

## Review Article

### Esthetics smile design: A comprehensive review

<sup>1</sup>Shubh Tandon, <sup>2</sup>Vasu Midha, <sup>3</sup>Vishu Midha

<sup>1-3</sup>Private Practitioner, Chandigarh, India

#### ABSTRACT:

Smile, a person's ability to express a range of emotions with the structure and movement of the teeth and lips, can often determine how well a person can function in society. The goal for esthetic treatment should be an enhanced but natural appearance that imparts a vibrant and believable appearance to the patient. The goal of esthetic dentistry should be "bright, beautiful, but believable". One of the important features, predicting the attractiveness of the face is the „smile“ and most often the need for „esthetics“ motivates the patient to seek dental treatment<sup>3</sup>. The goal of an esthetic makeover is to develop a stable masticatory system, teeth, tissues, skeletal structures, muscles and joints all function in harmony.

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**Corresponding author:** Shubh Tandon, Private Practitioner, Chandigarh, India

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#### INTRODUCTION

Esthetic dentistry is characterized primarily by the smile. The goal in the creation of esthetic dental restorations is to simulate, or improve upon, the appearance of the natural dentition. However, it is important to note that the smile is just one element of the face, which serves as the primary means of emotional expression. Therefore, successful esthetic restorations must integrate harmoniously with the whole of the face, not just with the surrounding teeth. This requires a full understanding of each patient's unique personality-the psychology of dental esthetics.<sup>1-3</sup>

A good face is a letter of recommendation. From years it has been conceptualized that the first impact a person makes is because of his appearance which lasts for long time. Media projected perfect appearance has a strong impact on the behavior and thinking of our beauty conscious society. And it has led to an increased demand for esthetic treatment from public. The dental appearance is an integral component of facial beauty. The judgments, an individual makes concerning the personal characteristics of others, can be affected by dental appearance. Good dental appearances are thought to be a requirement of prestigious occupations among some professional groups. Established norms for dental and facial appearance do not vary widely among industrialized

nations, and extreme deviations are viewed as unacceptable.<sup>1-3</sup>

Placement of a restoration, which improves dental appearance, results in a positive effect on a patient's self esteem and quality of life. Oral health is not only the absence of oral disease and dysfunction but it include its influence on the subject's social life and dento-facial self confidence.<sup>1-3</sup>

#### FACIAL COMPOSITION

Facial beauty is based on standard esthetic principles that involve proper alignment, symmetry and proportion of face. Analyzing, evaluating and treatment planning for facial esthetics often involve a multidisciplinary approach which could include orthodontics, orthognathic surgery, periodontal therapy, cosmetic dentistry and plastic surgery. Thus, esthetic approach to patient care produces the best dental and facial beauty.<sup>4-7</sup>

But in our clinical practice, unless and otherwise there is an obvious discrepancy in the face, we restrict our smile makeover to the dental composition only. There are two facial features which do play a major role in the smile design:

- the interpupillary line and
- lips.<sup>4-7</sup>

The interpupillary line should be perpendicular to the midline of the face and parallel to the occlusal plane. Lips are important since they create the boundaries of

smile design. If we come across major discrepancies in the above-mentioned two factors, then we have to seriously consider the correction of the facial composition, before we venture into the correction of the dental composition.<sup>4-7</sup>

In classical terms, the horizontal and vertical dimensions for an ideal face are as follows:

### **HORIZONTAL**

The width of the face should be the width of five “eyes”.

The distance between the eyebrow and chin should be equal to the width of the face.

### **VERTICAL**<sup>4-7</sup>

The facial height is divided into three equal parts from the forehead to the eyebrow line, from the eyebrow line to the base of the nose and from the base of the nose to the base of the chin.

The full face is divided into two parts, eyes being the midline.

The lower part of the face from the base of the nose to the chin is divided into two parts, the upper lip forms one-third of it and the lower lip and the chin two-thirds of it.

The basic shape of the face when viewed from the frontal aspect can be one of the following:

- Square
- Tapering
- Square tapering
- Ovoid<sup>4-7</sup>

The lateral profile of an individual can be any one of the following:

- Straight
- Convex
- Concave

These factors play a role in determining the tooth size, shape and the lateral profile; in short, the tooth morphology is dependent on the facial morphology.

Vital elements of smile designing (dental composition)

The vital elements of smile designing include the following:

#### **Tooth components**

- Dental midline
- Incisal lengths
- Tooth dimensions
- Zenith points
- Axial inclinations
- Interdental contact area (ICA) and point (ICP)
- Incisal embrasure
- Sex, personality and age
- Symmetry and balance<sup>4-7</sup>

#### **Soft tissue components**

- Gingival health
- Gingival levels and harmony
- Interdental embrasure
- Smile line<sup>4-7</sup>

### **DIGITAL SMILE DESIGN**

DSD technique is carried out by digital equipment already prevailing in current dental practice like a computer with one of the DSD software, a digital SLR camera or even a smart phone. A digital intra-oral scanner for digital impression, a 3D printer and CAD/CAM are additional tools for complete digital 3D work flow. An accurate photographic documentation is essential as complete facial and dental analysis rests on preliminary photographs on which changes and designing is formulated, a video documentation is required for dynamic analysis of teeth, gingiva, lips and face during smiling, laughing and talking in order to integrate facially guided principles to the smile design.<sup>8-12</sup>

### **PHOTOGRAPHY PROTOCOL**

To proceed with a correct digital planning it is crucial to follow a photography protocol. Photographs taken should be of utmost quality and precision, with correct posture and standardized techniques, as facial reference lines like the commissural lines, lip line and inter-pupillary line which forms the basis of smile designing are established on them. Poor photography misrepresents the reference image and may lead to an improper diagnosis and planning.<sup>8-14</sup>

The following photographic views in fixed head position are necessary:

1. Three frontal views:
  - Full face with a wide smile and the teeth apart,
  - Full face at rest, and
  - Retracted view of the full maxillary and mandibular arch with teeth apart.
2. Two profile views:
  - Side Profile at Rest
  - Side Profile with a full Smile
3. A 12 O, clock view with a wide smile and incisal edge of maxillary teeth visible and resting on lower lip.
4. An intra occlusal view of maxillary arch from second premolar to second premolar.<sup>8-12</sup>

### **VIDEOGRAPHY PROTOCOL**

According to Coachman during videography best framing and zoom should be adjusted with suitable exposure and focus adjusted to mouth. For ideal development of the facially guided smile frame, four videos from specific angles should be taken:

- A facial frontal video with retractor and without retractor smiling,
- A facial profile video with lips at rest and wide-E smile,
- A 12 O'clock video above the head at the most coronal angle that still allows visualization of the incisal edge,
- An anterior occlusal video to record maxillary teeth from second premolar to second premolar with the palatine raphe as a straight line.<sup>8-14</sup>

Four complementary videos should also be taken for facial, phonetic, functional and structural analysis.<sup>8-12</sup>

## GOLDEN PROPORTIONS

The concept of the „golden proportion“ has often been offered as a cornerstone of smile design theory. The term „golden proportion“ has been used for centuries. The golden proportion mathematically denotes that the ratio of a smaller to a larger length is equal to the ratio of the larger length to the total length. Application of golden proportion to dental esthetics was first documented by Levin in 1978. He explained the association of proportion with an esthetically pleasing dentition and smile. A portion between 2 adjacent parts which is repeated across enhances the unity within the diverse part of the composition. The uniqueness of this ratio is that the ratio of the smaller part to the larger part is the same as the ratio of the larger part to the whole. Lombardi was the first to propose the application of the golden proportion in dentistry, stating, " it has proved too strong for dental use" also he defined the idea of a repeated ratio which implies that in an optimized dentofacial composition from the frontal aspect, the lateral to central width and the canine to lateral width are repeated in proportion. Maxillary central incisors, because of their position in front of the arch, should appear to be the widest, whitest, and therefore, the most predominant teeth when viewed from the frontal aspect. Clearly, for the golden proportion to be most useful in esthetic dentistry, it must be adapted for easy bilateral analysis of the teeth. Snow has advocated the use of the " golden percentage" as a means of applying the golden proportion across the midline to encompass the total canine-canine width.<sup>13-15</sup>

## DIRECT BIOMETRIC MEASUREMENT

Direct measurement permits the clinician to quantify resting and dynamic lip – tooth relationships. The measurements such as philtrum height, commissure height, interlabial gap, amount of incisor show at rest, amount of incisor display on smile, crown height, gingival display, smile arc are done.

The philtrum height is measured in millimeters from subspinale (the base of the nose at the midline) to the most inferior portion of the upper lip on the vermilion tip beneath the philtral columns. Commissure height is measured from a line constructed from the alar bases through subspinale and then from the commissures perpendicular to this line. The differential lip growth exhibits as the difference in height in philtrum and commissural height in adolescents. The interlabial gap is measured as the distance in millimeters between the upper and lower lips when lip incompetence is present.

Crown height is the vertical height of the maxillary central incisors; crown height is normally between 9 and 12 mm in adults (10.6 mm in men and 9.6 mm in women).

The amount of gingival display on smile and the incisor display, along with crown height, helps the deciding how much tooth movement is required to

improve the smile index. A gummy smile is often more esthetic than a smile with less tooth display.

The smile arc from the frontal view is the relationship of the curvature of the incisal edges of the maxillary incisors and canines to the curvature of the lower lip in the posed social smile. In an ideal smile arc or in consonant smile, the curvature of the maxillary incisal edge is parallel to the curvature of the lower lip upon smile; in a nonconsonant or flat smile, the maxillary incisal curvature is flatter than the curvature of the lower lip on smile.<sup>14-18</sup>

## CONCLUSION

Digital smile design concept is a helpful tool in aesthetic visualization of patient's problem. It not only helps patients to envision their treatment outcome but also improves clinician's diagnosis and treatment planning.

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