ORIGINAL ARTICLE

SIGNIFICANCE OF INTERCOMMISSURAL WIDTH AND ANTERIOR TEETH SELECTION

[1]MUHAMMAD WAQAR HUSSAIN, BDS, FCPS
[2]KHEZRAN QAMAR, BDS, FCPS
[3]SAJID NAEEM, BDS, FCPS

ABSTRACT

The objective of the present study was to determine the correlation between the intercommissural width and the combined mesiodistal width of maxillary six-anterior teeth in the study. It was a cross sectional study and was carried out from Aug 2011 to Jan 2012.

Non-probability purposive sampling. The present study included 159 dentate subjects having Angle's class I molar and canine relationships. The patients were selected from the department of Prosthodontics, Lahore Medical and Dental College, Lahore. The subjects with history of orthodontic treatment, extractions, drifting and attrition of the teeth were excluded. All those subjects having any restoration in upper anterior segment, any facial deformity, crowding or spacing of anterior teeth were also not included. The informed consent was obtained.

The patients were seated in the upright position and were asked to look straight. Before the measurement of intercommissural width subjects were asked to widely open and close the mouth several times. It was done to fatigue the muscles and to relax them during the measurement. The distance between the left and right commisures of mouth were measured using digital caliper.

The casts of maxillary arches were used to measure the intercanine width. The distal margin of both the maxillary canines were marked on each sides of the maxillary cast. A dental floss was placed at the greatest curvature of the maxillary arch and was marked at the distal margin of the canines. The dental floss was sectioned at the markings and the distance was measured between the marks using digital caliper. Both the parameters were measured three times by the single person to ensure the accuracy and the mean was taken. The measurements were recorded in a Proforma. The statistical results of this study showed that there was no correlation between the intercommissural width and the combined mesiodistal width of maxillary anterior teeth. It was concluded that the intercommissural width was not a good predictor for the selection of maxillary anterior teeth width for edentulous patients in the study group.

Key Words: *Intercommissural width, anterior teeth selection, edentulism, Pre extraction records.*

INTRODUCTION

The comfort, function and the esthetics of a completely edentulous patient should be restored when treated prosthodontically.[1] The patient's function and the comfort problems can be resolved successfully.[2] However restoring the esthetics of a completely edentulous patient successfully is challenging task.[2] With the loss of teeth many patients undergo some degree of psychological shock and depression.[3]

The maxillary teeth are mainly concern with the dental and facial esthetics.[4] Their other functions include the lip support, incision and phonetics.[4] The maxillary denture teeth should restore optimal dentolabial relations in harmony with the overall facial appearance.[5] While selecting these teeth for a complete denture, the mesiodistal width of the upper anterior teeth is considered by some authors as a harder aspect to be established than their length.[5] When no pre-extraction records of the natural teeth such as casts or photographs are available, selecting the proper anterior teeth size can be difficult.[6]

[1] Senior registrar, Prosthodontics, Lahore Medical &Dental College, Lahore. Postal Address: 286 /D, St #12, Askari 10, Lahore Cantt, Pakistan. E-mail: drsajidnaeem@hotmail.com, Phone No.: 042-36500082, 0300-4577548

[2] Assistant Prof Prosthodontics, LMDC.

[3] Prof Prosthodontics, LMDC. Postal Address: 213 – B, Revenue Employees Cooperative Housing Society, Johar Town, Lahore, Pakistan. E-mail: drsajidnaeem@hotmail.com. Phone No.: 042-35185858, 0300-4245331

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There are many biometric guide line available in the dental literature to use as a guide for defining the proper size and shape of anterior teeth and intercommissural width is one of them.[6] The aim of the present study was to determine the correlation between the intercommissural width and the combined mesiodistal width of the maxillary anterior teeth in study group. If any relation exists then this may be utilized to select the teeth for those completely edentulous patients who have no previous records. In this way the better esthetics results can be obtained for a completely edentulous patient.

METHODOLOGY

The present study was carried out on 159 dentate subjects, selected from the department of Prosthodontics, Lahore Medical and Dental College, Lahore. The demographic information like age and sex was recorded. The age ranged from 18 to 30 years. The subjects were selected on the clinical basis. The subjects with Angle's class I canine and molar relationships were included in the study. The exclusion criteria included the individuals with a history of orthodontic treatment, extractions, drifting and attrition of the teeth. Subjects having any restoration (crowns, bridge, fillings and removable prosthesis) present in upper anterior segment were also excluded. None of the patient had any facial deformity, crowding or spacing of anterior teeth. The informed consent was taken for using their data in the research.

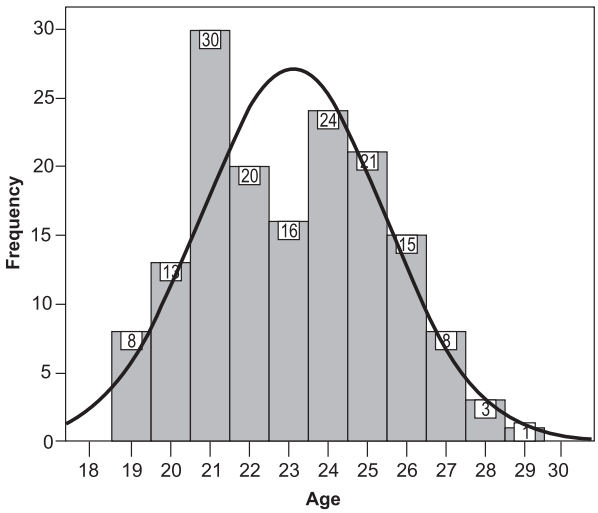
Before measuring the intercommissural width, the participants were asked to widely open and close the mouth several times to allow fatigue of the muscles to relax them during the measurement. Then the lip vermilion was measured between left and right commisure of mouth using the digital caliper. While measuring the intercommissural width the participants were made relaxed, their mandibles were in the rest position and the lips had to be unscratched. The same measurement was completed three times for precision and to test the reproducibility of the measurement. The mean of three readings was recorded.

The measurement of the intercanine width was carried out from the artificial stone casts of maxillary arches. The stone casts were made from irreversible hydrocolloid impressions in perforated stock trays. Dental floss was placed at the greatest curvature of the maxillary cast and made fixed with adhesive tape; one mark on each side was placed at the distal margin of the canines. The floss was sectioned at the markings, made straight and the distance was measured between the marks with the help of a digital caliper.

Each parameter was measured thrice and the average value was recorded in a Proforma. The data was analyzed in statistical software (SPSS version 11) a compute based software program. Quantitative variables intercommissural width [ICD] and intercanine distance [ICW]) were presented as mean and ± standard deviation. The qualitative variable like sex was presented as frequency and percentages. Pearson's correlation coefficient was used to find out the correlation between intercommissural width with intercanine distance. P-value ≤ 0.05 was considered for significance. Partial correlation coefficients were also computed after controlling of age to observe an effect of age on correlation between inter commissural distance and with intercanine distance.

RESULTS

Intercommissural width and the combined mesiodistal width of maxillary six-anterior teeth. Histogram of the age distribution is presented in Fig 1. The average age of the patients was 23.08 ± 2.34 year (95% CI: 22.72 to 23.45). Out of 159 patients 80(50.3%) were male and 79(49.7) were female.



Mean± SD = 23.08±2.34 Years (95%CI: 22.72 to 23.45)
Median (IQR) = 23(4) Years
Maximum Age = 19 Years
Minimum Age = 29 Years

Fig 1: Histogram of Age Distribution of the Patients

The average Inter canine width was 46.01±7.31 mm (95% CI: 44.96 to 47.25) similarly the average of the intercommissural width is presented in Table 1. Average Inter canine width and intercommissural width were significantly higher in male than in female ($p<0.01$) shown in Table 2.

Relationship between the Inter canine width (combined mesiodistal width) and inter commissural distance is presented in scatter plot which shows week relationship. Pearson correlation coefficients (r) for the Inter canine width and inter commissural distance established a negative correlation as presented in Fig 2. The relationship was very week and not significant (r= -0.07; P=0.41). Similarly Pearson correlation coefficients were also estimated for gender. Correlation was negative and not significant (r =-0.014; p=0.90) for

male and (r= - 0.073; p=0.52) for female. The relationship were observed for inter commissural distance and with combined mesiodistal width of maxillary six-anterior teeth after controlling of age effect. Partial correlation coefficients were presented in Table 3 and 4. Ages were effect in relationship because a slight difference was observed in correlation after controlling age.

DISCUSSION

The loss of anterior teeth can be psychologically devastating for many patients. Achieving excellent aesthetics when restoring or replacing the maxillary anterior teeth is one of the challenging jobs. In edentulous patient with no pre-extraction records available, the choice of tooth size, mold and arrangement is more difficult. Anterior teeth size, form and color must be in harmony with surrounding oral and facial environment. Teeth width is considered to be more important than the length because the horizontal axis is the one that is noticed more.[7] The present study was an attempt to investigate the potential relationship between the combined mesio-distal width of maxillary anterior teeth and the intercommissural width.

This study was carried out at the outpatient department of Lahore Medical and Dental College. All 159 subjects were Pakistani Nationals and were selected randomly. The population sample had 80 (50.3%)

TABLE 1: DESCRIPTIVE STATISTICS OF STUDY CHARACTERISTICS OF THE PATIENTS

n=159

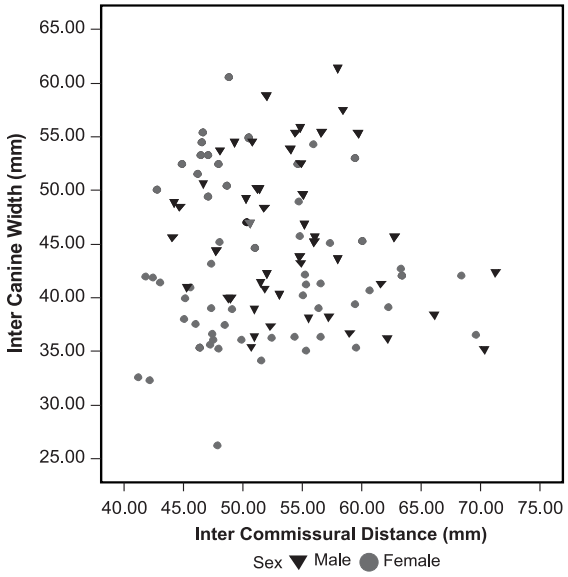
Variables	Mean ± SD	95%CI	Median (IQR)	Max - Min
Inter canine Width	46.01±7.31	44.96 to 47.25	45.6(12.3)	61.44-26.26
Intercommissural Width	52.03±6.07	51.35 to 53.25	51.4(8.57)	71.26- 41.17

TABLE 2: COMPARISON OF TOOTH MEASUREMENT BETWEEN GROUPS

Variables	Malen= 80	Femalen= 79	P-Values
Inter canine Width	47.53±6.72	44.67±7.63	0.013*
Intercommissural width	53.57±5.45	51.01±6.42	0.007*

Independent sample t test applied
(* significant difference)

n=159



	Pearson Correlation Coefficient (r)	P-Value	Decision
Overall	- 0.07	0.41	Not significant
Male	-0.014	0.90	Not significant
Female	-0.073	0.52	Not significant

Fig 2: Relationship between Inter Canine width and Intercommissural width

TABLE 3: PARTIAL CORRELATION COEFFICIENT OF INTER CANINE WIDTH WITH INTER COMMISSURAL DISTANCE

Parameter	Partial Correlation Coefficient Inter Canine Width	P-Values
Inter Commissural Distance	- 0.059	0.46

Control Variables = Age

TABLE 4: PARTIAL CORRELATION COEFFICIENT AFTER CONTROLLING OF AGE EFFECT WITH RESPECT TO GENDER

Parameter	Partial Correlation Coefficient (Inter Canine Width) Male R	P-Values	Female r	P-Values
Inter Commissural Distance	- 0.09	0.45	-0.12	0.31

Control Variables = Age

male and 79 (49.7%) female. The subjects selected were in the age range of 18 to 30 years. Just similar to the present study Al Wazzan[7] et al conducted their study to know the relationship of intercommissural and inter-canine distance that could help in the selection of the anterior teeth. They found that the intercommissural width is not reliable for the selection of maxillary anterior teeth. Many studies have used vernier caliper for recording the intercanine distance as used in the present study.[8,9,10,11,12]

The measurement of intercommissural width was carried out by using vernier caliper as done by Al Wazzan.[7] The value of the intercanine distance recorded from the stone cast showed a mean value of (46.01 ± 7.31 mm) to the total sample. This was significantly high in male than female. Similarly Al-Wazzan K et al[7] found the intercanine distance mean value (45.16 ± 3.28 mm) that is almost same as in the present study. They also found the difference of the values in gender (45.16 ± 3.52 mm) for male and (43.93 ± 3.22 mm) for female.

Few studies[8,14,15] have shown a higher mean value of the intercanine distance than in the present study. However there are some other studies in dental literature that have shown a low value of the mean of the intercanine distance.[16,17,18] The gender based variations similar to the present study were also reported in the literature.[11,13] However no gender based variations were reported in few studies.[8,16]

Present study has shown the mean value for intercommisural distance of 52.03 mm with age ranging from 71.26 mm to 41.17 mm. These values were higher for males than for females.

Correlation coefficient for intercommisural distance was found to be _0.014 for males and _ 0.073 for females.

The present sample of 159 subjects also revealed an increased intercommissural width values for male than female. These gender based variations similar to the present study were also reported.[7]

There is a weak correlation between intercanine distance and intercommissural width in the present study and was not significant ($r = -0.07$; $p = 0.41$). Correlation was negitive and was not significant for female and male. The results of the present study are in agreement with the results of the study done by Silverman.[14] They also found no relationship between measurement of intercommissural width and intercanine distance in their respective study and no correlation was found when population was divided according to the gender. They have also reported a negative and an insignificant correlation value for the intercommissural width and intercanine distance.

No assessment was made regarding ethnic variations and skeletal relationships. Further studies should be carried out to determine if this correlation leads to different results.

CONCLUSION

From the results of this study, it was concluded that the intercommissural width measurement is not accurate for the selection of the maxillary anterior teeth for the completely edentulous patients in the study group. Moreover the measurement of the intercommissural width showed the gender-based difference.

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