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Review Article

Wacp by Smylist® - A Logical and Objective Approach to Smile Design Pre-Planning

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Abstract

The determination of white aesthetics for teeth is largely a subjective approach and more or less based on emotions, even though it is so evident that there are huge variabilities in individual smiles. There are documented design rules for positioning the given smile and defining the dental morphology, but hardly any rules have been defined foe the white aesthetics to be considered prior to the treatment. This article describes a new conscious pre-planning method created by Dr. Maria Csillag which is based on face geometry applied to white aesthetics. This has been termed as the W.A.C.P. (White Aesthetic Conscious Pre-planning) technique. It provides a complex visualization of the smile and aims to clarify the queries and possible modifications that exist around general smile design rules. The Smylist® method helps in pre-defining the effects of a given smile by showing, in minutes, the outcome of planned aesthetic work on the patient's portrait photo through the Smylist® Aesthetic Design Software with options to communicate the information to the dental laboratory.

Keywords: *Smile Design; Smylist; Smylist®; Facial; Midline; W.A.C.P; WACP; Pre-Planning; Aesthetic; Design; Software; Face Analysis; Parameters; Face; Geometry*

The advent of digital technology in aesthetic dentistry has enhanced all the branches in dentistry and has tremendously improved the process of designing all the way to execution. A very novel approach propounded in this article is to use digital technology and create a desired virtual end result and then reverse plan the treatment.

Digital software helps to visualise the outcome, create a virtual mockup and then display this information through CAD-CAM systems, thus providing the most effective communication between patient, clinician and dental technician. This not only eases the process but also saves time and money in the process [21].

Since the digital world cannot be subjective, the question that comes up is "What are the rules that should be applied in designing the most appropriate smile for a given face?" The next natural question is "Which from among the thousands of smile combinations should be used?" The Smylist® method is a new pre-design technique that enables prediction of facial harmony, allows for discovery of genetic smiles and gives greater control over the effect of the work on the patient's mouth and face in an easy, conscious manner. The digital tool used for this is the Smylist® Aesthetic Design Software.

The Smylist® concept

The Smylist® method allows for the diagnosis of the persona of the individual which encompasses the whole face, the entire muscle structure, the condylar positions and the multiple gomphosis joints of the maxilla and the mandible before planning the white aesthetic.

According to this method, the smile should be very strongly connected with the overall genetic face, facial musculature and the relation of the upper and lower teeth to each other. This concept creates this overall harmony with this connection. Only then it is suggested to select the ideal smile combination for the individual. Digital technology is used effectively at this point, and the Smylist® software allows visualization from among 60,000 possible combinations of teeth characteristics which make up the virtual smile on the patients face.

Geometric facial analysis

After examination and evaluation of the clinical situation and completion of the digital photo protocol, the first step in the Smylist® pre-planning method is "Geometric facial analysis". A single photograph is sufficient for this analysis. The first step is to is to analyse all the anatomical structures using geometric forms (such as ovals, trapezoids, triangles and cubes), lines (such us up and down, sloped, in and out or tilted) and curves (upwards, downwards curved or butterfly). Identifying all theses elements is termed as geometric mapping of the face. The next part is to match these shapes to the associated tooth structures. The geometric face map provides all the detailed information of the face which in turn is the basis of the W.A.C.P methodology [22-27].

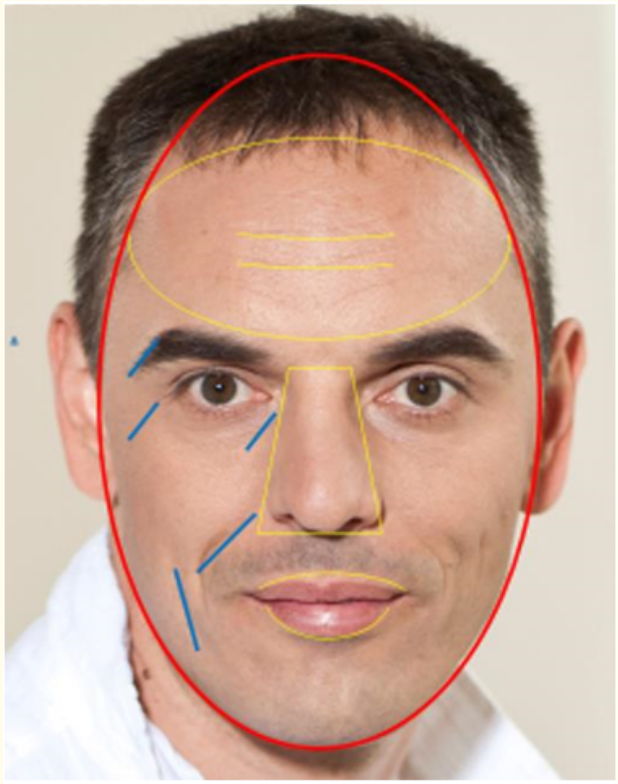

Figure 1

The elements which are used for this mapping are

- Face form: Can be oval, round, square, cuboid, trapezoid (pear shape), upturned triangle (heart form), diamond shape.
- Forehead: Can be oval, trapezoid, cuboid.
- Forehead lines: Can be straight, upwards curved and downwards curved.
- Eyebrows: Can be straight, upwards and downwards straight, curved.
- Setting of the eyes: Can be upwards, downwards, straight position.
- Eye wrinkles (Crow's feet): Can be upwards, downwards, horizontal.
- Eye sockets: Can be upper curved, downward sloped, triangular or not exist.
- Bridge of the nose and Nose form: Cuboid, trapezoid.
- Tip of the nose: Can be circle form, triangular or trapezoid.
- Base of the nose: Can be flat, base with staircase, negative staircase.
- Contour of the nostrils: Can be flat and curved.
- Nasolabial wrinkles: Can be deep and steep, deep and slightly inclined or not exist.
- Upper lip: Can be slightly and strongly upper curved, straight, downwards curved, butterfly form.
- Lower lip: Can be slightly and strongly upper curved or tubby.
- Marionett lines: Either exist or do not.
- Smile lines, Grüberly: Can be deep/slightly inward tilted or not exist.
- Chin wrinkles: Can be horizontally straight and downwards curved.
- Contour of the mandible: Slightly contoured, angled at 90 degrees, angled at less than 90 degrees.
- Contour of the lower third of the face: Can be vertically straight, slightly inward, strongly inward or tilted outwards.
- Contour of the chin: Can be short and flat, slightly curved, long and strongly curved.
- Contour of the double chin: May or may not exist.

The W.A.C.P. technique

The most important element of perfect communication is to be able to speak to the patient about the smile in an understandable way. The practitioner should be able to describe a smile appropriately, give information to the dental laboratory and send data to the CAD-CAM system.

The W.A.C.P. technique is an easy method for defining the white aesthetic in relation to the overall face character. The WACP which stands for "White Aesthetic Conscious Pre-planning" aids the clinician to visualise the smile, the parameters of the smile and the face together as single coherent anatomical. This system uses 8 parameters to completely describe the smile, communicate with the lab and also involve the patient in this process. These Smylist® parameters provide a clear, understandable system for describing and analysing the smile to enable it to be harmonised to a given face [28-32].

The 8 Smylist® parameters

1. First incisal shape: Can be oval, trapezoid and square. As opposed to the common nomenclature which names the front incisor a triangle, the Smylist® method redefines the shape as a trapezoid because trapezoids may be found on the face.

2. Second incisal shape: Normal, French-type, Sporty type (Smylist® nomenclature).
3. Canine type: Cuspide, Bevelled and Flat.
4. Incisal edge configuration: Angled-bevelled incisal edge combination.
5. Vertical Position of the teeth (Smylist® smile types): Smylist® I-III types.
6. Orovestibular position of the teeth: Can exhibit no dominancy, dominant first incisor, dominant first incisor and canine.
7. Incisal curvation: Can be flat, slightly curved, strongly curved, reversed, butterfly (Smylist® classification).
8. Premolar, molar inclination: Can be inward tilted and vertically straight.

Once understood properly, the Smylist® parameters allows close to 60,000 variations of smiles which can be used for a given patient. Selecting the most appropriate and harmonious smile amidst this many combinations is very difficult and cannot be done on the basis if subjective emotions alone. This weak area of aesthetic dentistry and smile designing is resolved by using the W.A.C.P. technique.

Figure 2

According to the Smylist® method, all parameters belonging to the smile have an effect on the face and can reinforce and harmonise those elements whose form, shape, contours or placement matches the parameters. To create harmony between the given parameters and anatomical structures, parallelism has to be created between the geometric face map and the teeth. This process has been termed as the "parallel harmonisation" technique.

The co-relation and association between the elements of the face map and the Smylist parameters is enumerated below.

The 8 Smylist® parameters and their anatomical pairs

1. First incisal- The nose and the entire geometric facial map.
2. Second incisal- The contour and width of the base of the nose.
3. Canine type- Nasolabial wrinkle.
4. Incisal edge configuration- The whole geometric map.
5. Vertical Position of the teeth (Smylist® smile types): Smylist® I-III. types -the contour of the base of the nose.
6. Orovestibular position of the teeth- The horizontal section of the head.

7. Incisal curvation- Upper lip and lower lip and the whole geometric map.
8. Premolar, molar inclination- The contour of the lower third of the face, smile fold.

This very objective set of rules thus creates the perfect objective smile for the patient for e.g. the vertical positions of the teeth could be set by looking and defining the contour of the base of the nose. If the contour is steep between the columella and the nostrils, the vertical position of the teeth with a staircase effect should be chosen (Smylist® II. type), if the level of the columella and nostrils is the same, the teeth should be set on the same level without a step (Smylist® I. type). Positioning the teeth and defining the extent of the staircase effect is performed by following the contours of the nose and parallelising to them.

Another example is the definition of the canine type. The canine type is associated with the nasolabial fold. The mesial slope of the canine should be parallelised with the slope of the nasolabial wrinkle. For premolar, molar inclination, the contour of the third part of the face and smile fold should be observed, and it is recommended to set the teeth parallel to these anatomical and geometric lines.

Thus, with this technique, perfect harmony is consciously created between the smile and the face in a matter of minutes. Even if the patient has no teeth, the face should be looked at to try and detect a genetic smile. Smylist® Aesthetic Design Software allows for control of pre-visualisation effects.

The Smylist® aesthetic design software

After using the W.A.C.P. rules, visualisation is a necessary part of the aesthetic pre-planning for any kind of dental work, and the Smylist® method is no exception. The Smylist Aesthetic software incorporates all the W.A.C.P rules and creates the appropriate Smile Design for the patient from among thousands of possibilities. The software incorporates the smile on the patients Cheesa A picture. It is a virtual mockup of how the smile will impact the patients face and will be in harmony with the face The patient gets the opportunity to visualise the outcome on his or her portrait photo before any treatment starts, and can then request changes in the aesthetic work. With the Smylist® Aesthetic Design Software, gingival contours can also be adjusted very easily. A virtual gingival surgery can be performed very easily, and it is just as easy to show outcomes without having to touch the patients teeth and gingiva.

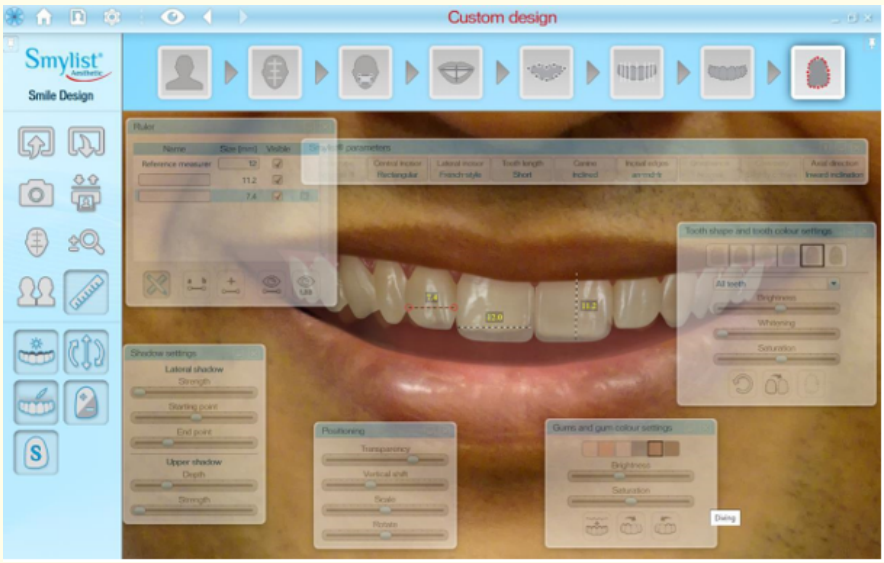

Figure 3

One of the most powerful tool in the software is the 'Measurement" tool. This tool allows a reference measurement to be made by physically measuring one reference measurement in the patients mouth and then updated on the software. All the measurement lines are automatically updated by this tool. This will thus generate exact sized of all the veneers, crowns and table tops which are designed by the software, The software can then generate 3D STL files for all the required teeth. These are with exact customized sizes for the individual patient. These STL files can now be merged into any given CAD-CAM system. The Software can be used with any kind of dental work as a component in the pre-design visualisation method. Reasonable and rational planning, however, remains the dentist's responsibility.

Clinical application of the Smylislt® concept

The Smylist® method, and its aesthetic approach, has four critical innovations which lead to some important changes; not only in the field of aesthetics, but also in gnathological planning and many more aspects of multiple dental as well as medical disciplines.

White aesthetics can now be defined with greater consciousness than ever before. Aesthetic outcomes can be planned by harmonising Smylist® dental parameters and facial geometry in a conscious way. The smile can be described, common language can be provided. It can help minimalize the emotional part of aesthetic planning, and individuality can be expressed throughout the dental work.

A virtual mock up with the Smylist® Aesthetic Design Software can be created with a conscious pre-design work can be performed to test the effects of the white aesthetic on the patient's face. With this method, chair side time will be minimalised and complex aesthetic information can be sent to the dental technicians, and CAD-CAM machines to complete the digital aesthetic planning, midline and occlusal plane setting and execute procedures in a conscious way. With this fusion only mock up models will be necessary while all the measured and positioned information can be sent to the lab in a digital format.

In complex therapy face muscle harmonisation is an extremely important factor for a quality result. After a complex face-smile-muscle and multiple gomphosis (Gomphosis is the descriptive term for the joint between the tooth and bone) diagnosis an instant "deprogramming" is to be done. This will create a given smile which is blended and based on the Smylist® aesthetic and functional aspect in total harmony with each other.

Conclusion

The new Smylist® aesthetic and gnathological approach and visualisation system thus changes the planning of aesthetic and rehabilitation work and gnathological therapy also considering aesthetic and functional part based on Smylist® rules. Smylist® Aesthetic Design Software can give easier, faster way to visualise the outcome and sending information to CAD-Cam systems in a conscious way based on Smylist® rules. On the one hand it may give new ideas on how to present and create harmony in personalised aesthetic work based on face geometry, creating a new stage in the planning called the pre-planning method. On the other hand, it gives a new approach to speeding up the design and positioning of a new smile or other dental work, in an appropriate manner, with the aid of conscious software visualisation. Hence by using these concepts, a constant back and forth between the dental clinician, the dental technician and the patient can be avoided. In addition, secondary functional problems will be either eliminated or minimalized extensively. Lastly this approach will create the desired mandibular/maxillary relationship, the skeletally matched occlusal plane and the accurate individual midline, all based on the Smylist® philosophy.

Thus, using the Smylist® system will lead to more successful cases being reported in the future, with fewer and minimalised aesthetic and TMJ problems post- dental work. The Smylist® theory guides the clinician to identify the "genetic" smile of the patient and gives completely new ideas and opens up vast fields of research for dental and genetic sciences. In fact, using the Smylist® concept of geometrical face mapping, archaeologists could digitally build up a face from skeletal remains found during excavations.

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