

Immediate dentine sealing technique

Douglas Terry, John Powers and Stefan Paul provide a clinical illustration demonstrating the immediate dentine sealing technique using total-etch method, and providing self-etch protocol

Management of the dental tissues between the preparation and provisional phase of restorative treatment plays a pivotal role in the success of indirect adhesive restorations. In the development of these restorations, the exposed vital dentine immediately after cavity preparation is susceptible to insult from bacterial infiltration and microleakage during the provisional interim.

Bacterial and fluid penetration through these tubules can result in colonisation of micro-organisms, post-operative sensitivity and the potential for subsequent irritation of the pulp. The most effective way of managing these possible sequella and protecting this pulp-dentine interface is through stabilising the exposed dentine tissue by utilising an immediate dentine sealing technique after preparation and before impression taking and provisionalisation.

The 'immediate dentine sealing' technique allows the development of a hybrid layer on vital teeth immediately

after cavity preparation. This hybrid layer is described as a polymerised resin intermingled with collagen fibres and can be accomplished using either a total-etch (etch-and-rinse) or self-etch protocol.

Although these strategies differ in the method in which the dentine is treated and the adhesive system utilised, they are related in that both procedures provide an acid-resistant envelope. This resin-infiltrated layer seals the dentine, preventing microleakage; protects the pulp from mechanical trauma, thermal stimuli and bacterial invasion; and thus prevents hypersensitivity during impression taking, provisional restoration fabrication and final cementation.

The 'resin coating' technique is an alternative variation, which involves the application of a dentine bonding system followed by a low-viscosity microfilled resin on the prepared cavity. This procedure reduces the oxygen-

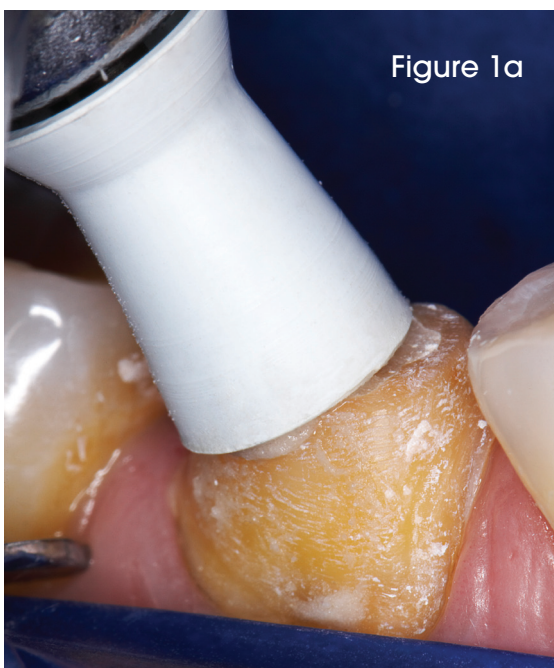


Figure 1a

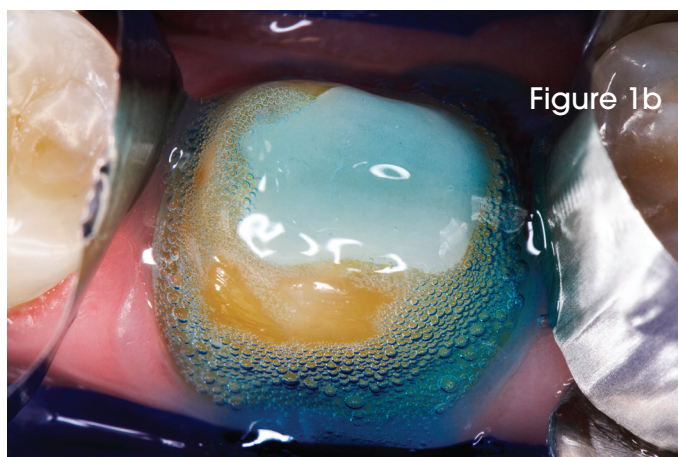


Figure 1b

Figures 1a and 1b: For total-etch method: After cleaning preparation with disinfectant, etch the dentine for 5-10 seconds using a 32-37.5% phosphoric acid (Uni-etch with BAC, Bisco; Gel Etchant, Kerr/Sybron) and rinse thoroughly. Remove excess water and leave preparation visibly moist. Apply adhesive primer to the moist preparation and gently air dry. Surface should appear shiny; otherwise repeat this process. Light cure for 10 seconds. For self-etch method: After cleaning preparation with disinfectant, completely dry preparation and apply self-etch adhesive, agitate, air dry, and light cure for at least 10 seconds

inhibition layer of the uncured resin by diffusion of the free radicals from the microfilled resin.

Additional clinical benefits from either technique include:

- Improved marginal and interfacial adaptation
- Reduced internal stress by relieving polymerisation contraction stress
- Prevention of desiccation of the dentine
- Improved bond strength of resin cement to dentine
- Enhanced smoothness of the laboratory die
- Potential prevention of hydraulic intratubular loading pressure during cementation of the restoration

- Easier removal of provisional cement.

In addition, for non-vital prepared teeth, this technique could protect the prepared dentine surface and intraradicular canal preparations from coronal microleakage. It is important, however, to remember a fundamental requirement for successful adhesion requires the use of the dental dam during the restorative procedure.

Contamination of the enamel and dentine with saliva, moisture from intra-oral humidity, blood and crevicular fluid can compromise the bonding performance of the restorative materials by affecting the adhesion at the interface and reducing bond strengths.



Figure 2: For total-etch method: Apply a thin coat of adhesive bonding resin (All-Bond 3 Part A and B, Bisco), air thin and light cure for 10 seconds. Apply a thin coat of bonding resin (All-Bond 3 Resin, Bisco; OptiBond FL, Kerr/Sybron), air thin and light cure. Block out any undercuts using flowable composite.

For self-etch method: Apply SE liner (All-SE, Bisco; OptiBond All-In-One, Kerr), air thin and light cure. Block out any undercuts using flowable composite. Completed immediate dentine sealed preparation



Figure 3: Redefine the preparation, including the enamel margins



Figure 4: Remove the oxygen-inhibited layer of the freshly bonded surfaces with an alcohol-moistened pellet



Figure 5: Continue with impression-taking protocol



Figure 6: Apply separating medium (Pro-V coat, Bisco) to entire preparation except for 1mm from cavo-surface margin to ensure retention. Gently air dry for 10-15 seconds to evaporate the solvent



Figure 7: Fabricate provisional and finish, rinse the separating medium off of preparation with water, and cement provisional



Figure 8: Upon final crown cementation visit, remove provisional, thoroughly clean the preparation with pumice slurry or air abrasion and proceed with aforementioned adhesive protocol (i.e. acid etch and adhesive)

Preserving and stabilising tooth hard tissues requires more than a rudimentary understanding of newly developed materials and techniques. It also demands a comprehensive knowledge of internal tooth structure and the complex interplay between its alteration and the adhesive mechanisms for its treatment.

With the continual development of adhesive technology, clinicians must take steps to ensure that their treatment and techniques are appropriate for the materials used. Managing the stability of dentine tissue during the restorative phase with the early formation of the hybrid layer provides a clinical solution that complements the patient's comfort while improving the long-term durability of indirect restorations.

The clinical illustration demonstrates this technique using total-etch technique, while self-etch protocol is provided (Figures 1-8). [PD](#)

Acknowledgements

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As part of the International Foundation for Oral Design's 2011 Symposium in London, Douglas Terry will be presenting a one-day course entitled 'Achieving aesthetic and restorative excellence with composite restorations' on 8 May 2011. For more information, please visit www.oraldesignsymposium.com.