

Comparison Of Maxillary Anterior Teeth And Bizygomatic Width In 17 -18 Year Old Age Group Individuals Of Different Gender

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Abstract:

Background The facial esthetics depend on anterior teeth . The dentofacial relationship helps in selecting dental characteristics. There exists a relationship between teeth size and face size. For different ethnic groups and races , the facial parameters differ . There are many methods that help in selecting the maxillary anterior teeth.

Aim To assess and correlate the width of maxillary anterior teeth and bizygomatic width in the 17-18 year old age groups individuals of different gender .

Materials and methods: The study was conducted among the undergraduate students of a private dental college in Chennai . The bizygomatic width and the width of maxillary anterior teeth of the participants were measured using a spreading caliper and vernier caliper respectively . Data collected were tabulated in Microsoft excel.The statistical analysis was done using SPSS software version 23.0 .

Results: The study had 60 participants, of which 38.3% were males and 61.7% were females. Males(11.730) have high bizygomatic width and high maxillary anterior teeth width (6.591 ± 0.1083) (p value=0.001) when compared to females's bizygomatic width (11.557) and maxillary anterior teeth(6.538 ± 0.1963) (p value=0.883).

Conclusion: The bizygomatic width and maxillary anterior teeth width was larger in male population compared to the female population. The values obtained can be utilised in selecting appropriate teeth size to obtain optimum facial esthetics .

Key words: Bizygomatic width, maxillary anterior tooth width, correlation, dentofacial relationship, inter canine width, Novel analysis.

Introduction:

A smiley face gives additional beauty to a person. In that sense the anterior teeth play a great role in the self-esteem of an individual. The size, form of anterior teeth affects the facial aesthetics. In 1872, White said that tooth size is proportional to the face and the colour of the tooth should correspond with the facial complexion(1). The dentofacial relationship helps in selecting dental characteristics like intercanine width(2). The relationship between the teeth size and the face size was found by Leon Williams(3) . The teeth in men are larger when compared to women(4). H. Pounds formula helps in selecting the maxillary central incisors(5). Berry proposed the biometric ratio method. He says that the maxillary central incisors dimension is one-sixteenth of face width and one-twentieth of face length(6). For selecting the teeth pre-extraction records and the patient's natural dentition helps to achieve. For different ethnic groups and races, the facial parameters differ .

There are various methods which help in the selection of maxillary anterior teeth. They are interalar distance, inter pupillary distance, head diameter, inter commissural width and a bizygomatic width(7). There are no such studies which says that single esthetic factor can be used for selecting artificial teeth(8). Bizygomatic width is the measure of facial width between the lateral points of the bizygomatic arc. Bizygomatic width is used in dentofacial relationship .Bizygomatic width divided by 16 gives the width of maxillary central incisor. Bizygomatic width divided by 3.3 gives the width of six anterior teeth. There is a strong relationship between certain psychological characteristics and morphological structures of bizygomatic arch(9). The bizygomatic width is very useful for determining facial width in forensic facial reconstruction(10).

By knowing the bizygomatic width, we can predict the width of missing anterior teeth and will be helpful in replacement of teeth and vice versa . Measurement of width of anterior teeth would also help in identifying different ethnic populations. As there is no sufficient literature available in this topic we are doing a study in the South Indian population regarding this .Our team has extensive knowledge and research experience that has translate into high quality publications (11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30) The aim of this study was to evaluate the width of maxillary anterior teeth and bizygomatic width in males and females of the 17- 18 year old age group .

Materials and methods:

This cross sectional study was conducted among university students of a private institution in chennai. The study was approved by the Scientific Review Board of the institution . About 60 individuals were selected of which 23 were males and 37 were females. The individuals with no missing maxillary anterior teeth and no interdental crowding or spacing were included. The individuals with loss of tooth structure due to fracture, caries or attrition were excluded. The anterior teeth width was measured using a vernier caliper and the bizygomatic width was measured by using a spreading caliper . The statistical analysis was done by using SPSS software version 23.0.

Results:

The Sample size of the present study was 60 individuals of which 37 individuals are females (61.7%) and 23 individuals are males (38.3%) . The mean width of maxillary anterior in Males was 6.591 ± 0.1083 and females were 6.538 ± 0.1963 . The mean bizygomatic width of males was 11.730 ± 0.4527 and females were 11.557 ± 0.5615 .

Table: 1 Correlation of bizygomatic width with maxillary anterior teeth between males and females

Gender	N	Mean	p value
Bizygomatic width (cm)			
Male	23(38.3%)	11.730 ± 0.4527	0.883
Female	37(61.7%)	11.557 ± 0.5615	
Maxillary anterior teeth(cm)			
Male	23(38.3%)	6.591 ± 0.1083	0.001
Female	37(61.7%)	6.538 ± 0.1963	

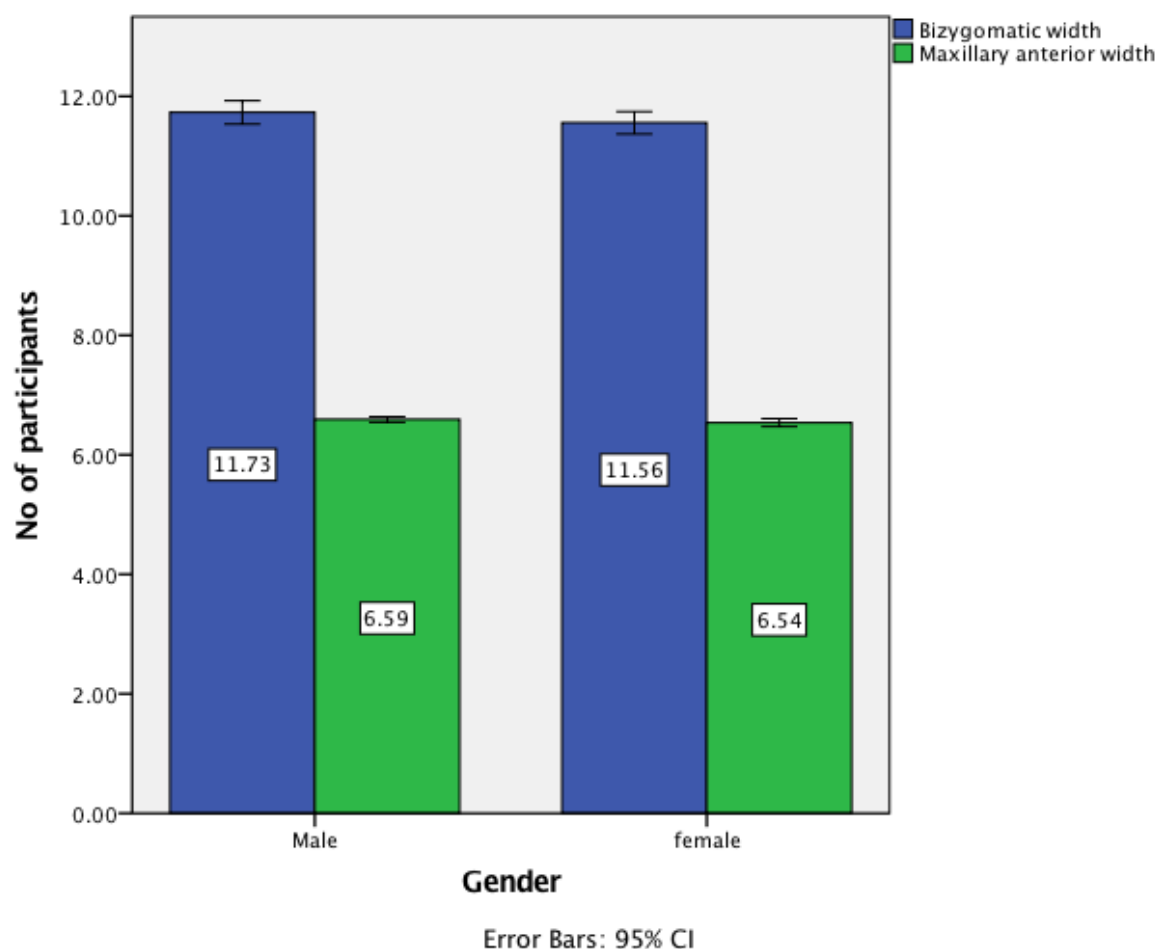


Figure 1 : The bar graph represents the association between the bizygomatic width and maxillary anterior teeth width in different genders. X axis represents the gender and Y axis represents the no. of participants .The bizygomatic width of males and females were 11.73 and 11.557cm respectively. The maxillary anterior teeth width of males and females were 6.591 and 6.538 respectively. Males have greater bizygomatic width and maxillary anterior teeth width than females. The differences between the groups were not statistically significant (chi square value, $p=0.5$).

Discussion:

Bizygomatic width is the measure of facial width between the lateral points of a bizygomatic arc. It is one of the useful tools that helps in predicting the width of anterior teeth. The width of anterior teeth is the summation of width of central incisors, lateral incisors and the canines of both quadrants. This technique will be very useful when there are no pre-extraction records of the missing anterior tooth.

In the present study the bizygomatic width and the width of maxillary anterior teeth are higher in males than in females . Males having larger facial dimensions than females could be a

predicting factor for this inference. This was in accordance with the study by Tasleem Abitha et al., in which maxillary central incisor and bizygomatic width were greater in males, it is due to the fact that males have greater sexual dimorphism than females (31). But in contrary, the width of both bizygomatic and the maxillary central incisors were higher in females than in males in the study by Bhagat et al. (32).

In a research done by Ashish. R. Jain et al., to determine the correlation of width of maxillary anterior teeth using extra oral factors (bizygomatic width, width of eyes, intercommissural width, interpupillary distance). They concluded that a single extra oral factor is enough for selecting the anterior teeth (2).

The ratio of mesiodistal dimension of the maxillary central incisors to bizygomatic width was assessed to be 1:14 for males (33). The study by Ewa Parciak et al., compared the maxillary anterior teeth width with facial dimension among three different races. The bizygomatic width for Asian, Black, White females and males was more than the south Indian population (34). In a previous study by Bedoya et al., the mean bizygomatic distance for Mestizo people was similar to south Indian people. The bizygomatic width for Afro people was less than the South Indian people and for Ticuna people it was greater than South Indian people and this difference was due to environmental and genetic factors that had an influence on the external characteristics of an individual (35).

Apart from maxillary anterior teeth width, studies have made use of the intercanine distance to correlate with bizygomatic width and central incisors width which will be useful for selecting the maxillary anterior teeth width (36). But the bizygomatic width in our study was insignificant. The mesiodistal width of anterior teeth in males is greater than that of females and this is due to genetic predisposition (37).

Limitation

Studies have to be conducted with larger sample sizes in future to validate the findings of the present study.

Future scope:

In future the research has to be done to find the relation between mandibular anterior teeth and bizygomatic width.

Conclusion:

The bizygomatic width and the width of maxillary anterior teeth is higher in males when compared to females. Determination of maxillary anterior teeth and bizygomatic width finds its utility in

enormous dental application especially it helps in eduntulous patient who have no pre-extraction records of the missing anterior tooth .

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Conflict of interest:

The author declares that there was no conflict of interest in the present study.

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Reference:

1. Shukri NMM, Jain AR. The Correlation of Bizygomatic Width and Ridge Relationships in Determination of Width of Maxillary Anterior teeth [Internet]. Vol 10, Drug Invention Today . 2018. P. 727-733. Available from: <https://jprsolutions.info/files/final-file-5b1bcb993bf0a8.30786614.pdf>
2. Jain AR, Nallaswamy D , Ariga P. Determination of the Correlation of Width of Maxillary Anterior teeth using Extraoral Factor (Bizygomatic Width) in Indian Population [Internet]. Vol 11 Drug Invention Today . 2019. P. 1074- 81. Available from: <https://jprsolutions.info/files/final-file-5cda56cd5cd5e4.12061758.pdf>
3. Baleegh S, Choudhry Z, Malik S Baleegh H. The Relationship Between Widths Of Upper Anterior Teeth And Facial Widths [Internet]. Vol 35, Pakistan Oral & Dental Journal . 2015. P. 742- 745. Available from: http://podj.com.pk/archive/Dec_2015/PODJ-42.pdf
4. Miran FA, University of Sulaimani, Muhamad SR, General dental practitioner at Chamchamal medical center. The selection of maxillary anterior teeth width in relation to facial measurements [Internet]. Vol. 2, Sulaimani dental journal. 2015. p. 101–7. Available from: <http://dx.doi.org/10.17656/sdj.10047>

5. Salim NBA, Jain AR, Varma A. Reliability of H.pound's Formula for Anterior Teeth Selection [Internet]. Vol. 10, Biomedical and Pharmacology Journal. 2017. p. 1003–7. Available from: <http://dx.doi.org/10.13005/bpj/1197>
6. Sayed ME, Porwal A, Al-Faraj NA, Bajonaid AM, Sumayli HA. Evaluation of the Current Techniques and Introduction of a Novel Approach for Estimating Maxillary Anterior Teeth Dimensions. J Contemp Dent Pract. 2017 Jul 1;18(7):541–8.
7. 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.
8. Jain AR, Nallaswamy D, Ariga P. Determination of Correlation of Width of Maxillary Anterior Teeth with Extraoral Factor (Interpupillary Width) in Indian Population [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2019. Available from: <http://dx.doi.org/10.7860/jcdr/2019/41082.12988>
9. Gabarre-Mir J, Navarro-Pastor JB, Gabarre-Armengol C, Estaún-Ferrer S. Bizygomatic Width and its Association with Social and Personality Traits in Males [Internet]. Vol. 35, International Journal of Morphology. 2017. p. 1037–42. Available from: <http://dx.doi.org/10.4067/s0717-95022017000300036>
10. Oskam CL, Premachandra IM, Dias GJ. Bizygomatic breadth determination in damaged skulls [Internet]. International Journal of Osteoarchaeology. 2009. Available from: <http://dx.doi.org/10.1002/oa.1087>
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, Gadgil 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. Karunakaran 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, Gadgil 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, Selestina 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. Prithviraj 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. Abitha T, Santhanam A. Correlation between bizygomatic and maxillary central incisor width for gender identification [Internet]. Vol. 22, Brazilian Dental Science. 2019. p. 458–66. Available

from: <http://dx.doi.org/10.14295/bds.2019.v22i4.1775>

32. Bhagat S, Gupta V, Tyagi N, Sharma E, Gupta S, Dadu M. Berry's index: Adjuvant to bite marks. J Forensic Dent Sci. 2018 Jan;10(1):45–9.
33. Shammam M, Bukhari EO, Rummani AJ, Almasri AA, Bakhsh DE, Hafiz LO. Evaluation of Relation between Bizygomatic Width and Mesiodistal Dimension of Maxillary Central Incisor in Saudi Population: An In-vivo Study [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2020. Available from: <http://dx.doi.org/10.7860/jcdr/2020/45687.14159>
34. Parciak EC, Dahiya AT, AlRumaih HS, Kattadiyil MT, Baba NZ, Goodacre CJ. Comparison of maxillary anterior tooth width and facial dimensions of 3 ethnicities. J Prosthet Dent. 2017 Oct;118(4):504–10.
35. Bedoya A, Osorio JC, Tamayo JA. Dental Arch Size, Biting Force, Bizygomatic Width and Face Height in Three Colombian Ethnic Groups [Internet]. Vol. 33, International Journal of Morphology. 2015. p. 55–61. Available from: <http://dx.doi.org/10.4067/s0717-95022015000100009>
36. Gueye M, Dieng L, Mbodj EB, Seck AK, Toure A, Thioune N, et al. [Relationship between bizygomatic width and the size of maxillary anterior teeth among young Senegalese black people recruited in army]. Odontostomatol Trop. 2014 Dec;37(148):5–12.
37. Pamecha S, Dayakara HR. Comparative Measurement of Mesiodistal Width of Six Anterior Maxillary and Mandibular Teeth in Rajasthan Population [Internet]. Vol. 12, The Journal of Indian Prosthodontic Society. 2012. p. 81–6. Available from: <http://dx.doi.org/10.1007/s13191-012-0117-x>