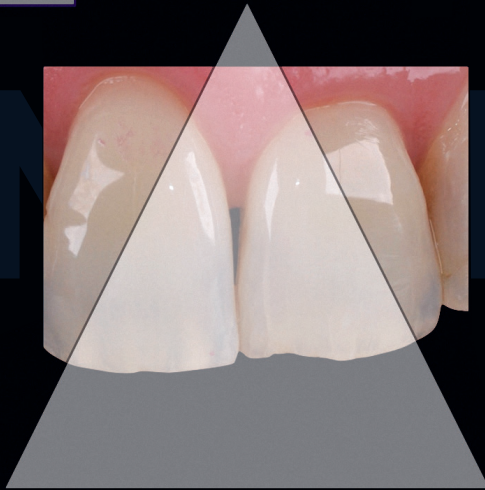
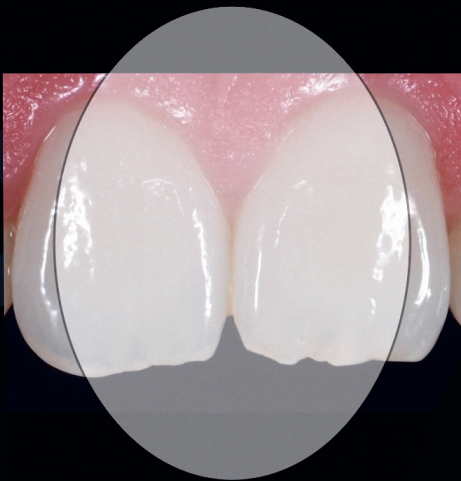




STRONG



Dynamic



Delicate

Calm



The Art and Creation of a Personalized Smile: Visual Identity of the Smile (VIS)



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Incorporating elements into the smile design that visually translate each patient's personal identity may help dentists provide restorations that correspond to the esthetic as well as the psychological features of the created image. This can positively affect patients' emotions, behavior, and confidence, and thus their reaction to the definitive treatment outcome.

The purpose of this article is to show that in addition to the esthetic rules established throughout time, the emotional expression of the treatment, represented by the shapes and lines that constitute a smile, should also be taken into consideration during the treatment planning. Symbols of the "visual language" together with 3D software that immediately converts this data into a 3D wax-up STL file for personalized smile design could be a powerful tool for planning such new smile designs.

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ESTHETICS AND IDENTITY

The human brain reacts instantly to a person's image, forming a first impression. There is a clear correlation between first impressions and significant social results. Appearance is vital, as some facial characteristics are particularly useful in targeting adaptive behavior.^{1,2}

Research in the areas of neuroscience and cognitive psychology suggests that facial traits are unconsciously noticed by the observer and generate sensations that influence the way a person is perceived. A quick observation of any human face creates a remarkable first impression.^{3,4}

Esthetic outcomes in dental treatment have become more important to patients. Regardless of the complexity of the treatment, patients are seeking better-looking smiles.⁵ However, 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 may feel that the restored teeth do not really "belong" to him or her. Without the proper knowledge, the origin of this disharmony can be difficult to identify.⁶ The massive and sometimes inadequate use of the term esthetics, especially when it is limited to techniques and materials, misleads professionals who seek to provide or give back to their patients the so-desired beauty. Despite being the highest goal of esthetic dentistry, the attainment of real beauty is more complex than it seems.

Esthetics is defined as the comprehension of the visual principles and parameters that generate a pleasant image. It is therefore a rational, logical, analytical study of beauty.⁷ Beauty, on the other hand, is the emotional, complex perception of the whole; which at the same time includes, and sometimes excludes, the esthetic principles, but above all else it is grounded on identity.

Beauty is the product of human perception through its many senses (visual, olfactory, tactile, hearing, and gustatory). It can be rationally evaluated, but its perception involves an emotional, unconscious, and fulminant process. The gift of perceiving beauty is an innate characteristic of the human being. The dental practice, as well as any other disciplines that treat the human being, should be concerned about the harmonization of its results with the whole. After all, beauty in dentistry reveals itself through smiles that express much more information than symmetry, proportion, and alignment. Known as "the science of beauty in nature and art," esthetics is responsible for the scientific investigation of the physiology and psychology of perception and for establishing visual organizational foundations

through which the conscious construction of a beautiful image is possible. Esthetics and identity are the two main pillars of a smile's beauty concept.

The careful application of esthetic principles does not lead to the creation of beauty. Symmetry is a basic principle for the configuration of visually balanced faces and smiles, but some studies demonstrate that if applied strictly, its effect becomes one of artificiality, leading to plainness and the loss of attraction.⁸

Esthetic parameters generally represent average characteristics presented in a given population varying according to gender and age. They are important references for the diagnosis and treatment plan but may be insufficient for the total satisfaction of some patients when applied rigorously. Their use must be relativized, taking into account physical preoperative characteristics, personality, and personal preferences.

In order to understand the relationship between the smile design and its emotional acceptance, the authors have been researching the concept of Visagism and its application to dentistry and smile designs since 2007.⁹

VISAGISM

Derived from the French word for face, *visage*, "Visagism" describes the study of the face in terms of its constituent traits, the esthetic relation among its elements, and its visual expression. The Visagism concept was defined by the plastic artist Philip Hallawell as the art of creating a customized personal image that expresses a person's sense of identity.^{10,11} The main focus of his work was on painting human figures, and he studied the visual language of the face to create paintings with more realistic expressions. He gave a great boost to the development of Visagism with the association of visual expression of facial traits, given by lines, shapes, and colors, to the archetype theory coined by Carl Jung.¹² Such association suggests that facial traits generate sensations that influence the way a person is perceived, or that a quick observation of a face creates a remarkable first impression.¹³

Archetypal Symbols

The last years of Jung's life were dedicated to research of different cultures and civilizations worldwide and establish-

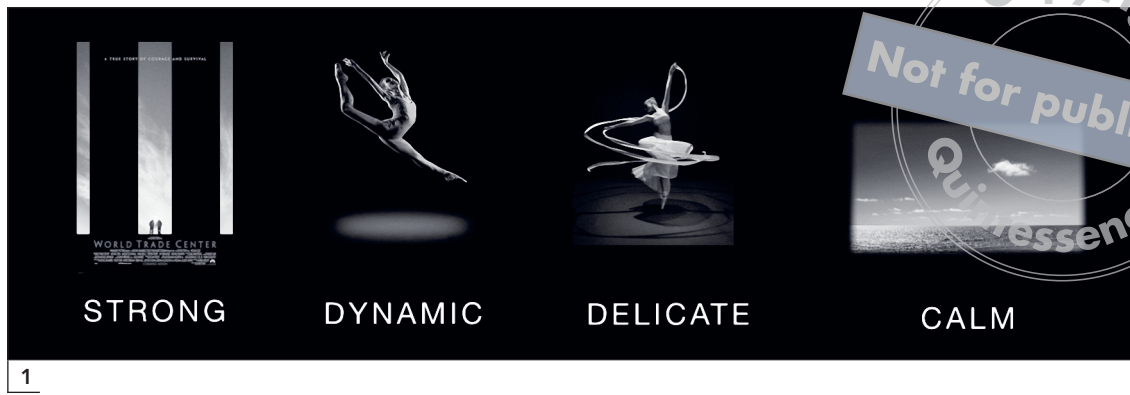


Fig 1 Universal visual language: Vertical lines represent strength, power; inclined lines represent dynamism; rounded lines represent suavity, delicacy; and horizontal lines represent stability and calmness.

Fig 2a The artwork of Philip Hallawell. Visual expression of the face, from its geometric typology, would be intrinsically related to the sense of personal identity.

Fig 2b Four basic facial types (left to right: strong, dynamic, delicate, calm) according to the theory of archetypal and personal expression.

ing links between occidental rationalism and oriental mysticism. He observed that certain symbols and images have been used in all cultures with the same meaning. Jung coined the term “archetypal symbols” to define these images. His amazing book, *Man and His Symbols*,¹² introduces some universal symbols in all cultures, from all times, regardless of background, ethnicity, religion, and geographic location. Consider the universal meaning of the lines represented in Fig 1.

In his work, Hallawell^{10,11} considers that facial types, with their specific geometric configurations, represent archetypal symbols that are automatically recognized by the observer's brain, generating striking emotional impressions of the observed individual. Thus, according to Hallawell, visual expression of the face, from its geometric typology, would be intrinsically related to the sense of personal identity (Figs 2a and 2b).

Human Temperaments

Hallawell associated the expression of elements of visual language with types of temperaments. For this he took into consideration the Hippocrates (460–370 BC) theory on human temperaments. According to Hippocrates, who is considered the father of Western medicine, each human being is an odd mixture of characteristics of four distinct temperament types—choleric, sanguine, melancholic, and phlegmatic—and each person can identify with one or two more dominant temperaments. Below are the main behavioral psychological characteristics of each temperament:

- *Choleric*: dominant, determined, objective, explosive, intense, leader, passionate
- *Sanguine*: extroverted, communicative, enthusiastic, dynamic, expansive
- *Melancholic*: introverted, organized, perfectionist, artistic, abstractive, timid
- *Phlegmatic*: diplomatic, pacifist, mystic, spiritual, conformist, discreet, tending to submission

The present authors decided to rename these temperaments using their own nomenclature to represent the essence of each. Thus the term “choleric” was replaced by *strong*, “sanguine” by *dynamic*, “melancholic” by *delicate*, and “phlegmatic” by *calm*.⁸

Such an approach has facilitated communication with patients, since terms such as “choleric” or “melancholic” were usually not well accepted or understood by them. The new terms also establish a direct association with the smile design types described below.

Visual Language

Each type of color, line, or shape has a specific emotional meaning. Primary colors and lines represent the most basic elements of visual language. The latter can be divided into straight lines and curves, the straight lines being subdivided into vertical, horizontal, and inclined lines. The emotional expression of those lines depends on their relationship to the law of gravity.¹⁴ Horizontal lines, because they conform to gravity, express stability, passivity, and calmness, while vertical lines represent the movement of the point against gravity, expressing strength and power, just as inclined lines arouse the sensation of instability,

tendency to movement, and dynamism. Curved lines are associated with delicacy, sensuality, and feminine gender.

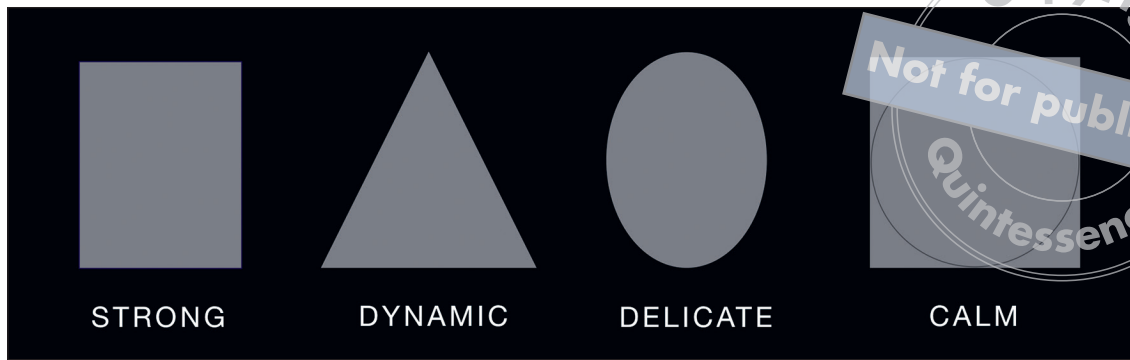
The combination of lines generates the most basic forms, transferring to them their own expressions. Thus, the vertical rectangle expresses strength by the predominance of the vertical element on the horizontal, the triangle expresses dynamism, the oval expresses delicacy, and the square expresses stability and immobility by the balance between its vertical and horizontal elements (Fig 3). These basic shapes can be observed in the facial contour, as well as in the shapes of the central incisors and three-dimensional configuration of the dental arrangement—thus the incisal silhouette (Fig 4).

For Hallawell, through their own emotional meaning, lines and forms can be associated with temperaments, so that rectangular shapes as well as straight vertical lines have expression compatible with the characteristics of the choleric (strong) temperament, since the inclined lines and triangular shapes relate to the sanguine (dynamic), rounded lines and ovoid forms to the melancholic (delicate) type, and horizontal lines and circular forms to the phlegmatic (calm) temperament.

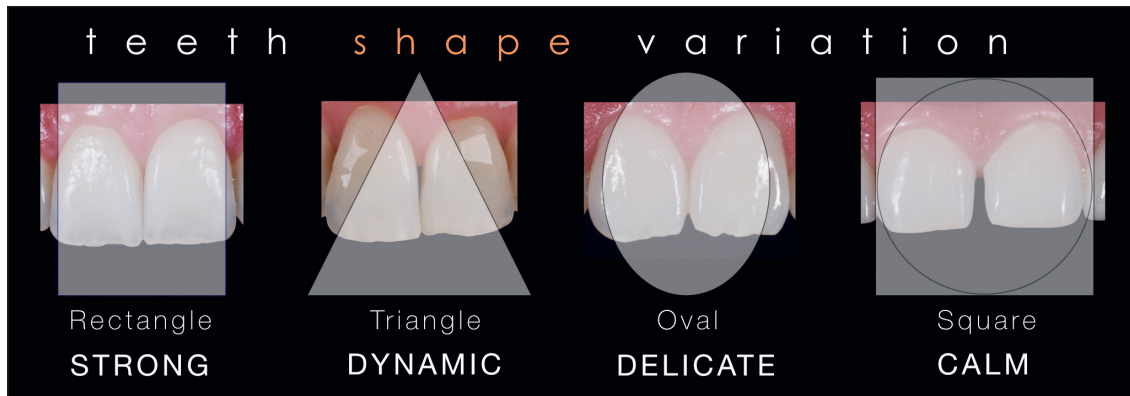
VISUAL IDENTITY OF THE SMILE (VIS)

The visual language knowledge applied to the main expressive elements of smile design, such as dental shapes, incisal edge, interdental ratio or dominance, and 3D positioning of the teeth in the arch, determined four smile design types with primary expression (Fig 5):

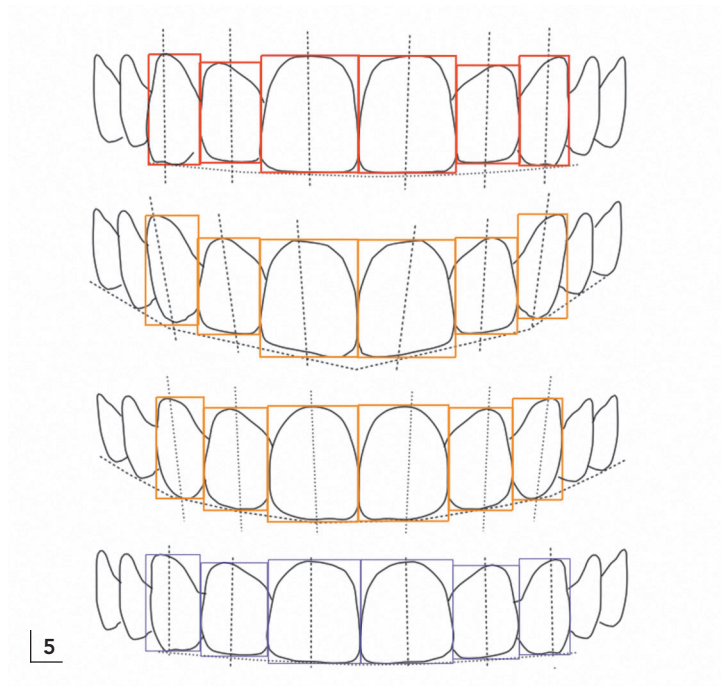
- *Strong*: composed mainly of rectangular dental shapes, strong dominance of centrals and canines on lateral incisors (radial symmetry), as well as plane incisal edge and rectilinear 3D dental positioning on the arch in occlusal view
- *Dynamic*: triangular or trapezoidal dental shapes, standard dominance, inclined incisal edge, and angled 3D dental positioning on the arch
- *Delicate*: oval dental shapes, medium dominance, curved incisal edge, and standard 3D dental positioning
- *Calm or Stable*: smoothly rounded square dental shapes, weak dominance (current symmetry), horizontal incisal edge, and 3D rectilinear or standard dental positioning on the arch



3



4



5

Fig 3 The combination of lines generates the most basic forms, transferring to them their own expressions.

Fig 4 These basic shapes can be observed in the facial contours of the natural dentition, especially the shape of the incisors.

Fig 5 Such drawings, from their primary expression, are visual representations of the four temperamental types. From top to bottom: strong, dynamic, delicate, calm.



6a



6b



6c



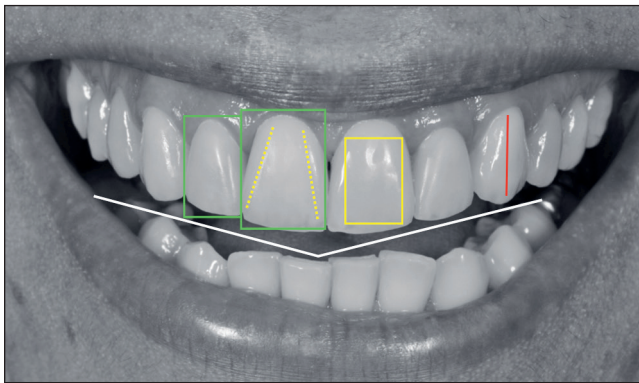
6d



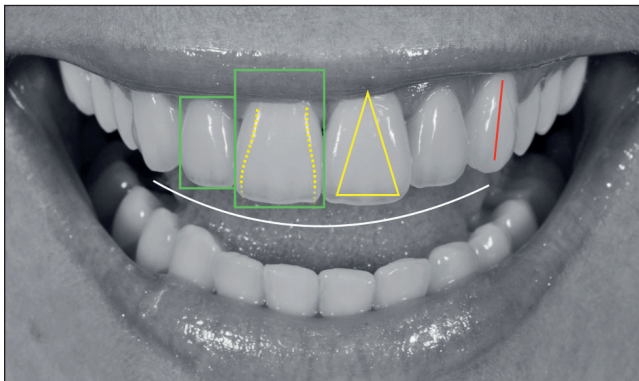


Figs 6a to 6d Four different before and after cases. The patients in each case are extremely happy with the final outcomes. Each smile is designed specifically for the individual facial perception and the personality reflection of these different patients. If one of these smiles were designed for another patient, the final outcome would have failed.

Fig 6e Multiple variables on each smile. Incisal silhouettes (white), tooth shapes (yellow), dominance of the centrals (green), and tooth axis (red). In order to create the individualized smile, the combination of the above lines, line angles, and curves must be meticulously chosen, and will significantly differ from patient to patient. The algorithms of the Rebel software select the ideal setup out of these endless possibilities, based on the facial perception and personality of the individual patient.



Sciences such as cognitive psychology, biology, and neuroscience have uncovered the influence of facial traits and temperament on the constitution of identity, considering them as distinct elements that interact synergistically and constantly during the life of each person, defining their uniqueness. For a better integration in the individual context of each dental patient, esthetic rehabilitations must go beyond the established esthetic rules, including information coherent with the facial typology and personality. The facial configurations of each individual present themselves as a unique combination of distinct traits.



Through the large number of smile design elements (such as incisal edge, dominance, and dental axis), as well as shapes as sub-elements (such as morphological details of each tooth), it was necessary to establish, based on the dental scientific literature, which should be determined by the facial typology and which could visually represent the unique personality of each patient, beyond their personal preferences and expressions (Figs 6a to 6e).

For standard practice, reproducible and accessible to all professionals, a concept for smile design customization was elaborated by Paolucci et al.⁹ Called "Visual Identity of the Smile" (VIS), it developed from the association of different knowledge bases, such as esthetic and functional dental fundamentals, artistic visual language, facial recognition, and still personality typology. For the objective application of this concept, the Rebel software program was developed.



Visualizing the Final Result at the Beginning

Prior to initiating any treatment, it is necessary to visualize the desired outcomes. It then becomes possible to formulate the steps required to achieve this result.¹⁵ This visual-



Fig 7 Patient is uncomfortable with the look of her smile. Her chief complaint is the appearance and the small spaces between her teeth. She also has narrow buccal corridors.

ization already creates a lot of advantages. A “direct mock-up” is the ideal way of communicating with the patient regarding the final result. However, instead of trying many different design options while working with the mock-up, which is currently being done intuitively, the dentist will already have an imaginary frame with which to work.

The Rebel Software

The Rebel software is able to perform facial reading and personality assessment, evaluate a patient's personal preferences, and convert that information into mathematical language. Through preprogrammed algorithms, initially a two-dimensional smile design is created. The software is capable of automatically transforming this 2D smile design into a 3D customized model. The model generation is performed by a custom 3D library, developed specifically for Rebel Simplicity. Every model is personalized according to the proposed teeth configuration.¹⁶

The Rebel system is actually a virtual lab that converts the 2D design into 3D and creates a digital wax-up immediately. The 2D is created by relating the facial perception and the personality of the patient to the smile design, by applying algorithms for computing the optimal combination of the incisal silhouette, tooth axis, dominance of the centrals, and the combination of individual tooth shapes out of thousands of possibilities. It may sound complicated; however, it is the simplest way of getting one of the best 3D digital wax-ups possible. In other words, Rebel is a very sophisticated artificial intelligence–based software; however, it provides great simplicity to the end users—dentists and dental technicians.



CASE PRESENTATION: REBEL WORKFLOW

The patient in this case was not comfortable with the look of her smile. Her chief complaint was the spaces between her teeth and secondarily her gummy smile. A negative smile line and somewhat narrow buccal corridors were also visible (Figs 7 and 8).

After completing the following three simple steps, all the necessary information is transferred to the Rebel digital laboratory:

1. Digital scanning of single mock-up on a central incisor
2. Full-face photography protocol
3. Simple questionnaire

Single Central Mock-up and Intraoral Digital Scanning

Single Central Mock-up

A composite mock-up is first created on one (or two) of the central incisors in order to identify the incisal edge position vertically and the position of the facial surface buccolingually. This is no different than making any direct mock-up;

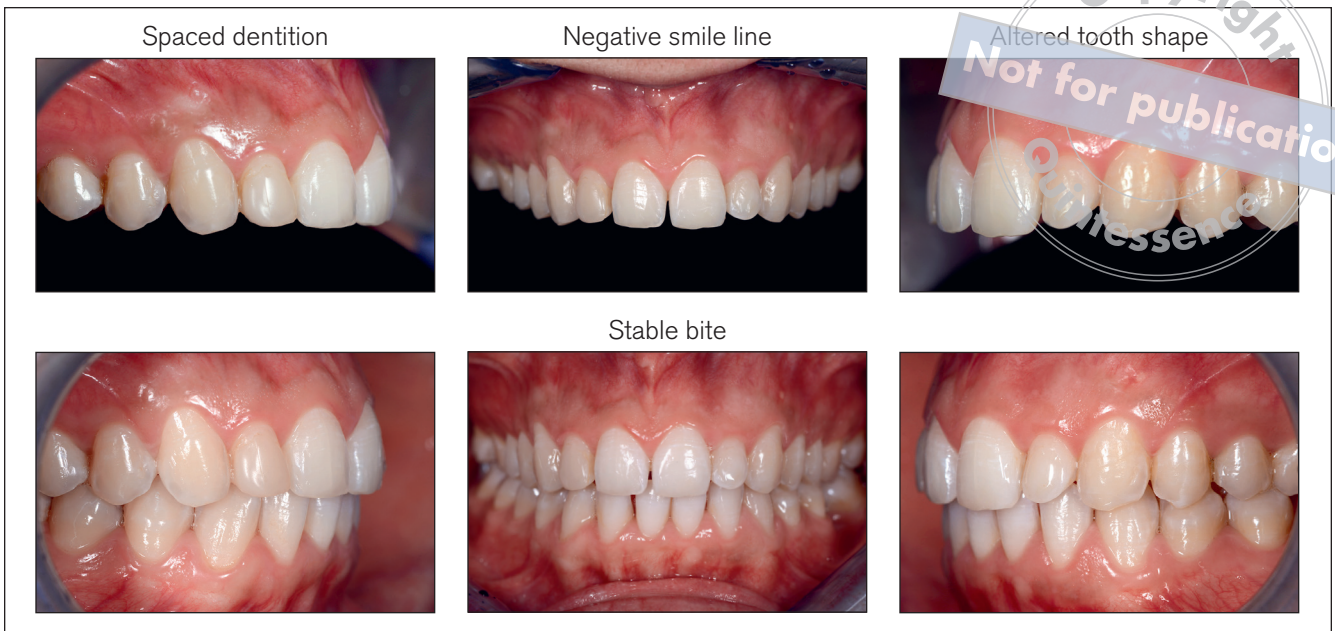


Fig 8 When analyzed carefully, a negative smile line can be observed, with the central incisors being shorter in length than the canines.

Fig 9 Treatment of every esthetic case should start by defining the incisal edge position of the maxillary central incisors. A composite mock-up on one (or two) of the central incisors identifies the incisal edge position (vertically) and the position of the facial surface (bucco-lingually). This simple mock-up is digitally 3D scanned together with the full maxillary arch.



however, the design of this mock-up for Rebel does not require the usual detail, meaning that the dentist does not need to choose the shape of the teeth (square, triangular, rounded, etc), the angulation of their axis, surface texture, etc. The Rebel artificial intelligence-based software will

provide the details of the new smile design according to the facial perception and personality of the patient. This will allow any dentist at any level to start working with mock-ups and end up with high-level wax-ups (Fig 9).

If the dentist prefers not to make a mock-up, the additional length that would need to be added on the centrals vertically and the volume on the facial side (ie, 0.3 mm thicker facially) can be determined (relating the existing length of the teeth to the upper lip position with the aid of a periodontal probe) and added to the file to be sent to Rebel.

Intraoral Digital Scanning

Once completed, the mock-up on the central(s) is digitally scanned with any intraoral scanner that can create an STL file. Most intraoral scanners already automatically convert the 3D scanning to an STL file.

If the dentist does not have an intraoral scanner in the dental practice, an analog impression of the maxilla (preferably with the direct mock-up done on the centrals) can be made and sent to the nearest dental lab (any lab that has a CAD/CAM machine will have a digital scanner). The dental technician can digitalize this impression for the dentist and upload the STL file into Rebel to complete your order using the provided link.

The Full-Face Photography Protocol

The software needs to have five specific full-face photographs for facial recognition of the patient and to relate the 3D intraoral digital scan to the facial features. These five photographs, shown in Fig 10, are described below.

Full-Face Rest Position

This photograph is for the automatic facial recognition part of the software, and part of the new Rebel smile design will be based on this facial perception of the patient. Technically it is very important that the forehead and the ears of the patient are visible. If the patient has long hair, it needs to be away from the face. The patient's head must be upright (not tilted to the right, left, or up/down), the eyes preferably positioned parallel to the horizon, and the lips apart. The software automatically checks the required full-face image and, if it is not acceptable, the dentist will receive an immediate message to replace it.

Full-Face Smiling

Keep the patient in the same position, with the eyes open and parallel to the horizon, and the head upright. This time ask the patient to keep the lips apart with a soft

smile (if possible, showing the incisal edges of the maxillary incisors).

Face 12 O'clock Position

There are two simple ways of taking this photograph, which displays the relationship of the maxillary central incisors and the displayed arch position to the lower lip line. The first, and the easy choice, is to keep the patient in the same position and ask him/her to bend the face forward 45 degrees while maintaining a full smile. Or the dentist can have the patient lie on the dental chair in a supine position, move to 12 o'clock position, and maintain a full smile; the dentist can then take the photograph from 45 degrees.

Full-Face Open Bite

The patient should be asked to hold the full-mouth retractors, again positioning the eyes parallel to the horizon, holding the head upright, and keeping the teeth (maxillary and mandibular) separated and the occlusal plane parallel to the horizon.

Full-Face Retracted Occlusion

The same protocol above should be repeated; however, this time the teeth should be closed.

Questionnaire

The interview, which will indicate the character and personality of the patient, is completed in less than a minute through a questionnaire in the software. It provides the primary and complimentary character of the patient. Because the temperamental type of each individual is defined by a unique combination of characteristics of the four main temperaments and a precise and practical evaluation of it, it is necessary to apply a specific questionnaire.

The optimal tooth shape is determined with the help of the interview. The questionnaire is based on popular psychological tests for personal self-assessment. The first question is an adapted test by Dellinger¹⁷ and the other three questions concern personality traits based on the theory and questionnaire by Eysenck and Eysenck.¹⁸ The questionnaire is checked by a computer algorithm to classify the patient's personality. Based on the data from the interview, a software algorithm automatically calculates the temperament, as perceived by the patient. The temperament is a combination of strong, dynamic, delicate, and

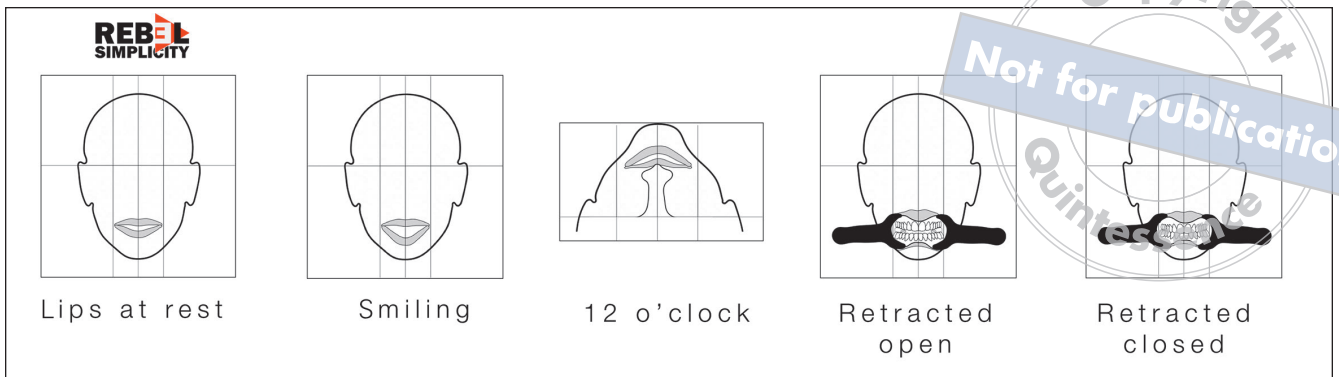


Fig 10 The full-face photography protocol. Five photos need to be taken: (1) lips at rest, (2) smiling, (3) 12 o'clock position, (4) retracted open, (5) retracted closed.

calm. After this procedure, the dentist and/or technician will have the full idea of the facial perception and personality of the patient (Fig 11).

As the dentist is about to send the three mandatory files to the Rebel digital laboratory, he/she will also be asked to describe any specific designs regarding the clinical case, such as the buccal corridors, imperfections, intensity of the surface texture, etc, or to choose some of the optional features provided if needed (Fig 12).

Rebel Digital Laboratory

Once all this information is sent to the Rebel digital laboratory, the software will immediately create the new Rebel smile design by first converting it to 2D format and into the 3D design. While doing this, the Rebel software will decide on the main elements of the new smile design, such as the incisal silhouette, dominance of the centrals, tooth axis, and arch form, as well as choose the ideal individual tooth

shape that would be the most natural relative to the patient's facial perception and the personality the patient wanted to be perceived.

Rebel has a very large digital tooth library, composed of the ideal forms of natural teeth and wax-up designs of top dental technicians. In addition, the software selects the two main shapes (ie, from rectangular, triangular, ovoid, square) that match with patient's facial perception and personality, and depending on the percentages, it blends and molds the selected two main shapes into the ideal forms. For example, if the overall perception of the face and personality is a combination of 70% dynamic and 30% delicate, it selects the ideal triangular and ovoid shapes and blends them into each other with a combination of these percentages, the main silhouette of the teeth being triangular but with the saddle appearance of ovoid as well.

Once this design is automatically placed over the digitally scanned original maxilla of the patient and rendered, an immediate STL file of this new Rebel digital wax-up is formed (Figs 13a and 13b).

INTERVIEW

My favorite geometric shape is: *
Choose only one figure

My friends consider me: *
Please, choose at least three words

What I think about myself: *
Please, choose at least three words

Three words that describe me best: *
Please, choose exactly three words

Fig 11 Based on the data from the interview, the software algorithm automatically calculates the temperament the way the patient wants to be perceived. The temperament is a combination of strong, dynamic, delicate, and calm.

DESCRIPTION

Please discuss with the patient the following details:

Incisal edge contour

Incisal embrasures

Surface texture

Buccal corridors

Please write your comments:

SPECIAL REQUESTS MOCK-UP TUTORIAL CONTINUE

Fig 12 Rebel digital lab allows the dentist to provide additional information regarding details such as the final design of the incisal embrasures, surface texture, and expected appearance of the buccal corridors, which will then be calculated and designed by the Rebel software.

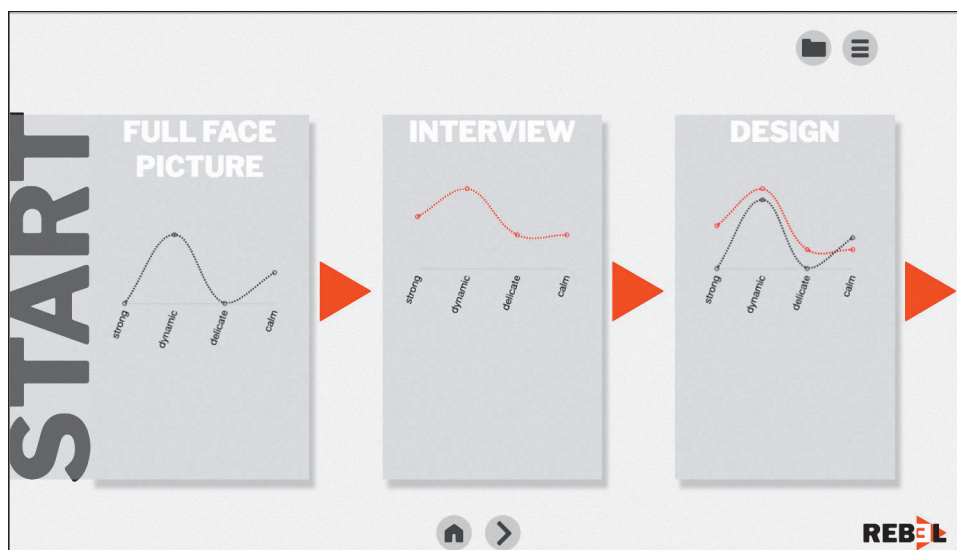


Fig 13a The outcomes of the facial recognition and the personality test both correspond to a dynamic design. Rebel is now ready to convert these mathematical readings into a visual 3D digital wax-up.

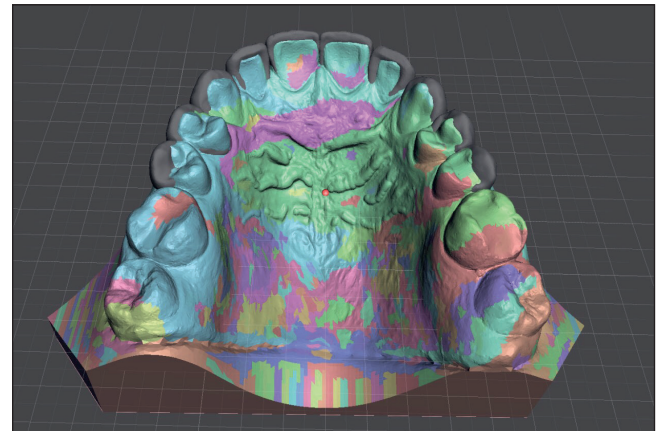
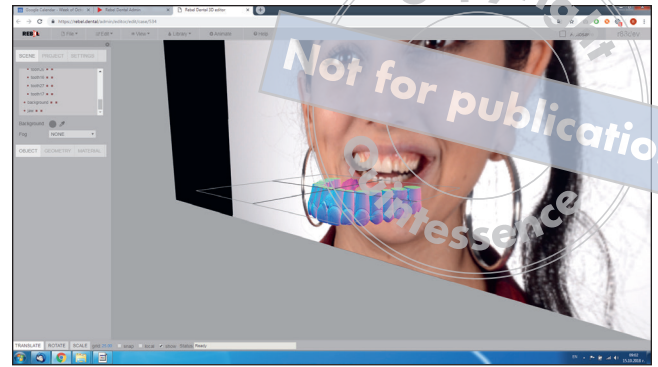
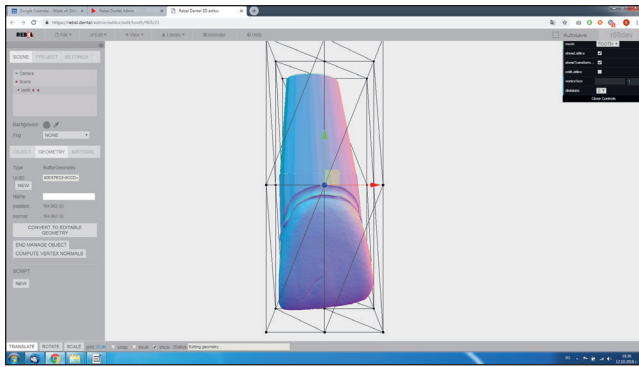


Fig 13b Since the size of the frontal facial aspect of teeth of the photos does not correspond to the actual size of the teeth in the mouth, a smile design using a computer program is necessary to provide for this discrepancy. Ignoring this aspect in the smile design can lead to errors in the information provided to the laboratory and to final restorations of inadequate volume and dimensions. A mathematical model allows the parameters measured in 2D to be recalculated and determines the real 3D dimensions of the teeth to provide accurate parameters for the digital wax-up. The digital planning software that Rebel uses provides dentists and technicians with a 2D preview of the final design that relates the facial perception and the personality of the patient within a few seconds. Then the Rebel Simplicity software is immediately capable of recalculating and recreating personalized 3D models of the teeth by morphing the individual tooth shapes from its 3D library within 15 minutes, through a complete hands-free digital workflow. Every model is generated according to the proposed 2D teeth configuration. Users can visualize the 3D model in their browsers and can also download the models for use in a dental laboratory.

Back to Chairside

The STL file is then sent to the dentist via email, ready to be 3D printed. After the STL file is 3D printed, the dentist can easily transfer this design to the patient's mouth by making a silicone impression of the digital wax-up. The harder this silicone transfer impression, the more precise the transfer will be, duplicating all the details (such as the line angles that give the ideal shape of the teeth, surface texture, etc), and more importantly, eliminating the messy excess of material that will appear on the gingival tissues (Fig 14).

This transfer should be done right away so the dentist can evaluate the new design well before starting the tooth preparation—as the APT (Aesthetic Pre-evaluative Tempo-

rary) or as the final mock-up. By this way, not only the ideal 3D smile design but also the opportunity for important 3D communication between the dentist and patient can be accomplished. The final esthetic design can then be approved at this time (Figs 15a to 15c).

Another feature of Rebel is that it designs the smile in a resective way. That means if some of the original teeth positions remain outside of the final smile design arch position, such as rotated or facially protruded teeth, the design will be created regardless of the positions of these teeth. This will create two major advantages. The first is that the dentist will be able to place the silicone impression and thus create the APT in the patient's mouth, without the need of cutting (Aesthetic Pre-Recontouring [APR]) the protruded parts of the original teeth. The second advan-

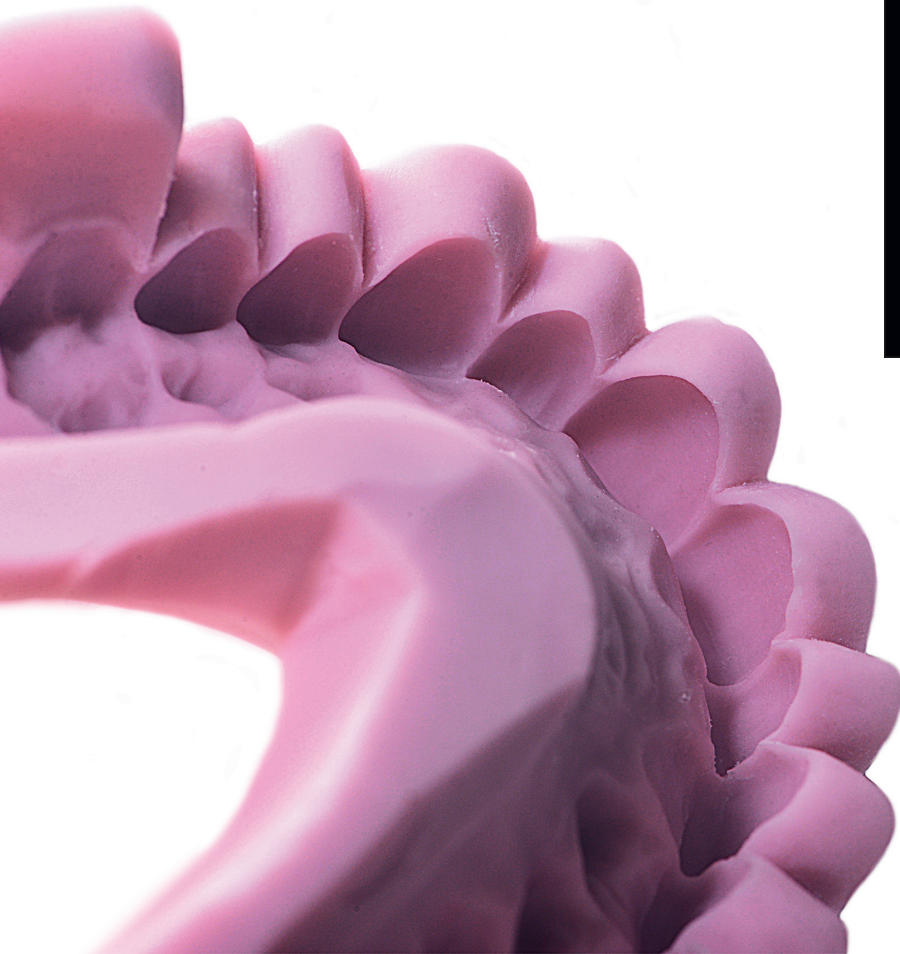
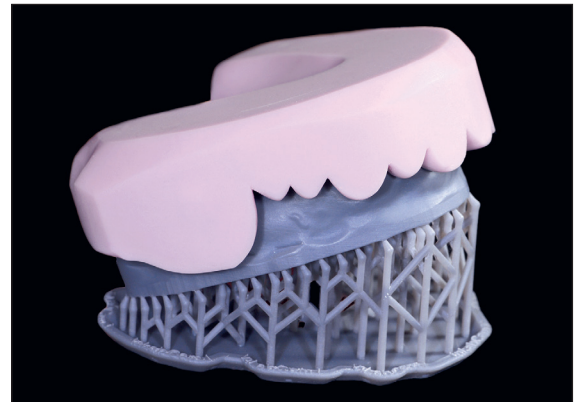
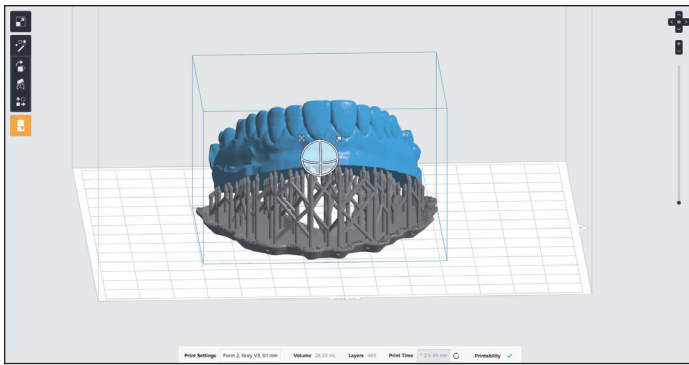
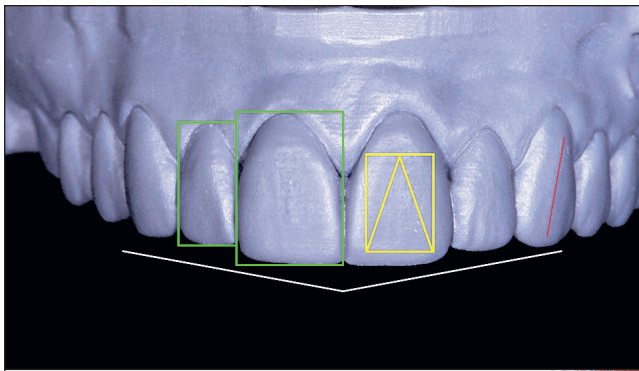


Fig 14 After the STL file is received from the Rebel digital lab via email, it can be 3D printed (Form 2, Formlabs). When the 3D-printed model is created, the dentist can easily transfer this design to the patient's mouth by making a silicone impression of the digital wax-up and using a provisional material of choice (ie, Luxatemp, DMG).

tage is that it will allow both the dentist and the patient to realize the final smile design relative to the patient's original teeth through this APT. This is a great information-sharing tool that creates a platform for both parties regarding the treatment planning. The dentist can now sol-

idly discuss with the patient the need, for example, of adjunctive orthodontic treatment to better position these teeth for a minimally invasive approach instead of their extensive tooth preparation outside of the new smile design.



15a



15b



15c

Fig 15a Note the implementation of the inclined lines, line angles, and triangular to trapezoidal forms used in this personalized smile design that highlights the dynamic nature of the patient. The tooth shape is selected and morphed by the selection of the triangular shape as the main structure, modified slightly with the rectangular shape. And strong dominance is used for the central incisors, with a triangular incisal silhouette, followed by the slightly inclined to straight tooth axis of the canines.

Figs 15b and 15c The APT (Aesthetic Pre-evaluative Temporaries), or final indirect mock-up, which was designed 100% digitally by Rebel as a 3D digital wax-up, in the patient's mouth. It now reflects the dynamic nature of her personality and facial perception.



Figs 16a to 16c After approval of the esthetic outcome of the APT (from the Rebel 3D digital wax-up), the dentist can start preparing the teeth through the APT.



Fig 17 The same design of the Rebel digital wax-up is transferred on the stone model through an analog wax-up. Then e.max pressable ceramics, with a one-third incisal cutback, and feldspathic porcelain are applied with the microlayering technique. However, since the final esthetic design is digital and in the form of an STL file, the veneers can also be produced by milling in a monolithic fashion with any CAD/CAM system.



Tooth Preparation Through the APT

Once the final design is approved by the dentist and the patient, the dentist can begin preparing the teeth through the APT (Figs 16a to 16c).¹⁹

APT, being a very solid reference for the depth cutter, will not only allow the maximum space for the ceramist's work, but let the dentist be minimally invasive during the tooth preparation phase. Limiting the preparation surface on enamel increases the success rate to 98.8% when compared to excessive tooth preparation with large amounts of dentin exposure, or extending the limits over the root surface, which brings the success rate down to 68%.

Finalizing the Case

The definitive porcelain laminate veneers can be fabricated by analog or digital means.

As soon as the teeth are prepared, the dentist can choose to continue the case digitally—by making an intra-oral digital scan, superimposing the Rebel digital wax-up over this digital impression of the prepared teeth, and finalizing the case with the CAM veneers—or to continue the conventional analog way. In the conventional way, the lab can produce these veneers by using pressable ceramics or feldspathic veneers. In this case presented, the material chosen was e.max pressable ceramics, with a one-third



Fig 18 The final result: e.max porcelain laminate veneers in place. The patient is extremely happy with the new smile design, expressing her feelings by saying she feels like she has had that smile for many years. *Small photographs, from left: before, APT, and final veneers.*

incisal cutback, and feldspathic porcelain applied using the microlayering technique (Fig 17).

CONCLUSION

Beauty is a foundation of the universe. The search for beauty unveils reasons deeper and more righteous than an appearance based simply on esthetic principles. Its application has a positive, deeper, and intangible impact on a patient's life, and that should be the goal of esthetic dentistry.

The principle of unity is the connection between esthetics and beauty. It is the point where the visual organization provided by esthetic principles meets sense, emotions, and meaning, thus harmonizing itself with the whole.

The combination of the basic rules of esthetics together with the reflection of the facial analysis and personality of the patient in the new smile design creates more natural and personalized smiles (Fig 18). However, in dental practice this has been limited due to the lack of an objective method for assessing personality and incorporating it into the smile design. With the Rebel software, clinicians can provide new smile designs that affect patients' emotions,

sense of identity, behavior, and self-esteem by combining modern digital technologies with the classic treatment rules to achieve predictable esthetic results in a simple, practical, and personalized manner. Instead of the dentist trying to fill a completely empty canvas, Rebel provides a new smile design from scratch, Rebel provides a fully filled canvas by taking every detail into consideration but also providing the comfort zone and opportunity to make small adjustments if needed.

The authors' clinical experience has shown an 85% to 90% patient acceptance and success rate overall. But if for any reason the subjective result does not satisfy the patient, the dentist can always make minor alterations on the APT to adapt the design according to the patient's desires.

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