

Pattern of Distribution of Malocclusion among Patients Seeking Orthodontic Treatment at Dental College Nepal Medical College

Piya A¹, Shrestha V B², Acharya J³, Khanal S⁴, Bhattarai P⁵

¹ Lecturer, Department of Orthodontics and Dentofacial Orthopaedics, ²Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, Peoples Dental College and Hospital, Nayabazar, Kathmandu. ³Lecturer, Department of Community and Public Health Dentistry, ⁴Lecturer, Department of Pedodontics and Preventive Dentistry, ⁵Professor and Head of Department, Department of Orthodontics and Dentofacial Orthopaedics, ^{1,3,4,5}Dental College -Nepal Medical College, Attarkhel, Jorpati.

Abstract

Background:

Malocclusion can cause dental caries, periodontal diseases, esthetic and functional problems. This may also lead to temporomandibular disorder. The demand of orthodontic treatment is increasing. Therefore, it is essential to assess the epidemiological data on the pattern of malocclusion so that it can aid in determining the resources for planning the appropriate treatment. This also provides the baseline data for planning further orthodontic treatment.

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 dental hospital in Nepal Medical College, along with the gender differences if any.

Materials and Method:

A cross-sectional study was done among 131 patients (78 females, 53 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 (59.5%). Class II malocclusion was seen in 26.7% of the patients and class III was seen in 13.7%. 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.

Keywords:

Angle's classification, malocclusion, prevalence

Correspondence: Dr. Anshu Piya, Lecturer, Department of Orthodontics and Dentofacial Orthopaedics, Dental College-Nepal Medical College, Email: piyanshu@yahoo.com

Introduction

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 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 dental hospital in NMC 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 in Dental hospital in NMC.

Materials and Methods

This cross-sectional study included orthodontic patients who visited the department of orthodontics and department of pedodontics referred for orthodontic consultation from February 2012 to October 2013. A pre-signed consent was taken from all the patients enrolled in the study. Pre-treatment orthodontic records of 131 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.^{2,12}

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 (131) enrolled in this study, 59.5% were females and 40.5% 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, 21.4% belonged to 6 to 11 yrs, 39.7% belonged to 12 to 17 years and the remaining 38.9% were of 18-35 years of age (Table 1). 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 (59.5%). Class II malocclusion was seen in 26.7% of the subjects and class III was seen in 13.7% of

them (Table 2 and Figure 1). Among those who presented with Class II malocclusion, 10.7% had Class II Division 1 and 3.1% were reported to have Class II Division 2. (Table 2)

Increase in overjet was found in 48.9% of the patients. Deep overbite was found in 56.5% of the subjects. Anterior teeth crossbite was found in 20.61% of the patients and in 1.53% posterior teeth crossbite was found. Anterior openbite was present only in 0.8% of the patients. In 45.8% of the subjects, crowding was present on both upper and lower arches, whereas in 16% crowding was seen solely in upper and lower arches. In 16.8% of the patients, spacing was seen in upper arch while in 5.3%, spacing was found to be on both arches (Table 3.1 and Figure 2). Congenitally missing teeth were present in 9.2% of the subjects. Teeth were missing due to trauma in 6.9% of the patients. In 6.1%, mesiodens were present. Peg laterals were present in 3.1% of the subjects. In 3.1%, scissor bite of single or multiple teeth were present (Table 3.2 and Figure 2).

Table 1. General characteristics of the patients (N=131)

| Variable | Number | Percent |
|---------------|--------|---------|
| Gender | | |
| Male | 53 | 40.5 |
| Female | 78 | 59.5 |
| Age | | |
| 6-11 years | 28 | 21.4 |
| 12-17 years | 52 | 39.7 |
| 18-35 years | 51 | 38.9 |

Table 2. Pattern of Malocclusion

| Variable | Number | Percent |
|--|--------|---------|
| Angle's classification of Malocclusion | | |
| Class I | 78 | 59.5 |
| Class II | 17 | 13.0 |
| Class II Div I | 14 | 10.7 |
| Class II Div 2 | 4 | 3.1 |
| Class III | 18 | 13.7 |

Table 3.1 Other Occlusal Traits Present

| Variables | Number | Percent |
|------------|--------|---------|
| Overjet | 64 | 48.85 |
| Overbite | 74 | 56.49 |
| Crossbite | | |
| Anterior | 27 | 20.61 |
| Posterior | 2 | 1.53 |
| Openbite | 1.0 | 0.80 |
| Crowding | | |
| Upper arch | 21 | 16.03 |
| Lower arch | 21 | 16.03 |
| U/L arch | 60 | 45.80 |
| Spacing | | |
| Upper | 22.0 | 16.79 |
| U/L | 7 | 5.34 |

Table 3.2. Other occlusal traits present

| Variables | N | Percent |
|-------------------------|----|---------|
| missing (congenital) | 12 | 9.16 |
| missing (trauma,caries) | 9 | 6.87 |
| mesiodens | 8 | 6.11 |
| peg laterals | 4 | 3.05 |
| scissor bite | 4 | 3.05 |

Figure 1. Pattern of Malocclusion (Percent)

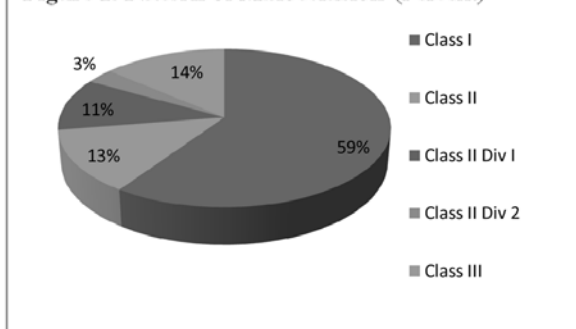
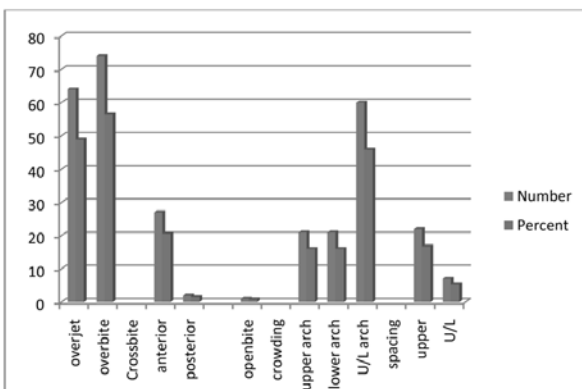


Figure 2. Other Occlusal Traits



Discussion

In the present study, only those patients seeking orthodontic treatment and patients referred from pedodontic department for orthodontic consultation 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 59.5%, Class II malocclusion was seen in 26.7% and class III malocclusion in 13.7%. 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 13 %, Class II div 2 in 10.7%. 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 Sharma¹⁰ in the population of Sunsari district of Nepal but compared to the study done in Turkish population¹⁴ 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 (59.5%) and deep overbite (56.49%) 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 (39.7%) 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 (59.5%) 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} Prevalence of crowding of upper arch (16.03%) was similar to lower arch (16.03%). Upper lateral incisors were mostly affected tooth in anterior teeth crossbite similar to another study.¹⁷

In this study, Class I malocclusion was found to be more prevalent with no significant gender differences which was concurrence with the study done in India.¹³ 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 Gul-e-Erum and Fida¹ 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 59.5%, 26.7% and 13.7% 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 Nepal is necessary for proper planning of orthodontic treatment for the people of Nepal.

Limitation

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

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