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Original Research Paper

# ARCH-WIDTH CHANGES IN EXTRACTION AND NON-EXTRACTION PATIENTS

Orthodontology

**KEYWORDS:** Extraction, Non extraction, Extraction VS Non extraction, Arch Width, Intercanine width.

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## ABSTRACT

The debate and controversy of extraction and non extraction has nearly been 100 years old. Some researchers claim extraction to constrict arch and subsequently create unaesthetic black triangles at the corner of the mouth, however recent studies show that instead extraction treatment causes increase of arch width..Anterior and posterior arch widths of the maxillary and mandibular arches of 35 patients treated by 4 first-premolar extraction and 35patients treated without extractions were measured on pretreatment & posttreatment study models and compared statistically to determine whether the dental arches were narrower after extraction treatment, to test the accuracy of this view. Measurements were made in the canine and the molar regions from the most labial aspect of the buccal surfaces of the canines and the molars. There is significant increase in intercanine arch widths were the same except for in Extraction patients, and insignificant increase in nonextraction patients.

## INTRODUCTION

controversy still surrounds the question of whether better long-term results are achieved by extraction or by nonextraction therapy. An undocumented criticism of extraction treatment is that it results in narrower dental arches when compared with nonextraction therapy.[1,2] The maintenance of the pretreatment values for intercanine and intermolar distances was suggested as the key to post treatment stability because these values were believed to represent a position of muscular balance for the patient.[3,4,5,6] Although the literature has provided information regarding the effects of extraction and nonextraction therapy, the findings on the amount of inter arch & intra arch changes of these therapy display variation.[7]

Therefore, an attempt is made in this study with the aim to assess the dental arch width changes of extraction and non-extraction treatment in patients with Angle's Class I malocclusion treated with MBT prescription technique in terms of malocclusion type and treatment mechanics.

## MATERIAL & METHOD:

The study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics of Ahmedabad dental college and hospital, Ahmedabad on 70 patients for the purpose of this study were selected after screening 200 subjects, obtained from the patient records .Study models of the patients were divided into two Group A (Extraction patients) and Group B (Non extraction patients). Orthodontic study models at Pretreatment (T1) and Posttreatment (T2) time intervals of subjects were selected with subjects having Angle's Class I malocclusion, fully erupted permanent dentition ,without missing permanent teeth or congenitally absent teeth at the starting of treatment. without any adjunctive appliances such as a Quad Helix or a rapid palatal expander used as part of their orthodontic treatment. Subjects with craniofacial anomalies ,Edentulous spaces or mixed dentition cases any History of trauma to dentofacial region, marked jaw asymmetries and TMJ abnormalities ,Significant cuspal wear,Extensive restorations or prosthetics or with Anterior and posterior cross bites were excluded from study sample.Study model measurements are performed using a digital calliper accurate to 0.01 mm.The following maxillary and mandibular dimensions are measured on study models and following measurements are calculated(1) INTERCANINE WIDTH - from most labial aspect of buccal surfaces of canine of the right side to canine of the left side And (2)INTERMOLAR WIDTH -from most labial aspect of buccal surfaces of first molars of the right side to the first molar of the left side. The widths of the anterior and posterior parts of the maxillary and mandibular dental arches were measured at most labial aspect of the buccal surfaces of those teeth, as described by Gianelly9All statistical analyses were performed using the SPSS software package (SPSS for Windows 8, version 18.0). A paired samples t-test was used to evaluate the treatment changes. Thirty study models were selected randomly and remeasured by the same examiner.

## RESULTS

Table 1 shows the differences in the arch width of Group A maxillary arch and mandibular archat T1 And T2 .Similerly Table 2 show changes of Group B maxillary arch and mandibular arch at T1 and T2 interval. result of paired t test comparison of arch dimensions in Group A maxillary arch and mandibular arch ,As Shown in tables there is statistically significant increase (p value >0.05) in intercanine distance of Group a maxillary arch from 35.97 to 37.11, while in mandibular arch from 28.79 mm to 29.73 mm. In case of inter molar distance there is decrease of 0.99 mm in maxillary arch and 0.55 mm in mandibular arch which is not significant..

## DISSCUSSION

Transverse or vertical arch malrelationships such as crowding and local irregularities are common causes of malocclusions and are handled usually by extraction or nonextraction treatment in the permanent dentition after cessation of growth.[10] stimulus for this investigation was the assertion that extraction treatment is tantamount to constriction of the dental arches, and this decreased arch width has deleterious effects on smile esthetics, particularly when compared with nonextraction treatment. Arch width was measured at most labial or buccal surface of the canine and first molar. The labial surfaces of the canines and the molars were chosen as the measuring landmarks instead of the more customary cusp tips for several reasons[9]

1. to determine the widest possible widths of the arches
2. to prevent confusion when selected cusps tips were not distinct

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3. to avoid identifying a specific molar for measurement

Table 1 shows intercanine and intermolar arch width changes of Group A maxillary and mandibular arch.there is a significant difference in the intercanine width compared to intermolar width of Group A .[9,10,11,12,13,] The increase in the intercanine distance in this study in both extraction and nonextraction subjects compares with the previously cited increases recorded by others authors who evaluated patients treated by both strategies,possibly reflecting minor lateral movement as the canines are moved distally into the premolar sites. [9,13,14,15,16] Bishara et al [17] found that during the treatment the maxillary intercanine width of the males increased significantly in the extraction group because of the alignment of the crowded anterior segment. However, they did not mention the initial tooth size arch length discrepancies of the study group. The maxillary and mandibular intermolar widths increased in the nonextraction group and decreased in the extraction group. These intercanine and intermolar width findings are similar to the findings of this study, although the malocclusion types differed between the two studies Table 2 (3&Table 4) describes intercanine and intermolar arch width differences occurring in Group B maxillary and mandibular arch denoting there is no significant arch dimension changes in this group which is similar.[9,10,12], These results do not show statistical significance. However it still shows an overall increase in intermolar distance and intercanine distance of mandibular arch while decrease in maxillary intercanine distance .

In the nonextraction group, because of less tooth size arch length discrepancy, the crowding might be treated mostly by the movements of the anterior teeth. The results of this study confirm that extraction treatment does not result in narrower dental arches than nonextraction treatment.[9,10,11,12,17,19,20]

Table 1: Comparision of Arch Width Changes in in Group A

| | Arch Width (mm) | Time interval | Mean | Std. Deviation | Mean Difference | p Value |
|---|---|---|---|---|---|---|
| Maxilla | Inter canine | T1 | 35.97 | 3.33 | 1.14 | <0.001 |
| | | T2 | 37.11 | 3.28 | | |
| | Inter molar | T1 | 52.85 | 3.47 | -0.36 | 0.364 |
| | | T2 | 52.50 | 2.91 | | |
| Mandible | Inter canine | T1 | 38.79 | 3.07 | -0.11 | <0.001 |
| | | T2 | 38.67 | 2.47 | | |
| | Inter molar | T1 | 56.82 | 3.40 | 0.11 | 0.364 |
| | | T2 | 56.93 | 3.48 | | |

Table 2 : Comparision of Arch Width Changes in Group B

| | Arch Width (mm) | Time Interval | Mean | Std. Deviation | Mean Difference | P Value |
|---|---|---|---|---|---|---|
| Maxilla | Inter canine | T1 | 38.79 | 3.07 | -0.11 | 0.699 |
| | | T2 | 38.67 | 2.47 | | |
| | Inter molar | T1 | 56.82 | 3.40 | 0.11 | 0.645 |
| | | T2 | 56.93 | 3.48 | | |
| Mandible | Inter canine | T1 | 30.81 | 2.53 | 0.22 | 0.395 |
| | | T2 | 31.04 | 1.79 | | |
| | Inter molar | T1 | 51.77 | 3.72 | 0.36 | 0.112 |
| | | T2 | 52.14 | 3.55 | | |

## CONCLUSION

In this research Two group of variables were considered consisting of subjects treated with extraction of all first premolars we & subjects with non-extraction treatment modality. Patient who were treated with appliances specifically designed to increase dental arch width like palatal expanders were excluded. Arch width was measured at most labial or buccal surface of the canine and first molar & measurements were taken on study models with digital caliper of pretreatment and post treatment stages. The conclusion which We can deduce that extraction treatment does not result in narrower dental arches and constricted arch widths are not usually an offshoot of extraction treatment. After this research we can infer that clinically facial attractiveness of the macro level is not affected by the extraction of premolar carried out for orthodontic purpose.

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