

Influence of Proportions of the Nose on Aesthetic Score of an Individual- A Pilot Study

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ABSTRACT

Introduction: Achieving an ideal dental, skeletal and appealing soft tissue adaptation and profile of the patient is of utmost importance postorthodontic treatment. The soft tissue profile is the key determinant of the aesthetics of the individual. Nose, being the centre of the face, plays a major role in determining the aesthetics. But, do morphological changes of the nose influence the perception of aesthetics?

Aim: To assess if the proportions of the nose influence the aesthetics/aesthetic score of an individual.

Materials and Methods: The present pilot cross-sectional study was conducted on 50 patients reporting to the Outpatient Department (OPD) at Saveetha Dental College and Hospitals, Chennai, India, who were randomly selected to participate in this study. Calibrated anterior and right lateral profile view photographs as black and white images were taken. The basal alar width,

length of the nose and the nasal index were calculated using software. Each photograph was also scored on a scale of 0-10 by 4 individuals on the basis of their perception of aesthetics to determine the aesthetic score. The obtained data was tabulated and statistically analysed using Pearson's correlation method.

Results: Mesorrhine type of nose was the most prevalent type of nose in the selected population. A negative correlation was observed between nasal index and aesthetic score (-0.047) that was statistically non significant (p -value>0.05). Patients with leptorhinne type of nose have an increased aesthetic score than mesorrhine and platyrrhine type of nose.

Conclusion: The type of nose does not influence the aesthetics of an individual. The divine or golden proportions are not the actual determinants of facial attractiveness and aesthetics. The golden proportions are one of the determinants of facial attractiveness and aesthetics.

Keywords: Golden proportion, Leptorhinne, Mesorrhine, Nasal index, Platyrrhine

INTRODUCTION

Many features that determine or attribute to beauty are less learned and hence "Beauty is in the eye of the beholder" may ring true in these conditions. This begins with evaluating the face by assessing the underlying skeletal structures to determine any form of disproportion or asymmetry [1]. The face is evaluated by dividing into horizontal thirds and vertical fifths. This way, any disproportions of the face leading to asymmetry can be evaluated. For the horizontal thirds, the face is divided and the distance from the hairline to glabella, the glabella to the subnasale, and the subnasale to the menton is measured. These three sections typically are $1/3^{\text{rd}}$ of the total facial height and are hence proportionately divided. For the evaluation of the vertical fifths, the face is divided equally with reference to the eye. The face is also divided into vertical fifths, in which each part is equal to the width of the eye. The nose fits into the central $1/5^{\text{th}}$ which forms the centre of the face [2].

The ancients were the firsts to describe the golden proportion concept. The golden proportion is an aesthetically pleasing facial feature to the eye which occurs naturally. The golden ratio is 1.61803 and is the Greek letter phi (ϕ) represents the same [3]. Though golden proportion is the most appealing, it may not be the only component that describes attractiveness or the aesthetic characters of an individuals. As the nose is located at the centre of the face, it acts as an important component determining the aesthetics [4]. The size, shape and proportion of the nose may determine its harmony with the face and due to its central position it can be subjected to a greater degree of scrutiny. It has to be kept in mind that smaller facial asymmetries usually get unnoticed but those involving the nose are usually noted [5]. All these considerations involving the aesthetics of the nose are secondary to its function but currently the concepts are vice-versa.

So, do these proportions directly affect the perception of aesthetics of an individual? Studies conducted previously [6,7] have evaluated the improvement of aesthetics postcosmetic correction of nasal morphology. But no study has evaluated the aesthetic score prior to any intervention and if there is a need for the same. The aim of the present study was to evaluate using photographs if nasal proportions have a direct influence on the aesthetics of an individual.

MATERIALS AND METHODS

The present study was a pilot cross-sectional study conducted at Saveetha Dental College and Hospitals, Chennai, India, using extraoral photographs of study subjects. The study proposal and methodology were approved by the ethical committee of the institute and the ethical approval number is IHEC/SDC/ORTHO-2004/22/387. The study was conducted over a period of three months between January 2022 to March 2022.

Fifty volunteers aged between 18-25 years reporting to the Outpatient Department of Orthodontics at Saveetha Dental College and Hospitals, Chennai were randomly selected. The sample size of the present preliminary study could not be calculated as no previous study has conducted a similar type of research.

Inclusion criteria: In order to eliminate confounding factors such as beard and moustache which may affect the recordings of the study, only female population was included. Female patients aged between 18-25 years with no skeletal malocclusion, class 1 skeletal pattern, no any other type of angle's malocclusion, no previous history of surgery or any other interventional aesthetic therapy, no previous history of trauma were included in this study. Skeletal class 1 subjects were included to eliminate bias with perception of aesthetics. To eliminated the influence of ethnicity, only Dravidians were recruited into this study.

Exclusion criteria: Patients above the age of 25 years (as most patients visiting the orthodontics department were within 25 years

of age), males, syndromic patients, patients with a history of trauma, surgically corrected nasal deformities, cleft patients were excluded from the study.

Study Procedure

Calibrated extraoral frontal and profile photographs were taken with a Nikon D5300 DSLR with a 90 mm Tamron macrolens with an ISO:100, F18 and Shutter speed of 1/200. To ensure standardised calibrated images, a centimetre scale was placed in the background and frontal and right lateral extraoral photographs were taken by the same operator using the same camera settings. To obtain standardised and repeatable images, all images were photographed at a distance of 1.5 m from the subject. The obtained images were stored as black and white photographs digitally. This was done in order to avoid differences or bias due to skin tone. For obtaining the numerical of nasal proportions, the images were imported on Webceph software and calibrated using the scale used in the background [Table/Fig-1].

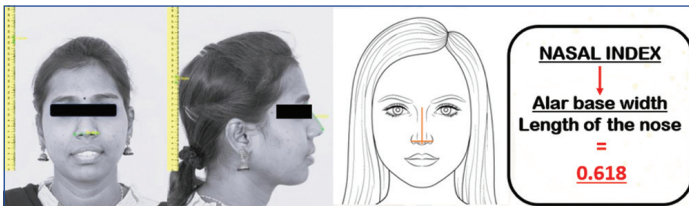


[Table/Fig-1]: Calibrated frontal and right profile photographs imported on web ceph software.

The following measurements were made on the images [Table/Fig-2].

- Alar width AL-AL,
- Length of the nose (nasion to pronasion) [4]

The nasal index was calculated as the ratio between the breath or alar base width and the height of the nose [Table/Fig-2].



[Table/Fig-2]: Basal alar width measurement (AL-AL), length of the nose (Nasion-Nasal Tip) and nasal index calculation guide [4].

With reference to the calculated values of nasal index, the population included was divided based on the type of nose into 3 groups:

Group 1: Leptorhinne type of nose

Group 2: Mesorrhine

Group 3: Platyrhinne [9].

Leptorhinne type of nose is long and narrow nose types usually seen in Caucasians. Mesorrhine type of nose are medium nose types usually seen in Asians and Platyrhinne type of nose are broad and flat types usually seen in Africans [9].

Scoring of photographs for aesthetic score: Photographs with the required settings and criteria were taken and scored on a numerical scale of 0-10 where 0 is the lowest limit and 10 is the highest limit of scoring by 4 separate individuals who are not dentists by profession. The photographs were randomly placed in slide show, and each set was shown for 15 seconds. The values were tabulated and an average of the aesthetic score was taken as the final score of the individual.

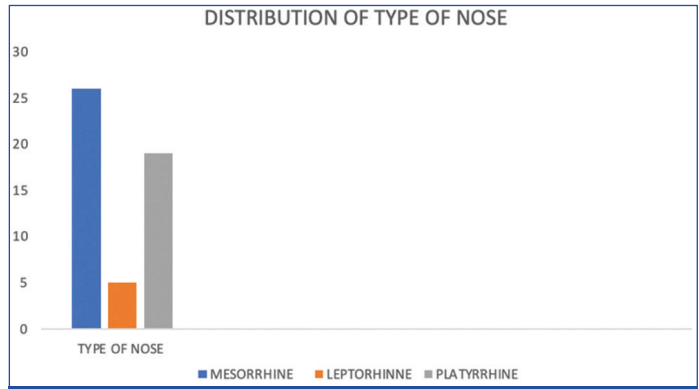
STATISTICAL ANALYSIS

The measurements made on the photographs were tabulated and the nasal index value for each subject was noted in Microsoft Excel. The average of the aesthetic score was calculated and noted against each volunteer's nasal index value respectively. The data from the excel sheet was imported to Statistical Package for the Social

Sciences (SPSS) software version 23.0. Descriptive statistics was done to enumerate the incidence of the type of nose in the given selected population. A Pearson's correlation statistical test was done between the parameters, nasal index and aesthetic score to determine if the two have a positive or negative effect on each other.

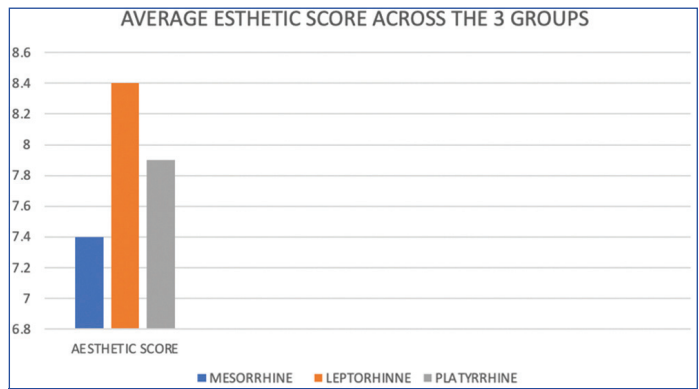
RESULTS

A total of 50 photographs were collected and the respective data was tabulated and analysed. The distribution of the type of nose in the given study population is illustrated in [Table/Fig-3]. The figure shows that 26 subjects have a Mesorrhine type of nose which is the most predominant type followed by platyrhinne (n=19) and Leptorhinne (n=5).



[Table/Fig-3]: Distribution of the type of nose.

The average aesthetic score for each type of nose is illustrated in [Table/Fig-4]. On analysing the aesthetic score, subjects with Mesorrhine type of nose had an average score of 7.6, subjects with platyrhinne type of nose had an average aesthetic score of 7.9 and subjects with Leptorhinne type of nose had an average aesthetic score of 8.4.



[Table/Fig-4]: Average aesthetic score across the three different types of noses based on nasal index.

On correlation of the above 2 parameters, a negative correlation was observed between the aesthetic score and type of nose which is found to be statistically non significant. The data from Pearson's statistical correlation is tabulated in [Table/Fig-5].

| Parameters | Pearson's correlation | Significance 2 tailed |
|--------------------------------|-----------------------|-----------------------|
| Nasal index vs Aesthetic score | -0.047 | 0.746 |

[Table/Fig-5]: Pearson's correlation value and p-value for nasal index vs aesthetic score.

DISCUSSION

It can be observed from the present study that Mesorrhine type of nose (52%-26 subjects) was the most common type followed by platyrhinne and then Leptorhinne. The average aesthetic score of Leptorhinne (8.4/10) was found to be higher than platyrhinne and Mesorrhine. On correlation of the aesthetic score with the nasal index, a negative correlation was observed which indicates that the nose is not the only component that influences the aesthetic score.

As the nasal index decreases, the aesthetic score increases. But the results were statistically insignificant (p -value=0.746). This also indicates that a longer nose is more attractive than an ideal and broader nose. Right from the Greeks, to the Renaissance, and current day surgeons, clinicians, artists and cosmetologists, a correlation of facial aesthetics with the golden proportions has been done. This has been truly shown by that a face can be perceived beautiful if it abides by the golden proportion [10-13]. It is a known fact that the golden proportion is the most appealing but it may not be the only factor to determine aesthetics. This could be well-understood by the results obtained from a study conducted in Malaysian population where the authors had concluded that the perception of aesthetics was not significantly influenced by the golden proportion [14]. A few studies have also highlighted the variations in golden proportions with respect to varied ethnic groups while still being attractive and pleasing [15,16].

Few researches from the past have put forth a validated point that the golden ratio or proportions need not be considered as an aesthetic ideal while rehabilitating the anterior dental segment [17-19]. Another recent study conducted among Brazilian population consisting of 37 female and 44 male undergraduate students aged around 21-year-old, demonstrated that their facial proportions were not significantly dimensioned according to the golden proportion. With the current available and past literature, it can be validated that the golden proportions cannot be used as the only ideal method to describe aesthetics of the dental and facial structures [20-22]. These are only guidelines and are expected to evolve and change with time and with respect to patients' expectations. In Orthodontics, the horizontal proportions are used as ideal measurements to help improve the occlusal stability, temporomandibular joint function and correct asymmetries and jaw discrepancies via orthognathic surgeries. These act as guide for treatment planning in order to achieve a harmonious face while correcting the disharmony [16].

Considerations from the patient's perspective are always kept as the first priority while treating them. They present with requests for facial rejuvenating procedures which involve procedures of the nose, lip as well as chin and cheek augmentation. Hence, it needs to be understood that enhancing aesthetics cannot be a site-specific procedure but is a holistic approach as all features of the face are cumulatively involved. Hence, one must consider these factors which establishing treatment outcomes and consider the overall aesthetics rather than relying only on the golden proportions.

Limitation(s)

The study methodology is subjective as the aesthetic scores might tend to vary. Secondary facial features and characteristics may also influence the scoring of subjects. The given study was conducted in a small population group and hence larger samples should be included.

Further research can be carried out amongst various other age groups and races. Dentate and edentate population can also be compared as well, with larger and equal sample size.

CONCLUSION(S)

A negative correlation which is not statistically significant was observed between the aesthetic score and type of nose. Morphology of the nose cannot be the only component that governs the aesthetics of an individual. All structures surrounding the nose cumulatively influence the overall aesthetics of the individual. Hence, a comprehensive approach is advocated in order to enhance the aesthetic of an individual.

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