A CLASSIFICATION OF FACE FORM AND TOOTH FORM – AN INVIVO STUDY

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ABSTRACT

Objective: To determine predominant face form and tooth form in males and females among Indian population.

Material and methods: A standardized digital photograph of full face and the maxillary central incisors of 200 dental students with 79 males and 121 females in age group between 18 and 28 years were included in the study. The image prints of traced outline form of the face and the right maxillary central incisor tooth were obtained separately to classify the face form and the tooth form according to William's method. The images prints to classify the face form and the maxillary central incisor tooth form were done by 5 prosthodontists. The means were considered, respective percentages were statistically analyzed by Chi-square test and the results tabulated.

Results: The maxillary central incisor tooth showed considerable asymmetry where as the face were basically symmetric The predominant tooth form is combination tooth form in both males and females and the predominant face form is square in males and ovoid in females.

Conclusion: The predominant face form and tooth form obtained is useful in selection of anterior teeth for edentulous patients among Indian population.

Keywords: Tooth form; Face form; Typal form; Nontypal form; Combination form; William's method.

INTRODUCTION

Esthetics plays a major role in prosthodontic treatment of edentulous patients.[1] The term denture esthetics is defined as "the effect produced by a dental prosthesis that affects the beauty and attractiveness of the person".[2] Also, Lowry has stated that, "dental art is the theory or practice of esthetics in the expression of beauty in its form, arrangement and hue of teeth and facial expression".[3]

For the artificial denture to achieve an artistic and esthetic beauty, special attention must be given to the selection of tooth, the arrangement of teeth, contouring and coloring of the external form of the denture. For this, face form and tooth form are two of the few important factors that influence the denture harmony, both esthetically and psychologically.[3]

The historical review of dentistry unfolds the evolution of various techniques for selecting anterior tooth mold that established relationship between the tooth form and the face form has being projected.[4]

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The most universally accepted "Law of Harmony" was stated by James Leon William[5] 1914 who hypothesized the relation between the form of inverted maxillary central incisor and the face form. Numerous studies[6,7,8] have been conducted on various population groups based on William's geometric theory to evaluate the correlation between the tooth form and the face form. Among which many studies proved[6.9.10] with positive results while others[11,12,13] disproved which may be attributed due to racial and gender differences.[1,14,15,16]

The studies[17,18] conducted among the Indian population group based on William's theory, showed not a highly defined correlation between the tooth form and the face form. However, there is lack of information about the different tooth and face forms predominantly seen in Indian ethnicity.

Hence, an attempt was made in the present study to classify different predominant tooth and face forms among males and females of Indian population. The result thus obtained would be used in the selection and prosthetic restoration of

maxillary anterior teeth for edentulous patients of Indian population.

TABLE 1: DESCRIPTIVE STATISTICS FOR COMPARISON OF PREDOMINANT FACE FORM IN MALES AND FEMALES BY WILLIAM'S METHOD.

Face Form	Males	Females
Square	42 (53)	23 (19)
Ovoid	19 (24)	80 (66)
Tapering	18 (23)	18 (15)
Total	79 (100)	121 (100)

Note: Figures in the parenthesis indicate percentage

χ^2 = Chi-square test = 35.9

P (Probability factor) < 0.001 HS

TABLE 2: DESCRIPTIVE STATISTICS FOR COMPARISON OF PREDOMINANT MAXILLARY CENTRAL INCISOR TOOTH FORM IN MALES AND FEMALES BY WILLIAM'S METHOD.

Tooth form	Males	Females
Square	17 (22)	27 (22)
Ovoid	6 (8)	18 (15)
Tapering	10 (13)	14 (12)
Combination	46 (58)	62 (51)
Total	79 (100)	121 (100)

Note: Figures in the parenthesis indicate percentage

χ^2 = Chi-square test = 2.6

P (Probability factor) > 0.05 N

MATERIAL AND METHODS

In the present study, 200 dental students as study subjects were randomly selected between age group 18 and 28 years with 79 males and 121 females. The study subjects were of Indian origin from different states, with mixed races and ethnic groups studying at Bapuji Dental College and Hospital, Davangere, Karnataka, India. The research study was conducted after explaining the student subjects in their own language along with a signed written consent form approved by the institutional ethical committee.

The selection of student subjects was made based on the following criteria:

- Facial symmetry.
- Presence of maxillary anterior teeth in good alignment.
- Subjects without any fixed, removable, orthodontic or orthognathic surgical treatment.
- Subjects without caries, tooth fracture, restoration, gingival and periodontal diseases.

A standardized digital photographic procedure was adopted using Olympus FE-200 [Olympus Corporation Shinjuku-Ko, Tokyo, Japan] mounted on a tripod. A full face photograph with closed lips was taken from a standardized distance of 100cm with lens being parallel to the subjects face. An intra oral photograph of the maxillary central incisors was taken using cheek retractors from a standardized distance of 12cm with the lens being parallel to central incisor teeth. The photographs were then transferred to a computer [Windows PC, Microsoft] having image editing software [Photoshop 6.0 Adobe].[9,11]

Figure 1: Determination of outline form of face.

The outline forms of the face [Figure 1] and the tooth [Figure 2] on the photographs were traced using image editing software according to James L William's method as follows:

a) Face form was determined by an outline tracing made of the temporal bones at the height of the hairline, temporal process of the zygomatic arches and the gonion.

b) Tooth form was determined on the right maxillary central incisor tooth by an outline tracing made around the buccal surface of the tooth, which corresponded to the mesial and

distal contours, the incisal edge and the cervical margin.[14]

Figure 2: Determination of outline form of tooth.

The photographic printouts of the traced outlines of tooth form and face form were taken separately to classify according to James Leon Williams method by 5 prosthodontists having 8 years of experience.

Figure 3: Face form to classify by William's method.

Face form classification: The face form was classified [Figure 3] as follows:

a) Square face – outline of the face form between the reference points showed no deviation from vertical.

b) Tapering face – that converged from the temporal bone to the gonion.

c) Ovoid face – that diverged from the temporal bone to the gonion.[7]

Tooth form classification: A diagram of perpendicular lines was placed on the tooth form [Figure 4] and the tooth in each quadrant was classified as follows:

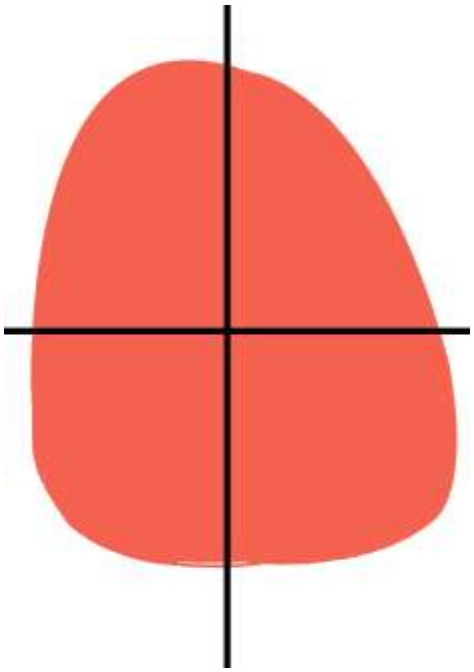
a) Square incisor tooth – mesial and distal proximal surfaces are parallel for at least half of the cervicoincisal length of the crown.

b) Tapering incisor tooth – mesial and distal proximal surfaces converge from incisal to cervical.

c) Ovoid incisor tooth – mesial and distal proximal surfaces are biconvex.

- One of the 3 basic tooth forms (square, ovoid or tapering) was classified to a tooth only if

Figure 4: Tooth form to classify by William's method.



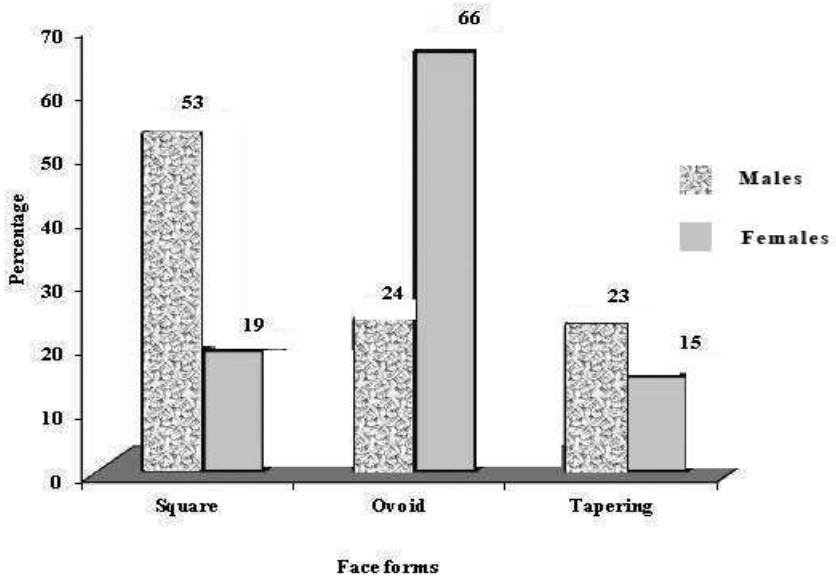
that form predominated in at least 75% of the outline tracing print [3 quadrants]. If one of the basic form predominated in at least 50% of the outline tracing print [2 quadrants], the tooth form should be classified as a combination tooth form.[14]

The means were taken from the prosthodontist's classifications of face and tooth forms. The respective percentages were calculated and the results were tabulated after statistical analysis using Chi-square test for association.

RESULTS

According to the prosthodontist's classifications,

Figure 5: Predominant face form in males and females by William's method.



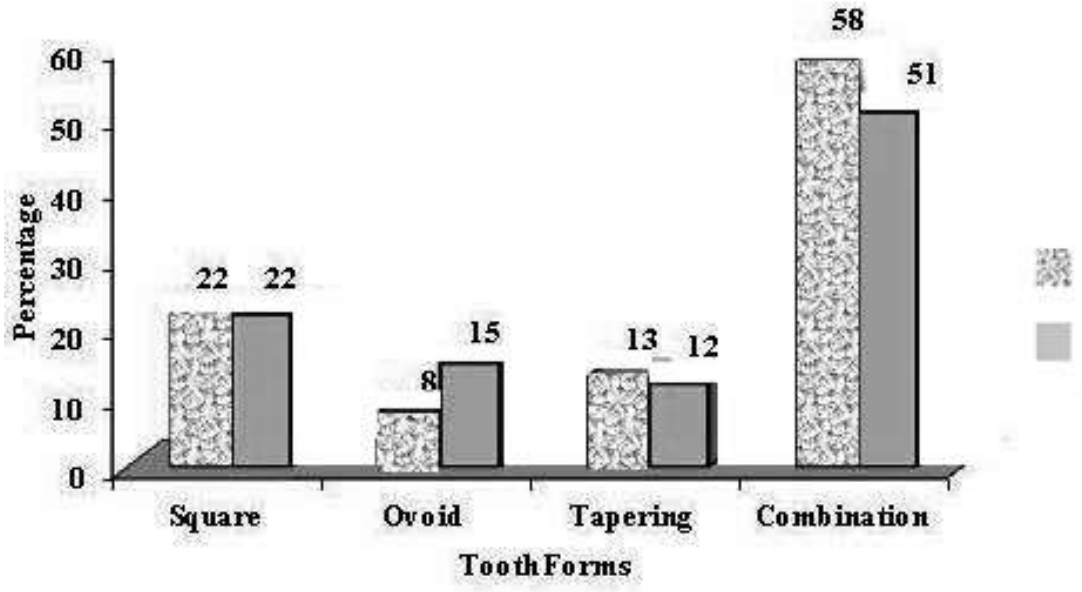
The square face form 53% predominated in males followed by ovoid 24% and tapering 23% face forms when compared with the ovoid face form 66% predominated in females followed by square 19% and tapering 15% face forms [Figure 5, Table 1]. The Chi-square test value 35.9 was found to be highly significant with a p value < 0.001.

The combination tooth form 58% predominated in males followed by square 22%, tapering 13% and ovoid 8% tooth forms when compared with the combination tooth form 51% predominated in females followed by square 22%, ovoid 15% and tapering 12% tooth forms [Figure 6, Table 2]. The Chi-square test value 2.6 was found to be not significant with a p value >0.05.

DISCUSSION

The concept of tooth selection in complete denture prosthodontics has changed from basic human temperamental theory and geometric theory to the philosophy of creating the effects of sex, personality and age. Since, most of the time an edentulous patient report for complete denture treatment without any definitive information about his lost natural teeth. It has become necessary to look for some craniofacial landmarks and derive the information on the size of the

Figure 6: Predominant tooth form in males and females by William's method.



natural teeth through biometry so that the anterior teeth selected are in a pleasing proportion to the face. The shape and the size of the artificial teeth selected should not exhibit extreme characteristics, but harmonize with the face and profile of the patient.[3]

The Indian population range with a wide diversity of races, also with mixed cultures and ethnicity, often pose problem for selection of anterior teeth in an edentulous patient. Although William's Law of harmony is the most accepted universally, the studies[17,18] till date among Indian population for correlation between the tooth form and the face form has not been highly defined. The present study was thus conducted based on William's method of classifying different tooth and face forms predominantly seen among Indian population.

The predominant face form in males in the present study was square face form 53% followed by ovoid 24% and tapering 23% face forms. The value was higher when compared with the previous study being 38% predominantly square face followed by ovoid and tapering faces.[11]

The predominant face form in females in the present study was ovoid face form 66% followed by square 19% and tapering 15% face forms. The value was lesser when compared with the previous study being 34% predominantly tapering face followed by ovoid and square faces.[11]

The predominant tooth form for males in the present study was combination tooth form 58% followed by square 22%, tapering 13% and ovoid 8% tooth forms. The value was not in correlation when compared with the previous study being square teeth.[19]

The predominant tooth form for females in the present study was combination tooth form 51% followed by square 22%, ovoid 15% and tapering 12% tooth forms. The value was not in correlation when compared with the previous study being ovoid teeth.[19]

Combination face form

William's typal face forms were square, ovoid and tapering. The nontypal or modified face forms were classified as follows:

Modified Square.

Modified Ovoid and

Modified Tapering.[20]

Combination tooth form

William discovered how nature had systematized anterior tooth into 3 typal tooth forms as square, ovoid and tapering. He also discovered the nontypal or modified tooth forms called as "combination forms", created by the in blending, into each typal form, of more or less of the elements of one or both of the other types. Tapering or ovoid or both were in blended into square. Square or ovoid or both were in blended into tapering. Square or tapering or both were in blended into ovoid. Many of the combination forms were more pleasing or beautiful than the typal forms.

The 16 combination tooth forms were grouped under typal tooth forms as follows:

Square [Class I] – 6 number of combination tooth forms.

Tapering [Class II] – 6 number of combination tooth forms.

Ovoid [Class III] – 4 number of combination tooth forms.

Once the maxillary central incisor tooth form was determined, the lateral incisors and cuspids that harmonized with each of the central incisors were selected that formed complete set of maxillary anterior teeth. Later the lower anterior teeth were selected in the same manner. Finally, the selected anterior artificial teeth will be more esthetically blended in harmony with that of the face.[21]

A study revealed tooth form combinations, beginning with the three anatomical typal forms by sectioning the tooth into various segments and later reconstruct it to redefine new and different tooth forms thus finally determining 48 anatomical tooth combinations in the ratio of:

- One segment taken from the three basic forms [1:3 = 1], there are 6 shapes.
- One segment taken from two of the three basic forms [1:2 = 1], there are 18 shapes.
- Half a segment from the three forms [½ : 3 = 1], there are 6 shapes.
- Half a segment from two of the three forms [½ : 2 = 1], there are 18 shapes.[22]

The "Natures secret of design in human teeth" was that a correlation exists between the upside down facial form and the form of the maxillary central incisor. William identified not only the typal forms of faces that were in correlation with the typal tooth forms but also the nontypal tooth forms that existed in dissimilar faces.[21]

Within the limitations of the Indian population group studied, the following findings may be drawn:

- The maxillary central incisor tooth form shows considerable asymmetry while the face form is basically symmetric.
- The predominant face form was square in males and ovoid in females.
- The predominant tooth form was combination tooth in both males and females.

Thus, while selecting anterior teeth for Indian edentulous patients, the dentists as well as the laboratory technicians would require the typal tooth forms only rarely and the combination tooth forms more often which will increase the predictability and success of denture treatment.

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