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

By MU Dr. Petr Hajný, CZ

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 of the 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 55 with a pontic at 50 and a bridge from tooth 45 to 47.

The gingival tissues were in poor condition and this was mainly attributed to the impact of the metal ceramic restorations. Figure 4 shows the need for increasing the vertical dimension.

Material selection
It is on the basis of a bleachable 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 fabrication of the bridge of the new vertical dimension.

Clinical procedure
After the existing restorations had been removed, FRC Postec glass-fibre reinforced composite root canal posts were inserted into teeth 21, 25, 35, 44 and 45, followed by the placement of MultiCore® 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 LT blocks in shade BL2 (Staining technique). The occlusal height was raised at the same time and temporarily stabilized with TelioCAD 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 500®). A late record of the new vertical dimension as taken using Virtual CADBite silicon material. The bridges were manufactured using a Wieland® scanner and a Zenotec mini milling unit. The restorations were designed with Shaper® software (Figs 6 to 8). To recon- struct the bridge from tooth 23 to 26, the canine, the first premolar and the second premolar of the first quadrant were mirrored while the first molar was reconstructed on the basis of data retrieved from the Shaper library.

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- gramat® S1 furnace and then customised applying stains from the Zenostar Art Module in the staining technique. Finally, the occlusal contact points were polished (Fig. 9).

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 preparations were pretreated with Multilink® Automix Primer A + B and then seated using Multilink Automix luting composite (yellow shade). After the luting composite had been pre-cured with a Bluephase® curing light and excess material was removed, the restorations were permanently cemented in place activating the Turbo mode of the curing light a number of times. Articulation and occlusal con tact points were assessed with a T-scan device and then the occlusal surfaces were polished.

Antagonists, we may conclude that we chose a functional and sensible solution [Enamel wear caused by monolithic zirconia crowns after 6 months of clinical use – T. Stober, J.L. Bermejo, P. Rammelsberg, M. Schmitter].

Conclusion
A slight difference in brightness between the various restorations, bridges and the IPS e.max CAD crowns can be noted. With hindsight, we would adjust the shade of the Zenostar framework with antagonists, we may conclude that we chose a functional and sensible solution [Enamel wear caused by monolithic zirconia crowns after 6 months of clinical use – T. Stober, J.L. Bermejo, P. Rammelsberg, M. Schmitter].

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Fig. 1. Before view of the lips
Fig. 2. OpttraGate
Fig. 3. Before lateral view with OpttraGate
Fig. 4. Clinical situation after removal of maxillary crown
Fig. 5. Wieland work station and ZrO₂ block
Fig. 6. Design of the bridge 23 to 26 in the Shaper software
Fig. 7. Design of the cantilever bridge from tooth 33 to 35 with a pontic at 36 and a bridge from tooth 41 to 43
Fig. 8. Virtual articulation to establish the functional characteristics
Fig. 9. View of the lips: The patient is pleased with the outcome. Her wish has been fulfilled.
Fig. 10. Monolithic restorations after eleven months: IPS e.max CAD restorations and Zenostar ZrO₂
Fig. 11. Anterior view of the rehabilitation
Fig. 12. View of the lips: The patient is pleased with the outcome. Her wish has been fulfilled.
Fig. 13. Close-up of the monolithic IPS e.max CAD crowns fabricated using the staining technique

Fig. 14. Monolithic restorations after four months: IPS e.max CAD restorations and Zenostar ZrO₂
Fig. 15. Anterior view of the rehabilitation
Fig. 16. View of the lips: The patient is pleased with the outcome. Her wish has been fulfilled.

Fig. 17. Monolithic restorations after six months: IPS e.max CAD restorations and Zenostar ZrO₂
Fig. 18. Anterior view of the rehabilitation
Fig. 19. View of the lips: The patient is pleased with the outcome. Her wish has been fulfilled.