

## Prevalence of Anterior Open Bite among Yemeni Adults

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### Abstract

**Background:** Anterior open bites a vertical discrepancy where the upper incisors crowns fail to overlap the lower incisors crown when the mandible brought into the centric occlusion. The aims of this study were to determine the prevalence of anterior open bite in the permanent dentition in a sample of sample of Yemeni adults, 18-25 years old in Sana'a city.

**Materials and methods:** The study was conducted in Sana'a at the faculties of dentistry (Sana'a, Al-Salam, and Science and Technology Universities) to ensure a mixed ethnic sample from all cities in Yemen for a sample of 1585 students (576 male and 1009 female). The overbite was recorded in the dental clinics for the dental students directly in the oral cavity by measuring with metallic rulers the degree of the vertical overlap of the upper incisors to the lower incisors during centric occlusion. The data was processed and analyzed using computer software program "SPSS" (Statistical Package for Social Sciences) version 17. A descriptive statistical analysis was used in this study.

**Results:** The overall prevalence of the anterior open bite in the current study was 4.1%, more frequent among male (8%) than female (1.9%). The normal overbite account was 41.2%, increased overbite reported in 26.75% of the sample, reduced over bite in 22.15%, while edge to edge was recorded in 5.8% of the sample.

**Conclusion:** The prevalence of anterior open bite in Yemeni adults was 4.1%. Males generally showed a higher percentage, 4 times more than female (7.99 in male and 1.88 in female).

**Keywords:** Open bite; Anterior teeth; University students; Edge to edge bite

### Introduction

Anterior open bite is a major occlusal disorder in the vertical relationship [1] had been defined by several authors as the absence of vertical overlap between the upper and the lower incisors when the posterior teeth are in centric occlusion [2,3].

The etiology of anterior open bite is multi-factorial involving genetic, as well as environmental factors. The genetic factors had been studied by many authors and association had been reported [4,5]. This association is caused by a genetically determined anomaly of craniofacial development, rather than local factors influencing alveolar growth. Environmental factors such as tongue thrust, nasal obstruction, enlarged lymphatic tissue, hypertrophic tonsils, aberrant muscle function, supernumerary teeth, abnormal tongue posture, mouth breathing, lip, thumb, pipe, pencil, or finger-biting and sucking habits [4-9].

Several classifications of anterior open bite had been stated in the literature [3,10]. Moyers classification is the most commonly used, depends on the severity of the anterior open bite which is either simple dental origin or complex skeletal origin and It's usually associated with Class I, II or III skeletal discrepancies [10]. According to McNamara, open bite is either dental or skeletal; the dental open bite is localized to the anterior teeth and the surrounding soft and hard tissues without presenting any skeletal defect in cephalometric radiograph. While, skeletal open bite shows vertical disharmony [3].

The parameters of the dental open bite are un erupted anterior teeth and proclaimed incisors while skeletal open bite is characterized by one or more clinical features such as an increase in the anterior facial height, chronic gum infections and periodontal enlargement, posterior cross bite, short ramus, steep mandibular plane angle, palatal plane tipped upward anteriorly, increase in the angles between the mandibular plane and the cranial base (backward rotation of the mandible), angle between Y axis and the cranial base [11-13].

The aesthetic appearance of open bite individuals are unpleasant psychological impact in the social life and communication [14]. Patients with severe facial deformity show a significantly higher prevalence of emotional instability, introversion, anxiety, psychological distress, depression, adverse psychological reactions, and unsociability [15]. In addition, the stomatognathic function may be affected such as speech impediments and difficulty incising food [16,17]. Enhancement in esthetic satisfaction by treating such cases will progress oral health-related quality of life and establishing a better oral hygiene, mainly by diminishing psychological discomfort and disability [18].

Numbers of epidemiological studies regarding the prevalence of anterior open bite have given a vast amount of information on it is occurrences at a different dental stages, its prevalence and distribution in various part of the world. Different results have been achieved by several authors showing the wide range of variety in the prevalence of anterior open bite among different population, ages and ethnic groups [19-25].

Camilleri and Mulligan reported only 1% of open bite among Malta Population [19]. In contrast Tschill reported a prevalence of 37.6% among Caucasian [20].

In recent decades, the demand for orthodontic treatment has

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increased in many countries. About 10 years ago a similar situation started to develop in Yemen i.e., the number of patients seeking orthodontic treatment in has increased markedly from one year to another. Therefore, Knowledge about the prevalence of anterior open bite is essential in assessing resources that are required, and for setting up of efficient orthodontic services in the society. Therefore, the present study had been designed to determine the prevalence of anterior open bite among adults population.

## Materials and Methods

The present study had been carried out for all dental students (no students refused to participate in the study) at the faculties of dentistry in; Sana'a, Al-Salam and the Science and Technology Universities, in Sana'a, for practical reason in assessing the dental clinics, and to ensure consistency of the study sample since the enrolled students were from the majority of the cities in Yemen. All the students enrolled in the study were of Yemeni nationality, aged 18-25 years old, and no previous orthodontic treatment or in active orthodontic treatment and students who had no syndromes or any craniofacial anomalies. The students were informed about the aims of the research and the steps required for collecting the information at the lecture room. Clinical examination was carried out for 1585 dental students (1009 female and 576 male) in the dental clinic at each university. The overbite was recorded for each student according to the degree of vertical overlap of the lower incisors by the upper incisors in centric occlusion by metallic rulers directly in the oral cavity. The overbite was considered normal if the maxillary central incisors overlapped the incisal one-third of the mandibular central incisors. Excessive relation if the overlap exceeded the middle third of the lower central incisors crown and reduced when it was less than incisal one third of the crown. An edge-to-edge incisor relationship was recorded if the maxillary and mandibular incisors occluded on their incisal edges. Anterior open bite was diagnosed when there was a vertical gap between the maxillary and mandibular incisor edges with the teeth in centric occlusion. All the examination performed by the main researcher. The study protocol was ethically approved by the university research committees.

## Data processing and analysis

Data was collected, summarized, coded and entered to the Statistical Package for Social Sciences (SPSS) program (version 17) into the computer. A descriptive statistical analysis was used (demographic statistic). The results presented in tables.

## Results

A total of 1585 students 18-25 years old were involved in this study. The majority were female 1009, while 576 were male. Table 1, shows the distribution of the vertical relationship among the whole sample, male and female. It is clear that normal vertical relationship was the most frequent occurrence followed by increase over bite and the least one are anterior open bite among both gender. However, it observed 4 times in male 7.99% than female 1.88% (Table 2).

## Discussion

A descriptive cross-section study was conducted to determine the prevalence of anterior open bite among a sample of Yamani university student's 18-25 years old at Sana'a city age. The results showed that the overall prevalence of anterior open bite was 4.1% and it 4 times more common among males than females a ratio of 4:1.

Camilleri and Mulligan reported less percentage 1% of open bite among Malta school children [19] than the present finding. However,

current percentage of the anterior open bite was in agreement with the finding among Pakistani, Lithuania and Lebanon, population when [21-23]. Whereas, slightly less percentage were recorded among; Kuwaiti, Iranian and in Indian studied sample [24-26].

In contrast extremely high percentage 37.6% of open bite had been recorded by Tschill among Caucasian in the deciduous dentition [20]. Moreover, previous results in Colombia, Nigeria, and Nepal revealed a little more percentage than the current study 9%, 7% and 5% respectively [27-29].

Worldwide open bite prevalence in deciduous and early mixed dentition showed increase percentage when evaluated with permanent dentition [22,27,29-32]. This is wide variation in the prevalence of anterior open bite, can be partially attributed to the study sample size, age of the individual; younger age had a high percentage mainly due to habits which diminish by age, environmental factors as well as ethnic back ground.

Concerning gender, open bite were reported four time more in male than female in the present study ratio 4:1 which in contrast with previous studies in Lebanon, India and Pakistan in which open bite reported more among females [21,23,26].

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. There is a reality that the Yamani parents are more worried about the facade of their daughters, and all effort can be spend to prevent and intercept the foretell abnormalities in the developing dentition at early age so as to comprise attractive smile in the prospect life.

## Conclusion

The prevalence of anterior open bite in Yemeni adults is 4.1%. It is 4 times more in male than female (7.99 in male and 1.88 in female). The normal overbite account 41.2%, 26.75% increased overbite, reduced 22.15%, and edge to edge in 5.8%.

## Limitations

The study excluded the risk factors of open bite due to the fact that, the majority of the students with open bite had difficulties to memorize the exact causes or may be ashamed to tell truth. However, only two students stated "genetic factors".

## Recommendations

A larger sample size is recommended to be studied in the future

Vertical relationship	Male	Female	Total
Normal	217 (37.7)	436 (43.2)	653 (41.1)
Increased	113 (19.5)	311 (30.8)	424 (26.8)
Reduced	149 (25.9)	202 (20.0)	351 (22.2)
Edge to Edge	51 (8.9)	41 (4.1)	92 (5.8)
Anterior Open bite	46 (8.0)	19 (1.9)	65 (4.1)
Total	576 (100)	1009 (100)	1585 (100)

Table 1: Distribution of vertical relationship among the study sample (%).

Gender	Number	Open bite	Percentage
Male	576	46	7.99%
Female	1009	19	1.88%
Total	1585	51	4.1%

Table 2: Male to female ratio in relation to anterior open bite.

with different age groups and in different areas in Yemen to determine the overall prevalence of anterior open bite and its etiological factors so as to raise the awareness upon bad habits and their side effects on the permanent dentition in order to avoid further complication at adults hood.

## References

1. Subtelny JD, Sakuda M (1964) Open bite diagnosis and treatment. *Am J Orthod* 50: 337-358.
2. Proffit WR, Fields HW (2000) *Contemporary Orthodontics*. 3rd edn. St. Louis, MO, Mosby. pp: 135-137, 142, 189.
3. Mcnamara J, Brudon W (2001) *Orthodontics and Dentofacial Orthopedics*. 1st edn. Needham Press Inc. pp: 112-115.
4. King L, Harris EF, Tolley EA (1993) Heritability of cephalometric and occlusal variables as assessed from siblings with overt malocclusions. *Am J Orthod Dentofacial Orthop* 104: 121-131.
5. Rowley R, Hill FJ, Winter GB (1982) An investigation of the association between anterior open-bite and amelogenesis imperfecta. *Am J Orthod* 81: 229-235.
6. Takeyama H, Honzawa O, Hozaki T, Kiyomura H (1990) A case of open bite with Turner's syndrome. *Am J Orthod Dentofacial Orthop* 97: 505-509.
7. Watson WG (1981) Open-bite-a multifactorial event. *Am J Orthod* 80: 443-446.
8. Linder-aronsen S (1974) Effects of adenoidectomy on dentition & nasopharynx. *Am J Orthod* 65: 1-15.
9. Lowe A (1980) Correlations between orofacial muscle activity and craniofacial morphology in a sample of control and anterior open bite subjects. *Am J Orthod* 78: 89-98.
10. Moyer RE (1988) *Handbook of Orthodontics*. 4th edn. Michigan, Mosby. pp: 420-431.
11. Klocke A, Nanda RS, Kahl-Nieke B (2002) Anterior open bites in the deciduous dentition: Longitudinal follow-up and craniofacial growth considerations. *Am J Orthod Dentofacial Orthop* 122: 353-358.
12. Nahoum HI (1971) Vertical proportions and the palatal plane in anterior open-bite. *Am J Orthod* 59: 273-282.
13. Cangialosi TJ (1984) Skeletal morphologic features of anterior open bite. *Am J Orthod* 85: 28-36.
14. Jacobson A (1984) Psychological aspects of dentofacial esthetics and orthognathic surgery. *Angle Orthod* 54: 18-35.
15. Kovalenko A, Slabkovskaya A, Drobysheva N, Persin L, Drobyshev A, et al. (2012) The association between the psychological status and the severity of facial deformity in orthognathic patients. *Angle Orthod* 82: 396-402.
16. Tanaka E, Iwabe T, Watanabe M, Kato M, Tanne K (2003) An adolescent case of anterior open bite with masticatory muscle dysfunction. *Angle Orthod* 73: 608-613.
17. Humber P (2011) Anterior open bites: old problem, new solutions. *Aesthetic dentistry today* 5: 35-37.
18. Silvola AS, Varimo M, Tolvanen M, Rusanen J, Lahti S, et al. (2014) Dental esthetics and quality of life in adults with severe malocclusion before and after treatment. *Angle Orthod* 84: 594-599.
19. Camilleri S, Mulligan K (2007) The prevalence of malocclusion in Maltese schoolchildren as measured by the Index of Orthodontic Treatment Need. *Malta Medical Journal* 19: 19-24.
20. Tschill P, Bacon W, Sonko A (1997) Malocclusion in the deciduous dentition of Caucasian children. *Eur J Orthod* 19: 361-367.
21. Marwat HJ, Amin B, Khan A (2008) Frequency of Anterior Open Bite Patients Reporting To Afid. *Pakistan Oral & Dental Journal* 28: 71-74.
22. Sidlauskas A, Lopatiene K (2009) The prevalence of malocclusion among 7-15 year old Lithuanian school children. *Medicina (Kaunas)* 45: 147-152.
23. Kassis A, Serhal JB, Nassif BN (2010) Malocclusion in Lebanese Orthodontic Patients: An Epidemiologic and Analytic Study: An Observational Retrospective Study. *IAJD* 1: 34-43.
24. Behbehani F, Artun J, Al-Jame B, Kerosuo H (2005) Prevalence and severity of malocclusion in adolescent Kuwaitis. *Med Princ Pract* 14: 390-395.
25. Atashi MHA (2007) Prevalence of Malocclusion in 13-15 Year old Adolescents in Tabriz. *Journal of Dental Research, Dental Clinics, Dental Prospects* 1: 13-18.
26. Shivakumar KM, Chandu GN, Reddy S, Shafiulla MD (2009) Prevalence of malocclusion and orthodontic treatment among middle and high school children of Davangere city, India by using Dental Aesthetic Index. *J Indian Soc Pedod Prevent Dent* 27: 211-218.
27. Thilander B, Pena L, Infanta C, Parada SS, Mayorga CD (2001) Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. *Euro J Orth* 23: 153-167.
28. Onyeaso CO (2004) Prevalence of malocclusion among adolescents in Ibadan, Nigeria. *Am J Orthod Dentofacial Orthop* 126: 604-607.
29. Sharma JN (2010) Pattern of distribution of malocclusions in patients seeking orthodontic treatment at Bpkhns from Sunsari district of Nepal. *Health Renaissance* 8: 93-96.
30. Lux CJ, Dücker B, Pritsch M, Komposch G, Niekusch U (2009) Occlusal status and prevalence of occlusal malocclusion traits among 9 year old school children. *Eur J Orthod* 31: 294-299.
31. Urzal V, Braga AC, Ferreira AP (2013) The prevalence of anterior open bite in Portuguese children during deciduous and mixed dentition--correlations for a prevention strategy. *Int Orthod* 11: 93-103.
32. Bagdadi H (2008) The Most Important Morphological Features of Anterior Open Bite among Syrian Population. Master degree thesis, Damascus University, Syria.