Analysing The Golden Proportion Between The Vertical Measurements Of The Upper Third, Middle Third And Lower One Third Of Face In Different Facial Forms In Males And Females.

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ABSTRACT:

Introduction: The human face is a complex source of information, influenced by ethnicity, gender, and age. However, attractive faces often share ideal proportions related to the golden ratio, suggesting a universal standard of beauty amidst diverse characteristics.

Aim: To determine correlation between different facial form with height of upper, middle, and lower one third of face using golden ratio in males and females.

Methods: The sample consisted of 82 patients (41 females and 41males) ranging in age group of 18- 30 years. The following parameters were observed and analyzed: 1) the vertical measurement of the upper, middle third and lower one third of the face, in different face forms: to determine if there is a presence or absence of the golden ratio.

Results: Showed that the 85.3% of females and 40.3% of the males followed the golden proportion between the vertical measurements of the upper third, middle third and lower one third of face in different face forms.

Conclusion: While comparing both the genders it is seen that females followed the ideal golden ratio more than the males in different facial forms.

Keywords: Upper, Middle third, Lower one third of face, Golden ratio, Extra-oral photography, Face forms.

INTRODUCTION

The evolution of orthodontics during the 20th century followed an interesting path in the assessment of facial esthetics and attractiveness. Facial aesthetics is an important concern of the current society. Social acceptance, psychological well-being, and self-esteem of an individual are all related to facial form and attractiveness. Improvement of facial appearance is the most frequently reported subjective reason for seeking orthodontic treatment.[1,2] The divine proportion also known as golden proportion, has a value of 1.618, this number is found in numerous natural phenomena, geo-metrical propositions, and human architectural constructions. The Golden Proportion is found in many cephalometric measurements and in various stages of facial growth.[3]

Ricketts was the first orthodontist to publish a study of facial dimensions and their relationship to the golden ratio and facial aesthetics.[4] And also the mankind has always attempted to define beauty and to elucidate key elements of facial aesthetics [5].The traditional notion that beauty is directly linked to specific symmetrical proportions has been challenged over time, from ancient Greek ideals to modern surgical practices, as the understanding of beauty's complexity and subjectivity has grown definition of

symmetry as a precise and well-defined concept of balance, or 'patterned self-similarity.'

The golden proportion mathematically states that the ratio of a smaller length to a larger length is equal to the ratio of the larger length to the whole length, which is equal to 'phi' that is equal to 1.618. This is the concept of the golden proportion.[6]

A Greek Philosopher Aristotle defined beauty as a sense of harmonious proportionality. Since then, various aesthetic proportions have been proposed, including the 1:1 ratio and the facial division into thirds. However, the "golden ratio" is often considered the most aesthetically pleasing proportion, commonly seen in nature and artistic creations. It's believed to be a key characteristic of beauty[7].

AIM AND OBJECTIVES

To determine correlation between different facial form with height of upper, middle, and lower one third of face using golden ratio in males and females.

MATERIALS AND METHODS;

The study was observational and also cross-sectional in nature. The inclusion criteria of this study was followed. 1) Age group of 18 to 30 years 2) No previous orthodontic treatment. The exclusion criteria of this study were followed. 1) Facial asymmetry 2) Facial deformities. 3)Improper growth of face 4) Congenital and craniofacial anomalies. 5) Head injury 6) Photographs with poor quality images. The sample consisted of 82 subjects (41 females and 41 males) of age groups 18- 30 years. The following parameters were observed and analyzed on photographs: 1) the vertical measurement of the upper, middle third and lower one third of the face, in different facial forms.

METHOD:

Photographic method: A portrait of the patient's face was obtained with a standardized photographic method (Canon EOS 650D). A photograph of the patient was obtained and the reference points, ABC were marked on the photograph. The vertical measurement of upper third (hair line to glabella), middle third (glabella to upper lip line) and lower one third (lower lip line to menton) is measured from us in soft tissue landmarks using the Ink-scape application. (fig :1)

Marking of reference points: The vertical measurement of upper third (hair line to glabella), middle third (glabella to upper lip line) and lower one third (lower lip line to menton) is measured from us in soft tissue landmarks using the Ink-scape application.

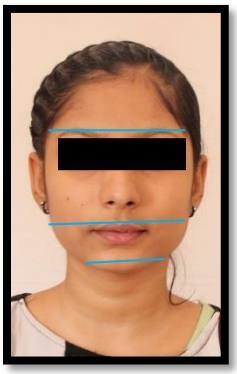

Fig:1 Vertical measurements of Upper third Middle third and Lower one third of the face.

RESULTS

Table 1: Comparison of vertical measurement of face (upper 1/3rd, middle 1/3rd and lower middle third) in

different face forms in males and females which follows the golden ratio.

Golden ratio	Males (41)		Females (41)		p value
	Frequency	Percentage	Frequency	Percentage	
1.618	19	46.3%	35	85.3 %	p=0.746 NS

Table:1: The results of present study revealed that (46.3%) of males and (85.3%) of females had facial proportions consistent with the golden ratio (1.618), but the difference between genders was not statistically significant (p=0.746).

DISCUSSION

Ricketts was the first one to apply divine proportion to the composition of facial hard and soft tissue. He used these divine proportion a guide for planning orthognathic surgery after detailed examination of lateral, frontal cephalogram and photographs. He showed that for a beautiful face, proportion in face was related to golden ratio.[10]

Anand Awadhesh Tripathi et al.[11], study was conducted on North Indian females using Ricketts divine proportion analysis on frontal photographs concluded that the ratios in transverse and vertical dimension as well as soft tissue of attractive face affirmed to the divine proportion.

Edmundo Medici Filho etal.[12], study analyzed frontal photos using Ricketts' divine proportion analysis and found that divine proportions in facial soft tissue were more prevalent in females than males.

Anand Awadhesh Tripathi etal.[13] concluded that Ratios in transverse and vertical dimension as well as soft tissue of attractive face affirm to the divine proportion.

Yasushi Mizumoto etal.[14], the subjects in the 3 groups of Asian women: group 1, 30 young adult patients with a skeletal Class 1 occlusion; group 2, 30 models; and group 3, 14 popular actresses, showed good total facial proportions. The proportions of the face-height components in group 1 were similar to the golden proportion, which indicated a longer, lower facial height and shorter nose. Group 2 differed from the golden proportion, with a short, lower facial height. Group 3 had golden proportions in all 7 measurements. The proportion of the face width deviated from the golden proportion, indicating a small mouth or wide-set eyes in groups 1 and 2.

Romilkumar Shah et al.[15], concluded that the findings of this study state that the perception of aesthetically pleasing faces by laypersons do not accurately follow golden proportion but are close enough to it. The faces not showing golden proportions are perceived as less attractive.

Kerem Sami Kaya et al.[18], concluded that the measurements and proportions for facial balance in the study population showed that the facial width and height proportions deviated from the golden proportion.

Crystal R Soans et al.[19], concluded that golden proportion can be used as a guideline in orthodontic treatment planning. However, it should not be the decisive factor in determining facial attractiveness.

Arezoo Jahanbin et al.[20], concluded that the results suggested the perception of beauty is influenced by the Divine Proportions and Tr-Me:Tr-Sn(Trichion to Menton :Trichion to Subnasale) and Tr-Me:N-Me (Trichion to Menton : Nasion to Menton and are the most influential ratios in the perception of the beauty of profile; however, if the Divine Proportion is to be used in treatment planning, it should be used along with other factors.

Alberto Rossett et al.[21], concluded that ratios between 3D facial distances were not related to attractiveness. Most of the facial ratios were different from the golden ratio.

Angelos Mantelakis et al[22]concluded that only one facial ratio was observed to be similar to the golden proportion in professional model facial photographs. No correlation was found between facial ratios in professional black models with the golden proportion. It is proposed that an individualistic treatment for each ratio is a rather better method to guide future practice.

The limitation of the present study, the divine proportion, or golden ratio, has several limitations when applied to human facial aesthetics. One major limitation is subjectivity, as beauty is perceived differently by individuals. Additionally, cultural variability plays a significant role, with facial beauty standards differing across cultures. Furthermore, individual uniqueness means that strict adherence to the golden ratio does not guarantee attractiveness, as each face has its own distinct characteristics. The golden ratio also has a limited scope, primarily focusing on proportions while neglecting other essential facial features and overall facial harmony.

CONCLUSION:

1. The present study concluded that all vertical facial proportions in both the gender follows golden ratio. In females it is (85.3 %), and in males it is (40.3 %). Although not an absolute criterion of facial attractiveness, the divine proportion can be used as a guide in planning orthodontic treatment, orthognathic surgical procedures like asymmetry correction, chin augmentation, and cosmetic procedures like rhinoplasty and cheiloplasty.

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