

## THE ART OF A BEAUTIFUL SMILE



by George E. Kirtley, DDS,  
AAACD, ABCD  
Indianapolis, IN  
[www.smilesbygeorge.com](http://www.smilesbygeorge.com)

### INTRODUCTION

In much the same way an artist uses brushes and paint to create his or her art, we too must approach what we do, using the face and its features along with our instruments (e.g., handpiece, laser, imaging systems) to do the same. However, to approach esthetic dentistry successfully, one must understand the distinction between “craft” and “art.” *Craft* is the mechanics (the step-by-step protocols and procedural methodology that we have learned through years of experience) of what we do, and *art* is the quality of what we do. The ability to create art must first include a thorough understanding of the craft. The art or quality of what we do cannot be reduced to a mere formula or procedure. It is the intangible that is acquired only through observing and doing. One must observe the masters, just as an aspiring artist must watch and learn from the masters of his craft. It is the skill acquired with the development of a discerning eye that differentiates the mechanic from the artist. When the discerning and learned eye is combined with a foundation of mechanics, the functionally beautiful smile is created. As with all constructive endeavors, predicting a successful end result is impossible without a blueprint to follow. It would be the same for the portrait artist whose desire is to accurately depict the beauty of his model by creating accurate proportions, yet has no references to accomplish that. And, it is like the esthetic/restorative dentist who expects incomparable esthetics and function by picking up the handpiece and starts to cut without any perspective or defined vision of the end result.

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The two main objectives in dental esthetics are 1) to create teeth of pleasing inherent proportion and proportion to each other; 2) to create a pleasing

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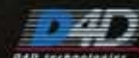
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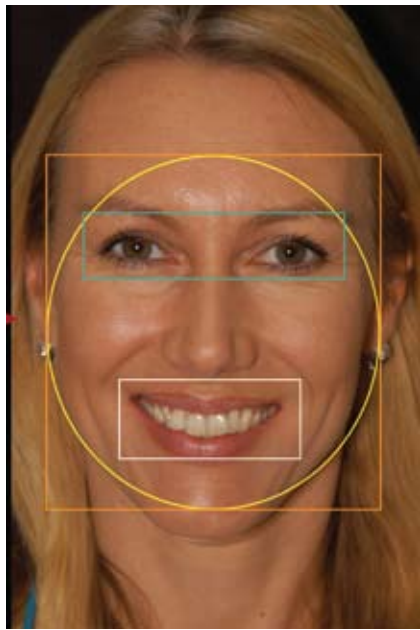
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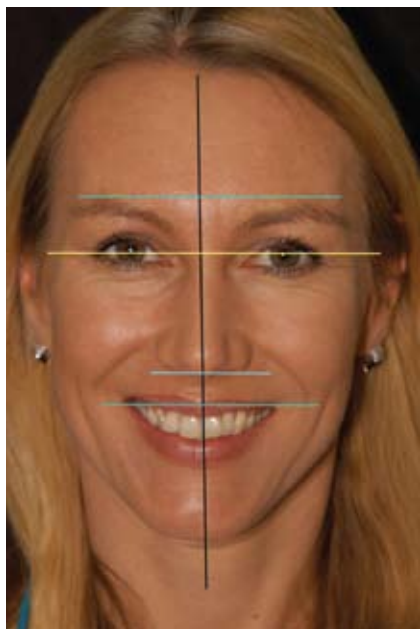
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*Figure 1A: Frames and subframes within the context of the face.*



*Figure 2: Horizontal and vertical reference lines on the face. From top: Ophriac line, bipupillary line, alar line, commissural line.*



*Figure 1B: Note disharmony between incisal edges and commissural reference line.*

tooth arrangement in harmony with the patient's lips, gingiva, and face.<sup>1</sup> The esthetic/restorative dentist must clearly realize the inter-relationship between these components to effectively create an esthetically functional smile. As the portrait artist works within certain frames and references to create a visually pleasing result, the esthetic restorative dentist, too, must utilize these frames of reference to establish the smile's proportion, symmetry, and balance. Use of these references are an integral part in the accurate design of facial esthetic reconstruction, of which the smile is of paramount importance (Figs 1A & 1B).

### EXTRAORAL FEATURES AFFECTING SMILE DESIGN

These references include—but are not limited to—horizontal and vertical lines drawn between anatomical landmarks of the face. A comparative analysis serves to provide us with information as to the harmony or visual tension that exists between them and the dentition we strive to reconstruct and enhance.

### HORIZONTAL LINES OF REFERENCE

The most commonly used horizontal reference line is the bipupillary line<sup>1</sup> (the line drawn between the pupils of the eyes). This line's lack of parallelism to the gingival margins of the central incisors and incisal/occlusal plane often signals need of correction to attain visual harmony in the smile. Other horizontal lines of reference would be the ophriac (eyebrow), intra-alar, and commissural (corners of the mouth) lines (Fig 2).

### VERTICAL LINES OF REFERENCE

The midfacial or skeletal midline enables the visual orientation of the midline of the face relative to the midline of the dentition.<sup>1</sup> This highlights the coincidence (or lack thereof) between the two, giving the clinician a perspective on medio-lateral discrepancies of the dental midline location, left-to-right symmetry, and what changes from a vertical standpoint would be necessary to attain optimum esthetic results of the smile. Additionally, it can provide



*Figure 3: Preoperative images showing excessive gingival display and buccal corridor deficiency (1:2 frontal and full-face views).*



*Figure 4: Postoperative images (frontal and full-face views) showing correction of esthetic deficiencies.*



*Figure 5: Preoperative view showing deficient incisal edge length, and postoperative view showing elongation of incisal edges following the curvature of the lower lip line.*

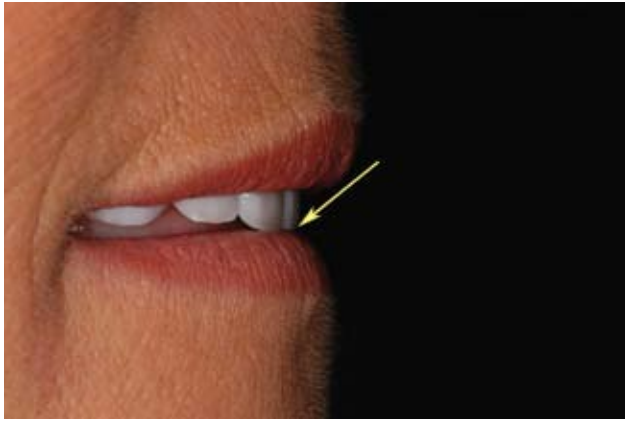


Figure 6: Incisal edge position (determined by phonetics, function, and esthetics).



Figure 7: Parallelism of incisal edge and gingival margin.

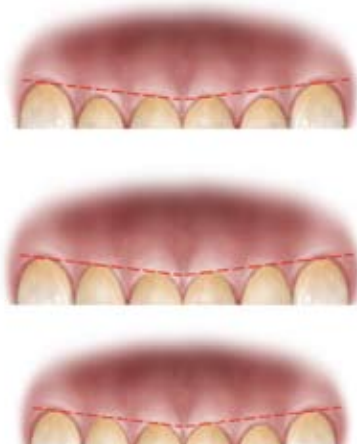


Figure 8: Esthetic gingival architectural design from central incisor to cuspid to premolars.

a visual cue as to the degree of the teeth's axial inclination (Fig 2).

#### LIP LINES

Position of the upper lip can affect the amount of tooth displayed during the act of smiling and at rest. Additionally, the movement of the upper lip determines the extent of exposure of the teeth and gingival margins during smiling. This is of particular help to the clinician in evaluating the need for esthetic gingival contouring or crown lengthening in the anterior region and in the buccal corridor area (Figs 3 & 4).

The incisal edge of the maxillary central incisors is the single most important determinant in functionally esthetic smile design, and it is the lower lip line that contributes to its positional design. The curvature of the lower lip also serves as a reference to the incisal plane/smile line (Figs 5 & 6).<sup>1</sup>

#### INTRAORAL FEATURES AFFECTING SMILE DESIGN

##### GINGIVAL ARCHITECTURE

As much as extraoral references are important in designing a smile, intraoral features contribute signifi-

cantly to the smile's overall artistic value. Most important are the gingival tissues surrounding the dentition.

Gingival architecture differs from one patient to the next. What is consistent in the esthetic gingival patterns is the location of the gingival margins being parallel to the bipupillary line, with the lateral incisor zenith being at or below the line drawn between the central incisor and the canine (Figs 7-9).<sup>2</sup> When gingival asymmetry or imbalance occurs, balance must be created through either simple (laser con-





*Figure 9: Parallel relationship of gingival margins of central incisors, incisors, incisal edge, and bipupillary line.*



*Figure 10: Axial inclinations of teeth from the frontal view.*

touring) or more involved surgical means.

#### **TOOTH DESIGN**

Within the context of tooth design there are many points to consider, any of which can dramatically affect the artistic look for which we strive. The axial inclinations, incisal embrasure form, contact areas, tooth dimensions, characterizations, and color are all factors that we can alter and define, enabling us to attain the desired esthetic result.

**Axial inclinations:** When viewed from the frontal perspective, the tooth axis of the central incisor is lo-

cated just distal to the vertical midline of the tooth. The laterals exhibit a more distal inclination to the vertical midline, and the cuspids even more so (Fig 10).

**Incisal embrasure form:** Depending upon the depth and angulations of the embrasure (Fig 11), incisal embrasure form can create the illusion of a more mature esthetic design or a more youthful one.

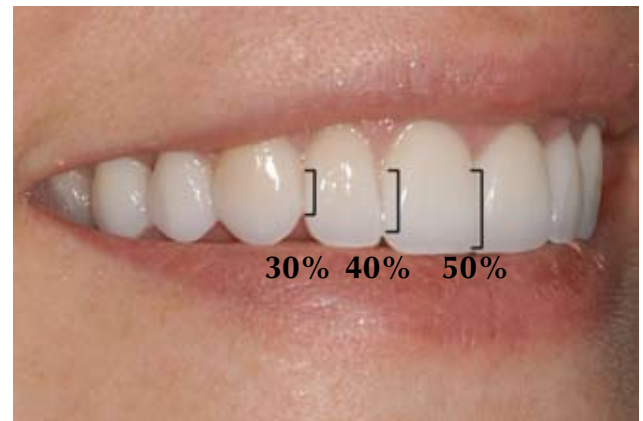
**Contact areas:** The interdental contact areas are simply those areas where the teeth touch each other interproximally. The length of these contact areas in the esthetic smile

shortens as you move posteriorly, with the longest contact between the central incisors. The length of the contact area between the central incisors ideally is 50% of the length of the central incisor. The contact area between the central and lateral is 40% of the length of the central incisor, and between the lateral and cuspid it is 30% of the length of the central incisor (Fig 12).<sup>2,3</sup>

**Characterizations:** The characteristics of teeth differ with age. Young teeth are brighter owing to greater amounts of enamel; older teeth are darker due to the loss of enamel and the show-through of the underlying



*Figure 11: Esthetic incisal embrasure form, showing increasing depth from centrals posteriorly.*



*Figure 12: Preoperative view of contact relationship of teeth and postoperative view of proper contact relationship of teeth.*

dentin. Younger teeth have more texture, resulting in a more reflective surface and brighter appearance. All of these characterizations can be artistically designed into the ceramic restoration, depending upon the effect we wish to create in our smile design (Fig 13).

### PROPORTION

The most dramatic artistic effect is the creation of proper proportion. All of the above factors pale in importance to proportion and its overall effect on the smile.

We know that the most influential factors in a harmonious anterior dentition are the size, shape, and position of the maxillary central incisors. They are the most important factor in the design of a functionally esthetic smile. The design of the central incisors begins with the establishment of the proper incisal edge position, which is determined not only by esthetics, but also by function and phonetics.<sup>4</sup> Many of the esthetic concerns we see are a result of disproportion of the central incisors to each other and to the surrounding dentition. Often there is the need to elongate the incisal edge to

correct wear, limited tooth display, or unesthetic tooth/crown proportion. The location of the incisal edge obviously affects the esthetic design. The length and width ratios of the central incisors can vary because of this, and the formula of the "golden proportion" may not be followed.

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*The most commonly used horizontal reference line is the bipupillary line.*

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### GOLDEN PROPORTION

*Golden proportion* is a term often heard in relation to dental esthet-

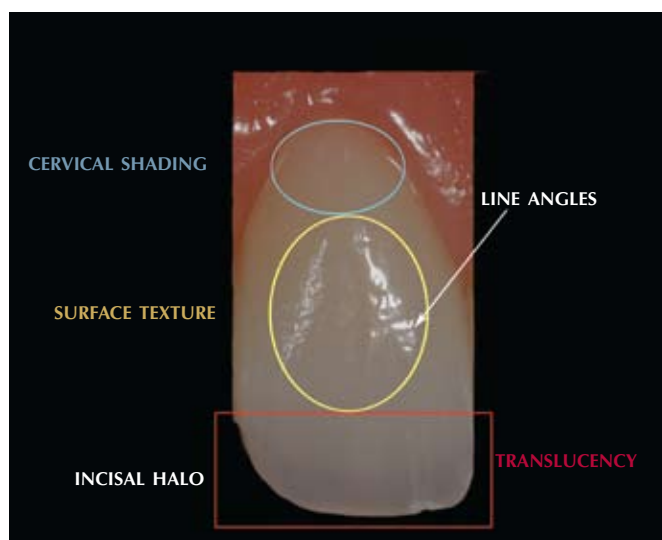


Figure 13: Designed surface characterizations.

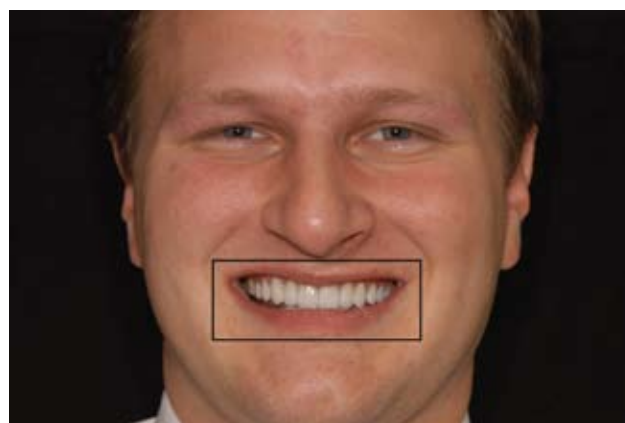
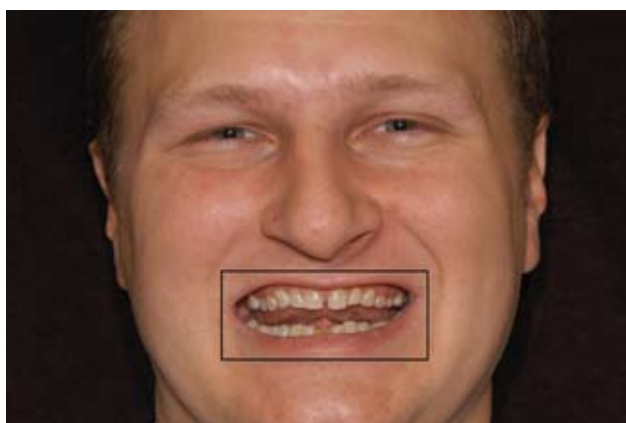


Figure 14: The importance of dental and facial proportion relationship.

ics. However, its consideration in true esthetic and artistic form can be over-emphasized. At most, it should be considered a tool and not a rule. The golden proportion as it relates to dentistry states that if the apparent size of each tooth (as observed from the frontal view) is 60% of the size of the tooth anterior to it, the relationship is considered to be artistically pleasing.<sup>2,5</sup> Although this may be generally true, studies have shown that the majority of beautiful smiles evaluated do not coincide with the exact golden proportion formula, and that there are distinct

differences between male and females, with females' canines displaying a larger width than males'.<sup>6</sup> In his book, *The Science and Art of Porcelain Laminate Veneers*, Dr. Galip Gurel states,

"If the original definition of the Golden Proportion is applied to dentistry then we would assume that all anterior teeth would display a relationship that is uniform and perfect for everyone...reality tells us that this is questionable because everyone does not possess the same facial morphology, lips and proportions and dental arch design."<sup>6</sup>

What more accurately aids us in our smile design efforts is the concept of "recurring esthetic proportion," which advocates using a proportion of your own choice, as long as it remains constant as it moves posteriorly.<sup>7</sup> This idea individualizes smile design based on the anatomical features specific to that patient. Although it may differ from the golden proportion formula, the esthetic results are often superior to what we can achieve through strict adherence to predefined mathematical ratios (Fig 14).





*Figure 15: Preoperative treatment view of patient to be imaged.*



*Figure 16: Computer-imaged view of patient.*



*Figure 17: Final postoperative treatment view.*

### COMPUTER-GENERATED IMAGING TO AID SMILE DESIGN

Anatomically correct computer-generated imaging is a tremendous aid, not only in educating the prospective cosmetic patient, but also in enabling the doctor to evaluate proper length, width, proportion, and even shade issues before treatment is implemented within the context of the patient's extraoral features. It is equally important in providing a clear line of communication to the laboratory technician as to what is esthetically desired in the ceramic design. The patient,

dentist, and laboratory technician all can view the case preoperatively from frontal (Figs 15-17), lateral, and full-face perspectives (Envision A Smile imaging software [Envision A Smile; Indianapolis, IN]).

### CONCLUSION

When a portrait is painted, the artist first creates an oval on which vertical and horizontal lines are then drawn as references. These references enable the artist to create symmetry and balance for the anatomical features that will be drawn within it. When a cosmetic surgeon prepares

for a case, measurements, reference points, formulas, and calculations are used, enabling that surgeon to more predictably gain the result intended. Before an instrument is even lifted, a clear path of intent has been established. The blueprint is in order. There should be no difference in the approach we take to artistically create a smile. The principles of artistic design are as much a part of esthetic dentistry as they are for the portrait artist or the cosmetic surgeon. When followed with a solid foundation of craft (mechanics), they result in a functionally correct and highly esthetic smile.

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## AACD Acknowledgment

*The American Academy of Cosmetic Dentistry recognizes Dr. George Kirtley as an AACD Accredited Member and thanks him for restoring the smile of a Give Back A Smile™ survivor.*

**Editor's Note:** Dr. Kirtley is the developer of the Envision A Smile software that is mentioned in this article. *AK*



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