Research Article

Pattern of Malocclusion among Patients Seeking Orthodontic Treatment at Hospitals and Private Clinics of Province 2, Nepal

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ABSTRACT

Introduction: Malocclusion affect the esthetic, function of the patients, so they seek orthodontic treatment for normal function and healthy and beautiful smile. Increase in public awareness and availability of orthodontic specialty services have led to increasing number of orthodontic patients in specialty clinics and hospitals. The objective of this study is to examine the pattern of malocclusion in the patients visiting medical and dental teaching hospitals and dental clinics and to measure the different Angle's classification of malocclusion with discrepancies in all three planes.

Materials and Method: Three hundred seventeen acceptable study casts were selected from 403 case records of orthodontic patients who visited the different hospitals and private clinics of Province 2, Nepal. A standard guidance of Angle's classification was used to classify the cases and casts were measured to record the data. Different Angle's classification of malocclusion with discrepancies in all three planes was studied. Descriptive statistics (frequency, percentage, mean and SD) and inferential statistics (chi square and fisher exact test) was used to find out the association between occlusal traits and demographic variables.

Result: According to the Angle's classification of malocclusion, most of the patient's cast 65.9% were of class I, followed by class II 31.8%, class III 5.3% occlusion pattern. Among the class II malocclusion, class II division 1 malocclusion was more prevalent (86.13%). Under space discrepancies, crowding of teeth was present in 42.58% of patient. Of the total teeth crowding patient, 70.3% had crowding of teeth in both the arches followed by only mandibular arch (25.18%). There is statistically significant association between the age and the occlusal traits like crowding (p value 0.008), spacing (p value 0.000) and overjet (p value 0.000) at 0.01 level of significance.

Conclusion: Angle's class I was the most prevalent malocclusion followed by class II and class III. Increased overjet was the commonest occlusal trait. There was statistically significant association between the age and occlusal traits like crowding, spacing and overjet.

KEYWORDS: Angle's classification, Malocclusion, Occlusal traits, Orthodontics

INTRODUCTION

Malocclusion has been a problem for some individual since antiquity and attempts to correct this disorder go back at least to 1000 BC.[1] Malocclusion is not considered as a disease but as a normal deviated condition. Evidence shows that it was related to the whole physical health and quality of life. WHO (1987) defined malocclusion as an handicapping dento-facial anomalies causing disfigurement or impending function and may require treatment when the defect was likely to be a cause of patients' physical and emotional wellbeing.[2] Malocclusion affect the esthetic, function of the patients, so they seek orthodontic treatment for normal function and healthy and beautiful smile. Increase in public awareness and availability of orthodontic specialty services have led to increasing number of orthodontic patients in specialty clinics and hospitals. In order to provide a quality orthodontic

treatment at any locality, the knowledge about prevalence of malocclusion and its' trait is utmost. Nepal is a landlocked country with diverse ethnic population, culture, climate and environment. The distribution of different malocclusions in Nepal might be different from rest of the world. Similarly, the distribution of different malocclusions in Province 2 might be different from rest of the Provinces of Nepal. This study, thus, aim to highlight the prevalence of malocclusion and its' trait in province 2.

MATERIALS AND METHOD

This is a cross sectional study which included orthodontic patients' pretreatment dental cast who visited different hospitals and private clinics of Province 2, Nepal from September 2019 to February 2020. Three hundred seventeen acceptable study casts were selected from 403 casts who met the set inclusion criteria. The subjects ranged from 9 to 40 years. The inclusion criteria were: (1) permanent dentition with fully erupted intact first molar, (2) patient willing for orthodontic treatment, (3) no history of previous orthodontic treatment, (4) absence of craniofacial anomalies. A standard guidance of Angle's classification was used to classify the cases as class I, class II, class III. Dental casts were examined and measured to record the data. Different Angle's classification of malocclusion with discrepancies in all three planes was studied. Several traits of malocclusion included in the study were: over jet, spacing, crowding, deep bite, open bite, bimaxillary protrusion, cross bite and scissor bite. Missing teeth and retained deciduous teeth were also recorded. Amount of overjet was measured in millimeters between two antagonistic anterior teeth (central or lateral incisor) measured from the facial surface of the most lingual mandibular tooth to the middle incisal edge of a more facially positioned maxillary tooth. An overjet ≥ 3mm was considered to be an increased overjet. The term negative overjet was used if both the left and right maxillary central incisors were in palatal occlusion.[3-5] Overbite was measured in millimeters and recorded as the overlap of the mandibular anterior teeth by the maxillary anterior teeth. A pencil mark was done on the tooth indicating the extent of the overlap which facilitated the measurement. The overbite was considered normal when the linear measurement was between 0 to 3 mm, deep overbite if >3 mm The overbite less than 0 mm was noted as anterior open bite.[3-5] The amount of an open bite was measured directly in millimeters between the incisal edges of the antagonistic anterior teeth. Authors were

themselves involved in data collection after getting the ethical clearance from IRC NMC (F-NMC/407/075/076). Written formal permission was obtained from the concerned institute, hospitals and private clinics. The collected data were entered into SPSS and analyzed using descriptive statistics (frequency, percentage, mean and SD) and inferential statistics (Pearson's Chi square and fisher exact test) was performed to justify the result using SPSS version 25.

RESULT

A total of 317 patients' cast was included in the study. Among them, most of the respondents 65.6% were in the age group of 9-18years with Mean age ±SD=17.68±5.21. Regarding gender, two-third of the respondent 66.6% were female. Similarly, 87.4% of the respondents belonged to Hindu religion.

According to the Angle's classification of malocclusion, most of the patient's cast 65.9% were of class I, followed by class II 31.8%, class III 5.3% occlusion pattern. Among the class II malocclusion, class II division 1 malocclusion was more prevalent (86.13%) (Table 1).

Similarly, class I (65%) canine relation was more common followed by class II (31.9%) and class III (3.2%). The prevalence of impacted teeth was 2.8%.

Out of 317 patient's cast examined, 3.5% (11) had retained deciduous teeth. The most common retained deciduous teeth were maxillary canine.

Table 1: Distribution of Respondents according to Pattern of Malocclusion

n=317

Pattern of Malocclusion	Frequency	Percentage
Class I	209	65.9
Class II	101	31.9
Class II Division 1	87	86.1
Class II Division2	14	13.9
Class III	07	2.2

Under space discrepancies, crowding of teeth was present in 42.58% of patient. Of the total teeth crowding patient, 70.3% had crowding of teeth in both the arches followed by only mandibular arch (25.18%).

Spacing was present in 34.38% patient with spacing being more commonly present in maxillary arch (64.22%).

The prevalence of missing teeth observed in the study was 8.6%. among the missing teeth, maxillary central incisor teeth were most commonly missing followed by mandibular lateral incisor, mandibular second premolar and maxillary incisors in descending order.

Crossbite and scissor bite was present in 7.3% and 15.8% of the patient respectively.

Bimaxillary protrusion was present in 17.7%.

There was increased overjet in 60.6% and deep overbite was seen in 49.2% of the patient. Negative overjet was present in 2.8% of the respondent. Similarly, 2.5% of the respondent had open bite.

Pearson Chi square test and Fisher exact test was conducted to find out the association between the different occlusal traits and gender and age which showed that there is statistical significant association between the age and the occlusal traits like crowding (p value 0.008), spacing (p value 0.000) and overjet (p value 0.000) at 0.01 level of significance and none of the attributes of malocclusion were significantly related with gender at p <0.05. (Table 2 and 3)

Table 2: Association between Occlusal Traits and Age

Occlusal Traits	Age in years			P value
	9-18 N (%)	19-28 N (%)	>28 N (%)	
Crowding# Maxillary Mandibular Both None	3(1.4) 19(9.1) 73(35.1) 113(54.3)	2(2.0) 15(15.3) 22(22.4) 59(60.2)	1(9.1) 0(0.0) 0(0.0) 10(90.9)	0.008*
Spacing # Maxillary Mandibular Both None	39(18.8) 2(1.0) 21(10.1) 146(70.2)	29(29.6) 0(0.0) 12(12.2) 57(58.2)	2(18.2) 4(36.4) 0(0.0) 5(45.5)	0.000*
Overjet# Normal Increased Negative	67(32.2) 134(64.4) 7(3.4)	41(41.8) 57(58.2) 0(0.0)	8(72.7) 1(9.1) 2(18.2)	0.000*
Deepbite# Normal Increased Openbite	102(49.0) 102(49.0) 4(1.9)	44(44.9) 51(52.0) 3(3.1)	7(63.6) 3(27.3) 1(9.1)	0.267
Molar relation# Class I Class II Class III	131(63.0) 70(33.7) 7(3.4)	68(69.4) 30(30.6) 0(0.0)	10(90.9) 1(9.1) 0(0.0)	0.130

Statistically Significant at the level of (p=0.01), #-fisher exact test

Table 3: Association between Occlusal Traits and Gender

Occlusal Traits	Gender		P value
	Male N (%)	Female N (%)	
Crowding# Maxillary Mandibular Both None	2(1.9) 13(12.3) 35(33.0) 56(52.8)	4(1.9) 21(10.0) 60(28.4) 126(59.7)	0.672
Spacing # Maxillary Mandibular Both None	21(19.8) 4(3.8) 12(11.3) 69(65.1)	49(23.2) 2(0.9) 21(10.0) 139(65.9)	0.343
Overjet## Normal Increased Negative	36(34.0) 66(62.3) 4(3.8)	80(37.9) 126(59.7) 5(2.4)	0.648
Deepbite## Normal Increased Openbite	42(39.6) 62(58.5) 2(1.9)	111(52.6) 94(44.5) 6(2.8)	0.064
Molar relation# Class I Class II Class III	74(69.8) 31(29.2) 1(0.9)	135(64.0) 70(33.2) 6(2.8)	0.474

Level of Significance at < 0.05, # fisher exact test, ## chi square test

DISCUSSION

The result of present study showed that females (66.6%) are more concern for the orthodontic treatment which is similar to the data reported by JN Sharma[6] (two-third of sample), Acharya et al. (69.33%).[7]

The mean age of the patients was 17.68±5.21 years with the age ranging from 9 years to 40 years. The 65.6% patients were from the age group 9 to 18 years which is similar to Piya et al.[8] (39.7%) and JN Sharma[6].

In this study the prevalence of Class I malocclusion (65.9%) is more than the data reported by Celikoglu et al.[9], Onyeaso[5] who reported that 41.5% and 50.0% of the sample examined had class I malocclusion respectively. When this study is compared to other studies conducted

in Nepal, the reported value is more than data reported by Piya et al[10] (50.5%), Pandey et al[10] (61.62%), in consensus to the data reported by Acharya et al[9] (63.33%) and JN Sharma8 (67.5%) but less than data reported by Baral[11] (71.5%).

The prevalence of Class II malocclusion (31.8%) in the present study was less than that reported by Celikoglu et al.[9] with the reported value to be 38.3%, Pandey et al[9] (33.47%), Acharya et al[7] (36%)and Erum, Fida[10] (70.5%) but more than the data reported by Piya et al.[8] (26.7%), JN Sharma[6] (28.8%) and Baral[11] (24.6%). The prevalence of class III malocclusion in the present study (5.3%) is close to data reported by Pandey et al[10] (4.6%), Baral[11] (4.1%) %), JN Sharma[6] (3.7%) and Thilander et al.[4] (5.8%) but less than that reported by Celikoglu et al.[9] (16.7%), Piya et al[8] (13.7%) and Erum, Fida[12] (10.9%). The differences between the prevalence of malocclusion might be due to ethnicity differences.

The most frequently encountered occlusal trait was increased overjet (62.3%) which is more than that reported by Pandey et al.[10] (58.99%), Acharya et al.[7] (40%), Piya et al.[8] (48.9%), Celikoglu et al.[9] (41.7%). The difference between the prevalence of increased overjet could be due to habits and ethnic variation. Male (62.3%) and female (59.7%) had increased overjet in the present study and is not significant. Negative overjet was observed in 2.8% of the patient in the present study which is less than that observed by Pandey et al.[10] (4.6%), Gelgor et al[5] (10.4%). In the present study, the increased overjet data was followed by increased deep bite (49.2%) which is less than that reported by Pandey et al.[10] (67.36%), Piya et al.[8] (56.5%) close to that reported by Acharya et al.[7] (46.66%) more than that reported by Baral[12] (29.5%), Celikoglu et al.[9] (36.6%) and Gelgor et al.[5] (18.3%). When the association of deep bite was calculated with gender, increased deep bite was more frequent in male (58.5%) than in female (42.5%). The prevalence of open bite (2.5%) in the present study was less than that reported by Shrestha and Shrestha[13] (8%), Celikoglu et al.[9] (10%), Pandey et al[10] (4.6%), Baral[11] (8.9%) and Gelgor et al[5] (8.2%) but more than that reported by Piya et al[8] (0.8%).

Crowding was present in 42.58% in the present study which is more than that reported by Baral[11](10.5%) and Pandey et al.[1]1 (35.98%). Both upper and lower dental arches was the most frequent space discrepancies recorded with value of 70.3%. This value is close to that reported by Gelgor et al.[5] (65.2%).

The prevalence of spacing in this study for upper dental arch (22.1%) was in consensus to data reported by Piya et al.[8] (22%), and lower dental arch (1.9%) was considerably less than the data reported by Thilander et al.[4] (25.9%), Celikoglu et al.[9] (12.5%).

Bimaxillary protrusion was present in 17.7% of the patient in this study which is more than the study conducted by Pandey et al.[12] (1.67%). This could be due to the ethnic variation.

The epidemiological data on the prevalence of malocclusion is an important determinant in planning appropriate levels of orthodontic services, so further studies are required to provide accurate estimates of orthodontic treatment in population of Province 2, Nepal.

CONCLUSION

Angle's class I was the most prevalent malocclusion followed by class II and class III. Increased overjet was the commonest occlusal trait. There was statistically significant association between the age and occlusal traits like crowding, spacing and overjet and none of the attributes of malocclusion were significantly related with gender.

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