

ARCH WIDTHS IN ADULTS WITH CLASS I NORMAL OCCLUSION AND CLASS III MALOCCLUSION

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ABSTRACT

The purpose of this study was to compare dental arch widths in Class III malocclusion with Class I normal occlusion subjects. Methodology: The Inter canine, Interpremolar and Intermolar widths were measured on 70 dental casts (35 class I and 35 class III malocclusion subjects). The data was developed on SPSS 16 for windows. Independent-samples t-test was applied for comparing the two groups. Results: Upper interpremolar and intermolar widths were narrower and lower Inter canine and Intermolar width was larger in class III malocclusion group. Upper inter canine and lower Interpremolar width between the two groups did not reveal any significant difference. Conclusion: In class III malocclusion, almost all the dental arch width measurements in maxilla were smaller and mandibular dental arch width measurements were larger as compared to normal class I normal occlusion.

Key Words: Class I occlusion, Class III malocclusion, Dental arch width.

INTRODUCTION

Class III malocclusion usually display anomalous cephalometric features and is much less incident in the general populations.¹⁻⁴ The prevalence of Class III malocclusion is reported to be 1.4% in Danish,⁵ 3.5% in Turkish population,⁶ 14% in American⁷ and 16.8% in the Kenyan population.⁸

Numerous researchers have tried to establish the dental arch form unique to certain malocclusions, ethnic groups.¹ The Orthodontists award a considerable importance to the dental arch width for diagnoses and treatment planning to address the dental esthetics and stability of the dentition.⁹⁻¹⁴ Orthodontic journalism confirms a significant difference among the dental transverse dimensions among class I, class III malocclusion groups and genders. Researchers' strongly recommend early detection of all Classes of malocclusion and have proposed a number of treatment options for the correction of this divergence of the dental arches.^{1,15}

The findings determined for other regions might be insufficient for application to different racial or ethnic groups and may exhibit variations. The present study was carried out to determine the difference between

dental arch widths of class I normal occlusion and class III malocclusion in our region for a better understanding that might be significant for diagnosis and treatment planning.

PURPOSE OF THE STUDY

To compare the Dental arch widths in adult patients with Class I normal occlusion and Class III malocclusion.

METHODOLOGY

The study was carried out on 70 dental casts of patients with age range 16-20 years. (35 class I normal occlusion and 35 Class III, both genders). Demographic data of patients was recorded and the measurements were taken using vernier scale. Following criteria was used: Class I normal occlusion: All teeth present except third molars, bilateral class I canine and molar relation, no or minor crowded arches. Class III malocclusion: All teeth present except third molars, bilateral class III canine and molar relation, negative overjet.

The following measurements were used in this study:

Maxillary cast: (Fig.1)

Maxillary Inter canine width (UC-C): Distance between the cusp tips of right and left maxillary permanent canines.

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Maxillary Interpremolar width (UP-P): Distance between buccal cusp tips of right and left maxillary first premolars.

Maxillary Intermolar width (UM-M): Distance between the mesiobuccal cusp tips of right and left maxillary permanent first molars.

Mandibular cast: (Fig.1)

Mandibular Inter canine width (LC-C): Distance between the cusp tips of right and left mandibular permanent canines.

Mandibular Interpremolar width (LP-P): Distance between buccal cusp tips of right and left mandibular first premolars.

Mandibular Intermolar width (LM-M): Distance between the mesiobuccal cusp tips of right and left mandibular permanent first molars.

STATISTICAL ANALYSIS

The mean and standard deviation for each parameter was calculated using the SPSS Version 16 for Windows. Both group measurements were compared using independent t-test. 30 randomly selected casts were remeasured after one week of first measurement and was compared to find out any method error using paired t-test.

Table 1: Comparison of Dental Arch Widths

Significant value ($p < .05$)

RESULTS

There was no statistically significant difference documented between the first and the second measurements. Table No.1 indicates the comparative result of dental arch widths in class I normal occlusion and Class III malocclusion. The Class III sample had significantly greater mandibular Inter canine and Intermolar and narrow maxillary interpremolar and intermolar arch widths as compared to class I normal occlusion. Both groups revealed insignificant differences for upper Inter canine and lower interpremolar dental arch widths.

DISCUSSION

The current study was carried out to compare the dental arch widths in adults with normal Class I occlusion with Class III malocclusion patients. The mean age of the study sample was 18.2 ± 1.3 years. The literature reveals that class III malocclusion is often associated with narrow maxillary dental arch widths as compared to normal class I occlusion patients. This might be due to nasal obstruction, paranasal habits, low tongue position and abnormal swallowing pattern etc.¹⁶

TABLE 1: COMPARISON OF DENTAL ARCH WIDTHS

Parameter	Class I (n=35) Mean Value (mm)	Class III (n=35) Mean Value (mm)
UC-C	33.1 ± 1.3	32.2 ± 1.2
UP-P	40.4 ± 1.9	$37.5 \pm 1.3^*$
UM-M	51.8 ± 1.3	$48.7 \pm 1.4^*$
LC-C	25.2 ± 1.1	$28.3 \pm 1.3^*$
LP-P	33.4 ± 1.5	32.9 ± 1.2
LM-M	41.1 ± 1.9	$44.3 \pm 1.1^*$

* Significant value ($p < .05$)

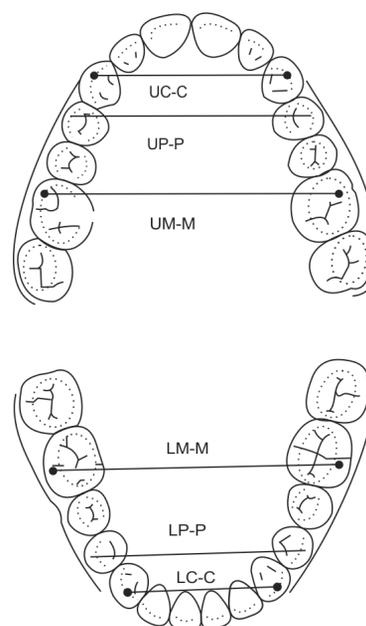


Fig 1

Maxillary Arch

The current study revealed narrow maxillary arches for class III patients. The interpremolar and intermolar dental arch widths were significantly narrow while inter canine width showed insignificant findings in class III patients. These findings were in agreement with results of a study conducted by Usyal and co-workers¹⁸. In contrary to above, Braun et al¹⁷ studied the dental arch widths in 1998 and found that Class III malocclusion subjects exhibited approximately 5.1 mm greater maxillary dental arch widths than the Class I normal occlusion patients. However, Harren and Jordi¹⁹ found smaller intermolar widths in class III subjects while rest differences were insignificant. Al-khateeb also reported that maxillary inter canine and intermolar widths were similar in both groups.²⁰

Mandibular Arch

Braun et al¹⁷ established that in class III subjects the mandibular dental arch width was approximately 2.1 mm wider than the Class I normal occlusion mandibular arches. Quite similar findings were found out in the current study indicating that the mandibular dental arches associated with Class III malocclusion were wider than the class I normal occlusion sample. Similar findings were demonstrated by Uysal and co-workers.¹⁸ Furthermore, the present study indicated that the lower intercanine and intermolar dental arch width was significantly wider in class III than the class I normal occlusion subjects. This might be due the excess mandibular tooth size. Sperry et al²¹ found out that that the overall ratio of mandibular tooth size in Class III group was greater than the Class I subjects. Similarly, Lavelle²² and Lin²³ determined that maxillary tooth mass was smaller and mandibular tooth size was larger in class III cases.

Hnat et al²⁴ also reported that when mandibular tooth size increases, the mandibular arch length and arch width also increase to accommodate the large sized dentition. This finding is in agreement to our study results. However, the current study results do not agree with findings of Harren & Jordi¹⁹ and Alkhateeb²⁰ studies. According to their results, the mandibular arch widths were similar in both groups.

The current study revealed that the maxillary dental arch width measurements were narrower in patients with Class III malocclusion while the mandibular dental arch width were wider in the Class III group as compared to class I normal occlusion patients. This might have resulted in more lingual inclined maxillary posterior teeth while the mandibular teeth are inclined more buccally creating cross bites in class III patients. Therefore, rapid maxillary expansion may be considered before or during the treatment of a Class III patient. Similar conclusions were deducted by Uysal.¹⁸

CONCLUSION

Maxillary interpremolar and intermolar dental arch width was narrower in class III as compared to class I normal occlusion sample.

The mandibular intercanine and intermolar arch widths was wider in class III malocclusion subjects.

The maxillary posterior teeth tend to incline lingual and mandibular teeth were more buccally inclined in class III malocclusion.

For the reason of the shortage of Class III patients in the general population, a larger sample size study might give more significant results. Increasing the sample size would guide to a greater probability of establishing results for class III dental arch width measurements.

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