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Evaluation of Ideal Proportions in Maxillary Anterior Teeth of Natural Dentition

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Abstract
Aim and Objective: *The aim of this study was to evaluate the existence of Golden Proportion, Recurring Esthetic Dental Proportion (RED) and Golden Percentage between maxillary anterior teeth of natural dentition in different groups of people.*
Material and Methods:*A cross-sectional observational study was conducted inMamata dental college and Hospital, Khammam. The Study was conducted with a sample of 80 people which includes 40 students (20 male and 20 female) and 40 patients (20 male and 20 female) in the age group of 20-40years. Standardized frontal images of all the samples were captured using digital camera. Width of each tooth was measured with Adobe Photoshop 7 and data analysis was done with SPSS version 17 and paired two way ANOVA was performed.*
Results:*Golden proportion did not exist between maxillary anterior teeth of natural dentition. RED proportion was not constant between central and lateral and lateral and canine. Golden percentage was constant with values 13,15,20,20,15 and 13%.*
Conclusion:*The golden proportion and RED proportion was not found to exist between maxillary anterior teeth of natural dentition. The theory of golden percentage was more applicable to the subjects of this study.*
Keywords:*Golden proportion, Recurring esthetic dental proportion, Golden percentage, Maxillary anterior teeth.*

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I. Introduction:

Disordered teeth reflect asymmetry and anything asymmetrical is not clearly esthetic. The size and form of maxillary anterior teeth are important factors in dental and facial esthetics.Defect is realized soon after perfection is recognized. The goal of the dental treatment is to restore ideal teeth relations in uniformity with the overall facial appearance.

The term "esthetic" or "unesthetic" implies something which is pleasant or unpleasant.[1]Golden proportion, Recurring Esthetic Dental proportion, Golden percentage are theories utilized in esthetics.[123]The Golden proportion mathematically denotes ratio of smaller to larger[2]. Recurring esthetic dental proportion is the successive width of teeth remaining constant when progressing distally from the midline[3]. Golden percentage is the bilateral analysis of the width of six anterior teeth[4] .

The "Simple" relationship, larger-part-to-smaller-part exists on either side of the midline,which is the most common of the subtle variations seen in nature and in natural dentitions.[2]The present study aimed to compare the three different mathematical proportions among different groups of people with natural dentition.

II. Aim And Objective:

The aim of this study was to evaluate the existence of Golden Proportion, Recurring Esthetic Dental Proportion (RED) and Golden Percentage between maxillary anterior teeth of natural dentition in different groups of people.

III. Materials And Methods:

Subject selection:

Sample size of 80 was taken, which includes 40 students (20 male and 20 female) within the age group of 20 -25 years and 40 patients (20 male and 20 female) within the age group of 30 to 40 years.

Inclusion criteria:

Natural maxillary anterior teeth, teeth with no size alterations and absence of anterior restorations.

Exclusion criteria:

Presence of spacing, crowding and rotations, Subjects who have undergone orthodontic treatment.

Image capture:

Standardized frontal image of each subject smile was taken using digital camera. The camera was positioned and adjusted so as to obtain sharp image of the face, from the tip of the nose to tip of the chin. The camera was stabilized with tripod at 60cm fixed distance. The subject was asked to smile and image was captured. The images were then downloaded to a computer and all the measurements were taken with the help of software Adobe photoshop 7.

Measurements:

Measurements of all the teeth were taken by ruler or measurement scale present at the top of the software Adobe photoshop 7 and calculated by applying the formulas given below:

Golden Proportion: - Width of tooth x 62%

Recurring Esthetic Dental Proportion: - Width of lateral incisor/width of central incisor x 100

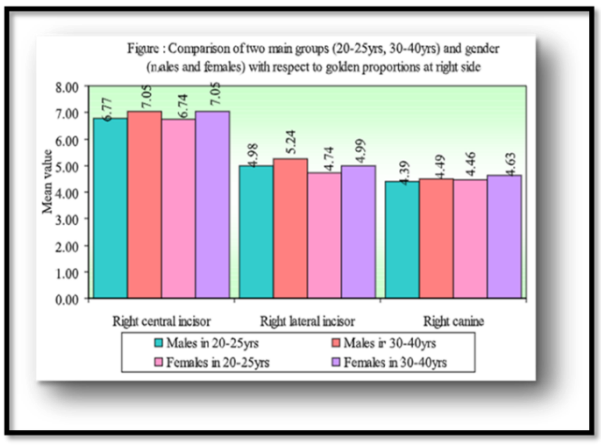
Golden percentage: -Width of C.I, L.I, Canine/width of six anteriors x 100

IV. Results:

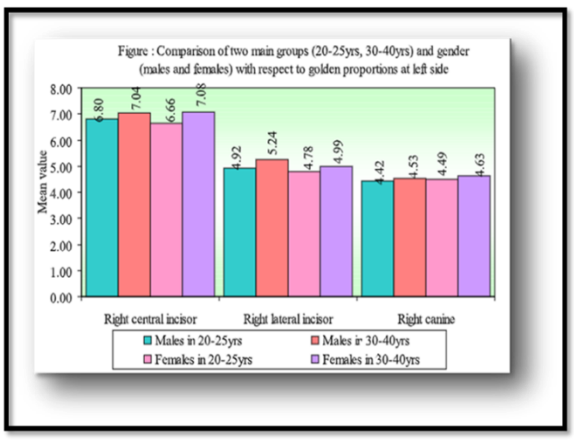
With respect to golden proportion there was no significant difference between different age groups or gender. Golden proportion of central incisor is 6, lateral incisor is 4 and canine is 4 on either side of the midline. (Graph 1and 2)

With respect to Recurring esthetic dental proportion all the groups have shown similar results i.e. within the range of 70-86. The ratio increases as it moves distally. (Graph 3)

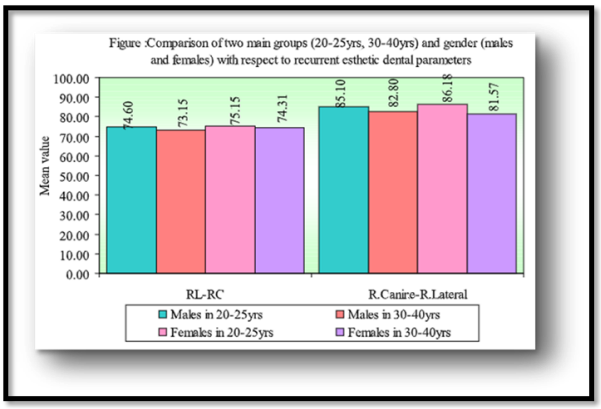
Golden percentage value of central incisor is 20, lateral incisor is 15 and canine is 13 which is similar to standard values.(Graph 4)

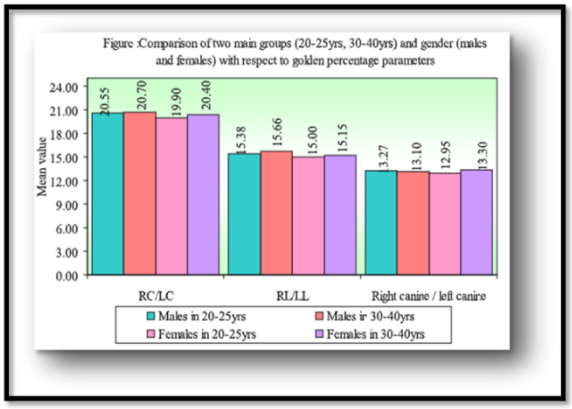


Graph – 1



Graph – 2





Graph – 3Graph – 4

V. Discussion:

Ideal proportions are useful for evaluation of symmetry, dominance and proportion in the application of esthetic dental treatment. The present study was conducted on 80 people, out of whom 40 were dental students (20 male and 20 female) and 40 were patients (20 male and 20 female). A method for determining the ideal size and position of anterior teeth has been described in this study. With the diversity that exists in different age groups and gender, rarely the teeth follow mathematical rules of smile design.

Levin suggested the golden proportion to relate successive width of the anterior teeth as viewed from the labial aspect. He stated the width of the central incisor should be in golden proportion to the width of the lateral incisor and the lateral incisor should be in golden proportion to the width of the canine[2].In contrast, in the study done by Preston JD there is no golden proportion relationship for the perceived anteroposterior progression of the maxillary arch.[5] Ward suggested the Recurring esthetic dental proportion as the proportion of the successive width of the teeth remaining constant when progressing distally from midline[3]. Snow considered a bilateral analysis of apparent individual tooth width as a percentage of the total apparent width of the six anterior teeth[4] .

In the current study, images of all the subjects were captured during the smile and measurements of all the teeth were taken with the help of the software Adobe Photoshop 7. This is similar to the analysis done in previous study with the aid of digital photographs and computer analysis.[6]

The results of the present study revealed that Golden proportion did not exist between the widths of the maxillary anterior teeth in individuals who have an esthetic smile. This was in accordance with the study conducted by Fayyad et al and Mashid et al. In their study overall results showed that golden proportion did not seem to exist[7] [8] .The ratio between central and lateral incisors and canines are not constant i.e. the ratio increases as it moves distally. Hence, there is no evidence in this study to support RED proportion theory.This result was similar to the result in a study conducted by MahmoodDashtiet al.[9]

Golden percentage value of central incisor is 20%, lateral incisor is 15%, and canine is 13%. These values are nearer to values suggested by snow i.e. 23% for centrals, 15% for laterals and 12% for canines which are more applicable to natural dentition and appear to be of significant benefit in esthetic smile design.[4]

Frush and Fisher suggested that sex, age and personality related to the contour of the anterior dental segment. [10] In the present study ratios of the ideal proportions are not influenced by either different gender or age groups.This result is similar to the study conducted by Fayyad et al, in which Gender has no statistically significant effect when the golden proportion, RED and the golden percentage were applied[7] .The principles of these mathematical proportions can be systematically applied to evaluate dental esthetics in predictable ways.

VI. Conclusion:

The Golden proportion and RED proportion was not found to exist between maxillary anterior teeth on natural dentition. The theory of Golden percentage was more applicable to the subjects of this study.

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