



Using Margin Elevation With Bonded Ceramics: A Case Report

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ABSTRACT

Thirty years ago, glass ionomer was first used as a means of bonding resin matrix composite to dentin. Today this method is used to elevate the margin of a preparation to a level which gives the clinician more access to the operating field. This technique has been described in the dental literature with resin composites bonded with resin adhesives. There are still inherent problems with this approach. Since resin adhesives are subject to hydrolysis, marginal leakage, and recurrent caries. Studies have demonstrated the ability of glass ionomer to chemically bond to dentin. Resin composite can predictably bond to etched glass ionomer, eliminating the problem of hybrid layer hydrolysis which occurs with resin bonding agents. Margin elevation takes advantage of the favorable properties of glass ionomer cements (adhesion through chemical bond to dentin, fluoride release, biocompatibility, coefficient of thermal expansion similar to tooth structure, and decreased interfacial bacteria penetration/caries activity) while allowing overlaying of a suitable direct or indirect restorative material. This technique should be utilized when a preparation stands an increased risk of contamination or has a gingival margin on dentin/cementum. This case describes restoration of a tooth with a deep subgingival margin located on cervical dentin. The tooth was prepared for a ceramic onlay. Resin-modified glass ionomer was then inserted into the mesial proximal box and re-prepared with the occlusal wall of the glass ionomer becoming the new gingival margin, allowing significantly increased access and isolation. The tooth was then restored with an e.max onlay and cemented with RelyX Unicem. The restoration has been examined at a 6-month recall. With proper case selection and attention to detail, glass ionomer margin elevation is an excellent technique for improving the predictability of restorative procedures.



Photo 1



Photo 2



Photo 3



Photo 4

MATERIALS AND METHODS

The patient presented to the IUSD Graduate Operative clinic with the chief complaint "I have a chipped back tooth that has been that way for a few months." After performing pulpal sensitivity tests the pulp was determined to be vital. Clinical and radiographic findings revealed a defective MO resin composite restoration on #31 (Photos 1,2) with recurrent decay and a fractured mesiolingual cusp. After removing the defective restoration and all caries, the mesioingival margin was 2-3mm subgingival and located on cervical dentin (Photo 3). After placement of a well-adapted matrix band the preparation was conditioned with polyacrylic acid (GC Cavity Conditioner, GC America) for 10 seconds, rinsed, and blotted dry with a cotton pellet. Resin Modified Glass Ionomer (Fuji II LC, GC America) was inserted into the preparation and light cured for 20s with a Quartz-Tungsten-Halogen curing light. The RMGI was cut back to the height of the gingival margin and the preparation refined (Photo 4). Following margin elevation with RMGI a polyvinylsiloxane impression was made with light and heavy body material (Aquasil Ultra XLV, Aquasil Ultra Rigid Tray Material, Dentsply Caulk). The tooth was provisionally splinted to #30 which was prepared to receive a PFM crown. A rubber dam was placed to isolate the tooth (Photo 4) #31 was cleaned with a prophyl brush and pumice mixed with .12% Chlorhexidine (Periogard, Colgate). The e.max onlay was tried in and then cemented with self-adhesive resin luting cement (RelyX Unicem, 3M ESPE). Excess cement was removed and proper occlusion verified with shimstock. The restoration was finished and polished (Photo 5) with intraoral polishers (Dialite, Brassler).

DISCUSSION

The bonding capability of RMGI to dentin has been well substantiated in the literature for decades. Although margin elevation has been described in the scientific literature frequently with flowable or packable resin composites, the problems associated with resin composite are still present, notably the hydrolysis of the so-called hybrid layer created by penetration of resin into exposed collagen fibrils. RMGI does not appear to be as susceptible to hydrolysis and forms a chemical bond to dentin while resin dentin bonding agents depend solely on micromechanical retention. There is some controversy surrounding the use of the margin elevation technique in conjunction with indirect restorations due to the fact that glass ionomers wear more over time than the overlaying restorative material. For this reason RMGI is preferred over conventional glass ionomer cements as they have shown superior longevity in a long-term clinical trial. Unfortunately the patient pictured in this case is no longer a patient of the dental school and only 6 month recall photos are available (Photo 6)



Photo 5



Photo 6

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