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 restorative 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 preparation and perfectly adapted margins and polishing. In addition, the BRILLIANT Crios bloc can be used for the fabrication of composite materials. As part of material sampling, a 54-year old patient in this case required a new 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 restoration (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 deep distal stage of tooth 37 required additional preparation to meet the following criteria:

- Minimal occlusal thickness 1.5 mm
- Minimal buccal thickness 0.8 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 situation. Therefore decided on a squeeze bite impression and a silicone (AFFINIS, COLTENE) as experience has shown direct optical impression taking to be more reliable in this situation.

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. The bloc available to us was used for the restoration.

In our case we chose the programme GC Ceramill 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.

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 appears very smooth and the residual lug is small-er after milling. This facilitates its re- moval 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 already appeared after a short time. Furthermore, when inspecting 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 cleansing 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 5 seconds (also see instructions 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 technical features. The flexural strength and the modulus of elasticity are representative in the following graphs.

For comparison purposes, the ceramic and composite materials of other manufacturers were used. The good flexural strength and the e-modulus, which is similar to dentine, make the material more elastic than ceramic.

Conclusion

Handing 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 filling of the restoration required (i.e. as with IPS e.max CAD).
- bushes of the composite is easy to achieve, also much easier than with IPS Empress CAD.
- No etching with hydrofluoric acid or silanisation necessary.
- repair, with composite are easy to realise, analogous to a filling.
- Dentin like e-modulus, less brittle- ness than ceramic.

Long-term studies are necessary to compare the clinical results with ceramic materials. In terms of applica- tion, this material proved excellent. The patient was very satisfied with the result and praised the pleasant wear comfort of the composite res- toration versus his previous ceramic crown immediately after treatment. Next we would like to attempt res- toration of an implant with a single crown.