

Prevalence of Malocclusion and Its Association with Deleterious Oral Habits in Saudi School Children

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ABSTRACT

Objective: To evaluate the prevalence of malocclusion and its association with deleterious oral habits in school going children from 9 to 11 years old, in Sakaka region of Saudi Arabia

Material and Methods: The present cross-sectional study was undertaken to evaluate the prevalence of malocclusion and its association with deleterious oral habits in school going children from 9 to 11 years old, in Sakaka region of Saudi Arabia. Data were collected using a questionnaire and orthodontic examination chart.

Results: 46% of the examined children had normal occlusion. Deleterious oral habits which are deemed to be the greatest culprits in the causation of occlusal discrepancies were found to be prevalent in 79.2% of the children evaluated in the study. The highest prevalence was seen for thumb sucking, which was common in more than 70% of the subjects and the lowest prevalence was for nail biting which was common in only 9% of the subjects. **Conclusions:** habit of mouth breathing was seen among 21% of the studied population. The variables that were most strongly associated with the presence of oral habit were malocclusion and mandibular spacing although the number of subjects with oral habits displayed more occurrence of all the variables that were under consideration. Midline shift and maxillary and mandibular crowding, illustrated in this study were higher compared to those obtained from other developing countries.

Keywords: Malocclusion, Deleterious, Prevalence

INTRODUCTION

Increased concern about dental appearance during childhood and adolescence to early adulthood has been observed. The public equates good dental appearance with success in many pursuits. In general, societal forces define the norms for acceptable, normal, and attractive physical appearance¹.

The word malocclusion literally means "bad bite"^{2,3}. Malocclusion can be defined as an occlusion in which there is a malrelationship between the arches in any of the planes of spaces or in which there are anomalies in tooth position beyond normal limits³. An individual with malocclusion might develop a feeling of shame about their dental appearance and may feel shy in social situations or lose career opportunities⁴.

Malocclusion has not been thoroughly investigated because the related pain and misery are seldom acute. However, malocclusion has a large impact on both individuals and society in terms of discomfort, quality of life, and social and functional limitations^{2,5,6}. Hence, it is important to determine the prevalence of malocclusion and its occurrence

and distribution in a community. The prevalence of malocclusion varies from country to country and between different age and sex group "Habit" is a practice acquired by the frequent repetition of the same act, which occurs consciously at first, then unconsciously⁷. Pacifier sucking, followed by finger sucking are the most common harmful habits in childhood, mainly from 0 to 3 years, due to the process of development. These oral habits are major risk factors for malocclusion and their harmful consequences have been reported in several epidemiological studies^{8,9,10}.

Thus the present study was undertaken to evaluate the prevalence of malocclusion and its association with the presence of deleterious oral habits in children of the sakaka region of Saudi Arabia.

Objective

To evaluate the prevalence of malocclusion and its association with deleterious oral habits in school going children from 9 to 11 years old, in Sakaka region of Saudi Arabia.

MATERIALS AND METHODS

Table 1: Demographic information, selection criteria and armamentarium.

Selection criteria	Inclusive 1. Children from 9-11 year old. 2. Have central, lateral incisor and first permanent molar 3. Non Syndromic and non-cleft patients 4. No history of orthodontic treatment.		Exclusive 1.Children with craniofacial anomalies. 2.Previous orthodontic appliance therapy.	
Study design	Cross sectional study			
Sample size calculation	G*Power software version 3.0.10 with power 90%, α (0.05) and effect size (d) 0.50 was used			
In relation to age	9 years: 120	10 years: 120	11 years: 120	
Clinical examination	Same investigator		Same investigator	Same investigator
In relation to gender	Total Subject: 360, all children are male			
Armamentarium	Structured questionnaire 2. Examination check list 3. Dental kit			

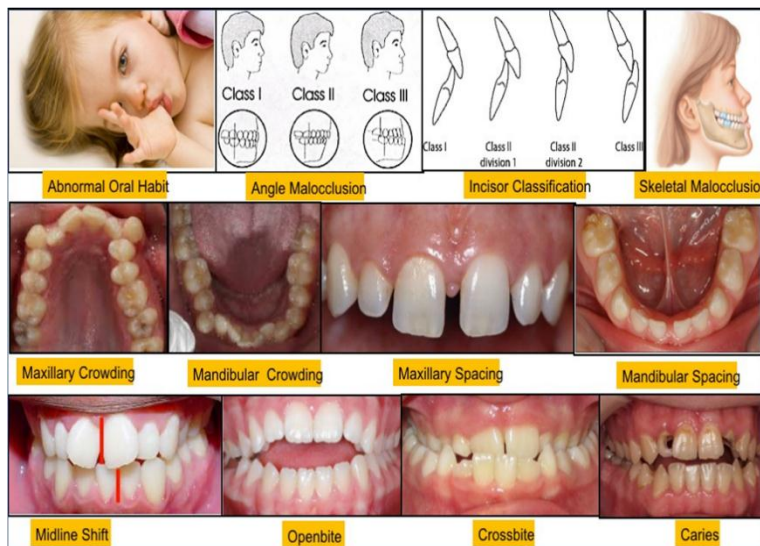


Figure 1. Abnormal oral habit and different malocclusion traits.

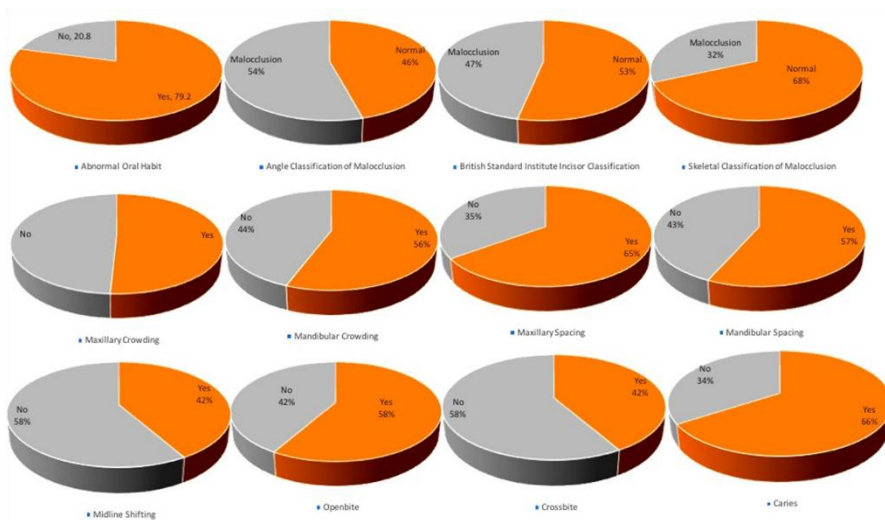


Figure 2. Subject distribution in relation to abnormal oral habit and different malocclusion traits.

Statistical analysis

The intra- and inter-examiner agreements were analyzed with the kappa statistics. According to Altman (00), the kappa values of the intra- and inter-examiner agreements were interpreted. Various factors with normal and abnormal oral habits with different malocclusion traits were evaluated by Chi square test. Logistic regression analysis was performed using the

dichotomous dependent variable, normal and abnormal oral habits groups. Both crude and backward stepwise logistic regression analyses were done to explore associations of different malocclusion traits and the abnormal oral habits. These analyses were carried out using the statistical package SPSS Version 22.0 (SPSS Inc., Chicago, IL, USA). Significance level was set at $p < 0.05$.

RESULTS**Table 2.** Intra-examiner agreements.

Intra-examiner	Kappa value	Standard error
A	0.832	0.04
B	0.868	0.039
C	0.901	0.036
D	0.869	0.05

Table 3. Association of abnormal oral habits with different malocclusion trait.

Variables		Abnormal Oral Habit		p value
		No	Yes	
Angle Classification of Malocclusion	Normal	36.4	63.6	<0.001***
	Malocclusion	7.7	92.3	
British Standard Institute Incisor Classification	Normal	29.7	70.3	0.011
	Malocclusion	10.7	89.3	
Skeletal Classification of Malocclusion	Normal	25.6	74.4	0.058
	Malocclusion	10.5	89.5	
Maxillary Crowding	Yes	19.7	80.3	0.75
	No	22	78	
Mandibular Crowding	Yes	13.4	86.6	0.025*
	No	30.2	69.8	
Maxillary Spacing	Yes	16.7	83.3	0.126
	No	28.6	71.4	
Mandibular Spacing	Yes	13.2	86.8	0.019*
	No	30.8	69.2	
Openbite	Yes	18.6	81.4	0.47
	No	24	76	
Crossbite	Yes	22	78	0.79
	No	20	80	
Midline Shifting	Yes	18	22	0.518
	No	22.9	77.1	

Table 4. Crude odds ratio (Binary logistic regression analysis): normal vs. abnormal oral habits and different malocclusion traits.

Variables	Odds Ratio	95% CI		p value
		Lower	Upper	
Angle Classification of Malocclusion	0.205	0.049	0.86	0.030*
British Standard Institute Incisor Classification	1.271	0.313	5.157	0.737
Skeletal Classification of Malocclusion	1.605	0.31	8.306	0.573
Maxillary Crowding	2.595	0.593	11.367	0.206
Mandibular Crowding	0.341	0.067	1.739	0.196
Maxillary Spacing	2.729	0.329	22.672	0.353
Mandibular Spacing	0.186	0.026	1.317	0.092
Openbite	1.224	0.232	6.447	0.812
Crossbite	0.669	0.164	2.724	0.575
Midline Shifting	0.782	0.236	2.589	0.688

An odds ratio greater than 1 indicates that the respective independent factor associates with normal oral habits, and less than 1 indicates that the respective independent factor associates with abnormal oral habits. $P < 0.05$ considered as significant. CI: confidence interval.

Table 5. Adjusted odds ratio (stepwise regression analysis: backward method): normal vs. abnormal oral habits and different malocclusion traits.

Variables	Odds Ratio	95% CI		p value
		Lower	Upper	
Angle Classification of Malocclusion	0.244	0.072	0.826	0.023*
Mandibular Spacing	0.277	0.089	0.863	0.027*

- Variables entered on step 1: Angle Classification of Malocclusion, British Standard Institute Incisor Classification, Skeletal Classification of Malocclusion, Maxillary Crowding, Mandibular Crowding, Maxillary Spacing, Mandibular Spacing, Openbite, Crossbite, Midline Shifting and Caries.
- Variables removed on step 2: Openbite
- Variables removed on step 3: British Standard Institute Incisor Classification
- Variables removed on step 4: Midline Shifting
- Variables removed on step 5: Skeletal Classification of Malocclusion
- Variables removed on step 6: Crossbite
- Variables removed on step 7: Maxillary Crowding
- Variables removed on step 8: Maxillary Spacing
- Variables removed on step 9: Mandibular Crowding

DISCUSSION

The present study determined the prevalence of malocclusion, and the relationship of malocclusion with associated factors, such as deleterious oral habits, in Saudi school going population of 9 to 11-year-old children in Sakaka city. The mixed dentition period, as observed in this study gives a fair indication of any developing malocclusion and hence provide an opportunity for timely intervention and intercepting any probable development of a malocclusion. Results of this study revealed that 46% of the examined children had normal occlusion.

This is in contrary to the results obtained by Murshid et al¹¹, Ciuffolo et al¹², and Thilander et al¹³, who found that 92, 93, and 88% of the examined adolescents had some type of occlusal anomalies respectively. Deleterious oral habits which are deemed to be the greatest culprits in the causation of occlusal discrepancies were found to be prevalent in 79.2% of the children evaluated in the study. The highest prevalence was seen for thumb

sucking, which was common in more than 70% of the subjects and the lowest prevalence was for nail biting which was common in only 9% of the subjects. The habit of mouth breathing was seen among 21% of study population and the results were significantly higher when compared to the findings of the study done by Garde *et al.* (2014) among 6 to 12 year old children who found that the habit is in only 4.3% of their population. This huge difference might lie in the difference between the methodologies of the researches and the fact that in the current study even subjects with mixed mouth and nasal breathing were considered as mouth breathers.

The various orthodontic variables (Table 3) were subjected to binary logistic regression analysis (Table 4) and stepwise regression analysis (Table 5) and the variables that were most strongly associated with the presence of oral habit were malocclusion and mandibular spacing although the number of subjects with oral habits displayed more occurrence of all the variables that were under consideration. Midline shift and maxillary and mandibular crowding, illustrated in this study were higher compared to those obtained from other developing countries^{14,15}

CONCLUSION

Results of this study indicated that the prevalence of malocclusion secondary to deleterious oral habits is high in the children of Sakaka region. Thus, a greater awareness as to the effect of deleterious oral habits need to be imparted to the people of this region along with increased delivery of interceptive procedures so as to intercept and stop the development of malocclusion at an early age and thus preventing the children from going through the feelings of low self-esteem, a diminished quality of life and other negative aspects associated with malocclusion.

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