Different types of malocclusion and oral habits in Sharja and Ajman Emirates

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Abstract

Aim: to determine the prevalence of malocclusion among adults attending Dental Centers in Ajman and Sharjah, as well as the association of gender, ethnicity, and prevalent oral habits with the types of malocclusion.

Material and Methods: The study was conducted on 300 patients with age range 18-30 years. Intraoral dental and Orthodontic classification was performed alongside a questionnaire. Patients' occlusions were classified based on Angle's Classification.

Results: Among the sample group, it was found that Class I malocclusion was the most prevalent malocclusion with 74% , Class II division 1 was 12% and Class II division 2 was 11% and the least was Class III with 3% with significant difference between males and females. For different ethnic groups included in the study the same pattern of prevalence applied (Class I followed by Class II, Class III came last) except for Caucasians and Far Eastern, where Class II division 2 surpassed division 1 with a significant difference between all Classes of malocclusion except for Class I.

As for oral habits, nail biting was the most prevalent oral habit showing 20.7%, followed by teeth grinding 11%, thumb sucking 10%. Tongue Thrust was the least prevalent habit with a significantly higher prevalence in Class II malocclusion of the studied sample.

CONCLUSION: Class I malocclusion was the most prevalent malocclusion, followed by Class II division 1, Class II division 2, and the least was Class III. All ethnic groups showed the same pattern of distribution except for Caucasians, Far Eastern, and South Asian. The pattern of distribution was the same for both males and females; however, a difference in the percentage existed between genders. The most prevalent oral habit was nail biting. All oral habits were not related to different types of malocclusions except for tongue thrust (higher prevalence in Class II Malocclusion). This study is a base for further Arab and Middle Eastern studies.

Key words: Malocclusion, Oral habits, Ethnic groups, Prevalence of malocclusion.

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Introduction

Malocclusion is a problem that has been studied for long in various populations to understand its causes and magnitude, and hence be able to provide proper treatment.[1] It comes third after Caries and periodontal diseases, which are considered the most common problems in oral health; as proposed by the World Health Organization.[2] It is a morphological variation that may or may not be associated with a pathological condition.[3] The most common classification of malocclusion was made by Angle who considered the maxillary first molar to be the key of occlusion and made his classification accordingly.[4]

The majority of people are concerned with their facial appearance, which is common in different age groups due to peer pressure in the young age and social pressure in adulthood; as being attractive has a direct impact on one's success.[5] Malocclusion can, not only develop a sense of shyness and inferiority demotivating people, but also disturb the basic functions of chewing, swallowing and even breathing.[6-7]

Malocclusion is not just a single set up but rather many factors interconnected with each other and complicated by various causes. The Orthodontic practice is concerned with providing preventive and interceptive measures and most importantly, educating patients and parents.[8] A basic knowledge of the prevalence of malocclusion is needed in treating or carrying out the preventive or interceptive measures for the target population through a well-organized educational dental care program. In Arab populations, the available information on the prevalence of malocclusion is unfortunately lacking, compared to other countries where there are quite a number of studies in this concern.[9-14] The majority of research was conducted either on school children in the mixed dentition or young adults less the 18 years.[8-10,13-14] To our knowledge the adult stratum of the society has been neglected despite their significant number and needs.

Consequently, the aim of this study was to determine the prevalence of malocclusion among adults attending Dental Centers in Ajman and Sharjah, as well as the association of gender, ethnicity, and prevalent oral habits with the type of malocclusion.

Material and methods

This was a cross-sectional prospective study on 300 patients of different ethnic backgrounds, randomly selected

from the dental Gulf Center in Ajman and Sharjah from a common pool of 600 patients. The age range was 18-30 years. The sample size was calculatedusinghttps://www.calculator.net/sample-size-calculator.html; it was found to be 285 and was approximated to 300with 95% confidence interval and 80% power using chi square test. The duration of the study ranged from 6 to 8 months.

The study was approved by the ethical Committee of the Gulf Medical University (GMU).All the patients signed an informed consent.

Inclusion criteria:[15]

- The presence of upper first permanent molars
- No clinically apparent facial asymmetry
- No clinically apparent skeletal deformities
- The presence of a full set of permanent teeth
- No previous orthodontic treatment
- Willing to participate in the research

A diagnosis sheet was constructed in the form of a questionnaire that was assessed by experts in the fields of Dentistry, Public health and Orthodontics and pre-piloted on 5 interviewers to ensure clearance of the questions. A pilot study was conducted on 30 participants and the duration of the diagnosis and questionnaire filling was estimated to be 15-20 minutes for each patient. To assess intra-examiner reliability, the data was collected twice for all the 30 participants, two weeks apart, and the difference between the two tested evaluations using Kappa test was 89%.[16]

The diagnosis sheet comprised of both closed and open end questions while maintaining the patient's anonymity by not involving their names. The patients' history, information about oral habits (nail biting, thumb sucking, tongue thrusting and bruxism) and oral care were collected, as well as a full dental and orthodontic intra-oral examination. The orthodontic examination (static and functional) was done based on Angle's classification of malocclusion, and the different clinical intraoral signs of oral habits. [17]

The patients were classified according to their ethnicity into different groups. The data was analyzed using Statistical Package for Social Sciences (SPSS) 21 version. The frequencies and percentages of the different parameters were calculated and the difference between frequencies was tested using Chi-square test. P value equal to or less than 0.05 was considered significant.

Results:

The frequency and percentages calculated for the sample are shown in **Figure 1**. The most common type of malocclusion in the whole sample was found to be Class I in 74.3% of the subjects, followed by class II division 1 in 12% of the sample, while Class II division 2 was10.7%. Finally, Class III malocclusion was found to be the least; only 3% of the sample.
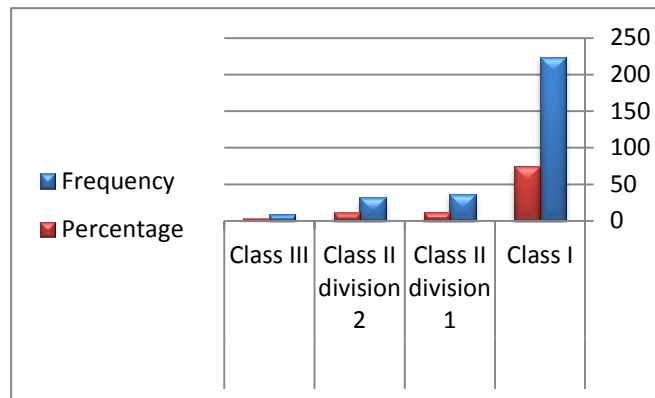

Figure 1: The frequency and percentages of the different classes

Relating the prevalence of different types of malocclusion to Ethnicity

Most ethnic groups showed the same pattern of malocclusion distribution (Class I followed by Class II, Class III came Last) but with different percentages for each class, except for Caucasians, Far Eastern, and South Asians where Class II division 2 surpassed division1. For Class I malocclusion, the difference in the distribution percentage was non-significant between all ethnic groups. In all other groups (Class II division 1, Class II division 2, and Class III) there was a significant difference in the distribution percentage **Table 1, Figure 2**.

	Angle Classification				
	Class I	Class II division 1	Class II division 2	Class III	Total
African	58.1%	22.6%	12.9%	6.5%	100.0%
Arab	68.3%	22.2%	6.3%	3.2%	100.0%
Caucasian	69.2%	7.7%	15.4%	7.7%	100.0%
Far eastern	70.0%	3.3%	16.7%	3.3%	100.0%
Persian	71.8%	15.4%	10.3%	2.6%	100.0%
South Asian	82.3%	6.5%	9.7%	1.6%	100.0%
X^2(p value)	2.031 (0.932) NS	11.763 (0.001) S	5.398 (0.05) S	6.093 (0.05) S	

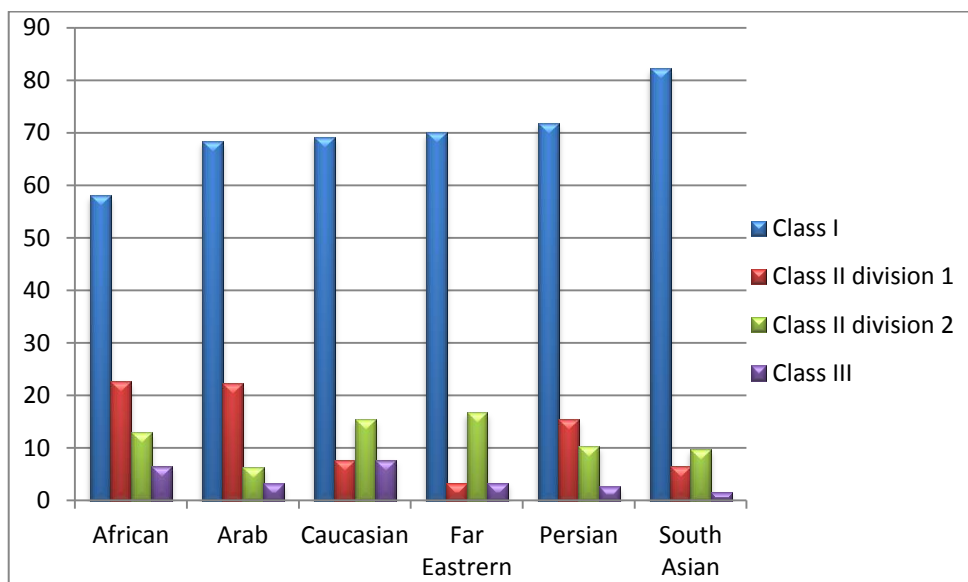**Table 1**: Prevalence of different Angle Classes within the different Ethnic groups

Figure 2: Angle malocclusions in different Ethnic groups

Relating the prevalence of different types of malocclusion to Gender

The results showed a significant difference in the distribution of the different types of malocclusion between males and females, where the females came with a higher percentage of Classes II and III and a lower percentage in Class I compared to the results obtained from the male sample; **Table 2, Figure 3**.

Gender *Angle classification Cross tabulation

	Angle classification				Total
	Class I	Class II division 1	Class II division 2	Class III	
Female	70.2%	13.2%	12.6%	4.0%	100.0%
Male	78.5%	10.7%	8.7%	2.0%	100.0%
Total	74.3%	12.0%	10.7%	3.0%	100.0%
X^2(p value)	13.732 (0.001) S				

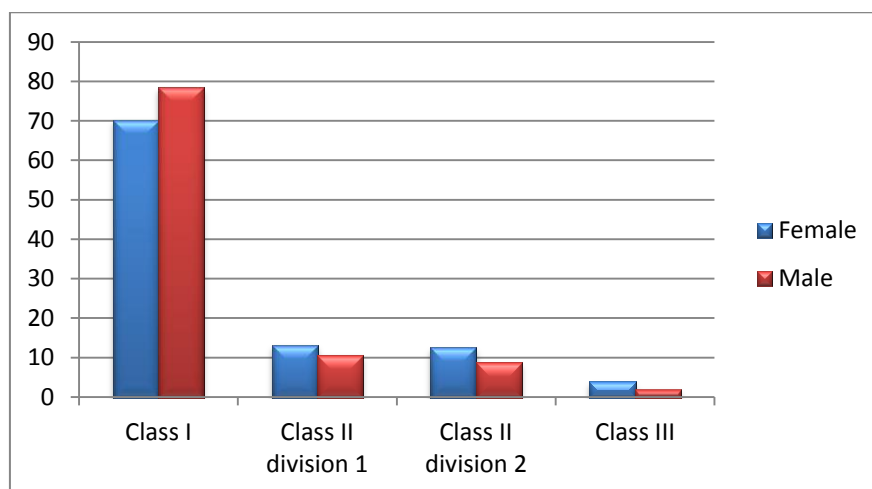**Table 2**: Genders' percentages for different Angle's Classes

Figure 3: Angle's classification in different Genders

Relating the prevalence of different types of malocclusion to oral habits

From the sample, 143 participants had oral habits (47.7%). Nail biting showed the highest percentage; 20% followed by thumb sucking and teeth grinding each 11%, and finally tongue thrusting 5%. The prevalence of oral habits was shown in **Table 3, Figure 4**.

Habit	*Percent*	
Tongue thrusting	15	5%
thumb sucking	33	11%
Nail biting	62	20%
Teeth grinding	33	11%

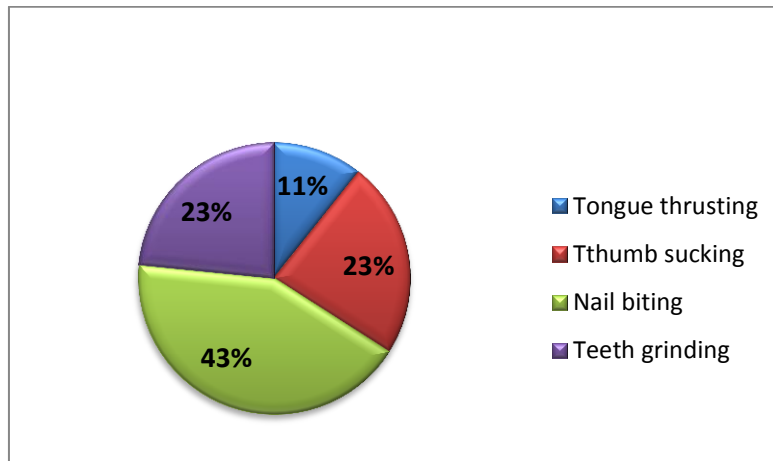**Table 3:** Prevalence of Oral habits within the sample

Figure 4: The Prevalence of different habits

Oral habits		Class I (223)	Class II division 1 (36)	Class II division 2 (32)	Class III (9)	P value
Tongue Thrust	**N**	10	2	2	1	0.01[*]
	%	4.5%	5.6%	6.3%	11.1%	
Thumb Sucking	**N**	22	5	3	1	0.05[*]
	%	9.9%	13.9%	9.4%	11.1%	
Nail Biting	**N**	40	13	8	1	0.003[*]
	%	17.9%	36.1%	25%	11.1%	
Teeth Grinding	**N**	21	7	3	2	0.01[*]
	%	9.4%	19.4%	9.4%	22.2%	

Table 4: Oral habits percentages for different Angle's Classes

There was a significant difference in the distribution of habits among the different types of Angle's classes.

Where tongue thrust, thumb sucking, and teeth grinding were significantly higher in Classes II and III

Nail Biting was significantly higher in Class II, **Table 4**.

Discussion:

Numerous prevalence studies were carried out on growing children in either the mixed or permanent dentition stages in different parts of the world. Whereas, fewer studies assessed the prevalence in the adult population in which craniofacial growth was complete. For this reason,

malocclusion amongst adult patients attending the Gulf Dental Centre in Sharjah and Ajman was studied to fill the gap present due to the deficiency of studies in this part of the world and for this age group. This attempt might provide oral health planners with relevant epidemiological data to enable proper planning of prevention and treatment protocols.

Angle's classification is a universally accepted, reliable system that can be used in large populations without bias.[18-19] According to Meer, Class I molar relation was the most prevalent in any population,[15] which was true as the results of the current study showed that the most common type of malocclusion was Class I in 74% of

the participants. This was more than the prevalence reported in other studies for Class I.[8,15,20-23]

Furthermore, Class II malocclusion was followed by Class III in its prevalence. A finding that concurred with other studies conducted on different age groups and ethnic backgrounds;[15,20-21,23]nevertheless the reported percentages were less. These differences in the findings might be a reflection of the variation in the age groups of the studied samples and/or the sample size, or single gender selection. [15].

On the other hand, a study by Boek et al on Brazilians; reported that Class III was the most prevalent (66.6%), yet that was in patients with dentofacial deformities.[24]

In our study, the prevalence of malocclusion for the different ethnic groups showed varied outcomes when compared to other studies.

The African group results showed Class I to be the most prevalent (58.1%), followed by Classes II (35.5%) and III (6.5%), respectively. This was similar to the findings reported by Chukwudi (50% Class I, 14% Class II, 12% Class III)[8] and different from those reported by Dacosta (Class I 84.0%, Class II 1.7% III 2.0%)[25] and Rwakatema and Nganga (82.1% Class I, 6.9% Class

II, and 11% Class III).[26]The percentage in our study was more for Class I and Class II and less for Class III than those reported by other studies as these studies were conducted on an adolescent sample. [8,17,26]

Similarly, the Arab group showed outcomes comparable to the total sample and to other studies.[15,20-22] Class I showed a higher percentage compared to Meer etal[15]Behbehani et al[20] and Assiry,[22] whereas Classes II and III showed a lower percentage compared to Meer etal,[15]Behbehani et al [20] and Gudipaneni et al. [21]

In addition, the Persian and the South Asian ethnic groups showed higher Class I percentage and lower Class II and III percentages compared to other studies.[27-33]Arabiun reported less percentages for Persians in all Classes of malocclusion.[34]

The Caucasian ethnic group showed a higher percentage in Classes I, II division 2 , and III; and a lower percentage in Class II division 1than those reported by Bilgic et al.[35]Class II division 2 also showed a higher percentage than that reported by other studies,[36-37]lower percentages for Class III were also reported by other studies.[37-38]The discrepancy in the results regarding the Caucasians could be attributed not only to the difference in age groups, but also to the small

frequency of Caucasian participants in the study.

The literature was found to be lacking in information regarding the Far Eastern ethnic group which showed zero percent Class II division 1 and Class III in this study.

The frequency of studies on nail biting found in the literature was low, the biggest of which was conducted in 1945 by Pennington; where the reported percentage was 21% in recruits older than 18 years.[39]Similarly,Pacan et al in 2014 reported a prevalence rate of 19.8%,[40] and Vishnoi et al in 2018 reported 19.5%.[16]Other studies on oral habits didn't discuss nail biting among the other habits.[41-42]In the present study 47.3% of the sample showed the presence of oral habits, nail biting was found to have the highest prevalence rate of all; 43.6%, followed by thumb sucking, grinding teeth, and finally tongue thrusting. Other studies reported that tongue thrusting showed the highest prevalence followed either by thumb sucking,[41-42] or nail biting then thumb sucking and bruxism came at the end.[16]These contrasting findings may be attributed to the difference in the age group studied. Furthermore, as nail biting is considered a method of releasing stress; this could be an indication of increased pressures in adults compared to younger age groups.

There was a significant difference in the distribution of oral habits among the different types of malocclusions, where tongue thrust, thumb sucking, and teeth grinding were significantly higher in Classes II and III. Nail Biting was significantly higher in Class II. These findings were supported by the literature that included these habits as one of the etiological factors of dental malocclusion. Various oral habits encourage the development of impaired occlusion in the deciduous dentition and this is more marked when the habit persists.[42-43-44]

It is interesting to report that the Sharjah and Ajman culture is a mixed one, with different intermingling ethnic groups and cross-ethnic marriages that might affect the prevalence of malocclusion and oral habits; resulting in a unique pattern. Therefore, such epidemiological studies are very important for wise planning and as a comparative base for different studies in the Arab and Middle Eastern areas.

Conclusion

1- Class I malocclusion was the most prevalent malocclusion, followed by Class II division 1, Class II division 2, and the least was Class III.

2- All ethnic groups showed the same pattern of distribution except

for Caucasians, Far Eastern, and South Asians.

3- The pattern of distribution was the same for both males and females; however a difference in the percentage existed between genders.

4- The most prevalent oral habit was nail biting (20%). All habits showed more distribution in Class II (divisions 1&2) and Class III compared to Class I malocclusion cases; with nail biting showing more distribution in Class II cases (36% in division1and 25% in division 2).

5- This study may serve as a comparative base for further Arab and Middle Eastern studies.

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