Modern Restorative Dentistry: Anterior Application

New restorative protocol uses adhesive bonding resins to restore form and function.

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A new type of dentistry is emerging. This new restorative protocol, called Modern Restorative Dentistry (MRD), appears to be minimally invasive but is actually “maximally embracive.” The protocol “embraces” the concept that all good tooth structure should be left during tooth preparation and modern, adhesive bonding resins should be used to restore form and function. Restorative resins are used as a wetting agent for etched enamel to adhere the restoration in a cohesive manner, much the way a porcelain veneer is attached to the tooth.

Technique

The physical and mechanical characteristics of resin-based composites have improved considerably, yet the literature indicates that the same cannot be said for the operative decisions and techniques associated with their insertion and finishing.2

Deciding whether to include enamel pits, fissures, defects, and grooves has been discussed, yet no clear science-based recommendations have been made.3 To eliminate the possibility of posttreatment problems associated with challenging determinations, this author published a protocol for cleaning and pre-etching the enamel surrounding cavity preparations (see Technique Steps on this page). The “pre-etch” technique was developed to help improve final restoration success through better adhesive bonding and sealing, plus removing bacterial biofilm that can be stuck deep in the grooves of what appears to be healthy enamel.4

The “pre-etch” procedure is the starting point for the MRD technique—clean, etched enamel surrounds the restoration. From this “pre-etch” procedure, caries removal is performed, conserving as much dentin as possible. Then, enamel rod alignment is optimized with bevels and chamfers. The prepared enamel is etched and the dentin hybridized using a self-etch primer. The etched enamel is wetted with unfilled resin (uncured) flowable composite is added to the unfilled resin, and composite paste is injected into the resin “sandwich.” Most anterior restorations are single-loaded. In deep gingival or deep axial cases, the author does an increment or two before the injection into the resin “sandwich.” The specific steps for the restorative technique are shown in “Technique Steps.”

Materials

Improvements have been made in the filler and resin compositions of the new composite materials, as well as the emergence of new filler types.2 One company with a long history of high-quality adhesive and resin materials is Kuraray Medical (www.kuraraydental.com). The case presented uses Kuraray’s adhesive bonding agent, Clearfil® Protect Bond, and the new restorative composites Clearfil® Majesty Esthetic and Clearfil® Majesty Flow. The Majesty restorative composites fulfill the requirements for an ideal restorative material for the MDR protocol. Majesty is strong, has high wear rates and minimal shrinkage, and is highly polishable.5,6

Technique Steps

1. Teeth are initially marked with articulating paper to evaluate existing contacts, forces, and esthetics.
2. Tooth isolation is established; a rubber dam is preferred.
3. Initial debris, stain, and marking ink are cleaned with air abrasion (sodium bicarbonate, aluminum oxide, or pumice).7
4. The clinician may elect to pre-etch uncured enamel to create a preventive seal of grooves and an infinite edge margin to finish.
5. If interproximal tooth structure is being treated, pre-wedging begins the process of tooth separation, tissue, and rubber dam retraction.
6. Tooth preparation includes caries removal (with the aid of caries detection), chamfers for bulk of materials, and bevels (for esthetics and completely sealed margins).
7. Cleaning and disinfection of the preparation is done with flour of pumice and chlorhexidine gluconate, then full-strength sodium hypochlorite for 60 seconds.
8. A matrix system is placed as needed for anterior or posterior situations. The matrix is sealed with a wedging system.

ANTERIOR CASE (1.) At the hygiene visit, a proximal gingival carious lesion was detected on a maxillary lateral incisor (2.) The enamel was beveled 2 mm to 3 mm surrounding the preparation (colored blue for illustration purposes). (3.) A clear anterior matrix was placed (4.) Clearfil Majesty Esthetic Resin was used in a compule form, shade BL2.
with phosphoric acid within the confines of a dead soft metal strip. Caries removal was aided with high magnification and a caries detector. The enamel was beveled 2 mm to 3 mm surrounding the preparation (in Figure 2, the bevel is colored blue for illustration purposes). A clear anterior matrix (Bioclear, www.bioclearmatrix.com) was placed (Figure 3). The bonding procedure occurred according to the technique, making sure not to cure the unfilled resin on the preparation margins. Majesty Flowable Resin (shade B1) was placed in the matrix but not cured. Majesty Esthetic Resin (shade BL2) was selected to be used in a composite form (Figure 4). The paste resin was injected into the uncured flowable resin, displacing it to the periphery of the margins (Figure 5). Curing occurred through the matrix. Very little finishing and polishing was needed (Figure 6). The final restoration was completed in less than 20 minutes (Figure 7).

Conclusion
The current economy challenges us as private practice clinicians to deliver efficient, affordable, yet profitable restorative dentistry. Fortunately, the concepts of MDR allow us to deliver restorative care in a productive manner with reliable long-term clinical outcomes. Tooth preservation is the goal of MDR and is achieved with protocols that reinforce the restoration cohesively into the tooth. This article illustrated MDR concepts using restorative resins and adhesive bonding. Future articles will demonstrate our protocol in other clinical procedures.

References