

Prevalence of Malocclusion in 13-15 Year-old Adolescents in Tabriz

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Abstract

Background and aims. Malocclusion with its great hazardous effects seems to have become more prevalent in recent decades; therefore, the present study was carried out to assess the prevalence of different malocclusions among 13-15 year-old adolescents in Tabriz.

Materials and methods. The subjects in the present study consisted of 398 adolescents aged 13-15, who were randomly selected from 5 different districts of the city. Students who had previous orthodontic treatment or extraction of any permanent teeth were excluded from the study. Angle's classification was used to describe the type of malocclusion and the evaluation of other aspects of malocclusion such as overjet, overbite and crowding were considered the minor goals of the study. The prevalence of different types of malocclusion in the population under study was estimated.

Results. According to the results of the study, only 4% of 13-15 year-old adolescents under study had normal occlusion, whereas 51% had Class I, 21.9% had Class II [17.6% div 1, 4.3% div 2] and 17.1% had Class III malocclusion. With respect to overjet, the study revealed that 30.7% of the population under study had increased overjet, 33.9% had decreased overjet and 2% had reverse overjet. Increased overbite was observed in 40.2% of the population studied, whereas decreased overbite was found in 19.3%, deep bite was noted in 3.3% and open bite was detected in 3.3% of the studied population.

Conclusion. Class I malocclusion was the most prevalent, whereas Class III malocclusion was the least prevalent among adolescents aged 13-15 in Tabriz.

Key words: Malocclusion, prevalence.

Introduction

Malocclusion, defined as an improper relationship between teeth in the opposite jaws, has been a prevalent disorder in recent decades.^{1,2}

The prevalence of malocclusion varies in different parts of the world among various populations. Ethnic, genetic and environmental factors are the major

contributors, with a role in the specific cause of malocclusion. Knowledge about the distribution of different malocclusions may help orthodontic practitioners better understand the existent problem in a geographic location and help them in the proper orientation and management of treatment possibilities.^{1,2}

The need for information regarding the prevalence of malocclusion in males and females and in different age and ethnic groups has provoked many studies in this respect.

The United States

Krogman (1951), in his study on children aged 6.5-12.5, found the prevalence of malocclusion as follows: normal occlusion 45.9%; Class I, 28%; Class II, 24.4% and Class III, 1.7%.¹

Savara (1955), in his study on teenagers aged 14-17, reported the prevalence of malocclusion as follows: normal occlusion, 21.1%; Class I, 50.1%; Class II, 19.4% and Class III, 9.4%.¹

Newman (1956), in his study on children and teenagers aged 6-14, reported the prevalence of malocclusion as follows: normal occlusion, 48.1%; Class I, 38.2%; Class II, 13.2% and Class III, 0.5%.¹

Jackson and Brehm (1961), in their study on 6328 children and teenagers aged 6-18, reported the prevalence of malocclusion as follows: normal occlusion, 16.6%; Class I, 60.1%; Class II, 22.8% and Class III, 0.5%.¹

Emrich, Bordie and Blayney (1965), in their study on 13475 adolescents aged 12-14, reported the prevalence of malocclusion as follows: normal occlusion, 54%; Class I, 30%; Class II, 15% and Class III, 1%.¹

Mills (1968), in his study on 1337 teenagers aged 13-14, reported the prevalence of malocclusion as follows: normal occlusion, 17.5%; Class I, 72.2%; Class II, 6.6% and Class III, 3.7%.¹

A study on 3289 black American adolescents aged 12-14, yielded the prevalence of malocclusion as follows: normal occlusion, 16.6%; Class I, 67.8%; Class II, 12.1% and Class III, 5%.¹

A study on 651 Indian-American children and teenagers aged 6-18, revealed the prevalence of malocclusion as follows: normal occlusion, 34.6%; Class I, 53%; Class II, 9.5% and Class III, 2.9%.¹

Other countries

A study in Denmark on 1700 children and adolescents aged 9-18, reported the prevalence of malocclusion as follows:

normal occlusion, 14%; Class I, 58%; Class II, 24% and Class III, 4%.¹

A study in Norway on 2349 children aged 7-8, reported the prevalence of malocclusion as follows: normal occlusion, 41.3%; Class I, 30.1%; Class II, 21.3% and Class III, 7.3%.¹

A study in Poland on 355 children aged 7-12, indicated the prevalence of malocclusion as follows: normal occlusion, 57.6%; Class I, 24.4%; Class II, 3.5% and Class III, 14.4%.¹

A study on 1550 Chinese adolescents living in Australia, aged 12-14, revealed the prevalence of malocclusion as follows: normal occlusion, 7.1%; Class I, 58.8%; Class II, 21.5% and Class III, 12.6%.¹

A study on 919 teenagers in Kenya, aged 13-15, reported that the prevalence of malocclusion was as high as 72%. In this study crowding, increased overjet, and open bite were found in 19%, 10%, and 8% of the cases, respectively.^{3,5}

A study on 398 men in Sweden, aged 21-25, reported that the prevalence of malocclusion was as high as 57%. In this study crowding, increased overjet and open bite were found in 43%, 10%, and 8% of the cases, respectively.⁶

Studies in Iran

In Iran, like many other countries, several attempts have been made to study the distribution of malocclusion in different parts of the country (Table 2).⁷⁻¹⁰

Lack of information concerning the prevalence of malocclusion in Tabriz, the second largest city in Iran, especially for the population in active orthodontic treatment ages, was the primary reason for this cross-sectional study on the prevalence of malocclusion in 13-15 year-old adolescents.

Materials and Methods

The subjects in this study consisted of 398 male adolescents aged 13-15 (mean age 14±1). All the subjects were studying in guidance schools in Tabriz and were randomly selected from five different districts of the city as follows:

Out of 62756 children aged 13-15 eligible for this study, 533 ones were randomly selected, from which 135 ones were

excluded from the study because of previous orthodontic treatment or extraction of some permanent teeth, and finally 398 cases were evaluated.

Angle's classification was used to describe the type of malocclusion and some other aspects of malocclusion, defined arbitrarily, were considered the minor goals, including increased overjet (more than 3 mm), decreased overjet (less than 2 mm), increased overbite (more than 2 mm), deep bite (contact of lower incisors with palate), decreased overbite (less than 1 mm), open bite (the distance between incisors; 0 mm or more), mouth breathing habit (lip separation at rest more than 2 mm) and crowding (clinical sign of tooth rotations or overlapping more than 3-4 mm).

The profiles of the subjects were evaluated through the imaginary line connecting the landmark points glabella, subnasal and soft tissue pogonion, as defined in orthodontic textbooks.²

From the knowledge concerning educational and professional status of the parents, recorded in the questionnaires, socio-economic status of the subjects could be assessed for the subjects.

All collected data were obtained through direct clinical observation by two well-trained dental students and controlled by an orthodontist after being recorded in specific forms.

In the statistical evaluation, frequency analysis was performed to obtain the

percentage of different types of malocclusion.

Results

According to the results of this study, only 4% of 13-15 year-old students in Tabriz had normal occlusion, whereas 57% had Class I, 21.9% had Class II (17.6%, div 1 and 4.3 5%, div 2) and 17.1% had Class III malocclusion (Fig 1).

The study showed that only 33.4% of the population studied had normal overjet, whereas 30.7% of the population had increased overjet, 33.9% had decreased overjet and 2% had reverse overjet. With respect to overbite, only 33.9% of 13-15 year-old children had normal occlusion, whereas 40.2% had increased overbite, 19.3% had decreased overbite and 3.3% had deep bite and 3.3% of the studied population had open bite. Approximately 77.4% of the adolescents showed crowding of the upper or lower incisors and 23.8% had mouth breathing. Extra-oral examination of the subjects revealed that only 54.8% had straight profile, whereas 42.2% had convex and 3% had concave soft tissue profile. Table 1 summarizes the findings of the study.

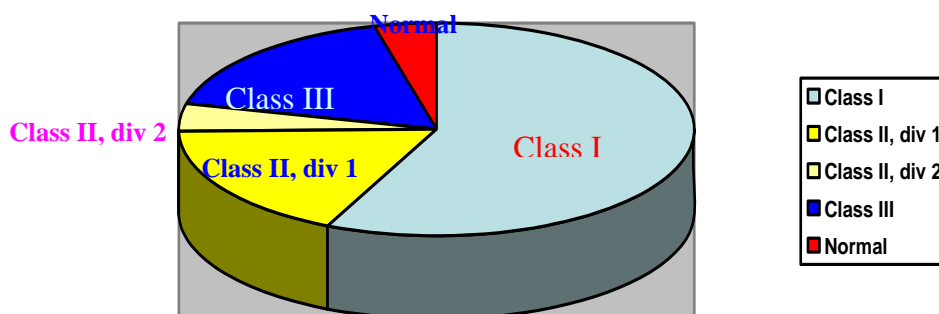


Figure 1. The distribution diagram of malocclusion in adolescents aged 13-15 in Tabriz.

Table 1. The distribution of different malocclusions among adolescents aged 13-15 in the present study

Malocclusion or disorder	The number of subjects studied	The percentage of subjects studied
Normal occlusion	16	4%
Class I	227	57%
Class II, div 1	66	17.6%
Class II, div 2	21	4.3%
Class III	27	17.1%
Incisor crowding	308	77.4%
Increased overjet (more than 3 mm)	122	30.7%
Decreased overjet (less than 2 mm)	135	33.9%
Reverse overjet	8	2%
Increased overbite (more than 2 mm)	160	40.2%
Deep overbite	13	3.3%
Decreased overbite (less than 1 mm)	77	19.3%
Open bite (distance between incisors, more than 0 mm)	13	3.3%
Straight profile	218	54.8%
Convex profile	168	42.2%
Concave profile	12	3%

Discussion

In recent epidemiological studies, no distinct clear-cut definitions have been offered regarding normal and abnormal states of the subjects studied; therefore, there is considerable disparity between studies in different parts of the world concerning the prevalence of malocclusion. For example, in the United States, the prevalence of abnormal occlusion between 1930 and 1950 has ranged from 30% to 90%.

Helm and Hei Kinheimo found that indirect studies on the prevalence of malocclusion using patients' study casts show higher prevalence of malocclusion than studies that are carried out directly on the subjects¹.

From the review of literature concerning the prevalence of malocclusion in Iran and other countries it has been concluded that several factors have a role in the pattern of different kinds of malocclusion among populations. These contributing factors could be considered as the time of the study, geographical and topographical area and the age and sex of the population studied.^{1, 11, 12}

Time factor

Previous studies have shown that distribution of a particular type of malocclusion varies with time; for example, the prevalence of normal occlusion at a certain time in some populations decreases, whereas the prevalence of malocclusion increases in the same population at another time. These findings might be attributed to the gradual increase in the complexity in human societies and ethnic differences among some populations, which is more highlighted now than in the past. Nutrition is another possible factor in this regard, which can affect the pattern of occlusal relationship over time.^{1, 2}

Age and sex factors

Various studies have been carried out on young populations because of the importance of age in regard to early treatment. As most malocclusions may correct themselves or worsen with time depending on the growth pattern or environmental factors, such as early loss of deciduous teeth or trauma, the prevalence

of some particular malocclusions may decrease or increase with time. Nevertheless, it is possible to find differing prevalence rates of malocclusion in different age groups in the same population.^{9,10}

On the other hand, most authors have failed to show any differences in the prevalence of some particular malocclusions among males and females in the populations studied before.¹¹

Topographical differences

The prevalence of malocclusion varies from one geographical area to another and differs from one country to another country and even from one city to another city. Different studies in different geographical locations have yielded different prevalence rates of malocclusion (Table 2).^{1,4-7}

As shown in Table 2, in all the previous studies in Iran, similar to the present study, Class I malocclusion is the most prevalent one among all types of malocclusion. One

surprising finding is that Class III malocclusion is more prevalent in Tabriz than other cities in Iran.

Statistically, no relationship was found between the patients' socio-economic and educational status and occupation with malocclusion rate in the population studied.

Conclusions

1. Class I malocclusion is the most prevalent, whereas Class III malocclusion is the least prevalent among adolescents aged 13-15 in Tabriz.

2. Decreased overjet, increased overbite and crowding of incisors are the most common anomalies in adolescents aged 13-15 in Tabriz.

3. Class III malocclusion is more prevalent in Tabriz than other cities in Iran.

4. There is no relationship between malocclusion and factors such as socio-economic status, mouth breathing, gender, oral health care and the teeth.

Table 2. The prevalence of malocclusion in different cities in Iran (%)

Study	City	Year	Normal	Class I	Class II	Class III
Azadeh Sadeghi	Tehran	73-74	21.7%	52%	22.8%	3.5%
Sadegh Yaghubi	Ilam	73	2.5%	63.1%	34.4%	-
Ahad Kharat Ahari	Ahar	74	15.9%	67.8%	9.6%	6.7%
Ordubazari	Tehran	74	0.3%	62.1%	36.7%	-
Akhondi -Azizi	Karaj	75-76	22.2%	68.2%	9%	0.6%
Himan Navidi	Tabriz	81-82	33.3%	8.1%	35.4%	13.2%
This study	Tabriz	82-83	4%	57%	21.9%	17.1%

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