

I. Objectives

The purpose of the study was: (1) to compare nanoleakage patterns of total etching system (Scotchbond Multi-Purpose) with self etching adhesive (Clearfil SE Bond and Prompt L-Pop) and (2) to investigate the effect of thermocycling on nanoleakage

II. Materials and Methods

Thirty freshly extracted human molars stored in 0.5% chloramines-T solution were used. Occlusal, buccal and lingual enamel was removed. The 30 teeth were divided randomly into the three dentin treatment groups (Scotchbond Multi Purpose, Clearfil SE Bond and Prompt L-Pop). The flat bonded surface was covered with a layer of less than 2mm thick of Z-250 hybrid resin composite. For each dentin-adhesive group was sub-divided randomly into two sub-groups for the thermocycling testing. The thermocycling was conducted at 5-55°C water for 30,000 cycles. The teeth were placed in a 50% (w/v) silver nitrate solution in total darkness for 24 hours and immersed in photo-developing solution for 8 hours. The sections were cut bucco-lingually across the bonded surface and two specimens per tooth were obtained, making a total of 10 specimens for each group. All the cut surfaces were polished with increasingly fine diamond pastes (6,3,1 μm). Examination was carried out in scanning electron microscope.

III. Results

1. All specimens in the six groups showed nanoleakage at the adhesive/dentin interface.
2. Scotchbond Multi-Purpose produced a very distinct hybrid layer, being approximately 15-20μm thick. Distinct resin tags were also observed. Accumulation of silver particles were noted at the base of the hybrid layer and in some parts loosely distributed patches of silver deposit appeared in the hybrid layer. Silver was also deposited around the resin tags and peri and lateral tubules.
3. In the case of Clearfil SE Bond, the hybrid layer was approximately 2-3μm thick. The resin tags were not clear. Silver particles were deposited along the lower half of the hybrid layer by thin line. At top of the hybrid layer, amorphous silver particles were also identified beneath the layer of composite resin.
4. Prompt L-Pop produced a thin hybrid layer of approximately 2-3μm. This system showed few resin tags. Silver also deposited along the base of the hybrid layer, with isolated deposits located throughout its whole thickness. Other regions exist where the distinct bands of silver deposits could be detected but in the base of hybrid layer, silver deposition was not distinct.
5. There was no difference in leakage patterns among thermocycled groups and controls. The silver distribution in the base of and within the hybrid layer was somewhat more intense.