Visagism- analysing face and personality in Smile Designing

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Abstract

Aesthetics has become one of the most important outcomes of daily dental treatments. Regardless of the complexity of the cases, the patients are seeking better-looking smiles. Often the final esthetic results may fail to meet the patient's expectations due to disharmony between the smile design and the patient's identity. The patient's demands and the plethora of information have driven the profession to a specific questioning respecting the customization of the new smile design. A rebel is web-based software that incorporates the Visagism concept for designing the restorations. The analysis and execution are performed in a few simple steps. Facial analysis is done with a full-face photograph and a broad smile with visible dentition. Personality analysis is done based on the interview. The final personalized digital smile design combines the most appropriate tooth shapes based on the personality interview and the essential parameters of the smile frame dependent on the face. Thus, the clinicians can customize a smile design in harmony with the psychodentofacial features of the patients by using

appearance, personality, and personal preferences as a reference to achieve predictable results.

Keywords: Visagism, smile design, personality, esthetics, dentofacial, teeth shape, Rebel software

Introduction

A smile is a dynamic component of facial appearance and has a social and psychological effect on an individual's personality [1]. Today's world requires a novel approach that places the patient's needs in the center. Sometimes patients may recognize what is lacking in their smile, but they could not verbalize their needs in most cases simply because they do not know how to. Also, certain restrictions and technical limitations from which the dentists suffer, such as not being able to visualize the outcome in detail before starting the procedure. Sometimes, everything looks just fine and functional, but it just does not "feel right." In this era of digitization, it is plausible to be able to produce and customize beautiful smiles.[2]. With photogrammetry, all the details are transferred to the digital environment with different approaches and assessed with special software to create the most distinct and suitable smile design.

A recent study [3] conducted by Cervino G. et al. highlighted the use of digital smile design software in different fields of dentistry. Their literature search has depicted that this technology has undergone positive evolution in all areas, from treatment planning to predictable restorative results. Various DSD software products are available such as Smile Designer Pro, Smile Design, DSD 2D, Planmeca Romexis®, but do not consider the personality factor in designing the smile. Omar and Duarte appraised different programs used for Digital Smile Design, like Photoshop CS6, Keynote, Planmeca Romexis Smile Design, CEREC SW 4.2, Aesthetic Digital Smile Design, Smile Designer Pro, DSD App, and VisagiSMile.[4] According to their survey,

Photoshop CS6 and Keynote provide a more comprehensive smile analysis than other DSD programs. The aptitude of all these programs in full digital smile design should incorporate facial, dentogingival, and dental esthetic parameters.

Wolffhechel K et al. determined the relationship between self-reported personality traits, first impressions, and facial characteristics. The results revealed a positive correlation and inferred that several personality traits could be read from a face, and facial features influence the first impression.[5] Sharma et al. conducted a study to determine the correlation between different types of temperaments and tooth form. According to them, tooth form was closely related to the personality of an individual [6]. Rambabu et al. conducted a study to see any relation between dentofacial esthetics (determined by three parameters, i.e., tooth form, long axes of anterior maxillary teeth, and connection line between embrasure) and the personality traits (four mental temperaments) through the concept of Visagism. Their results stated no correlation between temperaments and photographic analysis of the face. However, they have appreciated the idea of combining the Visagism concept for creating a personalized smile design.[7]

"VisagiSMile," an innovative dental software (VisagiSMile; Sofia, Bulgaria), works on the Visagism concept, enabling clinicians to personalize and improve smile designs that induce an immediate emotional reaction by the patient and can be evident by changes in behavior, posture, and even phonetics.[8]

Application of Visagism in Esthetic Dentistry

Teeth shapes play a role in the personality, which can be reflected in Visagism. The lines, directions, and the way light reflects off the teeth artfully convey different emotions. Each tooth is unique and has its personality. Several reference lines should be considered when

observing anterior maxillary teeth, such as those that unite the gingival zeniths, incisal embrasures, gingival papillae, and incisal plane. These lines are archetypical symbols, which means specific alterations in their composition will provoke different emotions in the observer. Clinicians must comprehend the intricacies of teeth and the emotions conveyed by any smile design, and the same should be communicated with patients prior to treatment.

According to the personality, the four basic tooth shapes are Choleric -rectangular, Sanguine-triangular, Melancholic- oval, and Phlegmatic- square teeth. Vertical, horizontal, inclined, straight, and curved lines interact in infinite ways to create the diversity of natural tooth shapes. These lines illustrate their power of expression and emotional significance, helps to classify the basic forms of maxillary central incisors: rectangular, triangular, oval, and square. [9,10]

Protocol for digital planning and designing by VisagiSMile software

VisagiSMile is web-based software that executes a comprehensive evaluation of the facial features, contemplates the personality factor to create a natural and proportional appearance, and helps in designing a new enhanced personalized smile. VisagiSMile is the only software that emphasizes creating a smile that will reflect the person's personality.

Designing a smile can incorporate changing the position of the teeth, correcting the shape and size of teeth, changing tooth color, and correcting the ratio of teeth to the gum. The process of smile designing with VisagiSMile necessitates two photographs: one of a full-face with a broad smile and visible dentition and another of the upper jaw with retracted lips and black contrast tool. The picture in full-face with a broad smile and visible dentition uploaded in the software is placed behind the facial frame. By marking the landmark points on the image, the software automatically analyzes the facial structure and classifies the facial shape as strong, dynamic, delicate, or calm (Fig.1). Then, the full-face image is uploaded to the software. It is automatically positioned behind the calibration guidelines, consisting of three vertical references parallel to each other and a horizontal line perpendicular to them.

Automatic/manual face reading is chosen for calibration, facial map selection, and facial type analysis. The face type is described in terms of the four types of temperaments: i.e., Choleric/strong, Sanguine/dynamic, Melancholic/delicate, phlegmatic/calm, or a combination of these. The face is defined by the facial contour, the eyes, the nose, eyebrows, and mouth. These features will be selected using points and lines. Imaging technology uses an automated landmarking method to derive precise, detailed, and informative facial types from 27 standard facial morphometric landmarks. The divisions of these are as follows.

Facial shape selection-Nine points

Right and left eye selection- Eight points

Nose & eyebrows selection- Six points

Mouth selection- Four points.

A digital facial map marking the previous points is created for each face. The facial type option will be clicked to analyze the face type. The readings are denoted in percentages. The interview is a psychological test that is used to determine the type of personality of the subject. The type of personality is automatically recognized by VisagiSMile software. The test is an adapted version of Dr. Susan Dillinger's test and Eysenck's personality questionnaire. [11,12] Based on the selection of answers, personality type is recognized by the software. The different personalities are strong/ dynamic/ delicate/calm or a combination of these. The personalities are ranked in order of percentages. Thus, the computer software

determines the facial type and the personality of the individual. (Fig.2)
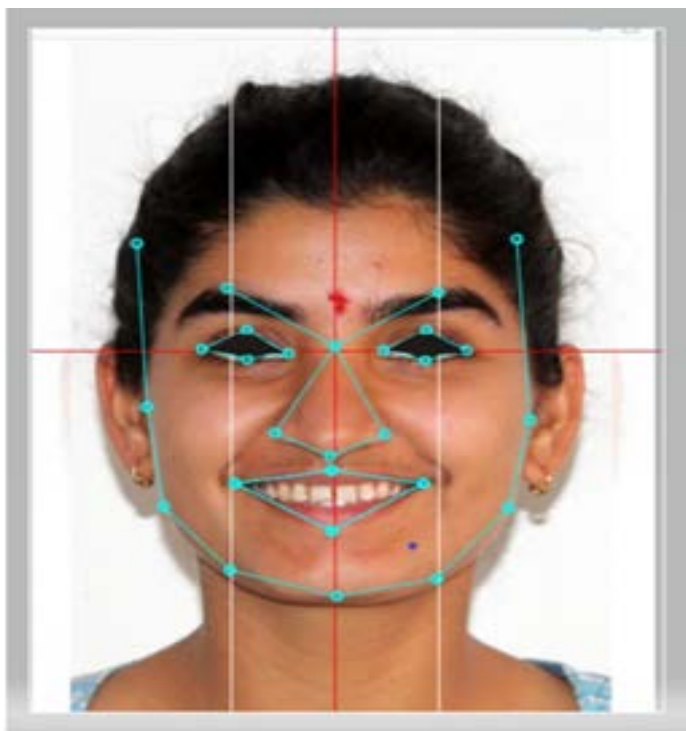

Fig.1: Facial map

Fig.2: Facial and personality analysis

An intraoral picture of the upper jaw with retracted lips and the black contrasting tool is uploaded. The patient's choices about the desired teeth design are also considered in calculating the proposed smile design. (Fig.3) The

options include features of the teeth related to their shape, texture, and color. There are four basic tooth shapes: rectangular, triangular, oval, and square. According to the facial analysis, the software computes the main parameters of the individual smile frame: incisal projection, tooth shapes, tooth inclination, dominance (low, medium, and high) [8,13]. The smile design integrates the interview data and the facial analysis, and the patient's preferences following the aesthetic rules (Fig. 4). The teeth preview is displayed, and the patient and the dentist can work out any necessary corrections that need to be made. The preview is further revealed in the form of real teeth. (Fig.5) The final design is adapted on an intraoral picture which is digitally positioned on the patient's face. Recently a new software is added to the family of VisagiSMile.
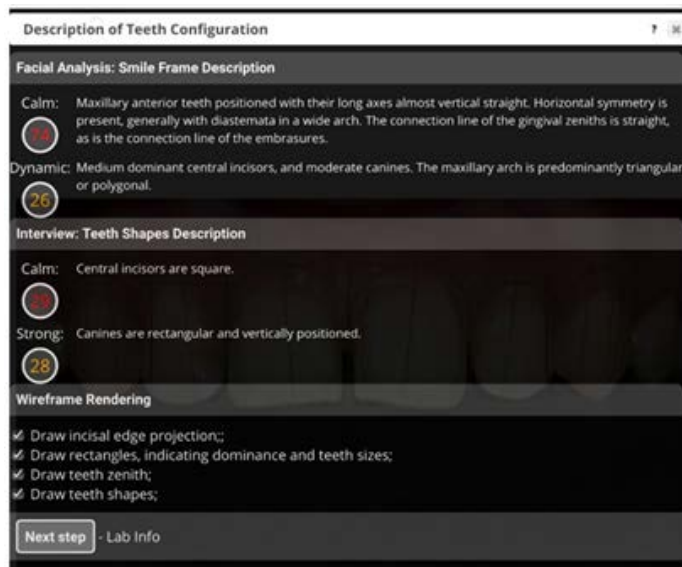

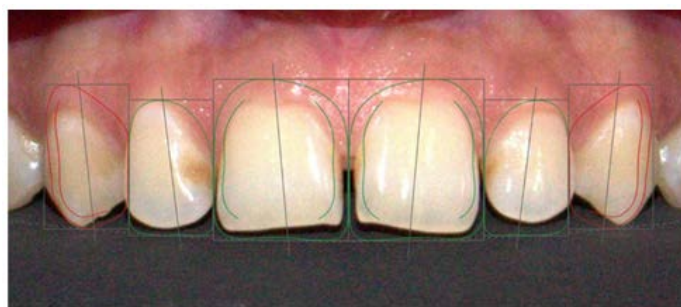Fig.3 Description of teeth configuration according to analysis

Fig. 4: Wireframe rendering of design preview

Fig.5: Design preview in real teeth

The REBEL Simplicity

In the Fifth Dimension, including the personality traits on top of the previous aesthetic rules makes a world of difference when properly introduced to the algorithm. An algorithm that Rebel is built on. The computational mind of Rebel is fueled not only by the biological, structural, functional, and aesthetic parameters but also the variables related to the personality. The REBEL system is a virtual lab that converts the 2D design into 3D and creates a digital wax-up immediately. The 2D is created by implementing algorithms to compute the ideal combination of the incisal silhouette, tooth axis, central incisor dominance, and combination of individual tooth forms out of countless alternatives.

It may sound complicated; however, it is the simplest way of getting one of the best 3D digital wax-ups possible.

REBEL has a very sophisticated artificial intelligence-based software behind it; however, it provides great simplicity to the end-users, the dentists, and dental technicians.

Conclusion

Previsualizing the outcome can be a motivating factor for initiating treatment and keeping the patient involved throughout.

It presents a clinical procedure demonstrating an accurate operative protocol for intraoral and extraoral esthetic analysis of the patient, with static photographic documentation. 2D REAL smile design using Visagismile

and 3D REAL previsualization using REBEL Simplicity. Clinical previsualization is possible utilizing a mock-up or aesthetic pre-evaluative temporaries (APTs) based on a diagnostic digital wax-up.

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