

Uncompromised quality

A case study integrating SDR in composite restorative techniques

SDR (Smart Dentin Replacement) is a recently developed, low-viscosity, fluoride-containing composite restorative, designed for use as a base in Class I and Class II cavities and providing a considerable reduction in polymerisation shrinkage and the resulting polymerisation stress. The material can be used in combination with existing methacrylate-based adhesives and composite restoratives. SDR is suitable for bulk placement in increments of up to 4mm, and its handling properties are comparable to those of flowable composites.

SDR can easily be integrated in existing protocols for direct composite restoration; it will improve treatment efficiency, optimise filling quality and increase patient comfort by reducing post-operative sensitivity.

The following clinical case illustrates step by step the replacement of two insufficient composite fillings with recurrent caries by the composites SDR (Dentsply DeTrey, Germany) and Tetric Evo Ceram (Ivoclar Vivadent, Liechtenstein).

Case study

A 23-year-old male patient presented for a follow-up examination. Recurrent caries was found under composite fillings in teeth 25 and 26 (Figure 1). Bitewing radiographs confirmed the diagnosis. A cold test showed both teeth were vital.



Figure 1: Initial situation: old composite fillings with recurrent caries in teeth 25 and 26

At the treatment visit, after infiltration anaesthesia, the two old composite fillings were removed with a cylindrical diamond bur, taking care not to damage the residual sound tooth structure (Figure 2). This was followed by caries excavation, using round ceramic burs and a caries-detecting solution, and final cavity preparation, using a fine-grit diamond bur (all preparation instruments: Komet, Germany).



Figure 2: Situation after composite filling removal and prior to caries excavation

After rubber dam placement over teeth 24 to 27, a metal matrix band was applied to tooth 26. A wooden wedge (Kerr Hawe, Switzerland) was used to separate the teeth and seal the cavity (Figure 3).

The tooth preparation was inspected, cleaned and etched with phosphoric acid gel for 30 seconds. Then the etchant was thoroughly removed, using water spray from the air-water syringe, and the cavity was air-dried. The adhesive XP Bond (Dentsply DeTrey) was applied and rubbed in with the aid of a minibrush; after 30 seconds the solvent was evaporated with some compressed air and the adhesive was light-cured for 20 seconds.



Figure 3: Rubber dam and metal matrix applied to tooth 26

To replace the missing dentin and part of the cervical enamel, SDR was bulk-placed directly from the Compula into the cavity and polymerised for 20 seconds (Figure 4).

It is important to begin dispensing SDR at the deepest point of the cavity, extruding it at a steady pressure, and always keeping the thin metal tip of the Compula, which greatly facilitates void-free filling, immersed in the material extruded. SDR self-levels within a few seconds and can then be light-cured.



Figure 4: Situation after bulk placement of SDR

Particular care should be taken not to overfill the cavity with SDR, so that sufficient space remains for the posterior composite used to restore the occlusal surface. An occlusal cover of 2mm will ensure a good aesthetic result, in combination with the translucent universal shade of SDR.



Figure 5: Occlusal restoration of tooth 26 with Tetric Evo Ceram

The next step was to complete the occlusal third of the filling with the composite Tetric Evo Ceram shade A2 (Figure 5). The occlusal surface was restored as accurately as possible, using composite modelling instruments. Excess material was removed. The composite was light-cured for 20 seconds prior to wedge and matrix removal, and additionally afterwards. Prior to placing the adjacent restoration, the proximal filling margins and the mesial marginal ridge were finished and smoothed, using a long, pointed, fine-grit diamond (Figure 6).

The metal matrix was then applied to tooth 25. The matrix band was adapted to the contour of the filling in tooth 26 with a plugging instrument and tightly secured with a wooden wedge to obtain good proximal contacts (Figure 7).

Subsequently, tooth 25 was restored in the same way



Figure 6: This interproximal view of tooth 26 shows a void-free restoration with excellent marginal integrity and seamless transition from composite material to tooth structure



Figure 7: Matrix and etchant applied to tooth 25, after finishing the filling margins on tooth 26

as tooth 26.

After rubber dam removal, the restorations were finished, beginning at the margins in tooth 25. Short, pointed (bullet-shaped) and concave fine-grit diamonds with rounded tips were used for occlusal contouring, i.e. eliminating any occlusal interferences and checking static and dynamic occlusion. Finally, the restorations were polished to a high shine, using one-step composite polishers, polishing brushes and a polishing paste (Optrapol, Ivoclar Vivadent) (Figure 8).



Figure 8: Final composite fillings: both function and aesthetics were successfully restored

This clinical case shows that the new composite restorative SDR can be successfully integrated in a safe and well-proven treatment concept.

SDR offers dentists a simplified filling technique and patients a restorative material of uncompromised quality.



Franz Witte apprenticed as a dental technician in a dental lab and went on to study dentistry at the University of Greifswald. He established a joint practice with Dr Nicola Witte in 2002 (www.zahnarzt-witte.de) and in 2006 achieved postgraduate education in implantology by the German Association of Dental Implantology (DGZI). In 2008, he was certified as an implantology specialist by the DGZI.

Association of Dental Implantology (DGZI). In 2008, he was certified as an implantology specialist by the DGZI.