Pattern of Deep Bite among Orthodontic Patients at Dhaka Dental College and Hospital

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ABSTRACT

Aims: To assess the pattern of deep bite of orthodontic patients.

Material and methods: In this cross sectional study, a total number of 200 sets of pretreatment study cast of patients selected from model store of Orthodontics Department in Dhaka Dental College & Hospital, Mirpur-14, Dhaka-1206, Bangladesh.

Results: The study finding show the percentage distribution were as follows, 1% of the sample had open bite, 38.5 % of the sample had normal value of incisor overbite, while 60%patients showed varying values of deep bite. As far as the distribution of these 121 patients in different categories of deep bite is concerned. Maximum number of patients; 50% of these were having mild degree of deep bite while only6.5% showed moderate degree of deep bite and 3.5% showed full coverage of lower incisor crowns.

Conclusion: The conclusion that can be drawn from this study is that the commonest overbite relationship in the Bangladeshi sample is the mild overbite (50% patients). Moderate and severe deep bite malocclusions are less prevalent but nearly of the same percentage distribution. In all categories of deep bite, female to male ratio was higher.

Key Words: Orthodontic treatment, Malocclusion, Over bite, Deep bite

INTRODUCTION

Normally the upper incisors overlap the incisal one third of the labial surface of the lower incisors and the lower incisors come into contact with the middle third of the palatal surface of upper incisors, when the teeth are in occlusion. The vertical overbite has been defined by Strang(1950)[1] as " the overlapping of the upper anterior teeth over the lowers in the vertical plane." Deep bite can be defined as "vertical overlap of upper teeth on the labial surface of lower teeth in centric occlusion when exceeds normal range of 1-2mm".[2] In abnormal situations, the overlap may be increased, decreased or absent. Further, the overbite in a case may be complete or incomplete. A wide range of incisal overbite is seen with normal posterior occlusal relations. Depth of bite becomes a defined clinical problem when occlusal or temporomandibular function is, or may become, impaired and when facial esthetics is harmed.[3] Aesthetic impairment and trauma to the palatal or lower labial gingiva are frequently reported by persons with this problem. Sometimes the deep overbite is so severe that the front teeth bite into the gums either behind the upper front teeth or in front of the lower front teeth producing damage (traumatic overbite)[4]

There are several factors that seem to be related to the development of deep bite. Among these incisor supraocclusion, excessive overjet, mesiodistal width of the anterior teeth, incisors angulation, canine position, molar infraocclusion, molar cusp height, failure of age related natural opening of the deep bite, mandibular ramus height, and vertical face type.[2] The factors contributing to excessive overbite vary with the type of occlusion. Excessive overbite is not to be viewed as an isolated entity, it must be seen as a part of the total malocclusion. In good occlusion, the amount of overbite is determined largely by dental factors, that is , crown length and tooth position. In class I malocclusion the depth of bite is controlled by dental factors, for example, length of the crowns of the incisors, elevation of maxillary first molars, and the angle between the long axes of the central incisors as well as by skeletal featurs. However, in class II , the skeletal morphology dominates dental features. Deminished anterior facial height and shortened ramus height,in particular, dominate the dental factors mentioned above.[3]

If not treated, deep bites can result in trauma to the palatal mucosa behind the upper incisors or to the labial gingiva of the lower incisors (Proffit, 2007).[5] This can result in painful soft tissue and periodontal defects. Nasry & Barclay (2006)-found that traumatic bites in conjunction with poor oral hygiene could result in periodontal lesions, with gingival trauma and food impaction being important aetiological factors. As a result, deep bite correction is often an essential component of orthodontic treatment, aiming to allow for optimal function of the masticatory apparatus.[6]

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Management of all malocclusions requires a very important step of dealing with overbite especially the deep bite, otherwise the expected treatment outcome can not be achieved. Considering the significance of deep bite in orthodontic treatment planning and treatment execution, accurately determine the deep bite status among different types of malocclusion is very important.

Deep bite has been considered one of the most common and early manifestation of malocclusion.[2] Assumption of deep bite severity is necessary when treatment need is estimated for population groups. Accurate information on pattern of different occlusal traits like deep bite is essential when planning of orthodontic services involves targeting specific types of malocclusion.[7] The aim of this study therefore is to determine the pattern of deep bite among orthodontic patients at Dhaka Dental College and Hospital.

MATERIAL AND METHOD

It was a cross-sectional, observational study, carried on 200 pretreatment study casts of patient having permanent dentition, irrespective of their gender. Study casts were selected consecutively from the model store of orthodontic department, Dhaka dental College and Hospital, Dhaka, having the following inclusion criteria: Undamaged acceptable quality study casts and presence of permanent dentition from 1st molar to 1st molar. Care was taken to exclude study casts of patients who were having sign of previous orthodontic treatment, features of tooth extraction and missing permanent tooth or teeth from first molar to first molar.

Scoring of the selected 200 sets of study casts were done, to evaluate deep bite according to following criteria.[8-9]

Score	Overbite severity
0.0	<1/3 lower incisal coverage
1.0	1/3 to 2/3 coverage
2.0	2/3 up to fully covered
3.0	Fully covered

The incisal edge of the lower central incisor should be quite close to the lingual contour of the upper incisor when the dentition is in maximum intercuspation. This can be measured vertically (overbite) and horizontally (overjet). Incisor overbite is the vertical (craniocaudal, occlusogingival) distance between the incisal edges of the central incisors (Fig. 1) measured perpendicular to the occlusal plane.

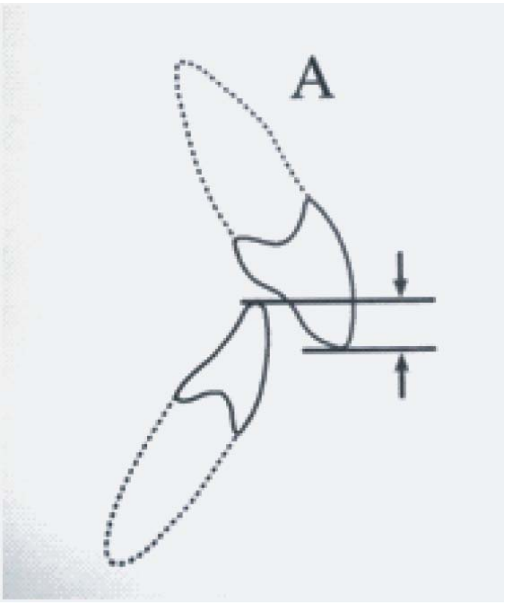

Fig.1. Lateral view of the central incisors, showing the method of measuring overbite

The easiest way to measure this[10] is

(1) to place the casts in maximum intercuspation,
(2) use a fine lead pencil to mark where the incisal edge of the upper incisor occludes over the lower incisor,
(3) separate the casts, and
(4) use the depth gauge of the calipers to measure how far the pencil mark is from the incisal edge of the lower incisor(-Fig-2).

Fig. 2: Overbite measurement using a digital caliper.

One convention is to measure either the left or right central incisors with the greater overbite; others measure both sides and record the average. When the incisors do not meet and there is an anterior openbite (also termed negative overbite and apertognathia), the gap between the incisor edges in the two jaws is measured perpendicular to the occlusal plane, and the value is recorded as a negative value.

Dental casts measurement were performed by a digital caliper. All measurements of all subjects were carried out again four weeks later by same operator to evaluate measurements error. Almost all the measurements were same ,

where differed, average was taken. After collection of data the obtained data was checked, verified& edited. These were entered in a personal computer using the SPSS(statical package for social science) software. Entered data were cleaned, edited and appropriate statistical tests were done depending on the distribution of data. All data analyzed through standard statistical methods by using SPSS / STATA 10 software.

RESULTS

This study was a cross sectional observational study conducted among the dental casts of 200 patients of the department of Orthodontics and Dentofacial Orthopadics, Dhaka dental College and Hospital.

Table 1 Age and gender distribution of the sample

Age in years	Male %(n)	Female %(n)	Total %(n)	P-value
<20	34.2(26)	65.8(50)	38.0(76)	0.001*
20-24	40.4(40)	59.6(59)	49.5(99)	0.008
25+	28.0(7)	72.0(18)	125(25)	0.001*
Total	36.5(73)	63.5(127)	100(200)	0.002*

*P < 0.005 is statistically significant

Table 1 Shows that significant difference was found between male and female in <20 years, (20-24)years and 25+ years age groups .

Table 2 Distribution of subject according to their sex

Sex	Frequency	Mean±SD
Male	73	20.7±3.5
Female	127	20.5±4.1
Total	**200**	**20.6±3.9**

Table 2 shows that out of 200 patients, 73 were male and 127 were males. The mean age was 20.7±3.5for male and 20.5±4.1 for females.

Fig 3 Distribution by gender

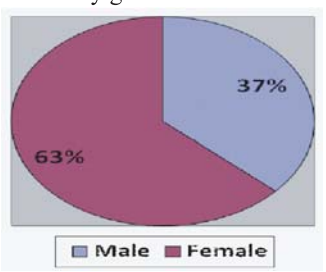

Fig 3 shows that 63% of the population were female and 37% of the population were male.

Table 3 Sex distribution of the sample into varying severity of overbite/deepbite

Incisor overbite Score	Male %(n)	Female %(n)	Total %(n)	P-value
0	28.6(22)	71.4(55)	38.5(77)	0.001
1	40.6(41)	59.4(60)	50.5(101)	0.010
2	53.8(6)	46.2(7)	6.5(13)	0.300
3	42.9(3)	57.1(4)	3.5(7)	0.053
Open bite	0	1.6(2)	1.0(2)	

P < 0.05 is statistically significant

Score	Overbite severity
0.0	< 1/3 lower incisor coverage
1.0	1/3 to 2/3 coverage
2.0	2/3 up to fully covered
3.0	Fully covered

Fig 4 percentage distribution of overbite severity

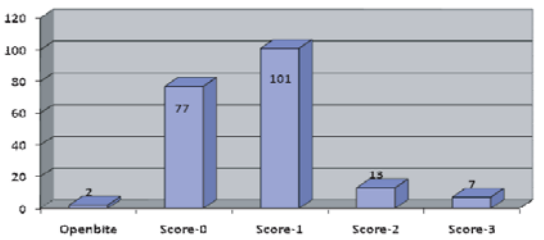

Figure 4 presents, the percentage distribution of overbite values among the 200 samples. 77(38.5%) of sample had normal overbite , 101(50.5%) had mild overbite ,13(6.5%) were moderate overbite and least common were the severe overbite in 7(3.5%) but open bite,2(1%).

DISCUSSION

The prevalence of malocclusion had been found to vary with the different population, race and origin. This type of study might help in planning an orthodontic patient service based upon the the pattern of overbite in different types of malocclusion. Evaluation of deepbite among the referred cases for orthodontic treatment for people of Bangladesh had not been reported in the literature.

The study was conducted at Dhaka dental College and Hospital on studycasts of patients present in the model store of orthodonticsdepartment. The subjects for this study were nottaken from general population, but sought care andwere receiving treatment at the orthodontics department, Dhaka

dental College and Hospital, Dhaka. Patients seeking orthodontic treatment are of bothsexes; including preadolescents, adolescents and adults.

In our present study we found from Table 1 that the sex distribution was 73 males (37%) and 127 females (63%). Highest frequency of malocclusion than other groups among which females (63%) seeking orthodontic treatment were approximately twice than the males (37%). Increased response of the females when compared to males could be related to the increased parental concern or higher esthetic concern of girls than boys and also due to our socioeconomic situation.

Age range was categorized in Table-2 as 20 years, 20-24 years, and over 25 years to evaluate the age range having maximum interest for the treatment. Statistically significant difference ($p<0.05$) was found between male and female in <20 years, (20-24) years and 25+ years age groups. Most common age group seeking orthodontic treatment was 20-24 years.

This study shows that out of 200 patient 198 patients had varying degrees of overbite and remaining 1% patient had open bite (Table -3).Out of 198 patients, normal value of incisor over bite (< 1/3 lower incisor coverage) was found in 38.5 % patients (Male 28.6 %, Female 71.4%). There was a statistically significant difference ($p<0.05$) between male and female in the normal value of over bite where females are higher than males.

As far as the degree of deep bite is concerned, it is obvious from Table 3, that 60 % patients showed varying degrees of deep bite. Out of 121 patient (60%), highest number of patients (50.5%) had mild degree of deep bite (1/3 to 2/3 lower incisor coverage) where females are higher than males which is statistically significant ($p<0.05$). 6.5% patients showed moderate degree of deep bite (2/3 up to full coverage of lower incisor crowns), while 3.5% patients were found to have severe deep bite(full coverage of lower incisor crowns). There was no significant difference was found between male and female in moderate degree of deep bite. If we look at the female to male ratio in different categories of deep bite, it is clear from Figure 3 that in all three categories of deep bite, the number of female outweighs the number of male patients.

CONCLUSION

From the result and discussion in conclusion followings are suggested:

1. The commonest overbite relationship in the Bangladeshi sample is the mild overbite(50% patients)
2. Moderate and severe deep bite malocclusion are less prevalent but nearly of the same percentage distribution .
3. In all categories of deep bite , female to male ratio was higher.
4. Age group 20-24 years showed highest frequency with female twice more than the males

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