**Easy and efficient: Composite resin blocks for the CAD/CAM technique**

Single-tooth restorations with Tetric CAD

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Composite blocks for CAD/CAM applications are on the rise, particularly for producing small restorations, such as inlays, onlays and occlusal veneers. And quite rightly so, for this type of material has a lot to offer: it exhibits sound mechanical properties combined with an extraordi-

nary grading accuracy and it is easy and efficient to process in day-to-
day procedures.

The following clinical report describes the workflow to create an esthetic single-tooth restoration using the new Tetric CAD® composite block. The blocks are available in two degrees of translucency – HT and MT – and in a variety of shades. They exhibit a pronounced chameleon effect to provide restorations that blend in well with the optical characteristics of the surrounding residual tooth structure. The material can be polished to a high gloss in a few seconds both intraorally and extraorally. In addition, it can be easily repaired intraorally with conventional composite resins.

**Clinical case**

The pre-op showed a defective amalgam filling on tooth 36. The filling needed replacing (Fig. 1). Subsequently, the restoration was designed in the CAD module (Fig. 3). The restoration was ground from the block. Grind times are considerably shorter for CAD/CAM composite resins compared with other materials. Although the cutting efficiency is lower for smaller restorations, such as inlays as they are frequently polished to a high gloss. It only took a few seconds both intraorally and extraorally. In addition, it can be easily

repaired intraorally with conventional composite resins.

**Designing the restoration**

Shade selection is performed on the natural dentition, primarily on the neighbouring teeth. We decided to use shade HT A2. The HT blocks are a good choice, particularly when it comes to producing small restorations such as inlays as they provide a pronounced chameleon effect. Once the amalgam was removed, the tooth was prepared in line with the recommended preparation guidelines (Fig. 2). Then, an optical impression was taken using an intraoral scanner and the inlay was designed in the CAD module (Fig. 3). Subsequently, the restoration was ground from the block.

Conditioning the restoration

The attachment point was easy to smooth out with fine-grit diamonds. This was followed by extraoral polishing using composite polishers (e.g. OptraPol®) (Fig. 5). The luting composite was applied and scrubbed into the pre-treatment bonding surface for 20 seconds using a microbrush (Adhese® Universal is also available in the VivaFlex® delivery system for direct applications). It is important to observe the recommended agitation time to ensure that the adhesive can penetrate sufficiently (Fig. 8). Excess material is carefully dispersed using compressed air until a glossy immaculate film results. Pooling must be avoided.

The inlay was seated using Variolink® Esthetic luting composite. The inlay was seated using Variolink® Esthetic luting composite. The inlay was seated using Variolink® Esthetic luting composite. The restoration can be cleaned easily with steam cleaner. It is recommended to additionally clean the restoration with 70% ethanol to disinfect it. Pre-treating the restoration in this way is mandatory for Tetric CAD because air-blasting increases the surface area and creates a retentive pattern that acts as a basis for the adhesive cementation. Pre-treating therefore ensures a reliable bond between the luting material and the restoration.

To condition the restoration, Adhese® Universal adhesive was applied and scrubbed into the pre-treated bonding surface for 20 seconds using a microbrush (Adhese® Universal is also available in the VivaFlex® delivery system for direct applications). It is important to observe the recommended agitation time to ensure that the adhesive can penetrate sufficiently (Fig. 8). Excess material is carefully dispersed using compressed air until a glossy immaculate film results. Pooling must be avoided.

It is necessary to light-cure the adhesive at this point: the adhesive will be cured together with the luting composite when the inlay is placed on the tooth.

**Pre-treating the prepared tooth**

Adequate isolation of the operating field is required for reliable bonding. The tooth preparation was cleaned and then conditioned, rinsed and dried using a conventional etch & rinse procedure. Adhese Universal was used to condition the tooth in the absence of air for 20 seconds and then dispersed (Fig. 9). The adhesive was then light-cured for 10 seconds using the Bluephase Style curing light (Fig. 10). According to the manu-

facturer’s recommendation, a cur-

ing light emitting a light intensity of at least 1000 mW/cm² should be used for this step.

**Placing the restoration**

The inlay was seated using Variolink® Esthetic luting composite. The luting composite was applied directly from the syringe onto the bonding surface and then the inlay was seated and retained in posi-

tion applying light pressure (Fig. 11). Variolink Esthetic is particularly well suited for this step because excess material can be removed from the contact line with ease and it does not cause a “buffering effect” as is of-
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At the final curing stage, the adhesive on the bonding surface and the luting composite are cured together (exposure time: 10 seconds per mm of composite and segment). It is recommended to use a curing light that produces a light intensity of at least 1,000 mW/cm² for this step.

Fig. 13: Applying Liquid Strip to prevent the formation of an inhibition layer

Fig. 14: Light-curing all segments for 20 s per mm of composite using a Bluephase Style

Fig. 15: Occlusal check followed by intraoral polishing with OptraPol

Fig. 16: Inlay in situ: great optical integration thanks to chameleon effect

Ten the case with harder luting composites (Fig. 12). Tack-curing from all sides for 2 seconds facilitates the clean-up process. The cement line should be covered with air block gel (e.g. Liquid Strip) to prevent the formation of an oxygen inhibition layer (Fig. 13).

At this stage, the adhesive and the luting composite applied to the bonding surface are polymerized by the light passing through the restoration. In the process, a reliable adhesive bond forms. Upon completion of the light-curing step, Liquid Strip can be rinsed off (Fig. 14).

Finishing and outcome
An occlusal check was carried out and any interferences were removed using fine diamonds. In the present case, final intraoral polishing was performed with the OptraPol polishers (Fig. 15). This procedure resulted in a highly esthetic single-tooth restoration. Because of the chameleon effect, the inlay blends seamlessly into the surrounding natural tooth structure (Fig. 16).

Conclusion
Highly esthetic permanent single-tooth restorations can be achieved with the composite blocks of the Tetric CAD range in really short times. The guidelines for the adhesive technique need to be observed and a coordinated luting system must be used.

Easy and rapid processing and polishing procedures and the possibility for effecting intraoral repairs, similar to conventional filling composites, enable a highly efficient treatment workflow and increase the efficiency of day-to-day procedures in the dental practice.

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