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Prevalence of Anterior Open Bite among Sample of Sudanese University Students

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Abstract

Objective: The aims of this study were to determine the prevalence and etiological factors of anterior open bite in the permanent dentition in a sample of Sudanese university students.

Materials and methods: A cross section study for 1224 Sudanese university students (612 males and 612 females), age ranges between 17 and 23 years old. Anterior open bite was registered when there was lack of contact between the anterior teeth while the posterior ones stayed in occlusion.

Results: The prevalence of anterior open bite among 1224 university students was 8.5% (11.77% in males and 5.23% in females). The most common etiological factor was thumb sucking habit (24.1%). Moderate anterior open bite had the highest percentage (59.6%) among the students with open bite followed by severe anterior open bite (32.7%) and the extreme anterior open bite had the lowest percentage (7.7%).

Conclusion: Prevalence of anterior open bite in this study was high 8.5%. Thumb sucking habit was the most common cause of anterior open bite among the students.

Keywords: Anterior open bite, Thumb sucking, University students

Introduction

Open bite was defined as lack of vertical overlap between the incisor edges of the maxillary and mandibular anterior teeth. It can be either located anterior or posterior and can be either dental or skeletal in origin [1]. It was found to be significantly associated with temporomandibular joint disorders [2-4]. Adolescent patients with anterior open bite commonly have masticatory muscle dysfunction [5].

Anterior open bite can be either simple or complex [6]. Simple anterior open bite is the vertical separation of anterior teeth that extends up to premolars, whereas the complex is the vertical separation of anterior teeth that extends up to the molars. Dental open bites are mainly due to reduced dento alveolar vertical heights [7].

Worldwide, the prevalence of anterior open bite in previous studies was ranging between 1.6% and 47.1% [8-24]. Females were reported to have higher incidence of anterior open bite than males [9,13,14,16-18]. Furthermore according to age, anterior open bite was more frequent among children than adults (1.5-24.5%) [8,11,20].

The etiological factors of anterior open bite are either bad habit; thumb sucking, pacifier use, mouth breathing, lip and tongue habits or abnormalities in the skeletal growth. In children, it is mainly due to non-nutritive sucking habits, thumb sucking and pacifier use. Non-nutritive sucking habits had been explained by two theories; learning theory and Freud's psychoanalytic theory. In addition, abnormal tongue function was also attributed to anterior open bite [20].

Anterior open bite considered one of the most challenging dento-facial deformities to treat due to the difficulties in determining the causes, formulating a diagnosis and the potential for relapse after treatment [21-25]. It can be treated either by the removal of etiological factors and closure of the bite by normal eruptive process or by orthodontic appliances. Whereas, the difficult cases are treated by intrusion (either active or relative intrusion achieved by inhibiting eruption of the posterior teeth) is attempted with orthodontic appliances. Orthognathic surgery is the last and only resort for complicated cases [26].

A vast amount of information regarding the open bite; prevalence, etiological factors and treatment are available among different populations [8-24].

In Africa, the incidence of anterior open bite ranged between 1.6% and 2.8% [8-10]. Idia N Ize-Lyamu et al., reported 2.8% of anterior open bite among 1031 Nigerian children between 2 and 5 years old and 33% of the children were thumb suckers [8]. Whereas, Abu Affan et al. reported less percentage (2%) among 635 Sudanese 12 year old children [9]. Mahmoud et al., found the least percentage (1.6%) among Egyptian adolescents [10].

To our knowledge, there is no available data about the prevalence of anterior open bite among Sudanese adults population. Therefore, this study has been designed to create base line information by evaluating the prevalence of anterior open bite and its etiology factors among a sample of university students.

Material and Method

A descriptive cross section study was carried out at the University of Medical Science and

Technology, Khartoum, Sudan, from December 2014 to March 2015.

Approval letter from the Ethical committee of the university of

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Medical Science and Technology Faculty of Dentistry was obtained prior to the conduction of the study.

Sudanese students with no history of orthodontic treatment, syndromes or any craniofacial anomalies were selected according to a stratified sampling technique. The desirable sample size was 1224 student. An informed consent was obtained from each student. Before taking part in this study all participants were given a brief about the aim and the methods that will be carried out.

A questionnaire was given to each participant. It included gender, presence or absence of bad habits and the type of bad habit (thumb sucking, pacifier sucking, tongue sucking, lip biting and mouth breathing). A clinical examination to determine the severity of anterior open bite using sterile gloves and a disinfected ruler to measure the distance between the incisal edges of the upper and lower incisors was carried out for each selected student in ordinary chair in the daylight. The anterior open bite was recorded when there was lack of vertical overlap between upper and lower anterior teeth when the teeth in centric occlusion. The severity of anterior open bite has been classified in the present study into; moderate (0-2 mm), severe (2-4 mm) and extreme (>4 mm). All the examination was performed by the main investigators.

Data analysis

Data were collected, summarized, cleaned and coded; then entered to the Statistical Package for Social Sciences (SPSS) program (version 20). Frequency tables and descriptive statistic were done. Chi square test was used P-value of less than 0-05 was considered as significant.

Results

The number of the examined students was 1224 (612 males and 612 females) with an age group that ranges between 17 and 23 years old.

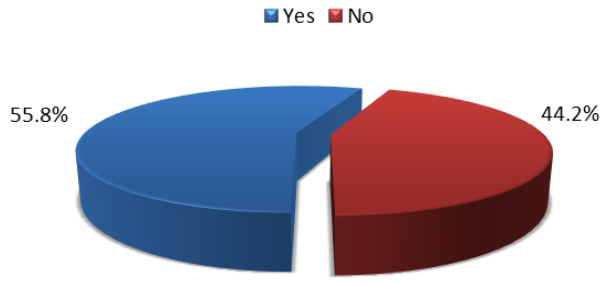

Figure 1: Percentage of student with open bite practicing bad habits.

Gender	Normal bite	Open bite	Total
Male	540(88.23)	72(11.77)	612(100.0)
Female	580(94.77)	32(5.23)	612(100.0)
Total	1120(91.50)	104(8.50)	1224(100.0)
P-Value = 0.023			

Table 1: Prevalence of anterior open bite among gender (%).

Practicing of bad habits	Gender		Total
	Male	Female	
Yes	36(50.0)	22(68.75)	58(55.77)
No	36(50.0)	10(31.25)	46(44.23)
Total	72(100.0)	32(100.0)	104(100.0)
P-Value = 0.209			

Table 2: Practicing of bad habits among gender with open bite (%).

Practicing one of the bad habits	Severity of anterior open bite			Total
	Moderate(0-2 mm)	Severe(2-4 mm)	Extreme(>4 mm)	
Not Applicable	34(32.69)	10(9.62)	2(1.92)	46(44.23)
Thumb sucking habit	6(5.77)	8(7.69)	0(0.0)	14(13.46)
Pacifier sucking habit	0(0.0)	0(0.0)	2(1.92)	2(1.92)
Tongue thrust habit	0(0.0)	2(1.92)	2(1.92)	4(3.85)
Lip biting	6(5.77)	2(1.92)	0(0.0)	8(7.69)
Mouth breathing habit	6(5.77)	2(1.92)	2(1.92)	10(9.62)
More than one habits	10(9.62)	8(7.69)	2(1.92)	20(19.23)
Total	62(59.62)	32(30.77)	10(9.62)	104(100,0)
P-Value = 0.023				

Table 3: Association between bad habits and the severity of anterior open bite among students with open bite (%).

Severity of anterior open bite	Gender		Total
	Male	Female	
Moderate (0-2 mm)	42(40.38)	20(19.23)	62(59.62)
Severe (2-4 mm)	22(21.15)	12(11.54)	34(32.69)
Extreme (>4 mm)	8(7.69)	0(0.0)	8(7.69)
Total	72(69.23)	32(30.77)	104(100.0)
P-value = 0.373			

Table 4: The severity of anterior open bite among gender (%).

The prevalence of anterior open bite among the students was recorded 8.5%, and the majority 91.5% of the students had normal bite. More than half (55.8%) of the students with open bite had practiced bad habits Figure 1.

Table 1 showed that anterior open bite was reported on 8.5% of the study students it more common among males' students (11.77%) than females (5.23%). A significant different was observed P = 0.023.

In Table 2, it was noticed that males practiced bad habits (50%) whereas, females (68.75%). There was no association in practicing bad habits within gender (P value = 0.209).

In Table 3 it is clear that moderate anterior open bite was most commonly caused by lip biting habit, thumb sucking, mouth breathing (5.77%) and more than one habit (9.62%) while severe anterior open bite was mainly caused by thumb sucking habit and more than one habit (7.69%). However, the extreme anterior open bite was mainly caused by pacifier, mouth breathing, tongue thrust habits and more than one habit (1.92%). There was a significant difference between etiology of anterior open bite and its severity (P value = 0.023).

In addition the moderate anterior open bite due to more than one habit has the highest percentage (9.62%) while the severe and extreme anterior open bite due to pacifier sucking, tongue thrust and more than one habit have the least percentage (1.92%).

In Table 4, it is clear that no female were recorded to have extreme open bite while 8 males had. The majority of the students with open bite had moderate and severe degree of open bite. There was no significant difference of the severity of anterior open bite among gender (P value = 0.373).

Discussion

This is a cross sectional study aimed to determine the prevalence

of anterior open bite and its etiological factors among a sample of university students in Khartoum –Sudan.

The outcome of this study demonstrated an increase in the prevalence of anterior open bite 8.5% among 1224 university students compared to previous study among Sudanese school children by Abu Affan et al., which reported a very low percentage (2%) of anterior open bite [9]. However, it was similar to the studies conducted by Khalil Ahmed et al., among 118 patients [16] and Gelgaor et al., among adolescents in central Aantolia [27]. Howerver, it more than the percentages reported in previous studies that range between 1.6% and 5% [8,10,13,15,17-20]. On the other hand, it was less than the percentages reported among other population 16.9%, 17.7% and 32% [12,11,21].

This study showed that anterior open bite is more common in males (11.77%) than females (5.23%) approximately the ratio was 2:1. Which in consistent to the results reported by Hameedullah et al., low male to female ratio 2:1 of anterior open bit [18]. Moreover, among 1585 Yemeni university students males were recorded more affected with open bite than females with a ratio of 4:1 [28].

In contrast numerous previous studies found that anterior open bite was more common in females than males [10,13,15,16-18]. A high female to male ratio 5: 3 was recorded by Mohamed et al., among 5000 Egyptian Population [10], while Shahri et al., Khalil et al., and Saqib et al., [15-17] reported lower ratio.

Variations in the prevalence of anterior open bite among genders can be partially attributed to the fact that the Sudanese parents and other Islamic community are more concern about the appearance of girls than boys and try to observed, prevent and treat all kinds of the abnormalities concerning the teeth and reflect unpleasant appearance on the smile of their daughters at early age.

Regarding the etiology of anterior open bite, the present result revealed that thumb sucking habit was the most common cause (24.1%), followed by mouth breathing habit (17.2%) then lip biting (13.8%) and tongue thrust (6.9%) and the least common was pacifier sucking habit (3.4%) (Figure 2). Which in agreement with Ize-Iyamu et al. results, thumb sucking was found to be the most important etiological factor of an anterior open bite in younger age group in Negeria [8].

Concerning the severity of anterior open bite in the current study, the moderate anterior open bite had the highest percentage (59.6%) followed by severe anterior open bite (32.7%), however, the extreme anterior open bite had the lowest percentage (7.7%). Khalil et al., reported that 3% of the patients had moderate anterior open bite (less than 1 mm) and 5% of the patients had severe anterior open bite (1.1-2 mm) [16]. However, Saqib et al., reported that (60%) of the patients had moderate anterior open bite of less than 1 mm, while (40%) of the patients had severe anterior open bite of between 1.1- 2 mm, [17]. which are slightly similar to results of this study.

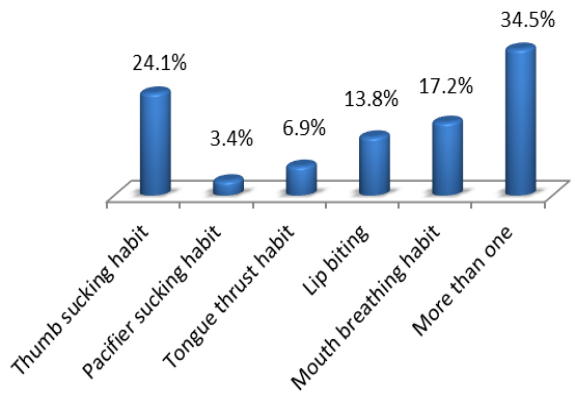

Figure 2: Shows the distribution of etiological factors of open bite among students and it obvious that the thumb sucking habit was the most common cause (24.1%) and pacifier sucking habit were the least one (3.4%). Whereas, (34.5%) of the students used to practice more than one bad habit.

However, it very hard to compare between the current results and other finding worldwide in part due to varying methods and indices used for performing these studies and other variables such as differences between the age group and sample sizes of each population

Conclusion

1. The prevalence of anterior open bite among Sudanese university students was 8.5%. Males (11.77%) show more prevalence than females (5.23%) with a ratio 2:1. The most common etiological factor of anterior open bite is thumb sucking habit.
2. Moderate anterior open bite had the highest percentage (59.6%) followed by severe anterior open bite (32.7%); however, the extreme anterior open bite had the lowest percentage (7.7%).
3. Moderate anterior open bite was most commonly caused by lip biting habit, thumb sucking, mouth breathing (5.77%) and more than one habit (9.62%) while severe anterior open bite was mainly caused by thumb sucking habit and more than one habit (7.69%). However, the extreme anterior open bite was mainly caused by pacifier, mouth breathing, tongue thrust habits and more than one habit (1.92%).

Recommendations

A larger sample size is recommended to be studied in the future with different age groups and in different areas in Sudan to determine the overall prevalence of anterior open bite and its etiological factors, on the other hand, this study will raise the awareness upon bad habits and their side effects on the permanent dentition. Therefore, detection and prevention and of this problems earlier can assist, improved treatment and evade the aggravation of occlusal alterations at elder age.

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