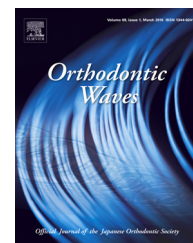


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Original article

Influence of nose contours on aesthetic perception of maxillary incisor inclination in smiling facial profile of Indian subcontinent people

Arun Kumar Dasari BDS, MDS, Kaladhar Reddy Aileni BDS, MDS, Madhukar Reddy Rachala BDS, MDS*, Nagam Reddy Shashidhar BDS, MDS, Chagam Reddy Manjunatha BDS, MDS

Department of Orthodontics, SVS Institute of Dental Sciences, Mahabubnagar, Telangana, India

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ABSTRACT

Purpose: This study was aimed to evaluate the perception of maxillary incisor inclination (MxI) on smiling facial profile with respect to various nose contours by orthodontists, general dentists and laypeople.

Materials and methods: One male and one female smiling facial profile photograph with a Class I occlusion on skeletal Class I jaw bases with normal profile were digitized. Each photograph was altered by changing the incisor inclination (+5°, +10°, -5°, -10°) and nose contour (straight, convex & concave) to obtain 15 photographs and were randomly distributed among the three groups to score the attractiveness using visual analogue scale.

Results: Significant differences ($P < 0.05$) were detected when each photograph's ratings were compared. Convex nose contour with any MxI was rated as aesthetically unattractive by orthodontists whereas in concave nose subjects up to 5° labial inclination was preferred (P value 0.4440). Among the dentists and laypeople group up to 10° of lingual inclination in convex nose subjects and 5° of both labial and lingual inclinations in concave nose subjects were rated as attractive.

Conclusion: Change in the nose contour showed a statistically significant change in the aesthetic perception of maxillary incisor inclination among all the three groups.

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1. Introduction

Facial beauty is the main concern for patients who seek orthodontic treatment. A beautiful face has balanced harmony

among all parts of the face like forehead, orbits, zygomas, nose, lips, chin and throat. In the evaluation of facial aesthetics, orthodontists should consider both the frontal and lateral views, of which smiling profile view is an integral part. The face in profile is divided into three equal 1/3rd parts

* Corresponding author at: Department of Orthodontics, SVS Institute of Dental Sciences, Mahabubnagar 509002, Telangana, India. Tel.: +91 9704364411.

E-mail addresses: dr.dasari.arun@gmail.com (A.K. Dasari), drakaladhar@yahoo.co.in (K.R. Aileni), mrachalaortho@yahoo.co.in (M.R. Rachala), nagamsr@gmail.com (N.R. Shashidhar), chagam.manju@gmail.com (C.R. Manjunatha). <http://dx.doi.org/10.1016/j.odw.2015.03.002>

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(upper, middle and lower) [1]. The nose, which occupies the middle third of the face has a dominating effect on the facial appearance, helping to establish the character of the midface. In sixth century BC, Sushruta [2] (great surgeon and teacher of Ayurveda, the ancient Indian system of medicine) described that, of all the organs in the body, the nose is considered the primary organ in relation to respect and reputation because of its prominent central position (in middle third), which captures the attention of the observers and markedly influences the people's perception.

It is necessary to see the whole face in smile analysis and be aware of the fact that, in addition to the teeth and lips, there are three other major aesthetic components in the facial complex which will determine the overall facial profile aesthetics: forehead, nose and chin. In 1958, Aufrecht [3] wrote: "The nose and the chin are conspicuous components of the profile line, and there is marked aesthetic interrelation between the two. The prominence of one will influence the relative prominence of the other." The significance of nasal appearance has drawn the attention of writers throughout history. The most famous literary figure created by the playwright Edmond Rostand (1868-1918), Cyrano de Bergerac, was a character equally well known for his great skill in duels and his inordinately long nose [4].

In general, nasal morphology correlates relatively well with ethnic background, though considerable individual variability remains. Diagnosing clinicians should respect such ethnic nasal variation, striving to improve and refine the nasal appearance while maintaining ethnic features. According to Fomon and Bell [5], there are three categories of nasal features in ethnic background i.e. Leptorrhine, Mesorrhine and Platyrhine. The Leptorrhine or Caucasian nose is usually found in Northern European and Mediterranean ethnic groups with long, narrow nose and nostrils. Mesorrhine type is seen in Asian group with reduced dorsal projection and wide dorsum, reduced tip projection and short columella. Platyrhine type is usually found in black ethnic group with reduced radix projection, reduced dorsal length, concave dorsum, reduced nasal tip projection, flared alae with wide nostrils and thick skin.

The father of modern rhinoplasty, Jacques Joseph (1865-1934), presented what he considered to be the ideal nasal shape with a combined length of the three parts of the nose (bony part, septal cartilaginous part, and cartilaginous and soft tissue tip) equal to the length between the base of the nose and the edge of the chin [6]. Ideally the nasal dorsum should be 1-2 mm posterior to the line drawn from nasion to nasal tip. In women the nasal dorsum should lie approximately 2 mm posterior to a line drawn from the radix to the nasal tip, whereas in males it should lie on this line or slightly in front of it. The shape of nasal dorsum is recorded as normal, convex or concave. Significant nasal dorsal convexity leads to a nasal 'hump' deformity, whereas nasal dorsal concavity leads to a 'skislope' appearance [7]. Enlow and Hans reported that male noses were usually ranged from straight to convex (aquiline), whereas female noses tended to range from straight to concave, with a tendency to tip up [8]. This has led orthodontists and plastic surgeons to investigate the relationship among these parts with growing interest.

One of the major concern for patients undergoing orthodontic treatment will be the proclination/crooked appearance, which is clearly evident during smiling/interaction with others. Attempt to achieve ideal maxillary incisor inclination (MxI) with orthodontic treatment may not be aesthetically pleasing when compared to other prominent structures like nose and chin in profile view. Many studies have been done on various inclination & position of maxillary incisors in relation to different antero-posterior position of forehead, nose & chin in which the authors have discussed about the facial aesthetics [9-13]. Till date there is no study which has been conducted by relating the MxI with respect to nose and chin contours. So, in this study we evaluated the perception of MxI on smiling facial profile (as proclination can only be quantitatively measured by their inclination labio-lingually either in lateral cephalogram or in photographic analysis) with respect to various nose contours by orthodontists, general dentists and laypeople. In the subsequent article we have discussed the aesthetic perception of smiling profile with change in chin contour as well as a combination of altered nose and chin contours.

2. Materials and methods

This study was carried out by using one male and one female smiling profile photograph (from Indian subcontinent, Dravidian race, sub group of Mongoloid race) with the inclusion criteria of: harmonious smile in both frontal and profile views, Angle's Class I molar and canine relationship on a skeletal Class I jaw bases, maxillary incisors well positioned according to cephalometric standards, profilometric measurements within the normal range, straight nose and orthognathic chin. Models with Class I occlusion on skeletal Class I jaw bases were selected, because of the fact that even after correcting the malocclusions (whether skeletal/dental class I/II/III) and obtaining the ideal skeletal (Class I) and dental relationships (incisor inclination), facial appearance may not be attractive due to the influence of other components of the face like forehead, cheek, nose, chin etc. The photographs were taken in natural head position using Digital SLR camera (Canon EOS 1000 D). Skeletal and dental relationships were confirmed with lateral cephalogram. An informed consent form was obtained from both the subjects.

Image alteration: The smiling profile photographs were altered with the Dolphin imaging system version 11.5 and Adobe Photoshop CS6 to obtain 15 photographs of each subject. The parameters which were included in this study were the inclination of maxillary incisors (normal, +5°, +10°, -5°, -10°) and nose contours (straight, convex, and concave). The maxillary incisor inclination is altered by using Adobe Photoshop CS6. The incisor inclination is evaluated by two methods [10]: (1) By drawing a Frankfort-horizontal line (FH) and a line tangent to labial surface of maxillary central incisor (measured as 98°); (2) The angle between a line tangent to labial surface of maxillary incisor and Sn-Pog' line (measured as +12°) (Fig. 1). Taking these measurements as reference, the maxillary incisor inclination was changed labially (+5°, +10°) and lingually (-5°, -10°) to obtain four different photographs of each subject.

In profile view, the nose is comprised of various aesthetic subunits like nasal radix, nasal dorsum and nasal lobule (nasal

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