Malocclusion assessment in orthodontically treated young Iraqi (6-18) years old

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ABSTRACT

The aim of this study was to provide an additional information about occlusal variations, and to determine the possible sex difference in a group of young Iraqi who were seeking for orthodontic treatment.

A sample of (253) orthodontically treated patients (125 female and 128 male) selected from (3719) patients attending P.O.P department in college of dentistry in Mosul University. for each one the age, sex, molar occlusion in accompanied to some selected malocclusion criteria (crowding, spacing, crossbite and openbite) were recorded.

The results of this research evaluated the number, percentage for each type of molar occlusion and the malocclusion criteria. The using of two sided Z-test of two proportions at ($p<0.05$) indicate that significant sex difference in CL II_b, CL II_1, crowding and spacing and a non- significant difference in CL I_b, CL I_u, CL II, CL II_2, CL III, CL IV, crossbite and openbite. The occlusal variation for Iraqi follows a universal general distributional pattern for most world populations.

Key Words : Occlusal variation, sex difference, malocclusion.

الخلاصة

هدف هذه الدراسة هو الكشف عن الاختلافات الملحوظة المحتملة للإطباق في كلا الجنسين ، لإعطاء معلومات حول الاختلافات الاطباقية ضمن العراقيين.

العينة مكونة من (٢٥٣) مريض تم علاجهم بواسطة جهاز التقويم المتحرك (١٢٥) أنثى و (١٢٨) ذكر عراقي أخذت من (٣٧١٩) مريض راجعوا كلية طب الأسنان جامعة الموصل. سجل تصنيف (Angle) ونوع تشوهات الإطباق واستخدم فحص مربع كاي (Chi-square) وكذلك (Z-test).

نتائج الدراسة الحالية تشير إلى وجود اختلافات ملحوظة بين كلا الجنسين بالنسبة لتصنيف CL II_1, CL II_b، تزاحم الاسنان ، تفارق الاسنان ، واختلافات غير ملحوظة في CL IV, CL III, CL II_2, CL I_u, CL II_u, CL I_b ؛ الإطباق المتبادل، والإطباق المفتوح. اختلافات الإطباق تتبع نموذج توزيعي عام لمعظم سكان العالم.

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INTRODUCTION

The definitions of malocclusion have originated within the field of corrective treatment and are accordingly biased [1, 2]. Malocclusion is deviation from a rarely attained arrangement among teeth that does not necessarily cause a functional problem [2]. Therefore, the developing trend has been to speak of "occlusal variation" to avoid the connotation of the word malocclusion [1,3].

In (1965) Emrich, Brodie, and Blayney [4] reported on occlusal relation for (1341) white children and (1476) black children, (12-14) years old their findings also indicated that while children have class II occlusion about twice as frequently as black children (15%) & (7%), respectively.

Mclain & Proffitt [5] cite a U.S. public health epidemiological study from (1966) an adolescents ages (12-17) years. The study compares black & white children and the findings indicate that white children exhibit class II occlusion almost (2:1) compared with black children, and more black children exhibit class III occlusion.

Alphonso & Henry [6] found that class I molar relation are close to the same prevalence for black & white children. The prevalence of class II relation is significantly greater in white children, & the prevalence of class III relation is significantly greater in black children.

Some studies [7] explore the possible sex difference in occlusion, they indicated a significant difference between males and females in both angle class I and II. While others [8] found no significant difference between sexes and indicated that the prevalence of malocclusion was (72%) in their population.

Abu-Affan *et al.* [9] indicated that malocclusion are less common among African and Arab children than Europeans, and stated than angle class III is more common among African and Arab children than in Europeans and the opposite is found in relation to class II malocclusion.

It is unclear whether a secular trend toward increasing malocclusion is present in our population. Two broad sets of theories have been proposed to explain irregular occlusal variation one based on genetic arguments; the other emphasizes the role of environment [10, 11, 12].

The aims of the present study are to assess the occlusal variations for the orthodontically treated patients and to delineate the presence or absence of female to male difference in occlusion. It is worth to mention that the information provided by this work may be used as a basis for preventive as well as interceptive orthodontics.

MATERIALS AND METHODS

This research was carried out in the Department of Paedodontics, Orthodontics and Preventive Dentistry at College of Dentistry in Mosul University. The patients were attending to this Department to receive orthodontic treatment by the dental students. Each of the examined patients in this study were received a complete orthodontic treatment. From about (3719) patients attended to this Department during the years (1998, 1999, 2000 and 2001), an about (865) patients were seek for orthodontic treatment, (253) patients (125 males and 128 females) from them represented the sample of the study.

The following equipments were used: dental chair, dental mirrors, dental probs.

The criteria for sample selection were as follows:

1. Subject, parents are Iraqi in origin.
2. Their ages were ranged between (6-18) years.
3. No previous history of orthodontic treatment.
4. No any medical compromising condition.

Each patient is examined by an orthodontic specialist under light of dental chair, the patient is asked to close his mouth in centric occlusion, the relationship between the upper first molar and his antagonist was recorded in according to Angle's classification [13]:

1. Class I molar: the mesiobuccal cusp of the first upper molar is occluded within the buccal groove of the lower antagonist.
2. Class II molar: the mesiobuccal cusp of the upper first molar is occluded one half cusp width in relation to the lower antagonist.

Division I: there is increased in overjet, with proclined upper central incisors:
Division II: Retroclined upper central incisors.
Class III: the upper first molar in occluded one half-cusp width posterior to the buccal groove of the lower first molar.

An additional class IV was included, on this type, one side of the molars relationship was class II and the other was class III molar relationship [7, 13, 14].

The relationship where recorded in unilateral and bilateral form in relation to the class I and the class II (which subdivided into division 1 and 2).

In accompanied to that the following malocclusion criteria were recorded for each patient, these were defined as follow:

1. Dental crowding: The teeth are overlapped with either rotation of displacement in the position, so that there was a lack of space for a less, half, or more than those of their mesiodistal crown width [15].
2. Dental spacing: it refers to tooth separation that exposed to view the interdental papillae. They were assessed anteriorly and posteriorly [16].
3. Cross bite: this was assessed when one or more of the upper anterior teeth was positioned in reverse relationship for the mandibular one, and when the upper premolars or molars deviated bucco-lingually greater than half of the cusp [17], it was either unilateral or bilateral.
4. Open bite: no overlapping in the mandibular incisors by their antagonists, or loss of any contact between the upper and lower anterior teeth when patient is in centric occlusion [15].

Statistical analysis was done including percentage for each type of malocclusion also Chi-square test to find the significance of each type of malocclusion within the sample and two-sided Z-test of two proportions to investigate the sex difference in each type of malocclusion. The level of significance was ($p<0.05$).

RESULTS

The results are summarized in tables (1, 2, 3, 4, 5, 6, 7, and 8.). The first three tables (1, 2, & 3) for the occlusal variation between males and females. Table (1) represents the distribution of this variation while table (2) is shows the percentage of the variation, we found that CL I & IV malocclusion are more prevalent in females than males. While CL II & III are more in males than females. Also the incidence of CL I tend to be more common then CL II followed by CL III & CL IV at the least.

Table (1): Occlusal variation by sex cross tabulation

Sex	Cl I_b	Cl I_u	Cl II_b			Cl II_u	Cl III	Cl IV	Total
			d.1.	d.2	Total				
Females	95	15	4	2	6	8	2	2	128
Males	89	12	13	1	14	6	4	1	125
Total	183	27	17	3	20	14	6	3	253

b-bilateral , u-unilateral

Table (2): Percentage of occlusal variation

Occlusal Variation	Females %	Males %	Total %
	(n =128)	(n=125)	(n=253)
Class I_b	74.2	70.4	64.4
Class I_u	11.7	9.6	10.7
Class II_b	4.8	11.2	7.9
Division 1	3.1	10.4	9.7
Division 2	1.7	0.8	1.2
Class II_u	6.2	4.8	2.5
Class III	1.6	3.2	2.4
Class IV	1.6	0.8	1.2

Table (3) for chi-square for each group within the sample shows a non-significant difference for the 4 classifications, at level of P. 0.05.

Table (3): Comparison of each group within the sample

Occlusal Variation	Chi-Square	Degree of Freedom	Significance
Class I_b	0.34	1	NS
Class I_u	0.03	1	NS
Class II	0.34	1	NS
Class III and IV	0.004	1	NS

S-significant, NS-non significant

Table (4) shows the sex difference for classes revealing the non-significant sex difference in CL I_b with females having the larger value and a significant sex difference in CL II_b and CL II_1 with the males having the larger value at (0.05) level of significance. Whereas a non-significant sex difference are found among CLI_u, CL II_2, CL II_u, CLIII and CL IV at (0.05) level of significance.

Table (4): Sex differences for the classification

Occlusal Variation	Z-test	*p*-value
Class I_b	0.8	NS
Class I_u	0.46	NS
Class II	2.33	S
Division 1.	2.0	S
Division 2.	1.72	NS
Class II_u	0.7	NS
Class III	0.8	NS
Class IV	0.7	NS

$p<0.05$, S-significant, NS-non significant

Tables (5 and 6) for the variation & percentage of malocclusion criteria respectively within males & females, shows that the crowding, spacing, cross-bite and open-bite are more prevalent in males than females. Also the incidence of crowding tends to be more common then the others.

Table (5): Variation of malocclusion criteria

Malocclusion Criteria	Females (No.)	Males (No.)	Total (No.)
Crowding	50	60	110
Spacing	19	34	53
Cross bite	33	40	73
Open bite	8	9	17
Total	110	143	253

Table (6): Percentages of malocclusion criteria

Malocclusion Criteria	Females (%)	Males (%)	Total (%)
Crowding	24.2	40.0	41.1
Spacing	14.8	27.2	20.9
Cross bite	25.8	32.0	28.9
Open bite	6.3	7.2	6.7
Total	128	125	253

Table (7) for chi-square of malocclusion criteria shows a non significant difference for crowding, spacing, cross bite and a and open bite within the sample at (0.05) level of significance.

Table (7): Comparison of malocclusion criteria within the sample

Malocclusion Criteria	Chi-square	Degree of Freedom	Significance
Crowding	0.017	1	NS
Spacing	0.31	1	NS
Cross bite	0.05	1	NS
Open bite	0.005	1	NS

S-significant NS-non significant

Table (8) reveals Z- test for sex difference of malocclusion criteria indicating the significant sex difference in crowding and spacing with the males having the larger value at (0.05) level of significance. Whereas a non- significant sex difference is found for cross-bite and open-bite at (0.05) level of significance.

Table (8): Sex differences of malocclusion criteria

Malocclusion Criteria	Z-test	*p*-value
Crowding	3.2	S
Spacing	3.25	S
Cross bite	1.4	NS
Open bite	0.33	NS

$p<0.05$ S-significant NS-non significant

DISCUSSION AND CONCLUSIONS

The present study was undertaken to offer a reliable & valid research tool for investigating the etiology of malocclusion, present an epidemiologic panorama of dental occlusion among different ethnic world population, and provide information about the occlusal variation among Iraqi and to find the possible significant sex difference in occlusion.

The age of the study sample ranged from (6-18) years. In this age range, the individual variation in dental patterns at the mixed dentition stage may modify the occlusion [18], also the occlusal status is not stable since the craniofacial growth and development is significant at this age range.

From the results of this study, one can notice that the prevalence of class I mal-occlusion in the females is higher than that of the males. However this difference is not significant. This difference is in agreement with the findings of Goose *et al.* [19] on British, Solow and Helm [20] on Danes, Wood [21] on Alaskan Eskimos, and Siriwat and Jarabak [22] on Americans. However, it is in disagreement with the findings of Helm [23] on Danes who reported a higher incidence of class I among males than females.

The incidence of Angle class II malocclusion in males is higher of that of the females with significant sex difference at ($p<0.05$). This is in accordance with the reported data on Danes [23].

The incidence of Angle class III malocclusion in males is higher of that of the females with no significant sex difference at ($p<0.05$). This finding is in agreement with the data of Goose *et al.* [19], Solow and Helm [20], and Helm

[23]. But it is in disagreement with the findings of Wood [16] who reported a higher percentage of class III malocclusion in the females than males.

Angle [13] indicated the presence of a fourth class of malocclusion, but did not give it a Roman numeral. Nowadays, this fourth class is called Angle class IV. Angle class IV occurs when the subject has a unilateral class II accompanied with a unilateral class III [7]. Angle class IV has no divisions Because of its nature it does not have a sub division. The incidence of class IV malocclusion is similar in the females and males with no significant sex difference.

By examining the results of the variation number, percentage, Chi-square test and Z-test of two proportions different types of malocclusion criteria for males and females in the sample, one suggests that this variation is dependent of sex at (p<0.05), with the males having the larger value for crowding and spacing. Whereas the difference in cross bite and open bite are found to be non-significant.

It is important to state that the occlusal variation among Iraqi differs numerically from other studies in different areas of the world. These differences may be attributed to genetic back ground, dietary consistency, diverse criteria, and inter-examiner disparity [7, 11, 12, 18, 20, 23]. The general pattern of occlusal variation among the young Iraqi does not differ from other patterns. In other words, the incidence of Angle class I malocclusion tends to be more common than Angle class II. In addition, Angle class II. 1 occurs more often than Angle class II. 2. Furthermore, Angle class IV occurs the least.

Table (9): Occlusal variation among different ethnic groups

Author	Nationality	Size	Age	Malocclusion %	CL I	CL II	CL III
Coose *et al.*(1957)	British	296	7-15	32.7	13.7	16.1	2.9
Helm (1968)	Danish	382	6-18	78.5	49.7	24.5	4.3
Grewe *et al.* (1968)	Indian	651	9-14	65.5	53.0	9.6	2.9
Wood (1971)	Eskimo	100	11-20	82.0	64.0	8.0	10.0
Sputh (1980)	American	455	14	84.5	39.3	36.5	8.7
Siriwat & Jarabak (1985)	American	500	8-12	100.0	47.2	46.4	6.4
The Present Study (2001)	Iraqi	253	6-12	100.0	73.53	9.02	2.4

From this study we concluded that there are:

1. Class I molar occlusion has the highest fraction followed by class II_b, II_u, after that class III and IV (the male are the higher for the class II_b, II_1, and class III).
2. A significant sex difference in occlusion exits. Specifically, occlusal variation frequencies are significantly different for males and females for class II, crowding and spacing.
3. Occlusal variation differs numerically among different world populations. However, the occlusal variation follows a universal general distributional pattern for most world populations.

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