

# Simple adhesive luting in everyday practice

José Ignacio Zorzín<sup>1</sup>

## Introduction

Self-adhesive resin cements facilitate the adhesive bonding of indirect restorations. When using these materials, no pre-treatment of the hard tooth substances is necessary. Self-adhesive resin cements have a wide indication spectrum, but in everyday practice you have to resort to conventional adhesive cementation in some cases. As a result, you have to procure both a self-adhesive cement and a conventional composite cement and select your cement per case. Universal self-adhesive resin cements are an interesting solution to this problem. They can be used as self-adhesive resin cement and - in combination with an associated primer - also as a conventional adhesive resin cement.

The following clinical cases show the possibilities of using a universal self-adhesive resin cement (G-CEM ONE, GC Europe). The first case shows the self-adhesive cementation of a monolithic zirconium oxide bridge and the second case the conventional adhesive cementation of two lithium disilicate inlays (Initial LiSi Press, GC Europe).

## Case 1

The endodontically treated tooth 24 had to be extracted due to a root long fracture. It was decided to fill the gap by means of a three-unit monolithic zirconia bridge. After adhesive restorative therapy of abutment teeth 23 and 25, these teeth were prepared with an isogingival finish line (chamfer). After taking the impression, a provisional restoration was made, luted with a eugenol-free, temporary cement (Freegenol, GC Europe) and cleaned (Fig. 1). No eugenol-containing cement should be used to fasten the provisional restoration, as eugenol impairs the polymerization and adhesion of adhesives and composites.

After completion, the monolithic zirconia bridge was inserted (Fig. 2). For this purpose, the temporary solution was removed and then all remains of the luting cement were removed with a scaler and a polishing cup with pumice slurry (Fig. 3). The colour effect, accuracy of fit and occlusion of the bridge were checked (Fig. 4). Prior to adhesion, all intaglio surfaces of the restoration must be clean and slightly roughened. Saliva, in particular, adheres very strongly to the oxide ceramic due to its polarity and must be thoroughly removed. Cleaning with alcohol is unfortunately ineffective and phosphoric acid is absolutely contraindicated. In the case of zirconium oxide, the adhesive surfaces are cleaned and roughened after the try-in by sandblasting with aluminum oxide powder (35 µm grit) at low pressure (approx. 1.5 bar). Ideally, this is done chair-side (e.g. Airsonic Mini Sandblaster, Hager and Werke). For this purpose, it is advisable to mark the surfaces to be treated, as in the present case, with a waterproof felt-tip pen (Fig. 5) before they are sandblasted (Fig. 6). Alternatively, if the restoration has already

<sup>1</sup> José Ignacio Zorzín  
P.D. Dr. med. Dent  
Research Assistant and Dentist,  
Dental Clinic 1 (Preventive  
Dentistry and Periodontology),  
University Hospital of Erlangen,  
Germany



Fig. 1: Temporary restoration from teeth 23 to 25



Fig. 2: Monolithic zirconia bridge to be luted



Fig. 3: Abutment teeth 23 and 25, thoroughly cleaned



Fig. 4: Try-in of the restoration

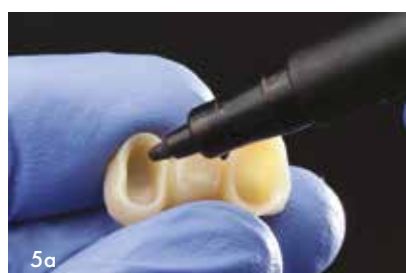


Fig. 5: The intaglio surface was marked with a black felt-tip pen as a visual control



Fig. 6: After sandblasting the intaglio surface, the black marking had entirely disappeared

been roughened in the laboratory, you can use a restoration cleaner after the try-in (e.g. Ivoclean, Ivoclar Vivadent or Katana Cleaner, Kuraray Noritake).

Before the relative isolation of the work area, with cotton rolls and parotid absorbent pad, the tooth abutments were cleaned again and then checked for contamination with saliva and blood. For insertion with the self-adhesive resin cement, the dentine must not be overdried, but must appear semi-moist. In this case, a "re-wetting" was necessary. For

this purpose, a microbrush was sprayed from a distance with air-water spray. With the microbrush prepared in this way, the tooth was moistened.

In order to prevent premature light polymerization of the self-adhesive resin cement during insertion, the ambient light was reduced. Then, G-CEM ONE was applied on the inner crown surfaces (Fig. 7a and b) and the bridge was inserted with strong pressure (Fig. 8).

The tack-cure technique was used for the clean-up. For this



Fig. 7: Cementation with the universal self-adhesive resin composite G-CEM ONE (GC Europe)

Fig. 8: Insertion of the bridge with strong pressure



Fig. 9: Tack-curing the excess cement for 1 s to give it an instant rubbery consistency

Fig. 10: Excess removal with a probe

Fig. 11: Occlusal view after cementation



Fig. 12: Vestibular view after cementation

purpose, the light guide of the curing light was waved over the excess cement for 1 second (Fig. 9) until it reached a rubber-like consistency. The hardened excess cement could be easily removed with a scaler (Fig. 10). Reaching a good consistency for excess cement removal depends on the light-curing unit being used. Therefore, one should practice in advance to find the best combination of time, intensity, and distance of the curing light in use.

After complete removal of the excess cement, the adhesion, occlusion and articulation movements were checked (Figs. 11 and 12).



Fig. 13: Deficient restorations on teeth 46 and 47



Fig. 14: After removal of the caries and the old restorations

**Case 2**

During a check-up, it was found that the restorations on teeth 47 and 46 were deficient (Fig. 13). Under local anesthesia and rubber dam isolation (isodam, Sigma Dental Systems), the restorations and caries were removed. Using the rubber dam has several advantages in this clinical situation: increased patient comfort, infection prophylaxis for

the treatment team, a perfect overview and thus time-saving. Due to the pronounced oro-vestibular expansion of the cavities in the approximate region, it was decided to restore the teeth indirectly with glass-ceramic restorations (Fig. 14).

A two-bottle universal adhesive (G2-BOND Universal, GC Europe) was applied to the dentine portions of the cavities (self-etch mode; Fig. 15), gently blown and light-cured (Fig.



15a



15b

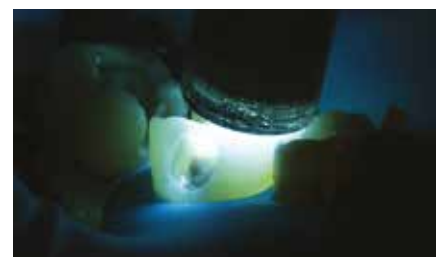


Fig. 16: Light-curing of the adhesive



Fig. 17: After cavity preparation for indirect glass ceramic restorations



18a



18b

Fig. 18: Inlays made from Initial LiSi Press



Fig. 19: Try-in of the inlays



Fig. 20: The restorations were etched with hydrofluoric acid



21a

Fig. 21: Preparing the restoration surface to be bonded with G-Multi PRIMER



21b

Fig. 21: Preparing the restoration surface to be bonded with G-Multi PRIMER



Fig. 22: Selective enamel etching



Fig. 23: Preparations after etching



24a



24b



Fig. 24: Application of G-CEM ONE Adhesive Enhancing Primer ensures immediate high bond strength

Fig. 25: The preparations are ready for cementation



Fig. 26: Seating of the inlay



Fig. 27: Excess removal with a probe

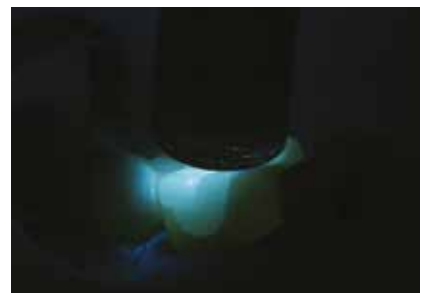


Fig. 28: Light-curing of all margins



Fig. 29: After finishing of the margins



Fig. 30: Immediately after removal of the rubber dam. The teeth are still slightly dehydrated.

16). Finally, undercuts and irregularities were blocked using a composite (G-aenial Universal Injectable A3, GC Europe) and the cavities were prepared (Fig. 17). An impression was made using the two-step technique and provisionals were made. These were, as described above, luted with a eugenol-free, provisional cement (Freegenol) and cleaned.

The restorations were made from a lithium disilicate press ceramic and characterized (Initial LiSi Press, shade A3-MT and Initial IQ Lustre Pastes ONE, GC Europe; Fig. 18).

After having removed the provisional restorations and having thoroughly cleaned the cavities, the restorations were

tried in and checked for fit and aesthetics (Fig. 19). This should be done under rubber dam to minimize the risk of incidental aspiration and to protect the ceramic from damage if the patient would bite on it. Evidently, the aforementioned good reasons for rubber dam remain also valid.

After the try-in, the adhesive surfaces of the inlays were etched with 5% hydrofluoric acid for 20 seconds (IPS Ceramic Etching Gel, Ivoclar Vivadent; Fig. 20). Etching creates a clean surface with a retentive micro-relief. To reconcile the hydrophilic glass ceramic with the rather hydrophobic resin cement, the etched surfaces were silanized with a universal

primer (G-Multi PRIMER, GC Europe, Fig. 21).

After pre-treatment of the restorations, the enamel surfaces of the cavity were etched with 35% phosphoric acid gel for at least 15 sec. (Fig. 22), then thoroughly rinsed with water spray and dried with compressed air (Fig. 23). Due to the glass-ceramic and the non-(macro)retentive preparation, the adhesive attachment of the inlays was carried out with the universal self-adhesive resin cement in combination with its corresponding primer (G-CEM ONE and G-CEM ONE Adhesive Enhancing Primer, GC Europe). The primer was applied with a brush to the prepared enamel and dentine surfaces (Fig. 24, left to rest for 10 s and dried for 5 s at maximum air pressure (Fig. 25). At this time, the intensity of the operation light and ambient light was reduced to prevent premature setting of the universal self-adhesive resin cement. The Adhesive Enhancing Primer contains a chemical initiator for G-CEM ONE. When G-CEM ONE comes into contact with the primer, the setting reaction is accelerated. For this

reason, the inlay was first seated on tooth 47 (Fig. 26) and thereafter the inlay on 46. After insertion, the cement was tack-cured as described above. The excess cement was thoroughly removed (Fig. 27) and then extensively light-cured (Fig. 28). Before removing the rubber dam, the margins were finished with polishing discs (Sof-Lex, 3M) and polishing strips (Epitex, GC Europe) (Fig. 29). After removal of the rubber dam, the occlusion and articulation check was carried out (Fig. 30).

### Conclusion

The presented cases show how - with a universal self-adhesive resin cement - indirect restorations can be attached in a self-adhesive as well as conventional adhesive manner. Hence, universal self-adhesive resin cements simplify adhesive cementation in everyday practice.

*Reprinted with permission GC get connected*