Research Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2021;11:2:29-31.

Comparative Evaluation of the Outline of Face to Determine Maxillary Anterior Crown Morphology in Prosthetic Rehabilitation

Mohammad Kashif Noorani[1*] Kumar Adarsh[2] Kunal Gaurav Seth[3] Apurva[4] Bhavana Sharma[5] Suprabha Sharan[6]

[1]Senior Lecturer, Department of Prosthodontics, Dr BR Ambedkar Dental College and Hospital, Patna, Bihar, India.
[2]Senior Lecturer, Department of Orthodontics, Dr BR Ambedkar Dental College and Hospital, Patna, Bihar, India.
[3]Private Practitioner, Muzaffarpur, Bihar, India.
[4]Consultant Orthodontist, Delhi, India.
[5]Senior Lecturer, Department of Periodontology, Hazaribagh College of Dental Sciences and Hospital, Hazaribagh, Jharkhand, India.
[6]Private Practitioner, Patna, Bihar, India.

ABSTRACT

Background: The facial outline and dental outline are esthetic factors used to determine the proper form of artificial teeth. The purpose of this study was to investigate the relationships between the facial outline and dental outline.

Material and methods: The outlines of the face and tooth were digitally traced and the digitized curved outlines were converted into X-Y coordinates with special software, which, in turn, were imported into Fourier Shape Descriptor software for harmonic analysis. The quantitative outputs of Fourier analysis were analyzed and tested with statistical software to investigate the differences across the shapes of the 3 outlines under study. Shade selection was done with Vita Easy Shade of the central incisor for each patient for analysis.

Results: Facial and tooth outlines were similar for each sex, although the similarity was stronger among the men. By contrast, no relationship was found between tooth and maxillary arch outlines or between face and maxillary arch outlines. A1 is the most common shade in both the sexes.

Conclusions: Face and tooth forms were quantitatively related.

Keywords: Fourier analysis, Maxillary central incisor, Spectrophotometric, Vita Easy Shade.

INTRODUCTION

The size and form of the maxillary anterior teeth are important to not only dental, but also facial esthetics. The most influential factors contributing to a harmonious anterior dentition are the size, shape, and arrangement of the maxillary anterior teeth, particularly the maxillary central incisors as viewed from the front [1]. In patients whose anterior teeth are missing and for whom no records are available, choosing the form of anterior prosthetic teeth becomes more difficult. The best artificial teeth are the ones that reflect the patient's sex and age, which render the prostheses morenatural[2,3]. Several criteria were presented to aid artificial tooth selection, and several methods were introduced to assess the best esthetic outcome of the definitive prosthesis after anterior tooth loss. Among the most well-established criteria is the form of the face for predicting the form of maxillary incisors[3]. Qualitative classification by Williams, first proposed in 1914, remains the most commonly

Received: Oct. 5, 2020: **Accepted**: Dec. 7, 2020
*Correspondence Dr. Mohammad Kashif Noorani.
Department of Prosthodontics, Dr BR Ambedkar Dental College and Hospital, Patna, Bihar, India.
Email: Not Disclosed

pISSN 2278-0076
eISSN 2321-9270

accepted method for determining anterior tooth form and has been supported by studies that link the form of the face or the maxillary arch with that of the maxillary incisors[4,5,6].

MATERIAL AND METHODS

50 dentulous patients with age between 20 -30 yrs were selected. Frontal photograph of each participant was taken in their rest position. Intra-oral photograph of maxillary central incisors was also captured for each participant. The outline of these teeth was traced and then imposed over the facial outline. Computer software (written by Pioneers Training Academy) was used to convert the outline of face & tooth into an X-Y function curve, which was saved as a comma -separated-value (.csv) file to be used for Fourier shape analysis. By increasing the number of harmonics, finer details are recorded for the shape. Only lower harmonic levels that describe the gross or the primary curvatures of an outline (H3-H5) were considered in the analysis of the results.

RESULT

Statistical software (Statistical Package for Social Sciences, v16; SPSS Inc) was used for data analysis. The post hoc Tukey test was used to allow comparisons within all possible pairs of outlines.The ANOVA results (Table 1) revealed no statistically significant differences between face and tooth outlines at any of the 4 shape harmonic levels (H3-H5) or at both projections (P>.05).

Table 1. Differences in mean harmonic coefficients within all outline pairs

Harmonic	Projection	Face
3	Peak	.666
	Side	.159
4	Peak	.331
	Side	.254
5	Peak	.473
	Side	.260

Significance levels: ≤.001 (*) and ≤.01 (**).

DISCUSSION

Robert[7]. Conducted a study to compare face shape with tooth form. Healthy individual natural maxillary incisors with minimal restorations were accepted. Standard close-up photographs of the teeth were made at right angles to the central incisors at a fixed focal length of 14.6 inches. They concluded that when both upper and lower segments are square, the category is square. When the upper segment is square and the lower segment is tapering, the category is square-tapering; for the reverse, it is tapering-square. When the segments are tapering in opposite directions, the category is ovoid. Wright [8]conducted a study to correlate between face form and tooth form in young adults. Study included a total of 632 young adults, of whom 600 presented data on both face and tooth form. They concluded that Face and tooth forms were similar in 39.3 per cent and identical in only 13 per cent of those examined in this study. Mavroskoufis [9] conducted a study on the face-form as a guide for the selection of maxillary central incisors. These observations showed that there is a much greater percentage of dissimilarity between incisor and face-form, both “actual” and “apparent” than similarity. Sellen [10]did a study to incorporate a computer program to analyze four esthetic factors: form of the face, arch form, palatal contour, tooth shape, and to determine whether there was correlation between tooth, face, and arch forms and palatal contour. Impressions were made of the maxillary dentition of 50 dentate undergraduate dental students with irreversible hydrocolloid impression material and casts formed. A standardized photographic procedure was used to record portrait slides of each subject’s face and of maxillary dental arches and central incisors made from dental casts. A comprehensive computer program was developed to correlate esthetic factors by superimposition. They concluded that Correspondence of outline forms through superimposition revealed an insignificant correlation between face, tooth, and arch forms.

Kanokwan [11] conducted a Fourier Analysis of Facial Profiles of Young Twins study quantitated facial profiles of twins using Fourier equations, determining their value in profile analysis and the assessment of the genetic contribution to facial shape. Standardized profile slide photographs of 79 pairs of 4–6 year-old twins (37 MZ pairs, 42 DZ pairs) were scanned and x and y coordinates were extracted from each profile using sellion and Camper’s plane as references. The coordinates were subjected to Fourier analysis and the normalised vertex projection coefficients were studied. Fourier

analysis could quantitate facial profiles of young children and differentiate some details, but was unable to discriminate between genetic and environmental influences, and any possible interactions between these influences, on their overall facial profiles at this developmental stage. the similarity between the face and the maxillary central incisor tooth outlines reported in the current study supports the theory of the association by Williams between the central incisor shape and the upside down shape of the face. Our results also are in agreement with similar findings reported by other more recent studies[3,5,6].

CONCLUSION

Tooth and face forms were quantitatively related. So, face form can be used reliably I selection of tooth form.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Ufuk Hasanreisoglu, Semih Berksun, Kerem Aras, Ilker Arslan. An analysis of maxillary anterior teeth: Facial and dental proportions. J Prosthet Dent 2005; 94:530-8.

2. Sellen PN, Jagger DC, Harrison A. The selection of anterior teeth appropriate for the age and sex of the individual. How variable are dental staff in their choice? Journal of Oral Rehabilitation. 2002; 29:853-857.

3. Ashraf I Shaweesh, Ziad N Al-Dwairi, Halah D Shamkhey. Studying the relationships between the outlines of the face, maxillary central incisor, and maxillary arch in Jordanian adults by using Fourier analysis. J Prosthet Dent. 2015; 113:198-204.

4. Semih Berksun, Ufuk Hasanreisoglu, Burak Gokdeniz, Computer-based evaluation of gender identification and morphologic classification of tooth face and arch forms, J Prosthet Dent. 2002; 88:578-84.

5. Lindemann HB, Knauer C, Pfeiffer P. Morphometric relationships between tooth and face shapes. Journal of Oral Rehabilitation. 2004; 31:972-978.

6. Vivianne Oliveira Pedrosa, Fabiana Mantovani Gomes França, Flávia Martão Flório, Roberta Tarkany Basting. Study of the morpho-dimensional relationship between the maxillary central incisors and the face, Braz Oral Res. 2011; 25(3):210-6.

7. Robert HW, Brodbelt LDSRCS, Geoffrey F, Walker Derek Nelson, Laurence W Seluk. Comparison of face shape with tooth form,

8. Wright WH, Pittsburgh Pa. Esthetics Selection of Teeth and Correlated Factors. Jour. ADA, 1941; 28.

9. Mavroskoufis F. Ritchie GM. The face-form as a guide for the selection of maxillary central incisors. The Journal of prosthetic dentistry, 1980, 43.

10. Sellen PN, B Phila DC, Jagger A Harrison. Computer-generated study of the correlation between tooth, face, arch forms, and palatal contour. J Prosthet Dent. 1998; 80(2):163-8.

11. Kanokwan Tangchaitrong, Louise Brearley Messer, David C, Thomas Grant, Townsend Fourier. Analysis of Facial Profiles of Young Twins. American Journal of Physical Anthropology. 2000; 113:369-379.