A study on Arch Widths of Bangladeshi Adult Subjects with Class II -2 malocclusion compared to Normal Occlusion

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ABSTRACT

Aim: To evaluate the transverse discrepancy in Class II div 2 malocclusion and normal occlusion. Also to test the hypothesis that models with class II div 2 malocclusions may have mean maxillary arch widths significantly smaller than those with normal occlusion. Thus the proposed study will generate interest among the orthodontists for further study over the transverse discrepancy of our patients and guide them to establish effective treatment strategy and their management.

Materials and Methods : Cross sectional comparative study was carried out Department of Orthodontics & Dentofacial Orthopedics of Dhaka Dental College & Hospital, Dhaka with 100 sample was included in this study.

Results: Maxillary intercanine, interfirst premolar and interfirst molar widths between normal occlusions and class II div 2 malocclusions were statistically significant. Maxillary measurements of class II div 2 malocclusion were smaller than normal occlusion. Mandibular intercanine, interfirst premolar and interfirst molar widths between Class II div 2 malocclusion and normal occlusions were statistically significant.

Conclusion: This study helps in determining possible differences in the dental arch widths of Bangladeshi people in Class II-2 adults compared to adults with normal occlusion may be an important aid in further understanding of dentoalveolar characteristics of these conditions, as well as improving their management.

Keywords: Arch Widths; Class II div 2 malocclusion; normal occlusions

INTRODUCTION

Class II malocclusion problems are often combined with jaw and dental arch discrepancies on the sagittal as well as on the transverse or vertical planes.[1] Orthodontic treatment of the malocclusions and especially non extraction treatment plans, often include expansion of the upper dental arch.[2-5] Dental arch dimensions change during treatment as well as during the retention phase. Nevertheless, research studies about dental arch dimensions during the active growth period are few and concern only certain parameters. Papageorgiou et al.[6] studied dental dimensions in people with class II division 2 malocclusion. Some authors made a comparative study on arch widths between class II division 2 and class II division 1 malocclusion. Concerning class II division 1 malocclusion some studies are available. A very recent study conducted over white Brazilians to compare the arch widths with normal occlusion and class II division 1 malocclusion.[7] Staley et al.[8] as well as Buschang et al.[9] examined dental arch differences in adults. Toutountzakis[10] examined upper intermolar widths in children, Frohlich[11] states the upper and lower intermolar and intercanine widths, whereas Ingerval and Lennartsson[12] examined intermolar widths and length of both dental arches. Baccetti et al.[13] studied the changes and widths discrepancies of both dental arches at the region of primary and permanent molars on dental casts. Bishara et al.[1] studied length changes and arch discrepancies of both dental arches in class II division 1 malocclusion. Normal occlusion is commonly defined as "an occlusion within the accepted deviation of the ideal". This definition gives no clear limit to the range of normal occlusion. However, an occlusion which satisfies the requirements of function and aesthetics, even though there may be minor irregularities of individual's teeth may be accepted as normal occlusion. In normal occlusion, each tooth occupies a definite position in the arch and bears a definite relationship with its neighbors of the same and opposite arch.[14]

In Bangladesh, few studies been conducted like as "Estimation of ideal arch form, arch length and arch width in normal occlusion in Bangladeshi population"[15] and "A comparative study of arch widths of Bangladeshi subject with normal occlusion and class II division I malocclusion".[16] Till now, our efforts were confined to isolated case management and study of prevalence different malocclusion. A definite study in determining possible differences in the dental arches widths of Bangladeshi people in Class II-2 adults compared to adults with normal occlusion may be an important aid in further understanding of dentoalveolar characteristics of these conditions, as well as improving their management.

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METHODOLOGY

The cross sectional comparative study was carried out Department of Orthodontics & Dentofacial Orthopedics of Dhaka Dental College & Hospital, Dhaka total 100 pairs of study models were selected from patients and students of the Orthidontics & Dentofacial Orthopedics Department of Dhaka Dental College & Hospital and were divided into two groups. The first group consisted of 50 pairs of study models with permanent dentition and diagnosed as class I normal occlusion.

The second group includes another 50 pairs of dental casts with permanent dentition and diagnosed as diagnosed as class II division 2 malocclusion. Class II division 2 malocclusion was again divided into two categories, class II division 2 malocclusion with crowding and class II division 2 malocclusion without crowding. Dental cast's measurement was performed by a digital slide caliper to the nearest 0.01mm.

All measurements of all subjects was carried out again two weeks later by an another operator to evaluate measurements error. Almost all the measurements were same measured by two operators, 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 (statistical package for social science) software. Entered data were cleaned, edited and appropriate statistical tests were done depending on the distribution of data.

All data were analyzed through standard statistical methods by using SPSS software. Version 23.0 (statistical package for social science SPSS Inc. Chicago, USA) statistical software employing appropriate statistical tests like unpaired Student's "t" test, mean, SD, 95% Confidence Limit, Standard Error and their "p" values were obtained to see the statistical significance. P value < 0.05 was considered as significant.

SELECTION CRITERIA

Inclusion criteria: For class I normal Occlusion

1. Bilateral class I molar relationship

2. Normal overjet and ovetbite, spacing and crowding less than 2 mm.

3. Class I soft tissue profile

4. No missing teeth except wisdom teeth.

5. Absence of posterior cross bite even limited to a

Inclusion criteria: For class II division 2 malocclusion

1. Bilateral class II molar relationship
2. Retrusive maxillary central incisors, overjet less than 3 mm.
3. Straight soft tissue profile
4. No missing teeth, except wisdom teeth
5. Absence of posterior cross bite even limited to a single tooth.
6. No history of previous orthodontic treatment

Exclusion criteria:

1. Posterior crossbite.
2. Missing teeth other than wisdom teeth.
3. Age below 13 years.
4. History of previous orthodontic treatment.

Table-1: Comparison of maxillary measurement between class-I (normal) occlusion and class-II div-2 malocclusion

	Class-I normal occlusion (n=50) Mean(mm) (±SD)	Class II div 2 malocclusion (n=50) Mean(mm) (±SD)	P value
Maxillary intercanine width	34.64 (±1.69)	33.46 (±2.77)	0.01*
Maxillary inter-first premolar width	42.14 (±2.59)	39.69 (±2.85)	0.001*
Maxillary interfirst molar width	51.57 (±3.61)	50.01 (±2.28)	0.01*

Level of p value significant = <0.05.

Table shows maxillary intercanine, interfirst premolar and interfirst molar widths between class-I normal occlusion and Class II div 2 malocclusion were statistically significant. Maxillary measurement of class-I normal occlusion were larger than Class II div 2 malocclusion. (Table-1)
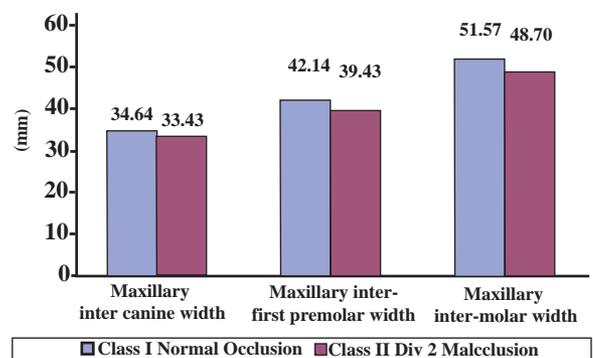
Figure-1: Comparison of maxillary measurement between class-I (normal) occlusion and class-II div-2 malocclusion

Table-2: Comparison of mandibular measurement between class-I (normal) occlusion and class-II div-2 malocclusion

	Class-I normal occlusion (n=50) Mean(mm) (±SD)	Class II div 2 malocclusion (n=50) Mean(mm) (±SD)	P value
Mandibular intercanine width	25.95 (±1.82)	24.85 (±1.94)	0.01*
Mandibular inter-first premolar width	33.98 (±2.24)	32.06 (±3.61)	0.002*
Mandibular interfirst molar width	44.67 (±2.60)	43.26 (±3.57)	0.01*

Level of p value significant = <0.05.

Table shows Mandibular intercanine, interfirst premolar and interfirst molar widths between class-I normal occlusion and Class II div 2 malocclusion were statistically significant. Mandibular measurement of class-I normal occlusion were larger than Class II div 2 malocclusion. (Table-2)
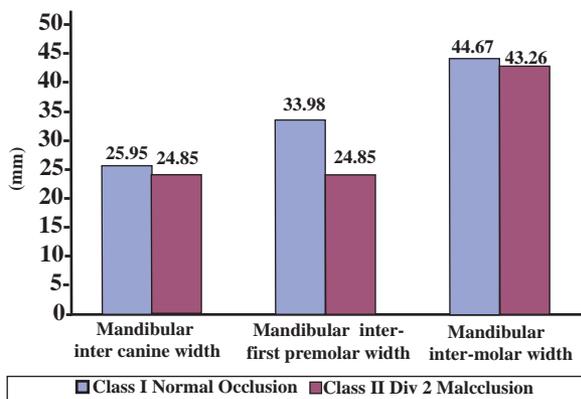
Figuer-2: Comparison of mandibular measurement between class-I (normal) occlusion and class-II div-2 malocclusion

DISCUSSION

In Bangladesh the incidence of Angle's Class II malocclusion is 32.74%[17] and 28.86%[18]. The report suggests that the incidence of such class II highest among the malocclusion groups. Today literature in this field, in context to our country has been very inadequate. A few dissertation works have been done previously which is related to this study in the department of Orthodontics & Dentofacial Orthopedics of Dhaka Dental College and Hospital. Thus the proposed study will generate interest among the orthodontists for further study over the transverse discrepancy of our patients and guide them to establish effective treatment strategy and their management. In our study to compare arch widths, we selected subjects without posterior crossbite, even in a single tooth. This will ensure accurate measurements of arch widths and will not affect the result. In addition to measurements in canine and molar region, arch widths between premolar teeth were also calculated. The study of Uysal et al.[19], comparisons of the normal occlusion and Class II division 2 malocclusion samples. Normal occlusion subjects had statistically significant narrower lower intercanine and interfirst molar widths (P < 0.001) than did the subjects with Class II division 2 malocclusion. In our study showed all measurements were larger in the normal occlusion samples when compared with the Class II division 2 groups. This variations may be due to racial variations. In another study Rana et al.[20] and Uysal et al.[19] found maxillary intercanine, interfirst premolar and interfirst molar widths between class I normal occlusion and class II div 2 malocclusion were statistically significant. In this study shows mandibular intercanine, interfirst premolar and interfirst molar widths between class I (normal) occlusion and class II div 2 malocclusion were statistically significant. Mandibular measurement of class I normal occlusion were larger than class II div 2 malocclusion (Table-2). Similar study Rana et al.[20] found mandibular intercanine, interfirst premolar and interfirst molar widths between class I normal occlusion and class II div 2 malocclusion were statistically significant.

CONCLUSIONS:

According to the results of this study in conclusion followings are reached : Subjects with class II division 2 had mean maxillary mandibular intercanine, interfirst premolar and interfirst molar widths smaller than normal occlusion. Mandibular intercanine interfirst premolar and interfirst molar widths were larger in normal occlusion than Class II div 2 malocclusion. Subjects with normal occlusion had mean maxillary intercanine, interfirst premolar and interfirst molar widths larger than Class II division 2 malocclusion. . All groups of maxillary arch width have significantly larger arch width than mandibular arch width.

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