Dental Anatomical Combinations—smile design harmony based on facial configuration

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Introduction

The restoration of the aesthetics in prosthodontic treatment is an area of dentistry where digital technologies are becoming widely used. A number of studies have demonstrated the effectiveness of computer visualisation in clarifying the patient’s preferences and achieving a predictable and satisfactory outcome of the prosthetic treatment.1–3 Good-quality dental software products in the market all involve systems of smile design assessment according to the overall facial context. Therefore, all concepts and systems relating to smile design require a photograph of the patient smiling naturally.2

The expression on the face forms the first impression and has a high social value.4–6 The facial contour assumes an
important role, especially for the future definition of the maxillary central incisors (Figs. 1a & b).\textsuperscript{7–11}

In the following case report, I will present an aesthetic rehabilitation in the anterior with no-preparation veneers, taking into consideration the patient’s expectations for his new future smile and the tooth shape, internal substructure of the veneer due the ceramic layering technique and the external surface appearance of the veneer based on the quality of the veneer texture.

The challenge of this case was to realign all the teeth with a new dental anatomical combination to close all the spaces. One of the difficulties experienced in this rehabilitation was moving the distal inclination of the maxillary right central incisor to a regular axial position. Furthermore, soft-tissue conditioning was needed in order to create a new cervical contour.\textsuperscript{12}

**Technique**

Based on the anatomical concepts and facial details, I used a new tooth form classification system, called “Dental Anatomical Combinations”, in order to create the right technical approach in the laboratory.\textsuperscript{13} This concept aims to help dental professionals produce different tooth anatomies that extend beyond the standard tooth shapes.

The basic principle of this system is the segmentation and recombination of two or even all three of the basic tooth forms.\textsuperscript{13} First, the surface of each tooth form is sectioned into smaller segments; for example, by sectioning the tooth into three different segments, a mesial, distal and incisal segment can be obtained. If necessary, these full segments can be further divided in half, resulting in six half segments: mesial cervical, mesial body, mesial incisal, distal cervical, distal body and distal incisal (Fig. 2).\textsuperscript{13,14}

To create the final tooth form, the full or half segments can be recombined, creating complementary shape classes (Table 1).\textsuperscript{13} The class numbering system (1:3, 1:2, 1/2:3 or 1/2:2) indicates which segment was used (the number before the colon signifies whether a full [1] or half [1/2] segment) and with how many basic tooth forms for recombination (the number after the colon signifies the number of basic tooth forms [2 or 3]).\textsuperscript{13}

The first complementary class, 1:3, uses one full segment of each of the three principal tooth forms, resulting

![Table 1: Complementary classes.\textsuperscript{13}](image)

**Figs. 3a & b:** Complementary class 1:3. Full tooth segments of all three basic forms are combined.\textsuperscript{13}
Case report

The laboratory starts digital analysis of the face of the patient on his bifrontal, bizygomatic and bignathic areas, drawing on top the face a proposed anatomical configuration of the tooth that is mainly related to the aspects of the two central incisors. Based on all the information from the office, this is the first step in a customised smile makeover (Figs. 4a–d).

The no-preparation veneers would be created working on an alveolar model that would allow the dental technician to condition the soft tissue on a hard material like dental stone. Soft-tissue modifications made on a hard material will assure a good result in the mouth once the restoration is placed (Figs. 5–8).

The veneers were made with a layering feldspathic ceramic technique. Because of the Shade A1 plus value chosen, the laboratory stratified the ceramic (Creation, KLEMA Dental-produkte), using Shade A1 Dentin at the cervical surface and BD-A dentin with a higher value from the middle third towards the incisal edge. A white translucent ceramic material was used on the middle of the tooth surface to determine the quality of the value. In the incisal area, several translucent ceramic masses with blue, pink and opal transparency effects were applied (Figs. 9–13).

After the glazing and manual polishing, the veneers were removed from the refractory cast and adapted to the master dies in dental stone. This step was realised using the microscope to assure precision and better fit. After this procedure, the last manual polishing was done to guarantee the smooth surface of the margins (Figs. 14–17). At this point, the veneers were ready to be delivered to the dental office for try-in and cementation.
An important topic of this aesthetic rehabilitation is the precision of the margins. I would like to explain the difference between the meaning of “emergence profile” and “angle profile”, which are in close connection regarding precision, but they have different specific meanings. The emergence profile concerns the precise relationship between the surface contour of the soft tissue and the facial contour surface of the tooth in its emergence profile that must not be overcontoured compared with the gingival margin.

The emergence profile precision thus relates to two areas: the soft tissue and the facial contour of the tooth.

The angle profile concerns the relationship in precision between the technical margin of the veneers and the clinical finishing line preparation on the natural tooth in order to decide, under the microscope, the precise fit of the veneer and the suitable emergence angle inclination of the margin, which will determine subsequently the future emergence profile design (Fig. 18).

Fig. 9a & b: Ceramic layering. The first effects were brushed directly into the moist ceramic material via infiltration (a). Result after the first firing ready to be worked on three surfaces, making vertical grooves for the staining procedure (b). Figs. 10 & 11: Veneers with vertical grooves, placed on the cast ready for staining under microscope magnification. Fig. 12: Final result after correction baking and glazing. Fig. 13: Teeth with sectioned ceramic masses.

Fig. 14: Manually polished veneers on the model. Figs. 15–17: Accurate finishing line and veneer texture.
Conclusion

The technique described here employs a new concept for planning the individual shape of the teeth in the context of the patient’s face. Knowing the possibilities of anatomical configurations of the tooth, by combining the facial transition line segments and incisal edges, allows the dental technician to create a variety of individual shapes, avoiding common standard production. This is very significant from the dental technician’s point of view in terms of how to use a specific technique to create a new, beautiful smile with natural-looking teeth (Figs. 19–22). Combining digital and analogue means of working is a constructive way to ensure harmony between individualised teeth and the facial type for the new custom smile redefinition.

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