

Smile Design Wheel™ :

A practical approach to smile design

Author_ Dr Sushil Koirala, Nepal

_Modern trends in cosmetic dentistry and media coverage of smile makeovers 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 at work and in 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 practices to meet the increasing aesthetic demands of their patients.

different and particular to each individual.³ An impaired smile on the other hand, has been associated with higher incidences of depression.⁴

Aesthetics deals with objective and subjective beauty.⁵ 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 multifactorial issue, which needs to be adequately addressed for any aesthetic treatment. The objective beauty of a smile can be established with the application of various principles of smile design, and the creation of subjective beauty may enhance cosmetic value.^{5,6}

_Smile design

Smile design has been defined in various ways in the literature; I would like to summarise it as follows: "Smile design is a systematic process governed by the psychology, health, function and rules of natural aesthetics to bring about some changes in soft- and hard-oral tissue within anatomical, physiological and psychological limitations, thereby creating a positive influence on the overall aesthetics of a person's face and personality as a whole".⁷

We all appreciate a beautiful smile when we see it, but it is difficult to explain exactly what makes a smile beautiful. It is evident that a pleasing smile depends on the following features: the

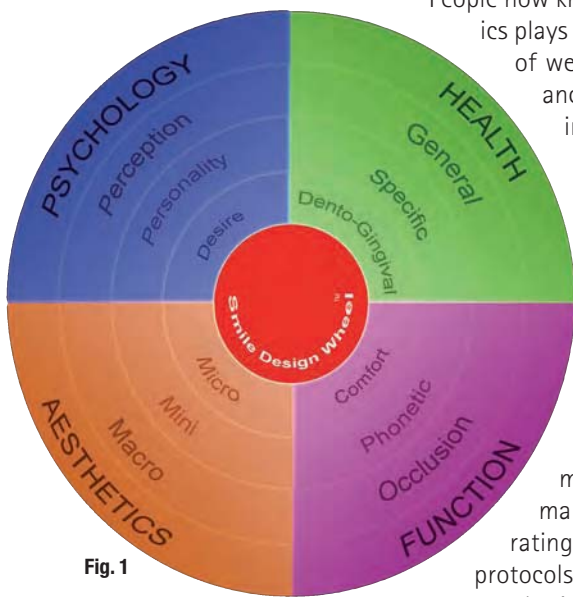


Fig. 1

_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.¹ It is the most important of facial expressions and is essential in expressing friendliness, agreement and appreciation.² 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

quality of the dental and gingival components, their conformity to the rules of structural beauty, the relationship between teeth and lips, and their harmonious integration with the facial components.⁸ Overall facial beauty and smile aesthetics are normally judged by psychological aspects—perception, personality, desire—the state of health, the mathematical ratio of the facial, dento-facial and dento-gingival components. The psychological aspects are highly subjective and fluctuate constantly because of identity, peer and media pressure. Hence, the only objective method of aesthetic analysis is mathematical.

Indeed, mathematics has been considered the only frame of reference for comprehending nature.⁸ 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.⁷ 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 should 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 was devised as a simple guide to the most important components of smile design, their clinical significance and sequence to be maintained during the smile design procedure. I believe that 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 PHFH pyramids assessment and their basic objectives.

Step I: Understand— The pyramid of psychology

According to Prof. Robert A. Baron, psychology is best defined 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. Cognitive processes deal with every

aspect of our mental life: our thoughts, memories, mental images, reasoning, decision-making, and so on, in short, with all aspects of the human mind.

In smile design, we normally try to understand the second part of psychology, i.e. the human mind or rather the minds of our patients. There are three fundamental zones we consider in detail for the psychological pyramid assessment: perception, personality and desire.

Perception

Perception is the process through which a person can select, organise and interpret input from their sensory receptors. A person cannot imagine beauty and aesthetics without some input in advance. The media is the most common source of information at present regarding beauty and aesthetics. A patient usually conceives his or her own perception of smile aesthetics based on his or her own personal beliefs, cultural influences, aesthetic trends within society and information from the media.

Dentists need to communicate with their patients to determine such information during the initial consultation, which helps in understanding the patient's perception of the treatment result. The use of questionnaires, visual aids, such as previous clinical cases or smiles of various celebrities, can aid immensely in this process.

Personality

According to the human psychology, personality is an individual's unique and relatively stable pattern of behaviour, thoughts and emotions. It is to be noted that each patient's problem or concern should be comprehensively evaluated with respect to his or her personality type. According to Roger P. Levin,⁹ there are four personality types:

– **Driven:** This type of person focuses on results, makes decisions quickly and dislikes small talk. They are highly organised, like details in condensed form, are businesslike and assertive.

– **Expressive:** This type of person wants to feel good, is highly emotional, makes decisions quickly, dislikes details or paperwork, and likes to have a good time.

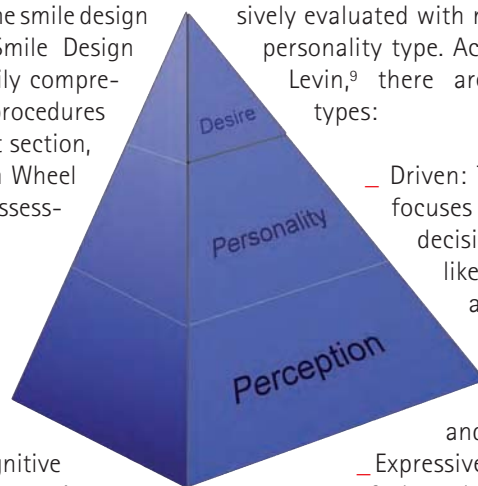


Fig. 2

- **Amiable:** People with this personality type are attracted by people with similar interests, fear consequences, are slow in decision-making, react poorly to pressure, are emotional and slow to change.
- **Analytical:** This type of person requires endless details and information, has an inquiring mind, is highly exacting and emotional. This type is the most difficult to convince and takes the longest to reach a decision.

Desire

Desire is a subjective component. Increased public awareness of smile aesthetics through the media has led to a rapid increase in patients' desires and levels of expectation. Patients are now willing to pay for the enhancement of their smile aesthetics. Therefore, the ethical responsibilities of cosmetic dentists in identifying the need- or want-based desires of patients have also increased. The desires and levels of expectation in many patients are higher than what is clinically achievable, and it is the clinician's duty to explain and guide patients towards a realistic aesthetic goal.

The psychological assessment of any person is very subjective; however, aspects like perception, personality, expectation or desire are important for the smile design procedure. Patient satisfaction is closely related to these aspects. Hence, understanding the pyramid of psychology is an integral aspect in smile design.

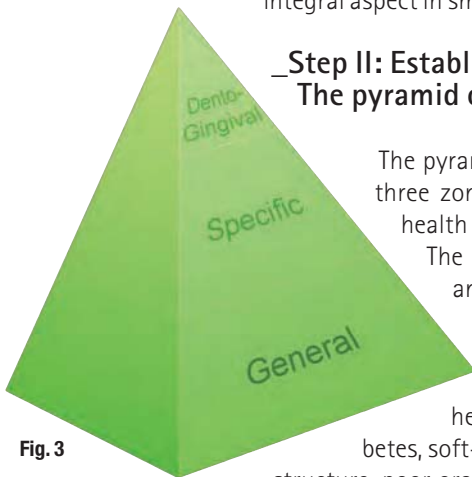


Fig. 3

**Step II: Establish—
The pyramid of health**

The pyramid of health is divided into three zones: general health, specific health and dento-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 investi-

gation protocols can be used to obtain the necessary information relating to the patient's health. The clinician can use this information to prepare a personalised 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 properly examined with the evaluation of para-functional habits, level of comfort during chewing and deglutition, and temporomandibular joint movement.

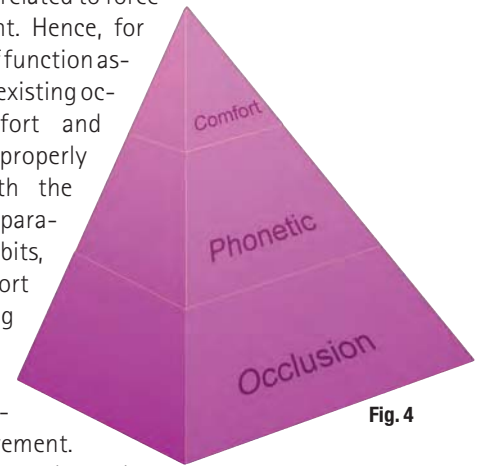


Fig. 4

The clarity of normal speech and pronunciation are also examined. The occlusion, comfort and phonetics components of the functional pyramid should be restored and maintained at an acceptable level before starting the treatment of any aesthetic component.

**Step IV: Enhance—
The pyramid of aesthetics**

The pyramid of aesthetics is the last but most sensitive pyramid of the Smile Design Wheel, as aesthetics has both subjective and objective aspects. The assessment of the subjective aspects—perception, personality, desire—is carried out during the pyramid of psychology assessment.

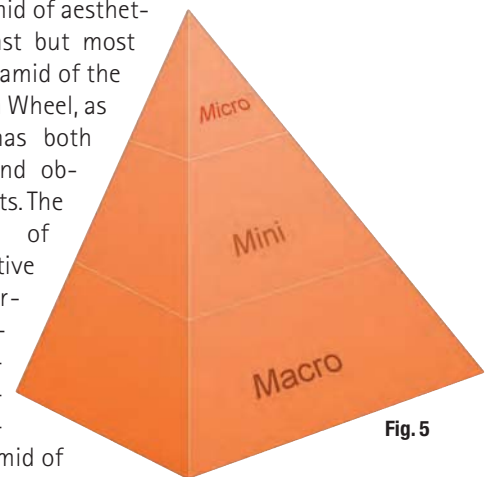


Fig. 5

It is to be noted that the assessment of the objective aspects depends on the distance (focal length) used to visualise the aesthetic component. Hence, the aesthetics pyramid can broadly be divided into three major zones: macro, mini and micro.



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 inter-relation. Various facial reference points and guidelines are used for aesthetic 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; and
- _ 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 the visual 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 analysed during mini-aesthetic assessment using frontal, vertical and transverse char-

acteristics of the smile. Clinical photographs are the basic tools for mini-aesthetic analysis. The smile can be analysed at rest (M-position) or smile (E-position).

In the M-position, the following references are measured and analysed:

- _ commissure height;
- _ philtrum height; and
- _ visibility of the maxillary incisors.

In E-position the following references should be analysed:

- _ smile arc (line);
- _ dental midline;
- _ smile symmetry;
- _ buccal corridor;
- _ display zone and teeth visibility;
- _ smile index; and
- _ 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 within 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 sur-



Fig. 8

rounding gingiva and the adjacent teeth should be analysed. 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; and
- _ 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;
- _ gingival zenith; and
- _ 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, the 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, most 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 individualised and interdisciplinary approach.

The Smile Design Wheel presented in this article clearly indicates the most important components (PHFA pyramids) of smile design, their clinical significance and sequence to be maintained during the smile design procedure. I believe that the Smile Design Wheel is a simple and practical protocol in smile design that can help the clinician to easily comprehend the 'complex' smile design procedures of aesthetic dentistry.

Editorial note: A complete list of references is available from the publisher.

_contact	cosmetic dentistry
<p>Dr Sushil Koirala, VISA president, can be reached at skoirala@wlink.com.np.</p>	