

# Prevalence of angle's classification of malocclusion among patients Attending Orthodontic Department in College of Dentistry- retrospective cross-sectional study

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**Background and objectives:** Since demand for orthodontic treatment is increasing. This stresses the importance of epidemiological studies in order to obtain knowledge about the prevalence of different types of malocclusion and the need for orthodontic treatment. This research aims to know the percentage of class I, class II, class III malocclusion in patients attending orthodontic clinics in College of Dentistry/ Hawler Medical University and their relationship with age, gender and stages of dental development.

**Methods:** a total of 110 case sheets were collected from orthodontic clinic, patients that have asymmetric angle's molar classification, any local or systemic problems, or undergone any orthodontic treatment before, were excluded, so, a sample size of 87 patients were taken (41 male and 46 female), with ages ranging from 6 to 25, after coding case sheets, data were inputting in an excel sheet of Microsoft Office and analyzed by chi-square test.

**Results:** most common malocclusion in order of prevalence were angle's class I (49.4%) , followed by angle's class II ( 42.5%) then angle's class III was the least prevalent among them which is (8%), malocclusion is more frequent among female than male and its more prevalent in the mixed dentition than in permanent.

**Conclusion:** Class I malocclusion was the most prevalent type of malocclusion while class III was the least. Malocclusion is more frequent among female than male but the difference is not significant, and it were found to be more frequent in the mixed dentition rather than in the permanent dentition, and it decreased with increasing age.

**Keywords:** malocclusion, dental development stage, angle classification.

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## Introduction

A malocclusion is a misalignment or incorrect relation between the teeth of the two dental arches when they approach each other as the jaws close. The term was coined by Edward Angle, the "father of modern orthodontics" who was the first to classify malocclusion.<sup>1</sup> He based his classifications on the relative position of the maxillary first molar.<sup>2</sup>

According to Angle, the mesiobuccal cusp of the upper first molar should align with the buccal groove of the mandibular first molar.

Malocclusion is a common finding, although it is not usually serious enough to require extensive treatment.<sup>3</sup>

Those who have more severe malocclusions, which present as a part of craniofacial anomalies, may require extensive orthodontic and sometimes surgical treatment (orthognathic surgery) to correct the problem.

Malocclusions may be coupled with skeletal disharmony of the face, where the relations

between the upper and lower jaws are not appropriate. Such skeletal disharmonies often distort sufferer's face shape, severely affect esthetics of the face, and may be coupled with mastication or speech problems and mostly treated with orthognathic surgery. The goal of orthodontic treatment is to obtain optimal occlusion with framework of function, stability and esthetic.<sup>4</sup>

The orofacial region is an area of significant concern because it draws the most attention from other people in interpersonal interactions and its primary source of physical and emotional communications.<sup>4</sup>

As the result, patients who seek orthodontic treatment are concerned with improving their appearance and social acceptance. Orthodontic anomalies have been associated with psychosocial distress, poor periodontal condition and impaired masticatory function, so, should be regarded as a health problem.<sup>5</sup>

Hence, demand for orthodontic treatment is increasing in most countries, therefore rational planning of orthodontic measures on a population basis is essential in assessing the resources required for such a service.

This stresses the importance of epidemiological studies in order to obtain knowledge about the prevalence of different types of malocclusion and the need for orthodontic treatment.

Many studies on prevalence of malocclusion in different populations in near and distant countries have been done, Since the early 1900's, when orthodontics became a recognized specialty of the dental profession, much has been written on the incidence and prevalence of malocclusion in the different population.<sup>6</sup>

For example, if we take the neighboring countries, we find that in Saudi Arabia the most common malocclusions according to angle's classification and in order of prevalence were Angle's Class I (52.8%), Angle's Class II (31.8%), Angle's Class III (15.4%), according to a research done in 2018.<sup>7</sup>

While in Syria, we find rather different results in a sample of children. It was stated by a study done in 2014 that normal occlusion was recorded in 38.5% of the whole, class I malocclusion was found in 30%, class II division I in 16%, class II division II in 3.5% and class III registered in 12%.<sup>8</sup>

If we take distant countries, a research done in India in showed that 83% of patients attending the governmental college of dentistry had malocclusion. Of which Class I malocclusion constituted the major proportion of malocclusion, which was found in 67% of the studied population, Class II Division I constituted 8% of the sample size, Class II Division II constituted 6% of the sample size, Class III constituted 2% of the total sample size.<sup>9</sup>

Unfortunately, to the extent of our knowledge there is no local study in Iraq showing the prevalence of malocclusion in any given age group and subdividing them according to Angle's classification.

This study proposes to bring out the prevalence of malocclusion according to different ages, gender and stages of dental development in patients attending orthodontic clinic in college of dentistry in Hawler medical university by using empirical means, that includes collection of data and data analysis based on information present in case sheets of recent two years which are available in orthodontic clinic / College of Dentistry-Hawler Medical University.

### **Subjects and Methods**

A retrospective cross-sectional study was designed. The data was collected from case sheet of patients at department of Pedodontics-Orthodontics-Prevention in college of dentistry, Hawler medical university. The case sheets were for patients attending the department seeking orthodontic treatment in the time frame of September 2018 – April 2019.

After the department's permission, the research group was handed out a total of 87 case sheets. The sample size contained 87 patients (41 males: 47.1%, 46 females:

52.9%) out of 110.

Patients having any local or systemic problems or undergone any orthodontic treatment before were excluded from the study. Also, patients with asymmetric Angle's molar classification were excluded. The case sheet generally focuses on age, gender, presence of crowding, presence of spacing, anteroposterior relation, and stage of dentition, molar classification, canine classification, incisor classification, overjet and overbite.

The case sheet was divided into 3 parts: the first part included demographic questions regarding age, to conclude whether there is any correlation between age and malocclusion found in those patients. Their age group ranged from 6 to 25 years old as follows: 6-12 years, 13-17 and 18-25 years old. The second part dealt with gender of the patient and concludes that there are any different between male and female or not. Furthermore, last part of case sheet shows the relation between malocclusion and stage of dental development as follows: Early mixed dentition, late mixed dentition and permanent dentition. The malocclusion determination was based on Angle's classification of malocclusion and it was evalu-

ated clinically in maximum intercuspation, which was attained by asking the subject to swallow and then to bite the teeth together.

#### Angle classification.

1. Class I molar relationship is described as: The mesiobuccal cusp of the maxillary first molar occluding in line with the buccal groove of the mandibular first molar, the maxillary first molar is slightly posteriorly positioned relative to the mandibular first molar.

2. class II molar relationship is described as: The mesiobuccal cusp of the maxillary first molar occluding anterior to the buccal groove of the mandibular first molar, the maxillary first molar is in line with or anteriorly positioned relative to the mandibular first molar.

3. Class III molar relationship is described as: The mesiobuccal cusp of the maxillary first molar occluding posterior to the buccal groove of the mandibular first molar, the maxillary first molar is severely posteriorly positioned relative to the mandibular first molar, The case sheets were coded, and the data was put in an excel sheet of Microsoft Office and analyzed by chi square test with the same software.

**Table 1: Prevalence of various malocclusion.**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I	43	49.4	49.4	49.4
	II	32	36.8	36.8	86.2
	III	12	13.8	13.8	100.0
	Total	87	100.0	100.0	

#### Results

The prevalence of different malocclusion was showed in table 1. Results showed that 49.4% class I malocclusion (39.5% male, 60.5% female). While class II was slightly lower, which was 36.8% (46.9% male, 53.1% female). But class III patients were significantly less than the rest: 13.8% (75% male, 25% female). There were a total of 41 males and 46 females in the study.

Considering the differences in gender, 41.5

% of the male patients were class I, while 36.6% were class II and 22% were class III. In contrary, the female's category class I had a higher sum of patients reaching to 56.5% followed by class II at 37% but going sharply low to 6.5% for class III, see (Table 2). The statistical results of chi square test showed that there is no significant difference between the two genders ( $P > 0.05$ ) and the results are independent of each other see (Table 3).

**Table 2 Classification: Gender distribution of malocclusion**

		Gender		Total	
		F	M		
Classification	I	Count	26	17	43
		Expected Count	22.7	20.3	43.0
		% within Classification	60.5%	39.5%	100.0%
		% within Gender	56.5%	41.5%	49.4%
		% of Total	29.9%	19.5%	49.4%
	II	Count	17	15	32
		Expected Count	16.9	15.1	32.0
		% within Classification	53.1%	46.9%	100.0%
		% within Gender	37.0%	36.6%	36.8%
		% of Total	19.5%	17.2%	36.8%
	III	Count	3	9	12
		Expected Count	6.3	5.7	12.0
		% within Classification	25.0%	75.0%	100.0%
		% within Gender	6.5%	22.0%	13.8%
		% of Total	3.4%	10.3%	13.8%
Total	Count	46	41	87	
	Expected Count	46.0	41.0	87.0	
	% within Classification	52.9%	47.1%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
	% of Total	52.9%	47.1%	100.0%	

**Table 3: Differences in gender distribution of malocclusion**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
<b>Pearson Chi-Square</b>	4.737a	2	.094	.105
<b>Likelihood Ratio</b>	4.875	2	.087	.105
<b>Fisher's Exact Test</b>	4.631			.105
<b>N of Valid Cases</b>	87			

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.66.

The relationship between Angle’s classification and stage of dentition showed significant difference after testing the results by Fisher’s exact test ( $P < 0.05$ ) which means that there is dependence between the two categories on each other (Tables 4 and 5).

Also, the relationship between age and Angle’s classification showed same results with fisher’s exact test, which also means that the classification is dependent on age group ( $P < 0.05$ ). (Tables 6 and 7)

**Table 4: Classification: Stages of mixed to permanent dentition**

		early mixed	late mixed	Permanent	
<b>Classification</b>	<b>I</b>	11	13	19	43
	<b>II</b>	11	15	6	32
	<b>III</b>	7	5	0	12
<b>Total</b>		29	33	25	87

**Table 5: The relationship between Angle's classification and stage of dentition**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
<b>Pearson Chi-Square</b>	12.557a	4	.014	.012
<b>Likelihood Ratio</b>	15.308	4	.004	.006
<b>Fisher's Exact Test</b>	12.749			.010
<b>N of Valid Cases</b>	87			

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 3.45.

**Table 6: Classification of relationship between age and Angle's classification**

		Age			Total
		13-17	18-25	6-12	
<b>Classification</b>	<b>I</b>	9	9	25	43
	<b>II</b>	3	1	28	32
	<b>III</b>	0	0	12	12
<b>Total</b>		12	10	65	87

**Table 7: differences in relationship between age and Angle's classification**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
<b>Pearson Chi-Square</b>	13.665a	4	.008	.009
<b>Likelihood Ratio</b>	16.677	4	.002	.003
<b>Fisher's Exact Test</b>	11.929			.011
<b>N of Valid Cases</b>	87			

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is 1.38.

**Discussion:**

Although many studies have been published that describe the prevalence and types of malocclusion. It is difficult to compare these findings, in part, because of the varying methods and indices used to assess and record occlusal relationships, age differences of the study populations, examiner subjectivity, specific objectives, and differing sample sizes.<sup>6</sup>

The current study was conducted to determine the prevalence of angles classification of malocclusion in relation to different age groups and gender of patients seeking orthodontic treatment in college of dentistry. The subjects were classified into three categories of malocclusion and then the findings were compared with similar studies conducted in the past.

The high frequency of class I malocclusion could be due to the fact that only cases that need mild corrections are accepted in the orthodontic department in college of dentistry to be treated by the final year students. Since they use removable appliances to treat their patients and due to the limited time they have, they cannot accept complicated cases especially those that have moderate to severe skeletal problems. Most of the time, class I and class II are treated rather than class III, because the latter category most probably requires fixed appliances and/or surgical intervention. Comparing the findings of this research with other findings available from the literature, it is found that the findings of this research about different classes of malocclusion are in accordance to the findings of a research made by.<sup>10-15</sup> There are some other studies like the study of Ajayi E.O. showed that class II is the least common among classes of malocclusion.<sup>16</sup> This is because the prevalence of malocclusion varied for different ethnic groups, different age groups and different methods of registration.<sup>12</sup> In the same research of Aslam it appeared that results of gender are also in accordance with the current findings of this research.<sup>10</sup> Other studies like the study of

Lagana, the study of Bugaighis, Brito, and Mahajan are in accordance to the results of this research on gender distribution.<sup>9,11,17,18</sup>

According to gender differences in the presence of malocclusion, its more frequent in female than male, but this difference is not significant.<sup>18</sup> This difference highlights the difference between need and demand for orthodontic treatment.

Its common experience that girls seek treatment in a greater numbers than boys due to increased awareness of esthetic among female than male, as its mentioned in the study of Foster and Al-zubair.<sup>19,20</sup>

Results from this study also shows that malocclusion is more frequent in the mixed dentition than in permanent, and also many other studies like a study made by Thilanders and Brito are in accordance to it.<sup>3,18</sup> This result is due to some of the characteristics like anterior open-bite and increased overjet present in the mixed dentition can be self-correcting through elimination of permanent mouth breathing, habits and other environmental factors.<sup>15,21</sup>

Or that may due to the impact of many oral habits on dentition, like nail biting, non-nutritive sucking habits, tongue thrusting, which is more obvious in the mixed dentition rather than in permanent.<sup>22</sup>

The results show that the frequency of malocclusion decreases with increasing age, and other studies like the study made by Tak is in accordance to these findings.<sup>13</sup>

**Conclusion**

Class I malocclusion was the most prevalent type of malocclusion among patients attending orthodontic clinic in college of dentistry, while class III was the least prevalent.

There were gender differences in the prevalence of malocclusion, which is more frequent among female than male, but this difference is not significant, and malocclusion were found to be more frequent in the mixed dentition rather than in the permanent dentition, and it appeared to be decrease with increasing age, therefore early attention to the development of

to reduce its prevalence and further adverse effect.

### Conflicts of interest

The authors report no conflicts of interest.

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