User case study on the new composite bloc BRILLIANT Crios by COLTENE in the fabrication process of a CAD/CAM CEREC crown

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The application fields of the new composite bloc include crowns, inlays, onlays and veneers as well as implant-supported crowns. BRILLIANT Crios is a reinforced composite bloc for the fabrication of permanent restorations using a CAD/CAM milling process.

This is available in Low Translucent (LT) and High Translucent (HT) shades in sizes 12 and 14. The material properties allow extended preparation and the possibility of tapering margins and polishing. In addition, the BRILLIANT Crios bloc can be milled from methacrylate-based composite materials. As part of material sampling, a 45-year-old patient in this case required a newly fabricated restoration after losing a full ceramic crown due to fracture. The patient presented with a missing restoration on tooth 37. The X-ray of the unrestored stump (Fig. 1) shows the tooth with a root filling and a composite abutment post (this restoration was performed by a different dentist).

Due to the loss of the full ceramic crown, the patient was willing to have a new restoration fabricated using a CEREC crown made of the new composite-based BRILLIANT Crios (COLTENE) CAD/CAM material. The existing root filling and stump 37 required additional preparation to meet the following conditions:

- Minimal marginal thickness 1.5 mm
- Minimal buccal thickness 0.8 mm
- Minimal thickness under support enamel
- Minimal cervical thickness 0.8 mm

Occusal corrections and additional preparation of the transitions to the distal stage were required in this case. The existing deep distal stage on tooth 37 also proved problematic in this situation. Therefore, we decided on a squeeze bite impression with an A-silicone (AFFINIS, Sirona) rather than direct optical impression taking to be very difficult in such situations.

With the aid of the subsequently fabricated plaster model (Fig. 2), it was quite easy to take the optical impression for fabricating the CEREC crown. The BRILLIANT Crios bloc used for milling the full crown is shown on the photo (Fig. 3, shade A2 HT). At the time of preparing this report, there were only two milling programmes available from other manufacturers for processing composite blocs in the CEREC system. In future, there will be an own COLTENE BRILLIANT Crios milling programme by the Sirona company available for use in the CAD software.

In our case we chose the programme GC Cereamart 14. Presently, the bloc can be milled with this Sirona programme (A further possible programme is the 3M ESPE Lava Ultimate). The bloc available to us was size 14 in future a bloc size 12 will also be available.

Contraction and milling of the crown leads to the following result (Fig. 4). Compared with ceramic materials, for example IPS Empress (Ivo- claire Vivadent), the surface structure of the ground crown appears very smooth and the residual lug is smaller after milling. This facilitates its removal with a diamond and nothing remains visible after brief polishing. Polishing can be performed after milling using a conventional rotary polisher or milling paste. The crown in question also passed the check for cracks or material chipping.

A check of the precision fit on the model in occlusion.*

Prior etching of the enamel areas with phosphoric acid is recommend- ed and was carried out by us. For bonding of the restoration, a dual- curing resin cement, i.e. DuoCem™ (COLTENE) or a light-curing composite can be used. The BRILLIANT Crios crown is now ready for insertion. After bond- ing our full crown with DuoCem™ (COLTENE), the edges were cleaned, excess was removed, and then every surface of the restoration was light-cured for 30 seconds (light output > 800mW/cm²) and then worked on with a rubber polisher. Milling of the occlusion proved simple and quick. The gloss of the entire composite crown already appeared after a short time. Furthermore, when readjusting the occlusal contact points, we were able to polish immediately, which is much more difficult to do with ceramic, and in particular, with fired crowns.

CAD/CAM restorations made from the new Crios blocs can be charac- terised, modified or also repaired at any time. Modifications can be made directly without prior treatment. In case of intraoral repairs, the restora- tion surface is cleaned with clearing paste, and then roughened using a diamond rotary instrument. In both cases, ONE COAT 7 UNIVERSAL is applied to the surface to be treated and cleaned with compressed air for 5 seconds. This is followed by light-curing for 30 seconds (also see instructions for use ONE COAT 7 UNIVERSAL). Colour shades or com- posite (i.e. BRILLIANT EverGlow, COLTENE) is then used afterwards according to the respective mastication of the patient.

No firing of the restoration required (i.e. as with IPS e.max CAD).

- Glos of the composite is easy to achieve, also much easier than with IPS Empress CAD.
- No etching with hydrofluoric acid or silanisation necessary.
- If required, repairs with composite are easy to realise, analogous to a fill- ing.

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Conclusion

Handling is conveniently simple and the clinical result after placement and a weeks later is very good (Figs. 8 + 9). The following points result in time saving and “service benefits” versus ceramic restorations:

- No firing of the restoration required.
- Glos of the composite is easy to achieve, also much easier than with IPS Empress CAD.
- No etching with hydrofluoric acid or silanisation necessary.
- If required, repairs with composite are easy to realise, analogous to a fill- ing.

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**Fig. 1: Initial situation, single X-ray of tooth 37 with existing root filling and abutment post**

**Fig. 2: Plaster model with prepared tooth stump 37**

**Fig. 3: Milling bloc BRILLIANT Crios, colour shade A2 HT**

**Fig. 4: Milled crown with residual lug (separation point from bloc)**

**Fig. 5: Crios crown on plaster model**

**Fig. 6: ONE COAT 7 UNIVERSAL is applied to the bonding surface of the crown and rubbed in with a dental brush for 20 s**

**Fig. 7: The finished BRILLIANT Crios crown on the plaster model in occlusion**

**Fig. 8: Clinical situation after placement and polishing**

**Fig. 9: Follow-up after 4 weeks**

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*Comparison of filler morphology, mechanical strength and milling characteristics of different CAD/CAM blocs for Sirona inlab-MC XL milling system * Camerino Kappmann, Ralph Bährner, Colville/Thalwil CH, Switzerland. David Zweifel, Private Dental Laboratory, Switzerland

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