



Original Research Article

Significance of Intercanthal Distance in the Selection of Width of Maxillary Anterior Teeth Size in Kashmiri Population: A Research

Shabir A Shah¹, Talib Amin Naqash², Sabzar Abdullah², Unjum Bashir³, Samrina Gulzar⁴, Sheema Bashir⁴

¹Associate Professor, Prosthodontics and Head Dental Materials, Government Dental College and Hospital, Srinagar, J & K, India.

²Resident, ³Registrar, Department of Prosthodontics, Government Dental College and Hospital Srinagar, J & K

⁴House Surgeon, Government Dental College and Hospital Srinagar, J & K.

Corresponding Author: Talib Amin Naqash

Received: 23/12/2014

Revised: 29/01/2015

Accepted: 02/02/2015

ABSTRACT

Background: The selection of appropriate size of artificial teeth takes an important place in designing complete denture prosthesis. However, the standards or proportions commonly used as a guide have been developed mainly on Caucasian populations.

Objectives: To investigate the relationship between intercanthal distance and two variables i.e. mesio-distal width of central incisors and combined width of six maxillary anterior teeth size in Kashmiri population.

Materials and methods: This is a descriptive cross sectional study conducted on 200 subjects, (100 males - 100 females), from Kashmiri population. The age range was from 18-55 years. The intercanthal distance was measured as the distance between the medial (inner) angles of the palpebral fissure. Mesio-distal width of the maxillary central incisors and combined width of six maxillary anterior teeth were recorded. An electronic digital caliper (Narex – Czechoslovakia), was used for all measurements. Data were analyzed using Person chi-square test.

Results: For the sample population the ratio was 1:0.268 for the central incisors and 1:1.395 for six anterior teeth. Mean intercanthal distance was found to be 31.67.

Conclusion: These results could be used as a helpful guide for initial selection of anterior teeth width in the Kashmiri population.

Keywords: Intercanthal distance, Palpebral fissure, Teeth selection.

INTRODUCTION

One of the important tasks in cosmetic dentistry is to create harmonious proportions between the widths of maxillary anterior teeth when replacing these teeth. Maxillary anterior artificial teeth especially the central incisor plays an important role in

determining the esthetics of complete denture. [1-5] A denture is usually considered esthetically acceptable when the teeth and bases are in harmony with the surrounding musculature, the shape and size of the face. [3] The width of the teeth is considered by some to be more critical than the length.

Several studies have been attempted to identify normal tooth proportions. [6-8]

Pre extraction records are mostly unavailable; therefore selection of proper anterior teeth size for edentulous patients can be intricate. Anatomical measurements such as bizygomatic width, interpupillary distance, interallar width, intercommisural width have been suggested in situations when no pre-extraction are available. [9]

MATERIALS AND METHODS

The maxillary anterior teeth of 200 adult subjects were selected (100 men and 100 women) from the outpatient department of Government Dental College and Hospital, Srinagar. They ranged in age from 18-55. The selection criteria required the subjects to have all their natural anterior teeth except for possibly the third molars, no history of orthodontic treatment, no tooth size alteration, rotation, spacing, crowding and restoration. Subjects with a history of congenital anomaly, orbital disease, trauma, or facial surgery were excluded. This followed the approval by the ethics/research committee of Government Dental College and Hospital, Srinagar, Jammu & Kashmir and informed consent from the participants.

Inter-canthal distance was measured with digital caliper to the tenth of a millimeter as done by Nasr EL-Sheikh et al. in his study. [10] The inter-canthal dimension is defined as the distance between the medial angles (canthi) of the palpebral fissure. Measurements of maxillary anterior teeth were made intraorally with digital caliper. The external edges of the caliper were ground down to facilitate proper fit in the embrasure; the internal measuring edges of the beaks remained unaltered. The mesiodistal measurements were recorded at the contact areas (widest dimensions). Three measurements per tooth were made, and

mean was calculated. The mean of the mesiodistal width of the central incisors was obtained. Combined width of six anterior teeth was obtained by adding mesiodistal widths of the individual teeth.

RESULTS

Pearson chi-square test was used for statistical analysis. The Excel and SPSS (SPSS Inc, Chicago) software packages were used for data entry and analysis. The descriptive statistics (mean, standard deviation, minimum and maximum) of the recorded measurements are listed in table 1. The values were greater for men than for women, with significant differences ($p < 0.01$) for the variables tested. No significant differences were found between sexes with respect to inter-canthal distance ($p < 0.001$).

As shown in table 1 inter-canthal distance was in the range of 23.51-38.24mm with mean distance of 31.67mm and standard deviation of 2.90. Mean mesiodistal dimensions of central incisors were in the range of 7.18- 10.17 mm with mean distance of 8.50 mm and standard deviation of 0.43. Combined width of six anterior teeth was in the range of 36.90-50.24mm with mean distance of 44.21mm and standard deviation of 2.43.

For all 200 subjects, the Pearson's correlation coefficient for inter-canthal distance, mean mesiodistal width of central incisors and combined width of six anterior teeth were not statistically significant even when they were considered separately for males and females. Pearson correlation coefficients demonstrated positive correlation as shown in table 2.

The ratios between mean inter-canthal distance and teeth measurements are given in table 3. For the sample population the ratio was 1:0.268 for the central incisors and 1:1.395 for six anterior teeth.

Table 1: Mean value and range of intercanthal distance and tooth measurement widths

	All subjects (mm)	Minimum (mm)	Maximum (mm)	Men (mm)	Women (mm)	p Value
Intercanthal distance	31.67 ± 2.90	23.51	38.24	32.04 ± 2.50	30.08 ± 2.89	.925
Mean mesiodistal Width of central incisors	8.50 ± 0.43	7.18	10.17	8.59 ± 0.49	8.29 ± 0.58	<0.001
Combined Width of six anterior teeth	44.21 ± 2.43	36.90	50.24	45.87 ± 2.54	44.36 ± 2.61	<0.001

Table 2: Correlation matrix (for all subjects and by sex) for intercanthal distance and width of six anterior teeth

	Mean mesiodistal width of central incisors (p value)	Combined width of six anterior teeth (p value)
All subjects	0.218 (0.001)	0.299 (0.001)
Men	0.251 (0.001)	0.354 (0.001)
Women	0.218 (0.003)	0.269 (0.001)

Table 3: Ratio of intercanthal distance to tooth width factors

	Mean mesiodistal width of central incisors ± SD (95% CI)	Combined width of six anterior teeth ± SD (95% CI)
All subjects	0.277 ± 0.028	1.445 ± 0.131
Men	0.258 ± 0.023	1.313 ± 0.117
Women	0.258 ± 0.029	1.382 ± 0.131

DISCUSSION

Although earlier anthropometric studies included many facial landmarks, intercanthal distance has been studied to a lesser extent in relation to central incisor width. [10] Intercanthal distance is a linear distance between the medial angles of palpebral fissure bilaterally. At five years of age, 93% of intercanthal distance growth has been achieved; maturity is reached between 8 and 11 years. No differences related to sex, race or age have been shown in the intercanthal distance. [10, 11]

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. [11-13]

In the present study measurements of intercanthal distance were found greater in males than in females. This is in consistent with previous reports. [13]

The mean width of intercanthal distance (31.67) was greater in this study when compared with findings of Abdullah [13] (32.00mm), Freihofer [14] (31.20mm) and

Gupta et al [15] (30.70mm). However it was smaller than those reported by Alwazzan [11] (31.92mm), Murphy et al [16] (33.90mm).

Racial differences and different instruments and methods used are probably the reasons for differences in value for intercanthal distance.

Since ethnic differences exist between different populations, universal application of the previous research is possible only when it is studied in other population also. [10] Hence the present study was an attempt to analyze the correlation between intercanthal distance and central incisor width and whether it can be taken as a reliable predictor for selection of maxillary anterior teeth.

CONCLUSION

These results could be used as a helpful guide for initial selection of anterior teeth width in the Kashmiri population.

REFERENCES

1. Frush JP, Fisher RD. How dentogenic restorations interpret the sex factor. J Prosthet Dent 1956;6:160-72.
2. Young HA. Denture esthetics. J Prosthet Dent 1956;6:748-55.
3. Krajicek DD. Natural appearance for the individual denture patient. J Prosthet Dent 1960;10:205-14.
4. Lombardi RE. The principles of visual perception and their clinical application to denture esthetics. J Prosthet Dent 1973;29:358-82.
5. Sellen PN, Jagger DC, Harrison A. Methods used to select artificial anterior teeth for the edentulous patient: a historic overview. Int J Prosthodont 1999; 12:51-8.

6. Sanin C, Savara BS. An analysis of permanent mesiodistal crown size. *Am J Orthod* 1971;59:488-500.
7. Lavelle CL. Maxillary and mandibular tooth size in different racial groups and in different occlusal categories. *Am J Orthod* 1972;61:29-37.
8. Shillinberg HT, Kaplan MJ, Grace CS. Tooth dimensions- a comparative study. *J South Calif Dent Assoc* 1972;40:830-9.
9. Woodhead CM. The mesiodistal diameter of permanent maxillary central incisor teeth and their prosthetic replacements. *J Dent* 1977;5:93-8.
10. Nasr Mohamed Ahmed EL-Sheikh, Latifa R Bairam Mendilawi, Nadia Khalifa. Intercanthal distance of a Sudanese population sample as a reference for selection of maxillary anterior teeth size. *Sudan journal of medical science* 2010;5(2):117-22
11. Alwazzan KA. The relationship between intercanthal dimensions and the widths of maxillary anterior teeth. *J Prosthet Dent* 2001;86(6):608-12.
12. Mohammed Aleem Abdullah. Intercanthal distance and geometric progression as a predictor of maxillary central incisor width. *J Prosthet Dent* 2002;88:16-20
13. Abdullah MA, Stipho HD, Talic YF, Khan N. The significance of intercanthal distance in Prosthodontics. *Saudi Dent J* 1997;9:36-9.
14. Freihofer HP. Intercanthal and inter orbital distances. *J Maxillofac Surg.* 1980; 8(4): 324-6.
15. Gupta VP, Sodhi PK, Pandey RM. Normal values for intercanthal, interpupillary, and outer intercanthal distances in the Indian population. *Int J Clin Pract.*2003;57(1):25-9
16. Murphy WK, Laskin DM, Intercanthal and interpupillary distance in the black population. *Oralsurg Oral med Oral Pathol* 1990; 69(6): 676-80.

How to cite this article: Shah SA, Naqash TA, Abdullah S et. al. Significance of Intercanthal distance in the selection of width of maxillary anterior teeth size in Kashmiri Population: A Research. *Int J Health Sci Res.* 2015; 5(2):213-216.
