A novel approach for filling tunnel-prepared teeth with composites of two different consistencies: A case presentation

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A new approach to fill tunnel preparations with composites of two different consistencies is presented. Removal of caries through a narrow access space and reliably filling this cavity are the two main problems with tunnel-prepared teeth. Caries removal can be supplemented by the use of hand instruments, especially curettes, but filling the lesion with composite of a single consistency is problematic. Flowable composite alone does not create enough pressure to place the filling material into shallow extensions of the lesion; packable composite does not flow well enough. A solution for this problem may be a dual-consistency technique: flowable composite is placed, followed by packable composite, with no light curing in between. The flowable composite is pressed into small details of the cavity by the pressure created by the packable composite. (Quintessence Int 2012;43:93–96)

Key words: dual-consistency technique, flowable composite, packable composite, Opallis, Syntac, tunnel preparation

To date, methods of caries removal aim to save as much sound tooth structure as possible. In this way, tunnel preparations have become popular: Proximal caries are treated through an access cavity from the occlusal surface and filled with glass-ionomer cement.1 Elevated fluoride release, ease of handling, and possibility of bulk placement would be obvious advantages of this material. However, clinical follow-ups have shown frequent breakage of the marginal ridge, cavitation in the proximal enamel, and recurrent caries, resulting in overall inferior clinical performance.1,2 When composites are used instead, problems sometimes arise with their consistency. The application of flowable composite may not create enough pressure to place it into shallow extensions of the lesion, whereas packable composite may not flow well enough. Belvedere proposed the combined use of two consistencies of composite without light curing in between.3 This technique is adapted for use with tunnel preparations in the following case presentation.

CASE REPORT

A 32-year-old woman presented for a routine examination. On the bitewing radiographs, a large proximal lesion was detected distally in the mandibular left second premolar (Figs 1 and 2a). Positive vitality of the tooth was confirmed, anesthesia was performed, and a coarse diamond bur was used to create an access in the region of the distal pit of the occlusal surface (Fig 2b). Following this, the bulk of the caries was removed with a round
 bur. Residual caries in the cervical region and on the parapulpal wall was removed with a spoon excavator. The coronal extensions of the caries to the buccal and lingual aspect were removed with a sharp universal curette (Figs 2c and 2d). Rubber dam (Roeko Flexi Dam, Coltène Whaledent) and a proximal matrix (3M ESPE) were applied. Microbrushes (Microbrush International) were tried out to fit into the small access of the cavity. Then, enamel was etched selectively for 15 seconds, followed by total etching of the entire cavity for another 15 seconds. The cavity was rinsed for 30 seconds and dried (Fig 3a). Syntac (Vivadent) was applied as recommended by the manufacturer (Fig 3b). Afterward, a small amount of Opallis Flow A2 (FGM) was applied into the proximal extension of the cavity (Fig 3c), directly followed by a small amount of Opallis EA2 (enamel) (FGM) (Fig 3d). The softer consistency composite was pushed into possibly existing fine irregularities of the lesion by the packable composite. In this way, the entire proximal part of the defect was filled. The excess of the flowable composite was removed, and both components were light cured. Then, the rest of the cavity was filled the same way with Opallis Flow and DA2 (Fig 4a), replacing dentin,
Fig 3  (a) Cavity following etch-and-rinse procedure. (b) Application of Syntac with a small microbrush. (c) Application of a small amount of Opallis Flow A2. (d) First proximal increment of Opallis EA2.

Fig 4  (a) Cavity after further application of two increments including Opallis D A2. (b) Final increment with Opallis EA2 with occlusion checked. (c) Polished restoration. (d) After 20 months of service.
and finally by another increment of Opallis Flow and EA2. Occlusion was checked, and polishing was performed (Figs 4b and 4c). The treatment was carried out under 3.6× magnification (EyeMag Pro F, Zeiss) and illumination (EyeMag Light, Zeiss) when appropriate. Figures 4d and 5 show the clinical and radiograph situations 20 months posttreatment.

DISCUSSION

The main problem with tunnel preparation is that a comparably large caries lesion has to be treated through a narrow access space. Carious tissue can be left behind. To solve this problem, additional illumination and magnification was used. Careful removal of caries was achieved by the use of a curette. Opallis was chosen as an esthetic composite because of its universal material properties, good polishability, and delivery in a broad range of different shades (see Figs 4c and 4d).

Using the regular approach for this defect (slot preparation), reconstruction of the proximal contact would have been difficult, especially with the curved surface of the distal aspect of the tooth. On the other hand, we have limited clinical evidence for the longevity of tunnel-prepared and composite-reconstructed teeth. In vitro studies and a 2-year clinical study yielded promising results, but further long-term studies have to be carried out before a general recommendation toward tunnel restorations can be made.

CONCLUSION

The dual-consistency technique may be a way to improve filling of tunnel-prepared teeth and saving additional tooth structure in the critical area of the proximal ridge.

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REFERENCES