Prevalence of malocclusion characteristics and chief motivational factor for treatment in orthodontic patients from Maharashtra, India

Aniket H. Vibhute, Nupura A. Vibhute[1], Rajendra Daule[2]

Departments of Orthodontia, [2]Conservative Dentistry, Bharati Vidyapeeth Dental College and Hospital, Pune, [1]Oral Pathology and Microbiology, School of Dental Sciences, KIMSDU, Karad, Maharashtra, India

ABSTRACT

Objective: To determine the incidence of malocclusion characteristics and chief motivational factor for treatment in orthodontic patients from Maharashtra, India. **Materials and Methods:** The present study was based on the examination of dental casts of pretreatment records of 560 orthodontic patients (319 females and 241 males). The relationship of the first upper and lower molars according to the Angle's classification was examined. Crowding, spacing, crossbite, overjet, overbite were recorded. The chief complaint of the patients was recorded from their history proformas. **Results:** The study demonstrated that Class I malocclusion was found in 275, Class II Division 1 in 195, Class II Division 2 in 58 and Class III malocclusion in 32 subjects. Crossbite was observed in 62 (11.07%), an increased overjet in 346 (61.7%) and spacing was detected in 82 (14.6%) patients. Esthetics was found to be the ruling chief complaint of patients seeking orthodontic treatment.

Key words: Aesthetics, crowding, malocclusion, orthodontic treatment, spacing

Introduction

The demand for orthodontic treatment is ever increasing.[1] Therefore, the epidemiological data on the prevalence of malocclusion is essential in assessing the resources required for orthodontic services.[2] The prevalence of malocclusion has been reported to vary from 11% to 93%.[3-5] These significant variations may depend on differences in registration methods, ethnic origin, social class, or age of the examined subjects.[1] However, diagnostic criteria are the key factor determining the prevalence of malocclusion.[6]

The aim of this study was, therefore, to determine the prevalence of individual traits of malocclusion based on the Angle's classification of molar relationship in a sample of population from Maharashtra, India. Furthermore, this data will be useful in comparing with that of other populations and help in assaying the treatment needs specific to the Indian population.

The other important factor aimed in this study was to assess the chief complaint of the patient seeking orthodontic treatment as it can also provide valuable information regarding the current traits in orthodontic treatment in the country.

Materials and Methods

The present study was based on the retrospective examination of dental casts of pretreatment records of 560 orthodontic patients (319 females and 241 males). The relationship of the first upper and lower molars according to the Angle's classification was examined. Crowding, spacing, crossbite, overjet, overbite was recorded. The chief complaint of the patients was recorded from history proformas. All data was obtained from the files of orthodontic patients.

Address for correspondence: Dr. Nupura A. Vibhute, C/O Dr. H.G. Vibhute, Opposite Hotel Greenfield, Uttekaranagar, Sadar Bazar, Satara, Maharashtra – 415 001, India. E-mail: drnupura@rediffmail.com

All patients who met the following inclusion criteria were included in the sample:
1) Age 12 to 30 years;
2) Permanent dentition present;
3) No multiple missing teeth;
4) Presence of first permanent molar and canines;
5) No syndrome and
6) No previous history of orthodontic treatment.

Findings were classified in the following criteria:

Sagittal molar relationship was classified as Angle's Class I malocclusion, Class II Division 1, Class II Division 2 and Class III malocclusions.

Patients that deviated from the Class I relationship as described by Angle[7] (including crowding, spacing, rotation and abnormal overjet and overbite) were categorized as Class I malocclusion. Therefore, the Class I normal category limited to patients with ideal or near ideal occlusions was not present as the sample size included pretreatment orthodontic patients. Patients with a different Angle classification of occlusion on each side were categorized into a single class based on the predominant pattern of occlusion and/or canine relationship.

Posterior crossbite and scissors bite were evaluated assessing transversal relationship of the upper and lower premolar and molar teeth and registered as bilateral, right and left.[1,5,8] Overjet, the distance between the edge of the upper central incisor and the labial surface of the lower central incisor, was measured in millimeters. The overjet between 1.1 and 3 mm were considered normal, greater than 3 mm was considered increased and less than 1 mm was taken as edge to edge. The term negative overjet was used if both the left and right maxillary central incisors were in palatal occlusion.[1,5,9]

Overbite, the perpendicular distance from the edge of the central lower incisor to the upper central incisor edge, was measured in millimeters and considered as normal between 0 and 3 mm. Greater than 3 mm was considered as deep bite, less than 0 mm as open bite.[1,5,6,9,10]

Surplus space in the upper and lower dental arches exceeding 2 mm was considered as spacing.[5,6]

Crowding of upper and lower arches was measured in millimeters and considered as no crowding between 0 and 1 mm, mild crowding between 1 and 4 mm, moderate crowding between 4 and 7 mm and severe crowding more than 7 mm.[5,6]

The history proformas were checked to note the chief complaint of the patient to determine the main reason to seek orthodontic treatment in the sample size. It was grouped into esthetic reasons, functional reasons, periodontal health reason and external motivation (parents' pressure, peer pressure etc.)

Results

All the collected data was recorded and analyzed.

The study demonstrated [Figure 1] that Angle's Class I malocclusion was found in 275, Class II Division 1 in 195, Class II Division 2 in 58 and Class III malocclusion in 32 subjects. Thus the most frequent malocclusion found was Class I malocclusion (49.1%), followed by Class II Div 1 malocclusion (34.8%), Class II Div 2 malocclusion (10.3%) and Class III malocclusion (5.7%).

Following were the findings regarding specific malocclusion characteristics.

Crossbite was observed in 62 (11.07%) patients of the sample, mostly observed in females ($P < 0.05$). It was more commonly found unilaterally on the right than left side. A scissor bite was observed only in 8 (1.42%) subjects with no statistically significant sexual difference.

Overjet and overbite was observed as follows. The most frequently diagnosed finding for overjet was an increased overjet in 346 (61.7%) of all patients examined with a higher prevalence in males ($P < 0.05$). The prevalence of the negative overjet (4.1%) was higher than edge to edge (1.6%) values.

Increased overbite was recorded in 244 (43.6%) of the patients and mostly observed in males ($P < 0.002$).

Spacing in the upper and lower dental arches was detected in 82 (14.6%) and no significant gender differences was found for spacing in the upper and lower arches ($P > 0.05$).
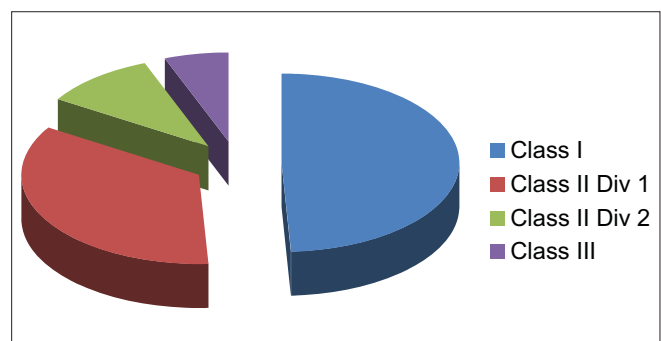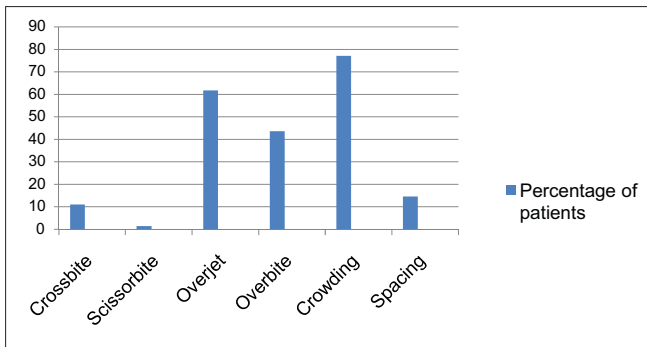

Figure 1: Pie diagram showing prevalence of malocclusion

Figure 2: Graph showing distribution of patients according to the malocclusion characteristic

Figure 3: Pie diagram showing distribution of patients as per the chief complaint

Crowding in the upper and lower dental arches was detected in 432 (77.1%). The highest on the scale of malocclusion characteristics [Figure 2]. Crowding for lower dental arch was found to be more prevalent than upper arch with no statistically significant sexual difference.

The history proformas were checked to note the chief complaint of the patient to determine the main reason to seek orthodontic treatment. Figure 3 revealed that esthetics is the main reason for patients to seek orthodontic treatment with about 518 (92.5%) patients showing concern about looks.

Following were the findings regarding specific malocclusion characteristics chief complaints of patients in study.

Periodontal health concern came out as the least important chief complaint with only 3 (0.05%) patients giving the reason to seek orthodontic treatment. The other reasons for seeking orthodontic treatment were functional problems and external motivation, which included peer pressure and pressure from parents.

Discussion

Although many studies have been published that describe the prevalence and types of malocclusion, it is difficult to compare and contrast these findings, in part because of the varying methods and indices used to assess and record occlusal relationship.[1,6,11] Other variables (including age differences of the study populations, examiner subjectivity, specific objectives and differing sample sizes) further complicate efforts to understand and appreciate the differences recorded in patterns of malocclusion between ethnic groups.[1,11] It is stated that the prevalence of different types of malocclusions may show great variability even in a population of the same origin.[10] In the present study, which included a wide population who accepted for orthodontic treatment, malocclusion was found to be present in all cases. This value is more than the data reported by Gelgor
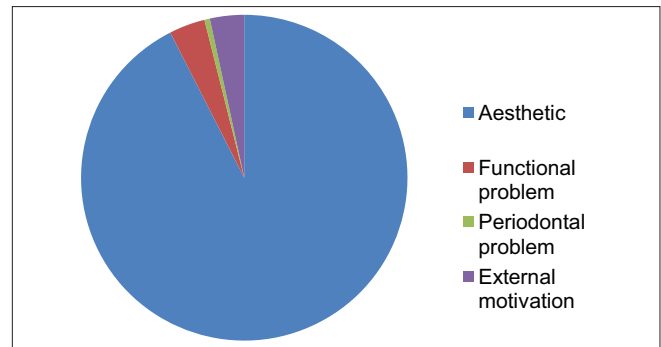
et al.[5] who detected malocclusion in 89.9% of their study population. The difference might be because of the different material used in both studies. They investigated the prevalence of malocclusion in general subpopulation whereas this study is limited to orthodontic patients.

Although Angle's classification is limited in that it does not incorporate vertical and transversal abnormalities, as well as skeletal discrepancies, it is a universally accepted system that is reliable and repeatable and that minimizes examiner subjectivity.[11] In this study the prevalence of normal occlusion was not taken into account as study was based on orthodontic patients seeking treatment and not general population.

The prevalence of Class I malocclusion (49.1%) in the present study was less than the data reported by Silva and Kang,[12] Onyeaso,[9] and Sıdlauskas and Lopatiene[6] who reported that 69.4%, 50.0% and 68.4% of the sample examined had Class I malocclusion, respectively. When compared with the studies published in different countries, this value is less than the data reported by Sayın and Turkkahraman[10] (64%) but more than the data reported by Gelgor *et al*.[5] (34.9%).

The prevalence of Class II Division 1 (34.8%) in the present study was more than that reported by Sıdlauskas and Lopatiene[6] (27.7%) and Sayın and Turkkahraman[10] who reported 19%, and (10.3%) was reported by Gelgor *et al*.[5]

The prevalence of Class III malocclusion (5.7%) is less than the prevalence determined by some studies[5,9,10] but close to the data reported by Proffit *et al*.[11] (5.7%) and Thilander *et al*.[1] (5.8%). The differences between the prevalence of malocclusions might be related to the material and racial differences.

The present study confirmed that predominant anteroposterior relationship of the arches in examined

subjects was Class I malocclusion, with no significant gender differences. On the other hand, Onyeaso *et al.*[12] reported that males were found to have significantly more of Class II and III molar relationships than females.

The data of high prevalence of increased overjet and overbite, in the present study, was more than the data reported by Proffit *et al.*[11] who reported that 29.6% had normal overjet and 45.2% had increased overjet. Additionally, females had normal overjet and normal overbite ($P < 0.05$) and males had increased overbite and overjet more frequently ($P < 0.002$). This value was in agreement with the study reported by Gelgor *et al.*[5] who stated the gender differences for normal overbite was more common in females ($P < 0.001$) and increased overbite more frequent in males ($P < 0.05$).

In the present study, scissor bite was less frequently observed than crossbite and observed in only 1.42% of the subjects examined with no significant sexual difference. Bilateral crossbite was the most frequently observed pattern of crossbite and observed more frequently in females than males ($P < 0.05$). One explanation for the high rates of crossbite in the present study might be that our study evaluated the subjects accepted for orthodontic treatment but Gelgor *et al.*[5] investigated the referred population.

Crowding in the upper and lower dental arches was the most frequent of all anomalies recorded (77.1%). This finding complied with the results of Thilander *et al.*[1] and Gelgor *et al.*[5] who reported that crowding was the most frequent of all anomalies. In the present study, crowding in the lower dental arch was the most common finding. This was in agreement with the data reported by Sayın and Turkkahraman.[10]

The prevalence of spacing in this study (14.6%) was considerably less than the data reported by Thilander *et al.*[1] (25.9%). This may be due to differences in the sample.

The other important factor aimed in this study was to assess the chief complaint of the patient seeking orthodontic treatment. The analysis of the chief complaint of the patient to seek orthodontic treatment was revealed as an aesthetic concern in about 518 (92.5%) patients whose concern about "the looks" was the major deciding factor. Esthetics is thus the main reason for patients to seek orthodontic treatment. Functional efficiency and periodontal health concerns came as lesser important complaints for patients regarding seeking of orthodontic treatment. A study of the main motivational factor for seeking treatment is of paramount importance in the treatment planning and patient cooperation and thereby influencing the final success rate of the treatment.

Conclusion

The prevalence of malocclusion and the chief complaint are very important in determining and planning appropriate levels of orthodontic services. Further studies are required to provide accurate estimates of the orthodontic treatment need in Indian population and the correlation between the chief complaint and prevalence of malocclusion and the motive of the patient seeking orthodontic treatment.

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