Monolithic brothers

Fabricating individualized monolithic restorations using IPS e.max CAD LS₂ and Zenostar ZrO₂

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Patients who visit the dentist with the wish to have their smile enhanced would like this to happen in a fast, efficient and complication-free manner. Esthetic and functional rehabilitations for anterior dental arch and occlusal height CAD lithium disilicate ceramics (LS₂) can be completed in a single day using IPS e.max® in combination with CAD/CAM technology (the CEREC system by Sirona, Germany, was used here). We use T-Scan® technology (Tekscan, USA) to assess the articulation and this method has enabled us to achieve excellent results.

Until recently, closing lateral gaps in patients refusing to undergo implant treatment posed a problem with timescales for us. Zirconia bridges have become the solution for these cases. To be able to treat our patients within a few hours, but at the longest within 48 hours, we were looking for possibilities of speeding up, or simplifying, this treatment modality. After considering the results of scientific studies investigating the surface properties and wear of various polished monolithic ZrO₂ restorations, we decided that the Zenostar® CAD/CAM system from Wieland would be appropriate for this purpose. This system allows us to mill even extensive bridges from zirconia.

Case presentation

The patient in this case was a 60-year-old lady whose dentition had been restored with metal ceramic crowns in the anterior and bridges in the posterior region. Her main complaint was the colour and length of the teeth. Her teeth were completely invisible during both speaking and smiling (Figs 1 to 3). She wished to have a bright smile that was the colour of “Hollywood white”. She refused to have any implant therapy to close the gaps in the posterior region. For this reason, we chose to use all-ceramic bridges. The plan was to manufacture a bridge spanning from tooth 23 to 26, a cantilever bridge from tooth 35 to 33 with a pontic at 36 and a bridge from tooth 41 to 43.

Material selection

On the basis of a pre-occlusal shade guide, the patient decided in favour of the BL2 bleach shade and did not want this shade to be tuned down with materials of a darker hue. We therefore decided to use the unstained, or pure, shade variant for the fabricating of the Zenostar® bridges and IPS e.max CAD E37 blocks in the BL2 bleach shade (Fig. 5). Usually, we use IPS e.max CAD for the fabrication of three-unit bridges up to the second premolar. The presence, however, required four-unit bridges and a cantilever bridge in the posterior region; IPS e.max CAD does not cover these indications.

Clinical procedure

After the existing restorations had been removed, FRC Postec post and core composite root canal posts were inserted into teeth 21, 25, 35, 44 and 45, followed by the placement of Multilink® Flow core build-up composite. Next, we replaced all existing single restorations with crowns made of IPS e.max CAD using the CEREC MCXL CAD/ CAM system and IPS e.max CAD E37 blocks in shade BL2 (staining technique). The occlusal height was raised at the same day and temporarily stabilized with Telio® CAD bridges. The lower anterior teeth were restored with luminate veneers made of IPS e.max CAD (staining technique). Prior to placing the Telio CAD bridges with Telio CS Link, impressions were taken (Virtual® 380). A late record of the new vertical dimension as taken using Virtual CAD/Bite silicone material. The bridges were manufactured using a Wieland® scanner and a Zenostar mini milling unit. The restorations were designed with Shapem® software (Figs 6 to 8). To reconstruct the bridge from tooth 25 to 26, the canine, the first premolar and the second premolar of the first quadrant were narrowed while the first molar was reconstructed on the basis of data retrieved from the 3Shape library, (Figs 10 and 11).

Final seating

On the second day, the temporary Telio CAD bridges were removed and the teeth were cleaned with chlorhexidine-containing Cervitec® Liquid mouth rinse. Try-in was carried out without any problems; additional adjustments were not required. The restorations were cleaned with Ivoclean® and then silanized with Monobond® Plus the occlusal contact points were polished (Fig. 9).

The contours of the molar were from the beginning very clear and detailed. There was no need for additional manual fissure adjustment. The restorations were milled, sintered in a Pro-Granat® SF furnace and customized applying stains from the Zenostar Art Module in the staining technique. Finally, the occlusal contact points were polished. The contours of the bridge 23 to 26 in the 3Shape software were designed with Shapem® software (Figs 6 to 8). To reconstruct the bridge from tooth 23 to 25, the canine, the first premolar and the second premolar of the first quadrant were narrowed while the first molar was reconstructed on the basis of data retrieved from the 3Shape library, (Figs 10 and 11).

Conclusion

A slight difference in brightness between the ceramized zirconia bridges and the IPS e.max CAD crowns can be noted. With hindsight, we would adjust the shade later on by means of the staining technique.

For the patient, her new bright smile was simply a wish fulfilled (Figs 12 and 13). From our point of view, the 3Shape software enabled us to complete this rehabilitation in an efficient manner. The tooth shapes were easy to copy. An initial proposal for the design of the occlusal surface of the posterior teeth was immediately available and could be quickly and predictably adjusted. The restorations showed a smooth surface and clearly contoured fissures both on the screen and after milling in the 4-axis milling unit. We were able to seat the restorations straightaway as further adjustments were not necessary. Monolithic zirconia restorations have shown similar, if not lower, levels of enamel wear on antagonist surfaces compared to other ceramic restorations in clinical applications. By using monolithic restorations, we are able to complete certain cases in a single day. If we look at recent investigations that evaluated the enamel wear caused by monolithic zirconia crowns and other ceramic materials and compared these results with the enamel wear caused by natural antagonists, we may conclude that we choose a functional and sensible solution [Enamel wear caused by monolithic zirconia crowns after 6 months of clinical use – T. Stober, J.L. Bermoro, P. Ramnusberg, M. Schmitter].

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