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Modern trends in cosmetic dentistry and media coverage of smile aesthetics have increased public awareness of dental aesthetics. People now know that smile aesthetics plays a key role in their sense of well-being, social acceptance, success and personal relationships, and self-confidence. The aesthetic expectations and demands of dental patients have increased substantially. Now, a glowing, healthy and vibrant smile is no longer available only to millionaires and movie stars. Therefore, many dentists are incorporating various smile design protocols in their daily routines to meet the increasing aesthetic demands of their patients.

Smile aesthetics

A smile is a facial expression that is closely related to the emotions and psychological state of a person. A smile is exhibited when a person expresses happiness, pleasure or amusement. It is the most important of facial expressions and is universal in expressing friendliness, agreement and appreciation. A smile requires the coordination of facial, gingival and dental components that are stimulated voluntarily or involuntarily by various emotions. It is evident that each smile is different, particular to each individual. An impaired smile, on the other hand, has been associated with higher incidences of depression.

Aesthetics deals with objective and subjective beauty. Objective beauty is based on the appreciable properties possessed by the object itself. However, subjective beauty is relative to the perception and emotion of the observing person. Perception, however, in smile aesthetics is based on personal beliefs, cultural influences, aesthetic trends and fashion, and input from the media. Hence, smile aesthetics is a multifacorial issue, which needs to be adequately addressed for any aesthetic treatment. The objective beauty of a smile is achieved when it is in harmony with the application of various principles of smile design, and the creation of subjective beauty may enhance cosmetic value.

Indeed, mathematics has become considered the only frame of reference for comprehending nature. Therefore, the cosmetic dentist needs to be familiar with various mathematical and geometric concepts for achieving smile aesthetics and their clinical protocols.

The Smile Design Wheel

For any smile design procedure, the clinician needs to consider the elements of the smile design pyramids – psychology, health, function and aesthetics (PHFA), listed here according to order of importance. It is necessary to determine the patient’s psychological status, establish a healthy oral environment, restore function and then give attention to enhancing the aesthetic aspect. All four pyramids must be accorded equal importance to achieve a desirable clinical result.

By integrating these PHFA pyramids, I developed the Smile Design Wheel (Fig. 1), in which each pyramid is subdivided into three related zones. The Smile Design Wheel will help clinicians to easily comprehend the ‘complex’ smile design procedures of aesthetic dentistry. In the next section, I briefly explain the Smile Design Wheel protocols with PHFA pyramids assessment and their basic objectives.

Step I: Understand

The pyramid of psychology

According to Prof. Robert A. Baron, psychology is best described as the science of behaviour and cognitive processes. Behaviour deals with any action or reaction of a living organism that can be observed or measured. Hence, the only objective method of aesthetic analysis is mathematical.

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The pyramid of health is divided into three zones: general health, specific health and dental/gingival health. The health pyramid assessment and its management play a vital role in most cases, as patients may have certain limitations owing to their health, like uncontrolled diabetes, soft-tissue pathology, poor bone structure, poor oral hygiene, tooth decay, periodontal disease etc., which should be addressed prior to functional and aesthetic treatment.

The health pyramid assessment process includes patient history (medical, dental, nutritional), examinations (extra-oral, intra-oral) and investigations (radiographs, pulp vitality test, study models analysis). Various types of questionnaires and clinical examination and investigation protocols can be used to obtain the necessary information relating to the patient’s health. The clinician can use this information to prepare a personalized treatment protocol. All three components of the pyramid of health should be established within normal limits before starting any aesthetic restorative procedure on a patient.

Step III: Restore—The pyramid of function

Function is related to force and movement. Hence, for the pyramid of function assessment, the existing occlusion, comfort and phonetics are processed with the evaluation of para-functional habits, level of comfort during evaluation of para-functional malocclusion and pronunciability which are the basic tools for macro-aesthetic analyses.

Macro-aesthetics

Macro-aesthetics deals with the overall structure of the face and its relation to the smile (Fig. 6). To appreciate the macro-aesthetic components of any smile, the visual macro-aesthetics distance should be more than 5 feet. However, in clinical practice, the assessment of the macro-aesthetic components is done using various facial photographs with geometric and mathematical appraisals, using reference points and their interrelation. Various facial reference points and guidelines are identified during assessment for orthognathic and facial cosmetic surgery; however, in smile design the following macro-aesthetic guidelines are considered fundamental:

- Facial midline
- Facial thirds
- Interpupillary line
- Naso-labial angle
- Rickett’s E-plane

Mini-aesthetics

Mini-aesthetics deals with the aesthetic correlation of the lips, teeth and gums at rest and in smile position (Fig. 7). The aesthetic correlation can be appreciated properly when viewed at a closer distance than that of the typical macro-aesthetics distance.

The visual mini-aesthetics distance is similar to the across-the-table distance, which is normally within 2 to 5 feet. There are various guidelines in aesthetics based on the relationship and ratio between lips, teeth and gingival tissue. These can be analyzed during mini-aesthetic assessment using frontal, vertical and transverse characteristics of the smile. Clinical photographs are the basic tools for mini-aesthetic analysis. The smile can be analyzed at rest (M-position) or smile (E-position).

In the M-position, the following references are measured and analyzed:
- Commisson height
- Philtrum height
- Visibility of the maxillary incisors

In E-position the following references should be analyzed:
- Smile line
- Dental midline
- Smile symmetry
- Buccal corridor
- Display zone and teeth visibility
- Smile index
- Lip line

Micro-aesthetics

Micro-aesthetics deals with the fine structure of dental and gingival aesthetics (Fig. 8). Mini-aesthetics can be appreciated at a visual micro-aesthetic distance of less than 2 feet or a normal make-up distance. For the clinical assessment of micro-aesthetic components of the teeth and gingival tissue, appropriate illumination and magnification tools are required for intra-oral examination. Necessary clinical intra-oral photographs should be taken for documentation and future reference.

For micro-aesthetics, the detail of the individual tooth structure and its relation to the surrounding gingiva and the adjacent teeth should be analyzed. The following are the major points to be considered:
- Upper centrals (tooth size ratio)
- Principle of golden ratio
- Axial inclination
- Incisal embrasures
- Contact point progression
- Connector progression
- Shade progression
- Surface micro-texture

In smile design, the aesthetic conditions related to gingival health and appearance are an essential component. The gingival shape, position, embrasure, and contour in relation to the teeth are interdependent. The following are major aspects that should be addressed during smile design to achieve gingival or pink aesthetics:
- Gingival shape
- Gingival contour
- Gingival embrasure
- Circumferential interval
- Gingival height (position or level)

To achieve higher patient satisfaction and long-lasting treatment results, the following should be the sequence in any smile design procedure: proper comprehension of psychological aspects, establishment of health and the restoration of function within its normal limit, and the subsequent enhancement of aesthetic components.

Conclusion

Today, various protocols of smile design are available in cosmetic dentistry. However, some clinicians wish to use the simplest protocol with the most predictable results. It is to be noted that smile design should always be a multifactorial decision-making process that allows the clinician to treat patients with an individualized and interdisciplinary approach.