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EVALUATION OF FACIAL DIVINE PROPORTION IN SOUTH INDIAN POPULATION

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Abstract:
Aim: To evaluate facial divine proportion and its relationship to facial attractiveness in the south Indian population.
Materials and Methods: For evaluation of facial divine proportion frontal photographs of 100 subjects between 18 to 25 years of age were taken. These photographs were then analyzed for various parameters of facial proportion.
Result: The results of our investigation showed that a relationship exists between the divine proportion and the perception of beauty.
Conclusion: This study shows that most of the facial proportions of people who are considered attractive conform more or less to the divine proportion (1.618), but some parameters are slightly deviated.
Key Words: Divine Proportion, Facial Attractiveness, Aesthetics & South Indian Population

Introduction:

Beauty or facial attractiveness almost always elicits a favorable reaction during social interaction. Physical appearance plays a very important role in determining behavioral patterns This beauty is basically determined by the facial skeleton or soft tissue structures [1] The study of the face and the ability to alter its structure through prosthodontics, orthodontics and surgery requires a thorough analysis and evaluation of facial symmetry and proportion. Ricketts [2,3] was the first to claim that analysis of a face could be done mathematically using the divine proportion."Divine proportion" is a term which is used to describe the division of a line such that the ratio of the smaller section to the larger one equals that of the larger section to the whole. [2]

Materials and Methods:

The sample used for this study consisted of 100 subjects who were selected based on the inclusion criteria given below.

Inclusion Criteria:

- ✓ South Indian subjects between 18 to 25 years of age
- ✓ No history of trauma to the dentofacial region
- ✓ No marked facial asymmetry
- ✓ No previous history of facial surgery

Frontal facial photographs were taken of all 100 subjects. The acquisition of standardized photographs was done based on guidelines followed in previous studies [3][4]. A digital camera was set up on a tripod stand at fixed distance from the subject. Subjects were seated on an adjustable stool and instructed to hold the head in the natural head position by looking straight into a mirror hung at eye level. An effort was made to keep the interpupillary line parallel to a horizontal ruler. The photographs were taken without any spectacles.
The photos that were taken were then cropped and converted to black and white images.

Photographic Points Used in Study:

The following points are located on the frontal facial photographs according to definition given by Ricketts [3]

- ✓ Trichion (TR) – the point at the top of the forehead at the junction of the face and skull fascia (hairline)
- ✓ Lateral canthus (LC) – the point at the lateral canthus of the eye
- ✓ LN – Lateral rim of nose
- ✓ Chelion (CH) – the point at the corner of the mouth
- ✓ Menton (ME) – soft tissue menton.

Three transverse and seven vertical linear measurements of the face were taken.
The vertical facial proportions were - TR–ME: LC– ME, TR–LN: LN–ME, LC–LN: LN–CH and CH–ME: LN-CH.
The two transverse facial proportions were - CH: LN and LC: CH.

An updated version of the ImageJ computer software was used to take the measurements and also used to analyze the photographs. For each photograph, the scale was set in the ImageJ software, keeping the unit of length as centimeter. This enabled accurate measurements of the photographs.
The data so obtained was subjected to statistical analysis.

Results:

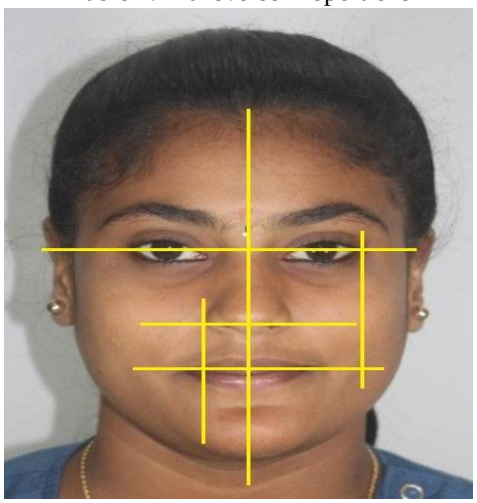
Vertical Facial Proportion	Mean
TR – ME : LC – ME	1.65
TR – LN : LN – ME	1.57
LC – LN : LN – CH	1.46
CH – ME : LN - CH	1.64

Table 1: Vertical Proportions

Table 1 shows the vertical facial proportions TR–ME: LC– ME, TR–LN: LN–ME, LC–LN: LN–CH and CH–ME: LN-CH which are very close to the divine proportion.
Table 2 shows the transverse facial proportions CH: LN and LC: CH. When compared to vertical facial proportions, the transverse facial proportions deviate more from the divine proportion.

Transverse Facial Proportion	Mean
CH : LN	1.39
LC : CH	1.45

Table 2: Transverse Proportions



Discussion:

Ricketts [2,3] applied the divine proportion to the composition of hard and soft tissues and showed that faces generally considered attractive are very closely related to the divine proportion. But there are various studies that suggest that a marked difference exists in the soft tissue morphologies of different ethnicities. One such study by Barnes et al [5] reports that the faces of North American black men show a strong relation to the golden proportion. A study by Kawakami et al [6] shows that the deviations from the golden proportion were more in males when compared to female subjects. Table 1 shows that of the four vertical facial proportions obtained in this study, two are extremely close to the golden proportion. On the other hand Table 2 shows the transverse facial proportions, which are quite widely deviated from the value of the golden proportion. But the values obtained are quite close to the Silver ratio (1.318). The Silver ratio was introduced by Yanagi [7]. A study conducted by Mizumoto et al [8] found that the transverse facial proportion of Japanese women was close to the Silver ratio rather than to the golden ratio. Thereby we find that the results obtained in our study correspond to previous studies [2,3] that there exists a relationship between the perception of beauty and the golden proportion.
However we should also keep in mind the popular saying, “Beauty lies in the eye of the beholder”. Hence no matter how many mathematical equations or values are applied, we cannot confine the perception of beauty or attractiveness to a fixed value. It ultimately depends on individual discernment. One of the principal drawbacks of this study was the selection of subjects. All subjects were selected from Chennai, thereby by restricting the subject pool to a single place and small number. Hence this study cannot be taken as a representation of the entire South Indian population.

Conclusion:

This study showed that most of the facial proportions of the subjects selected based on the inclusion criteria was very close to the golden proportion. However some of the proportions, namely, the transverse proportions deviated rather widely from this value. The transverse proportions were closer in value to the Silver ratio. So in conclusion we may infer that there is definitely, to some extent atleast some relationship that exists between the divine or golden proportion and the perceived beauty of an individual.

Conflict of Interest:

We, the authors, declare that we do not have any conflict of interest in relation to the publication of this study.

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