

The prevalence of malocclusion among 14-18 years old students in Shiraz

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Original Article

Abstract

BACKGROUND AND AIM: Malocclusions are major traits whose prevalence should be noticed, by gender, among high school students to program oral health status in a society and clarify the needs and demands of this orthodontic field.

METHODS: In a cross-sectional population-based study, using a stratified random cluster sampling design, a sample of 1338 students of Shiraz, aged 14-18 years from 15 high schools, located in four different regions of Shiraz was obtained and evaluated clinically for malocclusion traits. Using tongue blades, researchers studied the students under normal room illumination conditions.

RESULTS: The overall prevalence of malocclusion was 23.70%. Angle's classes I, II, and III malocclusion were observed in 12.78%, 9.94%, and 0.97% of the samples, respectively. There was no statistically significant difference in the overall prevalence of malocclusion between sexes. Other malocclusion traits evaluated were edge-to-edge occlusion (4.78%), crossbite (1.93%), and open bite (1.19%).

CONCLUSION: The results of this study showed a high prevalence of malocclusion class I as well as an edge to edge malocclusion trait. Considering the findings, health care officials are expected to pay more attention to oral health fields.

KEYWORDS: Malocclusion, Adolescents, Oral Health Status, Shiraz, Iran

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The evaluation of occlusion is a part of study designed to determine the oral health status in a population. The prevalence of malocclusion has been observed to range between 20% and 80% in the majority of reports.¹⁻⁴ This wide range is mainly due to the various and sometimes divergent criteria used in assessing dental and jaw relationships in the population studied. The factors influencing the malocclusion prevalence in different studies include age, sex, genetic, and environmental differences in each population and also variations according to individual

investigators.¹

Such studies have not been done in most areas of our country, so this valuable data among adolescents is missing for oral health policies in the country. Policies that finally affect one's quality of life. With this data, health managers can be helped by estimating facilities and budget needed to improve oral health. Shiraz is the biggest capital in South of Iran with a mixture of different races in its population. The aim of this cross-sectional study was to evaluate the prevalence and distribution, by gender, of malocclusion and

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malocclusion traits among high school students in Shiraz.

Methods

Using a stratified cluster sampling method in fifteen high schools of four regions of Shiraz, we examined 1338 high school students; 621 boys and 717 girls, aged 14-18 years. In our sampling, we excluded other students, those not in the range of 14-18 years, students with the history of trauma to the head and jaws and those with orthodontic treatment experience without the availability of the initial study models. Using gloves, mirrors, and spatules in a regular well-lit classroom, a single operator scored molar and canine relationship, overjet, overbite and anterior and posterior crossbite under standardized and validated recording criteria after getting written consent.

The basic angle classification was used in assessing occlusion. Students with class I molar relationship, normal overbite, and overjet (ranging 1-3 mm), correct axial inclinations, proper alignment and minimal crowding were classified as normal, otherwise as class I malocclusion. The occlusion was categorized as class II if the mandibular teeth were distal by a full width of a premolar or by half the width of a molar, or if the mandibular canine interdigitated into the embrasure between the maxillary canine and the first premolar in the absence of first molars. A division was also recorded for this class. If the mandibular teeth were mesial by a full width of a premolar or by half the width of a molar, or if the maxillary canine interdigitated into

the embrasure between the first and second mandibular premolars in the absence of first molars, the occlusion was classified as class III malocclusion. For the malocclusion traits of open bites, crossbites, and edge to edge occlusion, the students were also checked. Finally, the data were analyzed using chi-square and t-test statistics with 95% confidence intervals to investigate the relationship between gender and malocclusion characteristics.

Results

Approximately, one-third of the students had some form of malocclusion with the same prevalence in male and female students according to the criteria used. Overall, prevalence of malocclusion class I was 12.70%, class II malocclusion was 9.94% (4.78% division I and 5.16% division II), and class III malocclusion was 0.97%. There were no statistically significant differences in malocclusion between sexes ($P > 0.05$) (Table 1).

The malocclusion traits detected were edge to edge occlusion (4.78%), open bites (1.19%), and crossbites (1.93%). Sex differences, though not statistically significant, were observed in these traits, as follows: while anterior open bites (0.82%), posterior open bites (0.37%), and unilateral crossbites (1.56%) were more commonly observed in females, in males, edge-to-edge occlusions were found more frequently. Furthermore, bilateral crossbites were exclusively seen in females. However, it is worth mentioning that the differences observed were not statistically significant ($P > 0.05$) (Table 2).

Table 1. Prevalence of malocclusion in students of Shiraz (1338 students) according to sex and angle classification

Malocclusions (angel classification)	621 males		717 females		Total	
	Number	Percent	Number	Percent	Number	Percent
Normal occlusion	464	74.71	557	77.68	1021	76.30
Class I malocclusion	78	12.56	93	12.97	171	12.78
Class II malocclusion	68	10.95	65	9.06	133	9.94
Class II malocclusion division I	32	5.15	32	4.46	64	4.78
Class II malocclusion division II	36	5.79	33	4.60	69	5.16
Class III malocclusion	11	1.77	2	0.27	13	0.97
Total malocclusion	157	25.29	160	22.32	317	23.70

Table 2. Prevalence of malocclusion traits in students of Shiraz (1338 students) according to sex

Malocclusion traits	621 males		717 females		Total	
	Number	Percent	Number	Percent	Number	Percent
Edge to edge occlusion	38	6.11	26	3.62	64	4.78
Anterior open bite	2	0.32	9	1.25	11	0.82
Posterior open bite	2	0.32	3	0.41	5	0.37
Unilateral crossbite	8	1.28	13	1.81	21	1.56
Bilateral crossbite	0	0.00	5	0.69	5	0.37
Total malocclusion traits	50	8.05	56	7.81	106	7.92

Discussion

It is very hard to estimate the prevalence of malocclusion in a population due to the different criteria used to define it. As a result, the validity of comparing one study with other ones is questionable.¹ For instance; Grainger developed the orthodontic treatment priority index (TPI), which summed six occlusal features into a score. This score differentiates persons with normal occlusion from those with varying degree of malocclusion. For example, in TPI, molar relation, horizontal incisor relation, vertical incisor relation, tooth displacement, congenital missing, and posterior crossbites are used as occlusal features.⁵

Other methods in assessing malocclusion such as malocclusion severity index⁶ and Salzmann⁷ handicapping malocclusion assessment may be used with lower frequency. Overall, we have a great number of methods, each introducing its own features or traits for defining malocclusion. For example, a dental survey of 715 children, with the age range of 4-18 years, was conducted in Ghana. Those with normal occlusion numbered 61.40%, and those with class I malocclusion was about 36.10%.⁸ These values were lower in comparison with Chinese children who showed about 58.80% class I malocclusion.⁹ Another argument is about the definition of every trait used in different indices. Other factors influencing the malocclusion prevalence in different studies include: age, sex, genetic, and environmental differences in each population.¹

In our study, there were no statistically

significant differences in malocclusion between sexes. In the study of Grewe et al.¹ concerning malocclusion, also no differences in sexes were found, but there were sex differences in studying other malocclusion traits. In contrast, Abu Alhajja et al.¹⁰ and Bjoerk et al.¹¹ using registration method, examined 13-15 years old students in search of malocclusion prevalence in North Jordanian School. They could not find any differences in sexes with regard to malocclusion traits. In a survey done by Foster, he examined 462 Indian children in Northern Wisconsin. He could relate a few types of malocclusion to the ancestry of the population he studied. He found that class II malocclusion were mostly seen in children with Caucasian ancestry while class III malocclusion were more frequently observed in those with Indian ancestry.⁴ Unfortunately, as our population is very mixed in its ancestry we could not include this factor in our study.

Owing to the impact of malocclusion on the quality of human life, it is crucially important to study malocclusion prevalence. Traebert and Peres for instance, conducted a study on this issue. They obtained these malocclusion data through the dental esthetic index and the impact of the oral health condition on the quality of life through the oral impacts on daily performance index. They found that among all the features included in the study, only dental crowding had an impact on the quality of life.¹²

Assuming that the attitude to standards of life is different in each population and culture, it would be worthwhile to take this aspect into consideration for future studies.

Also surveys, such as orthodontic treatment desire and parent's perception about their child's oral esthetic in relation to orthodontic treatment need, are necessary to be done in our country.

prevalence of malocclusion class I as well as an edge to edge malocclusion trait. Considering the findings, health care officials are expected to pay more attention to oral health fields.

Conclusion

The results of this study showed a high

Conflict of Interests

Authors have no conflict of interest.

References

1. Grewe JM, Cervenka J, Shapiro BL, Witkop CJ, Jr. Prevalence of malocclusion in Chippewa Indian children. *J Dent Res* 1968; 47(2): 302-5.
2. Mills LF. Epidemiologic studies of occlusion IV. The prevalence of malocclusion in a population of 1,455 school children. *JDR* 1966; 425(332): 6.
3. Ast DB, Allaway N, Draker HL. The prevalence of malocclusion, related to dental caries and lost first permanent molars, in a fluoridated city and a fluoride-deficient city. *American Journal of Orthodontics* 1962; 48(2): 106-13.
4. Foster LW. Dental conditions in white and Indian children in northern Wisconsin. *Jour Amer Dental Assoc* 1942; 29: 2251-5.
5. Gardner JW. Orthodontic Treatment priority index. Washington DC: Public Health Service Publication; 1967.
6. Hill PA. The prevalence and severity of malocclusion and the need for orthodontic treatment in 9-, 12-, and 15-year-old Glasgow schoolchildren. *Br J Orthod* 1992; 19(2): 87-96.
7. Salzmann JA. Handicapping malocclusion assessment to establish treatment priority. *Am J Orthod* 1968; 54(10): 749-65.
8. Houpt MI. Dental survey in the Brong Ahafo Region of Ghana. *Archives of Oral Biology* 1967; 12(12): 1337-41.
9. Lew KK, Foong WC, Loh E. Malocclusion prevalence in an ethnic Chinese population. *Aust Dent J* 1993; 38(6): 442-9.
10. Abu Alhajja ES, Al-Khateeb SN, Al-Nimri KS. Prevalence of malocclusion in 13-15 year-old North Jordanian school children. *Community Dent Health* 2005; 22(4): 266-71.
11. Bjoerk A, Krebs A, Solow B. A method for epidemiological registration of malocclusion. *Acta Odontol Scand* 1964; 22: 27-41.
12. Traebert ES, Peres MA. Prevalence of malocclusions and their impact on the quality of life of 18-year-old young male adults of Florianopolis, Brazil. *Oral Health Prev Dent* 2005; 3(4): 217-24.