ORIGINAL ARTICLE

The Pattern of Malocclusion: A Single Centre Study on 300 Orthodontic Patients

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ABSTRACT:

Objective: Identifying malocclusion frequency in different populations can help to determine the manpower needed in orthodontics. The aim of present research was to determine the distribution of malocclusion in Pakistani orthodontic patients.

Material and Methods: A Descriptive Cross Sectional study at orthodontic department, de'Montmorency College of dentistry, Lahore, from 1.5.2016 to 1.5.2017. A group of 300 orthodontic patients were included. Clinical examination was done to find whether the participants had class I, II and III. The Exclusion criteria were, patients having previous orthodontic fixed appliance treatment, history of trauma, recent extractions, having bridges and TMJ splint treatment. The prevalence of malocclusion and its distribution was determined. The data was analyzed using SPSS 20. The mean age and gender distribution was calculated.

Results: The prevalence of class I, II and III were found to be 65%, 26%, and 9% respectively. The mean age was 19.21 ± 3.76 years. Out of 300, 195 (65%) patients had class I malocclusion, 78 (26%) had class II and 27 (9%) had class III malocclusion. The male to female ratio was 1:2.

Conclusion: Class I malocclusion was the most prevalent followed by class II and class III. However all the classes were independent in relation to both the age and gender.

KEYWORDS: Prevalence, Malocclusion, Pattern.

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INTRODUCTION

According to World Health Organization (WHO), the main oral diseases should be subjected to periodic epidemiological surveys. The epidemiological data on orthodontic treatment need is of great importance for public dental programs, orthodontic management, prioritizing patients, and third party funding.[1] At present, malocclusion is the third most common dental disease after dental caries and periodontal diseases.[1] Malocclusion is defined as lack of correct relation between upper and lower teeth while maximum intercuspation.[2] It can be caused by multiple etiological factors; including digit or thumb sucking, tongue habits, temporomandibular joint issue, and amelogenesis imperfacta.[3,4] Association between any variation in cervical vertebrae morphology and malocclusion is well established.[5-8] The implications of malocclusion are disturbances in esthetics, functions such as mastication and speech and difficulty in slicing from front teeth[9].

Edward Angle, is known as father of modern orthodontics and dentofacial orthopaedics, was the first to

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classify malocclusion on basis on maxillary first molar relationship [10].According to him, the mesiobuccal cusp tip of the maxillary first molar should rest in buccal groove of the lower first molar. Furthermore teeth should be on an imaginary line of occlusion. This line of occlusion in maxilla is smooth curvy line via central fossae of the molar and cingulum region of cuspids and anterior teeth while in mandibular arch this line of occlusion is a smooth curvy line via labial cusp tips of the mandibular molars and incisal tips of canines and incisors.[11] Any deviation from above mentioned criteria of normal occlusion is known as malocclusion as per Edward angle. According to Angle classification[12]

Class I Malocclusion: The mesio-buccal cusp tip of the maxillary first molar should rest in buccal groove of the lower first molar but teeth are not on an imaginary line of occlusion.

Class II Malocclusion: The mesio-buccal cusp tip of the maxillary first molar lie anterior to the buccal groove of the lower first molar

Class III Malocclusion The mesiobuccal cusp tip of the maxillary first molar lie posterior to the buccal groove of the lower first molar

Different studies have been conducted on the frequency of different types of malocclusion in various ethnic population subgroups. There is a high frequency of Class I malocclusion in White Americans, Black Americans and, in Nigerians. While, in Oriental populations, class III was found out to be most prevalent, whereas Class II problems are more prevalent in whites of northern European descent. Rationale of present study was to find out the frequency of different types of malocclusion in our population as identifying malocclusion frequency can help to determine the manpower needed in orthodontics, for public dental programs, orthodontic management, prioritizing orthodontic patients, and third party funding.[13] The clinical implication from these finding could mean that the orthodontic management of certain type of malocclusion would be more commonly encountered in Pakistani community. As frequency in different populations is different; present study was designed to determine the frequency of malocclusion in Pakistani population of Punjab province. The data will be useful to compare the result of present study with data of different populations.

METHODOLOGY

After taking institutional ethical approval (ERB No. 2016/012) and informed consent from patients, this study was conceived at the Department of Orthodontic,

de'Montmorency College of Dentistry, Lahore in which 300 untreated patients, irrespective of age and gender, were included to determine the prevalence of malocclusion. Duration of this study was May 2016 to May 2017.The sample size was determined by a power analysis using a sample size determination program of PASS Software (NCSS, Kaysville, Utah).

Inclusion Criteria

Ready to give informed consent

Orthodontic patients with Chronological ages of 15 and 25years

Residents of Punjab province of Pakistan

No previous history of orthodontic treatment

Exclusion Criteria

Any systemic or metabolic disease.

Craniofacial syndromes

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History of trauma

Recent extractions

TMJ problems

Clinical examination was done by retracting cheeks with a mouth mirror to get a direct side view of molar relationship (class I, class II and class III).Dental history sheets were used to rule out any systemic disease and history of dental trauma. Casts were analyzed in occlusion to record angle's classification for molar relationship as per following criteria: [10,12]

Molar Class I: Mesiobuccal cusp of the upper first molar occluded with the mesiobuccal groove of the lower first molar.

Molar Class II: Mesiobuccal cusp of the upper first molar occluded anterior to the Class I position.

Molar Class III: Mesiobuccal cusp of the upper first molar occluded posterior to the Class I position

The data was analyzed using SPSS 20 with P value of <0.05 was considered to be statistically significant. The mean age and gender distribution was calculated. Pearson chi-square was applied to find out the relationship between malocclusion (class I, II, III) to age and gender groups. For Intraexaminer reliability, 30 sets of study casts were randomly selected from the main sample and were reassessed 10 days after the initial assessment. The casual errors were calculated according to Dahlberg's formula. The

systematic errors were estimated with dependent t tests, for P<0.05.

RESULTS

The range of casual errors were within acceptable levels, since there were no significant differences between the first and second measurements of molar relationship assessment, the first set of measurements was used, and no variable had a statistically significant systematic error

The mean age was 19.21 ± 3.76 years. Out of 300, 195 (65%) patients had class I malocclusion, 78 (26%) had class II and 27 (9%) had class III malocclusion. The male to female ratio was 1:2. (Table **1**). Calculations by chi square test showed that occurrence of class I, II, and III are not dependent to gender (Table **2**).

Table 1. Frequency of Malocclusion in Orthodontic Patients (N=300).

Parameter	Frequency
Class I Malocclusion	195 (65 %)
Class II Malocclusion	78 (26 %)
Class III Malocclusion	27 (9 %)
Males having Malocclusion	102 (34 %)
Females having Malocclusion	198 (66 %)

Table 2. Results of Chi square test (N=300).

Type	Males (N 102)	Females (N 198)	Total (N 300)	P value
Class I	59	99	195	0.212
Class II	30	68	78	0.198
Class III	13	31	27	0.361

Thus results showed that class I malocclusion was most frequently found in local population followed by class II and III malocclusion, and occurrence of any type of malocclusion was not dependent on gender.

DISCUSSION

Disturbances in esthetics, functions such as mastication and speech and difficulty in slicing from front teeth, can happen as a result of malocclusion. . There are various causes of malocclusion such as non abrasive diet, abnormal sucking habits, and teeth grinding habits. Harmony of stomatognathic system is essential for esthetics, speech, swallowing and mastication. In cases of malocclusion, symptoms can appear in any region of stomatognathic system

The prevalence of malocclusion has been studied various times in different countries of the world and the results vary from 11% to 93%.[14-17] There is a high frequency of Class I malocclusion in White Americans (Class I 52.5%, Class II 42.4% & Class III < 5%) and also in Black Americans (Class I 71%, Class II 16% & Class III 8.4%). Similarly, in Nigerians, Class I malocclusion is most common type of malocclusion (74%), while, in Oriental populations, class III was found out to be most prevalent, whereas Class II problems are more prevalent in whites of northern European descent. The most common type of malocclusion in Saudi Arabian population is Class I (69.3%), followed by Class II division 1(12.2%), Class III (9.8%), Class II division 2 (5%) and pseudo Class III (3.7%). These variations may depend on various factors such as registration methods, ethnic origin, social class, and age factors.[18] The prevalence of class I, II, and III were found to be 65%, 26%, and 9% respectively, in present study. The results of this research revealed that class I malocclusion is more common than class II malocclusion. The male to female ratio in our study was 1:2. Calculations showed that occurrence of class I, II and III are not dependent to age or gender which is in agreement with results of recent studies.[19,20]

Although several reported studies concluded the prevalence of malocclusion, the findings are difficult to compare because of different materials and methods, age groups, inter-investigator variation, and the unmatched sample sizes. In the present study, the frequency of malocclusion is similar to study by Rahman,[18]Nadim,[20]Sari et al.[21]in Turkish patients, and to the results of Sayin,[22]but different when compared with the study by Fida,[13]Jones,[23] Yang,[24]Abualhaija[25] and Luthian[26]. Result of current study is in contrast with the findings of Gulerum and Ijaz, also Hameed et al. reported Class II as the most common type of malocclusion. On the other hand Shehzad and Afzal et al. reported Angle's Class I as the most frequent type of malocclusion, which is in agreement with findings of our study. The differences in frequency might be related to the racial differences and the setup in which they were conducted.

Early treatment should take into account the severity of the malocclusion and also its impact on the neuromuscular system by preventing asymmetries in the development of the alveolar bone and further disturbances in the permanent

dentition, as well as inhibiting the progression and severity of the malocclusion.

Needless to say, the planning of public health policies should be grounded in knowledge about the needs of the population, by correlating causes, effects and solutions to the problems. With all the data presented here the authors hope to contribute to such planning by allowing the necessary material and human resources to be properly estimated. The limitation of this study is that we did not investigate the etiological causes of malocclusion. We will focus on the aspect in the future large scale studies.

CONCLUSION

It was concluded that Class I malocclusion is the most prevalent followed by class II and class III . It provides a base line data for orthodontic treatment planning and also highlights the need for further large scale studies in various ethnic background population groups.

FINANCIAL DISCLOSURE

We have no relevant financial interests in this manuscript.

CONFLICT OF INTEREST

We have no conflict of interest that I should disclose.

CONTRIBUTION BY AUTHORS

Muhammad Azeem: Corresponding author, conceiving and designing the study, data recording, analysis and interpretation of data.

Muhammad Ilyas: written or critically reviewed the manuscript.

Waheed Ul Hamid: Main supervisor, critically reviewed the manuscript & final editing

Ahmad Shamim: written or critically reviewed the manuscript.

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