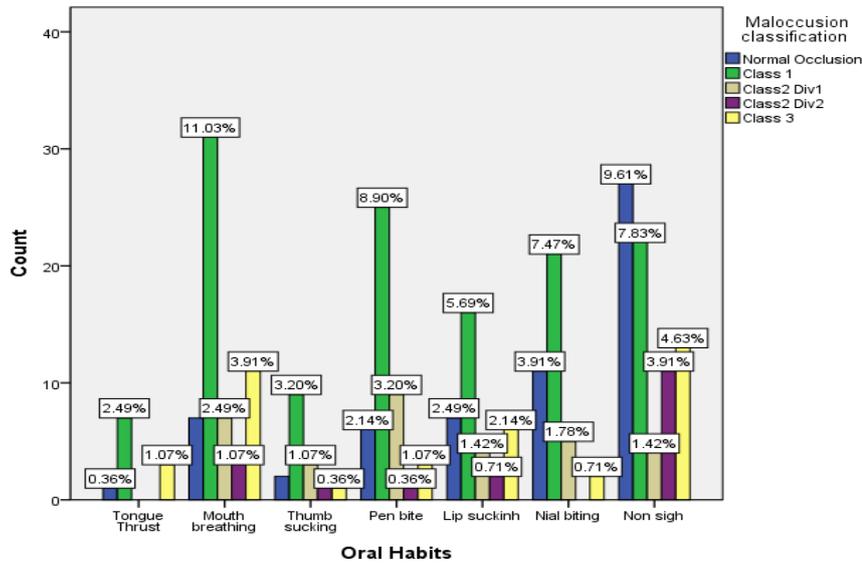


Figure1- The distribution of oral habits according to dental classification

The result of the study reported that the relationship between oral habits and malocclusion was calculated by the Pearson chi-square test was used for multiple comparisons between the groups and showed that a p-value of < 0.05 (p = **0.002**) and a p-value of < 0.05 in one-way ANOVA test (p = **0.000**) were considered statistically significant as shown in table 3.

Table 3- Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48.223 ^a	24	.002
Likelihood Ratio	52.503	24	.001
ANOVA test	85.577	4	.000
N of Valid Cases	281		

A p-value <0.05 was considered statistically significant

Discussion:

While oral behaviors like thumb and finger sucking, lip sucking, mouth breathing, and nail-biting (Onychophagy) might occur temporarily, when they become excessive or are practiced on a regular basis, they can result in malocclusion or poor dental health. Lagana et al. (2013) investigated the prevalence of malocclusions, oral habits, and the need for orthodontic treatment in a sample of 7-to 15-year-old Albanese schoolchildren and found that oral habits were present in 80.6% of their participants. Additionally, Cavalcanti et al. (2008) confirmed that there was a connection between malocclusion and damaging oral habits. However, according to Luzzi et al. (2011) found that there is no statistically significant link between malocclusion and non-nutritive sucking practices.

In this study, an attempt was made to examine subjects representing the relationship between oral habits and malocclusion among 10-12 years old school children in Az-Zawia, Libya.

This study demonstrated a strong correlation between deleterious oral habits (DOH) and malocclusions. Several writers have published about the relationship between unhealthy behaviors and malocclusion. According to research by Garde J. et al. (2014), oral habits are recurrent behaviors in the oral cavity that lead to the loss of tooth structure. These behaviors include pacifier and digit sucking, lip sucking and nail-biting, bruxism, self-harming behaviors; tongue thrusting; and mouth berating.

Their effect is based on the nature, onset, and duration of habits. Persistent nonnutritive sucking behaviors can disrupt the stomatognathic system and cause an imbalance between the exterior and internal muscles, which can lead to long-term problems. Tongue thrusting, an abnormal tongue position with deviation from the normal swallowing pattern, The

findings of this study are supported by the observations by Dean JA et al. (2000) that mouth breathing may be related to anterior open bite, abnormal speech, and anterior protrusion of the maxillary incisors.

Mouth breathing

Airway obstruction caused by allergic rhinitis and enlarged adenoids can lead to mouth breathing. It results in postural modifications such as lip incompetence, a low-positioned tongue, and increased vertical face height for jaw rotation in the clockwise direction [Harari D et al., 2010]. Numerous writers agree that the pattern of craniofacial growth can be impacted by the unbalanced muscle action that is typical of mouth breathing. This relationship between inadequate nasal breathing and dentofacial morphology has been extensively investigated [Zicari AM et al., 2009].

The result of the study showed a statistically significant association ($p < 0.05$) between mouth breathing, bad habits, and malocclusions, so we believe that mouth breathing and bad habits in preschoolers can be considered risk factors for malocclusions. The study's findings also revealed that the highest prevalence of deleterious oral habits was mouth breathing, which was more than 21.0% of the subjects, and the lowest prevalence was for tongue thrust, which was only 3.9% of the subjects. When compared to the results of the study conducted by [Garde J et al., (2014)], it was discovered that 21.0% of the study population had the habit of mouth breathing.

This significant discrepancy may be attributable to the different research procedures and the fact that in the current study, even subjects who exhibited mixed nasal and mouth breathing were treated as mouth breathers. The results of this investigation support the observations made

by Murshid ZA et al. (2007), which demonstrate that mouth breathing (20.2%) is more common than thumb sucking (16.7%); our study also demonstrates that mouth breathing (21.0%) is more common than tongue thrusting (3.9 percent).

Mouth breathing may be involved in the etiopathogenesis of some types of Class III malocclusion, according to Rakosi T et al. (1981), children who breathe through their mouths all the time have an open jaw, a low-positioned tongue, and increased mandibular development. The constant distraction of the mandibular condyle from the fossa may also be a growth stimulus. Additionally, the absence of tongue thrust on the palate and the upper jaw may result in a Class III malocclusion with diminished or reverse overjet, as well as a sagittal and transverse maxillary skeletal deficit.

Studies by Joshi MR (1964) and McNamara JA (1981) confirm that patients who mouth breathed were more likely to have class II malocclusions. According to Huber et al. (1946), mouth breathing has been linked to all forms of malocclusions. In contrast to what was previously said, the findings of the study revealed that class I malocclusion is more frequent and associated with patients whose mouth breath.

On the other hand, individual data from the four epidemiological studies on occlusion features and the prevalence of malocclusion revealed that there is a strong correlation between the prevalence of poor oral habits and the prevalence of malocclusion, according to Marmaitte U. (2014). A certain study that looked at the prevalence of malocclusion and the prevalence of bad oral habits in kids between the ages of 5 and 7 revealed that a sizable percentage of kids in this age range had one or more malocclusion-related characteristics, and another sizable percentage

had bad oral habits. This means that malocclusions can have a variety of characteristics, but some of the most common ones include improper tooth spacing and vertical misalignment of the incisors.

However, contrary to what was previously stated, Luzzi, V. M. et al. (2011) reported that no statistically significant relationships could be found between non-nutritive sucking practices and malocclusion. The fact that this study was restricted to one city in Zawia posed limitations. It is suggested that a larger sample of students from all around the country be used to more accurately assess the incidence of parafunctional oral habits.

Conclusion:

The scientific community agrees that mouth breathing and oral habits can have an early impact on occlusion, and if they are not changed, they can lead to malocclusion development or exacerbate it. Therefore, it is important to intercept and remove risk factors in order to prevent malocclusion and promote normal dento-skeletal growth.

The result of our study shows that there was a significant association between mouth breathing and bad habits with malocclusion. Moreover, the result of the study reported that the highest prevalence of deleterious oral habits was for mouth breathing and class I malocclusion is more often related to mouth-breathing patients when compared with other malocclusion classifications.

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