



REVIEW ARTICLE

SMILE DESIGN-A JOURNEY FROM IMPERFECTIONS TO PERFECTION

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ABSTRACT

Beauty is what gives the highest degree of pleasure to the mind & suggests that object of delight approximates to one's conception of an ideal. In the era of beauty peagants, involvement of anatomists and esthetic dentists in defining the beauty is well understood. The present article reviews the various anatomical parameters for assessing a beautiful face and a beautiful smile. These may be of help to anatomists, dentists and of course to aspirants. Cosmetic dentistry thus adds to the facial esthetics enhancing the overall beauty and well being of an individual.

INTRODUCTION

Smile exerts a positive influence on our personal and professional relationships — and some researchers believe it positively impacts our physical and mental health. "Beauty is power; a smile is its sword." Indeed, our ability to smile is one of the most profound non-verbal communication skills we humans have. Cosmetic dentistry can completely correct or significantly diminish the insecure perceptions about the imperfect smile through a comprehensive approach known as Smile Design. Through both traditional and emerging dental techniques, the cosmetic dentist works in partnership with the patient to produce a new smile — one that the person will readily share with others with a new sense of confidence and esteem. (Nicholas C. Devis, 2007)

Objectives of Dental Esthetics

The two main objectives in dental esthetics are:

1. To create teeth of pleasing inherent proportions and of pleasing proportion to one another and
2. To create a pleasing tooth arrangement in harmony with the gingiva, lips, and face of the patient.

What is an ideal smile?



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The ability to distinguish an “ideal” smile rests in the emotional experience a person has when looking in the mirror — it is both individual and personal. The mission of the cosmetic dentist is to help each person integrate their subjective cultural perceptions of beauty and perceived preferences with the reality of an objective diagnosis and practical treatment possibilities.

Smile Design: Art meets engineering

Consider the challenges of building or remodeling a house. Planning would consider the challenges of building or remodeling a house. Planning would require decisions about design, engineering, materials, contractors and subcontractors. From the choice of construction materials to the size of each room to the style of architecture — the eventual assembly for each home would be as varied as its geographic location just as the final design would be as diverse as the preference of the owner living within. (Patnaik *et al.*, 2003; McLaren and Tran Cao, 2009) Planning for a new smile is much the same. By comparing the person's current conditions with the desired result, the dentist can map out several possible strategies for consideration in meeting the desired smile design goals. The interrelation of the smile analysis criteria and the comprehensive oral health factors is addressed. The benefits of supplementary care with other dental specialty disciplines may be considered. The array of available treatment procedures will be described, and the palette of prospective restorative materials will be explained. Together the dentist and patient will weigh the advantages and disadvantages of each of the many choices to determine the scope of treatment and the final plan to achieve the desired smile. (Rufenacht, 2000) The dentist as artist can help a patient visualize the potential results of proposed treatment recommendations using photographic images, tracing analysis, and even computer simulation. While these pictures may differ slightly from the eventual outcome, the dentist can utilize drawings or digitized images to describe particular procedures and to compare how they could affect the final look. (McLaren and Rifkin, 2002) Eventually, the dentist and patient work together to determine the best course of action as they collaborate to achieve a practical and realistic smile enhancement.

The process of smile design analysis (Morley and Eubank, 2001; Dr. Lee Ostler)

Smile design should involve the evaluation of certain elements in a specific sequence;

1. Facial analysis (general facial balance)
2. Dento-facial analysis (Maxillo-mandibular relationships to the face, and the dental midline relationship to the face)
3. Dento-labial analysis (the relationship of the teeth to the lips)
4. Dento-gingival analysis (the relationship of the teeth to the gingiva, and
5. Dental analysis (the inter tooth and intra tooth relationships, ie, form and position along with color).

Smile components

A smile is something that bridges the large gap between any two individuals. Of all the components of a smile, the teeth

play a very important role in creating a perfect effect. It is not just necessary to have good perfect teeth, it is also necessary for the teeth to be in harmony with the face, the lip line, the curvature of the mouth, etc.

Beautiful Smile

A beautiful smile is an added asset to a beautiful face. Goldstein (1998) described certain parameters of a beautiful smile which are described below:

(A) Facial Analysis:

1. Full Smile: Following parameters judge the beauty of a face in full smile.

- (i) Relationship between interpupillary line (AB) & occlusal plane of teeth (CD): Ideally these should be parallel to each other but may be canted to right or left side.
- (ii) Midline relationship of teeth (Central incisor) to face (philtrum). In the most beautiful face, this relationship would be symmetrical; in others it may be to right or left of centre.

2. Profile: Following parameters are considered in a profile

- (i) Nasolabial angle-This is the angle between columella of nose & anterior surface of upper lip.

- 0 = 90° (Normal)
 0 = <90° (Convex)
 0 = > 90° (Concave)

In men the nasal-labial angle is generally 90° to 95°, whereas In women it is generally 100° to 105.9°.

- (ii) Rickets E-Plane - It is drawn from tip of the nose to the chin. Then the distance between this plane & the lips is measured. Ideally the upper lip should be at a distance of 1-2 mm & lower lip at a distance of 2-3 mm from this plane.

(B) Dentofacial Analysis: —It has following parameters:

- (i) *Position of upper lip* – while smiling, upper lip should be neither too high so that to expose the upper gums, nor too low so as to cover more than half of upper teeth. It should be ideally covering not more than 1/4th of teeth.
- (ii) *Alignment of upper incisal edge to lower lip*– The best position is a convex curve downwards, but it may be straight or even concave downwards.
- (iii) *Tooth-lower lip position* – The teeth may be just touching the lower lip or there may be a slight gap.
- (iv) *Number of teeth exposed during full smile:* The smile may be canine to canine (6 teeth exposed); premolar to premolar (8-10 teeth exposed); molar to molar (16 teeth exposed).
- (v) *Midline relationship of central incisors to philtrum* – A midline through philtrum should ideally pass through the centre of two central incisors. However, it may pass right or left of the centre of central incisors.

- (vi) *Midline skewing to left or right* – Ideally, there should be no skewing. But there may be left or right skewing.
- (vii) *Bilateral negative space* – under normal conditions, there is little space visible between angles of mouth & teeth while smiling is called as negative space.

(C) Dental analysis:

- (i) *Proportions of central incisors* – Height & width of central incisors is measured with callipers. The most ideal width to height ratio is 80%
- (ii) Proportion of central incisor to lateral incisor to canine - The ideal ratio should be 1. 6: 1: 0. 6.
- (iii) Interdental contact area and point - It is defined as the broad zone in which two adjacent teeth touch. It follows the 50:40:30 rule in reference to the maxillary central incisor. The increasing ICA helps to create the illusion of longer teeth by wider and also extend apically to eliminate black triangles.
- (iv) Incisal embrasures - The incisal embrasures should display a natural, progressive increase in size or depth from the central to the canine. So that the contact point moves apically as we proceed from central to canine. If the incisal embrasures are too deep, it will tend to make the teeth look unnaturally pointed. As a rule, a tooth distal to incisal corner is more rounded than its mesio incisal corner.
- (v) Zenith points - The most apical position of the cervical tooth margin where the gingiva is most scalloped. It is located slightly distal to the vertical line drawn down the centre of the tooth. The lateral is an exception as its zenith point may be centrally located.

(D) Dento Gingival Analysis

1. Healthy gingiva - Healthy gingiva is usually pale pink in color, stippled, firm and it should exhibit a matte surface; located facially – 3 mm above the alveolar crestal bone and interdentally – 5 mm above, the intercrestal bone papilla should be pointed and should fill the gingival embrasure right up to the contact area.
2. Gingival level and harmony - Establishing the correct gingival levels for each individual tooth is the key in the creation of harmonious smile. The gingival margin of the lateral incisor is 0.5–2.0 mm below that of the central incisors. The least desirable gingival placement over the laterals is for it to be apical to that of the centrals and or the canines.

Putting the plan into action

To this point, the smile design is still on paper — or perhaps a computer screen. Once the plan is finalized, though, the real work begins: the actual procedures the cosmetic dentist uses to create the patient's brand new smile. A wide array of techniques now at a cosmetic dentist's disposal, but most have been in development for decades. Some techniques, like whitening, bonding, veneering or enamel shaping, change the appearance and shape of the patient's natural teeth. Other techniques like crowns, bridgework and implants provide permanent artificial replacements for missing or abnormal teeth

that cannot be corrected with the previously mentioned procedures. (Abdul-Haq *et al.*, 2009) Orthodontics may also play a role in many smile design plans to correct malocclusion and faulty tooth alignment. Although the optimum time for orthodontic applications is typically just before or at puberty, cosmetic dentists have realized their benefit for smile design even for adults of all ages. Innovations in braces and other orthodontic devices have reduced discomfort and improved their appearance and even saved time. Some of these procedures involve just one visit to the dentist; others may take months or even years to complete. Regardless of the techniques involved the outcome should be the same, the smile you once beheld in the mirror has been transformed. A sense of disappointment or embarrassment has now been replaced with confidence as you freely share your new smile with the world. More importantly, dental health has simultaneously been restored. You will be a healthier you and that is definitely something to smile about. (Shanbhag *et al.*, 2014; de Lima Lucas *et al.*, 2013; Sajid *et al.*, 2010)

Smile design techniques (Pithon *et al.*, 2014)

Here's a brief description of some of the more common techniques used by cosmetic dentists to correct or enhance a person's smile:



BEFORE

AFTER

Whitening — a chemical application with a peroxide base is applied directly to the teeth to remove minor staining and discoloration.

Bonding — An acrylic material is applied to a tooth that can be shaped and colored to match the natural look of the patient's other teeth. Primarily used for chipped, broken or decayed teeth, as well as to alter tooth shape with minimum tooth removal.

Enamel Shaping — the removal of minute amounts of enamel, the tooth's outer layer, to improve the look of the shape of a tooth.

Veneers — a thin shell of tooth-colored material, usually porcelain, custom-designed to be affixed to the front surface of the teeth.

Crowns and Bridgework — a technique that covers heavily damaged teeth or replaces missing teeth. They usually have an inner core for strength and an outer porcelain shell for the feel and appearance of real teeth.

Dental Implants — as an alternative solution for replacing missing teeth, titanium posts are surgically implanted in the patient's jaw. Artificial tooth replacements are connected to the posts to restore missing tooth above the gum.

Gum Contouring — a minor surgical procedure altering the position of the gum tissue and sometimes the underlining bone, to improve the look and regularity of the gingival line around the teeth.

Envisioning the future

Author Lewis Carroll once wrote, “If you don't know where you are going, any road will take you there.” These may be cynical witticisms, but they actually contain profound wisdom for anyone considering cosmetic enhancement. Smile design requires much more than a patient specifically requesting a popular procedure or even generally saying, “Make my smile beautiful.” Like any other worthwhile undertaking, it necessitates forethought and planning. Effective planning begins with an extensive, thought-provoking discussion between patient and dentist.



BEFORE



AFTER

Therefore, the patient and the dentist should begin with the end in mind. The first priority is to gain an understanding of the patient's perceptions. To appreciate a patient's concerns, the dentist will often start the discussion with a few key questions. How do you feel about your teeth? What do you like, and what do you dislike? If you could change anything you wanted, what would it be? Thinking ahead several years, what do you want for the future? These questions take direct aim at the heart of the issue — the patient's concerns and priorities. As a patient openly and honestly shares the answers, an insightful clinician can discern the patient's insecurities and desired visualized outcome. (Moore *et al.*, 2005) It can be fun too, a chance to stretch the imagination and picture the ideal result. A little dreaming is always the heart of any great plan process, even the creation of a new smile. With the destination firmly in mind, the patient and dentist can take the next step in charting the course to reach it. (Sudhakar and Vishwanath, 2014; Wasche *et al.*, 2007)

Conclusion

Smile design is a relatively new discipline in the area of cosmetic dentistry, and it involves several areas of evaluation and treatment planning, which simply means that cosmetic dentistry has to be a multispecialty branch, wherein all treatments like orthodontics, periodontics, and surgical procedure have to be performed whenever deemed necessary. So smile we create should be esthetically appealing and functionally sound too.

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