Survey on malocclusion in Iraqi dental student sample

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Abstract:

The aim of this survey is to investigate the prevalence of malocclusion and different morphological features of dental occlusion in an Iraqi sample. The sample consisted of (218) dental student at college of Dentistry, Baghdad university, aged (18-21 year) & of both sexes. Were clinically evaluated after exclusion of students who have received any type of orthodontic treatment. The students also divided into two groups, the group who have received extraction of any tooth and the other group who have no extraction.

Of the sample (26.14%) had normal occlusion, (66.05%) had CL.I malocclusion, (7.33%) had CL.II malocclusion and (0.45%) who had CL.III malocclusion. The differences in prevalence of malocclusion was statistically significant between these groups. On the other hand. This statistical difference was significant in cases with extraction than those cases without extraction ($P< 0.05$). clearly, there is a need for further epidemiologcal research aiming to increase the knowledge a bout the prevalence and type of malocclusion as well as the extent of need & demand for orthodontic treatment.

Key ward:

Malocclusion, orthodontic anomalies, survey, prevalence, extraction.

Introduction:

The prevalence of malocclusion varies widely in different countries of the world. In primitive and isolated societies there is less variation in occlusal patterns than is observed in modern societies. [1]. Epideimiological studies deal with the prevalence of occlusal disharmonies and the actual need for orthodontic treatment are very necessary to use as a background for proper orthodontic diagnosis and treatment planning [1].

The assessment of occlusion for public health purposes has two main objectives. The first is to screen the population for individual treatment need and priority. The second is to obtain information for the planning of resources and facilities for orthodontics treatment.

Reports on the most common oral diseases mainly dental caries and periodontal diseases and numerous surrey have been conducted to investigate the prevalence of malocclusion in Iraq population were available (angle's Cl.I occlusion (72.7%), Cl.II (24.4%) and (2.9%) had Cl.III malocclusion) [2-6]. Mean while no other information has been published regarding the morphologic characteristics of dental occlusion especially in an educated level of Iraqi population like dental student group.

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Therefore it is likewise important to carry out a survey to investigate the prevalence of malocclusion and different morphological characteristics of dental occlusion in a group of dental student at college of dentistry /Baghdad University.

Materials and methods:

The sample consisted of first class dental student in College of Dentistry / Baghdad University. The total number of the sample was (218) of both sexes aged (18-21 years) after exclusion of students who have received any type of orthodontic treatment. The students also divided into two groups, the group who have received extraction of any tooth and the other group who have no extraction, were clinically evaluated to determine the prevalence of various orthodontic anomalies.

The materials were used includes: Plane mouth mirrors (No.4), Tweezers, Calibrated vernier, Kidney dishes, Pans for sterilization, Cotton and paper tissue, Disinfectant solution.

The examination were carried out in the clinic of orthodontic department, College of dentistry, Baghdad University. The Dental, Medical and Geographical informations were registered according to the chart list, the student who have received any type of orthodontic treatment were excluded, the following steps of examination were taken:-

(1) Sagittal Occlusion:

In the permanent dentition, the sagittal occlusion was defined at the first molar according to Angle[7-9], the key to occlusion in Angle's classification is the relationship between the first permanent molars, in which there are three groups:

- Class I or neutrocclusion: the mesio buccal cusp of the upper first permanent molar occludes with the mesiobuccal grove of the lower first permanent molar.
- Class II or distocclusion: The mesiobuccal cusp of the lower first molar occludes distal to the Class I position. This is known as post-normal relationship.
- Class III or mesiocclusion: The mesiobuccal cusp of the lower first molar occludes mesial to the class I position. This is known as a pre-normal relationship.

When the first molar was lacking, the sagittal occlusion was defined at the canines according to Barrow et al, [10]. Discrepancies less than half a cusp width were recorded as normal occlusion.

(2) Overjet and Overbite:

The overjet was measured according to Baume et al. [11] with the aid of a calibrated vernier while the subject is in centric occlusion and with his occlusal plane horizontal. The end of the fixed scale is placed on the labial surface of the lower incisor and the sliding scate is adjusted to touch the most labial part of the corresponding upper incisor, measurment is recorded to the nearest whole millimeter.

Increased overjet was considered as > 4 mm and decreased overjet was considered as < 1 mm.

An increased, decreased, or reversed overjet value was considered as a single occlusal anomaly.

The over bite was measured according to Draker [12] while the subject is in centric occlusion with his occlusal plane horizontal. The amount of vertical overlap of the upper incisor on the lower inesior is marked with the pencil on the labial surface of the lower incisor using

the incisal edge of the upper incisor to guide the pencil with conical plane of the sharpened point of the pencil itself parallel to the subjects occlusal plane. If there is lack of vertical overlap between any of the opposing pairs of incisors (Open bite), the amount of open bite is measured directly and recorded to the nearest whole millimeter. Increased over bite was considered as > 4 mm and decreased overbite as < 1 mm.

An increased or decreased over bite including anterior open bite was considered as a single occlusal anomaly.

(3) Transverse Occlusion:

a- Crossbite:

Recorded according to Björk etal [13] for each side, for the canine and premolar section, and for the molar section. When the buccal cusp of the upper tooth occludes lingually to the buccal cusp of the corresponding lower tooth. Crossbite is thus recorded only when the cusps have passed one another. The registration is made in the appropriate segment as soon as one tooth is deviating.

Anterior crossbite was also recorded according to Bjork et al [13] in which one, two or three of the upper incisors occlude lingual to the lowers.

b- Scissorsbite:-

Recorded according to Bjork et al [13] on each side for the canine and premolar section and for the molar section, if the lingual cusp of the upper tooth occludes buccally to the buccal cusp of the corresponding lower tooth. Scissors bite is thus recorded only when the cusps have passed one another. The registration is performed in the appropriate section as soon as one tooth is deviating.

(4) Crowding and Spacing:

Crowding and spacing was recorded for each jaw according to Bjork et al [13], it was recorded for the incisor section comprising all the incisors and for the lateral section comprising the canine and premolars of each side.

The incisor section is demarcated by the distal contact point of the two lateral incisors, when the lateral incisors do not deviate labially or lingually in relation to the midline of the alveolar process. The lateral sections are limited by these points and the mesial contact point of the first molars.

The diagnosis of spacing was registered if there was a deviation of > 2 mm in a section and the diagnosis of crowding if the deviation was ≤ -2 mm.

Registration of the maxillary medial diastema was made in the upper anterior segment and the measurement of diastema is made to the nearest whole millimeter at the level of the gingival margin according to Bjork et al [13]. The diagnosis of medial diastema was made if there was a spacing of ≥ 2 mm.

(5) Missing Teeth:

Notations on missing teeth either due to extraction. Hypodontia, trauma and impaction were taken. The presence of spacing, the contour of the underlying alveolar ridge, the caries-experience of present teeth and pertinent questions to the subject will usually allow a correct assessment of missing teeth due to trauma or extraction .Considering the subjects chronological and dental ages, if the contour of the underlying alveolar ridge does not indicate an impacted tooth, the tooth is considered to be congenitally absent [11].

Data analysis was carried out using the statistical packing for social sciences (SPSS 10) and the use of Excel

2000 program. The number and percentage (%) were calculated for each group of malocclusion. Statistical analysis concerning comparison between groups were conducted to investigate any significant differences using test of chi-square (X^2) the differences were considered significant (S) when P-value ($P< 0.05$) and high significant (HS) when ($P< 0.0001$) and non significant (NS) when ($P> 0.05$).

Results:

The statistical percentage for the prevalence of normal occlusion was (76.06%) of the total number (71) of examined dental student in cases with out extraction and (2.04%) of the total number (147) of examined dental student in cases with extraction. The total percentage of normal occlusion was (26.15%) of the total number in both cases (218) of examined dental student (table 1).

Table (1): Number & % of normal occlusion Cl.I, Cl.II and Cl.III malocclusions

	Without extraction	%	With extraction	%	Total	%
Normal occlusion	54	76.06	3	2.041	57	26.15
CL. I malocclusion	4	5.634	140	95.24	144	66.06
CL.II malocclusion	12	16.9	4	2.721	16	7.339
CL.III malocclusion	1	1.408	0	0	1	0.459
Total	71	100	147	100	218	100

The statistical difference of normal occlusion between with out extraction and with extraction cases by chi-square was high significant ($P< 0.0001$). (table 2).

The statistical percentage for the prevalence of Cl. I malocclusion was (5.63%) of the total number (71) of examined dental student in cases with out extraction and (95.24%) of the total number (147) of examined dental student in cases with extraction. The total percentage of CL.I malocclusion was (66.06%) of the total number in both cases (218) of the examined dental student (table 1). The statistical difference of Cl.I malocclusion between with out extraction and with extraction cases by chi-square was high significant ($P< 0.0001$) (table 2).

The statistical percentage for the prevalence of Cl. II malocclusion was (16.9%) of the total number (71) of examined dental student in cases with out extraction and (2.72%) of the total number (147) of examined dental student in cases with extraction. The total percentages of CL.II malocclusion was (7.33%) of the total number in both cases (218) of examined dental student (table 1).

The statistical difference of Cl.II malocclusion between without extraction and with extraction cases by chi-square was significant ($P< 0.05$) (table 2).

The statistical percentage for the prevalence of Cl. III malocclusion was (1.4%) of the total number (71) of examined dental student in cases with out extraction and (0.0%) of the total number (147) of examined dental student in cases with extraction. The total percentage of CL.III malocclusion was (0.45%) of the total number in both cases (218) of examined dental student (table 1).

There is no any statistical difference of Cl.III malocclusion between without extraction and with extraction cases (table 2).

Table (2): Chi-square of malocclusions between without extraction & with extraction

	Chi-square	P-value	Sig
Normal occlusion	5.875	0.000	HS
CL. I malocclusion	5.758	0.000	HS
CL.II malocclusion	2.658	0.0475	S
CL.III malocclusion	-	-	-

The statistical percentage for the prevalence of orthodontic anomalies in CL. I malocclusion was (0.45%) for crowding, bimaxillary protrusion, crossbite and central diastema while the statistical percentage was (0.0%) for the other anomalies including deep bite, Buccally malposed canine, rotation and displacement, proclination, retroclination, open bite, dental shifting , increase overjet and spacing of the total number of examined dental student in cases of Cl.I malocclusion with out extraction (table3) and (figure 1), while in cases of Cl.I malocclusion with extraction, the statistical percentage for the prevalence of orthodontic anomalies was (27.52%) for crowding, (5.5%) for bimaxillary protrusion, (4.58%) for deepbite, (3.21%) for buccally malposed canine, (7.33%) for rotation and displacement, (2.29%) for crossbite, (1.37%) for proclination, (1.83%) for open bite, (0.91%) for dental shifting, (1.37%) for increased overjet, (0.45%) for retroclintion, (4.58%) for spacing and (3.21%) for central diastema (table 3) and (figure 1).

Table (3): Number and percentage (%) of orthodontic anomalies in CL. I malocclusion

	Without extraction		With extraction		Total	%
	NO.	%	NO.	%		
Crowding	1	0.4587	60	27.52	61	27.98
Bimaxillary protrusion	1	0.4587	12	5.504	13	5.963
Deep bite	0	0	10	4.587	10	4.587
Buccally malposed canine	0	0	7	3.211	7	3.211
Rotation and displacement	0	0	16	7.339	16	7.339
Cross bite	1	0.4587	5	2.293	6	2.752
Proclintion	0	0	3	1.376	3	1.376
Open bite	0	0	4	1.834	4	1.834
Dental shifting	0	0	2	0.917	2	0.917
Increase over jet	0	0	3	1.376	3	1.376
Retroclination	0	0	1	0.458	1	0.458
Spacing	0	0	10	4.587	10	4.587
Central diastema	1	0.4587	7	3.211	8	3.669

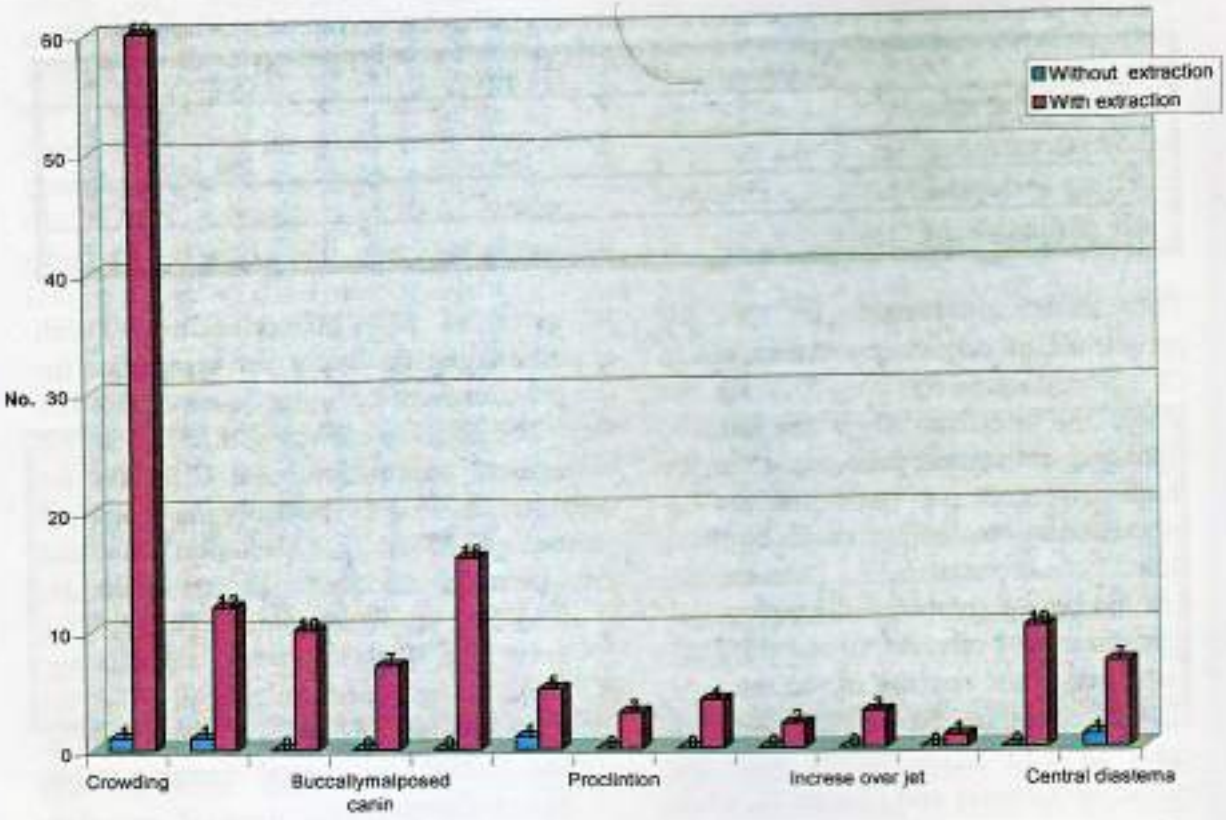

Figure (1): Assessment of othodontic anomalies in CL. I malocclusion group.

The statistical difference by chi-square for orthodontic anomalies in Cl I malocclusion between whit out extraction and with extraction cases was high significant ($P < 0.0001$) for crowding , significant ($P < 0.05$) for bimaxillary protrusion, crossbite and central diastema. While there is no statistical difference for the other orthodontic anomalies (table 4) and (figure 1).

The statistical differences by chi-square between groups of normal occlusion, Cl.I, Cl. II and Cl. III malocclusion in cases with out extraction indicating that this statistical difference was high significant between normal occlusion and Cl. I malocclusion groups ($X^2= 5.98$), and also between normal occlusion and Cl III malocclusion groups ($X^2= 5.79$). Where as the statistical difference was significant between normal occlusion and Cl. II malocclusion groups ($X^2= 3.75$), Cl. I and Cl. II malocclusion groups ($X^2= 3.97$), and also between Cl. II and Cl. III malocclusion groups ($X^2= 3.47$) (table 5) and (figure 2).

Where as the statistical difference was not significant between Cl. I and Cl. III malocclusion groups ($X^2= 1.64$) (table 5).

However, the statistical difference between groups in cases with extraction was high significant between normal occlusion and Cl. I malocclusion

groups (X^2= 5.67) and also between Cl. I and Cl. II malocclusion groups (X^2= 5.13). (table 5) and (figure 2).

Table (4): Chi-Square of orthodontic anomalies in CL. I malocclusion between without extraction & with extraction.

	Chi-square	P-value	Sig
Crowdin	5.632	0.000	HS
Bimaxillary proclination	3.652	0.023	S
Deep bite	-	-	-
Buccally malposed canine	-	-	-
Rotation and displacement	-	-	-
Cross bite	2.992	0.0398	S
proclination	-	-	-
Open bite	-	-	-
Dental shifting	-	-	-
Increase over jet	-	-	-
Retroclination	-	-	-
Spacing	-	-	-
Central diastema	2.978	0.0388	S

*P<0.05 Significant
**P<0.0001 High Significant

Table (5): Chi-square between groups (with extraction & without extraction)

	without extraction			with extraction		
	Chi-square	P-value	Sig	Chi-square	P-value	Sig
Normal & CL. I	5.988	0.000	HS	5.679	0.000	HS
Normal & CL. II	3.757	0.0322	S*	1.763	0.184	NS**
Normal & CL. III	5.797	0.0000	HS	-	-	-
CL. I & CL. II	3.974	0.0344	S	5.139	0.000	HS
CL. I & CL. III	1.64	0.132	NS	-	-	-
CL. II & CL. III	3.475	0.0347	S	-	-	-

*P<0.05 Significant
**P>0.05 Non significant
***P<0.0001 High significant

Where as the statistical difference was not significant between normal occlusion and Cl.II malocclusion groups (X^2= 1.76). However, there is no statistical difference between normal occlusion and Cl.III malocclusion groups, between Cl.I and Cl.III malocclusion groups and between Cl.II and Cl. III malocclusion groups. (table 5) and (figure 2).

These differences were statistically significant ($P < 0.05$) between groups as a total and in both the extraction and without extraction cases (table 6) and (figure 2).

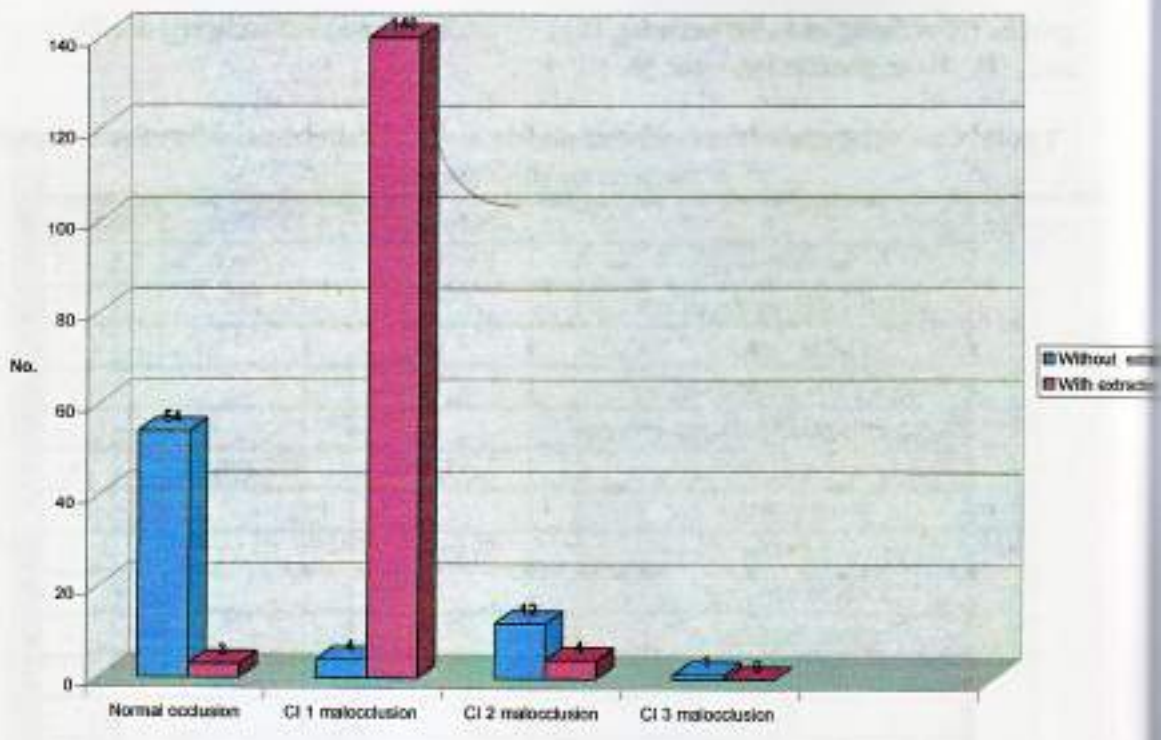

Figure (2): The statistical difference in prevalence of normal occlusion and CL.I, CL.II,CL.III malocclusion groups.

Table(6): Chi-Square Between Groups (With Extraction & Without Extraction) Total

	without extraction			with extraction		
	Chi-square	P-value	Sig	Chi-square	P-value	Sig
Between groups	3.154	0.0392	S*	3.022	0.014	S
Total between with extraction &without extraction	3.044	0.0382	S*			

*P<0.05 Significant

Discussion:

Of the sample, (26.15%) had normal occlusion , (66.06%) had Cl.I malocclusion , (7.33%) had Cl.II malocclusion and (0.45%) who had Cl.III malocclusion . These data indicating that the Cl. I malocclusion is markedly prevalent than the others.

However, the statistical differences between normal occlusion and Cl.I , Cl. II and Cl. III malocclusion in this sample is significant (figure 2). This mean that according to priorty of prevalence, the Cl.I malocclusion taking the first step, followed by normal occlusion in the second step, Cl.II malocclusion in the third step, and finally the Cl. III malocclusion in fourth step. On the other hand, the prevalence of orthodontic anomalies in Cl.I malocclusion according to priority in which (27.98%) of the sample who have had crowding, (7.33%) had rotation and displacement , (5.96%) had bimaxillary

protrusion, (4,58%) had deep bite, (4.58%) had spacing , (3.66%) had central diastema, (3,2%) had buccally malposed canine, (2.75%) had cross bite, (1.83%) had open bite, (1.37%) had increased overjet, (1.37%) had proclination, (0.91%) had dental shifting and (0.45%) who have had retrolination (figure 1).

On the other hand the prevalence of malocclusion was statistically significant in cases with extraction than those cases with out extraction and this may be due to the loss of harmony and integrity of the dental arch resulting in malocclusion.

These results were agreed with a survey of 112 dental students at 19 years of age, it was found by wilkinson that 50% had lost one or more first permanent molars with consequent malocclusion of those students who had retained all the first permanent molars, malocclusion was evident in 59% where as 77% of those who has lost one lower first permanent molar and 71% of those who had lost both lower first permanent molars, showed malocclusion. [14]

Although, comparison with other studies is not always possible because of the differences in definitions of examined occlusal features, varying examination techniques and different indices used. Thus, comparison will only be made with those studies carried out on a similar age group using a similar methodology emphsizing on those performed on Iraqi samples.

Although the dental services in Iraq have been in continuous development both in type of the service given and in the size and distribution of the service supplied [15], but studies devoted to identify the malocclusion problem in the Iraq population have been quite few [6,16,17] . Reviewing these studies, several problem areas were found of that, they were concerned mainly with the primary schools, intermediate schools and preparatory schools only, neglecting the level of higher educated student like at university stage. Therefore, this survey on malocclusion have been undertaken. Clearly, there is a need for further epidemiological research aiming to increase the knowledge about the prevalence and type of malocclusion as well as the extent of need and demand for orthodontic treatment [18] .

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