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Research Article

AN EXAMINATION OF RELATIONSHIP BETWEEN WIDTH OF THE MAXILLARY CENTRAL INCISORS AND MAXILLARY ARCH WIDTH

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ABSTRACT

Increased Mesiodistal widths of teeth are one of the main reasons for crowding and malocclusion in adults. This is mainly due to the tooth size-arch size discrepancy. However, there is very little knowledge whether the Mesiodistal width of the incisors has any relation with the arch size of the patient.

This study was conducted to verify whether a correlation exists between the arch width of maxillary arch and the Mesiodistal width of the upper central incisors.

31 maxillary casts were used in this study. Mesiodistal widths of the central incisors were measured and arch width in the premolar and the molar regions were measured. Measurements were made from the tip of the buccal cusp of the premolars and from the tip of the Mesiobuccal cusp of the molars. The values obtained were analyzed using the SPSS for Windows, version 14.0 software. The results showed a non-significant correlation between the central incisor widths and both the arch width in the premolar and molar region. It was concluded that the Mesiodistal width of central incisor is not correlated with the width of the arch in the premolar and molar region.

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INTRODUCTION

Malocclusion is a common problem that is encountered in day to day life. This may be caused by many different factors. One such contributing factor maybe tooth size. Though various studies have been done on various etiological features, there is not much information available on whether the width of the teeth, especially the upper central incisors has any relationship with the arch width.

The establishment of a correlation between tooth width and arch width will help in predicting crowding in the permanent dentition. The aim of this study was to determine if there is a correlation between Mesiodistal width of central incisors and Maxillary arch width in the premolar and molar regions.

MATERIALS AND METHODS

The study samples included thirty-one study casts of patients who had reported to the dental OP of Saveetha Dental College, Saveetha University, India.

Inclusion criteria

The criteria for inclusion of subjects were:

1. Age ranged from 18 to 25 years.
2. The presence and the complete eruption of all permanent teeth, excluding third molars.

3. No conservative treatment
4. No evidence of fractured teeth.
5. No history of previous orthodontic treatment
6. Proper anatomy of cusps.
7. No congenital deformities of tooth
8. No obvious interproximal wear of tooth
9. Healthy state of gingiva and periodontium
10. Notemporomandibular joint problems

Patient consent for participation in the study was taken and rubber base impressions were made and models were poured in dental stone. The study casts were numbered for ease of identification.

Measurement

- Measurement of mesiodistal width of central incisors was obtained from each dental cast using the digital vernier caliper calibrated to the nearest 0.01 mm.
- The mesiodistal width of the central incisor was measured at the maximum mesiodistal width area of the crown
- Arch width measurements were made in the premolar and molar regions. For the first premolars. Measurements were made from buccal cusp tip of the upper first premolar on one side of the arch to the buccal cusp tip of the 1st premolar on the opposite side. The

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first molars were measured from mesiobuccal cusp tip of one side of the arch to the mesiobuccal cusp tip of the first molar on the opposite side.

RESULTS

The values of the measurements of the three values taken are shown in the table below. (Table-1)

Statistical analysis was performed on the values which were obtained.

The analysis showed that the coefficient of correlation between the mesiodistal width of the central incisor and premolar to premolar arch width to be 0.161. which shows there is very little correlation between the two. For the molars, the coefficient of correlation was found to be -0.021, which shows there is no correlation between the central incisor crown width and the width of the arch in the premolar and molar regions.



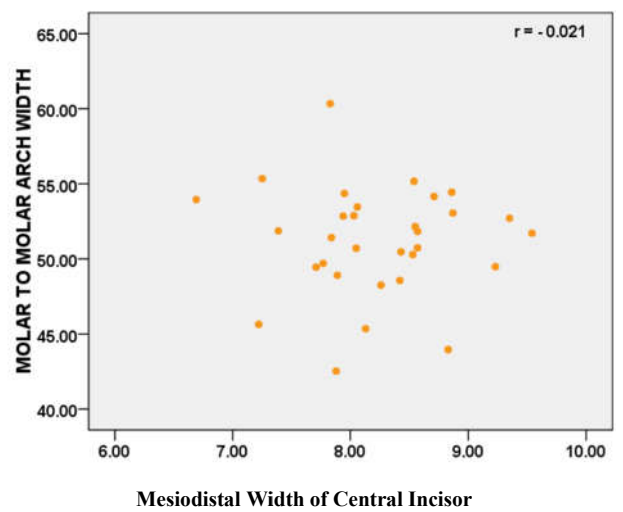
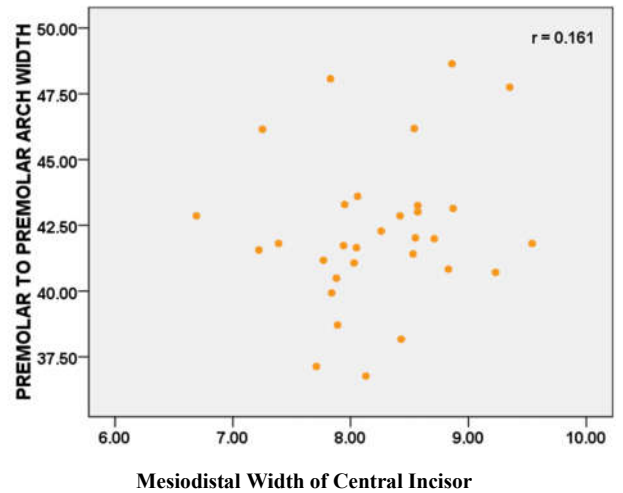
Fig-1 Models used for the study



Fig-2 Digital vernier caliper used in the study.

Table-1 Values which were obtained

SL NO	MESIODISTAL WIDTH OF INCISOR	PREMOLAR TO PREMOLAR ARCH WIDTH	MOLAR TO MOLAR ARCH WIDTH
1	8.05	41.65	50.71
2	8.54	46.18	55.17
3	7.22	41.56	45.64
4	7.39	41.81	51.87
5	8.55	42.02	52.15
6	7.83	48.07	60.34
7	8.42	42.86	48.57
8	8.06	43.60	53.46
9	8.26	42.28	48.26
10	8.57	43.01	50.74
11	6.69	42.86	53.95
12	7.77	41.17	49.70
13	7.71	37.13	49.45
14	7.95	43.29	54.36
15	8.71	41.99	54.16
16	8.43	38.17	50.47
17	8.13	36.77	45.35
18	9.23	40.71	49.48
19	7.94	41.73	52.85
20	8.87	43.14	53.05
21	8.83	40.83	43.96
22	7.89	38.71	48.91
23	8.86	48.64	54.44
24	7.84	39.93	51.42
25	8.57	43.25	51.83
26	8.53	41.41	50.29
27	8.03	41.07	52.88
28	7.88	40.49	42.53
29	9.35	47.75	52.71
30	9.54	41.81	51.71
31	7.25	46.15	55.35



DISCUSSION

Teeth are an excellent tool for anthropologic, forensic, odontologic and genetic investigations.^[1] However, there are noted variations in tooth morphology which may be due to genetic factors^[2], race^[3], some syndromes^[4] or sex.^[5]

A study by Dr.GauravAgnihotri and Dr. Gulati published in 2008, established the morphometric criterion for premolar and molar indices and quantified the existence of a statistically significant sexual dimorphism in arch widths. A significant and definite correlation between the widths of four maxillary incisors and arch width was found in their study.^[6] Howe et al in their study found that the combined mesiodistal width of upper incisors for males was more compared to females.^[7]

This is in total contradiction to the present study that shows that there is no correlation between incisor widths and arch width. The reason for this lack of correlation could be because of the fact that arch width may be determined by various etiological factors The changes in the arch dimension may be influenced by various factors other than tooth size like a digit sucking habit in childhood^[8], unbalanced muscular pressure^[9], growth of the supporting bones^{[10],[11]} These however have no relationship to the width of the incisors, which is genetically determined. So whatever the width of the central incisors, the width of the arches may be altered by the

environment and probably, that was the reason why the correlation was very low.

CONCLUSION

From this study, the following conclusions were drawn.

1. There was no significant correlation between the mesiodistal width of the central incisor and maxillary arch width in the premolar region and
2. There was no significant correlation between the mesiodistal width of the central incisor and maxillary arch width in the molar region.

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