Clinical

Smile design with composites: A case study

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Adhesive dentistry has improved dramatically over the last decade. Not only are adhesives more reliable and easier to use, but composites have also changed significantly. With the addition of nano fillers and improvements in the optical properties, a large range of indications was created for direct restorations. Composites have become almost as esthetic as modern ceramics and it is easier and faster to achieve a natural gloss, which lasts longer than previously.

Several new indications have therefore presented for composites. Minimal invasive diastema closures, reconstructions of peg laterals and direct veneers are now possible, in some cases, without preparation.

A basic pre-requisite for those indications is a deep understanding of facial and dental esthetic parameters. The clinician needs to understand the challenges that each clinical case presents and to design an appropriate treatment plan which approaches the case from a multidisciplinary point of view. Tooth proportions need to be considered in relation to gingival esthetics and both in relation to the facial appearance of the patient. It is pointless to make the most beautiful direct veneer if the contours or the texture do not match the adjacent teeth or the gingival zeniths are clearly not symmetric and visible. If, for example, we add a tilted occlusal plane or an upper teeth midline shift in relation to the facial midline, the results can be frustrating.

For this reason, treatment needs to start from a facial perspective. Average facial parameters are analized and the display is evaluated. Asymmetries are detected and the relationship between the gingiva, teeth and the lips with the rest of the face is diagnosed. After the challenges are understood, a treatment plan that will probably involve periodontal, endodontic and prosthetic aspects is designed..

Finally, the decision of the use of ceramic or composite restorative materials is considered depending on different factors. Our philosophy is based on the minimal invasive concept. As long as we can provide the patient with the same esthetics, durability and predictability of ceramics, we will select composites. In cases where many teeth are involved, multiple diastemas are present or occlusal imbalances can jeopardize a successful outcome and major changes need to be made, our choice leans towards ceramics. Cost can also play a role at times, since there are no laboratory costs with composites.

Whenever a direct approach is chosen, it is of paramount importance for the clinician to understand the system he is using. In the clinical case shown in this article, the system IPS Empress Direct (Ivoclar Vivadent, Schaan, Liechtenstein) was chosen, because of its simple layering concept, its natural looking shades and long lasting gloss. The system is based on 32 dentin, enamel and effect shades that cover most of the possible opacity, shades and special effects present in the majority of patients. Dentin shades are opaque enough to block what is needed and the enamel shades are very close to natural enamel, making the shade matching an easy task.

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Clinical case

A 24-year-old patient came to our office concerned about her smile. Her chief complaints were her discolored left central incisor and left lateral which had an insufficient composite filling (Figure 1). The digital smile design (DSD) concept diagnoses esthetic problems from a facial perspective and, based on a simplified digital analysis from a few photographs, proposes treatment options and assists with the interaction between the different specialists on the team.

The first step was to draw a horizontal and a vertical line. The picture is centered, moved and rotated until the bipupilar line becomes horizontal. The facial midline is subsequently ascertained (Figure 2). Once the picture was analysed it was obvious that her gingival display was clearly asymmetric with the gingival zeniths as well as the incisal borders of the incisors at different levels (Figure 2).

A close-up picture of the smile was superimposed and used for the next steps (Figures 3 and 4). The correct proportions were measured (Figure 5) and lines drawn at the margins of each anterior tooth. The tooth axis and lip margins were also drawn (Figure 6). The isolated situation is

Figure 1

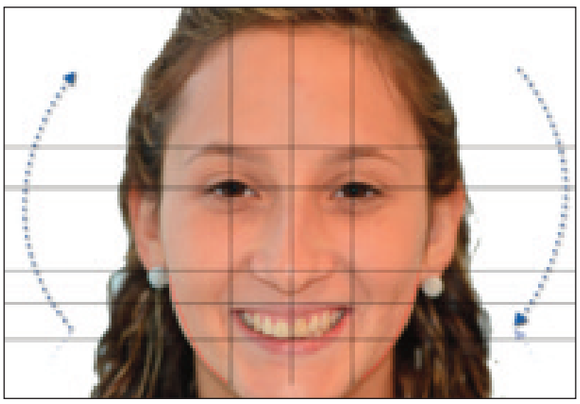

Figure 2

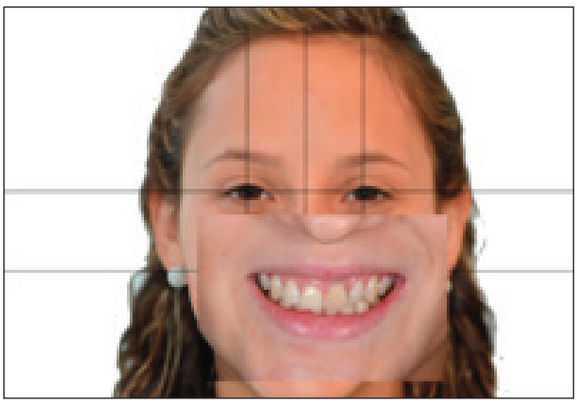

Figure 3

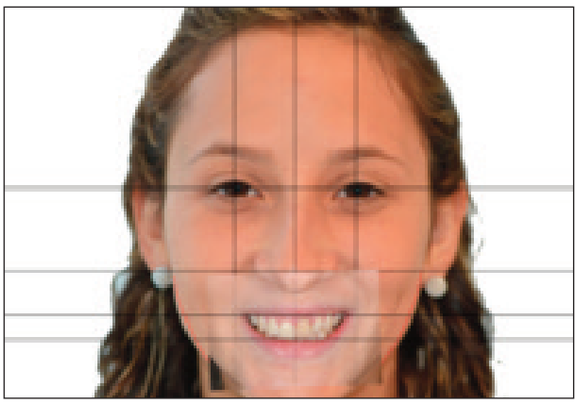

Figure 4

Figure 5

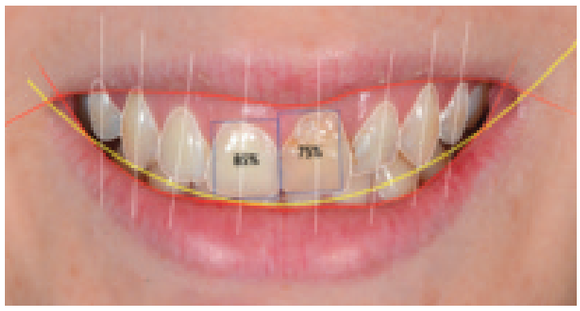

Figure 6

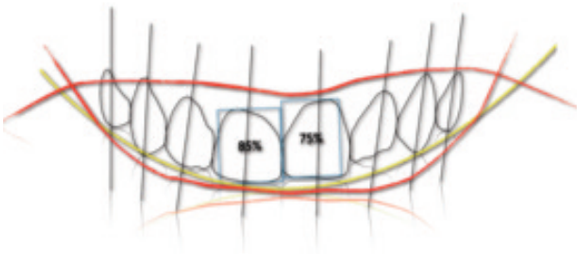

Figure 7

shown in Figure 7. Considering the ideal tooth proportions and positions, lines were drawn starting from the better side - the right one (Figures 8 and 9). The contours were then copied, mirrored and pasted on the other side with the ideal inclination (Figures 10 and 11). The isolated situation is shown in Figure 12. A close-up photgraph using a contraster was taken. Tooth 21 is obviously discolored and, as well as tooth 22, shows a deficient composite at the cervical region (Figure 13). Internal bleaching was performed with

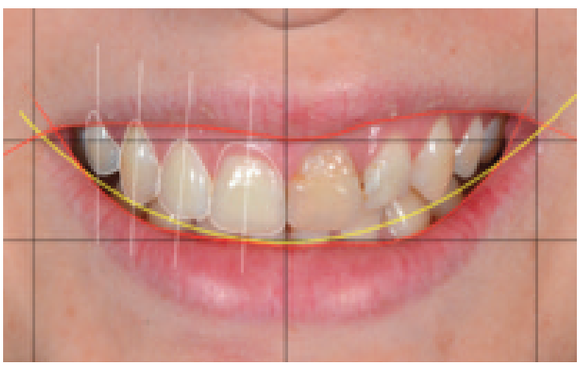

Figure 8

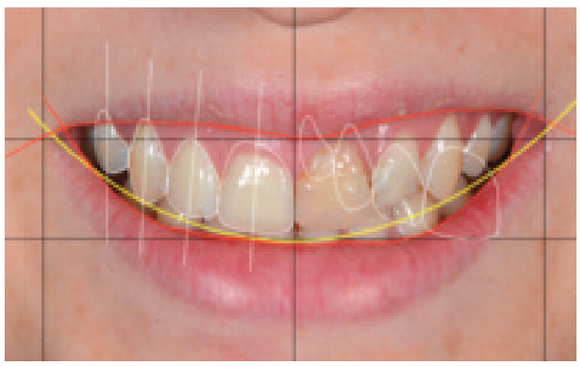

Figure 9

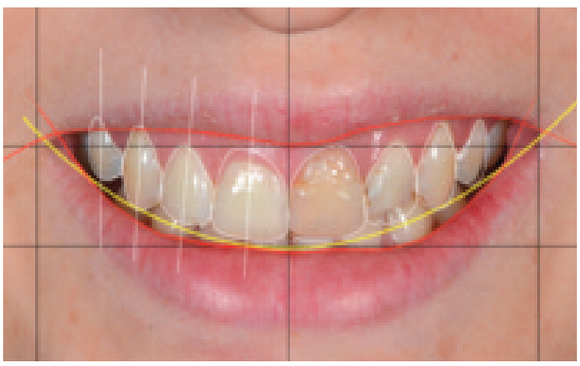

Figure 10

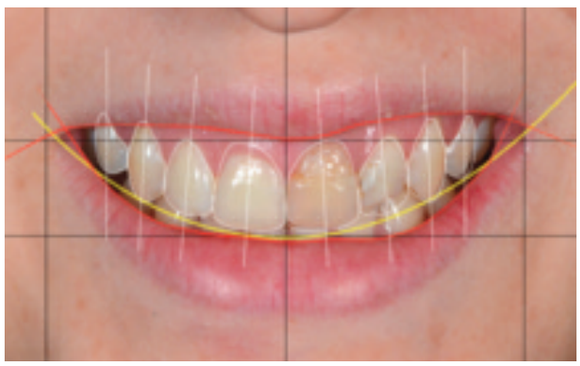

Figure 11

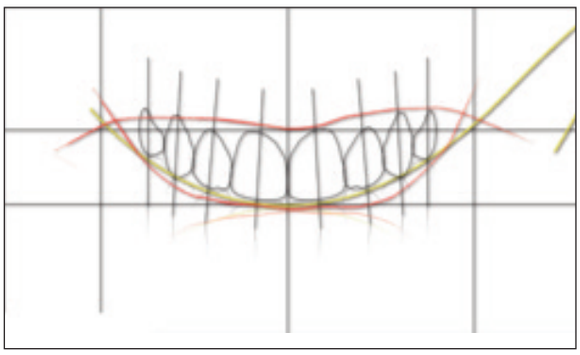

Figure 12

Figure 13

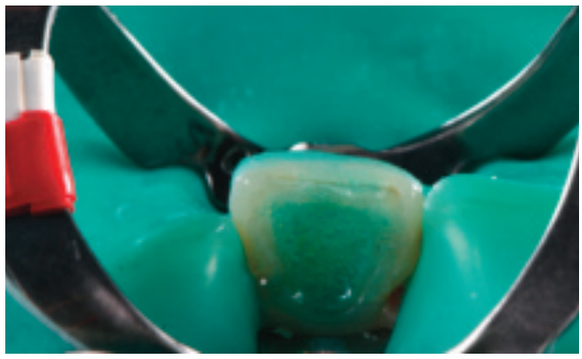

Figure 14

Figure 15

Figure 16

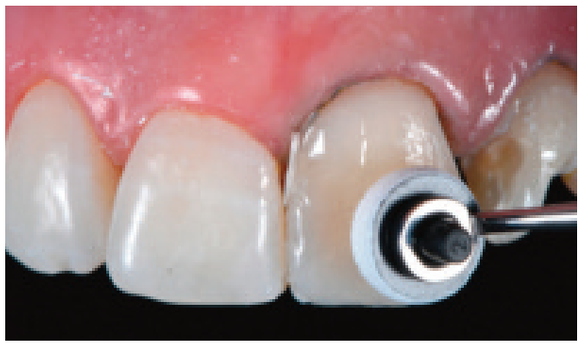

Figure 17

Figure 18

Hydrogen Peroxide at 38% for 20 minutes (Figure 14). The restorative treatment commenced after a period of ten days. A direct mock-up with composite was made in order to check the right length and tooth proportions (Figure 15).

A silicon guide was created with Virtual Putty, based on the impression of the corrected mock-up. After composite removal, etching and bonding with Excite F, the silicon guide was used during the layering process (Figure 16). IPS Empress Direct Dentin Bleach L and Enamel Bleach L were placed with the help of a novel composite spatula Optrapad (Ivoclar Vivadent). The newly design foam helps to adapt the composite far more efficiently (Figure 17). In order to achieve the opalescent effect, OPAL shade from IPS Empress direct was used in combination with the shade Trans 30. The direct veneers (teeth 21 and 22) were finished first with burs in order to give natural texture and then polished with Astropol/Astrobrush for the final gloss (Figure 18). Crown lengthening was then performed on tooth 11 and 12 with

Figure 19

Figure 20

an oscillating instrument (Komet, Brasseler) with the purpose of leveling the gingival zeniths (Figure 19). Figure 20 shows the natural integration of the composite material in comparison with untouched teeth.

Thanks to proper diagnosis with the help of the Digital Smile Design (DSD) concept, the understanding of the esthetic challenges and the optical properties of IPS Empress Direct an excellent esthetic result can be appreciated, with a confident and happy patient at the end of the treatment (Figure 21).

Figure 21