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Determination of smile zone shape in Indian population- A cross -sectional study

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Abstract

Introduction: Smile is not just turning your mouth up at corners but it is the expression of happiness. In dentistry esthetic is synonymous of beauty. Esthetic is not utmost, but enormously subjective. Esthetics is the integration of the facial, dentofacial and the dental composition. Purpose of this study is to evaluate the prevalence of different shapes of smile zone in a group of people representing the Indian population.

Materials and Methods: Sample size for this study was 356 volunteers, ranging in age from 18 to 40 years. Inclusion criteria for the subjects were that the subjects should be of Indian origin and should have natural dentition, competent lips, and no history of dental treatment. An unvarying frontal image of each subject's face was captured by using a digital camera (Nikon, D5300 with 70-300 mm lens). Images were captured by camera during spontaneous smiling state of the subject, and all the images were downloaded on the personal computer. Different shapes of smile zone were determined. Analysis of the various shapes was performed by utilizing the adobe Photoshop version 8.

Results: Out of 356 subjects 224 (62.921%) were having bow smile zone shape, 80 (22.472%) were having straight smile zone shape, 38 (10.674%) were having ellipse smile zone shape, 14 (3.933%) were having curved smile zone shape and no one was having rectangle and inverted smile zone shape.

Conclusions: The most common smile zone shape in Indian population is Bow shape which is followed by straight, ellipse, and curved smile zone shape.

Keywords: Smile zone shape, Spontaneous smile, Smile features, Esthetics

Introduction

Smile is not just turning your mouth up at corners but it is the expression of happiness and one must have a grace and confidence in smile. In this universe, every perfect thing is imperfect and every imperfect thing is perfect. Trees can be twisted, curved in bizarre ways and however they are beautiful. Beauty is related to the individual's observation of beauty as quoted by Margaret Hungerford ''Beauty is in the eye of the beholder". That acuity of beauty may also be predisposed by cultural, ethnic, or racial conceptions of beauty worldwide.[1] In dentistry esthetic is synonymous of beauty. Esthetic is not utmost, but enormously subjective.[2]

Everything looks beautiful in a framework whether it is a house, painting, food, vehicle etc. House looks beautiful by its boundaries, painting looks beautiful within its borders, food becomes more appealing when it served in a beautiful plate, and any vehicle is purchased by the shape of its body. The frame catches the concentration of the eye to the things inside the frame.[3] In dentistry, the wall and frame in the shape of face and lips are endowed for us by the nature. The concentration of the eye catches to the things inside the lips.[3]

Esthetics is the integration of the facial composition, dento- facial composition and the dental composition.[1] Advanced classification recognizes five levels of esthetics: facial, oro-facial, oral, dentogingival, and dental.[4,5] Lips and the smile are the part of the dento- facial composition as they are related to the face.

During smile the inferior border of the upper lip and the superior border of the lower lip generate an outline of the space. The space that contains the teeth and tissues is called the smile zone.[6] The curvature of the lips over and above the dominance of the shapes generated by the lips has been noted in the studies.[7]

When organizing the treatment for esthetic cases, smile zone shape cannot be isolated from a widespread approach to patient care. Achieving a successful, sound and efficient result requires an understanding of the smile zone shapes, as different smile zone shapes help in crafting the esthetic values when restoring or rehabilitating the different types of patients with different smile zone shapes.

The objective of this study is to evaluate the prevalence of different shapes of smile zone in a group of people representing the Indian population. This article is focused on collection of data necessary for determination of smile zone shape in Indian population.

Materials and Methods

As there is no study on smile zone shape in Indian population, so, for the determination of prevalence rate a pilot study was conducted on 100 volunteers and the prevalence rate was determined. Out of 100 volunteers 66 were having bow shaped smile zone.

As per the prevalence rate the proposed sample size for this study was 356 volunteers, ranging in age from 18 to 40 years. Inclusion criteria for the selection of the subjects was that the subjects should be of Indian origin and should have natural dentition in maxillary and mandibular arch, competent lips, and no history of dental treatment.

The procedure was explained to the volunteers and consent forms were obtained. Standard protocol was followed for recording the subject's smile. An unvarying frontal image of each subject's face was captured by using a digital camera (Nikon, D5300 with 70-300 mm lens).The camera was stabilized with the help of a tripod at a fixed working distance of 5 feet from the subject. The subject's head has positioned, so that the Frankfort horizontal plane remains parallel to the floor. The camera was adjusted so that glabella of the subject should be in centre of the camera lens. Images were captured by camera during spontaneous smiling state of the subject,

and all the images were downloaded on the personal computer.

Different shapes (straight, curve, ellipse, bow, rectangle, and inverted) of smile zone were determined by analysing the outline of upper and lower lips during smile (Figure.1). Analysis of the various shapes was performed by utilizing the adobe Photoshop version 8, and there was a single investigator for all the measurements (Figure 2,3,4, and 5).

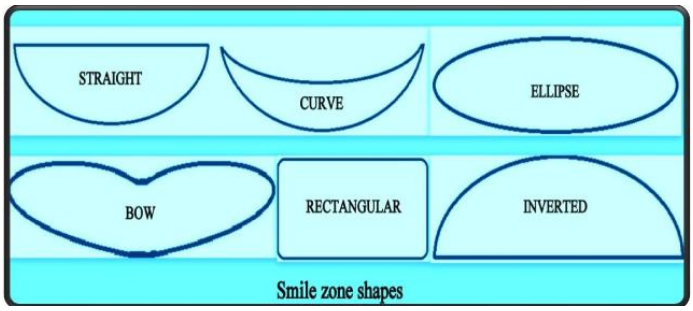

Figure 1: Smile zone shapes

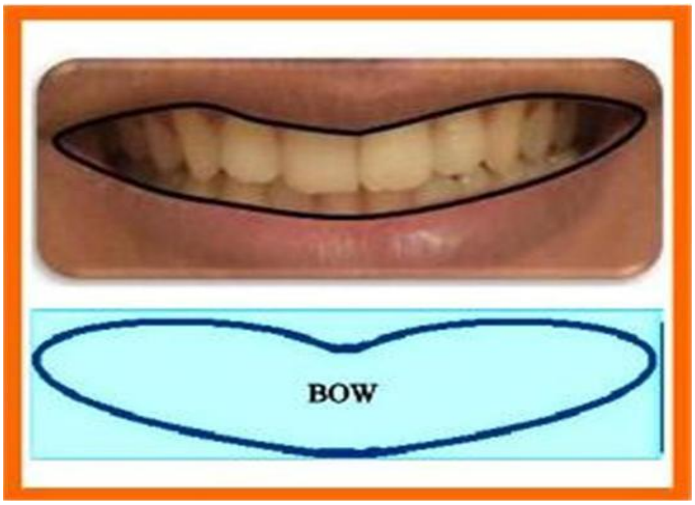

Figure 2: Subject with bow smile zone shape

Figure 3: Subject with straight smile zone shape

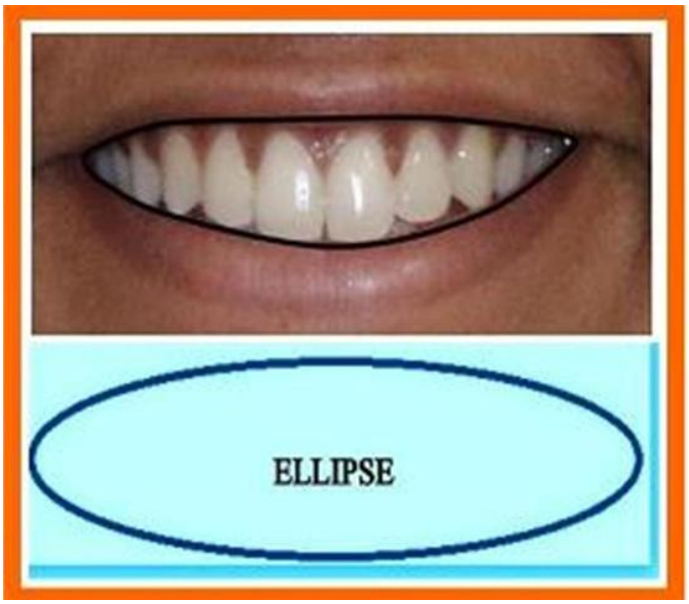

Figure 4: Subject with ellipse smile zone shape

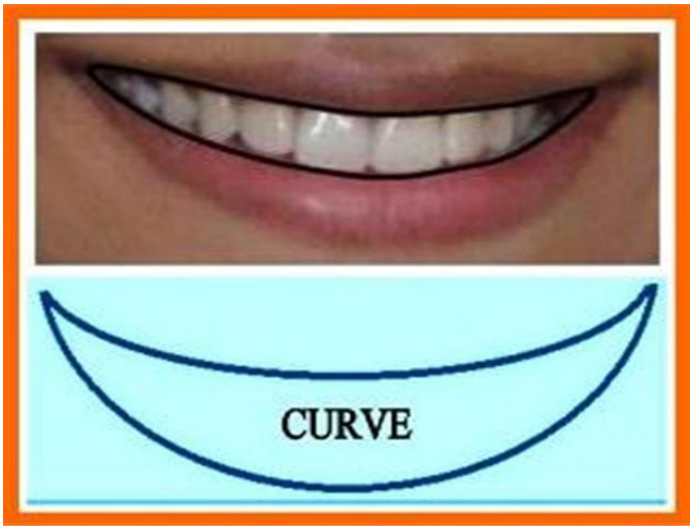

Figure 5: Subject with curve smile zone shape

Results

In this descriptive study obtained images were downloaded on the personal computer and different shapes of the smile zone were analyzed. Out of 356 subjects 224 (62.921%) were having bow smile zone shape, 80 (22.472%) were having straight smile zone shape, 38 (10.674%) were having ellipse smile zone shape, 14 (3.933%) were having curved smile zone shape and no one was having rectangle and inverted smile zone shape. In this study data revealed that in Indian population

most common smile zone shape is bow. Data obtained from this study are summarized in table 1.

Smile Zone Shapes	Subjects (%)
Bow	224 (62.921%)
Straight	80 (22.472%)
Ellipse	38 (10.674%)
Curved	14 (3.933%)
Rectangle	00
Inverted	00

Table 1: Prevalence of different smile zone shapes

Discussion

An aesthetically pleasing smile is a harmonious entity of oral components in which lip and tooth relationships are important factors.[8,9] Perfect smile is a perfect blend of balance and symmetry of facial and dental features. For the designing of a perfect smile analyses and evaluations of the face, lips, gingival tissues, and teeth are required and it also requires an approval of how they come into sight together.

The esthetic zone is also known as the smile zone. In smile zone all the hard and soft tissues are visible when the patient makes a wide smile. Smile zone analysis usually starts with evaluation of the smile zone shape.[10]The inferior border of the upper lip and the superior border of the lower lip form an outline of the space that is revealed when smiling.

Various smile features have been reported like: Smile arc, [11] buccal corridor, [12] amount of gingival exposure at smiling, [12,13,14] presence of gingival and incisal asymmetry, [8,15,16,17] presence of anterosuperior diastema, [13,18] presence of midline shift and changes in axial proclination, [8,17] maxillary incisors ratio, size and symmetry.[11,15] These smile features need to be evaluated in different shapes of smile zone.

Different shapes of the smile zone provide valuable guidelines when considering smile makeovers. A skilled restorative dentist can recreate all the smile features in dentate, partially dentate, and completely edentulous patients of that specific shape of smile zone up to the optimum esthetic values.

Visibility of oral components (smile features) may be different in different shapes of smile zone. By evaluating the smile zone shape a clinician can determine the visibility of all the oral components crucial for esthetic of a patient in a specific type of smile zone shape. There may be cultural, ethnic, or racial variations in display of oral components during smile between individuals of different smile zone shape.

While evaluation of the smile zone shape capturing of the smile is very important factor. Recording of the smile can be either in static (photograph) form or in dynamic (video) form. In static form, approximate frames in the frontal, sagittal, and oblique planes are required in the photograph. In dynamic form, the video should be made and transferred on to a computer and the finest image should be selected. [19,20] Ideally, recording should be made in static and dynamic forms. But in present study static smiles were captured. There are basically two types of smile voluntary smile and spontaneous smile. In this study spontaneous smile of the subject was captured because it seems more natural. However, the posed or voluntary smile is more reproducible.[21,22] But posed smile is influenced by individual's social skill and emotional background and this is the disadvantage of this smile. [23]

In literature there are the six types of smile zone shapes. These are straight, curve, ellipse, bow, rectangle, and inverted. As per the study [1] in North American population straight, curve, and ellipse smile zone shapes are more common. There is no study on smile zone shape in Indian population. Present study determines the different shapes of smile zone in Indian population. After analyzing the data the more common smile zone shape in Indian

population is bow 224 (62.921%) which is followed by straight 80 (22.472%), ellipse 38 (10.674%), and curve 14 (3.933%) smile zone shape. There was no subject with rectangular and inverted smile zone shape.

There are the many factors those influence the different shapes of the smile zone. These factors are the direction of the muscle from its origin to insertion, overdevelopment or underdevelopment of the elevator or depressor muscles of the lips and the corner of the mouth, genetic variation in the length and width of the lips.[24] Variation in the smile zone shape may be due to the cultural diversity.

There is a need to find correlation between the various smile features (smile arc, buccal corridor, amount of gingival exposure at smiling, presence of gingival and incisal asymmetry, presence of midline diastema, presence of midline shift and changes in axial proclination, maxillary incisors ratio, size and symmetry) and different smile zone shapes. Such a study has been taken up by the authors of this article and is in progress.

Conclusions

By knowing the shape of the smile zone a skilled restorative dentist can recreate all the smile features in dentate, partially dentate, and completely edentulous patients up to the optimum esthetic values. The most common smile zone shape in Indian population is Bow shape which is followed by straight, ellipse, and curved smile zone shape.

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