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Comparison Of Interalar Distance Between Different Genders In Chennai Population- A Cross-Sectional Study

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ABSTRACT

BACKGROUND: The interalar width is the width of the nose measured at the widest points between the outer surfaces of the alae of the nose. Interalar width helps in the successful selection of perfect size, shape and mesio-distal length of maxillary anterior teeth, which play a very important role in facial appearance

AIM: The aim of the study is to analyse and compare the interalar distance between males and females of chennai population. .

MATERIALS AND METHODS: The study was pursued among undergraduate students of a private dental college in chennai. All the participants' data was recorded inclusive of the demographic details and IAD measurement by visual examinations. The interalar distance was measured with the help of a digital vernier calliper. The data measured was tabulated and analysed by using unpaired T-test with the help of IBM SPSS software (Version 23.0). The p value found less than 0.05 was found significant.

RESULTS: The study included 75 participants. Among the participants 39% were males and 61% were females. The mean interalar width of males (mean=34.40±3.2 mm) was found to be greater than that of females (mean=33.04±3.6 mm). The overall mean interalar width of the participants was calculated to be 33.57±3.53 mm. The difference between the groups were insignificant, chi-square, The p value was 0.465.(P>0.05)

CONCLUSION: The interalar distances of females were greater compared to that of males. This may be because of the larger arch present in males as interalar width can be related to maxillary anterior teeth. It is very difficult to replace teeth with artificial ones if there are no pre-extraction records.
KEY WORDS: Innovative technology, Interalar Width, Gender difference, Maxillary Anterior Teeth.

INTRODUCTION

Everyone is concerned about facial appearance (1). It has been recognised that individuals with malocclusions and missing teeth might develop feelings of shame, and might feel shy about the facial appearance related body-self concept(2). Maxillary anterior teeth play a very important role in facial appearance. The width of the tooth, length of the crown, shape, size are all very important factors defining the shape of the face. For a successful rehabilitation of missing teeth, selection of teeth is very important. Patients undergoing the replacement will want the tooth to look as natural as possible. Shape, size, colour, length, width, curvature will be very important for the artificial selection of the tooth (3).

Artificial rehabilitation is very easy when the pre-extraction records are available but when there's no pre-extraction records, some amount of difficulty is experienced in selecting the perfect teeth. Various measurements were studied for the selection of maxillary anterior teeth in some previous studies (4), inner canthal distance and interalar width are some of the measurements. There's been many attempts made to select the proper anterior teeth as it is very difficult to fabricate dentures. There's a relationship between interalar width and distance between maxillary canines (5).

Before the invention of relations of teeth with interalar width, inter canthal width, etc; there were many other procedures for the selection of the anterior tooth. Berry discovered that the proportions of the upper central incisor tooth had a definite proportional ratio to face proportions. The tooth was one sixteenth of the face width and one twentieth the face length (6). "Stein's coordinated size technique" was based on the coronal index of 70–100, commonly used in prosthetics on four model teeth representing the range of maximum frequency of use, and on the common variability in size of individual natural teeth.

Boucher and Hoffman referred to the nasal index as a guide to select the anterior teeth as it relates the inter alar width to the space available for setting the anterior teeth (7). Wehner suggested that the "parallel lines" extended from the lateral surface of the ala of the nose onto the labial surface of the upper occlusal rim could be used to give an estimation of the midline vertical axis of the upper canine teeth (8). Kern made measurements on 509 dried skulls and found that most of the measurements of nasal width are equal to or within 0.5 mm of the measurements of the four maxillary anterior teeth (9). Mavroskoufis and G.M. Ritchie gave a formula for the selection of the mesiodistal width of the anterior artificial teeth (A = N + 7 mm) where N is the nasal width (10). Our team has extensive knowledge and research experience that has translated into high quality publications (11-30).

There is no consensus of data regarding a single esthetic factor that can be used reliably as an aid for artificial tooth selection. New technologies have been introduced in dentistry during the last decades. Digital imaging has become a mainstream in the dental practice, and advances in computer technology have provided the dental professional with new tools that allow digitizing, measuring, displaying, and manipulating facial images. Thus the study aims to assess and compare the interalar width between males and females in chennai population.

MATERIALS AND METHODS

The study was performed among the undergraduate students of a private dental college in chennai.

Inclusion criteria:

All study participants above 18 years of age were included so that growth of the face was essentially complete. Cases who had normal occlusion with full complement of natural teeth.

Exclusion criteria:

1.Individuals with proximal restorations on the distal surfaces of the canine that could grossly affect the width of maxillary anterior teeth.

2.Individuals who had spacing or crowding of maxillary anterior teeth were excluded.

3. Individuals with congenital or developmental deformities (abnormal or altered nose) and had undergone any surgical repair in the orofacial region.

4.Individuals treated orthodontically or proximal stripping were excluded.

5. Individuals with developmental anomalies of the maxillary anterior teeth and deciduous canines were excluded. No individuals were included with atypical conditions such as traumatized lips and mobile anterior teeth.

In this study, the interalar width was measured by the method in which the individual was seated on the dental chair in a relaxed state and in an upright position. Two points were marked on either side of the nose with a fine tipped marking pen indicating widest points on the outer surfaces of the alae of the nose. The distance between the two points marked on the alae of the nose was recorded using a pair of Vernier Calipers by bringing the recording parts of the gauge just in contact with the outer surfaces of the alae, without any pressure being applied. While measuring, the patient was asked to stop breathing momentarily to avoid any change in shape of the nose. The readings on the Vernier scale were noted down to the fraction of one tenth of a millimeter. The readings were repeated three times and the mean was recorded.

The data obtained was tabulated in Microsoft excel sheet and transferred to IBM SPSS software(version 23.0) for further analysis. The unpaired independent t-test was used to analyse the significance of the mean interalar width between the study samples. The comparison of the mean values between the different genders was analysed with Pearson's chi-square test.

RESULTS

The study included 75 participants of which 38.67% were males and 61.33% were females. The mean interalar distance of the study participants was calculated as 33.57 mm ± 3.53 mm. The mean interalar width calculated in males was 34.40 mm ± 3.27 mm. The mean interalar width calculated in females was 33.04 mm ± 3.61 mm.(Table 1)

In one sample t-test; the t value determined was 82.308; in independent t-test; the t value when equal variance was assumed was 1.647, and when equal variance was not assumed it was found to be 1.685. The significant value respectively was 0.104 and 0.097. There was no significant difference between the males and females.

The pearson chi square test done and the correlation of gender and the percentage of individuals is shown in Figure -1. There were no males and 2.67% females (blue) who had interalar

width in the range of 20-25 mm. The 2.67% males and 6.67% females had interalar width in the range of 26-30 mm (green). The 20% and 34.67% males and females respectively had interalar width within the range of 31-35 mm (cream) and 16% and 17.33% males and females respectively had their interalar width within the range of 36-40 mm (purple). Both majority of females and males had their interalar width within the range of 31-35mm. The pearson chi square value was found to be 0.465 which means there's no significant difference between the gender and the interalar width.

Table-1: The following table represents the mean interalar width in males and female participants of the study.

Gender	N	Mean	p-Value
Male	29	34.40±3.2 mm	0.104
Female	46	33.04±3.6 mm	0.097

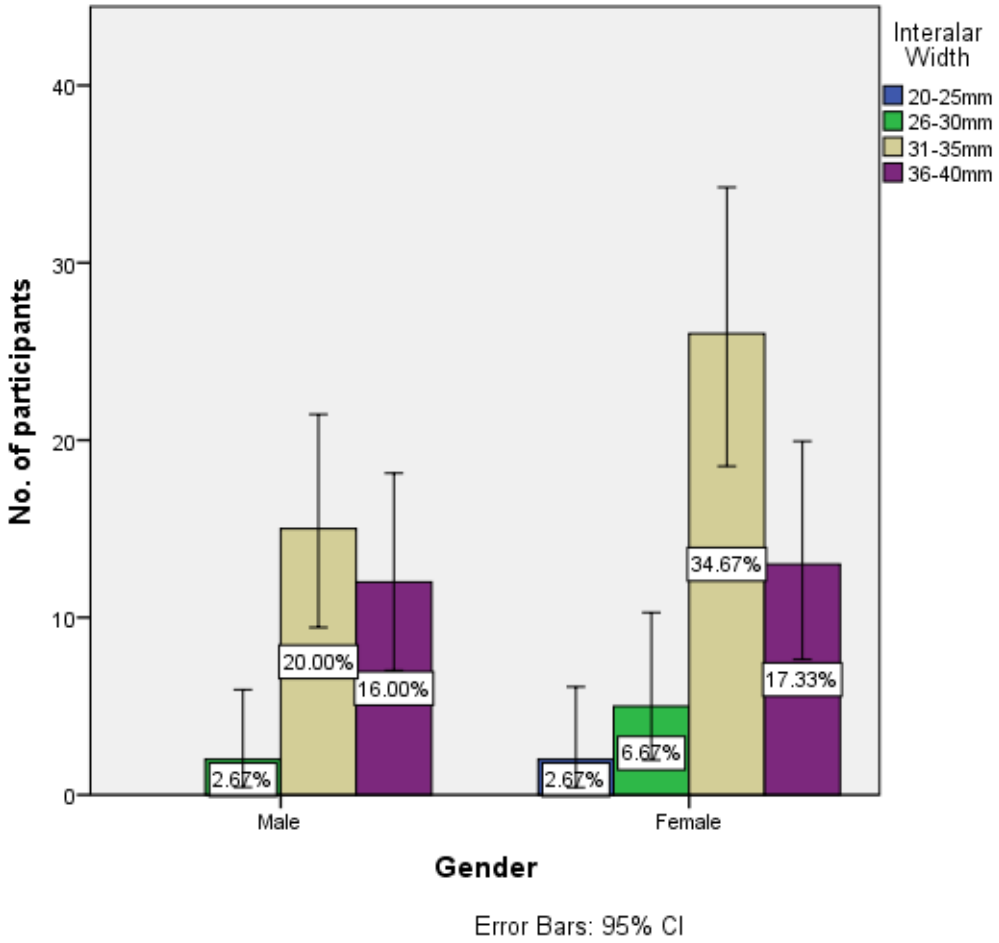

Figure 1: The above bar graph represents the comparison of values of interalar distance between males and females. The x-axis represents the gender and the y-axis represents the percentage of the participants.The individuals with the width ranging 20-25 mm are depicted in blue, 26-30 mm are depicted in green, 31-35 mm are depicted in cream, 36-40 mm are depicted in purple. The p value was 0.465 which was statistically insignificant (p <0.05) though females had higher interalar distance in the range of 31-35 mm than males.

DISCUSSION

The mean interalar width for males in the study was calculated as 34.04 mm ± 3.61 mm. In another study (31), a measurement of 120 people was taken and the mean interalar width was taken in females was calculated as 34.28 mm ± 1.9 mm and in males was taken 38.71 mm ± 3.21 mm.

The interalar width taken in females in both the studies is almost similar whereas there is a significant difference in the measurement of interalar width of males. This may be because of the age difference.

The study was conducted in 75 people of an area, it was conducted in a very small sample size; if the number of people increases there can be appreciable variation in the results.This study will help in diagnosis of various complications such as proper tooth alignment, size etc. The interalar width is very useful in the selection of maxillary anterior teeth; its shape, size, length, mesio-distal width. The interalar width can be measured with the help of vernier calliper, or with the help of image processing software, which can digitalize the measurements.

In another study (32), in which the nasal width was measured on soft tissue, there was no relationship between this facial structure and the total width of the four maxillary incisors, but the facial measurement seemed to be correlated with the distance between the tips of the maxillary canines.In another study (33), the distance between the tips of maxillary canines measured in digital photographs (TTP) showed a median of 37.44 mm, ranging from 31.58 to 43.35 mm. In this study, the overall mean interalar width of the participants was calculated to be 33.57±3.53 mm which is in the range of the previous study.

According to many other studies females had significantly smaller interalar distance compared to males. (34), (31). In this study, though there was found to be no significant difference between the interalar width of males and females, majority of the females and males had almost the same interalar width which is 31-35mm. Another study revealed an average interalar width as 3.852 cm in males and 3.396 cm in females (3). The values showed that the interalar width was lesser in females by 0.456 cm (4.56 mm), revealing an influence of sex factor.

In another study (7), the distance between the tips of maxillary canines measured in digital photographs (TTP) showed a median of 37.44 mm, ranging from 31.58 to 43.35 mm on a total of 81 individuals out of which there were 37 men and 44 women.In another study (5), it was stated that no correlation of interalar width was found with intercanthal distance, whereas in all the previous studies cited, there was evidence regarding the correlation of the same.

This study might also be helpful in finding out the relation with intercanthal distance and various other parameters in the future.

CONCLUSION

According to the present study, the interalar width of males was more than that of females. Though there was no significant difference between the interalar width of males and females, the measurement may help as a baseline data of the population studied to help in the replacement of maxillary anterior teeth.

AUTHOR CONTRIBUTIONS

Author 1: Dev Arora, 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 final approval of the manuscript.

Author 3: Dr. Sandhya, aided in conception of the topic, designing the study and supervision, correction, preparation of the manuscript, and final approval of the manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

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REFERENCES

1. George S, Bhat V. Inner canthal distance and golden proportion as predictors of maxillary central incisor width in south Indian population. Indian J Dent Res. 2010 Oct;21(4):491–5.

2. Shaw WC. The influence of children's dentofacial appearance on their social attractiveness as judged by peers and lay adults [Internet]. Vol. 79, American Journal of Orthodontics. 1981. p. 399–415. Available from: http://dx.doi.org/10.1016/0002-9416(81)90382-1

3. Miranda G, D'Souza M. Evaluating the reliability of the interalar width and intercommissural width as guides in selection of artificial maxillary anterior teeth: A clinical study [Internet]. Vol. 6, Journal of Interdisciplinary Dentistry. 2016. p. 64. Available from: http://dx.doi.org/10.4103/2229-5194.197665

4. Mishra MK, Singh RK, Parajuli PK, Shrestha P, Baral D, Suwal P. A comparative study to find out the relationship between the inner inter-canthal distance, interpupillary distance, inter-commissural width, inter-alar width, and the width of maxillary anterior teeth in Aryans and Mongoloids [Internet]. Clinical, Cosmetic and Investigational Dentistry. 2016. p. 29. Available from: http://dx.doi.org/10.2147/ccide.s87837

5. Smith BJ. The value of the nose width as an esthetic guide in prosthodontics. J Prosthet Dent. 1975 Nov;34(5):562–73.

6. Berry DC. The Journal of Prosthetic Dentistry [Internet]. Vol. 43. 1980. p. 475. Available from: http://dx.doi.org/10.1016/0022-3913(80)90229-2

7. Hoffman W Jr, Bomberg TJ, Hatch RA. Interalar width as a guide in denture tooth selection. J Prosthet Dent. 1986 Feb;55(2):219–21.

8. Wehner PJ, Hickey JC, Boucher CO. Selection of artificial teeth. J Prosthet Dent. 1967 Sep;18(3):222–32.

9. Kern BE. Anthropometric parameters of tooth selection. J Prosthet Dent. 1967 May;17(5):431–7.

10. Mavroskoufis F, Ritchie GM. The face-form as a guide for the selection of maxillary central incisors. J Prosthet Dent. 1980 May;43(5):501–5.

11. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. Eur J Dent. 2020

Dec;14(S 01):S105–9.

12. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. Clin Oral Investig. 2020 Sep;24(9):3275–80.

13. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. J Oral Pathol Med. 2019 Apr;48(4):299–306.

14. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene [Internet]. Vol. 130, Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2020. p. 306–12. Available from: http://dx.doi.org/10.1016/j.oooo.2020.06.021

15. Antony JVM, Ramani P, Ramasubramanian A, Sukumaran G. Particle size penetration rate and effects of smoke and smokeless tobacco products - An invitro analysis. Heliyon. 2021 Mar 1;7(3):e06455.

16. Sarode SC, Gondivkar S, Sarode GS, Gadbail A, Yuwanati M. Hybrid oral potentially malignant disorder: A neglected fact in oral submucous fibrosis. Oral Oncol. 2021 Jun 16;105390.

17. Hannah R, Ramani P, WM Tilakaratne, Sukumaran G, Ramasubramanian A, Krishnan RP. Author response for “Critical appraisal of different triggering pathways for the pathobiology of pemphigus vulgaris—A review” [Internet]. Wiley; 2021. Available from: https://publons.com/publon/47643844

18. Chandrasekar R, Chandrasekhar S, Sundari KKS, Ravi P. Development and validation of a formula for objective assessment of cervical vertebral bone age. Prog Orthod. 2020 Oct 12;21(1):38.

19. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. Eur J Dent. 2018 Jan;12(1):67–70.

20. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study. Eur J Dent. 2018 Jan;12(1):21–6.

21. Ponnulakshmi R, Shyamaladevi B, Vijayalakshmi P, Selvaraj J. In silico and in vivo analysis to identify the antidiabetic activity of beta sitosterol in adipose tissue of high fat diet and sucrose induced type-2 diabetic experimental rats. Toxicol Mech Methods. 2019 May;29(4):276–90.

22. Sundaram R, Nandhakumar E, Haseena Banu H. Hesperidin, a citrus flavonoid ameliorates hyperglycemia by regulating key enzymes of carbohydrate metabolism in streptozotocin-induced diabetic rats. Toxicol Mech Methods. 2019 Nov;29(9):644–53.

23. Alsawalha M, Rao CV, Al-Subaie AM, Haque SKM, Veeraraghavan VP, Surapaneni KM. Novel mathematical modelling of Saudi Arabian natural diatomite clay. Mater Res Express. 2019 Sep 4;6(10):105531.

24. Yu J, Li M, Zhan D, Shi C, Fang L, Ban C, et al. Inhibitory effects of triterpenoid betulin on inflammatory mediators inducible nitric oxide synthase, cyclooxygenase-2, tumor necrosis factor-alpha, interleukin-6, and proliferating cell nuclear antigen in 1, 2-dimethylhydrazine-induced rat colon carcinogenesis. Pharmacogn Mag. 2020;16(72):836.

25. Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis [Internet]. Vol. 25, Pathology & Oncology Research. 2019. p. 447–53. Available from: http://dx.doi.org/10.1007/s12253-019-00588-2

26. Zafar A, Sherlin HJ, Jayaraj G, Ramani P, Don KR, Santhanam A. Diagnostic utility of touch imprint cytology for intraoperative assessment of surgical margins and sentinel lymph nodes in oral squamous cell carcinoma patients using four different cytological stains. Diagn Cytopathol. 2020 Feb;48(2):101–10.

27. Karunagaran M, Murali P, Palaniappan V, Sivapathasundharam B. Expression and distribution pattern of podoplanin in oral submucous fibrosis with varying degrees of dysplasia – an immunohistochemical study [Internet]. Vol. 42, Journal of Histotechnology. 2019. p. 80–6. Available from: http://dx.doi.org/10.1080/01478885.2019.1594543

28. Sarode SC, Gondivkar S, Gadbail A, Sarode GS, Yuwanati M. Oral submucous fibrosis and heterogeneity in outcome measures: a critical viewpoint. Future Oncol. 2021 Jun;17(17):2123–6.

29. Raj Preeth D, Saravanan S, Shairam M, Selvakumar N, Selestin Raja I, Dhanasekaran A, et al. Bioactive Zinc(II) complex incorporated PCL/gelatin electrospun nanofiber enhanced bone tissue regeneration. Eur J Pharm Sci. 2021 May 1;160:105768.

30. Prithiviraj N, Yang GE, Thangavelu L, Yan J. Anticancer Compounds From Starfish Regenerating Tissues and Their Antioxidant Properties on Human Oral Epidermoid Carcinoma KB Cells. In: PANCREAS. LIPPINCOTT WILLIAMS & WILKINS TWO COMMERCE SQ, 2001 MARKET ST, PHILADELPHIA …; 2020. p. 155–6.

31. Attokaran G, Shenoy K. Correlation between Interalar Distance and Mesiodistal Width of Maxillary Anterior Teeth in Thrissur, Kerala, Indian Population. J Int Soc Prev Community Dent. 2018 Mar;8(2):118–23.

32. Mavroskoufis F, Ritchie GM. Nasal width and incisive papilla as guides for the selection and arrangement of maxillary anterior teeth. J Prosthet Dent. 1981 Jun;45(6):592–7.

33. Gomes VL, Gonçalves LC, Costa MM, Lucas BDL. Interalar distance to estimate the combined width of the six maxillary anterior teeth in oral rehabilitation treatment. J Esthet Restor Dent. 2009;21(1):26–35; discussion 36.

34. A L-Kaisy N, Garib BT. Selecting maxillary anterior tooth width by measuring certain facial dimensions in the Kurdish population. J Prosthet Dent. 2016 Mar;115(3):329–34.