Monolithic single crown restorations of a new CAD/CAM lithium disilicate: Initial LiSi Block

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Lithium disilicate is a very popular glass ceramic, due to its excellent balance between strength and aesthetics. Recently, GC has launched the first fully crystallised lithium disilicate CAD/CAM block, called Initial LiSi Block. It is based on advanced High Density Micronisation (HDM), which gives it its typical microstructure with fine, densely dispersed crystals and perfect marginal fit.

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MDT Christian Hannker *was trained in the dental laboratory Karl Czirjak in Diepholz (Germany) from 1996 to 2000. In the years thereafter, he attended numerous training courses and obtained his Master title in Vechta in 2005 (Germany). In the same year, he was trained in the Osaka Ceramic Training Center (Japan) and received the 3M Espe Talent Award. In May 2006, he opened his on dental laboratory in Hüde am Dümmer See (Germany) and quickly merged with the laboratory of Bellmann. He founded a training laboratory in Rastede (Germany) in 2006 and a milling centre in 2012. He is a member of the Dental Excellence Laboratory Group, consultant and specialised advisor and cooperates in research and development in the field of CAD/CAM.*

Case report

A patient requested treatment because she had a lack of chewing ability on the right side. She had old crowns on teeth 45 and 46 and an abraded dentition. A bone-level implant had been placed at locus 47 (Fig. 1).

Fig. 1: Initial situation.

After alginate impression taking, models were created from the original situation (Fig. 2). The mandibular model was used to create a custom impression tray with a perforation in the 47 area, as well as an EXACLEAR impression made with a standard sectional tray (Fig. 3) for the creation of the temporary restoration on teeth 45 and 46.

Fig. 2: Gypsum models. Some wax was added on 46 to improve the shape of the distal side.

Fig. 3: Impression made with EXACLEAR to serve as a mould for the temporary restorations.

Fig. 4: Shade determination.

The shade was determined before the start of the treatment (Fig. 4).

The old crowns and caries were removed (Fig. 5). Thereafter, the core was built up with G-ænial Universal Injectable and prepared with a round chamfer.

Fig. 5: Abutment teeth after removal of the old restorations and caries.

To obtain a high accuracy, the healing abutment was removed and an impression coping was placed on 47, in order to make the impression on implant level with the pick-up technique. Retraction cords were placed to expose the preparation margin of the abutment teeth 45 and 46 (Fig. 6). Thereafter, a gutta percha pressure bandage was placed (Fig. 7) over the preparations to repress the marginal gingiva and left in place until the impression was taken. The impression was made using a one-phase double mix technique (Fig. 8). Thereafter, the provisional restoration on teeth 45 and 46 made with a dual cure composite for temporary crowns and bridges (TEMPSMART DC) (Fig. 9 and 10) and temporarily cemented using FREEGENOL.

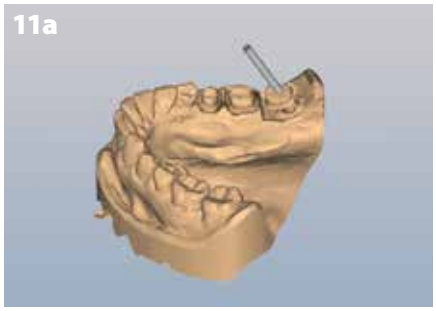
Fig. 6: Placement of the retraction cords and transfer coping for the impression.

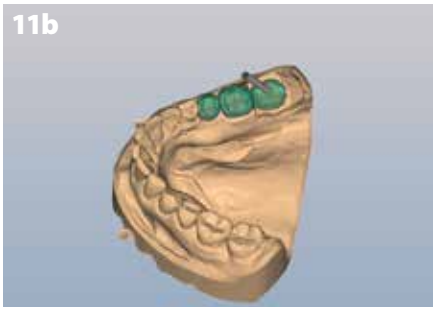
Fig. 7: Gutta percha pressure bandage was placed over the retraction cords before impression taking.

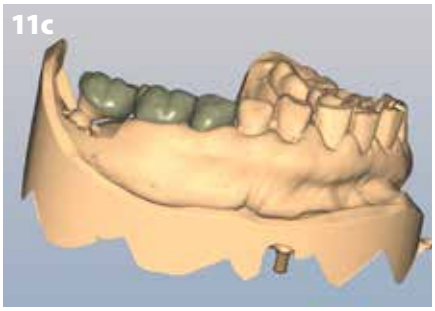
Fig. 8: One-stage double mix impression combined with pick-up of the implant.

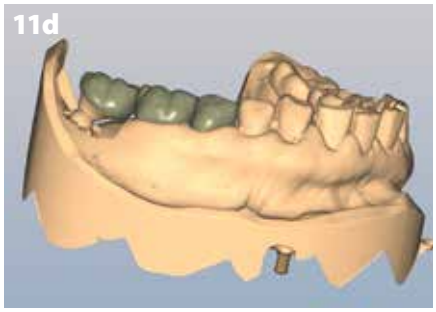
Fig. 9: The temporary restoration was made with TEMPSMART DC.

Fig. 10: a) extra-oral light-curing to speed up the final setting. **b)** after finishing and polishing **c)** intaglio surface after finishing and polishing, showing smooth margins.









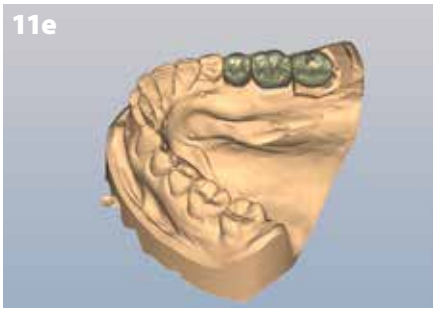


Fig. 11: Model scans **(a)** bare preparations. **(b)** designed crowns **(c)** designed crowns checked with the antagonist model **(d)** vestibular view **(e)** occlusal view.

The impression was poured and the stone model as well as the antagonist model were scanned (Fig. 11). The crowns were designed and milling parameters were set with a CAD/CAM program (PowerMill Pro, Autodesk) (Fig. 12).

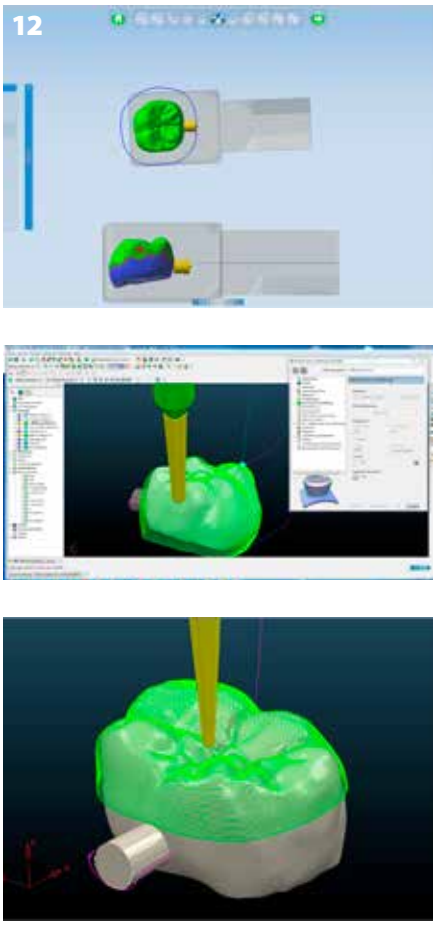


Fig. 12: Designing and setting the milling parameters.

The crowns were prepared from lithium disilicate CAD/CAM blocks (Initial LiSi Block, shade A2). For the implant crown on locus 47, a dedicated abutment solution block was selected and fired after milling. (Fig. 13). One of the advantages of Initial LiSi blocks is their high opalescence, especially the high translucency (HT) shades. This enables to obtain highly aesthetic results, even without further characterisation.

Fig. 13: The lithium disilicate restorations after milling.

After milling for 35 minutes (Exocad PowerMill CAM, DMG), the restoration was removed from the block and the sprue was smoothened out. Then, the crowns were fit on the separate dies and on the model, respectively, already showing a perfect marginal fit. (Figs. 14 and 15).

Fig. 14: Verification of the marginal fit on the dies and the implant abutment.

Fig. 15: The milled restorations on the model.

Next, the implant crown was glass soldered onto the customised zirconia abutment (Fig. 16). The monolithic restorations were characterised and glazed with Initial Lustre Pastes NF (Fig. 17).

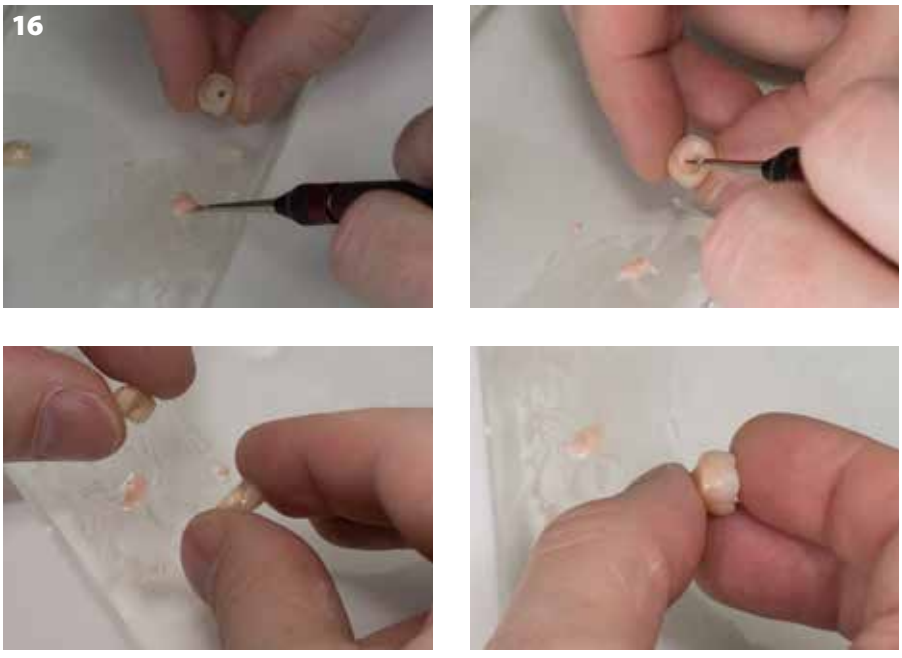


Fig. 16: The lithium disilicate crown was soldered onto the customised zirconia abutment.

Fig. 17: Initial LiSi Block crowns, after characterisation.

Fig. 18: After the removal of the temporary crowns, the gingiva was found in good condition.

Fig. 19: After cementation of tooth 45-46 and screwing of crown 47.

After removal of the temporary restorations, the gingiva was found in good condition (Fig. 18). The crowns of teeth 45 and 46 were luted onto the abutment teeth using a self-adhesive resin cement (G-CEM LinkAce*). The crown of tooth 47 was screwed onto the implant (35 Ncm) and the access hole was filled with Teflon and composite on top (Fig. 19). The occlusion was checked and the final result was shown to the patient. The CAD/CAM lithium disilicate restorations blended seamlessly with the adjacent natural dentition and showed a perfect marginal fit.

The patient was very pleased with the natural looking treatment results. At the follow-up appointment after two years, no adverse events had been reported and the crowns were positively evaluated in terms of aesthetics as well as function.

*G-CEM LinkAce has been replaced with G-CEM ONE.