

Smile Designing: Understanding The Fundamental Concepts

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ABSTRACT

Background: Esthetic or cosmetic dentistry has become one of the main areas of dental practice emphasis and growth for several years. New artistic skills have developed with the development of new materials and techniques in dentistry that helps in enhancing the smile of the patient. Timeless human esthetics implies a sense of beauty, a pleasing impulse, naturalness, and a youthful appearance relative to one's age. The goal for esthetic treatment should be an enhanced but natural appearance that imparts a vibrant and believable appearance to the patient. This should be the goal in dental esthetics: a result that would be considered "bright, beautiful, but believable." The present paper aims at understanding the esthetic need of the patient and fundamental concepts of smile designing.

Keywords: Esthetics, smile designing, golden proportion, artistry.

INTRODUCTION

"Beauty lies in the eyes of beholder¹", by MARGARET HUNGERFORD.

Smile design refers to the many scientific and artistic principles that considered collectively can create a beautiful smile. These principles are established through data collected from patients, diagnostic models, dental research, scientific measurements, and basic artistic concepts of beauty.²

Esthetic or cosmetic dentistry has become one of the main areas of dental practice emphasis and growth for several years. These terms (i.e., esthetic and cosmetic) have almost become synonymous in our dental nomenclature. The literal definitions of these terms are very different. *Cosmetic* means to do "something superficial to

cover a defect or deficiency" and secondarily "serving to beautify the body." The second part of this definition has a very large cultural component to this, i.e., beauty is in the eye of the beholder. There is also an implication that something "cosmetic," while deemed "beautiful," is obvious to the observer that a facial or dental characteristic has been enhanced— e.g., using make-up to accentuate a facial feature.³ According to the Merriam-Webster dictionary, the definition of *esthetics*, on the other hand, is "responsive to or appreciative of what is pleasurable to the senses" or "pleasing in appearance." Thus, cosmetics and esthetics are somewhat inseparably intertwined, but esthetics also encompasses appearances that do not have a "cosmetic appearance."¹

The principles of smile design require an integration of esthetic concepts that harmonizes facial esthetics with the dental facial composition and the dental

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composition. The dental facial composition includes the lips and the smile as they relate to the face. The dental composition relates more specifically to the size, shape, and positions of the teeth and their relationship to the alveolar bone and gingival tissues. Therefore, smile design includes an evaluation and analysis of both the hard and soft tissues of the face and smile.² "DENTISTRY is an evolving profession". "We are becoming much more of a profession for which aesthetics is tied directly into our work, and is not considered as an adjunct to it."⁴

DISCUSSION

"DENTISTRY is an evolving profession". "We are becoming much more of a profession for which aesthetics is tied directly into our work, and is not considered as an adjunct to it."⁴

Esthetics: A Health Science And Service

Is esthetic dentistry a health science and a health service? Or is it the epitome of vanity working its way into a superficial society?³

The answer to these questions lies in the scientific facts gleaned from over a thousand studies proving the direct and indirect relationship of how looking one's best is a key ingredient to a positive self-image, which, in turn, relates to good mental health. The authors of a recent survey of nearly 30,000 people point to a relationship between psychosocial well-being and body image. They found that feeling attractive, fit, and healthy results in fewer feelings of depression, loneliness, and worthlessness. This study also found that the earlier in life appearance is improved, the more likely it is that the person goes through life with a positive self-image.

Two questions seem in order. Are we as dentists doing all we should to motivate our existing patients to improve their smiles? Are we as a profession doing all we should to motivate the 50% of the population who do not normally visit the dentist to have their smiles esthetically improved?⁴ Based on the enormous amount of research showing the advantages of an attractive smile, the answer to both questions would seem to be "No." We can and should do much more to inform the

public about why a *great smile is an important asset*.⁵

Understanding The Patient's Esthetic Needs

A practicing dentist must be acquainted with certain generalities concerning the psychological significance of the patient's mouth. He or she must be familiar with certain basic considerations that apply to esthetic treatment and must be aware of problems that such treatment may elicit or aggravate in the patient

Understanding the patient's motives requires acute perception on the dentist's part, informed by a thorough examination and history that reveal the patient's actual dental problems. The patient's own assessment of his problems and his reaction to them are of equal importance. The dentist should be alert for a displacement syndrome, in which an anxiety aroused by real and major emotional problems may be transferred to a minor oral deformity.³

When a patient with a longstanding complaint finally presents for treatment, the dentist must determine what prevented him or her from coming for treatment sooner. A patient who criticizes a former dentist is apt to be hostile, and the dentist should not present a treatment plan before determining what the patient believes treatment can accomplish.

CLASSIFICATION OF A SMILE

The Commissure smile (67%) in which the corners of the mouth are first pulled up and outward, followed by the levators of the upper lips contracting to show the upper teeth.

The Cuspid smile (31%) in which the Levator labii superioris are dominant. They contract first exposing the canine teeth, and then the corners of the mouth contract secondarily to pull the lips upward and outward.

Complex smile (2%) in which all the elevators of the upper lip, the elevators of the corners of the mouth, and the depressor of the lower lips contract simultaneously showing all the upper and lower teeth simultaneously.

FUNDAMENTALS OF SMILE DESIGNING

New artistic skills have developed as stated earlier with the development of new materials and techniques in dentistry. The restorative dentist manipulates *light, colour, illusion, shape and form* to create an esthetic outcome.⁶

LIGHT AND SHADOW

Basic to the practice of successful esthetic dentistry is a working knowledge of *the properties of light*.

Unfortunately, there seems to be too little consideration given to this critically important factor. We must consider three characteristics of light if we expect to achieve superlative results with porcelain:

1. Direction of light
2. Movement of light
3. Colour of light

PRINCIPLES OF COLOUR

Colour, as the eye interprets it, is either a result of absorption or reflection. In absorption, a white light is passed through a filter.⁷ The colours that pass through the filter and reach the eye are perceived as the colour of the filter. In reflection, as with solid objects, the colour that we see is the portion of the spectrum that is reflected back to the eye.⁶ Complete familiarity with the three-dimensional nature of colour is the key to successful clinical colour matching.

Hue

The dimension of hue is most easily understood. It is, in Munsell's words, "that quality by which we distinguish one colour family from another, as red from yellow from blue or purple." It is important to realize that the hues are the result of the wavelength of the stimulus—light. Colour is light and light is colour. Light is merely one small portion of the electromagnetic spectrum (fig 1)

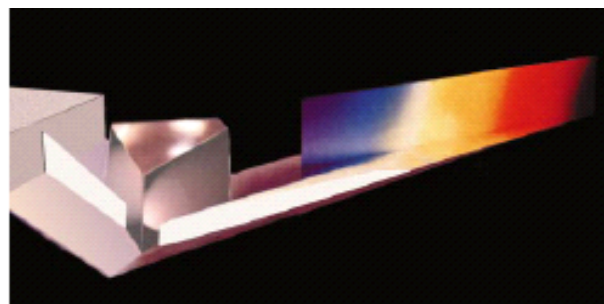


Fig 1: Electromagnetic spectrum.

Value

Value relates colour brightness to the specific area on the black-white scale. The value of a colour is determined by that quality of gray with which its brightness can be matched. Value relates to the quality (not quantity) of a colour's greyness. A black and white photograph of a coloured object is a value picture. It is a one dimensional (value) rendition of a three-dimensional (coloured) object. Value is the only one of the three colour dimensions that can exist independently.⁸

Chroma

Chroma, the third dimension, was described by Munsell as "that quality by which we distinguish a strong colour from a weak one; the departure of a colour sensation from that of white or gray; the intensity of a distinctive hue; colour intensity".³ Chroma is the saturation or the amount of hue.⁴ (fig 2)

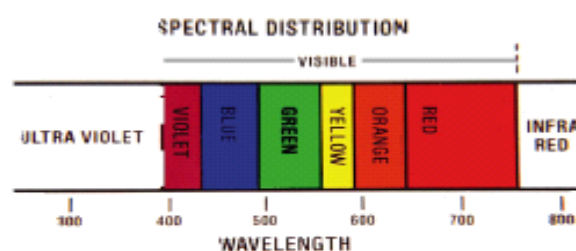


Fig 2: Saturation or the amount of hue.

Hue sensitivity

After 5 seconds of staring at a tooth or shade guide, the eye accommodates and becomes biased. If a person stares at any colour for longer than 5 seconds and then stares away at the white surface or closes his or her eyes, the image appears, but in complementary hue. This phenomenon,

known as *hue sensitivity*, adversely affects the shade selection.⁶

THE PRINCIPLES OF FORM

The golden proportion

Tooth-to-tooth relationship is the next point to consider. It was the Greeks who tried to formulate beauty as an exact mathematical concept. They believed that beauty could be quantified and represented in a mathematical formula. This led Pythagoras to conceive the Golden Proportion ($1/1.618 = 0.618$), and Plato, the Beautiful Proportion ($1/1.733 = 0.577$). Both concepts state that a shape or object with specific proportions is perceived as having innate beauty. The most widely used concept in dentistry is that of the Golden Proportion, whose formula is as follows:

$$S/L = L/(S + L) = 2/(1 + \sqrt{5}) = 0.618$$

where S is the smaller and L the larger part. The uniqueness of this ratio is that when applied by three different methods of calculation (linear, geometric, and arithmetic), the proportional progression from the smaller to the larger to the whole part always produces the same results.⁷ (fig 3)



Fig 3: Proportional progression from the smaller to the larger.

ILLUSION

Creating illusions is one of the most important objectives of esthetic dentistry. The ability to make a tooth look wider or thinner, smaller or larger, is an invaluable aid when solving difficult esthetic problems. When using restorative or prosthetic techniques on one or more teeth, duplicating the conditions and esthetics of the remaining natural dentition should be the ultimate goal.⁷ When patients request a "natural appearance" it does not

necessarily mean that they want an exact copy of the adjacent or opposite tooth as the goal; the dentist frequently must alter tooth form by illusion to accomplish the desired esthetic results.⁹ (fig 4)

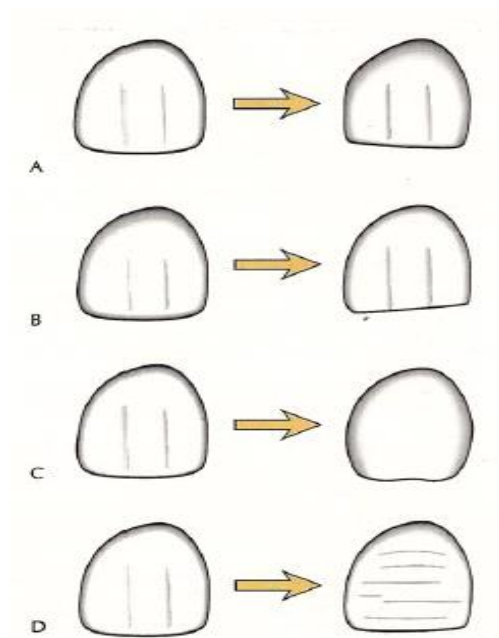


Fig 4: Tooth form by illusion to accomplish the desired esthetic results.

COMPONENTS OF AN ESTHETIC SMILE

Harmonizing an esthetic smile require a perfect integration of facial composition and dental composition.

Facial composition- hard and soft tissues of face

Dental composition- teeth and their relationship to gingival tissues

BUCCAL CORRIDOR SPACE

The esthetics of a smile is influenced by such features as the amount of gingival display, the presence of a smile arc, and the shade of the teeth. A smile demonstrating minimal gingival display has been deemed more esthetic than a smile with excessive gingival display. A smile demonstrating a curvature of the maxillary incisal edges (smile arc) that parallels the curvature of the lower lip is considered more esthetic than a smile with a flat maxillary incisal edge relationship. Furthermore, coincidence of the maxillary midlines with the facial midline has been found to be important, as has a light shade of teeth.¹⁰

Buccal corridor space is defined as “the distance between the lateral junction of the upper and lower lips and the distal points of the canines during smiling.”¹² But according to Frush and Fischer, “buccal corridor space is the space between the facial surfaces of posterior teeth and the corner of lips when the patient is smiling.” Generally, a smile includes not only the 6 anterior teeth but also the first premolars. Henceforth, posterior teeth should be included when evaluating buccal corridor space.

CLASSIFICATION OF SMILE LINE (fig 5)

Class I- Very high smile line: more than 2 mm of marginal gingival visible or more than 2 mm apical to the cemento-enamel junction visible for the reduced but healthy periodontium. This could be the *gummy smile*.

Class II- High smile line: between 0 to 2 mm of marginal gingival visible or between 0 and 2 mm apical to the cement-enamel junction visible for the reduced but healthy periodontium.

Class III- Average smile line: gingival embrasures only visible.

Class IV- Low smile line: gingival embrasures and cement-enamel junctions not visible.¹²



Fig 5: Classification of smile line.

CONCLUSION

The true meaning of facial aesthetics, in regards to dentistry, is to look at the growth and development as well as aging of the patient's facial form and relate that to how the dentition would improve it.¹³ The color, shape, and position of the

teeth are all part of the equation. Recognizing that form follows function and that the anterior teeth serve a vital role in the oral health of the patient is paramount.⁹

Using a comprehensive approach to diagnosing and treatment planning of esthetic cases can help achieve the smile that best enhances the overall facial appearance of the patient and provides the additional benefit of enhanced oral health.²

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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