

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 and in sizes 12 and 14. The material properties allow extended processing: easy preparation, tapered margins and polishing. In addition, the BRILLIANT Crios bloc can be repaired with methacrylate-based com-

posite materials. As part of material sampling, a 34-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 untreated 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 tooth stump 37 required additional preparation to meet the following criteria:

- Minimal occlusal thickness 1.5 mm
- Minimal buccal thickness 0.8 mm
- Minimal thickness under supporting cusp 1.5 mm
- Minimal cervical thickness 0.8 mm

Occlusal 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



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

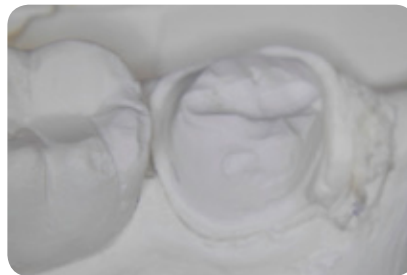


Abb. 2: Plaster model with prepared tooth stump 37



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.

clinical situation. We therefore decided on a squeeze bite impression with an A-silicone (AFFINIS, COLTENE) as experience has shown 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 Cerasmart 14. Presently, the Crios 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.

Construction and milling of the crown leads to the following result (Fig. 4). Compared with ceramic materials, for example IPS Empress (Ivoclar Vivadent), the surface structure of the ground crown ap-

pears 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 plaster model was good (Figs. 5 + 7), so that we decided to try-in and then place the restoration on the patient.

To ensure bonding between the mounting material and the milled restoration, use ONE COAT 7 UNIVERSAL bond (COLTENE) only. An etching step with hydrofluoric acid is not necessary.

ONE COAT 7 UNIVERSAL was applied to the sandblasted and cleaned mounting area of the restoration and rubbed in for 20 seconds (Fig. 6). Excess adhesive was removed with oil-free compressed air for 5 seconds. Bonding to the tooth substance and/or composite can be carried out using a suitable adhesive. ONE COAT 7 UNIVERSAL Bond is recommended here (procedure according instructions for use). We used this adhesive throughout in our case.

Prior etching of the enamel areas with phosphoric acid is recommended 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 bonding 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 > 800m W/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 characterised, modified or also repaired at any time. Modifications can be made directly without prior treatment. In case of intraoral repairs, the restoration surface is cleaned with cleaning 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 10 seconds (also see instructions



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

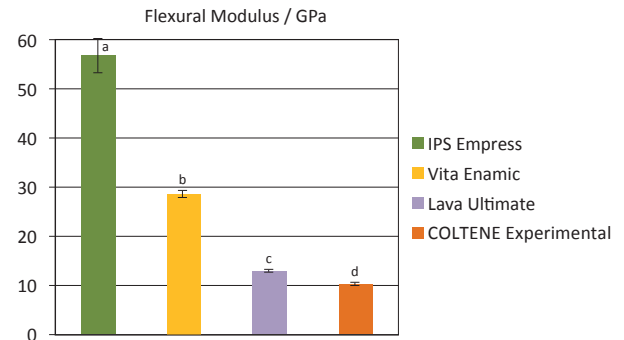
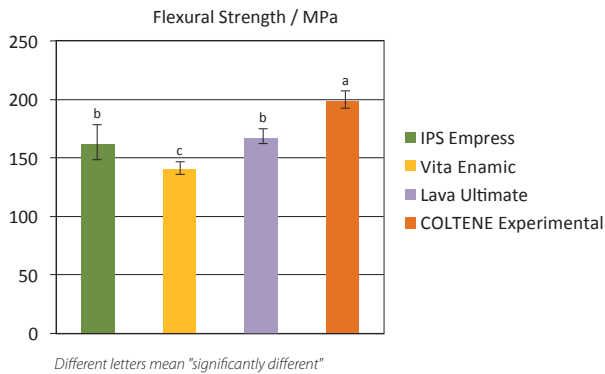
*Updated with the Sirona CEREC Update 4.4.2 (March 2016)

for use ONE COAT 7 UNIVERSAL). Colour shades or composite (i.e. BRILLIANT Ever-Glow, COLTENE) are then used afterwards according to the respective manufacturer's instructions. The material discussed for the fabrication of a CEREC crown is a composite with the following techni-

cal features. The flexural strength and the modulus of elasticity are represented in the following graphs.**

For comparison purposes, the ceramic and composite materials of other manufacturers were used. The good flex-

ural strength and the e-modulus, which is similar to dentine, make the material more elastic than ceramic.



**Source: www.scientific.coltene.com/27.08.2015

"Comparison of filler morphology, mechanical strength and milling characteristics of different CAD/CAM blocks for Sirona inLab MC XL milling system"
Cornelia Kopfmann, Ralf Böhner, Coltène/Whaledent AG, Switzerland. David Zweifel, Private Dental Laboratory, Switzerland

Conclusion:

Handling is conveniently simple and the clinical result after placement and 4 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 (i.e. as with IPS e.max CAD).
- Gloss 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, analogue to a filling.
- Dentine like e-modulus, less brittleness than ceramic.

Long-term studies are necessary to compare the clinical results with ceramic materials. In terms of application, this material proved excellent. The patient was very satisfied with the result and praised the pleasant wear comfort of the composite restoration versus his previous ceramic crown immediately after treatment.

Next, we would like to attempt restoration of an implant with a single crown.

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