



Comparison of Relationship between Intercondylar Width and Maxillary Inter-canine Width

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim and Objectives: To check the prevalence of facial form in edentulous subjects in North Indian Population and to compare the relationship between inter-condylar distance and inter-canine distance which could help the dentist for the selection of maxillary anterior teeth.

Methods: A total of hundred dentate adults (20-35 years) with class 1 occlusion, having no attrition and with healthy temporomandibular joint were selected for the study. The facial form was evaluated with the Trubyte Tooth indicator. The width of the condyles were measured between the beyron's point with the help of facia type facebow. The width of the maxillary intercanine was measured between the tips of cuspids in both the patients mouth and the cast. Statistical analysis was performed to determine the relationship between the inter condylar width and the maxillary intercanine width.

Results: More than one third of patients had ovoid face form (35%) followed by square (33%), square tapering (18%) and tapering (14%). There was significant positive correlation between maxillary inter canine width and inter condylar width ($r=0.62$, $p=0.0001$). Both maxillary inter canine width and inter condylar width were significantly ($p<0.05$) higher among males than females.

Conclusion: when pre extraction records are not available, the result can help to determine the width of the artificial maxillary anterior teeth in edentulous patient.

Keywords: Intercondylar width; intercanine width; face form.

1. INTRODUCTION

Esthetic is concerned with the mind and emotions in relation to the sense of beauty. Facial appearance has important social and psychological effects on the human personality; the features most commonly associated with the facial attraction are the eyes and mouth [1].

Loss of teeth is the common problem in the present world. Replacing the missing teeth is the challenging task for the dentist as teeth determine the esthetic of the patient. So proper selection of the anterior teeth has been the most important step during fabrication of complete denture. Many facial measurements like bizygomatic width, inter-commisural width, interpupillary width, inter alar width and intercanthal width have been used for the estimation of the width of the maxillary six anterior teeth. [2] Though researchers cannot rely completely on a single method.

The new complete denture wearers demands for the appearance same like of their natural teeth. Pre-extraction records might not be present with every edentulous patients. Mastication and esthetics are the main objective during teeth selection. Anterior teeth selection is done to provide the pleasing esthetics. [3] Anatomic landmarks which remain unaltered throughout the life are the helping hands for the selection of the anterior teeth. Intercondylar distance has been regarded as the stable landmark which is not hampered by resorption [4].

This study was conducted to determine if a relationship exists between intercondylar width and maxillary intercanine width in dentate subjects which can be used as a guideline to aid in the determination of the maxillary anterior width in completely edentulous patient.

2. MATERIALS AND METHODS

This study was conducted in the Department of Prosthodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow. The study involved 100 number of dentulous subjects including male & female. All dentulous subjects fell in between 20-35 year age group. Written consent was taken from subjects after explaining the procedure in detail.

2.1 Inclusion Criteria

- Subjects of Indian origin.

- Age limit: 20-35 yrs.
- Dentulous subjects with Angles Class I occlusion without any deformity.
- All teeth present upto second molar.

2.2 Exclusion Criteria

- Attrited canines
- Congenital or acquired oro-facial deformity
- Subjects treated orthodontically
- History of TMJ pain or disorder

2.3 Detection of Facial Form

Facial form was detected with the help of Customized Trubyte tooth indicator instrument (Dentsply/work division, Dentsplyinst, USA). All subjects were asked to sit in upright position with his/her teeth in centric occlusion, lips relaxed and with unsupported head, looking straight forward to maintain natural head position. Facial form of all subjects were checked and noted.

2.4 Measurement of Maxillary Inter-canine Width

Maxillary arch impression were taken in a metal perforated stock tray by using alginate impression material. Cast were fabricated using dental stone type III.

The inter-canine distance for all subjects were measured between the cusp tips of the maxillary canines with the digital vernier caliper in the cast as well as in the patients mouth and average score were tabulated.

2.5 Measurement of Inter-condylar Distance

Patients were seated in a rest position. The inter-condylar width was measured using arbitrary face bow (Hanau-H2 FACIA TYPE). The middle point of tragus was marked for making tragus canthus line. The tragus canthus lines was drawn and the hinge axis was marked 13 mm anterior to external auditory meatus (beyron's point). The width between the two condylar rods was measured in millimeters with the help of the digital vernier caliper. Every width was measured thrice to ensure the accuracy and the mean was taken.



Fig. 1. Detection of facial form using trubyte indicator



Fig. 2. Measuring maxillary intercanine width with digital vernier caliper



Fig. 3. Measuring maxillary intercanine width In cast with digital vernier caliper



Fig. 4. Marking of Beryon's point

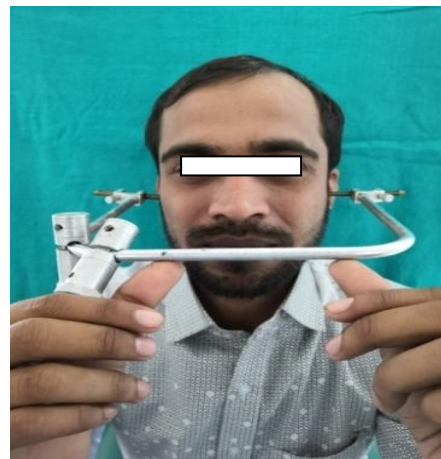


Fig. 5. Measuring inter condylar with hanau h2 facia type face bow

For all the subjects in the study, percentages ,mean and Standard Deviation were calculated. The Unpaired t-test/one way analysis of variance (ANOVA) was used for comparisons. The Pearson correlation coefficient was calculated. The p-value<0.05 was considered significant.

3. RESULTS

Majority of subjects were between 20-25 years of age (74%). The mean age of patients was 23.36±2.84 years. More than half of patients were males (60%).

Table 1 and Fig. 6 shows the distribution of patients according to face form. More than one third of patients had ovoid face form (35%) followed by square (33%), square tapering (18%) and tapering (14%).

Table 2 and Fig. 7 shows the correlation of inter canine width with inter condylar width. There was significant positive correlation between inter canine width and inter condylar width (r=0.62, p=0.0001).

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Table 3 shows the comparison of inter canine width and inter condylar width with age. There was no significant (p>0.05) in inter canine width and inter condylar width between age 20-25 and 26-30.

Table 4 and Fig. 8 shows the comparison of inter canine width and inter condylar width with gender. Both inter canine width and inter condylar width were significantly (p<0.05) higher among males than females.

4. DISCUSSION

The comfort, function, and esthetics must be restored altogether while treating a completely edentulous patient. One of the main objectives during selection and arrangement of artificial teeth is to produce a prosthesis that produces most suitable to individual patient. The anterior teeth are the ones primarily selected to satisfy esthetics [5].

Mavroskoufis et al. [6] studied the nasal width and incisive papilla as a guide of selection of maxillary anterior teeth. Al wazzan [7] reported intercanthal distance can be used as preliminary

method of determining width of maxillary anterior teeth in edentulous patients. Abdullah [8] reported intercanthal distances and geometric progression as a predictor of maxillary central incisors width.

Table 1. Distribution of patients according to face form

Face form	No. (n=100)	%
Ovoid	35	35.0
Square	33	33.0
Square tapering	18	18.0
Tapering	14	14.0

Table 2. Correlation of Inter canine Width with Intercondylar width

	Inter canine Width (cms)	
	Correlation coefficient	p-value ¹
Intercondylar width (cms)	0.62	0.0001*

¹Pearson correlation coefficient, *Significant

Table 3. Comparison of inter canine width and inter condylar width with age

Age in years	Inter canine width (cms)	Inter condylar width (cms)
20-25	3.59±0.35	12.23±0.63
26-30	3.57±0.31	12.32±0.66
p-value ¹	0.84	0.52

¹Unpaired t-test

Table 4. Comparison of inter canine width and Inter condylar width with gender

Gender	Inter canine width (cms)	Inter condylar width (cms)
Male	3.64±0.40	12.40±0.69
Female	3.50±0.21	12.04±0.47
p-value ¹	0.04*	0.005*

¹Unpaired t-test, *Significant

Dental esthetics is one of the major part of the facial esthetics. Replacing the missing teeth accurately fulfilling the demands of the patient can be regarded as the successful prosthodontic treatment. This study was conducted to see the relationship between the intercondylar width and maxillary intercanine width. The purpose of the study was also to see the prevalence of the facial form among them. Total 100 subjects were involved including both males and females.

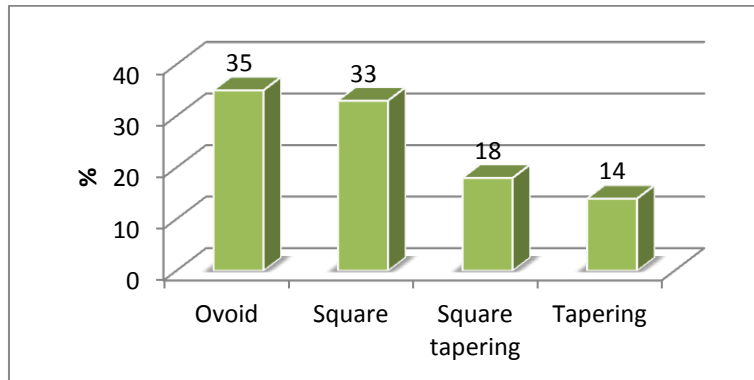


Fig. 6. Distribution of patients according to face form

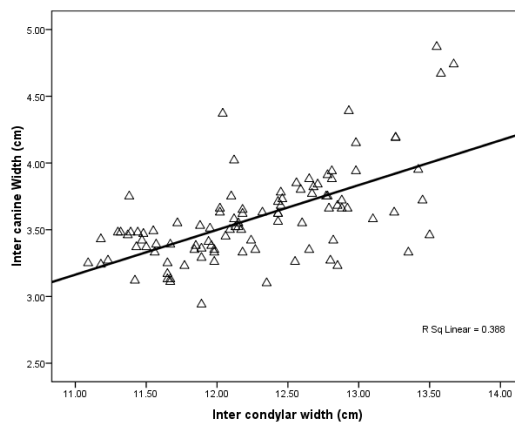


Fig. 7. Scatter diagram showing correlation of inter canine width with Inter condylar width

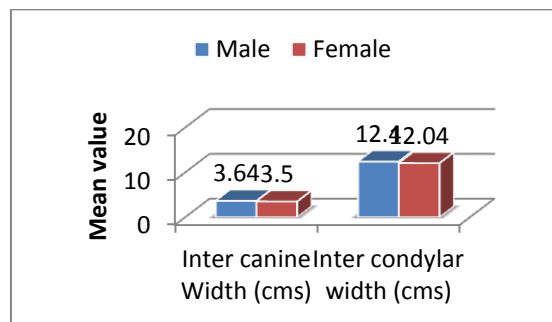


Fig. 8. Comparison of inter canine width and inter condylar width with gender

The study showed that the face form of the patients were ovoid (35%), square (33%), square tapering (18%) and tapering (14%). As pointed in the analysis, there was significant positive correlation between maxillary intercanine width and intercondylar width indicated by the correlation coefficient 0.62 and p-value 0.0001. The intercanine width was significantly ($p > 0.04$) higher in males (3.64 ± 0.40) than females (3.50 ± 0.21). The intercondylar width was also significantly ($p > 0.005$) higher in males

(12.40 ± 0.69) than females (12.04 ± 0.47). There was no significant ($p > 0.05$) association of intercanine width and intercondylar width with different face forms.

5. CONCLUSION

Within the limitation of the study, the following conclusions were drawn:

There is significant correlation between the intercondylar width and maxillary intercanine

width as indicated by the correlation coefficient which is 0.62 and p-value 0.0001. So we can use the intercondylar width to determine the maxillary intercanine width in the edentulous patients of North Indian Population incase of no pre extraction records available.

After the observation of the study we can suggest that during the selection of teeth, Intercanine width of complete denture patients with the help of Intercondylar width can be helpful using the following formula.

Intercanine width = $-0.52+0.33 \times \text{Intercondylar width}$ ($p=0.001$, $R^2=0.38$).

CONSENT

Consent was taken individually from all the patients.

ETHICAL APPROVAL

Ethical approval was taken from institutional ethical research cell committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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