

Comparative Evaluation of Mesiodistal Width of Six Maxillary Anterior Teeth in J&K Population

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Abstract

Introduction: Teeth selection is an important aspect which is mostly governed by the age and personality of the individual with little or no respect to gender and positioning. Even manufacturers prepare the mold for artificial teeth keeping in mind the arch size and shades. Since teeth selection is multifactorial in nature, replacement of missing teeth cannot be fulfilled by a single size, shape, or shade of artificial teeth.

Aim: The aim of the study is to evaluate the mesiodistal width of maxillary six anterior teeth in J&K region based on the sex of the patient.

Materials and Methods: The study was conducted on 100 students comprising of 50 males and 50 females. Alginate impressions were made of maxillary arches using manufacturer's recommendations, and impressions were poured in Type III dental stone. Casts were recovered, and measurements were done using Vernier caliper for individual tooth. Thread was used to measure mesiodistal width of three teeth on both right and left sides and entire mesiodistal width of 6 teeth.

Results: The mean values of six individual teeth on both left and right sides, mean mesiodistal values of combined three teeth on the right and left, and combined mesiodistal width of six anterior teeth were measured and statistically analyzed. The mean difference in combined mesiodistal width of three anterior teeth in the right side and left side for males and females was found to be 0.4 mm.

Conclusion: Males have more mesiodistal width than females in J&K population. The right side maxillary anterior teeth have more mesiodistal width than the left side.

Clinical Implication: Manufacturers as well as dentists should consider sex along with particular position while designing prosthesis to achieve more lifelike prosthesis.

Key words: Anterior, Maxillary, Mesiodistal, Vernier

INTRODUCTION

Rehabilitation of a dental patient not only requires functional replacement but also achieves a predictable and successful outcome, a triad of functional demands, biological fulfillments, and esthetic demands must be fulfilled. The quest of humans to look more attractive has

encouraged dentists to explore new avenues to satisfy the demands of patients. The word esthetic implies beauty, naturalness, and youthfulness appearance relative to ones age. Face plays a key role in attractiveness of an individual. Symmetry is a law of nature, and all the living things including humans follow this rule. Symmetry is one of the key factors contributing to facial harmony and in cases of oral rehabilitation determines the success of treatment provided.¹ Humans along with other animals have a high affinity for symmetry, and any deviation is easily appreciated by them.² Several authors Lau and Clark³, Farhan *et al.*⁴, Tjan *et al.*⁵ suggested that deviation more than 0.5 mm is easily noticeable from a distance also. A smile is a tool that is appreciated by entire world irrespective of age, race, and region. Frush and Fisher⁶ prescribed dentogenesis concept

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www.ijss-sn.com

Month of Submission : 08-2017
Month of Peer Review : 09-2017
Month of Acceptance : 10-2017
Month of Publishing : 10-2017

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or SPA concept which considers sex, personality, and age of an individual before fabrication of prosthesis. William leon⁷ stated that shape of the teeth is also influenced by the facial form and demonstrated a positive interaction between teeth and facial form. Several authors Miller *et al.*⁸ and Harper⁹ stated the interrelationship between races and teeth. They stated dark black complexion people have broader, yellower teeth as compared to white ones. Since teeth selection is multifactorial in nature, replacement of missing teeth cannot be fulfilled by a single size, shape, or shade of artificial teeth. The molds used in the fabrication of artificial teeth are differentiated on the basis of size and color, but no consideration to the sex of an individual was considered. The aim of the study is to evaluate the mesiodistal width of maxillary six anterior teeth in J&K region based on the sex of the patient. Null hypothesis states no difference in teeth selection with sex as criterion.

MATERIALS AND METHODS

The study was conducted on 100 students in MNR Dental College and Hospital, Sangareddy, J&K, comprising of 50 males and 50 females. Inclusion criteria were followed (Table 1), and alginate impressions were made of maxillary arches using manufacturer’s recommendations (Tropicalgin). Impressions were poured in Type III dental stone. Casts were recovered, and measurements were done using Vernier caliper for individual tooth. A line following the maximum contours of teeth was drawn perpendicular to the long axis of teeth, and measurements were carried out for all 100 maxillary casts (Figure 2). Thread was also used to measure mesiodistal width of three teeth on both the right and left sides and entire mesiodistal width of 6 teeth. Data were collected and statistically analyzed.

RESULTS

The mean values of six individual teeth on both the left and right side, mean mesiodistal values of combined three teeth on the right and left, and combined mesiodistal width of six anterior teeth were measured and statistically analyzed (Table 2). In males, the mean values obtained for the right side central incisor, lateral incisor, and canine are 8.8 mm, 7.6 mm, and 8.5 mm, whereas values obtained for the left side central incisor, lateral incisor, and canine are 8.7 mm, 7.4 mm, and 8.4 mm, respectively. In females, the mean values obtained for the right side central incisor, lateral incisor, and canine are 8.6 mm, 7.5 mm, and 8.2 mm, whereas values obtained for the left side central incisor, lateral incisor, and canine are 8.5 mm, 7.3 mm, and 8.1 mm, respectively. The mean difference in combined mesiodistal width of three anterior teeth in the right side and left side for males and females was found to be 0.4 mm.

Table 1: Inclusion criteria

Absence of missing maxillary anterior teeth
Absence of congenital defects
Absence of macro or microdontia
Absence of supernumerary tooth
Absence of spacing or midline diastema
Absence of maxillofacial defects
Absence of crowding
Absence of medical history
Absence of orthodontic treatment
Absence of abrasion, erosion, and attrition

Table 2: Mean values of mesiodistal width

Tooth number	Males	Mean calculated	Total	Females	Mean calculated	Total
11	8.8			8.6		
12	7.6	24.9 right side		7.5	24.3 right side	
13	8.5		49.4	8.2		48.2
21	8.7			8.5		
22	7.4	24.5 left side		7.3	23.9 left side	
23	8.4			8.1		

DISCUSSION

The aim of prosthodontics is not only to replace missing teeth but also to restore form, function, and esthetics.¹⁰ Esthetics is not only a subjective thing but also a collection of objective evaluations. Studies¹¹ are carried out to study esthetics, and they concluded esthetics to be a different science which mainly depends on patient’s perception with little regard to dentist’s evaluation. The present study was undertaken with the objective to study the width of maxillary anterior teeth in J&K population and to find any association between gender and width of maxillary anterior teeth.

Null hypothesis that no discrepancy exists between teeth on the basis of gender in J&K region stands rejected as a positive interaction was found between the groups. Proportioning is the law of nature, and teeth are no different from it. Various proportions such as golden proportion¹² and red proportion were introduced with the aim to evaluate esthetics and provide a baseline of rules for fabrication of real-type prosthesis. Aristotle was first to observe the value of golden proportion in esthetics.¹³ Egyptians found the golden number and correlated length-to-width ratio.¹⁴ Lombardi was first to propose the application of golden proportion in dentistry.¹⁵ Width is one of the most important proportionings which determines the overall personality of an individual.¹⁶ Various standard textbooks have described anatomical variations in size between the left and right sides, but none of the textbooks have differentiated the size on the

basis of gender. Manufacturers also prepare teeth molds according to the left and right side with no consideration to the sex of an individual. Textbooks^{17,18} recommend the size of 8.5 mm and 8.6 mm for central incisor, 6.5 mm and 6.6 mm for lateral incisor, and 7.5 and 7.6 mm for maxillary canine.

In Group A (males), 11 was found to have mean width of 8.8 mm and that of 21 was 8.7 mm, 12 was having mean width of 7.6 mm and 7.4 mm for 22, and mean width of 13 was 8.5 mm and 8.4 mm for 23, whereas in Group B (females), 11 was having mean width of 8.6 mm and that of 21 was 8.5 mm. The mean width of 12 and 22 was 7.5 mm and 7.3 mm, respectively, and mean width of 13 and 23 was 8.2 mm and 8.1 mm. This demonstrates the variability in mesiodistal width between maxillary anterior teeth among males and females (Figure 1). The values obtained were different from that provided in books which could be due to regional differences or due to non-discrimination between subjects into males and females.



Figure 1: Measurement of mesiodistal width of individual tooth by Vernier caliper



Figure 2: Line following maximum contours of teeth

Richardson¹⁹ and Malhotra²⁰ and McAurthor²⁰ conducted similar studies without differentiating in males and females and found different values in North Indian and Caucasian populations when compared with textbooks. This signifies the racial influence on the size of the teeth.

Furthermore, it was found that, in both males and females, right side maxillary central incisor was found to be larger than left side maxillary central incisor by 0.1 mm. Wazzan *et al.*²¹ stated that difference of 0.1 mm between the two central incisors to be normal which further supports the present study. The results of the study demonstrate that, in both males and females, the right side maxillary central incisor, right side maxillary lateral incisor, and right side maxillary canine were found to be bigger by 0.1 mm, 0.2 mm, and 0.1 mm, respectively, than the left side. Garn *et al.*²² conducted a similar study and found a difference of 0.3 mm on both sides of midline to be physiologic and normal in nature. The mean mesiodistal width found in both males and females was found to be 0.4 mm more in the right side than left side. This signifies that teeth on the right side are always broader than on the left side. Pamecha and Dayakara²³ conducted a similar study and found right and left sides to be never exactly the same. The total width of maxillary six anterior teeth found in males was 49.4 mm, whereas in females, it was 48.2 mm. This suggests males have 1.2 mm broader teeth than females, thus strengthening the dynesthetic interpretation of dentogenic concept. This study is in accordance to the study by the Lysell and Myrberg²⁴ which suggest males have greater mesiodistal width than females. Garn *et al.*²² also confirmed the results of the present study and stated that tooth crown size is mediated by X or Y chromosome. Females also have greater variability in teeth morphology as crown size is mediated by X chromosome in diploid females as compared to haploid males. This suggests that same teeth on opposite sides are never mirror images and should be taken in consideration while restoring the esthetics of an individual. Further studies are directed to study the mesiodistal width of mandibular anteriors, to find relations between maxillary and mandibular midlines, and to correlate facial and dental midlines. It is also suggested that manufacturers should also consider sex as a factor while preparing molds for artificial teeth.

CONCLUSION

1. Males have more mesiodistal width than females in Telangana population.
2. Right side maxillary anterior teeth have more mesiodistal width than the left side.
3. Gender is also an important criterion while designing prosthesis to achieve lifelike appearance.

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How to cite this article: Khajuria RR, Singh R, Safaya R, Hajira N. Comparative evaluation of mesiodistal width of six maxillary anterior teeth in J&K population. *Int J Sci Stud* 2017;5(7):4-7.

Source of Support: Nil, **Conflict of Interest:** None declared.