Demineralization Inhibition at Restoration Margins of 3M Filtek One Material

Jonathan Ames, DDS; Keaton Shin, DDS; Kevin Donly, DDS, MS.
The University of Texas Health Science Center at San Antonio, San Antonio, TX 78229

PURPOSE

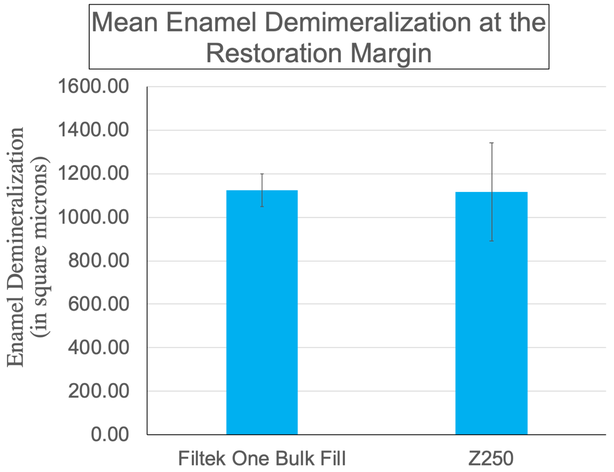
To determine the effect of ytterbium trifluoride, an opaquing agent in Filtek One Bulk Fill (3M ESPE) restorative material, on demineralization inhibition potential.

MATERIALS and METHODS

Twenty extracted permanent molars and premolars had Class V preparations placed on the buccal surface with the preparation margins in enamel. All tooth surfaces had an acid-resistant varnish placed to within one millimeter of the preparation margins. Ten teeth had a Filtek One Bulk Fill restoration placed, while the other ten had a resin control placed (Z250 3M ESPE). Each group of ten prepared restorations was placed in an agitated artificial caries solution (pH 4.5) for four days[1]. The teeth were then held in deionized water for two weeks before sectioning. Teeth were sectioned through the tooth and the restoration to obtain 100 µm sections. These sections were photographed using polarized light microscopy in an imbibition media of water (refractive index of 1.33). The areas of the body of the lesions were measured using a computerized imaging system, and mean lesion body sizes were determined for each of the treatment groups. Means were compared using a Mann-Whitney Rank Sum Test.

RESULTS

The mean (±SD) of enamel demineralization (μm^2) 100µ adjacent to the dental restorative material were: Filtek One Bulk Fill (1123.50 ±76.03) and Z250 (1117.51 ±224.51). The Mann-Whitney Rank Sum Test demonstrated no statistically significant difference in enamel demineralization adjacent to Filtek One Bulk Fill restorations compared to Z250 restorations. (*P*=0.959).



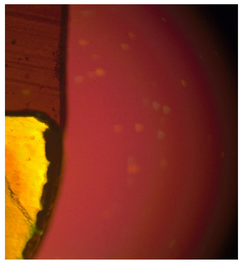


Figure 1: Polarized light photomicrograph of sound enamel (E) adjacent to a Filtek One Bulk Fill restoration (R).

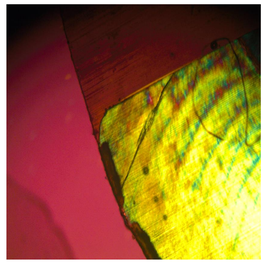


Figure 2: Polarized light photomicrograph of sound enamel (E) adjacent to a Z250 3M ESPE restoration (R).

DISCUSSION

When looking at the findings from this in vitro study, it is apparent that the concentration of ytterbium trifluoride in Filtek One Bulk Fill does not prevent enamel demineralization at the restoration margin. The restorative material containing ytterbium trifluoride (figure 1) performed clinically the same as the restorative material without ytterbium trifluoride (figure 2) with respect to the amount of demineralization along the restoration margins of Class V restorations.

REFERENCES

1. ten Cate JM, Duijsters PP: Alternative demineralization and remineralization of artificial enamel lesions. Caries Res 1982; 2:51-56.