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Intercanthal Distance And Mesiodistal Width Of Maxillary Anterior Teeth Among Different Genders

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ABSTRACT Background
Intercanthal distance is the distance between medial angles of palpebral fissures. It is half the interpupillary width. Intercanthal distance plays a crucial role in the field of dentistry . Intercanthal distance has a significance in selection of teeth in the field of dentistry.
Aim
The aim of the study is to determine whether a relationship exists between the intercanthal distance and width of maxillary anterior teeth.

Materials and methods

The cross-sectional study was carried out among the general public visiting as outpatients to a private dental college in chennai. Anterior Teeth measurement and intercanthal distance were measured using digital vernier callipers . Comparison between gender was estimated by an independent T test. The data collected was tabulated and analysed using IBM SPSS software (version 23). Association between different genders and the mean anterior teeth & intercanthal distance were assessed using Pearson's chi-square test.

Results

There were 100 participants in the study, 28% were males and 72% were females. The mean value of intercanthal distance of males and females were 22.34 ± 1.88 and 21.7667 ± 1.97 respectively. The mean mesiodistal width of maxillary anterior teeth of males and females were 48.546 ± 0.84 and 47.567 ± 0.82 respectively.

Conclusion

This study showed that the intercanthal distance and mesiodistal width of maxillary anterior teeth in males were more when compared to females; though it was statistically insignificant.Both of these parameters are a good prognostic factor for determining the maxillary anterior width.

KEYWORDS

intercanthal distance, mesiodistal width of maxillary anterior teeth, esthetic restoration, innovative technique. **Running title:** Intercanthal distance and Mesiodistal width of maxillary anterior teeth.

INTRODUCTION

Intercanthal distance is the distance between the medial angles of palpebral fissures. It is half the interpupillary width. If the intercanthal distance is increased, then it is called telecanthus. Intercanthal distance is one of the reliable anatomic dimensions . It provides a valid approach to the selection of anterior teeth (1) . Anatomic measurements are effective in anterior teeth selection, esthetics. It plays a crucial role in denture prosthodontics (2) . Maxillary anterior teeth play a significant role in pleasing appearance, and facial morphology . Correlation of intercanthal distance and mesiodistal width of maxillary anterior teeth helps in esthetic restoration for edentulous patients . It has an enormous psychological impact (3) .

Maxillary anterior artificial teeth, especially the central incisors, play a major role in determining the esthetics of complete denture (4) . Selection of proper anterior teeth for edentulous patients is important as there are no pre extraction records available . The measurement of the width of the teeth is considered to be more difficult than the length (5) . Selection and arrangement of artificial teeth is a primary concern for the prosthodontist . The difference in dimensions of mesiodistal width of teeth can be due to various numbers of factors (6) . The artistic skills and scientific knowledge are required for the dentists in selection of teeth (7) . The maxillary anterior teeth are the key elements contributing to dentofacial beauty (8) . Selecting and replacing missing teeth to natural proportions and esthetic preference of a patient in the absence of pre extraction records is a very challenging task .

Intercanthal distance provides a valid approach in anterior teeth selection (9) . Prosthesis fulfills the esthetic harmony of the dentofacial structures (10) . Facial appearance plays a major psychological implication. Patient satisfaction is important in denture treatment as it affects not only the facial appearance but also the psychological state of the patient . Age, gender, area of residence and ethnic origin influences the different anatomical landmarks of a person's face . It is difficult to acquire the measurement of maxillary anterior teeth for edentulous patients (11) . When pre-extraction records are

not available, selecting the proper anterior teeth size for edentulous patients can be difficult . Many attempts have been made to establish methods for estimating the combined width of maxillary anterior teeth (12) . So, this study establishes a method to estimate the combined width of intercanthal distance and mesiodistal width of maxillary anterior teeth. This study is useful for the dentists to select the size of anterior teeth.Our team has extensive knowledge and research experience that has translate into high quality publications (13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(12),(24),(25),(26),(27),(28),(29),(30),(31) The aim of the study is to determine whether the intercanthal distance can be severe as a guide to determine the width of maxillary anterior teeth.

MATERIALS AND METHODS

This study was conducted among the students of saveetha dental college. The measurements were taken from 100 participants consisting of 28 males and 72 females. The subjects were selected for the measurements. The recording of measurements continued till the required samples were obtained. This study includes subjects who were free from facial abnormality and teeth with intact contact points. This study excluded the subjects who had teeth agenesis and subjects with spacing of maxillary anterior teeth. The investigator and principal investigator were involved in this study.Selection of participants was done by means of randomised selection.The subject was seated in an upright position with the head held steadily. Intercanthal distance was measured from one medial angle to the other medial angle of palpebral fissures by using digital vernier callipers. Each measurement was the mean of three readings. All the readings were carried out by the same examiner to avoid inter examiner variability. By using the same digital vernier callipers the mesiodistal width of six maxillary anterior teeth was measured. The mean values were calculated to establish the consistency of measurements. The values were collected and analyzed statistically by the SPSS software. Tbe normal values were obtained by estimating mean and standard deviation. Comparison between the genders was estimated by an independent sample T test. The significant value was considered to be $p<0.05$ .Therefore the study was conducted to check whether a relationship exists between the intercanthal distance and mesiodistal width of maxillary anterior teeth and whether it shows a variation among males and females.

RESULTS

A sample size of 100 participants consisting of 28 males and 72 females were selected for this study. In figure 1, the mean values and standard deviation of intercanthal distance and mesiodistal width of six maxillary anterior teeth for both males and females were given. Among the 100 participants the mean value of intercanthal distance was 21.9277 and the mean value of mesiodistal width of six maxillary anterior teeth was 47.841 as shown in(table 1). Comparison of intercanthal distance and mesiodistal width of maxillary anterior teeth was shown in (table 2).By comparing with gender , in females the mean value of intercanthal distance was found to be 21.7667 ± 1.97 and in males it was 22.34 ± 1.88. The mean mesiodistal width of maxillary anterior teeth in females was found to be 47.567 ± 0.82 and in males it was 48.546 ± 0.84. The mean values of intercanthal distance in males was found to be more when compared to females. The mean values of mesiodistal width of maxillary anterior teeth in males was found to be more when compared to females. By comparing with gender, the values are not significant.The percentage of mean value of intercanthal distance of females was 15.52% and males was 15.93% and the

percentage of mean value of intercanthal distance and mesiodistal width of maxillary anterior teeth of females was 33.92% and males was 34.62% as shown in(figure 1).

Table 1 The mean Intercanthal distance (ICD) and mesiodistal width of maxillary anterior teeth(MDW) assessed in the study participants.

	N	Mean	p-value
INTERCANTHAL DISTANCE	100	21.9277±1.95932	.000
MD WIDTH OF MAXILLARY ANTERIOR TEETH	100	47.841±.9374	.000

Table 2 Comparison of intercanthal distance and mesiodistal width of maxillary anterior teeth in males and female participants of the study.

	GENDER	N	Mean	P value
INTERCANTHAL DISTANCE	Male	28	22.34 ± 1.88	.739
	Female	72	21.7667 ± 1.97	
MD WIDTH OF MAXILLARY ANTERIOR TEETH	Male	28	48.546 ± 0.84	.851
	Female	72	47.567 ± 0.82	

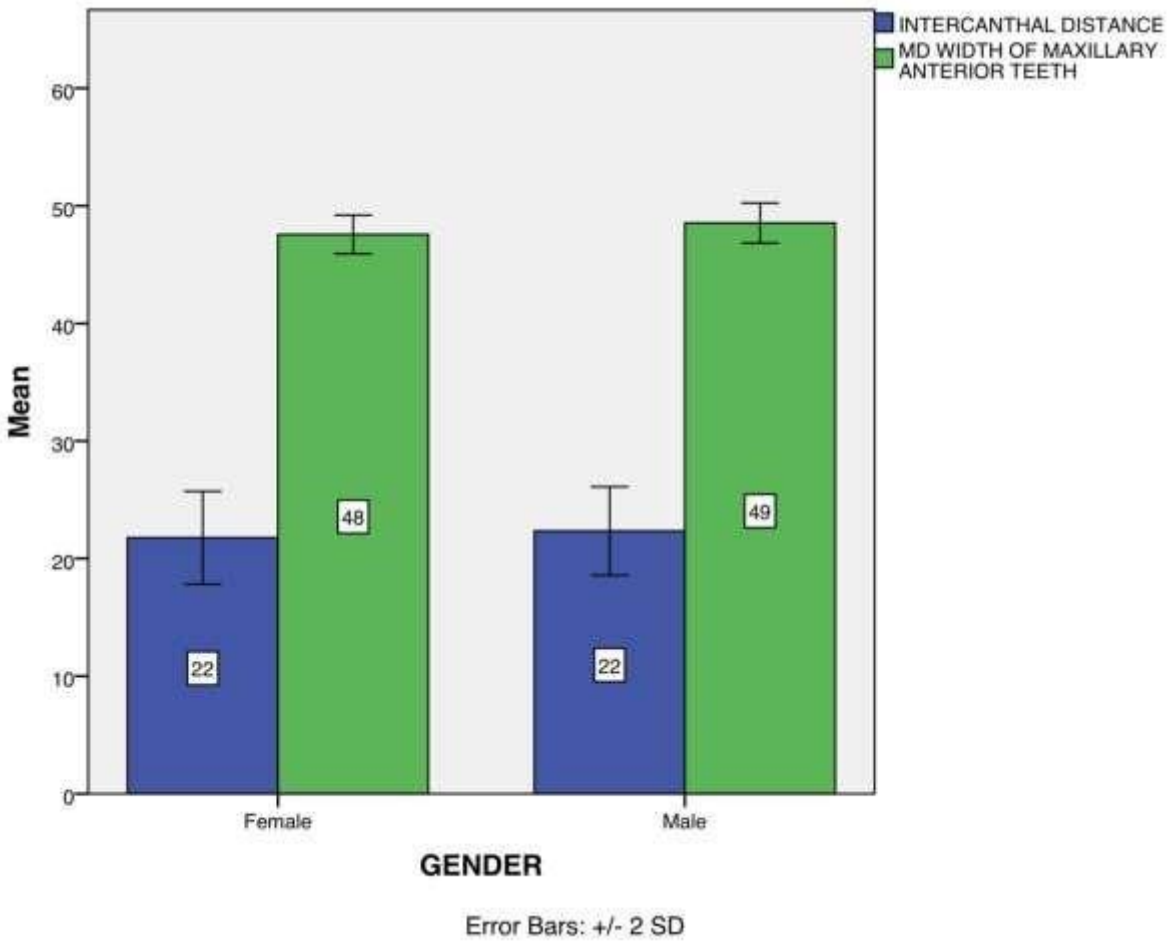

Figure 1 Bar graph representing the mean intercanthal distance and mesiodistal width of maxillary anterior teeth among different gender populations of the study. X- axis represents gender and Y-axis represents intercanthal distance(blue) and mesiodistal width of maxillary anterior teeth(green) of the study participants. Males had more intercanthal distance and mesiodistal width of maxillary anterior teeth than females. The difference is statistically insignificant (chi square test, p value=0.0739).

DISCUSSION

Esthetics is one of the most important factors to be considered while replacing missing anterior teeth . Every successful rehabilitation must be taken into consideration in the esthetic demands of today's patients, who are very conscious of their appearance . It is very challenging to replicate the size and position in the absence of any pre extraction records .

Using independent sample t test the mean values of intercanthal distance and mesiodistal width of maxillary anterior teeth were obtained. This study showed that the intercanthal distance and mesiodistal width of maxillary anterior teeth was found to be more in males than that of females. (32) . This study showed that there is no significance between both males and females in the case of mesiodistal width of maxillary central incisor width and intercanthal distance (33) . Even though different anthropometric landmarks have been suggested for aiding teeth selection in the absence of any pre extraction records it

has been proven beyond that these landmarks vary from different race and ethnic origin . Some of the studies with opposite findings showed that the intercanthal distance and mesiodistal width of maxillary anterior teeth were significantly higher for females than male (34) . In the present study measurements of intercanthal distance were found greater in males than in females. This is consistent with previous reports (35) . There was no significant difference between both males and females in the evaluation of mesio distal width of maxillary anterior teeth (36) .Previous studies compared the relation between intercanthal distance and central incisor width, proved that it can be taken as a reliable guideline for selecting maxillary central incisors in edentulous patients (37). In selection of anterior teeth is a vital step in case of complete denture construction (38) . However, based on results of this study, where a significant relationship was found, it would be feasible to predict the total sum of the anterior teeth from the intercanthal dimension, using simple linear regression models (39) . On the other hand, one of the greatest advantages of intercanthal distance is dimensional stability over time, which becomes an advantage for the clinician, since it could be taken as a reference to estimate the mesiodistal dimensions of the upper anterior teeth in the rehabilitation plan . Racial differences and different instruments and methods used are probably the reasons for differences in value for intercanthal distance . Factors that can affect the intercanthal distance and width of of the maxillary anterior teeth are genetics, race, and sex . Hence the present study shows that intercanthal distance can be taken as a reliable predictor for selection of maxillary anterior teeth.

Limitations of the study: This study is limited to only a small number of populations. Comparison between different age groups can also be done.This can be done for a wide range of population and additional research on a greater sample involving more parameters is needed.

CONCLUSION

Mean values of mesiodistal width of maxillary anterior teeth and intercanthal distance were found to be more in males when compared with females though statistically insignificant. The intercanthal distance can be used as a predictor for determining the mesiodistal width of maxillary anterior teeth, which helps in selection of teeth for esthetic teeth replacement.

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CONFLICT OF INTEREST

All the authors declare no potential conflict of interest.

AUTHORS CONTRIBUTIONS

Author 1: Uma maheswari.K, carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis and in the preparation of the manuscript.

Author 2: Dr.Gheena S, aided in conception of the topic, designing the study and supervision of the study, correction and Dinakaran approval of the manuscript.

Author 3: Dr.Sandhya .S supervised the study, helped in correction and final approval of the manuscript.

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