

MALOCCLUSION TRAITS IN SAUDI FEMALES SEEKING ORTHODONTIC TREATMENT

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ABSTRACT

The objective of the present study was to assess the distribution of malocclusion traits in a selected sample of Saudi adolescent and adult females seeking orthodontic treatment in the Eastern Region of Saudi Arabia. The sample consisted of 330 females divided into two age groups; adolescents (12-17 years) and adults (18-35 years). Each patient was clinically examined and the type of malocclusion was recorded including Angle's classification, overjet, over bite, open bite, crossbite, scissors bite, crowding and spacing. The collected data were statistically analyzed for percentage distribution of different malocclusion traits for both the age groups. The study revealed that adolescents constituted the larger proportion of subjects seeking orthodontic treatment in the Eastern Region of Saudi Arabia. Angle's Class I malocclusion was the most prevalent type, followed by Class III and Class II malocclusion. Crowding and spacing were the most frequent space discrepancies in all malocclusion traits.

Key words: Malocclusion traits, Saudi, Adults, Adolescents

INTRODUCTION

Increasing demands for efficiency in the delivery of dental services necessitate continuous assessment of dentofacial anomalies in various ethnic groups¹⁻¹⁴, and provide an insight into the concept of an acceptable occlusion in these populations. Most of these studies have been conducted to determine the prevalence of malocclusion based on a narrow perspective focusing on specific age group to fulfil the goal of the investigation. A review of the literature related to the recording of malocclusion severity reveals that most of the published investigations selectively consider children and adolescents¹⁻⁸, and fewer researchers concentrate their documentation of malocclusion distribution for the adult stage of development.⁹⁻¹⁴

A number of investigators have reported the prevalence of malocclusion in the Saudi populations.¹⁵⁻¹⁷ However, all the studies except one¹⁷ were carried out on a narrow age range. The previous studies also revealed that the majority of orthodontic patients were of the younger age than the adults.¹⁵⁻¹⁷ A scarcity of published reports on the distribution of the malocclusion traits among different regions and various age groups in Saudi populations provided the rationale for the current investigation. Thus, the purpose of the present study was to determine the distribution of

malocclusion traits in adolescent and adult patients seeking orthodontic treatment in the Eastern Region of Saudi Arabia.

METHODOLOGY

Three hundred and seventy two patients (42 male and 330 female), aged 12–35 years, were drawn from consecutive 381 Saudi patients (8-35 years old) attending orthodontic screening clinic in Dammam Central Hospital. The male patients and those below 12 years of age were excluded, and the study was conducted on remaining 330 female patients. The selected sample was divided into two age groups (as shown in Figure 1); patients from 12–17 years representing 255 adolescents, and those from 18–35 years were 75 adults. None of the patients had undergone orthodontic treatment in past. All the patients were examined for Angle's classification, overjet, overbite, open bite, crossbite, scissors bite, crowding and spacing according to method used by Bjork et al.¹⁸

1. Occlusal discrepancies

a. Sagittal Relationship

- 1 The type of malocclusion was classified according to the method proposed by Angle¹⁹ i.e Class I, Class II and Class III relationships.

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- 2 Overjet (moderate = 4-6 mm; severe > 6 mm).
- 3 Anterior Crossbite (one or more maxillary incisors in lingual position in relation to the mandibular incisors).

b. *Vertical Relationship*

- 1 Overbite (edge to edge = 0; moderate = 4-6 mm; severe > 6mm)
- 2 Open bite; anterior open bite (if the space between upper and lower incisors is 1mm or more) and lateral open bite (if at least 2 pairs of antagonists teeth lack in contact unilaterally or bilaterally).

c. *Transverse Relationship*

- 1 Posterior crossbite (one or more maxillary posterior teeth in lingual position in relation to the mandibular teeth, differentiated into unilateral or bilateral).
- 2 Scissors bite (one or more maxillary posterior teeth in buccal position in relation to the mandibular teeth, differentiated into unilateral or bilateral).

2. Space discrepancies

a. *Spacing*

Spacing was assessed in both arches and was considered if there was 2mm or more excess in each dental arch, either localized or generalized.

b. *Crowding*

Crowding was considered if there was 2 mm or more deficiency in each dental arch.

The data were transferred to the computer for analysis using SPSS program for Windows (version 12 SPSS Inc., Chicago, USA) and the distribution for occurrence of different malocclusion traits were determined in the female adolescent and adult patients.

RESULTS

Percentage distribution for different age groups is given in (Fig.1). Adolescents constituted 77% of the sample, while adults represented the remaining 23%.

I. Angle's classification

Table 1 show that the most frequent type of Angle's classification for malocclusion in the total sample was Class I which was found in 73.9% of the cases followed by Class III (13.3%) and Class II (12.7%). The total number with Angle's Class I malocclusion (N=244), was distributed as 80.3% adolescents and 19.7% adults. On

the other hand, 66.7% and 33.3% of the total number of Class II were adolescents and adults respectively. Moreover, adolescents constituted 70.5% of class III cases, while adults formed the other 29.5%. Table 2 presents the distribution of different Angle's classifications within each of the adolescents and adults. Within the adolescents, Class I was the most prevalent, followed by class III and Class II. In contrast, Class III and Class II showed nearly equal distribution in the adults.

II. Different malocclusion traits

The percentage distribution of different malocclusion traits in reference to the total sample size is presented in Table 3 as well as in reference to the total number within each of the adolescents and adults (Table 4).

Overjet

Among the total sample, 76% and 73% were adolescents with moderate and severe overjet respectively, while corresponding figures were 24% and 26.3% in adults (Table 3). Within adolescents 14.9% presented with moderate overjet, while 5.5% showed severe overjet. As for the adults, moderate and severe overjets were evident in 16% and 6.7% respectively (Table 4).

Crossbite

Table 3 shows that 100% of the subjects with anterior crossbite were adolescents. As for the posterior crossbite, 60.5% and 74% of the unilateral and bilateral types respectively fell into the adolescent group, while adults had 39.5% for unilateral and 25% for bilateral posterior cross bite. Moreover, the total unilateral scissor bite was distributed as 62.5% and

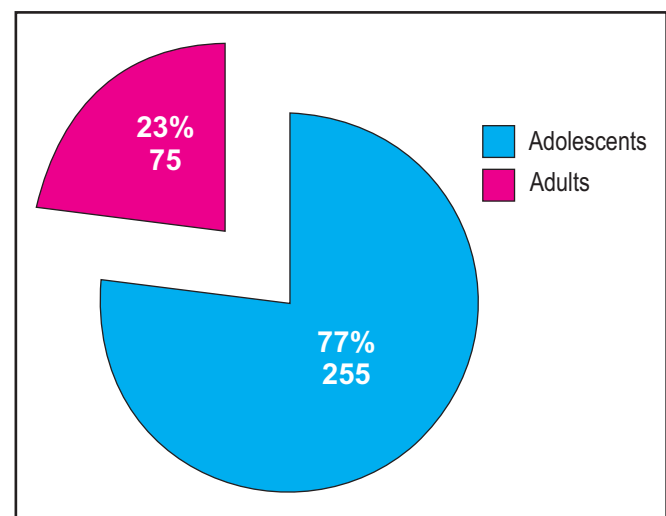


Fig 1: Age distribution of the study sample

TABLE 1: PERCENTAGE OF ANGLE'S CLASSIFICATION IN BOTH AGE GROUPS IN REFERENCE TO THE TOTAL SAMPLE

Angle's Classification	Total (330)		Adolescents		Adults	
	N	%	N	%	N	%
Class I	244	73.9	196	80.3	48	19.7
Class II	42	12.7	28	66.7	14	33.3
Class III	44	13.3	31	70.5	13	29.5

N: Number

TABLE 2: DISTRIBUTION OF ANGLE'S CLASSIFICATION WITHIN EACH OF THE ADOLESCENTS AND ADULTS

Angle's Classification	Adolescents (225)		Adults (75)	
	N	%	N	%
Class I	196	76.9	48	64
Class II	28	10.9	14	18.6
Class III	31	12.1	13	17.3

N: Number

TABLE 3: DISTRIBUTION OF THE DIFFERENT MALOCCLUSION TRAITS IN BOTH ADOLESCENTS AND ADULTS TO THE TOTAL SAMPLE

Malocclusion	Total		Adolescents		Adults	
	N	%	N	%	N	%
Overjet						
Moderate 4-6 mm	50	15.2	38	76	12	24
Severe >6mm	19	5.8	14	73.7	5	26.3
Anterior crossbite	13	3.9	13	100	0	0
Posterior crossbite						
Unilateral	43	13.03	26	60.5	17	39.5
Bilateral	16	4.8	12	74	4	25
Scissors bite						
Unilateral	8	2.4	5	62.5	3	37.5
Bilateral	2	0.6	2	100	0	0
Overbite						
Edge to edge	33	10	21	63	12	36.4
Moderate 4-6 mm	55	16.7	43	78.2	12	21.8
Severe >6mm	8	2.4	7	87.5	1	12.5
Open bite						
Anterior	15	4.5	7	46.7	8	53.3
Lateral	20	6.1	17	85	3	15
Crowding						
Maxillary	78	23.6	58	73.4	20	25.6
Mandibular	115	34.8	78	67.8	37	32.2
Spacing						
Maxillary	138	41.8	113	81.9	25	18.1
Mandibular	68	20.6	57	83.8	11	18.1

N: Number

37.5% in adolescents and adults respectively. On the contrary, no adult subject manifested bilateral scissors bite. Table 4 displays that in the adolescents, anterior crossbite showed a percentage distribution of 5.1%, whereas unilateral posterior crossbite showed a higher

percentage than the bilateral type. In addition, unilateral scissors bite was more frequent than the bilateral one. On the other hand, in adults, unilateral posterior crossbite showed a higher percentage distribution than the bilateral type and unilateral Scissors bite was

evident in 4% of the adults. On the contrary, no anterior crossbite as well as bilateral scissors bite was recorded in the adult group.

Overbite

Among the sample, 63% adolescents and 36.4% adults had edge to edge bite. As for the moderate overbite; the subjects were divided as 78.2% and 21.8% for adolescents and adults respectively, while severe overbite was present in 87.5% of adolescents and 12.5% of adults (Table 3). Within adolescents, moderate overbite was the most frequent (16.9%) among all overbite types, while in adults, both edge to edge and moderate traits showed equal distribution and the severe type was assigned the least percentage (Table 4).

Open bite

Table 3 shows that anterior open bite was present in 46.7% adolescents and 53.3% adults; whereas, lat-

eral open bite was more frequent in adolescents. Table 4 shows that 6.7% of the malocclusion traits in adolescents were lateral open bite compared to 2.7% anterior open bite. In contrast; of all open bite adults, the anterior discrepancy was more frequent than the lateral one.

Crowding and spacing

The majority of maxillary and mandibular space discrepancies; crowding and spacing were present in adolescents (Table 3). Table 4 shows that among the adolescents, crowding was present in 73.4% and 67.8% for maxillary and mandibular arches respectively; moreover, maxillary spacing was more frequent than mandibular spacing. In the adults, mandibular crowding showed higher percentage (32.2%) than the maxillary crowding, while spacing displayed higher distribution in maxillary arch compared to the mandibular arch.

TABLE 4: DISTRIBUTION OF DIFFERENT MALOCCLUSION TRAITS WITHIN EACH OF THE ADOLESCENTS AND ADULTS

Malocclusion	Adolescents (255)		Adults (75)	
	N	%	N	%
Overjet				
Moderate 4-6 mm	38	14.9	12	16
Severe >6mm	14	5.5	5	6.7
Anterior crossbite	13	5.1	0	0
Posterior crossbite				
Unilateral	26	10.1	17	22.6
Bilateral	12	4.7	4	5.3
Scissors bite				
Unilateral	5	1.9	3	4
Bilateral	2	0.8	0	0
Overbite				
Edge to edge	21	8.2	12	16
Moderate 4-6 mm	43	16.9	12	16
Severe >6mm	7	2.7	1	1.3
Open bite				
Anterior	7	2.7	8	10.6
Lateral	17	6.7	3	4
Crowding				
Maxillary	58	73.4	20	25.6
Mandibular	78	67.8	37	32.2
Spacing				
Maxillary	113	44.3	25	33.3
Mandibular	57	22.4	11	14.7

N: Number

DISCUSSION

The expansion of orthodontic practice in Saudi population dictated the importance of collecting data for planning of orthodontic treatment needs. Moreover, the diversity of age groups seeking orthodontic treatment encouraged the formulation of a study concerning distribution of different malocclusion traits among adolescents and adults. Although many studies have described the distribution of occlusal traits in diverse populations¹⁻¹⁴, fewer were concerned with the distribution of malocclusion in different age groups and regions, thus evoking the idea of the current research.

A wide age range (12-35 years) of the sample of present study helped to represent both adolescent and adult age groups, the most frequent age range for those seeking orthodontic treatment. Similar age groups were considered by Al-Balkhi and Zahrani¹⁷ in Saudis, as well as by Helm and Petresen²⁰ in Scandinavian population. In contrast, Al-Emran et al¹⁶ studied prevalence of malocclusion among adolescent Saudi males. The majority of studies¹⁻⁸ surveyed children or adolescents solely related to diversity of ethnic backgrounds.

Regarding the obvious differences in the proportion of adolescents compared to adults evident in the present sample, this could be explained on the fact that adult patients are not frequently referred for orthodontic treatment or are less concerned about the negative esthetic aspect of their malocclusion and the need for orthodontic treatment. Furthermore, adults may feel reluctant to undergo orthodontic treatment due to prolonged treatment periods. Similar explanations were also described by Al-Balkhi and Zahrani.¹⁷

Another obvious finding of the present study was that the majority of patients seeking orthodontic treatment were females compared to males. This could be attributed to the fact that females are more concerned about their facial aesthetics than males. This was in agreement to Brunelle¹¹, as well as, Green and Pope²¹ who emphasized that females utilize medical services in general more than males and are more likely to receive orthodontic treatment than males. In contrast, this was not in agreement with the observation of Al-Balkhi and Zahrani¹⁷ who found no significant difference in number of females and males seeking orthodontic treatment in Riyadh region.

The results of the present study revealed that out of the total number of subjects manifesting different classes of malocclusion, adolescents represented greater percentage than adults as shown in Table 1. Despite

the fact that this could be attributed to the diversity in proportion of adolescents to adults in the included sample, but it could be considered a reliable result reflecting the more frequent need of adolescent to orthodontic treatment than adults. Al-Balkhi and Zahrani¹⁷ found that adolescents constituted the highest majority of patients in a sample of Saudi subjects. In addition, Class III was more frequently apparent in the studied group than Class II. Similar results were reported by Richardson and Ana.²² This was in disagreement with Nashashibi et al.¹⁵ Al-Emran et al.¹⁶, as well as, Al-Balkhi and Zahrani¹⁷ who reported that the most common type of malocclusion was Class I, followed by Class II division 1 and Class III in Saudi subjects living in middle region. This might be due to different sample size, gender or most probably due to distinct features of Saudi population in different regions. Moreover, the present results were also in contradiction with another study carried out in a different population.⁴

Concerning the different malocclusion traits within the adolescent group; it was evident that space anomalies showed the highest occurrence followed by maxillary and mandibular crowding. Moreover, spacing was highly prevalent in maxillary arch as compared to mandibular arch. Such findings could be related to the highest percentage of space discrepancies in the total sample indicating the importance of space discrepancies particularly crowding in demand for orthodontic treatment. It was interesting to note that such space anomalies were more frequent in the maxilla than in the mandible. This was in agreement with the previous studies in Saudi population.¹⁵⁻¹⁷

It is worth mentioning that the adult group showed similar results to those of adolescents regarding the highest percentage of all malocclusion traits reported for space discrepancies but crowding was mostly observed in mandibular arch in contrast to adolescent where it was more frequent in the maxilla. This observation was in agreement with Helm and Petersen²⁰, who observed remarkable stability of all malocclusion traits by age except for overbite and mandibular crowding which tended to increase in frequency. A possible explanation for such finding could be the tendency for late teen crowding with increasing age.

The space discrepancies were more common in the maxilla than in the mandible in both adolescent and adult groups. This could be attributed to hereditary factors in tooth-arch size discrepancies. On the contrary, Al-Emran et al.¹⁶ reported higher frequency of spacing in the mandibular arch. Such disagreement

could be related to the different age and gender distribution in the latter study.

Following in the priority for malocclusion traits in adolescents were the moderate overbite and overjet discrepancies. In comparison, Al-Emran et al.¹⁶ found that deep overbites equal to 3mm were slightly more frequent, while severe overjets which corresponded well with the high frequency of Class II malocclusion found in their study was manifested in adolescent males. On the other hand, adults showed higher percentage for unilateral posterior cross bite than overjet and overbite anomalies. This reflected good correspondence with the findings that crossbite was often observed in Angle Class III malocclusions which had a high prevalence in the present study. Al-Balkhi and Zahrani¹⁷ reported that the prevalence of crossbites in Saudi patients was relatively high and almost equally distributed between the anterior and posterior regions of the dental arch.

A systematic and well-organized dental care program for a population requires some basic information including prevalence of malocclusion, to help in deciding treatment priorities among those demanding orthodontic treatment at public expense. Thus, the data gathered in the present study can be considered as a step in providing basic information for those seeking orthodontic treatment in the Eastern Region of Saudi Arabia.

CONCLUSIONS

The majority of patients seeking orthodontic treatment were of the adolescent age-group as compared to adult age-group.

The moderate overjet and overbite as well as space anomalies were more frequent in adolescent than adults.

Within both adolescent and adult groups; crowding and spacing seemed to be the most common reasons for patients seeking orthodontic treatment.

Moderate overbite and overjet were the second priority for seeking orthodontic treatment in adolescents. On the other hand, unilateral posterior crossbite was the second priority in adults.

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