Sticks to the teeth – not the instruments

The direct restoration of multiple defects, in particular old restorations with secondary caries, places considerable demands on both the clinician and the materials.

By Dr. Ralph Schönemann, Germany

Compared with indirectly fabricated restorations, the effort is consider- ably less, as these generally require a temporary restoration as well as a second treatment session following conventional impression taking. The fabrication of individual full ceramic restorations after optical scanning and subsequent automated fabrication is, of course, a single appoint- ment alternative, does however, re- quire investment in this technology. A prerequisite for the successful, di- rect preparation of restorations with purely light-curing composite ma- terials in the layering technique, is avoiding tension during volumetric shrinkage which occurs during poly- merisation.

The adhesives and hybrid compos- ites should be compatible with each other and offer good long-term per- formance. This is reflected both in in- vitro tests as well as in in-vivo long- term studies.

Sticks to the teeth and not the in- struments. One of the requirements for state-of-the-art adhesives and composites is safe handling during the preparation of the restoration. This implies a good, uniform wetting layer when applying the adhesive and convenient modeling properties of the hybrid composite which allow the clinician safe adaptation to the bonded tooth.

Submicron hybrid composites of- fer an impressive rapid and con- sistent gloss. Appropriate shades and an easy to achieve gloss due to intelligent filler design provide the desired and sustainable aesthetics.

Permanent protection against leakage in the marginal region is a prerequisite. Last but not least, the result achieved with a composite in terms of colour, gloss and abra- sion has to be reliable in the long term. This result is complemented by a technically reliable adhesive through permanent impermeabil- ity of the restoration margins. The practical implementation of a direct restoration, combining adhesive and composite, and an evaluation of the prerequisite material requirements, are discussed in the following case study.

In this case, the patient presented with insufficient restorations (Fig. 1). The restoration margins revealed leakage and discoloration. The gap closure between 35 and 37 was par- ticularly irritating for the patient. The X-ray image (Fig. 2) revealed sec- ondary caries and the approximal situation. The teeth involved were cleaned, as were the adjacent teeth, while waiting for local anaesthesia to come into effect. The placed flexi- Dam permitted a good overview and provided good conditions for drying the work area and thus for a perma- nent adhesive bond between tooth and restoration. The old restorations were removed entirely and the sec- ondary cavities was excavated (Fig. 3). ONE COAT 7 UNIVERSAL was used as adhesive. ONE COAT 7 UNIVERSAL is an MSB-based, light-curing single- component bonding agent which can be applied in self-etching, selec- tive etching or total etch techniques. The tooth surface is conditioned with Etchant Gel S and an S.P.E.C. 3 LED lamp is used for polymerisation (Fig. 4).

After excavation of the secondary with insufficient restorations (Fig. 9) the enamel and dentine were etched with a phosphoric acid conditioning is indicated. Subsequently, the enamel with Etchant Gel S for 90 sec- onds is followed by a shortened Total Etch for 10 seconds (Fig. 5). Then the etchant was removed thoroughly by rinsing for 20 seconds and the cavities were dried with air. Imme- diately afterwards, ONE COAT 7 UNI- VERSAL was applied with a brush to maintain adequate moisture and to provide complete cover prior to plac- ing the matrix (Fig. 6). The adhesive is gently flushed with an air blower and polymerised with the S.P.E.C. 3 LED lamp for 10 seconds.

A variety of partial matrix systems are available for a sophisticated de- sign of the approximal surfaces. Here we used a ROEKO tension-free steel matrix band and trimmed it to the desired length as a partial matrix. This band is available in different widths and material strengths.

The nonelastic properties of the ma- terial make anatomical customisa- tion extremely easy. The thickness of the band in the area of the contact point can be minimised effectively by thinning. Fixation and basal seal- ing of the trimmed partial matrix is performed with a wooden wedge, and for lateral sealing the band edges are pressed to the tooth surface us- ing a clamping ring.

The design of the approximal surfac- es (Fig. 7) with BRILLIANT EverGlow A3/D3 (Fig. 8) is very simple. The pre- paration is carried out with a nonelastic zirconium round burr in anticlock- wise rotation, yet without water. The desired result is a tight, spheri- cal contact. Approximal convexity can be customised very easily in this manner. This is again followed by designing the approximal surface with BRILLIANT EverGlow A3/D3 (Fig. 9) as very simple. The clinical long-term objective of sealed restoration margins can be achieved with even greater certainty when using a reliable adhesive such as ONE COAT 7 UNIVERSAL, which was used here.

After removing the matrix, the ap- proximal surface is given a spherical design using an EVA file, any bond- ing expressed basally from the ma- trix is removed, and the transition from the tooth to the restoration is brought to the same level. The ma- trix is applied distally to premolar 35 and sealed basally with a wooden wedge and laterally with a clamping ring. ONE COAT 7 UNIVERSAL is ap- plied and gently air-cleaned after an exposure time of 20 seconds. ONE COAT 7 UNIVERSAL is polymerised with the S.P.E.C. 3 LED lamp for 10 seconds (Fig. 10). The matrix, which has now been stabilised by bonding, is then thinned out swiftly using a zirconium round burr in anticlock- wise rotation, yet without water. At the same time, the partial ma- trix must be reliably fixed by the wooden wedge. Metal chips were avoided by using anti-clockwise rota- tion. Any metal chips that may still be generated, are dispersed with air. The desired result is a tight, spheri- cal contact. Permanent protection against leakage in the marginal region is a prerequisite. The high density and composition of the filler particles of the BRILLIANT EverGlow composite- optimise the results in terms of re- ducing shrinkage and the resulting lower shrinkage stress.

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