Cementation – a decisive factor

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Reliable cementation of fixed prosthetic restorations represents one of the most sensitive and crucial tasks in the course of prosthetic dental treatment. Mistakes committed during this step may adversely affect the aesthetic appearance and service life of the restoration.

Against such a background, it is essential to have a thorough grasp of the chemical and physical properties of dental cements as well as of their range of indication and compatibility with appropriate restorative materials. Ideally, the luting material should provide a flawless and durable bond between the tooth structure and prosthetic reconstruction so that a resistant unit which cannot be penetrated by oral liquids is established.

Ease of use is another basic requirement of luting materials. Not all luting composites are easy to mix and apply. In addition, excess removal of composite-based cements in particular presents a clinical challenge. This is a drawback compared to conventional luting materials. For this reason, many dentists prefer using conventional luting cements to place veneered aluminium, lithium disilicate and zirconium oxide restorations. However, practical experience has shown that the conventional method does not provide the same high-performance results as the adhesive method. Adhesive cementation methods are more complicated than nonadhesive ones, but they ensure an optimal bond, promoting a durable unit between the tooth structure and prosthetic restoration.

Case study

A female patient hit her head on the pavement after a car ran into her. As she was not wearing a full face helmet, her jaw was unprotected. She suffered a jaw fracture and a fracture of posterior teeth, which had previously

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Figure 1: Occlusal view of bridge.

been restored with two bridges made of glass fibre-reinforced composite. Both bridges had to be replaced because of the accident. As the patient wanted her teeth to be restored aesthetically, a ceramic veneered zirconium oxide system was selected. These restorations can be cemented using either a conventional or adhesive method.

Only the glass fibre-reinforced composite bridge core was left of the original bridge in quadrant 4; the composite veneering material had completely delaminated from the framework (Figure 1). It was therefore necessary to fabricate a new bridge to restore the normal function of the jaw. The remaining part of the bridge had to be removed to prepare the abutment teeth for the new bridge. The abutment teeth had been restored with glass fibre posts and core build-ups ten years ago. At the time, both these reconstructions and the bridge proper were inserted using Variolink® II luting composite.

The abutment teeth were completely intact and did not show any signs of infiltration or secondary caries when they were prepared (Fig 2). This attests to the quality and durability of the luting composite used. After tooth reparation, a zirconium oxide bridge was fabricated according to conventional procedures.

Figure 2: Lateral view of prepared abutment teeth.

Figure 3: Relative isolation of the treatment field with OptraGate.

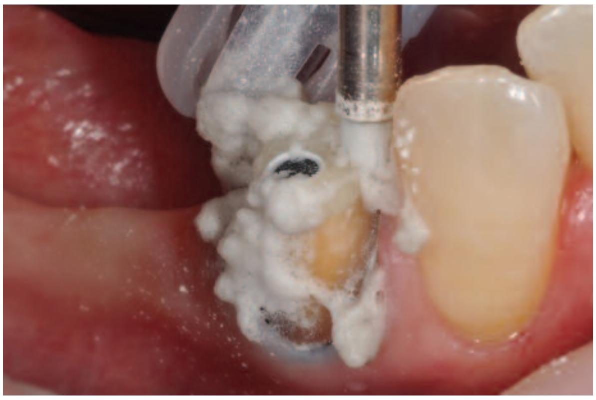

Figure 4: Cleaning of remaining tooth structure with water, pumice and soap.

Figure 5: Application of adhesive

Figure 6: Light-curing of excess material.

Figure 7: Bridge in situ with excess cement.

Prior to adhesive cementation, the contact surfaces of the zirconium oxide bridge were conditioned. For this purpose, Metal/Zirconia Primer was applied to the inner surfaces of the bridge. After a reaction time of three minutes, excess primer was dispersed to a thin layer using blown air. It is advisable to place an OptraGate® lip retractor before commencing oral treatment, as this auxiliary device enhances the view and ensures relative isolation of the treatment field (Figure 3). It is also recommendable to place a retraction cord for sulcus fluid control to avoid contamination of the tooth surfaces with fluid.

At the beginning of the treatment, the entire surface of the remaining tooth structure was carefully cleaned using

Figure 8: Easy removal of excess material.

Figure 9: Removal of retraction cord placed for sulcus fluid control.

Figure 10: Removal of residual cement and adhesive with a curette.

Figure 11: Lateral view of the bridge, two weeks after insertion.

a mixture of water, pumice and liquid soap. In the process, any residual temporary luting material and other impurities, which might adversely affect the bonding result, were completely removed (Figure 4). The preparation surfaces were thoroughly cleaned with water, gently dried and the adhesive Multilink® Primer A/B was applied. This adhesive consists of two components A + B, which are mixed together (Figure 5). Multilink Primer A/B is a self-etching one-step system, which eliminates the need for additional etching with phosphoric acid. After the primer, the dual-curing luting composite Multilink® Automix was applied. This material is supplied in an automix syringe containing both base and catalyst paste and does not require separate manual mixing. Whilst the material is extruded from the syringe, the two components are optimally mixed in the automix syringe tip, eliminating the risk of air entrapments. Multilink Automix can be dispensed directly onto the crown, which facilitates the working procedure and helps save time. Due to its optimal consistency, the material can be accurately applied to the area where needed without contaminating any other tooth surfaces. Excess material should be removed in a timely fashion, i.e. during the first phase of the curing process. Multilink Automix features an improved new "Easy Clean-Up" formula, which further facilitates excess removal and offers clear advantages in the clinical handling of the material. Excess cement is light-activated for approximately two seconds per quarter surface (eight seconds in total) using a curing light (Figures 6 and 7). In the process, the excess obtains a gel-like consistency and can be easily removed in one piece using a scaler (Figure 8).

At the end of the cementation process, the retraction cord, which was instrumental to fluid control, was removed (Figure 9). The preparation margins were checked with a curette (Figure 10) to ensure that they were free of residual adhesive and cement, which may cause an inflammatory response. The pictures of the recall show that the treatment field has remained completely free of any inflammatory reactions (Figure 11). Both the shade and shape of the restoration blend imperceptibly into the surrounding tooth structure. A healthy gingiva is the best proof of a successful restoration.

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