

Assessment of Malocclusion among Patients Seeking Orthodontic Treatment at Dental College in Kerala, India

Abstract

Objective: To determine the prevalence of individual traits of malocclusion based on Angle's classification of molar relationship and to provide quantitative information regarding the pattern of dentofacial characteristics in orthodontic patients attending Azeezia College of Dental Sciences and Research, Kerala, along with the gender differences if any. **Materials and Method:** A cross-sectional study was done among 156 patients (59 females, 97 males). Angle's classification was used to assess the molar relationship. Chief complaints, crowding, spacing, overjet, overbite, crossbite, scissorbite, openbite, dental anomalies and supernumerary tooth were recorded. All data were collected from the records and dental casts of orthodontic patients. Association was analyzed using Chi square test ($p < 0.05$). **Results:** This study demonstrated that Angle's Class I malocclusion was seen to be most prevalent (61.5%). Class II malocclusion was seen in 11.5% of the patients and class III was seen in 14.2%. Upper and lower arch spacing was seen to be more prevalent in Class I malocclusion. However, this was not statistically significant. **Conclusion:** There are certain drawbacks of Angle's classification of malocclusion as this classification only reveals the malocclusion in antero-posterior planes not transverse and vertical planes. Further researches involving skeletal analysis are recommended.

Key Words

Angle's classification; malocclusion; prevalence

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INTRODUCTION

The prevalence of malocclusion has increased in recent decades, and it is considered one of the most common dental problems together with dental caries, gingival disease, and dental fluorosis. Malocclusion patterns vary in different populations due to the variations in the genetic and environmental influences. Occlusion is the relationship among all the components of masticatory system in their function, parafunction and dysfunction.^[1] Edward H. Angle defined occlusion as a normal relation of occlusal inclined planes of the teeth when jaws are closed.^[2] Whereas, occlusion which is aesthetically and functionally not acceptable is referred to as

malocclusion.^[1] The demand of orthodontic treatment is increasing as patients are concerned about their esthetics. Therefore, it is essential to assess the epidemiological data on the pattern of malocclusion. In many countries, study of the prevalence and pattern of malocclusion had been included in National Health surveys in order to receive valuable information to plan and train the manpower and treatment facilities in orthodontic specialty.^[3-7] Dental malocclusion is present in all societies but its prevalence varies.^[8-9] The demand for orthodontic treatment is increasing in modern era. Therefore, it is essential to know the prevalence of malocclusion to assess the necessary resources required for orthodontic treatment.^[10] The aim of

Table 1: Distribution of study subjects according to gender

Gender	Number	Percentage
Male	59	37.8
Female	97	62.2

Table 2: Distribution of study subjects according to age

Age	Number	Percentage
6-11 years	33	21.2
12-17 years	65	41.6
18-35 years	58	37.2

Table 3: Distribution of study subjects according to Angle's classification of malocclusion

Angle's classification of Malocclusion	Number	Percentage
Class I	96	61.5
Class II	18	11.5
Class II Div I	13	8.3
Class II Div II	7	4.5
Class III	22	14.2

Table 4: Distribution of study subjects according to other occlusal traits

Variables	Number	Percentage
Overjet	82	52.6
Overbite	73	46.8
Crossbite Anterior	46	29.5
Crossbite Posterior	15	9.6
Openbite	4	2.6
Crowding Upper arch	34	21.8
Crowding Lower arch	46	29.5
Crowding U/L arch	42	26.9
spacing Upper	15	9.6
spacing U/L	18	11.5

Table 5: Distribution of study subjects according to other occlusal traits

Variables	Number	Percentage
Missing (congenital)	18	11.5
Missing (trauma, caries)	12	7.7
Mesiodens	11	7.1
Peg laterals	8	5.1
Scissor bite	15	9.6

this study was to determine the prevalence of individual traits of malocclusion based on Angle's classification of molar relationship and to provide quantitative information regarding the pattern of dentofacial characteristics in orthodontic patients attending Azeezia College of Dental Sciences and Research, Kerala, along with the gender differences. Furthermore, these collected data will be useful in comparing with those of other populations in future and also will be useful in planning the treatment needs to those patients attending the Department of Orthodontics and Dentofacial Orthopaedics in Azeezia College of Dental Sciences and Research, Kerala.

Materials and Methods

This cross-sectional study included orthodontic patients who visited the department of orthodontics and dentofacial orthopaedics from January 2013 to March 2014. A pre-signed consent was taken from all the patients enrolled in the study. Pretreatment orthodontic records of 156 patients fulfilling the selection criteria were obtained and used for the study. Clinical examination of the patients was done using mouth mirror and probe. A single examiner was used throughout the study for examination and measurements. A metal ruler was used to measure the overjet, overbite, spacing, crowding and molar relationship. Those patients with complete pre-treatment records and those undergoing orthodontic

treatment were included in the study. The exclusion criteria included those patients who came to dental OPD just for consultation or had previously undergone orthodontic treatment. Chief complaints, crowding, spacing, overjet, overbite, crossbite, scissorbite, openbite, dental anomalies and supernumerary tooth were recorded. All data were collected from the records and dental casts of orthodontic patients. Sagittal molar relationship were classified as Angle's class I malocclusion, Class II div 1, Class II div 2 malocclusion and Class III malocclusion. Patients with Class I malocclusion having crowding, spacing, abnormal overjet and overbite were also included under Class I malocclusion. Class I malocclusion was characterized as the mesio-buccal cusp of maxillary first permanent molar occluding in the buccal groove of mandibular first permanent molar. Class II malocclusion was characterized as disto-buccal cusp of maxillary first molar occluding in the buccal groove of the mandibular first permanent molar. Class II division 1 malocclusion was characterized by proclined upper incisors with increased overjet and deep overbite. Class II division 2 malocclusion was characterized by retroclined maxillary central incisors and proclined maxillary lateral incisors or retroclined maxillary central and lateral incisors and proclined maxillary canines. Class III malocclusion was characterized as mesio-buccal cusp of maxillary first permanent molar occluding in the interdental space between mandibular first and second molars.^[2,11,12] Overjet is the horizontal overlap between maxillary incisors and mandibular incisors. Overjet between 1 to 3 mm were considered as normal and more than 3 mm were considered as increased and less than 1 mm was considered as edge to edge bite. Overbite is the vertical overlap between maxillary and mandibular incisors. Overbite between 0 to 3 mm was considered normal. Greater than 3mm was considered increased and less than 0 was considered decreased overbite.^[13] Crossbite or negative overjet were used when maxillary teeth were palatal in position than mandibular teeth. Space in upper and lower arches exceeding 2mm was considered spacing.^[1,11,13-18] Crowding was recorded in upper arch and lower arch. Between 0-1 mm, no crowding was considered.^[11] Scissor bite was recorded when palatal surface of maxillary posterior teeth occluded buccal to the buccal cusp of lower posterior teeth. Supernumerary tooth was recorded when extra tooth was present clinically or radiographically.^[17] Data

analysis was performed using SPSS 16.0 and the distribution for occurrence of different malocclusion traits was determined in the children, adolescent and adult patients. A written form of informed consent was taken after the objectives and benefits of the study were clearly mentioned to the patients. For patients below the age of 18years, consent was obtained from their parents/guardians. Frequencies were obtained for descriptive analysis. Pearson's Chi Square test was done to determine tests of association ($p < 0.05$). Association between pattern of malocclusion, spacing overjet, overbite and crowding were calculated with gender but no statistically significant results were obtained.

RESULTS

The study showed that among the total subjects (156) enrolled in this study, 62.2% were females and 37.8% were males seeking orthodontic treatment as shown in Table 1. Regarding the age of the subjects, they were divided into three groups: Ages 6 to 11 (children), 12 to 17 (adolescents) and 18 to 35 (adults). Among them, 21.2% belonged to 6 to 11 yrs, 41.6% belonged to 12 to 17 years and the remaining 37.2% were of 18-35 years of age (Table 2). The age group seeking the orthodontic treatment mostly was found to be between 12 to 17 years. Angles Class I malocclusion was seen to be most prevalent (61.5%). Class II malocclusion was seen in 11.5% of the subjects and class III was seen in 14.2% of them (Table 3). Among those who presented with Class II malocclusion, 8.3% had Class II Division 1 and 4.5% were reported to have Class II Division 2 (Table 3). Increase in overjet was found in 52.6% of the patients. Deep overbite was found in 46.8% of the subjects. Anterior teeth crossbite was found in 29.5% of the patients and in 9.6% posterior teeth crossbite was found. Anterior open bite was present only in 2.6% of the patients. In 26.9% of the subjects, crowding was present on both upper and lower arches, whereas in 21.8% crowding was seen solely in upper and 29.5% in lower arch. In 9.6% of the patients, spacing was seen in upper arch while in 11.5%, spacing was found to be on both arches (Table 4). Congenitally missing teeth were present in 11.5% of the subjects. Teeth were missing due to trauma in 7.7% of the patients. In 7.1%, mesiodens were present. Peg laterals were present in 5.1% of the subjects. In 9.6%, scissor bite of single or multiple teeth were present (Table 5).

DISCUSSION

In the present study, only those patients seeking

orthodontic treatment were included unlike the study done by Gelgor *et al.*,^[11] who detected malocclusion in 89.9% of the study population. They reported the malocclusion in general subpopulation attending dental OPD. The present study demonstrated that Angle's Class I malocclusion was found in 61.5%, Class II malocclusion was seen in 11.5% and class III malocclusion in 14.2%. This result is almost similar to the study done by Shrestha *et al.*^[12] in the Nepalese population. Among the Class II patients, Class II div 1 was seen in 8.3 %, Class II div 2 in 4.5%. The prevalence of malocclusion is similar to that reported in another study conducted in Maharashtra, India.^[13] Similar result was found in the study done by Sharma^[10] in the population of Sunsari district of Nepal but compared to the study done in Turkish population^[14] done by Sayin, the prevalence of Class II malocclusion among patients was found to be higher. The difference in sample size, ethnic variation and socio-demographic variations could be the reason for the differences. The prevalence of malocclusion may vary even among the population having same origin.^[11-14] Asian races showed a higher prevalence of Angle class III malocclusion than other races.^[15] Chinese and Malaysian adult males showed a much higher mean prevalence rate of Class III malocclusion whereas Indian males showed higher prevalence of Class II malocclusion which is inconsistent with the result of the present study.^[16] The prevalence of Class I malocclusion (61.5%) and deep overbite (46.8%) in the present study was more than that reported by Gul-e-Erum and Fida in Pakistani population.^[1] In the study done by them, the prevalence of Class II malocclusion (70.5%) and increased overjet (75%) were higher followed by Class I and Class III malocclusion respectively. This could be due to difference in sample size and racial predisposition to certain malocclusion.^[10] In the study done by Albarakati and Sahar,^[19] Class I malocclusion was more prevalent in Saudi female population followed by Class III malocclusion while Class I malocclusion followed by Class II malocclusion was more prevalent in this study. Age range between 12 to 17 years (41.6%) showed highest frequency of malocclusion followed by adults and then younger children. This age group is exactly the same as in the study done in Nigerian population.^[17] This could be because this is the age when puberty starts that led to the patients become more esthetically concerned seeking orthodontic

treatment. Among them females (62.2%) were higher than males in seeking orthodontic treatment. This result is similar to the study done in Dharan.^[10] This could be due to more esthetic concern in females than males regarding malocclusion or could be due to parental concern for matrimonial reasons. Crowding in upper and lower arches was seen most prevalent in this study similar to other studies.^[12,13,19] Similarly, no significant gender differences were obtained in case of crowding, overjet, overbite and spacing. However, this result is different from the study done by Gelgor *et al.*,^[11] and Aniket *et al.*^[13] Increased spacing in the maxillary arch of Class II patients were seen in the study done by Gule- Erum and Fida^[1] whereas in the present study increased spacing in maxillary arch was seen more in Class I patients. This could be due to tooth size-arch length discrepancies among the patients enrolled in this study. This can be confirmed by using Bolton's analysis.

CONCLUSION

In this hospital based study, the frequency of Class I, Class II and Class III malocclusion was found to be 61.5%, 11.5% and 14.2% respectively. There are certain drawbacks of Angle's classification of malocclusion as this classification only reveals the malocclusion in antero-posterior planes not transverse and vertical planes. This classification does not incorporate skeletal discrepancies but it is universally accepted system as it is simpler and reliable method minimizing examiners subjectivity. By knowing the occlusal problems, their prevalence and need for appropriate treatment, helps us to plan the treatment necessary thus increasing the scope of orthodontics in future. This also provides the baseline data for planning the orthodontic treatment. Nationwide Survey including various ethnic groups of India is necessary for proper planning of orthodontic treatment for the people of India.

LIMITATION

This is a hospital based study so the results do not represent the prevalence of malocclusion of the entire Kerala population.

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